CATAWBA RIVER BASINWIDE WATER QUALITY MANAGEMENT PLAN

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FORWARD

The Catawba River Basin is unique in a number of respects, and these unique features offer some special challenges in protecting the quality of its waters. Despite the relatively pristine conditions of its headwaters, which includes the Linville River, one of just four state-designated Natural and Scenic Rivers in North Carolina, the Catawba Basin is the most densely populated river basin in the state. The basin has over a million residents and encompasses the state's largest city, Charlotte.

The river mainstem is almost entirely impounded by a series of seven hydropower reservoirs running from Lakes James, located at the foot of the Blue Ridge Mountains, to Lake Wylie, which straddles the state line with South Carolina. The reservoirs, by virtue of their location in this highly populated region, have become a tremendous recreational and water supply resource. Yet the water quality of these and five other reservoirs in the basin may be jeopardized by the surrounding growth pressures. Three of the twelve reservoirs in the basin are considered threatened, primarily from excessive nutrient loading from both wastewater treatment plants and stormwater runoff. Without careful monitoring and protection, water quality impacts may not be seen by many until the problems become severe enough to alter uses in the main bodies of the lakes. For example, water quality standard violations for chlorophyll *a* have begun to be observed in the main body of Lake Wylie with more severe conditions occurring in the Crowders Creek and Catawba Creek arms of the lake. A nutrient management strategy has been recommended in order to prevent degradation of the main body of Lake Wylie and to begin to restore uses to the tributary arms. Studies are currently underway to determine the need for additional protection in several of the basin's other reservoirs.

In regard to the basin's nearly 3100 miles of free-flowing rivers and streams, 16% are considered impaired with 90% of the impairment attributed to nonpoint sources of pollution. Agricultural runoff, construction activities and urban stormwater are the primary nonpoint sources of pollution, and sediment is by far the most widespread cause of impairment. In addition to the nonpoint pollution sources, the basin has nearly 550 permitted dischargers. A small number of these facilities have problems with toxicity and color, but of larger importance is the fact that the waste assimilative capacity, for oxygen-consuming wastes, of a growing number of streams is becoming exhausted. This is necessitating recommending more stringent waste limits for discharges in order to protect water quality standards and sustained use of the basin's waters.

A major challenge facing those with a stake in the basin is how to protect the quality of its water resources in the face of strong growth pressures. This plan does not purport to have all the answers, but it does begin to lay the groundwork for addressing them. Through analyses of extensive data collected over the past 5 to 10 years, it identifies and addresses eight major water quality issues in the basin:

1) Nutrient inputs to lakes from both point and nonpoint sources
2) Sedimentation in streams and lakes from urban runoff, construction and agriculture
3) Lack of assimilative capacity for oxygen-consuming wastes in streams and lake coves from wastewater treatment plant discharges
4) Stream water quality impairment from urban stormwater runoff
5) Health concerns associated with fecal coliform bacteria
6) Toxicity from heavy metals and its impacts on aquatic life and water supplies
7) Discharges of colored effluent from wastewater treatment plants
8) Enforcement of water quality regulations and compliance with discharge permits

Solving these problems is beyond the capabilities of any one agency or group. State and federal government regulatory programs will play an important part; but much of the responsibility will rest with industry, agriculture, local governments and the public. Those who live, work and recreate in the basin have the most at stake. It is hoped that this plan will provide a framework for cooperative efforts between the various stakeholders in the basin toward a common goal of protecting the basin's water resources.

EXECUTIVE SUMMARY

NORTH CAROLINA'S BASINWIDE APPROACH TO WATER QUALITY MANAGEMENT - PURPOSE OF CATAWBA BASINWIDE PLAN

Basinwide management is a new watershed-based water quality management initiative being implemented by the North Carolina Division of Environmental Management (DEM). The *Catawba River Basinwide Water Quality Management Plan* (Catawba Plan) is the fourth in a series of basinwide water quality management plans that will be prepared by DEM for all seventeen of the state's major river basins by 1998. The plan will be used as a guide by DEM in carrying out its water quality program duties and responsibilities in the Catawba River Basin. It can also provide a framework for cooperative efforts with local interests to protect the water resources of the 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 permit renewals in that basin. Each plan is then to be evaluated, based on follow-up water quality monitoring, and updated at five year intervals. The Catawba Basinwide Plan was approved in February of 1995 and will be updated in 1999. Basinwide permitting of NPDES (National Pollutant Discharge Elimination System) wastewater treatment facilities is scheduled to commence in April 1995.

BASINWIDE GOALS

The primary goals of DEM'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 so as to protect water quality standards while accommodating population increases and reasonable economic growth.

In addition, DEM 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.

CATAWBA BASIN OVERVIEW

The Catawba River Basin, along with the nearby Broad River basin in North Carolina, forms the headwaters of the Santee-Cooper River system which flows through South Carolina to the Atlantic Ocean. The Catawba is the eighth largest river basin in North Carolina covering 3279 square miles in the southwestern region of the state. The Catawba River rises from the eastern slope of the Blue Ridge Mountains at elevations in excess of 3,000 feet and flows eastward, then southward to Lake Wylie which straddles the North Carolina-South Carolina state line (Figure 1). The headwaters of the Catawba River are formed by swift-flowing, cold water streams originating in the steep terrain of the mountains in Avery, Burke, Caldwell and McDowell Counties. Many of these streams exhibit good to excellent water quality and are classified as trout waters. Below Lake Wylie in South Carolina, the Catawba flows through Fishing Creek Reservoir and Wateree Lake before becoming the Wateree River. The Wateree, joined by the Congaree River, flows into Lake Marion, and the entire river system eventually drains to the Atlantic Ocean.

One of the most important headwater streams is the Linville River. The Linville is one of only four rivers in the state designated by the General Assembly as a state Scenic River under the state's Natural and Scenic Rivers Program (a program administered the North Carolina Division of Parks

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and Recreation). The Linville flows through Linville Gorge Wilderness Area, a section of the Pisgah National Forest, and into Lake James, the first of a series of hydroelectric dams that segment the mainstem of the Catawba River into a series of impoundments. These impoundments, commonly referred to as the Catawba Chain Lakes include Lake James, Rhodhiss Lake, Lake Hickory, Lookout Shoals Lake, Lake Norman, Mountain Island Lake and Lake Wylie. As the basin enters the piedmont region from the mountains, land use shifts from forest to agriculture and urban uses.

The largest tributary to the Catawba River is the South Fork Catawba River which flows into Lake Wylie near the state line. It originates in the South Mountain area in southern Burke County. Its two major headwater tributaries are Jacob Fork and Henry Fork. There are 3,083 miles of freshwater streams in the basin and over 60,000 acres of impoundments. The basin is subdivided into nine subbasins represented in Figure 1 by six-digit subbasin codes (03-08-30 through 03-08-38). The subbasins are often referred to throughout the plan by their last two digits (e.g., 03-08-30 equals subbasin 30).

The population of the basin, based on 1990 census data, was estimated at 1,033,400. Municipalities with a population of 5,000 or more in the Catawba basin include Belmont, Charlotte, Conover, Hickory, Lincolnton, Mooresville, Morganton, Mt. Holly and Newton. The Catawba basin is the most densely populated river basin in the state with an overall population density of 312 persons per square mile versus a statewide average of 127 persons per square mile. The percent population growth over the past ten years (1980 to 1990) was 16.5% versus a statewide percentage increase of 12.7%. The basin encompasses all or part of the following 14 counties: Alexander, Avery, Burke, Caldwell, Catawba, Cleveland, Gaston, Iredell, Lincoln, McDowell, Mecklenburg, Union, Watauga and Wilkes.

Land cover, based on a 1982 assessment by the Soil Conservation Service is dominated by forest (54%), agriculture (20%) and urban/built-up areas (16%), which jointly comprise 90% of the land/water surface area in the entire basin. The remaining basin is comprised of open water (4%), rural transportation (3%) and minor development (3%). North Carolina is in the process of obtaining statewide land cover data through the Center for Geographic Information and Analysis (CGIA).

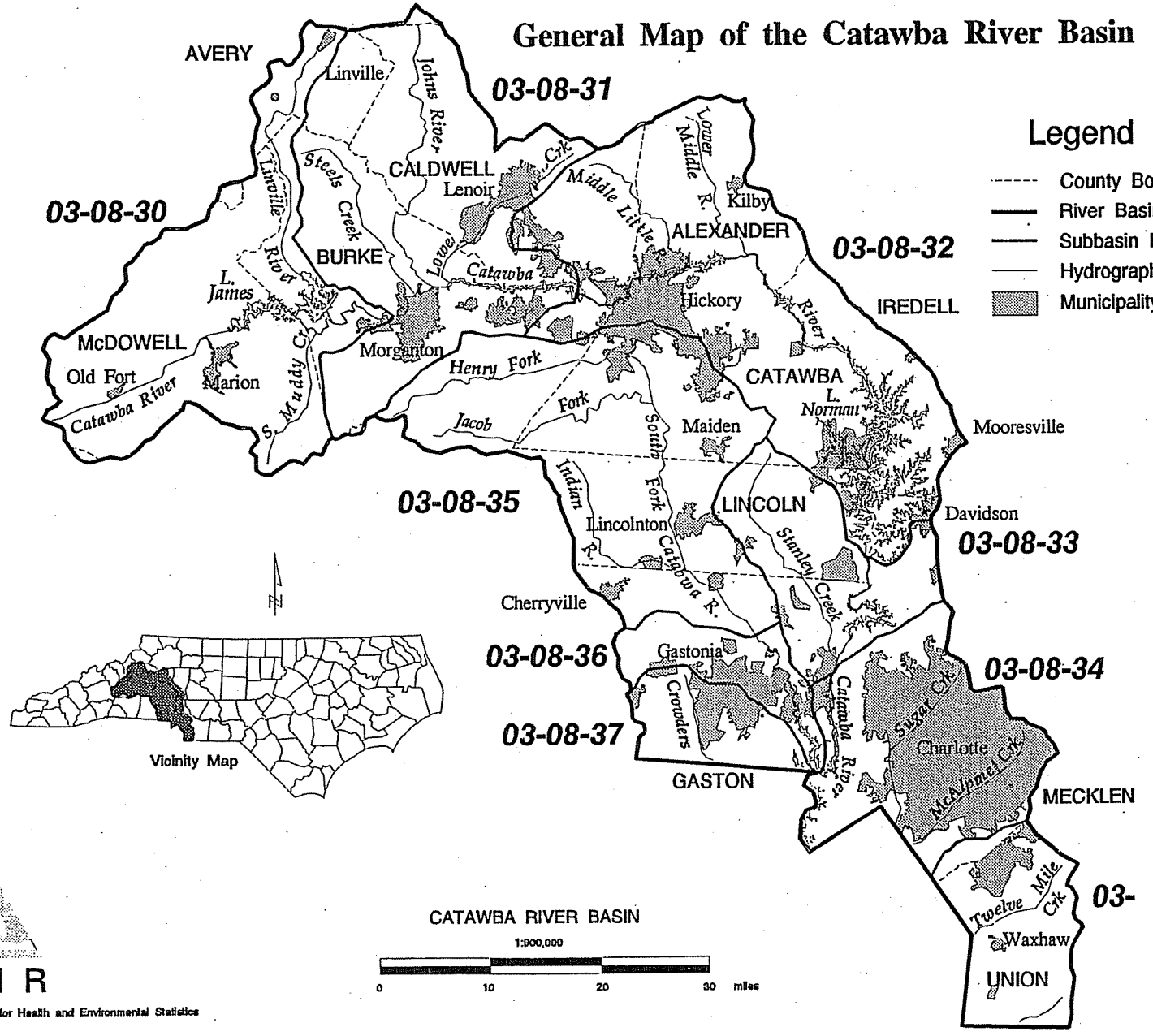
There are a total of 545 NPDES (National Pollutant Discharge Elimination System) dischargers in the basin, 39 of which are major facilities, 165 are purely domestic, 45 are municipalities and 64 are industries. The total permitted flow for all facilities is 203 million gallons per day (MGD). In addition to the discharge facilities, there are 94 swine, cattle, dairy, chicken and poultry operations in the basin that have registered with the Division of Environmental Management (DEM) as ~~concentrated animal feeding operations under 15A NCAC 2H .0217.~~

ASSESSMENT OF WATER QUALITY IN THE CATAWBA RIVER BASIN

An assessment of water quality data collected by DEM and others revealed that in the forested upper region of the basin, most of the streams feeding the Catawba River have good water quality. As the river continues into the piedmont, nonpoint runoff from agricultural operations, urban runoff, and other sources has caused nutrient enrichment, sedimentation and fecal coliform problems in the streams and rivers as well as in the tributary arms of many lakes in the mid and lower basin. Urban stormwater runoff is of particular concern in the lower basin in and around Mecklenburg and Gaston counties. Impacts from point source dischargers have also been documented. Biochemical oxygen demand, nutrients and localized toxicity and color impacts are the chief point source concerns.

One type of monitoring data used to assess water quality and identify long-trends is benthic macroinvertebrate sampling. Benthic macroinvertebrates are bottom-dwelling aquatic organisms

General Map of the Catawba River Basin



DEHNR

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that can be seen with the naked eye (mostly aquatic insect larvae). An analysis of the benthic macroinvertebrate database for the entire basin shows that a total of 180 benthos sites (287 samples) have been sampled in the Catawba River basin since 1983. Twenty of the 45 benthos sites in the 1992 basinwide assessment have long-term data for analysis of changes in water quality. Of these sites, 12 (60%) showed long term improvements in water quality, 7 (35%), showed no change, and one site (Clark Creek) had a decline in water quality from 1984 to 1985, with no change since 1985.

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. The word *uses*, depending on the classification of the waters, refers to activities such as swimming, fishing and water supply. DEM has collected extensive chemical and biological water quality monitoring data throughout the Catawba basin as 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 that 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 Catawba basin, described more fully in Chapter 4, are summarized below for freshwater streams and lakes. A list of impaired streams along with recommended management strategies is presented in Table 6.1 in Chapter 6.

Freshwater Streams and Rivers

Of the 3042 miles of freshwater streams and rivers in the Catawba basin, use support ratings were determined for 90% or 2737 miles with the following breakdown: 52% were rated fully supporting, 22% support-threatened, 12% partially supporting, four percent not supporting, and 10% nonevaluated. Thus a total of 16% are considered impaired. In general, those subbasins upstream on the Catawba mainstem above from Mt. Island Lake dam (subbasins 30, 31, 32 and 33) those subbasins upstream from and including Long Creek on the Sourth Fork Catawba River (subbasins 35 and 36) had a majority of their streams which were either supporting or support-threatened. A higher percentage of impaired streams were found in the lower South Fork, Catawba Creek, Crowders Creek and Sugar Creek subbasins (subbasins 34, 37 and 38).

Probable causes and sources of impairment have been determined for about 90% of the impaired streams. Sediment was the most widespread cause of impairment (376 miles), followed by fecal coliform bacteria (51 miles), turbidity (26 miles) and metals (16 miles). In regard to fecal coliform bacteria, bacteria levels at 26 of the 39 ambient sampling locations were found to exceed the state standard of 200 MPN in over 10% of the samples. Further, at 18 stations, over 25% of the samples exceeded the state standard.

Lakes

Twelve lakes in the Catawba Basin, totaling 46,985 acres, have been monitored and assigned use support ratings (see Table 4.7, Chapter 4). Of these 12, nine are fully supporting their uses, and three are support-threatened: Lake Hickory, Lake Wylie and Maiden Lake. The main cause of use support impairment is high chlorophyll *a* levels which result from algae blooms brought on by excessive nutrient loadings. Nutrients come from both point source discharges and nonpoint sources including urban and agricultural lands. The tributary arms of the lakes are most susceptible to pollution impacts not only from nutrients but from sediment and biochemical oxygen-demanding (BOD) wastes, as well. These areas should be monitored periodically because they will exhibit problems before the main body of the lake.

MAJOR WATER QUALITY ISSUES AND RECOMMENDED MANAGEMENT STRATEGIES

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 affected. Those issues considered most significant on a basinwide scale are presented below along with recommended management or research actions. These include: oxygen-consuming wastes, nutrients, toxicants, sedimentation, color, urban stormwater and fecal coliform bacteria.

A. MANAGEMENT OF OXYGEN-CONSUMING WASTES FROM DISCHARGE FACILITIES

The Division of Environmental Management has the responsibility of ensuring that the waste limits in NPDES discharge permits are established so as to protect dissolved oxygen standards in receiving waters. In the past, these limits have been established on a case-by-case basis, but followup studies that have examined the cumulative affects of multiple discharges on receiving streams have found that this approach sometimes results in overallocating the waste assimilative capacity of the receiving waters. Under the basinwide approach, efforts are being made, as resources allow, to establish strategies called total maximum daily loads (TMDLs) which would apply to multiple dischargers on streams or watershed areas within the basin. TMDLs include recommended permit limits designed to protect water quality standards and provide additional capacity for future expansions or new facilities. TMDLs for BOD have been established for the following streams:

- Lyle Creek Watershed
- Sugar Creek Watershed
- South Fork Catawba River
- Crowders, McGills and Abernethy Creeks
- Six Mile Creek Watershed

The strategies for each of these water bodies are presented in Section 6.3 of Chapter 6. These TMDLs are based on predictive computer modeling that takes into account such factors as water quality data, stream flow and physical conditions, waste loading and waste assimilative capacity. Appendix III summarizes the modeling methodology.

In addition to setting TMDLs for stream protection, TMDLs are also recommended for protection of the transitional environment between free flowing streams and lake waters in the tribuary arms of major lakes along the mainstem of the Catawba River (Lake James, Lake Hickory, Rhodhiss Lake, Lookout Shoals Lake, Lake Norman, Mountain Island Lake and Lake Wylie). This is a potentially sensitive area to loading of oxygen demanding wastes. As stream waters slow and deepen as they enter a lake, the rate at which oxygen enters the water is reduced. This means that a concentration of oxygen demanding waste that was acceptable in a free flowing stream may result in dissolved oxygen levels below the state standard in the transitional areas.

Accordingly, it is recommended that all new and expanding dischargers of oxygen consuming wastes that discharge to the lakes along the mainstem of the Catawba River (except Lake Wylie - see Nutrients, below) or are predicted to increase oxygen demanding waste loading to the lakes, should meet a minimum treatment limits of 15 mg/l BOD_5 and 4 mg/l NH_3-N. These limits will help to protect dissolved oxygen water quality standards in the Catawba River chain of lakes and will allow for continued growth in the region.

B. NUTRIENTS

Control of nutrients is necessary to avoid the development of nuisance algae conditions in the state's waterways. Point source controls typically include NPDES permit limitations on total phosphorus (TP) and total nitrogen (TN). Nonpoint controls of nutrients generally include best management practices (BMPs) to control nutrient loading from areas such as agricultural land, urban areas, construction sites and forestry activities.

Assimilative capacity for nutrients varies greatly in the Catawba Basin as the waters flow from stream to lake to stream. A 1992 report by DEM and South Carolina Department of Health and Environmental Control (92-04) described the nutrient assimilative capacity of Lake Wylie as exhausted. Rhodhiss Lake and Lake Hickory are eutrophic lakes, but their short retention time appears to mitigate the effect of algal growth. Ongoing and planned studies will further detail the assimilative capacity for nutrients of Lake James, Rhodhiss Lake, Lake Hickory, Lookout Shoals Lake, and Mountain Island Lake.

Updating the Lake Wylie Nutrient Management Strategy

The 1992 Lake Wylie Report (92-04) documented eutrophic conditions in Lake Wylie and several of its major tributaries. To address eutrophication in Lake Wylie, the State adopted a point and non-point nutrient control strategy for the Lake Wylie watershed. For point sources, it required state-of-the-art nutrient removal for all new or expanding wastewater discharges in the vicinity of the lake. In addition, the nutrient management strategy required existing facilities on tributaries to the three most highly eutrophic arms of the lake (South Fork Catawba River, Catawba Creek and Crowders Creek) to meet state-of-the-art nutrient removal. For nonpoint sources, this strategy included targeting of funds from the state's Agricultural Cost Share Program for the Reduction of Nonpoint Source Pollution for implementation of best management practices on agricultural lands to highly impacted watersheds of Lake Wylie.

In conjunction with the Catawba River basinwide planning effort, the existing Lake Wylie management strategy was reexamined in light of current water quality data and in order to assess the strategy's consistency with the State's stated goal of managing problem pollutants while accommodating reasonable economic growth. The Lake Wylie nutrient management strategy, presented below, is designed to reduce and eventually prevent the occurrence of eutrophication-related water quality standard violations in Lake Wylie and is consistent with the general results and conclusions of the 1992 Lake Wylie report. For the purposes of this document, the Lake Wylie Nutrient Management Area is considered to be Lake Wylie and its tributaries including the Catawba River and its tributaries below Mountain Island Dam and the South Fork Catawba River below its confluence with Long Creek.

Point Source Strategy - Lake Wylie

Entire Lake Management Area:

- No new discharges should be allowed to the lake mainstem or its tributaries, unless an evaluation of engineering alternatives shows that it is the most environmentally sound and economically feasible alternative.
- Existing discharges to the lake mainstem and tributaries should be encouraged to be removed when alternatives become available. Incentives should be established to encourage the privately owned facilities to transfer their wastes to larger municipal WWTPs which have a greater resource base to consistently operate the state-of-art treatment facilities required to protect water quality in the above listed sensitive areas.

- All industrial dischargers will be handled on a case-by-case basis because best available technology (BAT) is not clearly defined for them as a group. It is recommended that industries reduce TP and TN to BAT levels.

New/Expanding Non-industrial Dischargers to Lake Wylie (except Catawba and Crowders Creek arms)

- ≥ 1 MGD: Recommended limits are 1 mg/l TP and 6 mg/l TN (summertime)
- < 1 MGD but > 0.05 MGD: Recommended limits are 2 mg/l TP

Catawba Creek (>0.05 MGD):

- By 2006, all dischargers should be required to meet limits of 0.5 mg/l TP, 4mg/l summertime TN and 8 mg/l wintertime TN.

Crowders Creek (> 1 MGD):

- By 2001, all facilities should meet limits of 1 mg/l TP and 6 mg/l TN

Nonpoint sources - Lake Wylie

All tributaries to Lake Wylie should be given priority by the Division of Soil and Water Conservation for cost share funds for use in implementation of best management practices (BMPs). When possible, resources should be targeted toward implementation of BMPs in the Catawba Creek, Crowders Creek and the South Fork Catawba River watersheds since a significant amount of the nutrients reaching these streams is from non-point sources. Since the South Fork Catawba River provides by far the largest nutrient load of any tributary to Lake Wylie, the South Fork should be considered the highest priority for implementation of BMPs.

Rhodhiss Lake, Lake Hickory and Mountain Island Lake

Specific management plans for addressing point and/or non-point source pollution to Rhodhiss Lake, Lake Hickory and Mountain Island Lake will be developed after completion of studies now underway by DEM, the US Geological Survey, Mecklenburg County and others.

C. TOXIC SUBSTANCES

Toxic substances routinely regulated by DEM include metals, organics, chlorine and ammonia. Point source dischargers will be allocated chemical specific toxic substance limits and monitoring requirements based on a mass balance technique. Whole effluent toxicity limits are also assigned to all major dischargers and any discharger of complex wastewater. Where clusters of discharges and other pollution sources exits, concerns about the interaction of toxicants from different facilities are addressed by calculating a total maximum daily load (TMDL) for these streams. This method involves determining the total dilution available downstream of a number of pollution sources that are believed to contribute to a threat to water quality, and allocating pollutant loads to sources so as to prevent instream violations of water quality standards. TMDL strategies are presented in Section 6.5.2 of Chapter 6 for portions of Clark Creek and the South Fork Catawba River.

All new and expanding dischargers are required to dechlorinate their effluent if chlorine is used for disinfection. If a chlorine standard is developed for North Carolina, chlorine limits may be assigned to all dischargers in the State that use chlorine for disinfection.

Strategies being implemented through the industrial and urban NPDES stormwater program should also be helpful in reducing toxic substance loading to surface waters. Industries are being required to prevent contamination of stormwater runoff from their sites through practices such as covering stockpiles of toxic materials that could pose a threat to water quality, and where necessary, implementing other best management practices to control the water quality of runoff.

D. SEDIMENTATION

Sediment is the most widespread cause of water quality use support impairment in the Catawba River Basin as it is throughout most of the state. Significant sources include agricultural activities, road construction, urban development and timber harvesting. There are 19 programs administered by various local, state and federal agencies which have been developed to control sediment from these activities (Table 6.3 of Chapter 6). Without these programs, sediment-related water quality impacts would undoubtedly be much worse. However, despite the combined efforts of all of the above program there were still 376 miles of streams in the Catawba Basin found to be impaired by sediment, thus pointing to the need for continued overall improvements in sediment control. Most the programs referenced above and listed in Chapter 6 are the responsibility of agencies other than DEM. DEM is using the basinwide approach to draw attention to this issue to work more closely with the responsible agencies to find ways of improving sediment control. Possibilities for improvement may include the following measures:

- More effective implementation and maintenance of sediment control measures by contractors, farmers and other land owners
- Better enforcement of existing regulations
- More widespread adoption of sediment control programs by local governments
- Public education
- Possible strengthening of sediment control laws and regulations including limiting the area of disturbed land on a given site and providing a more stringent time period for reestablishing vegetation on denuded areas than currently required.

All or portions of the following streams (followed by their respective subbasin numbers) have been identified as being impaired or threatened by sediments and should receive high priority as sediment control programs are implemented: Linville River (03-08-30), South Fork Catawba (03-08-35), Lower Creek (03-08-31), Long Creek (03-08-36), Lower Little River (03-08-32), Twelve Mile Creek (03-08-38), Clark Creek (03-08-35), and Waxhaw Creek (03-08-38).

F. COLOR

Color is rarely the result of one specific chemical, rather a mixture of many dissolved and/or suspended constituents contribute to color. Because color is perceived differently by different people and in different lighting conditions, no general definition of color impairment can be specified by a simple set of criteria. DEM has identified the need to develop a color monitoring protocol that will allow specific analyses of color in waters of the state. Because textile industries are a significant source of color to waters of the Catawba and other river basins, DEM intends to work with the North Carolina Textile Manufacturing Association on developing appropriate methodologies for color analysis. This work will be followed with a monitoring program with the goal of developing treatment strategies for facilities that are a significant source of colored effluent. Two subbasins that make up the South Fork Catawba River watershed (03-07-35 and 03-07-36) will be targeted in a pilot study to address color.

G. URBAN STORMWATER

DEM has identified 111 miles of streams in the Catawba River Basin as being impaired by urban stormwater, many of which are in the Charlotte-Mecklenburg area. DEM administers several programs aimed at controlling urban stormwater runoff. These include: 1) NPDES stormwater permit requirements for industrial activities and for municipalities greater than 100,000 in population (which includes Charlotte) and 2) programs for the

control of development activities near High Quality Waters (HQW) and Outstanding Resource Waters (ORW) and activities within designated Water Supply (WS) watersheds. However, because of the widespread occurrence of stormwater runoff impacts throughout this rapidly urbanizing basin, it is recommended that smaller municipalities begin efforts to identify sources of stormwater runoff and take corrective actions such as eliminating illicit discharges to stormwater systems. Several strategies for addressing urban stormwater are summarized briefly in Section 6.8 of Chapter 6. It should be noted that the City of Charlotte is the first municipality in the southeast to have obtained an NPDES stormwater permit.

H. FECAL COLIFORM BACTERIA

Fecal coliforms are bacteria typically associated with the intestinal tract of warm-blooded animals and are widely used as an indicator of the potential presence of pathogenic, or disease-causing, bacteria and viruses. They enter surface waters from improperly treated discharges of domestic wastewater and from nonpoint source runoff. Common nonpoint sources of fecal coliforms include leaking or failing septic systems, leaking sewer lines or pump station overflows, runoff from livestock operations and wildlife.

Of the 39 ambient water quality monitoring stations in the Catawba basin, fecal coliform measurements exceeded the state standard of 200 MPN at least 10% of the time at 27 stations, and more than 25% of the time at 18 stations. In light of this information, local health departments are encouraged to sample waters in their jurisdictions, particularly in and around known swimming areas and to alert citizens to potential health hazards from water contact if bacterial levels are found to be too high.

I. ENFORCEMENT AND TREATMENT PLANT OPERATOR TRAINING

NCDEM is aggressively improving permit compliance through such methods as better screening of effluent violations, streamlining enforcement actions and imposing automatic penalties. At the same time, NCDEM's training and certification program for wastewater treatment plant operators is being expanded and improved in order to reduce problems associated with operator errors and to improve plant operations and efficiency.

In summary, basinwide management is a planning process that seeks to maximize water quality protection through the use of existing programs and regulations while providing a framework for long-term planning and economic growth. The Catawba River Basinwide Water Quality Management Plan summarizes water quality information for the basin, identifying the major causes and sources of pollution, and recommends actions needed help achieve the goals of balanced growth and environmental protection in the Catawba Basin. Achieving these goals will require the concerted efforts of all stakeholder interests in the basin.