NATURAL RESOURCES AND ENVIRONMENT

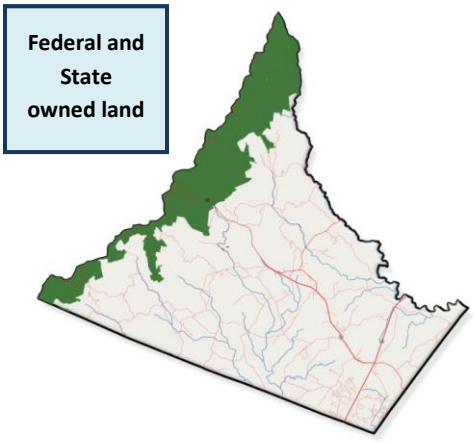
INTRODUCTION

Greene County is blessed with many unique and valuable natural resources. Preserving these features for the use and enjoyment of future generations has long been a value shared by residents of Greene County. It is important to see these lands and waterways not only as wildlife habitat and functioning ecosystems, but also as integral to human life and economic activity. In many ways, from provision of recreation opportunities to a basis for tourism, their health represents the health of the entire county.

The county is situated in two river basins, the Rapidan and the Rivanna, both of which flow into the Chesapeake Bay. Maintaining clean water not only protects the drinking water source for residents, but helps to preserve fish habitat and the natural course of the waterways both within the county and for communities downstream.

There are a number of policies and strategies that have been and can be employed to meet the goals of preserving a healthy environment. While stopping all development and human use is not desirable, there are ways to ensure that lands can be effectively utilized and preserved for the benefit of future generations at the same time.

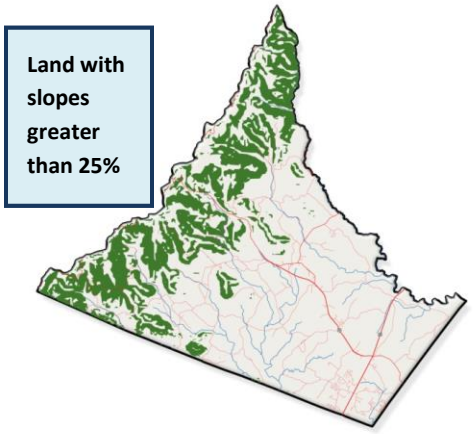
EXISTING CONDITIONS



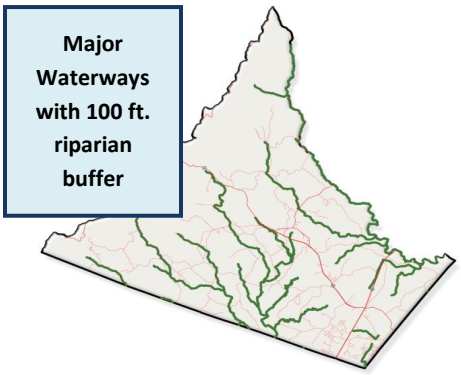
Portions of Greene County, particularly the Shenandoah National Park and various smaller state-owned lands, are managed in order to preserve their natural condition while allowing the public to enjoy use of the land. The national park comprises a total of 197,438 acres, 79,579 of which are designated as wilderness. 95% of the park is forested, hosting over 1300 distinct species of plants. Within the park are also 50 species of mammals, 32 species of fish, 27 species of reptiles, 24 species of amphibians, and over 200 species of birds. There are over 60 peaks with an elevation above 3000 feet and over 90 mountain streams originating in the park. The Rapidan Wildlife Management Area, made up of 1,169 acres near the border with Madison County, is the primary state-owned preserve with many of the same ecological characteristics of the national park.

The western portion of Greene County is predominantly mountainous, containing a significant portion of the county's animal habitat, as well as the source of many waterways. The mountains also create the visual backdrop that gives Greene County its unique aesthetic character. One objective measure that often identifies such a landscape is "critical slopes," defined as land with a slope greater than 25% (as defined by Virginia Department of Environmental Quality.) This land is especially susceptible to erosion and landslides, as well as the loss of vegetation if disturbed.

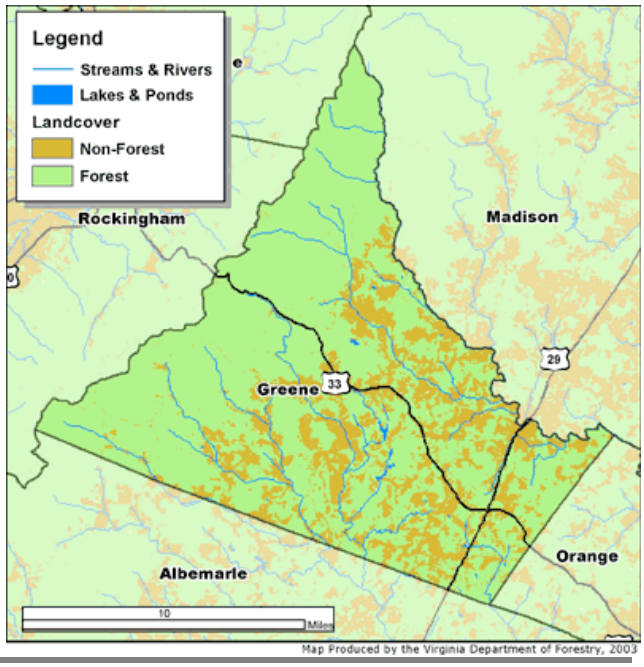
Greene County has a number of important waterways running through it. Waterways in Greene County flow into two watersheds. The northern portion of the county is in the Rappahannock watershed and the lower portion of the county is in the James watershed. Both are within the major watershed of the Chesapeake Bay.



The Rapidan River creates the northern-eastern border of Greene County with Madison County, and is a drinking water source for Greene County residents. The river begins in the Blue Ridge Mountains and flows into the Rappahannock River west of Fredericksburg. In 2001 the river was nominated by the EPA as a "Tier III Exceptional Waterway," but the Virginia Department of Environmental Quality rejected the application. The Conway River and the South River are two other important waterways completely contained within Greene County that flow into the Rapidan River. Swift Run, Blue Run, and Roach River flow through the southern portion of the county into the North Fork of the Rivanna River.



The federal Environmental Protection Agency requires states to monitor waterways in accordance with the Clean Water Act. Polluted waters not only disrupt animal habitat and plant life but can create health risks for recreational activity and drinking water supply contamination. Waterways in Greene County scored relatively well with 2014 Virginia DEQ Water Quality Assessments. Two streams, Rippin Run and Preddy Creek were considered impaired enough to require development of a federal Total Maximum Daily Load, which sets the level of pollutants a waterway can have and still meet EPA standards. The Rivanna Conservation Alliance, through the ongoing StreamWatch program, monitors the health of waterways in Greene County and helps prioritize mitigation efforts.



Greene County is estimated to have 63.6% forest cover, which is 1.6% above the forest cover percentage for Virginia. 98% of Greene County's forest cover is hardwoods, most commonly Oak-hickory, and 2% natural pine. Direct ecosystem services of forests include water filtering, soil conservation, plant and animal habitat, and sequestering greenhouse gases.

All land and waters, from wilderness areas to residential backyards, function as wildlife habitat. The Virginia Department of Game and Inland Fisheries has listed 393 animal species as either documented or likely to be within Greene County. The list includes 25 species listed as endangered, threatened, or of very special concern. The Virginia Wildlife Action Plan identifies two distinct "eco-regions" for Greene County, the Blue Ridge Mountains and Southern Appalachian Piedmont. Because of soil type, climate, and landcover differences these two areas types host different ecosystems.

AVAILABLE PRESERVATION TOOL

The following tools are in addition to those presented in the land use chapter of the Comprehensive Plan. See the Land Use chapter for a description of conservation easements, land use assessment policy, Agriculture and Forestal Districts, clustering development, and conservation subdivisions.

CULPEPER SOIL AND WATER CONSERVATION DISTRICT (CSWCD)

The CSWCD develops a wide range of programs to encourage community participation in conserving and protecting soil, water and related natural resources, with particular focus on the impact of land disturbance and management of the Chesapeake Bay. District programs are funded by local, state and federal agencies with technical support from the USDA Natural Resources Conservation Service (NRCS). They support many programs for working lands conservation; grazing land management; forage management, which all benefit both producer and soil and water quality. Over 90 miles of streambank in pastureland have been protected in Greene through their programs since 2010; and as of today there are another 12.5 miles approved for funding and waiting for funds; all include grazing lands management.

CSWCD also facilitates a successful urban/residential cost share program designated as The Virginia Conservation Assistance Program (VCAP), which include ten best management practices.

In addition to supporting producers and homeowners, significant CSWCD resources are provided to teachers in Greene County for classroom presentations, outdoor field days called Meaningful Watershed Educations Experience, and teacher continuing education certification programs.

Website: http://www.culpeperswcd.org/

DARK SKY PROTECTION

In 2007, the Zoning Ordinance was amended to include a lighting ordinance to cut down on light pollution, reduce the effects of unnatural lighting on the environment, and encourage energy-efficiency. The ordinance allows for nighttime lighting for safety and utility, while minimizing its intensity and glare

from misdirected or unnecessary light sources. The primary benefit of dark skies is to allow people to see stars in a natural setting that may add value for tourism, quality of life, and amateur astronomy.

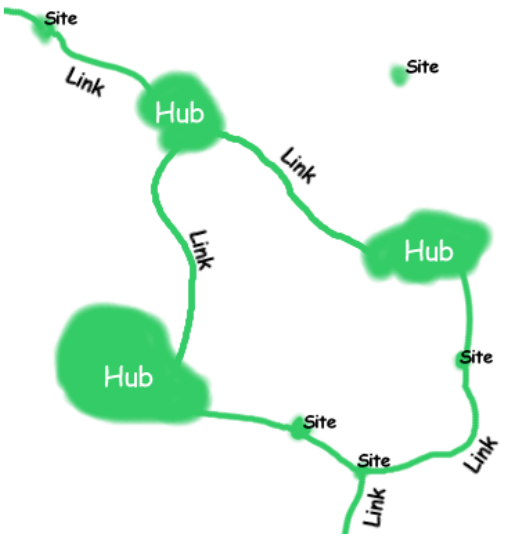
EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT

Stormwater runoff has been recognized as an environmental concern for many reasons. Rushing waters tend to scour stream channels, which were evolved to hold only a certain capacity, and the excess sediment is eroded away and deposited further downstream. Additionally, water runoff can carry ground pollutants such as motor fuels and lawn fertilizers into the waterways. Under natural conditions, significant portions of rain water will be dissipated from evaporation into the air or infiltration into the soil, but surfaces such as roadways, parking lots, and rooftops promote greater overland flow directly to stream channels. These hard surfaces, also known as impervious surfaces, are often characteristic of increased development.

On May 13, 2014, Pursuant to Code § 62.1-44.15:27, of the State of Virginia, an ordinance was adopted by the County of Greene Board of Supervisors, as part of an initiative to integrate the County of Greene stormwater management requirements with the County of Greene erosion and sediment control requirements into a unified stormwater program. The program regulates any land-disturbing activity, such as grading, excavation, and construction.

GREEN INFRASTRUCTURE

Green infrastructure is a purposeful creation and preservation of a network of green space throughout the whole region. It is often depicted as a connected network of hubs and links. To achieve this vision, a county can use a composite of conservation tools or incentives. The challenge of green infrastructure is to navigate between the extremes of environmental preservation by strategically choosing which lands will remain open and ensuring that proper links are made between these spaces. Instead of reacting to the pressures of development in a haphazard manner, the placement of a community's green infrastructure ought to be deliberate, science-based, and firmly within the public interest. This requires as much foresight as we put into the roads and other infrastructure needed to build the places we live in.

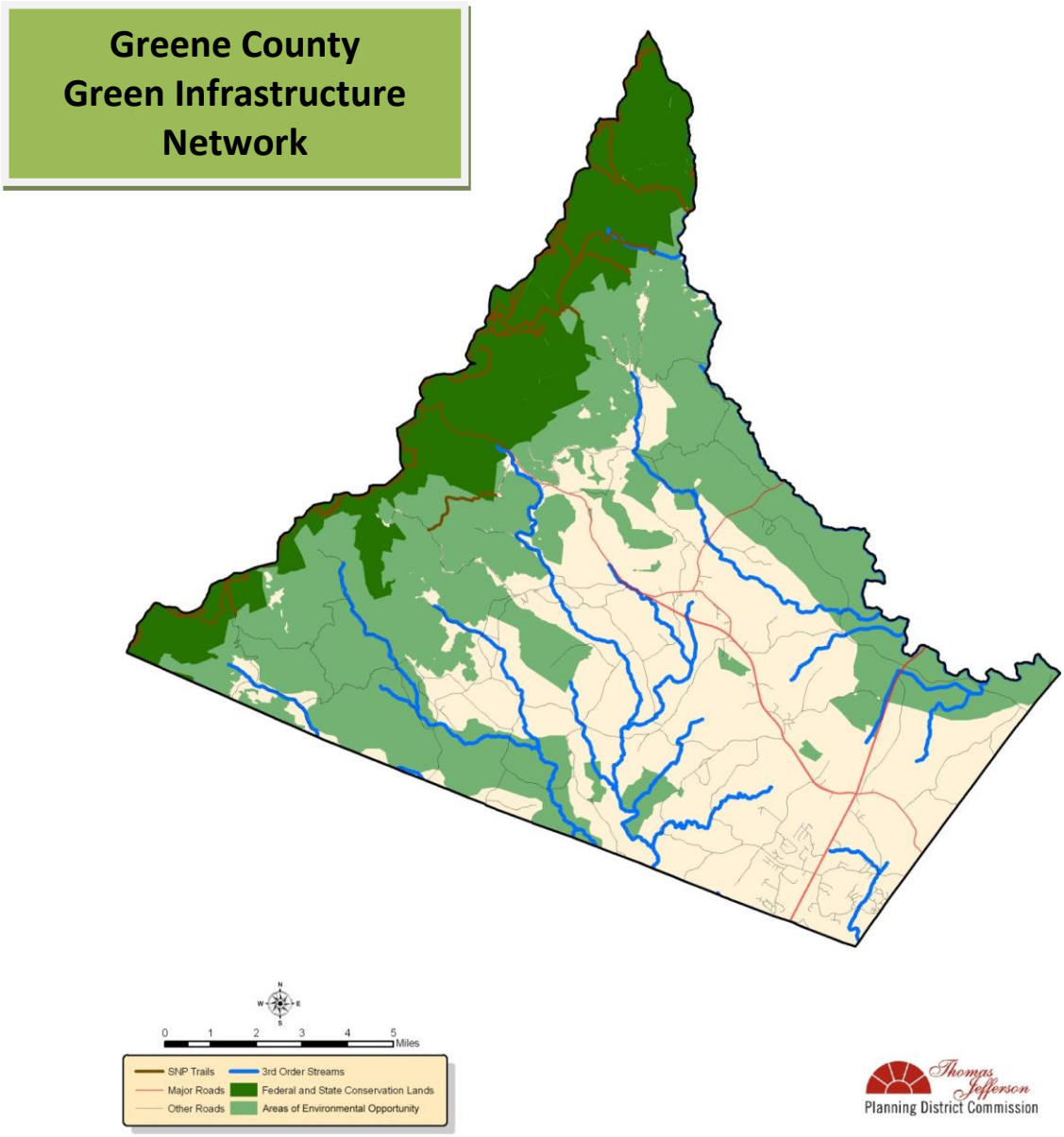


Green infrastructure recognizes that a connected system of open space dispersed throughout a region serves many goals. Securing natural amenities in close proximity to living spaces increases quality of life for residents and has been shown to enhance property values. Health benefits, from decreased obesity rates to better air quality, have long been associated with sufficient green space nearby. Additionally, interconnected lands are vital to the preservation of

biodiversity. Protecting fragmented and isolated preserves of land for wildlife is not enough to allow a healthy ecosystem to function.

A 2009 Green Infrastructure Study, conducted by the Thomas Jefferson Planning Commission, analyzed several natural features throughout Greene County, labeling them “cornerstones layers.” These layers on the map included known habitat areas, steep slopes, and buffers on major streams, existing trails and adopted greenway plans, and lands that are already protected. All of these factors were combined to create a composite map, which forms the basis of a potential green infrastructure network.

It should be noted that the areas marked on the Green Infrastructure Network map as “Critical Environmental Areas” all lie outside of the Future Land Use Growth Areas of this Comprehensive Plan.

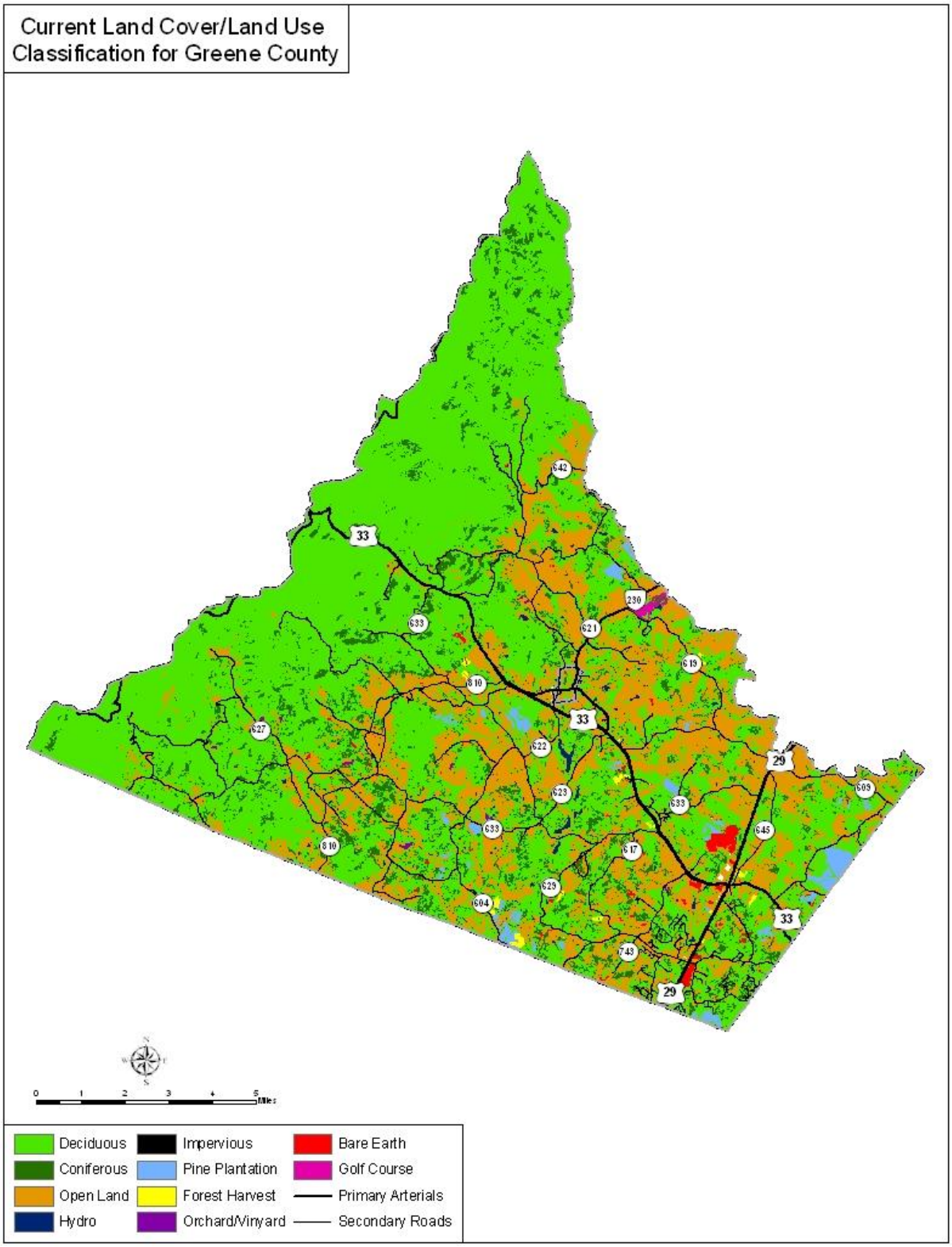


ENERGY EFFICIENCY PROVISIONS

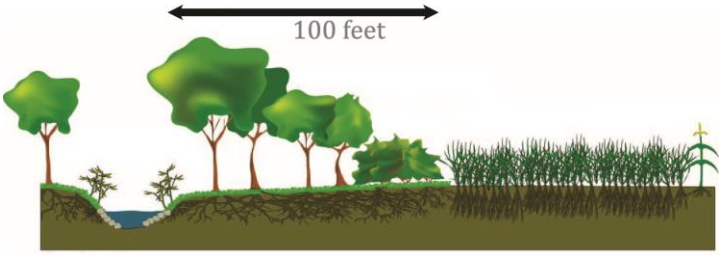
Minimizing energy usage and the carbon foot print from buildings within the county can help meet important local and national conservation goals, as well as reduce County energy expenses. After an independent energy audit in 2010, the County has implemented numerous energy efficiency modifications. The leading energy-efficiency standard for buildings is LEED, which evaluates such measures as insulation and heating efficiency. The location of a building relative to other services is also an important determinant of energy usage. More compact development patterns tend to reduce travel volume and thus reduce total fuel usage.

CURRENT LAND COVER/LAND USE CLASSIFICATIONS

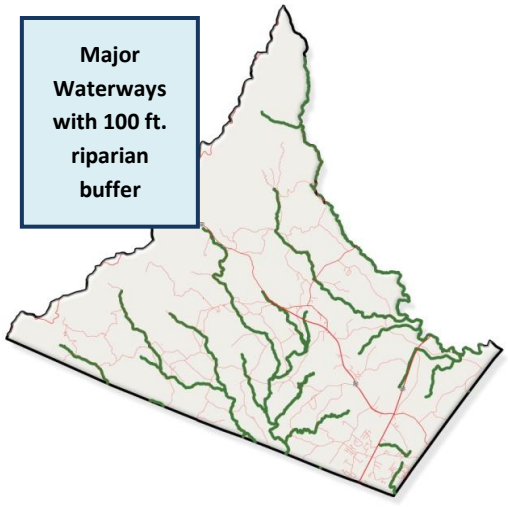
The following map "Current Land Cover/Land Use Classification: Greene County" details the land cover/land use categories for the county: deciduous forest, coniferous forest, pine plantation, forest harvest, orchard/vineyard, golf course, bare earth, open land (e.g., pasture, lawn), water, and impervious surface (e.g., streets, sidewalks, roofs, parking lots). This map evaluates actual land cover to a high degree of detail in areas of specific interest, such as stream buffers, critical slopes, and potential conservation easements. This information may be used to evaluate potential sites for placement of greenways, parks, and schools. The map will be useful for assessing biodiversity and will be a source of data for more studies that correlate land use with stream health and for models that correlate land cover, hydrology, and the hydraulics of area streams.


Current Land Cover/Land Use Classification for Greene County
642
33
230
633
621
619
810
33
627
622
29
623
609
633
633
645
810
617
629
604
33
743
29
0 1 2 3 4 5 Miles
Deciduous
Coniferous
Open Land
Hydro
Impervious
Pine Plantation
Forest Harvest
Orchard/Vinyard
Bare Earth
Golf Course
Primary Arterials
Secondary Roads

RIPARIAN BUFFERS



Riparian areas are the interface between land and streams. These borders play an important role in soil conservation, biodiversity, and aquatic ecology. Riparian buffers can protect landowners from soil erosion, and consequently protect the waterways downstream from excessive sedimentation. They provide natural flood control by slowing down and absorbing some of the rushing stormwater passing through the channel. There are water quality benefits as well. A 100-foot wide strip of forest and grass can reduce sediment by 97 percent, nitrogen by 80 percent and phosphorus by 77 percent.



There are economic incentives in place in Virginia to encourage riparian buffers on farmland or forested land. The Department of Forestry offers tax reduction incentives for forest buffers. The U.S. Department of Agriculture runs a number of cost-sharing programs that Greene County residents may be eligible for, including the Conservation Reserve Program (CRP), Virginia Conservation Reserve Enhancement Program (CREP), and the Environmental Quality Incentives Program (EQIP). Virginia Department of Conservation and Recreation (DCR) also offers a number of opportunities for assistance equal to 25 percent of the landowner's out-of-pocket expenses incurred in installing the practices. Greene County would receive DCR assistance through the Culpeper Soil and Water Conservation District.

WATERSHED DESIGN STANDARDS

There are a number of ways to design residential, commercial or mixed-use developments to minimize the impact on water quality and quantity of runoff, for either urban or rural settings. Strategies include the use of pervious surfaces as much as possible to let water seep into the soil naturally. Green roofs are vegetative layers placed on rooftops to capture water before it ever runs to the ground. Roof drain disconnection, rain gardens, well-placed drainage basins, and various water treatment or filtration

practices are other elements of watershed design. At the household level, individuals can use rain barrels or other catchment devices to capture rainwater and reuse for household purposes. On May 13, 2014, the County of Greene Board of Supervisors, as part of an initiative to integrate the County of Greene stormwater management requirements with the County of Greene erosion and sediment control requirements adopted a unified stormwater program. The unified stormwater program is intended to facilitate the submission and approval of plans, issuance of permits, payment of fees, and coordination of inspection and enforcement activities into a more convenient and efficient manner for both the County of Greene and those responsible for compliance with these programs

CONTROL OF INVASIVE SPECIES

Much of the nature of the county's rural land is conveyed in its visual aspects: rolling, tree covered hills leading to the surrounding slopes of the Blue Ridge. Over its history, that view has changed, declined and returned through combinations of human, animal and plant impacts. The beauty of Greene County now faces increasing threats from invasive insects and plants, which threaten existing plant species. Although the County has no direct role in combating invasive species, citizens are encouraged to be aware of these emerging issues, perhaps with guidance or support from various state and federal resources.

GOALS AND IMPLEMENTATION STRATEGIES: NATURAL RESOURCES AND ENVIRONMENT

- Protect and conserve surface and groundwater resources, especially headwaters of key rivers and tributaries.
    - Limit the use of certain kinds of septic systems on slopes of 25% or greater to the extent allowable by State law.
    - Promote the voluntary establishment of new riparian buffers around 3rd order streams to protect valuable surface water resources and maintain existing riparian buffers.
    - Consider adopting Watershed Protection Design Standards.
    - For developments of 10 or more homes in A-1 or C-1 zones, consider the requirement for a hydrological study to demonstrate that the groundwater supply is sufficient to support the development.
    - Prior to issuing a building permit in areas not served by central water, require landowner to demonstrate that the well provides adequate water.
    - Protect water quality for fish in all existing streams and new water in impoundments or parks.
    - Cultivate awareness and practice of water conservation.
- Enact measures to protect Greene County's irreplaceable natural resources and become a model county for natural resource stewardship.
    - Consider initiating a Mountain Protection Plan process.

- Discourage road construction on slopes of 15% or greater. Permitted roads should follow the natural topography and minimize grading, cutting, and filling as much as possible.
- Discourage excessive changes to the existing topography or tree cover, particularly outside designated growth areas.
- Reduce carbon footprint associated with the structure and location of buildings.
- Encourage voluntary monitoring and control of invasive species.

- Encourage open space dedication, riparian buffers, pervious surfaces and other best management practices.
  - Seek voluntary proffers for open space dedication, riparian buffers, limits to pervious surfaces and similar practices.
  - Support voluntary implementation of the recommendations of the county Green Infrastructure Study.
  - Encourage the voluntary dedication (through proffers and other tools) of land in conservation easements or Agricultural and Forestal Districts.

- Create governmental and public awareness of the importance of preserving natural resources while accommodating residential growth.
- Enact natural resource protection measures through development standards.
  - For residential development in rural areas promote conservation/cluster development to protect sites sensitive natural resources.
  - Minimize impact and preserve aesthetics of the rural countryside by buffers and natural vegetation screening.
- Refer to Green Infrastructure Study as a means to protect ecologically sensitive areas.