

Executive Summary

North Carolina's Basinwide Approach to Water Quality Management

Basinwide water quality planning is a nonregulatory watershed-based approach to restoring and protecting the quality of North Carolina's surface waters. Basinwide water quality plans are prepared by the NC Division of Water Quality (DWQ) for each of the seventeen major river basins in the state. Each basinwide plan is revised at five-year intervals. While these plans are prepared by the DWQ, their implementation and the protection of water quality entails the coordinated efforts of many agencies, local governments and stakeholders in the state. The first basinwide plan for the White Oak River basin was completed in 1997.

This document is the first five-year update of the *White Oak River Basinwide Water Quality Plan*. The format of this plan was revised in response to comments received during the first planning cycle. DWQ replaced much of the general information in the first plan with more detailed information specific to the White Oak River basin. A greater emphasis was placed on identifying causes and sources of pollution for individual streams in order to facilitate local restoration efforts.

DWQ seriously considered comments from two public workshops held in the basin during plan development. The plan was revised based on comments from a public meeting to review the draft plan. This input will help guide continuing DWQ activities in the basin.

Goals of the Basinwide Approach

The goals of DWQ's basinwide program are to:

- identify water quality problems and restore full use to impaired waters;
- identify and protect high value resource waters;
- protect unimpaired waters while allowing for reasonable economic growth;
- develop appropriate management strategies to protect and restore water quality;
- assure equitable distribution of waste assimilative capacity for dischargers; and
- improve public awareness and involvement in the management of the state's surface waters.

White Oak River Basin Overview

The White Oak River Basin lies entirely within the southern coastal plain. The name of the basin is a bit of a misnomer in that it includes four separate river systems: the New River and its tributaries in the southwestern section; the White Oak River and its tributaries; the Newport River and its tributaries; and the North River in the eastern section. The basin also includes Bogue, Back and Core Sounds as well as significant portions of the Intracoastal Waterway.

The White Oak River watershed (subbasin 03-05-01), the basin's namesake, is located immediately east of the New River. It is the second largest watershed in the basin. There are 132 stream miles and 12,050 estuarine acres in this subbasin as well as eight miles of Atlantic

coastline. The river flows past the western end of Bogue Sound and into the Atlantic Ocean at Bogue Inlet.

The New River watershed (subbasin 03-05-02) is the westernmost of the four major river systems in the basin. It is also the largest and most populated and includes the City of Jacksonville. The New River is a coastal blackwater river with a watershed entirely within Onslow County. The watershed above Jacksonville is characterized by gum-cypress swamps with upland areas used primarily for forestry and agriculture. At Jacksonville, the river widens into a broad, slow-moving tidal embayment. It eventually discharges in the Atlantic Ocean through a narrow opening called New River Inlet. The City of Jacksonville and the US Marine Corps, with the operation of Camp Lejeune, comprise the majority of land in the lower watershed (that area below the US 17 bridge). There are 223 stream miles, 22,810 estuarine acres and 15 miles of Atlantic coastline in this subbasin.

The Newport River watershed (subbasin 03-05-03) is located just east of the White Oak River. It flows into the eastern end of Bogue Sound before entering the Atlantic Ocean near Morehead City. The Newport River watershed begins in Craven County and flows through Newport. There are 85 stream miles, 33,211 estuarine acres and 25 miles of Atlantic coastline.

The North River watershed (subbasin 03-05-04) is located on the western side of Core Sound and is mostly rural. The headwaters of the North River originate in Carteret County and flow directly into Back Sound near Harkers Island. Jarrett and Nelson Bays also drain inland areas in this subbasin. There are 4 stream miles and 49,077 estuarine acres in this subbasin.

The eastern most subbasin (03-05-05) is sparsely populated, and most of the land area is in the Cape Lookout National Seashore. There are 12,861 estuarine acres and 43 miles of Atlantic coastline in this subbasin.

There are 4 counties and 16 municipalities located in whole or in part in the basin. Based on 1990 data, the population of the basin is 146,240 people. The most populated areas are located in Jacksonville and Camp Lejeune on the New River, and Morehead City and Beaufort on Bogue Sound and the Newport River. The overall population density is 143 persons per square mile versus a statewide average of 139 persons per square mile. There are areas in the basin with very sparse populations (subbasins 03-05-04 and 03-05-05). The population density in the remainder of the basin exceeds the average state population density.

Large portions of the basin are publicly-owned areas, such as the Croatan National Forest on the White Oak River, and the Hoffman State Forest and Camp Lejeune on the New River. Statistics provided by the US Department of Agriculture, Natural Resources Conservation Service indicate that during the last decade there has been a 35,000-acre (65.6%) increase in the amount of developed land, and a 9,000-acre (15.1%) decrease in cultivated cropland, and a 29,000-acre (9.7%) decrease in forestland. Uncultivated croplands and pasturelands have increased by nine acres.

Assessment of Water Quality in the White Oak River Basin

Surface waters are classified according to their best intended uses. Determining how well a water supports its designated uses (use support status) is an important method of interpreting water quality data and assessing water quality. Waters are rated fully supporting (FS), partially supporting (PS) or not supporting (NS). The terms refer to whether the classified uses of the water (i.e., aquatic life protection, recreation and water supply) are being met. For example, waters classified for aquatic life protection and secondary recreation (Class C for freshwater or SC for saltwater) are rated FS if data used to determine use support did not exceed specific criteria. However, if these criteria were exceeded, then the waters would be rated as PS or NS, depending on the degree of degradation. Waters rated PS or NS are considered to be impaired. Waters lacking data, or having inconclusive data, are listed as not rated (NR).

Beginning in 2000 with the *Roanoke River Basinwide Water Quality Plan*, DWQ assesses ecosystem health and human health risk through several use support categories. Six categories are used to assess water quality under this approach: aquatic life/secondary recreation, fish consumption, shellfish harvesting, primary recreation, water supply and "other" uses. Each of these categories is related to the primary classifications applied to NC rivers and streams. A single water could have more than one use support rating corresponding to one or more of the multiple use support categories. For many waters, a use support category will not be applicable (N/A) to the best use classification of that water (e.g., drinking water supply is not the best use of a Class C water). The current method of determining use support differs from that done prior to 2000; in that, there is no longer an *overall* use support rating for a water.

The aquatic life/secondary recreation use support category is applied to all waters in North Carolina. Therefore, this category is applied to the total number of stream miles (416.9), estuarine acres (131,215.9), and coastal miles (91) in the White Oak River basin. A basinwide summary of current aquatic life/secondary recreation use support ratings is presented in Table 1.

Approximately 13 percent of stream miles (54 mi.) and 87 percent of estuarine acres (114,565) were monitored for the protection of aquatic life and secondary recreation by DWQ during this basinwide planning cycle. The 91 miles of Atlantic coastline are not currently monitored by DWQ to assess the aquatic life and secondary recreation use support category. There were no impaired stream miles and no impaired estuarine waters in this use support category in the basin during this planning cycle.

Table 1 Aquatic Life/Secondary Recreation Use Support Summary Information for Waters in the White Oak River Basin (1999)

Aquatic Life/Secondary Recreation Use Support Ratings	Monitored, Evaluated and Not Rated Streams*		Monitored Streams Only**	
	Miles or Acres	%	Miles or Acres	%
Fully Supporting	71.8 mi. 118,450 ac	17.0% 90%	54 mi. 114,565 ac	13% 87%
Impaired	0	0%	0	0%
<i>Partially Supporting</i>	<i>0</i>	<i>0%</i>	<i>0</i>	<i>0%</i>
<i>Not Supporting</i>	<i>0</i>	<i>0%</i>	<i>0</i>	<i>0%</i>
Not Rated	339.4 mi. 12,766 ac	83% 10%	84.9 mi. 721 ac	20% 0.5%
Total	416.9 mi. 131,216.4 ac		139 mi. 115,286 ac	

* = Percent based on total of all waters, both monitored and evaluated.

** = Percent based on total of all monitored waters.

Like the aquatic life/secondary recreation use support category, the fish consumption use support category is also applied to all waters in the state. Approximately 7.5 percent of stream miles (31.3 miles) and 100 percent of Atlantic coastline (91 miles) in the White Oak River basin were monitored for the fish consumption use support category during this basinwide cycle. Fish consumption use support ratings are based on fish consumption advisories issued by the NC Department of Health and Human Services (DHHS). Currently, there is a statewide advisory limiting consumption of bowfin due to high mercury concentrations. Because of this advisory, all waters in the state are considered partially supporting the fish consumption use. However, many waters across the state do not contain bowfin. A summary of current fish consumption use support ratings for monitored and evaluated streams in the White Oak River basin is presented in Table 2.

Table 2 Fish Consumption Use Support Summary Information for Waters in the White Oak River Basin (2000)

Fish Consumption Use Support Ratings	Monitored, Evaluated and Not Rated Streams*		Monitored Streams Only**	
	Miles or Acres	%	Miles or Acres	%
Fully Supporting	0		0	
Impaired	416.8 mi. 131,216.7 ac 91 cmi	100%	31.3 mi. 91 cmi	7.5% 100%
<i>Partially Supporting</i>	<i>416.8 mi. 131,216.7 ac 91 cmi</i>	<i>100%</i>	<i>31.3 mi. 91 cmi</i>	<i>7.5% 100%</i>
<i>Not Supporting</i>	<i>0</i>		<i>0</i>	
Not Rated	0		0	
TOTAL	416.8 mi. 131,216.7 ac 91 coastal mi		31.3 mi. 91 coastal mi	

* = Percent based on total of all streams, both monitored and evaluated.
cmi = coastline miles.

** = Percent based on total of all monitored streams.

There are 36.3 stream miles, 91 coastal miles and 118,131.7 estuarine acres currently classified for primary recreation in the White Oak River basin. Approximately 80 percent of estuarine acres were monitored by DWQ over the past five years and by Division of Environmental Health Shellfish Sanitation over the last two years; all are fully supporting the primary recreation use. A basinwide summary of current primary recreation use support ratings is presented in Table 3.

Table 3 Primary Recreation Use Support Summary Information for Waters in the White Oak River Basin (1999)

Primary Recreation Use Support Ratings	Monitored, Evaluated and Not Rated Streams*		Monitored Streams Only**	
	Miles or Acres	%	Miles or Acres	%
Fully Supporting	94,503.9 ac	80%	94,503.9 ac	80%
	91 cmi	100%	91 cmi	
Impaired	0	0	0	0
<i>Partially Supporting</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Not Supporting</i>	<i>0</i>	<i>0</i>	<i>0</i>	
Not Rated	36.3 mi.	100%	0	
	23,627.9 ac	20%		
TOTAL	36.3 mi.		94,503.9 ac	
	118,131.8 ac		91 cmi	
	91 cmi			

* = Percent based on total of all streams, both monitored and evaluated.
cmi = coastline miles.

** = Percent based on total of all monitored streams.

There are 32 stream miles and 117,659 estuarine acres classified for shellfish harvesting (Class SA) in the White Oak River basin. All were monitored during the past five years by DEH Shellfish Sanitation. A basinwide summary of current shellfish harvest use support ratings is presented in Table 4.

Table 4 Shellfish Harvest Use Support Summary Information for Waters in the White Oak River Basin (1999)

Shellfish Harvest Use Support Ratings	Monitored Streams	
	Acres	%
Fully Supporting	89,601	76%
Impaired	28,058	
<i>Partially Supporting</i>	<i>18,187</i>	<i>16%</i>
<i>Not Supporting</i>	<i>9,872</i>	<i>8%</i>
Not Rated	0	0%
Total	117,659	

Note: There are also 30 of 32 Class SA stream miles that are considered impaired as well.

Recommended Management Strategies for Restoring Impaired Waters

The long-range mission of basinwide planning is to provide a means of addressing the complex problem of planning for increased development and economic growth while maintaining, protecting and enhancing water quality and intended uses of the White Oak River basin's surface waters.

Within this basinwide plan, DWQ presents management strategies and recommendations for those waters considered to be impaired or that exhibit some notable water quality problem.

Major water quality problems in the basin include fecal coliform bacteria contamination (affecting shellfish harvesting) and high levels of mercury in fish tissue (affecting fish consumption). Fecal coliform bacteria contamination is primarily attributed to nonpoint source pollution (NPS). Sources of nonpoint source pollution include runoff from urban areas and agricultural lands. High levels of mercury are likely from atmospheric sources.

For streams and estuarine waters degraded by point source pollution, the plan presents a management strategy to reduce the impacts from that pollutant source. The task of quantifying nonpoint sources of pollution and developing management strategies for these impaired waters is very resource intensive. This task is overwhelming, given the current limited resources of DWQ, other agencies (e.g., Division of Land Resources, Division of Soil and Water Conservation, Cooperative Extension Service, etc.) and local governments.

DWQ plans to further evaluate impaired waters in the White Oak River basin in conjunction with other agencies that deal with nonpoint source pollution issues and develop management strategies for a portion of these impaired waters for the next *White Oak River Basinwide Water Quality Plan* (2006).

Addressing Waters on the State's Section 303(d) List

For the next several years, addressing water quality impairment in waters that are on the state's 303(d) list will be a DWQ priority. Section 303(d) of the federal Clean Water Act requires states to develop a list of waters not meeting water quality standards or which have impaired uses. The waters in the White Oak River basin that are on this list are discussed in the individual subbasin descriptions in Section B. States are also required to develop Total Maximum Daily Loads (TMDLs) or management strategies for 303(d) listed waters to address impairment. EPA issued guidance in August 1997 that called for states to develop schedules for developing TMDLs for all waters on the 303(d) list within 8-13 years.

There are approximately 2,387 impaired stream miles on the 2000 303(d) list in NC. The rigorous and demanding task of developing TMDLs for each listed water during a 13-year time frame will require the focus of many resources. It will be a priority for North Carolina's water quality programs over the next several years to develop TMDLs for 303(d) listed waters.

Challenges Related to Achieving Water Quality Improvements

To achieve the goal of restoring impaired waters throughout the basin, DWQ will need to work more closely with other state agencies and stakeholders to identify and control pollutants. The costs of restoration will be high, but several programs exist to provide funding for restoration efforts. These programs include the Clean Water Management Trust Fund, the NC Agricultural Cost Share Program, the Wetlands Restoration Program and the federally funded Conservation Reserve Enhancement Program.

With increased development occurring, there will be significant challenges ahead in balancing economic growth with the protection of water quality in this basin. Point source impacts on surface waters can be measured and addressed through the basinwide planning process. Nonpoint sources of pollution can be identified through the basinwide plan, but actions to address these impacts must be taken at the local level. Such actions should include: development and enforcement of local erosion control ordinances; requirement of stormwater best management practices for existing and new development; development and enforcement of buffer ordinances; and land use planning that assesses impacts on natural resources. This basinwide plan presents many water quality initiatives and accomplishments that are underway within the basin. These actions provide a foundation on which future initiatives can be built.