

EXECUTIVE SUMMARY

NORTH CAROLINA'S BASINWIDE APPROACH TO WATER QUALITY MANAGEMENT - PURPOSE OF CHOWAN RIVER BASIN PLAN

Basinwide management is a watershed-based approach to water quality protection. The plan is being prepared by the North Carolina Division of Water Quality (DWQ), however implementation of the plan and protection of water quality involved the efforts of all stakeholders in the basin. The *Chowan Basinwide Water Quality Management Plan* (Chowan Plan) is the fourteenth in a series of basinwide water quality management plans that will be prepared by DWQ for all seventeen of the state's major river basins by the year 1998. The plan will be used as a guide by DWQ in carrying out its water quality program duties and responsibilities in the Chowan River Basin.

A basinwide management plan report is prepared for each basin in order to communicate to policy makers, the regulated community and the general public the state's rationale, approaches and recommended long-term water quality management strategies for each basin. The draft plans are circulated for public review and comment and are presented at public meetings in each basin. The plan for a given basin is completed and approved prior to the scheduled date for basinwide discharge permit renewals in that basin. The plans are then to be evaluated, based on follow-up water quality monitoring, and updated at five-year intervals.

The Chowan Plan is due for completion in September of 1997 and will be updated in the year 2002. Basinwide NPDES permitting is scheduled to commence in January of 1998.

BASINWIDE GOALS

The primary goals of DWQ's basinwide program are to 1) identify and restore full use to impaired waters, 2) identify and protect highly valued resource waters, and 3) manage problem pollutants throughout the basin to protect water quality standards while accommodating reasonable economic growth. In addition, DWQ is applying this approach to each of the major river basins in the state as a means of better identifying water quality problems; developing appropriate management strategies; maintaining and protecting water quality and aquatic habitat; assuring equitable distribution of waste assimilative capacity for dischargers; and improving public awareness and involvement in management of the state's surface waters.

PUBLIC WORKSHOPS

A public workshop was conducted in the Chowan River basin on the morning of July 25, 1996. Attendance at the workshop was strong, exceeding 60 people. The purpose of the workshop was to familiarize stakeholders in the basin with DWQ's basinwide approach and to solicit their input about what they see as the major water quality issues in the basin. The workshops were co-sponsored by the North Carolina Cooperative Extension Service (CES), the North Carolina League of Municipalities and DWQ. A summary of the comments received at these workshops is provided in Chapter 6 of the plan. DWQ examined the comments received at the workshop and grouped them into eight broad categories: monitoring and data-related issues; cooperation and coordination between States, state agencies, and local governments; nonpoint source pollution; point source issues; resource concerns; regulatory issues; education; and site-specific concerns. Some of the specific comments that were presented by more than one of the breakout groups include:

- Need for better monitoring coverage;
- Need for better communication and cooperation between North Carolina and Virginia;
- Need for increased public education and involvement of local stakeholders; and
- Nonpoint source pollution concerns.

These issues are presented in more detail in Chapter 6 of the plan.

CHOWAN BASIN OVERVIEW

The Chowan River basin is located in the northeastern coastal plain of North Carolina and southeastern Virginia. The North Carolina portion includes all or parts of Northampton, Hertford, Gates, Bertie and Chowan Counties. The Chowan River is formed at the border of Virginia and North Carolina by the confluence of the Nottoway and Blackwater Rivers. The Chowan basin includes 1,315 square miles in North Carolina, but the largest part of the drainage basin (3,575 square miles-approximately 76%) lies in Virginia (Figure 1). Major tributaries to the Chowan River include the Meherrin River and its largest tributary, Potecasi Creek, as well as the Wiccacon River and its largest tributary, Ahoskie Creek. The Meherrin River flows into North Carolina from Greensville County, Virginia.

Based on data from the US Department of Agriculture, Natural Resources Conservation Service (NRCS), land cover in the basin is dominated by forest and agriculture which together make up 87% of the total area. In looking at land cover changes between 1982 and 1992, the most significant change was seen in the urban/built-up category with a 59% increase. During that same time period, there were reductions seen in the amount of forested land (-1%) and cultivated cropland (-2%), and pastureland (-23%), and there was a slight increase in the amount of uncultivated cropland. The increase in swine numbers from 1990 to 1994 has been dramatic in the subbasins encompassing the upper portion of the Chowan River in North Carolina (327% increase) and the Meherrin River and tributaries (446% increase).

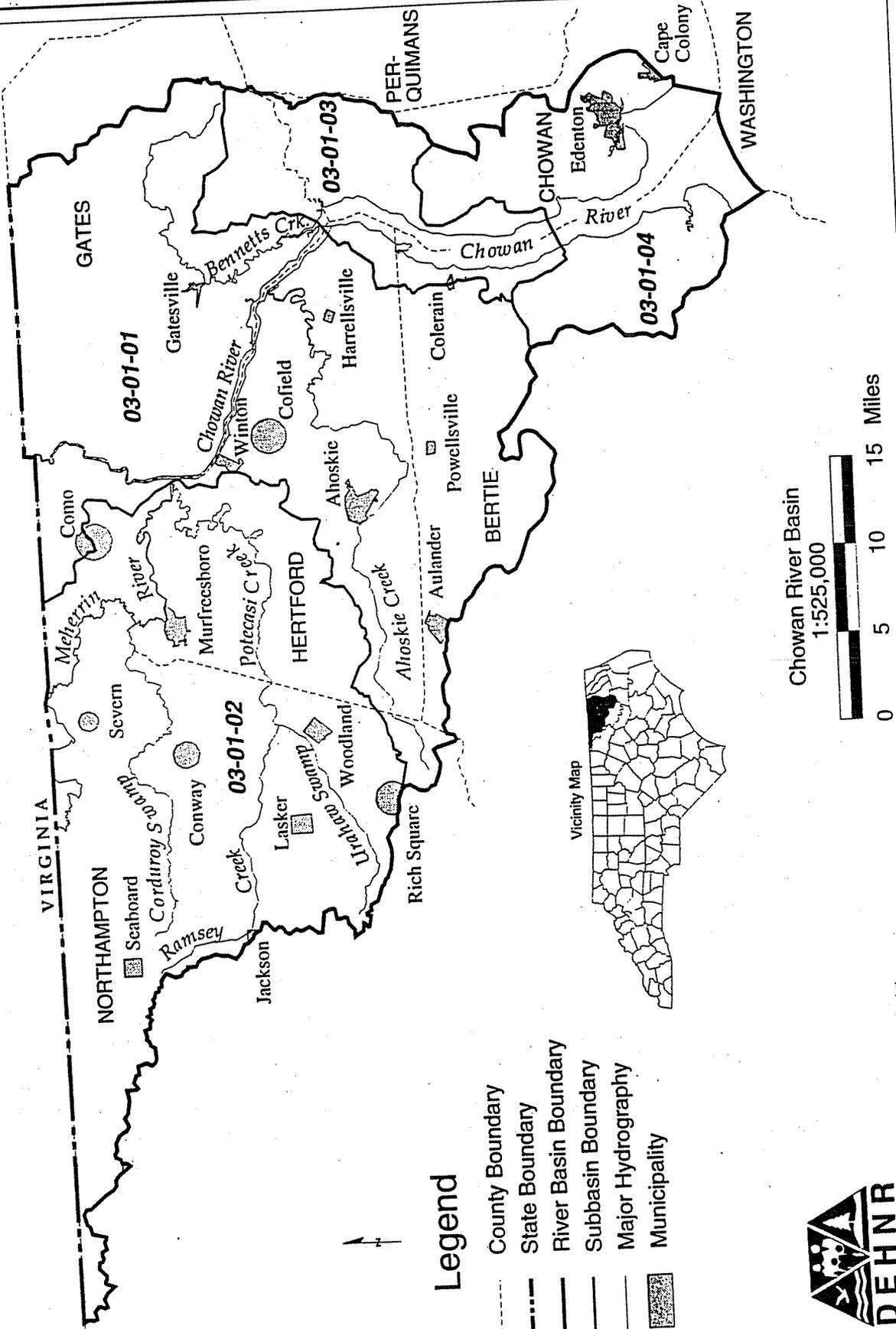
Population in the North Carolina portion of the basin declined by 1% from 1970 - 1990. Murfreesboro, Ahoskie, and Edenton are the largest urban areas in the basin. Population growth in the basin is low to moderate, with most growth occurring around the larger municipalities and in the vicinity of the lower Chowan River. Rural areas are seeing declines in population. Based on projections from 1990 into the year 2020, Chowan County is expected to see a 17% increase and Gates County may see a 19% increase. Other areas within the basin are expected to see decreases in numbers of residents.

Important natural resources in the basin include wetlands, anadromous fish spawning areas and Merchant's Millpond State Park. River herring (alewife and blueback herring) and shad (Hickory shad and American shad) migrate into the river from the ocean to reproduce. There are seven aquatic species that are listed by North Carolina as either Threatened, Special Concern, or Significantly Rare. No species in this basin have been listed as Endangered.

~~Most of the water used in the basin comes from ground water sources. Projected use estimates indicate that there will be modest increases in water use over the next couple of decades.~~

The Chowan 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's National Estuary Program and was the subject of a major study known as the Albemarle-Pamlico Estuarine Study (APES). The results of research conducted as part of APES culminated in the Comprehensive Conservation and Management Plan (CCMP) which is currently being implemented, and is discussed further in Chapters 5 and 6. Basinwide management is part of this implementation.

General Map of the Chowan River Basin



Produced by: State Center for Health and Environmental Statistics
July, 1995

Figure 1. General Map of the Chowan River Basin

ASSESSMENT OF WATER QUALITY IN THE CHOWAN RIVER BASIN

An assessment of water quality data collected by DWQ and others reveals that the Chowan River Basin has seen improvements in water quality over the years since the application of the Nutrient Sensitive Waters management strategy. There are areas however that are impaired and in need of attention. Below is a summary of some key monitoring data that reflect water quality in the basin. A more detailed presentation of this information can be found in Chapter 4.

Summary of Biological Indicators

Benthic Macroinvertebrates - In freshwaters, benthic macroinvertebrates (or benthos) are primarily bottom-dwelling aquatic insect larvae such as species of stoneflies, mayflies and caddisflies. Measurements of the number, types and diversity of these organisms at strategic sampling sites is an important means of assessing water quality. Benthic macroinvertebrate sampling has been conducted at ten sites throughout the Chowan basin with results ranging from poor to excellent. In some cases, the swampy nature of the sampling site prevented the assignment of a rating (an index for swampy systems is currently under development). Based on benthic macroinvertebrate data from 1995, bioclassifications were Fair for the Wiccacon River and Ahoskie Creek and Good-Fair for the Chowan River at Riddicksville. General water quality in the Meherrin River is Good and Fair for Potecasi Creek.

Fish Community Evaluations - Fish community structure (IBI) analyses were performed on data from 2 sites in the Chowan River Basin collected by DWQ. One site received a rating of Fair. The other site, although sampled, did not receive a rating because of its swampy nature.

Fish Tissue Analyses - Fish tissue samples were collected at 10 sites from 1983 to 1995 within the Chowan River Basin consisting of 226 observations. Samples were collected as part of the DWQ's ambient fish tissue monitoring program or as part of special mercury studies.

The Chowan River from the Virginia border to Albemarle Sound remains under a fish consumption advisory due to dioxin contamination. The Union Camp Fine Paper mill in Franklin, Virginia is believed to have contributed to the dioxin contamination of fish in the Chowan River. This advisory has been in place since August of 1990 and currently recommends that the general population consume no more than two meals of any fish except herring, shellfish and shad (including roe) in one month and that children and child-bearing women consume no fish until further notice. Yearly monitoring by Union Camp in North Carolina indicates that dioxin levels are gradually decreasing in fish from the Chowan and Meherrin Rivers since new bleaching technologies were instituted by the company to improve effluent quality and eliminate the formation of dioxin.

Lakes Studies - Merchants Millpond is the only lake which has been monitored in the Chowan River Basin as part of the Lakes Assessment Program. Merchants Millpond was sampled most recently in 1995. Results indicate that the lake is eutrophic. The proliferation of aquatic weeds, which cover the lake's surface, is not uncommon in millponds. However, the growth of these plants is threatening some of the lake's recreational uses (such as canoeing) which is of concern since this is a popular state park. The lake has received a use support rating of Support-Threatened. Problems stem from an overabundance of nutrients draining to the pond from the nearby watershed. The primary source appears to be agriculture.

Use-Support Ratings

Another important method for assessing surface water quality is to determine whether the quality is sufficient to support the uses for which the waterbody has been classified by the state. All surface waters in the state have been assigned a classification. These classifications are discussed in Section 2.7 of Chapter 2. The word *uses* refers to activities such as swimming, fishing and water supply. DWQ has collected extensive chemical and biological water quality monitoring data throughout the basin, some of which is summarized above. All data for a particular stream segment have been assessed to determine the overall *use support* rating; that is, whether the waters are *fully supporting*, *partially supporting* or *not supporting* their uses. A fourth rating, *support-threatened*, applies where all uses are currently being supported but water quality conditions are marginal. Streams referred to as *impaired* are those rated as either partially supporting or not supporting their uses. Use support ratings in the Chowan River basin, described more fully in Chapter 4, are summarized below for freshwater streams and lakes.

Freshwater Streams and Rivers - Of the 788 miles of freshwater streams and rivers in the Chowan basin, use support ratings were determined for 64% or 507 miles of water. The relative breakdown of percentages for the use support categories is as follows:

SUPPORTING	42%
Fully supporting (17%)	
Support-threatened (25%)	
IMPAIRED	22%
Partially supporting (22%)	
Not supporting (0%)	
NOT EVALUATED:	36%

These use support values are different from the values in the 1992-1993 305(b) Report. The total waters supporting their uses appear to have increased, while those that are impaired appear to have decreased. While the water quality may have improved since the 1992-1993 305(b) report, the changes in values are due to revisions in the methodology for assigning use support (this is discussed in section 4.6.5 of Chapter 4).

MAJOR WATER QUALITY ISSUES AND RECOMMENDATIONS

Several water quality issues emerge as being of particular importance in light of factors such as the degree of water quality degradation, the value of the resources being impacted and the number of users potentially affected. Those issues considered most significant on a basinwide scale are presented below. Chapter 6 of the Chowan Plan provides recommendations for many other issues including managing inputs of fecal coliform bacteria, sediment and oxygen consuming wastes. Those presented here are of most concern to the Chowan basin.

A. CONTROLLING NUTRIENTS

Nutrient enrichment in the Chowan River Basin continues to be a primary water quality concern. Since the application of the Nutrient Sensitive Waters (NSW) management strategy, reductions in nutrient loads have been achieved and algal blooms have been less frequent and last for shorter periods of time. Chapters 3 and 4 of this document present summaries of nutrient-related studies conducted over the years and an investigation into changes in chlorophyll *a* concentrations over time. As of 1990, installation of control measures for agricultural nonpoint sources through the Agricultural Cost Share Program had resulted in a six percent reduction in North Carolina's total phosphorus input (DEM, 1990). Also, many point source discharges in the basin have converted their facilities to land application operations, reducing nutrient loads to the surface waters. Overall, as of

1990, the nitrogen reduction goal of 20% had been accomplished and total phosphorus had been reduced by 29% (goal of 35%).

Recommendation

Although there have been gains in nutrient reductions and associated water quality benefits, continued implementation of the NSW strategy is recommended since the lower Chowan remains susceptible to algal blooms. The major components of the strategy include recommendations for point and nonpoint sources of pollution. To address point source discharges, municipal or industrial wastewater facilities are required to either land apply their waste (for municipal plants) or meet stringent discharge limits for nitrogen and phosphorus. Nonpoint sources have been addressed by targeting Agricultural Cost Share funds to the basin for the application of best management practices (BMPs). Since the inception of the cost share program in 1985, \$391,254 have been spent in the basin to control nonpoint source pollution.

B. WORKING WITH THE NPS TEAM TO CONTROL NPS POLLUTION

Pollution from nonpoint sources is identified as the major contributor to water quality impairment in the Chowan River Basin. It will be important during this basinwide planning cycle to actively work with the NPS team to better identify nonpoint source pollution contributions and to improve conditions where feasible. It is recognized that in some cases the information that DWQ has on the probable contributions from land uses such as agriculture is dated and sketchy. Accomplishments in managing runoff from agriculture and animal operations that have occurred during the last five years or so (such as Conservation Management Plans in compliance with the Farm Bill, or improved management of waste from animal operations in compliance with new regulations) are not reflected in this information. It is important for the progress that has been made in BMP implementation to be identified and acknowledged. Team members can assist in consolidating this information. However, agriculture and animal operations remain prominent in the landscape of the river basin and it will be important to work toward further gains in this area in order to protect water quality.

Recommendation

Addressing nonpoint source pollution is best accomplished by a knowledgeable team of local professionals and stakeholders - the NPS team. Therefore, the primary recommendation for impaired waters in the Chowan basin is to work with this team to prioritize areas for restoration and target available resources toward them. The NPS team is further discussed in section 6.2.3 and in Chapter 7.

FUTURE INITIATIVES IN THE CHOWAN RIVER BASIN

FURTHER EVALUATION OF SWAMP SYSTEMS

Many of the waterbodies in the eastern third of the State are classified as swamp waters. It is difficult to evaluate monitoring data in these systems to determine if a waterbody is impaired. For example, a swamp may have low dissolved oxygen concentrations, but these may be due to natural conditions rather than from impacts from point and nonpoint sources. DWQ will continue its efforts to evaluate these systems using chemical and biological data and to recommend reclassification of these waters to swamp as appropriate.

USE RESTORATION WATERS

The North Carolina Division of Water Quality is currently developing the Use Restoration Waters (URW) program to restore surface waters to their designated uses. If adopted, this program will allow the state to work with local governments, businesses, and residents to develop management strategies appropriate for the area. In order to be effective, the URW program will include a mix of voluntary and mandatory programs. The voluntary and mandatory programs will be coordinated on a watershed-specific basis by DWQ and a group of stakeholders who have an interest in the impaired water body and associated watershed. In addition, the URW program will attempt to develop cooperative relationships among these agencies so that overlapping efforts can be consolidated and targeted to restore designated water body uses.

WETLANDS RESTORATION

The NC General Assembly approved the establishment of a wetland restoration program in this state. North Carolina will begin a concentrated effort to inventory and digitally map wetlands throughout the state. As the program progresses, it is envisioned that a restoration plan will be developed for each river basin and incorporated into the basinwide planning process. Through this, the water quality protection function of wetlands can be used more effectively in areas prioritized during basinwide planning.

NONPOINT SOURCE TEAMS

DWQ has begun setting up nonpoint source teams in each of the state's 17 major river basins. One has been set up for the Chowan Basin and will be reconvened in the near future. These teams will have representatives from agriculture, urban stormwater, construction, mining, on-site wastewater disposal, forestry, solid waste, wetlands, groundwater, local governments and other interested organizations. These teams will provide descriptions of NPS activities within a basin, conduct assessments of NPS controls in targeted watersheds, identify future monitoring sites, develop five-year action plans for priority NPS issues and NPS watersheds, and develop Section 319 project proposals for priority watersheds.

REGIONAL COUNCILS

The Comprehensive Conservation and Management Plan (CCMP) for the Albemarle/Pamlico (A/P) Sounds region recommended that regional councils be formed in each of the A/P region's five river basins. An Executive Order was signed by Governor Hunt in April 1995 calling for the establishment of the five regional councils. The Neuse Basin Regional Council was the first formed (November 1995). The other four, including one for the Chowan, are currently being established.

Each council will include local government representation (one municipal and one county rep from each county in the basin) as well as representation from non-governmental stakeholder groups in each basin. The groups would have the potential to help target and address the water quality and resources issues of greatest concern to stakeholders in the basin and to forge the link between the APES program, the CCMP and basinwide planning.

IMPROVED MONITORING AND INTERAGENCY COORDINATION

DWQ has been discussing with other environmental agencies the potential for coordination of field resources. If individuals from another environmental agency are visiting certain streams or rivers or lakes to investigate fish populations or wetland areas, they could also collect water quality data from that area.

GENERAL NPDES PROGRAM INITIATIVES

In the next five years, efforts will be continued to:

- **improve compliance with permitted limits;**
- **improve pretreatment of industrial wastes to municipal wastewater treatment plants so as to reduce the toxicity in effluent wastes;**
- **encourage pollution prevention at industrial facilities in order to reduce the need for pollution control;**
- **require dechlorination of chlorinated effluents or use of alternative disinfectants;**
- **require multiple treatment trains at wastewater facilities; and**
- **require plants to begin plans for expansion well before they reach capacity.**

Longer-term objectives will include refining overall management strategies after obtaining feedback on current management efforts during the next round of water quality monitoring. Long-term point source control efforts will stress reduction of wastes entering wastewater treatment plants, seeking more efficient and creative ways of recycling byproducts of the treatment process (including nonpotable reuse of treated wastewater), and keeping abreast of and recommending the most advanced wastewater treatment technologies.