

## Chapter Twelve: Natural Resources

The natural resources of an area are the building block upon which all development begins. An understanding of the basic natural environment is important to the planning process - especially as the city looks to develop in a way that sustains the natural environment. The following information is an analysis of the natural environment in the Charlottesville area.

### Climate

Charlottesville has mild winters and humid summers, due in part to its location. It is situated on the western edge of the Piedmont Plateau, in the foothills of the Blue Ridge Mountains. Characterized by broad rolling hills and moderate slopes, Charlottesville has a mean temperature of 56.7° F and receives about 47 inches of precipitation in a typical year.

In winter, the city's average temperature is 37.5° F. Charlottesville is considerably warmer than nearby localities having the same elevation. The Blue Ridge Mountains are the reason for the temperature difference. They act as a barrier to the Arctic air masses, lessening their severity. Temperatures fall below freezing only about 60 days out of the year. Winter precipitation is primarily in the form of rain, although Charlottesville receives an average of 15 inches of snow annually.

Summers in Charlottesville are warm and moist, with highs in the mid-80's and lows in the mid-60's. Much of the 13 inches of precipitation that falls in the summer can be attributed to thunderstorms, whereas most of the precipitation throughout the rest of the year is the result of frontal systems. About 40 afternoon or evening thunderstorms occur during a typical summer.

The spring and fall are typically mild with highs in the upper 60's and lows in the mid-40's. Precipitation averages just below 13 inches for both seasons. The trees begin to blossom in March and fall foliage is usually at its peak between October 15th and 20th. (Source: Virginia State Climatology Office)

### Geology

Charlottesville is located on the western edge of the Piedmont Plateau, the largest physiographic province in Virginia. The humid climate is responsible for the deeply weathered bedrock that lies beneath a layer of soil and saprolite. Much of the bedrock in and around Charlottesville was formed sometime during the Proterozoic era (2500-544 million years ago) and Early Paleozoic era (544-245 mya) on the margin of ancient North America. Most of the bedrock is made up of igneous and metamorphic rocks.

The Charlottesville Formation, which makes up over a third of the bedrock found beneath the city, contains fine-grained metamorphic rocks that were created during the Precambrian Age. The formation contains large amounts of quartz-biotite gneiss and a few beds of sericitic and graphitic gneiss. The Charlottesville formation is about one mile wide and runs through the center of the city in a southwest to northeast direction. Unweathered outcrops of gneiss can be seen on Rose Hill Drive where it crosses Schenks Branch.

Beneath the eastern part of Charlottesville lies Catoctin greenstone, a formation containing both igneous and metamorphic rock. The formation was created by a series of basaltic lava flows between which layers of sediment were deposited. Over time, the sedimentary rock and lava have metamorphosed. After the formation of the greenstone, molten lava containing orthoclase, microcline, and subordinate quartz pushed its way up through the Catoctin formation. An alaskite dike runs southwest to northeast from Fry's Spring up through Greenbrier.

Between the Catoctin and Charlottesville formation lies the Swift Run formation. Made up of quartzitic sandstone, a sedimentary rock, the Swift Run formation contains large blue quartz pebbles. The rock is 2,250 feet thick near Ridge Street.

Amphibolite dikes are found throughout the western half of Charlottesville. Two narrow dikes exist within the Swift Run formation near Ridge Street, and an 830-foot wide dike runs beneath the Lawn. The latter dike,

appropriately named the University amphibolite dike, is bordered on both sides by faults. All of the amphibolite dikes are from the Precambrian Age.

A narrow strip of the Johnson Mill formation exists between the Charlottesville formation and the University amphibolite dike. This formation is made up of graphite slate with pyrite spread throughout. This metamorphic rock is between 240 and 400 feet thick and was created during the Cambrian Age.

The Lynchburg formation underlies several of the northwestern neighborhoods including Venable, Barracks/Rugby, and Meadows/Route 29. The formation is between 4,500 and 12,000 feet thick. The once fine-grained silty sediments metamorphosed into medium to fine-grained biotite-quartz gneiss and graphitic and sericitic schist during the Precambrian Age.

Beneath the Lewis Mountain and Barracks neighborhoods lies the Rockfish conglomerate formation. The lower part of the rock layer is made up of rounded pebbles and boulders that are overlain by a thick layer of metamorphosed sandstone.

## **Soils**

Charlottesville is located within the Piedmont Plateau, which is characterized by numerous small streams which cut a broad plain up into sections of rolling to hilly relief. Charlottesville's soils are loams, meaning that they contain clay, sand, and a mixture of organic material. The loams are slightly to strongly acidic.

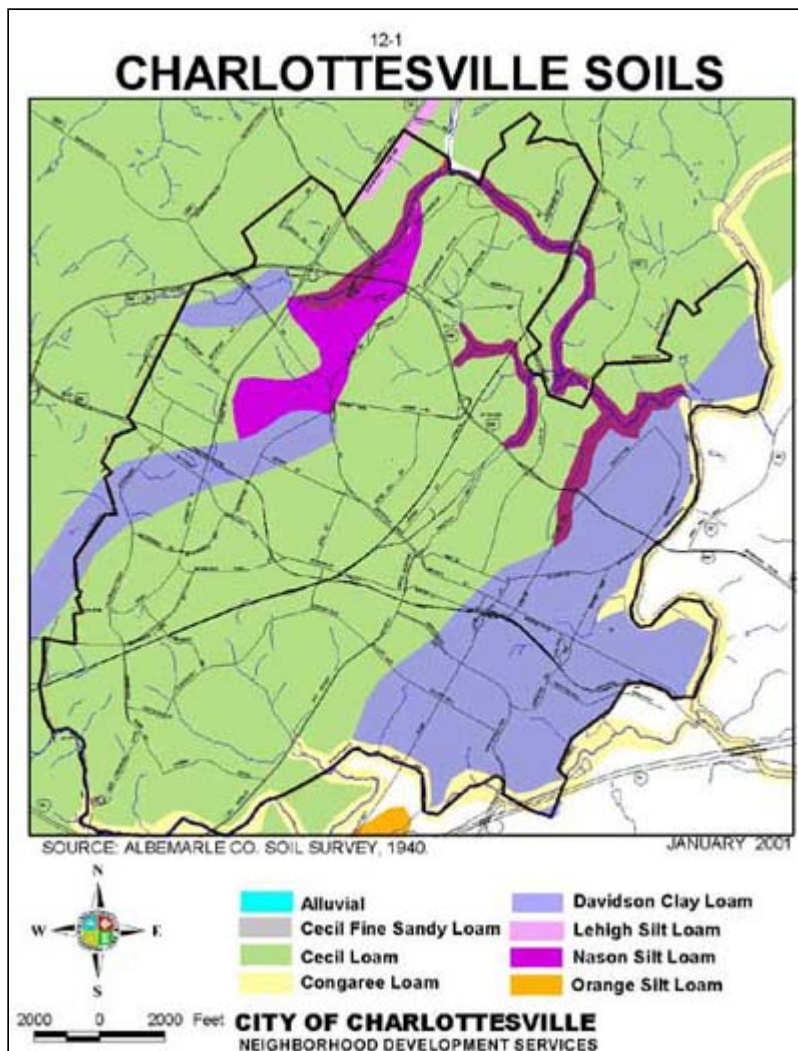
The most abundant soil in the western part of Charlottesville is Cecil loam, a grayish-brown to light reddish-brown mellow loam. Although it is susceptible to sheet erosion, the soil can be quite fertile if maintained properly. Cecil loam's parent rock is granite.

Davidson clay loam makes up much of the soil in the Belmont, Woolen Mills, and Martha Jefferson neighborhoods. The reddish colored soil is well drained both internally and externally and is considered the most productive soil in the Piedmont Plateau. Davidson clay loam is underlain by basic rock such as diorite and amphibole.

Congaree silt loam is brown or grayish-brown and is found in many streambeds throughout the city. The soil is well drained but is subject to overflow during a storm. Congaree is the most fertile soil in Albemarle County.

Lehigh silt loam is grayish-brown floury silt loam that lies atop drab silty clay that is very tough and hard when dry and sticky when wet. Lehigh silt loam is underlain by graphitic schist or metamorphosed shale. This soil is found in a very small amount along Route 29 North.

Nason silt loam is grayish-yellow in color and has a floury feel. The soil does not absorb rainwater and loses a lot of material due to severe washes. A reddish-yellow silty clay subsoil is exposed where erosion has occurred. The parent material of Nason silt loam is schist. This soil is found in the western edges of the Barracks/Rugby and Venable Neighborhoods.



## Vegetation

Biophysical processes such as growth, invasion, succession, fire and disease shape the natural environment into recognizable biological communities. The vegetation found within the City of Charlottesville has been categorized according to the biological processes that affect the landscape. The city's vegetation has been divided into four types: complex forest, developed understory, suburban cover and urban cover.

The first vegetation type is the complex forest. The ecosystem processes in the forest remain intact. These forest fragments are characterized by their mature trees and may or may not have an understory. They are valuable ecosystems that provide homes to numerous species of plants and animals.

In the developed understory category are canopy species with most of the understory remaining. The biophysical processes in these areas operate in a limited fashion.

The third type of vegetation found within the city is suburban cover. It includes canopy trees and lawn. Invasive species thrive in these mostly human maintained ecosystems.

Urban cover is the final and least biodiverse of the four categories. It consists of singular trees or volunteer vegetation. Only specialized or highly adaptive species thrive in areas with urban cover and the vegetation is almost entirely maintained by humans.

## Fauna

There are 375 different types of species living in Charlottesville. The city boasts close to 200 species of birds, including the state bird, the northern cardinal. Fifty-four of the 74 terrestrial invertebrates that make their home

in the city are butterflies. The tiger swallowtail butterfly, Virginia's state insect, can be found within the city limits. There are 46 species of mammals, 33 species of reptiles, 22 species of amphibians, and two species of fish found within the City of Charlottesville