BASIN 17 WHITE OAK

BASIN DESCRIPTION

The White Oak Basin drains 910 square miles of the North Carolina Coastal Plain and includes the barrier islands from Browns Inlet to Ocracoke Inlet. The basin encompasses the drainage areas of three separate rivers, the White Oak River, the Newport River and North River. The basin also includes the waters of Bogue Sound and Core Sound. About 45% of the area of the basin is classified as water by the 1997 Natural Resource Inventory. An additional 40% of the basin is forested, with much of it being in the Croatan National Forest.

WATER USE

Factors Affecting Water Demand

The Natural Resources Inventories conducted by the Department of Agriculture estimated that the land classified as "urban/built-up" increased from 4% to 7% from 1982 to 1997. This basin has about 1% of the state's residents and contains all or part of 13 municipalities in four counties. This basin includes portions of Onslow County, one of the state's major metropolitan areas. As in many other parts of the state, portions of the White Oak Basin have begun to see significant growth. From 1990 to 1997 year-round population in Carteret County grew by over 12%. Population in two counties in the basin, Jones and Onslow, declined over the same period.

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 9.1 million gallons per day (mgd), almost all of which came from ground water sources. USGS estimated total basin population at 72,260. Residential demand was estimated at 4.45 mgd with about 63% of this demand being supplied by public water systems. Overall, public water systems supplied 4.23 mgd from ground water for both residential and non-residential uses. Surface water is not used as public water supply source in this basin. The remaining residential water demand was met by 1.6 mgd of self-supplied ground water. In addition, about 3 mgd of self-supplied water was withdrawn for non-residential water uses.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.

LWSPs were submitted by eight public water systems using water from this basin. These systems supplied 3.3 mgd of water to 22,538 persons. The following discussion and table summarize the LWSP population served with water from this basin and its water use for 1997.

1997 LWSP System Water Use from Basin (mgd)

Sub-basin	LWSP Population	Residential Use	Non-residential Use	Total Use*
White Oak River	22,538	1.63	1.18	3.3

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

About half (49%) of the total amount of water used was for residential uses. Thirty-six percent of total use was for non-residential uses and 14% was unaccounted-for water.

LWSP systems expect to supply water to 31,100 persons by the year 2020, a 38% increase over 1997 levels. Their demand for water is projected to grow 66% to 5.5 mgd by 2020.

In the 1997 LWSPs, none of the eight 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 eight LWSP systems in this basin had average demand above this threshold. By 2020, none of the 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 4.8 mgd of the 9.1 mgd total of water used from this basin, as shown in the table below. Irrigation use comprised 53% of the self-supplied uses, followed by domestic (34%), livestock (10%), commercial (3%), and industrial (<1%) uses.

1995 USGS Estimated Self-supplied Water Use in mgd

Sub-basin	Domestic	Livestock	Industrial	Commercial	Irrigation	Total
White Oak River	1.64	0.46	0.01	0.14	2.53	4.8

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.

Registered Water Withdrawals for 1999

Sub-basin	Agricultural		Non-agricultural		Total	
	#	mgd	#	mgd	#	mgd
White Oak River	3	1.863	3	13.878	6	15.741

The registered agricultural withdrawals are three aquaculture operations. The three non-agriculture withdrawals include a mining operation and two private water systems.

WATER AVAILABILITY

All local plan systems in this basin depend on ground water. The systems pumping water from this basin have an available supply of 8.8 mgd of ground water based on the 12-hour yields supplied in their LWSPs.

Several public water systems are on the Bogue Banks barrier island. LWSP data are only available for Atlantic Beach since the other communities are supplied by private water systems that are not required to prepare a LWSP. These beach systems have high seasonal demands that place a great deal of stress on the fragile water supply. Salt water intrusion is always a concern for wells in a coastal setting.

The water-bearing geologic deposits of the Coastal Plain form a regional aquifer system that has historically provided plentiful, high-quality, low-cost water. However, ground water levels in the Cretaceous aquifers have been declining because of over-pumping. Most of the systems in the White Oak Basin use ground water from the shallower Castle Hayne aquifer, which is not being over-pumped.

To ensure that ground water remains a reliable long-term water source in the Coastal Plain, the Environmental Management Commission adopted rules in December 2000 establishing a Capacity Use Area for 15 counties in the Central Coastal Plain, including Carteret and Onslow. If approved by the legislature in 2002, permits would be required for all ground water withdrawals over 100,000 gallons per day within these counties. Pumping from the Black Creek and Upper Cape Fear aquifers would be limited or reduced in some areas. Affected water users will need to manage water demand and develop alternative sources of supply to offset these reductions.

Since most systems in the White Oak basin use ground water from the Castle Hayne aquifer, their ground water use would not be restricted, however, water systems would still need to obtain a water use permit. Swansboro would be indirectly affected since it does purchase water from Onslow County, a system that withdraws some of its water from the affected aquifers.

Much of the basin is already in the existing Capacity Use Area #1, which also requires permits for all withdrawals exceeding 100,000 gallons per day. Currently, Morehead City has a 2.5 mgd permit, Newport has a 0.92 mgd permit, and Beaufort has a permit for 1.0 mgd.

INTERBASIN TRANSFERS OF SURFACE WATER

Across the state many water users and systems move surface water between sub-basins to meet their needs. Regulatory approval is generally needed for transfers of 2.0 mgd or more. Since all of the systems in this basin use ground water, there are no interbasin transfer issues.

SUMMARY OF INFORMATION FROM 1997 LWSPs

! Total per capita water use for the basin was 148 gallons per day (gpd) in 1997 and is projected to increase to 178 gpd by 2010.

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

! One system, Swansboro, relies on purchase water as its sole supply.

! In 1997 these systems used 3.3 mgd of ground water.

! The reported 12-hour groundwater supply was 8.8 mgd.

! Four systems were planning additional supplies totaling 3.1 mgd in the 1997 LWSPs.

! The systems along the barrier islands are subject to significant seasonal demands.

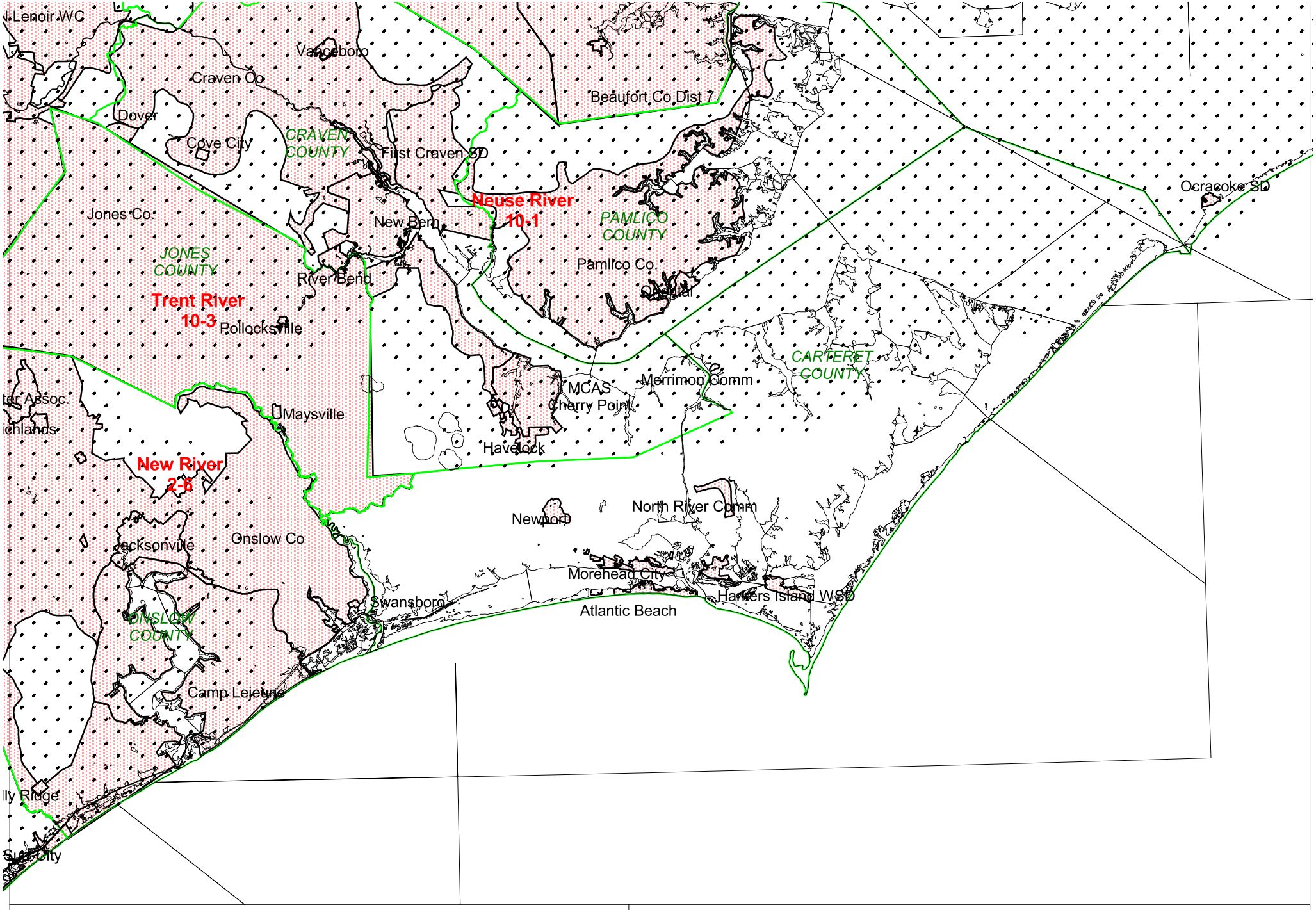
! The systems are projecting significant growth, 38% in population and 66% in demand, by 2020.

! Only about 0.01 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.

! Systems reporting high Demand-to-Supply Ratios:

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

January 2001
State Water Supply Plan
Division of Water Resources, DENR



Basin 17 White Oak River

(unshaded basin)

LWSP service area | County Boundary | Basin Boundary

WHITE OAK RIVER BASIN (17)

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**

		Year-round Service Population		Average Daily Demand (mgd)		Available Supply (mgd)		Demand as % of Supply	
Water Systems by County	**Water Source or Supplier**	**1997**	**2010**	**1997**	**2010**	**1997**	**2010**	**1997**	**2010**
CARTERET (in proposed Central Coastal Plain Capacity Use Area)									
ATLANTIC BEACH	Castle Hayne Aquifer	2300	3252	0.789	1.77	4.212	4.212	19%	42%
BEAUFORT	Castle Hayne Aquifer	4550	6075	0.53	0.672	1.296	1.519	41%	44%
HARKERS ISLAND WSD	Castle Hayne Aquifer	2500	3000	0.14	0.2	0.324	0.324	43%	62%
MOREHEAD CITY	Castle Hayne Aquifer	7560	9000	1.248	1.473	1.8	2.37	69%	62%
NEWPORT	Surficial Aquifer	2906	3759	0.341	0.58	0.771	1.158	44%	50%
NORTH RIVER COMM	Castle Hayne Aquifer	304	0	0.028	0	0.223	0	14%	0%
JONES (in proposed Central Coastal Plain Capacity Use Area)									
MAYSVILLE	Beaufort Aquifer	997	985	0.114	0.056	0.144	0.144	79%	39%
ONSLOW (in proposed Central Coastal Plain Capacity Use Area)									
SWANSBORO	ONSLOW CO	1421	1760	0.145	0.201	0.145	0.241	100%	83%