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 Pasquotank River basin was completed in 1997.

This draft document is the first five-year update of the *Pasquotank 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 Pasquotank 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 considered comments from two public workshops held in the basin and subsequent discussions with local resource agency staff and citizens during draft plan development. 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.

Pasquotank River Basin Overview

The Pasquotank River basin encompasses 3,635 square miles of low-lying lands and vast open waters, including Albemarle Sound, in the state's northeast outer coastal plain. The basin includes all or portions of Camden, Chowan, Currituck, Dare, Gates, Hyde, Pasquotank, Perquimans, Tyrrell and Washington counties. The basin also contains numerous small watersheds that drain into Albemarle, Currituck, Croatan, Roanoke and Pamlico Sounds.

A small portion of the Pasquotank River basin is located in Virginia, managed by Virginia as the Chowan River and Dismal Swamp basin. The portion of the basin managed by Virginia covers

4,061 square miles of the Chowan River and Pasquotank River basin's headwaters, covering approximately 145 miles in length and varying from 10 to 50 miles in width (Virginia, 2000).

The Pasquotank River basin is part of the Albemarle-Pamlico Estuarine system, the second largest estuarine system in the United States. In 1987, this estuarine system became part of the Environmental Protection Agency National Estuary Program and was the subject of a major study known as the Albemarle-Pamlico Estuarine Study.

Population of the basin, based on 1990 census data, was estimated to be 97,215. The 2000 population was estimated at 118,913. This change in population over the ten-year period results in a 22 percent increase in population. In 1998, population among the municipalities ranged from 278 in Creswell to 17,188 in Elizabeth City. The overall population density of the basin is 46 persons per square mile compared to an estimated statewide average of 139 persons per square mile. The greatest population and density are concentrated in the coastal area of the basin.

The land comprising the Pasquotank River basin is dominated by open water. Forty-one percent of the land use in the basin is water with another 38 percent characterized as forest/wetlands. Important natural resources in the basin include wetlands, anadromous fish spawning areas, National Seashore and National Wildlife Refuges. Most of the water used in the basin comes from surface water and groundwater sources, but the vast majority comes from groundwater sources.

Assessment of Water Quality in the Pasquotank 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 and 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 basin, an approach to assess ecosystem health and human health risk is being initiated via the development of use support ratings for each of six use support categories: aquatic life and secondary recreation, fish consumption, shellfish harvesting, primary recreation, water supply and "other" uses. Each of these categories relates 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 categories. For many waters, a use category will not be applicable (NA) to the best use classification of that water (e.g., drinking water supply is not the best use of a Class C water). This 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.

Aquatic Life/Secondary Recreation

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 (474.1), estuarine acres (918,223.6), freshwater acres (22,770.2), and coastal miles (110.6) in the Pasquotank River basin. A basinwide summary of current aquatic life/secondary recreation use support ratings is presented in Table 1.

Approximately 29 percent of stream miles (135.6. mi.), 69 percent of estuarine acres (639,207.2 acres) and 94 percent of freshwater acres (15,938.3 acres) were monitored for the protection of aquatic life and secondary recreation by DWQ during this basinwide planning cycle. The 110.6 miles of Atlantic coastline are not currently monitored by DWQ to assess the aquatic life/secondary recreation use support category. There was no impairment in this use support category in the basin during this planning cycle.

Many of the not rated streams in the Pasquotank River basin are swamp streams. DWQ has developed draft biological criteria that may be used in the future to assign bioclassifications to swamp streams (as is currently done for other streams and rivers across the state). However, validation of the swamp criteria will require collecting data for several years from swamp stream reference sites. The criteria will remain in draft form until DWQ is better able to evaluate such things as: year-to-year variation at reference swamp sites, effects of flow interruption, variation among reference swamp sites, and the effect of small changes in pH on the benthos community. Other factors, such as whether the habitat evaluation can be improved and the role fisheries data should play in the evaluation, must also be resolved.

Table 1 Aquatic Life/Secondary Recreation Use Support Summary Information for Waters in the Pasquotank River Basin (2000)

Aquatic Life/Secondary Recreation Use Support Ratings	Monitored, Evaluated and Not Rated Streams*			Monitored Streams Only**	
	Miles or Acres	%		Miles or Acres	%
Fully Supporting	**629,196.7 estuarine ac**	**68.2%**		**629,196.7 estuarine ac**	**0%**
Impaired	**0**	**0%**		**0**	**0%**
Partially Supporting	*0*	*0%*		*0*	*0%*
Not Supporting	*0*	*0%*		*0*	*0%*
Not Rated	**474.1 mi** **22,770.2 fresh ac** **289,026.9 estuarine ac** **110.6 coastal mi**	**100%** **100%** **31.5%** **100.0%**		**135.6 mi** **15,938.3 fresh ac** **10,010.5 estuarine ac**	**100%** **100%** **1.6%**

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

Fish Consumption

Like the aquatic life/secondary recreation use support category, the fish consumption use support category is also applied to all waters in the state. One hundred percent of Atlantic coastline (110.6 miles) in the Pasquotank River basin was monitored for the fish consumption use support category during this basinwide cycle. No stream miles were monitored for fish consumption use support. Fish consumption use support ratings are based on fish consumption advisories issued by the NC Department of Health and Human Services (NCDHHS). Currently, there is a regional advisory limiting consumption of shark, swordfish, king mackerel, tilefish, as well as, largemouth bass, bowfin (or blackfish), and chain pickerel (or jack) for elevated levels of methylmercury. Because of this advisory, all waters south and east of Interstate 85 are considered partially supporting the fish consumption use. A basinwide summary of current fish consumption use support ratings is presented in Table 2.

Table 2 Fish Consumption Use Support Summary Information for Waters in the Pasquotank 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%**		**0**	**0%**
Impaired					
Partially Supporting	*474.1 mi 22,770.2 fresh ac 918,223.6 estuarine ac 110.6 coastal mi*	*100%*		*110.6 coastal mi*	*100%*
Not Supporting	*0*	*0%*		*0*	*0%*
Not Rated	**0**	**0%**		**0**	**0%**

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

Primary Recreation

There are 707,455.2 estuarine acres, 110.6 coastal miles, 15,938.3 freshwaters acres and 25.1 freshwater miles currently classified for primary recreation in the Pasquotank River basin. The Division of Environmental Health Shellfish Sanitation and Recreational Water Quality Section monitors primary recreation on both the estuarine and coastal shorelines. During the last two years, all monitored sites are fully supporting the primary recreation use. However, one site at the Villas Condominiums, Inc. did not support primary recreation due to an ongoing swimming closure advisory in accordance to rule which has been in effect more than two years. However, DEH does not monitor this site. 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 Pasquotank River Basin (2000)

Primary Recreation Use Support Ratings	Monitored, Evaluated and Not Rated Streams*		Monitored Streams Only**	
	Miles or Acres	**%**	**Miles or Acres**	**%**
Fully Supporting	651,469.1 estuarine ac 110.6 coastal mi	92.1% estuarine ac 100% coastal mi	651,469.1 estuarine ac 110.6 coastal mi	99.9% estuarine ac 100% coastal mi
Impaired	**21.4 estuarine ac**	**<1% estuarine ac**	**21.4 estuarine ac**	**<1% estuarine ac**
Partially Supporting	*0*	*0%*	*0*	*0%*
Not Supporting	21.4 estuarine ac	<1% estuarine ac	21.4 estuarine ac	<1% estuarine ac
Not Rated	*55,964.7 estuarine ac* *25.1 miles* *15,938.3 fresh ac*	**7.9% estuarine ac** **100% fresh ac**	*15,938.3 fresh ac*	**100**
TOTAL	*707,455.0 estuarine ac* *110.6 coastal mi* *25.1 miles* *15,938 fresh ac*		**651,490.5 estuarine ac** **15,938 fresh ac** **110.6 Coastal Miles**	

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

Shellfish Harvesting

In the Pasquotank River basin, there are 395,371.3 estuarine acres which have shellfish harvesting (Class SA) identified by the state as its best use. 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.

The Pasquotank River basin contains many Prohibited shellfish harvesting areas, which are now given a use support rating of not supporting (NS) shellfish harvesting based on the DEH designation. This use support rating differs significantly from the historical use support ratings of partially supporting (PS) for Prohibited shellfish harvesting areas. Changes that are related to water quality or DEH SS growing area reclassifications are explained in detail in the subbasin chapters of Section B.

Table 4 Shellfish Harvest Use Support Summary Information for Waters in the Pasquotank River Basin (1995-2000)

Shellfish Harvest Use Support Ratings	Monitored Streams	
	Acres	%
Fully Supporting	**390,338.0**	**98.7%**
Impaired	**5,033.3**	**1.3%**
Partially Supporting	*0*	*0%*
Not Supporting	*5,033.3*	*1.3*
Not Rated	**0**	**0**
Total	**395,371.3**	**100%**

Water Supply

There are 30.3 stream miles and 23.8 freshwater acres currently classified for water supply in the Pasquotank River basin. All are considered fully supporting on an evaluated basis, based on information provided by the regional water treatment plant consultant. Local water treatment plant operators monitored all during the past five years.

Use Support Summary

There are no impaired waters in the aquatic life/secondary recreation use support category and one impaired water in the primary recreation use support category. All waters are considered impaired for the fish consumption use support category due to a regional fish consumption advisory for shark, swordfish, king mackerel, tilefish, largemouth bass, bowfin (or blackfish), and chain pickerel (or jack) bowfin and king mackerel. There are 5,033.3 estuarine acres impaired for the shellfish harvesting use support category. All water supply watershed waters are fully supporting their uses in the basin. Descriptions of impaired segments, as well as problem parameters, are outlined in Appendix III. Management strategies for each water are discussed in detail in the appropriate subbasin chapter.