CHAPTER 2

GENERAL BASIN DESCRIPTION WITH WATER QUALITY STANDARDS AND CLASSIFICATIONS

2.1 CATAWBA RIVER BASIN OVERVIEW

The Catawba River Basin is the eighth largest river in the state covering 3279 square miles in the south central portion of western North Carolina. The Catawba River rises from the eastern slope of the Blue Ridge Mountains and flows eastward, then southward, to the North Carolina-South Carolina line (Figure 2.1). The headwaters of the Catawba River are formed by swift-flowing, cold water streams originating in the steep terrain of the mountains in Avery, Burke, Caldwell and McDowell Counties. Many of these streams exhibit good to excellent water quality and are classified as trout waters. While the topography of the upper river basin is characterized by mountains, with elevations in excess of 3000 feet above mean sea level, the lower basin has rolling terrain and land use shifts from forest to agriculture and urban uses.

The mainstem of the Catawba River is unlike almost any other in the state because it composed largely of a series of impoundments. Lake James is the first of a series of seven hydroelectric dams that segment the mainstem of the river. These impoundments, commonly referred to as the Catawba Chain Lakes include, from upstream to downstream, Lake James, Rhodhiss Lake, Lake Hickory, Lookout Shoals Lake, Lake Norman, Mountain Island Lake and Lake Wylie. Lake Wylie, the most downstream impoundment on the Catawba in North Carolina, straddles the state line between and North and South Carolina. Waters leaving Lake Wylie in South Carolina flow generally southeastward through several more impoundments including Fishing Creek Reservoir, Wateree Lake and Lake Marion before emptying into the Atlantic Ocean.

The largest tributary to the Catawba River in North Carolina is the South Fork Catawba River which flows into Lake Wylie. It originates in the South Mountain area in southern Burke County. Its two major headwater tributaries are Jacob Fork and Henry Fork. One of the most important headwater streams is the Linville River. The Linville is one of only four rivers in the state designated by the General Assembly as a state Scenic River under the state's Natural and Scenic Rivers Program administered the NC Division of Parks and Recreation. The Linville flows through the Pisgah National Forest Wilderness area and into Lake James.

There are 3,083 miles of freshwater streams in the Catawba basin in North Carolina and over 60,000 acres of impoundments. The basin is subdivided into nine subbasins represented in Figure 2.1 by six digit subbasin codes (03-08-30 through 03-08-38). Throughout the document the individual subbasins will often be referred to by the last two numbers in their respective six digit codes (i.e., 03-08-30 equals subbasin 30).

The population of the basin, based on 1990 census data, was estimated at 1,033,347. Municipalities with a population of 5,000 or more in the Catawba basin include Belmont, Charlotte, Conover, Hickory, Lincolnton, Mooresville, Morganton, Mt. Holly and Newton. The overall population density of the basin is 312 persons per square mile versus a statewide average of 127 persons per square mile. The percent population growth over the past ten years (1980 to 1990) was 16.5 % versus a statewide percentage increase of 12.7%. The basin encompasses all or part of the following 14 counties (with approximate percentage of the county in the basin shown in parentheses): Alexander (60%), Avery (50%), Burke (100%), Caldwell (70%), Catawba (100%), Cleveland (<5%), Gaston (>95%), Iredell (15%), Lincoln (95%), McDowell (75%), Mecklenburg (70%), Union (25%), Watauga (<5%) and Wilkes (<5%).

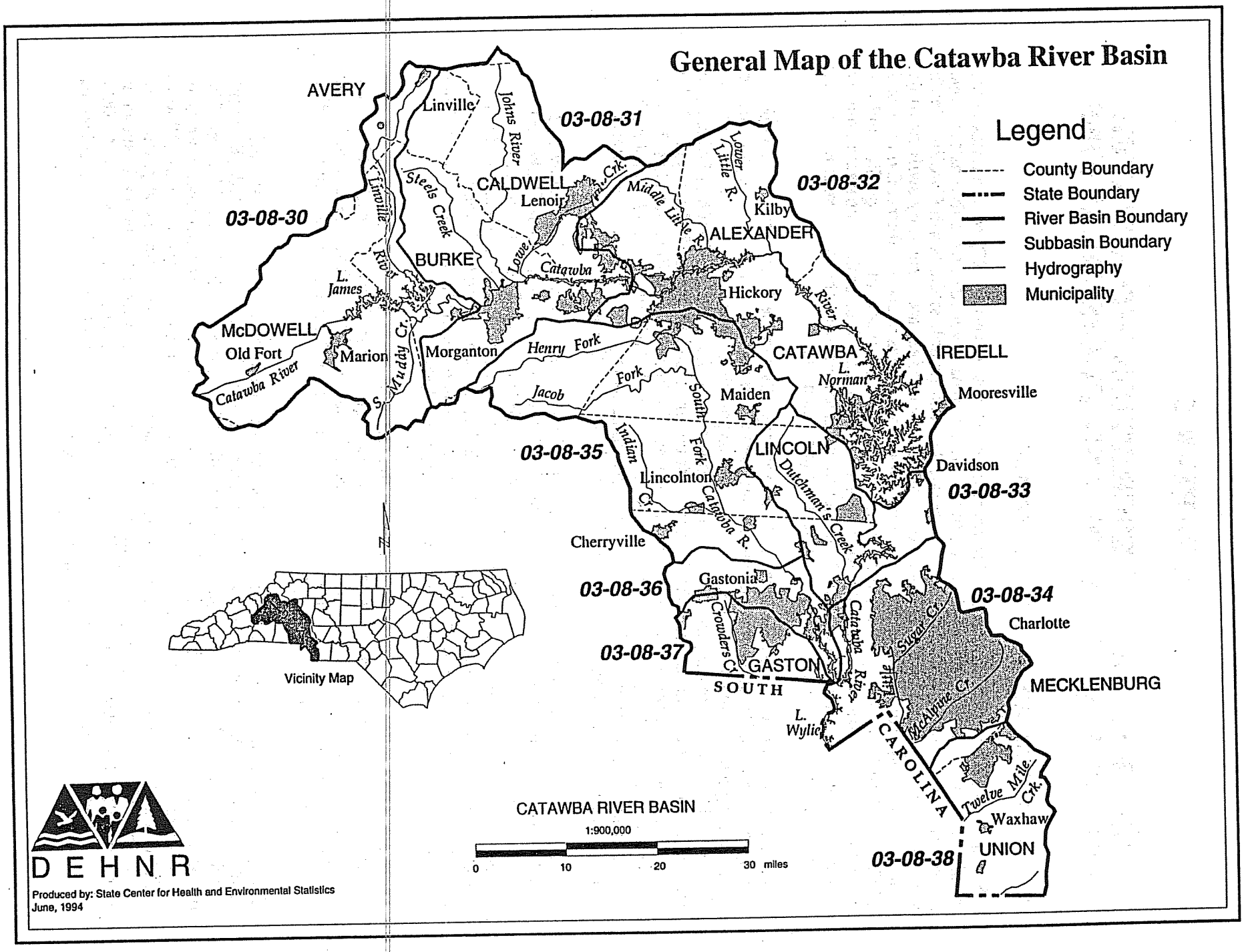

Figure 2.1 General Map of the Catawba River Basin

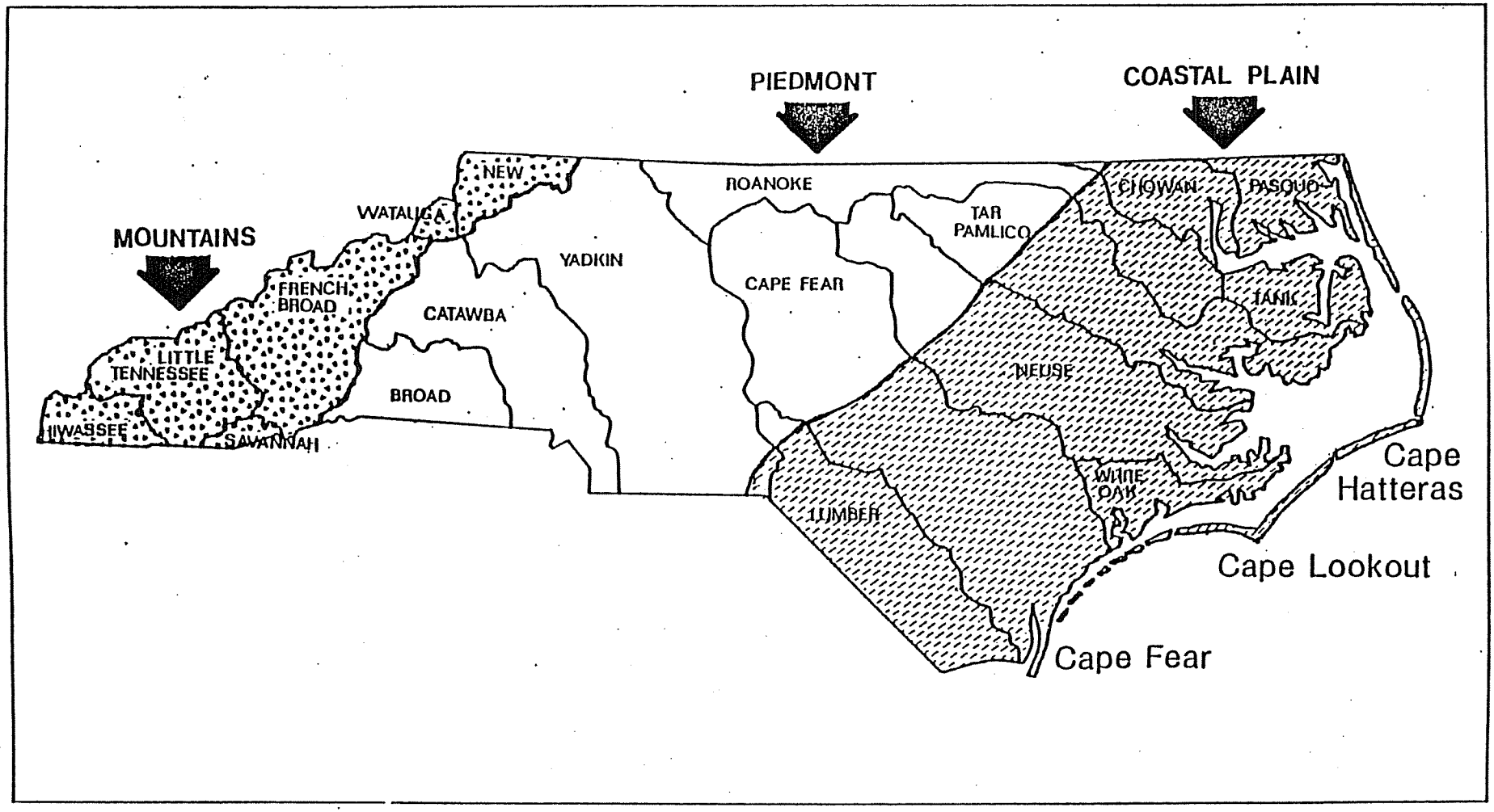

Figure 2.2 River Basins and Physiographic Regions of North Carolina

Average rainfall in the basin ranges from about 45 inches per year in the lower portion near Charlotte to more than 50 inches per year in the headwaters. The average July temperature ranges from about 80°F at Charlotte to about 71°F in the headwaters with the average January temperature ranging from 45°F near Charlotte to 36°F in the upper basin. The evapotranspiration rate ranges from 42 inches per year near Charlotte to 38 inches in the headwaters.

Land cover, based on a 1982 assessment by the Natural Resources Conservation Service is dominated by forest (45%), urban/built-up areas (23%) and agriculture (16%) which jointly comprise 84% of the land/water surface area in the entire basin. The remaining basin area is comprised of other cover types such as open water, rural transportation and minor development .

2.2 MAJOR LAKES IN THE CATAWBA RIVER BASIN

As noted above, one of the most prominent hydrologic features of the Catawba River basin is the series of hydropower impoundments along the river's length that are widely referred to as the Catawba chain lakes (Figure 2.3). From a water quality standpoint, the water quality of each

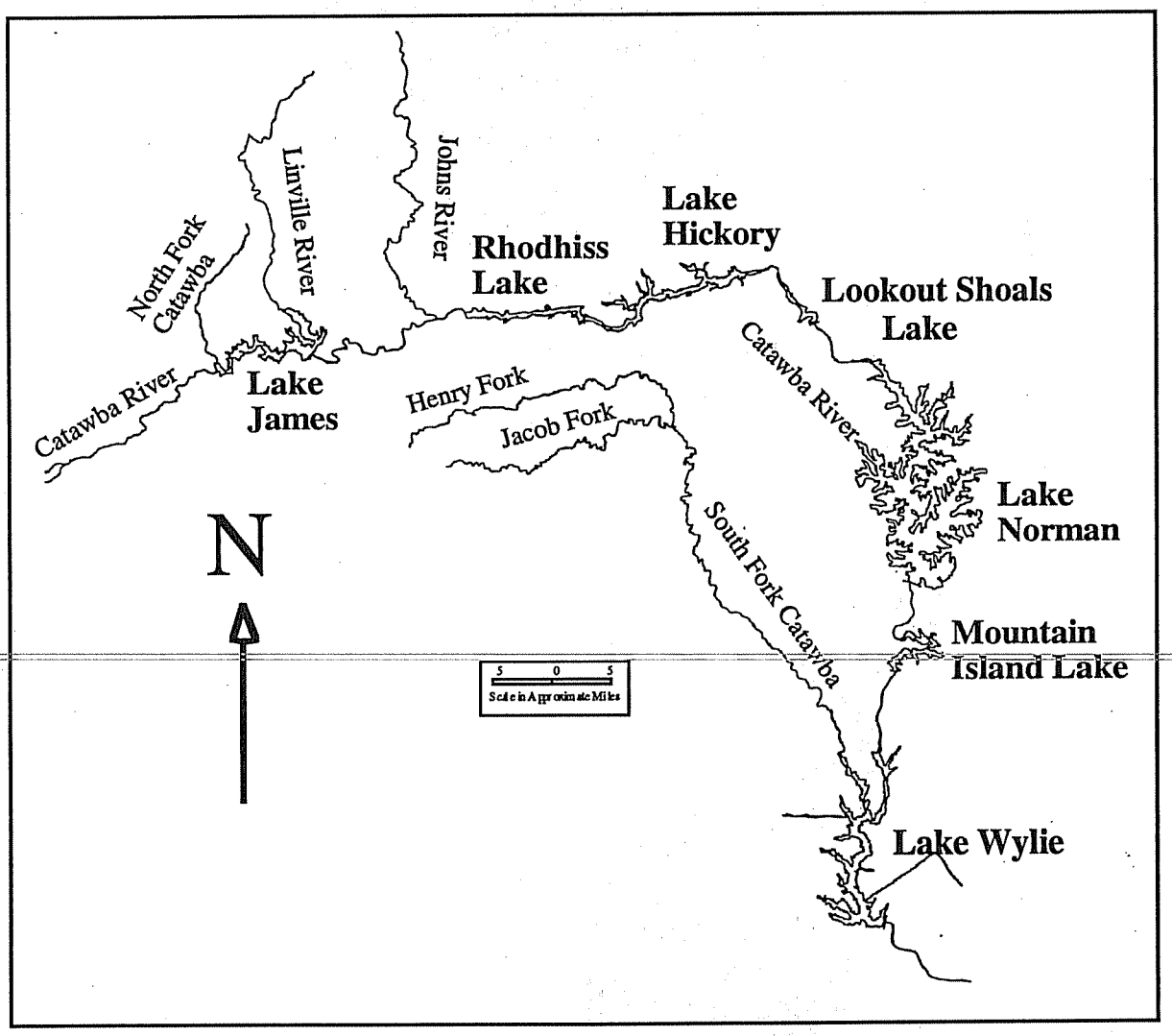

Figure 2.3 Catawba River Chain Lakes

impoundment is influenced by discharge from the upstream reservoir as well as inputs from the surrounding watershed. The most upstream impoundment located on the Catawba River is Lake James which has exhibited the highest water quality of all of the lakes in the Catawba chain.

The next three impoundments in the chain are Rhodhiss Lake, Lake Hickory and Lookout Shoals Lake. Enriched conditions found at some of these reservoirs may be caused by nutrient loading from agricultural runoff, urban stormwater and municipal dischargers. Although nutrient concentrations in these reservoirs are sufficient to support substantial algal populations, short water retention times and limited light availability generally keep algae from reaching higher levels (NC Department of Environment, Health and Natural Resources, 1992).

Lake Norman is located on the Catawba River below lookout Shoals Lake and has historically exhibited good water quality. Water released from Lake Norman forms Mountain Island Lake which is moderately productive. The final impoundment on the Catawba River in North Carolina is Lake Wylie. It is experiencing localized sedimentation and nutrient enrichment problems.

All seven of the Catawba chain lakes, as well as Little River Dam Lake, are owned by Duke Power Company and were created to generate electricity. All of the chain lakes were completed between 1904 and 1928 except Lake Norman, which was completed in 1967. In addition to power generation, the lakes have become popular recreational areas, and some are used for water supply purposes and for waterfront home development (Table 2.1).

Table 2.1 Statistics on Major Lakes in the Catawba River Basin

Lake	Surface Area (Acres)	Mean Depth (Feet)	Max. Depth (Feet)	Shore Length (Miles)	Retent. Time (Days)	Trophic Level	Elev. MSL (Feet)	Watershed Area (Sq. Mi.)	Major Uses
Catawba Chain Lakes (Upstream to downstream order)									
Lake James:	6,510	46	118	145	208	Oligo	1194	380	Hydro, Rec
Rhodhiss Lake:	3,515	20	52	90	21	Meso	995	1,090	Hydro, Rec
Lake Hickory:	4,100	33	85	105	33	Eutro	931	1,310	Hydro, Rec, WS
Lookout Shoals:	1,270	30	69	39	7	Eutro	835	1,449	Hydro, Rec
Lake Norman:	32,510	33	118	520	239	Oligo	760	1,790	Hydro, Rec, WS
Mt. Island Lake:	3,234	16	52	61	12	Oligo	648	1,859	Hydro, Rec, WS
Lake Wylie:	12,450	23	69	327	39	Eutro	569	3,020	Hydro, Rec
Other Major Lakes (Not on Catawba River)									
Lake Tahoma	161					Oligo			Rec (was Hydro)
Little River Dam	162					Eutro		25	Rec (was Hydro)
Maiden Lake	14					Eutro		20	WS
Bessemer City	15					Meso		0.4	WS
Newton City Lake	17					Oligo			WS

The five other lakes in the Catawba basin included in Table 2.1 include Little River Dam Lake, Lake Tahoma, Maiden Lake, Bessemer City Lake and Newton City Lake. Little River Dam is no longer used for hydropower purposes but has become a local fishing spot. It is located on a tributary to Lake Hickory. Lake Tahoma, located on Buck Creek, a tributary to the Catawba River upstream from Lake James, was originally created in the 1920s for hydropower purposes. It is now a recreational lake owned by Lake Tahoma, Incorporated, a corporation of property owners living around the lake. The last three lakes are small water supply reservoirs that serve the municipalities of Maiden, Bessemer City and Newton.

2.3 LAND USE, POPULATION AND GROWTH TRENDS

2.3.1 General Land Cover/Land Use Patterns

Land cover information in this section is derived from the US Department of Agriculture, Natural Resources Conservation Service's (NRCS) National Resources Inventories (NRI) of 1982 and 1992. The NRI is a multi-resource national inventory based on soils and other resource data collected at scientifically selected random sample sites. It is considered accurate to the 8-digit hydrologic unit scale established by the US Geological Survey (NRCS, 1993). Several state agencies including the NC Department of Transportation and the Department of Environment, Health and Natural Resources are working with the state's Center for Geographic Information and Analysis (CGIA) to develop statewide land use coverage based on recent satellite imagery. However, until these other land coverages become available, the NRI data is the most recent comprehensive data for the basin as a whole.

Table 2.2 summarizes acreages and percent cover of land cover for the basin as a whole and for the

Table 2.2 Land Cover in the Catawba River Basin by 8-Digit USGS Hydrologic Units for 1982 and 1992 (USDA, Natural Resources Conservation Service - 1982 and 1992 NRI)

1982	Upper Catawba 03050101		S Fork Cataw. 03050102		Lower Catawba 03050103		TOTAL ACRES	% of
LAND COVER	Acres (1000s)	%	Acres (1000s)	%	Acres (1000s)	%	(1000s)	TOTAL
Cult. Crop	86.8	6.2	69.5	15.4	37.3	16.4	193.6	9.3
Uncult. Crop	43.3	3.1	10.4	2.3	2.8	1.2	56.5	2.7
Pasture	93.2	6.6	53.2	11.8	14.1	6.2	160.5	7.7
Forest	737.1	52.5	179.7	39.9	69.6	30.7	986.4	47.4
Urban/built-up	196.9	14.0	59.4	13.2	94.7	41.7	351.0	16.9
Other	246.6	17.6	78.1	17.3	8.5	3.7	333.2	16.0
Totals	1403.9	100.0	450.3	100.0	227.0	100.0	2081.2	100.0
% of Total Basin		67.5		21.6		10.9		100.0
SUBBASINS	30 to 33 and 37		35 and 36		34 and 38		All	

1992	Upper Catawba 03050101		S Fork Cataw. 03050102		Lower Catawba 03050103		TOTAL ACRES	% of
LAND COVER	Acres (1000s)	%	Acres (1000s)	%	Acres (1000s)	%	(1000s)	TOTAL
Cult. Crop	50.9	3.6	38.1	8.5	31.6	13.9	120.6	5.8
Uncult. Crop	48.3	3.4	12.8	2.8	2.3	1.0	63.4	3.0
Pasture	82.7	5.9	56.6	12.6	13.7	6.0	153.0	7.4
Forest	693.9	49.4	177.4	39.4	59.6	26.3	930.9	44.7
Urban/built-up	281.3	20.0	78.7	17.5	114.1	50.3	474.1	22.8
Other	246.8	17.6	86.7	19.3	5.7	2.5	339.2	16.3
Totals	1403.9	100.0	450.3	100.0	227.0	100.0	2081.2	100.0
% of Total Basin		67.5		21.6		10.9		100.0
SUBBASINS	30 to 33 and 37		35 and 36		34 and 38			

three major watershed areas within the basin.

Land cover in the basin for 1992, as presented in Table 2.2, is dominated by forest land (45%), urban/built-up (23%) agriculture (16% - cultivated and cultivated cropland and pastureland) which jointly comprise roughly 84% of the land/water surface area in the entire basin. The remaining 16% of land cover in the Other category includes transportation corridors, open water and minor lands. It is significant that the percentage of land cover in this basin in the urban/built-up category exceeds the percentage in agriculture. In general, the percentage of land cover in urban/built-up is highest in the lower portion of the basin in correlation with population density figures, especially in subbasins 34, 37 and 38. Forest land cover would be expected to dominate the upper basin (subbasins 30, 31 and 35).

Changes in land cover percentages between 1982 and 1992 are presented in Figure 2.4. The developing nature of the basin is evidenced by the increase in the percentage of urban/built-up lands and the decreases in agricultural and forest lands. Cover types are described in Table 2.3.

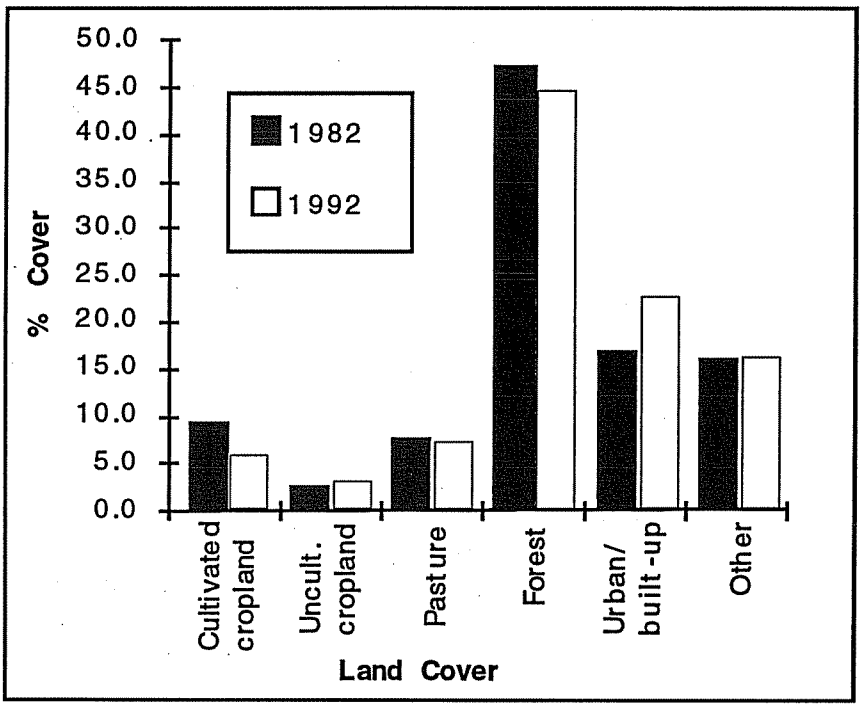

Figure 2.4 Comparison of Selected Land Cover Types (% cover) Between 1982 and 1992

2.3.2 Population and Growth Trends in the Basin

The Catawba River basin has an estimated population of 1,033,347 based on 1990 census data. Table 2.4 presents census data for 1970, 1980 and 1990 for each of the subbasins. It also includes land areas and population densities (persons/square mile) by subbasin based on the *land area* (excludes open water) for each subbasin. Most the population is located in the lower portion of the basin (Mecklenburg and Gaston Counties) as depicted in the population density map (Figure 2.5). Other population centers include Marion, Morganton, Lenoir, Hickory Lincolnton and Davidson. The percentage increase in population for the entire basin was 40% from 1970 to 1990 and was 16.5% for the 10-year period from 1980 to 1990. This latter figure compares to a statewide increase of 12.7% over the same 10-year period. Population growth rates by subbasin, are presented in Figure 2.6. Subbasin 38 (Union County area) had a 20-year growth of over 100%.

Table 2.3 Description of Land Cover Types (1982 NRI - USDA NRCS)

Land Cover Type (No.)	Land Cover Description
1) Cultivated Cropland	Land used for the production of adapted crops for harvest, including row crops, small-grain crops, hay crops, nursery crops, orchard crops, and other specialty crops. The land may be used continuously for these crops or they may be grown in rotation with grasses and legumes.
2) Uncultivated Cropland	Summer fallow, aquaculture in crop rotation, or other cropland not planted (may include cropland in USDA set-aside or similar short-term program).
3) Pastureland	Land used primarily for production of introduced or native forage plants for livestock grazing. This category includes land that has a vegetative cover of grasses, legumes, and /or forbs, regardless of whether or not it is being grazed by livestock.
4) Forest Land	Land at least 10 percent stocked by single-stemmed trees of any size which will be at least 4 meters at maturity, and land bearing evidence of natural regeneration of tree cover and not currently developed for nonforest use. Ten percent stocked, when viewed from a vertical direction, is a canopy cover of leaves and branches of 25 percent or greater. The minimum area for classification of forest land is 1 acre, and the area must be at least 1,000 feet wide.
5) Urban and Built-up Land	Includes airports, playgrounds with permanent structures, cemeteries, public administration sites, commercial sites railroad yards, construction sites, residences, golf courses, sanitary landfills, industrial sites, sewage treatment plants, institutional sites, water control structure spillways and parking lots. Highways, railroads, and other transportation facilities are considered part of this category if surrounded by other urban and built-up areas. Tracts of less than 10 acres that do not meet this category's definitions (e.g., small parks or water bodies) but are completely surrounded by urban and built-up lands are placed in this category.
6) Other	Minor Land - Lands not classified into one of the other categories. Rural Transportation - Consists of all highways, roads, railroads, and associated rights-of-way outside Urban and Built-up areas; private roads to farmsteads, logging roads; and other private roads (but not field lanes). Small Water Areas - Water bodies less than 40 acres in size and streams less than one-half mile wide. Census Water - Large water bodies consisting of lakes and estuaries greater than 40 acres and rivers greater than one-half mile in width.

Table 2.4 Catawba Subbasin Population (1970, 1980 and 1990) and Land Area Summaries

SUBBASIN	POPULATION (Number of Persons)			POPULATION DENSITY (Persons/Square Mile)			LAND AND WATER AREAS			
							Total Land and Water Area		Water Area	Land Area
	1970	1980	1990	1970	1980	1990	(Acres)	(Sq. Miles)	(Sq. Miles)	(Sq. Miles)
03-08-30	36,369	42,671	42,702	70	82	82	336,659	526	10	516
03-08-31	77,096	88,648	92,541	133	153	160	372,006	581	3	578
03-08-32	101,842	126,998	151,979	157	196	234	451,872	706	59	647
03-08-33	30,127	39,067	47,301	139	180	218	141,101	220	4	216
03-08-34	281,144	348,562	435,725	885	1,098	1,372	207,501	324	7	317
03-08-35	87,074	101,427	110,523	155	181	197	357,843	559	1	558
03-08-36	52,676	59,851	61,697	520	591	609	66,438	104	3	101
03-08-37	62,379	59,586	64,977	594	567	618	67,872	106	1	105
03-08-38	10,714	20,121	25,902	60	112	145	114,669	179	1	178
Totals	739,421	886,931	1,033,347	301	351	403	2,115,200	3,305	89	3,216

Note: Population, land area and water area were derived from 1970, 1980 and 1990 census data.

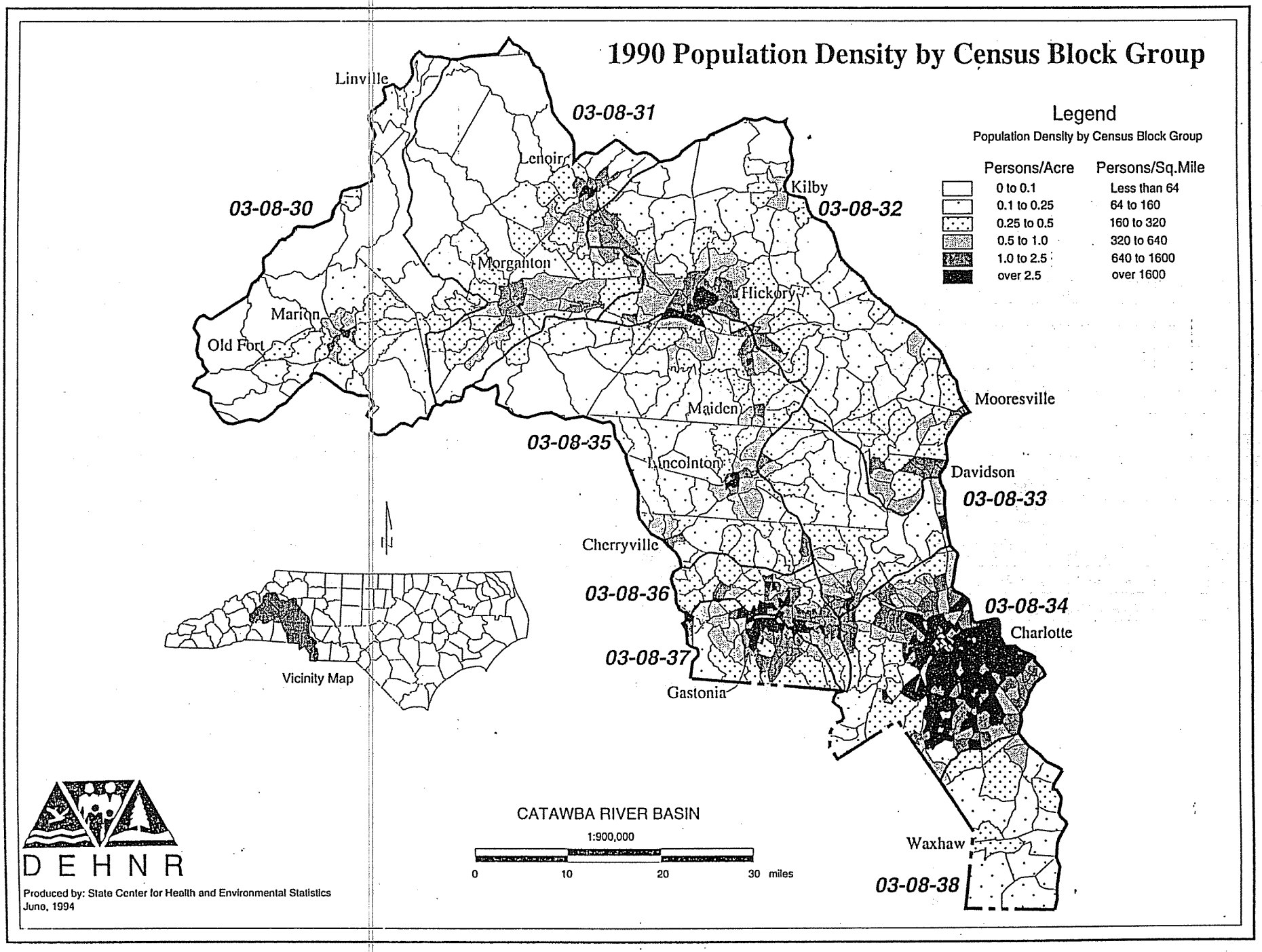

Figure 2.5 1990 Population Density by Census Block Group

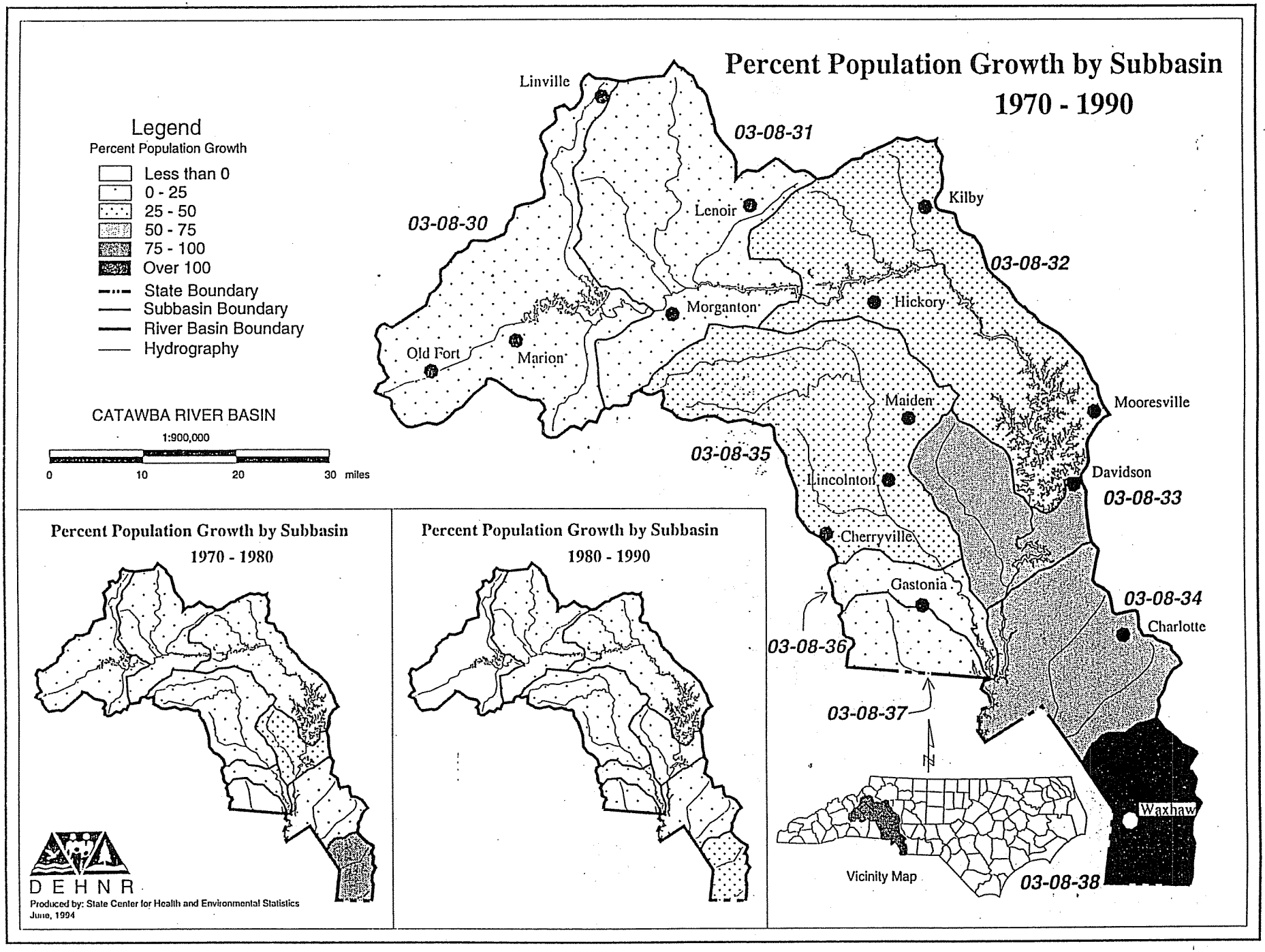

Figure 2.6 Population Growth Increases by Subbasin (1970 to 1990)

In using these data, it should be noted that some of the population figures are estimates because the census block group boundaries do not generally coincide with subbasin boundaries. The census data are collected within boundaries such as counties and municipalities. By contrast, the subbasin lines are drawn along natural drainage divides separating watersheds. Therefore, where a census block group straddles a subbasin line, an estimate has to be made on the percentage of the population that is located in the subbasin. This is done by simply determining the percentage of the census block group area located in the subbasin and then taking that same percentage of the total census block group population and assigning it the subbasin. Use of this method necessitates assuming that population density is evenly distributed throughout a census block group, which is not always the case. However, the level of error associated with this method is not expected to be significant for the purposes of this document. It is also important to note that the census block groups change each ten years so comparisons between years must be considered approximate.

Figure 2.5 shows population densities by census block group based on 1990 census data. The population density categories are based on persons/acre. An average family unit size is close to 2.5 persons. Therefore, a density of 2.5 persons/acre (1600 persons/square mile) is very roughly equivalent to one house per acre. The lowest density category of less than 0.1 person/acre is equivalent to less than 64 persons/square mile. The highest population densities are generally located in the lower portion of the basin in Mecklenburg and Gaston Counties (subbasins 34 and 37). Other areas with population densities greater than 1 person/acre occur around the municipalities of Cherryville, Davidson, Hickory, Lenoir, Lincolnton, Maiden, Marion, Mooresville and Morganton. The only subbasin with a population density of less than the state average (127 persons/square mile) is subbasin 30 (Lakes James watershed). Subbasin 34 (Charlotte area) has a population density of 1,372 persons/square mile.

Figure 2.6 displays percent population growth by subbasin for the time period from 1970 to 1990. During that twenty year period, subbasin 38 experienced a population increase of over 100%. Subbasins 33 and 34 had population growth increases in the 50 to 75% range. Subbasins 32 and 35 were in the 25 to 50% range and subbasins 30 and 31 were in the 0 to 25% range.

2.4 REGISTERED ANIMAL OPERATIONS

In 1992, the Environmental Management Commission adopted a rule modification (15A NCAC 2H .0217) to establish procedures for properly managing and reusing animal wastes from intensive livestock operations. The rule applies to new, expanding or existing feedlots with animal waste management systems designed to serve more than or equal to the following animal populations: 100 head of cattle, 75 horses, 250 swine, 1,000 sheep or 30,000 birds with a liquid waste system. The deadline for submittal of registrations to DEM for existing facilities was December 31, 1993. Table 2.5 summarizes the number of registered intensive livestock operations and animals, by type and subbasin, for those registrations received for the basin through May 1994.

Table 2.5 Registered Animal Operations in the Catawba River Basin

TYPE OF OPERATION	SUBBASINS									TOTALS
	30	31	32	33	34	35	36	37	38	
CATTLE										
Operations		1	4	3	4	7	2		1	21
Animals		75	460	715	428	930	300		140	2,908
CHICKENS										
Operations										0
Animals										0
DAIRY										
Operations	2	1	14	5	3	24	6	2	1	57
Animals	210	235	3,628	790	446	6,677	2,240	395	185	14,621
POULTRY										
Operations						1				1
Animals						48,000				48,000
SWINE										
Operations		1	6	1		6	1		5	15
Animals		2,800	2,885	300		3,800	200		11,614	9,985
TOTALS										
Operations	2	3	24	9	7	38	9	2	7	94
Animals	210	3,110	6,973	1,805	874	59,407	2,740	395	11,939	75,514

2.5 SURFACE WATER CLASSIFICATIONS AND WATER QUALITY STANDARDS

2.5.1 Program Overview

Clean water is critical to the health, economic well-being and the quality of life of those residing or working in the Catawba River basin. Most water users throughout the basin rely on surface water for basic needs such as water supply and/or wastewater disposal. In addition, many businesses and residents of the Catawba Basin rely directly or indirectly on clean lakes, rivers and streams to meet their recreational needs and for a source of living. Water-oriented real estate and building industries, and those businesses that serve the recreational needs of the basin such as fishing, boating and vacationing are just some examples. To these groups and the public they serve, it is important that the waters support viable fisheries and shellfish resources. In addition, full enjoyment of boating, swimming and residing along the water requires the waters to be relatively

safe (low risk of contracting water-borne disease) and aesthetically desirable (free of objectionable colors, odors and smells). Yet maintaining clean water becomes increasingly difficult and more expensive as the population grows, as land develops and as competition for its resources heighten. In order to assure that water quality throughout the basin is maintained at levels that support the various uses presented above as well as aquatic life, North Carolina has established a water quality classification and standards program pursuant to G.S. 143-214.1. Classifications and standards are developed pursuant to 15A NCAC 2B.0100 - Procedures for Assignment of Water Quality Standards.

Waters were classified for their "best usage" in North Carolina beginning in the early 1950's, with classification and water quality standards for all the state's river basins adopted by 1963. The effort to accomplish this included identification of water bodies (which included all named water bodies on USGS 7.5 minute topographic maps), studies of river basins to document sources of pollution and appropriate best uses, and formal adoption of standards/classifications following public hearings.

The Water Quality Standards program in North Carolina has evolved over time and has been modified to be consistent with the Federal Clean Water Act and its amendments. Water quality classifications and standards have also been modified to promote protection of surface water supply watersheds, high quality waters and the protection of unique and special pristine waters with outstanding resource values. Classifications and standards have been broadly interpreted to provide protection of uses from both point and nonpoint source pollution. Stormwater rules to protect uses and standards of coastal water are an example of North Carolina's water quality authorities.

2.5.2 Statewide Classifications and Water Quality Standards

Appendix I summarizes the state's primary and supplemental classifications including, for each classification, the best usage, key numeric standards, stormwater controls and other requirements as appropriate. This information is derived from 15A NCAC 2B 0.200 - Classifications and Water Quality Standards Applicable to Surface Waters of North Carolina.

Primary Classifications

Under this system, all surface waters in the state are assigned a *primary* classification that is appropriate to the best uses of that water body (e.g., aquatic life support and swimming). Primary freshwater classifications include the following: *C, B* and *WS* (Water Supply) *I* through *WS V.* The WS freshwater classifications may also include a *CA* designation which stands for *critical area.* The critical area is an area in close proximity to a water supply intake and/or the shoreline of the reservoir in which it is located. Primary saltwater classifications include *SC, SB* and *SA.* SC and SB are saltwater counterparts to the freshwater C and B classifications. SA is a classification assigned to waters used for shellfish harvesting. SA, WS-I and WS-II are also, by definition, considered to be High Quality Waters, discussed below.

Supplemental Classifications

In addition to primary classifications, surface waters may be assigned a supplemental classification. The supplemental classifications include *HQW* (High Quality Waters), *ORW* (Outstanding Resource Waters), *NSW* (Nutrient Sensitive Waters), *Tr* (Trout Waters) and *Sw* (Swamp Waters). Most of these have been developed in order to afford special protection to sensitive or highly valued resource waters. Therefore, while all surface waters are assigned a primary classification, they may also have one or more supplemental classifications. For example, many surface waters in the upper Catawba basin are supplementally classified as trout (Tr) waters. Therefore, a typical freshwater stream in the mountains might have a C Tr classification where C is the primary classification followed by the Tr supplemental classification.

Water Quality Standards

Each primary and supplemental classification is assigned a set of water quality *standards* that establish the level of water quality that must be maintained in the water body to support the uses associated with each classification. Some of the standards, particularly for HQW and ORW waters, outline protective management strategies aimed at controlling point and nonpoint source pollution. These strategies are summarized in Appendix I and are discussed briefly below. Tables 1 and 2 in Appendix 1 summarize the state's freshwater and saltwater numeric standards. The standards for C and SC waters establish the basic protection level for all state surface waters. With the exception of Sw, all of the other primary and supplemental classifications have more stringent standards than for C and SC and therefore require higher levels of protection.

Special HQW protection management strategies are presented in 15A NCAC 2B.0201(d), which is included in its entirety in Appendix I under Antidegradation Policy. These measures are intended to prevent degradation of water quality below present levels from both point and nonpoint sources. HQW requirements for new facilities and facilities which expand beyond their currently permitted loadings address oxygen-consuming wastes, total suspended solids, disinfection, emergency requirements, volume, nutrients (in nutrient sensitive waters) and toxic substances. For oxygen-consuming wastes, for example, effluent limitations for new or expanding facilities are as follows: BOD_5 = 5 mg/l; NH_3-N = 2 mg/l; DO = 6 mg/l (except for those expanding discharges which expand with no increase in permitted pollutant loading).

For nonpoint source pollution, development activities which require an Erosion and Sedimentation Control Plan in accordance with rules established by the NC Sedimentation Control Commission or local erosion and sedimentation control program approved in accordance with 15A NCAC 4B .0218, and which drain to and are within one mile of high quality waters will be required to control runoff from the one-inch design storm using either a low density or high density option described in the rules.

The requirements for ORW waters are more stringent than those for HQWs. Special protection measures that apply to North Carolina ORWs are set forth in 15A NCAC 2B .0216 (most of which is included in Appendix I). At a minimum, no new discharges or expansions are permitted, and stormwater controls for most new development are required.

2.5.3 Surface Water Classifications in the Catawba Basin

The Catawba Basin has examples of all of the freshwater classifications and supplemental classifications presented above except swamp waters. A complete listing of these classifications can be found in a DEM publication entitled "Classifications and Water Quality Standards Assigned to the Waters of the Catawba River Basin". Trout waters, WS-I, WS-II, HQWs, and ORWs are generally limited to tributaries of the upper Catawba River and upper South Fork Catawba River. Table 2.6 summarizes those waters in the basin that are classified in whole or part as WS, HQW or ORW. Figures 2.7 through 2.9 show ORW streams in the basin.

REFERENCES

North Carolina Environmental Management Commission, Amended Effective February 1, 1993, Procedures for Assignment of Water Quality Standards (15 NCAC 2B .0100), and Classifications and Water Quality Standards Applicable to Surface Waters of North Carolina (15A NCAC 2B .0200), Raleigh, NC.

North Carolina Department of Environment, Health, and Natural Resources, 1992, North Carolina Lake Assessment Report, Report No. 92-02, Division of Environmental Management, Water Quality Section, Raleigh, NC.

Table 2.6 Waters in the Catawba Basin Classified in Whole or Part as WS, HQW or ORW

WATER BODY	WS Classification	HQW	ORW
Armstrong Creek	II	•	
Buck Creek	II		
Catawba River (at Morganton)	IV		
Clear Creek	I	•	
Henry Fork	I		•
Hoyle Creek	IV		
Indian Creek	II		
Jacob Fork	III		•
Jarrett Creek		•	
Jem Branch	I		
Johns River			
Lake Hickory	IV		
Lake Norman	IV		
Lake Rhodhiss	IV		
Lake Wylie	IV		
Linville River		•	
Long Creek	II		
Long Creek (Arrowood Lake)	II		
Mackey Creek	II	•	
Maiden Lake	II		
Mountain Island Lake	IV		
Mulberry Creek		•	
So. Fork Catawba River	IV		
Steels Creek		•	•
Upper Creek		•	•
Warrior Fork	III		
Wilson Creek and Tribs			•

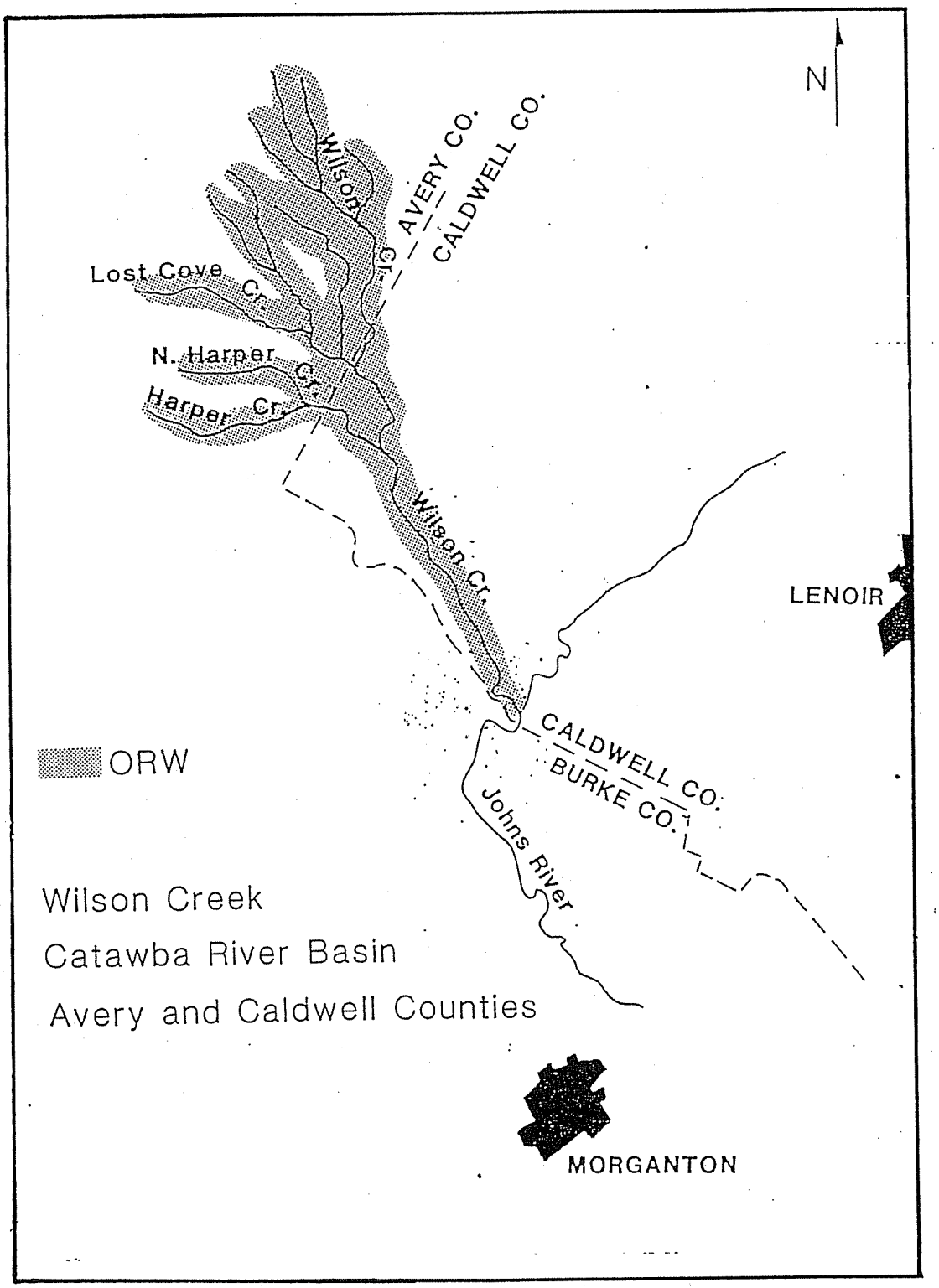

Figure 2.7 Wilson Creek Outstanding Resource Waters (ORW)

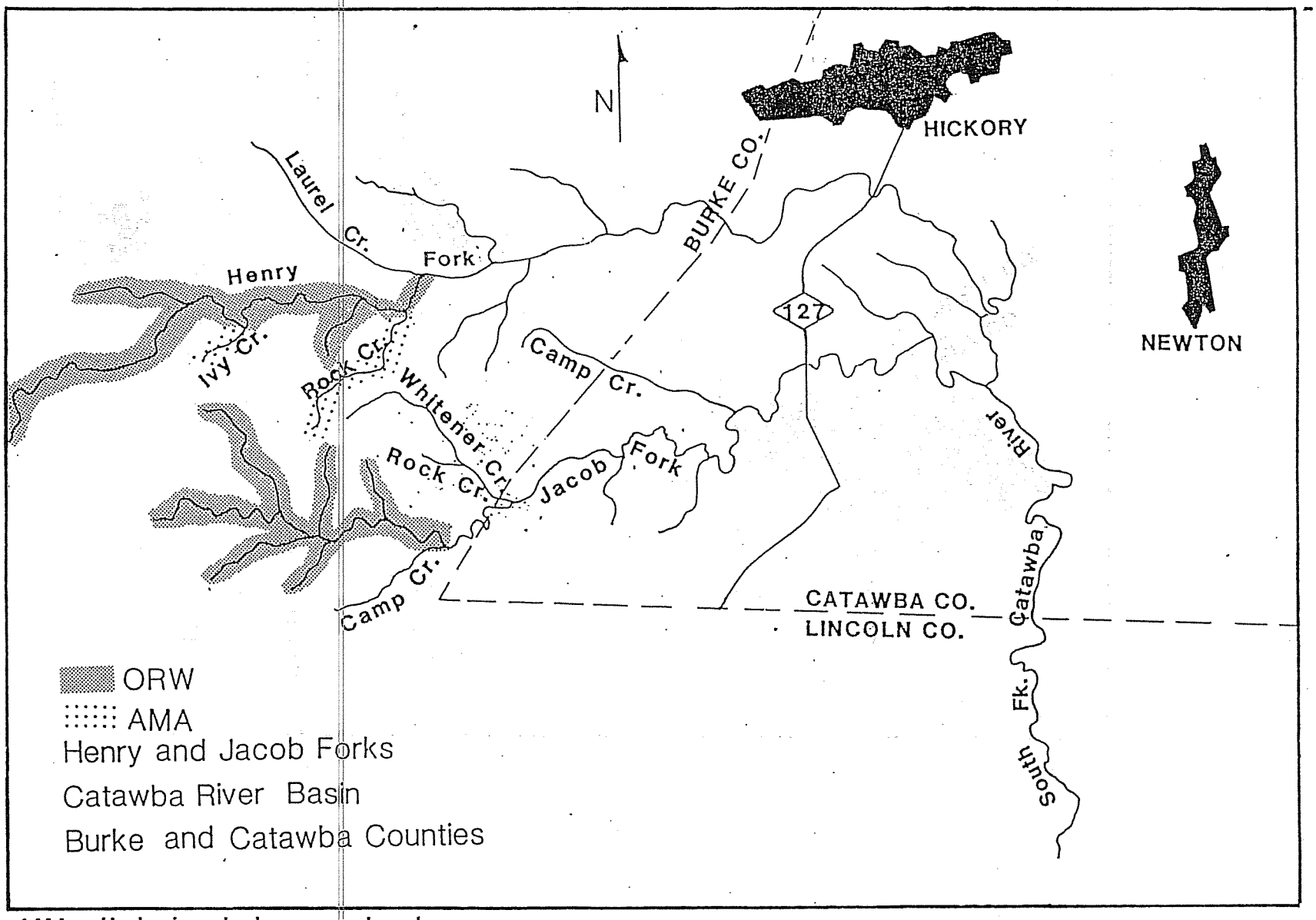

Figure 2.8 Henry and Jacob Forks Outstanding Resource Waters (ORW)

AMA – Undesignated segments where management strategy is also applicable

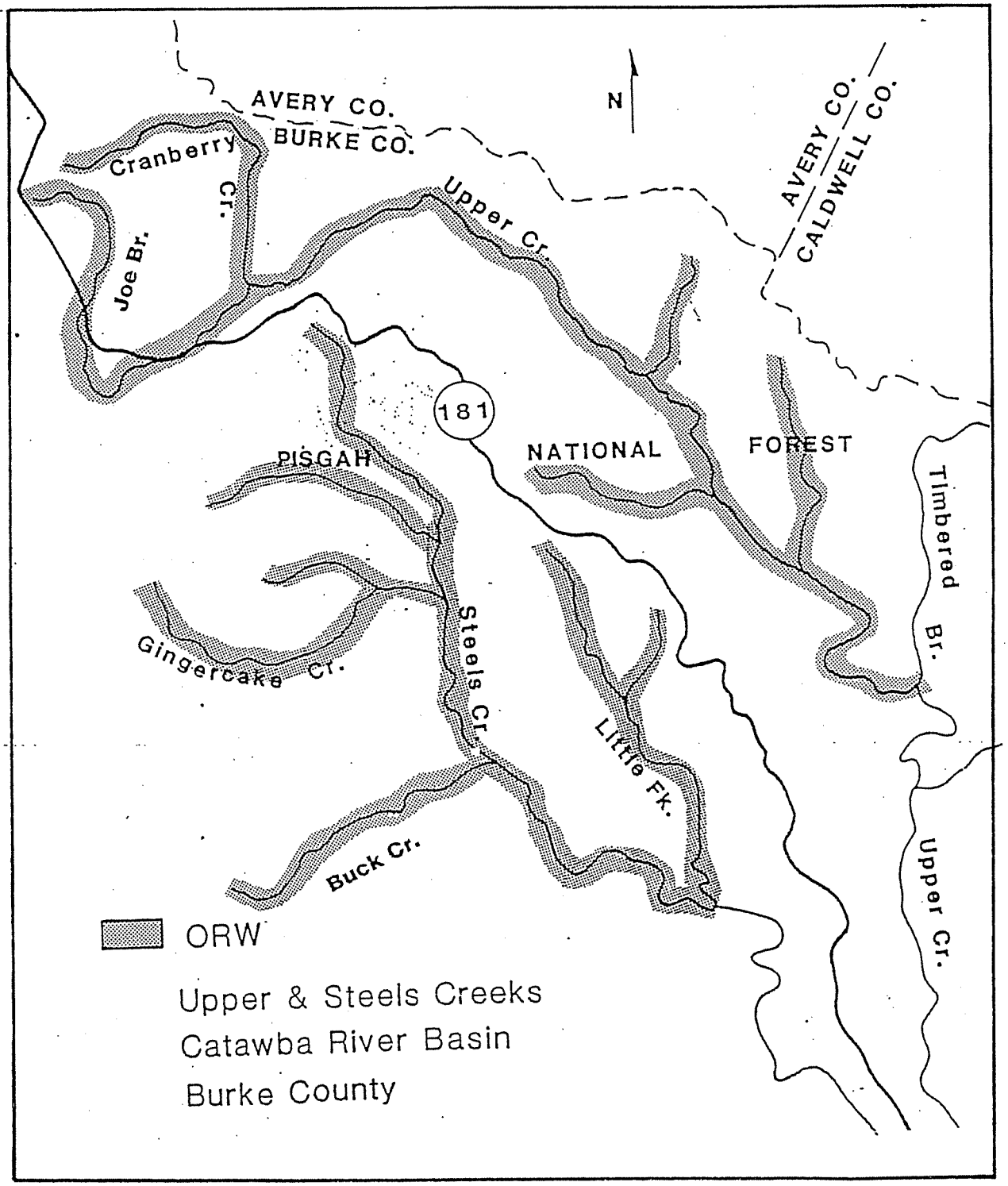

Figure 2.9. Upper and Steels Creek Outstanding Resources Waters (ORW)