

# BASIN 1 BROAD RIVER

## BASIN DESCRIPTION

The Broad River Basin is located mostly in South Carolina. The 1511 square miles of the Broad River Basin located in North Carolina are the headwaters of the river. Many small streams draining the eastern slope of the Blue Ridge Mountains in Henderson, Buncombe, and McDowell counties combine to form the Green and Broad Rivers which merge east of the Town of Green River, in Polk County. As the Broad continues easterly through Rutherford and Cleveland counties, it is joined by the First Broad and Second Broad Rivers before turning south and flowing into South Carolina. Buffalo Creek, which drains eastern Cleveland County, merges with the main stem a few miles into South Carolina. The Broad River merges with the Saluda River near Columbia, South Carolina to form the Congaree River, which flows into Lake Marion and eventually into the Atlantic Ocean.



## WATER USE

### Factors Affecting Water Demand

This basin is home to about 2.5% of the state's residents and contains all or part of 29 municipalities in 8 counties. No major metropolitan areas are located in this basin. From 1990 to 1997 year-round population in four counties in this basin grew by 10% or more.

### Total Water Use in Basin

The U.S. Geological Survey's (USGS) 1995 summary of water use estimated total water use in the basin at 50 million gallons per day (mgd), with about 83% coming from surface water sources. Total basin population was estimated at 181,380 with total residential demand estimated at 11.8 mgd. Sixty percent of the residential demand was served by public water supply systems. Overall, public water systems supplied 22.7 mgd from surface water and 1.3 mgd from groundwater for residential and non-residential uses. The remaining residential water demand was met by 4.7 mgd of self-supplied ground water. In addition, there was about 20.9 mgd of self-supplied water withdrawn for non-residential uses.

### Local Water Supply Plans (LWSPs)

Units of local government that supply or plan to supply water to the public are required to develop a LWSP. The Division of Water Resources (DWR) reviews LWSPs and maintains a database of the LWSP information. This summary is based on data contained in the 1997 LWSPs, unless otherwise noted.

LWSPs were submitted by 15 public water systems that supply water from this basin. (Lake Lure has not submitted a 1997 LWSP, so their 1992 LWSP data was used in these summaries.) These systems supplied 26 mgd of water to 100,887 persons in 1997. The Sandy Mush and Alexander Mills water systems are now part of the Forest City water system. Two water systems, Chimney Rock and Rutherfordton-Spindale have submitted plans for the first

time. The following discussion and table summarize the LWSP population served with water from this basin and water use for 1997.

1997 LWSP System Water Use from Basin (mgd)				
Sub-basin	LWSP Population	Residential Use	Non-residential Use	Total Use*
Broad River	100,887	7,349	15.13	26

\*Total Use also includes unaccounted-for water and system process water

Residential uses accounted for 28% of the total water use in these systems. Non-residential water use accounted for 58% and unaccounted-for water use represented 7% of the total water use by systems using water from this basin.

Because of expansions of service into unserved areas and growth in this region over the next two decades, LWSP systems expect to supply water from this basin to 141,201 persons by the year 2020, a 40% increase over 1997 levels. Their average daily service area demand is projected to increase 56% to almost 41 mgd over the same period.

In the 1997 LWSPs, four of the 15 systems using water from this basin reported that their peak demands will exceed their water treatment capacity by 2010.

Water systems should maintain adequate water supplies and manage water demands to ensure that average daily use does not exceed 80% of their available supply. Data for 1997 indicated that one of the 15 LWSP systems in this basin had average demand above this threshold. By 2020, one system projects demand levels that will exceed 80% of their available supply.

### Self-supplied Use

Not everyone gets water from a public water system. Many households and some commercial and industrial operations supply their own water. For 1995, the USGS estimated that self-supplied users, excluding power generating facilities, accounted for 25.6 mgd of the 50 mgd total of water used from this basin, as shown in the table below. Industrial use comprised half of the self-supplied uses, followed by irrigation (24%), domestic (18%), livestock (7%), and commercial (1%).

1995 USGS Estimated Self-supplied Water Use in mgd						
Sub-basin	Domestic	Livestock	Industrial	Commercial	Irrigation	Total
Broad River	4.74	1.74	12.75	0.27	6.11	25.61

**Registered Water Withdrawals**

Anyone withdrawing 1.0 mgd or more of surface or ground water for agricultural uses or 100,000 gallons per day for other uses is required to registered that withdrawal with DWR. Registered withdrawals in this basin are summarized in the table below.

Registered Water Withdrawals for 1999						
Sub-basin	Agricultural		Non-agricultural		Total	
	#	mgd	#	mgd	#	mgd
Broad River	0	0	14	4.419	14	4.419

\*Excludes water use for power generation

Registered withdrawals include one mining operation, two golf courses, five industries, and six private water systems. Industries used 3.6 mgd of the registered water use shown above. Three hydroelectric and one thermoelectric power facilities also registered their water use, but are not included in the above totals.

**WATER AVAILABILITY**

Surface water is used to meet the majority of overall water needs in the Broad River Basin. LWSPs indicate that 6 water systems in this basin withdrew about 24.9 mgd of surface water in 1997.

Surface water will continue to be the primary source of water for most of the municipal water systems in this basin. Local water supply plans show that 2 systems have water supply reservoirs in this basin. The combined demand on these reservoirs averaged about 6 mgd in 1997. The estimated available supply from these reservoirs is 40 mgd. Kings Mountain has minimum release of 8.4 mgd from Henry Moss Lake.

Four of the systems submitting local water supply plans have run-of-river. These run-of-river intakes supplied about 18.9 mgd of water in 1997. The available supply from these intakes, based on information reported in local water supply plans, is about 48 mgd.

In some cases, the available supply is limited based on withdrawal limits set by DWR based on instream flow needs. The Cleveland County Sanitary District is limited to 5 mgd from the current Broad River intake, but that will be expanded to 10 mgd when intake capacity is added on Knob Creek. The Town of Shelby may withdraw up to 18 mgd from the Broad River as long as a flow of 25 cfs is maintained downstream of their intake. Forest City may withdraw up to 12 mgd from the Second Broad River.

Five LWSP systems supplied 0.47 mgd of ground water to their customers in 1997. The combined 12-hour yield reported by these systems is 0.6 mgd.

**INTERBASIN TRANSFERS OF SURFACE WATER**

Across the state many water systems move surface water between sub-basins to meet their needs. Regulatory

approval is generally needed for transfers of 2.0 mgd or more. The table below summarizes the identified interbasin transfers in 1997 associated with this basin.

Estimated Interbasin Transfers based on 1997 data			
Sub-basin	Number	mgd OUT	mgd IN
Broad River	5	1.47	0.15

The majority of the transfer into the Broad Basin is due to waters sales from Hendersonville to Saluda. Kings Mountain transferred nearly 1.5 mgd out of the Broad to the Catawba and South Fork Catawba River Basins.

Interbasin transfer may become more of an issue for the Broad River Basin as water systems in and near the basin pursue additional water supplies, especially if water is purchased from other systems.

**SUMMARY OF INFORMATION FROM 1997 LWSPs**

! Total per capita water use for the basin was 258 gallons per day (gpd) in 1997 and is projected to increase to 281 gpd in 2010.

! Seven systems report they are not connected to another water supply system that can supply water in an emergency. Additionally, Kings Mountain reports the system's interconnection can not provide adequate water.

! Seven water systems purchased a total of 0.79 mgd from this basin. Two of these systems had no purchase contract.

! Four systems rely on purchase water as their sole supply.

! The reported raw water supply was 88 mgd surface water and a 12-hour groundwater supply of 0.6 mgd.

! There is one county-wide system, Cleveland County SD.

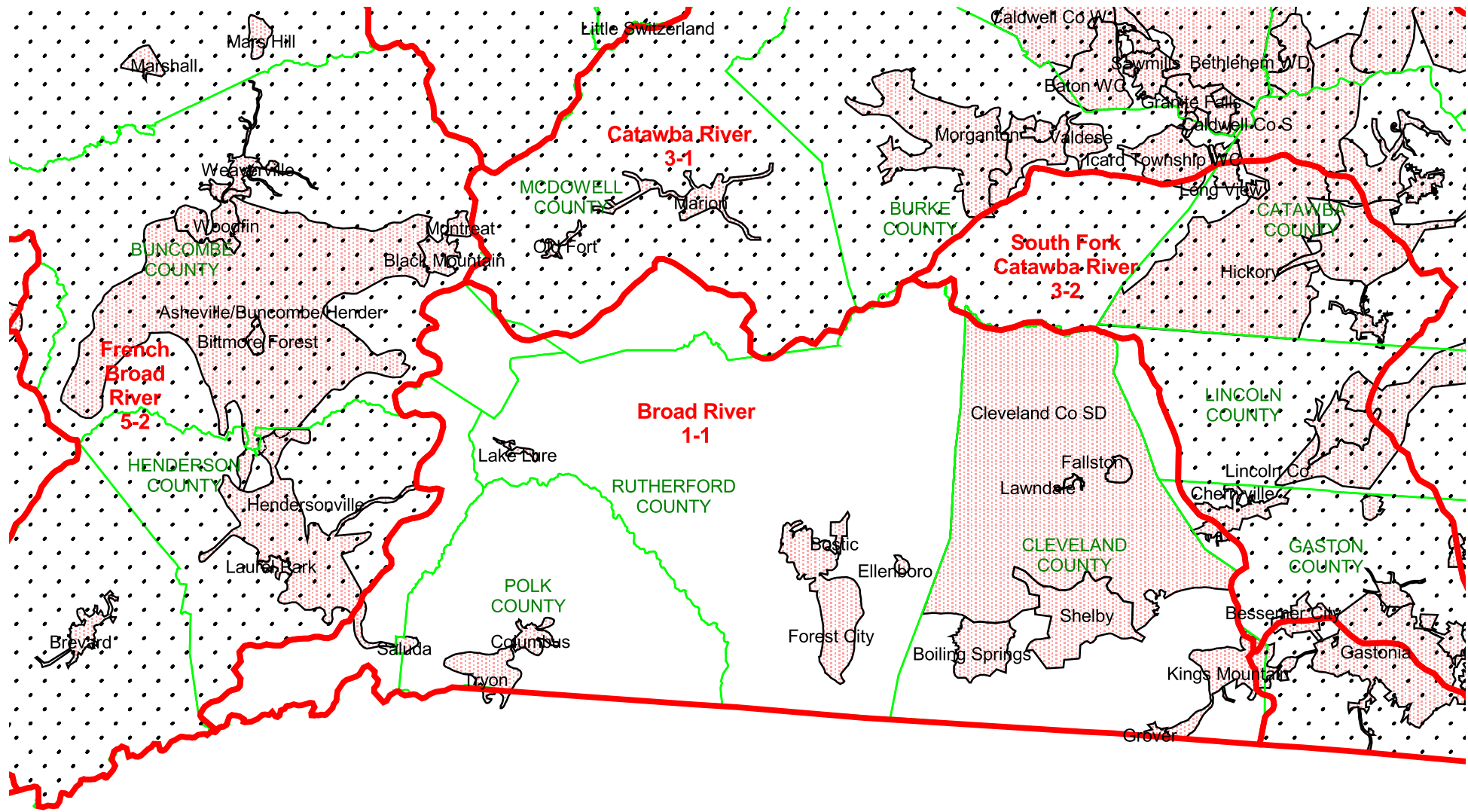
! Three systems are planning additional water supplies totaling about 5 mgd in their 1997 LWSPs.

! The systems are projecting significant growth, 40% in population and 56% in demand, through 2020.

! About 0.03 mgd of additional water supply will be needed by water systems to ensure that water demands in 2010 do not exceed 80% of available supply.

**! LWSP systems reporting high Demand-to-Supply Ratios:**

	1997	2010
Demand exceeds available supply	1	0
Demand exceeds 80% of available supply	1	1



# Basin 1 Broad River

(unshaded basin)



**BROAD RIVER BASIN (1)**

1997 and 2010 Population and Water Use as reported by LWSP systems using water from this basin.

Water systems showing "Demand as % of Supply" above 80% should be actively managing demand and pursuing additional supplies.

mgd = million gallons per day

Water Systems by County	Water Source or Supplier	Year-round Service Population		Average Daily Demand (mgd)		Available Supply (mgd)		Demand as % of Supply	
		1997	2010	1997	2010	1997	2010	1997	2010
<b>CLEVELAND</b>									
BOILING SPRINGS	SHELBY	3814	4600	0.334	0.52	1	1	33%	52%
CLEVELAND CO SD	Broad River	38000	41000	2.598	4.72	5	10	51%	47%
FALLSTON	Bedrock Wells / CLEVELAND CO SD	572	620	0.048	0.052	0.07	0.07	68%	74%
GROVER	KINGS MOUNTAIN	700	772	0.088	0.096	2	2	4%	5%
KINGS MOUNTAIN	Moss Lake	11520	13000	7.041	7.88	37.6	37.6	19%	21%
LAWNDALE	Bedrock Wells	644	592	0.056	0.056	0.08	0.08	70%	71%
SHELBY	Broad River	19565	24300	6.171	9.6	18	18	34%	53%
<b>POLK</b>									
COLUMBUS	Bedrock Wells	1646	1860	0.349	0.389	0.342	0.452	102%	86%
TRYON	Lake Lanier	4635	6170	0.8	1.46	2.5	2.5	32%	58%
<b>RUTHERFORD</b>									
*LAKE LURE	Bedrock Wells	675	741	0.042	0.048	0.092	0.092	47%	52%
BOSTIC	FOREST CITY	362	380	0.072	0.084	0.33	0.33	22%	25%
CHIMNEY ROCK	Bedrock Wells	137	144	0.015	0.016	0.044	0.043	35%	36%
ELLENBORO	FOREST CITY	1625	1723	0.133	0.157	0.33	0.333	40%	47%
FOREST CITY	Second Broad River	7776	10476	6.068	6.006	12	12	51%	51%
RUTHERFORDTON-SPINDALE	Broad River	9216	17050	5.689	7.735	13	13	47%	60%

\* 1997 LWSP not submitted -1992 data used in analysis