Chapter 13
Water Resources

13.1 River Basin Hydrologic Units

Under the federal system, the White Oak River basin is made up of hydrologic areas referred to as cataloging units (USGS 8-digit hydrologic units). Cataloging units are further divided into smaller watershed units (14-digit hydrologic units) that are used for smaller scale (Table 52).

Table 52 Hydrologic Subdivisions in the White Oak River Basin

Watershed Name and Major Tributaries	DWQ Subbasin 6-digit Codes	USGS 8-digit Hydrologic Units	USGS 14-digit Hydrologic Units Local Watersheds*
New River	03-05-02	03030001	03030001010010, …10010, …10020, …10030, …10040, …10050, …20010, …20020, …20030, …20040, …20050, …30010, …30020
Bogue-Core Sounds	03-05-01	03020106	03020106010010, …10020, …10030, …10031, …10040, …10050, …10060, …10070, …20010, …20020, …20030, …20060, …20070, …20080
White Oak River	03-05-01	"	03020106010010, …10020, …10030, …10031, …10040, …10050, …10060, …10070, …20010, …20020, …20030, …20060, …20070, …20080
Newport River	03-05-03	"	03020106020040, …20040, …20050, …20052, …30010, …30010, …30030, …30040, …30050, …30060, …30070, …30080, …30082
North River	03-05-04	"	03020106040010, …40010, …40020, …50020, …50040
Jarrett Bay and Nelson Bay	03-05-04	"	03020106040010, …40010, …40020, …50020, …50040
Core Sound and Back Sound	03-05-05		03020106040022, …50030

*Numbers from the 8-digit and 14-digit column make the full 14-digit HU.

13.2 Water Withdrawal in the White Oak River basin

The General Assembly established a water supply planning program under General Statute 143-355(l) and (m) to assure the availability of adequate supplies of good quality water to protect the public health and to support desirable economic growth. The original statute required units of local government that provide or plan to provide public water service to prepare a Local Water Supply Plan (LWSP). Session Law 2003-167 expanded the scope of water systems required to prepare a LWSP to include all community water systems that regularly serve 1,000 or more service connections or 3,000 or more individuals. It also required water systems preparing a local plan to explain how they plan to respond to water shortages caused by droughts.

The LWSPs must be updated at least every five years. They are submitted to and reviewed for completeness and consistency by the Division of Water Resources. The plans provide a valuable source of data for all local and regional water supply planning. Information from the local plans is available on the Division's web site www.ncwater.org. General Statute 143-215.22 requires any person that withdraws large quantities of water to register their withdrawal with DENR. Non-agricultural water users that withdraw 100,000 gallons per day or more of ground water or surface water are required to register their withdrawals. Agricultural water users that withdraw

1,000,000 gallons per day or more of ground water or surface water are required to register their withdrawals. Like the LWSPs water withdrawal registrations have to be updated at least every five years.

All the White Oak River basin is in the designated Central Coastal Plain Capacity Use Area established by the Environmental Management Commission in 2002. Permitting and water use in this area are regulated by the Central Coastal Plain Capacity Use Area rules (15A NCAC 2E .0500) a copy of which can be found on the DWR website at: www.ncwater.org. Water users that withdraw more than 100,000 gallons per day of ground water within the designated area must obtain a permit from the Division of Water Resources and regularly report the quantity of water withdrawn. Water use quantities shown in Table 53 are taken from the sources of water withdrawal data collected and maintained by the Division of Water Resources.

Table 53 Local Water Supply Plan Systems and Registered Water Withdrawals

County	2004 Average (mgd)	2004 Maximum (mgd)	Source	Facility/Water System
Carteret	0.711	1.818	Ground Water	Atlantic Beach
Carteret	0.109	0.235	Ground Water	Atlantic Veneer Corp
Carteret	0.515	0.768	Ground Water	Beaufort
Carteret	0.122	0.216	Ground Water	Beaufort Fisheries
Carteret	1.703	4.779	Ground Water	Bogue Banks Water Corp
Carteret	0.15	0.272	Ground Water	Carolina Water Service-Brandywine Bay
Carteret	0.433	0.851	Ground Water	Carolina Water Service-Pine Knoll Shores
Carteret	0.094	0.35	Ground Water	Carteret Co - North River Community
Carteret	0.137	0.248	Ground Water	Harkers Island WSD
Carteret	1.306	2.103	Ground Water	Morehead City
Carteret	0.415	1.085	Ground Water	Newport
Carteret	0.759	1.277	Ground Water	West Carteret Water Corp
Jones	8.183	9.216	Belgrade Quarry	Martin Marietta - Belgrade Quarry
Jones	0.069	0.117	Ground Water	Maysville
Onslow	4.618	6.951	Ground Water	Camp Lejeune
Onslow	4.323	5.456	Ground Water	Jacksonville
Onslow	0.079	0.154	Ground Water	Lawn Pro Inc
Onslow	6.863	10.185	Onslow Quarry	Martin Marietta - Onslow Quarry
Onslow	0.097	0.136	Ground Water	NW Onslow Water
Onslow	3.29	5.386	Ground Water	Onslow WSA
Onslow	0.157	0.295	Ground Water	Richlands
Estimated water use in Million Gallons per Day (mgd)				

13.3 Source Water Assessment of Public Water Supplies

13.3.1 Introduction

The Federal Safe Drinking Water Act (SDWA) Amendments of 1996 emphasize pollution prevention as an important strategy for the protection of ground and surface water resources. This new focus promotes the prevention of drinking water contamination as a cost-effective means to provide reliable, long-term and safe drinking water sources for public water supply (PWS) systems. In order to determine the susceptibility of public water supply sources to

contamination, the amendments also required that all states establish a Source Water Assessment Program (SWAP). Specifically, Section 1453 of the SDWA Amendments require that states develop and implement a SWAP to:

- Delineate source water assessment areas;
- Inventory potential contaminants in these areas; and
- Determine the susceptibility of each public water supply to contamination.

In North Carolina, the agency responsible for the SWAP is the Public Water Supply (PWS) Section of the DENR Division of Environmental Health (DEH). The PWS Section received approval from the EPA for their SWAP Plan in November 1999. The SWAP Plan, entitled *North Carolina's Source Water Assessment Program Plan*, fully describes the methods and procedures used to delineate and assess the susceptibility of more than 9,000 wells and approximately 207 surface water intakes. To review the SWAP Plan, visit the PWS website at http://www.deh.enr.state.nc.us/pws/index.htm.

13.3.2 Delineation of Source Water Assessment Areas

The SWAP Plan builds upon existing protection programs for ground and surface water resources. These include the state's Wellhead Protection Program and the Water Supply Watershed Protection Program.

Wellhead Protection (WHP) Program
North Carolinians withdraw more than 88 million gallons of groundwater per day from more than 9,000 water supply wells across the state. In 1986, Congress passed Amendments to the SDWA requiring states to develop wellhead protection programs that reduce the threat to the quality of groundwater used for drinking water by identifying and managing recharge areas to specific wells or wellfields.

Defining a wellhead protection area (WHPA) is one of the most critical components of wellhead protection. A WHPA is defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." The SWAP uses the methods described in the state's approved WHP Program to delineate source water assessment areas for all public water supply wells. More information related to North Carolina's WHP Program can be found at http://www.deh.enr.state.nc.us/pws/swap.

Water Supply Watershed Protection (WSWP) Program
DWQ is responsible for managing the standards and classifications of all water supply watersheds. In 1992, the WSWP Rules were adopted by the EMC and require all local governments that have land use jurisdiction within water supply watersheds adopt and implement water supply watershed protection ordinances, maps and management plans. SWAP uses the established water supply watershed boundaries and methods established by the WSWP program as a basis to delineate source water assessment areas for all public water surface water intakes. Additional information regarding the WSWP Program can be found at http://h2o.enr.state.nc.us/wswp/index.html.

13.3.3 Susceptibility Determination – North Carolina's Overall Approach

The SWAP Plan contains a detailed description of the methods used to assess the susceptibility of each PWS intake in North Carolina. The following is a brief summary of the susceptibility determination approach.

Overall Susceptibility Rating
The overall susceptibility determination rates the potential for a drinking water source to become contaminated. The overall susceptibility rating for each PWS intake is based on two key components: a contaminant rating and an inherent vulnerability rating. For a PWS to be determined "susceptible", a potential contaminant source must be present and the existing conditions of the PWS intake location must be such that a water supply could become contaminated. The determination of susceptibility for each PWS intake is based on combining the results of the inherent vulnerability rating and the contaminant rating for each intake. Once combined, a PWS is given a susceptibility rating of higher, moderate or lower (H, M or L).

Inherent Vulnerability Rating
Inherent vulnerability refers to the physical characteristics and existing conditions of the watershed or aquifer. The inherent vulnerability rating of groundwater intakes is determined based on an evaluation of aquifer characteristics, unsaturated zone characteristics and well integrity and construction characteristics. The inherent vulnerability rating of surface water intakes is determined based on an evaluation of the watershed classification (WSWP Rules), intake location, raw water quality data (i.e., turbidity and total coliform) and watershed characteristics (i.e., average annual precipitation, land slope, land use, land cover, groundwater contribution).

Contaminant Rating
The contaminant rating is based on an evaluation of the density of potential contaminant sources (PCSs), their relative risk potential to cause contamination, and their proximity to the water supply intake within the delineated assessment area.

Inventory of Potential Contaminant Sources (PCSs)
In order to inventory PCSs, the SWAP conducted a review of relevant, available sources of existing data at federal, state and local levels. The SWAP selected sixteen statewide databases that were attainable and contained usable geographic information related to PCSs.

13.3.4 Source Water Protection

The PWS Section believes that the information from the source water assessments will become the basis for future initiatives and priorities for public drinking water source water protection (SWP) activities. The PWS Section encourages all PWS system owners to implement efforts to manage identified sources of contamination and to reduce or eliminate the potential threat to drinking water supplies through locally implemented programs

To encourage and support local SWP, the state offers PWS system owners assistance with local SWP as well as materials such as:

- Fact sheets outlining sources of funding and other resources for local SWP efforts.
- Success stories describing local SWP efforts in North Carolina.

- Guidance about how to incorporate SWAP and SWP information in Consumer Confidence Reports (CCRs).

Information related to SWP can be found at http://www.deh.enr.state.nc.us/pws/swap.

13.3.5 Public Water Supply Susceptibility Determinations in the White Oak River Basin

In April 2004, the PWS Section completed source water assessments for all drinking water sources and generated reports for the PWS systems using these sources. A second round of assessments were completed in April 2005. The results of the assessments can be viewed in two different ways, either through the interactive ArcIMS mapping tool or compiled in a written report for each PWS system. To access the ArcIMS mapping tool, simply click on the "NC SWAP Info" icon on the PWS web page (http://www.deh.enr.state.nc.us/pws/swap). To view a report, select the PWS System of interest by clicking on the "SWAP Reports" icon.

In the White Oak River Basin, 257 public water supply sources were identified. All of the public water supply sources are groundwater wells. Of the 257 groundwater sources, 28 have a Higher susceptibility rating, 141 have a Moderate susceptibility rating and 88 have a Lower susceptibility rating. It is important to note that a susceptibility rating of Higher does not imply poor water quality. Susceptibility is an indication of a water supply's potential to become contaminated by the identified PCSs within the assessment area.