

# Roanoke River Basin

(posted with the permission of Watt Foster who contributed this document)

One of the largest watersheds in the state, the Roanoke River Basin is located in the southern region of Virginia. It is bordered by the New River Basin to the west, James River Basin to the north, Chowan River Basin to the east, and continues south into Plymouth, North Carolina toward the Albemarle Sound. The Roanoke River watershed comprises approximately 16 percent of Virginia's total land area, covering roughly 9,580 square miles. It covers a wide range of topography, beginning in Montgomery County at the base of the Blue Ridge Mountains and flowing southeasterly through Blue Ridge and Piedmont Provinces, as well as northwesterly through the Valley and Ridge Province.

Affecting a total of sixteen counties and six cities in Virginia, as well as many municipalities in North Carolina, the Roanoke River Basin is comprised of four major reservoirs and numerous rivers. Kerr, Smith Mountain, Leesville, and Philpott reservoirs are used for hydroelectricity and recreation. Kerr Reservoir is the largest, totaling 49,000 acres at the junction of the Roanoke River and North Carolina state line. Smith Mountain Lake, 20,000 acres, and Leesville Lake, 3,400 acres, are located in the northern region of the basin. Philpott reservoir, 2,880 acres, is located near Martinsville. The Roanoke River Basin also includes Lake Gaston and Roanoke Rapids Lake, located in North Carolina. The main rivers in the Roanoke River Basin are the Roanoke, Staunton, and Dan Rivers. Flowing around the borders of Montgomery, Roanoke, and Floyd counties, as well as through Smith Mountain Lake, Leesville Reservoir, and Kerr Reservoir, the Roanoke River is 410 miles long. The Staunton River is actually part of the Roanoke River, comprising the portion that flows along the northern and eastern border of Halifax County. A popular river for outdoor recreation, the Staunton River is nationally known for its striped bass hatchery. Major tributaries of the Roanoke and Staunton Rivers include Little Otter, Big Otter, Blackwater, Pigg, and Falling Rivers, as well as Goose Creek and Tinker Creek. The Dan River is 180 miles long. Also a popular river for fishing, it includes the "Grand Canyon of Virginia", a rugged gorge that attracts anglers from across the state. Eventually, the Dan River merges with the Staunton River to form Kerr Reservoir. Major tributaries of the Dan River include Hyco, Banister, and

Smith Rivers. The Roanoke River Basin also contains an abundant number of smaller rivers, creeks, and streams such as South Mayo River, Cherrystone Creek, Peters Creek, Mudlick, Ore Branch, and Lick Run.

Currently, there are many issues facing the Roanoke River Basin. Water quantity is a major concern, including drought, flooding, and water withdrawals from municipalities and industries. Drought is a period of abnormally low rainfall, which causes a negative flow of water. This means that there is more water going out than coming in. This is a considerable problem, causing negative environmental, social, and economic effects. Within the environment, drought causes slower water flows and lowers water levels, which causes higher temperatures within the rivers. This rise in water temperature depletes oxygen in the rivers, leading to diseased fish and even extensive fish kills. Low water levels cause higher concentrations of pollution and can cause depletion in groundwater, affecting areas far beyond the site of rivers and streams. These problems do not have an easy solution or quick recovery. Any rainfall that occurs during a drought is quickly intercepted by vegetation or absorbed by the ground. In order to meet the needs of the environment, as well as improve the conditions of rivers, an extended period of sustained rainfall is necessary. These conditions can lead to social concerns, as the discharge rate from reservoirs is often reduced to compensate for the drought. If a drought is severe enough, state and local governments will impose restrictions on nonessential water use, such as washing cars and watering lawns.

Economically, businesses may also be affected by a drought if they depend on fresh water to operate. For example, farmers often experience a decrease in crop quality or even crop loss. These industry concerns of availability of water necessary to run operations can significantly impact the economic growth of an area.

The drought of 2002 had a major impact on the Roanoke River Basin. Numerous river and stream flows fell to below the tenth percentile of recorded inflows for the day and some reached record lows almost daily. As water levels dropped, stakeholders across the entire basin felt the repercussions. Governor Warner placed water restrictions on the entire state of Virginia, including the Roanoke River Basin. Restrictions occurred in North Carolina as well. Power companies, such as American Electric Power (AEP) which utilizes the Smith Mountain Lake and Leesville and Southeast Power Administration

(SEPA) which generates power at Kerr and Philpott, were forced to modify operations. As of September 3, 2002, both companies had reduced discharge rates and power generation. As of August 2002, SEPA had spent approximately \$940,000 since the previous December to purchase power from the open market. Low water levels affected tourism as well, as summer is prime recreation season for the basin. As water levels decrease, boating becomes hazardous and boat ramp status is affected. David Coburn of NC State Parks estimates that the closing of boat ramps cuts visitation and tourism by 90 percent. This is a significant issue for small businesses that rely on tourism to survive. These problems facing power plants and tourism businesses are at odds, however, creating a clash of interests. A reduction of reservoir outflows is a partial solution for advocates of small tourism. Nevertheless, this is in direct conflict with area power plants which need reservoir outflow to operate. Paper mills, namely Weyerhaeuser, whose operations depend on fresh water, were threatened. Located near the Albemarle Sound, Weyerhaeuser could only skim fresh water from the top two meters of the river for a period of time in August, due to salt wedge movement from reduced river flows. These problems indicate a need for more supplemental water. For example, the storage of water could be increased through impoundment projects.

Flooding is another aspect of water quantity that can have negative consequences in the Roanoke River Basin. Flooding can occur across the entire basin area, and often results from hurricanes. Erosion and property damage are two common outcomes of flooding. Historically, the City of Salem has the highest cost per capita of property damage due to flooding than any local government in Virginia. The City of Roanoke has the highest cost of property damage overall. There may be prolonged closure of state roads, sometimes lasting up to several weeks. Flooding can also cause the overrun of sewage into rivers and streams, and in the most severe cases, flooding may cause the death of citizens. During flash floods in August of 2002, Henderson and Vance Counties (NC) experienced the overflow of 66,000 gallons of raw sewage and 500,000 gallons of non-disinfected wastewater entering the Nutbush Creek in the Roanoke River Basin, raising bacterial contamination levels significantly. The upstream dams in the basin provide protection to a certain extent. While dams are effective at reducing the magnitude of flooding, they also increase the duration of flooding during growing season in the lower basin. This prolonged period of flooding kills tree seedlings, plants, and animals, which creates an excess of

biological decay that depletes oxygen in water. The development of floodplain from its natural state increases the risk of flood damage. The lower Roanoke River Basin generally generates less damage than other basins, mainly because it remains in its natural state.

The withdrawal of water is a controversial issue currently facing the Roanoke River Basin. The basin supports numerous municipalities and industries across the area. The basin supports the municipalities of Danville, Martinsville, Bassett, Moneta, Rocky Mount, Brookneal, Altavista, Lawrenceville, Chatham, Roanoke, Salem, Halifax, South Boston, Clarksville and others in Virginia. The basin also supports Virginia Beach via a seventy-six mile pipeline, which runs from Lake Gaston to the coast. This occurred after a tense fourteen-year battle between Virginia and North Carolina. As of 2001, the Virginia Beach pipeline was permitted to withdraw a maximum of sixty million gallons per day. It averaged, however, less than forty million gallons per day. Within North Carolina, the Roanoke River Basin supports the municipalities of Eden, Mayodan, Reidsville, Yanceyville, Roxboro, Henderson, Warrenton, Littleton, Roanoke Rapids, Weldon, Jackson, Rich Square, Scotland Neck, Hamilton, Jamesville, Williamston, Windsor, Plymouth, and others. Currently, Raleigh and Durham are interested in using Kerr Lake as a potential source for the Triangle area's long-term water needs. Called the Section 216 Study at Kerr Dam/Reservoir, the project will surely be expensive, long, technically challenging, and met with strong opposition. A feasibility study is expected to last three years

Many industries find the rivers of the Roanoke River Basin an attractive site to locate. Paper mills, wood chip mills, and power plants use the rivers' resources to operate, but this can have a major impact. Dominion Generation, formerly called Vepco and located in Clover, was sued in 2000 over pollution issues. The harmful emissions produced by the power plant affected areas reaching as far as New York City, particularly by creating acid rain. The company has since been forced to reduce its amount of emissions. More recently, Dominion Generation, along with Person and Roxboro counties of North Carolina, were interested in building south of Roxboro and withdrawing water from the Dan River. The power plant planned to withdraw a maximum of 30 million gallons per day. While the power plant would have caused great economic growth in the area, it was opposed by many other Dan River communities. The operations of Dominion would have caused interbasin transfers, meaning that while

the Roanoke basin would have been the source of water and source of discharge water, 75 percent of the water would have been lost by evaporation to another basin. Dominion eventually backed off its proposal in February of 2003 due to “changing market conditions.” Person and Roxboro counties, however, are still proceeding with attempts to secure permits for withdrawal.

The Roanoke River Basin is a popular place for outdoor recreation. Boating, paddling, and fishing are common activities around the basin. The rivers and lakes of the basin contain a variety of fish species, including striped bass, sunfish, smallmouth bass, largemouth bass, white bass, walleye, and catfish. Trout fishing is extremely popular, with parts of the Roanoke River and various other creeks stocked by the Department of Game and Inland Fisheries. As of 2001, a one-mile stretch of the Roanoke River was included in a delayed harvest program. This preservation effort stocks trout from fall to spring. Any fish caught during this time must be released. Trout caught during the remaining months of June through September may be kept. This program allows fish to harvest during months of higher water and lower temperatures. Many of these trout fisheries are made possible by private property owners. Due to private property concerns, however, a number of rivers and streams will no longer be stocked. Issues such as litter and boating or docking on private property may account for this rise in private property postings. As the eco-tourism continues to increase around the waters of the Roanoke River Basin, recreation enthusiasts need to be aware that their behavior may affect any future access.

The water quality of rivers and streams are tested by the Department of Environmental Quality (DEQ). Any bodies of water not meeting the DEQ’s standards are labeled impaired. There are four main problems currently facing the rivers of the Roanoke River Basin. The main problem is fecal coliform. This increase in harmful bacteria has caused over thirty rivers and streams in the basin to fail or partially fail to meet the DEQ’s requirement for swimming use. Another problem according to the DEQ is referred to as General Standard – Benthic. Benthic organisms are organisms which live on or in lake bottoms, such as oysters, crabs, and clams. Flat, Town, Ash Camp, and Twittys Creek are experiencing degradation of these species. Low dissolved oxygen is a third problem facing the basin. This means that there has been a rapid decline in oxygen content, which is usually due to large accumulations of macroalgae. This problem, which exists in the Roanoke River, can result in extensive fish kills. Finally,

parts of the Dan River and Staunton River qualify for PCB fish advisories. PCBs are man-made chemicals which may contain up to 209 individual compounds. PCBs were once used in lubricants and electrical equipment but have not been manufactured in the United States since 1977. Despite this, PCBs are still found in the environment. They do not dissolve easily in the ground or in water. As PCBs infiltrate rivers and streams, fish ingest the chemicals which can then be passed on to humans. It is believed that PCBs are a probable cause of cancer. Since a study in 1999, forty-two miles of the Dan River are considered impaired by PCBs. Fish sampling conducted by the DEQ found PCBs above the Department standard of 600 parts per billion (ppb). Not all species of fish located in this region of the Dan River are affected, however. Only flathead catfish, with samples ranging from 271 ppb to 2,689 ppb, and channel catfish, with samples ranging from 62 ppb to 648 ppb, are of concern. It is recommended that people do not eat more than two 8-ounce servings of these fish a month, and that pregnant women and children consume none. Seventy-nine miles of the Staunton River are affected by PCBs. Six species of fish, smallmouth bass, channel catfish, flathead catfish, striped bass, white bass, and carp, are placed on the advisory, with the same restrictions as fish from the Dan River.

Sources of river impairment are generally classified as non-point or point. Non-point pollution means that water runs over the land and through the ground, picking up pollutants and depositing them in surface waters, also resulting in impervious surface area. This accounts for the majority of problems within the Roanoke River Basin. Problems with non-point pollution in the basin are further specified as either urban or agricultural. Urban non-point source pollution is due to urban activities, such as development. Agricultural non-point source pollution is due to farming activities, such as pesticide spraying or fertilizing. Agricultural non-point source pollution has a major impact on 89.97 miles of river and a moderate to minor impact on 170.27 miles. Point pollution can be traced back to a specific origin. Within the basin, problems with point pollution are the result of municipalities and industries. Municipal point source pollution has a major impact on 8.95 miles and a moderate to minor impact on 21 miles. Also, the Roanoke River has point pollution from the Kerr Dam. Other sources of problems within the basin include hydromodification, urban runoff and storm sewers, and combined sewer overflow. Hydromodification accounts for 9.46 miles of major impact. Urban runoff and storm sewers account for

22.56 miles of major impact and 33.78 miles of moderate to minor impact. Combined sewer overflow accounts for 20 miles of major impact. There may also be impact associated with illegal discharges, such as through the use of straight pipes.

There are numerous organizations around the Roanoke River Basin and across the state of Virginia that have a stake in the basin's welfare. For example, the Roanoke River Basin Association's mission is to establish and carry out a strategy for the development, use, preservation, and enhancement of the resources of the Roanoke River Basin in the best interest of present and future generations of basin residents. The Blue Ridge River Runners are dedicated to conserving and protecting Virginia streams and rivers. Citizens for the Preservation of the River demonstrate concern with local advocacy issues. Clean Water Action assists legislative and election campaigns at the local, state, and national level. Float Fishermen of Virginia, Inc. work to preserve and protect the rivers, streams, and waterways of Virginia, while floating down these important resources. The Regional Partnership of Local Governments was involved with the Gaston and Roanoke Rapids dams' relicensing. It also monitors the 216 Study, the Smith Mountain Lake and Leesville relicensing, and many other issues. The Upper Roanoke River Roundtable advocates water quality and quantity management by involvement of all watershed stakeholders. The Virginia Conservation Network advocates funding for watersheds across the state. Many other organizations exist, including the Environmental Defense Fund, Southern Environmental Law Center, Virginia Lakes and Watersheds Association, and Virginia Canals and Navigation Society, to name a few.

The Virginia Scenic Rivers program was created in 1970. A scenic river is a river or stream whose scenic beauty, historic importance, recreational significance and natural characteristics make them resources of particular importance. A river must be designated through a series of steps conducted by the Department of Conservation and Recreation (DCR). A river is generally requested to be studied for scenic river status by local government or the General Assembly. The DCR's Division of Planning and Recreation Resources conducts a map survey, literature review, and field study to determine qualification. The field study is an evaluation of eleven factors, such as water quality, corridor development, historic features, and quality of fishery. Once completed, a report is proposed to the General Assembly. If

designated a scenic river, an administrating agency checks the river periodically for changes. A Virginia scenic river designation means that when a proposed hydropower or similar project is proposed, the Federal Energy Regulatory Commission must consider the project's impact. This also gives government agencies the opportunity to consider other values the river possesses, such as scenic value, during a project's planning process. The General Assembly must give authorization of construction, operation, or maintenance of any structure that will impede the natural flow of the river. Landowners are allowed to continue using their land as before designation. Designation also gives local citizens, landowners, and local governments greater influence over state projects affecting the river. There are thirteen scenic rivers in Virginia. This includes the Staunton River. Staunton River's status was extended in 2001 from 10.8 miles to 40.5 miles.