

Physical Environment

Description of Roan Assessment Area

The Roan Assessment Area is located about ten miles east of Unicoi, Tennessee in the Blue Ridge Mountains. The area is located in the Southern Metasedimentary Mountain Eco-region. The assessment area is approximately 64 square miles (40,964 acres) in size, and only 22 square miles (14,091 acres) is FS ownership. The assessment area covers portions of four 6th level watersheds including Little Doe River, Middle Doe River, Upper Doe River, and Buck Creek. Elevation in the area ranges from about 2001 feet in the northwest corner of the analysis area along the Little Doe River to 6256 feet at Roan High Knob.

The project area has an average annual temperature of 55 degrees Fahrenheit. January is usually the coldest month with an average temperature of 35 degrees Fahrenheit, while July is usually the hottest month with an average temperature of 75 degrees Fahrenheit. The area averages about 55 inches of precipitation annually, which is distributed somewhat evenly throughout the year. March is usually the wettest month with an average of 5.9 inches of precipitation, while October is usually the driest with an average of 3.0 inches of precipitation. The length of the growing season is approximately 180 days per year. Prevailing winds in eastern Tennessee are predominantly from the southwest.

Soils

The landform of the area is characterized by steep, dissected mountains and narrow V-shaped valleys. The physical character of the project area is greatly influenced by the geology associated with the Blue Ridge Physiographic province. Geology is a mixture of Precambrian-age metamorphic and sedimentary materials such as bouldery colluvium; Precambrian sandstone, siltstone, shale, quartzite, greywacke, arkose, phyllite, slate and schist and Quaternary sandy shaly colluvium; Cambrian shale, sandstone, siltstone, quartzite and conglomerate. The diverse parent material along with other factors such as aspect, topography, and climate has resulted in soil types with different characteristics. Common soil series found within the assessment area includes Burton-Wayah Complex, Chestnut, Cleveland, Porters, and Unaka.

Burton soils are found on slopes ranging from 15 to 95 percent. The parent material is residuum weather from igneous and metamorphic rock. These soils are well drained and available water to a depth of 60 inches is moderate. Organic matter in the surface horizon is about 12 percent.

Wayah soils are very similar to Burton soils. Parent material for Wayah soils also includes soil creep, and available water is found at 72 inches.

Chestnut soils have slopes ranging from 20 to 35 percent. These soils have residuum parent material that formed from igneous and metamorphic rock. These soils are well drained and available water to a depth of 60 inches is low. The surface horizon contains approximately 4 percent organic matter.

The Cleveland soil series in this area have slopes ranging from 50 to 80 percent. Parent material is residuum from igneous and metamorphic rock. These soils are well drained and available water to a depth of 60 inches is very low. The organic matter content is about 4 percent in surface horizons.

The Porters soil series in this area has slopes ranging from 15 to 80 percent. Parent materials include soil creep and residuum from igneous and metamorphic rock. These soils are well drained and the available water to a depth of 60 inches is low. Organic matter content is about 1 percent in the surface horizon.

Unaka soils in this area have slopes ranging from 15 to 60 percent. The parent material is residuum formed from igneous and metamorphic rock. These soils are well drained and available water to a depth of 60 inches is low. Organic matter content in the surface horizon is approximately 6 percent.

Water

Drainages within the assessment area include Doe River and several tributary streams of the Watauga River including Five Poplar Branch, Heaton Creek, George Creek, Clarke Creek, and Tiger Creek to name a few. With the exception of the headwaters the majority of all the streams in the assessment area are found on private land. Land ownership within the assessment area is approximately 34% national forest and 66% in private ownership.

Stream flow varies seasonally due to rainfall and evapo-transpiration. Higher discharges generally occur in the winter and spring months while low flows generally occur in the late summer and fall. Low flows (7Q10) generally range from 0.1 to 0.5 cfs per square mile of watershed.

Valley types within this assessment area exhibit moderate relief, are generally stable, and have moderate side slope gradients. The upper reaches of streams can be described as A and B types by the use of the classification system developed by Rosgen (Rosgen, 1994). Stream gradients are generally steep in the upper reaches of the watershed (10% +) with low stream sinuosity. Channel materials are predominantly cobble with a mixture of bedrock, boulders, gravel and sand. Larger streams generally have a decrease in gradient, and stream types are more characteristic of B and C channels. Both of these stream types are generally stable.

The water quality of streams occurring on national forest within the assessment area can generally be characterized as low in conductivity, low in alkalinity, slightly acidic, low in nutrients, and generally free of excessive sediment. Based on empirical evidence,

however, localized sediment input and deposition into streams from private land practices is a water quality concern.

The water qualities of streams on national forest lands have been found to meet their use classifications. However, some portions of streams on private lands are on the State of Tennessee's 303(d) list. In this assessment area 6.2 miles of Hampton Creek considered by the State of Tennessee to be Category 5 (one or more uses impaired) due to Physical substrate habitat alterations, and channelization.

The Tennessee Eco-region Project has completed an initial effort to establish reference conditions for water quality by eco-region (TDEC, 2000). A summary of selected water quality statistics for the Blue Ridge Eco-region represented in the assessment area is displayed in Table 2 below. The data values and statistics shown represent sites within the entire eco-region, and provide a first approximation of reference water quality.

Table 2. Descriptive Statistics of Water Quality Data for Blue Ridge Eco-region

<u>Parameter</u>	<u>Unit</u>	<u># Observations</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Median</u>	<u>Mean</u>
Temp	° C	153	1.01	24.72	11.60	11.67
Dissolved Oxygen	Mg/l	152	7.74	16.60	10.06	10.31
Suspended Residue	Mg/l	164	5.00	49.00	5.00	5.51
Dissolved Residue	Mg/l	164	5.00	126.00	22.00	26.96
Turbidity	NTU	163	0.10	15.00	0.90	1.50

While the reference conditions present the best case in terms of water quality, the desired future condition for water quality within the assessment area would be for all waters to continue to achieve their designated use criteria established by the State of Tennessee.

Water Quality

Rosgen, Dave L. 1994. *A Classification of Natural Rivers*. Catena 22. Pages 169-199.

Tennessee Department of Environment and Conservation, Division of Water Pollution Control. 2000. Tennessee Ecoregion Project 1994-1999.