

Chapter 4 - Water Quality Issues Related to Multiple Watersheds in the Catawba River Basin

4.1 Prior Basinwide Plan Recommendations and Achievements for Issues Related to Multiple Watersheds

4.1.1 Introduction

The 1995 Catawba River Basinwide Water Quality Management Plan included a number of recommendations to address water quality issues in the basin. Some of these recommendations were pertinent to several watersheds or the basin as a whole, while others were specific to a particular stream or area within a subbasin. A status of the more specific recommendations is reported within the subbasin chapters in Section B. In this chapter, recommendations from the 1995 plan that relate to more than one watershed are addressed. These issues are grouped into six categories: discharges to the major lakes, nutrient management for Lake Wylie, color reduction, sedimentation control, stormwater management and the South Fork Catawba River toxics review. A summary of the 1995 recommendations is presented and followed by a description of efforts that have (or have not) been made related to the task.

4.1.2 General Recommended Strategies for New and Expanding Dischargers to Lakes

DWQ recommended that all new and expanding discharges of oxygen-consuming wastes, or those predicted to increase oxygen-consuming waste loading to the lakes (Lake James, Rhodhiss Lake, Lake Hickory, Lookout Shoals Lake, Lake Norman, Mountain Island Lake and Lake Wylie), should be required to meet a minimum of advanced treatment limits of 15 mg/l BOD₅ and 4 mg/l NH₃-N.

Status of Progress

This strategy has been implemented on all major municipalities and direct dischargers.

4.1.3 Nutrient Management for Lake Wylie

Eutrophic conditions in Lake Wylie and several of its major tributaries have been evident for several years. To address eutrophication in Lake Wylie, DWQ and the South Carolina DHEC developed a point and nonpoint nutrient control strategy for the Lake Wylie watershed. 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.

1995 Recommended Point Source Nutrient Reduction Strategies

- No new discharges allowed on the lake mainstem or its tributaries, unless an evaluation of engineering alternatives (EAA) shows that it is the most environmentally sound alternative. For any new or expanding discharges that meet this requirement, it was recommended that advanced treatment technology be required.
- Any new or expanding facility with a permitted design flow of greater than or equal to 1 MGD was required to meet monthly average limits of 1.0 mg/l total phosphorus (TP) and 6.0 mg/l total nitrogen (TN), (TN applies to summer only). For new or expanding facilities with a permitted design flow of less than 1 MGD but greater than 0.05 MGD (50,000 gallons per day), a TP limit of 2.0 mg/l was recommended. No expansion was to be allowed if it increased the total nutrient load from the facility, unless an EAA shows that it is the most environmentally sound alternative.
- All industrial discharges were to be handled on a case-by-case basis. DWQ recommended that industries in the management area control TP and TN to best available technology levels.
- Existing discharges to the lake mainstem and tributaries were encouraged to remove that discharge when alternatives became available. Programs such as the Charlotte-Mecklenburg Utility (CMUDD) sewer line extension project were supported.
- Additional recommendations were made for point source discharges to the Catawba Creek and Crowders Creek watersheds to reduce nutrient enrichment. These recommendations called for more stringent permit limits for nutrients on all dischargers with permitted design flow of ≥ 0.05 MGD within the Catawba Creek watershed (0.5 mg/l TP and TN limits of 4 mg/l in summer and 8 mg/l in winter) by January 1, 2006. Interim limits of 1.0 mg/l TP and 6.0 mg/l TN become effective January 1, 2001. By January 1, 2000, all facilities with permitted design flow of ≥ 1 MGD will be required to meet limits of 1.0 mg/l TP and 6.0 mg/l TN in summer within the Crowders Creek watershed.
- Incentives should be established to encourage privately-owned facilities to tie on to larger municipal WWTPs.

1995 Recommendations for Nonpoint Sources

Future study will be conducted to reevaluate the extent of the defined management area. Nonpoint sources on the South Fork Catawba River upstream of Long Creek will be further assessed to determine what effect additional control of nutrients in the upper South Fork Catawba River basin may have upon eutrophication in Lake Wylie. Results of this study will be considered during the development of the next Catawba River Basin Plan.

All tributaries to Lake Wylie should be targeted by the NC 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. The South Fork Catawba River watershed should be considered the highest priority for implementation of BMPs.

Status of Progress

The Lake Wylie Management Strategy is still being implemented, and therefore, the full effects of the strategy are yet to be realized. DWQ has already required marked reductions in point

source loads and is working to gain a better understanding of nonpoint source nutrient contributions to Lake Wylie and ways to control them. Some specific actions taken since the 1995 Catawba River Basinwide Water Quality Management Plan include:

- Upon expansion or major modification, all industries are required to control nutrients on a site-specific basis. Municipal dischargers are required to meet advanced nutrient removal upon expansion or major modification (see appropriate chapter in Section B for more information).
- As identified in the 1995 basinwide plan, existing dischargers in the Catawba Creek and Crowders Creek watersheds will be required to meet more stringent permit limits.
- There have been no new permit requests for discharges to the lake mainstem or its tributaries.
- Targeting of cost share funding for BMPs has not necessarily been targeted to the South Fork Catawba River watershed as a result of the basinwide plan. However, the watershed has been rated a Category I watershed in the Unified Watershed Assessment program under the President's Clean Water Action Plan. This designation will allow some additional nonpoint source funding to be targeted to this watershed in the future.
- In direct response to nutrient reduction requirements specified in the 1995 Lake Wylie Nutrient Management Strategy, several municipalities are evaluating the potential environmental and economic benefits derived from a regional approach to wastewater treatment in the Lake Wylie watershed. Consolidation of anticipated future nutrient removal costs is one of the primary goals, as well as removing some of the individual discharges to the Lake Wylie watershed. For example, the towns of Belmont, Mt. Holly and Cramerton and Gaston County are jointly reviewing regional wastewater treatment alternatives.
- The Town of Cramerton has purchased the JPS Automotive WWTP and plans to route wastewater to this facility in the future and eliminate the town's existing discharge.

Significant reductions in pollutants have been achieved by various point sources. DWQ staff have summarized examples of the point source pollutant reduction initiatives occurring in the Lake Wylie watershed. These examples do not identify all of the efforts being made, but focus on the areas closest to Lake Wylie. In an effort to evaluate the impact of recent permit changes, NPDES staff examined a sampling of several large point source dischargers within three watersheds: Crowders Creek, Catawba Creek and South Fork Catawba River.

City of Gastonia's Wastewater Treatment Plant Improvements

The City of Gastonia has three wastewater treatment facilities that discharge into different tributaries of Lake Wylie: Catawba Creek WWTP, Long Creek WWTP and Crowders Creek WWTP. Gastonia's role as a provider of large regional systems is key in water quality improvements for Lake Wylie. Progress has been made at all three of these facilities and continues to be made. The following summarizes Gastonia's past accomplishments and proposed improvements at the three facilities.

1) Catawba Creek WWTP

Catawba Creek WWTP discharges to an arm of Lake Wylie, which is wide and slow moving and does not assimilate wastewater well. In an effort to improve water quality, Gastonia has decommissioned the Catawba Creek facility at a cost exceeding \$2.25 million. This will result in

the removal of several tons of oxygen-consuming wastes and nutrients from Catawba Creek. Reductions in pollutant loading as a result of the elimination of this discharge are anticipated to be over 150 tons/year of both BOD₅ and total suspended solids, over 140 tons/year of total nitrogen, and over 20 tons/year of total phosphorus.

2) *Long Creek WWTP*

Gastonia will route the wastewater presently treated at the Catawba Creek WWTP to the newly renovated Long Creek WWTP. There are at least two advantages to having wastewater discharged at this plant as opposed to Catawba Creek WWTP. Long Creek WWTP provides more effective treatment for nutrient removal than the Catawba Creek WWTP, and it discharges to the South Fork Catawba River, a river more capable of assimilating wastewater than Catawba Creek. It will cost Gastonia approximately \$30 million to upgrade the Long Creek WWTP to meet new effluent limits (for both nitrogen and phosphorus).

3) *Crowders Creek WWTP*

Crowders Creek WWTP, which discharges to the Crowders Creek arm of Lake Wylie, has also made improvements in the area of nutrient reduction. Currently, the Crowders Creek WWTP removes phosphorus and by September 30, 2001, the plant will be modified to include removal of total nitrogen. Over 60 tons/year of total nitrogen and phosphorus reductions will be removed from Crowders Creek. Improvements to the Crowders Creek WWTP, in order to meet the new effluent limits, will cost approximately \$14 million.

Dischargers to Crowders Creek

1) *Bessemer City WWTP*

Bessemer City WWTP currently discharges to Abernethy Creek, but is scheduled to connect to Crowders Creek WWTP. Pollutant reductions resulting from this connection should result in a significant reduction of oxygen-consuming wastes and ammonia nitrogen.

2) *Carolina Byproducts Resources (CBP)*

This is a rendering facility that accepts inedible animal by-products and waste restaurant oils and uses them for protein and fat for the animal feed industry. Its discharge permit was renewed in 1997. A reexamination and reapplication of the effluent guidelines used to develop the permit limits led to more stringent limits and a reduction of several tons of total suspended solids, ammonia nitrogen and BOD₅. As a condition in the discharge permit, DWQ required CBP to connect to Crowders Creek WWTP. Reductions in pollutant loading as a result of the elimination of this discharge are anticipated to be over 50 tons/year of both BOD₅ and total suspended solids, over 20 tons/year of ammonia nitrogen, and over 6 tons/year of both total nitrogen and total phosphorus.

Dischargers to South Fork Catawba River

1) Pharr Yarns

Pharr Yarns discharges to the South Fork Catawba River. Upon the most recent permit renewal for Pharr Yarns, a reexamination and reapplication of the effluent guidelines used to develop the permit limits resulted in more stringent limits for BOD₅ and TSS. These new limits should result in a reduction of over 30 tons/year of both BOD₅ and total suspended solids.

2) Delta Mills

Delta Mills discharges to Clark Creek in the South Fork Catawba River watershed. Upon Delta Mills' most recent permit renewal, a reinvestigation of production numbers used with the effluent guidelines to develop the permit limits resulted in more stringent limits for both existing flow (1.0 MGD) and expanded flow (1.5 MGD). These new limits are expected to significantly reduce pollutant loads from this facility.

Various Industrial Dischargers

Several industrial discharges, including Pharr Yarns, Clariant, Crompton and Knowles, and JPS Automotive are in the process of performing site-specific studies regarding pollution prevention and the investigation of treatment technologies beyond currently constructed systems. The aim of this work is to reduce total phosphorus and total nitrogen levels to levels of best available technology that is economically achievable. This should result in additional reductions in pollutant loadings to the Lake Wylie system.

Summary of Overall Point Source Pollutant Reductions to Lake Wylie Watershed

Figure A-21 presents a summary of overall pollutant reductions to the Lake Wylie watershed as described above. This summary includes all wastewater treatment facilities in subbasins 03-08-34, 03-08-36 and 03-08-37 with permitted flows above 0.5 MGD that discharge to Lake Wylie. The eleven facilities included in this summary account for approximately 92 percent of the point source flows from wastewater treatment plants in the three subbasins. Flows from water treatment plants, mining facilities, cooling water systems and all facilities downstream of Lake Wylie were excluded from the summary.

Each pie chart in this figure represents 100 percent of permitted loading from the eleven dischargers to the reservoir prior to the adoption of the 1995 Catawba River Basinwide Water Quality Management Plan. The reductions that have been achieved since that time are due to lower permit limits or elimination of the discharge. It should be noted that these reductions represent permitted loads. Actual load reductions for the dischargers included in the summary may vary depending on effluent quality.

Figure A-21 demonstrates that there has been a lot of progress made in reducing the amount of pollutants authorized to be discharged. More reductions will be realized as additional permit limits go into effect in 2001 and 2006.

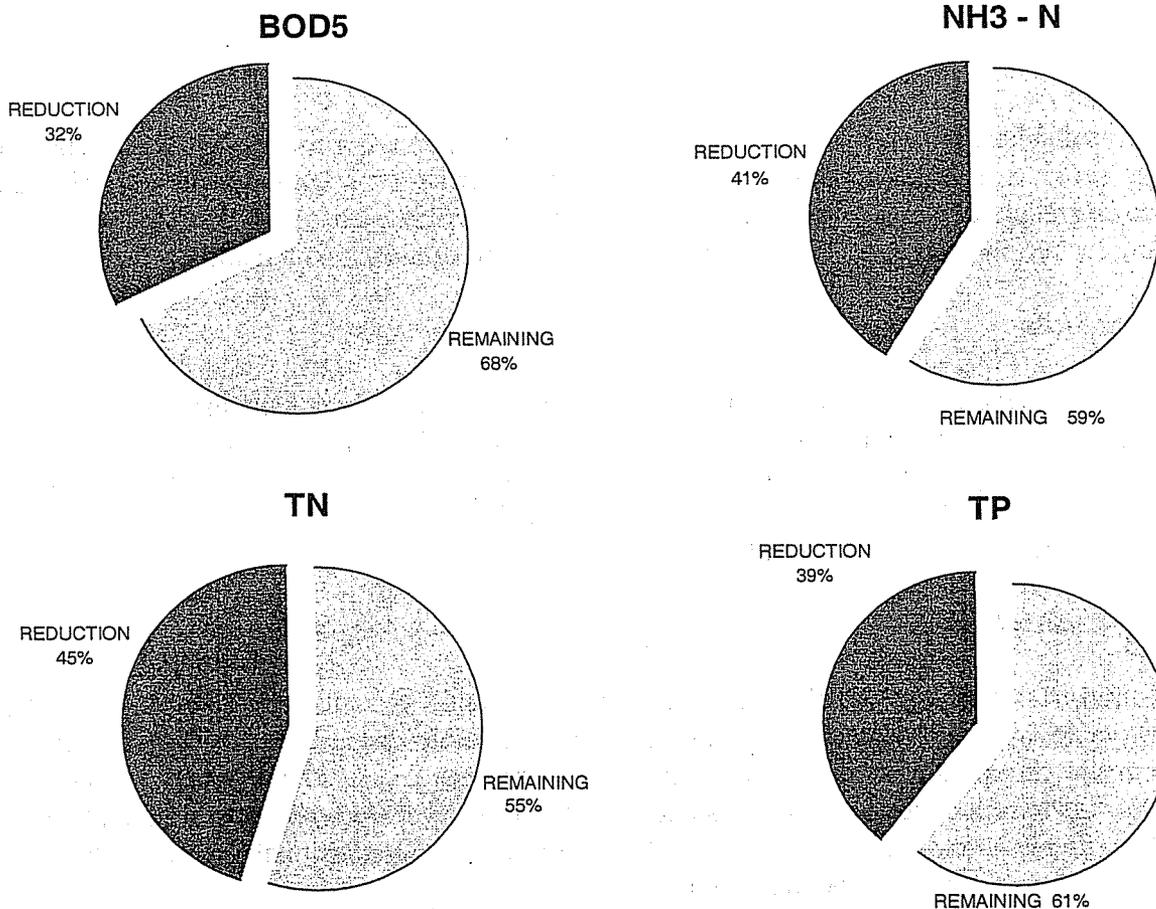


Figure A-21 Overall Permitted Pollutant Reductions to the Lake Wylie Watershed Since the 1995 Catawba River Basinwide Plan

1999 Recommendations

Nutrient loads from the South Fork Catawba River to Lake Wylie were examined to determine if there was a trend in the total load to the lake since 1992, and as a means to assess the need for additional management strategies at this time. Daily nutrient loads were assessed using the period of 1992 to 1997. In general, there was no trend in the total phosphorus load. However, a slight decreasing trend in total nitrogen load was seen at McAdenville. Thus, there is currently no evidence to suggest that additional controls are needed based on nutrient load trends. Trends should be reevaluated in the next basin cycle when proposed additional nutrient controls for the Lake Wylie watershed are in effect.

In addition to these pollutant reducing activities, the Division submitted a memorandum to John Hankinson of the US Environmental Protection Agency - Region IV supporting South Carolina's request to designate Lake Wylie as a no-discharge zone for marine toilets. The EPA has concurred with this request and the designation will be noticed in the Federal Register, then made an official regulation.

4.1.4 Color Reduction Strategy

The 1995 basinwide plan recommended a pilot study to address color in the South Fork Catawba River watershed (03-08-35 and 03-08-36). This watershed was selected for a pilot study because of the relatively high concentration of textile discharges in the watershed and public concerns and complaints regarding color. The study was to involve color monitoring and development of color control measures for several facilities in the South Fork Catawba watershed.

In addition, DWQ is committed to work with the Office of Waste Reduction to identify possible color source reduction methods. The results of the pilot study would be used to guide color management decisions throughout the Catawba River basin and to develop a color management strategy for the South Fork Catawba watershed as part of the Catawba basinwide plan update in 1999.

According to state regulations, colored effluent is allowed in “only such amounts as will not render the waters injurious to public health, secondary recreation, or to aquatic life and the wildlife or adversely affect the palatability of fish, aesthetic quality or impair the waters for any designated uses”. This color standard is a narrative standard based on aesthetics. The standard for color is not a numeric standard. The advantage of a narrative standard is that it is flexible. The disadvantages are that it is subjective and difficult to enforce. The state has considered developing a numeric standard, but there are many challenges in doing so. Some of these challenges include knowing what the appropriate analytical approach is; what the appropriate numeric standard is; and if a different standard should be used for different regions in the state to reflect variations in background water color. In addition, the practical application of this regulation must take into account the various ways in which color is perceived. No narrative definition of color impairment can be specified by a simple set of criteria because color is perceived differently by individuals under varying environmental conditions.

Status of Progress

As a result of the 1995 Catawba River Basinwide Plan, DWQ developed a color study plan for the South Fork Catawba River watershed. The purpose of this study was to determine: background color for the basin and acceptable increases in color over that background; site-specific color limits, if necessary; and the effects of voluntary waste reduction on instream color. Progress on this study has been limited due to more pressing demands on DWQ staff. However, as a result of the complaints about the color of the South Fork Catawba River and its tributary Clark Creek, DWQ determined that actions to reduce color in effluent must be taken.

It should be noted, that to date, there are no data to show that the colored effluent is posing any human health threat or is the only source of impact on the aquatic life in the river. Color is usually not a toxicological problem. However, under certain conditions it can limit light penetration that may be essential for the growth and existence of instream organisms. All dischargers with color waste are required to conduct toxicity testing on the effluent to assure the discharge will not adversely impact the organisms in the receiving stream. All of the color discharge facilities conducting toxicity testing have been in compliance with permit limits.

As a first step toward making progress in reducing color in the South Fork Catawba River watershed, DENR hosted a color reduction conference in Charlotte in 1998. Over 140 people from across the state were in attendance. Most attendees represented textile mills, municipalities and consulting firms. The main purposes of the conference were to emphasize the state's interest in reducing instream color and to encourage facilities to reduce color.

1999 Recommendations

DWQ, in response to comments at the public workshops and to complaints, has brought the need to reduce color in effluent to the forefront. Progress is being made to address this need with the following actions.

DWQ still believes that the most effective and equitable means of addressing color is to rely on the narrative aesthetic standard and complaints. DWQ will concentrate on a color reduction strategy to reduce color in the South Fork Catawba River watershed to the point that complaints are infrequent. Some of the specific actions DWQ will take to address the issue of color are to:

- Identify means to reward those facilities that have taken some measures to reduce color and avoid penalizing these facilities.
- Work with the Riverkeeper and other environmental groups in the areas to obtain assistance in monitoring efforts. These local stakeholders will also be asked to conduct routine reconnaissance that might include taking pictures, documenting plumes and making visual observations. A reporting format will be developed with these groups to assure that the information obtained is standardized.
- Verify significant color dischargers in the South Fork Catawba River watershed and request a meeting with them. The meeting is intended to review the history of color and let the dischargers know that they will be required to reduce their color input unless they can demonstrate that they are not a significant source of color. The meeting is intended to also discuss plans for determining the amount of color reduction necessary to protect the aesthetic water quality standard.

Specific action items underway or to be completed between now and 2006 are:

- August 1999 - All dischargers were invited to attend a color reduction strategy meeting.
- A draft Color Action Plan was presented by DWQ. As a result of discussion during the meeting, the dischargers requested time to work together on an alternative Color Action Plan that incorporated sampling along the entire 40 miles of the South Fork Catawba River and would address issues related to color analysis and background color. This request was granted with the stipulation that the alternative plan would be complete by October 1, 1999.
- September 1999 - A draft alternative plan was presented to DWQ.
- October 1999 - The dischargers and DWQ agreed upon the final components of the alternative Color Action Plan. They include:
 - Monitoring twice monthly April - October 1999 and once a month November through October 2000.
 - Review data in October 1999 with assistance from a Citizen's Advisory Committee to determine problem areas. Sources at the problem areas would be required to conduct

- color reduction studies to determine the ability and cost of achieving 25, 50, 75 and 99 percent color removal. These studies will be completed by the end of 2002.
- The facilities would form an alliance, formally known as the South Fork Catawba River Water Quality Alliance, Inc.
 - Permits would include monitoring requirements unless there is a formal agreement signed between DWQ and the Alliance stating that the study will be completed with all facilities participating. Failure to participate will result in reopening of the permit to allow the addition of monitoring requirements.
 - January-March 2000 - Finalize study plan. The Alliance will work with DWQ, other researchers and environmental interests in the South Fork Catawba River watershed to establish a comprehensive study plan.
 - December 2000 - Year 1 Report due.
 - June 2002 - Final report due.
 - December 2002 - Color Reduction Studies completed and submitted to the Division.
 - 2003-2004 - Based on the results of the monitoring and reduction studies, a final reduction goal will be established for facilities that continue to have significant color discharges. Permit limits would be developed, as needed, for the next permit cycle (2004-2007) based on the final reduction goals.

Dianne Reid, the contact person for this initiative, can be reached at (919) 733-5083 ext. 568.

4.1.5 South Fork Catawba River Watershed Toxics Review

The 1995 basinwide plan recommended that wasteload allocations for each facility discharging to the South Fork Catawba River from Lincolnton to Lowell should include a TMDL analysis for total loading at the Lowell Gage to address toxicity concerns. The South Fork Catawba River watershed is discussed in this section because the river flows through two subbasins (03-08-35 and 03-08-36). Therefore, a more complete picture of the entire river can be presented in this chapter rather than separating the river into subbasin chapters in Section B.

Status of Progress

EPA has recently changed the definition and requirements of a TMDL. TMDLs are now required for those waters listed on the state 303(d) list as required by EPA (see Appendix IV for more information). Although a TMDL is not required for the South Fork Catawba River because it is not impaired, DWQ believed that a cursory review of toxics in the South Fork watershed was warranted. To evaluate if potentially toxic chemicals may exceed water quality standards or action levels, available DWQ and USGS ambient monitoring data and NPDES and Pretreatment discharger data were assembled for the entire South Fork Catawba River watershed. These data were summarized to provide a basis for identifying areas where problems may exist. The available ambient and discharger chemical data were confined to three general classes: metals/inorganics, organics and pesticides/herbicides.

DWQ conducts instream monitoring for metals along the South Fork Catawba River watershed. USGS recently performed a pesticide/herbicide study that included the South Fork Catawba River watershed. As part of the study, USGS collected samples from Jacobs Fork, Indian Creek, and the lower South Fork Catawba River. Organic chemical data are only available from

dischargers. Instream chemical monitoring for subbasin 03-08-35 indicates that manganese standards are often exceeded in the South Fork Catawba River. In addition, copper levels are often higher than the action level, and thus, need to be assessed using instream aquatic toxicity tests to determine if the standard is exceeded. Standards or action levels are exceeded for other metals sporadically.

Additionally, in order to evaluate the cumulative effects of multiple NPDES dischargers and the background level of some metals, a model for low flow conditions was used. Modeling was performed for the main channel of the South Fork Catawba River and several major tributaries. The model analyzed for all metals and organic chemicals found in effluent. Predicted concentrations were compared to water quality standards to determine if instream exceedences may be a problem. If predicted concentrations were greater than a water quality standard or greater than two times an action level, the chemical was classified as a chemical of concern and was recommended for further study. In some cases, a chemical was listed as a chemical of concern if further information is needed to make a sound judgment. Recommendations based on the results of this analysis are presented below.

1999 Recommendations

Based on the analysis conducted by DWQ to date, specific recommendations are as follows:

- DWQ will look into conducting additional monitoring on Hoyle Creek. If monitoring shows water quality standards or designated uses are not being met, then DWQ may request that dischargers to this creek conduct additional monitoring for cadmium, copper, nickel, lead, silver and total phenols.
- DWQ will assess the need for additional monitoring stations on the middle South Fork Catawba River.
- DWQ needs to identify the sources of copper, cadmium and silver in the South Fork Catawba River watershed. If these metals are from NPDES dischargers, DWQ may need to place copper and silver limits on dischargers at next permit renewal. Efforts will be made to determine how much of the copper originates from nonpoint sources.
- Instream monitoring for other organic chemicals is needed to increase knowledge about organic chemicals in discharges.
- Given that some metals are in excess of the action level, additional ambient toxicity testing may be needed to determine whether these metals are toxic at the concentrations found instream.

4.2 Priority Issues and Recommendations for the Entire Basin During the Next Five Years

4.2.1 Introduction

Clean water is crucial to the health, economic and ecologic well-being of the state. Tourism, water supplies, recreation and a high quality of life for residents are dependent on the water resources within any given river basin. Water quality problems are varied and complex. Inevitably, water quality impairment is due to human activities within the watershed. Solving

these problems and protecting the surface water quality of the basin in the face of continued growth and development will be a major challenge. Looking to the future, water quality in this basin will depend on the manner in which growth and development occur.

The long-range mission of basinwide management is to provide a means of addressing the complex problem of planning for increased development and economic growth while protecting and/or restoring the quality and intended uses of the Catawba River basin's surface waters. In striving towards its mission, DWQ's highest priority near-term goals are to:

- identify and restore impaired waters in the basin;
- identify and protect high value resource waters and biological communities of special importance; and
- protect unimpaired waters while allowing for reasonable economic growth.

4.2.2 Strategies for Restoring and Protecting Impaired Waters

Impaired waters are those waters identified in Section A, Chapter 3 as partially supporting (PS) or not supporting (NS) their designated uses based on DWQ monitoring data. Table A-27 presents impaired waters in the Catawba River basin, the sources of impairment, summaries of the recommended management strategies, and location of further information in the basinwide plan.

These waters are impaired, at least in part, due to nonpoint sources (NPS) of pollution. The tasks of identifying nonpoint sources of pollution and developing management strategies for these impaired waterbodies is very resource intensive. Accomplishing these tasks is overwhelming, given the current limited resources of DWQ, other agencies (e.g., Division of Land Resources, Division of Soil and Water Conservation, Cooperative Extension Service, etc.) and local governments. Therefore, only limited progress towards restoring NPS impaired waters can be expected during this five-year cycle unless substantial resources are put toward solving NPS problems. Due to these restraints, this plan has no NPS management strategies for most of the streams with NPS problems.

DWQ plans to further evaluate the impaired waterbodies in the Catawba River basin in conjunction with other NPS agencies and develop management strategies for a portion of these impaired waterbodies for the next Catawba River Basinwide Water Quality Plan, in accordance with the requirements of Section 303(d) (see Part 4.2.3 below).

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

For the next several years, addressing water quality impairment in waters that are on the state's 303(d) list will be a priority. The waters in the Catawba River basin that are on the state's year 2000 (not yet EPA approved) 303(d) list are presented in the individual subbasin chapters in Section B.

Section 303(d) of the federal Clean Water Act requires states to develop a 303(d) list of waters not meeting water quality standards or which have impaired uses. States are also required to develop Total Maximum Daily Loads (TMDLs) or management strategies for 303(d) listed

Table A-27 Impaired Waters within the Catawba River Basin (as of 1999)•

Subbasin	Chapter in Section B	Listed Water	Use Support Rating	Potential Sources	Recommended Management Strategy
03-08-30	1	Lower Mackey Creek	PS	P	DWQ is working with discharge to improve and remove the discharge. DWQ is also developing a TMDL for mercury.
03-08-30	1	Corpening Creek	PS	NP P	More information and local actions to address stormwater runoff are needed.*
03-08-31	2	Lower Creek below Zacks Fork	PS	NP	DWQ supports WPCOG study recommendations. Local actions are needed.*
03-08-31	2	Zacks Fork	PS	NP	DWQ supports WPCOG study recommendations. Local actions are needed.*
03-08-31	2	Spainhour Creek	PS	NP	DWQ supports WPCOG study recommendations. Local actions are needed.*
03-08-31	2	Greasy Creek	PS	NP	DWQ supports WPCOG study recommendations. Local actions are needed.*
03-08-31	2	Bristol Creek	PS	NP	DWQ supports WPCOG study recommendations. Local actions are needed.*
03-08-33	3	McDowell Creek	PS	NP	DWQ will support actions of the Mecklenburg County SWIM program.*
03-08-34	4	Long Creek	PS	NP	DWQ will continue to monitor to assess sources of impairment. Local actions are needed.*
03-08-34	4	Sugar Creek	PS	NP P (upper section)	South Carolina, Charlotte-Mecklenburg Utilities and DWQ are working towards a nutrient reduction plan for point sources. DWQ is developing a fecal coliform bacteria TMDL.*
03-08-34	4	Irwin Creek	PS	NP P	South Carolina, Charlotte-Mecklenburg Utilities and DWQ are working towards a nutrient reduction plan for point sources.*
03-08-34	4	Little Sugar Creek	PS	NP P	South Carolina, Charlotte-Mecklenburg Utilities and DWQ are working towards a nutrient reduction plan for point sources. DWQ is developing a fecal coliform bacteria TMDL.*
03-08-34	4	McAlpine Creek	PS	NP P (lower section)	South Carolina, Charlotte-Mecklenburg Utilities and DWQ are working towards a nutrient reduction plan for point sources. DWQ is developing a fecal coliform bacteria TMDL.*
03-08-35	5	Clark Creek	PS	NP P	DWQ has completed a toxics review with recommendations and a color reduction strategy is being implemented.*
03-08-35	5	Mauney Creek	PS	NP P	Stanley WWTP has made improvements; more information and local actions are needed.*
03-08-37	7	Catawba Creek	NS	NP P	Many point source reductions are being made. Local actions are needed.*
03-08-37	7	Crowders Creek	PS	NP P	Many point source reductions are being made. Local actions are needed.*

Key: NS = Not Supporting PS = Partially Supporting
 NP = Nonpoint sources P = Point Sources

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

• = These waters are also on the 303(d) list, and a TMDL and/or management strategy will be developed to remove the water from the list.

waters to address impairment. In the last few years, the TMDL program has received a great deal of attention as the result of a number of lawsuits filed across the country against EPA. These lawsuits argue that TMDLs have not adequately been developed for specific impaired waters. As a result of these lawsuits, EPA issued a guidance memorandum in August 1997 that called for states to develop schedules for developing TMDLs for all waters on the 303(d) list. The schedules for TMDL development, according to this EPA memo, are to span 8-13 years.

There are approximately 470 stream segments on the 303(d) list in NC. The rigorous and demanding task of developing TMDLs for each of these waters during an 8 to 13-year time frame will require the focus of much of the water quality program's resources. Therefore, it will be a priority for North Carolina's water quality programs over the next several years to develop TMDLs for 303(d) listed waters. This task will be accomplished through the basinwide planning process and schedule.

4.2.4 Growth and Development and Stormwater Management

Urbanization often has greater hydrologic effects than any other land use, as native watershed vegetation is replaced with impervious surfaces in the form of paved roads, buildings, parking lots, and residential homes and yards. Urbanization results in increased surface runoff and correspondingly earlier and higher peak flows after storms. Flooding frequency is also increased. These effects are compounded when small streams are channelized (straightened) or piped and storm sewer systems are installed to increase transport of drainage waters downstream. Bank scour from these frequent high flow events tends to enlarge urban streams and increase suspended sediment. Scouring also destroys the variety of habitat in streams leading to degradation of benthic macroinvertebrate populations and loss of fisheries (EPA, 1999).

Urban runoff also carries a wide variety of contaminants to streams including oil and grease from roads and parking lots, street litter and pollutants from the atmosphere. Generally, there are a larger number of point source discharges in urban areas. Cumulative impacts from habitat alterations, point and nonpoint source pollution can cause severe impairment to urban streams.

Status of Progress

DWQ administers a number of programs aimed at controlling urban stormwater runoff. These include: 1) 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; and 2) NPDES stormwater permit requirements for industrial activities and municipalities greater than 100,000 in population.

Throughout the Catawba basin various types of activities with point source discharges of stormwater are required to be permitted under the Phase I NPDES stormwater program. These include industrial discharges related to manufacturing, processing and materials storage areas. Construction activities with greater than five acres of disturbance are also required to obtain an NPDES permit. Most of those areas requiring coverage must develop Stormwater Pollution Prevention Plans (SPPP) to minimize and control pollutants discharged from their stormwater systems. Municipal areas with populations greater than 100,000 are also required to obtain an NPDES stormwater permit and develop a stormwater program. In the Catawba River basin, only

the City of Charlotte is required to obtain an NPDES stormwater permit. Additional information on the City of Charlotte's Storm Water Program can be found in Section C.

1999 Recommendations

In addition to the current NPDES stormwater permitting, DWQ is developing a permitting and program strategy to address the EPA proposed Phase II stormwater permitting program requirements. The Phase II program will be directed towards smaller municipalities and construction sites. Phase II could potentially bring an additional 60 cities and 24 counties statewide into the NPDES permitting process. At present, Phase II requirements will be handled with existing state staff. The proposed rules were published in November 1999. About 20 local and four county governments within the Catawba River basin will fall within the Phase II requirements. For more information on the state NPDES stormwater program, contact the Stormwater and General Permits Unit at (919) 733-5083.

At the Governor's request, a series of public meetings were held across the state in 1999 to kick off the "21st Century Communities Task Force". The seven-member task force conducted public meetings to look at growth issues across the state. The task force will report its findings to a special legislative commission on growth and issue a final report in January 2001.

The presence of intact riparian buffers and/or wetlands in urban areas can lessen the urban impacts. Protection of buffers should be considered where feasible; however, the amount of impervious cover should be limited as much as possible. Wide streets, huge cul-de-sacs, and long driveways and sidewalks lining both sides of the street are all features of urban development that create excess impervious cover and consume natural areas.

Planning Recommendations for New Development

- Minimize number and width of residential streets.
- Minimize size of parking areas (angled parking & narrower slots).
- Place sidewalks on only one side of residential streets.
- Minimize culvert pipe and hardened stormwater conveyances.
- Vegetate road right-of-ways, parking lot islands and highway dividers to increase infiltration.
- Plant and protect natural buffer zones along streams and tributaries.

For more information regarding these and other recommendations, refer to the EPA's website: www.epa.gov/owow/watershed/wacademy/acad2000/protection.

Proactive planning efforts at the local level are needed to assure that development is done in a manner that maintains water quality. 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 developing and enforcing environmental protection measures. These actions are critical to water quality management and the quality of life for the residents of the basin.

These actions should include, but not be limited to:

- preservation of open spaces;
- provisions for controlled growth;

- development and enforcement of buffer ordinances and water supply watershed protection ordinances more stringent than state requirements;
- implementation of best management practices to reduce sediment to streams from urban development;
- stormwater runoff detention from urban developments;
- full support of the Mecklenburg County Surface Water Improvement Management (SWIM) plan;
- halt on floodplain development and protection of wetland areas;
- examination of zoning ordinances to ensure that they limit large, unnecessary parking lots, allow for vegetation and soil drainage systems, and build in green spaces in parking lots to limit and absorb runoff; and
- sustainable land use planning that considers long-term effects of development.

Phase II of the NPDES stormwater permitting program, promulgated by EPA and administered by DWQ, will help address stormwater runoff from additional municipal areas. Some local initiatives are presented in Section C.

4.2.5 Water Supply Watershed Protection

There are 26 surface water supply watersheds in the Catawba River basin. Local governments that have land use jurisdiction within these watersheds are responsible for the adoption, implementation and enforcement of the state's water supply watershed minimum requirements. Local governments can adopt and enforce more stringent water supply watershed protection ordinances if they choose. For example, the state's rules require the use of a 30-foot vegetated buffer (for low density development) along all waters in the water supply watershed that appear as solid blue lines on USGS 1:24,000 scale topographical maps. The state's rules allow the buffer's vegetation to consist entirely of grass rather than natural vegetation. However, a local government can require a larger and undisturbed (natural vegetation) buffer. If a local government adopts a more stringent ordinance, the state cannot require the local government to enforce anything more stringent than the state's minimum requirements. However, the state does have statutory authority to assess local governments or developers civil penalties for not administering the state's minimum requirements.

Some recent development may have received valid local approval (under vested rights) to develop under previous building requirements. Vested rights may be granted by the local government as allowed under state statutes (NCGS 153A-344.1 or NCGS 160A-385.1). This can be confusing seeing "new" development occurring in the water supply watershed that does not appear to comply with the current ordinance.

Since its inception in 1993, the DWQ's Water Supply Watershed Protection Program has focused on assuring that affected local governments are aware of their responsibility to adopt and enforce water supply watershed protection ordinances, review local ordinances to assure that they meet the state's minimum requirements, and provide technical assistance. Now that the majority of ordinances have been reviewed and approved by the state's Water Quality Committee of the Environmental Management Commission, it is DWQ's intent to refocus the program. Although technical assistance will still be a major component of the program's function, it will be DWQ's

intent to direct more effort to ensuring that local governments are complying with the state's minimum requirements.

DWQ is in the process of developing an audit/enforcement component for the water supply watershed protection program. This process is expected to take about a year to set up using existing programs as models.

4.2.6 Sedimentation Control

DWQ's role in sediment control is to work cooperatively with those agencies that administer the sediment control programs in order to maximize the effectiveness of the programs and protect water quality. Where programs are not effective, as evidenced by violation of instream water quality standards and where DWQ can identify a source, then appropriate enforcement action can be taken. Generally, this would entail requiring the landowner or responsible party to install acceptable best management practices (BMPs).

Status of Progress

Communication and cooperation continues to improve between state agencies that work to reduce erosion. The Division of Land Resources (DLR) has the primary responsibility for assuring that erosion is minimized and sedimentation is reduced. There are currently inadequate staff within DLR to achieve the mission of this agency. In February 1999, the NC Sedimentation Control Commission adopted significant changes for strengthening the Erosion and Sedimentation Control Program.

An erosion and sediment control plan must also be developed for disturbed sites of one acre or more under the state's Sedimentation Pollution Control Act (SPCA) administered by the NC Division of Land Resources. Site disturbances of less than one acre are required to use BMPs, but a plan is not required.

For activities not subject to these rules, such as agriculture and forestry, sediment controls are carried out on a voluntary basis through programs administered by several different agencies. Forestry operations, however, must comply with nine performance standards to remain exempt from permitting requirements of the SPCA. The performance standards can be found in the document: *Forest Practice Guidelines Related to Water Quality*.

New Rules Regarding Sediment Control

The Division of Land Resources (DLR) has the primary responsibility for assuring that erosion is minimized and sedimentation is reduced. For the past several years, there were inadequate staff to achieve the mission of the agency; however, in its 1999-2001 biennial budget, the NC General Assembly provided funding for 10 new positions in the Land Quality Section of DLR.

In February 1999, the NC Sedimentation Control Commission adopted significant changes for strengthening the Erosion and Sedimentation Control Program. The following rule changes were filed as temporary rules, subject to approval by the Rules Review Commission and the NC General Assembly:

- A pre-construction conference may be required.
- Provisions for ground cover stabilization were reduced from 30 working days to 15 working days and from 120 calendar days to 90 calendar days. (Stabilization must now be complete in 15 working days or 90 calendar days, whichever period is shorter.)
- No person may initiate a land-disturbing activity until notifying the agency that issued the Plan Approval of the date the land-disturbing activity will begin.
- The Director of Division of Land Resources may now begin to assess penalties of significant violations upon initial Notice of Violation (NOV).

Additionally, during its 1999 session, the NC General Assembly passed House Bill 1098 to strengthen the Sediment Pollution Control Act of 1973 (SPCA). The bill made the following changes to the Act:

- Increases the maximum civil penalty for violating the SPCA from \$500 to \$5000 per day.
- Provides that a person may be assessed a civil penalty from the date a violation is detected if the deadline stated in the Notice of Violation is not met.
- Provides that approval of an erosion control plan is conditioned on compliance with federal and state water quality laws, regulations and rules.
- Provides that any erosion control plan that involves using ditches for the purpose of de-watering or lowering the water table must be forwarded to the Director of DWQ.
- Amends the General Statutes governing licensing of general contractors to provide that the State Licensing Board for General Contractors shall test applicants' knowledge of requirements of the SPCA and rules adopted pursuant to the Act.
- Removes a cap on the percentage of administrative costs that may be recovered through plan review fees.

In August 1999, the Sediment Control Commission initiated rule making to increase plan review fees to \$40 per acre. In addition, the Commission voted to request that Governor Hunt use his authority to put into effect at an earlier date (before August 1, 2000) the rules adopted in February. For information on North Carolina's Erosion and Sedimentation Control Program or to report erosion and sedimentation problems, visit the new website: <http://www.dlr.enr.state.nc.us/>. Or you may call the NC Division of Land Resources, Land Quality Section at (919) 733-4574.

Recommendations

DWQ will continue to work cooperatively with DLR and other agencies that administer sediment control programs in order to maximize the effectiveness of the programs and to take appropriate enforcement action when necessary to protect or restore water quality. However, more voluntary implementation of BMPs is needed for activities that are not subject to these rules in order to substantially reduce the amount of widespread sedimentation in the basin.

Funding is available for cost sharing with local governments that set up new erosion and sedimentation control programs or conduct their own training workshops. The Sediment Control Commission will provide 40% of the cost of starting a new local erosion and sedimentation control program for up to 18 months. Two municipalities or a municipality and county can develop a program together and split the match. It is recommended that local governments draft and implement local erosion and sedimentation control programs.

Some Best Management Practices

Agriculture

- Using no till or conservation tillage practices.
- Strip cropping, contour farming and use of terraces.
- Taking land on steep terrain out of production.

Construction

- Using phased grading/seeding plans.
- Limiting time of exposure.
- Planting temporary ground cover.
- Using sediment basins and traps.

Forestry

- Controlling runoff from logging roads and other areas.
- Replanting vegetation on disturbed areas.
- Leaving natural buffer areas around small streams and rivers.

General Practices

- Avoiding disturbance of streams and the riparian zone.
- Protecting existing vegetated riparian buffers and restoring vegetation that has been cleared from the buffer areas.
- Maintaining natural stream channels to reduce susceptibility to erosion and maintain habitat.
- Maintaining predevelopment peak flows and flow velocities to the extent possible through the use of stormwater management techniques.

Construction activities can dramatically increase the sediment delivered to streams. Generally, a landowner or developer must install acceptable best management practices (BMPs) when the land is disturbed by construction or development activities. Management practices may include barriers, filters or sediment traps to reduce the amount of sediment that leaves a site. Under the Sedimentation and Pollution Control Act, local governments may take responsibility for reviewing and enforcing the Sedimentation and Erosion Control Program within their jurisdiction.

The responsibility for controlling sediment from construction activities falls on many shoulders. The parties with the greatest responsibility include: homeowners, developers/contractors, local governments and the NC Division of Land Resources. Table A-28 presents actions that will help to address sediment problems associated with construction activities. No sediment control measures are completely effective, so some level of sedimentation will occur with land-

disturbing activities. Education and promotion of stewardship are keys to reducing sedimentation, along with judicious strengthening of regulations and enforcement.

Table A-28 Recommended Actions to Prevent Construction-Related Sediment Problems

Homeowners	<ul style="list-style-type: none"> • Know and follow state and local erosion/sedimentation ordinances. • Fit development to existing site conditions and avoid highly erodible soils. • Establish, maintain and protect streamside vegetation. • Carefully monitor the construction process. • Establish and maintain vegetation as quickly as possible. • Continue to control sediment after construction is complete. • Report any serious sediment problems on construction sites, including bare soil that has not been stabilized or malfunctioning erosion controls.
Developers and Contractors	<ul style="list-style-type: none"> • Know and follow state and local erosion/sedimentation ordinances. • Fit development to existing site conditions and avoid floodplains and highly erodible soils. • Minimize the extent and duration of exposure. • Protect disturbed areas from stormwater runoff. Use dikes, diversions and waterways to intercept runoff and divert it away from disturbed areas. • Convey stormwater away from steep slopes to stabilized outlets, preserving natural vegetation when possible. • Inspect and maintain control structures during construction. • Retain sediment on-site. When possible, construct sediment traps before other land-disturbing activities. • Train equipment operators to execute erosion control practices.
Local Governments, With or Without Delegated Sediment and Erosion Control Programs	<ul style="list-style-type: none"> • Educate citizens on the importance of erosion and sediment control before they begin construction activities, and ensure they understand their responsibilities under local or state laws. • Report any serious problems on construction sites, including bare soil that has not been stabilized or malfunctioning erosion/sediment controls. • Consider developing a sediment and erosion control program in your jurisdiction. This will allow greater control over implementation and enforcement of the program. It will also offer the opportunity to require sediment control on developments disturbing less than one acre. • Evaluate the effectiveness of current sediment control enforcement if you have your own program. • Maintain publicly-owned open space to prevent sediment loss from tracts of land near waterbodies.

References/Resources

- The following can be ordered from the NC Division of Land Resources at (919) 733-3833:
 - *NC Erosion and Sediment Control "Planning and Design Manual"* (\$55 in-state)
 - *NC Erosion and Sediment Control "Inspector's Guide"* (\$20 in-state)
 - *NC Erosion and Sediment Control "Field Manual"* (\$20 in-state)
 - *NC Erosion and Sediment Control "Video Modules"* (\$15 in-state)
 - *Erosion Patrol 3rd Grade Curriculum Supplement*
 - *Muddy Water...It's More Dangerous Than You Think Video*

You may also refer to Appendix VI for a contact name and number for the NC Division of Land Resources regional office in your area.

4.2.7 The Importance of Riparian Buffers

Probably the best-known and most widely useful category of BMPs is the retention of naturally vegetated buffers along streams. Streamside buffers serve many functions including nutrient filtering, bank stabilization, reduction of soil and land loss, moderating water temperature (which helps increase dissolved oxygen and hence fisheries), and providing wildlife habitat and corridors for movement (EPA, 1999).

Although streamside vegetation of any kind is desirable, forests provide the greatest amount of benefit and highest potential for meeting both water quality and habitat protection objectives. A sound scientific foundation exists to support the sediment and nutrient reduction, as well as ecological values and functions of riparian forest buffers. Riparian vegetation slows runoff and helps maintain stable streambanks and protect downstream property. Riparian vegetation also soaks up rainwater instead of allowing it to runoff, thereby helping to recharge groundwater. The use of riparian buffers as a management tool should be promoted.

What is a Riparian Buffer?

The term riparian buffer is used to describe lands adjacent to streams and comprised of an area of native trees, shrubs and other vegetation.

Riparian buffers are managed to:

- maintain the integrity of stream channels and shorelines by protecting them from erosion;
- reduce the impact of nonpoint sources of pollution by trapping, filtering and converting sediments, nutrients and other chemicals; and
- supply food, cover and thermal protection to fish and other wildlife.

The loss of riparian buffers can reduce water quality, wildlife and fish populations, cause property damage and loss of agricultural lands through bank erosion. The loss of riparian vegetation results in increased water temperatures and decreased oxygen levels. These factors can significantly impact aquatic life and reduce land values. There are many benefits to protecting and restoring riparian buffers. The appropriate width of the buffer should consider land use, topography and water quality goals.

Recommendations

The General Assembly expressed interest in protecting water quality in the Catawba River basin through the ratification of the Clean Water Act of 1999 (HB 1160, Part VII). This bill gives authority to the Environmental Management Commission (EMC) to adopt temporary rules to protect water quality in the Cape Fear, Catawba and Tar-Pamlico River basins. The intent of the bill is to allow for development of rules for basinwide buffers or other water quality protection measures as required in these three river basins. The temporary rule-making process can be used to put water quality protection measures into place more rapidly than the permanent rule-making process and thus provide more immediate protection for riparian buffers.

Temporary rules require public input on language development and public hearings. Temporary rules are effective until permanent rules are adopted. Public hearings are also required during the permanent rule-making process.

Temporary rule-making for the Catawba River basin could not begin until the Catawba River Basinwide Water Quality Plan was approved by the EMC in December 1999. At the time of approval, DWQ staff alerted the EMC to local resolutions and comments made by the public concerning rule making for buffers.

The EMC did instruct DWQ staff to pursue temporary rule-making for buffers for the Catawba River basin. There will be opportunities for stakeholder input into the language of the temporary rules and public hearings will be held after the rule-making language is developed.

The Clean Water Act (Part VII) requires that DWQ take several steps to obtain public input on the development of temporary rules for buffers within the Catawba River basin. The bill requires that DWQ obtain stakeholder input on the development of the temporary rule language. As a first step, DWQ met with about 30 stakeholder groups in January 2000 to obtain feedback on the pursuit of rule-making for buffers in the basin. Some of the major issues the stakeholder group identified as needing to be addressed during rule development included:

- land owner rights;
- buffer width requirements;
- applicability of the rule for lake and river shorelines versus perennial and intermittent streams;
- enforceability of the rules; and
- compatibility with existing buffer programs (i.e., Mecklenburg county SWIM Stream Buffer Program).

Additional meetings with stakeholders on the language of the rules are anticipated in the next few months.

After temporary rule language is developed and approved by the EMC, the temporary rules will be publicly noticed and public hearings will be held throughout the basin. The earliest that the EMC would be able to reasonably adopt temporary rules and meet the HB1160 requirements would be late summer 2000.

Temporary rules are effective until permanent rules are adopted. Public hearings are also required during the permanent rule making process. Permanent rule language will likely be considered by the EMC during 2001, with an effective date of August 2002.

There have been some efforts at the local level in the Catawba River basin to protect stream water quality through buffer requirements. For example, Mecklenburg County adopted a Stream Buffer Plan that is flexible and establishes a buffer width based on the number of acres in the watershed (see Section C, Chapter 1, Part 1.5.2). Another effort, called Voices and Choices (see Section C, Chapter 1, Part 1.8.3) has been working on proposed buffer recommendations. In addition, 26 local governments in a 5-county area of the upper basin submitted local resolutions supporting buffers for the basin. (It should also be noted that one county government in the upper basin submitted a resolution in opposition to buffer rules). Interested citizens always have the option to petition their local government representatives to establish a buffer plan for their county.

