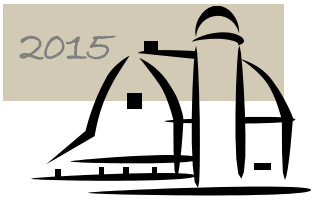


4. ENVIRONMENT

INTRODUCTION

In Culpeper County, the resources we use for our growing needs are plentiful, but not unlimited. The degree to which we can meet these demands depends on the ability of our environment to support them. As the County evolves we intend to preserve and conserve our natural resources through responsible planning.

SOILS

Culpeper County lies entirely within the Piedmont Plateau physiographic province. Such provinces are geologic regions with similar relief, biologic and climatic characteristics. The north, northwest and western portions of the County is known as the Piedmont Uplands and is composed of acid crystalline rock material such as granites, gneisses, basalts and arkosic sandstones. The southeastern part of the County, east of Lignum near the Rapidan-Rappahannock confluence, is a remnant part of the Piedmont Uplands composed of basic metamorphic rock such as sericite shists. The southern and central portion of the County, east of Route 15 to Lignum, is part of the Triassic Basin (an old ocean bed) and is composed of sedimentary rock such as shale and sandstone with intrusions of igneous rock. The different rock types determine the physical and chemical composition of the overlying soil types.

Many soils found within the County are suitable for agricultural and residential purposes. Soil limitations do exist in some locations; these limitations include steep slopes, susceptibility to wind and water erosion, shallow soil depths, unfavorable soil structure and workability, and permanent wetness problems that hinders farming and septic disposal. All soils require careful management and conservation practices to prevent deterioration in water quality and to maintain and improve soil quality. See Maps 4.1 for generalized soils throughout the county.

> “Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.” - Margaret Mead, American cultural anthropologist and author.

HYDROLOGY

Surface Hydrology

The County of Culpeper lies wholly within the Rappahannock River basin. The County is drained by three major tributaries and their stream networks into the Rappahannock River. The three major tributaries are the Hazel River, which drains the northern portion of the County; Mountain Run, which drains the central portion of the County and consists of several impoundments that were designed as multi-purpose lakes; and the Rapidan River, which drains the southern portion of the County and forms the County's southern boundary. The Rappahannock River itself forms the northern and eastern boundaries of Culpeper County and the confluence of the Rappahannock and Rapidan Rivers border the southeastern tip of the County. The County is also located in the non-tidal portion of the Chesapeake Bay Watershed. Approximately 2,075 acres of Culpeper County is covered by lakes, rivers and streams.

The 26 square mile portion of the Mountain Run watershed west of the Town of Culpeper contains Lake Pelham and Mountain Run Lake which serve as the primary water supply for the Town of Culpeper. These lakes are also used for recreation, including fishing and boating, although gas engines are prohibited. Mountain Run Lake was completed in 1959 with the construction of an earth fill dam approximately 700 feet long and 40 feet high structure impounds 611 acre-feet of which 531 acre-feet are reserved for water supply storage and 80-acre feet are reserved for sediment storage. The lake has a surface area of 75 acres. Lake Pelham was completed in 1972 with an earth-fill structure about 1,000 feet long and 38 feet high. There are 16,542 acres in the drainage area for Lake Pelham and the dam impounds 1,942 acre-feet of which 1,000 acre-feet are reserved for water supply and 942 acre-feet are reserved for sediment storage. Lake Pelham has a surface area of 254 acres. (Lake Pelham Watershed Management Plan, 1989 Espey, Houston & Associates) There are two additional lakes, Caynor and Merrimac, in the watershed that could be considered for future water supply. Their impoundment structures are owned and maintained by the Culpeper Soil and Water Conservation District.

The lakes west of the Town of Culpeper have proven to be an amenity, increasing growth pressures in this area thereby increasing the potential of point and non-point source pollution. To mitigate the adverse environmental impacts of this growth and associated development, the Town and County have developed a watershed management plan to protect and enhance the water quality conditions within the watershed. This plan led to the adoption of a Watershed Management District (WMD) which is detailed beginning on page 4-10. See Maps 4.2 and 4.3 for the watershed and sub-basin boundaries.

Several stream flow-gauging stations are maintained throughout the County. The U.S. Geological Survey publishes the data from these annually. Flow information coupled with water quality information can help determine the feasibility of water withdrawals or surface water impoundments along these streams and rivers.

The Virginia Department of Environmental Quality (DEQ) released the Final 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report) in 2012. The 2012 Integrated Report is a summary of the water quality conditions in Virginia. DEQ develops and submits this report to the U.S. Environmental Protection Agency every even-numbered year. Impaired waters are listed to identify a potential risks to public health and safety. These listed waters require implementing an action plan called a Total Maximum Daily Load (TMDL) to improve water quality. A number of Culpeper County streams are

included on this impaired waters list. Land development which may further impact impaired streams should be required to take additional measures in order to prevent further degradation.
Table 4.1 lists the stream segments and the impairment of streams within Culpeper County.

Impaired Streams

Table 4.1

NAME	LOCATION	CAUSE	IMPAIRED MILES
Rappahannock River	Segment begins at the confluence with Great Run, at rivermile 154.9, and continues downstream until the confluence with the Hazel River, at rivermile 147.52.	Escherichia coli	6.81
Hughes River	Segment begins at the confluence with Kilbys Creek and continues downstream until the confluence with the Hazel River.	Escherichia coli	3.67
Popham Run	Segment begins at the confluence with Ragged Run and continues downstream until the confluence with the Hughes River.	Escherichia coli	2.42
Hazel River	Segment begins at the Route 707 bridge crossing and continues downstream until the confluence with an unnamed tributary to the Hazel River, at rivermile 16.03.	Escherichia coli	15.43
Blackwater Creek	Segment begins at the headwaters of Blackwater Creek, downstream to the confluence with the Hazel River.	Escherichia coli	8.22
Thornton River	Segment begins at the confluence with Mill Run, at rivermile 8.65, and continues downstream until the confluence with an unnamed tributary to the Thornton River, at rivermile 3.25.	Escherichia coli	5.40
Muddy Run	Segment begins at the headwaters of Muddy Run and continues downstream until the confluence with the Hazel River.	Escherichia coli	12.6
Hazel River	Segment begins at the confluence with Indian Run and continues downstream until the confluence with Muddy Run.	Escherichia coli	3.32
Indian Run	Segment begins at the confluence with an unnamed tributary to Indian Run, upstream from Route 626, and continues downstream until the confluence with the Hazel River.	Fecal Coliform	3.82
Rappahannock River	Segment begins at the confluence with Ruffans Run and continues downstream until the confluence with Tinpot Run.	Escherichia coli	2.02

Rappahannock River	Segment begins at the confluence with an unnamed tributary to the Rappahannock River, at approximately rivermile 142.5, and continues downstream until the confluence with Marsh Run.	Escherichia coli	2.83
Lake Pelham	Segment includes all of Lake Pelham.	Oxygen, Dissolved, pH	249.58 (acres)
Mountain Run Reservoir	Segment includes all of Mountain Run Reservoir.	Oxygen, Dissolved	72.75 (acres)
Mountain Run	Segment begins at the confluence with Flat Run and continues downstream until the confluence with the Rappahannock River.	Escherichia coli	7.39
Mountain Run	Segment begins at the Route 15/29 bridge crossing and continues downstream until the confluence with Jonas Run.	Benthic-Macroinvertebrate Bioassessments, PCB in Fish Tissue	19.33
Mountain Run	Segment begins at the confluence with an unnamed tributary that flows from Caymore Lake and continues downstream until Lake Pelham.	Escherichia coli	1.56
Mountain Run	Segment begins at the Route 15/29 bridge crossing and continues downstream until the confluence with Jonas Run.	Escherichia coli	6.43
Jonas Run	Segment begins at the confluence with an unnamed tributary to Jonas Run (XDZ), at approximately rivermile 3.74, and continues downstream until the confluence with Mountain Run.	Escherichia coli	3.71
Robinson River	Segment begins at the confluence with Crooked Run, and continues downstream until the confluence with the Rapidan River.	Escherichia coli	5.26
Crooked Run	Segment begins at the confluence with Little Crooked Run and continues downstream until the confluence with the Robinson River.	Escherichia coli	7.29
Cedar Run	Segment begins at the confluence with Buck Run and continues downstream until the confluence with Cabin Branch.	Escherichia coli	3.20
Rapidan River	Segment begins at the confluence with an unnamed tributary to the Rapidan River, at rivermile 34.5, approximately 0.6 rivermile downstream from Route 689, and continues downstream until the confluence with Cedar Run.	Escherichia coli	4.58
Rapidan River	Segment begins at the confluence with the Robinson River and continues downstream until the confluence with an unnamed tributary to the Rapidan River, at rivermile 36.6.	Escherichia coli	3.33

Rapidan River	Segment begins at the confluence with Wilderness Run, rivermile 7.78, and continues downstream until the confluence with Middle Run.	Escherichia coli	2.47
Rapidan River	Segment begins at the boundary of the public water supply area, approximately 1.21 rivermiles upstream from the Route 3 crossing, and continues downstream until the confluence with Lick Branch.	Escherichia coli	3.46
Brook Run	Segment begins at the confluence with an unnamed tributary to Brook Run. At Route 647, and continues downstream until the confluence with the Rapidan River.	Benthic-Macroinvertebrate Bioassessments	2.45
Hazel Run	Segment begins at the headwaters of the Hazel Run, and continues downstream to the confluence with the Rapidan River.	Escherichia coli	3.4

Ground Water

Culpeper County depends on groundwater for domestic, commercial and industrial use. Several areas adjacent to the Town of Culpeper use the Town's water system; otherwise, development is serviced by individual or community wells.

Groundwater is a vulnerable resource, the quality of which is largely determined by how people use the land. Due to Culpeper County's dependence on groundwater, it is imperative that measures are taken to protect this resource. According to the Virginia Water Control Board, the most severe threats to groundwater quality come from leaking surface impoundments used to store, treat and recycle waste products; leaking underground storage-tanks; malfunctioning septic tanks and drain fields; improper uses and inadequate design of landfills; and agricultural use of fertilizers and pesticides.

A groundwater assessment program is being developed for the County to determine the location, quantity, and quality of groundwater available in various geologic regions of the County. As groundwater resources are developed through public or private development, we will design groundwater protection programs to insure that this vital and limited resource is protected. It is essential that the County-wide groundwater study be completed and that groundwater protection ordinances be developed and implemented as groundwater systems develop. A generalized program for groundwater protection through mandatory and voluntary Best Management Practice (BMP) implementation, recycling programs for used oil and waste reduction in the landfill, household and farm hazardous waste cleanup days, and public education currently seems attainable. In addition, the protection of surface and groundwater quality and quantity must be considered each time a land use change is proposed.

FLOODPLAIN

Flood prone areas in Culpeper County occur along all major streams as designated by the Flood Hazard Map (Map 4.4) developed from the 2007 HUD Flood Hazard Boundary Maps. Approximately 17,000 acres in Culpeper County are located in the 100-year floodplain. The Development Constraints Map (Map 4.7) also shows the approximate limits of the 100-year floodplain along with topographical and soils constraints.

Land uses in the flood prone areas are subject to the provisions contained in the County's Floodplain Overlay District section of the County Zoning Ordinance. The Floodplain Overlay District outlines permitted uses, special uses, and other regulations concerning development and structures within the 100-year floodplain areas. Culpeper County is also a participant in the National Flood Insurance Program that allows for the issuance of flood insurance and disaster assistance in relevant areas.

Forests and other natural vegetation along streams and ponds are important to protect water quality. These vegetated streambanks and shorelines provide a riparian buffer that filters nutrients and sediments, provide shade that moderates water temperature, and provide habitat and food for wildlife. In addition to the County's Floodplain and Watershed Management Overlay Districts, Culpeper County encourages development to protect streams and surface water from disturbance through the use of riparian buffer setbacks under the County's Stormwater Management ordinance. For proposed development there shall be a 100-foot setback from the Hazel, Rapidan, and Rappahannock River, 50-foot setback for all other perennial streams and 25-foot setback for all intermittent streams and stormwater ponds. Culpeper County plays a vital role in protecting the water quality in the headwaters of the Rappahannock River.

WETLANDS

Wetlands are transitional zones between open water and dry land. Non-tidal wetlands, as are found within Culpeper County, often occur where water is found at or near the surface of the ground or in places where the ground is covered by shallow water ranging from a few inches to several feet. Some wetland areas are dry during certain seasons and flooding is common during the winter and spring when rivers overflow their banks. Non-tidal wetlands include freshwater marshes and ponds, shrub swamps, bottomland hardwood forests, and wooded swamps and bogs.

The U.S. Army Corps of Engineers, in cooperation with the EPA, administers wetlands through Section 404 of the Clean Water Act and has had the primary regulatory authority for preserving non-tidal wetlands in Virginia. The Corps must review any development plan that involves wetland areas, and a permit to work in a wetland or a letter indicating that a permit is not necessary must be obtained.

The Culpeper Soil and Water Conservation District provides technical assistance to manage, protect, and enhance the land and water for the benefit and enjoyment of the citizens of Culpeper.

Quick Link: Culpeper Soil and Water Conservation District- www.culpeperswcd.org

Wetland Preservation

It is estimated that there were 220 million acres of wetlands in what is now the continental United States in 1780. In 2009, it was estimated that only 110 million acres of wetlands remained.

Wetlands perform the following functions:

- By trapping waterborne sediment and its pollutants, wetlands protect the quality of surface waters. Therefore, the preservation of wetlands will help mitigate the water quality impacts that future development will have on the streams and lakes in Culpeper County.

- Wetlands serve as a natural means of flood control; they absorb and store water during high-runoff periods, thereby reducing flood crests, and protecting life and property.

- Wetlands are critical at times of drought because they maintain critical base-flow to surface waters through the gradual release of stored flood-waters. Wetlands, therefore, can reduce the need to create the reservoirs and other water-storage facilities often constructed as a means to augment municipal water supplies.

- Some wetlands contain important, even unique, communities of wild plant and animal species. They also serve as temporary refuge for migratory birds such as ducks.

- Wetlands provide recreational venues for hunters, fishermen, and campers, as well as open spaces to buffer incompatible uses.

Wetlands are a valuable resource that must be preserved. Therefore, it will be the policy of Culpeper County to discourage the drainage or destruction of wetlands that meet the criteria as outlined in the Federal Manual for Identifying and Delineating Wetlands (or the most current federal identification and delineation policy). If such disturbance is unavoidable, the proper permits must be obtained from the Army Corps of Engineers. Innovative storm water management and Best Management Practices (BMPs) that preserve, establish and enhance wetland features are encouraged.

TOPOGRAPHY

Culpeper County topography ranges from an elevation of 1160 feet above sea level on Mitchell's Mountain to 130 feet above sea level at the junction of the Rapidan and the Rappahannock Rivers. In general, the land surface slopes southeastward from an average altitude of 600 feet above sea level in the western portion of the county to 350 feet in the southeast. The northwestern portion of the County is generally hilly to steep, the central portion of Culpeper County ranges from mostly level to rolling; and the southeastern section of the County is mostly level. There are numerous mountains designated in the County, the elevations of which are shown in Table 4.2.

Development and land disturbing activities, excluding agriculture, on 15%-25% slopes should always require grading permits with erosion and sediment controls prescribed. Additionally, drain fields

located on 15%-25% slopes should require a hydrologic report assuring that ground and surface water will be protected both on and off-site. Those areas located on 25% or greater slopes should be restricted from development and drain fields should be prohibited. See map 4.5 for the topography of Culpeper County.

TABLE 4.2 MOUNTAIN ELEVATIONS IN CULPEPER COUNTY

MOUNTAIN	ELEVATION
Mitchells Mountain	1,160
Scott Mountain	890
Hitt Mountain	882
Bruce Mountain	850
Cedar Mountain	833
Parrish Mountain	817
Mount Pony	790
Fox Mountain	762
Buzzard Mountain	621
Fleetwood Hill	540
Sheads Mountain	540
Coles Hill	510
Hansbrough's Ridge	470
Stony Point	410

WOODLAND FEATURES

Culpeper County has forested land in tracts that range from small privately owned wood lots to major parcels managed for commercial harvest. In addition to commercial timber opportunities, wooded areas also provide the following benefits: Watershed protection through storm water management and erosion control, aesthetic and scenic viewsheds, air pollution and noise reduction, groundwater recharge areas and recreation.

As shown on map 4.6, a large portion of the County is wooded. Retention of this acreage will help ensure that the environmental quality of the community is protected. Areas that are managed for commercial timber operations should use Best Management Practices (BMP) and should enact a reforestation plan. Areas under development should provide plans that indicate preservation of the existing woodland features and re-vegetation of areas that are denuded in order to reduce the erosion, sedimentation, and storm water runoff impacts on downstream areas. Retention of existing woodlands on slopes greater than 15% is encouraged.

LAND CAPACITY / DEVELOPMENT CONSTRAINTS

The Development Constraints Map (Map 4.7) identifies both areas that are restricted from building and those with building limitations. This is a generalized map that approximates those areas with development constraints. The map is not intended to be site specific or all-inclusive. Site-specific information should be provided for any development project that encounters areas with building restrictions.

The allowable activities in a floodplain area include agricultural uses, certain public and private recreational uses, accessory residential uses such as yards and gardens, and stormwater management facilities as long as the floodplain elevation is not altered as described in the floodplain ordinance.

Soil properties are measured in terms of depth to water table, ease with which water filters through, moisture retention capacity, stability with changes in temperature and moisture content, acidity (pH), corrosiveness and a variety of other criteria. The relative importance of each criterion varies with the contemplated use. Specifically, home sites are relied upon to provide both drinking water and to clean wastes. The areas designated as unsuitable for drain fields are those in areas where the soils have high shrink-swell potential or shallow depth to bedrock. In general, the soils with the greatest building limitations are found in the Triassic Basin.

Slope can be a limiting and restrictive development factor for buildings and grading. Disturbing moderately steep (15%-20 %) and steep slopes (>20%) can increase erosion rates and change the hydrology of the landscape. Critical slope is typically defined as a slope gradient exceeding 15 percent where erosion rates increase and groundwater flows can seep to the surface. Practical engineering judgment should be used when developing on critical slope areas and conservative use of erosion control measures is encouraged.

ALTERNATE ENERGY

Renewable energy sources like wind, solar, geothermal, hydrogen and biomass are expected to play an important role in our future. Wind is the Nation’s fastest-growing sources of energy. Solar power is used to generate electricity with both thermal and photovoltaic technologies. Solar water heaters are used for water or space heating for residential, commercial, and industrial facilities. Geothermal energy is the heat from the Earth which can be used to create electricity with minimal environmental impact. Resources of geothermal energy range from shallow ground to hot water and hot rock found a few miles beneath the Earth's surface. Hydrogen is a clean energy carrier made from renewable energy resources (e.g. solar, wind, geothermal), nuclear energy, and fossil energy. The term ‘biomass’ means any plant derived organic matter available on a renewable basis, including dedicated energy crops and trees, agricultural food and feed crops, agricultural crop wastes and residues, wood wastes and residues, aquatic plants, animal wastes, municipal wastes, and other waste materials. Biomass is used to create fuel, electricity, and chemical resources. Examples of biofuels are ethanol and renewable diesel. Culpeper County supports the expansion and use of renewable energy sources where appropriate Countywide. As these energy sources become more common, it may be necessary to implement appropriate regulations which address changing technologies. For example, wind power can generate noise, aesthetic and other concerns that may need to be addressed.

WATERSHED PROTECTION: GENERAL

Chesapeake Bay Act

With the advent of the Chesapeake Bay Preservation Act (the Bay Act), enacted in 1988 by the State legislature, a program of watershed management was initially designed to restore the once pristine water quality afforded by the Chesapeake Bay and its fishing industries. Stringent guidelines and enforcement measures were set in place to manage tributaries leading to the Bay. These measures impact private citizenry, private industry and public policy with the goal of improving the ecology of the Bay.

The implementation of measures taken from the Bay Act may be advisable to improve water quality over time.

Stormwater Management

The Virginia Department of Conservation and Recreation oversees all stormwater regulations applicable in Culpeper County.

LAKE PELHAM AND MOUNTAIN RUN LAKE WATERSHEDS

On March 3, 1992, the Culpeper County Board of Supervisors adopted Article 8C *Watershed Management District (WMD)*, into the Culpeper County Zoning Ordinance. The WMD is an overlay zone specific to the Mountain Run Lake - Lake Pelham Watershed. The Ordinance seeks to implement the policies that follow. The maximum densities allowable, as well as other aspects of the ordinance, differ slightly from the policies listed below. As with all of the guidelines set forth in this Comprehensive Plan, these policies are general in nature, and implementation must be undertaken with many considerations in mind, and at the discretion of the Board of Supervisors.

General Policy

1. The County seeks to outline a set of general policies (goals) and specific implementing policies (or objectives) which will protect public health and safety; and prevent water quality deterioration in the Lake Pelham watershed.

2. Any strategy to improve water quality will seek to keep costs of land use conservation and water quality enhancement below the cost of the benefits achieved for public health and safety. In considering benefits, the County will fully consider the costs to the public health from damage to the water supply and, where necessary, attempt to quantify the same.

3. In determining whether water supply quality is being maintained, the County will examine the following water quality parameters: (1) the amount of nitrogen, phosphorous, solids, and the effect on dissolved oxygen; (2) the amount and concentration of the following metals and toxins: arsenic,

cadmium, chromium, lead, mercury and zinc; (3) fecal coli form concentrations; (4) temperature; (5) tree cover distribution.

Specific or Implementation Policies

1. Because non-residential uses, particularly commercial and industrial uses, involve considerable threats of toxin and metal pollution, both from their own wastes and from heavy auto travel associated with the uses, non-residential development, other than what already exists or is planned should be limited. Non-residential uses, other than parks, schools, churches and other community facilities, and those public facilities that must locate in the Lake Pelham Watershed in order to serve development that has or is likely to locate there, shall be required to provide storm water management facilities and utilize Best Management Practices (BMPs), which insure that water quality will not be degraded.

2. The average overall density for residential development in any sub-area as set out in the LPW Management District shall not exceed the density for the full area unless adjustments are made to another sub-area which would result in the same or lesser overall impact.

3. Cluster styles of development, such as cluster subdivisions, planned residential developments, architecturally integrated developments, and planned unit developments, offer the opportunity, although not the certainty, that the development will pose the least adverse impact on the water supply. Clustering provides an opportunity to improve the use of open space for filtering and to avoid highly erodible soils or steep slopes or other areas where impacts could be difficult to control. The County acknowledges that cluster styles of development that are designed to protect the water supply are the preferred method of development in the LPW.

4. The County will require that developments using clustering demonstrate that densities are actually increasing as they move further from the lakes and primary creeks and streams, or that the developments have been specifically designed to maximize the effectiveness of local wet ponds.

5. Natural vegetated buffer areas are encouraged along intermittent streams and around stormwater ponds in order to allow soils an opportunity to filter out particles before they reach the water supply. Natural filtration is a proven way to reduce pollution in the water supply.

6. To protect the water supply the County will require natural vegetated buffer areas of at least 200 feet be provided along Lake Pelham and Mountain Run Lake; at least 100 feet shall be provided along primary creeks and streams leading into those Lakes; and at least 50 feet shall be provided along tributaries to the lakes and to those creeks and streams. Adequate mechanisms are needed in development proposals to insure that these areas remain and be maintained in a natural state.

7. At the heart of the watershed protection plan is a reliance on Low Impact Development and other Best Management Practices intended to engineer at the site and regional levels a system that will protect the water supply. The amount of runoff in the Lake Pelham Watershed is directly related to the amount of impervious surface. The quality of that runoff is directly related to the land use and intensity. The County will modify development standards to require that developments utilize Low Impact Development and other Best Management Practices. Grading is limited during development

to only that which is necessary to put roads, utilities, driveways, parking areas, principal structures, necessary accessory structures and a reasonable amount of activity space in place.

8. The Lake Pelham Watershed is susceptible to pollution from failed drain fields or highly concentrated pollutant loadings, especially in areas directly abutting Lake Pelham, or within direct storm water access. Because the principal problem anticipated in the Lake Pelham watershed is nitrification, development of public sewer is encouraged. To avoid future lake degradation, policies shall be implemented which properly restrict septic systems in the Lake Pelham area. The County shall discourage those developments in the Lake Pelham area which cannot be served by Town water and sewer, or wait for the availability of those services. Alternative methods of sewage are strongly discouraged within the Lake Pelham Watershed.

9. The County requires Erosion and Sediment Control Plans for land disturbing activities of greater than 5,000 sq. ft. in the WMD.

GREEN BUILDING CODE

The National Green Building Standard, known as ICC-700, was approved Jan. 29, 2009 as an American National Standard. The new Standard provides guidance for safe and sustainable building practices for residential construction, including both new and renovated single-family to high-rise residential buildings. This is the only “green” standard that is coordinated with the Code Council’s family of I-Codes and standards.

The International Code Council and the National Association of Home Builders developed the Standard with input from diverse stakeholders ranging from code officials and other building professionals to the entire spectrum of the “green” building community. This new standard and other programs like it provide a practical route and clear guidance towards greener residential construction. The standard also promotes homeowner education for the maintenance and operation of residential buildings in order to ensure long-term health, financial, and environmental benefits.

In 2011, the Culpeper County Building Department was among the nine winners of the “Green Government Challenge” issued by the Virginia Municipal League. The “Go Green Virginia” campaign, which began in 2007 is a competition between counties, cities, and towns who establish, implement, and adopt policies or actions that reduce energy usage and promote sustainability.

BUY LOCAL AND FARMERS MARKET

Locally marketed food doesn't have to travel far. This reduces carbon dioxide emissions and packing materials. Buying local food also helps to make farming more profitable and selling farmland for development less attractive. This ensures that family farms in the community will continue to thrive and that healthy, flavorful, plentiful food will be more available for future generations. Culpeper County strongly encourages the local food movement.

MINERAL RESOURCES

Purpose

It is important to know where mining occurred in the past, where mining is suitable in the present, and where potential mining sites may be in the future. Future mineral resource expansion can add to the tax base, provide jobs and may offer post-mining recreation sites. By recognizing the mineral resources available for Culpeper County, it becomes easier to plan for those resources that are important to the community. The most suitable areas for mineral resource mining are usually unsuitable for drainfields and agricultural uses. Specific quarry site selection requires detailed investigations, including evaluation of terrain, accessibility, rock quality, zoning and land-use ordinances, and environmental impacts.

History

Culpeper County is located within the Northern Piedmont and Blue Ridge Major Land Resource Areas (*Land Resource Regions and Major Land Resource Areas of the United States, USDA, NRCS, 1981*) and is underlain by igneous, sedimentary, and metamorphic rocks (see Map 4.8, Geology). These areas are bordered by the North Appalachian Ridge Valley to the west and the North Coastal Plain to the east.

The Triassic-Jurassic Basin, also known as the Culpeper Basin, is the dominant feature of Culpeper County's geology and stretches from the mid-eastern portion of the County diagonally to the southern tip (see Map 4.8). The rocks in this basin are Triassic-Jurassic red and brown shales, siltstones, and sandstones intruded by diabase. The types of rocks within this region include sandstone, siltstone, shale, hornfels, diabase, basalt, limited coal seams in some areas, and conglomerate. Groundwater quality in this basin is generally lower because of hardness, acidity, salinity, and iron.

Culpeper County has a varied history of mining efforts. In the mid to late 1800s, copper was found near Slaughter's mountain. The Virginia Department of Mines, Minerals and Energy has identified three mines that contain small deposits of copper: the Batna Mine, Culpeper Prospect, and Ellis Mine. Copper mineralization associated with Triassic rocks near Culpeper and Batna have been prospected but no commercial production has been established.

Gold was first found in Culpeper County around 1828. The gold deposits that were found, and may still exist today, are located in a 150 mile long by a 10 to 15 mile wide strip which runs from Montgomery County, Maryland to Appomattox County, Virginia. This linear region contains scattered occurrences of pyrite and gold. Gold ore was mined and milled at several sites in the vicinity of Richardsville in the eastern part of the County. Known gold deposits tend to be relatively low grade with low concentrations of fine flakes. In addition, soapstone has been found near Richardsville.

In the past, diabase, basalt, granitic rocks, sandstone, hornfels, and conglomerate have been quarried as sources of crushed stone. Limestone was quarried near Jennings Store for use as agricultural stone, and limestone from other parts of the County has also been burned to produce lime. Slate has been quarried and other types of rock have been used for local construction purposes. Clay materials were formerly produced for use in brick plants at Culpeper and Elkwood, and for use in the manufacture of brick and tile at Stevensburg. Sand obtained in the Hazel River area has been used for paving, masonry, concrete,

and ice control. Sand and gravel deposits suitable for construction are present along the Robinson, Rappahannock, and Rapidan Rivers.

Current Activity

According to the Virginia Department of Mines, Minerals and Energy, in 2013, there were six operating quarries in Culpeper County. The annual tonnage of granite and sandstone quarried from these operations in 2013 was 930,675 tons. These mines produce crushed stone for roadstone and concrete aggregate, and dimension stone for monuments and other architectural applications.

THE CULPEPER BASIN

The Culpeper Basin is a structural trough filled with sedimentary, metamorphic, and igneous rocks of Mesozoic age that border the eastern front of the Blue Ridge in northern Virginia. The basin extends 1,062 square miles from the Rapidan River near Madison Mills, Virginia, northeastward across the Potomac River and terminates just west of Frederick, Maryland.

The rock and mineral resources of the Culpeper basin are presently used for construction material, highway fill and building stone. The principal quarries, pits, mines, and prospects are shown on Map 4.10. Diabase is quarried for crushed aggregate and dimension stone, basalt is quarried for aggregate and crushed stone, and shale is extracted as a source of clay for brick manufacture. Future construction may require adequate quantities of crushed stone, brick clay, and aggregate at or near the surface and close to the area of use. Large reserves of some industrial materials are present, but new pits or quarries may be needed to fulfill the requirements economically before future construction commences.

CRITERIA FOR FUTURE QUARRY AND MINE LOCATIONS

Access

Transportation is an important aspect of identifying mineral resources potential. Access is extremely important to active mineral facilities. The weight and size of the vehicles required to transport material demand adequate routes. By siting these facilities along paved roadways with adequate widths, negative traffic impacts can be reduced. Where feasible, the use of railroad sidings should be encouraged. If truck traffic can be reduced through the practice of shipping freight via rail, this should be treated as a substantial benefit.

Compatible surrounding land use

The availability and location of mineral resources is important information for land-use planners, mining and quarrying industries, and the concerned public. Future availability and utilization of rock and mineral commodities depend on the decisions made by planners and other land-use decision makers. In planning for future extraction, the need to reserve adequate space for facilities, access roads, buffer zones, and corridors for high-load electrical lines should be considered.

Mineral resource extraction should be compatible with surrounding land uses. Siting facilities in agricultural or rural areas in A-1 and RA zoning districts with very low residential densities is appropriate. Large tracts of land are necessary to provide buffers from the dust, noise, and vibration associated with this industry.

Focus on environmental issues

The decision to utilize an available resource relies upon many external factors, principally economic and environmental concerns. Proper planning and regulation in advance of extraction of resources can minimize and prevent environmental disruption. Plans to extract any type of resource must be weighed against the effects of extraction on scenic values, recreational uses, surface water quality of the rivers and creeks, agricultural operations and residential quality of life.

Mineral resources can be mined only where they are found, thus planning for their potential environmentally sound extraction is the responsibility of the local government. The Culpeper Basin's southern to southeastern boundary in Culpeper County occurs along the Rapidan River. Environmental degradation may occur if proper planning and design techniques are not used. As such, all use permit applications for mineral extraction should include documentation which insures environmental protection.

Case by case consideration via conditional use permit

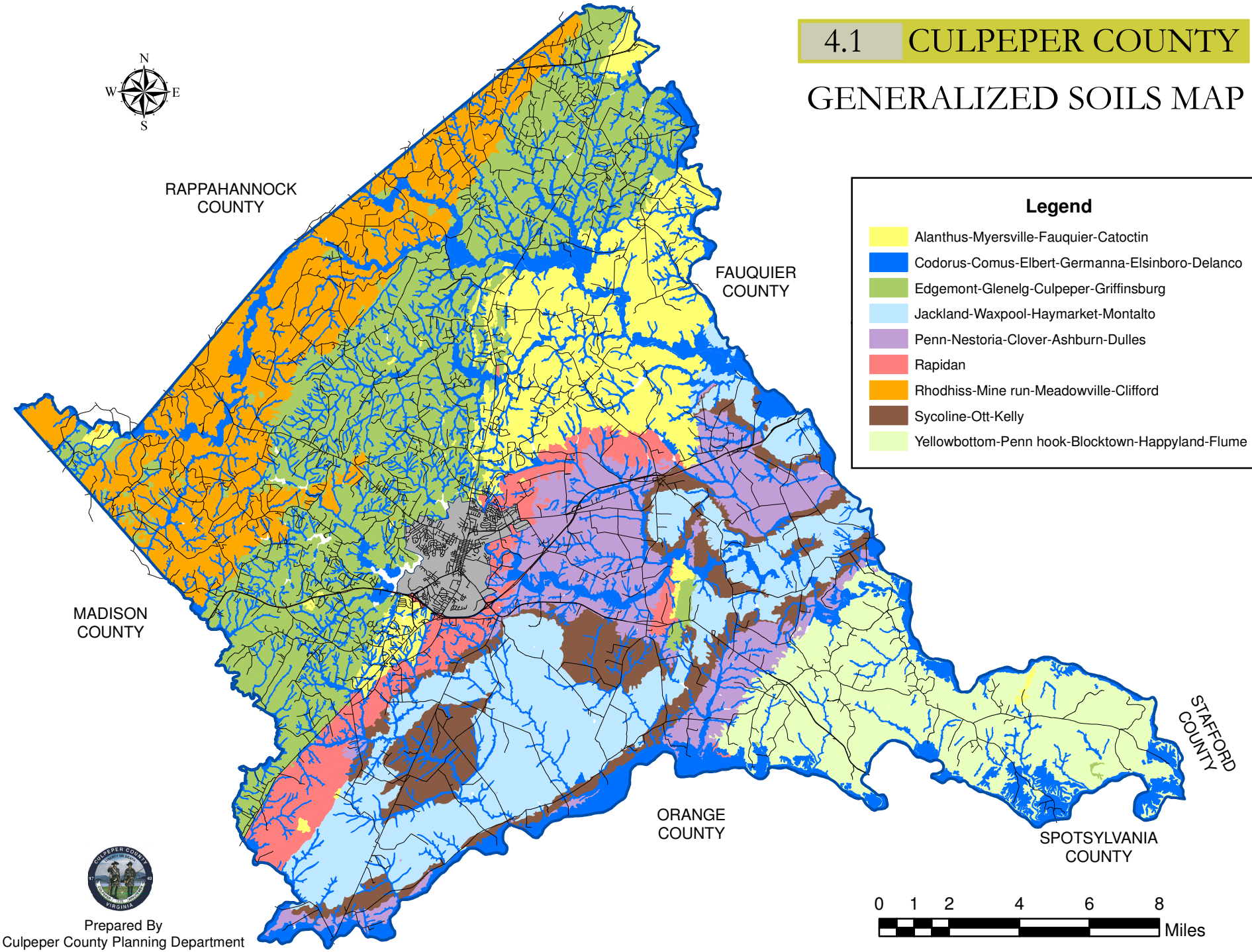
Mining, excavation, quarrying, product drilling, and all associated activities of extractive and mining operations are conditionally permitted in the Agricultural (A-1) and the Rural Area, (RA) zoning districts. Consequently, any operation of this type must apply for a conditional use permit. All applications for conditional use permits will be considered on a case by case basis by the Planning Commission and the Board of Supervisors. This process will allow for site-specific studies with proper planning and siting of the facility. Appropriate conditions should be imposed and approval should be given only when it is shown that the surrounding areas will be compatible with this type of land use, and only when the criteria outlined here have been met.

Future Mineral Resource Extraction

Map 4.11-Future Mineral Resource Extraction is intended to recognize areas where mineral resources exist, where access is adequate, where residential population is low, and where the environment can be protected. In short, it is an indicator of those areas where the County's mining and quarrying site criteria can most likely be met. It should be utilized as a guideline with more thorough study through the use permitting process, which is required for any application for permission to begin a mineral extraction operation.

4.1 CULPEPER COUNTY

GENERALIZED SOILS MAP



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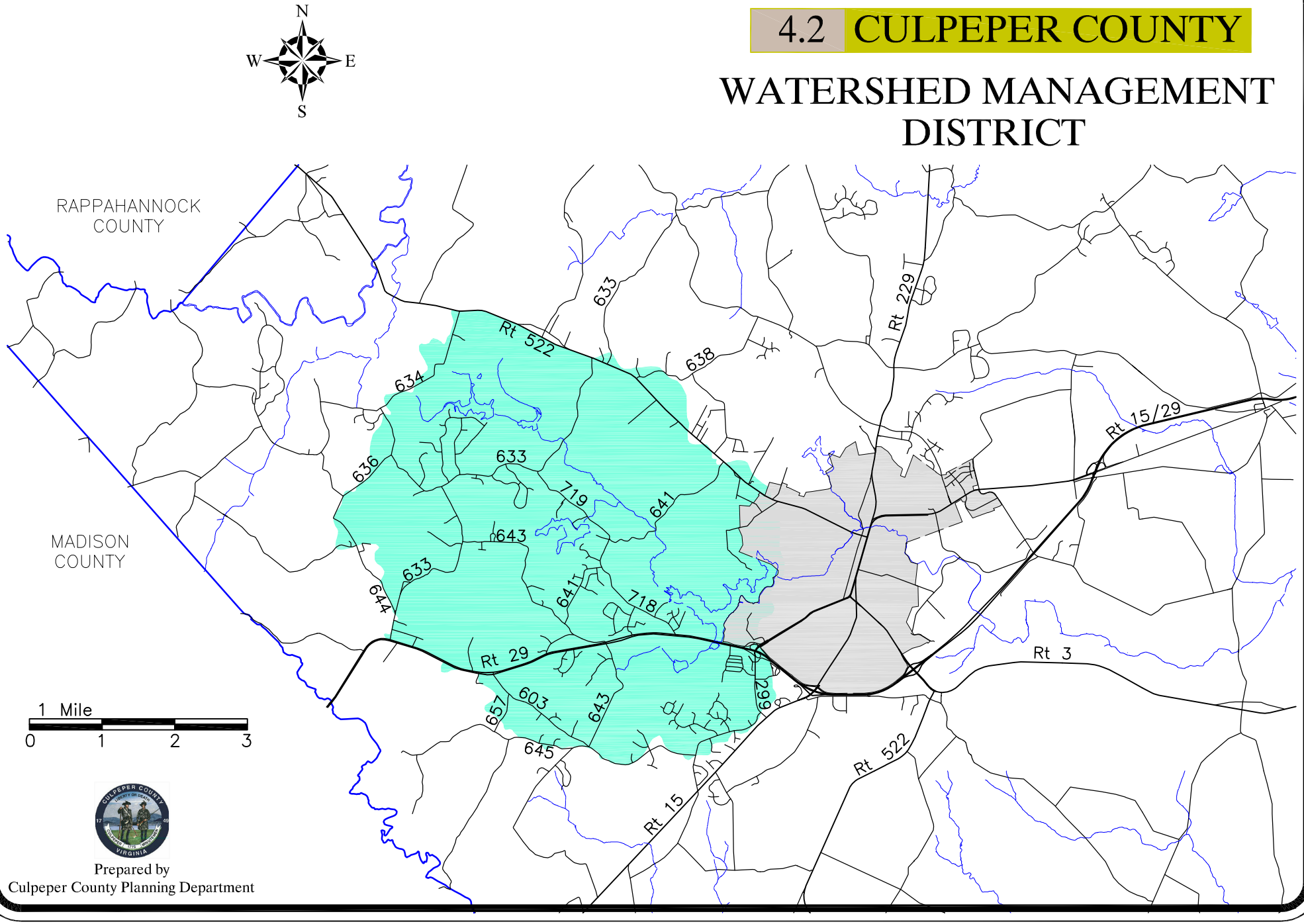
4.2 CULPEPER COUNTY

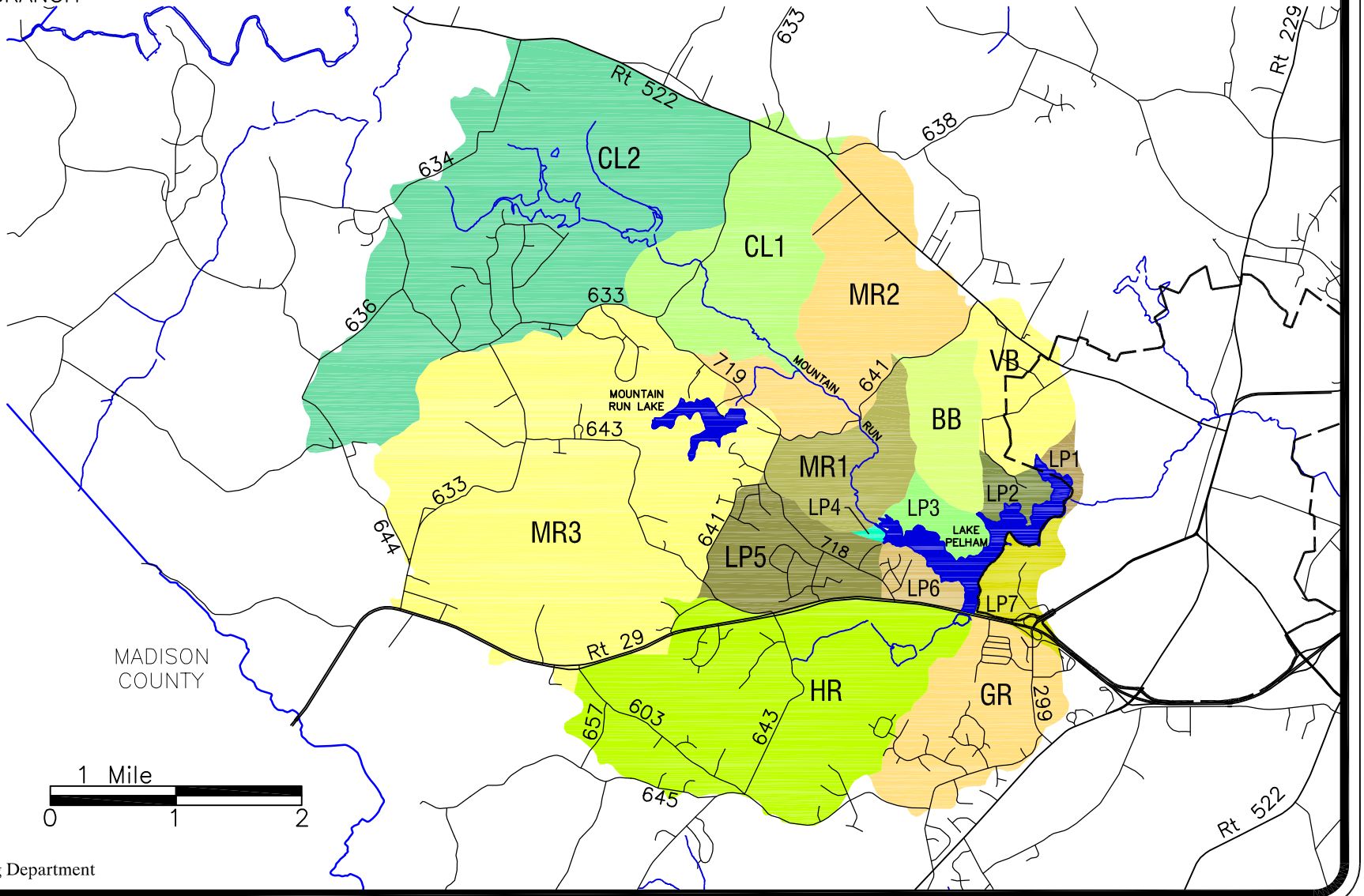
WATERSHED MANAGEMENT DISTRICT



DRAINAGE SUB-AREA DESIGNATION
BB–BOND BRANCH
CL–CAYNOR LAKE
GR–GAINES RUN
HR–HUNGRY RUN
LP–LAKE PELHAM
MR–MOUNTAIN RUN
VB–VAUGHN BRANCH

4.3 CULPEPER COUNTY

LAKE PELHAM & MOUNTAIN RUN LAKE DRAINAGE SUB-AREA DESIGNATIONS



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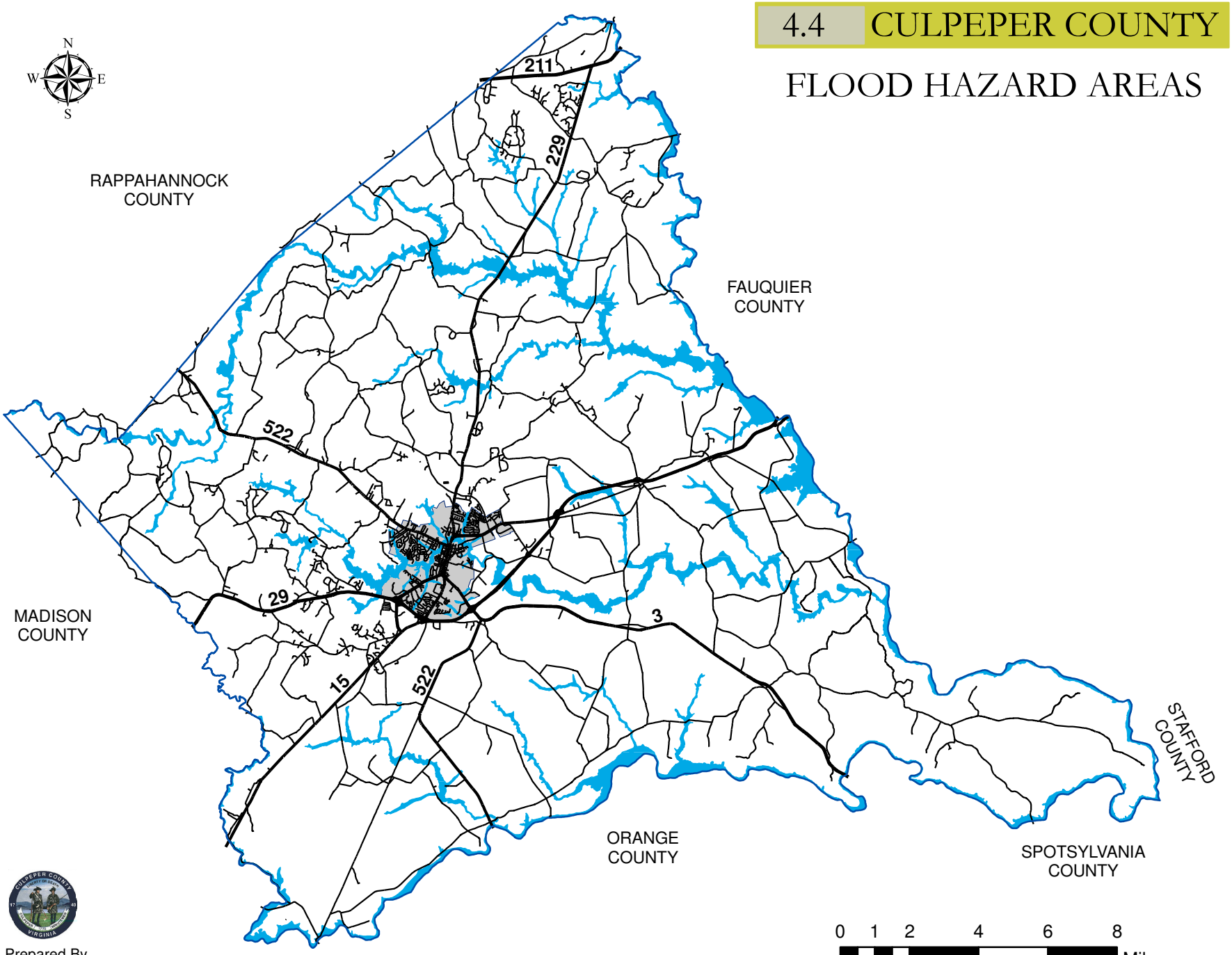
4.4 CULPEPER COUNTY

FLOOD HAZARD AREAS



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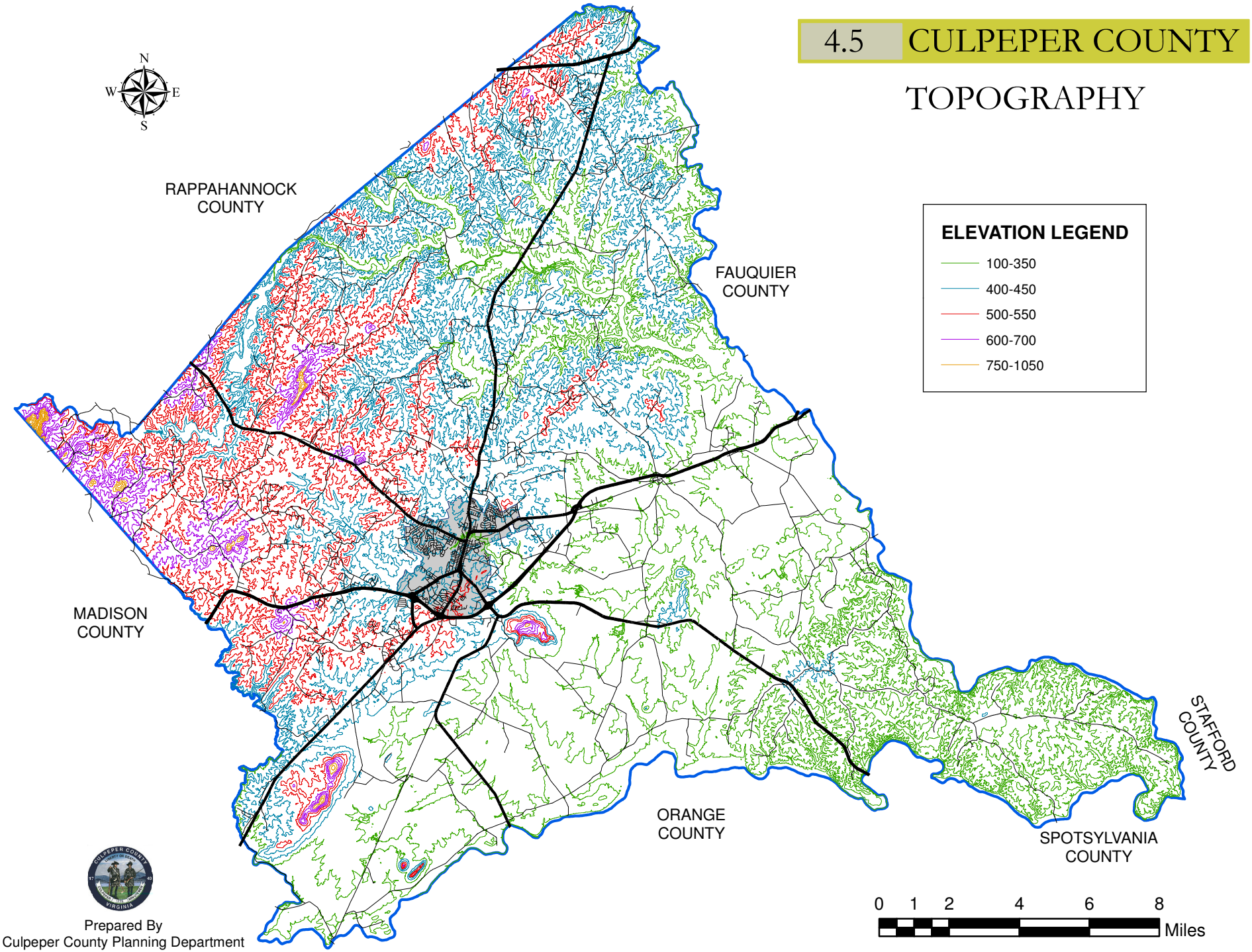
4.5 CULPEPER COUNTY

TOPOGRAPHY



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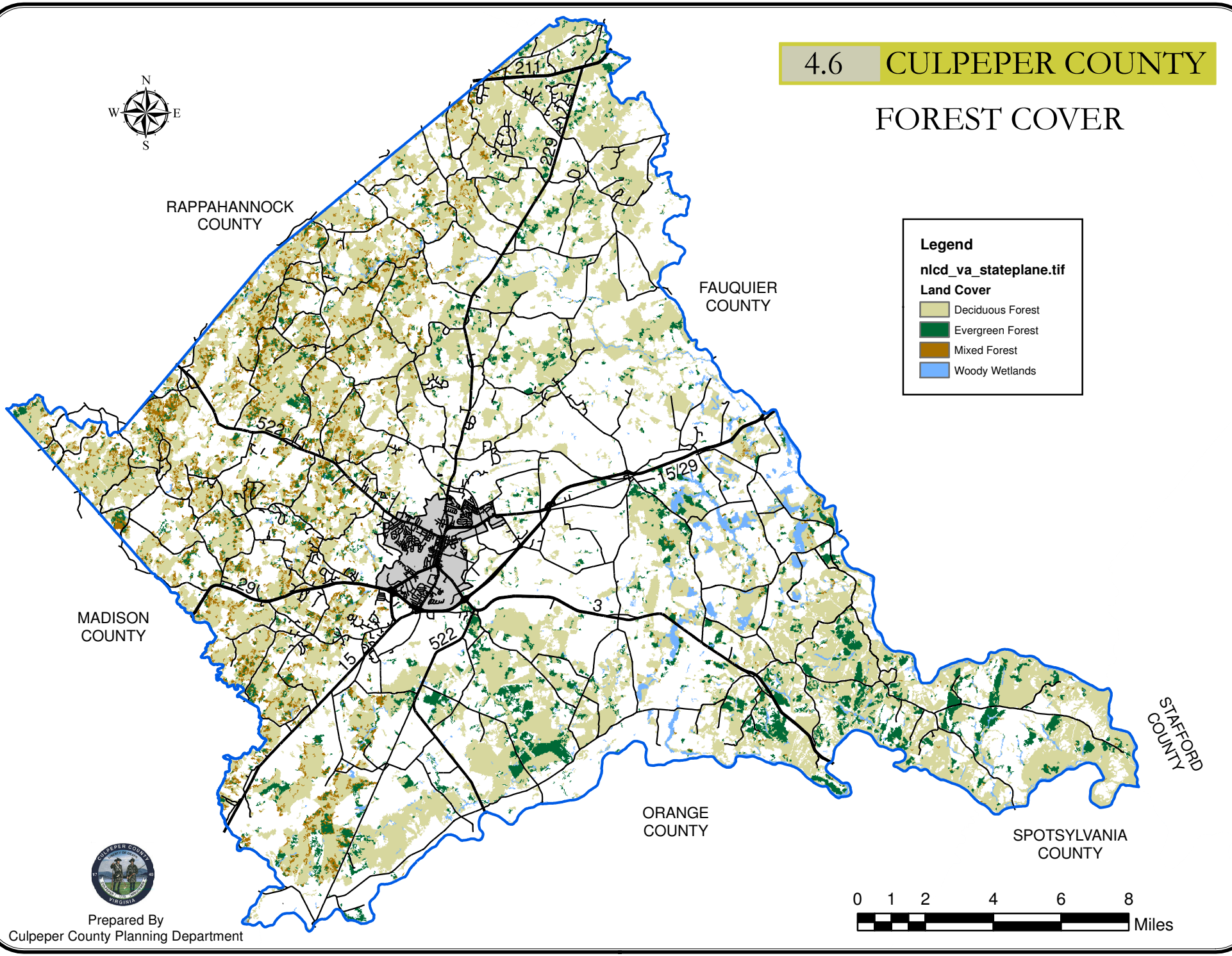
4.6 CULPEPER COUNTY
FOREST COVER
N
W
E
S
RAPPAHANNOCK COUNTY
FAUQUIER COUNTY
MADISON COUNTY
ORANGE COUNTY
SPOTSYLVANIA COUNTY
STAFFORD COUNTY
211
229
522
15/29
29
3
15
Legend
nlcd_va_stateplane.tif
Land Cover
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
0 1 2 4 6 8
Miles
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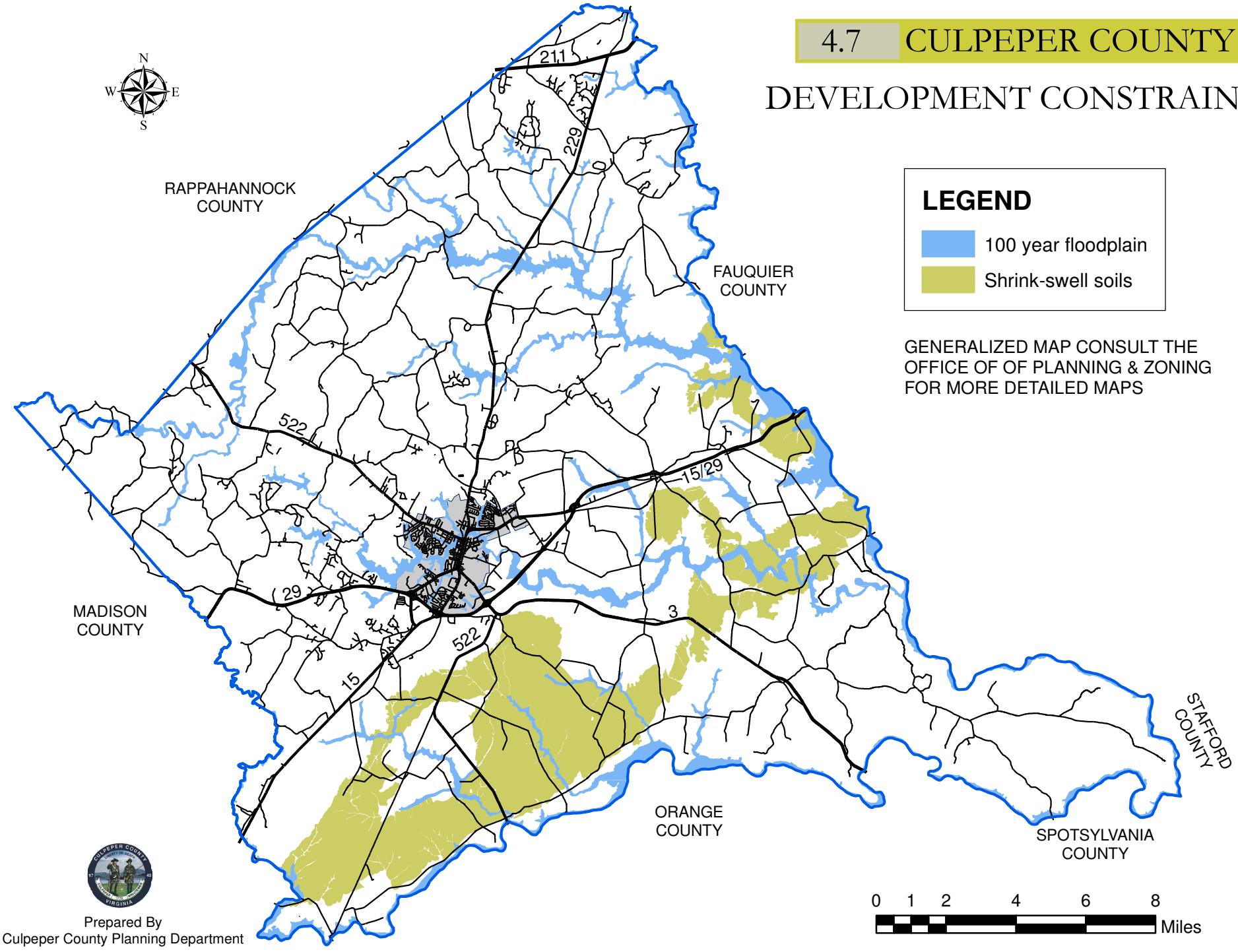
4.7 CULPEPER COUNTY

DEVELOPMENT CONSTRAINTS



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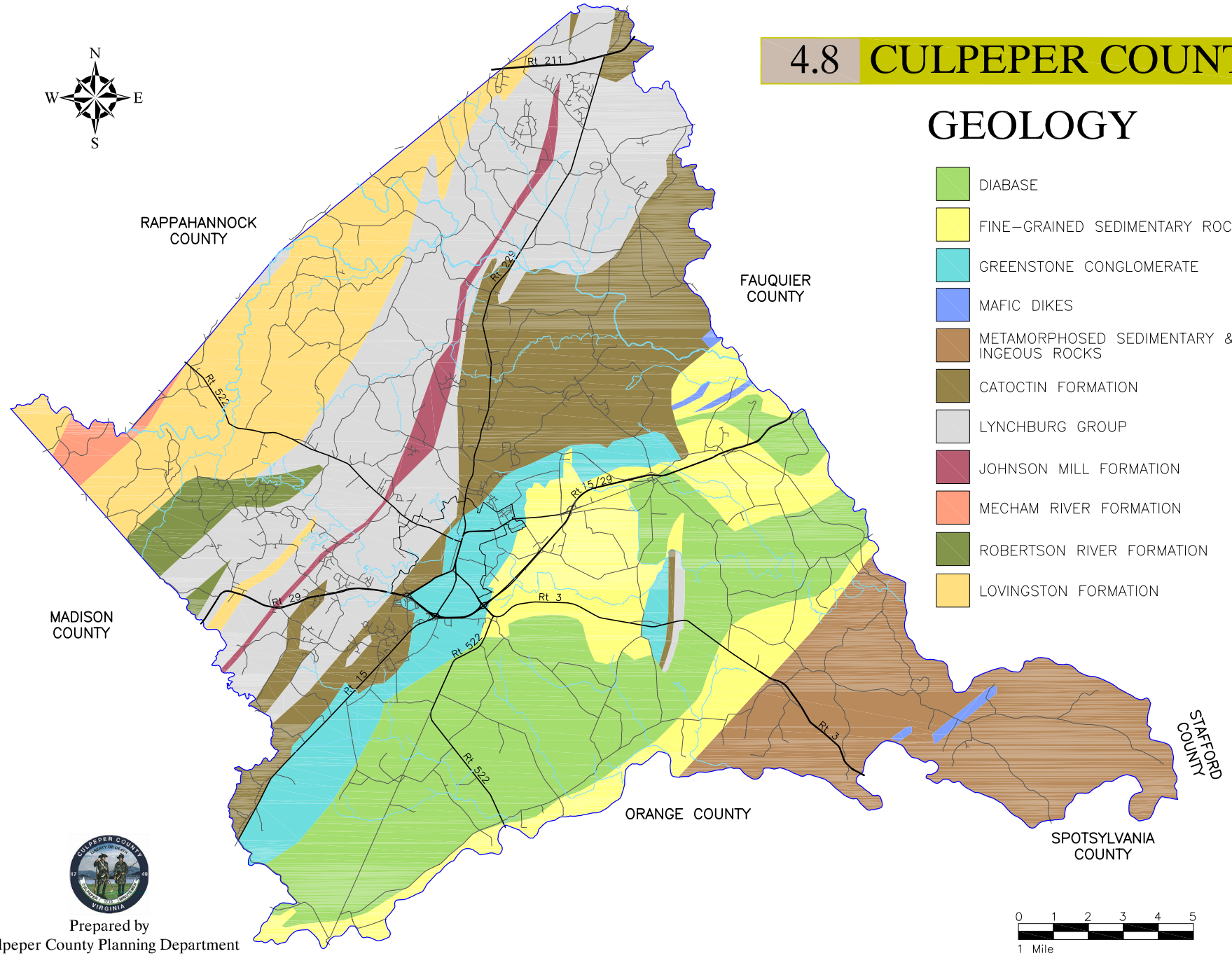
4.8 CULPEPER COUNTY

GEOLOGY



- DIABASE
- FINE–GRAINED SEDIMENTARY ROCKS
- GREENSTONE CONGLOMERATE
- MAFIC DIKES
- METAMORPHOSED SEDIMENTARY & INGEOUS ROCKS
- CATOCTIN FORMATION
- LYNCHBURG GROUP
- JOHNSON MILL FORMATION
- MECHAM RIVER FORMATION
- ROBERTSON RIVER FORMATION
- LOVINGSTON FORMATION

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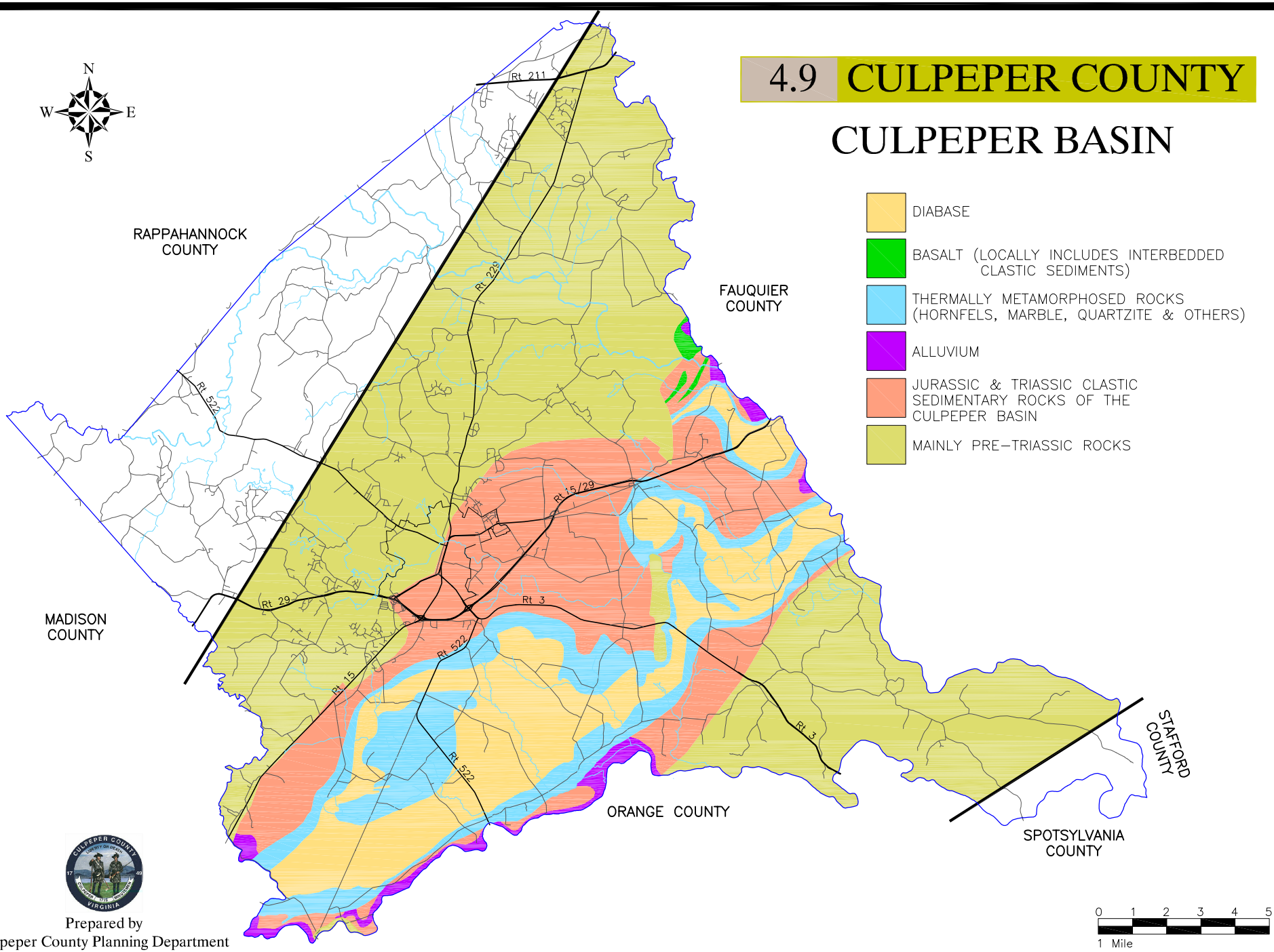
4.9 CULPEPER COUNTY

CULPEPER BASIN



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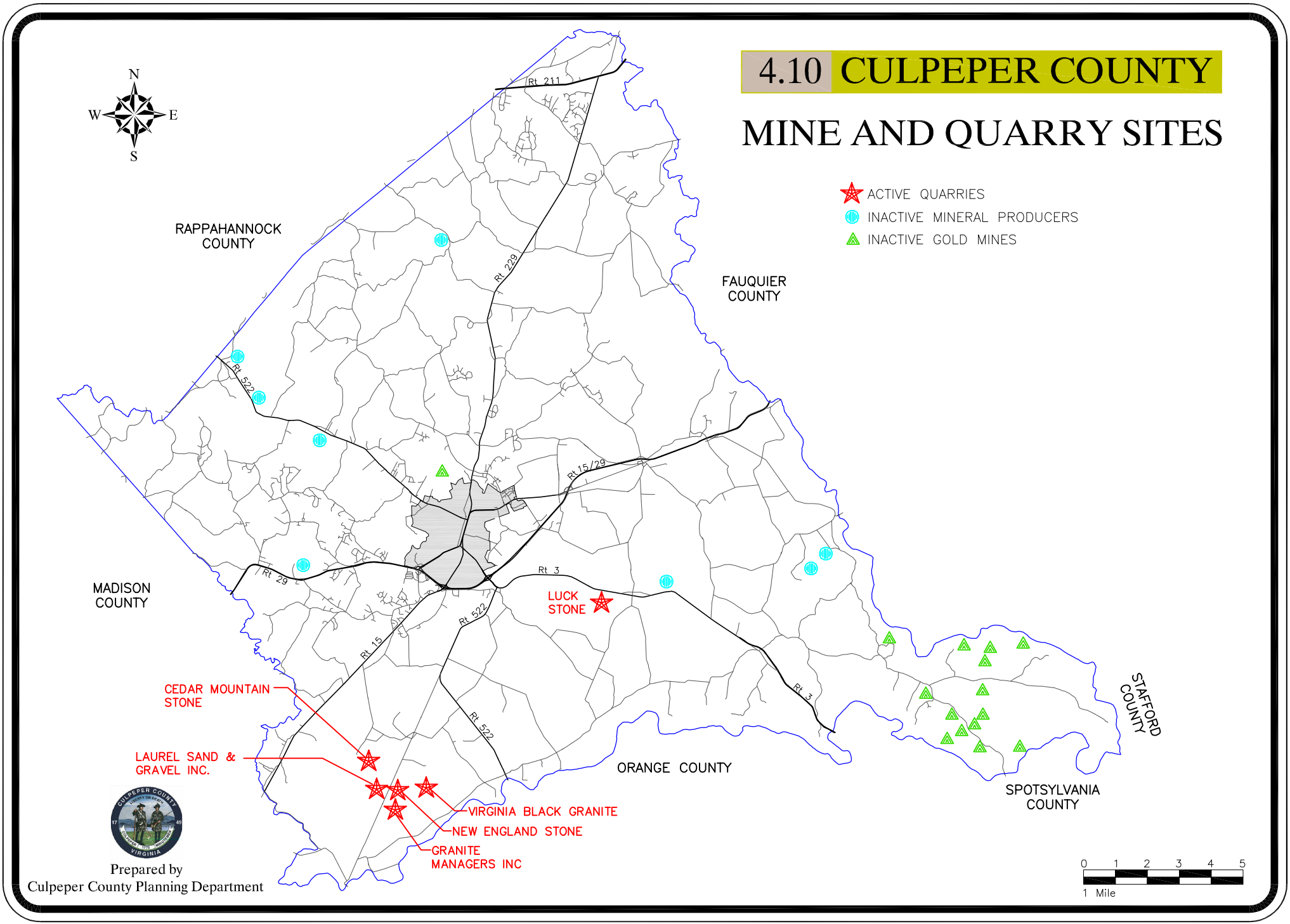
4.10 CULPEPER COUNTY
MINE AND QUARRY SITES
ACTIVE QUARRIES
INACTIVE MINERAL PRODUCERS
INACTIVE GOLD MINES
N
W
E
S
RAPPAHANNOCK COUNTY
FAUQUIER COUNTY
MADISON COUNTY
ORANGE COUNTY
SPOTSYLVANIA COUNTY
STAFFORD COUNTY
Rt 211
Rt 229
Rt 522
Rt 15/29
Rt 29
Rt 3
Rt 15
LUCK STONE
CEDAR MOUNTAIN STONE
LAUREL SAND & GRAVEL INC.
VIRGINIA BLACK GRANITE
NEW ENGLAND STONE
GRANITE MANAGERS INC
0 1 2 3 4 5
1 Mile
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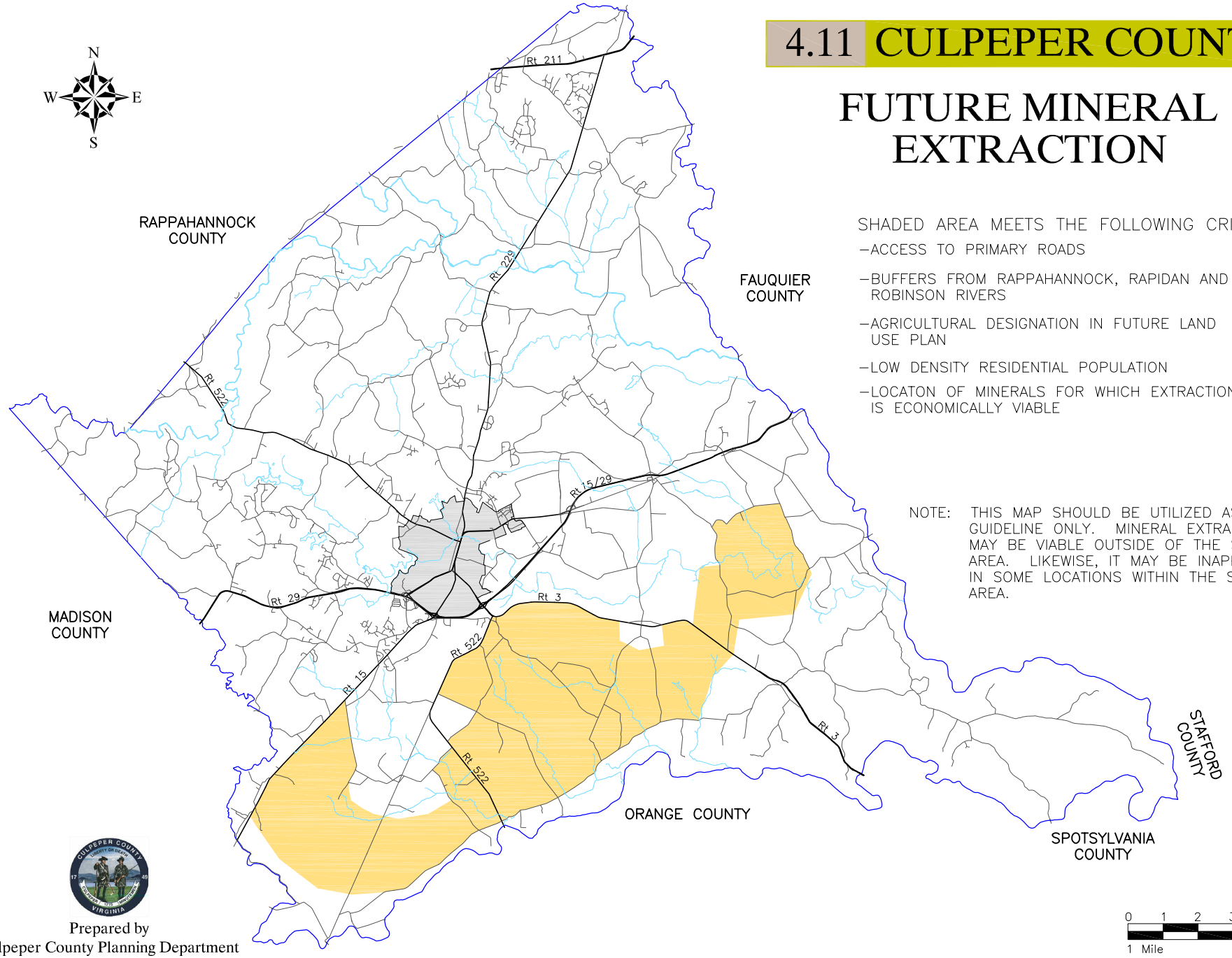
4.11 CULPEPER COUNTY

FUTURE MINERAL EXTRACTION



SHADED AREA MEETS THE FOLLOWING CRITERIA:

- ACCESS TO PRIMARY ROADS
- BUFFERS FROM RAPPAHANNOCK, RAPIDAN AND ROBINSON RIVERS
- AGRICULTURAL DESIGNATION IN FUTURE LAND USE PLAN
- LOW DENSITY RESIDENTIAL POPULATION
- LOCATON OF MINERALS FOR WHICH EXTRACTION IS ECONOMICALLY VIABLE

NOTE: THIS MAP SHOULD BE UTILIZED AS A GUIDELINE ONLY. MINERAL EXTRACTION MAY BE VIABLE OUTSIDE OF THE SHADED AREA. LIKEWISE, IT MAY BE INAPPROPRIATE IN SOME LOCATIONS WITHIN THE SHADED AREA.

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ENVIRONMENT GOALS AND OBJECTIVES

General

GOAL: PRESERVE AND IMPROVE THE QUALITY OF THE COUNTY'S SOIL, WATER, AIR, FORESTS AND FARMLAND.

GOAL: PROTECT ENVIRONMENTALLY SENSITIVE AREAS FROM DEVELOPMENT.

OBJECTIVES:

1. Require development to meet the highest standards in erosion and sediment control and storm water management.

2. Utilize groundwater studies to minimize excessive and inappropriate ground water withdrawals.

3. Require an impact assessment from any use that proposes to introduce hazardous wastes into the atmosphere, soil or water as a condition of review and approval.

4. Encourage preservation of forested lands and waterways that provide long-term environmental benefits to water quality, recreation, tourism, general aesthetics, and which reduces air and noise pollution.

5. Prohibit new construction in flood hazard areas.

6. Support and promote the preservation of significant wetlands as identified by Federal Government guidelines.

7. Identify prime farmland and promote public policies designed for its preservation and general conservation.

GOAL: MAINTAIN THE RURAL CHARACTER OF CULPEPER COUNTY.

OBJECTIVES:

1. Manage land-consumptive development through policies and development incentives which support rural characteristics.

2. Encourage residential and commercial development within the designated village centers where it can be economically and conveniently served by public facilities.

3. Encourage the effective maintenance of open space by restricting strip development and offering cluster alternatives in its place.

4. Encourage the design of subdivisions that provide adequate open space commensurate with the number and need of prospective residents and the County viewscapes.

5. Limit the extension of infrastructure improvements into agricultural and natural resource areas.

6. Ensure capital improvements are implemented in a manner which will enhance the quality and character of the rural nature of the County of Culpeper.

GOAL: PROTECT WATER RESOURCES AND WATER QUALITY FROM DETERIORATION FROM ALL SOURCES OF POLLUTION.

OBJECTIVES:

1. Provide technical assistance to farmers and property owners through the SWCD to reduce soil erosion; implement the Virginia Agricultural Best Management Practices (BMP) Cost Share Program and other strategies that minimize impacts on both surface and ground water quality from fertilizers, pesticides, soil erosion and other related pollutants.

2. Recommend to forest land owners, through the Virginia Extension Agent, that they develop a forest conservation plan which addresses timber stand improvements, utilization of damaged timber, sound harvesting techniques, pest control and reforestation practices.

3. Ensure that municipal waste is properly treated before being discharged. Limit or prohibit the use of individual septic systems in development areas and require wastewater pre-treatment and/or testing for businesses and industries.

4. Ensure informed decisions on rezoning applications, by requiring information concerning water quantity and quality, prime farm and forest land, urban and agricultural BMPs and storm water management.

5. Require both above ground and below ground storage tanks to have containment measures to prevent contamination of surface and groundwater due to leaks and spills.

GOAL: PROVIDE FOR A GREATER SUPPLY OF SUBSURFACE WATER FOR THE INDIVIDUAL RURAL USERS THAT ARE DEPENDENT UPON WELLS.

OBJECTIVES:

1. Inventory present water needs and supplies; locate water supply sources; and assess future needs and supplies.

2. Ensure that tests indicate clearly adequate groundwater resources as growth occurs in rural areas.

3. Encourage ground water testing and hydro-geologic studies.

4. Prevent local pollution of groundwater through the use of BMPs; the establishment of recycling programs for used oil; sponsoring household and farm hazardous waste cleanup days, and implementing public education programs.

5. Encourage the Virginia Department of Health (VDH) to assist owners of existing community and non-community wells to treat secondary contaminants such as iron and manganese.

GOAL: ENCOURAGE WATER SUPPLY PROTECTION AND FLOOD PREVENTION.

OBJECTIVES:

1. Consistent with federal and Virginia law, develop a public policy regarding water quality. This should include drinking water, effluent discharge, as well as underground water sources for agriculture, residential, commercial and industrial development.

2. Encourage the development of educational programs in the school systems to teach conservation, wise use of resources, and environmental awareness.

ONLINE RESOURCES

Culpeper Regional Water Supply Plan

Soils Data

Culpeper Soil and Water Conservation District

Stream Flows

Virginia Stormwater Management Program (VSMP)

Department of Environmental Quality

DEQ Impaired Streams List

Regional Planning District 9 www.rrregion.org