

CHAPTER **12**  
*Land  
Conservation*

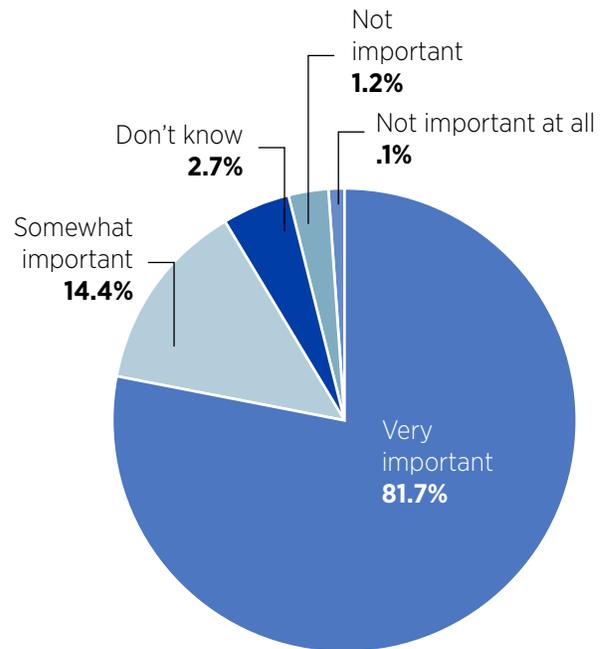
## Introduction

The conservation of Virginia's land and water resources is vital to the quality of life enjoyed by Virginians, and its importance is recognized by Article XI of the Constitution of Virginia. With population and associated development increasing at unprecedented rates, the conservation of these resources is essential to both the public well-being and the economic viability of the state. Land conservation is about more than just aesthetics; it is a strategy for improved water quality, safe drinking water supplies, resilience against sea-level-rise and other impacts of climate change, protection of our plant and animal communities, preservation of historic resources, maintaining viable working farm and forest lands, public health and wellbeing and maintenance of a thriving economy.

On April 24, 2018, Gov. Ralph Northam announced "I believe we need a land conservation strategy that is focused and targeted toward making measurable progress on our natural resource goals, from restoration of the Chesapeake Bay to providing resilience against sea-level-rise and other impacts of climate change." This new strategy will rely upon innovative tools that the Virginia Department of Conservation and Recreation developed in concert with partners across Virginia to identify the conservation value of lands across the Commonwealth based on a number of metrics. This scientific analysis will provide a roadmap for where the Commonwealth should focus its land conservation efforts, as well as which lands would produce multiple benefits if conserved.

At the same time, Gov. Northam also announced that he would seek to increase state funding for conservation programs and agencies to at least two percent of the general fund, from the current level of 0.6 percent. Land conservation advocates have long noted the need for a dedicated, stable source of funding that would make it possible to plan strategically for conservation projects. Without a reliable, dedicated source of funds, conservationists must depend on intermittent grant funding or opportunistically work with landowners who are able to use land conservation tax incentives. Although much good land conservation is done under those circumstances, it is not as strategically focused as it might be with regular funding.

**Figure 12.1 Importance of Protecting Natural Areas**



Source: 2017 Virginia Outdoors Demand Survey

Over the last century, much of Virginia's landscape character has been transformed by sprawling development or fragmented by gray infrastructure (buildings, roads and parking lots) to serve a growing population. Planning for conservation is vital for protecting many of Virginia's shared community assets, such as biodiversity, outdoor recreation, water quality, historic and cultural resources, scenic resources and working farm and forestlands. Useful tools for the protection of these assets will be described later in the chapter.

Conserved open-space lands provide benefits in terms of resilience to climate change, working (agricultural and forested) landscapes, scenic landscapes, recreation, natural areas and parks, cultural and historic resource protection, natural resource protection, water quality improvement and maintenance, and carbon sequestration, along with the substantial economic benefits associated with these functions.

## Conservation Planning

Conservation planning emphasizes the importance of connections between blocks of open space, between developed and undeveloped areas, and between society and the landscape. The use of a conservation planning model results in the protection of undeveloped land and waterways that provide essential benefits to society — clean air, clean water, food, fiber, open space for recreation and a sense of place. Conservation planning also seeks to identify and protect the integrity of large historic landscape areas that maintain the character and beauty of scenic vistas, along with significant blocks of productive farm and forestland that are essential to local and regional agricultural economies. Conservation planning is integral to long-term effective management of natural and cultural resources that support ecological health and quality of life for citizens of the Commonwealth.

Typically, communities carefully plan and fund “gray” infrastructure — roads, sewers, utilities and buildings — before development occurs. The same level of investment, public involvement and planning is needed for our green infrastructure, to steer development to suitable areas and encourage preservation of natural resources. Conservation planning identifies and prioritizes vital natural resources in concert with other community needs and alongside gray infrastructure before development occurs. This planning method guides land development and growth in ways that accommodate increased populations, but also plans for climate change resilience and protects natural resources providing long-term economic viability and community sustainability.

Conservation planning integrates outdoor recreation, open space, cultural resources and conservation lands into ongoing planning and land-use management decisions. Conservation planning supports cost-effective, sound economic development in harmony with land conservation, cultural resource protection and outdoor recreation. Conservation planning guides development to less sensitive and/or disaster-prone areas, which lowers the costs of development, protects water quality, reduces time needed for special permits and creates sustainable communities. Strategically linking undeveloped corridors and hubs of open-space land maximizes environmental, habitat and human benefits of development to meet the needs of growing populations.

The value of conservation planning lies in its comprehensive approach in providing direction for resource protection to all players in land-use issues. To be effective, the planning process must actively engage key players, groups and stakeholders in working together to reach a common goal. Achieving that goal will require a cooperative effort among federal, state and local public agencies, citizens, private conservation organizations, landowners and developers.

Conservation planning in Virginia incorporates a number of voluntary and regulatory resource-protection tools and strategies. These are available to local governments, private land-conservation

organizations, developers and individual landowners. Regulatory land-use tools may be delegated to localities by the state. Some mechanisms may be voluntarily negotiated with developers as a condition of development. Both governmental agencies and private organizations can utilize the growing number of voluntary mechanisms in negotiations with private landowners. More information about conservation tools, including information on state agencies and other organizations that are engaged in this work, is available at the [Virginia Department of Conservation and Recreation website](#).

## Importance of Land Conservation

Virginia is fortunate to have played an integral role in the founding history of our nation. Even with the unprecedented population growth of the last century, there are still places in the state where much of the landscape remains as it was when it was inhabited by American Indians and in the 16th century, when European settlement began. Virginia’s diverse habitats stretch from the mud flats and salt marshes of the Eastern Shore along the Atlantic Ocean to the forested mountains and agricultural valleys of the Blue Ridge and Appalachian mountains. As Virginia continues to grow and develop its lands, however, its long-treasured landscape character is being lost to sprawling development, fragmented by gray infrastructure and severely impacted by our changing climate.

Preservation of large expanses of landscape is essential to preserving the integrity of historic and scenic areas, and is necessary to provide the context and meaning of those resources. Historically important areas, especially, are best understood and appreciated when placed within the setting of the larger landscape that reveals and defines that history. The integrity of Virginia’s scenic vistas, which often possess a combination of natural and historic features, is susceptible to incremental degradation — ranging from isolated development to large linear infrastructure projects — that endangers the character of viewsheds. Land conservation is vital for protecting many of Virginia’s shared community assets, such as its rich biodiversity, outdoor recreation, water quality, historic and scenic resources, and working landscapes. Localities and stakeholders who wish to preserve essential landscape components will be well served by a comprehensive landscape-conservation strategy.

## Principles of Conservation Planning

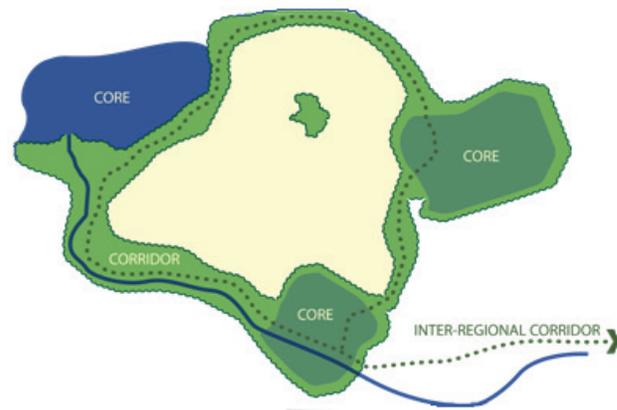
Conservation planning ideally produces a network of ecologically significant blocks of landscape, called cores or hubs, which are connected by linear bands of green space, called corridors. These landscape components vary in size, function and ownership. Cores may be comprised of public parks, natural areas, historic battlefields, working forests, farms and rural historic districts, while corridors may be scenic rivers, stream buffers, hiking trails and even scenic byways. Each component contributes to the economy, the physical and mental health of citizens and the long-term viability of natural resources and communities.

Large landscape cores are important for a number of reasons, including the following:

- Ecosystems function best on a large scale. The various natural communities and the many species that comprise them are highly interdependent. Take away a few species and many more may be lost.
- Many species require large blocks of interior habitat in order to prosper. Human development such as roads, housing, power and pipe lines and other utility connections fragment those interior habitats.
- Large blocks of diverse forest species provide the greatest resilience to climate change. Fragmentation of habitats creates opportunities for the introduction and spread of invasive species.
- Many ecological functions, such as cleaning the air and water of pollution, require large expanses of forest and wetlands.
- Businesses that rely directly on the land — primarily agriculture, forestry and tourism — are affected by economies of scale. Small, scattered farms and wood lots usually cannot support viable agricultural and forestal economies, nor are they as attractive to tourists.
- Large landscape preservation is essential to preserving the integrity of historic and scenic areas, essential to providing the context, meaning and appreciation of such resources.

Corridors connecting the cores are also vitally important as avenues of travel for animals, plants, and, in some cases, humans. Some environmentally sensitive features, such as stream courses, can only be protected with corridors. Corridors are important potential pathways for species migration in response to climate change. Linear corridors often offer scenic and recreational benefits, particularly when they follow rivers, trails or even roads.

**Figure 12.2** Corridors and Cores



*Virginia Department of Conservation and Recreation.*

Both public and private lands make up these green infrastructure networks. Some of the land may be publicly accessible, while other land is not. It is important to understand that even though land may not offer public access, it will still provide tangible community benefits such as scenic vistas, historic landscapes, clean air, clean water, food, fiber and wildlife habitat.

### Biodiversity

Virginia is home to more than 32,000 native species of plants and animals. Each is part of Virginia's natural tapestry, has intrinsic value and plays a role in the complex web of life. The loss of one may lead to the loss of dozens more, and it is difficult to know which may be keystones to entire ecosystems. Some 40 percent of all modern pharmaceuticals are derived from plants and animals. Wild organisms are important genetic reservoirs for improving domestic crops and livestock.

Much biodiversity protection can be accomplished by protecting habitat. For some highly specialized terrestrial species, a significant proportion of their habitat may be secured by protecting relatively small areas of land. One such example is the Virginia endemic vine, Addison's Leatherflower, which has a strong affinity for an unusual soil type on south to west-facing slopes. Other species, such as many forest-interior nesting birds, require large blocks of unbroken habitat in order to prosper. Most species benefit from corridors between population nodes in order to interbreed and to reoccupy vacated territory. Other key pieces of Virginia's landscape are critical habitat for brief periods of time. The southern tip of the Delmarva Peninsula, for example, supports millions of migrating birds each fall as they rest and feed in preparation for their flight south across the mouth of the Chesapeake Bay. Other species live out their lives in the dark in one of Virginia's more than 4,000 caves.



*Addison's Leatherflower* | Hal Horwitz

Protecting habitat for aquatic species is a significant challenge because much relies on protecting watersheds encompassing large land areas. Carefully focused watershed protection efforts will help secure the future for many rare aquatic species concentrated in specific river systems, such as the Clinch River in southwest Virginia. Efforts to protect riparian zones on farms

and working forests, and to implement other best management practices, will also significantly improve conditions for aquatic species throughout the state.

### *Outdoor Recreation*

Most of the popular forms of outdoor recreation — hiking, water access, visiting natural areas and parks — are either dependent on resource lands and waters or are enhanced by their proximity to them. Land protection is essential for ensuring outdoor recreation opportunities for Virginia's growing population. If the citizens of the Commonwealth are not afforded opportunities to enjoy the outdoors and experience Virginia's diversity, the future of Virginia's outdoors will be jeopardized. Long-term support for land conservation and open-space protection is strongly tied to outdoor recreation experiences for children and adults. Both public and private lands are important for meeting the needs of outdoor recreation. Public recreation areas are increasingly in demand as large tracts of private land are subdivided and traditional local recreational uses are lost. Conserved private land is important, not only in providing much of the hunting opportunities east of the Blue Ridge, but also in maintaining scenic vistas and serving as buffer lands around major parks and natural areas.



*Crow's Nest Natural Area Preserve* | Gary P. Fleming/Virginia Department of Conservation and Recreation

## Sea-Level Rise and Climate Change Resilience

The effects of climate change have, and will continue to have, a significant influence on Virginia's natural landscapes and the important natural, historic, cultural, scenic and agricultural resources they support. Changes in weather patterns and seasonality, driven by temperature and precipitation changes, rising sea-level and intensifying storm surge are changing the landscape. These effects are not simply new stressors to species and habitats, but are considered "metastressors." That is, in addition to their direct effects on species and ecosystems, they intensify the effects of other factors that are relatively well understood (e.g., sporadic extreme weather, direct habitat loss and alteration due to physical landscape changes, competition between native and nonnative or invasive species). Therefore, climate change must be taken into account both for our understanding of its direct impact on species and habitat, as well as for how it affects our ongoing efforts to conserve and manage the more familiar challenges to Virginia's biodiversity, natural landscapes and the working farms and forests upon which we depend.

Unfortunately, this is not easy. There is uncertainty just in predicting future climate patterns and then in projecting global predictions onto specific regions, states and local scales. This uncertainty is further multiplied when trying to anticipate how specific populations of plant and animal species will respond to climate change stressors. These species may or may not be able to move in response to changing climate, or the landscape itself will vary based upon changing combinations of abiotic and biotic characteristics. And the success of a given species' ability to move or adapt to some extent, also depends upon other species, which may or may not respond successfully to change. A great deal of research and modeling seeks ways to reduce these uncertainties, so that more confident conservation decisions can be made in the face of climate change stressors. These decisions will involve strategies for increasing the resilience of certain species populations to anticipated local change or focusing conservation and land management actions where impacts are thought to be least or outcomes of species best. The following provides a general snapshot of Virginia's anticipated climate change in light of biodiversity and natural lands conservation.

### Temperature and Precipitation

In Virginia, increases in air and water temperature and changes in precipitation patterns, including more intense storm events, are expected to have varying impacts on plants and animal species (Kane et al. 2013). Average annual temperature is predicted to increase at least 4°F and as much as 11°F by the end of the century (Pyke et al. 2008). Precipitation is also predicted to increase by at least 10 percent (Pyke et al. 2008). While these averages may seem relatively small over decades and centuries, they are calculated from more unpredictable and extreme events such as heat waves, droughts, intense-storm events, and flooding (Kane 2013). These events, in addition to the relatively gradual changes in temperature and precipitation, can have destructive

impacts on plant and animal populations and habitats and thus the natural systems upon which our landscape values are built.

Species restricted to certain geographic areas or to habitat types that occur in vulnerable topographic positions have experienced more drastic impacts of temperature and precipitation changes. This is expected to continue. For example, high-elevation species, particularly those restricted to mountaintop microclimates and habitats following Pleistocene glacial retreat (i.e., glacial relict populations), would readily disappear with changes in their microclimates. For example, a rare plant or animal species persisting only in high-elevation rock outcrops or spruce-fir forests would have no accessible suitable habitat to escape to as temperature, precipitation and seasonality changed. Such species will be lost from Virginia as they are extirpated from these more vulnerable and isolated habitats.

Similarly, increasing water temperatures would have such an effect on cold-water fish species, such as brook trout (Kane et al. 2013). This species requires rivers and streams that do not regularly reach temperatures above 70°F. This temperature might be exceeded too often due to decreasing snow cover, warmer air temperature and more frequent, relatively intense storm events in Virginia. As a result, freshwater temperatures would rise in streams harboring brook trout, whose reproductive success may gradually decrease, and populations would dwindle over time, to eventual loss from Virginia.

As another example, shifts in temperature and rainfall will continue to impact native tree species to varying degrees and patterns. Some such as longleaf pine will benefit and the suitable habitat range for this valued timber species will increase. Oaks such as northern red oak, white oak and black oak are expected to occur at much reduced frequency by mid-century (Kane et al. 2013).

Predicting the finer-scale changes in patterns of temperature and precipitation, and how assemblages of plant and animal species (i.e., natural communities) might respond over longer time frames is more complex. It is generally accepted that the plant and animal species that make up an affected community will not respond in concert, but that differing species' tolerances and responses to different climate change stressors will result in a reshuffling of communities: some species will move out, some will move in, and those unable to move will no longer persist there. Based upon patterns of change in assemblages of plant species to date, climate effects may be expected to be more drastic at higher elevations than in lowland areas, due to different lag times between the point at which change occurs and that at which a species population responds. For example, species in high-elevation habitats tend to have less tolerance to change because they inhabit areas relatively more exposed to the elements (Bertrand et al. 2011). Conversely, lowland areas inherently have more physical space, and thus more options for species to move their location in response to changing habitat availability and quality (Bertrand et al. 2011). A great deal of research and modeling is under way to elucidate how this

reshuffling may occur and how conservation and management might help ensure a landscape in which species and habitats are more likely to be resilient.

### Sea-Level Rise and Storm Surge

Sea level in the Chesapeake Bay region rose an average of 1.8 millimeters per year between 1900 and 2000, and displayed an increase in rate with a 3.5 millimeters per year rise between 1950 and 2000 (Pyke et al, 2008). Based upon an assessment of global climate models, the National Oceanic and Atmospheric Administration's Climate Program Office projects a global mean sea-level-rise of 0.2 meters (8 inches) to 2 meters (6.6 feet) by 2100 (Parris et al. 2012). This projection is based on estimates of ocean warming (i.e., expansion of warming water) and the melting of glacial ice sheets. But in coastal Virginia these causes of sea-level rise are compounded by continental subsidence (i.e., the sinking of the land mass due to glacial retreat) (Zervas 2009). In coastal areas of the mid-Atlantic region, this includes the Hampton Roads region, where it is estimated that sea-level rise will be as much as three times the global average (Sallenger et al. 2012).

To translate such predictions into practical information for use by policymakers and planners, scientists at the Virginia Institute of Marine Science conducted a recurrent flooding study (VIMS 2013) for coastal Virginia. This study, seeking to frame a nearer-term scenario for planning and action in coastal areas, is based on the expectation that in the next 20 to 50 years sea-level for Virginia will be 1.5 feet higher than it is at present. Sea-level rise will cause inundation of some coastal ecosystems, while others may migrate inland if natural corridors and processes exist to allow migration of natural communities. Tidal ecosystems will be increasingly altered by man-made infrastructure such as dikes to hold back rising waters and protect infrastructure. At varying rates, the upper limits of plant species ranges are shifting to higher altitudes and latitudes. Whole vegetation communities will not pick up and move in response to climate change. Instead, their component species will respond differently to changes in natural processes and will dissociate as conditions change. Climate change also will exacerbate threats already faced by Virginia ecosystems, such as invasive species, pathogens and pollution.

### Water Quality

The condition of the land has a direct and highly significant impact on water quality. A naturally vegetated landscape provides the greatest benefits to water quality. Undeveloped lands, especially forests, filter both surface water and groundwater. Developed lands usually become predominantly impervious surfaces, such as sidewalks, buildings, parking lots and roads that don't allow water to filter directly into the ground. Water that cannot soak into the ground runs over the hard surface and eventually ends up in a waterway, often picking up sediment as it flows.

The amount of impervious surface in a watershed directly affects the amount of runoff, altering natural drainage patterns, eroding stream banks, increasing flooding and harming sensitive aquatic life with sediment and other pollutants. Not only does impervious surface accelerate stream erosion and degrade surface water quality, but it also greatly reduces recharge of groundwater supplies. [The Center for Watershed Protection](#) reports that streams in watersheds with as little as 10 percent impervious cover have significantly reduced water quality and the more impervious cover there is, the more impaired the streams.



Riparian buffer | Virginia Department of Forestry

Protecting large tracts of land as open space through watershed planning and land conservation sustains and improves water quality. By and large, Virginians take for granted the water quality benefits provided by privately held forestland — land that is rapidly being converted to other uses. Several other states, such as Florida and New York, have recognized the importance of protecting significant portions of watersheds, primarily as a means of ensuring adequate drinking water supplies. Investing in green-infrastructure lands can often be more cost effective than conventional public works projects and can protect existing infrastructure investments. Virginia's conservation-lands strategy should also include the protection of significant watershed areas.

### Historic and Cultural Resources

Preservation of historic resources is linked with land conservation and open-space protection. As development spreads, it becomes even more important to protect cultural resources, which provide insight into the social, cultural and economic development of Virginia and give citizens a tangible link to the past. These resources include historic houses, commercial buildings, factories, mills, churches, battlefields, archaeological sites and cultural landscapes. It is sound environmental policy to protect these resources, which preserve important examples of the past needed to inspire and inform future generations.

Historic resources are also important to Virginia's economy. Attractive financial incentives spur private investment in historic structures, resulting in the rehabilitation and revitalization of neighborhoods and cities. At the same time, heritage tourism draws thousands of people to Virginia's towns and cities each year. The 2017 VODS reports that visiting historic areas is the fifth most needed outdoor recreation activity. Thus, protecting Virginia's historic and cultural resources in their landscape settings is essential to maintaining the quality of life in the state.

Historic land protection can take a number of forms. One commonly recognized form is the protection of actual historic sites, such as battlefields, settlements, plantations and historic homes, many of which have retained their original characteristics. Other sites of historic value may be obscured, but not obliterated, by changes in the landscape. Archeological sites often fall into this category and need to be protected from further damage. Many natural landscapes across Virginia are of invaluable cultural significance to the American Indians who called Virginia home long before Europeans arrived.



*This a recreation of a Monacan village at Natural Bridge | Virginia Department of Conservation and Recreation*

There is also historic value in preserving representative portions of Virginia's landscape. Cotton fields, pine savannahs, expansive mountain forests and long stretches of wild rivers are all part of Virginia's history. Preserving them is important for helping people reconstruct and visualize the past. For example, a small patch of an ancient swamp forest, protected by The Nature Conservancy, yielded important data from cypress tree growth rings. This data helped historians understand drought conditions during the settlement of Jamestown. Virginia's history will continue to be discovered as additional landscapes are protected.

### *Protecting Virginia's Open Spaces Supports its Tourism Industry*

Tourism has an annual economic impact of \$24 billion and sustains 230,000 jobs in Virginia. In 2016, tourism provided \$1.7 billion in state and local taxes. Conserving the lands that represent the character of the Old Dominion preserves the landmarks, battlefield sites, public parks, mountain vistas and beaches that tourists travel from all over the world to visit.

Outdoor recreationists spend more than \$8 billion within the state annually, making recreation a highly significant factor in attracting travelers to the Commonwealth, according to a 2011 study by Aaron Paul of the Yale School of Forestry and Environmental Studies. Most of the popular forms of outdoor recreation for tourism are either dependent on resource lands and waters or enhanced by their proximity to them. Land protection is essential for ensuring outdoor recreation opportunities for visitors and for Virginia's growing population, and to afford opportunities to enjoy the outdoors and experience Virginia's diverse landscapes and landmarks. Long-term support for land conservation and open-space protection is strongly tied to outdoor recreation experiences for children and adults.

Both public and private lands are important for meeting the needs of outdoor recreation. Public recreation areas are increasingly in demand as urban and suburban residents seek respite through enjoyment of open spaces.



Route 250, Highland County | Robert Coles/Scenic Virginia

## Scenic Resources

The tapestry of Virginia's landscape ranges from mountain overlooks, to hardwood forests, to the coastal plain. Virginia's scenery, particularly in rural and agrarian settings, is an important part of what draws people to the Commonwealth. Protecting these scenic landscapes and resources is another reason for land conservation. Scenic areas need to be targeted as special priorities for protection.

Land conservation can maintain a region's sense of place and the local character of communities. Preserving a clear boundary between cities or towns and countryside safeguards the rural character of Virginia.

Land conservation can serve to protect open space on the edge of urban areas while encouraging more compact, walkable communities. In an urban context, land conservation can serve to maintain community identity and character by encouraging infill development on vacant, underused or overlooked land, including brownfields. For more information on scenic resources, see Chapter 10.

## Working Landscapes

Together, agriculture and forestry are Virginia's largest industries. The economic impact of agriculture and forestry-related industries in Virginia was over \$91 billion in total industry output in 2015, the base year used for this study. The industries also provide approximately 442,260 jobs in the Commonwealth, representing 8.7 percent of total state employment, according to the Weldon Cooper Center for Public Service at the University of Virginia. The total value-added impact was \$45.5 billion, which made up 9.5 percent of state gross domestic product.

As a result of a combination of factors including population growth, development patterns and an aging farming population, Virginia's agricultural land shrunk by 882,000 acres from 1982 to 2007. Real estate cycles affect the rate of farmland lost to development, but the overall trend clearly reflects a declining number of agricultural acres.

With more than 16 million acres of forested land, Virginia is 62 percent forested. According to the Virginia Department of Forestry, since 1977 an average of more than 16,000 forested acres has been converted to non-forest uses annually, a trend that is projected to continue. The rate of forest loss has decreased in recent years in response to the decline in the economy and the related diminished pressures of land development, according to the Virginia Department of Forestry's 2016 "State of the Forest" report.

A bright spot for both agriculture and tourism is Virginia's growing wine industry. Virginia's wine industry contributes more than \$1.37 billion annually to the state's economy, an increase of 82 percent since 2010. In 2017, Virginia ranked fifth in the number of wineries in the nation with more than 287. In 2016, Virginia had 3,173 acres of wine grapes, making it the nation's fifth-largest producer of wine grapes. Visits to wineries helped bring in more than \$750 million for the state's economy.

Nonetheless, numerous economic factors are causing many traditional farms and forestlands to be developed. Depressed commodity prices due to competition from other countries, land costs (and by extension property taxes), dwindling interest in the upcoming generation to pursue demanding careers on the land and the farm-as-pension-fund approach to retirement all lead to many farms and forests being sold for development. Eventually, as forests become smaller and farms more widely separated, the land-based economy slows. As supporting businesses disappear, more working lands grow idle or are converted to other uses. Therefore, an important part of supporting our land-based economy is to preserve the most productive lands and areas with supporting infrastructure. Protecting the Commonwealth's working lands ensures that the necessary land base for these important industries will be preserved for future use.

### *Economic Benefits of Land Conservation*

A vibrant economy ensures the financial resources to maintain healthy ecological systems and environmental quality. Preserving land and natural resources is critical to a community's economic vitality. Natural open space and trails are prime attractions for potential homebuyers, increasing property values and thereby local tax revenues. More than 77 percent of potential homebuyers rated natural open space as "essential" or "very important," and walking and bicycling trails are among the list of attributes most desired by homebuyers. Open space, outdoor recreation and a clean, visually attractive environment draw and retain businesses and improve quality of life.



Jefferson Park, Richmond | John Murden

Studies demonstrate that open spaces can boost the value of neighboring commercial properties. Businesses seeking an area in which to locate report that quality of life is a major factor in their decision-making, and cultural and recreational open spaces are important components in creating that quality of life (Trust for Public Land, 2009). Recognizing this concept, many local governments strongly support land conservation, understanding that protected, undeveloped land generates more direct tax revenue than the services it requires. The direct effect of conservation land on major industries such as agriculture and forestry in Virginia is important to long-term economic stability of the Commonwealth.

### *Costs of Not Conserving Open-Space Land*

A number of localities have calculated the fiscal impact associated with different types of land use and found that increased growth brings new area residents who require services — roads, sewage and water-supply infrastructure, fire and police services, schools, libraries, etc. — that increase local government costs at a level greater than the additional local revenue they contribute. "While it is true that an acre of land with a new house generates more total revenue than an acre of hay or corn, this tells us little about a community's bottom line" (American Farmland Trust, 2010). Increased population density in a locality eventually requires increasingly complex public services that increase per-capita costs.

Since the cost to a locality to provide services to undeveloped land is relatively low, a net positive tax cash flow is achieved. Conversely, the costs to provide schools for the children in housing developments, plus other municipal costs, may be much greater than the tax and non-tax revenue that residential lands provide.

A 2012 study in Albemarle County found that, for every dollar of local revenue generated, the public costs for residential and institutional (hospitals, libraries, churches) development ranged from \$1.29 to \$1.59, a negative ratio. Commercial and industrial uses have a positive ratio, around \$0.50 in costs for every dollar of revenue generated, and farmland generates even greater surplus revenue at \$0.20 in costs for every dollar of revenue generated. However, the revenue-cost ratios associated with residential properties create a net deficit for Albemarle County, and for most other localities.

The primary objective of this report is to provide decision makers at the State of Virginia, Accomack County, and Northampton County with a high-level analysis of the fiscal and economic impacts of conserved land on the Eastern Shore of Virginia. The findings shown in this report are based on existing land-use and fiscal conditions in each county as of fiscal year end 2016. The results of this analysis provide a fiscal baseline against which any future development policy, strategy, plan, or project approval can be tested. The full report can be found at: <http://www.dcr.virginia.gov/land-conservation/document/lc-es-econ-imp-2014.pdf>

## Tools for Conservation Planning

### Virginia ConservationVision

The Virginia Department of Conservation and Recreation's Division of Natural Heritage, working with partners across the Commonwealth, has been developing ConservationVision to identify and prioritize natural-resource conservation targets across the state. Virginia ConservationVision has broad applications for conservation planning and is available to local and regional agencies and conservation organizations. It is a flexible, widely applicable tool for integrating and coordinating the needs and strategies of different conservation interests, using Geographic Information Systems to model and map land-conservation priorities and actions in Virginia. ConservationVision uses GIS to map significant natural features. By choosing specific models and data sets, analysts can use ConservationVision to highlight areas that are important for conservation.

This computerized system allows for analysis and identification of location and data on:

- Large, unfragmented natural habitats
- Concentrations of natural heritage resources
- Key outdoor recreation areas
- Prime agricultural lands
- Significant cultural and historic resources
- Important areas for sustainable forestry
- Critical areas for drinking water protection and water quality improvement
- Scenic resources

ConservationVision can be used to identify conservation lands that would be most economically beneficial to communities.

### Coastal GEMS

Virginia Coastal Zone Management Program's [Coastal Geospatial and Educational Mapping System](#) (Coastal GEMS) is designed to present spatial (maps) and nonspatial (textual information, fact sheets and links) information focused on the "best remaining" land-based and aquatic resources within Virginia's jurisdictional coastal zone. The first version of this application was released in 2006. It is continually updated and improved through advisory workgroups, training sessions and ongoing interactions with stakeholders. Coastal GEMS provides a growing inventory of water- and land-based natural resources, conservation planning tools and planning examples that can help to protect Virginia's coastal ecosystems and promote community involvement and environmental education.

### Resilient and Connected Landscapes

The Nature Conservancy's Resilient and Connected Landscapes project is the first study to comprehensively map resilient lands and significant climate corridors across Eastern North America.

<http://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/terrestrial/resilience/Pages/default.aspx>

### Virginia Wildlife Action Plan

The Virginia Wildlife Action Plan is a 10-year strategic plan, developed by the Virginia Department of Game and Inland Fisheries, that provides a common vision for the conservation of the Commonwealth's wildlife and the habitats in which they live. Virginia's plan identifies 925 species of greatest conservation need, representing a broad array of wildlife, and it focuses on the habitats that support these species, such as caves, high-elevation forests, coastal marshes, barrier islands, grasslands, small headwater streams, vernal pools and many others. The Wildlife Action Plan provides a common vision for wildlife conservation across the Commonwealth, identifying the important steps that we must all take to keep common species common and to prevent further decline, or possible extinction, of imperiled species. The plan can be found at <http://bewildvirginia.org/wildlifeplan>.

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