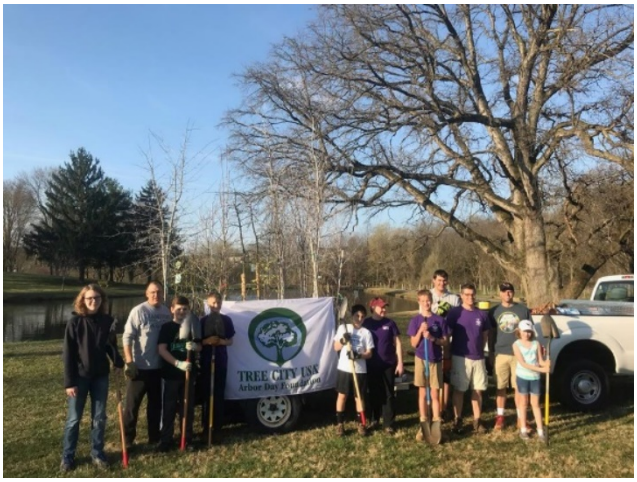
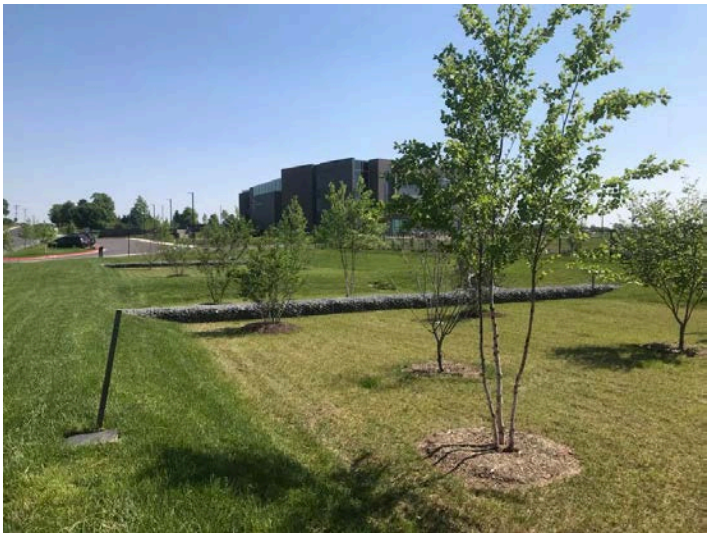
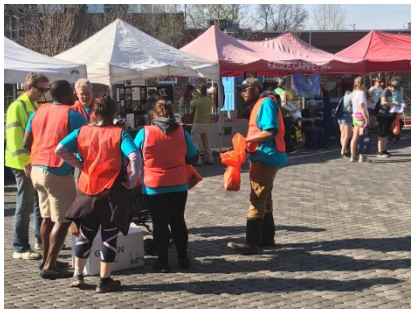
Chapter 10.

Sustainability and Environmental Stewardship







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Harrisonburg
VIRGINIA

Chapter 10 Environmental Stewardship and Sustainability

Contents

Introduction

A comprehensive plan focuses many of its policies on the use of land; therefore, it is important to understand the qualities of that land and the natural environment. The geology, topography, soils, vegetation, wildlife, air, and water resources provide a framework for wise land use decisions that avoid environmentally sensitive areas and protect and enhance valued natural environments.

Background

Geology

The City of Harrisonburg is located within the valley portion of the Ridge and Valley geologic province. The valley is underlain by sedimentary rocks of limestone, dolomite, and shale. A significant characteristic of the limestone and dolomitic rock of Harrisonburg, Rockingham County, and the Shenandoah Valley is its tendency to develop caves, solution channels, and sink holes as acid rainwater dissolves the rock over time. The geologic term for such limestone/dolomite areas is “karst.” The prevalence of sinkholes is significant because such areas can be unstable. Subsidence can damage roads and buildings, though catastrophic collapse rarely occurs.

Karst areas are particularly susceptible to groundwater contamination because of the direct connection between the surface and groundwater through sinkholes and along cracks in surface bedrock. Contamination that seeps down through the sinkholes and cracks can reach the honeycomb of channels and caves below, potentially travelling long distances through these conduits. While few houses or businesses in the City are dependent on groundwater for their source of drinking water, many homes in Rockingham County are served by wells. Some measures that localities can take to protect groundwater in karst areas include: prohibition of waste disposal in sinkholes, requirements that stormwater be directed away from sinkholes, and to establish spill containment measures for industrial and other uses handling toxic or potentially polluting materials near sinkholes.

Soils

A review of the *Soil Survey of Rockingham County, Virginia* (USDA Soil Conservation Service, 1982), which covers the City as well, reveals that the City's soils are dominated by clayey soils formed from limestone. The primary issues for construction are depth to bedrock, presence of limestone seams or ledges surround by clay soils, and the tendency of these soils to shrink and swell with changing moisture levels.

Topography

The City is characterized by rolling topography. Slopes from 0 to 15 percent present few limitations for development. Land in the 15 to 25 percent range is appropriate for residential uses; commercial and industrial development with large buildings and parking areas require a great deal of grading to be constructed on these slopes and are generally less appropriate. Slopes 25 percent and over are usually considered unsuitable for development.

Urban Forestry, Vegetation, and Wildlife

Harrisonburg is an urban area built upon and within an agricultural area. It no longer contains large areas of woodland and natural wildlife habitat. Most wetland areas in Harrisonburg are small. Fish, birds, and insects have begun to repopulate the restored segment of Blacks Run in Purcell Park, both in variety and number. Ducks are commonly found in and around Blacks Run throughout downtown. Most types of Harrisonburg's wildlife are those commonly found in urban and suburban settings.

Significant populations of deer are found in several sections of the City that require population management. In 2010, the City Council adopted ordinances to allow and regulate deer hunting by crossbow on private properties within City limits, during the archery season coinciding annually with the Virginia Department of Game and Inland Fisheries (VDGIF) established early, regular, and late archery seasons.

Harrisonburg is a certified Tree City USA, a program of The Arbor Day Foundation and US Department of Forestry. Generally, the Harrisonburg community values the City's remaining green spaces and expressed interest at public meetings in these green spaces being preserved and expanded to the extent possible. Increased tree planting is also supported. As of summer 2018, the City of Harrisonburg is undergoing an urban tree canopy assessment.

Water Resources

Hydrology

Harrisonburg is drained primarily by two streams, Blacks Run and the Sunset Heights Branch of Cooks Creek. About two-thirds of the City sits within the Blacks Run watershed. The area of the City, west of Route 42 and south of Route 33, is in the Sunset Heights Branch watershed of Cooks Creek. Small areas in the northern part of the City drain to the Smith Creek and Linville Creek sub-watersheds of the North Fork of the Shenandoah River. In 2008, the Federal Emergency Management Agency (FEMA) provided the City with an updated Flood Insurance Study, which includes 100-year floodplain maps and study booklets for Blacks Run, several of its tributaries, and the Sunset Heights Branch of Cooks Creek. The City uses this Study, along with the City's regulations for the Floodplain Zoning District, to regulate development in the 100-year floodplain and to prohibit encroachment in the floodway.

Water Quality

Water quality has become an important issue due to several mandatory water quality protection programs initiated by U.S. Environmental Protection Agency (US EPA), the Commonwealth of Virginia, and states contributing into the Chesapeake Bay watershed. The first is the Total Maximum Daily Load (TMDL) program, and the second is the US EPA requirement for the City to maintain a Virginia Pollutant Discharge Elimination System (VPDES) permit related to its Municipal Separate Storm Sewer System (MS4).

Total Maximum Daily Load (TMDL) Program

The Federal Clean Water Act requires states to identify and clean up water bodies not in compliance with Federal and state water quality standards. Virginia has been required to prepare a list of such "impaired waters" and to determine the total maximum daily loads or TMDLs for each impaired waterway. The TMDL reflects the total pollutant loading a water body can receive and still meet water quality standards with a built-in margin of safety. In 1992, the US EPA promulgated regulations regarding the development of TMDLs.

The City's storm sewer system drains into six different sub watersheds. Ultimately, all six subwatersheds drain into the Shenandoah River, the Potomac River, and the Chesapeake Bay. The Chesapeake Bay does not meet water quality standards and is listed as impaired. Due to this impairment, the US EPA issued a Chesapeake Bay TMDL. The needed pollutant reductions have been divided among the six states in the Chesapeake Bay watershed. As a result, the City of Harrisonburg has an allocated pollution reduction requirement for phosphorus, nitrogen, and sediment. The City's plan to reduce these pollutants can be found in the City's *Chesapeake Bay TMDL Action Plan* which is maintained by the Department of Public Works.

In addition to the Chesapeake Bay TMDL, six local TMDL studies have been completed on smaller watersheds within the City: two for Blacks Run, two for Cooks Creek, and two for Smith Creek. For each stream, the Virginia Department of Environmental Quality (VA DEQ) has determined that violations occur for both fecal coliforms and benthic organisms. Fecal coliforms are a range of bacteria present in fecal wastes from warm-blooded animals. Their presence indicates the presence of bacteria harmful to

humans. Benthic communities are made up of bottom dwelling organisms in streams. The number and types of benthic organisms found in a stream are indicators of pollution levels.

Virginia has chosen to develop a Blacks Run TMDL Implementation Plan that encourages voluntary actions to meet Federal water quality standards. The Smith Creek TMDL Implementation Plan includes a waste load allocation, or quantifiable reduction, of fecal coliform assigned to the City. To address both voluntary and mandatory actions to meet these standards, the City has implemented a number of measures to reduce fecal waste loads, such as a sanitary sewer inspection and management program to prevent sewage leaks, education programs on septic pump-outs, and pet waste clean-up education programs. The VA DEQ is in the first stages of updating the Blacks Run TMDL with specific waste load allocations assigned to local contributors of pollutant loading.

The benthic TMDL studies for the watersheds identify the sources of pollution that adversely affect benthic organisms. Again, non-point source pollution is the problem, and in the City, sedimentation is the chief culprit. Harrisonburg continues to address these problems by such measures as: improved sedimentation and erosion control regulations and enforcement, stormwater management best management practices (BMPs), a stream bank stabilization program, planting of riparian vegetation, and increased street cleaning. While Virginia's approach has been to seek voluntary measures to reduce pollution loads, if such measures do not result in improved water quality in streams, the state may require that measures be implemented to meet Federal water quality standards. EPA has the legal authority to require enforcement of TMDLs.

Virginia Pollutant Discharge Elimination System (VPDES) General Permit

The Department of Public Works manages a Stormwater Management Program under the Virginia Pollution Discharge Elimination System (VPDES) General Permit for Stormwater Discharges: Small Municipal Separate Storm Sewer Systems (MS4s) issued by the VA DEQ. The Permit requires compliance with six minimum control measures:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The most recent stormwater management regulations were adopted into the Code of Virginia in 2012, and became effective July 1, 2013. The local implementation of the stormwater regulations and the MS4 permit are the key vehicles to address many of the urban sector strategies identified in the Commonwealth of Virginia's *Chesapeake Bay TMDL Watershed Implementation Plan,* the Commonwealth's blueprint for attaining its water quality goals. This program is managed by both the Department of Public Works and the Department of Planning and Community Development. First permitted in 2003, after the City became a census-designated urbanized area, the City is currently in the 2013-2018 permit cycle and has received approvals for the five-year overall Program Plan and Annual

Reports to date. The City's *MS4 Program Plan and Chesapeake Bay TMDL Action Plan are* requirements of the City's MS4 permit. This plan has been approved by the VA DEQ for the 2013-2018 permit cycle, and is expected to be updated in the next permit cycle, 2018-2023. In 2017, City Council adopted the Stormwater Improvement Plan (SWIP) that will be used to inform the update of the Action Plan.

Air Quality

The City of Harrisonburg and Rockingham County are currently considered to be "in attainment" of the National Ambient Air Quality Standards (i.e., no violations of the air quality standards have been observed). Recent regulations issued by US EPA have revised the standard for ozone, making it more stringent. A number of communities across Virginia have been recommended by the VA DEQ for ozone "nonattainment" designation based on monitored data, including Shenandoah Valley communities of Frederick County and Winchester, the Roanoke area, and portions of Page and Madison counties in Shenandoah National Park. There is one ozone monitor in Rockingham County.

Noise Pollution

A primary source of noise in the City is traffic (road noise) especially with the presence of Interstate 81. The level of traffic and the high percentage of trucks make this a significant source of noise for properties near the interstate. The City should consider the implications of noise on proposed land uses adjacent to I-81 and high-volume arterial streets, as well as mitigation measures that may reduce noise to acceptable levels for noise-sensitive uses, such as residential areas.

Light Pollution

Light pollution has become an increasing concern in a number of localities and has been mentioned by the Harrisonburg community. As more and more individuals and businesses install security lighting or increase the intensity of existing lights, the problems of poorly designed lighting systems increase. The Comprehensive Plan includes a recommendation to reduce light pollution, while recognizing the importance of quality lighting for crime prevention.

Harrisonburg Electric Commission (HEC) provides installation and maintenance services for the City's public street lights. For more than 30 years, HEC has installed street lights that use full cut off optics.

Environmental Performance Standards Advisory Committee

In July 2016, City Council created the Environmental Performance Standards Advisory Committee (EPSAC). The purpose of the EPSAC is to provide guidance and recommendations to City Council in the establishment of environmental performance standards for public development and redevelopment projects, and to encourage the private sector to meet these standards as well.

Environmental Stewardship and Sustainability Goals, Objectives, and Strategies

Goal 11. To preserve and enhance the City's natural environment for future generations through education and policies that encourage development that is compatible with nature and builds community resiliency[1] and social responsibility within the community.

Objective 11.1 To foster an understanding of environmental issues facing the City and residents by keeping abreast of environmental issues.

Strategy 11.1.1 To continue staying engaged with organizations that communicate information about environmental stewardship and sustainability relevant to the City such as the Virginia Municipal League (VML), the Virginia Municipal Stormwater Association (VAMSA), the Central Shenandoah Planning District Commission (CSPDC), the Shenandoah Pure Water Forum, and Resilient Virginia.

Strategy 11.1.2 To encourage dialogue between surrounding municipalities regarding threats to environmental health in order to collaborate on preserving shared resources.

Strategy 11.1.3 To study how climate change will impact local health, safety, infrastructure, and the economy, and work to mitigate impacts.

Objective 11.2 To support stewardship of the natural world and enable sustainable development.

Strategy 11.2.1 To monitor energy use, water consumption, and other uses of resources within City government buildings and establish goals, policies, and programs for reducing usage.

Strategy 11.2.2 To monitor and evaluate greenhouse gas emissions from governmental operations and establish goals, policies, and programs for reducing emissions.

Strategy 11.2.3 To monitor and evaluate greenhouse gas emissions community-wide and establish goals and incentive programs for reducing emissions.

Strategy 11.2.4 To monitor and report on the results of City-initiated stream bank stabilization projects and other water quality related projects.

Strategy 11.2.5 To partner with community stakeholders to assess and map environmental and cultural assets to determine the value of these assets to the community, and to develop policies to protect them.

[1] Community resiliency is commonly defined as the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

Strategy 11.2.6 To produce an annual report on the City's environmental initiatives and environmental health.

Objective 11.3 To promote the development of voluntary water and air quality improvement programs for the public and private sectors that exceed federal and state standards and requirements.

Strategy 11.3.1 To continue to support the work of the Environmental Performance Standards Advisory Committee and implement committee recommendations.

Strategy 11.3.2 To create a set of voluntary environmental performance standards for public and private development and redevelopment projects, and to develop an incentive program to encourage implementation.

Strategy 11.3.3 To evaluate and study current lighting practices, and to recommend additional lighting provisions to mitigate outdoor light pollution.

Strategy 11.3.4 To collaborate with Rockingham County and the Virginia Department of Environmental Quality in developing an air quality improvement plan to keep the area's status as an attainment area for ozone pollution.

Strategy 11.3.5 To continue to seek ways of improving air quality by implementing policies or programs for governmental operations, such as continuing to optimize traffic signal plans to reduce vehicle idle time and in providing safe and convenient alternative transportation options by implementing the Bicycle & Pedestrian Plan and improving public transportation services through implementation of the Transit Development Plan.

Strategy 11.3.6 To continue to seek ways to create incentives for private property owners to implement stormwater best management practices to improve the quality of stormwater runoff by offering reductions in the stormwater utility fee for practices that can be counted towards the City's MS4 stormwater permit and the Chesapeake Bay TMDL Action Plan requirements.

Strategy 11.3.7 To encourage the use of low or zero emission vehicles in the City's fleet.

Objective 11.4 To preserve, expand, and manage networks of natural habitat corridors, green spaces, and forested areas that are accessible and usable by all community members.

Strategy 11.4.1 To adopt open space preservation requirements and/or incentives for new developments.

Strategy 11.4.2 To purchase and accept donations of land for the implementation of stream bank restoration, greenways, and park projects. See Chapter 11, Parks and Recreation's Objective 12.3 for related strategies.

Strategy 11.4.3 To implement landscape improvement projects at City gateways and other appropriate locations.

Strategy 11.4.4 To encourage and allow sustainable growing techniques, such as, but not limited to, edible gardens and tree plantings in open community spaces with emphasis in underserved communities.

Strategy 11.4.5 To create a policy and/or plan to utilize more native plant species on public properties that require less supplemental water use and to create incentives for businesses and privately-owned lands to do the same.

Strategy 11.4.6 To create and maintain sustainable habitats for pollinators.

Strategy 11.4.7 To consider imposing impact fees on new residential developments for the purposes of funding public facilities. See Chapter 7, Neighborhoods and Housing for related Strategy 5.3.2.

Objective 11.5 To protect and increase tree canopy cover in the City.

Strategy 11.5.1 To create a City urban forestry program to increase the number of trees planted and replaced on public properties and street right-of-ways, and to provide proper maintenance of trees on public properties to ensure tree health and to minimize damage to infrastructure.

Strategy 11.5.2To create more greenspaces and tree planting in downtown, neighborhood conservation areas, business revitalization areas, and corridor enhancement areas. See Chapter 15, Revitalization's Goal 18 for related objectives and strategies.

Strategy 11.5.3 To enhance street tree planting and other landscaping requirements for new development and redevelopment in the City's Zoning Ordinance and Design & Construction Standards Manual.

Strategy 11.5.4 To implement a policy that requires landscape plans for street improvement and transportation projects.

Strategy 11.5.5 To develop a tree inventory to monitor potential effects of invasive species, promote diversified tree canopy coverage, and maintain accurate datasets for water quality credits. (The dataset would help to meet MS4 permit and Chesapeake Bay TMDL requirements).

Strategy 11.5.6 To continue implementing measures to receive the City's designation as a Tree City USA community.

Strategy 11.5.7 To implement recommendations of the forthcoming urban tree canopy assessment.

Objective 11.6 To encourage, educate, and facilitate local urban agriculture to increase access to fresh, nutritional food for residents and to educate the community on food equity[2] issues.

Strategy 11.6.1 To amend the Zoning Ordinance to allow community gardens to be a principal use.

Strategy 11.6.2 To conduct a vacant parcel and land use audit to identify potential locations for community garden spaces based on proximity to food equity zones.[3]

Strategy 11.6.3 To broaden and deepen Harrisonburg's knowledge of food equity issues by working with community members, local businesses, community organizations, local universities and others to provide community engagement opportunities such as hosting movies, speakers, and presentations in culturally appropriate locations and diverse languages.

Objective 11.7 To promote and implement strategies to reduce waste.

Strategy 11.7.1 To explore opportunities to expand public and private recycling, composting, and other innovations for waste management.

Strategy 11.7.2 To encourage nonprofits, student organizations, faith-based organizations, and others to divert food goods from trash for resale or distribution to stressed populations.

Strategy 11.7.3 To create a public awareness campaign about food waste and educational programs to prevent food waste, including composting tutorials.

Strategy 11.7.4 To promote and provide incentives for water conserving fixtures and appliances.

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[2] Food equity means that individuals, families and households have the right to determine what their short and long term food needs are and be able to meet those needs. Achieving food equity is when all residents can find affordable, convenient, healthy, culturally relevant and reliable foods based on their needs.

[3] Food equity zones are areas where a higher proportion of residents in concentrated areas may not have food equity.

Strategy 11.7.5 To decrease the use of plastic bags and other single use items to and promote the use of biodegradable and reusable items.

Strategy 11.7.6 To involve residents and businesses in the conservation of resources to assist in maintaining cost-effective public service delivery.

Strategy 11.7.7 To develop a waste wood and woody debris utilization program that recovers wood from fallen and removed trees, and in partnership with interested agencies and organizations prevent the disposal of valuable wood resources into landfills.

Chapter Resources

Arbor Day Foundation, Tree City USA, "2016 Tree City USA Communities in Virginia," https://www.arborday.org/programs/treecityusa/treecities.cfm?chosenstate=Virginia

Harrisonburg Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan, https://www.harrisonburgva.gov/MS4-permit-program

Harrisonburg Municipal Separate Storm Sewer System (MS4) Permit Program Plan, https://www.harrisonburgva.gov/MS4-permit-program

Harrisonburg Environmental Performance Standards Advisory Committee (EPSAC), https://www.harrisonburgva.gov/EPSAC

Harrisonburg Solid Waste Management Plan, https://www.harrisonburgva.gov/trash

Harrisonburg Stormwater Advisory Committee (SWAC), https://www.harrisonburgva.gov/swac

Harrisonburg Stormwater Management Program (Municipal Separate Storm Sewer System Program, Stormwater Utility, Stormwater Projects, etc.), https://www.harrisonburgva.gov/stormwater-management-program

U.S. Department of Agriculture, Soil Conservation Service "Soil Survey of Rockingham County, Virginia", https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/virginia/rockinghamVA1982/rockinghamVA1982.pdf

Virginia Cooperative Extension, "Everyone at the Table: A community food equity assessment for Harrisonburg, VA," https://pubs.ext.vt.edu/CV/CV-80/CV-80.html

Land Cover

- Forest
- Trees
- Scrub/Shrub
- TurfGrass
- Pasture
- Cropland
- Harvested/Disturbed
- Surface Water
- Wetlands (NWI)
- Barren
- Impervious Surface

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Data Sources:
2016 Virginia Land Cover Dataset
- Virginia Geographic Information Network (VGIN)
- Department of Conservation & Recreation (DCR)
- Department of Environmental Quality (DEQ)
- Virginia Department of Forestry (VDOF)
- Tidal Marsh Inventory (TMI)
- National Hydrography Dataset (NHD)
- National Wetlands Inventory (NWI)
- Virginia Economic Development Partnership (VEDP)
- Virginia Department of Mines, Minerals, and Energy (DMME)
- Worldview Solutions, Inc.

Existing Land Cover

Comprehensive Plan

Map created: September 30, 2018

N W E S

0 ¼ ½ 1 Miles

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Features

- 100 Year Flood Plain
- 500 Year Flood Plain
- Waterbody

Watersheds

- Blacks Run
- Cooks Creek
- Dry Fork
- Linville Creek
- Mill Creek-North River
- Pleasant Run-North River
- Town of Keezletown-Cub Run

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Data Sources:
100 Year Floodplain - 2008 FEMA Flood Insurance Study
500 Year Floodplain - 2008 FEMA Flood Insurance Study
Waterbodies - 2015 Harrisonburg Planimetrics
Watersheds - National Hydrography Dataset, accessed 20170820

Environmentally Significant Areas

Hydrology

Comprehensive Plan

Map created: September 30, 2018

N W E S

0 ¼ ½ 1 Miles

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Land Feature

- Carbonate Karst
- Slopes 15% or Greater

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Data Sources:
Carbonate Karst - Carbonate rock at or near the land surface in a humid climate, U.S. Geological Survey
Slope - VBMP 2015 DTM Harrisonburg VA

Environmentally Significant Areas

Carbonate Karst and Steep Slopes

Comprehensive Plan

Map created: September 30, 2018

N W E S

0 ¼ ½ 1 Miles

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