

## EXECUTIVE SUMMARY

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

Basinwide management is a watershed-based approach to water quality protection. While this plan is being prepared by the North Carolina Division of Water Quality (DWQ), implementation of the plan and protection of water quality involve the efforts of all stakeholders in the basin. The *Broad River Basinwide Water Quality Management Plan* (Broad Plan) is the seventeenth in a series of basinwide water quality management plans that are being 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 Broad River Basin.

A basinwide plan 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 wastewater discharge permit renewals in that basin. The plans are then re-evaluated and updated at five-year intervals.

The Broad Plan is due for completion in July of 1998 and will be updated in the year 2003. Basinwide NPDES permitting is scheduled to commence in November 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

Broad River Basinwide Planning Workshops were conducted on June 2 and 3, 1997 in Spindale, Lake Lure and Shelby, North Carolina. There were a total of 90 registered participants representing local government, business and industry, farmers and landowners, state and federal government, academic institutions and citizen organizations. The purpose of the workshops 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 six broad categories: sedimentation, color, education, enforcement, management of nonpoint source pollution and the need for fair, equitable, common-sense regulations.

## BROAD BASIN OVERVIEW

The Broad River Basin encompasses a 1,506 square mile watershed drained by 1,472 miles of streams and rivers. The headwaters of the Broad and its major tributaries are located within the mountain physiographic region and flow towards the foothills before entering the piedmont southeast and east of Lake Lure. Figure 1 provides a general map of the North Carolina portion of the basin, including major hydrology, municipalities and county boundaries.

The three major tributaries into the Broad River before it enters South Carolina are the Green River, the Second Broad River, and the First Broad River. Several areas in the basin are classified for water supply use and approximately 30% of the streams are supplementally classified as trout waters to protect for the propagation and maintenance of that fishery.

The basin encompasses all of Cleveland, Polk and Rutherford counties, as well as portions of Buncombe, Henderson, Lincoln and Gaston counties. There are 29 municipalities in the basin including Lake Lure, Rutherfordton, Spindale, Forest City, Shelby and Kings Mountain.

The Broad River basin has an estimated population of 169,001 people based on 1990 census data. The entire basin has experienced moderate population growth between 1970 and 1990, with higher levels of growth occurring in the extreme eastern and western portions of the basin. In the eastern part of the basin in the Kings Mountain area, the population increase may be related to the high growth of the Charlotte area. In the western part of the basin, which is characteristically more mountainous, increases may be related to second home development or settlement of retirees.

Over 60% of the land in the Broad River basin is covered in forests. Based on data from the USDA Natural Resources Conservation Service, the most significant land cover change between 1982 and 1992, was a 71% increase in the amount of urban land. In 1992, approximately 20% of the land in the basin was covered by cultivated or uncultivated crop or pastureland.

Agriculture is an important industry in the basin. According to the NC Department of Agriculture (1996), revenues are higher for crop production than for livestock production for the counties that are either wholly or partly in the basin. Crops grown include, but are not limited to, sorghum, barley, oats, corn, soybeans, wheat and hay. There are eleven registered livestock operations within the basin, including cattle, poultry and swine.

The Broad River Basin is home to 97 rare animal and plant species. Two aquatic animals that are listed as Threatened by the State of North Carolina are the Bog Turtle and the Squawfoot (a mussel). There are five Natural Heritage Program Priority Areas in the basin. These are: the ~~Rollins/South Mountains Natural Area; Hickorynut Gorge; Green River Headwaters and Gorge;~~ the Tryon Region and Pacolet River Gorge; and Pinnacle Mountain.

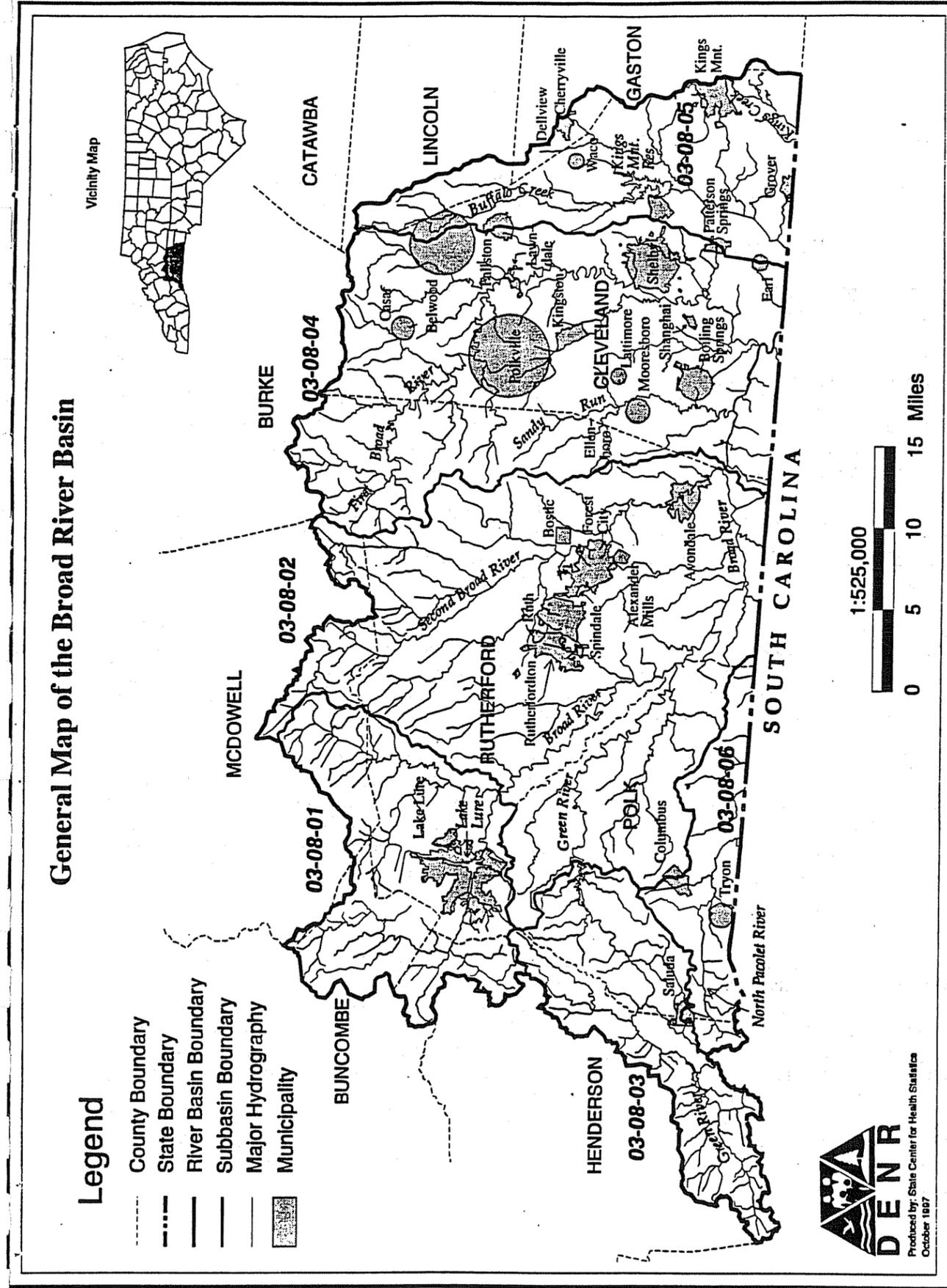


Figure 1. General Map of the Broad River Basin

## ASSESSMENT OF WATER QUALITY IN THE BROAD RIVER BASIN

An assessment of water quality data collected by DWQ and others reveals that the Broad River basin has generally good water quality. 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** - 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. Since 1983, 108 benthic macroinvertebrate samples have been collected at 69 different locations within the Broad River basin. Of these 108 samples, an Excellent bioclassification was found for 6%, 34% were Good, 37% were Good-Fair, 17% were Fair and 6% were Poor. More Recently, in 1995, 33 sites were sampled which give an indication of present water quality of mainstem and major tributary sites. Of these sites, 9% were Excellent, 46% were Good, 33% were Good-Fair, 12% were Fair and none were Poor.

**Fish Community Evaluations** - In 1995, six sites in the Broad River basin were sampled and rated using the North Carolina Index of Biotic Integrity (NCIBI). This index provides an assessment of the overall health of the fish community. The NCIBI ratings at these six sites were: Good-Excellent (1 site), Good (4 sites), and Fair-Good (1 site).

**Fish Tissue Analyses** - Fish tissue samples were collected at 8 sites within the Broad River basin between 1988 and 1996 and were analyzed for metals contaminants. All fish tissue samples collected throughout the Broad River basin during this time contained levels of metals contaminants below federal Environmental Protection Agency (EPA) and Food and Drug Administration (FDA) criteria. There are no fish consumption advisories posted for the basin.

**Lakes Studies** - Five lakes in the Broad River basin have been sampled as part of the Lakes Assessment Program. These are Lake Lure in subbasin 01, Lake Adger and Lake Summit in subbasin 03, and Lake Montonia and Kings Mountain Reservoir (also known as Moss Lake) in subbasin 030805. All of these lakes were sampled most recently by DWQ in 1995 except for Lake Montonia, which was sampled in 1996. They all have been assigned the trophic status classification of oligotrophic based on the North Carolina Trophic State Index (NCTSI).

### 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 Chapter 2, Chapter 5 and Appendix I. The word *uses* refers to activities such as swimming, fishing and water supply. All water quality 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, *fully supporting but 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 Broad River basin, described more fully in Chapter 4, are summarized below.

*Executive Summary*

Of the 1,472 miles of freshwater streams and rivers in the Broad basin (based on measurements made from USGS topographic maps), use support ratings were determined for 96% or 1,416 miles of water. The relative breakdown of percentages for the use support categories is as follows:

SUPPORTING .....	93%
Fully supporting (67%)	
Fully supporting but threatened (26% )	
IMPAIRED.....	3%
Partially supporting (3%)	
Not supporting (0%)	
NOT EVALUATED:.....	4%

These use support values are different from the values in the 1994-1995 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 Broad Plan provides recommendations for many other issues including managing inputs of fecal coliform bacteria and oxygen consuming wastes, in addition to specific recommendation for the impaired waters in the basin. The issues presented here are the larger issues of most concern to the Broad basin.

**A. RECOMMENDATIONS FOR SPECIFIC, IMPAIRED WATERBODIES**

Table 1 provides a description of the four waters in the basin that have been determined to be impaired based on recent monitoring data. These waters, as well as other waters that are considered impaired based on older data, are described in more detail in Chapter 6.

**B. ADDRESSING IMPACTS FROM WASTEWATER TREATMENT PLANTS**

Although much progress has been made in the treatment of wastewater over the past 20 years, three of the four streams in the basin that are impaired based on recent water quality sampling are impacted by point source discharges. In most of the cases, actions have been or will be taken in the foreseeable future to mitigate these impacts. However, it will be important during this basinwide planning cycle for DWQ to continue to work with the wastewater discharges of concern to make appropriate improvements to protect water quality. In addition, in the Broad River basin's larger river systems (i.e. the First Broad River and Second Broad River) there are issues related to assimilative capacity and wasteload allocation that need to be addressed. These rivers receive waste from a number of both industrial and domestic wastewater treatment facilities and are also influenced by water withdrawals from water treatment systems. Finally, an important wastewater related issue affecting the Broad River basin is the issue of color.

**Recommendations**

Table 1 presents specific recommendations for impaired waters in the basin, including those that are impacted by point sources. In addition, DWQ intends to develop calibrated water quality models for the First and Second Broad Rivers during this basinwide cycle to

ensure that permitted effluent limitations will protect water quality. Specific recommendations and comments regarding facilities discharging to these rivers are made in Chapter 6 (Section 6.4) of the Broad River Basinwide Water Quality Management Plan. Section 6.6.2 provides recommendations on color reduction. The current approach to address this issue statewide is to encourage facilities with color in their effluent to voluntarily take action to reduce that color. The Division of Pollution Prevention and Environmental Assistance is available to help facilities develop plans to achieve this goal.

Table 1 Recommended Management Strategies for Monitored Impaired Waters in the Broad River Basin\*

Waterbody (subbasin)	Use Support Rating	Probable Source of Impairment	Recommended Management Strategy	Chapter 6 Reference Section
Walnut Creek (030802)	PS	nonpoint source(s) (possibly agricultural runoff)	The landuse in the immediate vicinity of the monitoring location is primarily fallow agricultural fields. DWQ should work with the local agricultural agencies to help farmers in this watershed ensure that appropriate measures are taken to minimize runoff into surface waters from agricultural activities (resources permitting**).	6.4.2
Catheys Creek (030802)	PS	point source (Spindale) and nonpoint source(s) (possibly agricultural runoff)	DWQ will continue to work with point sources to ensure protection of the surface waters through compliance with effluent limits. DWQ should also work with local experts to assess NPS contributions to impairment (resources permitting**).	6.4.2
Beaverdam Creek (030804)	PS	point sources (four small discharges) and nonpoint sources (erosion, sand dredging)	DWQ will require that four discharges upstream of the monitoring site conduct instream monitoring to determine to what extent they are contributing to impairment. DWQ should also work with local experts to assess NPS contributions to impairment as well as the impact of the dredging project (resources permitting**).	6.4.4
Lick Branch (030805)	PS	point source (New Minnette Textiles)	DWQ will monitor the stream for progress since improvements were made to point source situation in late 1995.	6.4.5

\* Based on monitored data collected between 1992 and 1996.

\*\* Only limited progress towards developing and implementing nonpoint source strategies for these impaired waters can be expected without additional resources.

### C. CONTROLLING SEDIMENTATION

Erosion, and resulting sedimentation, are prevalent throughout the basin. Workshop participants (Section 6.2.3) and Nonpoint Source Team members (Section 6.2.2) have expressed that a priority issue for the basin is sedimentation control. Many waters in the basin are thought to be impacted or impaired, at least in part, by sedimentation (Table 4.17 in Chapter 4). The sources of sedimentation are discussed in detail in Chapter 3. Programs to address erosion and sedimentation are discussed in Chapter 5 and Appendix VI. Some of the actions being taken at the local level are discussed in Chapter 5, Section

5.6. General management strategies for controlling sedimentation are presented in Section 6.6.1 of Chapter 6.

**Recommendations**

Chapter 6 includes recommendations for controlling sedimentation from a variety of land disturbing activities including road and home construction, agriculture and forestry. Tools include use of appropriate best management practices, better enforcement of sediment control regulations, promotion of local sediment control programs and improved education.

**D. GROWTH MANAGEMENT**

Based on data from the USDA Natural Resources Conservation Service, the most significant landcover change between 1982 and 1992, was a 71% increase in the amount of urban land. Proactive planning efforts at the local level are needed to assure that development is done in a manner that maintains the good water quality that plays a role in attracting people to the area. These planning efforts will need to find a balance between water quality protection, natural resource management and economic growth. Growth management requires planning for the needs of future population increases as well as maintaining a strong tourism base. These actions are critical to water quality management and the quality of life for the residents of the basin.

**Recommendations**

It is recommended that local governments in the Broad River basin, particularly those in the eastern and western sections, take steps to plan for growth that protects water quality; however, limited progress can be expected without additional resources and technical assistance. The recommendations in Section 6.6.4 for urban stormwater control contain ideas that can help alleviate the impacts resulting from growth.

**E. ADDRESSING NONPOINT SOURCE IMPAIRED WATERS**

Although point sources of pollution continue to impact water quality in the basin, pollution from nonpoint sources is identified as a significant contributor to some impairment including areas that are identified as supporting their uses but threatened. Ninety-five percent of the 48 miles of waters that are impaired are thought to be impacted, at least in part, by nonpoint sources of pollution. It is recognized that in some cases the information that DWQ has concerning nonpoint source contributions from land uses such as agriculture are dated and general. 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. The reason for this is that the implementation of these programs is just beginning to occur or has occurred subsequent to water quality monitoring. However, agriculture remains 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.

In addressing nonpoint sources of pollution it is important to acknowledge agency resource constraints. The task of confirming and clearly identifying exact sources, developing management strategies, implementing best management practices and monitoring for water quality improvements is clearly beyond the current resources of DWQ, other agencies involved in managing nonpoint sources and local governments. Only limited progress can be expected unless substantial resources are put toward solving nonpoint source problems. Therefore this basinwide plan lacks specific strategies to address nonpoint source pollution.

### Recommendations

As one means of addressing this problem with available resources, DWQ has formed a voluntary nonpoint source team (NPS Team) for the basin. Working with the NPS Team (a knowledgeable team of local professionals and stakeholders) is an avenue for developing NPS priorities as well as targeting and coordinating existing resources within a basin. The NPS Team for the Broad River basin has received funding through the federal NPS program (Section 319) to take action to reduce sedimentation above Lake Lure. The team members participate voluntarily on the team within their existing resource constraints. Limited progress can be expected in restoring impaired waters through the team without additional resources. The NPS team is further discussed in Chapters 6 and 7.

### FUTURE INITIATIVES IN THE BROAD RIVER BASIN AND STATEWIDE

There are a number of initiatives that will be occurring in the basin over the next several years. Some are highlighted here. Chapter 7 provides a more thorough characterization of these initiatives.

- Development Of Field-Calibrated Models  
DWQ will be pursuing the development of a more sophisticated model for the larger rivers of the basin, especially the Second Broad River, to better predict point source impacts to surface waters. This model will be used to apply appropriate wastewater treatment effluent limits to dischargers to protect water quality.
- Investigation Into Long-Term Impacts Of Chip Mills  
In response to citizens' increasing concerns regarding the growing chip mill industry, Governor Hunt directed the NC Department of Environment and Natural Resources (NC DENR) to conduct an environmental and economic study of wood chip production in the state. These are facilities that produce wood chips for use in the production of paper products. One of the big concerns about these facilities is their potential to increase the amount of timber harvesting, especially clearcutting. For several months, NC DENR staff have been gathering information needed to identify issues that should be examined in the study. In October of 1997, public meetings were held across North Carolina to receive general public input into this process. Attendance was good and many ideas regarding the scope and nature of the forthcoming study were received.
- Efforts to Improve NC's Sedimentation and Erosion Control Program  
Recently, there has been an initiative in the Division of Land Resources to address sediment and turbidity water quality problems across the state. The Sedimentation and Erosion Control Commission has recognized the need to evaluate the implementation of the existing programs. A Technical Advisory Committee was established, along with three subcommittees, to perform the evaluation and develop recommendations. The committee and subcommittees met for several months during the fall of 1997 and presented a list of recommendations to the Commission in November. The Commission supported the recommendations and instructed the staff to implement the ones which can be implemented without rule or statute changes and have established a schedule to implement the others. It is believed that the changes initiated will result in program implementation improvements and reduction in sediment losses to our streams.
- The North Carolina Wetlands Restoration Program  
The North Carolina Wetlands Restoration Program (NCWRP) was established by the General Assembly in 1996. The purpose of the NCWRP is to protect and improve water quality, flood prevention, fisheries, wildlife and plant habitats, and recreational opportunities through the protection and restoration of wetlands and riparian areas. The

*Executive Summary*

NCWRP will accomplish this purpose by implementing projects that will restore wetland and riparian area functions and values throughout North Carolina. Beginning July 1, 1997, comprehensive Basinwide Restoration Plans will be developed for each river basin in conjunction with the Basinwide Water Quality Management Plans. GIS-based mapping methodologies will be used to assess the status of the existing wetlands and riparian area resources within each basin and to identify degraded wetlands and riparian areas. Potential restoration sites will be prioritized based on the ability of the restored sites to address problems that have been identified in the Basinwide Water Quality Management Plans. The restoration plans will provide the framework for the Wetlands Restoration Program, therefore it is essential that the public, local governments, state and federal agencies and others be involved in the development of these plans. Requests for information concerning the NCWRP and the Basinwide Restoration Plans should be sent to the following address: NC Wetlands Restoration Program, Division of Water Quality, P.O. Box 29535, Raleigh, NC 27626-0535.

- Consideration of Reclassification of Waters to HQW or ORW  
Table 2 presents a list of waters in the Broad River Basin that, based on DWQ monitoring, received an Excellent biological rating and may be considered eligible for High Quality Waters (HQW) or Outstanding Resource Waters (ORW) designation. DWQ has completed a study of the upper Green River intends to pursue reclassification to B HQW in the future. In addition, DWQ has been requested to consider Lake Montonia for HQW reclassification, and studies are underway to determine whether or not it qualifies for this change. The two other areas in the table have been shown to have excellent water quality, and could possibly qualify for the HQW or ORW classification if a request were received by DWQ. The HQW, ORW and WS classifications generally require more stringent point and nonpoint source pollution controls than do basic water quality classifications such as C.

Table 2 Potential HQW/ORW Waters for the Broad River Basin

Subbasin	Waterbodies
030801	Broad River (upstream of Lake Lure) and Cove Creek
030803	upper Green River (from source to Rock Creek - not including tributaries, and Rock Creek and tributaries)
030804	North Fork First Broad River
030805	Lake Montonia

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud. The text also notes that records should be kept for a sufficient period to allow for a thorough audit.

2. The second part of the document outlines the specific requirements for record-keeping. It states that all transactions must be recorded in a clear and concise manner, and that the records must be accessible to all authorized personnel. The text also mentions that records should be stored in a secure location and protected from unauthorized access.

3. The third part of the document discusses the role of the auditor in verifying the accuracy of the records. It states that the auditor should perform a thorough review of the records and should report any discrepancies to the appropriate authorities. The text also notes that the auditor should maintain a high level of independence and objectivity throughout the audit process.

