SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

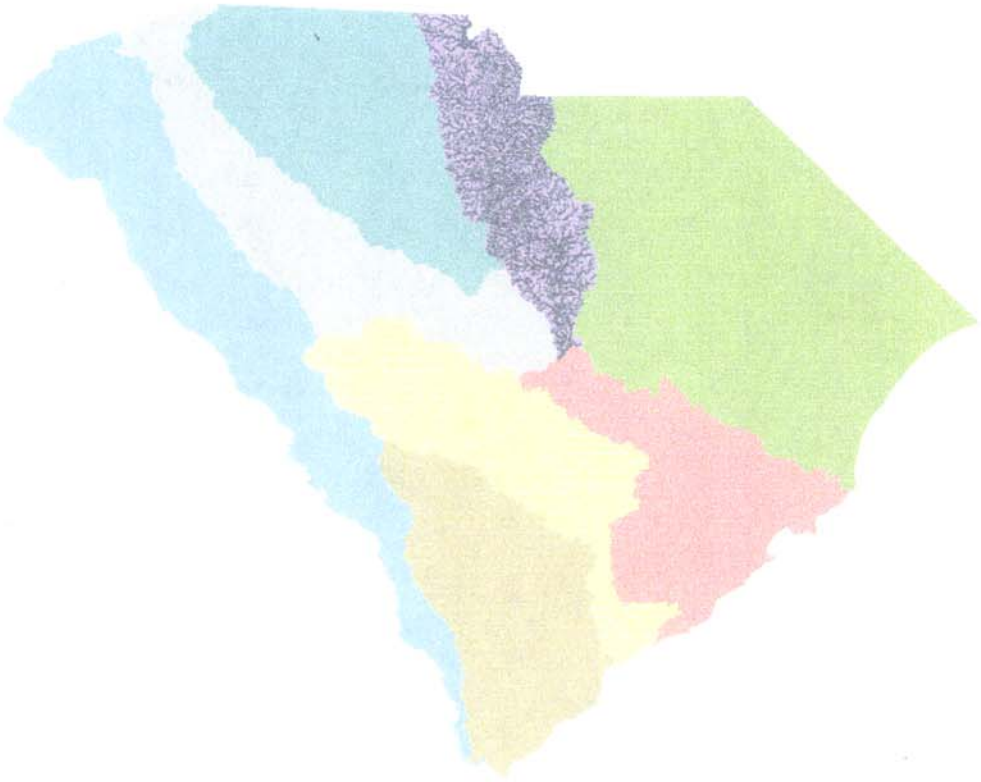
WATERSHED WATER QUALITY ASSESSMENT

CATAWBA RIVER BASIN

DECEMBER 2005

Watershed Water Quality Assessment

Catawba River Basin



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Watershed Water Quality Assessment – Catawba River Basin

December 2005

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012-05

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PREFACE

In 1993, the South Carolina Department of Health and Environmental Control (SCDHEC) published the first in a series of five watershed management documents. The first in that series, Watershed Water Quality Management Strategy: Savannah-Salkehatchie Basin, communicated SCDHEC's innovative watershed approach, summarizing water programs and water quality in the basins. The approach continues to evolve and improve.

The watershed documents facilitate broader participation in the water quality management process. Through these publications, SCDHEC shares water quality information with internal and external partners, providing a common foundation for water quality improvement efforts at the local watershed or large-scale, often interstate, river basin level.

Water quality data from the Catawba River Basin was collected during 1998 and 2002 and assessed during this third five-year watershed management cycle. This updated atlas provides summary information on a watershed basis, as well as geographical presentations of all permitted watershed activities. A waterbody index and facility indices allow the reader to locate information on specific waters and facilities of interest.

A brief summary of the water quality assessments included in the body of this document is provided following the Table of Contents. This summary lists all waters within the Catawba River Basin that fully support recreational and aquatic life uses, followed by those waters not supporting uses. In addition, the summaries list changes in use support status; those that have improved or degraded over the five years since the last strategy was written. More comprehensive information can be found in the individual watershed sections. The information provided is accurate to the best of our knowledge at the time of writing and will be updated in five years.

General information on Catawba River Basin Watershed Protection and Restoration Strategies can be found under that section on page 27, and more detailed information is located within the individual watershed evaluations.

As SCDHEC continues basinwide and statewide water quality protection and improvement efforts, we are counting on the support and assistance of all stakeholders in the Catawba River Basin to participate in bringing about water quality improvements. We look forward to working with you.

If you have questions or comments regarding this document, or if you are seeking further information on the water quality in the Catawba River Basin, please contact:

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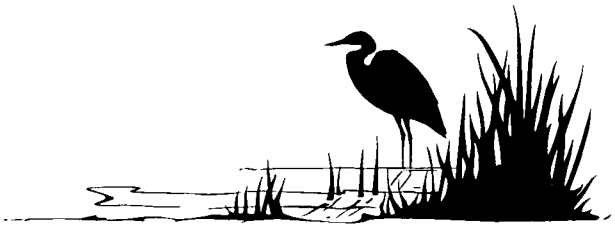

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Contributing photographers to the front cover include:
Matthew Carswell – Spider Lillies on the Catawba River
Ken Paschall – Lake Wateree Dam
Cindy Lacy – Wateree River

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South Carolina Department of Health and Environmental Control. 2005. Watershed Water Quality Assessment: Catawba River Basin. Technical Report No.012-05. Bureau of Water, Columbia, S.C.

Water Quality Assessment Summary

Catawba River Basin

TERMS USED IN TABLES

AQUATIC LIFE USE SUPPORT (AL) - The degree to which aquatic life is protected is assessed by comparing important water quality characteristics and the concentrations of potentially toxic pollutants with standards. Aquatic life use support is based on the percentage of standards excursions at a sampling site.

For **dissolved oxygen** and **pH**:

If the percentage of standard excursions is 10% or less, then uses are ***fully supported***.

If the percentage of standard excursions is greater than 10% and less than or equal to 25%, then uses are ***partially supported***.

If the percentage of standard excursions is greater than 25%, uses are ***not supported*** (see p.12 for further information).

For **toxins** (heavy metals, priority pollutants, chlorine, ammonia):

If the acute aquatic life standard for any individual toxicant is not exceeded more than once, uses are ***fully supported***.

If the acute aquatic life standard is exceeded more than once (i.e. $\geq$ 2), but is less than or equal to 10% of the samples, uses are ***partially supported***.

If the acute aquatic life standard is exceeded more than once (i.e.$\geq$2), and is greater than 10% of the samples, aquatic life uses are ***not supported*** (see p.12 for further information).

For **turbidity** and waters with **numeric total phosphorus, total nitrogen, and chlorophyll-a**:

If the percentage of standard excursions is 25% or less, then uses are ***fully supported***.

If the percentage of standard excursions is greater than 25%, then uses are ***not supported*** (see p.13 for further information).

RECREATIONAL USE SUPPORT (REC) - The degree to which the swimmable goal of the Clean Water Act is attained (recreational use support) is based on the frequency of fecal coliform bacteria excursions, defined as greater than 400/100 ml for all surface water classes.

If 10% or less of the samples are greater than 400/100 ml, then recreational uses are said to be ***fully supported***.

If the percentage of standards excursions is greater than 10% and less than or equal to 25%, then recreational uses are said to be ***partially supported***.

If the percentage of standards excursions is greater than 25%, then recreational uses are said to be ***nonsupported*** (see p.14 for further information).

Excursion - The term excursion is used to describe a measurement that does not comply with the appropriate water quality standard.

Table 1. Fully Supported Sites in the Catawba River Basin

* = Station not evaluated for Recreational Support

Watershed	Waterbody Name	Station #	Improving Trends	Other Trends
03050101-180	Lake Wylie	CW-245		
		CW-198	Decreasing Total Nitrogen	Decreasing pH
		CW-230	Decreasing BOD_5, Turbidity	Decreasing Dissolved Oxygen, pH
	Beaverdam Creek	CW-696*		
03050101-190	Allison Creek Arm of Lake Wylie	CW-200		Decreasing pH
		CW-201	Decreasing BOD_5, Total Nitrogen, Fecal Coliform	Decreasing pH
03050103-010	Catawba River	CW-016	Decreasing BOD_5	Increasing Total Phosphorus; Decreasing pH
	Cedar Creek Reservoir	RL-01017		
03050103-050	Fishing Creek	CW-031 *		
03050103-080	Camp Creek	CW-084 *		
03050103-090	Little Rocky Creek	CW-067 *		
03050104-010	Lake Wateree	RL-01003		
		RL-01033		
	Dutchmans Creek	CW-692 *		
	Beaver Creek	CW-076 *		
	White Oak Creek	CW-693 *		
03050104-030	Wateree River	CW-206	Increasing Dissolved Oxygen; Decreasing BOD_5, Total Nitrogen, Turbidity	
		CW-222 SC-002	Decreasing BOD_5, Turbidity, Fecal Coliform	Increasing pH
	Rafting Creek	RS-01046		

Table 1. Fully Supported Sites in the Catawba River Basin

* = Station not evaluated for Recreational Support

Watershed	Waterbody Name	Station #	Improving Trends	Other Trends
03050104-040	Flat Rock Creek	CW-077 *		
	Grannies Quarter Creek	CW-078 *		
03050104-050	Thorntree Creek	CW-075 *		
03050104-060	Cook Run	RS-02485		
03050104-070	Adams Mill Pond	CL-078		
	Big Pine Tree Creek	CW-021	Increasing Dissolved Oxygen; Decreasing BOD_5, Turbidity	
03050104-090	Spears Creek	CW-155		Increasing BOD_5, Fecal Coliform, pH
03050104-100	Colonels Creek	CW-250		
		CW-240		

Table 2. Impaired Sites in the Catawba River Basin

REC = Recreational; AL = Aquatic Life; DW = Drinking Water; PS = Partially Supported Standards; NS = Nonsupported Standards; * = Station not evaluated for Recreational Support; TD = TMDL Developed; TI = TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050101-180	Lake Wylie	CW-197	AL	NS	Copper	Decreasing BOD_5, Total Phosphorus, Total Nitrogen, Fecal Coliform	Decreasing pH
		CW-027	REC	PS	Fecal Coliform		Increasing Turbidity, Fecal Coliform
	South Fork	CW-192	REC	NS	Fecal Coliform	Decreasing Turbidity	
	Crowders Creek	CW-152	AL	NS	Copper	Increasing Dissolved Oxygen; Decreasing Turbidity, Fecal Coliform	Increasing BOD_5, Total Nitrogen; Decreasing pH
			REC	PS	Fecal Coliform		
		CW-023	REC	NS	Fecal Coliform	Increasing Dissolved Oxygen	Increasing Total Nitrogen, Total Phosphorus; Decreasing pH
		CW-024	AL	NS	Macroinvertebrates		
			REC	PS	Fecal Coliform		
	Brown Creek	CW-105 *(TD;TI)*	AL	NS	Turbidity		Increasing Turbidity; Decreasing pH
			REC	NS	Fecal Coliform		
	Beaverdam Creek	CW-153 *(TD;TI)*	REC	PS	Fecal Coliform	Decreasing Fecal Coliform	Decreasing pH
03050101-190	Allison Creek	CW-171 *(TD;TI)*	REC	NS	Fecal Coliform		Increasing BOD_5; Decreasing pH
		CW-249 CW-694	REC	NS	Fecal Coliform		

Table 2. Impaired Sites in the Catawba River Basin

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Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050101-190 (continued)	Calabash Branch	CW-134 ***(TD;TI)***	REC	NS	Fecal Coliform	Increasing Dissolved Oxygen; Decreasing BOD_5, Fecal Coliform	Decreasing pH
03050103-010	Hidden Creek	CW-221 ***(TD;TI)***	REC	NS	Fecal Coliform		Increasing BOD_5, Turbidity, Total Phosphorus; Decreasing pH
	Catawba River	CW-014	REC	PS	Fecal Coliform	Decreasing Turbidity, Total Phosphorus, Total Nitrogen	Decreasing pH
		CW-041	AL	NS	Copper	Decreasing BOD_5,	Decreasing pH; Increasing Turbidity
	Fishing Creek Reservoir	CW-016F	AL	NS	Turbidity, Total Phosphorus	Decreasing BOD_5,	Increasing Turbidity, Total Phosphorus, Total Nitrogen; Decreasing pH
		RL-01012	AL	NS	Chlorophyll-*a*		
		CW-057	AL	NS	Total Phosphorus	Increasing Dissolved Oxygen; Decreasing Fecal Coliform	Decreasing pH; Increasing Total Nitrogen
	Cedar Creek Reservoir	CW-174 ***(TD;TI)***	AL	NS	Dissolved Oxygen, Total Phosphorus, Total Nitrogen		Decreasing pH
			REC	PS	Fecal Coliform		
		RL-02319	AL	NS	Total Phosphorus		

Table 2. Impaired Sites in the Catawba River Basin

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Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050103-010 (continued)	Cedar Creek Reservoir	RL-01007	AL	NS	Chlorophyll-*a*, Dissolved Oxygen		
		RL-02452	AL	NS	Total Phosphorus		
		CW-033	AL	NS	Total Phosphorus		
03050103-020	Sugar Creek	CW-247	AL	NS	Cadmium, Copper		
			REC	PS	Fecal Coliform		
		CW-246 CW-627	AL	PS	Macroinvertebrates		
			REC	NS	Fecal Coliform		
		CW-013	REC	NS	Fecal Coliform	Decreasing BOD_5, Fecal Coliform; Increasing Dissolved Oxygen	Decreasing pH; Increasing Total Phosphorus
		CW-036	AL	NS	Copper	Decreasing Fecal Coliform; Increasing Dissolved Oxygen	Decreasing pH
			REC	NS	Fecal Coliform		
	Little Sugar Creek	CW-248	REC	NS	Fecal Coliform		
	McAlpine Creek	CW-226	REC	NS	Fecal Coliform	Decreasing Turbidity	Decreasing pH
		CW-064	AL	PS	Macroinvertebrates	Decreasing BOD_5; Increasing Dissolved Oxygen	Decreasing pH
			REC	NS	Fecal Coliform		

Table 2. Impaired Sites in the Catawba River Basin

REC = Recreational; AL = Aquatic Life; DW = Drinking Water; PS = Partially Supported Standards; NS = Nonsupported Standards; * = Station not evaluated for Recreational Support; TD = TMDL Developed; TI = TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050103-020 (continued)	Steele Creek	CW-009	REC	NS	Fecal Coliform		Increasing Turbidity; Decreasing pH
		CW-203	REC	NS	Fecal Coliform		
		CW-681*	AL	PS	Macroinvertebrates		
		CW-011	REC	PS	Fecal Coliform	Decreasing Fecal Coliform	Decreasing pH
03050103-030	Sixmile Creek	CW-176	REC	NS	Fecal Coliform		Decreasing Dissolved Oxygen, pH; Increasing BOD_5, Turbidity, Total Phosphorus, Total Nitrogen
	Twelvemile Creek	CW-083	AL	NS	Turbidity, Copper		Increasing BOD_5, Decreasing pH
			REC	PS	Fecal Coliform		
	Waxhaw Creek	CW-145	AL	NS	Copper		Decreasing Dissolved Oxygen
			REC	NS	Fecal Coliform		
03050103-040	Cane Creek	CW-185 *(TD)*	AL	NS	Dissolved Oxygen	Decreasing Total Phosphorus	Decreasing Dissolved Oxygen, pH
			REC	PS	Fecal Coliform		
		CW-210*	AL	PS	Macroinvertebrates		
		CW-017 *(TD)*	AL	NS	Dissolved Oxygen	Decreasing Total Phosphorus, Total Nitrogen	Increasing BOD_5; Decreasing pH
			REC	PS	Fecal Coliform		
	Bear Creek	CW-151 *(TD)*	AL	NS	Dissolved Oxygen		Decreasing Dissolved Oxygen
			REC	PS	Fecal Coliform		

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Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050103-040 (continued)	Bear Creek	CW-131 *(TD)*	AL	NS	Dissolved Oxygen		Decreasing Dissolved Oxygen
			REC	NS	Fecal Coliform		
	Gills Creek	CW-047 *(TD)*	AL	NS	Dissolved Oxygen		Decreasing Dissolved Oxygen, pH; Increasing BOD_5
			REC	NS	Fecal Coliform		
	Rum Creek	CW-232	AL	NS	Dissolved Oxygen		Decreasing pH
			REC	PS	Fecal Coliform		
03050103-050	Fishing Creek	CW-029 *(TD;TI)*	REC	NS	Fecal Coliform		Decreasing pH
		CW-005 *(TD;TI)*	AL	PS	Macroinvertebrates	Decreasing Total Phosphorus	
			REC	NS	Fecal Coliform		
		CW-225 *(TD;TI)*	AL	NS	Copper		Decreasing Dissolved Oxygen, pH; Increasing Fecal Coliform
			REC	NS	Fecal Coliform		
03050103-060	Wildcat Creek	CW-006 *(TD;TI)*	AL	NS	Turbidity		Decreasing Dissolved Oxygen, pH
			REC	NS	Fecal Coliform		
		CW-096 *(TD;TI)*	AL	NS	Turbidity	Decreasing Turbidity, Total Phosphorus	Decreasing pH
			REC	NS	Fecal Coliform		
	Tools Fork	CW-212 *(TD;TI)*	AL	NS	Turbidity	Decreasing Turbidity, Fecal Coliform	Decreasing pH; Increasing Total Phosphorus
			REC	NS	Fecal Coliform		

Table 2. Impaired Sites in the Catawba River Basin

REC=Recreational; AL=Aquatic Life; DW= Drinking Water; PS=Partially Supported Standards; NS=Nonsupported Standards; *=Station not evaluated for Recreational Support; TD=TMDL Developed; TI=TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050103-060 (Continued)	Fishing Creek	CW-224 ***(TD;TI)***	REC	NS	Fecal Coliform	Decreasing Total Phosphorus	Decreasing pH
		CW-654*	AL	PS	Macroinvertebrates		
		CW-008 ***(TD;TI)***	REC	PS	Fecal Coliform	Decreasing Fecal Coliform	Decreasing pH
		CW-233 ***(TD;TI)***	REC	PS	Fecal Coliform		Decreasing pH
	Stoney Fork	CW-697*	AL	PS	Macroinvertebrates		
	Taylor Creek	CW-695*	AL	PS	Macroinvertebrates		
	South Fork Fishing Creek	CW-007*	AL	PS	Macroinvertebrates		
	McFadden Branch	RS-01007	REC	NS	Fecal Coliform		
	Lake Oliphant	CL-021	AL	NS	pH, Chlorophyll-*a*		
03050103-070	Neelys Creek	CW-227 ***(TD;TI)***	REC	PS	Fecal Coliform		Decreasing Dissolved Oxygen, pH
	Tinkers Creek	CW-234 ***(TD;TI)***	AL	NS	Macroinvertebrates Turbidity	Increasing Dissolved Oxygen	Increasing Turbidity; Decreasing pH
			REC	PS	Fecal Coliform		
03050103-080	Camp Creek	CW-235 ***(TD)***	REC	NS	Fecal Coliform		Decreasing Dissolved Oxygen, pH

Table 2. Impaired Sites in the Catawba River Basin

REC=Recreational; AL=Aquatic Life; DW= Drinking Water; PS=Partially Supported Standards; NS=Nonsupported Standards; *=Station not evaluated for Recreational Support; TD=TMDL Developed; TI=TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050103-090	Grassy Run Branch	CW-088 *(TD)*	AL	NS	Dissolved Oxygen		Increasing BOD_5, Decreasing pH
			REC	NS	Fecal Coliform		
	Rocky Creek	CW-002 *(TD;TI)*	AL	NS	Macroinvertebrates Copper		Decreasing Dissolved Oxygen, pH
			REC	NS	Fecal Coliform		
		CW-236 *(TD;TI)*	REC	NS	Fecal Coliform		
	Beaverdam Creek	CW-691*	AL	PS	Macroinvertebrates		
	Rocky Creek Arm of Cedar Creek Reservoir	CW-175 *(TD;TI)*	AL	NS	Dissolved Oxygen, Turbidity, Total Phosphorus		Decreasing pH
			REC	NS	Fecal Coliform		
03050104-010	Lake Wateree	CW-231	AL	NS	Turbidity, Total Phosphorus		Increasing Fecal Coliform
		CW-208	AL	NS	pH, Total Phosphorus, Chlorophyll-*a*		Increasing Total Suspended Solids
		RL-02314	AL	NS	pH, Total Phosphorus		
		CW-207	AL	NS	pH, Total Phosphorus	Decreasing Fecal Coliform	Increasing Total Suspended Solids

Table 2. Impaired Sites in the Catawba River Basin

REC=Recreational; AL=Aquatic Life; DW= Drinking Water; PS=Partially Supported Standards; NS=Nonsupported Standards; *=Station not evaluated for Recreational Support; TD=TMDL Developed; TI=TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050104-010 (continued)	Lake Wateree	CW-209	AL	NS	pH, Total Phosphorus	Decreasing Total Nitrogen, Fecal Coliform	Increasing pH, Total Suspended Solids
		CL-089	AL	PS	pH		
	Little Wateree Creek	CW-040	AL	NS	Dissolved Oxygen	Decreasing Turbidity, Fecal Coliform	Decreasing Dissolved Oxygen
			REC	PS	Fecal Coliform		
	Dutchmans Creek	RS-02321	REC	NS	Fecal Coliform		
03050104-020	Big Wateree Creek	CW-072 ***(TD;TI)***	AL	PS	Dissolved Oxygen, pH	Decreasing BOD_5, Turbidity	
			REC	NS	Fecal Coliform		
03050104-030	Wateree River	CW-019	AL	PS	Dissolved Oxygen	Increasing Dissolved Oxygen; Decreasing BOD_5, Turbidity	
03050104-040	Grannies Quarter Creek	CW-237	AL	PS	pH	Decreasing BOD_5, Turbidity	
			REC	PS	Fecal Coliform		
03050104-050	Sawneys Creek	CW-228 ***(TD)***	REC	NS	Fecal Coliform	Decreasing BOD_5, Turbidity, Total Nitrogen	Increasing pH
		CW-079 ***(TD)***	REC	PS	Fecal Coliform	Decreasing BOD_5, Turbidity	
03050104-060	Bear Creek	CW-229	AL	PS	Dissolved Oxygen	Decreasing Turbidity	Decreasing Dissolved Oxygen; Increasing pH
			REC	NS	Fecal Coliform		

Table 2. Impaired Sites in the Catawba River Basin

REC = Recreational; AL = Aquatic Life; DW = Drinking Water; PS = Partially Supported Standards; NS = Nonsupported Standards; * = Station not evaluated for Recreational Support; TD = TMDL Developed; TI = TMDL Implementation underway

Watershed	Waterbody Name	Station #	Use	Status	Water Quality Indicator	Improving Trends	Other Trends
03050104-060 (continued)	Twentyfive Mile Creek	CW-080 *(TD;TI)*	AL	PS	Macroinvertebrates	Decreasing BOD_5, Turbidity, Total Nitrogen	Increasing pH
			REC	PS	Fecal Coliform		
03050104-070	Little Pine Tree Creek	CW-223	REC	PS	Fecal Coliform		Increasing Turbidity, pH
03050104-080	Swift Creek	CW-238	AL	NS	Dissolved Oxygen	Decreasing BOD_5, Fecal Coliform	Decreasing Dissolved Oxygen; Increasing Turbidity
03050104-090	Kelly Creek	CW-154 *(TD)*	REC	PS	Fecal Coliform		Increasing Total Phosphorus, pH, Fecal Coliform
	Spears Creek	CW-166 *(TD)*	REC	NS	Fecal Coliform	Decreasing BOD_5, Turbidity	Increasing pH

Table 3. Changes in Use Support Status

Catawba River Basin Sites that Improved from 1998 to 2002

REC= Recreational; AL=Aquatic Life; FS=Fully Supported Standards; PS=Partially Supported Standards; NS=Nonsupported Standards;

Watershed	Waterbody Name	Station #	Use	Status		Water Quality Indicator	
				1998	2002	1998	2002
03050101-180	Beaverdam Creek	CW-153	REC	NS	PS	Fecal Coliform	Fecal Coliform
03050103-020	Sugar Creek	CW-013	AL	NS	FS	Chromium, Copper	
	McAlpine Creek	CW-064	AL	NS	PS	Macroinvertebrates	Macroinvertebrates
03050103-030	Sixmile Creek	CW-176	AL	NS	FS	Zinc	
	Twelvemile Creek	CW-083	REC	NS	PS	Fecal Coliform	Fecal Coliform
03050103-040	Cane Creek	CW-017	REC	NS	PS	Fecal Coliform	Fecal Coliform
	Bear Creek	CW-151	REC	NS	PS	Fecal Coliform	Fecal Coliform
03050104-030	Wateree River	CW-206	REC	PS	FS	Fecal Coliform	
		CW-222/ SC-002	AL	NS	FS	Copper	

Table 4. Changes in Use Support Status

Catawba River Basin Sites that Degraded from 1998 to 2002

REC = Recreational; AL = Aquatic Life; FS = Fully Supported Standards; PS = Partially Supported Standards; NS = Nonsupported Standards

Watershed	Waterbody Name	Station #	Use	Status		Water Quality Indicator	
				1998	2002	1998	2002
03050101-180	Lake Wylie	CW-197	AL	FS	NS		Copper
	Crowders Creek	CW-152	AL	FS	NS		Copper
	Brown Creek	CW-105	AL	FS	NS		Turbidity
03050103-010	Catawba River	CW-014	REC	FS	PS		Fecal Coliform
		CW-041	AL	FS	NS		Copper
	Fishing Creek Reservoir	CW-016F	AL	FS	NS		Turbidity, Total Phosphorus
		CW-057	AL	FS	NS		Total Phosphorus
	Cedar Creek Reservoir	CW-174	AL	FS	NS		Dissolved Oxygen, Total Nitrogen, Total Phosphorus
		CW-033	AL	---	NS		Total Phosphorus
03050103-020	Sugar Creek	CW-036	AL	FS	NS		Copper
	Steele Creek	CW-011	REC	PS	NS	Fecal Coliform	Fecal Coliform
03050103-030	Twelvemile Creek	CW-083	AL	FS	NS		Turbidity, Copper
	Waxhaw Creek	CW-145	AL	FS	NS		Copper
03050103-040	Cane Creek	CW-185	AL	PS	NS	Dissolved Oxygen	Dissolved Oxygen
	Bear Creek	CW-131	AL	PS	NS	Dissolved Oxygen	Dissolved Oxygen
03050103-050	Fishing Creek	CW-005	REC	PS	NS	Fecal Coliform	Fecal Coliform
		CW-225	AL	FS	NS		Copper
03050103-060	Wildcat Creek	CW-006	AL	FS	NS		Turbidity
	Tools Fork	CW-212	AL	FS	NS		Turbidity
	Lake Oliphant	CL-021	AL	---	NS		pH, Chlorophyll-*a*
03050103-070	Tinkers Creek	CW-234	AL	PS	NS	Macroinvertebrates	Macroinvertebrates
03050103-080	Camp Creek	CW-235	REC	PS	NS	Fecal Coliform	Fecal Coliform
03050103-090	Rocky Creek	CW-002	AL	PS	NS	Macroinvertebrates	Macroinvertebrates Copper
	Cedar Creek Reservoir	CW-175	AL	FS	NS		Dissolved Oxygen, Turbidity, Total Phosphorus

Catawba River Basin Sites that Degraded from 1998 to 2002

REC= Recreational; AL=Aquatic Life; FS=Fully Supported Standards; PS=Partially Supported Standards; NS=Nonsupported Standards

Watershed	Waterbody Name	Station #	Use	Status		Water Quality Indicator	
				1998	2002	1998	2002
03050104-010	Lake Wateree	CW-231	AL	FS	NS		Turbidity, Total Phosphorus
		CW-208	AL	PS	NS	pH	pH, Total Phosphorus, Chlorophyll-*a*
		CW-207	AL	FS	NS		pH, Total Phosphorus
		CW-209	AL	FS	NS		pH, Total Phosphorus
	Little Wateree Creek	CW-040	AL	PS	NS	Dissolved Oxygen	Dissolved Oxygen
03050104-020	Big Wateree Creek	CW-072	AL	---	PS		Dissolved Oxygen, pH
03050104-040	Grannies Quarter Creek	CW-237	AL	FS	PS		pH
			REC	---	PS		Fecal Coliform
03050104-060	Bear Creek	CW-229	AL	FS	PS		Dissolved Oxygen
			REC	PS	NS	Fecal Coliform	Fecal Coliform
03050104-070	Little Pine Tree Creek	CW-223	REC	FS	PS		Fecal Coliform
03050104-080	Swift Creek	CW-238	AL	FS	NS		Dissolved Oxygen
03050104-090	Spears Creek	CW-166	REC	PS	NS	Fecal Coliform	Fecal Coliform

Introduction

The South Carolina Department of Health and Environmental Control (SCDHEC or the Department) initiated its first watershed planning activities as a result of a U.S. Environmental Protection Agency (USEPA) grant in June of 1972. These activities were soon extended by requirements for a Continuing Planning Process under §303(e), "Federal Water Pollution Control Act Amendments of 1972", U.S. Public Law 92-500. In 1975, the SCDHEC published basin-planning reports for the four major basins in South Carolina. A related planning activity resulted from §208 of the Federal Water Pollution Control Act, which required states to prepare planning documents on an areawide basis. Areawide plans were completed in the late 1970's for the five designated areas of the State and for the nondesignated remainder of the State. The updated versions serve as information sources and guides for water quality management. The Continuing Planning Process, watershed assessments, and 208 plans are elements of South Carolina's overall water quality management plan.

The Bureau of Water emphasizes watershed planning to better coordinate river basin planning and water quality management. Watershed-based management allows the Department to address Congressional and Legislative mandates in a coordinated manner and to better utilize current resources. The watershed approach also improves communication between the Department, the regulated community, and the public on existing and future water quality issues.

Purpose of the Watershed Water Quality Assessment

A watershed is a geographic area into which the surrounding waters, sediments, and dissolved materials drain, and whose boundaries extend along surrounding topographic ridges. Watershed-based water quality management recognizes the interdependence of water quality related activities associated with a drainage basin including: monitoring, problem identification and prioritization, water quality modeling, planning, permitting, and other activities. The Bureau of Water's watershed approach integrates these and other activities by watershed, resulting in appropriately focused water quality protection efforts. While an important aspect of the program is water quality problem identification and solution, the emphasis is on problem prevention.

The Department has divided the State into five regions (areas consisting of one or more river basins), along hydrologic lines, which contain approximately the same number of NPDES permitted dischargers. A Watershed Water Quality Assessment (WWQA) will be created for each major river basin within the five regions and will be updated on a five-year rotational basis. This will allow for effective allocation and coordination of water quality activities and efficient use of available resources. The Catawba River Bain is subdivided into 21 watersheds or hydrologic units and includes a portion of Lake Wylie (after it crosses the North Carolina State line), the Catawba River, Fishing Creek Reservoir, Great Falls Reservoir, Lake Wateree, and the Wateree River.

The hydrologic units used are from the 1999 USGS Hydrologic Unit Code for South Carolina. In an effort to make these units more representative of actual hydrology, SCDHEC has proposed changes to the 1999 map affecting some boundaries in the Catawba River Basin. These changes have

been provisionally approved by USGS pending a future statewide update. Appendix A. lists all SCDHEC geographic features (i.e. stations, facilities) and any watershed boundary changes that may have occurred as a result of these provisional changes. All water quality related evaluations are made at the 11-digit watershed level. The stream names used are derived from USGS topographic maps. The National Hydrography Dataset (NHD) was the system used in the development of the digital hydrography and stream length estimates. NHD is based on the content of the USGS 1:100,000 scale Digital Line Graph (DLG) hydrography data, integrated with reach (stream) related information from the USEPA Reach File Version 3.0 (RF3) data. Based on the blue line streams of the USGS topo maps, it is likely that portions of the stream network in terms of perennial, intermittent, and ephemeral streams are not represented.

The watershed-based assessments fulfill a number of USEPA reporting requirements including various activities under §303(d), §305(b), §314, and §319 of the Clean Water Act (CWA). Section 303(d) requires a listing of waters located within a watershed that do not meet applicable water quality standards. Section 305(b) requires that the State biennially submit a report that includes a water quality description and analysis of all navigable waters to estimate environmental impacts. Section 314 requires that the State submit a biennial report that identifies, classifies, describes, and assesses the status and trends in water quality of publicly owned lakes. The watershed plan is also a logical evaluation, prioritization, and implementation tool for nonpoint source (§319) requirements. Nonpoint source best management practices (BMPs) can be selected by identifying water quality impairments and necessary controls, while considering all the activities occurring in the drainage basin.

The assessment also allows for more efficient issuance of National Pollutant Discharge Elimination System (NPDES) and State wastewater discharge permits. Proposed permit issuances within a watershed may be consolidated and presented to the public in groups, rather than one at a time, allowing the Department to realize a resource savings and the public to realize an information advantage.

The Watershed Water Quality Assessment (WWQA) is a geographically based document that describes, at the watershed level, water quality related activities that may potentially have an adverse impact on water quality. The Watershed Implementation Staff investigates the impaired streams mentioned in the WWQA to determine, where possible, the source of the impairment and recommends solutions to correct the problems. As part of this effort, the watershed staff is forging partnerships with various federal and state agencies, local governments, and community groups. In particular, the Department's Watershed Program and the NRCS (Natural Resources Conservation Service) district offices are working together to address some of the nonpoint source (NPS) concerns in the basin. By combining NRCS's local knowledge of land use and the Department's knowledge of water quality, we are able to build upon NRCS's close relationships with landowners and determine where NPS projects are needed. These projects may include educational campaigns or special water quality studies.

Factors Assessed in Watershed Evaluations

Surface Water Quality

SCDHEC's Bureau of Water and Bureau of Environmental Services ensure that the water in South Carolina is safe for drinking and recreation, and that it is suitable to support and maintain aquatic flora and fauna. Functions include planning, permitting, compliance assurance, enforcement, and monitoring. This section provides an overview of water quality evaluation and protection activities.

Monitoring

In an effort to evaluate the State's water quality, the Department operates and collects data from a statewide network of ambient monitoring sites. The ambient monitoring network is directed toward determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards.

Ambient monitoring data are also used in the process of formulating permit limits for wastewater discharges with the goal of maintaining State and Federal water quality standards and criteria in the receiving streams in accordance with the goals of the Clean Water Act. These standards and criteria define the instream chemical concentrations that provide for protection and reproduction of aquatic flora and fauna, help determine support of the classified uses of each waterbody, and serve as instream limits for the regulation of wastewater discharges or other activities. In addition, by comparing the ambient monitoring network data to the State Water Quality Standards, these data are used in the preparation of the biennial §305(b) report to Congress, which provides a general summary of statewide water quality, and the §303(d) list of impaired waters with respect to attainment of classified uses.

Extensive revisions to SCDHEC's ambient water quality monitoring network were implemented in 2001. One of the primary purposes of the changes was to establish a network of permanent sites with a greater focus on watersheds. Another goal was to establish a more consistent sampling frequency and parameter coverage at the permanent sites. Thus while most of the previous sampling locations were maintained, the sampling frequency and parameter coverage at each may have changed.

The previous monitoring design was comprised of four main station types: primary (P), secondary (S), watershed (W), and biological (BIO) stations. The new station types include: Integrator (INT), Special Purpose (SPRP), Summer-Only (SUMM), Sediment-Only (SEDM), Random Stream for year ## (RS##), Random Lake for year ## (RL##), Random Tide Creek for year ## (RT##), or Random Open Water for year ## (RO##). The station descriptions depicting any transition in station types and/or coverage during the study period are located in each watershed evaluation.

Primary stations are sampled on a monthly basis year round. The static primary station network is operated statewide, and receives the most extensive parameter coverage, thus making it best suited for detecting long-term trends. Integrator Sites are the approximate equivalent under the new

design. Integrator Sites target the furthest downstream access of each of the 11-digit watershed units in the state, as well as the major waterbodies that occur within these watershed units. Special Purpose Sites are also permanent, fixed-location sites, but represent locations of special interest to the Department that do not meet the location criteria of Integrator Sites.

Secondary stations are sampled monthly from May through October, a period critical to aquatic life, and characterized by higher water temperatures and lower flows. Secondary stations are located in areas where specific monitoring is warranted due to point source discharges, or in areas with a history of water quality problems. Secondary station parameter coverage is less extensive and more flexible than primary or watershed station coverages. The number and locations of secondary stations have greater annual variability than do those in the primary station network, and during a basin's target year may have parameter coverage and sampling frequency duplicating that of primary or watershed stations. Summer-Only Sites are the equivalent under the new design. There are very few Summer-Only Sites as they are intended to track specific reservoir eutrophication concerns.

Watershed stations are sampled on a monthly basis, year round, during a basin's target year. Additional watershed stations may be sampled monthly from May through October to augment the secondary station network. Watershed stations are located to provide more complete and representative coverage within the larger drainage basin, and to identify additional monitoring needs. Watershed stations have the same parameter coverage as primary stations. Under the new design, Watershed stations are locations with extensive historic monitoring data (e.g. primary or secondary monitoring sites under the previous design). Changes in water quality can be identified by comparison of the new data to the historic data.

A statewide Probability-Based, or random sampling, component is part of the new monitoring design. A probability-based monitoring design is a type of a survey design in which the population of interest is sampled in a fashion that allows statements to be made about the whole population based on a subsample, and produces an estimate of the accuracy of the assessment results. The advantage of the probability-based sampling design is that statistically valid statements about water quality can be made about large areas based on a relatively small subsample. Separate monitoring schemes have been developed for stream, lake/reservoir, and estuarine resources. Each year a new statewide set of probability-based random sites is selected for each waterbody type. Random Sites are sampled on a monthly basis for one year with the same parameter coverage as Integrator Sites. The data from those Random Sites located within this basin are included in this assessment.

Ambient biological trend monitoring is conducted to collect data to indicate general biological conditions of State waters that may be subject to a variety of point and nonpoint source impacts. Ambient biological sampling is also used to establish regional reference or "least impacted" sites from which to make comparisons in future monitoring. Additionally, special macroinvertebrate studies, in which stream specific comparisons among stations located upstream and downstream from a known discharge or nonpoint source area, are used to assess impact.

Qualitative sampling of macroinvertebrate communities is the primary bioassessment technique used in ambient biological trend monitoring. A habitat assessment of general stream habitat availability and a substrate characterization is conducted at each site. Annual ambient biological monitoring is conducted during low flow "worst case" conditions in July - September. Some coastal plain streams that have no flow conditions in the summer months may be sampled in the winter (January-March). This technique may also be used in special studies for the purpose of determining if, and to what extent, a wastewater discharge or nonpoint source runoff is impacting the receiving stream. A minimum of two sample locations, one upstream and one downstream from a discharge or runoff area, is collected. At least one downstream recovery station is also established when appropriate. Sampling methodology follows procedures described in Standard Operating Procedures, Biological Monitoring. Only sites described as 'BIO' will collect information on the macroinvertebrate communities used in the ambient biological trend monitoring.

Many pollutants may be components of point source discharges, but may be discharged in a discontinuous manner, or at such low concentrations that water column sampling for them is impractical. Some pollutants are also common in nonpoint source runoff, reaching waterways only after a heavy rainfall; therefore, in these situations, the best media for the detection of these chemicals are sediment and fish tissue where they may accumulate over time. Their impact may also affect the macroinvertebrate community.

Aquatic sediments represent a historical record of chronic conditions existing in the water column, and sediment samples are analyzed at selected monitoring sites. Pollutants bind to particulate organic matter in the water column and settle to the bottom where they become part of the sediment "record". Accumulated sediments not only reflect the impact of point source discharges, but also incorporate nonpoint source pollution washed into the stream during rain events. As a result, contaminant concentrations originating from irregular and highly variable sources are recorded in the sediment. The sediment concentrations at a particular location do not vary as rapidly with time as do the water column concentrations. Thus, the sediment record may be read at a later time, unrelated to the actual release time. Lakes act as settling basins for materials entering the lake system directly from a discharge or indirectly from the land surface washed into streams. Therefore, it is not unusual for lake sediment concentrations to be higher than sediment concentrations found in streams.

The ambient monitoring program has the capability of sampling a wide range of media and analyzing them for the presence or effects of contaminants. Ambient monitoring data from 105 stations were reviewed for the Catawba River Basin.

Natural Swimming Areas

Although all waters of the State are protected for swimming, some areas are more popular than others and may require closer monitoring. Currently monitored areas are located and discussed in the appropriate watershed evaluations.

Classified Waters, Standards, and Natural Conditions

The waters of the State have been classified in regulation based on the desired uses of each waterbody. State standards for various parameters have been established to protect all uses within each classification. The water-use classifications that apply to this basin are as follows.

Class ORW, or "outstanding resource waters", are freshwaters or saltwaters that constitute an outstanding recreational or ecological resource, or those freshwaters suitable as a source for drinking water supply purposes, with treatment levels specified by the Department.

Class A were freshwaters that were suitable for primary contact recreation. This class was also suitable for uses listed as Class B. As of April 1992, Class A and Class B waters were reclassified as Class FW, which protects for primary contact recreation.

Class B were freshwaters that were suitable for secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters were suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class was also suitable for industrial and agricultural uses. The main difference between the Class A and B freshwater was the fecal coliform standard. Class A waters were not to exceed a geometric mean of 200/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 10% of the total samples during any 30 day period to exceed 400/100ml. Class B waters were not to exceed a geometric mean of 1000/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 20% of the total samples during any 30 day period to exceed 2000/100ml. As of April 1992, Class A and Class B waters were reclassified as Class FW, which protects for primary contact recreation.

Class FW, or "freshwaters", are freshwaters that are suitable for primary and secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters are suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class is also suitable for industrial and agricultural uses.

Class GB, or "groundwaters", include all groundwaters of the State, unless classified otherwise, which meet the definition of underground sources of drinking water.

Site specific numeric standards (*) for surface waters may be established by the Department to replace the numeric standards found in Regulation 61-68 or to add new standards not contained in R.61-68. Establishment of such standards shall be subject to public participation and administrative procedures for adopting regulations. In addition, such site specific numeric standards shall not apply to tributary or downstream waters unless specifically described in the water classification listing in R.61-69.

The standards are used as instream water quality goals to maintain and improve water quality and also serve as the foundation of the Bureau of Water's program. They are used to determine permit limits for treated wastewater dischargers and any other activities that may impact water quality. Using mathematical Wasteload Allocation Models, the impact of a wastewater discharge on a receiving stream is predicted under critical conditions following R.61-68. These predictions are then used to set limits for different pollutants on the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The NPDES permit limits are set so that, as long as a permittee (wastewater discharger) meets the established permit limits, the discharge should not cause a standards violation in

the receiving stream. All discharges to the waters of the State are required to have an NPDES permit and must abide by those limits, under penalty of law.

Classifications are based on desired uses, not on natural or existing water quality, and are a legal means to obtain the necessary treatment of discharged wastewater to protect designated uses. Actual water quality may not have a bearing on a waterbody's classification. A waterbody may be reclassified if desired or existing public uses justify the reclassification and the water quality necessary to protect these uses is attainable. A classification change is an amendment to a State regulation and requires public participation, SCDHEC Board approval, and General Assembly approval.

Natural conditions may prevent a waterbody from meeting the water quality goals as set forth in the standards. The fact that a waterbody does not meet the specified numeric standards for a particular classification does not mean the waterbody is polluted or of poor quality. Certain types of waterbodies (i.e. swamps, lakes, tidal creeks) may naturally have water quality lower than the numeric standards. A waterbody can have water quality conditions below standards due to natural causes and still meet its use classification. A site specific numeric standard may be established by the Department after being subjected to public participation and administrative procedures for adopting regulations. Site specific numeric standards apply only to the stream segment described in the water classification listing, not to tributaries or downstream unspecified waters.

Water Quality Indicators

Water quality data are used to describe the condition of a waterbody, to help understand why that condition exists, and to provide some clues as to how it may be improved. Water quality indicators include physical, chemical, and biological measurements. Copies of the Standard Operating Procedures used for these measurements are available from the Department's Bureau of Water and the Bureau of Environmental Services. The current State of S.C. Monitoring Strategy is available on our website at www.scdhec.gov/eqc/admin/html/eqcpubs.html#wqreports and describes what parameters are sampled, where they are sampled, and how frequently.

MACROINVERTEBRATE COMMUNITY

Macroinvertebrates are aquatic insects and other aquatic invertebrates associated with the substrates of waterbodies (including, but not limited to, streams, rivers, tidal creeks, and estuaries). Macroinvertebrates can be useful indicators of water quality because these communities respond to integrated stresses over time that reflect fluctuating environmental conditions. Community responses to various pollutants (e.g. organic, toxic, and sediment) may be assessed through interpretation of diversity, known organism tolerances, and in some cases, relative abundances and feeding types.

FISH TISSUE

Many pollutants occur in such low concentrations in the water column that they are usually below analytical detection limits. Over time many of these chemicals may accumulate in fish tissue to

levels that are easily measured. By analyzing fish tissue it is possible to see what pollutants may be present in waterbodies at very low levels. This information can also be used to determine if consumption of the fish poses any undue human health concerns and to calculate consumption rates that are safe.

Dissolved Oxygen

Oxygen is essential for the survival and propagation of aquatic organisms. If the amount of oxygen dissolved in water falls below the minimum requirements for survival, aquatic organisms or their eggs and larvae may die. A severe example is a fish kill. Dissolved oxygen (DO) varies greatly due to natural phenomena, resulting in daily and seasonal cycles. Different forms of pollution also can cause declines in DO.

Changes in DO levels can result from temperature changes or the activity of plants and other organisms present in a waterbody. The natural diurnal (daily) cycle of DO concentration is well documented. Dissolved oxygen concentrations are generally lowest in the morning, climbing throughout the day due to photosynthesis and peaking near dusk, then steadily declining during the hours of darkness.

There is also a seasonal DO cycle in which concentrations are greater in the colder, winter months and lower in the warmer, summer months. Streamflow (in freshwater) is generally lower during the summer and fall, and greatly affects flushing, reaeration, and the extent of saltwater intrusion, all of which affect dissolved oxygen values.

Biochemical Oxygen Demand

Five-day biochemical oxygen demand (BOD_5) is a measure of the amount of dissolved oxygen consumed by the decomposition of carbonaceous and nitrogenous matter in water over a five-day period. The BOD_5 test indicates the amount of biologically oxidizable carbon and nitrogen that is present in wastewater or in natural water. Matter containing carbon or nitrogen uses dissolved oxygen from the water as it decomposes, which can result in a dissolved oxygen decline. The quantity of BOD_5 discharged by point sources is limited through the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The discharge of BOD_5 from a point source is restricted by the permits so as to maintain the applicable dissolved oxygen standard.

pH

pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14 standard units (SU). A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in Coastal Plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pH. High pH values in lakes during warmer months are associated with high phytoplankton (algae) densities. The relationship between phytoplankton and daily pH cycles is well

established. Photosynthesis by phytoplankton consumes carbon dioxide during the day, which results in a rise in pH. In the dark, phytoplankton respiration releases carbon dioxide. In productive lakes, carbon dioxide decreases to very low levels, causing the pH to rise to 9-10 SU.

Fecal Coliform Bacteria

Fecal coliform bacteria are present in the digestive tract and feces of all warm-blooded animals, including humans, poultry, livestock, and wild animal species. Fecal coliform bacteria are themselves generally not harmful, but their presence indicates that surface waters may contain pathogenic microbes. Diseases that can be transmitted to humans through water contaminated by improperly treated human or animal waste are the primary concern. At present, it is difficult to distinguish between waters contaminated by animal waste and those contaminated by human waste.

Public health studies have established correlations between fecal coliform numbers in recreational and drinking waters and the risk of adverse health effects. Based on these relationships, the USEPA and SCDHEC have developed enforceable standards for surface waters to protect against adverse health effects from various recreational or drinking water uses. Proper waste disposal or sewage treatment prior to discharge to surface waters minimizes this type of pollution.

Nutrients

Oxygen demanding materials and plant nutrients are common substances discharged to the environment by man's activities, through wastewater facilities and by agricultural, residential, and stormwater runoff. The most important plant nutrients, in terms of water quality, are phosphorus and nitrogen. In general, increasing nutrient concentrations are undesirable due to the potential for accelerated growth of aquatic plants, including algae.

The forms of nitrogen routinely analyzed at SCDHEC stations are ammonia and ammonium nitrogen (NH_3/NH_4), total Kjeldahl nitrogen (TKN), and nitrite and nitrate nitrogen (NO_2/NO_3). Ammonia and ammonium are readily used by plants. TKN is a measure of organic nitrogen and ammonia in a sample. Nitrate is the product of aerobic transformation of ammonia, and is the most common form used by aquatic plants. Nitrite is usually not present in significant amounts. Total nitrogen is the sum of TKN and NO_2/NO_3.

Total phosphorus (TP) is commonly measured to determine phosphorus concentrations in surface waters. TP includes all of the various forms of phosphorus (organic, inorganic, dissolved, and particulate) present in a sample.

Chlorophyll *a*

Nuisance plant growth can create imbalances in the aquatic community, as well as aesthetic and access issues. Invasive growth of rooted aquatic vegetation can clog boat motors and create disagreeable conditions for swimming and water skiing. High densities of microscopic algae (phytoplankton) can cause wide fluctuations in pH and dissolved oxygen, and can cause undesirable shifts in the composition of aquatic life, or even fish kills. Chlorophyll *a* is a dominant photosynthetic

pigment in plants and is used as an indicator of the density of phytoplankton in the water column. The process of cultural eutrophication, from increased plant nutrients, is particularly noticeable in lakes. Continuous flushing in streams prevents the development of significant phytoplankton populations and the resultant chemical changes in water quality.

TURBIDITY

Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. It is an important consideration for drinking water as finished water has turbidity limits.

TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) are the suspended organic and inorganic particulate matter in water. Although increasing TSS can also be an indication of increased runoff from land, TSS differs from turbidity in that it is a measure of the mass of material in, rather than light transmittance through, a water sample. High TSS can adversely impact fish and fish food populations and damage invertebrate populations. There are no explicit State standards for TSS.

HEAVY METALS

Concentrations of cadmium, chromium, copper, lead, mercury, and nickel in water are routinely measured by the Department to compare to State standards intended to protect aquatic life and human health. These metals occur naturally in the environment, and many are essential trace elements for plants and animals. Human activities, such as land use changes and industrial and agricultural processes have resulted in an increased flux of metals from land to water. Atmospheric inputs are also recognized as important sources of metals to aquatic systems. Metals are released to the atmosphere from the burning of fossil fuels (coal, oil, gasoline), wastes (medical, industrial, municipal), and organic materials. The metals are then deposited on land and in waterways from the atmosphere via rainfall and attached to particulates (dry deposition).

Assessment Methodology

The Watershed Water Quality Assessment is a geographically-based document that describes, at the watershed level, water quality as well as conditions and activities related to water quality. Significant revisions to South Carolina's Water Quality Standards were effective on June 22, 2001. USEPA approved these standards for use in implementing the Clean Water Act on November 28, 2001. This section provides an explanation of the information assessment methodology used to generate the watershed-level summaries. Water quality data summaries used in this assessment are presented in Appendix A.

USE SUPPORT DETERMINATION

Physical, chemical and biological data were evaluated, as described below, to determine if water quality met the water quality criteria established to protect the State classified uses defined in S.C. Regulation 61-68, *Water Classifications and Standards*. Some waters may exhibit characteristics outside the appropriate criteria due to natural conditions. Such natural conditions do not constitute a violation of the water quality criteria. To determine the appropriate classified uses and water quality criteria for specific waterbodies and locations, refer to S.C. Regulation 61-69, *Classified Waters*, in conjunction with S.C. Regulation 61-68.

At the majority of SCDHEC's surface water monitoring stations, samples for analysis are collected as surface grabs once per month, quarter, or year, depending on the parameter. Grab samples collected at a depth of 0.3 meters are considered to be a surface measurement. At most stations sampled by boat, dissolved oxygen and temperature are sampled as a water column profile, with measurements being made at a depth of 0.3 meters below the water surface and at one-meter intervals to the bottom or at 0.3 meters, mid-depth, and bottom. At stations sampled from bridges, these parameters are measured only at a depth of 0.3 meters. For the purpose of assessment, only surface samples are used in standards comparisons and trend assessments. Because of the inability to target individual high or low flow events on a statewide basis these data are considered to represent typical physical conditions and chemical concentrations in the waterbodies sampled. All water and sediment samples are collected and analyzed according to standard procedures (SCDHEC 1997, 2001).

Results from water quality samples can be compared to State and USEPA criteria, with some restrictions due to time of collection and sampling frequency. For certain parameters, the monthly sampling frequency employed in the ambient monitoring network is insufficient for strict interpretation of the standards. The USEPA does not define the sampling method or frequency other than indicating that it should be "representative". The grab sample method is considered to be representative for the purpose of indicating excursions relative to criteria, within certain considerations. A single grab sample is more representative of a one-hour average than a four-day average, more representative of a one-day average than a one-month average, and so on; thus, when inferences are drawn from grab samples relative to criteria, sampling frequency and the intent of the criteria must be weighed. When the sampling method or frequency does not agree with the intent of the particular criterion, any conclusion about water quality should be considered as only an indication of conditions, not as a proven circumstance.

Macroinvertebrate community structure is analyzed routinely, at selected stations, as a means of detecting adverse biological impacts on the aquatic fauna of the state's waters due to water quality conditions that may not be readily detectable in the water column chemistry.

This water quality assessment is based on the last complete five years of available quality assured physical, chemical, and biological data (1997 - 2001). Because of the data quality assurance and quality control process outcome, only total phosphorus data collected from 1996 through June 1998 were included in this assessment.

AQUATIC LIFE USE SUPPORT

One important goal of the Clean Water Act, the South Carolina Pollution Control Act, and the State Water Quality Classifications and Standards is to maintain the quality of surface waters to provide for the survival and propagation of a balanced indigenous aquatic community of fauna and flora. The degree to which aquatic life is protected (Aquatic Life Use Support) is assessed by comparing important water quality characteristics and the concentrations of potentially toxic pollutants with numeric criteria.

Support of aquatic life uses is determined based on the percentage of numeric criteria excursions and, where data are available, the composition and functional integrity of the biological community. The term excursion is used to describe a measured pollutant concentration that is outside of the acceptable range as defined by the appropriate criterion. Some waters may exhibit characteristics outside the appropriate criteria due to natural conditions. Such natural conditions do not constitute a violation of the water quality criteria. A number of waterbodies have been given waterbody-specific criteria for pH and dissolved oxygen, which reflect natural conditions. To determine the appropriate numeric criteria and classified uses for specific waterbodies and locations, please refer to S.C. Regulation 61-68, *Water Classifications and Standards* and S.C. Regulation 61-69, *Classified Waters*.

If the appropriate criterion for **dissolved oxygen and pH** are contravened in 10 percent or less of the samples, the criterion is said to be fully supported. If the percentage of criterion excursions is greater than 10 percent, but less than or equal to 25 percent, the criterion is partially supported, unless excursions are due to natural conditions. If there are more than 25 percent excursions, the criterion is not supported, unless excursions are due to natural conditions. The decision that criteria excursions are due to natural conditions is determined by consensus and/or the professional judgment of SCDHEC staff with specific local knowledge.

If the appropriate acute aquatic life criterion for any individual **toxicant (e.g. heavy metals, priority pollutants, ammonia)** is exceeded more than once in five years, representing more than 10 percent of the samples collected, the criterion is not supported. If the acute aquatic life criterion is exceeded more than once, but in less than or equal to 10 percent of the samples, the criterion is partially supported. The USEPA criteria to protect aquatic life for most toxicants are specified as a four-day average and a one-hour average, and have been adopted as state criteria. Because samples are collected as grab samples, and because of sampling frequency, comparisons to chronic toxicity criteria (four-day average concentration) are considered inappropriate; therefore, only the acute criterion (one-hour average) for the protection of aquatic life is used in the water quality assessment.

The total recoverable metals criteria for **heavy metals** are adjusted to account for solids partitioning following the approach set forth in the Office of Water Policy and Technical Guidance on Interpretation and Implementation of Aquatic Life Metals Criteria, October 1, 1993, by Martha G. Prothro, Acting Assistant Administrator for Water, available from the Water Resource center, USEPA, 401 M St., SW, mail code RC4100, Washington, DC 20460; and 40CFR 131.36(b)(1). Under this

approach, a default TSS value of 1 mg/L is used. Where the metals criteria are hardness based, a default value of 25 mg/L is used for waters where hardness is 25 mg/l or less.

If the appropriate criterion for **turbidity** in all waters, and for waters with **numeric total phosphorus, total nitrogen, and chlorophyll-a** criteria is exceeded in more than 25 percent of the samples, the criterion is not supported. If the criterion is exceeded in 25 percent of the samples or less, then the criterion is fully supported.

If the conclusion for any single parameter is that the criterion is "not supported", then it is concluded that aquatic life uses are not supported for that waterbody, at that monitoring location. If there are no criteria that are "not supported", but the conclusion for at least one parameter criterion is "partially supported", then the conclusion is aquatic life uses are partially supported. Regardless of the number of samples, no monitoring site will be listed as partially or not supporting for any pollutant based a single sample result because of the possibility of an anomalous event.

The goal of the standards for aquatic life uses is the protection of a balanced indigenous aquatic community; therefore, biological data is the ultimate deciding factor, regardless of chemical conditions. If biological data shows a healthy, balanced community, the use is considered supported even if chemical parameters do not meet the applicable criteria.

MACROINVERTEBRATE DATA INTERPRETATION

Macroinvertebrate community assessment data are used to directly determine Aquatic Life Use Support and to support determinations based on water chemistry data. Macroinvertebrate community data may also be used to evaluate potential impacts from the presence of sediment contaminants. Aquatic and semi-aquatic macroinvertebrates are identified to the lowest practical taxonomic level depending on the condition and maturity of specimens collected. The EPT Index and the North Carolina Biotic Index are the main indices used in analyzing macroinvertebrate data. To a lesser extent, taxa richness and total abundance may be used to help interpret data.

The EPT Index or the Ephemeroptera (mayflies) - Plecoptera (stoneflies) - Trichoptera (caddisflies) Index is the total taxa richness of these three generally pollution-sensitive orders. EPT values are compared with least impacted regional sites. The Biotic Index for a sample is the average pollution tolerance of all organisms collected, based on assigned taxonomic tolerance values. A database is currently being developed to establish significant EPT index levels to be used in conjunction with the Biotic Index to address aquatic life use support.

Taxa richness is the number of distinct taxa collected and is the simplest measure of diversity. High taxa richness is generally associated with high water quality. Increasing levels of pollution progressively eliminate the more sensitive taxa, resulting in lower taxa richness. Total abundance is the enumeration of all macroinvertebrates collected at a sampling location. When gross differences in abundance occur between stations, this metric may be considered as a potential indicator.

RECREATIONAL USE SUPPORT

Recreational use support is defined as the degree to which the swimmable goal of the Clean Water Act is attained and is based on the frequency of fecal coliform bacteria excursions. A fecal coliform excursion is defined as an occurrence of a bacteria concentration greater than 400/100 ml for all surface water classes. Comparisons to the bacteria geometric mean standard are not considered appropriate based on sampling frequency and the intent of the standard. If 10 percent or less of the samples are greater than 400/100 ml, then recreational uses are said to be fully supported. If the percentage of standards excursions is greater than 10 percent, but less than or equal to 25 percent, then recreational uses are said to be partially supported. If the percentage of excursions is greater than 25 percent, then it is considered to represent nonsupport of recreational uses.

FISH CONSUMPTION USE SUPPORT

The Department uses a risk-based approach to evaluate fish tissue data and to issue consumption advisories in affected waterbodies. This approach contrasts the average daily exposure dose to the reference dose (RfD). Using these relationships, fish tissue data are interpreted by determining the consumption rates that would not be likely to pose a health threat to adult males and nonpregnant adult females. Because an acceptable RfD for developmental neurotoxicity has not been developed, pregnant women, infants, and children are advised to avoid consumption of fish from any waterbody where a mercury advisory was issued.

Fish consumption use support is determined by the occurrence of advisories or bans on consumption for a waterbody. For the support of fish consumption uses, a fish consumption advisory indicates partial use support, a consumption ban indicates nonsupport of uses.

DRINKING WATER USE SUPPORT

Nonattainment of drinking water use is indicated if the median concentration of the ambient surface water data for any pollutant exceeds the appropriate drinking water Maximum Contaminant Level (MCL), based on a minimum of three samples. Where MCLs do not exist, SCDHEC may use or develop other criteria such that pollutant concentrations or amounts do not interfere with drinking water use, actual or intended, as determined by SCDHEC.

Additional Screening and Prioritization Tools

Evaluation of water quality data and other supplemental information facilitates watershed planning. Information from the following sources is used to develop watershed-based protection and prevention strategies.

LONG-TERM TREND ASSESSMENT

As part of the watershed water quality assessments, surface data from each station are analyzed for statistically significant long-term trends using the Seasonal Kendall Test Without Correction

(SKWOC) for significant serial correlation, using procedures in the WQHYDRO computer package developed by Eric Aroner of WQHYDRO Consulting. Flows are not available for most stations, and the parametric concentrations are not flow-corrected. Seasonal Kendall's Tau Analysis is used to test for the presence of a statistically significant trend of a parameter, either increasing or decreasing, over a fifteen-year period. It indicates whether the concentration of a given parameter is exhibiting consistent change in one direction over the specified time period. A two sided test at $p=0.1$ is used to determine statistically significant trends, and the direction of trend. An estimate of the magnitude of any statistically significant trend is calculated.

A rigorous evaluation for trends in time-series data usually includes a test for autocorrelation. The data are not tested for autocorrelation prior to the trend analysis. It is felt that autocorrelation would not seriously compromise a general characterization of water quality trends based on such a long series of deseasonalized monthly samples.

One of the advantages of the seasonal Kendall test is that values reported as being below detection limits (DL) are valid data points in this nonparametric procedure, since they are all considered to be tied at the DL value. When the DL changed during the period of interest, all values are considered to be tied at the highest DL occurring during that period. Since it is possible to measure concentrations equal to the value of the DL, values less than DL are reduced by subtraction of a constant so that they remain tied with each other, but are less than the values equal to the DL. Since fecal coliform bacteria detection limits vary with sample dilution, there is no set DL; therefore, for values reported as less than some number, the value of the number is used.

For the purposes of this assessment, long-term trends in selected parameters were examined using data collected from 1986 through 2000. In 1992, a phosphate detergent ban was instituted in South Carolina; therefore, for total phosphorus, a second trend assessment is included for the available data from 1992 through 2000, it is this second time period that is reported in the text.

SEDIMENT SCREENING

There are no sediment standards; therefore, in order to identify sediments with elevated metals concentrations, percentiles are constructed using five years of statewide sediment data. Only values greater than the detection limit were used for chromium, copper, nickel, lead, and zinc. Because so few concentrations of cadmium and mercury are measured above the detection limit, all samples were pooled for these metals. A sediment metal concentration is considered to be high if it is in the top 10% of the pooled results, and very high if it is in the top 5%. Any analytical result above detection limits is flagged for pesticides, PCBs, and other priority pollutants. Sites with noted high metals concentrations or the occurrence of other contaminants above detection limits are prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation.

For saltwater sediments, national studies have been conducted by the National Oceanic and Atmospheric Administration (NOAA) and the State of Florida that have developed Sediment Quality Guidelines (SQGs) for the United States and the southeastern region. These SQGs summarize all

published toxicology and biomonitoring studies for a given contaminant and ranked them from lowest to highest concentration where an adverse effect was observed. The tenth percentile of the ranked data, from all published studies that reported an adverse effect, is termed the Effects Range Low (ERL) or Threshold Effects Level (TEL) and represents the threshold concentration for toxicity to occur. The median concentration where adverse effects in benthos are observed (the fiftieth percentile) is termed the Effects Range Median (ERM) or Probable Effects Levels (PEL). Measured sediment contaminant levels may be compared with ERLs/ERMs or TELs/PELs to predict potential probability for sediment bound contaminants to cause toxicity in benthic faunal communities. Saltwater sediment contaminant levels were compared with existing sediment quality guidelines by individual compound. Sites with sediments which had individual chemical contaminant concentrations which exceeded ERL/TEL and ERM/PEL guideline levels are identified to indicate that trace metal, pesticide, PAH or PCB concentrations exceeded levels potentially toxic to estuarine organisms.

Groundwater Quality

The state of South Carolina depends upon its groundwater resources to supply an estimated 40 percent of its residents. To monitor the ambient quality of this valuable resource, a network of existing public and private water supply wells has been established that provides groundwater quality data representing all of the State's major aquifers (see SCDHEC's Ambient Groundwater Quality Monitoring Network Report for listing of groundwater quality data). A great deal of monitoring is also being carried out at regulated sites with known or potential groundwater contamination (see SCDHEC's South Carolina Groundwater Contamination Inventory).

The ambient monitoring network has been designed to avoid wells in areas of known or potential contamination in order to analyze natural aquifer conditions. Information collected can then be used to identify variations in water chemistry among the major aquifers of South Carolina and give a general understanding of the groundwater conditions throughout the state at varying depths.

Wells sampled in the Catawba River Basin were drilled into one of three aquifers. All the wells above the fall line are completed in the Piedmont Bedrock Aquifer while wells below the Fall Line are completed in the Middendorf Aquifer and Black Creek Aquifer. All well samples met state standards for Class GB groundwater (see section on Classified Waters, Standards, and Natural Conditions). The ambient monitoring well sites are indicated in the appropriate watershed evaluations and depicted on the watershed maps.

Piedmont Bedrock Aquifer

The Piedmont Bedrock Aquifer extends from the Fall Line to the Blue Ridge Mountains. The Piedmont bedrock consists of fractured crystalline rock overlain by a saprolitic regolith, and limited alluvial valley fill deposits. Most public and private wells are completed in the fractured crystalline bedrock. Yields from crystalline bedrock vary greatly among wells, depending primarily upon the

existence of joints and fractures within the rock. The overlying saprolite is hydraulically connected with the underlying bedrock and provides the primary source of recharge water to the bedrock aquifer. Yields of 4 to 170 gallons per minute (gpm) from the 30 network wells in the Piedmont bedrock have been recorded. This broad range in yield is an indicator of the great variability in the occurrence, size and interconnection of joints and other fractures that exist in this aquifer.

Analysis of three samples obtained from wells completed in the Piedmont Bedrock Aquifer in the Catawba basin show close agreement in geochemical composition. All samples display a neutral pH tendency (7.0-7.7), and low total dissolved solids (TDS). Calcium was the dominant cation while bicarbonate was the most abundant anion. All samples displayed a tendency towards a moderately hard state. As in other samples from the crystalline bedrock, concentrations of silica were high when compared to samples from other aquifers in the Catawba basin.

Middendorf Aquifer

The Middendorf Aquifer overlies the crystalline bedrock and associated saprolite and stretches from the upper coastal plain beyond the Atlantic coastline where it is buried by younger Coastal Plain sediments at maximum depths of over 3000 feet. The Middendorf Aquifer is tapped by only a few wells in the middle and lower coastal plain regions. The lower usage toward the coast is primarily a result of the presence of shallower, more economically developed aquifers such as the Black Creek and Tertiary Limestone (Floridan) Aquifers. Middendorf sediments are comprised of fine to coarse quartzitic and arkosic sands, with discontinuous interbeds of sandy clays, kaolins, and gravel. Lower coastal plain water from the Middendorf Aquifer is often highly mineralized. The downdip increase in ion concentration is thought to be largely a function of the residence time of the water in the aquifer (flow is from the updip recharge area in the upper coastal plain toward downdip, coastal area), as well as from the possible mixing of more mineralized water from adjacent aquifers.

There is a downdip increase in pH from the upper coastal plain (Elgin, AMB-120) to wells in the lower Santee basin [e.g. Summerville (AMB-022), and Mt. Pleasant (AMB-119)]. This is in contrast to the much lower, acidic pH values found in the recharge area where buffering effects are not significant. Other changes in groundwater chemistry from the Middendorf's shallow recharge area to deeper portions of the aquifer include a less distinct downdip increase in fluoride concentrations.

Ambient groundwater samples from wells open to the Middendorf Formation in the Catawba basin are predominantly soft sodium bicarbonate waters with total dissolved solids (TDS) and specific conductivity from the sodium and potassium content with the exception of AMB-120 from Elgin. Analysis of this sample returned results similar to rainwater or with a pH of 5.2 and low TDS, which is consistent with other samples from the Middendorf aquifer near the recharge area.

Black Creek Aquifer

The Black Creek Aquifer is an important source of groundwater in the central coastal plain portion of the Catawba River Basin, namely Sumter County. This aquifer consists of medium to

coarse-grained glauconitic and phosphatic quartz sands interbedded with lenses of lignitic and micaceous clays. In some areas, the Black Creek Aquifer is hydraulically similar to, and screened in the same well with, the underlying Middendorf Aquifer. Yields of over 1000 gallons per minute (gpm) from the Black Creek are quite common when wells are screened in both aquifers. Yields that were recorded for Black Creek wells in the monitoring network ranged from 50 to 1500 gpm.

Similar to the Middendorf Aquifer, Black Creek Aquifer water chemistry also indicates a relationship between distance from recharge area and certain chemical concentrations. The high fluoride values in the Black Creek may be attributable to the presence of fluorapatite from the abundant fossilized shark teeth in the formation. Values of pH in the Black Creek Aquifer are generally alkaline, with a much less distinct trend toward higher downdip values than those observed in the Middendorf Aquifer. Samples obtained from the Black Creek aquifer display high variability in their composition, and samples from the recharge areas through the middle coastal plain often show no dominant ionic affinity. With increased distance from the recharge area, Black Creek waters become more buffered and are typically a sodium bicarbonate type.

NPDES Program

The Water Facilities Permitting Division is responsible for drafting and issuing National Pollutant Discharge Elimination System (NPDES) permits. Facilities are defined as either "major" or "minor". For municipal permits, a facility is considered a "major" if it has a permitted flow of 1 MGD or more and is not a private facility. The determination for industrial facilities is based on facility and stream characteristics, including toxicity, amount of flow, BOD (biological oxygen demand) loading, proximity of drinking water source, potential to exceed stream standards, and potential effect on coastal waters.

Permitting Process

A completed draft permit is sent to the permittee, the SCDHEC District office, and if it is a major permit, to the USEPA for review. A public notice is issued when the permit draft is finalized. Comments from the public are considered and, if justified, a public hearing is arranged. Both oral and written comments are collected at the hearing, and after considering all information, the Department staff makes the decision whether to issue the permit as drafted, issue a modified permit, or to deny the permit. Everyone who participated in the process receives a notice of the final decision. A copy of the final permit will be sent to anyone who requests it. Staff decisions may be appealed according to the procedures in R.61-72 and the rule of the Administrative Law Court of South Carolina.

The permitting Divisions use general permits with statewide coverage for certain categories of discharges. Discharges covered under general permits include utility water, potable surface water treatment plants, potable groundwater treatment plants with iron removal, petroleum contaminated groundwater, mine dewatering activities, aquaculture facilities, bulk oil and gas terminals, hydrostatic test

waters (oil & gas lines), and vehicle wash waters. Additional activities proposed for general permits include ready-mix concrete/concrete products and concentrated animal feeding operations. State Land application systems for land disposal and lagoons are also permitted.

Wasteload Allocation Process

A wasteload allocation (WLA) is the portion of a stream's assimilative capacity for a particular pollutant that is allocated to an existing or proposed point source discharge. Existing WLAs are updated during the basin review process and included in permits during the normal permit expiration and reissuance process. New WLAs are developed for proposed projects seeking a discharge permit or for existing discharges proposing to increase their effluent loading at the time of application. Wasteload allocations for oxygen demanding parameters and nutrients are developed by the Water Quality Modeling Section, and WLAs for toxic pollutants and metals are developed by the appropriate permitting division.

The ability of a stream to assimilate a particular pollutant is directly related to its physical and chemical characteristics. Various techniques are used to estimate this capacity. Simple mass balance/dilution calculations may be used for a particular conservative (nondecaying) pollutant while complex models may be used to determine the fate of nonconservative pollutants that degrade in the environment. Waste characteristics, available dilution, and the number of discharges in an area may, along with existing water quality, dictate the use of a simple or complex method of analysis. Projects that generally do not require complex modeling include: groundwater remediation, noncontact cooling water, mine dewatering, air washers, and filter backwash.

Streams are designated either effluent limited or water quality limited based on the level of treatment required of the dischargers to that particular portion of the stream. In cases where the USEPA published effluent guidelines and the minimum treatment levels required by law are sufficient to maintain instream water quality standards, the stream is said to be effluent limited. Streams lacking the assimilative capacity for a discharge at minimum treatment levels are said to be water quality limited. In cases where better than technology limits are required, water quality, not minimum requirements, controls the permit limits. The Department's Water Quality Modeling Section develops limits for numerous parameters including ammonia nitrogen (NH3-N), dissolved oxygen (DO), and five-day biochemical oxygen demand (BOD5). Limits for other parameters, including metals, toxics (including total residual chlorine), and nutrients are developed by the Water Facilities Permitting Division in conjunction with support groups within the Department.

Nonpoint Source Management Program

Nonpoint source (NPS) water pollution, sometimes called "runoff pollution" or "polluted runoff" does not result from a discharge at a specific, single location (or point), but generally comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from

plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest waterbody or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries, and wetlands. NPS pollution may also impact groundwater when it is allowed to seep or percolate into aquifers. Adverse effects of NPS pollution include physical destruction of aquatic habitat, fish kills, interference with or elimination of recreational uses of a waterbody (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and increased potential for flooding because waterbodies become choked with sediment.

Congress recognized the growing problem of nonpoint source pollution in the late 1980s, and added NPS provisions to the federal law. Section 319 of the 1987 Amendments to the Clean Water Act required states to assess the nonpoint source water pollution associated with surface and groundwater within their borders and then develop and implement a management strategy to control and abate the pollution. The first Assessment of Nonpoint Source Pollution in South Carolina accomplished this purpose. The Department's Bureau of Water manages the ongoing State NPS Management Program, which develops strategies and targets waterbodies for priority implementation of management projects. Section 319 funds various voluntary efforts, including watershed projects, which address many aspects of the pollution prevention management measure and provide education, outreach and technical assistance to various groups and agencies. Most of the projects are implemented by cooperating agencies.

Many land activities can individually or cumulatively contribute to NPS pollution. Eight categories of NPS pollution sources have been identified as contributing to water quality degradation in South Carolina: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands and riparian areas disturbance, land disposal, and groundwater contamination. There are programs, both regulatory and voluntary, that address all eight categories.

Agriculture

In South Carolina, pesticides, fertilizers, animal waste, and sediment are potential sources of agricultural NPS pollution. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, and through the management of water. The State has laws and regulations that prevent NPS pollution from several agricultural sources including pesticides and animal waste. Funding programs including those under §319 grants from EPA, cost share funds from USDA under EQIP, and CRP are used to implement best management practices that are not covered under regulations. Agriculture land acreage is quantified in the basin-wide and individual watershed evaluations.

Silviculture

Forests comprise a major portion of South Carolina's land base. Sixty-six percent, or 12.6 million acres, of the State's total land area is in timberland. Silvicultural practices associated with road access, harvest, and regeneration of timber present the most significant potential for NPS pollution. Silvicultural activities have the potential to degrade the State's waters through the addition of sediment, nutrients, organics, elevated temperature, and pesticides. Erosion and subsequent sedimentation are the most significant and widespread NPS problems associated with forestry practices. Sudden removal of large quantities of vegetation through harvesting or silvicultural practices can also increase leaching of nutrients from the soil system into surface waters and groundwaters. Programs to abate or control NPS pollution from forestry activities are primarily the responsibility of the S.C. Forestry Commission (SCFC) and the United States Department of Agriculture's Forest Service (USFS), with other agencies having supplementary programs. S.C. Forestry Commission provides monthly courtesy exams to SCDHEC's Division of Water Quality and to forest industries. If water quality was impacted by a forestry operation, SCDHEC may institute enforcement action under the South Carolina Pollution Control Act. The United States Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS) also provides technical assistance to government, landowners, and land users. Forest land acreage is quantified in the basin-wide and individual watershed evaluations.

Urban Areas

Urbanization has been linked to the degradation of urban waterways. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses. Suspended sediments constitute the largest mass of pollutant loadings to receiving waters from urban areas. Construction sites are a major source of sediment erosion. Nutrient and bacterial sources of contamination include fertilizer usage, pet wastes, leaves, grass clippings, and faulty septic tanks. Petroleum hydrocarbons result mostly from automobile sources. In the 1980's, the average statewide population growth was 11.7 percent, while the coastal counties had an increase of 22 percent, nearly double the State rate during the same time period. This continuing development and population growth has the potential to make urban runoff the most significant source of pollution in waters of the State in the future. Urban land acreage is quantified in the basin-wide and individual watershed evaluations.

SCDHEC has a number of statewide programs that address components of urban NPS pollution. The Bureau of Water administers four permitting programs that control runoff from new and existing urban sources. These include the Stormwater and Sediment Reduction program, Municipal Separate Storm Sewer System (MS4), Industrial NPDES Stormwater Permits, and the §401 water quality certification program (see p.27). Additional controls for urban runoff in the coastal zone are implemented by SCDHEC's Oceans and Coastal Resources Management (OCRM) through the State Coastal Zone Management Plan.

SCDHEC's Bureau of Environmental Health's Division of Onsite Wastewater Management administers the Onsite Sewage Disposal System program for the entire State, and oversees the permitting for the installation and management of septic systems. Although not associated with urban land use, this Division permits the septic systems of camping facilities if the facility is not on public sewer. The camp sewage is discharged into a public collection, treatment and disposal system if available, or an onsite wastewater treatment and disposal system (septic tank) is used.

Marinas and Recreational Boating

Potential adverse environmental impacts associated with marinas include dissolved oxygen deficiencies, high concentrations of toxic metals in aquatic organisms, and the potential to cause bacterial contamination of shellfish harvesting areas. In addition, marina construction activities can lead to the physical destruction of sensitive ecosystems and bottom-dwelling aquatic communities. Presently, there are more than 100 marinas in South Carolina, with 68 of them in the coastal zone. The U.S. Army Corps of Engineers and the SCDHEC are responsible for permitting marinas in South Carolina. Within SCDHEC, the two offices that have marina permitting authority are the Office of Ocean and Coastal Resource Management (SCDHEC OCRM) and the Office of Environmental Quality Control (SCDHEC Bureau of Water). SCDHEC OCRM issues critical area permits for marinas within the critical area of the coastal zone. SCDHEC Bureau of Water issues permits for marinas at all other locations within the State and issues §401 Water Quality Certifications (see p.27) for marinas statewide. The U.S. Coast Guard and the S.C. Department of Natural Resources are responsible for managing recreational boating activity.

Mining

South Carolina's mineral production consists of non-fuel minerals that provide raw materials for construction products and a precious metal industry. Portland cement clays (kaolin and brick), sand and gravel, and crushed stone represent the majority of the total mineral value. At the end of FY 2004-2005, there were 548 mining operations in South Carolina affecting more than 28,778 acres. There were 678 acres of mine land reclaimed during this same fiscal year, which brings the cumulative total of mine land reclaimed since the beginning of the mining and reclamation program to 15,227 acres. Surface mining has the potential to generate NPS pollution during mineral exploration, mine development extraction, transportation, mining and processing, product storage, waste disposal, or reclamation. Potential nonpoint source impacts related to mining activities generally include hydrologic modification, erosion and sedimentation, water quality deterioration, fish and wildlife disturbances, and public nuisances. The Department's Bureau of Land and Waste Management has primary regulatory responsibility for mining activities. Within the Bureau, the Division of Mining and Solid Waste Permitting is responsible for administering and implementing the S.C. Mining Act and its associated regulations. The Mining Act serves as part of an overall management plan for NPS pollution from active mines. Mining activities and locations are identified in the appropriate watershed evaluations.

Hydromodification

Hydrologic modification (or hydromodification) is defined as stream channelization, channel modification, and dam construction. These activities can negatively impact water quality, destroy or modify in-stream habitat and increase streambank and shoreline erosion. Two State permits, implemented by the SCDHEC, are involved in the implementation of management measures for hydromodification. A critical area permit is required for coastal waters, saltwater wetlands, and beaches defined as critical areas. A navigable waters permit is required for the remainder of the State. Implementation of State policy for dam construction is similar to control of other hydromodification projects in South Carolina, requiring the same State permits and certifications. In addition, dams require a State dam safety permit or a State stormwater management and sediment reduction permit. The Department must also issue Water Quality Certifications pursuant to §401 of the Federal Clean Water Act for dam construction and hydropower operations licensed by the Federal Energy Regulatory Commission.

Wetlands

Twenty-three percent of South Carolina is covered by 4.5 million acres of wetlands. The U.S. Army Corps of Engineers implements the federal program for regulating development in wetlands with guidelines established by EPA. The Corps delineates wetlands and determines which wetlands fall under regulatory jurisdiction and require a federal permit for development. The Wetlands Reserve Program, administered by the NRCS, is designed to restore and protect wetlands. At the state level, the primary focus of wetland regulation is the §401 Water Quality Certification. In the §401 certification process, applications for wetland alterations may be denied or modified due to the special nature of a wetland or the functions that a wetland provides. Wetland impacts must be compensated through restoration, enhancement, preservation, or creation and protected in perpetuity. Future development would be prohibited in these mitigated and legally protected areas. Knowledge of areas that are restricted from development due to mitigation or special water classification is useful in planning future development in a watershed. Wetland acreage is quantified in the basin-wide and individual watershed evaluations.

Land Disposal

Although modern solid waste disposal sites are considered point sources of pollution and regulated, leachate from sanitary landfills and dumps have the potential to pollute large portions of adjacent groundwater aquifers. Toxic compounds are commonly a part of the overall composition of landfill leachate, especially when the landfill has been used for the disposal of toxic chemicals. There are currently 140 permitted landfills in South Carolina. This total represents 35 municipal solid waste landfills (MSWLF), 62 industrial waste landfills, 41 construction and demolition (C&D) landfills, one sludge monofill, and one ash monofill. Regulatory authority over solid waste disposal activities resides

with SCDHEC's Bureau of Land and Waste Management. All active and closed industrial and municipal solid waste landfills are identified in the appropriate watershed evaluations.

Land application of wastewater or its by products is a form of recycling because it allows recovery of elements needed for crop production. Land application of biosolids may be beneficial and environmentally sound when applied at the correct agronomic rate. Land applying biosolids can benefit farmers by offsetting the costs of fertilizer and lime while reducing the pressure on existing landfills. SCDHEC's Bureau of Water, Division of Water Monitoring, Assessment and Protection, Groundwater Quality Section conducts a program to prevent, monitor, and correct groundwater contamination from nonpoint source pollution from land application of wastewater biosolids, solids, animal manures, biosolids, and sewage sludge. Land application, which is not a discharge, requires a "no discharge" permit (ND). All active industrial and municipal land applications are identified in the appropriate watershed evaluations.

Groundwater Contamination

All aquifers in the State are potential Underground Sources of Drinking Water and are protected under the S.C. Water Classifications and Standards. Groundwaters are thus protected in a manner consistent with the SCDHEC groundwater protection strategy. Staff hydrogeologists implement a screening program for nonpoint source impacts from pits, ponds, and lagoons associated with the permitted storage, treatment, and disposal of industrial and municipal wastewaters. In cases where a groundwater impact has been identified in violation of S.C. Water Classifications and Standards, appropriate actions will be coordinated with the facility owner to ensure regulatory compliance. The hydrogeologist coordinates with the facility owner to implement source identification, contaminant extent assessments, initiation of contaminant remediation systems, and performance evaluations of corrective actions. In addition to releases from wastewater treatment systems, the staff evaluates releases from other nonpoint sources such as above ground tanks, nonregulated fuel oil tanks, spills and/or leaks. Sites with confirmed groundwater impact will be placed under a Consent Agreement or an Order. SCDHEC's South Carolina Groundwater Contamination Inventory quantifies the status of groundwater quality in South Carolina. The sites in the inventory are known groundwater contamination cases in the State, and are referenced by name and county, and updated annually.

Water Quantity

Any withdrawal of surface water or groundwater over 3 million gallons in any month is required to be reported to the Department (per the *Surface Water Withdrawal and Reporting Act* 49-4-10 and the *Groundwater Use and Reporting Act* 49-5-10). These data are compiled into an annual report of total water usage in the state (see SCDHEC's South Carolina Water Use Report). The report also breaks down water usage into categories of interest such as water supply, hydropower, agriculture, and irrigation. In Capacity Use Areas, which are of concern due to the significant

groundwater use and subsequent lowering of groundwater levels in major aquifers, withdrawals over 3 million gallons in any month must receive a permit from the Department. Currently, no quantity permit is required for surface water withdrawals.

Interbasin Transfer of Water

According to The State Interbasin Transfer of Water Act, an interbasin transfer of water permit is required when any entity desires to withdraw, divert, pump, or cause directly the transfer of either 5% of the 7Q10 (seven day, ten year low flow), or one million gallons or more of water a day on any day, whichever is less, from one river basin and use or discharge all or any part of the water in a different river basin. The SCDHEC Board is empowered to negotiate agreements, accords, or compacts on behalf of and in the name of the State of South Carolina with other states or the United States, or both, with any agency, department, or commission of either, or both, relating to transfers of water that impact waters of this State, or are connected to or flowing into those waters. The Board is further empowered to represent this State in connection with water withdrawals, diversions, or transfers occurring in other states, which may affect this State.

Growth Potential and Planning

Land use and management can define the impacts to water quality in relation to point and nonpoint sources. Assessing the potential for an area to expand and grow allows for water quality planning to occur and, if appropriate, increased monitoring for potential impairment of water quality. Indicators used to predict growth potential include water and sewer service, road and highway accessibility, and population trends. These indicators and others were used as tools to determine areas within the Catawba River Basin having the greatest potential for impacts to water quality as a result of development.

SCDHEC's Strategic Plan for 2000-2005 (www.scdhec.gov/news/releases/pdf files/Stratpln.pdf) acknowledges that growth issues are best handled at the local government level. SCDHEC's role is to work with local governments and communities to help them understand the importance of planning for smart growth: buffers, greenspaces, mass transit, subdivision and roadway planning, bike paths and bike lanes, and park and ride lots. SCDHEC can also provide assistance in helping local entities access information and provide consultation on technical issues such as the establishment of buffers and watershed stormwater planning. Many counties in the Catawba River Basin lack county wide zoning ordinances; therefore, there is little local regulatory power to influence the direction or magnitude of regional growth. The majority of municipalities have zoning ordinances in place; however, much of the growth takes place just outside the municipal boundaries, where infrastructure is inadequate. Section 208 of the Clean Water Act serves to encourage and facilitate the development and implementation of areawide waste treatment management plans. The §208 Areawide Water Quality Management Plans were completed in great detail during the 1970's and have recently

been updated. Information from the updated reports is used in the individual watershed evaluations. South Carolina's water quality management plans support consolidation of wastewater treatment facilities into larger regional systems.

Watershed boundaries extend along topographic ridges and drain surrounding surface waters. Roads are commonly built along ridge tops with the best drainage conditions. Cities often develop in proximity to ridges as a result of their plateau terrain. It is not uncommon, then, to find cities or road corridors located along watershed boundaries, and thus influencing or impacting several watersheds.

Watershed Protection and Restoration Strategies

SCDHEC's Bureau of Water is responsible for ensuring that South Carolina's water is safe for drinking and recreation, and suitable to support aquatic life. This section provides an overview of other important Bureau programs and strategies applied statewide to protect and restore water quality. The point and nonpoint source controls described previously assist with achieving these goals.

Under §303(d) of the Federal Clean Water Act, each state is required to provide a comprehensive inventory of impaired waters for which existing required pollution controls are not stringent enough to achieve State water quality standards or Federal Clean Water Act goals. This biennial list, commonly referred to as the "303(d) list", is the basis for targeting waterbodies for watershed-based solutions. A copy of the current §303(d) list can be obtained by contacting the Bureau of Water. Several Bureau programs address these impaired streams in an effort to restore them.

Total Maximum Daily Load

A Total Maximum Daily Load (TMDL) is the calculated maximum allowable pollutant loading to a waterbody at which water quality standards are maintained. A TMDL is made up of two main components, a load allocation and a wasteload allocation. A load allocation is the portion of the receiving water's loading capacity attributed to existing or future nonpoint sources or to natural background sources. The waste load allocation is the portion of a receiving water's loading capacity allocated to an existing or future point source.

A TMDL is a means for recommending controls needed to meet water quality standards in a particular water or watershed. Historically, the typical TMDL has been developed as a wasteload allocation, considering a particular waterbody segment, for a particular point source, to support setting effluent limitations. In order to address the combined cumulative impacts of all sources, broad watershed-based TMDLs are now being developed.

The TMDL process is linked to all other State water quality activities. Water quality impairments are identified through monitoring and assessment. Watershed-based investigations result in source identification and TMDL development. TMDLs form links between water quality standards and point and nonpoint source controls. Where TMDLs are established, they constitute the basis for NPDES permits and for strategies to reduce nonpoint source pollution. The effectiveness and adequacy of applied controls are evaluated through continued monitoring and assessment.

Funding for TMDL implementation is currently available with USEPA's §319 of the Clean Water Act grants. For more information, see the Bureau of Water web page www.scdhec.gov/water or call the Watershed Program at (803) 898-4300.

Antidegradation Implementation

The State's Antidegradation Policy as part of S.C. Regulation 61-68 is represented by a three-tiered approach to maintaining and protecting various levels of water quality and uses; streams included

on the §303(d) list are addressed under Tier 1. Tier 1 antidegradation policies apply to all waters of the State and require that existing uses and the minimum level of water quality for those uses be maintained and protected. Tier 2 policies apply to high quality water where the water quality exceeds the mandatory minimum levels to support the Clean Water Act's goals of propagation of fish, shellfish, wildlife, and recreation in and on the water. The Department considers all the waters of the State as high quality waters. Tier 3 policies apply to the maintenance of water quality in waters that constitute an Outstanding National Resource Water and do not allow for any permanent permitted dischargers. Outstanding Resource Waters of the State are provided a higher level of protection than Tier 2, but do not meet the requirements of Tier 3.

Tier 1 protection will be implemented when applying numeric standards included in Regulation 61-68 for human health, aquatic life, and organoleptic protection as follows: if a waterbody has been affected by a parameter of concern causing it to be on the §303(d) list, then the Department will not allow a permitted net increase of loading for the parameter of concern unless the concentration will not contribute to a violation of water quality standards. This no net increase will be achieved by reallocation of existing total load(s) or by meeting applicable water quality standard(s) at the end-of-pipe. No discharge will be allowed to cause or contribute to further degradation of a §303(d) listed waterbody.

The Antidegradation Rules apply to both nonpoint source pollution and for point sources into impaired waters. Many activities contributing to nonpoint source pollution are controlled with voluntary measures. The Department implements permitting or certification programs for some of these activities and has the opportunity to ensure compliance with the Antidegradation Rules. The activities of primary concern are land development projects which are immediately adjacent to and discharge runoff or stormwater into impaired waters.

401 Water Quality Certification Program

If a Federal permit for a discharge into waters of the State, including wetlands, is required, the Department must issue Water Quality Certification pursuant to §401 of the Federal Clean Water Act. Certification is required for permits issued by the U.S. Army Corps of Engineers for construction in navigable waters and for deposition of dredged or fill material.

Regulation 61-101 presents administrative and technical guidance for the water quality certification program and requires SCDHEC to consider whether or not a project is water dependent; whether or not there are feasible alternatives which will have less adverse consequences on water quality and classified uses; the intended purpose of the project; and all potential water quality impacts of the project, both direct and indirect, over the life of the project. Any project with the potential to affect waters of the State must be conducted in such a manner to maintain the specified standards and classified and existing water uses.

As a routine part of the §401 Water Quality Certification review process, the waterbody in question is identified as impaired or not impaired according to the §303(d) list. If it is impaired, the

parameter of concern is noted, along with any steps required to prevent further degradation of the water quality of that waterbody. In an effort to facilitate watershed restoration where appropriate, mitigation for unavoidable wetland impacts is encouraged in areas that improve §303(d) listed waters.

Stormwater Program

Stormwater discharges result from precipitation during rain events. Runoff washes pollutants associated with industrial activities (including construction activity), agricultural operations, and commercial and household sites directly into streams, or indirectly into drainage systems that eventually drain into streams. The SCDHEC Stormwater Permitting Program focuses on pollution prevention to reduce or eliminate stormwater pollution. The Department has general permitting authority for stormwater discharges associated with industrial activity, including construction. General NPDES permits SCR000000 and SCR100000 for industrial and construction activities, respectively, require permittees to develop and implement stormwater pollution prevention plans that establish best management practices to effectively reduce or eliminate the discharge of pollutants via stormwater runoff. The Stormwater and Agricultural Permitting Section is responsible for issuing NPDES stormwater permits to prevent degradation of water quality as well as for issuing state sediment and erosion control permits for construction sites.

The NPDES permits are issued under the authority of the federal Clean Water Act and the S.C. Pollution Control Act. The state sediment and erosion control permits are issued under the authority of two S.C. laws. The S.C. Erosion and Sediment Reduction Act of 1983 addresses construction on state owned or managed land. The S.C. Stormwater Management and Sediment Reduction Act of 1991 addresses construction on land that is not state owned or managed. Currently, NPDES permits are required for: construction sites 1 acre and greater; construction sites in the coastal area that are within 1/2 mile of a receiving water body; and construction sites less than 1 acre on a case-by-case basis where water quality is a concern. Permits are required under the state sediment and erosion control for construction sites that are greater than 2 acres; however, there are exemptions under the law and regulation. The State Sediment and Erosion Program is somewhat duplicative of the NDPES Stormwater Program. The state program created by the 1991 Act can be delegated to local governments. Until a local government becomes delegated, SCDHEC's Office of Ocean and Coastal Resource Management is delegated the State Sediment and Erosion Control Program in the coastal area. The Stormwater and Agricultural Permitting Section manages the NPDES Stormwater Program in all areas of the state and the State Sediment and Erosion Control Program in the areas of the state where the program is not delegated to another entity.

Regulation 61-9 requires a compilation of all existing State water quality data with STORET data being used as a baseline. If analysis indicates a decrease in water quality then corrective measures must be taken. The permittee will identify all impaired water bodies in a Stormwater Management Plan (SWMP). In addition, existing pollution discharge control methods will be identified and incorporated into the SWMP. Procedures, processes, and methods to control the discharge of pollutants from the

municipal separate storm sewer system (MS4) into impaired waterbodies and publicly owned lakes included on the §303(d) list will be described in the SWMP. The effectiveness of these controls will be assessed and necessary corrective measures, if any, shall be developed and implemented.

Permits for municipal systems allow communities to design stormwater management programs that are suited for controlling pollutants in their jurisdiction. There are three population-based categories of municipal separate storms sewers: large municipal (population of 250,000 or greater), medium municipal (population of 100,000 or more but less than 250,000), and small municipal (population less than 100,000). Large and medium MS4s have been regulated since the 1990s. Those small MS4s within the boundaries of an urbanized area are called Regulated Small MS4s and were required to submit MS4 NPDES applications on or before March 10, 2003. MS4 NPDES Permits are required for all large, medium, and regulated small MS4s.

South Carolina Animal Feeding Operations Strategy

Among the general categories of pollution sources, agriculture ranks as the number one cause of stream and lake impairment nationwide. Many diseases can potentially be contracted from drinking water or coming into contact with waters contaminated with animal wastes. The Department uses S.C. Regulation 61-43: *Standards for the Permitting of Agricultural Animal Facilities* to address the permitting of animal feeding operations (AFOs). Implementing these regulations and their corresponding compliance efforts are a priority for the Department in order to reduce public health and environmental impacts from AFOs. There are approximately 1,100 active AFOs in S.C. While previously, there were no federally defined concentrated animal feeding operations (CAFOs) in operation in South Carolina, EPA modified the definition of a CAFO in the NPDES regulations in December 2002. These regulations have now been adopted in S.C. Based on the new federal CAFO definition, S.C. has approximately 200 CAFOs that require NPDES permits. Using the Watershed Program cycle and the division of the State into five regions, AFOs will be monitored and inspected by region. The §303(d) list will be used to prioritize the inspections. After all the inspections have been made in a region, the Department will move to the river basins in the next region in the watershed cycle. The Department is continuing to work in cooperation and coordination with the U.S. Department of Agriculture, the Natural Resources Conservation Service, the S.C. Department of Agriculture, the S.C. Soil and Water Conservation Districts, and the Clemson Extension Service.

Sanitary Sewer Overflow Strategy

Sanitary sewers are designed to collect municipal and industrial wastewater, with the allowance for some acceptable level of infiltration and inflow, and transport these flows to a treatment facility. When the sewer system is unable to carry these flows, the system becomes surcharged and an overflow will occur. Sanitary sewer overflows (SSOs) have existed since the introduction of separate sanitary sewers, and most overflows are caused by inadequate operation, maintenance, and management of the collection system.

The Department encourages utilities to embrace the principals of EPA's capacity Management, Operations, and Maintenance (cMOM) program. Through this program utilities can ensure adequate funding and capacity as well as a proactive approach to operations and maintenance. Those that have implemented cMOM programs have been able to significantly reduce or eliminate overflows from their collection systems. Additionally, the Department has adopted requirements for operation and maintenance of sewer systems in Regulation 61-9, Water Pollution Control Permits.

The Department's approach has been to shift resources historically applied to treatment plant inspections to include evaluations of pump stations and collection systems where problems are suspected. To assist evaluators in identifying water quality violations related to SSOs, staff have utilized the 303(d) list of impaired waters to identify waters impacted by fecal coliform or other appropriate pollutants and correlate those with collection systems with incidences of SSOs. The Department's Enforcement Referral Procedures Document is to be used to determine when a collection system should be referred to enforcement for SSOs. The enforcement process allows for the Department to consider actions taken by the collection system such as: timely and proper notification, containment and mitigation of discharge, voluntarily conducting self evaluations, and requests for compliance assistance. The Department will take immediate action where it has been determined that SSOs have occurred and the collection system has not made timely and proper notification.

Referral Strategy for Effluent Violations

The Department has developed referral effluent violation guidelines to specifically address discharges into impaired waters. The goal of the referral guidelines is to reduce pollutant discharges into impaired waters in order to ultimately restore them to their full potential usage. To achieve this goal, enforcement actions are initiated earlier in an effort to improve the quality of waters that do not meet standards. If a stream is impaired by a pollutant and the permit limit for that pollutant is exceeded more than once in a running annual reporting period, formal enforcement action will be initiated against the discharger.

SCDHEC's Watershed Stewardship Programs

Public participation is an important component of the Department's Watershed Water Quality Management Program. Benefits to this interaction on the local level include improved public awareness about SCDHEC water programs, and increased local interest and participation in water quality improvement. Described below are some of the Department's water programs that encourage public interest and involvement in water quality. These programs and their contacts are listed on the Department's website at www.scdhec.gov/water .

Source Water Assessment Program

A safe, adequate source of drinking water is key to development of communities and the health of citizens. The Safe Drinking Water Act (SDWA) provides authority to protect sources of drinking water. As a result of the 1996 amendments to the SDWA, source water protection has become a national priority. States are required to develop a plan for assessment of source waters for all federally defined public groundwater and surface water systems.

The Source Water Assessment Program (SWAP) involves determining the boundaries of the areas that are the source of waters for public water systems. For groundwater systems, these areas are defined using groundwater flow models. For surface water systems, the 14-digit Hydrologic Unit Code watershed is the designated protection area (although certain areas within the basin will be segmented as being of greater vulnerability to contamination from overland flow, groundwater contributions to surface water, and direct spills into the surface water). Known and potential sources of contamination in the delineated area must be identified, and the inventoried sources evaluated to determine the susceptibility of public water systems to such contaminants. Assessments must be made available to the public.

Local involvement will be a critical factor in the success of the SWAP, and local government, citizen groups, environmental groups, water suppliers, and the Department must all work together to increase the general public's awareness of where drinking water comes from and how to better protect sources of drinking water. Implementation of source water protection activities will occur at the local level, and local authorities may wish to base zoning and land-use planning on the source water assessments. The SWAP will be a key part of the Department's watershed management approach. To avoid duplication, information gathered from existing regulatory programs and/or watershed protection efforts will be utilized (e.g., ambient monitoring programs, TMDLs, etc.).

Consumer Confidence Reports

The Consumer Confidence Report (CCR) is an annual water quality report required of all Community water systems. The rationale behind the CCR is that consumers have a right to know what is in their drinking water and where it comes from. These reports are to educate consumers and help them make informed choices that affect the health of themselves and their families. It is believed that educated

consumers are more likely to protect their drinking water sources. All CCRs are to include the following basic components:

- the water source, its location, and the availability of source water assessment plan;
- information about the water system (name and telephone number of a contact person, opportunities for public participation, and information for non-English speaking populations if applicable);
- definitions of terms and abbreviations used in the report;
- table of detected contaminants including the known or likely source of the contaminants;
- the health effects language for Maximum Contaminant Level violations and an explanation of the violation;
- information on cryptosporidium, radon, and other contaminants if applicable; and
- educational information that includes an explanation of contaminants and their presence in drinking water, an advisory for immuno-compromised people, the Safe Drinking Water Hotline telephone number, and other statements about lead, arsenic, and nitrate if applicable.

Nonpoint Source Education

The goal of the Nonpoint Source Outreach Program is to educate the citizens of South Carolina about the sources of polluted runoff and techniques that can be used to reduce this runoff. The Program provides presentations on runoff pollution to community, church, civic, or professional groups; a variety of technical and nontechnical publications on runoff pollution and reduction techniques; *Turning the Tide*, a free Nonpoint Source newsletter; and teacher training that includes the *Action for a Cleaner Tomorrow* curriculum and information on reducing polluted runoff. To arrange a presentation, order publications, or ask questions, contact the Nonpoint Source Education coordinator at 803-898-4300 or visit our website.

South Carolina Water Watch

South Carolina Water Watch is a unique effort to involve the public and local communities in water quality protection. The Water Watch program was developed to encourage South Carolina's citizens to become stewards of the State's lakes, rivers, streams, estuaries, and wetlands. Volunteers select a water resource on which to focus and perform activities aimed at protecting water quality, such as shoreline surveys, public education, and litter cleanups. The Water Watch coordinator assists participants with materials and training to help make projects successful. SCDHEC invites individuals, school groups, civic organizations, businesses, and local governments to learn about and protect the quality of our waterways by contacting the Water Watch coordinator at 803-898-4300 or visit our website.

Champions of the Environment

Champions of the Environment is a student recognition program that raises awareness of environmental issues. Nationally recognized for its innovative approach to environmental education, the program promotes hands-on learning by recognizing students working on exemplary environmental projects beyond the realm of the classroom. With scholarships and media coverage, Champions of the

Environment encourages student initiative and self-esteem. The program promotes environmental awareness, leadership, conservation, creativity, and self-confidence through activities such as group projects, public speaking, and environmental research. Champions of the Environment is jointly sponsored by Dupont, International Paper, WIS-TV, and SCDHEC. For more information contact the Champions of the Environment coordinator at 803-898-4300 or visit our website.

Clean Water State Revolving Fund

Congress created the Clean Water State Revolving Fund (SRF) in 1987, to replace the §201 Construction Grants program. In doing so, 'state banks' were created to lend money for virtually any type of water pollution control infrastructure project. Project types include construction of wastewater treatment systems and nonpoint source pollution control. The interest rate on the loans is always below the current market rate. As repayments are made on the loans, funds are recycled to fund additional water protection projects. The vast majority of the SRF funds have been used for the construction of traditional municipal wastewater treatment systems. Because of its inherent flexibility, the SRF program is well suited to accommodate the watershed approach.

SRF loans are available to units of state, local, and regional government, and special purpose districts. South Carolina law prevents loans from being made directly to private organizations and individuals. Local governments such as cities and counties and other units of government such as Soil and Water Conservation Districts, Councils of Government, and Water and Sewer Districts are encouraged to apply for SRF loans for nonpoint source projects. Nonpoint source projects may include construction and maintenance of stormwater management facilities, establishment of a stormwater utility, purchase of land for wetlands and riparian zones, and implementation of source water protection assessments. For more information, contact the State Revolving Fund coordinator at 803-898-4300 or visit our website.

Citizen-Based Watershed Stewardship Programs

Throughout the Catawba River Basin, water quality is a common interest among citizen groups. The issues and membership of these groups vary widely. Some of the citizen groups interested in water quality in the Catawba River Basin are described below.

Bi-State Catawba Task Force

Citizens, industries, local and county government officials, regional councils of government, and various government agencies in North Carolina and South Carolina are members of the Bi-State Catawba Task Force. The Task Force's goals are to promote education about water quality issues and to provide a forum for networking among groups and individuals interested in the Catawba River Basin.

Catawba River Foundation

The Catawba River Foundation was formed to protect the Catawba River Basin in both North Carolina and South Carolina through support of the Catawba Riverkeeper®. The Catawba Riverkeeper® program is part of a national Riverkeeper program acting as a watchdog for specific waterbodies of concern. The Catawba Riverkeeper® has organized a group of Cove Keepers, Stream Keepers, and a Lake Keeper for Lake Wylie. The volunteers patrol the lake, learn how to detect problems and conduct water quality sampling in questionable areas. Volunteers report water quality problems for further investigation. The Riverkeeper® is working to set up a volunteer group of Keepers on each reservoir in the Catawba Basin, one reservoir at a time.

South Carolina Catawba River Task Force

Citizens, industries, local and county government officials, regional councils of government, and various government agencies in South Carolina are members of the S.C. Catawba River Task Force. The Task Force's goals are to promote education about water quality issues and to provide a forum for networking among groups and individuals interested in the Catawba River Basin.

Clean Water South Carolina

Clean Water South Carolina (CWSC) was created in January 2001, primarily to oppose a proposed regional wastewater treatment plant in South Carolina, which would have discharged treated wastewater from Charlotte, North Carolina to the Catawba River. Presently this group is working to promote legislation and studies to assess and improve water quality in South Carolina.

Catawba-Wateree Water Users Association

The Catawba-Wateree Water Users Association is comprised of water users in the Catawba and Wateree River Basins as well as other interested individuals and organizations. The group currently acts as a forum for networking and provides education about local water-related issues.

Implementation Committee of the South Carolina Catawba River Corridor Plan
This group formed to implement the recommendations presented in the South Carolina Catawba River Corridor Plan. Citizens, industries, local and county government officials, regional councils of government, and various government agencies are members of this group. The group's interests are in the free flowing Catawba River from Lake Wylie dam to Fishing Creek Reservoir.

Land Trusts
Several land trusts exist in the basin. These organizations acquire property or easements to protect water quality, habitat, and /or views. Land trusts include the Katawba Valley Land Trust, the Nation Ford Land Trust, and Trust for Public Land.

Tri-County Waste Water Committee
This committee is evaluating regional wastewater alternatives for York, Chester, and Lancaster counties in South Carolina. It's members include NPDES permit holders, local and county officials, state agencies, and interested citizens.

Wateree Home Owners Association (WHOA)
Members of the Wateree Home Owners Association (WHOA) of Fairfield County and WHOA of Kershaw County include property owners along Lake Wateree. The water quality of Lake Wateree and its watershed are an interest item for both organizations. WHOA of Fairfield County and WHOA of Kershaw County have formed a joint Water Watch Committee. Currently, the Committee is sampling a total of 19 sites. Three sites are in the river channel in Lake Wateree and 16 are in the major embayments of the lake. The Water Watch Committee collects water temperature, specific conductance, dissolved oxygen, dissolved oxygen % saturation, dissolved oxygen change, depth, pH, NH4, NO3, and turbidity data.

West Wateree Improvement Association
The West Wateree Improvement Association formed in 1996 in response to a hydrochloric acid release by a local industry. Their interests also include water quality issues in the Wateree River watershed.

Catawba River Basin Description

The ***Catawba River Basin*** extends across North and South Carolina. Within South Carolina, the river flows through the Piedmont, Sandhills, and Upper Coastal Plain regions of the State, and encompasses 2,323 square miles and 21 watersheds. These some 1.5 million acres consist of 75.5% forested land, 11.3% agricultural land, 3.6% forested wetland, 3.9% urban land, 2.9% scrub/shrub land, 2.3% water, and 0.5% barren land. There are a total of 3,140 stream miles and 26,310 acres of lake waters in the basin within South Carolina.

The Catawba River originates in North Carolina and flows through Lake Wylie and into South Carolina. Allison Creek flows into the midlake region of Lake Wylie within South Carolina. The Catawba River flows out of Lake Wylie and is joined by Sugar Creek, Twelvemile Creek, and Cane Creek before draining into Fishing Creek Reservoir. The Catawba River flows out of Fishing Creek Reservoir and joins with Fishing Creek and flows into Great Falls Reservoir. The river then joins with Camp Creek and Rocky Creek to form Cedar Creek Reservoir. Cedar Creek flows into the Catawba River just below the Cedar Creek Reservoir dam. The Catawba River joins Big Wateree Creek to form the Wateree River, which flows through Lake Wateree. Grannies Quarter Creek and Sawneys Creek flow into the Wateree River downstream of Lake Wateree. Twentyfive Mile Creek and Big Pine Tree Creek enter the river near the City of Camden, followed by Swift Creek, Spears Creek, and Colonels Creek before merging with the Congaree River Basin to form the Santee River Basin.

Physiographic Regions

The State of South Carolina has been divided into six Major Land Resource Areas (MLRAs) by the USDA Soil Conservation Service. The MLRAs are physiographic regions that have soils, climate, water resources, and land uses in common. The physiographic regions defining the Catawba River Basin are as follows:

The **Blue Ridge** is an area of dissected (separated by erosion into many closely spaced valleys), rugged mountains with narrow valleys dominated by forests; elevations range from 1,000 to 3,300 feet.

The **Piedmont** is an area of gently rolling to hilly slopes with narrow stream valleys dominated by forests, farms and orchards; elevations range from 375 to 1,000 feet.

The **Sand Hills** are an area of gently sloping to strongly sloping uplands with a predominance of sandy areas and scrub vegetation; elevations range from 250 to 450 feet.

The **Upper Coastal Plain** is an area of gentle slopes with increased dissection and moderate slopes in the northwestern section that contain the State's major farming areas; elevations range from 100 to 450 feet.

Land Use/Land Cover

General land use/land cover mapping for South Carolina was derived from the U.S. Geological Survey's National Land Cover Data (NLCD), based on nationwide Landsat Thematic Mapper (TM) multispectral satellite images (furnished through the Multi-Resolution Land Characteristics (MRLC) consortium, coordinated by USEPA) using image analysis software to inventory the Nation's land classes. The NLCD are developed by the USGS (EROS Data Center) using TM image interpretation, air photo interpretation, National Wetland Inventory data analysis, and ancillary data analysis.

Urban land is characterized by man-made structures and artificial surfaces related to industrial, commercial, and residential uses, and vegetated portions of urban areas such as recreational grasslands and industrial facility lawns.

Agricultural/Grass land is characterized by row crops, pastures, orchards, vineyards, and hay land, and includes grass cover in fallow, scrub/shrub, forest clearcut and urban areas.

Forestland is characterized by deciduous and evergreen trees (or a mix of these), not including forests in wetland settings, generally greater than 6 meters (approximately 20 feet) in height, with tree canopy of 25-100% cover.

Forested Wetland is saturated bottomland, mostly hardwood, forests primarily composed of wooded swamps occupying river floodplains, moist marginal forests, and isolated low-lying wet areas, located predominantly in the Coastal Plain.

Nonforested Wetland is saturated marshland, most commonly located in coastal tidelands and in isolated freshwater inland areas, found predominantly in the Coastal Plain.

Barren land is characterized by a nonvegetated condition of the land, both natural (rock, beaches, nonvegetated flats) and man-induced (rock quarries, mines, and areas cleared for construction in urban areas or clearcut forest areas).

Water (non-land) includes both fresh (inland) and saline (tidal) waters.

Soil Types

The dominant soil associations, or those soil series comprising, together, over 40% of the land area, were recorded for each watershed in percent descending order. The individual soil series for the Catawba River Basin are described as follows.

Ailey soils are well drained loamy and sandy soils with clayey or loamy subsoil.

Alpin soils are well drained and excessively drained, sandy soils with a loamy or sandy subsoil.

Appling soils are well drained, deep soils, brownish to red, firm clay in the main part of the subsoil, found on narrow to broad ridges.

Badin soils are moderately deep, well drained, moderately permeable, clayey soils that formed in material weathered from Carolina Slate or other fine grained rock, on ridgetops and side slopes.

Cecil soils are deep, well drained, gently sloping to sloping soils that have red subsoil.

Chastain soils are poorly drained to well drained soils that are clayey or loamy throughout and subject to flooding.

Chewacla soils are nearly level, somewhat poorly drained and well drained soils.

Enon soils are well drained to somewhat poorly drained, shallow to deep soils, mainly brownish, firm to extremely firm clay loam to clay in the subsoil, on narrow and medium ridges.

Georgeville soils are gently sloping to sloping, well drained and moderately well drained soils.

Goldston soils are dominantly sloping to steep, well drained to excessively drained soils.

Helena soils are gently sloping to sloping, moderately well drained to well drained soils.

Herndon soils are gently sloping to sloping, well drained and moderately well drained soils.

Hiwassee soils are well drained, moderately sloping soils with clayey subsoil, moderately deep.

Iredell soils are well drained to somewhat poorly drained, shallow to deep soils, mainly brownish, firm to extremely firm clay loam to clay in the subsoil, on narrow and medium ridges.

Lakeland soils are well drained, sandy soils with loamy subsoil and excessively drained soils.

Lucy soils are well drained to poorly drained soils, some with a sandy surface layer and a loamy subsoil, and some are sandy throughout and subject to flooding.

Madison soils are well drained, moderately sloping soils, with clayey subsoil, moderately deep.

Mecklenburg soils are deep to moderately deep, gently sloping to strongly sloping, well drained to somewhat poorly drained soils with a loamy surface layer and a clayey subsoil and underlain by decomposed bedrock.

Pacolet soils are well drained, moderately steep soils with clayey subsoil, moderately deep.

Pelion soils are well drained and moderately well drained soils that have a sandy surface layer and a loamy subsoil, many with a fragipan in the subsoil.

Rion soils are well drained, gently sloping to steep, deep to moderately deep clayey and loamy soils.

Tatum soils are dominantly sloping to steep, well drained to excessively drained soils, with a loamy subsoil, moderately deep or shallow to weathered rock.

Tawcaw soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Vance soils are deep to moderately deep, gently sloping to sloping, well drained soils.

Vaucluse soils are well drained, loamy and sandy soils with clayey or loamy subsoil.

Wagram soils are well drained to very poorly drained, depressional to nearly level and gently sloping soils with a loamy to sandy surface layer and a clayey to loamy subsoil.

Wateree soils are well drained, loamy soils with a loamy or clayey subsoil.

Wilkes soils are dominantly strongly sloping to steep, well drained soils.

Slope and Erodibility

The definition of soil erodibility differs from that of soil erosion. Soil erosion may be more influenced by slope, rainstorm characteristics, cover, and land management than by soil properties. Soil erodibility refers to the properties of the soil itself, which cause it to erode more or less easily than others when all other factors are constant.

The soil erodibility factor, K, is the rate of soil loss per erosion index unit as measured on a unit plot, and represents an average value for a given soil reflecting the combined effects of all the soil properties that significantly influence the ease of soil erosion by rainfall and runoff if not protected. K values closer to 1.0 represent higher soil erodibility and a greater need for best management practices to minimize erosion and contain those sediments that do erode. The range of K-factor values in the Catawba River Basin is from 0.10 to 0.43.

Fish Consumption Advisory

At the time of publication, a fish consumption advisory issued by SCDHEC is in effect for the Wateree River (downstream of Lake Wateree to its confluence with the Congaree River) advising people to limit the amount of some types of fish consumed from these waters. The advisory ***does not include*** Lake Wateree. Fish consumption advisories are updated annually in March. For background information and the most current advisories please visit www.scdhec.gov/fish\ . For more information or a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

Climate

Normal yearly rainfall in the Catawba River area during the period of 1971 to 2000 was 46.2 inches, according to South Carolina's **30-year** climatological record. Data compiled from National Weather Service stations in Camden, Catawba, Chester, Great Falls, Kershaw, Fort Mill, Sandhills Experimental Station, Wateree Dam, Wedgefield, Winnsboro, and Winthrop College were used to determine the general climate information for this portion of the State. The highest seasonal rainfall occurred in the summer with 13.17 inches; 10.60, 11.49, and 10.95 inches of rain fell in the fall, winter, and spring, respectively. The average annual daily temperature was 60.7 °F. Summer temperatures averaged 77.7 °F, fall temperatures averaged 61.5 °F, and winter and spring mean temperatures were 43.4 °F and 60.3 °F, respectively.

Watershed Evaluations

03050101-180

(Catawba River/Lake Wylie)

General Description

The Catawba River extends across North and South Carolina. Watershed 03050101-180 is located in York County and consists primarily of the ***Catawba River flowing through Lake Wylie*** and its tributaries. Within South Carolina, the watershed occupies 45,848 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Goldston-Badin series. The erodibility of the soil (K) averages 0.20 and the slope of the terrain averages 10%, with a range of 2-45%. Land use/land cover in the watershed includes: 70.9% forested land, 16.1% agricultural land, 9.2% water, 2.7% urban land, 0.9% barren land, and 0.2% scrub/shrub land.

The Catawba River originates in North Carolina and flows through Lake Wylie into South Carolina in this watershed. Lake Wylie is used for both power generation and recreation. Tributaries draining into and forming arms of Lake Wylie in South Carolina include Catawba Creek, Mill Creek, Crowders Creek (South Fork Crowders Creek, Rocky Branch, Brown Creek, Beaverdam Creek, Camp Run), and Torrence Branch. There are a total of 37.2 stream miles and 4,500.0 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-197	P/INT	FW	LAKE WYLIE ABOVE MILL CREEK ARM AT END OF S-46-557
CW-192	S/W	FW	SOUTH FORK CROWDERS CREEK AT S-46-79 4.5 MI NW OF CLOVER
CW-152	P/SPRP	FW	CROWDERS CREEK AT US 321 0.5 MI N OF NC STATE LINE
CW-023	P/SPRP	FW	CROWDERS CREEK AT S-46-564 NE OF CLOVER
CW-024	W/BIO	FW	CROWDERS CREEK AT S-46-1104
CW-105	S/W	FW	BROWN CK AT S-46-226, 0.3 MI W OF OLD N.MAIN ST. IN CLOVER
CW-696	BIO	FW	BEAVERDAM CREEK AT S-46-114
CW-153	S/W	FW	BEAVERDAM CREEK AT S-46-152 8 MI E OF CLOVER
CW-027	S/SPRP	FW	LAKE WYLIE, CROWDERS CK ARM AT SC 49 AND SC 274
CW-245	W	FW	L. WYLIE, CROWDERS CK ARM -1ST POWERLINE UPSTR.OF MAIN POOL
CW-198	P/W	FW	LAKE WYLIE, OUTSIDE MOUTH OF CROWDERS CREEK ARM
CW-230	W/INT	FW	LAKE WYLIE AT DAM, UNDER POWERLINES

Lake Wylie –There are five SCDHEC monitoring sites along Lake Wylie. Aquatic life uses are not supported at ***CW-197***, in the upper region of the lake, due to occurrences of copper in excess of the aquatic life acute criterion. There is a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentration, and total nitrogen concentration suggest improving conditions for these parameters. Recreational uses are fully supported at this site and a

significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Aquatic life uses are fully supported at the furthest upstream site in the Crowders Creek arm of Lake Wylie (***CW-027)***; however, there is a significant increasing trend in turbidity. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions, which are compounded by a significant increasing trend in fecal coliform bacteria concentration. Further downstream in the Crowders Creek arm (***CW-245)***, aquatic life and recreational uses are fully supported. At the furthest downstream site of the Crowders Creek arm (***CW-198)***, aquatic life and recreational uses are fully supported. There is a significant decreasing trend in pH. A significant decreasing trend in total nitrogen concentration suggests improving conditions for this parameter.

Aquatic life uses are fully supported at the dam site (***CW-230)***; however, there is a significant decreasing trend in dissolved oxygen concentration. There is a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are fully supported at this site. *Fish tissue samples from Lake Wylie indicate no advisories are needed at this time.*

South Fork **Crowders Creek** ***(CW-192)*** – Aquatic life uses are fully supported and a significant decreasing trend in turbidity suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions.

Crowders Creek – There are three SCDHEC monitoring sites along Crowders Creek. Aquatic life uses are not supported at the upstream site ***(CW-152)*** due to occurrences of copper in excess of the aquatic life acute criterion. There are also significant increasing trends in five-day biochemical oxygen demand and total nitrogen concentration. There is a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration and a decreasing trend in turbidity suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Further downstream ***(CW-023)***, aquatic life uses are fully supported; however, there are significant increasing trends in total phosphorus and total nitrogen concentrations. There is a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. At the furthest downstream site ***(CW-024)***, aquatic life uses are partially supported based on macroinvertebrate community data. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

Brown Creek (CW-105) - Aquatic life uses are not supported due to turbidity excursions, compounded by a significant increasing trend in turbidity. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Beaverdam Creek – There are two SCDHEC monitoring sites along Beaverdam Creek. Aquatic life use is fully supported at the upstream site *(CW-696)* based on macroinvertebrate community data. Aquatic life use is also fully supported at the downstream site *(CW-153)*. There is a significant decreasing trend in pH. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Natural Swimming Areas

FACILITY NAME *RECEIVING STREAM*	*PERMIT #* *STATUS*
EBENEZAR PARK LAKE WYLIE	46-N17 ACTIVE

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
LAKE WYLIE TEGA CAY #2 WWTP PIPE #: 001 FLOW: 0.320	SC0026743 MINOR DOMESTIC
LAKE WYLIE TEGA CAY #3 & #4 WWTP PIPE #: 001 FLOW: 0.290 PIPE #: 002 FLOW: 1.00	SC0026751 MINOR DOMESTIC
BEAVERDAM CREEK BEAVER CREEK MHP PIPE #: 001 FLOW: 0.015	SC0032662 MINOR DOMESTIC
BEAVERDAM CREEK PHARR YARNS/CLOVER DIV. PIPE #: 001, 002, 003 FLOW: M/R	SC0028321 MINOR INDUSTRIAL
BEAVERDAM CREEK TRIBUTARY BOWLING GREEN SPINNING CO. PIPE #: 001 FLOW: 0.0025	SCG250066 MINOR INDUSTRIAL
MILL CREEK LAKE WYLIE MHP PIPE #: 001 FLOW: 0.09	SC0037605 MINOR DOMESTIC

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
MCCALL DEER CREEK DR. LANDFILL LAND DEBRIS	462672-1701 --------
TEGA CAY 126, INC. CONSTRUCTION	462436-1201 (CWP-033) ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
MCCALL GRADING COMPANY, INC. MCCALL MINE	0926-91 GRAVEL
ML FORD & SONS FORD BORROW PIT	1259-91 SAND

Water Quantity

WATER USER *WATERBODY*	*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
CITY OF ROCK HILL LAKE WYLIE	20.0 34.5

Growth Potential

There is a high potential for growth in this watershed, which contains the Towns of Lake Wylie and Tega Cay and portions of the Towns of Clover and India Hook. Residential development along the frontage of Lake Wylie continues to increase, with densest areas located around Tega Cay, River Hills, and the lakeshore north of Rock Hill. Residential development away from the lake is increasing but remains scattered, except in the Town of Clover. Commercial development continues to occur in the Lake Wylie Community along S.C. Hwy. 49. Another major land use factor is the Catawba Nuclear Station on the west side of the lake. Transportation projects, which will have an impact on future growth, include the widened Buster Boyd Bridge and S.C. Hwy. 49, both of which provide improved access into the Charlotte urban area and encourage further residential and commercial growth along the western shore of the lake.

Watershed Restoration and Protection

Total Maximum Daily Loads (TMDLs)

TMDL was developed by SCDHEC and approved by EPA for ***Beaverdam Creek*** water quality monitoring site CW-153 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary source of fecal coliform to the

stream was determined to be runoff from grazed pastureland in the watershed. The second largest source was runoff from built-up land. The TMDL states that a 77% reduction in fecal coliform loading is necessary for the stream to meet the recreational use standard.

A TMDL was also developed by SCDHEC and approved by EPA for ***Brown Creek*** (a tributary of Beaverdam Creek) water quality monitoring site CW-105 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be failing septic systems, possible direct discharges, and runoff from built-up areas. The TMDL states that a 98.4% reduction in fecal coliform loading from these sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

A TMDL was developed by NCDENR and approved by EPA for ***Crowders Creek*** water quality in North Carolina and South Carolina and the Department concurs. Monitoring sites CW-023, CW-024, and CW-192 are included in the TMDL to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The TMDL states that a 78% reduction in fecal coliform loading is necessary for the stream to meet the recreational use standard.

Special Projects

TMDL Implementation for Fecal Coliform Bacteria in Allison Creek, Calabash Branch, Beaverdam Creek, and Brown Creek

The targeted areas in Allison Creek, Calabash Branch, ***Beaverdam Creek, and Brown Creek*** have been documented by SCDHEC as violating the water quality standard for fecal coliform. A Total Maximum Daily Load (TMDL) has since been developed and approved for these areas. The objective of this project is to reduce fecal coliform loading in Allison Creek at CW-171 by 67%, in Calabash Branch at CW-134 by 74%, in Beaverdam Creek at CW-153 by 77%, and in Brown Creek at CW-105 by 98.4% so that these watersheds meet the water quality standards for fecal coliform bacteria. There are several tools available for implementing these nonpoint source TMDLs, including nonpoint source outreach educational activities and materials. Section 319 grant funding through SCDHEC may be available to aid in implementing best management practices (BMP) within the areas of concern outside of areas deemed as Municipal Separate Storm Systems (MS4s) by the National Pollutant Discharge Elimination System (NPDES) Phase II. The Project will characterize possible sites of fecal coliform loading by using local knowledge, illicit discharge sampling, and spatial data analysis, while evaluating existing BMPs within the watershed. SCDHEC will continue to monitor water quality in these streams to evaluate the effectiveness of these measures.

Catawba Wateree FERC Re-licensing

The Federal Energy Regulatory Commission (FERC) is the agency that licenses, inspects, and oversees environmental matters related to most hydroelectric (hydro) projects. FERC licenses, which

regulate the design and operation of those projects, are issued for a term of 30 to 50 years. The relicensing process typically begins 5 years before the current license expiration date and involves the applicant providing information to state and federal resource and regulatory agencies, as well as other interested parties. During traditional licensing process, environmental issues such as water quality, minimum flow releases from dams and endangered species are addressed by states through 401 certifications required prior to new licenses being issued. In the Catawba watershed, Duke Power operates 13 hydro facilities and 11 reservoirs on the Catawba River in North and South Carolina. Seven of these facilities and 5 reservoirs are located in South Carolina, including **Lake Wylie**. All these facilities are regulated through a single license, which expires in 2008. Duke Power has initiated a "hybrid" relicensing process, which includes a collaborative process involving stakeholder negotiations, in addition to the traditional process. The Department is actively participating in the collaborative process as well as the traditional process, and Duke will apply for §401 Certification in 2006. More information about Catawba Wateree FERC relicensing can be found on the Duke Power website at: http://www.catawbahydrolicensing.com/.

"No Discharge" Designation for Lake Wylie

In May 2000, Lake Wylie was designated a ***No Discharge*** lake for marine toilets due to its importance from both an economical and recreational standpoint, which includes providing a reliable drinking water source for the City of Rock Hill. Federal and state law prohibit the discharge of untreated sewage into the waters of the United States, but treated sewage from marine toilets previously had been permitted, provided it has undergone some treatment and disinfection. Because microorganisms can continue to thrive after rudimentary treatment by on-board marine toilets, discharges may be completely banned from such waterbodies to protect the public's health, safety, and welfare. Federal law allows states to completely ban discharges if it can be demonstrated that adequate and accessible pumpout facilities are available. SCDHEC determined this to be the case at Lake Wylie with two marinas designated for treatment and disposal. The law banning discharges applies to large vessels with on-board toilets that previously were allowed to discharge treated wastes into the lake.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website: http://centralina.org/seql/background.htm

03050101-190

(Allison Creek)

General Description

Watershed 03050101-190 is located in York County and consists primarily of ***Allison Creek*** and its tributaries. The watershed occupies 42,485 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K) averages 0.28 and the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 67.9% forested land, 25.2% agricultural land, 3.4% water, 2.3% urban land, 0.9% barren land, and 0.3% scrub/shrub land.

Allison Creek originates near the Town of Clover and is joined by Morris Branch, Calabash Branch (Walker Branch), Grist Branch, Johnson Branch (Rock Branch), and Big Branch before forming an arm of Lake Wylie near the City of York. Little Allison Creek is also impounded and flows into the Allison Creek arm of the lake. There are a total of 46.4 stream miles and 1,699.4 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-171	S/W	FW	ALLISON CREEK AT US 321, 3.1 MI S OF CLOVER
CW-134	S/W	FW	CALABASH BRANCH AT S-46-414 2.5 MI SE OF CLOVER
CW-249/CW-694	INT/BIO	FW	ALLISON CREEK AT S-46-114
CW-200	S/W	FW	LAKE WYLIE AT SC 274 9 MI NE OF YORK
CW-201	P/W	FW	LAKE WYLIE, NORTH LAKEWOOD SD AT EBENEZER ACCESS

Allison Creek – There are two SCDHEC monitoring sites along Allison Creek. Aquatic life uses are fully supported at the upstream site ***(CW-171)***; however, there is a significant increasing trend in five-day biochemical oxygen demand. There is a significant decreasing trend in pH. Aquatic life uses are fully supported at the downstream site ***(CW-249/CW-694)*** based on macroinvertebrate community data. Recreational uses are not supported at either site due to fecal coliform bacteria excursions.

Calabash Branch (CW-134) - Aquatic life uses are fully supported, and a significant increasing trend in dissolved oxygen concentration and a significant decreasing trend in five-day biochemical oxygen demand suggest improving conditions for these parameters. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions; however, a significantly decreasing trend in fecal coliform bacteria suggests improving conditions for this parameter.

Allison Creek Arm of Lake Wylie – There are two SCDHEC monitoring sites along the Allison Creek arm of Lake Wylie ***(CW-200, CW-201)***, and aquatic life and recreational uses are fully supported at both sites. There is a significant decreasing trend in pH at both sites. Significant decreasing trends in five-day

biochemical oxygen demand, total nitrogen concentration, and fecal coliform concentration suggest improving conditions for these parameters at the downstream site ***CW-201***.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
ALLISON CREEK TRIBUTARY NORTH SAFETY PRODUCTS PIPE #: 001 FLOW: M/R	SC0002801 MINOR INDUSTRIAL
ALLISON CREEK ARM OF LAKE WYLIE DUKE POWER CO./CATAWBA NUCLEAR STATION PIPE #: 001-005 FLOW: M/R	SC0004278 MAJOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
DUKE POWER CO. INDUSTRIAL	463303-1601 (IWP-192, IWP-128) ACTIVE

Growth Potential

The majority of this watershed is rural in nature; however, portions of the Town of Clover and areas fronting and near Lake Wylie have existing concentrated development. There are also a few areas of intensive farming. Water and sewer services are available in the immediate vicinity of Clover, and water has been extended along S.C. Hwy. 274 near Lake Wylie. Future growth trends should show continued residential development on Lake Wylie, continued expansion around Clover, and increasing residential growth scattered throughout the rural areas. The Town of Clover eliminated its discharge and tied in with the City of Gastonia, N.C.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Allison Creek*** water quality monitoring site CW-171 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be runoff from agricultural activities, cattle-in-streams, and failing septic systems in the watershed. The TMDL states that a 67% reduction in fecal coliform loading from urban sources is necessary for the stream to meet the recreational use standard.

A TMDL was also developed by SCDHEC and approved by EPA for ***Calabash Creek*** (a tributary of Allison Creek) water quality monitoring site CW-134 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary source of fecal coliform to the stream was determined to be runoff from the urban land in the watershed. The TMDL states that a 74% reduction in fecal coliform loading from urban sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Fecal Coliform Bacteria in Allison Creek, Calabash Branch, Beaverdam Creek, and Brown Creek

The targeted areas in ***Allison Creek***, ***Calabash Branch***, Beaverdam Creek, and Brown Creek have been documented by SCDHEC as violating the water quality standard for fecal coliform. A Total Maximum Daily Load (TMDL) has since been developed and approved for these areas. The objective of this project is to reduce fecal coliform loading in Allison Creek at CW-171 by 67%, in Calabash Branch at CW-134 by 74%, in Beaverdam Creek at CW-153 by 77%, and in Brown Creek at CW-105 by 98.4% so that these watersheds meet the water quality standards for fecal coliform bacteria. There are several tools available for implementing these nonpoint source TMDLs, including nonpoint source outreach educational activities and materials. Section 319 grant funding through SCDHEC may be available to aid in implementing best management practices (BMP) within the areas of concern outside of areas deemed as Municipal Separate Storm Systems (MS4s) by the National Pollutant Discharge Elimination System (NPDES) Phase II. The Project will characterize possible sites of fecal coliform loading by using local knowledge, illicit discharge sampling, and spatial data analysis, while evaluating existing BMPs within the watershed. SCDHEC will continue to monitor water quality in these streams to evaluate the effectiveness of these measures.

Catawba Wateree FERC Re-licensing

The Federal Energy Regulatory Commission (FERC) is the agency that licenses, inspects, and oversees environmental matters related to most hydroelectric (hydro) projects. FERC licenses, which regulate the design and operation of those projects, are issued for a term of 30 to 50 years. The relicensing process typically begins 5 years before the current license expiration date and involves the applicant providing information to state and federal resource and regulatory agencies, as well as other interested parties. During traditional licensing process, environmental issues such as water quality, minimum flow releases from dams, and endangered species are addressed by states through 401 certifications required prior to new licenses being issued. In the Catawba watershed, Duke Power operates 13 hydro facilities and 11 reservoirs on the Catawba River in North and South Carolina. Seven of these facilities and 5 reservoirs are located in South Carolina, including **Lake Wylie**. All these

facilities are regulated through a single license, which expires in 2008. Duke Power has initiated a "hybrid" relicensing process, which includes a collaborative process involving stakeholder negotiations, in addition to the traditional process. The Department is actively participating in the collaborative process as well as the traditional process, and Duke will apply for §401 Certification in 2006. More information about Catawba Wateree FERC relicensing can be found on the Duke Power website at: http://www.catawbahydrolicensing.com/.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website: http://centralina.org/seql/background.htm.

03050103-010

(Catawba River)

General Description

Watershed 03050103-010 is located in York, Lancaster, and Chester Counties and consists primarily of the ***Catawba River*** and its tributaries through to the Cedar Creek Dam. The watershed occupies 105,390 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Wilkes-Herndon-Helena-Georgeville series. The erodibility of the soil (K) averages 0.28, and the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 74.3% forested land, 11.3% urban land, 6.5% water, 5.6% agricultural land, 1.8% scrub/shrub land, and 0.5% barren land.

The Catawba River flows through the Catawba Dam near the Town of Fort Mill, and is joined by Johnnytown Branch, Big Dutchman Creek (Little Dutchman Creek), Hidden Creek, Dye Branch (Jones Branch), Manchester Creek, and Burgis Creek (all originating near the City of Rock Hill) before accepting drainage from the Sugar Creek watershed. Downstream from the Sugar Creek drainage, the Catawba River flows past the Catawba Indian Reservation and is joined by Haggins Branch, Sixmile Creek (Barber Creek), Ferry Branch, Abernathy Creek, Greene Creek, and the Twelvemile Creek watershed. The Landsford Canal connects the bend in the river where Twelvemile Creek enters. Further downstream, the river accepts the drainage of Rock Water Spring Branch, Dunn Creek, and the Cane Creek watershed near the Town of Fort Lawn. The Catawba River then flows into Fishing Creek Reservoir, which is impounded by the Fishing Creek Dam. Bear Creek forms an arm of the reservoir.

The Catawba River is dammed again just downstream of the Fishing Creek Dam and the flow diverted to form Great Falls Reservoir. The retention time for Great Falls Reservoir is approximately one day, and essentially functions as an expanded area of the diverted Catawba River. The Fishing Creek watershed drains into Great Falls Reservoir just below the Fishing Creek Dam. Great Falls Reservoir is impounded by the Dearborn Dam, and together with the Cedar Creek Dam downstream serve to back the water up into the true Catawba River bed to form Cedar Creek Reservoir. The section of the Catawba River upstream of Cedar Creek Reservoir and downstream of the Catawba River Diversion Dam is dry and serves as an emergency spillway. Great Falls Reservoir also has a dam between it and this dry section used for periods of flood. The Camp Creek watershed drains into this section and forms a ponded area.

The Rocky Creek watershed drains into the section of Cedar Creek Reservoir between the Dearborn Dam and the Cedar Creek Dam. Debutary Creek drains into and forms an arm of Cedar Creek Reservoir just above the Cedar Creek Dam. Duke Power Company oversees the operation of these reservoirs, and they are used for power generation as well as recreation. Fishing Creek Reservoir is also used for water supply. There are a total of 231.9 stream miles and 4,049.1 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-221	S/W	FW	HIDDEN CREEK AT HWY. 161, 0.4 MI W OF I-77
CW-014	P/SPRP	FW	CATAWBA RIVER AT US 21
CW-041	PSPRP	FW	CATAWBA RIVER AT SC 5 ABOVE BOWATER
CW-016	P/INT	FW	CATAWBA RIVER AT SC 9 AT FORT LAWN
CW-016F	P/W	FW	FISHING CREEK RESERVOIR 2 MI BELOW CANE CREEK
RL-01012	RL01	FW	FISHING CREEK RES., 3.8 MI S OF FT. LAWN OFF W SHORE OF LAKE VIEW
CW-057	P/INT	FW	FISHING CREEK RESERVOIR 75 FT ABOVE DAM NEAR GREAT FALLS
CW-174	S/W	FW	CEDAR CREEK RES. AT UNIMPROVED RD ABOVE JUNCTION WITH ROCKY CREEK
RL-02319	RL02	FW	CEDAR CREEK RESERVOIR, W OF BIG ISLAND 7MI BELOW ROCKY CK CONFLUENCE
RL-01007	RL01	FW	CEDAR CREEK RESERVOIR, 2.15 MI SE OF GREAT FALLS
RL-02452	RL02	FW	CEDAR CREEK RESERVOIR, 0.15 MI SE OF S TIP OF PICKETT ISLAND
RL-01017	RL01	FW	CEDAR CREEK RESERVOIR, 2.5 MI SE OF GREAT FALLS
CW-033	W	FW	CEDAR CREEK RESERVOIR 100 M N OF DAM

Hidden Creek (CW-221) – Aquatic life uses are fully supported; however, there are significant increasing trends in five-day biochemical oxygen demand, turbidity, and total phosphorus concentration. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Catawba River – There are three SCDHEC monitoring sites along the Catawba River. There are significant decreasing trends in pH at all sites. Aquatic life uses are fully supported at the furthest upstream site ***(CW- 014)***, and significant decreasing trends in turbidity, total phosphorus concentration, and total nitrogen concentration suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. Further downstream ***(CW-041)***, aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute criterion. There is also a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported at this site.

Aquatic life uses are fully supported at the furthest downstream site ***(CW-016)***; however, there is a significant increasing trend in total phosphorus concentration. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported at this site. *Fish tissue samples from the Catawba River indicate no advisories are needed at this time.*

Fishing Creek Reservoir – There are three SCDHEC monitoring sites along Fishing Creek Reservoir. Aquatic life uses are not supported at the furthest uplake site ***(CW-016F)*** due to turbidity and total phosphorus concentration excursions. This is compounded by significant increasing trends in turbidity and total phosphorus concentration. There is also a significant increasing trend in total nitrogen concentration. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported at

this site. Further downstream ***(RL-01012)***, aquatic life uses are not supported due to chlorophyll-*a* excursions. Recreational uses are fully supported at this site.

Aquatic life uses are not supported at the furthest downlake site ***(CW-057)*** due to total phosphorus excursions. There is also a significant increasing trend in total nitrogen concentration. A significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. There is a significant decreasing trend in pH. Recreational uses are fully supported at this site and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. *Fish tissue samples from Fishing Creek Reservoir indicate no advisories are needed at this time.*

Cedar Creek Reservoir - There are six SCDHEC monitoring sites along Cedar Creek Reservoir. At the furthest uplake site ***(CW-174)***, aquatic life uses are not supported due to dissolved oxygen, total phosphorus, and total nitrogen excursions. There is a significant decreasing trend in pH. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. Aquatic life uses are not supported further downlake ***(RL-02319)*** due to total phosphorus excursions. Recreational uses are fully supported at this site. Aquatic life uses are not supported at ***RL-01007*** due to chlorophyll-*a* and dissolved oxygen excursions. Recreational uses are fully supported at this site.

At the next site downlake ***(RL-02452)***, aquatic life uses are not supported due to total phosphorus excursions. Recreational uses are fully supported at this site. Further downlake ***(RL-01017)***, aquatic life and recreational uses are fully supported. At the furthest downlake site ***(CW-033)***, aquatic life uses are not supported due to total phosphorus excursions. Recreational uses are fully supported at this site. *Fish tissue samples from Cedar Creek Reservoir indicate no advisories are needed at this time.*

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
CATAWBA RIVER BOWATER, INC./COATED PAPER DIV. PIPE #: 001 (01A, 01B) FLOW: M/R	SC0001015 MAJOR INDUSTRIAL
CATAWBA RIVER GREENS OF ROCK HILL LLC PIPE #: 001, 002 FLOW: M/R	SC0001783 MAJOR INDUSTRIAL (HOECHST CELANESE)
CATAWBA RIVER SPRINGS INDUSTRIES/GRACE COMPLEX PIPE #: 001 (01A), 002 FLOW: M/R	SC0003255 MAJOR INDUSTRIAL

CATAWBA RIVER CITY OF ROCK HILL/MANCHESTER CREEK PLT PIPE #: 001 FLOW: 20.0	SC0020443 MAJOR DOMESTIC
CATAWBA RIVER TOWN OF FT. MILL WWTP PIPE #: 001 FLOW: 2.0 PIPE #: 001 FLOW: 3.0 (PROPOSED)	SC0020371 MAJOR DOMESTIC
CATAWBA RIVER CITY OF LANCASTER/MAIN PLANT PIPE #: 001 FLOW: 7.5	SC0046892 MAJOR DOMESTIC
CATAWBA RIVER LANCASTER COUNTY P&D/FOSTER PLT PIPE #: 001 FLOW: M/R	SC0027391 MINOR INDUSTRIAL
CATAWBA RIVER LANCASTER COUNTY/INDIANLAND WWTP PIPE #: 001 FLOW: 4.0	SC0047864 MAJOR DOMESTIC
CATAWBA RIVER NATION FORD CHEMICAL CO. (R-M INDUSTRIES) PIPE #: 01A FLOW: M/R	SC0035360 MINOR INDUSTRIAL
CATAWBA RIVER LANCASTER COUNTY/CATAWBA RIVER WTP PIPE #: 001 FLOW: 0.698	SCG641013 MINOR DOMESTIC
CATAWBA RIVER CITY OF ROCK HILL WTP PIPE #: 001 FLOW: 0.698	SCG645008 MINOR DOMESTIC
CATAWBA RIVER CHESTER METRO/FT LAWN WTP PIPE #: 001 FLOW: 0.698	SCG641008 MINOR DOMESTIC
CATAWBA RIVER (CEDAR CREEK RES.) TOWN OF GREAT FALLS/WWTP PIPE #: 001 FLOW: 1.4	SC0021211 MAJOR DOMESTIC
CATAWBA RIVER TRIBUTARY INCHEM CORP. PIPE #: 001 FLOW: M/R	SCG250111 MINOR INDUSTRIAL
CATAWBA RIVER TRIBUTARY SPRINGS INDUSTRIES/FT LAWN COMPLEX PIPE #: 001, 002, 003 FLOW: 0.011	SCG250137 MINOR INDUSTRIAL
BIG DUTCHMAN CREEK PIEDMONT WATER CO./WOODFOREST SD PIPE #: 001 FLOW: 0.039	SC0035661 MINOR DOMESTIC
MANCHESTER CREEK INLAND PAPERBOARD & PACKAGING PIPE #: 001 FLOW: 0.024	SCG250142 MINOR INDUSTRIAL

BURGIS CREEK TRIBUTARY QUAIL MEADOW PARK PIPE #: 001 FLOW: 0.025	SC0028622 MINOR DOMESTIC
BARBER CREEK UTILITIES OF SC/SHANDON SD PIPE #: 001 FLOW: 0.014	SC0027189 MINOR DOMESTIC
ABERNATHY CREEK CEDAR VALLEY MHP PIPE #: 001 FLOW: 0.03	SC0032417 MINOR DOMESTIC
FISHING CREEK RESERVOIR REPUBLIC FASTENER PRODUCTS PIPE #: 001 FLOW: M/R	SC0029572 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
TOWN OF GREAT FALLS CONSTRUCTION	121002-1201 (121002-1701, CLOSED CWP-012, DWP-903)
HOECHST CELANESE CORP. INDUSTRIAL	463312-1601 (IWP-138) ACTIVE
BOWATER, INC. INDUSTRIAL	463318-1601 (IWP-141, IWP-127) ACTIVE
LANDFILL INC. INDUSTRIAL	IWP-105 ---

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
BORAL BRICKS, INC. FAILE MINE	0778-57 CLAY
DEESE HAULING & GRADING JJL & N PIT	1221-91 SAND
LCI-LINEBERGER CONSTRUCTION, INC. BORROW PIT - HWY #5	1201-57 SAND
CORNERSTONE DEVELOPMENT I-77 MINE SITE	1292-91 SAND
BRYANT NORMAN BRYANT DIRT MINE	1425-91 SAND

Growth Potential

Portions of the cities of Rock Hill and Fort Mill are included in the upper portion of the watershed, and are relatively densely developed. On the Fort Mill side of the Catawba River, there is a relatively wide floodplain, which will limit development adjacent to the river. Water and sewer service is available to most of the area on this side of the river, which includes a large portion of the Town of Fort Mill and the residential area west of the town. Potential growth areas include expansion around Fort Mill and the commercial and industrial development around the I-77/S.C. Hwy. 160 interchange. On the Rock Hill side of the river, there is extensive residential development in the city and to the north, with other developed residential areas to the east in the Friendship and Lesslie communities. Industrial areas have developed to the east of Rock Hill, and the large Bowater paper mill complex is located to the south. Extension of a water line from Rock Hill to the Bowater Facility has been completed, and will provide opportunities for higher density development in the area.

Portions of the Towns of Fort Lawn and Great Falls are located in the lower portion of this watershed. There is a concentrated area of industrial development along S.C. Hwy. 9 between Fort Lawn and the City of Lancaster, and there is a limited residential development along the shoreline of Fishing Creek. There is public water and sewer service in the Towns of Fort Lawn and Great Falls and water along S.C. Hwy.9 and portions of U.S. Hwy. 21, but growth prospects are limited.

Lancaster County plans to develop a large mixed-use community along Fishing Creek Reservoir. The development named Catawba Ridge would extend from S.C. Hwy. 9 down to S.C. Hwy. 200, within the County. The intension of the development company is to create a 16,000 home, densely populated residential area that would include commercial and industrial uses. To date, some residential developers have purchased acreage in the development with some limited housing construction underway. Sun City Carolina Lakes is another large residential community that is underway on the Lancaster County side of the Catawba River near the confluence with Sugar Creek.

Several additional factors will influence future development in the watershed. The presence of I-77 provides excellent access to the Charlotte urban area, encouraging residential, industrial, distribution, and commercial development. The proposed Dave Lyle Boulevard Extension will be built across the watershed and into Lancaster County, opening up large areas with good access to Rock Hill and I-77. Rock Hill's Waterford area will continue to expand its existing office, manufacturing, distribution, and residential uses. The Catawba Indian Nation is continuing economic development along the river and its property. The many development factors, the presence of Rock Hill and Fort Mill and the presence of I-77 with five interchanges in this watershed all point to continued growth over the next few years.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Hidden Creek*** water quality monitoring site CW-221 to determine the maximum amount of fecal coliform bacteria it can receive

from nonpoint sources and still meet water quality standards. The primary source of fecal coliform to the stream was determined to be runoff from urban areas in the watershed. The TMDL states that a 19% reduction in fecal coliform loading from urban sources is necessary for the stream to meet the recreational use standard.

A TMDL was also developed by SCDHEC and approved by EPA for ***Cedar Creek Reservoir*** water quality monitoring site CW-174 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be runoff from urban and agricultural areas in the watershed, including failing septic systems, leaking and overflowing sanitary sewers, and cattle-in-streams. The TMDL states that an 83% reduction in fecal coliform loading from urban and agricultural sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Hidden Creek

The Fecal Coliform Reduction Project for the unnamed Catawba River tributary, lead by the City of Rock Hill, was developed to meet the 19% reduction of fecal coliform bacteria in the creek as required by the TMDL. The tributary's watershed is characterized in the 1999 DHEC TMDL document as "developed residential and commercial" and is served by sanitary sewer. The document states that nonpoint sources are believed to be the source of fecal coliform bacteria in this watershed.

The project consists of three primary components to be implemented within the drainage area as follows: 1) an illicit discharge identification project, 2) the design and construction of stormwater run-off treatment BMPs, and 3) a public education/participation program. The proposed project includes an illicit discharge identification project throughout the drainage area; fecal coliform storm water data collection during two (2) storm events with samples collected in the tributary, its side streams, and from commercial parking lots; selection, design and construction of stormwater run-off treatment Best Management Practices (BMPs) within commercial parking lots; and a public education/participation program focused on residential pet waste management.

The "Unnamed Tributary" will be given an official name and visibly placarded to promote and maintain public awareness. The stream was named ***Hidden Creek***. Progress and results of all project components will be documented in an interim report and a final report.

TMDL Implementation for the Catawba River (Cedar Creek Reservoir) at Great Falls, S.C.

Waters in the targeted areas violated the state water quality standard for fecal coliform bacteria, and were placed on the 303(d) list. A TMDL was then developed. The goal of the cooperating partners for this project (Research Planning, Inc., and Clemson Extension Service) is to implement the TMDL using Best Management Practices (BMPs) on agricultural and rural sites. Since the project commenced

in early 2004, three agricultural landowners have decided to participate in the cost-sharing program, and six additional landowners are considering participation. As of October 2004, BMPs installed and/or in progress include: a feeding shed where manure will be collected and stored properly, a composter/waste storage facility, water lines to additional troughs, 2.5 acres of riparian herbaceous cover planted, 2885 ft. of fencing (for stream protection), 7 tons of crusher run in heavy use areas, and a solar powered well. Outreach activities that have been implemented include a Home-A-Syst workshop led by Clemson Extension. Septic tank system owners (members of approximately 15 households in attendance) were made aware of potential impacts from leaking/overflowing septic systems in need of repair. A tour of farms where BMPs that were implemented under a previous §319 funded project were showcased. The farm tour was very successful, with over 60 farmers participating. Interest in the cost-sharing aspects of the program for Rocky Creek rose after the tour.

Catawba Wateree FERC Re-licensing

The Federal Energy Regulatory Commission (FERC) is the agency that licenses, inspects, and oversees environmental matters related to most hydroelectric (hydro) projects. FERC licenses, which regulate the design and operation of those projects, are issued for a term of 30 to 50 years. The relicensing process typically begins 5 years before the current license expiration date and involves the applicant providing information to state and federal resource and regulatory agencies, as well as other interested parties. During traditional licensing process, environmental issues such as water quality, minimum flow releases from dams and endangered species are addressed by states through §401 certifications required prior to new licenses being issued. In the Catawba watershed, Duke Power operates 13 hydro facilities and 11 reservoirs on the Catawba River in North and South Carolina. Seven of these facilities and 5 reservoirs are located in South Carolina, including **Fishing Creek Reservoir, Great Falls Reservoir and Cedar Creek Reservoir**. All these facilities are regulated through a single license, which expires in 2008. Duke Power has initiated a "hybrid" relicensing process, which includes a collaborative process involving stakeholder negotiations, in addition to the traditional process. The Department is actively participating in the collaborative process as well as the traditional process, and Duke will apply for §401 Certification in 2006. More information about Catawba Wateree FERC relicensing can be found on the Duke Power website at: http://www.catawbahydrolicensing.com/.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie.

SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm

03050103-020

(Sugar Creek)

General Description

Watershed 03050103-020 is located in York and Lancaster Counties and consists primarily of ***Sugar Creek*** and its tributaries. The watershed occupies 29,130 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Mecklenburg-Iredell series. The erodibility of the soil (K) averages 0.27 and the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 81.5% forested land, 9.5% agricultural land, 4.1% urban land, 3.1% scrub/shrub land, 1.3% barren land, and 0.5% water.

Sugar Creek originates in North Carolina, near the City of Charlotte, and accepts drainage from Flint Hill Branch, Little Sugar Creek, and McAlpine Creek before reaching Steele Creek. Steele Creek also originates in North Carolina and accepts drainage from Blankmanship Branch and Jackson Branch before flowing through the Town of Fort Mill and into Sugar Creek. There are a total of 53.0 stream miles and 81.6 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-247	W/SPRP	FW	SUGAR CREEK AT MECKLENBURG CO.RD 51 (IN N.C.)
CW-248	W	FW	LITTLE SUGAR CREEK AT US 521 (IN N.C.)
CW-246/CW-627	W/I/BIO	FW	SUGAR CREEK UPSTREAM OF CONFLUENCE WITH MCALPINE CREEK
CW-226	P/SPRP	FW	MCALPINE CREEK AT US 521 IN NC
CW-064	S/W/BIO	FW	MCALPINE CREEK AT S-29-64
CW-009	S/W	FW	STEELE CREEK AT S-46-22 N OF FORT MILL
CW-203	W	FW	STEELE CREEK AT S-46-98
CW-681	BIO	FW	STEELE CREEK AT BY-PASS US 21
CW-011	S/W	FW	STEELE CREEK AT S-46-270
CW-013	P/W	FW	SUGAR CREEK AT SC 160 E OF FORT MILL
CW-036	S/INT	FW	SUGAR CREEK AT S-46-36

Sugar Creek – There are four SCDHEC monitoring sites along Sugar Creek. Aquatic life uses are not supported at the furthest upstream site ***(CW-247)*** due to occurrences of cadmium and copper in excess of the aquatic life acute criterion. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. Further downstream ***(CW-246/CW-627)***, aquatic life uses are partially supported based on macroinvertebrate community data. Recreational uses are not supported at this site due to fecal coliform bacteria excursions.

Aquatic life uses are fully supported further downstream ***(CW-013)***; however, there is a significant increasing trend in total phosphorus concentration. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand and a significant increasing trend in dissolved oxygen concentration suggest improving conditions for these parameters. Recreational uses are not supported at this site due to fecal coliform bacteria excursions; however, a

significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. At the furthest downstream site ***(CW-036)***, aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute criterion. There is a significant decreasing trend in pH. A significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. Recreational uses are not supported at this site due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Little Sugar Creek (CW-248) - Aquatic life uses are fully supported. Recreational uses are not supported due to fecal coliform bacteria excursions.

McAlpine Creek - There are two SCDHEC monitoring sites along McAlpine Creek. Aquatic life uses are fully supported at the upstream site ***(CW-226)***, and a significant decreasing trend in turbidity suggests improving conditions for this parameter. There is a significant decreasing trend in pH. Aquatic life uses are partially supported at the downstream site ***(CW-064)*** based on macroinvertebrate community data. There is a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand and a significant increasing trend in dissolved oxygen suggest improving conditions for these parameters. Recreational uses are not supported at either site due to fecal coliform bacteria excursions.

Steele Creek - There are four SCDHEC monitoring sites along Steele Creek. At the furthest upstream site ***(CW-009)***, aquatic life uses are fully supported; however, there is a significant increasing trend in turbidity. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. Further downstream ***(CW-203)***, aquatic life uses are fully supported, but recreational uses are not supported due to fecal coliform bacteria excursions. Continuing downstream, aquatic life uses are partially supported at the next site ***(CW-681)*** based on macroinvertebrate community data. Aquatic life uses are fully supported at the furthest downstream site ***(CW-011)***. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
SUGAR CREEK UTILITIES OF SC/FOXWOOD SD PIPE #: 001 FLOW: 0.12	SC0027146 MINOR DOMESTIC

DITCH TO SUGAR CREEK WIKOFF COLOR CORP. PIPE #: 001 FLOW: M/R	SCG250094 MINOR INDUSTRIAL
FLINT HILL BRANCH TWIN LAKES MOBILE ESTATES PIPE #: 001 FLOW: 0.0625	SC0031208 MINOR DOMESTIC
MCALPINE CREEK CWS/LAMPLIGHTER VILLAGE SD PIPE #: 001 FLOW: 0.63	SC0030112 MINOR DOMESTIC
STEELE CREEK PINELAKES CAMPGROUND PIPE #: 001 FLOW: 0.038	SC0024759 MINOR DOMESTIC
JACKSON BRANCH TRIBUTARY UTILITIES OF SC/CAROWOOD SD. PIPE #: 001 FLOW: 0.02	SC0038113 MINOR DOMESTIC

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
COOKS SHORT-TERM C&D CONSTRUCTION	291004-1301 (IWP-204) ----------
CONTAINER CORPORATION OF CAROLINA INDUSTRIAL	463323-6001 --------
JOHN HOWARD LANDFILL INDUSTRIAL	IWP-229 --------
SAM FISCHER LANDFILL INDUSTRIAL	IWP-207 --------
CUTSHAW LANDFILL CONSTRUCTION	462425-1201 (CWP-005) --------
COLTHARP LANDFILL CONSTRUCTION	462602-1201 ACTIVE

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*ND#* *TYPE*
SPRAYFIELD LAZY DAZE CAMPGROUND	ND0067105 DOMESTIC

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
CBM LANDFILL COMPANY CBM LANDFILL MINE	1094-91 SAND/CLAY
PRESSLEY MINING CO. PRESSLEY MINE	0808-57 CLAY
RESERVE DOMICILES LTD TRUSTEES COLTHARP ROAD MINE	1392-91 SAND

Growth Potential

This watershed contains a portion of the Town of Fort Mill and rapidly growing residential areas near I-77 in the Fort Mill Township. Major development factors include the Paramount Carowinds amusement park and surrounding industrial park area, and the Charlotte Knights baseball stadium. Industrial growth is expected surrounding the U.S. Hwy. 521/S.C. Hwy. 160 interchange. Water service is present in all sections of the watershed, except for some areas east of Fort Mill. Sewer service is present in Fort Mill and surrounding areas and along the Steele Creek corridor. The presence of the expanding Charlotte urban area just across the State line and the easy access via I-77 result in a strong growth trend, which will continue into the near future. Transportation factors, which will have an impact on the area, include the now completed widening of I-77 and the proposed Fort Mill bypass for S.C. Hwy. 160.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba River (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Phosphorus Reduction Implementation

Charlotte-Mecklenburg Utilities is implementing phosphorus reduction at their large plant on McAlpine Creek. This improvement when fully implemented should substantially reduce phosphorus coming into McAlpine Creek and Sugar Creek.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm

03050103-030

(Twelvemile Creek/Waxhaw Creek)

General Description

Watershed 03050103-030 is located in Lancaster County and consists primarily of ***Twelvemile Creek, Waxhaw Creek,*** and their tributaries. The watershed occupies 30,043 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Appling-Vance-Cecil-Enon series. The erodibility of the soil (K) averages 0.32, and the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 84.6% forested land, 10.8% agricultural land, 3.6% scrub/shrub land, 0.4% water, 0.4% barren land, and 0.2% urban land.

The Twelvemile Creek watershed originates in North Carolina and drains into the Catawba River. Cow Branch and Tarkill Branch (Long Branch) flow into Sixmile Creek, which drains into Twelvemile Creek. Twelvemile Creek also accepts drainage from Rone Branch, Millstone Branch, and Todd Branch before entering the Catawba River. Waxhaw Creek accepts drainage from Causar Creek (Andrew Jackson State Park Lake) and Mill Branch (Foster Branch) flows into the Catawba River downstream of Twelvemile Creek. Andrew Jackson State Park is another natural resource in the area. There are a total of 81.7 stream miles and 97.4 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-176	P/W	FW	SIXMILE CREEK AT S-29-54
CW-083	S/INT	FW	TWELVEMILE CREEK AT S-29-55 0.3 MI NW OF VAN WYCK
CW-145	W/INT	FW	WAXHAW CREEK AT S-29-29

Sixmile Creek (CW-176) - Aquatic life uses are fully supported; however, there is a significant decreasing trend in dissolved oxygen concentration, and significant increasing trends in five-day biochemical oxygen demand, turbidity, total phosphorus concentration, and total nitrogen concentration. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Twelvemile Creek (CW-083) – Aquatic life uses are not supported due to turbidity excursions and occurrences of copper in excess of the aquatic life acute criterion. There is also a significant increasing trend in five-day biochemical oxygen demand. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Waxhaw Creek (CW-145) - Aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute criterion. There is also a significant decreasing trend in dissolved oxygen concentration. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
CAUSAR CREEK HEALTH SOUTH CENTRAL CAROLINAS PIPE #: 001 FLOW: 0.008	SC0041807 MINOR DOMESTIC (HEALTH SOUTH)

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
COMBS SHORT-TERM C&D LANDFILL CONSTRUCTION	292903-1301 -------
FRANK LANDFILL CONSTRUCTION	292900-1301 -------
HOOD SHORT TERM C&D LANDFILL CONSTRUCTION	292902-1301 -------

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*ND#* *TYPE*
OXYDATION POND JINGLE JUNGLE INC.	ND0067989 DOMESTIC

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ASHE DIV., BORAL BRICKS, INC. MILLER PIT	0003-57 SHALE
NORWOOD TRUCKING & GRADING, INC. NORWOOD TRUCKING & GRADING, INC.	1250-57 SAND
FRANK WILLIAMS COMPANY FRANK WILLIAMS MINE	1109-57 CLAY, TOPSOIL

Growth Potential

This area is adjacent to rapidly growing sections of the Charlotte urban area and has good access via the four-lane U.S. Hwy. 521. Public sewer has now become available in the northern area of the watershed to compliment existing public water. The result of this new infrastructure has been an

explosion of residential and commercial growth. The Del Webb Sun City project is a good example of this growth, which has fueled the approval of thousands of new residential lots in a variety of planned communities and subdivisions. This area of Lancaster County is currently experiencing rapid growth. This trend is expected to continue over the next several years.

Watershed Protection and Restoration

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website: http://centralina.org/seql/background.htm.

03050103-040

(Cane Creek)

General Description

Watershed 03050103-040 is located in Lancaster County and consists primarily of ***Cane Creek*** and its tributaries. The watershed occupies 90,086 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Helena-Herndon-Georgeville-Appling series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 12%, with a range of 2-45%. Land use/land cover in the watershed includes: 69.6% forested land, 16.9% agricultural land, 9.3% urban land, 3.1% scrub/shrub land, 0.6% water, and 0.5 barren land.

Cane Creek originates in North Carolina and accepts drainage from Simpson Branch, Unity Branch, Flag Pond Branch, McAteer Branch, Sandy Branch, Cedar Pines Lake, and Camp Creek (North Prong, South Prong). Further downstream, the Bear Creek drainage enters Cane Creek. Bear Creek accepts drainage from Caney Branch and Dry Branch before flowing through the Lancaster Reservoir. Lancaster Reservoir (75 acres) is used for municipal and recreational purposes for the Town of Lancaster. Turkey Quarter Creek (Little Turkey Creek) flows into Bear Creek at the reservoir, and further downstream Gills Creek (Hannahs Creek) enters near the Town of Lancaster. Rum Creek drains into Cane Creek near the Town of Fort Lawn. There are a total of 236.4 stream miles and 371.5 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-185	S/W	FW	CANE CREEK AT SC 200 5 MI NNE OF LANCASTER
CW-151	S/W	FW	BEAR CREEK AT S-29-362 3.5 MI SE OF LANCASTER
CW-047	S/W	FW	GILLS CREEK AT US 521 NNW OF LANCASTER
CW-131	S/W	FW	BEAR CREEK AT S-29-292 1.6 MI W OF LANCASTER
CW-210	BIO	FW	CANE CREEK AT SC 9 BYPASS
CW-017	S/INT	FW	CANE CREEK AT S-29-50
CW-232	W	FW	RUM CREEK AT S-29-187

Cane Creek - There are three SCDHEC monitoring sites along Cane Creek. Aquatic life uses are not supported at the upstream site ***(CW-185)*** due to dissolved oxygen excursions, which are compounded by a significant decreasing trend in dissolved oxygen concentration. There is a significant decreasing trend in pH. A significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. Aquatic life uses are partially supported at the midstream site ***(CW-210)*** based on macroinvertebrate community data.

At the downstream site ***(CW-017)***, aquatic life uses are not supported due to dissolved oxygen excursions. There is also a significant increasing trend in five-day biochemical oxygen demand. There is a significant decreasing trend in pH. Significant decreasing trends in total phosphorus and total

nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

Bear Creek – There are two SCDHEC monitoring sites along Bear Creek. Aquatic life uses are not supported at either site ***(CW-151, CW-131)*** due to dissolved oxygen excursions, which are compounded by significant decreasing trends in dissolved oxygen concentration. Recreational uses are partially supported at the upstream site ***(CW-151)*** and not supported at the downstream site ***(CW-131)*** due to fecal coliform bacteria excursions.

Gills Creek (CW-047) - Aquatic life uses are not supported due to dissolved oxygen excursions, which is compounded by a significant decreasing trend in dissolved oxygen concentration. There is also a significant increasing trend in five-day biochemical oxygen demand. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Rum Creek (CW-232) - Aquatic life uses are not supported due to dissolved oxygen excursions. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
CANE CREEK MCATEER MOBILE HOME PARK PIPE #: 001 FLOW: .00565	SC0027383 MINOR DOMESTIC

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
FRANKS TIRE PROCESSING TIRE PROCESSING	292414-5201 --------
SNIPES SHORT-TERM C&D LANDFILL CONSTRUCTION	292648-1301 --------
SPRINGS INDUSTRIES INDUSTRIAL/CONSTRUCTION	293314-1201 (CWP-023, IWP-080 ------- IWP-081, IWP-134, IWP-102)
PARNELL INERT LANDFILL INDUSTRIAL	IWP-213 -------

Mining Activities

MINING COMPANY / *MINE NAME*	*PERMIT #* / *MINERAL*
BRS, INC.	1235-57
MT. NEBO PIT	SAND

Growth Potential

The City of Lancaster is located in this watershed, and has densely developed areas of residential, commercial, and industrial land uses. The City of Lancaster continues to expand its wastewater treatment plant. This will allow for increased industrial and municipal flows. A large area of residential development extends to the south of the city, and also along S.C. Hwy. 9 and S.C. Hwy. 903 to the east, and U.S. Hwy. 521 and S.C. Hwy. 200 to the north. Significant industrial and commercial growth has occurred on the north side of the city along the S.C. Hwy.9 Bypass. Rail lines in the cities of Rock Hill and Chester run along S.C. Hwy 9. Water service is available along major roads throughout the watershed. Sewer service is available in the City of Lancaster in the residential areas to its south, and along S.C. Hwy. 903 east of the city. Lancaster County continues to develop Catawba Ridge, a large mixed-use community along Fishing Creek Reservoir. The development would extend from S.C. Hwy. 9 down to S.C. Hwy. 200, within the County. The overall project could result in a densely populated residential area, which would include commercial and industrial uses. To date, some residential developer has purchased acreage in the development with some limited housing construction underway.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for several water quality monitoring sites in the ***Cane Creek*** watershed including CW-151 and CW-131 along Bear Creek, CW-047 on Gills Creek, and CW-185 and CW-017 along Cane Creek to determine the maximum amount of fecal coliform bacteria they can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the sites were determined to be runoff from agricultural areas. The TMDL states that a 7% reduction in fecal coliform loading from these urban and agricultural sources at monitoring site CW-151, a 69% reduction at CW-151, a 63% reduction at CW-047, a 39% reduction at CW-185, and a 74% reduction at CW-017 are necessary for the streams to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Great Falls Heritage Tract

The Katawba Valley Land Trust (KVLT) is in the process of raising money to buy 2,000 acres on either side of the Catawba River at Great Falls, as well as along Cedar Creek Reservoir and Great Falls Reservoir. This tract includes more than 15 miles of water frontage on the river and tributaries will be conserved as a nature preserve or park. This project contributes to implementation of the Catawba River Corridor Plan.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website: http://centralina.org/seql/background.htm.

03050103-050

(Fishing Creek)

General Description

Watershed 03050103-050 is located in York County and consists primarily of ***Fishing Creek*** and its tributaries from its origin to its confluence with Wildcat Creek. The watershed occupies 31,766 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Appling-Hiwassee series. The erodibility of the soil (K) averages 0.25, and the slope of the terrain averages 6%, with a range of 2-15%. Land use/land cover in the watershed includes: 61.6% forested land, 29.4% agricultural land, 6.1% urban land, 2.0% barren land, 0.5% water, and 0.4% scrub/shrub land.

Fishing Creek originates near the City of York, and this stream segment accepts drainage from Langham Branch and Hope Branch. There are a total of 47.5 stream miles and 152.2 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-029	P/W	FW	FISHING CREEK AT SC 49 NE OF YORK
CW-031	BIO	FW	FISHING CREEK AT SC 161
CW-005	P/W/BIO	FW	FISHING CREEK AT S-46-347 DOWNSTREAM OF YORK WWTP
CW-225	S/INT	FW	FISHING CREEK AT S-46-503

Fishing Creek - There are four SCDHEC monitoring sites along this section of Fishing Creek. At the furthest upstream site (***CW-029***), aquatic life uses are fully supported. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. At the next site downstream ***(CW-031)***, aquatic life uses are fully supported based on macroinvertebrate community data.

Further downstream (***CW-005***), aquatic life uses are partially supported based on macroinvertebrate community data. A significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. At the furthest downstream site ***(CW-225)***, aquatic life uses are not supported due to occurrences of copper in excess of the aquatic life acute criterion. There is also a significant decreasing trend in dissolved oxygen concentration. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions, which are compounded by a significant increasing trend in fecal coliform bacteria concentration.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
FISHING CREEK CITY OF YORK/FISHING CREEK WWTP PIPE #: 001 FLOW: 2.0	SC0038156 MAJOR DOMESTIC
FISHING CREEK TRIBUTARY SUBURBAN PROPANE - TIRZAH PIPE #: 001 FLOW: 0.01	SC0046248 MINOR INDUSTRIAL (SCANA PROPANE)
HOPE BRANCH MCAFEE MHP PIPE #: 001 FLOW: 0.018	SC0027111 MINOR DOMESTIC

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
YORK COUNTY LANDFILL MUNICIPAL	461001-1101 (DWP-103, DWP-085, CLOSED DWP-010, 461001-1102 461001-6001)
YORK COUNTY LANDFILL C & D	461001-1201 ---
ROGERS CELLULOSIC LANDFILL CONSTRUCTION	462427-1201 (CWP-017) ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ALBERT D. OLIPHANT INTERPROP 49/5 MINE	1096-91 SAND/CLAY
JULE ROGERS ROGERS SAND MINE	1265-91 SAND

Growth Potential

The majority of growth in this watershed is concentrated around the City of York. Water and sewer service are available in York and in several surrounding areas. The East York Industrial Park continues to attract new commercial development to the area. Another factor that may promote growth includes the rail lines from York to the cities of Rock Hill, Columbia, and Charlotte.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for several water quality monitoring sites in the ***Fishing Creek*** watershed including CW-029, CW-005, and CW-225 to determine the maximum amount of fecal coliform bacteria they can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the sites were determined to be runoff from urban and pasture lands, failing septic systems, leaking or overflowing sanitary sewers, and livestock with uncontrolled access to streams. The TMDL states that an 84.2% reduction in fecal coliform loading from these urban and agricultural sources at monitoring site CW-029 and a 69.1% reduction at sites CW-005 and CW-225 are necessary for the streams to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Fecal Coliform in the Fishing Creek Watershed, York County, SC

The Fishing Creek watershed lies in the north central quadrant of South Carolina and is designated as HUC 03050103-050, 060, and 070.The project was recently approved for funding under §319 and will get underway around the first of 2005. It will be implemented by a partnership of organizations including the York and Chester Soil and Water Conservation District, Clemson Extension Service, York County Government, USDA-NRCS, Chester and York County Cattlemen's Associations and Research Planning, Inc. Each partner will bring expertise to the project in order to implement the TMDL, which will reduce the load of fecal coliform bacteria in the watershed so that state water quality standards for this pollutant are met. Participants in the project will use local knowledge, sampling, and spatial data analysis to characterize sites in the watershed that have high fecal coliform loading. Best Management Practices and effective outreach activities will then be utilized to benefit water quality relative to cost on selected sites.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired

reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website: http://centralina.org/seql/background.htm.

03050103-060

(Fishing Creek)

General Description

Watershed 03050103-060 extends through York and Chester Counties and consists primarily of ***Fishing Creek*** and its tributaries from Wildcat Creek to Great Falls Reservoir. The watershed occupies 136,173 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Pacolet-Mecklenburg-Iredell series. The erodibility of the soil (K) averages 0.22 and the slope of the terrain averages 8%, with a range of 2-25%. Land use/land cover in the watershed includes: 71.2% forested land, 17.3% agricultural land, 6.0% urban land, 3.1% scrub/shrub land, 2.1% barren land, and 0.3% water.

This segment of Fishing Creek accepts the drainage from its upper reach and from Wildcat Creek (Tools Fork, Dye Creek), which originates near the City of Rock Hill. Taylor Creek enters Fishing Creek downstream of Wildcat Creek, followed by Stoney Fork, Browns Branch, and Clinton Branch. Further downstream, South Fork Fishing Creek (Love Creek, Conrad Creek) merges with Fishing Creek followed by Hicklin Branch (McFadden Branch), the Tinkers Creek watershed, Reeves Creek, and Dairy Branch near the Town of Fort Lawn. Lake Oliphant is located on a tributary to Conrad Creek. Fishing Creek empties into and forms the headwaters of Great Falls Reservoir. There are a total of 285.2 stream miles and 190.8 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-006	S/W	FW	WILDCAT CREEK AT S-46-650
CW-212	S/W	FW	TOOLS FORK AT S-46-195 7 MI NW OF ROCK HILL
CW-096	S/W	FW	WILDCAT CREEK AT S-46-998 9 MI ENE OF MCCONNELLS
CW-224	S/W	FW	FISHING CREEK AT S-46-163
CW-697	BIO	FW	STONEY FORK AT SC 121 &72
CW-695	BIO	FW	TAYLOR CREEK AT S-46-735
CW-654	BIO	FW	FISHING CREEK AT S-46-655
CW-007	BIO	FW	SOUTH FORK FISHING CREEK AT S-12-50
RS-01007	RS01	FW	MCFADDEN BRANCH AT COUNTY ROAD 525, 7 MI S OF ROCK HILL
CW-008	P/W	FW	FISHING CREEK AT SC 223 NE OF RICHBURG
CW-233	W/INT/BIO	FW	FISHING CREEK AT S-12-77
CL-021	W	FW	LAKE OLIPHANT, FOREBAY EQUIDISTANT FROM DAM & SHORE

Wildcat Creek - There are two SCDHEC monitoring sites along Wildcat Creek, and recreational uses are not supported at either site due to fecal coliform bacteria excursions. There is a significant decreasing trend in pH at both sites. Aquatic life uses are not supported at the upstream site ***(CW-006)*** due to turbidity excursions. There is also a significant decreasing trend in dissolved oxygen concentration. Aquatic life uses are also not supported at the downstream site ***(CW-096)*** due to turbidity excursions; however, significant decreasing trends in turbidity and total phosphorus concentration suggest improving conditions for these parameters at this site.

Tools Fork (CW-212) - Aquatic life uses are not supported due to turbidity excursions; however, a significant decreasing trend in turbidity suggests improving conditions for this parameter. There is a significant decreasing trend in pH. There is also a significant increasing trend in total phosphorus concentration. Recreational uses are not supported due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Fishing Creek - There are four SCDHEC monitoring sites along this section of Fishing Creek. At the furthest upstream site (***CW-224***), aquatic life uses are fully supported, and a significant decreasing trend in total phosphorus concentration suggests improving conditions for this parameter. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions. At the next site downstream ***(CW-654)***, aquatic life uses are partially supported based on macroinvertebrate community data.

Further downstream (***CW-008***), aquatic life uses are fully supported. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. At the furthest downstream site ***(CW-233)***, aquatic life uses are fully supported based on macroinvertebrate community data. There is a significant decreasing trend in pH. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

Stoney Fork (CW-697) – Aquatic life uses are partially supported based on macroinvertebrate community data.

Taylor Creek (CW-695) – Aquatic life uses are partially supported based on macroinvertebrate community data.

South Fork Fishing Creek (CW-007) - Aquatic life uses are partially supported based on macroinvertebrate community data.

McFadden Branch (RS-01007) - Aquatic life uses are fully supported. Recreational uses are not supported due to fecal coliform bacteria excursions.

Lake Oliphant (CL-021) - Aquatic life uses are not supported due to pH and chlorophyll-*a* excursions. Recreational uses are fully supported.

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-074	GB	PIEDMONT BEDROCK	GUTHRIES

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
FISHING CREEK CITY OF CHESTER/LANDO-MANETTA PLT PIPE #: 001 FLOW: 0.50	SC0001741 MINOR DOMESTIC
TOOLS FORK UTILITIES OF SC/COUNTRY OAKS SD PIPE #: 001 FLOW: .020	SC0039217 MINOR DOMESTIC
TOOLS FORK TRIBUTARY ADNAH HILLS MHP PIPE #: 001 FLOW: .040	SC0041670 MINOR DOMESTIC
TAYLOR CREEK MARTIN MARIETTA/ROCK HILL QUARRY PIPE #: 001 FLOW: M/R	SCG730061 MNOR INDUSTRIAL
CLINTON BRANCH PINETUCK UTILITIES/ PINETUCK SD PIPE #: 001 FLOW : 0.15	SC0041203 MINOR DOMESTIC
CLINTON BRANCH KENTUCKY-CUMBERLAND COAL CO. PIPE #:001 FLOW: M/R	SC0042129 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
CITY OF ROCK HILL MUNICIPAL	261002-1702 (CWP-025, 461002- ACTIVE 1202)
CITY OF ROCK HILL MUNICIPAL	461002-1201 (DWP-901) ---
COUNTY SQUIRE S/T LC DEBRIS CONSTRUCTION	462452-1701 (462452-1301) ACTIVE
POPE CONSTRUCTION C/C LANDFILL CONSTRUCTION	462424-1201 (CWP-002, IWP-165, --- 462424-1601)

CLAWSON LAND CLEARING	462620-1701
-------	ACTIVE
ARTHUR SHORT TERM C&D	122901-1301
C & D	---------

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
REA CONSTRUCTION CO.	0178-23
FISHING CREEK MINE	SAND
INSTREAM DREDGING	
MARTIN MARIETTA AGGREGATES	0104-91
ROCK HILL QUARRY	GRANITE
RAMBO ASSOCIATES	1112-91
RAMBO ASSOCIATES MINE	SAND; SAND/CLAY
JAD LAND DEVELOPMENT, INC.	1275-91
DUNLAP RODDEY SOIL MINE	SAND
BOGGS PAVING INC.	1279-91
JUDSON LAWRENCE PIT	SAND

Growth Potential

The major development factor in this watershed is the southern and western portions of the City of Rock Hill. Portions of the towns of McConnells, Lowrys, Richburg, Fort Lawn, and Great Falls, together with the unincorporated communities of Edgemoor and Lando, are also located in this watershed. Water and sewer services are limited to the areas around Rock Hill and around municipalities along the S.C. Hwy. 9 corridor in Chester County. Industrial development continues to occur around the I-77/S.C. Hwy. 9 interchange near Richburg. The area around McConnells and Lowrys has a high level of agricultural activity. The potential for future development is greatest near Rock Hill and around the I-77/S.C. Hwy. 9 interchange.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for several water quality monitoring sites in the ***Fishing Creek*** watershed including CW-224, CW-008, and CW-233 along Fishing Creek, CW-212 on Tools Fork, and CW-006 and CW-096 on Wildcat Creek to determine the maximum amount of fecal coliform bacteria they can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the sites were determined to be runoff from urban and pasture lands, failing septic systems, leaking or overflowing sanitary sewers, and livestock with uncontrolled access to streams. The TMDL states that a 97.4% reduction in fecal

coliform loading from these urban and agricultural sources at monitoring site CW-212, a 79.5% reduction at CW-006, a 79.2% reduction at CW-096, a 72.3% reduction at CW-224, a 46.3% reduction at CW-008, and a 47.5% reduction at CW-233 are necessary for the streams to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Fecal Coliform in the Fishing Creek Watershed, York County, SC

The Fishing Creek watershed lies in the north central quadrant of South Carolina and is designated as HUC 03050103-050, 060, and 070.The project was recently approved for funding under §319 and will get underway around the first of 2005. It will be implemented by a partnership of organizations including the York and Chester Soil and Water Conservation District, Clemson Extension Service, York County Government, USDA-NRCS, Chester and York County Cattlemen's Associations and Research Planning, Inc. Each partner will bring expertise to the project in order to implement the TMDL, which will reduce the load of fecal coliform bacteria in the watershed so that state water quality standards for this pollutant are met. Participants in the project will use local knowledge, sampling, and spatial data analysis to characterize sites in the watershed that have high fecal coliform loading. Best Management Practices and effective outreach activities will then be utilized to benefit water quality relative to cost on selected sites.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the

environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm

03050103-070

(Tinkers Creek)

General Description

Watershed 03050103-070 is located in York and Chester Counties and consists primarily of ***Tinkers Creek*** and its tributaries. The watershed occupies 17,005 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Pacolet-Cecil-Wilkes-Madison series. The erodibility of the soil (K) averages 0.28 and the slope of the terrain averages 10%, with a range of 2-40%. Land use/land cover in the watershed includes: 86.7% forested land, 8.8% agricultural land, 3.6% scrub/shrub land, 0.4% water, 0.4% urban land, and 0.1% barren land.

Tinkers Creek accepts the drainage of Rum Branch and Neelys Creek before draining into Fishing Creek. There are a total of 41.3 stream miles and 15.1 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-227	S/W	FW	NEELYS CREEK AT 2-46-997
CW-234	W/INT/BIO	FW	TINKERS CREEK AT S-12-599

Neelys Creek (CW-227) - Aquatic life uses are fully supported; however, there is a significant decreasing trend in dissolved oxygen concentration. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Tinkers Creek (CW-234) – Aquatic life uses are not supported due to macroinvertebrate community data and turbidity excursions, compounded by a significant increasing trend in turbidity. There is a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
NEELYS CREEK NEELYS CREEK HOMES, INC. PIPE #: 001 FLOW: .008	SC0041904 MINOR DOMESTIC
NEELYS CREEK TRIBUTARY JACK NELSON ENTERPRISES PIPE #: 001 FLOW: .012	SC0027341 MINOR DOMESTIC

Growth Potential

This watershed, which contains a portion of the Town of Leslie, is primarily rural, with scattered residential development located throughout. Water service is available but sewer service continues to be limited, thus restricting growth in the area. There is some ongoing forestry activity.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for several water quality monitoring sites in the ***Fishing Creek*** watershed including CW-227 on Neelys Creek and CW-234 on Tinkers Creek to determine the maximum amount of fecal coliform bacteria they can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the sites were determined to be runoff from urban and pasture lands, failing septic systems, leaking or overflowing sanitary sewers, and livestock with uncontrolled access to streams. The TMDL states that a 69.5% reduction in fecal coliform loading from these urban and agricultural sources at the above sites is necessary for the streams to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs".

Special Projects

TMDL Implementation for Fecal Coliform in the Fishing Creek Watershed, York County, SC

The Fishing Creek watershed lies in the north central quadrant of South Carolina and is designated as HUC 03050103-050, 060, and 070.The project was recently approved for funding under §319 and will get underway around the first of 2005. It will be implemented by a partnership of organizations including the York and Chester Soil and Water Conservation District, Clemson Extension Service, York County Government, USDA-NRCS, Chester and York County Cattlemen's Associations and Research Planning, Inc. Each partner will bring expertise to the project in order to implement the TMDL, which will reduce the load of fecal coliform bacteria in the watershed so that state water quality standards for this pollutant are met. Participants in the project will use local knowledge, sampling, and spatial data analysis to characterize sites in the watershed that have high fecal coliform loading. Best Management Practices and effective outreach activities will then be utilized to benefit water quality relative to cost on selected sites.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba River (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake

Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm

03050103-080

(Camp Creek)

General Description

Watershed 03050103-080 is located in Lancaster County and consists primarily of ***Camp Creek*** and its tributaries. The watershed occupies 26,305 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Helena-Pacolet-Cecil series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 92.1% forested land, 6.7% agricultural land, 1.0% scrub/shrub land, 0.6% barren land, and 0.1% water.

Camp Creek originates near the City of Lancaster and accepts the drainage of Dry Creek before flowing into Cedar Creek Reservoir. There are a total of 65.6 stream miles and 35.0 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-084	BIO	FW	CAMP CREEK AT S-29-20
CW-235	W/INT	FW	CAMP CREEK AT SC 97

Camp Creek – There are two SCDHEC monitoring sites along Camp Creek. At the upstream site ***(CW-084)***, aquatic life uses are fully supported due to macroinvertebrate community data. At the downstream site ***(CW-235)***, aquatic life uses are fully supported; however, there is a significant decreasing trend in dissolved oxygen concentration. There is a significant decreasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions.

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
LANCASTER COUNTY LANDFILL MUNICIPAL	291001-1101 (DWP-120) CLOSED
LANCASTER COUNTY LANDFILL MUNICIPAL	291001-1201 --------
CITY OF LANCASTER TRANS. STA.& LANDFILL MUNICIPAL	291003-6001 (DWP-025) CLOSED

Growth Potential

Lancaster County continues to develop Catawba Ridge, a large mixed-use community along Fishing Creek Reservoir, which would affect a portion of this watershed. The development would extend from S.C. Hwy. 9 down to S.C. Hwy. 200. To date, several residential developers have purchased acreage in the development with some limited housing construction underway.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Camp Creek*** monitoring site CW-235 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be runoff from agricultural lands. The TMDL states that a 44% reduction in fecal coliform loading from agricultural sources is necessary for the stream to meet the recreational use standard. For more details on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm.

03050103-090

(Rocky Creek)

General Description

Watershed 03050103-090 is located in Chester and Fairfield Counties and consists primarily of ***Rocky Creek*** and its tributaries. The watershed occupies 127,873 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Pacolet-Cecil-Madison series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 10%, with a range of 2-40%. Land use/land cover in the watershed includes: 85.5% forested land, 9.0% agricultural land, 3.2% scrub/shrub land, 1.7% urban land, 0.4% barren land, and 0.2% water.

Rocky Creek originates near the Town of Chester and accepts drainage from Grassy Run Branch, Bull Run Creek, Hooper Creek (Melton Branch), Barbers Creek (McDaniels Branch, Waters Branch), Bull Skin Creek, and Beaverdam Creek. Little Rocky Creek accepts drainage from Shannon Creek and Bell Creek (Stover Creek) before flowing into Rocky Creek. Hodges Branch and Turkey Branch drain into Rocky Creek at the base of the watershed. Rocky Creek drains into Cedar Creek Reservoir near the Town of Great Falls. There are a total of 265.3 stream miles and 269.4 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-088	S/W	FW	GRASSY RUN BRANCH AT SC 72 1.6 MI NE OF CHESTER
CW-002	P/W/BIO	FW	ROCKY CREEK AT S-12-335 3.5 MI E OF CHESTER
CW-067	BIO	FW	LITTLE ROCKY CREEK AT S-12-144
CW-691	BIO	FW	BEAVERDAM CREEK AT S-12-555
CW-236	W/INT	FW	ROCKY CREEK AT S-12-138
CW-175	S/W	FW	CEDAR CREEK RESERVOIR/ROCKY CREEK ARMAT S-12-141 SE OF GREAT FALLS

Grassy Run Branch (CW-088) - Aquatic life uses are not supported due to dissolved oxygen excursions. There is also a significant increasing trend in five-day biochemical oxygen demand. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

Rocky Creek – There are two SCDHEC monitoring sites along Rocky Creek. Recreational uses are not supported at either site due to fecal coliform bacteria excursions. There is a significant decreasing trend in pH at both sites. At the upstream site ***(CW-002)***, aquatic life uses are not supported based on macroinvertebrate community data and occurrences of copper in excess of the aquatic life acute criterion. There is also a significant decreasing trend in dissolved oxygen concentration. At the downstream site ***(CW-236)***, aquatic life uses are fully supported.

Little Rocky Creek (CW-067) – Aquatic life uses are fully supported based on macroinvertebrate community data.

Beaverdam Creek (CW-691) – Aquatic life uses are partially supported based on macroinvertebrate community data.

Rocky Creek Arm of Cedar Creek Reservoir (CW-175) - Aquatic life uses are not supported due to dissolved oxygen, turbidity, and total phosphorus excursions. There is a significant decreasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
ROCKY CREEK CITY OF CHESTER/ROCKY CREEK PLT PIPE #: 001 FLOW: 1.36 PIPE #: 001 FLOW: 2.0 (PROPOSED)	SC0036056 MAJOR DOMESTIC
ROCKY CREEK SPRINGS INDUSTRIES/KATHERINE PLANT PIPE #: 001 FLOW: M/R	SCG250041 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
WILLAMETTE INDUSTRIES INDUSTRIAL	123301-1601 (IWP-188) ACTIVE
CHESTER COUNTY C&D LANDFILL CONSTRUCTION	121001-1101 (DWP-081) CLOSED
CHESTER COUNTY C&D LANDFILL CONSTRUCTION	121003-1201 ACTIVE
CHESTER COUNTY TRANSFER STA. MUNICIPAL	121001-6001 --------

Growth Potential

This watershed contains portions of the towns of Richburg, Eureka Mill and Great Falls, and the City of Chester. Growth extends north and east of Chester, along York Road and S.C. 72.

Industrial, residential, and commercial growth has occurred in the Richburg area, associated with the I-77/S.C. 9 interchange and the presence of utilities in that area. Water service is available in the Chester area, along S.C. Hwy. 9 to Fort Lawn, and down S.C. Hwy. 99 to Great Falls. Sewer service exists in the Chester, Great Falls, and Richburg areas. The presence of I-77 will continue to have an impact on future growth in the watershed, especially in the Richburg area. The County's other important transportation artery, S.C. Hwy.9, has now been widened to four lanes between Chester and Fort Lawn. The remainder of the watershed is rural and should see scattered development in the future.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Grassy Run Branch*** water quality monitoring site CW-088 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be runoff from urban areas in the watershed. The TMDL states that an 86% reduction in fecal coliform loading from urban sources is necessary for the stream to meet the recreational use standard.

A TMDL was also developed by SCDHEC and approved by EPA for ***Rocky Creek*** water quality monitoring sites CW-002, CW-236, and CW-175 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be runoff from urban and agricultural areas in the watershed, including failing septic systems, leaking and overflowing sanitary sewers, and cattle-in-streams. The TMDL states that an 83% reduction in fecal coliform loading from urban and agricultural sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Rocky Creek

Waters in the targeted areas violated the state water quality standard for fecal coliform bacteria, and were placed on the 303(d) list. A Total Maximum Daily Load (TMDL) was then developed. The goal of the cooperating partners for this project (Research Planning, Inc., and Clemson Extension Service) is to implement the TMDL using Best Management Practices (BMPs) on agricultural and rural sites. Since the project commenced in early 2004, three agricultural landowners have decided to participate in the cost-sharing program, and six additional landowners are considering participation. As of October 2004, BMPs installed and/or in progress include: a feeding shed where manure will be collected and stored properly, a composter/waste storage facility, water lines to additional troughs, 2.5 acres of riparian herbaceous cover planted, 2885 ft. of fencing (for stream protection), 7 tons of crusher run in heavy use areas, and a solar powered well. Outreach activities that have been

implemented include a Home-A-Syst workshop led by Clemson Extension. Septic tank system owners (members of approximately 15 households in attendance) were made aware of potential impacts from leaking/overflowing septic systems in need of repair. A tour of farms where BMPs that were implemented under a previous 319 funded project were showcased. The farm tour was very successful, with over 60 farmers participating. Interest in the cost-sharing aspects of the program for Rocky Creek rose after the tour.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

Sustainable Environment for Quality of Life

Sustainable Environment for Quality of Life (SEQL) is a USEPA program, which addresses regional environmental planning through the Centralina Council of Governments and the Catawba Regional Council of Governments. SEQL is intended to assist local governments in the 15-county Charlotte/Gastonia/Rock Hill region to work together to promote economic growth while protecting the environment. Multiple air and water quality issues are analyzed simultaneously, while addressing transportation, water, land use, energy use, population growth and economic development. The Department has supported the program by providing air and water quality information. More information about SEQL is available at the following website:
http://centralina.org/seql/background.htm

03050104-010

(Wateree River/Lake Wateree)

General Description

Watershed 03050104-010 is located in Fairfield and Kershaw Counties and consists primarily of the ***Wateree River*** and its tributaries as it flows through ***Lake Wateree***. The watershed occupies 208,964 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Wateree-Rion-Madison series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 17%, with a range of 2-45%. Land use/land cover in the watershed includes: 88.9% forested land, 5.9% water, 2.2% scrub/shrub land, 1.3% agricultural land, 0.9% forested wetland, 0.7% urban land, and 0.1% barren land.

The Catawba River flows out of the Cedar Creek Dam and is joined by Cedar Creek (Bell Branch, Rocky Creek, Gar Creek), McDowell Creek, Crooked Creek, and the Big Wateree Creek watershed to form the headwaters of the Wateree River and Lake Wateree. Duke Power Company oversees operation of Lake Wateree, which is used for power generation, water supply, and recreational purposes. Little Wateree Creek originates near the Town of Winnsboro and accepts drainage from Horse Creek, McCulley Creek, Ready Creek, Minton Creek (White Oak Branch), and Horse Branch before flowing into the Big Wateree Creek embayment. Langley Branch enters the lake just downstream of the confluence, and Taylor Creek and Dutchmans Creek (Cedar Fork, Lots Fork) form arms of the lake near Lake Wateree State Park. Moving downlake, streams draining into the lake include: Singleton Creek (McDow Creek, Rocky Branch), Rochelle Creek, June Creek, Fox Creek, Beaver Creek (Tranham Creek, Showerbath Branch, Little Beaver Creek), Stillhouse Branch, Colonel Creek, and White Oak Creek. Lake Wateree State Park, located near Dutchmans Creek, is another natural resource in the area. There are a total of 470.5 stream miles and 11,856.3 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-231	W/INT	FW	LAKE WATEREE HEADWATERS, 50 YDS DS OF CEDAR CK CONFLUENCE
CW-040	S/W	FW	LITTLE WATEREE CREEK AT S-20-41 5 MI E OF WINNSBORO
RS-02321	RS02	FW	DUTCHMANS CREEK AT S-20-106
CW-692	BIO	FW	DUTCHMANS CREEK AT S-20-21
CW-076	BIO	FW	BEAVER CREEK AT S-28-13
CW-208	P/W	FW	LAKE WATEREE AT S-20-101, 11 MI ENE OF WINNSBORO
RL-02314	RL02	FW	LAKE WATEREE 1.0 MI SW FROM MOUTH OF BEAVER CREEK
CW-207	P/W	FW	LAKE WATEREE AT END OF S-20-291
CW-693	BIO	FW	WHITE OAK CREEK AT S-28-696
RL-01003	RL01	FW	LAKE WATEREE 11.25 MI NW OF CAMDEN ON W SHORE OF LAKE
CW-209	P/W	FW	LAKE WATEREE AT SMALL ISLAND 2.3 MI N OF DAM
RL-01033	RL01	FW	LAKE WATEREE 9.7 MI NW OF CAMDEN, TOWARD THE S END OF LAKE
CL-089	INT	FW	LAKE WATEREE IN FOREBAY EQUIDISTANT FROM DAM & SHORELINES

Lake Wateree – There are eight SCDHEC monitoring sites along Lake Wateree. Aquatic life uses are not supported at the headwaters site ***(CW-231)*** due to turbidity and total phosphorus excursions. Recreational uses are fully supported at this site; however, there is a significant increasing trend in fecal coliform bacteria concentration. At the next site downstream ***(CW-208)***, aquatic life uses are not supported due to pH, total phosphorus, and chlorophyll-*a* excursions. There is also a significant increasing trend in total suspended solids. Recreational uses are fully supported at this site. Further downstream ***(RL-02314)***, aquatic life uses are not supported due to pH and total phosphorus excursions. Recreational uses are fully supported at this site.

Aquatic life uses are not supported at the next site downstream ***(CW-207)*** due to pH and total phosphorus excursions. There is also a significant increasing trend in total suspended solids. Recreational uses are fully supported at this site and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter. Further downstream ***(RL-01003)***, aquatic life and recreational uses are fully supported. Continuing downstream ***(CW-209)***, aquatic life uses are not supported due to pH and total phosphorus excursions, compounded by a significant increasing trend in pH. There is also a significant increasing trend in total suspended solids. A significant decreasing trend in total nitrogen concentration suggests improving conditions for this parameter. Recreational uses are fully supported at this site and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Further downstream at the next site ***(RL-01033)***, aquatic life and recreational uses are fully supported. At the furthest downstream site ***(CL-089)***, aquatic life uses are partially supported due to pH excursions. Recreational uses are fully supported at this site. *Fish tissue samples from Lake Wateree indicate no advisories are needed at this time.*

Lake Wateree was treated with aquatic herbicides in 2000, 2001, and 2005 in an attempt to control aquatic macrophyte growth that has impaired boating, swimming and public access in certain areas of the lake. In addition, fall and winter drawdowns were utilized to help eliminate macrophyte growth.

Little Wateree Creek (CW-040) - Aquatic life uses are not supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen. A significant decreasing trend in turbidity suggests improving conditions for this parameter. Recreational uses are partially supported; however, a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Dutchmans Creek – There are two SCDHEC monitoring sites along Dutchmans Creek. Aquatic life uses are fully supported at the upstream site ***(RS-02321)***. Recreational uses are not supported due to fecal coliform bacteria excursions. At the downstream site ***(CW-692),*** aquatic life uses are fully supported based on macroinvertebrate community data.

Beaver Creek (CW-076) - Aquatic life uses are fully supported based on macroinvertebrate community data.

White Oak Creek (CW-693) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-059	GB	PIEDMONT BEDROCK	LAKE WATEREE STATE PARK

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
LAKE WATEREE NOSOCA PINES RANCH PIPE #: 001 FLOW: .025	SC0033651 MINOR DOMESTIC
LAKE WATEREE US AIR FORCE/WATEREE RECREATION PIPE #: 001 FLOW: 0.01	SC0044440 MINOR INDUSTRIAL
MCCULLEY CREEK TOWN OF WINNSBORO/WTP PIPE #: 001 FLOW: 0.01	SCG645027 MINOR DOMESTIC

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
FAIRFIELD COUNTY CARLISLE PIT	0336-39 SAND
FAIRFIELD COUNTY ROCHELLE MINE	0848-39 CLAY
NEW ENGLAND STONE IND., INC. KERSHAW MINE	0556-55 GRANITE
CAROLINA QUARRIES CONGAREE QUARRY	0405-57 GRANITE

Water Quantity

WATER USER *STREAM*	*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
LUGOFF-ELGIN WATER AUTHORITY	5.2
LAKE WATEREE	7.8
CITY OF CAMDEN	9.0
LAKE WATEREE	12.0

Growth Potential

There is a moderate to high potential for continued residential and commercial development adjacent to Lake Wateree and the Town of Winnsboro. Public water is available along S.C. Hwy. 34, which runs between the Towns of Winnsboro and Ridgeway, and plans are being developed to extend public sewer along this corridor.

Watershed Protection and Restoration

Special Projects

Catawba Wateree FERC Re-licensing

The Federal Energy Regulatory Commission (FERC) is the agency that licenses, inspects, and oversees environmental matters related to most hydroelectric (hydro) projects. FERC licenses, which regulate the design and operation of those projects, are issued for a term of 30 to 50 years. The relicensing process typically begins 5 years before the current license expiration date and involves the applicant providing information to state and federal resource and regulatory agencies, as well as other interested parties. During traditional licensing process, environmental issues such as water quality, minimum flow releases from dams and endangered species are addressed by states through 401 certifications required prior to new licenses being issued.

In the Catawba River watershed, Duke Power operates 13 hydro facilities and 11 reservoirs on the Catawba River in North and South Carolina. Seven of these facilities and 5 reservoirs are located in South Carolina, including **Lake Wateree**. All these facilities are regulated through a single license, which expires in 2008. Duke Power has initiated a "hybrid" relicensing process, which includes a collaborative process involving stakeholder negotiations, in addition to the traditional process. The Department is actively participating in the collaborative process as well as the traditional process, and Duke will apply for §401 Certification in 2006. More information about Catawba Wateree FERC relicensing can be found on the Duke Power website at: http://www.catawbahydrolicensing.com/.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined

as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

03050104-020

(Big Wateree Creek)

General Description

Watershed 03050104-020 is located in Fairfield County and consists primarily of ***Big Wateree Creek*** and its tributaries. The watershed occupies 37,434 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Wilkes-Winnsboro series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 15%, with a range of 2-40%. Land use/land cover in the watershed includes: 85.9% forested land, 6.8% agricultural land, 6.1% scrub/shrub land, 0.8% urban land, 0.3% water, and 0.1% barren land.

Big Wateree Creek accepts the drainage of Wall Creek, Willow Swamp Branch, Gaydens Creek, Scabber Branch, and Hogfork Branch before forming an arm of Lake Wateree. There are a total of 96.2 stream miles and 88.6 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-072	W/INT	FW	BIG WATEREE CREEK AT US 21

Big Wateree Creek (CW-072) - Aquatic life uses are partially supported due to dissolved oxygen and pH excursions. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
BIG WATEREE CREEK WHITE OAK CONFERENCE CENTER PIPE #: 001 FLOW: 0.0495	SC0035980 MINOR DOMESTIC

Growth Potential

There is a low potential for growth in this rural watershed. I-77 and S.C. Hwy. 200 cross near the center of the watershed and some commercial/industrial growth may occur around the intersection. The only water and sewer service is available along S.C. Hwy. 200 from the Town of Winnsboro to I-77. Another area of minor growth is the Blackstock area north of Winnsboro on U.S. Hwy. 321.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Big Wateree Creek*** (CW-072) for violations of the fecal coliform bacteria and turbidity standards. The primary sources of fecal coliform to the stream were runoff from agricultural activities, cattle-in-stream, and failing septic systems. The TMDL states that an 80% reduction in fecal coliform loading from agricultural sources is necessary for the stream to meet the recreational use standard. The probable sources of turbidity in the stream are the resuspension of sediment in the streambed and bank erosion. Because turbidity is not a concentration and therefore cannot be expressed as a load, total suspended solids (TSS) was used as a surrogate. The TMDL states that a 70% reduction in TSS loading is necessary for the stream to meet the aquatic life use standard. Implementation of the Big Wateree Creek fecal coliform TMDL should bring about the reductions necessary to improve water quality for turbidity also. For more details on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

Special Projects

TMDL Implementation for Fecal Coliform and Turbidity in the Big Wateree Creek Watershed

The targeted area in the Big Wateree Creek Watershed involves the waters above sampling station CW-072, and has been documented by SCDHEC as violating the water quality standard for fecal coliform bacteria and turbidity. Total Maximum Daily Loads (TMDLs) have since been developed and approved for this area for both parameters of concern. Based on guidelines set by SCDHEC, the objective of this project is to lower fecal coliform and turbidity loading, attainable within the allotted 319 funding, by 80% and 70%, respectively, so that water quality standards are attained. The project will work to obtain this goal by educating local landowners about sources of fecal coliform and turbidity loading and implementing Best Management Practices (BMPs) within the area of concern.

NPS Assessment and TMDL for Phosphorus in the Catawba River Basin

In June 2003, researchers at the University of South Carolina completed a §319-funded study of nutrient loading in the lower Catawba River basin using the WARMF (Watershed Analysis Risk Management Framework) water quality model. The model estimated that the lower Catawba (defined as the Catawba River downstream of the Lake Wylie dam and all tributaries through Lake Wateree) received an average load of 2100 kg/day of phosphorus for the 1996-1998 study period. Of this load, 46% was from point sources, 39% was from nonpoint sources, and 15% was from Lake Wylie. SCDHEC is currently using the WARMF model, which is being updated through 2003, to further refine nonpoint sources, to determine loading rates that would allow the reservoirs to meet the phosphorus standard (TMDLs), and to calculate wasteload allocations for phosphorus for the impaired reservoirs. Cooperators in the study include Catawba River stakeholders, North Carolina DWQ, and EPA Region 4.

03050104-030

(Wateree River)

General Description

Watershed 03050104-030 is located in Kershaw, Sumter and Richland Counties and consists primarily of the ***Wateree River*** and its tributaries from the Wateree dam to its confluence with the Congaree River. The watershed occupies 224,118 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Lakeland-Chastain-Tawcaw-Vaucluse series. The erodibility of the soil (K) averages 0.22 and the slope of the terrain averages 5%, with a range of 0-25%. Land use/land cover in the watershed includes: 56.5% forested land, 19.4% forested wetland (swamp), 13.0% agricultural land, 4.7% scrub/shrub land, 3.6% urban land, 2.4% water, 0.3% nonforested wetland (marsh), and 0.1% barren land.

Downstream from the Wateree Dam, the Wateree River accepts drainage from Grannies Quarter Creek watershed, Sawneys Creek watershed, Rocky Branch, and Sanders Creek (Gum Swamp Creek). There are several ponds and lakes along the Sanders Creek drainage that include Vaughs Mill Pond, Colonial Lake, and Lake Shamokin. Camp Creek enters the river downstream near the City of Camden, as does the Twentyfive Mile Creek watershed, Gillies Creek (Buck Creek), Big Pine Tree Creek watershed, Town Creek, and Gillies Ditch (Jumping Gully). Further downstream, the Swift Creek watershed enters the river followed by Rafting Creek (Ellerbee Mill Pond, Bracey Mill Creek, Little Rafting Creek, Dinkins Mill Pond), the Spears Creek watershed, Pigeon Roost Branch, Gum Swamp Branch (Robert Branch), and the Colonels Creek watershed. Gum Swamp Branch flows through several oxbow lakes that include Ruggs Lake, Big Lake, Little Lake, and Dry Swamp Lake. The Wateree River flows past the Town of Eastover and just prior to its confluence with the Congaree River, it accepts drainage from Little River (Beech Creek, Halfway Creek, Campbell Creek, Shanks Creek, Sandy Creek, Fullers Earth Creek). Kohlers Old River connects Halfway Creek to the river. Additional natural resources include the Manchester State Forest and Poinsett State Park located in the lower portion of the watershed. Poinsett State Park Lake is located on Shanks Creek. There are a total of 493.5 stream miles and 741.8 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-019	S/W	FW	WATEREE RIVER AT US 1
RS-01046	RS01	FW	RAFTING CREEK AT COUNTY ROAD 263, 1 MI E OF REMBERT
CW-206	P/SPRP	FW	WATEREE RIVER AT US 76 & 378
CW-222/SC-002	P/INT	FW	WATEREE RIVER 1.6 MI UPSTREAM OF CONFL. WITH CONGAREE RIVER

Wateree River - There are three SCDHEC monitoring sites and one South Carolina Public Service Authority (SCPSA) monitoring site along the Wateree River. Aquatic life uses are partially supported at the upstream site ***(CW-019)*** due to dissolved oxygen excursions; however, a significant increasing trend in dissolved oxygen concentration suggests improving conditions for this parameter. Significant

decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters as well. Recreational uses are fully supported at this site. Aquatic life uses are fully supported at the midstream site ***(CW-206)***, and a significant increasing trend in dissolved oxygen concentration and significant decreasing trends in five-day biochemical oxygen demand, turbidity, and total nitrogen concentration suggest improving conditions for these parameters. Recreational uses are fully supported at this site.

At the downstream site ***(CW-222, SC-002)***, aquatic life uses are fully supported and significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. There is a significant increasing trend in pH. Recreational uses are fully supported at this site and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Rafting Creek (RS-01046) – Aquatic life and recreational uses are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations.

A fish consumption advisory has been issued by the Department for mercury and includes the Wateree River within this watershed (see advisory p.39).

Natural Swimming Areas

FACILITY NAME / *RECEIVING STREAM*	*PERMIT #* / *STATUS*
POINSETT STATE PARK	43-N01
POINSETT STATE PARK LAKE	ACTIVE

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-018	GB	BLACK CREEK	OAKLAND PLANTATION
AMB-038	GB	MIDDENDORF	C. THOMPSON WATER DISTRICT

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / *FACILITY NAME* / *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* / *TYPE* / *COMMENT*
WATEREE RIVER	SC0002038
SCE&G/WATEREE STATION	MAJOR INDUSTRIAL
PIPE #: 001 FLOW: 490	
PIPE #: 002,003A,003B FLOW: M/R	

WATEREE RIVER INVISTA SARL/CAMDEN PIPE #: 001 FLOW: 4.200 PIPE #: 002 FLOW: 0.012	SC0002585 MAJOR INDUSTRIAL (EI DUPONT)
WATEREE RIVER CLARIANT LSM (AMERICA), INC. PIPE #: 001 FLOW: 0.800	SC0002682 MAJOR INDUSTRIAL (ARCHIMICA/NIPA /HARDWICK)
WATEREE RIVER CITY OF CAMDEN WWTP PIPE #: 001 FLOW: 2.4 PIPE #: 001 FLOW: 3.0 (PROPOSED)	SC0021032 MAJOR DOMESTIC
WATEREE RIVER INTERNATIONAL PAPER/EASTOVER (UNION CAMP) PIPE #: 001,01A FLOW: M/R	SC0038121 MAJOR INDUSTRIAL
WATEREE RIVER KERSHAW COUNTY/LUGOFF WWTP PIPE #: 001 FLOW: 0.72	SC0039870 MINOR DOMESTIC
WATEREE RIVER KAWASHIMA TEXTILE USA, INC. PIPE #: 001 FLOW: M/R PIPE #: 002 FLOW: 1.075	SC0023264 MAJOR INDUSTRIAL (WATEREE TEXTILE CORP.)
WATEREE RIVER FINNCHEM USA, INC. PIPE #: 001,002 FLOW: 0.22	SC0047902 MINOR INDUSTRIAL (HURON TECH CORP.)
WATEREE RIVER RICHLAND COUNTY/EASTOVER REG. WWTP PIPE #: 001 FLOW: 0.25 TIER I (CURRENT) PIPE #: 001 FLOW:0.50 TIER II PIPE #: 001 FLOW:0.75 TIER III	SC0047911 MINOR DOMESTIC
WATEREE RIVER PALMETTO UTILITIES INC. REG. WWTP PIPE #: 001 FLOW: 6.000 UNCONSTRUCTED	SC0043451 MINOR DOMESTIC
WATEREE RIVER CITY OF SUMTER PIPE #: 001 FLOW: 9.000 (PROPOSED)	SC0027707 MAJOR DOMESTIC
WATEREE RIVER SC DEPT. CORR./WATEREE RIVER PLT PIPE #: 001 FLOW: 0.250	SC0045349 MINOR DOMESTIC
GILLIES CREEK UNIMIN CORP./LUGOFF PLT PIPE #: 001,01A,002,02A,003 FLOW: M/R	SCG730382 MINOR INDUSTRIAL WAS SC0002909
GILLIES CREEK COGSDILL TOOL PRODUCTS PIPE #: 001 FLOW: M/R	SC0037575 MINOR INDUSTRIAL

GILLIES CREEK EASTERN LAND & TIMBER/IND. PK. MN. PIPE #: 001 FLOW: M/R	SCG730188 MINOR INDUSTRIAL
GUM SWAMP BRANCH BECKER HANSON AGGREGATES SE/HASSKAMP MINE PIPE #: 001,002 FLOW: M/R	SC0039292 MINOR INDUSTRIAL
LITTLE RAFTING CREEK SCENIC LAKE PARK PIPE #: 001 FLOW: 0.010	SC0031895 MINOR DOMESTIC
BEECH CREEK US AIR FORCE/SHAW AFB PIPE #: 01A,01B FLOW: M/R PIPE #: 001 FLOW: 1.20	SC0024970 MINOR INDUSTRIAL
BEECH CREEK TRIBUTARY CWS/OAKLAND PLANTATION SD PIPE #: 001 FLOW: 0.160	SC0030678 MINOR DOMESTIC
BEECH CREEK TRIBUTARY SOUTH FORGE APTS PIPE #: 001 FLOW: 0.0182	SC0033235 MINOR DOMESTIC
SANDERS CREEK TRIBUTARY NEW SOUTH/CAMDEN PIPE #:001 FLOW: M/R	SC0047384 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
INTERNATIONAL PAPER/EASTOVER INDUSTRIAL	IWP-187 ACTIVE
HAGOOD HERATIO DUMP ----------	--------- CLOSED
PLOWDEN C&D DUMP C&D	--------- CLOSED

Land Application Sites

LAND APPLICATION *FACILITY NAME*	*PERMIT #* *TYPE*
SPRAYFIELD ROLLING MEADOWS/HERMITAGE FINAN	ND0069868 DOMESTIC
SPRAYFIELD SMITHS MHP	ND0061735 DOMESTIC
RAPID INFILTRATION BASIN PRAXAIR, INC./LINDE DIV.	ND0069655 INDUSTRIAL

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
LUGOFF SAND COMPANY LUGOFF SAND MINE	0121-55 SAND
HANSEN AGGREGATES HARRY HASSKAMP MINE	0582-85 SAND/GRAVEL
CANTEY CONSTRUCTION, INC. BUTTERNUT MINE	1546-55 SAND

Water Quantity

WATER USER *STREAM*	*REGULATED CAPACITY (MGD)* *PUMPING CAPACITY (MGD)*
EI DUPONT DENEMOURS WATEREE RIVER	6.0 9.0

Growth Potential

There is a high potential for growth in this watershed, which contains portions of the City of Camden and the Town of Lugoff and is adjacent to Shaw Air Force Base. There is a high potential for development around these areas. A large portion of the watershed are river bottomland swamp forests, which are heavily forested for timber. The City of Camden is proposing to upgrade the WWTP to 3.0 MGD to serve the growth in the area. The Town of Stateburg and portions of the Towns of Wedgewood and Rembert are also contained in this watershed.

Watershed Protection and Restoration

Special Projects

Water Quality Model of the Upper Wateree River

The Kershaw County Water and Sewer Authority contracted with the U.S. Geological Survey to conduct an extensive modeling study of the upper Wateree River, which was completed in 1999. The study included the characterization of streamflow and water quality in the river and the development of hydrodynamic and water quality computer simulation models. Together, the models are designed to predict water quality, especially dissolved oxygen levels, under various streamflow and loading conditions. It has been determined that a formal TMDL will not be required for this section of the Wateree River, since the impairment in this portion of the river is due, at least in part, to the discharge of low dissolved oxygen water from Lake Wateree. This situation is being addressed by the Department via means other than the NPDES and TMDL programs. The models are currently being used; however, to develop wasteload allocations that will be included in NPDES permits issued for discharges to the river.

03050104-040

(Grannies Quarter Creek)

General Description

Watershed 03050104-040 is located in Kershaw and Lancaster Counties and consists primarily of ***Grannies Quarter Creek*** and its tributaries. The watershed occupies 45,211 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Goldston-Lakeland-Badin series. The erodibility of the soil (K) averages 0.15 and the slope of the terrain averages 15%, with a range of 0-45%. Land use/land cover in the watershed includes: 92.0% forested land, 5.6% agricultural land, 1.2% scrub/shrub land, 1.1% forested wetland (swamp), 0.1% water.

Grannies Quarter Creek drains into the Wateree River just below the Lake Wateree Dam. Flat Rock Creek (Little Flat Rock Creek) and Dry Branch flow into Grannies Quarter Creek. There are a total of 80.9 stream miles in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-077	BIO	FW	FLAT ROCK CREEK AT S-28-40
CW-078	BIO	FW	GRANNIES QUARTER CREEK AT S-28-58
CW-237	W/INT	FW	GRANNIES QUARTER CREEK AT SC 97

Flat Rock Creek (CW-077) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Grannies Quarter Creek – There are two SCDHEC monitoring sites along Grannies Quarter Creek. At the upstream site ***(CW-078)***, aquatic life uses are fully supported based on macroinvertebrate community data. At the downstream site ***(CW-237)***, aquatic life uses are partially supported due to pH excursions. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
GRANNIES QUARTER CREEK CITY OF CAMDEN WTP PIPE #: 001 FLOW: M/R	SCG643005 MINOR DOMESTIC WAS SC0047473

LITTLE FLAT ROCK CREEK CAROLINA QUARRIES/KERSHAW QUARRY PIPE #: 001 FLOW: M/R	SCG730155 MINOR INDUSTRIAL
LITTLE FLAT ROCK CREEK NC GRANITE CORP./KERSHAW QUARRY PIPE #: 001 FLOW: M/R	SCG730209 MINOR INDUSTRIAL

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
JIMMY R. WILLIAMS CAROLINA MAHOGANY #1	0013-55 GRANITE
CAROLINA QUARRIES KERSHAW QUARRY	0404-55 GRANITE
N.C. GRANITE CORP. PALMETTO QUARRIES #1	0487-55 GRANITE

Growth Potential

There is a low potential for growth in this watershed. U.S. Hwys. 521 and 601 run through the area and limited growth is expected adjacent to these roads.

03050104-050

(Sawneys Creek)

General Description

Watershed 03050104-050 is located in Fairfield and Kershaw Counties and consists primarily of ***Sawneys Creek*** and its tributaries. The watershed occupies 37,265 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Herndon-Georgeville-Tatum-Helena series. The erodibility of the soil (K) averages 0.43 and the slope of the terrain averages 10%, with a range of 2-25%. Land use/land cover in the watershed includes: 89.8% forested land, 7.6% agricultural land, 0.6% urban land, 1.2% scrub/shrub land, 0.7% forested wetland (swamp), and 0.1% water.

Sawneys Creek originates near the Town of Ridgeway and drains into the Wateree River. Thorntree Creek and Bee Branch drain into Sawneys Creek. There are a total of 104.9 stream miles and 36.9 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-075	BIO	FW	THORNTREE CREEK AT S-20-258
CW-228	P/W/BIO	FW	SAWNEYS CREEK AT S-20-151
CW-079	W/INT	FW	SAWNEYS CREEK AT S-28-37

Thorntree Creek (CW-075) - Aquatic life uses are fully supported based on macroinvertebrate community data.

Sawneys Creek - There are two SCDHEC monitoring sites along Sawneys Creek. At the upstream site ***(CW-228)***, aquatic life uses are fully supported based on macroinvertebrate community data. Significant decreasing trends in five-day biochemical oxygen demand, turbidity, and total nitrogen concentration suggest improving conditions for these parameters. There is a significant increasing trend in pH. Recreational uses are not supported at this site due to fecal coliform bacteria excursions.

At the downstream site ***(CW-079)***, aquatic life uses are fully supported and significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions.

Natural Swimming Areas

FACILITY NAME / *RECEIVING STREAM*	*PERMIT #* / *STATUS*
CAMP LONGRIDGE	20-N01
THORNTREE CREEK TRIBUTARY	ACTIVE

Nonpoint Source Management Program

Land Disposal Activities

Land Applications

LAND APPLICATION FACILITY NAME	*PERMIT # TYPE*
SPRAYFIELD	ND0067008
FAIRFIELD HEALTHCARE CENTER	DOMESTIC

Growth Potential

There is a low potential for growth in this watershed, which contains a portion of the Town of Ridgeway. The only available water service extends along SC 34 east of Ridgeway to the Ridgeway Gold Mine, which is scheduled to close.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Sawneys Creek*** water quality monitoring sites CW-228 and CW-079 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be failed septic systems and cattle-in-stream. The TMDL states that a 73-78% reduction in fecal coliform loading from these sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

03050104-060

(Twentyfive Mile Creek)

General Description

Watershed 03050104-060 is located in Richland, Kershaw, and Fairfield Counties and consists primarily of ***Twentyfive Mile Creek*** and its tributaries. The watershed occupies 79,733 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram-Goldston-Alpin-Tatum series. The erodibility of the soil (K) averages 0.24 and the slope of the terrain averages 10%, with a range of 0-45%. Land use/land cover in the watershed includes: 82.0% forested land, 9.0% agricultural land, 2.2% scrub/shrub land, 5.8% urban land, 0.5% water, 0.3% forested wetland (swamp), and 0.2% barren land.

Twentyfive Mile Creek originates near the Town of Blythewood and accepts drainage from Simmons Creek, Ben Hood Branch, Round Top Branch, Rice Creek (Lake Columbia), Sandy Branch (Bridge Creek, Reedy Branch, Tuppler Branch), Rocky Branch, Flat Branch, and Bear Creek (Donnington Branch). Further downstream, Big Branch enters Twentyfive Mile Creek followed by Yankee Branch, Jim Branch (Spring Branch), Briar Branch, Dodge Branch, Horsepen Creek (Wolfpit Branch), Bell Branch (Rock Branch), Cook Run, Flat Branch, and Beaverdam Branch before draining into the Wateree River. There are a total of 200.3 stream miles and 508.1 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-229	P/W	FW	BEAR CREEK AT S-40-82
CW-080	S/INT/BIO	FW	TWENTYFIVE MILE CREEK AT S-28-05 3.7 MI W OF CAMDEN
RS-02485	RS02	FW	COOK RUN AT S-28-210 FROM SC 34

Bear Creek (CW-229) - Aquatic life uses are partially supported due to dissolved oxygen excursions, which are compounded by a significant decreasing trend in dissolved oxygen concentration. There is a significant increasing trend in pH. A significant decreasing trend in turbidity suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions.

Twentyfive Mile Creek (CW-080) - Aquatic life uses are partially supported based on macroinvertebrate community data. There is a significant increasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand, turbidity, and total nitrogen concentration suggest improving conditions for these parameters. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Cook Run (RS-02485) - Aquatic life and recreational uses are fully supported.

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-036	GB	MIDDENDORF	TOWN OF ELGIN

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
BEAR CREEK TRIBUTARY KENNECOTT/ RIDGEWAY GOLD MINE PIPE #: 003 FLOW: M/R	SC0041378 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
EI DUPONT INDUSTRIAL	283316-1601 (IWP-075, IWP-175, ACTIVE IWP-083)
KERSHAW COUNTY LUGOF/ELGIN MUNICIPAL	DWP-917, DWP-008 ----------
BF GOODRICH (THERMOID) ----------	--------- CLOSED
GULLEDGE COMPOSTING SITE ----------	282443-3001 --------
TRAPP LCD & YARDTRASH LANDFILL ---------	402462-1701 CLOSED

Land Application Sites

LAND APPLICATION *FACILITY NAME*	*PERMIT #* *TYPE*
LAGOON HOLOX, LTD./BLYTHWOOD	ND0069582 INDUSTRIAL

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
KENNECOTT/RIDGEWAY MINING CO. RIDGEWAY MINE	0724-39 GOLD ORE

EASTERN LAND & TIMBER INDUSTRIAL PARK MINE	0592-55 SAND
CAROLINA CERAMICS, INC. MOBLEY ROAD MINE	0403-79 SHALE
L. DEAN CONSTRUCTION CO., INC. LANGFORD	1417-79 SAND

Growth Potential

There is a high potential for continued (rapid) residential, commercial, and industrial growth in this watershed, which contains portions of the Towns of Blythewood, Elgin, and Lugoff. There is an emphasis of growth along the U.S. Hwy 1 corridor between the Cities of Columbia and Camden. Sewer is provided to this area through a regional system located in Kershaw County.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

A TMDL was developed by SCDHEC and approved by EPA for ***Twentyfive Mile Creek*** water quality monitoring site CW-080 to determine the maximum amount of fecal coliform bacteria it can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the stream were determined to be failed septic systems, cattle-in-stream, and runoff from pastures and developed land. The TMDL states that a 70% reduction in fecal coliform loading from these sources is necessary for the stream to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

03050104-070

(Big Pine Tree Creek)

General Description

Watershed 03050104-070 is located in Kershaw County and consists primarily of ***Big Pine Tree Creek*** and its tributaries. The watershed occupies 41,885 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram series. The erodibility of the soil (K) averages 0.10 and the slope of the terrain averages 10%, with a range of 0-25%. Land use/land cover in the watershed includes: 53.4% forested land, 25.9% agricultural land, 10.9% urban land, 7.0% scrub/shrub land, 1.5% forested wetland, and 1.3% water.

Big Pine Tree Creek flows through Llewellyn Millpond and accepts drainage from Beaverdam Branch, Thoroughfare Branch, Hyco Branch, and Berkeley Branch before flowing through Adams Mill Pond in Goodale State Park and Hermitage Mill Pond (Thomas Branch). Downstream of Hermitage Mill Pond, Little Pine Tree Creek (Kendall Lake) joins Big Pine Tree Creek in the City of Camden and flows into the Wateree River. There are a total of 68.4 stream miles and 549.3 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-223	S/W/BIO	FW	LITTLE PINE TREE CREEK AT S-28-132
CL-078	W	FW	ADAMS MILLPOND, FOREBAY EQUIDISTANT FROM DAM TO SHORE
CW-021	W/INT	FW	BIG PINE TREE CREEK AT US 521, NW OF BRIDGE

Little Pine Tree Creek (CW-223) – Aquatic life uses are fully supported based on macroinvertebrate community data; however, there is a significant increasing trend in turbidity. There is a significant increasing trend in pH. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Adams Mill Pond (CL-078) – Aquatic life and recreational uses are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations.

Big Pine Tree Creek (CW-021) - Aquatic life and recreational uses are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Significant decreasing trends in five-day biochemical oxygen demand and turbidity, and a

significant increasing trend in dissolved oxygen concentration suggest improving conditions for these parameters.

Natural Swimming Areas

FACILITY NAME *RECEIVING STREAM*	*PERMIT #* *STATUS*
GOODALE STATE PARK GOODALE STATE PARK LAKE	28-N01 ACTIVE

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
BIG PINE TREE CREEK DEROYAL TEXTILES PIPE #: 001 FLOW: 0.1354	SC0002518 MAJOR INDUSTRIAL
LITTLE PINE TREE CREEK KENDALL CO./WATEREE PLT. PIPE #: 001,002 FLOW: M/R	SCG250049 MINOR INDUSTRIAL (SC0040266)

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
KERSHAW COUNTY LANDFILL MUNICIPAL	281001-1201 (DWP-016, DWP-042) CLOSED
KERSHAW COUNTY LANDFILL MUNICIPAL	281001-1101 (DWP-035) CLOSED
OLD KERSHAW LANDFILL (DUMP) ----------	-------- CLOSED
KENDALL CO. PLANT LANDFILL INDUSTRIAL	IWP-202 --------
CANTEY LAND CLEARING LANDFILL C&D	282618-1701 CLOSED
FAIR STREET DUMP ---------	------- CLOSED
DICEY CREEK DUMP ---------	------- CLOSED

Land Application Sites

LAND APPLICATION FACILITY NAME	*PERMIT # TYPE*
SLUDGE APPLICATION DEROYAL TEXTILES INC.	ND0075272 INDUSTRIAL

Mining Activities

MINING COMPANY MINE NAME	*PERMIT # MINERAL*
PALMETTO BRICK COMPANY YOUNG MINE	0629-55 KAOLIN
PALMETTO BRICK COMPANY HINES MINE	0995-55 KAOLI
JOSEPH K. MCCASKILL MCCASKILL MINE	1298-55 SAND

Growth Potential

There is a high potential for continued residential, commercial, and industrial development in this watershed, which contains a portion of the City of Camden. U.S. Hwy. 1 and U.S. Hwy. 521, together with I-20 provide the growth corridors. The interchange of I-20 and U.S. Hwy. 521 has a particularly high development potential. Sewer is provided to this area through a regional system located in Kershaw County.

03050104-080

(Swift Creek)

General Description

Watershed 03050104-080 is located in Kershaw, Sumter, and Lee Counties and consists primarily of ***Swift Creek*** and its tributaries. The watershed occupies 39,962 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Vaucluse-Pelion-Wagram-Lucy series. The erodibility of the soil (K) averages 0.12 and the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 58.4% forested land, 29.5% agricultural land, 6.2% scrub/shrub land, 4.2% forested wetland (swamp), 1.1% water, 0.3% urban land, and 0.3% barren land.

Swift Creek is joined by Little Swift Creek and flows through Boykins Mill Pond (200 acres) and White Oak Slash Lake before draining into the Wateree River. There are a total of 84.8 stream miles and 335.8 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-238	W/INT	FW	SWIFT CREEK AT SC 261

Swift Creek (CW-238) - Aquatic life uses are not supported due to dissolved oxygen excursions, which are compounded by a significant decreasing trend in dissolved oxygen concentration. There is also a significant increasing trend in turbidity. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-019	GB	BLACK CREEK	WATEREE CORRECTIONAL INST.

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME / *FACILITY TYPE*	*PERMIT #* / *STATUS*
WATEREE CORRECTIONAL INST.	--------
---------	CLOSED

Growth Potential

There is a low potential for growth in this watershed, which contains a portion of the Town of Rembert.

03050104-090

(Spears Creek)

General Description

Watershed 03050104-090 is located in Kershaw and Richland Counties and consists primarily of ***Spears Creek*** and its tributaries. The watershed occupies 45,300 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Lakeland-Wagram-Chastain-Chewacla series. The erodibility of the soil (K) averages 0.28 and the slope of the terrain averages 7%, with a range of 0-25%. Land use/land cover in the watershed includes: 76.8% forested land, 7.5% forested wetland, 8.4% agricultural land, 1.9% scrub/shrub land, 4.5% urban land, 0.8% water, and 0.1% barren land.

Spears Creek originates near the Town of Elgin and flows past Fort Jackson U.S. Army Base before draining into the Wateree River. Spears Creek flows through several small lakes including an unnamed 85-acre lake before accepting the drainage of Sloan Branch, Kelly Creek (White Pond), Haig Creek, McCaskill Creek (Runounder Branch, Otterslide Branch), and Raglins Creek. Further downstream Madraw Branch and Moke Branch enter Spears Creek near its confluence with the Wateree River. There are a total of 82.5 stream miles and 391.4 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-154	S/W/BIO	FW	KELLY CREEK AT S-28-367 2.9 MI SE OF ELGIN
CW-155	P/W/BIO	FW	SPEARS CREEK AT SC 12 3.6 MI SE OF ELGIN
CW-166	W/INT	FW	SPEARS CREEK AT US 601

Kelly Creek (CW-154) – Aquatic life uses are fully supported based on macroinvertebrate community data; however, there is a significant increasing trend in total phosphorus concentration. There is a significant increasing trend in pH. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are partially supported due to fecal coliform bacteria excursions, which are compounded by a significant increasing trend in fecal coliform bacteria concentration.

Spears Creek – There are two SCDHEC monitoring sites along Spears Creek. There is a significant increasing trend in pH at both sites. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred at both sites, they were typical of values seen in blackwater systems and were considered natural, not standards violations. At the upstream site ***(CW-155)***, aquatic life uses are fully supported based on macroinvertebrate community data; however, there is a significant increasing trend in five-day biochemical oxygen demand. Recreational uses are fully

supported; however, there is a significant increasing trend in fecal coliform bacteria concentration. At the downstream site ***(CW-166)***, aquatic life uses are fully supported and significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
SPEARS CREEK TRIBUTARY KROGER CO./PONTIAC FOODS PIPE #: 001 FLOW: M/R	SCG250053 MINOR INDUSTRIAL
SLOAN BRANCH LOVELESS & LOVELESS, INC. PIPE #: 001 FLOW: M/R	SCG730047 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
SCREAMING EAGLE ROAD/CHAMBERS LANDFILL MUNICIPAL	402400-1101 (DWP-126) ACTIVE
CLEMSON ROAD DUMP ----------	--------- CLOSED
SCREAMING EAGLE ROAD MUNICIPAL	DWP-028, DWP-106 CLOSED
CAROLINA CONTAINER NORTHEAST LANDFILL MUNICIPAL	403323-1101 (DWP-134, IWP-226) CLOSED
CAROLINA CONTAINER NORTHEAST LANDFILL MUNICIPAL	402434-1101 ACTIVE
LOVELESS & LOVELESS, INC. CONSTRUCTION	282428-1201 ---------
PINE HILL C&D LANDFILL C&D	PERMIT PENDING ----------
TNT SANDS LLC & LT LANDFILL CONSTRUCTION	402423-1702 ---------

Land Application Sites

LAND APPLICATION FACILITY NAME	*PERMIT # YPE*
INFILTRATION BASIN PALMETTO UTILITIES, INC. REG. WWTP	ND0068411 DOMESTIC
TILE FIELD HACIENDA MOBILE HOME ESTATES	ND0067598 DOMESTIC

Mining Activities

MINING COMPANY MINE NAME	*PERMIT # MINERAL*
CAROLINA CERAMICS, INC. KOON CLAY MINE	0137-55 KAOLIN
UNIMIN CORP. BLANEY PLANT	0089-55 SAND
TAYLOR CLAY PRODUCTS CO. TAYLOR MINE	0830-55 KAOLIN
HANSON BRICK COLUMBIA GADSON PIT	0409-55 KAOLIN
HANSON BRICK COLUMBIA COLEMAN MINE	0185-79 KAOLIN
LOVELESS & LOVELESS, INC. SCREAMING EAGLE ROAD PIT	0492-55 SAND
HARDAWAY CONCRETE COMPANY, INC. NORTHEAST MINE	0507-79 SAND
CHAMBERS RICHLAND CO. LANDFILL, INC. SCREAMING EAGLE ROAD MINE	0700-79 KAOLIN
TNT SAND TNT SAND MINE	0898-79 SAND
MILDRED R. PORTER PORTER'S PIT	1115-55 SAND; SAND/CLAY

Growth Potential

There is a moderate to high potential for residential, commercial, and industrial growth in this watershed, which contains a portion of the City of Columbia and portions of the Towns of Elgin and Pontiac. I-20 crosses the area, together with U.S. Hwy. 601 and U.S. Hwy. 1, and S.C. Hwy. 12. There are also several large and growing subdivisions, the Richland County Industrial Park, and a privately owned solid waste landfill to add to future growth in the area. Sewer is provided to this area

through a regional system located in Kershaw County. Water service is available from the City of Columbia's water system.

Watershed Protection and Restoration

Total Maximum Daily Loads (TMDLs)

TMDL was developed by SCDHEC and approved by EPA for ***Kelly Creek*** water quality monitoring site CW-154 and ***Spears Creek*** site CW-166 to determine the maximum amount of fecal coliform bacteria they can receive from nonpoint sources and still meet water quality standards. The primary sources of fecal coliform to the streams were determined to be failed septic systems, cattle-in-stream, and runoff from pastureland. The TMDL states that a 65% reduction in fecal coliform loading at CW-154 and 61% reduction at CW-166 is necessary for the streams to meet the recreational use standard. For more detailed information on TMDLs, please visit the SCDHEC's Bureau of Water homepage at http://www.scdhec.gov/water and click on "Watersheds and TMDLs" and then "TMDL Program".

03050104-100

(Colonels Creek)

General Description

Watershed 03050104-100 is located in Richland County and consists primarily of ***Colonels Creek*** and its tributaries. The watershed occupies 44,641 acres of the Sandhills and Upper Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Vaucluse-Ailey-Alpin series. The erodibility of the soil (K) averages 0.12 and the slope of the terrain averages 7%, with a range of 2-15%. Land use/land cover in the watershed includes: 90.4% forested land, 3.9% forested wetland (swamp), 3.5% agricultural land, 1.0% water, 0.7% urban land, 0.4% scrub/shrub land, and 0.1% barren land.

Colonels Creek originates near the Town of Pontiac and flows through the Fort Jackson U.S. Army Base property and into the Wateree River. Colonels Creek flows through DuPre Pond and Messers Pond, and accepts drainage from Buffalo Creek and Bee Branch on U.S. property. Colonels Creek then accepts drainage from Jumping Run Creek and Leesburg Branch before flowing through Murray Pond (200 acres) and Goodwill Pond (120 acres). There are a total of 65.9 stream miles and 340.2 acres of lake waters in this watershed, all classified FW.

Surface Water Quality

Station #	Type	Class	Description
CW-250	INT	FW	COLONELS CREEK AT SC 262
CW-240	W	FW	COLONELS CREEK AT US 601

Colonels Creek – There are two SCDHEC monitoring sites along Colonels Creek. Aquatic life and recreational uses are fully supported at both sites ***(CW-250, CW-240)***. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations.

Groundwater Quality

Well #	Class	Aquifer	Location
AMB-048	GB	MIDDENDORF	NORTH OF EASTOVER

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *COMMENT*
COLONELS CREEK - DITCH SC NATL GUARD/MCCRADY TRAINING FAC. PIPE #: 001 FLOW: M/R	SC0046108 MINOR INDUSTRIAL
LEESBURG BRANCH USMC/COMBAT VEHICLE MAINT. FAC. IPE #: 001 FLOW: M/R	SC0038792 MINOR INDUSTRIAL

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
CAROLINA GRADING INC. INDUSTRIAL	402446-1601 (IWP-223) ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
TURTLE CREEK FARM MILES MINING OF LUGOFF	1239-55 KAOLIN
C. RAY CONSTRUCTION CO., INC. PERCIVAL ROAD MINE	1370-79 SAND

Growth Potential

There is a moderate potential for growth in this watershed, which contains the eastern portion of Fort Jackson in the City of Columbia. Percival Road and I-20 run along the top of the watershed, and water and sewer is only available there and near the Leesburg Road/Fort Jackson area. There are some rural residential areas in the Leesburg Road area.

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APPENDIX A.

Catawba River Basin

Ambient Water Quality Monitoring Site Descriptions

Station #	Type	Class	Description
03050101-180			
CW-197	P/INT	FW	LAKE WYLIE ABOVE MILL CREEK ARM AT END OF S-46-557
CW-192	S/W	FW	SOUTH FORK CROWDERS CREEK AT S-46-79 4.5 MI NW OF CLOVER
CW-152	P/SPRP	FW	CROWDERS CREEK AT US 321 0.5 MI N OF NC STATE LINE
CW-023	P/SPRP	FW	CROWDERS CREEK AT S-46-564 NE OF CLOVER
CW-024	W/BIO	FW	CROWDERS CREEK AT S-46-1104
CW-105	S/W	FW	BROWN CK AT S-46-226, 0.3 MI W OF OLD N.MAIN ST. IN CLOVER
CW-696	BIO	FW	BEAVERDAM CREEK AT S-46-114
CW-153	S/W	FW	BEAVERDAM CREEK AT S-46-152 8 MI E OF CLOVER
CW-027	S/SPRP	FW	LAKE WYLIE, CROWDERS CK ARM AT SC 49 AND SC 274
CW-245	W	FW	L. WYLIE, CROWDERS CK ARM -1ST POWERLINE UPSTR OF MAIN POOL
CW-198	P/W	FW	LAKE WYLIE, OUTSIDE MOUTH OF CROWDERS CREEK ARM
CW-230	W/INT	FW	LAKE WYLIE AT DAM, UNDER POWERLINES
03050101-190			
CW-171	S/W	FW	ALLISON CREEK AT US 321, 3.1 MI S OF CLOVER
CW-134	S/W	FW	CALABASH BRANCH AT S-46-414 2.5 MI SE OF CLOVER
CW-249/CW-694	INT/BIO	FW	ALLISON CREEK AT S-46-114
CW-200	S/W	FW	LAKE WYLIE AT SC 274 9 MI NE OF YORK
CW-201	P/W	FW	LAKE WYLIE, NORTH LAKEWOOD SD AT EBENEZER ACCESS
03050103-010			
CW-221	S/W	FW	CATAWBA RIVER TRIBUTARY AT HWY. 161, 0.4 MI W OF I-77
CW-014	P/SPRP	FW	CATAWBA RIVER AT US 21
CW-041	PSPRP	FW	CATAWBA RIVER AT SC 5 ABOVE BOWATER
CW-016	P/INT	FW	CATAWBA RIVER AT SC 9 AT FORT LAWN
CW-016F	P/W	FW	FISHING CREEK RESERVOIR 2 MI BELOW CANE CREEK
RL-01012	RL01	FW	FISHING CK RES., 3.8 MI S OF FT. LAWN OFF W SHORE OF LAKE VIEW
CW-057	P/INT	FW	FISHING CREEK RESERVOIR 75 FT ABOVE DAM NEAR GREAT FALLS
CW-174	S/W	FW	CEDAR CK RES. AT RD ABOVE JUNCTION WITH ROCKY CREEK
RL-02319	RL02	FW	CEDAR CK RES., W OF BIG ISLAND 7MI BELOW ROCKY CK CONFLUENCE
RL-01007	RL01	FW	CEDAR CREEK RESERVOIR, 2.15 MI SE OF GREAT FALLS
RL-02452	RL02	FW	CEDAR CREEK RESERVOIR, 0.15 MI SE OF S TIP OF PICKETT ISLAND
RL-01017	RL01	FW	CEDAR CREEK RESERVOIR, 2.5 MI SE OF GREAT FALLS
CW-033	W	FW	CEDAR CREEK RESERVOIR 100 M N OF DAM
03050103-020			
CW-247	W/SPRP	FW	SUGAR CREEK AT MECKLENBURG CO. RD 51 (IN N.C.)
CW-248	W	FW	LITTLE SUGAR CREEK AT US 521 (IN N.C.)
CW-246/CW-627	W/I/BIO	FW	SUGAR CREEK UPSTREAM OF CONFLUENCE WITH MCALPINE CREEK
CW-226	P/SPR	FW	MCALPINE CREEK AT US 521 IN NC
CW-064	S/W/BIO	FW	MCALPINE CREEK AT S-29-64
CW-009	S/W	FW	STEELE CREEK AT S-46-22 N OF FORT MILL
CW-203	W	FW	STEELE CREEK AT S-46-98
CW-681	BIO	FW	STEELE CREEK AT BY-PASS US 21
CW-011	S/W	FW	STEELE CREEK AT S-46-270
CW-013	P/W	FW	SUGAR CREEK AT SC 160 E OF FORT MILL
CW-036	S/INT	FW	SUGAR CREEK AT S-46-36

Station #	Type	Class	Description
03050103-030			
CW-176	P/W	FW	SIXMILE CREEK AT S-29-54
CW-083	S/INT	FW	TWELVEMILE CREEK AT S-29-55 0.3 MI NW OF VAN WYCK
CW-145	W/INT	FW	WAXHAW CREEK AT S-29-29
03050103-040			
CW-185	S/W	FW	CANE CREEK AT SC 200 5 MI NNE OF LANCASTER
CW-151	S/W	FW	BEAR CREEK AT S-29-362 3.5 MI SE OF LANCASTER
CW-047	S/W	FW	GILLS CREEK AT US 521 NNW OF LANCASTER
CW-131	S/W	FW	BEAR CREEK AT S-29-292 1.6 MI W OF LANCASTER
CW-210	BIO	FW	CANE CREEK AT SC 9 BYPASS
CW-017	S/INT	FW	CANE CREEK AT S-29-50
CW-232	W	FW	RUM CREEK AT S-29-187
03050103-050			
CW-075	BIO	FW	THORNTREE CREEK AT S-20-258
CW-228	P/W/BIO	FW	SAWNEYS CREEK AT S-20-151
CW-079	W/INT	FW	SAWNEYS CREEK AT S-28-37
03050103-060			
CW-006	S/W	FW	WILDCAT CREEK AT S-46-650
CW-212	S/W	FW	TOOLS FORK AT S-46-195 7 MI NW OF ROCK HILL
CW-096	S/W	FW	WILDCAT CREEK AT S-46-998 9 MI ENE OF MCCONNELLS
CW-224	S/W	FW	FISHING CREEK AT S-46-163
CW-697	BIO	FW	STONEY FORK AT SC 121 &72
CW-695	BIO	FW	TAYLOR CREEK AT S-46-735
CW-654	BIO	FW	FISHING CREEK AT S-46-655
CW-007	BIO	FW	SOUTH FORK FISHING CREEK AT S-12-50
RS-01007	RS01	FW	MCFADDEN BRANCH AT COUNTY ROAD 525, 7 MI S OF ROCK HILL
CW-008	P/W	FW	FISHING CREEK AT SC 223 NE OF RICHBURG
CW-233	W/INT/BIO	FW	FISHING CREEK AT S-12-77
CL-021	W	FW	LAKE OLIPHANT, FOREBAY EQUIDISTANT FROM DAM & SHORE
03050103-070			
CW-227	S/W	FW	NEELYS CREEK AT 2-46-997
CW-234	W/INT/BIO	FW	TINKERS CREEK AT S-12-599
03050103-080			
CW-238	W/INT	FW	SWIFT CREEK AT SC 261
03050103-090			
CW-088	S/W	FW	GRASSY RUN BRANCH AT SC 72 1.6 MI NE OF CHESTER
CW-002	P/W/BIO	FW	ROCKY CREEK AT S-12-335 3.5 MI E OF CHESTER
CW-067	BIO	FW	LITTLE ROCKY CREEK AT S-12-144
CW-691	BIO	FW	BEAVERDAM CREEK AT S-12-555
CW-236	W/INT	FW	ROCKY CREEK AT S-12-138
CW-175	S/W	FW	CEDAR CREEK RES./ROCKY CREEK AT S-12-141 SE OF GREAT FALLS

Station #	Type	Class	Description
03050104-010			
CW-231	W/INT	FW	LAKE WATEREE HEADWATERS, 50 YDS DS OF CEDAR CK CONFLUENCE
CW-040	S/W	FW	LITTLE WATEREE CREEK AT S-20-41 5 MI E OF WINNSBORO
RS-02321	RS02	FW	DUTCHMANS CREEK AT S-20-106
CW-692	BIO	FW	DUTCHMANS CREEK AT S-20-21
CW-076	BIO	FW	BEAVER CREEK AT S-28-13
CW-208	P/W	FW	LAKE WATEREE AT S-20-101, 11 MI ENE OF WINNSBORO
RL-02314	RL02	FW	LAKE WATEREE 1.0 MI SW FROM MOUTH OF BEAVER CREEK
CW-207	P/W	FW	LAKE WATEREE AT END OF S-20-291
CW-693	BIO	FW	WHITE OAK CREEK AT S-28-696
RL-01003	RL01	FW	LAKE WATEREE 11.25 MI NW OF CAMDEN ON W SHORE OF LAKE
CW-209	P/W	FW	LAKE WATEREE AT SMALL ISLAND 2.3 MI N OF DAM
RL-01033	RL01	FW	LAKE WATEREE 9.7 MI NW OF CAMDEN, TOWARD THE S END OF LAKE
CL-089	INT	FW	LAKE WATEREE IN FOREBAY EQUIDISTANT FROM DAM AND SHORELINES
03050104-020			
CW-072	W/INT	FW	BIG WATEREE CREEK AT US 21
03050104-030			
CW-019	S/W	FW	WATEREE RIVER AT US 1
RS-01046	RS01	FW	RAFTING CREEK AT COUNTY ROAD 263, 1 MI E OF REMBERT
CW-206	P/SPRP	FW	WATEREE RIVER AT US 76 & 378
CW-222/SC-002	P/INT	FW	WATEREE RIVER 1.6 MI UPSTREAM OF CONFL. WITH CONGAREE RIVER
03050104-040			
CW-077	BIO	FW	FLAT ROCK CREEK AT S-28-40
CW-078	BIO	FW	GRANNIES QUARTER CREEK AT S-28-58
CW-237	W/INT	FW	GRANNIES QUARTER CREEK AT SC 97
03050104-050			
CW-075	BIO	FW	THORNTREE CREEK AT S-20-258
CW-228	P/BIO	FW	SAWNEYS CREEK AT S-20-151
CW-079	W	FW	SAWNEYS CREEK AT S-28-37
03050104-060			
CW-229	P/W	FW	BEAR CREEK AT S-40-82
CW-080	S/INT/BIO	FW	TWENTYFIVE MILE CREEK AT S-28-05 3.7 MI W OF CAMDEN
RS-02485	RS02	FW	COOK RUN AT S-28-210 FROM SC 34
03050104-070			
CW-223	S/W/BIO	FW	LITTLE PINE TREE CREEK AT S-28-132
CL-078	W	FW	ADAMS MILLPOND, FOREBAY EQUIDISTANT FROM DAM TO SHORE
CW-021	W/INT	FW	BIG PINE TREE CREEK AT US 521, NW OF BRIDGE

Station #	Type	Class	Description
03050104-080			
CW-238	W	FW	SWIFT CREEK AT SC 261
03050104-090			
CW-154	S/W/BIO	FW	KELLY CREEK AT S-28-367 2.9 MI SE OF ELGIN
CW-155	P/W/BIO	FW	SPEARS CREEK AT SC 12 3.6 MI SE OF ELGIN
CW-166	W/INT	FW	SPEARS CREEK AT US 601
03050104-100			
CW-250	INT	FW	COLONELS CREEK AT SC 262
CW-240	W	FW	COLONELS CREEK AT US 601

For further details concerning sampling frequency and parameters sampled, please visit our website at www.scdhec.gov/eqc/admin/html/eqcpubs.html#wqreports for the current State of S.C. Monitoring Strategy.

Water Quality Data

Spreadsheet Legend

Station Information:

STATION NUMBER Station ID

TYPE SCDHEC station type code

- **P** = Primary station, sampled monthly all year round
- **S** = Secondary station, sampled monthly May - October
- **P*** = Secondary station upgraded to primary station parameter coverage and sampling frequency for basin study
- **W** = Special watershed station added for the Catawba River Basin study
- **BIO** = Indicates macroinvertebrate community data assessed
- **INT** = Integrator Station (approximates a Primary station)
- **RL** = Random Lake station
- **RO** = Random Open water station
- **RS** = Random Stream station
- **RT** = Random Tide Creek station

WATERBODY NAME Stream or Lake Name

CLASS Stream classification at the point where monitoring station is located

Parameter Abbreviations and Parameter Measurement Units:

DO	Dissolved Oxygen (mg/l)	**NH3**	Ammonia (mg/l)
BOD	Five-Day Biochemical Oxygen Demand (mg/l)	**CD**	Cadmium (ug/l)
pH	pH (SU)	**CR**	Chromium (ug/l)
TP	Total Phosphorus (mg/l)	**CU**	Copper (ug/l)
TN	Total Nitrogen (mg/l)	**PB**	Lead (ug/l)
TURB	Turbidity (NTU)	**HG**	Mercury (ug/l)
TSS	Total Suspended Solids (mg/l)	**NI**	Nickel (ug/l)
BACT	Fecal Coliform Bacteria (#/100 ml)	**ZN**	Zinc (ug/l)

Statistical Abbreviations:

N For *standards compliance*, number of surface samples collected between January 1998 and December 2002.
For *trends*, number of surface samples collected between January 1984 and December 2002.
For *total phosphorus*, an additional trend period of January 1992 to December 2002 is also reported.

EXC. Number of samples contravening the appropriate standard

% Percentage of samples contravening the appropriate standard

MEAN EXC. Mean of samples that contravened the applied standard

MED For *heavy metals with a human health criterion*, this is the median of all surface samples between January 1997 and December 2001. DL indicates that the median was the detection limit.

MAG Magnitude of any statistically significant trend, average change per year, expressed in parameter measurement units

GEO MEAN Geometric mean of fecal coliform bacteria samples collected between January 1998 and December 2002

Key to Trends:

D Statistically significant decreasing trend in parameter concentration

I Statistically significant increasing trend in parameter concentration

* No statistically significant trend

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	DO N	DO EXC.	DO %	MEAN EXC.	TRENDS (88 -2002) DO	N	MAG	BOD	N	MAG
03050101180													
CW-197	INT	LAKE WYLIE	FW	57	1	2	3.3	*	186	0	D	166	-0.03
CW-192	CS	SOUTH FORK CROWDERS CK	FW	26	0	0		*	82	0.02	*	81	0.027
CW-152	SPRP	CROWDERS CK	FW	59	1	2	1.8	I	170	0.02	I	169	0.059
CW-023	SPRP	CROWDERS CK	FW	58	2	3	2.935	I	173	0.038	*	171	0.033
CW-024	CS / BIO	CROWDERS CK	FW	17	1	6	2.5						
CW-105	CS	BROWN CK	FW	18	1	6	4.7	*	72	0	*	71	0.034
CW-696	BIO	BEAVER DAM CK											
CW-153	CS	BEAVERDAM CK	FW	27	0	0		*	79	-0.033	*	78	-0.005
CW-027	SPRP	LAKE WYLIE	FW	42	1	2	4.2	*	95	0.05	*	93	0.024
CW-245	CS	LAKE WYLIE	FW	19	0	0							
CW-198	CS	LAKE WYLIE	FW	45	0	0		*	176	-0.017	*	159	0
CW-230	INT	LAKE WYLIE	FW	32	2	6	3.100	D	44	-0.123	D	41	-0.102
03050101190													
CW-171	CS	ALLISON CK	FW	27	0	0		*	81	0.011	I	80	0.033
CW-134	CS	CALABASH BRANCH	FW	26	0	0		I	81	0.05	D	79	-0.099
CW-249 / CW-694	INT / BIO	ALLISON CK	FW	21	0	0							
CW-200	CS	LAKE WYLIE	FW	30	1	3	4.75	*	84	-0.033	*	83	0.025
CW-201	CS	LAKE WYLIE	FW	47	0	0		*	180	0.011	D	159	-0.037
03050103010													
CW-221	CS	CATAWBA RVR TRIB	FW	24	0	0		*	79	-0.025	I	79	0.086
CW-014	SPRP	CATAWBA RVR	FW	58	2	3	4.650	*	122	0	*	121	0
CW-041	SPRP	CATAWBA RVR	FW	55	0	0		*	172	0	D	170	-0.019
CW-016	INT	CATAWBA RVR	FW	63	0	0		*	188	-0.006	D	170	-0.075
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	43	0	0		*	167	0.014	D	155	-0.025
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	9	0	0							
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	63	1	2	4.9	I	188	0.062	*	172	0.017
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	28	5	18	4.234	*	85	-0.018	*	84	0.017
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	0	0							
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	11	2	18	3.650						
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	0	0							
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	11	1	9	4						
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	18	0	0							

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				pH	pH	pH	MEAN	TRENDS (88-2002)			TURB	TURB	TURB	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	PH	N	MAG	N	EXC.	%	EXC.	TURB	N	MAG
03050101180																	
CW-197	INT	LAKE WYLIE	FW	58	0	0		D	185	-0.04	56	2	4	71.500	*	170	-0.014
CW-192	CS	SOUTH FORK CROWDERS CK	FW	26	0	0		*	82	-0.011	26	2	8	69.500	D	80	-0.25
CW-152	SPRP	CROWDERS CK	FW	59	0	0		D	170	-0.011	59	4	7	75.000	D	168	-0.274
CW-023	SPRP	CROWDERS CK	FW	58	0	0		D	174	-0.012	58	6	10	122.167	*	173	-0.124
CW-024	CS / BIO	CROWDERS CK	FW	17	0	0					17	2	12	115.000			
CW-105	CS	BROWN CK	FW	18	0	0		D	72	-0.025	18	5	28	142.000	I	71	0.934
CW-696	BIO	BEAVER DAM CK															
CW-153	CS	BEAVERDAM CK	FW	27	0	0		D	79	-0.017	27	4	15	423.750	*	78	0
CW-027	SPRP	LAKE WYLIE	FW	42	0	0		*	95	-0.01	42	7	17	140.714	I	94	0.373
CW-245	CS	LAKE WYLIE	FW	20	0	0					15	0	0				
CW-198	CS	LAKE WYLIE	FW	46	0	0		D	174	-0.033	44	2	5	45.500	*	160	-0.056
CW-230	INT	LAKE WYLIE	FW	33	0	0		D	45	-0.094	30	0	0		D	41	-0.166
03050101190																	
CW-171	CS	ALLISON CK	FW	27	0	0		D	81	-0.025	27	3	11	145.000	*	78	0
CW-134	CS	CALABASH BRANCH	FW	26	0	0		D	81	-0.025	26	2	8	70.000	*	81	-0.017
CW-249 / CW-694	INT / BIO	ALLISON CK	FW	21	0	0					21	3	14	186.667			
CW-200	CS	LAKE WYLIE	FW	30	1	3	8.55	D	84	-0.06	30	1	3	28	*	82	0.075
CW-201	CS	LAKE WYLIE	FW	48	0	0		D	180	-0.045	44	2	5	31.500	*	161	-0.033
03050103010																	
CW-221	CS	CATAWBA RVR TRIB	FW	25	1	4	10.85	D	80	-0.065	25	3	12	196.667	I	79	0.352
CW-014	SPRP	CATAWBA RVR	FW	58	0	0		D	122	-0.025	58	1	2	58	D	122	-0.151
CW-041	SPRP	CATAWBA RVR	FW	56	0	0		D	173	-0.03	56	3	5	90.000	I	173	0.281
CW-016	INT	CATAWBA RVR	FW	62	0	0		D	184	-0.029	57	0	0		*	173	0.145
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	43	0	0		D	165	-0.037	42	12	29	32.583	I	156	0.332
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	9	1	11	9				9	0	0				
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	63	4	6	9.225	D	187	-0.025	57	9	16	48.889	*	174	0.122
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	28	0	0		D	85	-0.029	28	6	21	43.167	*	84	0.096
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	0	0					10	2	20	40.500			
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	11	0	0					11	1	9	34			
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	1	10	4.5				10	1	10	32			
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	11	0	0					11	1	9	36			
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	17	1	6	5.8				16	4	25	39.250			

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				TP	TP	TP	MEAN	TRENDS (92-2002)			TRENDS (88-2002)			TN	TN	TN	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	TP	N	MAG	TP	N	MAG	N	EXC.	%	EXC.	TN	N	MAG
03050101180																				
CW-197	INT	LAKE WYLIE	FW	16	3	19	0.090	D	81	-0.001	D	126	-0.001	43	0	0		D	151	-0.015
CW-192	CS	SOUTH FORK CROWDERS CK	FW					*	33	0.002	D	53	-0.003							
CW-152	SPRP	CROWDERS CK	FW					*	69	0.02	*	107	0.007					I	150	0.192
CW-023	SPRP	CROWDERS CK	FW					I	69	0.014	*	112	0					I	157	0.055
CW-024	CS / BIO	CROWDERS CK	FW																	
CW-105	CS	BROWN CK	FW					*	32	0	D	52	-0.01							
CW-696	BIO	BEAVER DAM CK																		
CW-153	CS	BEAVERDAM CK	FW								D	51	-0.005							
CW-027	SPRP	LAKE WYLIE	FW								I	49	0.008							
CW-245	CS	LAKE WYLIE	FW	11	2	18	0.090							9	0	0				
CW-198	CS	LAKE WYLIE	FW	16	2	13	0.080	*	80	0	D	126	-0.001	37	1	3	2.08	D	141	-0.012
CW-230	INT	LAKE WYLIE	FW	14	1	7	0.12							18	0	0				
03050101190																				
CW-171	CS	ALLISON CK	FW					*	32	0	D	53	0							
CW-134	CS	CALABASH BRANCH	FW					*	33	0.033	D	55	-0.038							
CW-249 / CW-694	INT / BIO	ALLISON CK	FW																	
CW-200	CS	LAKE WYLIE	FW	14	3	21	0.093	*	43	0	*	65	0	7	0	0				
CW-201	CS	LAKE WYLIE	FW	16	0	0		*	79	0	*	123	0	37	0	0		D	141	-0.011
03050103010																				
CW-221	CS	CATAWBA RVR TRIB	FW					I	30	0.009	*	52	-0.004							
CW-014	SPRP	CATAWBA RVR	FW					D	58	-0.002	D	58	-0.002					D	102	-0.015
CW-041	SPRP	CATAWBA RVR	FW					*	61	0	D	107	-0.006					*	149	0.011
CW-016	INT	CATAWBA RVR	FW					I	64	0.005	*	109	0					*	154	0.011
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	14	14	100	0.189	I	80	0.006	I	126	0.003	38	4	11	1.775	I	147	0.016
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW											6	1	17	1.52			
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	16	16	100	0.153	*	81	0.001	*	125	0	44	2	5	1.915	I	152	0.01
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	11	9	82	0.166	*	41	0.002	*	60	0	5	2	40	1.905			
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	10	100	0.132							6	0	0				
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW											5	0	0				
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	10	10	100	0.126							6	0	0				
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW											6	0	0				
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	12	12	100	0.147							12	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CHL N	CHL EXC.	CHL %	MEAN EXC.	TRENDS (88-2002) TSS	N	MAG
03050101180										
CW-197	INT	LAKE WYLIE	FW	26	0	0				
CW-192	CS	SOUTH FORK CROWDERS CK	FW							
CW-152	SPRP	CROWDERS CK	FW					*	42	0
CW-023	SPRP	CROWDERS CK	FW					*	42	0
CW-024	CS / BIO	CROWDERS CK	FW							
CW-105	CS	BROWN CK	FW							
CW-696	BIO	BEAVER DAM CK								
CW-153	CS	BEAVERDAM CK	FW							
CW-027	SPRP	LAKE WYLIE	FW							
CW-245	CS	LAKE WYLIE	FW	9	0	0				
CW-198	CS	LAKE WYLIE	FW	20	0	0		*	45	0.084
CW-230	INT	LAKE WYLIE	FW	16	0	0				
03050101190										
CW-171	CS	ALLISON CK	FW							
CW-134	CS	CALABASH BRANCH	FW							
CW-249 / CW-694	INT / BIO	ALLISON CK	FW							
CW-200	CS	LAKE WYLIE	FW							
CW-201	CS	LAKE WYLIE	FW	20	0	0				
03050103010										
CW-221	CS	CATAWBA RVR TRIB	FW							
CW-014	SPRP	CATAWBA RVR	FW							
CW-041	SPRP	CATAWBA RVR	FW					*	53	-0.226
CW-016	INT	CATAWBA RVR	FW					*	82	-0.167
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	20	2	10	42.95			
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	6	3	50	58.33			
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	26	6	23	49.18			
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW							
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	4	0	0				
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	6	2	33	54.40			
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	4	0	0				
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	6	1	17	41			
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	9	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	GEO MEAN	BACT N	BACT EXC.	BACT %	MEAN EXC.	TRENDS (88-2002) BACT	TRENDS (88-2002) N	TRENDS (88-2002) MAG	NH3 N	NH3 EXC.	NH3 %	CD N	CD EXC.	CD %	MEAN EXC.
03050101180																		
CW-197	INT	LAKE WYLIE	FW	3.8	56	0	0		D	167	-0.1	43	0	0	19	0	0	
CW-192	CS	SOUTH FORK CROWDERS CK	FW	487.0	26	16	62	869.4	*	81	10.019	10	0	0	4	0	0	
CW-152	SPRP	CROWDERS CK	FW	187.1	59	10	17	1964.0	D	170	-20.208	46	0	0	19	0	0	
CW-023	SPRP	CROWDERS CK	FW	368.4	58	17	29	3388.2	*	174	-8.227	48	0	0	19	1	5	30
CW-024	CS / BIO	CROWDERS CK	FW	334.0	17	3	18	6766.7				12	0	0	5	0	0	
CW-105	CS	BROWN CK	FW	1461.4	18	16	89	2934.4	*	72	0							
CW-696	BIO	BEAVER DAM CK																
CW-153	CS	BEAVERDAM CK	FW	260.7	27	6	22	1545.0	D	79	-14.248	7	0	0	4	0	0	
CW-027	SPRP	LAKE WYLIE	FW	140.0	42	9	21	2834.4	I	94	5.435	13	0	0	13	0	0	
CW-245	CS	LAKE WYLIE	FW	2.9	15	0	0					9	0	0	6	0	0	
CW-198	CS	LAKE WYLIE	FW	5.7	44	0	0		*	158	0	37	0	0	15	0	0	
CW-230	INT	LAKE WYLIE	FW	2.5	30	0	0		*	41	-0.222	18	0	0	10	0	0	
03050101190																		
CW-171	CS	ALLISON CK	FW	509.4	27	13	48	1664.6	*	81	-2.519	5	0	0	2	0	0	
CW-134	CS	CALABASH BRANCH	FW	341.9	26	8	31	2408.8	D	81	-40.22	4	0	0	2	0	0	
CW-249 / CW-694	INT / BIO	ALLISON CK	FW	351.8	21	10	48	2257.0				12	0	0	8	0	0	
CW-200	CS	LAKE WYLIE	FW	18.8	30	1	3	740.0	*	84	0	7	0	0	5	0	0	
CW-201	CS	LAKE WYLIE	FW	3.1	42	0	0		D	157	-0.142	37	0	0	15	0	0	
03050103010																		
CW-221	CS	CATAWBA RVR TRIB	FW	329.7	25	10	40	3923.0	*	80	4.985	3	0	0	3	0	0	
CW-014	SPRP	CATAWBA RVR	FW	68.0	58	6	10	925.0	*	122	0.284	44	0	0	19	0	0	
CW-041	SPRP	CATAWBA RVR	FW	50.8	57	1	2	550.0	*	172	0.334	44	0	0	19	0	0	
CW-016	INT	CATAWBA RVR	FW	42.2	59	0	0		*	173	-0.43	46	0	0	19	0	0	
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	29.5	41	0	0		*	153	-0.5	38	0	0	14	0	0	
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	8.1	9	0	0					6	0	0	3	0	0	
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	8.0	56	0	0		D	171	-0.47	45	0	0	19	0	0	
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	47.2	28	3	11	543.3	*	84	0.831	5	0	0	4	0	0	
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	15.2	10	0	0					6	0	0	3	0	0	
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	15.9	11	0	0					6	0	0	4	0	0	
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	8.6	10	0	0					5	0	0	3	0	0	
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	32.4	11	0	0					6	0	0	4	0	0	
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	21.8	16	0	0					12	0	0	5	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CR N	CR EXC.	CR %	MEAN EXC.	CU N	CU EXC.	CU %	MEAN EXC.	PB N	PB EXC.	PB %	MEAN EXC.	HG N	HG EXC.	HG %
03050101180																		
CW-197	INT	LAKE WYLIE	FW	19	0	0		19	2	11	11.0	19	0	0		19	0	0
CW-192	CS	SOUTH FORK CROWDERS CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-152	SPRP	CROWDERS CK	FW	19	0	0		19	2	11	17.0	19	0	0		19	0	0
CW-023	SPRP	CROWDERS CK	FW	19	0	0		19	1	5	17	19	0	0		19	0	0
CW-024	CS / BIO	CROWDERS CK	FW	5	0	0		5	0	0		5	0	0		5	0	0
CW-105	CS	BROWN CK	FW															
CW-696	BIO	BEAVER DAM CK																
CW-153	CS	BEAVERDAM CK	FW	4	0	0		4	1	25	14	4	0	0		4	0	0
CW-027	SPRP	LAKE WYLIE	FW	13	0	0		13	1	8	19	13	0	0		13	0	0
CW-245	CS	LAKE WYLIE	FW	6	0	0		6	1	17	18	6	0	0		6	0	0
CW-198	CS	LAKE WYLIE	FW	15	0	0		15	1	7	11	15	0	0		15	0	0
CW-230	INT	LAKE WYLIE	FW	10	0	0		10	0	0		10	0	0		10	0	0
03050101190																		
CW-171	CS	ALLISON CK	FW	2	0	0		2	0	0		2	0	0		2	0	0
CW-134	CS	CALABASH BRANCH	FW	2	0	0		2	0	0		2	0	0		2	0	0
CW-249 / CW-694	INT / BIO	ALLISON CK	FW	8	0	0		8	1	13	16	8	0	0		8	0	0
CW-200	CS	LAKE WYLIE	FW	5	0	0		5	0	0		5	0	0		5	0	0
CW-201	CS	LAKE WYLIE	FW	15	0	0		15	0	0		15	0	0		15	0	0
03050103010																		
CW-221	CS	CATAWBA RVR TRIB	FW	3	0	0		3	1	33	12	3	0	0		3	0	0
CW-014	SPRP	CATAWBA RVR	FW	19	0	0		19	1	5	16	19	0	0		19	0	0
CW-041	SPRP	CATAWBA RVR	FW	19	0	0		19	2	11	33.0	19	0	0		19	0	0
CW-016	INT	CATAWBA RVR	FW	19	0	0		18	0	0		19	0	0		19	0	0
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	14	0	0		13	0	0		14	0	0		14	0	0
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	3	0	0		3	0	0		3	0	0		3	0	0
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	19	0	0		18	0	0		18	0	0		19	0	0
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0		4	0	0		4	0	0
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	3	0	0		2	0	0		3	0	0		3	0	0
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0		4	0	0		4	0	0
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	3	0	0		2	0	0		3	0	0		3	0	0
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	5	0	0		4	0	0		5	0	0		5	0	0

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	NI N	NI EXC.	NI %	MEAN EXC.	ZN N	ZN EXC.	ZN %	MEAN EXC.
03050101180											
CW-197	INT	LAKE WYLIE	FW	19	0	0		19	0	0	
CW-192	CS	SOUTH FORK CROWDERS CK	FW	4	0	0		4	0	0	
CW-152	SPRP	CROWDERS CK	FW	18	0	0		19	0	0	
CW-023	SPRP	CROWDERS CK	FW	19	0	0		19	0	0	
CW-024	CS / BIO	CROWDERS CK	FW	5	0	0		5	0	0	
CW-105	CS	BROWN CK	FW								
CW-696	BIO	BEAVER DAM CK									
CW-153	CS	BEAVERDAM CK	FW	4	0	0		4	1	25	87
CW-027	SPRP	LAKE WYLIE	FW	13	0	0		13	0	0	
CW-245	CS	LAKE WYLIE	FW	6	0	0		6	0	0	
CW-198	CS	LAKE WYLIE	FW	15	0	0		15	0	0	
CW-230	INT	LAKE WYLIE	FW	10	0	0		10	0	0	
03050101190											
CW-171	CS	ALLISON CK	FW	2	0	0		2	1	50	88
CW-134	CS	CALABASH BRANCH	FW	2	0	0		2	0	0	
CW-249 / CW-694	INT / BIO	ALLISON CK	FW	8	0	0		8	0	0	
CW-200	CS	LAKE WYLIE	FW	5	0	0		5	0	0	
CW-201	CS	LAKE WYLIE	FW	15	0	0		15	0	0	
03050103010											
CW-221	CS	CATAWBA RVR TRIB	FW	3	0	0		3	0	0	
CW-014	SPRP	CATAWBA RVR	FW	19	0	0		19	0	0	
CW-041	SPRP	CATAWBA RVR	FW	19	0	0		19	1	5	100
CW-016	INT	CATAWBA RVR	FW	18	0	0		18	0	0	
CW-016F	CS	LAKE, FISHING CK RESERVOIR	FW	13	0	0		13	0	0	
RL-01012	RL01	LAKE, FISHING CK RESERVOIR	FW	3	0	0		3	0	0	
CW-057	INT	LAKE, FISHING CK RESERVOIR	FW	18	0	0		18	0	0	
CW-174	CS	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0	
RL-02319	RL02	LAKE, CEDAR CK RESERVOIR	FW	2	0	0		2	0	0	
RL-01007	RL01	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0	
RL-02452	RL02	LAKE, CEDAR CK RESERVOIR	FW	2	0	0		2	0	0	
RL-01017	RL01	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0	
CW-033	CS	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				DO	DO	DO	MEAN	TRENDS (88 -2002)					
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG
03050103020													
CW-247	SPRP	SUGAR CK	FW	30	0	0		*	30	0.058			
CW-248	CS	LITTLE SUGAR CK	FW	18	0	0							
CW-246 / CW-627	I* / BIO	SUGAR CK	FW	8	0	0							
CW-226	SPRP	MCALPINE CK	FW	58	0	0		*	160	0.017	*	153	0.057
CW-064	CS / BIO	MCALPINE CK	FW	27	0	0		I	89	0.114	D	82	-0.099
CW-009	CS	STEELE CK	FW	29	2	7	4.540	*	89	0.018	*	82	0.031
CW-203	CS	STEELE CK	FW	19	0	0		*	30	-0.055			
CW-681	BIO	STEEL CK											
CW-011	CS	STEELE CK	FW	30	0	0		*	90	-0.01	*	83	-0.014
CW-013	CS	SUGAR CK	FW	47	0	0		I	159	0.099	D	153	-0.071
CW-036	INT	SUGAR CK	FW	41	0	0		I	98	0.1	*	90	-0.01
03050103030													
CW-176	CS	SIXMILE CK	FW	48	2	4	3.200	D	151	-0.045	I	149	0.05
CW-083	INT	TWELVEMILE CK	FW	43	4	9	4.375	*	106	0.013	I	101	0.049
CW-145	INT	WAXHAW CK	FW	31	3	10	4.333	D	43	-0.201	*	43	0.18
03050103040													
CW-185	CS	CANE CK	FW	30	15	50	2.765	D	87	-0.098	*	86	0
CW-151	CS	BEAR CK	FW	25	12	48	3.071	D	84	-0.168	*	83	0.017
CW-047	CS	GILLS CK	FW	26	7	27	3.886	D	84	-0.094	I	82	0.1
CW-131	CS	BEAR CK	FW	29	9	31	3.098	D	86	-0.067	*	86	0.029
CW-210	BIO	CANE CK											
CW-017	INT	CANE CK	FW	42	27	64	2.870	*	106	-0.076	I	104	0.075
CW-232	CS	RUM CK	FW	20	11	55	2.626	*	32	-0.025	*	31	0.126
03050103050													
CW-029	CS	FISHING CK	FW	43	0	0		*	156	-0.017	*	153	0
CW-031	BIO	FISHING CK											
CW-005	CS / BIO	FISHING CK	FW	44	0	0		*	97	0	*	97	-0.025
CW-225	INT	FISHING CK	FW	44	2	5	0.890	D	95	-0.067	*	95	0.017

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	pH N	pH EXC.	pH %	MEAN EXC.	TRENDS (88-2002) PH	TRENDS (88-2002) N	TRENDS (88-2002) MAG	TURB N	TURB EXC.	TURB %	MEAN EXC.	TRENDS (88-2002) TURB	TRENDS (88-2002) N	TRENDS (88-2002) MAG
03050103020																	
CW-247	SPRP	SUGAR CK	FW	30	0	0		*	30	-0.058	28	3	11	117.000			
CW-248	CS	LITTLE SUGAR CK	FW	18	0	0					18	2	11	62.000			
CW-246 / CW-627	I* / BIO	SUGAR CK	FW	8	0	0					8	2	25	65.500			
CW-226	SPRP	MCALPINE CK	FW	59	0	0		D	161	-0.025	58	9	16	118.667	D	152	-0.822
CW-064	CS / BIO	MCALPINE CK	FW	27	0	0		D	89	-0.019	27	3	11	193.333	*	83	-0.291
CW-009	CS	STEELE CK	FW	28	0	0		D	88	-0.043	28	4	14	108.750	I	82	0.707
CW-203	CS	STEELE CK	FW	18	0	0					18	2	11	153.000			
CW-681	BIO	STEEL CK															
CW-011	CS	STEELE CK	FW	29	0	0		D	89	-0.04	29	2	7	170.000	*	84	0
CW-013	CS	SUGAR CK	FW	47	0	0		D	159	-0.03	46	6	13	138.333	*	152	-0.36
CW-036	INT	SUGAR CK	FW	41	0	0		D	98	-0.028	40	6	15	176.667	*	90	-0.499
03050103030																	
CW-176	CS	SIXMILE CK	FW	48	0	0		D	151	-0.043	48	10	21	142.600	I	149	0.376
CW-083	INT	TWELVEMILE CK	FW	43	0	0		D	106	-0.028	42	14	33	172.786	*	103	0.237
CW-145	INT	WAXHAW CK	FW	31	0	0		*	43	-0.013	31	7	23	280.000	*	43	1.105
03050103040																	
CW-185	CS	CANE CK	FW	30	1	3	5.8	D	87	-0.032	30	3	10	126.667	*	87	0.091
CW-151	CS	BEAR CK	FW	25	0	0		*	84	0.012	25	2	8	56.000	*	84	-0.136
CW-047	CS	GILLS CK	FW	26	0	0		D	83	-0.017	26	6	23	167.000	*	84	0.478
CW-131	CS	BEAR CK	FW	29	1	3	5.6	*	87	-0.013	29	3	10	205.000	*	86	-0.129
CW-210	BIO	CANE CK															
CW-017	INT	CANE CK	FW	42	1	2	5.4	D	105	-0.017	42	7	17	111.000	*	106	-0.498
CW-232	CS	RUM CK	FW	20	1	5	5.9	D	32	-0.05	20	3	15	190.000	*	32	0.176
03050103050																	
CW-029	CS	FISHING CK	FW	43	0	0		D	156	-0.025	43	4	9	278.500	*	153	-0.033
CW-031	BIO	FISHING CK															
CW-005	CS / BIO	FISHING CK	FW	44	0	0		*	97	0.02	44	9	20	151.667	*	97	-0.297
CW-225	INT	FISHING CK	FW	44	0	0		D	95	-0.036	44	7	16	141.429	*	95	0.326

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				TP	TP	TP	MEAN	TRENDS (92-2002)			TRENDS (88-2002)			TN	TN	TN	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	TP	N	MAG	TP	N	MAG	N	EXC.	%	EXC.	TN	N	MAG
03050103020																				
CW-247	SPRP	SUGAR CK	FW																	
CW-248	CS	LITTLE SUGAR CK	FW																	
CW-246 / CW-627	I* / BIO	SUGAR CK	FW																	
CW-226	SPRP	MCALPINE CK	FW					*	62	0.079	I	86	0.093					*	132	0.062
CW-064	CS / BIO	MCALPINE CK	FW					*	31	0.136	*	53	0							
CW-009	CS	STEELE CK	FW					*	30	0	*	52	-0.003							
CW-203	CS	STEELE CK	FW																	
CW-681	BIO	STEEL CK																		
CW-011	CS	STEELE CK	FW					*	30	0	D	51	-0.002							
CW-013	CS	SUGAR CK	FW					I	63	0.054	I	97	0.033					*	123	0.136
CW-036	INT	SUGAR CK	FW					*	36	0.096	*	47	0.061							
03050103030																				
CW-176	CS	SIXMILE CK	FW					I	62	0.02	I	92	0.017					I	131	0.025
CW-083	INT	TWELVEMILE CK	FW					*	37	0.003	*	58	-0.003					*	31	0.032
CW-145	INT	WAXHAW CK	FW															*	30	0.019
03050103040																				
CW-185	CS	CANE CK	FW					D	31	-0.011	*	53	-0.003							
CW-151	CS	BEAR CK	FW					*	33	0.003	*	54	0							
CW-047	CS	GILLS CK	FW					*	33	0	*	55	0							
CW-131	CS	BEAR CK	FW					*	33	0	*	53	0							
CW-210	BIO	CANE CK																		
CW-017	INT	CANE CK	FW					D	39	-0.03	*	62	-0.009					D	33	-0.085
CW-232	CS	RUM CK	FW																	
03050103050																				
CW-029	CS	FISHING CK	FW					*	66	0	*	106	0					*	139	-0.008
CW-031	BIO	FISHING CK																		
CW-005	CS / BIO	FISHING CK	FW					D	50	-0.015	D	50	-0.015					*	89	0.053
CW-225	INT	FISHING CK	FW					*	37	-0.004	D	49	-0.009					*	33	0.069

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CHL N	CHL EXC.	CHL %	MEAN EXC.	TRENDS (88-2002) TSS	N	MAG
03050103020										
CW-247	SPRP	SUGAR CK	FW							
CW-248	CS	LITTLE SUGAR CK	FW							
CW-246 / CW-627	I* / BIO	SUGAR CK	FW							
CW-226	SPRP	MCALPINE CK	FW							
CW-064	CS / BIO	MCALPINE CK	FW							
CW-009	CS	STEELE CK	FW							
CW-203	CS	STEELE CK	FW							
CW-681	BIO	STEEL CK								
CW-011	CS	STEELE CK	FW							
CW-013	CS	SUGAR CK	FW							
CW-036	INT	SUGAR CK	FW							
03050103030										
CW-176	CS	SIXMILE CK	FW							
CW-083	INT	TWELVEMILE CK	FW							
CW-145	INT	WAXHAW CK	FW							
03050103040										
CW-185	CS	CANE CK	FW							
CW-151	CS	BEAR CK	FW							
CW-047	CS	GILLS CK	FW							
CW-131	CS	BEAR CK	FW							
CW-210	BIO	CANE CK								
CW-017	INT	CANE CK	FW							
CW-232	CS	RUM CK	FW							
03050103050										
CW-029	CS	FISHING CK	FW							
CW-031	BIO	FISHING CK								
CW-005	CS / BIO	FISHING CK	FW							
CW-225	INT	FISHING CK	FW							

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	GEO MEAN	BACT N	BACT EXC.	BACT %	MEAN EXC.	TRENDS (88-2002) BACT	TRENDS (88-2002) N	TRENDS (88-2002) MAG	NH3 N	NH3 EXC.	NH3 %	CD N	CD EXC.	CD %	MEAN EXC.
03050103020																		
CW-247	SPRP	SUGAR CK	FW	266.1	29	7	24	3674.3				18	0	0	10	2	20	20
CW-248	CS	LITTLE SUGAR CK	FW	431.1	18	6	33	5336.7				12	0	0	6	0	0	
CW-246 / CW-627	I* / BIO	SUGAR CK	FW	888.3	8	6	75	2271.7				7	0	0	3	0	0	
CW-226	SPRP	MCALPINE CK	FW	270.0	58	17	29	3282.4	*	159	0	47	0	0	19	0	0	
CW-064	CS / BIO	MCALPINE CK	FW	257.0	26	7	27	2742.9	*	87	0	9	0	0	4	0	0	
CW-009	CS	STEELE CK	FW	458.4	29	14	48	3514.3	*	89	7.534	11	0	0	5	0	0	
CW-203	CS	STEELE CK	FW	336.3	19	6	32	1978.3	*	30	-10.225	13	0	0	6	0	0	
CW-681	BIO	STEEL CK																
CW-011	CS	STEELE CK	FW	341.6	30	11	37	2848.2	D	90	-27.969	11	0	0	5	0	0	
CW-013	CS	SUGAR CK	FW	466.8	47	23	49	2455.2	D	159	-21.813	41	0	0	15	0	0	
CW-036	INT	SUGAR CK	FW	478.5	41	19	46	2215.3	D	97	-37.413	18	0	0	10	0	0	
03050103030																		
CW-176	CS	SIXMILE CK	FW	358.8	48	17	35	2789.4	*	150	1.982	42	0	0	16	0	0	
CW-083	INT	TWELVEMILE CK	FW	348.2	44	11	25	5544.5	*	106	5.135	19	0	0	11	0	0	
CW-145	INT	WAXHAW CK	FW	493.9	31	16	52	3071.3	*	43	1.001	20	0	0	11	0	0	
03050103040																		
CW-185	CS	CANE CK	FW	149.8	29	5	17	1216.0	*	86	6.019	13	0	0	6	0	0	
CW-151	CS	BEAR CK	FW	101.4	25	4	16	690.0	*	84	-11.417	5	0	0	2	0	0	
CW-047	CS	GILLS CK	FW	488.3	25	12	48	2414.2	*	83	33.907	5	0	0	2	0	0	
CW-131	CS	BEAR CK	FW	666.0	29	16	55	3656.3	*	86	2.493	7	0	0	4	0	0	
CW-210	BIO	CANE CK																
CW-017	INT	CANE CK	FW	79.2	42	9	21	2272.2	*	106	-2.729	22	0	0	11	0	0	
CW-232	CS	RUM CK	FW	183.2	20	3	15	1880.0	*	32	5.861	15	0	0	7	0	0	
03050103050																		
CW-029	CS	FISHING CK	FW	264.2	43	13	30	1019.2	*	156	0	38	0	0	13	0	0	
CW-031	BIO	FISHING CK																
CW-005	CS / BIO	FISHING CK	FW	251.9	44	12	27	2030.8	*	97	-9.682	40	0	0	14	0	0	
CW-225	INT	FISHING CK	FW	667.8	44	34	77	1026.8	I	95	25.277	22	0	0	11	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CR N	CR EXC.	CR %	MEAN EXC.	CU N	CU EXC.	CU %	MEAN EXC.	PB N	PB EXC.	PB %	MEAN EXC.	HG N	HG EXC.	HG %
03050103020																		
CW-247	SPRP	SUGAR CK	FW	10	0	0		10	2	20	16.0	10	0	0		10	0	0
CW-248	CS	LITTLE SUGAR CK	FW	6	0	0		6	1	17	24	6	0	0		6	0	0
CW-246 / CW-627	I* / BIO	SUGAR CK	FW	3	0	0		3	0	0		3	0	0		3	0	0
CW-226	SPRP	MCALPINE CK	FW	19	0	0		19	0	0		19	0	0		19	0	0
CW-064	CS / BIO	MCALPINE CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-009	CS	STEELE CK	FW	5	0	0		5	0	0		5	0	0		5	0	0
CW-203	CS	STEELE CK	FW	6	0	0		6	0	0		6	0	0		6	0	0
CW-681	BIO	STEEL CK																
CW-011	CS	STEELE CK	FW	5	0	0		5	0	0		5	0	0		5	0	0
CW-013	CS	SUGAR CK	FW	15	0	0		15	1	7	20	15	0	0		15	0	0
CW-036	INT	SUGAR CK	FW	10	0	0		10	2	20	11.5	10	0	0		10	0	0
03050103030																		
CW-176	CS	SIXMILE CK	FW	16	0	0		16	0	0		16	0	0		16	0	0
CW-083	INT	TWELVEMILE CK	FW	11	0	0		11	2	18	13.5	11	0	0		11	0	0
CW-145	INT	WAXHAW CK	FW	11	0	0		11	2	18	18.0	11	0	0		11	0	0
03050103040																		
CW-185	CS	CANE CK	FW	6	0	0		6	0	0		6	0	0		6	0	0
CW-151	CS	BEAR CK	FW	2	0	0		2	0	0		2	0	0		2	0	0
CW-047	CS	GILLS CK	FW	2	0	0		2	0	0		2	0	0		2	0	0
CW-131	CS	BEAR CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-210	BIO	CANE CK																
CW-017	INT	CANE CK	FW	11	0	0		11	1	9	20	11	0	0		11	0	0
CW-232	CS	RUM CK	FW	7	0	0		7	0	0		7	0	0		7	0	0
03050103050																		
CW-029	CS	FISHING CK	FW	13	0	0		13	0	0		13	0	0		13	0	0
CW-031	BIO	FISHING CK																
CW-005	CS / BIO	FISHING CK	FW	14	0	0		14	0	0		14	0	0		14	0	0
CW-225	INT	FISHING CK	FW	11	0	0		11	2	18	17.5	11	0	0		11	0	0

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	NI N	NI EXC.	NI %	MEAN EXC.	ZN N	ZN EXC.	ZN %	MEAN EXC.
03050103020											
CW-247	SPRP	SUGAR CK	FW	10	0	0		10	0	0	
CW-248	CS	LITTLE SUGAR CK	FW	6	0	0		6	0	0	
CW-246 / CW-627	I* / BIO	SUGAR CK	FW	3	0	0		3	0	0	
CW-226	SPRP	MCALPINE CK	FW	19	0	0		19	0	0	
CW-064	CS / BIO	MCALPINE CK	FW	4	0	0		4	0	0	
CW-009	CS	STEELE CK	FW	5	0	0		5	0	0	
CW-203	CS	STEELE CK	FW	6	0	0		6	0	0	
CW-681	BIO	STEEL CK									
CW-011	CS	STEELE CK	FW	5	0	0		5	0	0	
CW-013	CS	SUGAR CK	FW	15	0	0		15	0	0	
CW-036	INT	SUGAR CK	FW	10	0	0		10	0	0	
03050103030											
CW-176	CS	SIXMILE CK	FW	16	0	0		16	0	0	
CW-083	INT	TWELVEMILE CK	FW	11	0	0		11	0	0	
CW-145	INT	WAXHAW CK	FW	11	0	0		11	0	0	
03050103040											
CW-185	CS	CANE CK	FW	6	0	0		6	0	0	
CW-151	CS	BEAR CK	FW	2	0	0		2	0	0	
CW-047	CS	GILLS CK	FW	2	0	0		2	0	0	
CW-131	CS	BEAR CK	FW	4	0	0		4	0	0	
CW-210	BIO	CANE CK									
CW-017	INT	CANE CK	FW	11	0	0		11	1	9	530
CW-232	CS	RUM CK	FW	7	0	0		7	0	0	
03050103050											
CW-029	CS	FISHING CK	FW	13	0	0		13	0	0	
CW-031	BIO	FISHING CK									
CW-005	CS / BIO	FISHING CK	FW	14	0	0		14	0	0	
CW-225	INT	FISHING CK	FW	11	0	0		11	1	9	110

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	DO N	DO EXC.	DO %	MEAN EXC.	TRENDS (88 -2002) DO	N	MAG	BOD	N	MAG
03050103060													
CW-006	CS	WILDCAT CK	FW	30	2	7	4.090	D	86	-0.05	*	85	0.025
CW-212	CS	TOOLS FORK	FW	26	0	0		*	79	0	*	77	0.02
CW-096	CS	WILDCAT CK	FW	30	3	10	4.580	*	88	-0.025	*	87	0.034
CW-224	CS	FISHING CK	FW	30	1	3	3.15	*	75	-0.017	*	73	0
CW-697	BIO	STONEY FORK CK											
CW-695	BIO	TAYLORS CK											
CW-654	BIO	FISHING CK											
CW-007	BIO	S FORK OF FISHING CK											
RS-01007	RS01	MCFADDEN BRANCH	FW	8	0	0							
CW-008	CS	FISHING CK	FW	45	0	0		*	160	-0.028	*	157	0
CW-233	INT / BIO	FISHING CK	FW	29	0	0		*	41	0.022	*	40	0
CL-021	CS	LAKE OLIPHANT	FW	18	0	0							
03050103070													
CW-227	CS	NEELYS CK	FW	28	0	0		D	73	-0.051	*	72	0.018
CW-234	INT / BIO	TINKERS CK	FW	24	1	4	2	*	35	0.053	*	34	0.056
03050103080													
CW-084	BIO	CAMP CK											
CW-235	INT	CAMP CK	FW	24	0	0		D	36	-0.204	*	36	0.101
03050103090													
CW-088	CS	GRASSY RUN BRANCH	FW	23	7	30	3.129	*	80	-0.067	I	80	0.066
CW-002	CS / BIO	ROCKY CK	FW	46	3	7	3.267	D	164	-0.057	*	159	-0.017
CW-067	BIO	LITTLE ROCKY CK											
CW-691	BIO	BEAVER DAM CK											
CW-236	INT	ROCKY CK	FW	29	1	3	3.76	*	41	-0.045	*	40	-0.06
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	28	4	14	4.208	*	85	-0.05	*	84	-0.017
03050104010													
CW-231	INT	LAKE WATEREE	FW	31	1	3	4.6	*	42	0	*	38	-0.039
CW-040	CS	LITTLE WATEREE CK	FW	26	9	35	3.994	D	77	-0.184	*	73	0
RS-02321	RS02	DUTCHMANS CK	FW	12	0	0							
CW-692	BIO	DUTCHMANS CK											
CW-076	BIO	BEAVER CK											
CW-208	CS	LAKE WATEREE	FW	51	0	0		*	180	0.036	*	160	0.017
RL-02314	RL02	LAKE WATEREE	FW	12	0	0							
CW-207	CS	LAKE WATEREE	FW	50	0	0		*	179	0	*	161	0.008
CW-693	BIO	WHITE OAK CK											
RL-01003	RL01	LAKE WATEREE	FW	11	0	0							
CW-209	CS	LAKE WATEREE	FW	48	1	2	4.9	*	181	-0.033	*	158	0
RL-01033	RL01	LAKE WATEREE	FW	11	0	0							
CL-089	INT	LAKE WATEREE	FW	23	2	9	3.825						

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				pH	pH	pH	MEAN	TRENDS (88-2002)			TURB	TURB	TURB	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	PH	N	MAG	N	EXC.	%	EXC.	TURB	N	MAG
03050103060																	
CW-006	CS	WILDCAT CK	FW	30	1	3	5.8	D	86	-0.05	30	9	30	174.444	*	85	-0.042
CW-212	CS	TOOLS FORK	FW	26	0	0		D	79	-0.016	26	7	27	160.714	D	78	-0.999
CW-096	CS	WILDCAT CK	FW	30	1	3	5.8	D	88	-0.038	30	8	27	176.625	D	87	-0.522
CW-224	CS	FISHING CK	FW	30	0	0		D	75	-0.043	30	5	17	140.000	*	74	-0.523
CW-697	BIO	STONEY FORK CK															
CW-695	BIO	TAYLORS CK															
CW-654	BIO	FISHING CK															
CW-007	BIO	S FORK OF FISHING CK															
RS-01007	RS01	MCFADDEN BRANCH	FW	8	0	0					8	2	25	525.500			
CW-008	CS	FISHING CK	FW	45	0	0		D	160	-0.044	45	8	18	130.625	*	158	-0.355
CW-233	INT / BIO	FISHING CK	FW	29	0	0		D	41	-0.051	29	5	17	115.400	*	41	0.313
CL-021	CS	LAKE OLIPHANT	FW	17	2	12	9.250				16	1	6	40			
03050103070																	
CW-227	CS	NEELYS CK	FW	28	0	0		D	73	-0.027	28	0	0		*	72	0.289
CW-234	INT / BIO	TINKERS CK	FW	24	1	4	3.7	D	35	-0.042	24	8	33	209.500	I	35	1.012
03050103080																	
CW-084	BIO	CAMP CK															
CW-235	INT	CAMP CK	FW	24	1	4	5.67	D	36	-0.027	25	4	16	550.000	*	37	1.493
03050103090																	
CW-088	CS	GRASSY RUN BRANCH	FW	23	0	0		D	80	-0.062	23	0	0		*	79	0.205
CW-002	CS / BIO	ROCKY CK	FW	46	0	0		D	164	-0.05	44	4	9	93.500	*	158	0.024
CW-067	BIO	LITTLE ROCKY CK															
CW-691	BIO	BEAVER DAM CK															
CW-236	INT	ROCKY CK	FW	29	0	0		D	41	-0.086	28	4	14	121.250	*	40	0.427
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	28	0	0		D	85	-0.03	28	8	29	103.500	*	84	0.334
03050104010																	
CW-231	INT	LAKE WATEREE	FW	30	0	0		*	41	-0.055	29	12	41	38.500	*	39	0.125
CW-040	CS	LITTLE WATEREE CK	FW	26	1	4	4.55	*	77	0	24	0	0		D	72	-0.499
RS-02321	RS02	DUTCHMANS CK	FW	12	1	8	5.8				12	0	0				
CW-692	BIO	DUTCHMANS CK															
CW-076	BIO	BEAVER CK															
CW-208	CS	LAKE WATEREE	FW	50	15	30	8.840	*	178	0.022	47	8	17	38.750	*	159	0
RL-02314	RL02	LAKE WATEREE	FW	12	3	25	8.830				12	0	0				
CW-207	CS	LAKE WATEREE	FW	49	13	27	8.868	*	177	0.02	47	6	13	39.667	*	161	0
CW-693	BIO	WHITE OAK CK															
RL-01003	RL01	LAKE WATEREE	FW	11	0	0					11	0	0				
CW-209	CS	LAKE WATEREE	FW	47	11	23	8.786	I	179	0.029	47	5	11	36.400	*	157	-0.099
RL-01033	RL01	LAKE WATEREE	FW	11	0	0					11	0	0				
CL-089	INT	LAKE WATEREE	FW	23	3	13	7.733				24	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				TP	TP	TP	MEAN	TRENDS (92-2002)			TRENDS (88-2002)			TN	TN	TN	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	TP	N	MAG	TP	N	MAG	N	EXC.	%	EXC.	TN	N	MAG
03050103060																				
CW-006	CS	WILDCAT CK	FW								D	52	-0.002							
CW-212	CS	TOOLS FORK	FW					I	31	0.069	*	52	0							
CW-096	CS	WILDCAT CK	FW					D	33	-0.017	D	56	-0.006							
CW-224	CS	FISHING CK	FW					D	31	-0.012	D	43	-0.01							
CW-697	BIO	STONEY FORK CK																		
CW-695	BIO	TAYLORS CK																		
CW-654	BIO	FISHING CK																		
CW-007	BIO	S FORK OF FISHING CK																		
RS-01007	RS01	MCFADDEN BRANCH	FW																	
CW-008	CS	FISHING CK	FW					*	67	-0.004	*	111	-0.003					*	149	0.01
CW-233	INT / BIO	FISHING CK	FW																	
CL-021	CS	LAKE OLIPHANT	FW	12	2	17	0.100							8	0	0				
03050103070																				
CW-227	CS	NEELYS CK	FW					*	30	0	*	41	0							
CW-234	INT / BIO	TINKERS CK	FW																	
03050103080																				
CW-084	BIO	CAMP CK																		
CW-235	INT	CAMP CK	FW																	
03050103090																				
CW-088	CS	GRASSY RUN BRANCH	FW					*	31	0.01	*	53	-0.004							
CW-002	CS / BIO	ROCKY CK	FW					*	67	0	*	111	0					*	142	0.034
CW-067	BIO	LITTLE ROCKY CK																		
CW-691	BIO	BEAVER DAM CK																		
CW-236	INT	ROCKY CK	FW																	
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	11	7	64	0.186	*	42	0	*	63	0	5	1	20	2.67			
03050104010																				
CW-231	INT	LAKE WATEREE	FW	10	8	80	0.111							12	0	0				
CW-040	CS	LITTLE WATEREE CK	FW								D	49	0							
RS-02321	RS02	DUTCHMANS CK	FW																	
CW-692	BIO	DUTCHMANS CK																		
CW-076	BIO	BEAVER CK																		
CW-208	CS	LAKE WATEREE	FW	18	17	94	0.107	*	85	0	*	132	0	41	1	2	2.37	*	154	-0.003
RL-02314	RL02	LAKE WATEREE	FW	12	6	50	0.088							6	1	17	2.48			
CW-207	CS	LAKE WATEREE	FW	18	15	83	0.096	*	86	0	*	134	0	41	1	2	2.51	*	156	-0.003
CW-693	BIO	WHITE OAK CK																		
RL-01003	RL01	LAKE WATEREE	FW											6	0	0				
CW-209	CS	LAKE WATEREE	FW	18	10	56	0.100	*	84	-0.002	*	130	0	41	0	0		D	153	-0.01
RL-01033	RL01	LAKE WATEREE	FW											6	1	17	5.07			
CL-089	INT	LAKE WATEREE	FW	12	3	25	0.087							12	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CHL N	CHL EXC.	CHL %	MEAN EXC.	TRENDS (88-2002) TSS	N	MAG
03050103060										
CW-006	CS	WILDCAT CK	FW							
CW-212	CS	TOOLS FORK	FW							
CW-096	CS	WILDCAT CK	FW							
CW-224	CS	FISHING CK	FW							
CW-697	BIO	STONEY FORK CK								
CW-695	BIO	TAYLORS CK								
CW-654	BIO	FISHING CK								
CW-007	BIO	S FORK OF FISHING CK								
RS-01007	RS01	MCFADDEN BRANCH	FW							
CW-008	CS	FISHING CK	FW							
CW-233	INT / BIO	FISHING CK	FW							
CL-021	CS	LAKE OLIPHANT	FW	9	3	33	122.97			
03050103070										
CW-227	CS	NEELYS CK	FW							
CW-234	INT / BIO	TINKERS CK	FW							
03050103080										
CW-084	BIO	CAMP CK								
CW-235	INT	CAMP CK	FW							
03050103090										
CW-088	CS	GRASSY RUN BRANCH	FW							
CW-002	CS / BIO	ROCKY CK	FW							
CW-067	BIO	LITTLE ROCKY CK								
CW-691	BIO	BEAVER DAM CK								
CW-236	INT	ROCKY CK	FW							
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW							
03050104010										
CW-231	INT	LAKE WATEREE	FW	10	0	0				
CW-040	CS	LITTLE WATEREE CK	FW							
RS-02321	RS02	DUTCHMANS CK	FW							
CW-692	BIO	DUTCHMANS CK								
CW-076	BIO	BEAVER CK								
CW-208	CS	LAKE WATEREE	FW	22	8	36	44.99	I	68	0.756
RL-02314	RL02	LAKE WATEREE	FW	6	0	0				
CW-207	CS	LAKE WATEREE	FW	22	0	0		I	71	0.883
CW-693	BIO	WHITE OAK CK								
RL-01003	RL01	LAKE WATEREE	FW	7	0	0				
CW-209	CS	LAKE WATEREE	FW	22	0	0		I	69	0.512
RL-01033	RL01	LAKE WATEREE	FW	6	0	0				
CL-089	INT	LAKE WATEREE	FW	12	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	GEO MEAN	BACT N	BACT EXC.	BACT %	MEAN EXC.	TRENDS (88-2002) BACT	TRENDS (88-2002) N	TRENDS (88-2002) MAG	NH3 N	NH3 EXC.	NH3 %	CD N	CD EXC.	CD %	MEAN EXC.
03050103060																		
CW-006	CS	WILDCAT CK	FW	939.8	30	23	77	1931.7	*	86	-29.837	13	0	0	6	0	0	
CW-212	CS	TOOLS FORK	FW	947.1	26	21	81	2351.4	D	79	-44.202	5	0	0	2	0	0	
CW-096	CS	WILDCAT CK	FW	365.3	30	10	33	2708.0	*	88	-7.06	13	0	0	6	0	0	
CW-224	CS	FISHING CK	FW	550.9	30	14	47	1856.4	*	74	0	13	0	0	6	0	0	
CW-697	BIO	STONEY FORK CK																
CW-695	BIO	TAYLORS CK																
CW-654	BIO	FISHING CK																
CW-007	BIO	S FORK OF FISHING CK																
RS-01007	RS01	MCFADDEN BRANCH	FW	404.3	8	3	38	1986.7				4	0	0	3	0	0	
CW-008	CS	FISHING CK	FW	131.0	45	5	11	1814.0	D	159	-6.683	40	0	0	13	1	8	20
CW-233	INT / BIO	FISHING CK	FW	297.9	29	7	24	2462.9	*	41	14.124	19	0	0	11	0	0	
CL-021	CS	LAKE OLIPHANT	FW	6.5	16	0	0					9	0	0	5	0	0	
03050103070																		
CW-227	CS	NEELYS CK	FW	191.5	28	6	21	1075.0	*	71	6.113	6	0	0	4	0	0	
CW-234	INT / BIO	TINKERS CK	FW	285.1	24	6	25	2030.0	*	35	-2.23	16	0	0	8	0	0	
03050103080																		
CW-084	BIO	CAMP CK																
CW-235	INT	CAMP CK	FW	277.6	25	10	40	1817.0	*	37	0.381	18	0	0	9	0	0	
03050103090																		
CW-088	CS	GRASSY RUN BRANCH	FW	1305.6	23	17	74	3599.4	*	80	0	2	0	0	1	0	0	
CW-002	CS / BIO	ROCKY CK	FW	228.1	46	12	26	2449.2	*	163	-8.37	38	0	0	14	1	7	20
CW-067	BIO	LITTLE ROCKY CK																
CW-691	BIO	BEAVER DAM CK																
CW-236	INT	ROCKY CK	FW	308.5	29	9	31	2208.9	*	41	7.802	18	0	0	11	0	0	
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	247.2	28	8	29	3597.5	*	85	-4.858	5	0	0	4	0	0	
03050104010																		
CW-231	INT	LAKE WATEREE	FW	71.5	29	0	0		I	39	12.632	20	0	0	10	0	0	
CW-040	CS	LITTLE WATEREE CK	FW	126.7	25	3	12	670.0	D	74	-24.253	4	0	0	2	0	0	
RS-02321	RS02	DUTCHMANS CK	FW	481.9	12	6	50	1150.0				5	0	0	4	0	0	
CW-692	BIO	DUTCHMANS CK																
CW-076	BIO	BEAVER CK																
CW-208	CS	LAKE WATEREE	FW	4.4	47	0	0		*	162	0	42	0	0	16	0	0	
RL-02314	RL02	LAKE WATEREE	FW	2.7	12	0	0					6	0	0	4	0	0	
CW-207	CS	LAKE WATEREE	FW	3.5	47	0	0		D	164	-0.077	42	0	0	16	0	0	
CW-693	BIO	WHITE OAK CK																
RL-01003	RL01	LAKE WATEREE	FW	4.7	11	0	0					6	0	0	4	0	0	
CW-209	CS	LAKE WATEREE	FW	3.7	48	0	0		D	162	0	42	0	0	16	0	0	
RL-01033	RL01	LAKE WATEREE	FW	5.6	11	0	0					6	0	0	4	0	0	
CL-089	INT	LAKE WATEREE	FW	2.1	24	0	0					12	0	0	6	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CR N	CR EXC.	CR %	MEAN EXC.	CU N	CU EXC.	CU %	MEAN EXC.	PB N	PB EXC.	PB %	MEAN EXC.	HG N	HG EXC.	HG %
03050103060																		
CW-006	CS	WILDCAT CK	FW	6	0	0		6	0	0		6	0	0		6	0	0
CW-212	CS	TOOLS FORK	FW	2	0	0		2	0	0		2	0	0		2	0	0
CW-096	CS	WILDCAT CK	FW	6	0	0		6	1	17	20	6	0	0		6	0	0
CW-224	CS	FISHING CK	FW	6	0	0		6	1	17	29	6	0	0		6	0	0
CW-697	BIO	STONEY FORK CK																
CW-695	BIO	TAYLORS CK																
CW-654	BIO	FISHING CK																
CW-007	BIO	S FORK OF FISHING CK																
RS-01007	RS01	MCFADDEN BRANCH	FW	3	0	0		3	1	33	25	3	1	33	71	3	0	0
CW-008	CS	FISHING CK	FW	13	0	0		13	0	0		13	0	0		13	0	0
CW-233	INT / BIO	FISHING CK	FW	11	0	0		11	1	9	70	11	0	0		11	0	0
CL-021	CS	LAKE OLIPHANT	FW	5	0	0		5	1	20	18	5	0	0		5	0	0
03050103070																		
CW-227	CS	NEELYS CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-234	INT / BIO	TINKERS CK	FW	8	0	0		8	1	13	30	8	0	0		8	0	0
03050103080																		
CW-084	BIO	CAMP CK																
CW-235	INT	CAMP CK	FW	9	0	0		9	1	11	31	9	0	0		9	0	0
03050103090																		
CW-088	CS	GRASSY RUN BRANCH	FW	1	0	0		1	0	0		1	0	0		1	0	0
CW-002	CS / BIO	ROCKY CK	FW	14	0	0		14	2	14	37.0	14	0	0		14	0	0
CW-067	BIO	LITTLE ROCKY CK																
CW-691	BIO	BEAVER DAM CK																
CW-236	INT	ROCKY CK	FW	11	0	0		11	1	9	11	11	0	0		11	0	0
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0		3	0	0		4	0	0
03050104010																		
CW-231	INT	LAKE WATEREE	FW	10	0	0		9	0	0		10	0	0		10	0	0
CW-040	CS	LITTLE WATEREE CK	FW	2	0	0		2	0	0		2	0	0		2	0	0
RS-02321	RS02	DUTCHMANS CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-692	BIO	DUTCHMANS CK																
CW-076	BIO	BEAVER CK																
CW-208	CS	LAKE WATEREE	FW	16	0	0		16	0	0		16	0	0		16	0	0
RL-02314	RL02	LAKE WATEREE	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-207	CS	LAKE WATEREE	FW	16	0	0		16	0	0		16	0	0		16	0	0
CW-693	BIO	WHITE OAK CK																
RL-01003	RL01	LAKE WATEREE	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-209	CS	LAKE WATEREE	FW	16	0	0		16	0	0		16	0	0		16	0	0
RL-01033	RL01	LAKE WATEREE	FW	4	0	0		4	0	0		4	0	0		4	0	0
CL-089	INT	LAKE WATEREE	FW	6	0	0		6	0	0		6	0	0		6	0	0

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	NI N	NI EXC.	NI %	MEAN EXC.	ZN N	ZN EXC.	ZN %	MEAN EXC.
03050103060											
CW-006	CS	WILDCAT CK	FW	6	0	0		6	0	0	
CW-212	CS	TOOLS FORK	FW	2	0	0		2	0	0	
CW-096	CS	WILDCAT CK	FW	6	0	0		6	0	0	
CW-224	CS	FISHING CK	FW	6	0	0		6	0	0	
CW-697	BIO	STONEY FORK CK									
CW-695	BIO	TAYLORS CK									
CW-654	BIO	FISHING CK									
CW-007	BIO	S FORK OF FISHING CK									
RS-01007	RS01	MCFADDEN BRANCH	FW	3	0	0		3	0	0	
CW-008	CS	FISHING CK	FW	13	0	0		13	0	0	
CW-233	INT / BIO	FISHING CK	FW	11	0	0		11	0	0	
CL-021	CS	LAKE OLIPHANT	FW	5	0	0		5	0	0	
03050103070											
CW-227	CS	NEELYS CK	FW	4	0	0		4	0	0	
CW-234	INT / BIO	TINKERS CK	FW	8	0	0		8	0	0	
03050103080											
CW-084	BIO	CAMP CK									
CW-235	INT	CAMP CK	FW	9	0	0		9	0	0	
03050103090											
CW-088	CS	GRASSY RUN BRANCH	FW	1	0	0		1	0	0	
CW-002	CS / BIO	ROCKY CK	FW	14	0	0		14	0	0	
CW-067	BIO	LITTLE ROCKY CK									
CW-691	BIO	BEAVER DAM CK									
CW-236	INT	ROCKY CK	FW	11	0	0		11	0	0	
CW-175	CS	LAKE, CEDAR CK RESERVOIR	FW	4	0	0		4	0	0	
03050104010											
CW-231	INT	LAKE WATEREE	FW	9	0	0		9	0	0	
CW-040	CS	LITTLE WATEREE CK	FW	2	0	0		2	0	0	
RS-02321	RS02	DUTCHMANS CK	FW	4	0	0		4	0	0	
CW-692	BIO	DUTCHMANS CK									
CW-076	BIO	BEAVER CK									
CW-208	CS	LAKE WATEREE	FW	16	0	0		16	0	0	
RL-02314	RL02	LAKE WATEREE	FW	4	0	0		4	0	0	
CW-207	CS	LAKE WATEREE	FW	16	0	0		16	0	0	
CW-693	BIO	WHITE OAK CK									
RL-01003	RL01	LAKE WATEREE	FW	4	0	0		4	0	0	
CW-209	CS	LAKE WATEREE	FW	16	0	0		16	0	0	
RL-01033	RL01	LAKE WATEREE	FW	4	0	0		4	0	0	
CL-089	INT	LAKE WATEREE	FW	6	0	0		6	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				DO	DO	DO	MEAN	TRENDS (88 -2002)					
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG
03050104020													
CW-072	INT	BIG WATEREE CK	FW	21	4	19	3.078	*	32	-0.08	D	32	-0.176
03050104030													
CW-019	CS	WATEREE RVR	FW	30	5	17	4.416	I	86	0.045	D	84	-0.043
RS-01046	RS01	RAFTING CK	FW	11	0	0							
CW-206	SPRP	WATEREE RVR	FW	59	0	0		I	176	0.036	D	170	-0.099
CW-222 / SC-002	INT	WATEREE RVR	FW	79	1	1	4.1	*	169	0.014	D	164	-0.055
03050104040													
CW-077	BIO	FLAT ROCK CK											
CW-078	BIO	GRANNIES QUARTER CK											
CW-237	INT	GRANNIES QUARTER CK	FW	31	0	0		*	42	0.026	D	40	-0.09
03050104050													
CW-075	BIO	THORNTREE CK											
CW-228	CS / BIO	SAWNEYS CK	FW	46	0	0		*	135	0.018	D	129	-0.068
CW-079	INT	SAWNEYS CK	FW	27	1	4	4.03	*	38	-0.03	D	38	-0.095
03050104060													
CW-229	CS	BEAR CK	FW	42	9	21	3.477	D	125	-0.083	*	118	-0.05
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW	40	0	0		*	100	0.004	D	99	-0.047
RS-02485	RS02	COOK RUN BRANCH	FW	1	0	0							
03050104070													
CW-223	CS / BIO	LITTLE PINE TREE CK	FW	30	1	3	2.33	*	86	-0.014	*	85	0
CL-078	CS	LAKE, ADAMS MILLPOND	FW	19	1	5	3.5						
CW-021	INT	BIG PINE TREE CK	FW	32	0	0		I	43	0.152	D	41	-0.123
03050104080													
CW-238	INT	SWIFT CK	FW	26	16	62	2.420	D	37	-0.273	D	38	-0.088
03050104090													
CW-154	CS / BIO	KELLY CK	FW	31	0	0		*	86	0.02	*	85	0
CW-155	CS / BIO	SPEARS CK	FW	48	0	0		*	135	0.033	I	134	0.05
CW-166	INT	SPEARS CK	FW	30	2	7	4.500	*	40	0	D	38	-0.077
03050104100													
CW-250	INT	COLONELS CK	FW	23	1	4	3.3						
CW-240	CS	COLONELS CK	FW	20	1	5	4.05	*	32	-0.071			

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				pH	pH	pH	MEAN	TRENDS (88-2002)			TURB	TURB	TURB	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	PH	N	MAG	N	EXC.	%	EXC.	TURB	N	MAG
03050104020																	
CW-072	INT	BIG WATEREE CK	FW	22	3	14	6.587	*	33	0.048	23	3	13	166.333	D	33	-2.867
03050104030																	
CW-019	CS	WATEREE RVR	FW	30	0	0		*	86	-0.002	30	0	0		D	84	-0.507
RS-01046	RS01	RAFTING CK	FW	11	8	73	5.556				11	0	0				
CW-206	SPRP	WATEREE RVR	FW	59	3	5	6.563	*	176	0.007	58	0	0		D	171	-0.4
CW-222 / SC-002	INT	WATEREE RVR	FW	79	2	3	7.035	I	169	0.034	80	0	0		D	164	-0.355
03050104040																	
CW-077	BIO	FLAT ROCK CK															
CW-078	BIO	GRANNIES QUARTER CK															
CW-237	INT	GRANNIES QUARTER CK	FW	31	4	13	7.515	*	42	0.029	29	0	0		D	40	-0.99
03050104050																	
CW-075	BIO	THORNTREE CK															
CW-228	CS / BIO	SAWNEYS CK	FW	45	3	7	5.600	I	133	0.034	45	0	0		D	132	-0.438
CW-079	INT	SAWNEYS CK	FW	27	1	4	5.69	*	38	0.033	28	1	4	75	D	39	-0.637
03050104060																	
CW-229	CS	BEAR CK	FW	42	0	0		I	124	0.038	40	2	5	370.000	D	121	-0.401
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW	40	4	10	5.118	I	100	0.051	41	1	2	95	D	98	-0.222
RS-02485	RS02	COOK RUN BRANCH	FW	1	0	0					1	0	0				
03050104070																	
CW-223	CS / BIO	LITTLE PINE TREE CK	FW	30	6	20	5.673	I	86	0.066	30	2	7	430.000	I	84	0.194
CL-078	CS	LAKE, ADAMS MILLPOND	FW	18	3	17	5.600				17	0	0				
CW-021	INT	BIG PINE TREE CK	FW	32	12	38	6.196	*	43	0.046	32	0	0		D	42	-0.142
03050104080																	
CW-238	INT	SWIFT CK	FW	26	24	92	5.216	*	37	-0.001	28	0	0		I	38	0.278
03050104090																	
CW-154	CS / BIO	KELLY CK	FW	31	5	16	5.220	I	86	0.107	31	1	3	180	*	84	0.081
CW-155	CS / BIO	SPEARS CK	FW	48	6	13	5.267	I	135	0.1	47	4	9	105.000	*	131	0.012
CW-166	INT	SPEARS CK	FW	30	13	43	5.175	I	40	0.077	31	0	0		D	40	-0.492
03050104100																	
CW-250	INT	COLONELS CK	FW	23	8	35	5.454				24	0	0				
CW-240	CS	COLONELS CK	FW	20	15	75	5.187	*	32	-0.054	19	0	0				

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION				TP	TP	TP	MEAN	TRENDS (92-2002)			TRENDS (88-2002)			TN	TN	TN	MEAN	TRENDS (88-2002)		
NUMBER	TYPE	WATERBODY NAME	CLASS	N	EXC.	%	EXC.	TP	N	MAG	TP	N	MAG	N	EXC.	%	EXC.	TN	N	MAG
03050104020																				
CW-072	INT	BIG WATEREE CK	FW																	
03050104030																				
CW-019	CS	WATEREE RVR	FW					*	32	0.001	*	50	0							
RS-01046	RS01	RAFTING CK	FW																	
CW-206	SPRP	WATEREE RVR	FW					*	67	0	*	113	0					D	162	-0.023
CW-222 / SC-002	INT	WATEREE RVR	FW					*	65	0	*	110	0					*	154	0.001
03050104040																				
CW-077	BIO	FLAT ROCK CK																		
CW-078	BIO	GRANNIES QUARTER CK																		
CW-237	INT	GRANNIES QUARTER CK	FW																	
03050104050																				
CW-075	BIO	THORNTREE CK																		
CW-228	CS / BIO	SAWNEYS CK	FW					*	68	0	D	86	0					D	125	-0.008
CW-079	INT	SAWNEYS CK	FW																	
03050104060																				
CW-229	CS	BEAR CK	FW					*	61	0	*	78	0					*	116	-0.004
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW					*	37	0	*	56	0					D	35	-0.035
RS-02485	RS02	COOK RUN BRANCH	FW																	
03050104070																				
CW-223	CS / BIO	LITTLE PINE TREE CK	FW					*	32	0	*	50	0							
CL-078	CS	LAKE, ADAMS MILLPOND	FW	11	0	0								8	0	0				
CW-021	INT	BIG PINE TREE CK	FW																	
03050104080																				
CW-238	INT	SWIFT CK	FW																	
03050104090																				
CW-154	CS / BIO	KELLY CK	FW					I	33	0	I	51	0							
CW-155	CS / BIO	SPEARS CK	FW					*	63	0	*	83	0					*	101	0.008
CW-166	INT	SPEARS CK	FW																	
03050104100																				
CW-250	INT	COLONELS CK	FW																	
CW-240	CS	COLONELS CK	FW																	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CHL N	CHL EXC.	CHL %	MEAN EXC.	TRENDS (88-2002) TSS	N	MAG
03050104020										
CW-072	INT	BIG WATEREE CK	FW							
03050104030										
CW-019	CS	WATEREE RVR	FW							
RS-01046	RS01	RAFTING CK	FW							
CW-206	SPRP	WATEREE RVR	FW					*	113	0
CW-222 / SC-002	INT	WATEREE RVR	FW					*	115	0.247
03050104040										
CW-077	BIO	FLAT ROCK CK								
CW-078	BIO	GRANNIES QUARTER CK								
CW-237	INT	GRANNIES QUARTER CK	FW							
03050104050										
CW-075	BIO	THORNTREE CK								
CW-228	CS / BIO	SAWNEYS CK	FW							
CW-079	INT	SAWNEYS CK	FW							
03050104060										
CW-229	CS	BEAR CK	FW							
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW							
RS-02485	RS02	COOK RUN BRANCH	FW							
03050104070										
CW-223	CS / BIO	LITTLE PINE TREE CK	FW							
CL-078	CS	LAKE, ADAMS MILLPOND	FW	11	0	0				
CW-021	INT	BIG PINE TREE CK	FW							
03050104080										
CW-238	INT	SWIFT CK	FW							
03050104090										
CW-154	CS / BIO	KELLY CK	FW							
CW-155	CS / BIO	SPEARS CK	FW							
CW-166	INT	SPEARS CK	FW							
03050104100										
CW-250	INT	COLONELS CK	FW							
CW-240	CS	COLONELS CK	FW							

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

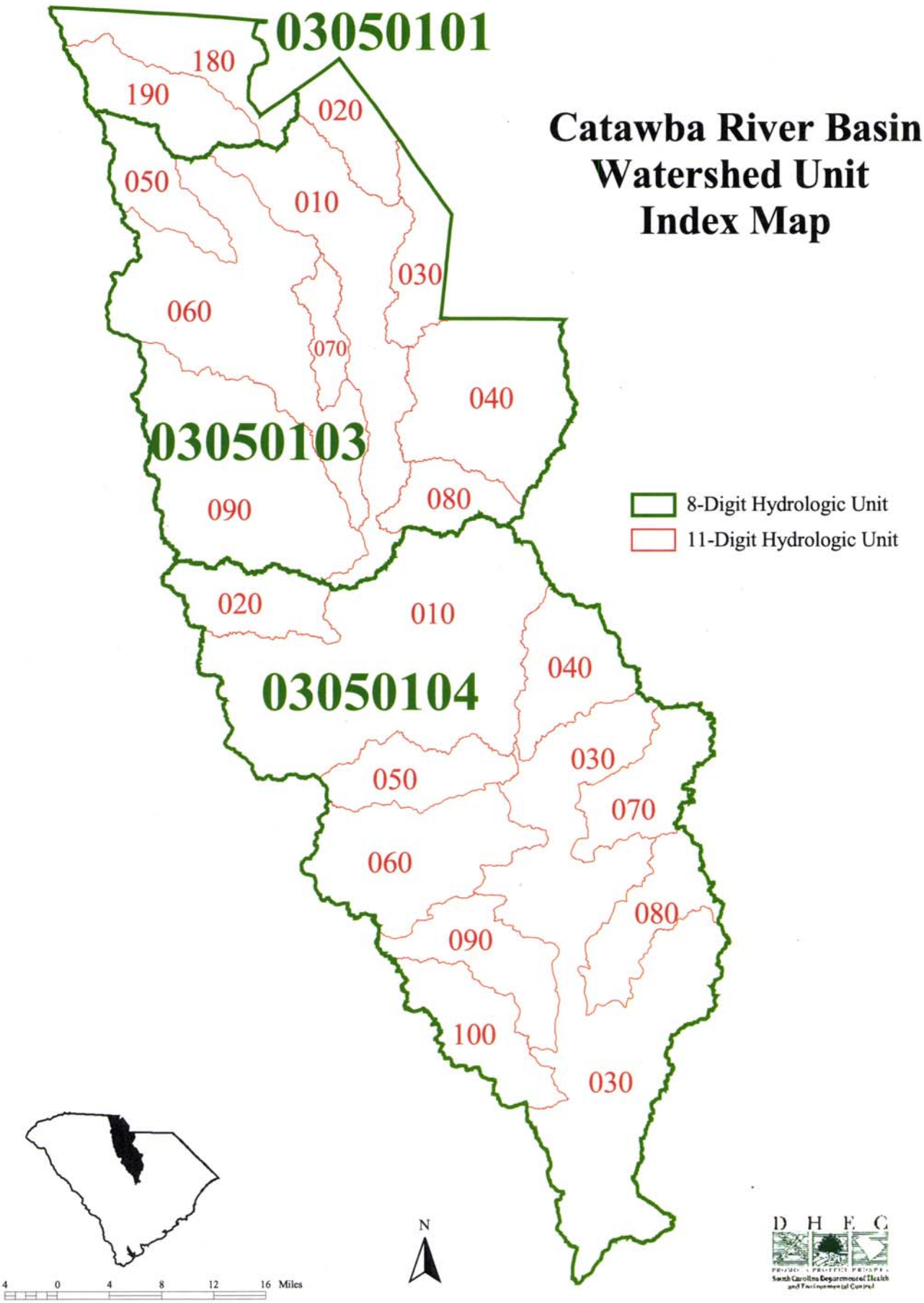
STATION NUMBER	TYPE	WATERBODY NAME	CLASS	GEO MEAN	BACT N	BACT EXC.	BACT %	MEAN EXC.	TRENDS (88-2002) BACT	TRENDS (88-2002) N	TRENDS (88-2002) MAG	NH3 N	NH3 EXC.	NH3 %	CD N	CD EXC.	CD %	MEAN EXC.
03050104020																		
CW-072	INT	BIG WATEREE CK	FW	458.6	23	9	39	2070.0	*	33	-37.822	15	0	0	7	0	0	
03050104030																		
CW-019	CS	WATEREE RVR	FW	78.3	30	2	7	1110.0	*	86	0.045	8	0	0	10	0	0	
RS-01046	RS01	RAFTING CK	FW	114.7	11	0	0					6	0	0	4	0	0	
CW-206	SPRP	WATEREE RVR	FW	42.9	60	0	0		*	170	-0.286	50	0	0	20	0	0	
CW-222 / SC-002	INT	WATEREE RVR	FW	31.4	78	1	1	410	D	166	-0.992	44	0	0	40	0	0	
03050104040																		
CW-077	BIO	FLAT ROCK CK																
CW-078	BIO	GRANNIES QUARTER CK																
CW-237	INT	GRANNIES QUARTER CK	FW	168.3	29	5	17	896.0	*	40	2.219	17	0	0	9	0	0	
03050104050																		
CW-075	BIO	THORNTREE CK																
CW-228	CS / BIO	SAWNEYS CK	FW	451.1	46	20	43	2717.0	*	130	7.112	41	0	0	15	0	0	
CW-079	INT	SAWNEYS CK	FW	195.2	28	6	21	873.3	*	39	-1.983	17	0	0	7	0	0	
03050104060																		
CW-229	CS	BEAR CK	FW	148.0	41	12	29	1854.2	*	122	-6.968	36	0	0	15	0	0	
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW	239.0	41	9	22	760.0	*	101	1.92	25	0	0	10	0	0	
RS-02485	RS02	COOK RUN BRANCH	FW	160.0	1	0	0											
03050104070																		
CW-223	CS / BIO	LITTLE PINE TREE CK	FW	175.6	30	4	13	700.0	*	86	1.991	6	0	0	4	0	0	
CL-078	CS	LAKE, ADAMS MILLPOND	FW	7.7	17	0	0					8	0	0	6	0	0	
CW-021	INT	BIG PINE TREE CK	FW	67.9	32	2	6	560.0	*	43	-5.932	19	0	0	10	0	0	
03050104080																		
CW-238	INT	SWIFT CK	FW	8.0	28	0	0		D	39	-2.814	16	0	0	9	0	0	
03050104090																		
CW-154	CS / BIO	KELLY CK	FW	160.7	31	4	13	1057.5	I	85	8.029	7	0	0	4	0	0	
CW-155	CS / BIO	SPEARS CK	FW	142.6	48	4	8	1410.0	I	134	7.167	41	0	0	15	0	0	
CW-166	INT	SPEARS CK	FW	242.7	32	9	28	1617.8	*	42	10.034	17	0	0	9	0	0	
03050104100																		
CW-250	INT	COLONELS CK	FW	86.0	24	2	8	900.0				14	0	0	8	0	0	
CW-240	CS	COLONELS CK	FW	9.4	19	0	0					16	0	0	6	0	0	

CATAWBA RIVER BASIN WATER QUALITY SUMMARY

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CR N	CR EXC.	CR %	MEAN EXC.	CU N	CU EXC.	CU %	MEAN EXC.	PB N	PB EXC.	PB %	MEAN EXC.	HG N	HG EXC.	HG %
03050104020																		
CW-072	INT	BIG WATEREE CK	FW	7	0	0		7	0	0		7	0	0		7	0	0
03050104030																		
CW-019	CS	WATEREE RVR	FW	10	0	0		10	0	0		10	0	0		10	0	0
RS-01046	RS01	RAFTING CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-206	SPRP	WATEREE RVR	FW	20	0	0		20	0	0		20	0	0		20	0	0
CW-222 / SC-002	INT	WATEREE RVR	FW	40	0	0		40	0	0		40	0	0		18	0	0
03050104040																		
CW-077	BIO	FLAT ROCK CK																
CW-078	BIO	GRANNIES QUARTER CK																
CW-237	INT	GRANNIES QUARTER CK	FW	9	0	0		9	0	0		9	0	0		9	0	0
03050104050																		
CW-075	BIO	THORNTREE CK																
CW-228	CS / BIO	SAWNEYS CK	FW	15	0	0		15	0	0		15	0	0		15	0	0
CW-079	INT	SAWNEYS CK	FW	7	0	0		7	0	0		7	0	0		7	0	0
03050104060																		
CW-229	CS	BEAR CK	FW	15	0	0		15	0	0		15	0	0		15	0	0
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW	10	0	0		10	0	0		10	0	0		10	0	0
RS-02485	RS02	COOK RUN BRANCH	FW															
03050104070																		
CW-223	CS / BIO	LITTLE PINE TREE CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CL-078	CS	LAKE, ADAMS MILLPOND	FW	6	0	0		6	1	17	14	6	0	0		6	0	0
CW-021	INT	BIG PINE TREE CK	FW	10	0	0		10	0	0		10	0	0		10	0	0
03050104080																		
CW-238	INT	SWIFT CK	FW	9	0	0		9	1	11	17	9	0	0		9	0	0
03050104090																		
CW-154	CS / BIO	KELLY CK	FW	4	0	0		4	0	0		4	0	0		4	0	0
CW-155	CS / BIO	SPEARS CK	FW	15	0	0		15	0	0		15	0	0		15	0	0
CW-166	INT	SPEARS CK	FW	9	0	0		9	0	0		9	0	0		9	0	0
03050104100																		
CW-250	INT	COLONELS CK	FW	8	0	0		8	0	0		8	0	0		8	0	0
CW-240	CS	COLONELS CK	FW	6	0	0		6	0	0		6	0	0		6	0	0

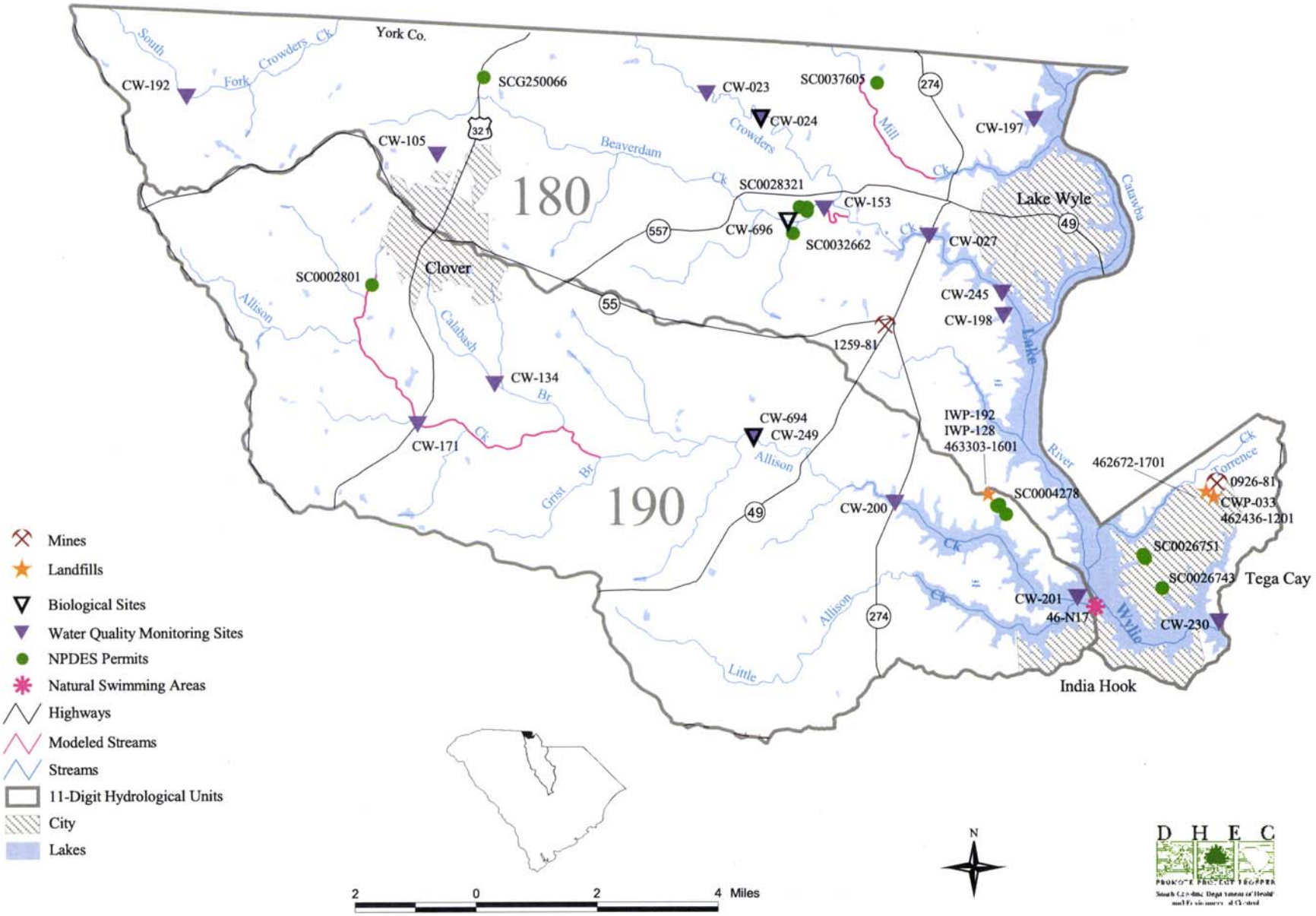
CATAWBA RIVER BASIN WATER QUALITY SUMMARY

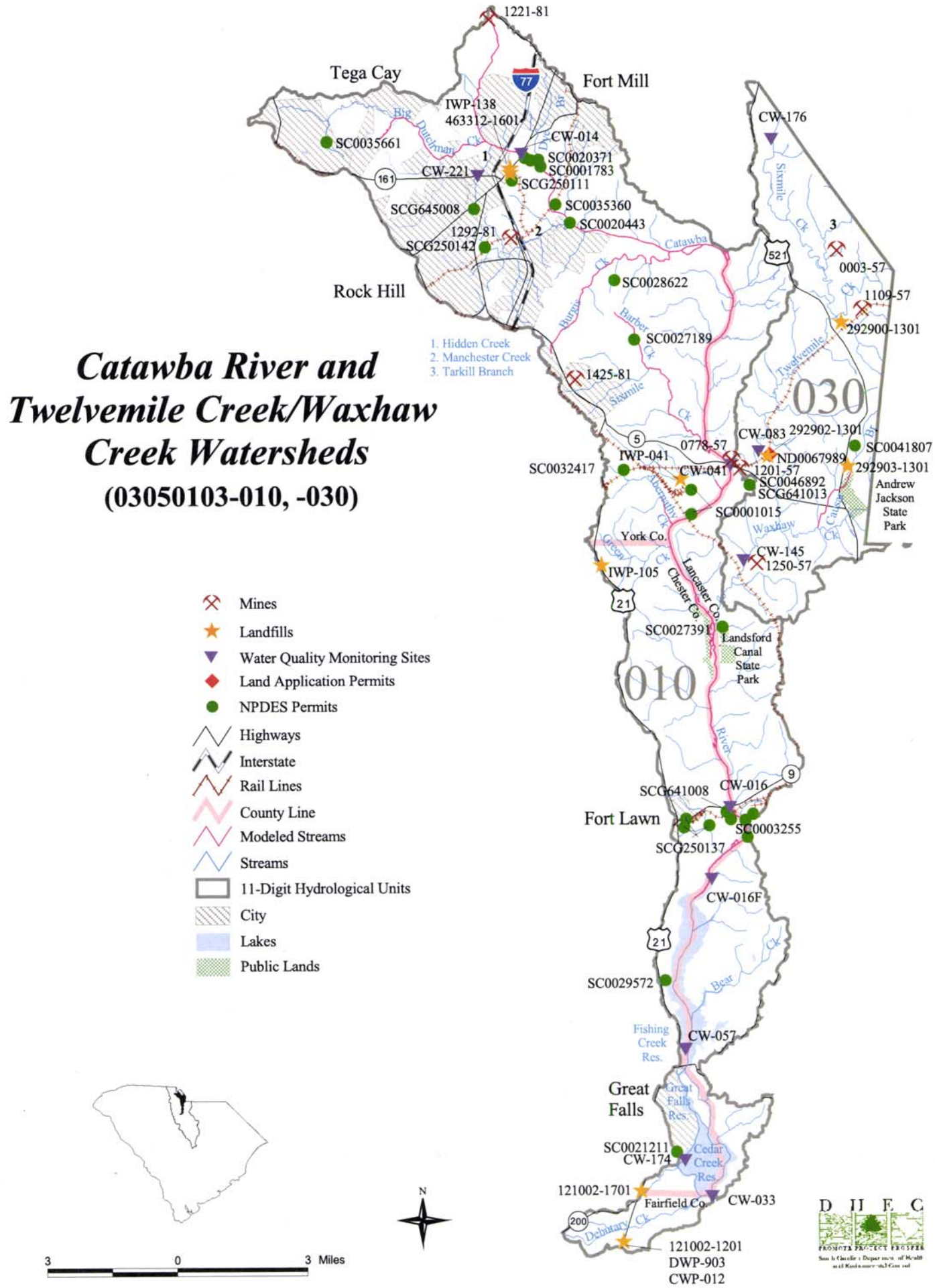
STATION NUMBER	TYPE	WATERBODY NAME	CLASS	NI N	NI EXC.	NI %	MEAN EXC.	ZN N	ZN EXC.	ZN %	MEAN EXC.
03050104020											
CW-072	INT	BIG WATEREE CK	FW	7	0	0		7	0	0	
03050104030											
CW-019	CS	WATEREE RVR	FW	10	0	0		10	0	0	
RS-01046	RS01	RAFTING CK	FW	4	0	0		4	0	0	
CW-206	SPRP	WATEREE RVR	FW	20	0	0		20	0	0	
CW-222 / SC-002	INT	WATEREE RVR	FW	40	0	0		40	0	0	
03050104040											
CW-077	BIO	FLAT ROCK CK									
CW-078	BIO	GRANNIES QUARTER CK									
CW-237	INT	GRANNIES QUARTER CK	FW	9	0	0		9	0	0	
03050104050											
CW-075	BIO	THORNTREE CK									
CW-228	CS / BIO	SAWNEYS CK	FW	15	0	0		15	0	0	
CW-079	INT	SAWNEYS CK	FW	7	0	0		7	0	0	
03050104060											
CW-229	CS	BEAR CK	FW	15	0	0		15	0	0	
CW-080	INT / BIO	TWENTYFIVE MILE CK	FW	10	0	0		10	0	0	
RS-02485	RS02	COOK RUN BRANCH	FW								
03050104070											
CW-223	CS / BIO	LITTLE PINE TREE CK	FW	4	0	0		4	0	0	
CL-078	CS	LAKE, ADAMS MILLPOND	FW	6	0	0		6	1	17	90
CW-021	INT	BIG PINE TREE CK	FW	10	0	0		10	0	0	
03050104080											
CW-238	INT	SWIFT CK	FW	9	0	0		9	0	0	
03050104090											
CW-154	CS / BIO	KELLY CK	FW	4	0	0		4	0	0	
CW-155	CS / BIO	SPEARS CK	FW	15	0	0		15	0	0	
CW-166	INT	SPEARS CK	FW	9	0	0		9	0	0	
03050104100											
CW-250	INT	COLONELS CK	FW	8	0	0		8	0	0	
CW-240	CS	COLONELS CK	FW	6	0	0		6	0	0	


Catawba River Basin
Watershed Unit
Index Map
03050101
180
190
020
050
010
030
060
070
040
03050103
090
080
020
010
040
03050104
050
030
070
060
080
090
100
030
8-Digit Hydrologic Unit
11-Digit Hydrologic Unit
4 0 4 8 12 16 Miles
N
D H E C

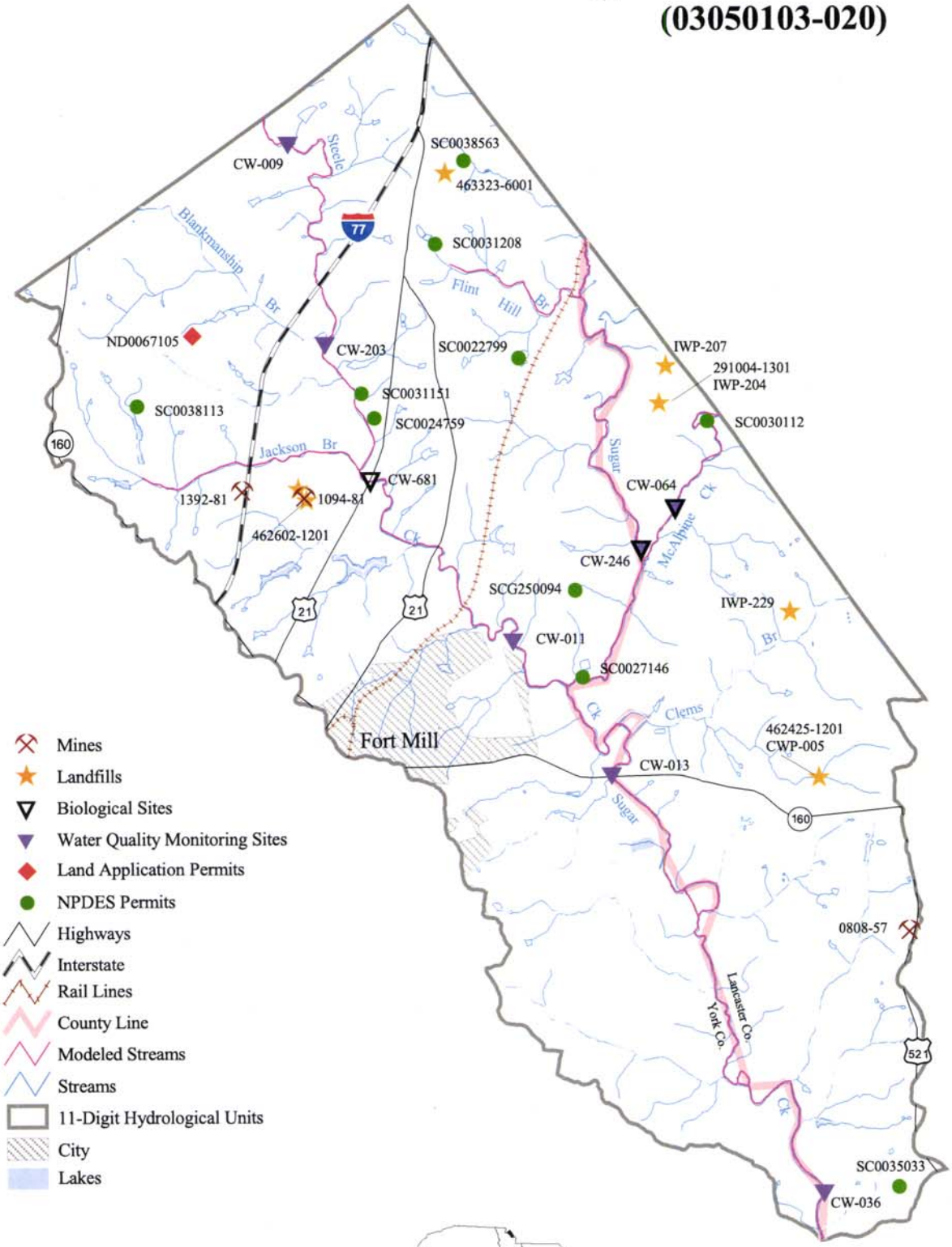
Catawba River/Lake Wylie and Allison Creek Watersheds

(03050101-180, -190)



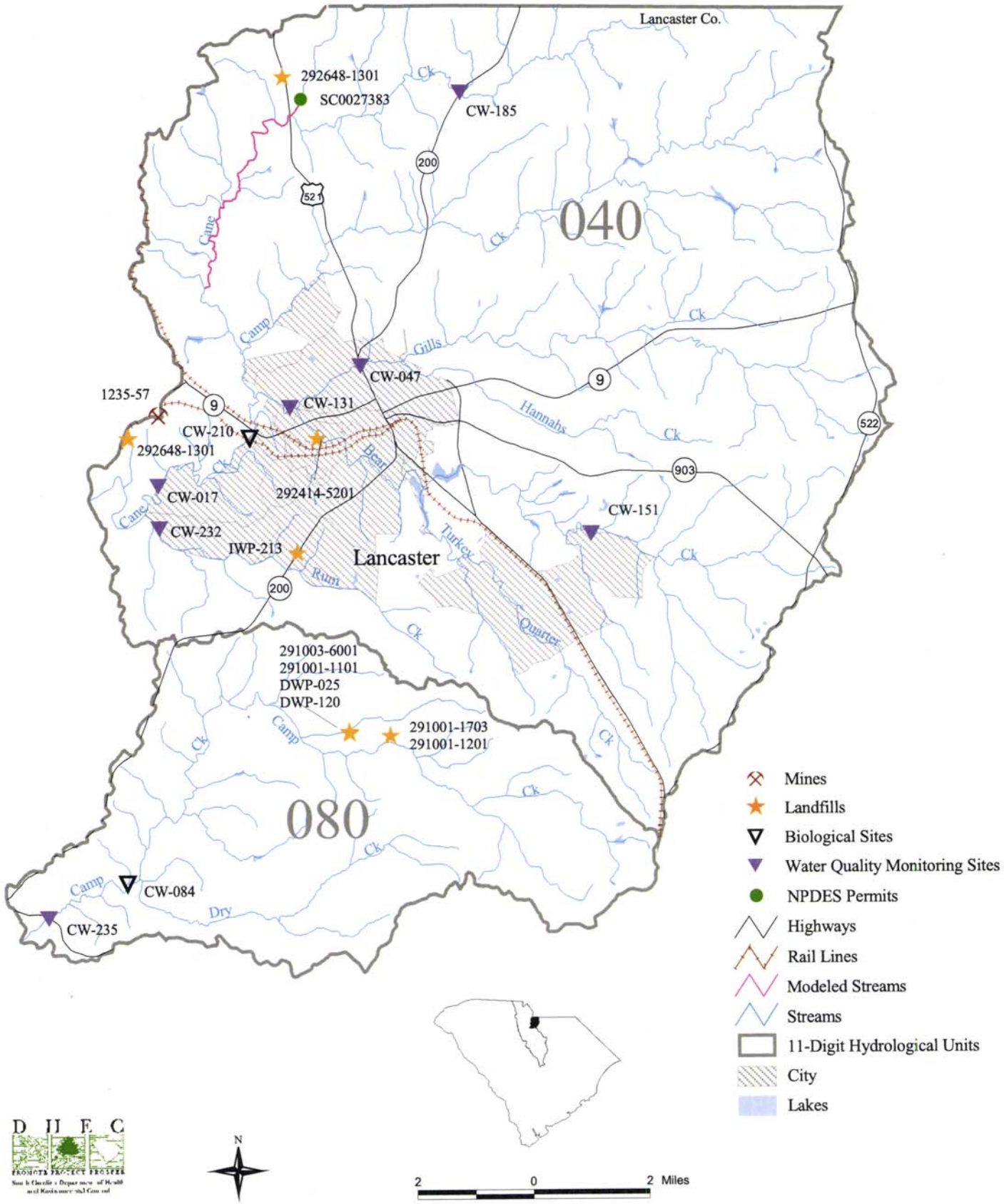

Catawba River and Twelvemile Creek/Waxhaw Creek Watersheds
(03050103-010, -030)
1. Hidden Creek
2. Manchester Creek
3. Tarkill Branch
Mines
Landfills
Water Quality Monitoring Sites
Land Application Permits
NPDES Permits
Highways
Interstate
Rail Lines
County Line
Modeled Streams
Streams
11-Digit Hydrological Units
City
Lakes
Public Lands
Tega Cay
Fort Mill
Rock Hill
Fort Lawn
Great Falls
York Co.
Chester Co.
Lancaster Co.
Fairfield Co.
1221-81
IWP-138
463312-1601
SC0035661
CW-014
SC0020371
SC0001783
CW-221
SCG250111
SCG645008
SC0035360
SC0020443
1292-81
SCG250142
SC0028622
SC0027189
1425-81
CW-176
0003-57
1109-57
292900-1301
030
CW-083
292902-1301
SC0041807
ND0067989
292903-1301
Andrew Jackson State Park
0778-57
IWP-041
SC0032417
CW-041
1201-57
SC0046892
SCG641013
SC0001015
CW-145
1250-57
IWP-105
SC0027391
Landsford Canal State Park
010
SCG641008
CW-016
SC0003255
SCG250137
CW-016F
SC0029572
Fishing Creek Res.
CW-057
Great Falls Res.
SC0021211
CW-174
Cedar Creek Res.
121002-1701
CW-033
121002-1201
DWP-903
CWP-012
Sixmile Ck
Twelvemile Ck
Waxhaw Ck
Catawba River
Big Dutchman Ck
Burgis Ck
Barber Ck
Debitary Ck
Bear Ck
Green Ck
3 0 3 Miles
N

Sugar Creek Watershed
(03050103-020)

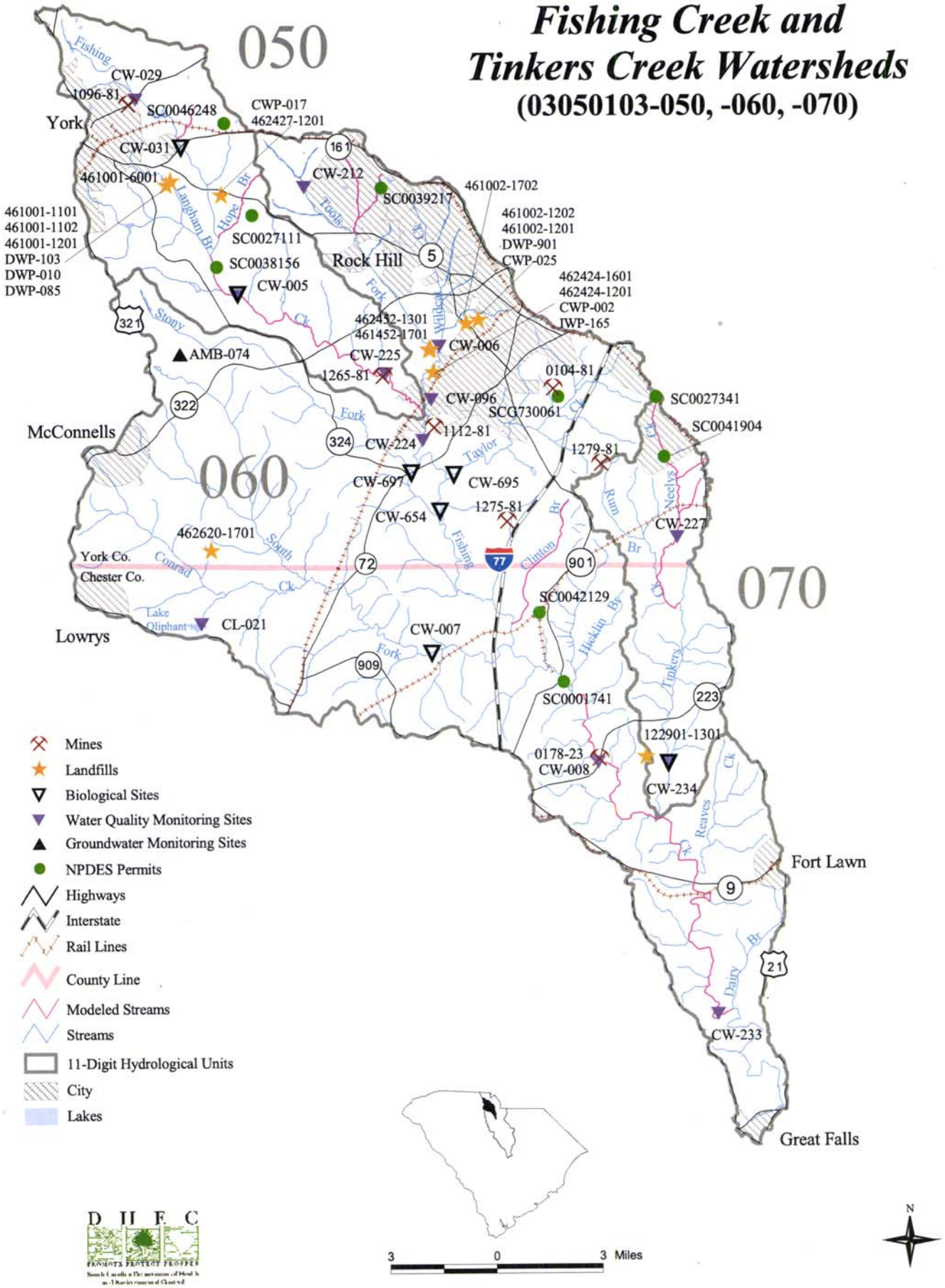


Cane Creek and Camp Creek Watersheds

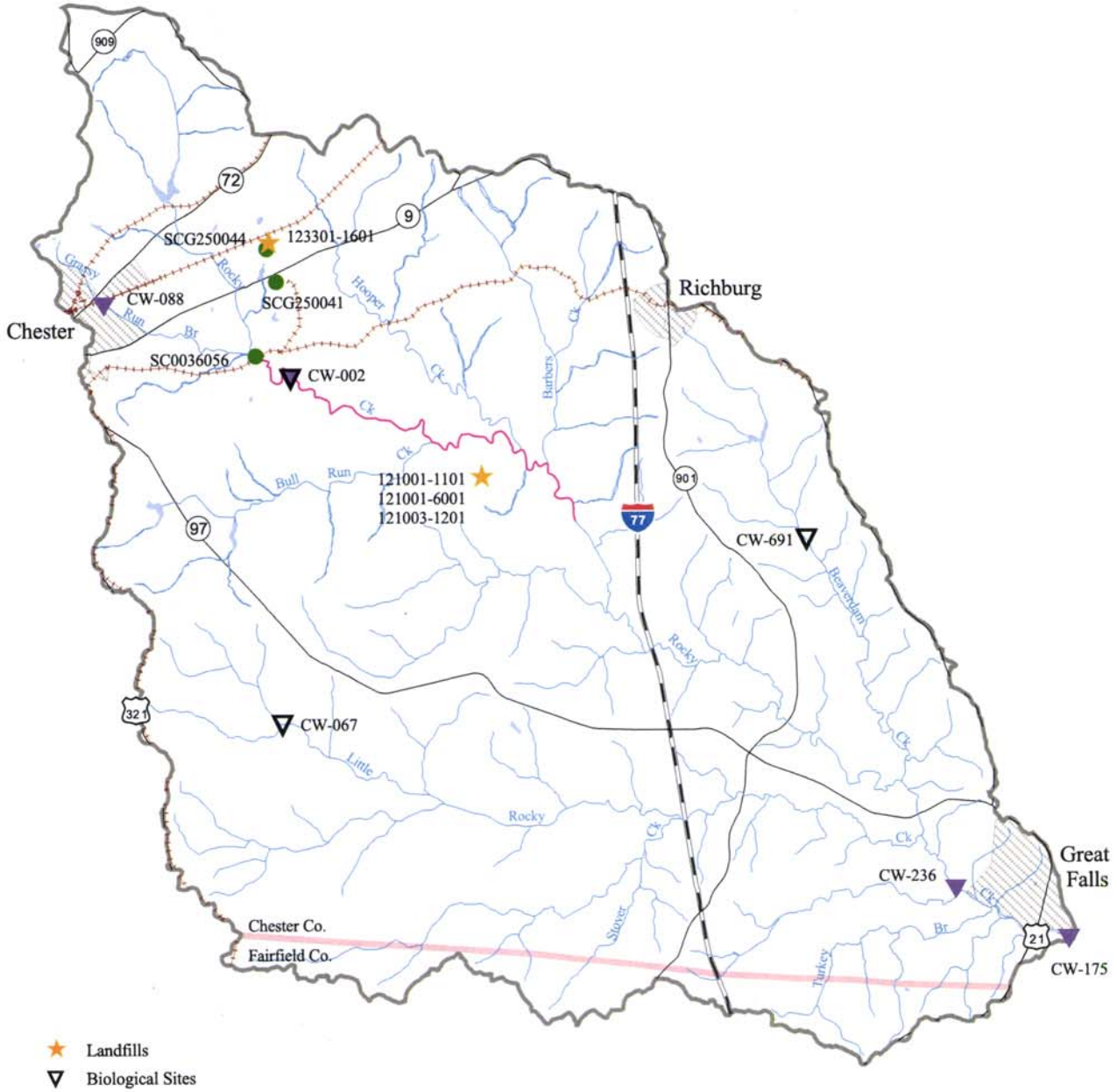
(03050103-040, -080)



Fishing Creek and Tinkers Creek Watersheds
(03050103-050, -060, -070)



Rocky Creek Watershed
(03050103-090)



- Landfills
- Biological Sites
- Water Quality Monitoring Sites
- NPDES Permits
- Highways
- Interstate
- County Line
- Rail lines
- Modeled Streams
- Streams
- 11-Digit Hydrological Units
- City
- Lakes

N

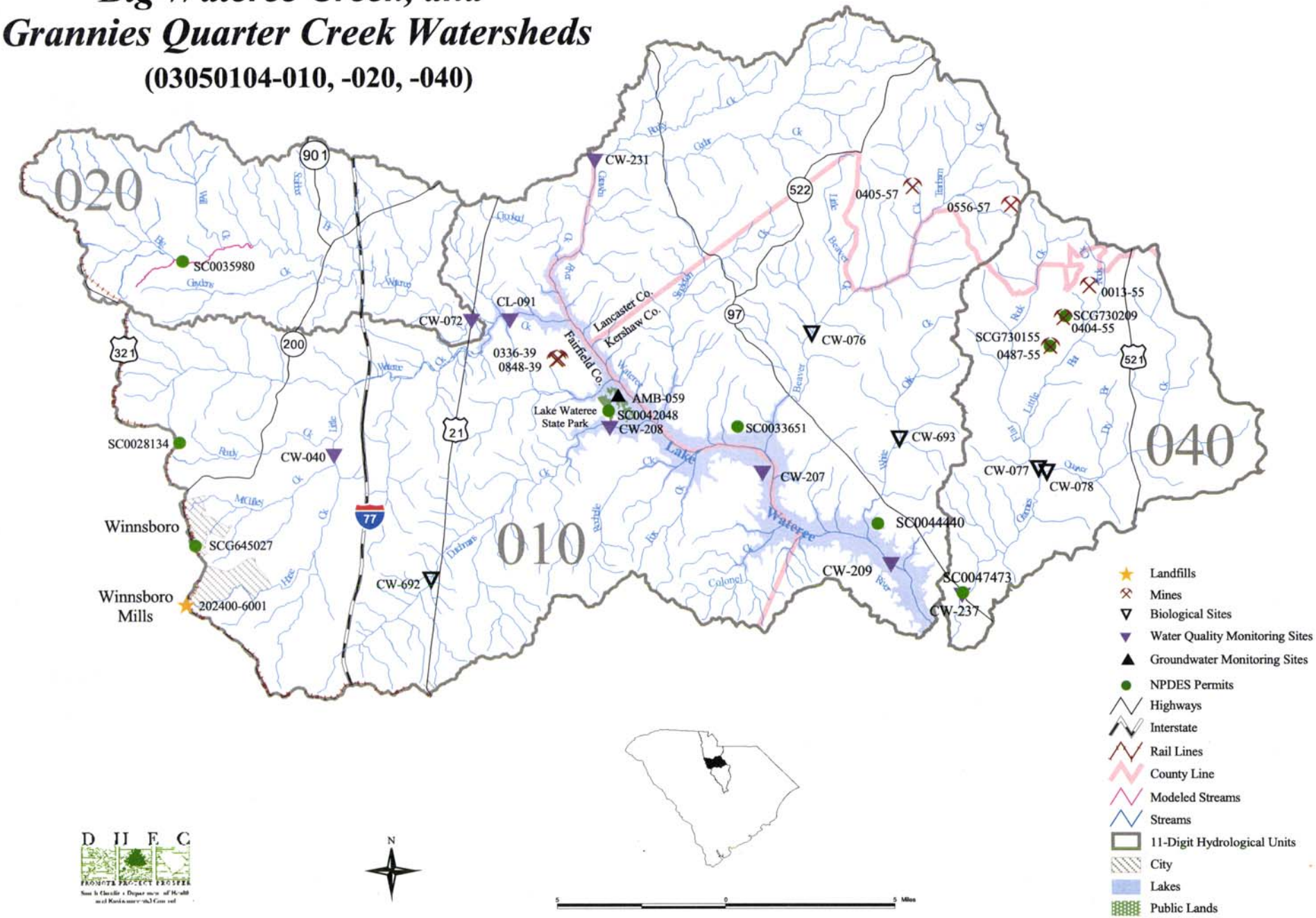
2 0 2 4 Miles

D H E C

PROMOTE PROTECT PROSPER

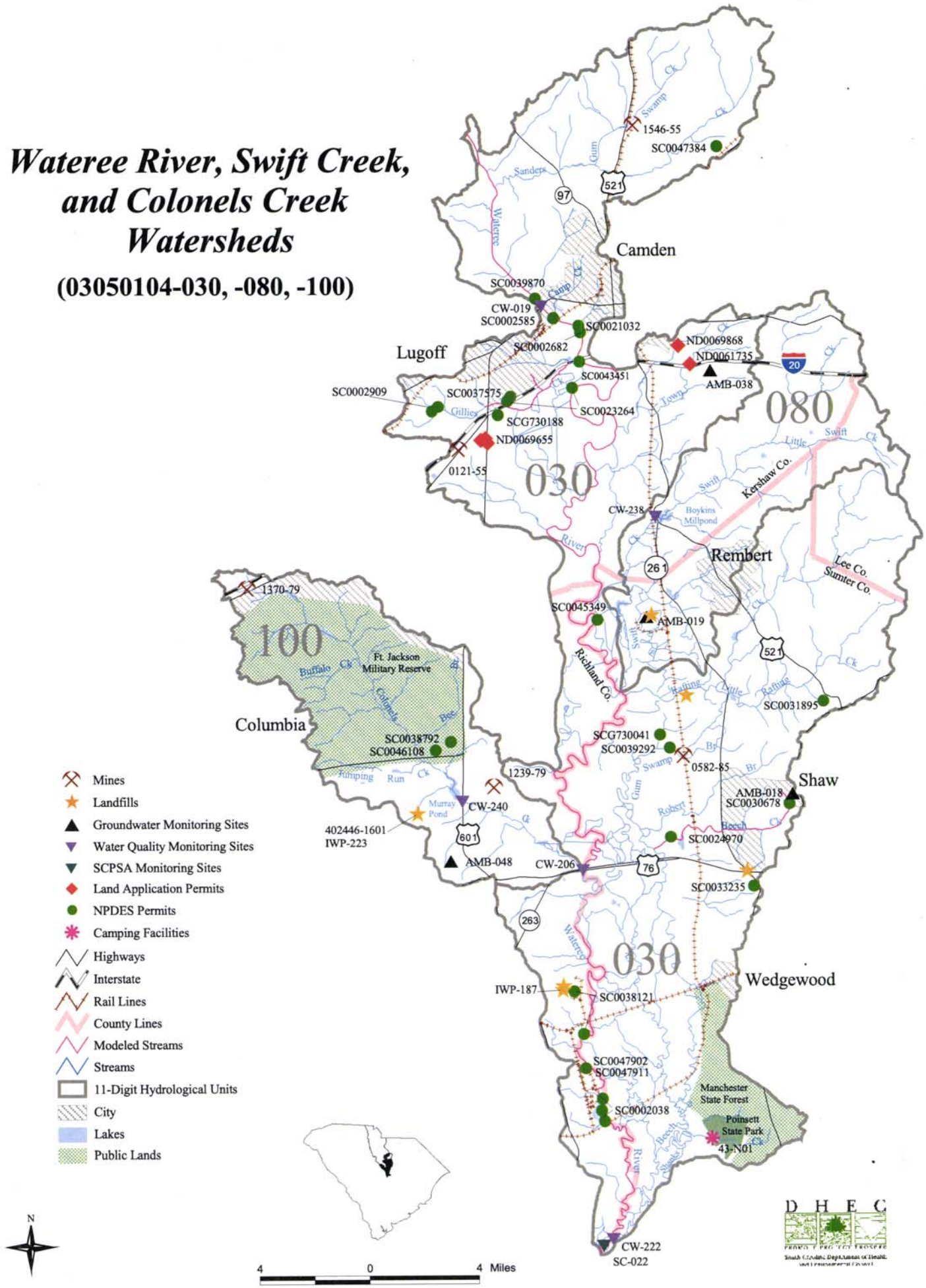
Wateree River/Lake Wateree, Big Wateree Creek, and Grannies Quarter Creek Watersheds

(03050104-010, -020, -040)

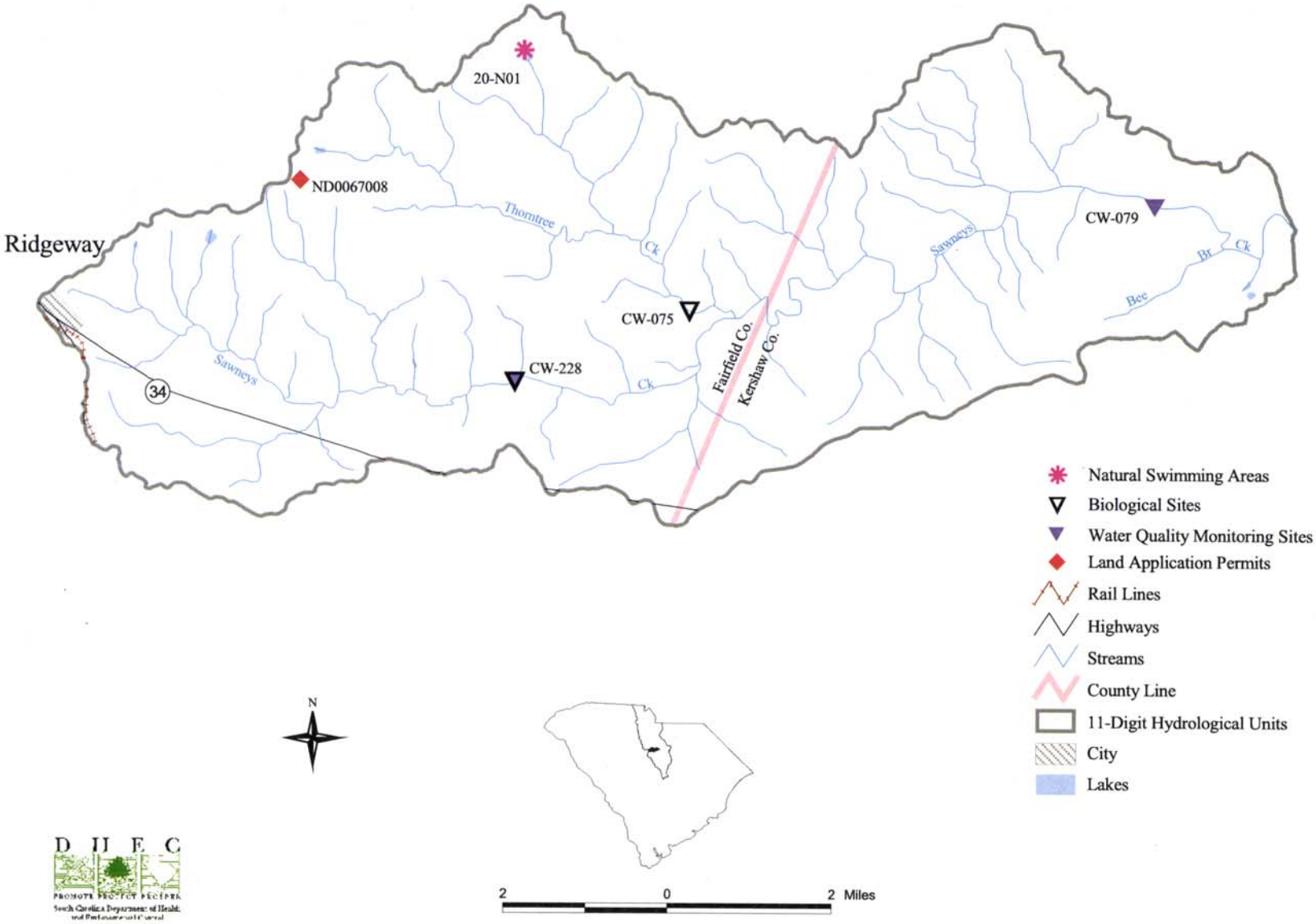


Wateree River, Swift Creek, and Colonels Creek Watersheds

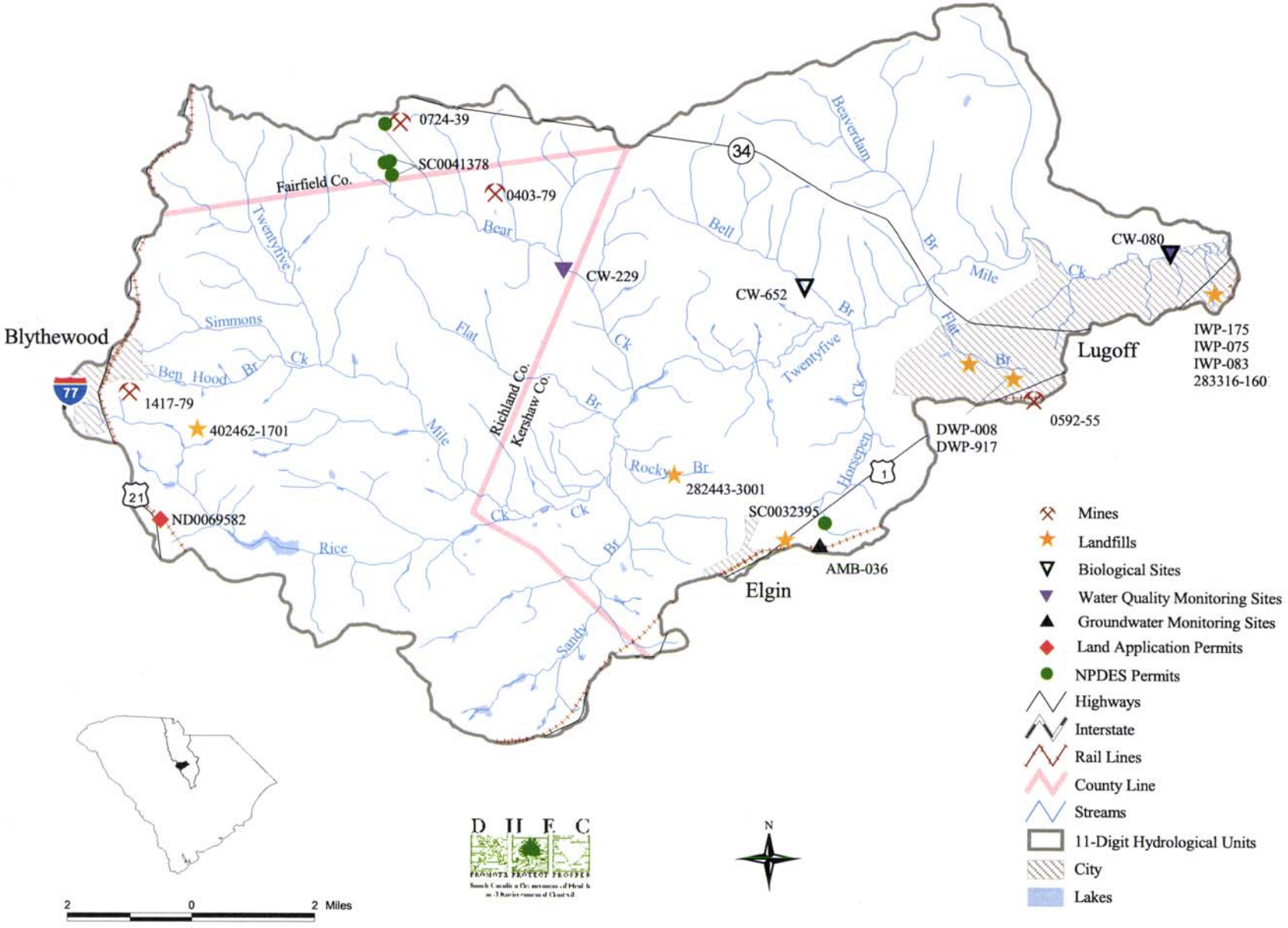
(03050104-030, -080, -100)



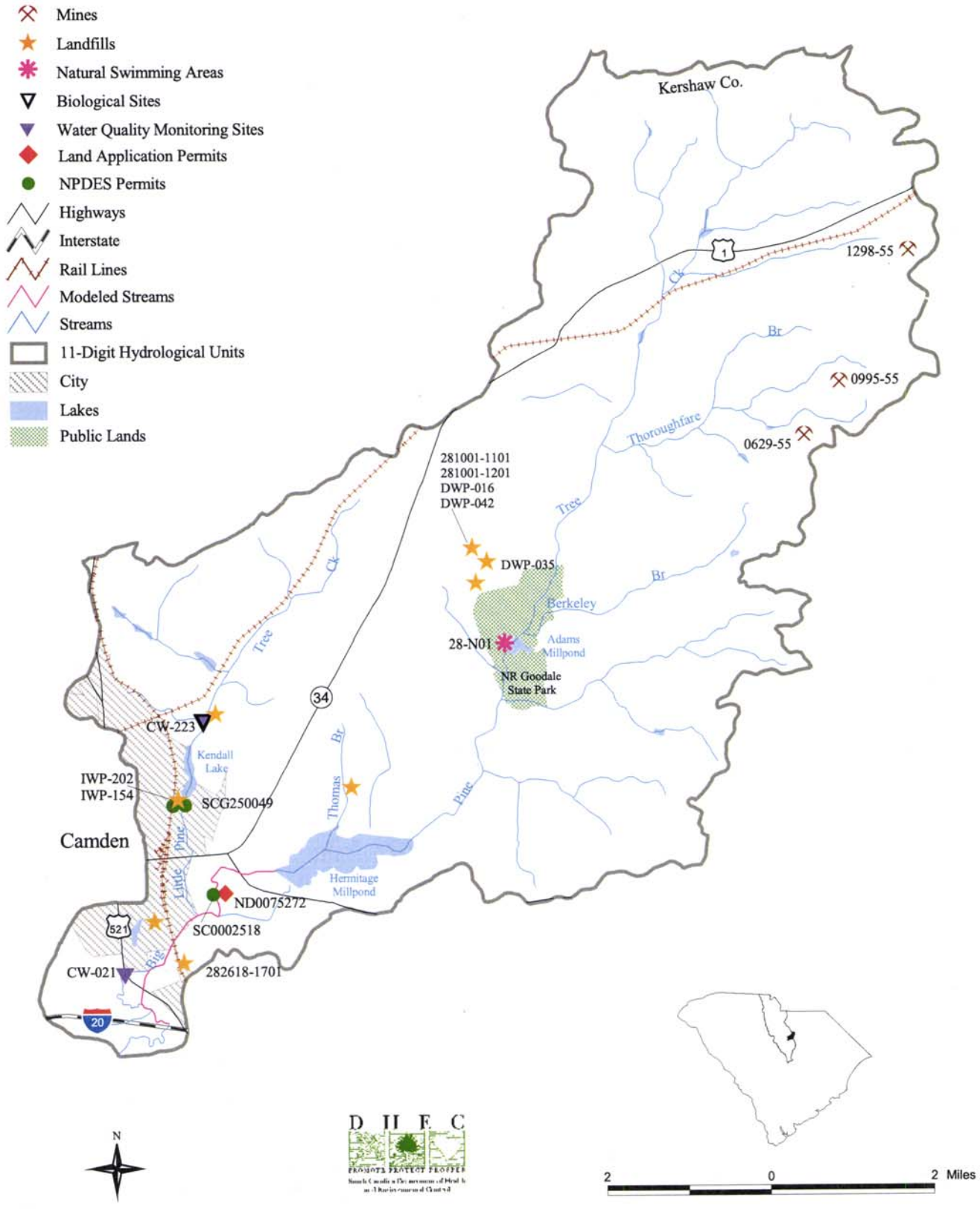
Sawneys Creek Watershed
(03050104-050)



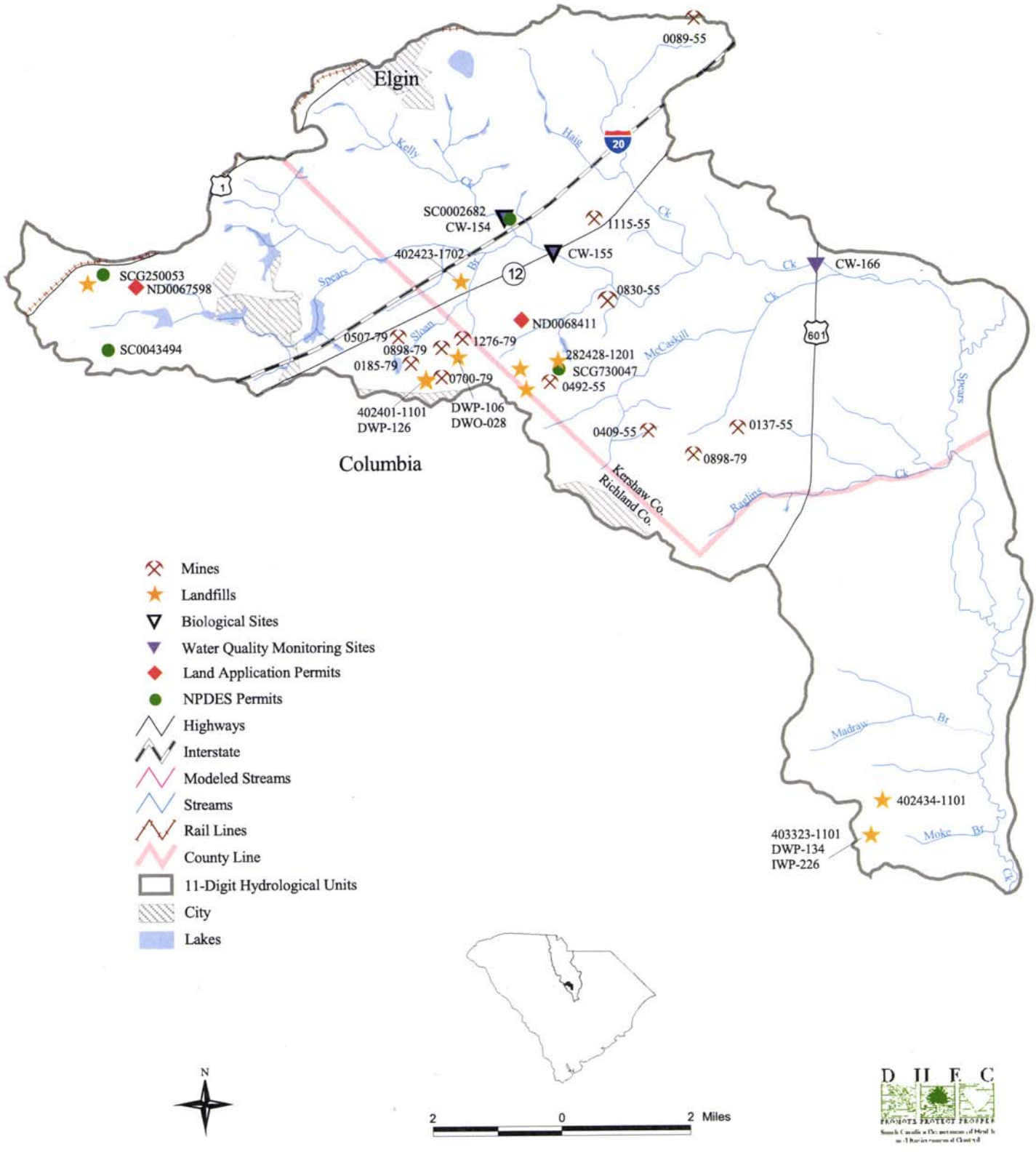
Twentyfive Mile Creek Watershed
(03050104-060)



Big Pine Tree Creek Watershed
(03050104-070)



Spears Creek Watershed
(03050104-090)



Waterbody Index

Facility Index

Facility Permit Index