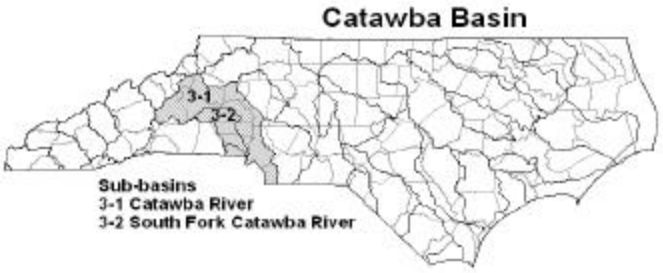
BASIN 3 CATAWBA



BASIN DESCRIPTION

The Catawba Basin drains 3343 square miles of western North Carolina. The major basin is subdivided into two sub-basins, the Catawba River and the South Fork Catawba River, as shown on the map.

The Catawba River originates in the many small streams that drain the eastern slope of the Blue Ridge Mountains between Blowing Rock and Old Fort. Flow from the Linville River merges with the Catawba in Lake James, the first of seven Duke Power reservoirs designed for hydropower generation on the river. The Catawba continues to flow easterly into Rhodhiss Lake and then Lake Hickory where it turns to flow south across the Piedmont through Lookout Shoals Lake, Lake Norman, Mountain Island Lake, and Lake Wylie on the South Carolina state line. Four of the lakes (Hickory, Norman, Mountain Island, and Wylie) are used for public water supply.

The South Fork Catawba River drains about 700 square miles south and west of the Catawba and merges with the Catawba at Lake Wylie. Runoff from the hills in southeastern Burke County and southwestern Catawba County is collected by Henry Fork and Jacob Fork Rivers. These streams join with the flow from several other streams near Lincolnton to form the South Fork Catawba. The river continues to flow south joining the Catawba at Lake Wylie east of Gastonia, NC. The Catawba continues south, merging with the Wateree River at Wateree Lake. The Wateree River continues flowing south to Lake Marion and then on to the Atlantic Ocean.

WATER USE

Factors Affecting Water Demand

This basin is home to about 16% of the state's residents and contains all or part of 59 municipalities in 14 counties, including Union County, one of the ten fastest growing counties in the state. Two of the 12 major metropolitan areas in the state get all or part of their water supply from this basin. From 1990 to 1997 year-round population in seven counties in this basin grew by 10% or more, with Union County growing by 26%.

This basin is the most densely populated basin in the state, with 14 municipalities with populations greater than 5,000. The basin continues to experience high levels of growth in the Charlotte metropolitan area, including the surrounding bedroom communities.

Demand for water increases during the growing season, especially in agricultural areas and in communities where irrigated landscaping is popular.

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 279 million gallons per day (mgd), with 86% coming from surface water sources. Total basin population was estimated at 1,127,430, with total residential demand estimated at 81 mgd. About 80% of residential demand was supplied by public water systems. Overall, public water systems supplied 152 mgd of surface water and 4 mgd of ground water for both residential and non-residential uses. The remaining residential water demand was met by 17 mgd of self-supplied ground water. In addition, there was 87 mgd of self-supplied surface water withdrawn for non-residential water uses not including electric power generation.

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 47 public water systems using water from this basin. (Mooresville and Lincoln County have not submitted 1997 LWSPs, so their 1992 LWSP data were used in these summaries.) These systems supplied 176 mgd of water to 937,391 persons. The following discussion and table summarize the LWSP population served and water use for systems using water from this basin.

1997 LWSP System Water Use from Basin (mgd)

Sub-basin	LWSP Population	Residential Use	Non-residential Use	Total Use*
Catawba River	892,492	74.4	61.6	163.8
So. Fork Catawba R.	44,899	3.13	5.75	12
Total	937,391	77.6	67.3	176

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

Residential use accounted for 44% of LWSP system use basin wide. Non-residential use accounted for 38% of total use and 16% was unaccounted-for water.

The Catawba Basin supplies water to some of the state's fastest growing areas. LWSP systems using water from this basin expect to supply water to over 1.5 million persons by the year 2020, a 63% increase over 1997 levels. Their demand is projected to grow from 176 mgd to 279 mgd by 2020, a 59% increase.

In the 1997 LWSPs, 12 of the 47 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 seven of the 47 LWSP systems in this basin had average demand above this threshold. By 2020, 14 systems project demand levels that will exceed 80% of their available supply.

Self-supplied Use

The USGS estimated that self-supplied users, excluding power generating facilities, accounted for 272 mgd of the 433 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 (22%), livestock (15%), domestic (12%), and commercial (1%).

1995 USGS Estimated Self-supplied Water Use in mgd

Sub-basin	Domestic	Livestock	Industrial	Commercial	Irrigation	Total
Catawba River	13.50	5.86	60.96	0.82	22.30	103.4
So. Fork Catawba R.	3.51	0.95	5.28	0.10	5.62	15.5
Basin Total	17.0	6.8	66.2	0.9	27.9	118.9

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 register that withdrawal with DWR. Registered withdrawals in this basin are summarized in the table below.

1999 Registered Water Withdrawals

Sub-basin	Agricultural		Non-agricultural		Total	
	#	mgd	#	mgd	#	mgd
Catawba River	8	7.92	168	23.73	176	31.66
S. Fork Catawba River	0	0	59	2.73	59	2.73
Basin Total	8	7.92	227	26.47	235	34.39

*Excludes water use for power generation

The registered agricultural users are all trout farms. Of the 227 non-agricultural withdrawal registrations in the basin, 200 are well withdrawals for private water system. Together, these private water systems, most of which are owned by either Carolina Water Service, Heater Utilities, or Piedmont Construction & Water Company, used about six mgd of ground water.

WATER AVAILABILITY

Surface water provides nearly all water needs in the Catawba Basin. LWSP surface water use is dominated by withdrawals from the Duke Power lakes on the Catawba River. Eleven systems have intakes in five of the Duke Power lakes and provide water to 26 other systems through sales. Nearly 830,000 people were supplied wholly or in part through these 11 intakes. By 2020 this population is projected to grow to more than 1.3 million, or about 89% of the basin LWSP population.

LWSPs show that 13 systems have reservoir intakes. Eleven of these water systems depend on Duke Power's Catawba lakes for their water supply. The combined LWSP demand on the Duke Power lakes averaged over 146 mgd in 1997 or about 83% of the basin's LWSP average daily demand. The estimated current available supply for LWSP systems from the Duke Power lakes is 384.5 mgd. This LWSP data is summarized below.

Supply and Demands from Duke Power Lakes based on 1997 data

Lake	LWSP with Intakes	Reported Supply	1997 Average Daily Demand	2020 Average Daily Demand
Lake Rhodhiss	3	102.5	13.4	21.3
Lake Hickory	2	34	12.1	26.9
Lake Norman*	3	90	116.3	184.2
Mountain Island Lake*	2	148		
Lake Wylie	1	10	4.4	7.1
Total	11	384.5	146.2	239.5

* Demands for Lake Norman and Mountain Island Lake are combined.

The two other LWSP systems that rely on reservoirs are supplied from the South Fork Catawba River sub-basin. The 1997 combined average daily demand on the reservoirs for these two systems was more than two mgd. The estimated supply from these two reservoirs is 2.3 mgd.

Eight of the surface water systems submitting LWSPs have run-of-river intakes. These intakes supplied nearly 24 mgd of water in 1997 (13.5% of the basin LWSP demand). Union County's Catawba supply is from a water treatment plant on the Catawba River in South Carolina jointly owned by Union County and Lancaster County, South Carolina. The estimated available supply from the eight run-of-river intakes including Union County is about 78 mgd. Gastonia's run-of-river intake on the South Fork Catawba River is reported as an emergency supply.

Charlotte has requested approval for increased withdrawals from Mountain Island Lake from the Federal Energy Regulatory Commission. The request, if granted, would allow maximum daily withdrawals by Charlotte of about 438 mgd from the Catawba River, 330 mgd of which would come from Mountain Island Lake. Because of system operational considerations, the 438 mgd would translate into an average daily withdrawal of about 219 mgd.

Ground water is a minor source for LWSP systems in this basin. Three systems have ground water sources that provided less than 1.0 mgd of water in 1997. The overall 12-hour yield for these systems is about 1.0 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
Catawba River	44	29.8	1.19
S. Fork Catawba River	29	0.37	16.0

The Catawba Basin is one of the most affected basins

in both the number transfers and the amount of water transferred. Thirty-four of the 48 transfers involving the Catawba sub-basin are transfers out of the Catawba sub-basin, 24 of which are transfers into the South Fork Catawba sub-basin and six of which are transfers into the Rocky River sub-basin of the Yadkin River. Twenty-six of the 32 transfers involving the South Fork Catawba sub-basin are transfers into the South Fork Catawba sub-basin totaling nearly 16 mgd.

Charlotte is currently seeking to obtain an Interbasin Transfer Certificate to expand its Mallard Creek Water Reclamation Facility, which discharges into the Rocky River sub-basin. In addition, Charlotte and Union County are seeking Interbasin Transfer Certification related to the planned Rocky River Regional Wastewater Treatment Plant. The City of Statesville is planning to build an intake in Lookout Shoals Lake in the Catawba River Basin, resulting in a large transfer into the South Yadkin sub-basin. However, Statesville's transfer was authorized in the legislative Act that established the interbasin transfer certification requirements.

As water use and the resulting transfers continue to increase in the Catawba Basin, more water systems will need to obtain transfer certifications.

SUMMARY OF INFORMATION FROM 1992 LWSPs

! Total per capita water use for the basin was 188 gallons per day (gpd) in 1997 and is projected to decrease to 184 gpd in 2010.

! 18 systems report they are not connected to another water supply system capable of providing water in an emergency.

! 39 water systems purchased almost 14 mgd of water in 1997 from this basin. Five of these systems had no purchase contract.

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

! Old Fort is the only LWSP system in the basin that does not have access to surface water through its own surface intake or through a purchase agreement.

! In 1997, the systems used nearly 176 mgd of surface water, with only about 1 mgd of ground water use.

! The reported raw water supply was 462 mgd surface water and a 12-hour groundwater supply of 1 mgd.

! There are four county-wide systems, Caldwell County, Charlotte-Mecklenburg, Lincoln County, and Union County.

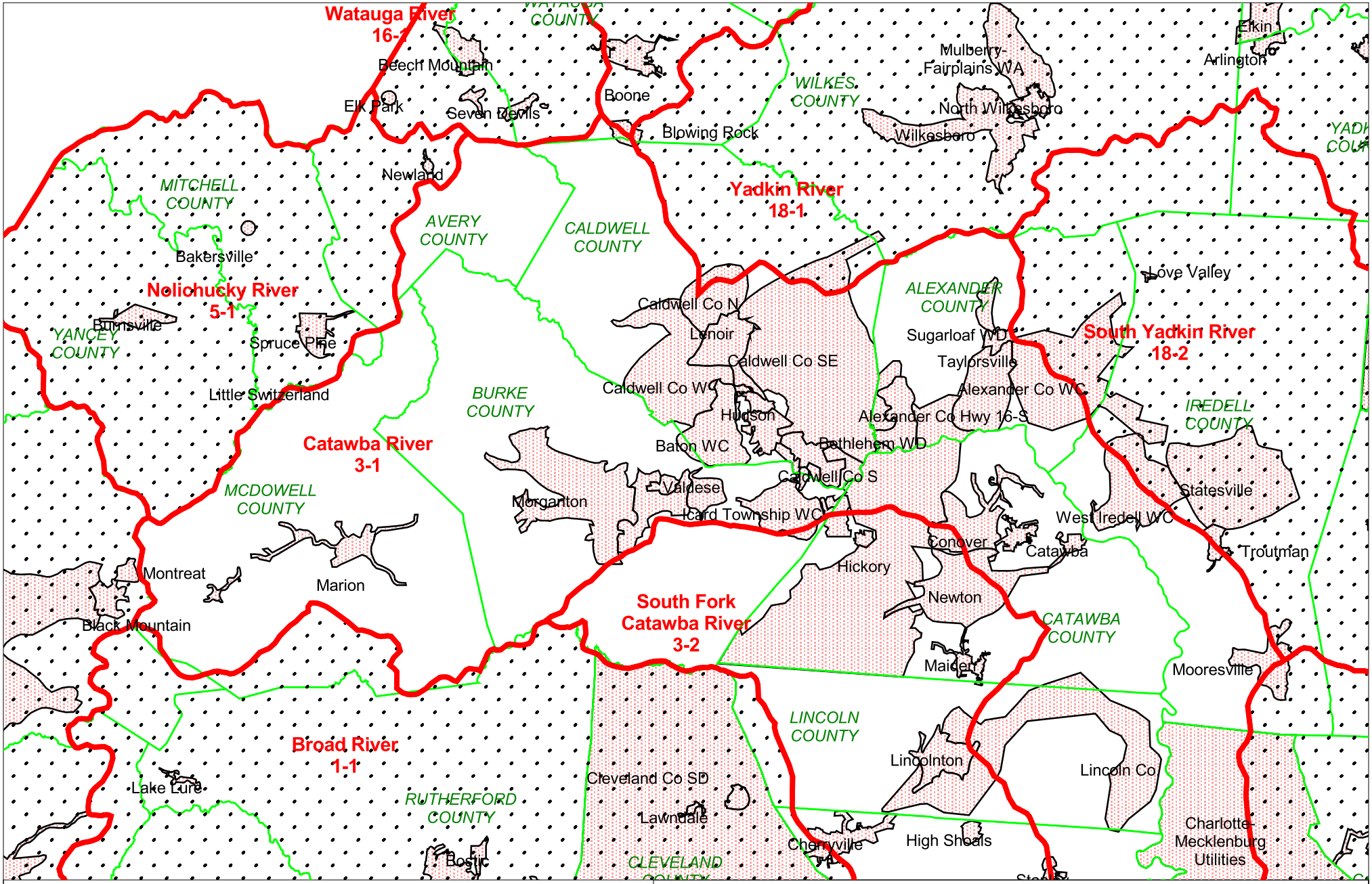
! Gastonia, Hickory, and Lenoir have the potential to act as regional water systems through large service areas and the large number of sales contracts with surrounding systems.

! 10 systems were planning additional supplies totaling over 80 mgd in the 1997 LWSPs.

! About 7.8 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, about 7.5 mgd of which is needed in the Catawba sub-basin.

! Systems reporting high Demand-to-Supply Ratios

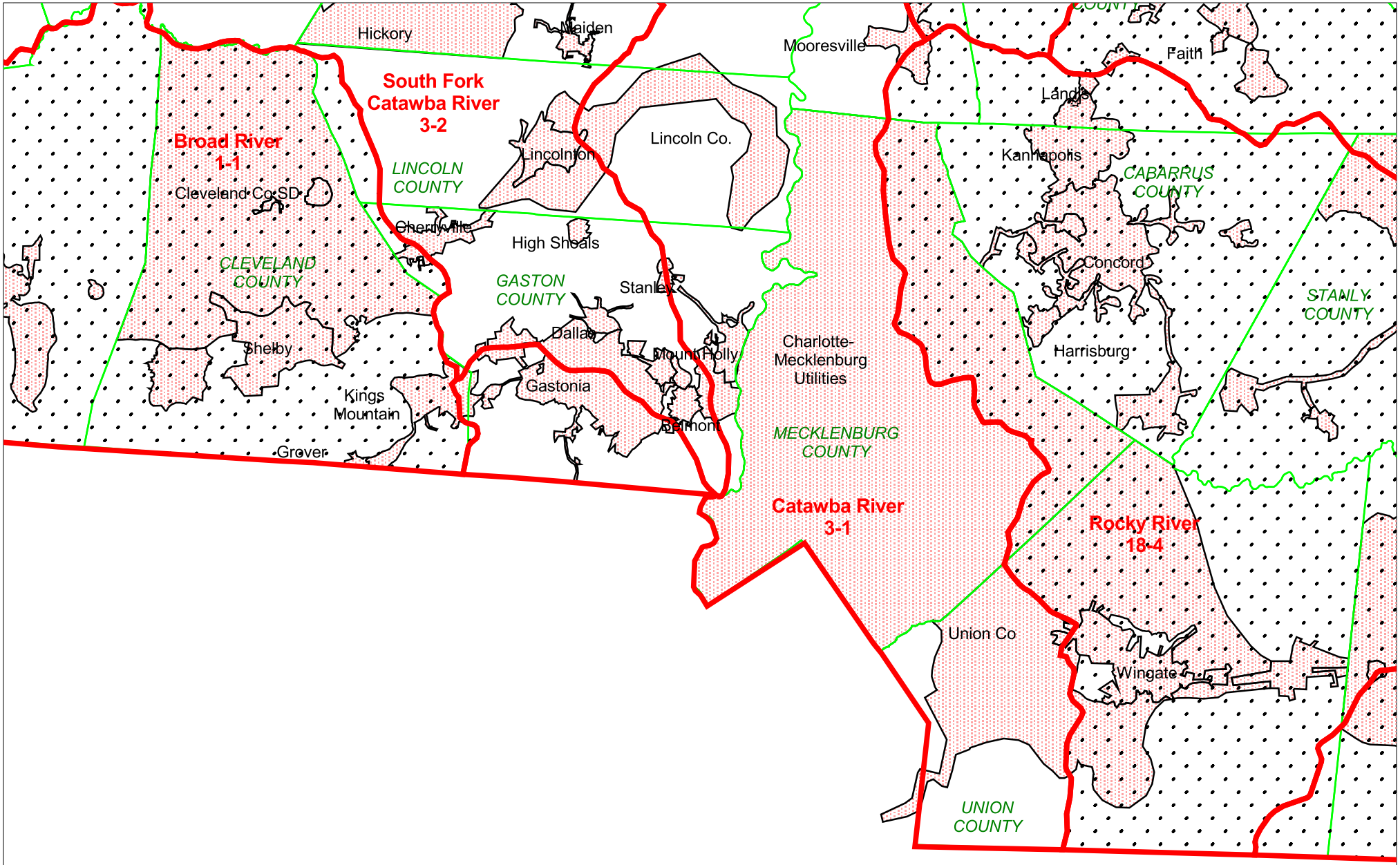
	1997	**2010**
Demand exceeds available supply	3	5
Demand exceeds 80% of available supply	7	15



Basin 3 Catawba River (Upper)

(unshaded basin)

LWSP service area | County Boundary | Basin Boundary



Basin 3 Catawba River (Lower)

(unshaded basin)

LWSP service area | County Boundary | Basin Boundary

CATAWBA RIVER BASIN (3)

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
ALEXANDER									
ALEXANDER CO HIGHWAY 16-S	HICKORY	2415	2784	0.122	0.204	0.25	0.25	49%	82%
BETHLEHEM WD	HICKORY	3729	4111	0.485	0.594	2	2	24%	30%
SUGARLOAF WD	TAYLORSVILLE	987	1060	0.066	0.072	0.075	0.075	88%	96%
TAYLORSVILLE	HICKORY / ALEXANDER WC	2200	2350	0.78	0.941	1.5	1.5	52%	63%
BURKE									
BURKE CO	LONGVIEW / VALDESE MORGANTON / ICARD TOWNSHIP WC	1313	1530	0.149	0.493	0.547	0.547	27%	90%
DREXEL	MORGANTON	3753	5235	0.254	0.427	0.864	0.864	29%	49%
ICARD TOWNSHIP WC	HICKORY / VALDESE	4548	5502	1.004	1.184	2	2	50%	59%
MORGANTON	Catawba River	20550	21992	13.25	13.5	18	18	71%	75%
RHODHISS	ICARD TOWNSHIP WC / GRANITE FALLS	754	885	0.057	0.071	0.23	0.23	24%	31%
TRIPLE COMM WC	VALDESE	5300	6816	0.454	0.574	0.75	1	61%	58%
VALDESE	Lake Rhodhiss	4169	4500	7.312	11.805	12	12	61%	98%
CALDWELL									
BATON WC	LENOIR	6417	8085	0.552	0.655	0.552	0.58	100%	113%
CALDWELL CO N	LENOIR	142	375	0.001	0.006	0.0013	0.0013	77%	462%
CALDWELL CO S	GRANITE FALLS	1616	1696	0.391	0.409	0.5	0.5	78%	82%
CALDWELL CO SE	LENOIR	7985	11250	0.314	0.422	0.411	0.411	76%	103%
CALDWELL CO W	LENOIR	4688	4905	0.488	0.505	0.637	0.637	77%	79%
GRANITE FALLS	Lake Rhodhiss	4310	5243	1.609	1.812	2.5	2.5	64%	72%
HUDSON	LENOIR	3215	0	0.382	0	0.5	0	76%	0%
LENOIR	Lake Rhodhiss	15881	20625	6.334	7.669	12	12	53%	64%
SAWMILLS	LENOIR / BATON WC	4953	5195	0.362	0.375	0.365	0.469	99%	80%
CATAWBA									
BROOKFORD	HICKORY	448	448	0.066	0.073	0.1	0.1	66%	73%
CATAWBA	NEWTON	652	995	0.09	0.184	0.4	0.4	23%	46%
CLAREMONT	CONOVER / Bedrock Wells	1036	1208	0.303	0.417	0.632	0.632	48%	66%
CONOVER	HICKORY	6700	9494	1.75	2.235	3	3	59%	75%
HICKORY	Lake Hickory	35300	43490	17.659	21.059	32	32	57%	67%
LONG VIEW	Lake Hickory/HICKORY	4500	5250	1.642	2.11	2.35	4.35	70%	49%
MAIDEN	Maiden Lake/NEWTON	2900	3101	1.52	1.712	1.825	1.825	83%	94%
NEWTON	Jacobs Fork/City Lake	12000	15100	2.51	3.67	8	8	31%	46%
GASTON									
BELMONT	Lake Wylie	8200	8619	4.38	6.59	10	10	44%	66%
BESSEMER CITY	Long Cr./Arrowood/Webber	4897	5200	1.253	1.51	2.2	2.2	57%	69%
CHERRYVILLE	Indian Creek/Bedrock Wells	5512	10315	1.6	2.82	3.45	3.45	46%	81%
CRAMERTON	GASTONIA	2477	3279	0.329	0.517	0.6	0.6	55%	86%
DALLAS	South Fork Catawba River	5500	5985	0.519	0.582	14	14	4%	4%
GASTONIA	South Fork Catawba River/Mountain Island Lake	65343	76304	16.19	20.154	75	75	22%	27%
HIGH SHOALS	South Fork Catawba River	650	1135	0.064	0.118	10.5	10.5	1%	1%
LOWELL	GASTONIA	2704	3039	0.454	0.603	0.483	0.6	94%	100%
MCADENVILLE	GASTONIA	813	870	0.425	0.476	0.604	0.604	70%	79%
MOUNT HOLLY	Mountain Island Lake	9000	15840	3.412	5.66	3.037	3.037	112%	186%
RANLO	GASTONIA	2126	1800	0.397	0.265	0.25	0.4	159%	66%
STANLEY	Hoyle Creek/MOUNT HOLLY	3500	4200	0.68	0.816	2	2	34%	41%
IREDELL									
*MOORESVILLE	LAKE NORMAN	11600	24660	1.776	3.608	6	6	30%	60%
LINCOLN									
*LINCOLN COUNTY	LAKE NORMAN	7775	12463	1.02	1.77	12	12	9%	15%
LINCOLNTON	South Fork Catawba River/LINCOLN CO	9288	14399	4.243	5.608	12.75	12.75	33%	44%
MCDOWELL									
MARION	Buck Cr./Clear Cr./Mackey Cr.	8620	11171	1.9	2.806	4.25	4.25	45%	66%
OLD FORT	Bedrock Wells	1115	1353	0.472	0.572	0.72	0.72	66%	80%
MECKLENBURG									
CHARLOTTE-MECKLENBURG	Lake Norman/Mountain Island Lake	584000	813300	95.505	125.9	145	219	66%	58%
UNION									
UNION CO	ANSON CO / CATAWBA RIVER WTP	41810	76000	4.67	8.364	10	15	47%	56%

* 1997 LWSP not submitted -1992 data used in analysis