

Section C: Chapter 1

Current Water Quality Initiatives

1.1 Workshop Summaries

In April 2002, five workshops were conducted by DWQ in the Yadkin-Pee Dee River basin at Elkin, Winston-Salem, Uwharrie, Salisbury and Fairview. There were 149 people in attendance representing a variety of interests. Figure C-1 presents an estimate of the percent of total attendance which represented various groups/interests, based on information recorded on attendance sheets. Figure C-2 presents the total attendance for each workshop by category.

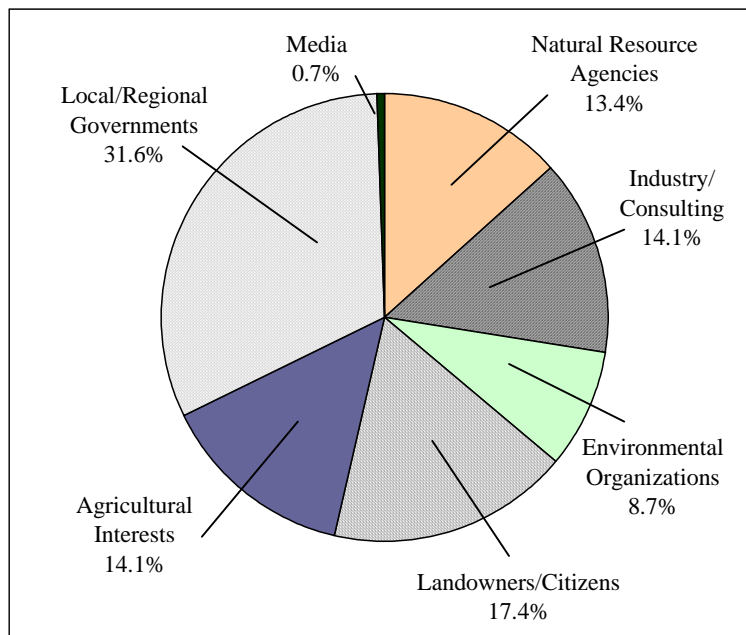


Figure C-1 Percent of Total Attendance by Various Interests at Five DWQ Water Quality Workshops in the Yadkin-Pee Dee River Basin (2001)

DWQ staff gave presentations about general water quality in the Yadkin-Pee Dee River basin, basinwide planning and the Wetlands Restoration Program. Participants at each workshop also gave brief presentations about local water quality initiatives. Workshop attendees were asked to discuss the following questions in small groups:

1. What are the main threats to water quality in the Yadkin-Pee Dee River basin?
2. Where are the problem areas or waters?
3. What recommendations do you have for addressing these problems/waters?
4. What local agencies or organizations should be involved in addressing the problems?

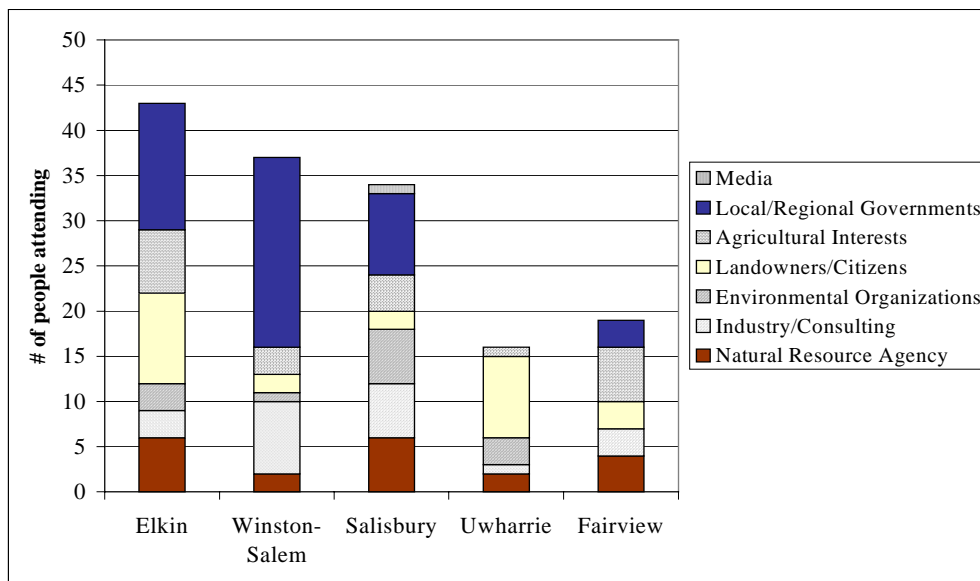


Figure C-2 Total Attendance at Each Yadkin-Pee Dee River Basin Water Quality Workshop by Various Interests (2001)

Good discussion was generated at each workshop, and all of the information was considered and, in many cases, incorporated into this draft plan. Participants expressed concerns about both point and nonpoint sources of pollution throughout the basin. Municipal WWTPs were the most frequently sited point sources. The most frequently sited nonpoint sources were aging collection and septic systems, runoff from developed areas, excess nutrients and excess sediment. Water quality concerns expressed at all five workshops are summarized below. Appendix V contains a detailed summary of the information gathered from workshop participants.

Important Water Quality Issues Basinwide

- Wastewater treatment (collection system failures, problem discharges, failing septic systems).
- Increasing development (increasing impervious surfaces) and runoff from developed areas.
- Excess nutrients (residential lawns, golf courses, agricultural runoff, failing septic and collection systems, and problem discharges).
- Sedimentation and streambank erosion.
- Physical stream/hydrology alterations (channelization, removal of riparian vegetation, development in floodplain areas).
- Water quantity issues (water withdrawals, effects of drought, consumptive use).

Recommendations for Improving Water Quality

- Better management of stormwater from developed areas.
- More enforcement of sediment/erosion control laws and ordinances.
- Widespread implementation of voluntary best management practices; positive encouragement for voluntary participation in agricultural programs.
- Local planning for development including zoning in areas of high projected population growth.

1.2 Federal Initiatives

1.2.1 Clean Water Act – Section 319 Program

Section 319 of the Clean Water Act provides grant money for nonpoint source demonstration projects. Approximately \$1 million is available annually for demonstration and education projects across the state. Project proposals are reviewed and selected by the North Carolina Nonpoint Source Workgroup, made up of state and federal agencies involved in regulation or research associated with nonpoint source pollution. Information on the North Carolina Section 319 Grant Program, including application deadlines and requests for proposals, are available online at <http://h2o.enr.state.nc.us/nps/319.htm>.

Currently, there are six projects in the Yadkin-Pee Dee River basin that have been funded (federal Section 319 money must be matched with nonfederal dollars) through the Section 319 base program between 1990 and 2001. Table C-1 summarizes these projects and provides a page reference to more detailed information in Section C.

Table C-1 Clean Water Act Section 319 Projects in the Yadkin-Pee Dee River Basin

Page in Section C	Section 319 Funding	Lead Organization	Project Area	Description
302	\$125,000 (FY 1996)	City of Monroe	Richardson Creek watershed in Union County	Extended Detention Wetland Demonstration
296	\$37,000 (FY 1999)	Environmental Impact (RC&D), Inc.	Anson, Moore, Montgomery and Richmond counties, focusing on sites along the US-220 corridor between Star and Rockingham	Sandhills Water Quality Longleaf Pine Ecosystem/Waste Management
291	\$43,000 (FY 1999)	NC Wildlife Resources Commission	Stevens Creek watershed (tributary to Goose Creek) in southeastern Mecklenburg County	Stevens Creek Model Watershed
	\$200,000 (FY 2001)	NC Cooperative Extension Service (NCSU)	This effort will be focused in the upper Yadkin River watershed (03040101); however, the knowledge gained will be applicable to much of the Southern Appalachian mountain range.	Restoration of Mountain Wetlands and Upper Yadkin Training Center
287	\$419,000 (FY 2001)	NC Division of Soil and Water Conservation	Waters throughout the Yadkin-Pee Dee and Cape Fear River basins which are listed on the 2000 303(d) list with agriculture as a potential source of impairment.	Agricultural Sediment Initiative for the Cape Fear and Yadkin-Pee Dee River basins
	\$30,000 (FY 2002)	NC Division of Forest Resources	Rendezvous Mountain Educational State Forest in Jones, Purlear and/or Coal Creeks in Wilkes County	Forestry BMP Demonstration
	\$25,000	NC Division of Forest Resources	Low water stream crossing	BMP
	\$16,000	NC Division of Forest Resources	Stream Restoration	Restoration
296	\$120,000 (FY 2003)	Carolina Land and Lakes RC&D, Inc.	Fourth Creek watershed in Iredell and Rowan counties	Fourth Creek TMDL Implementation

1.2.2 USDA – NRCS Environmental Quality Improvement Program (EQIP)

The Environmental Quality Incentives Program provides technical, educational and financial assistance to eligible farmers and ranchers to address soil, water and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with federal and state environmental laws and encourages environmental enhancement. The purposes of the program are achieved through the implementation of a conservation plan which includes structural, vegetative and land management practices on eligible land. Five to ten-year contracts are made with eligible producers. Cost share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management and grazing land management.

Fifty percent of the funding available for this program will be targeted at natural resource concerns relating to livestock production. The program is carried out primarily in priority areas that may be watersheds, regions or multistate areas, and for significant statewide natural resource concerns that are outside of geographic priority areas. Three priority areas in the Yadkin-Pee Dee River basin have been selected for a 2002 EQIP allocation: W. Kerr Scott Reservoir (\$243,416), South Yadkin River (\$35,000), and Rocky River (\$317,565).

NRCS district contacts for the Yadkin-Pee Dee River basin are included on the nonpoint source contact sheet found in Appendix VI or visit the website <http://www.nc.nrcs.usda.gov/Programs/eqip.htm> for more information.

1.2.3 US Fish and Wildlife Service - Pee Dee National Wildlife Refuge

The US Fish and Wildlife Service (FWS) is the only agency of the US Government whose primary responsibility is fish, wildlife and plant conservation. The service helps protect a healthy environment for people, fish and wildlife and helps Americans conserve and enjoy the outdoors and our living treasures. The service's major responsibilities are for migratory birds, endangered species, certain marine mammals, and freshwater and anadromous fish.

Pee Dee National Wildlife Refuge was established in 1963 and is next to the once-famous "Lockhart Gaddy Wild Goose Refuge". A once avid Canada goose hunter, Mr. Lockardt Gaddy, established a refuge for the birds on his land that grew from two released live decoys to more than 10,000. Bird watchers from all over the United States and several foreign countries visited Gaddy's Refuge to feed and observe the geese. Following the deaths of Mr. and Mrs. Gaddy, the refuge was closed to the public in the early 1970s. In the 1960s, the numbers of both geese and ducks began to decline in south central North Carolina. Fortunately, lands next to the Pee Dee River and Brown Creek offered excellent potential for waterfowl habitat development. With local and state support, the Pee Dee National Refuge was established in October 1963 with the purpose of providing sanctuary and wintering habitat for migratory birds.

Forest cover comprises approximately 6,100 acres of the refuge, including 2,900 acres of hardwood and 3,200 acres of pine and pine-hardwood forests. The upland pine habitat is

managed to support the endangered red-cockaded woodpecker, and the mixed pine-hardwood stands are managed to maintain a diversity of species. The bottomland hardwoods are critical areas for neotropical migratory songbirds. The bottomland hardwoods along Brown Creek on the refuge are the largest contiguous tract of their kind in the North Carolina Piedmont and are designated as a State Natural Heritage Area. The refuge also contains approximately 1,500 acres of agricultural and open land managed for waterfowl, including 13 draw down field impoundments that are seasonally flooded to attract thousands of ducks and geese. The diversity of habitats and management programs enables the refuge to support a broad spectrum of wildlife species, including more than 168 birds, 49 amphibians and reptiles, 28 mammals and 20 fish species.

Aquatic Resource Inventory of Brown Creek

The US Fish and Wildlife Service and Carolina Power and Light Company are cost sharing to conduct an aquatic resource inventory in the Brown Creek watershed and in portions of the Pee Dee River between Tillery and Blewett Falls dams and the lower Little River, with priority on the Pee Dee National Wildlife Refuge. The inventory is planned for 2003 and 2004 and will include documentation of diversity, range, distribution and relative abundance of a variety of invertebrate (primarily mussel) and fish species.

Comprehensive Conservation Planning

The US Fish and Wildlife Service is developing a management plan for the Pee Dee River National Wildlife Refuge. This Comprehensive Conservation Plan is required by the National Wildlife Refuge System Improvement Act of 1997. The plan considers both land uses and management practices on the refuge. Public input from those who use or are affected by the refuge is currently being solicited and that input will be used to develop alternatives to current land uses and management practices. The plans will focus on the management of habitat to support the wildlife species for which the refuge was established. They will also address public use, law enforcement, land protection, maintenance and staffing. The plan will project refuge activities for 15 years.

For additional information about this unit of the National Wildlife Refuge System, visit the website at <http://peedee.fws.gov/>. You may also contact refuge staff by calling (704) 694-4424 or by email peedee@fws.gov.

1.3 State Initiatives

1.3.1 Clean Water Management Trust Fund

North Carolina's Clean Water Management Trust Fund (CWMTF) was established by the General Assembly in 1996 (Article 13A; Chapter 113 of the North Carolina General Statutes). At the end of each fiscal year, 6.5 percent of the unreserved credit balance in North Carolina's General Fund (or a minimum of \$30 million) goes into the CWMTF. Revenues from the CWMTF are then allocated in the form of grants to local governments, state agencies and conservation nonprofit organizations to help finance projects that specifically address water pollution problems. The 18-member, independent, CWMTF Board of Trustees has full responsibility over the allocation of moneys from the fund.

The CWMTF funds projects that: 1) enhance or restore degraded waters; 2) protect unpolluted waters; and/or 3) contribute toward a network of riparian buffers and greenways for environmental, educational and recreational benefits. In the Yadkin-Pee Dee River basin, 30 projects have been funded for a total of nearly 30 million dollars (\$29,488,600). Figure C-3 presents total basin funding amounts by year and category. Table C-2 lists the individual grants.

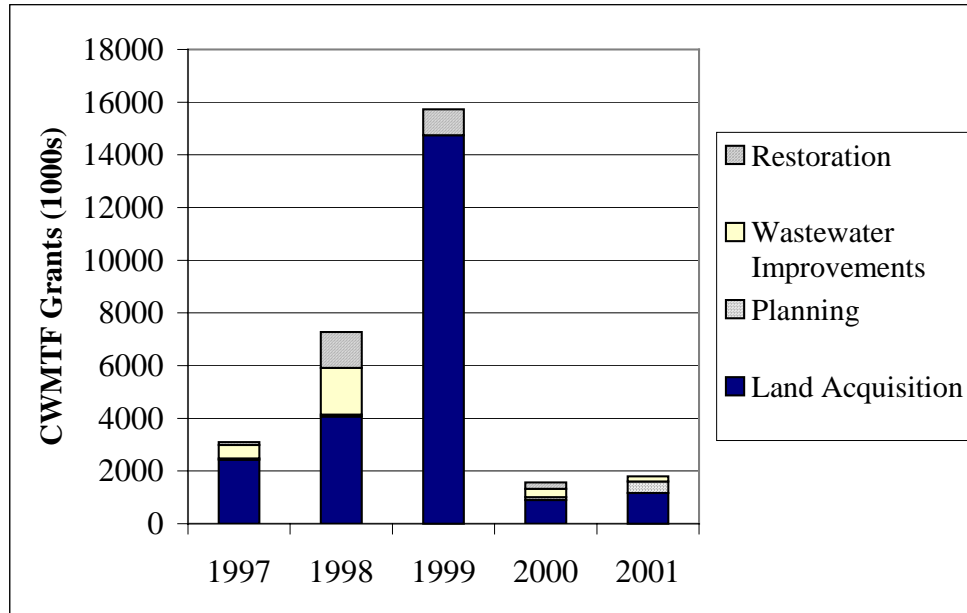


Figure C-3 Clean Water Management Trust Fund Grants Monies Approved (1997-2001) by Category in the Yadkin-Pee Dee River Basin

Several statewide and regional grants which are partially applicable to the Yadkin-Pee Dee River basin have also been funded by the CWMTF, including grants to the Conservation Trust for NC to develop riparian corridor protection plans, the Division of Soil and Water Conservation for the Agriculture Sediment Initiative, and the Center for Geographic Information Analysis for mapping and geographic information management.

For more information about the CWMTF, grant applications or details about a specific grant, call (919) 733-6375 or visit the website at www.cwmtf.net.

Table C-2 Projects in the Yadkin-Pee Dee River Basin Funded by the Clean Water Management Trust Fund (1997-2001)

Fiscal Year	Stream or Watershed	Project	Project Lead	Amount Funded
1997	South Yadkin River	Buffer acquisition	Land Trust for Central NC	\$500,000
1997	South Deep Creek Reservoir	Buffer acquisition	Town of Yadkinville	\$980,000
1997	Clarke Creek wetlands and rookery	Buffer acquisition	Land Trust for Central NC	\$75,000
1997		Planning	Yadkin-Pee Dee River Basin Assoc.	\$50,000
1997	Clarks Creek Hamer Creek	Wastewater system improvements	Town of Mount Gilead	\$498,000
1997	Salem Creek	Pilot View RC&D	Restoration	\$125,000
1997	Mitchell River	Buffer acquisition	Piedmont Land Conservancy	\$880,000
1998	Mitchell River	Restoration	Piedmont Land Conservancy	\$1,069,000
1998	Free Nancy Branch	Restoration	Pilot View RC&D	\$298,000
1998	Goose Creek	Buffer acquisition and planning	NC Wildlife Resources Commission	\$1,800,000
1998	Uwharrie River Little River	Coordinate public programs	Land Trust for Central NC	\$75,000
1998	Brush Creek	Wastewater system improvements	Town of Wadesboro	\$1,760,000
1998	Grants Creek	Buffer acquisition	Yadkin-Pee Dee River Basin Assoc.	\$2,273,000
1999	Salem Creek	Restoration	City of Winston-Salem Pilot View RC&D	\$985,800
1999	Barnett Branch	Buffer acquisition	NC Wildlife Resources Commission	\$563,500
1999	Ramah Creek	Buffer acquisition	Catawba Lands Conservancy	\$611,000
1999	Densons Creek Hughs Creek	Buffer acquisition	Town of Troy	\$300,000
2000		Buffer acquisition	Archaeological Conservancy	\$19,100
2000	South Yadkin River	Planning for buffer acquisition	Land Trust for Central NC	\$75,000
2000	South Yadkin River	Buffer acquisition	Pilot View RC&D	\$167,000
2000	Yadkin River in Yadkin County	Coordinate public programs	Pilot View RC&D Yadkin SWCD	\$24,000
2000	Rocky River	Wastewater system improvements	Town of Stanfield	\$300,000
2000	Mitchell River	Livestock exclusion BMPs	Surry SWCD	\$250,000
2000	Densons Creek	Buffer acquisition and ultraviolet disinfection	Town of Troy	\$708,700
2000	Yadkin River	Planning	Yadkin River Greenway Council	\$25,000
2001	South Fork Mitchell R	Planning	Surry SWCD	\$434,000
2001	Mulberry Creek	Wastewater system improvements	Town of North Wilkesboro	\$200,000
2001	Badin Lake	Buffer acquisition	Environmental Impact (RC&D), Inc.	\$708,000
2001	Lake Don T. Howell	Buffer acquisition	Cabarrus County Water and Sewer Authority	\$361000
2001		Conservation easements	Blue Ridge Rural Land Trust	\$103,000

1.3.2 NC Wetlands Restoration Program

The North Carolina Wetlands Restoration Program (NCWRP) is a nonregulatory program responsible for implementing wetland and stream restoration projects throughout the state. The program's mission is to improve watershed functions including water quality protection, floodwater retention, fisheries and wildlife habitat, and recreational opportunities in North Carolina's 17 river basins. To accomplish this mission, the NCWRP works closely with DWQ and other resource agencies to identify specific 14-digit hydrologic units in each river basin that exhibit both the need and opportunity for wetland, stream and riparian buffer restoration. These watersheds are called Targeted Local Watersheds and receive priority for NCWRP planning and restoration project funds.

Prior to July 2002, the NCWRP developed Watershed Restoration Plans (formerly called Basinwide Wetlands and Riparian Restoration Plans) for each river basin in the state (NCWRP, 1998). Beginning with the Neuse River basin in 2002, the NCWRP began incorporating its Targeted Local Watershed selections and restoration project information into the DWQ basinwide plans. This programmatic change allows the NCWRP to focus more planning effort at the local level where stream and wetland restoration efforts can have the greatest measurable impact.

Targeted Local Watersheds

The NCWRP evaluates a variety of data and information on water quality and habitat conditions in each river basin to select Targeted Local Watersheds. However, public comment and the professional judgment of local resource agency staff play a critical role in targeting local watersheds. Figures C-4 and C-5 depict targeted local watersheds within the upper and lower Yadkin-Pee Dee River basin. A summary of the Targeted Local Watersheds selected for the Yadkin-Pee Dee River basin, including the pertinent factors used for selecting those watersheds, is delineated in Table C-3. A description of the factors NCWRP considers in watershed selections follows.

**Figure C-4 NCWRP Targeted Local Watersheds
in the Upper Yadkin-Pee Dee River Basin**

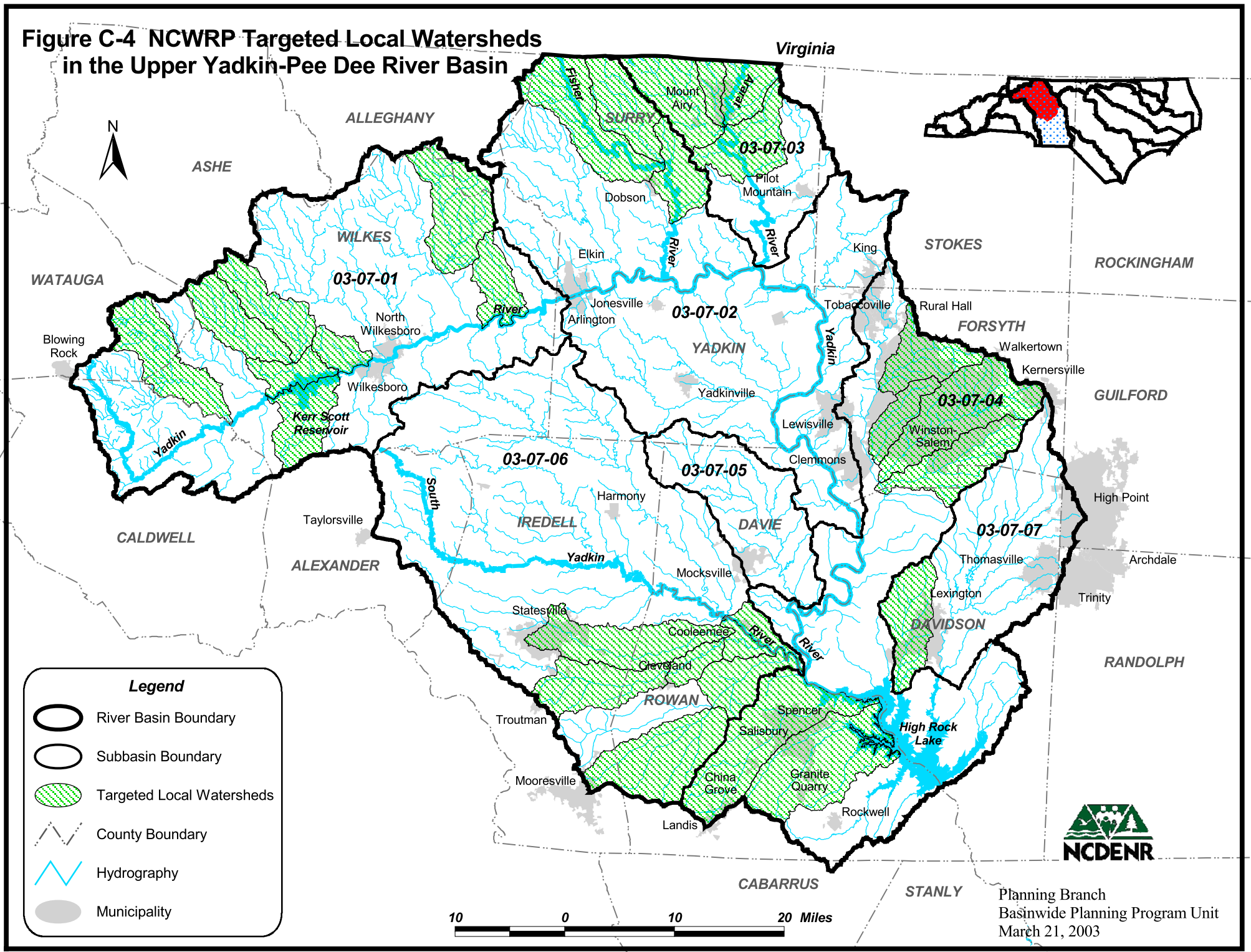
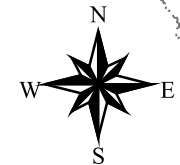
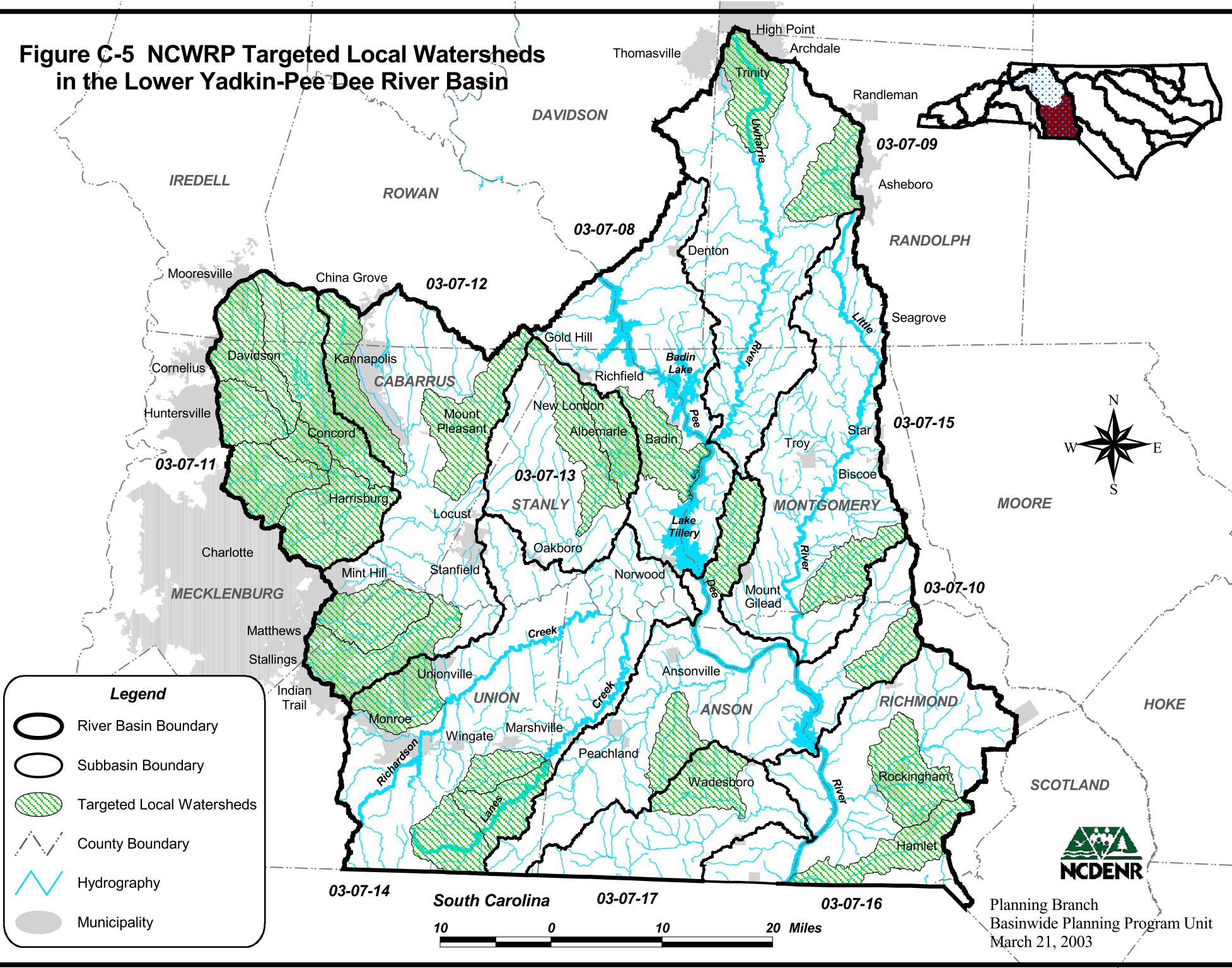


Figure C-5 NCWRP Targeted Local Watersheds in the Lower Yadkin-Pee-Dee River Basin



Planning Branch
Basinwide Planning Program Unit
March 21, 2003

Table C-3 NCWRP Detailed Summary of Targeted Local Watersheds in the Yadkin-Pee Dee River Basin

DWQ Subbasin	Local Watershed (Name and HU Code)	County Municipality	Land Area (sq mi.)	Land Cover C = Cleared D = Developed F = Forested			Impaired Waters? ¹	Public Water Supply ²	HQW or ORW ³	Aquatic NHP Element ⁴	Existing or Proposed Restoration Projects
				C	D	F					
03-07-01	Elk Creek 03040101010050	Wilkes	50.6	5%	-	95%	Yes	no	yes	no	
	South Prong Lewis Fork 03040101010080	Wilkes	36.3	7%	-	92%	No, but degraded habitat	yes	no	yes	Watershed Plan
	North Prong Lewis Fork 03040101010090	Wilkes	35.1	15%	-	85%	No, but degraded habitat	yes	no	no	Watershed Plan, BMPs Stream/Wetland Restoration
	Lewis Fork 03040101010100	Wilkes	17.7	22%	-	73%	No, but degraded habitat	yes	no	no	Watershed Plan
	Warrior Creek 03040101010110	Wilkes	34.2	15%	-	80%	No, but degraded habitat	yes	no	no	Watershed Plan, BMPs Stream Restoration
	Tucker Hole 03040101020010	Wilkes Wilkesboro	14.0	44%	5%	51%	No, but degraded habitat	yes	no	no	Watershed Plan
	East Prong Roaring River 03040101060030	Wilkes	56.3	19%	-	81%	No, but degraded habitat	no	yes	no	Stream Restoration
	Bugaboo Creek 03040101070010	Wilkes Rhonda	24.6	42%	2%	56%	No, but degraded habitat	yes	no	no	Stream Restoration BMPs
03-07-02	Little Fisher River 03040101090020	Surry	36.5	39%	2%	59%	No, but impacts evident	no	no	no	
	Upper Fisher River 03040101090010	Surry Dobson	60.1	27%	1%	72%	No, but impacts evident	yes	no	yes	
	Middle Fisher River 03040101090030	Surry Dobson	28.1	43%	2%	55%	No, but impacts evident	no	no	no	Stream Restoration
03-07-03	Upper Ararat River 03040101110010	Surry Mt. Airy	22	37%	5%	58%	Yes	yes	no	no	Ag Sediment Initiative
	Middle Ararat 03040101110020	Surry	39	37%	2%	61%	No, but degraded habitat	no	no	no	Ag Sediment Initiative
	Stewarts Creek 03040101100010	Surry Mount Airy	42.0	44%	3%	53%	No	yes	no	no	
	Lovills Creek 03040101100020	Surry Mount Airy	11.0	32%	20%	48%	Yes	yes	no	no	
03-07-04	Mill Creek 03040101170020	Forsyth Winston-Salem	32.7	21%	22%	56%	No, imminent threats noted	no	no	no	
	Silas Creek 03040101170040	Forsyth Winston-Salem	19.5	18%	17%	65%	No, but impacts evident	no	no	no	Stream Restoration
	Salem Creek 03040101170060	Forsyth Winston-Salem	70.1	26%	25%	48%	Yes	yes	no	no	Stream Restoration
	South Fork Muddy Creek 03040101170070	Forsyth Winston-Salem	45.2	39%	5%	55%	No, but impacts evident	no	no	no	

DWQ Subbasin	Local Watershed (Name and HU Code)	County Municipality	Land Area (sq mi.)	Land Cover			Impaired Waters?¹	Public Water Supply²	HQW or ORW³	Aquatic NHP Element⁴	Existing or Proposed Restoration Projects
				C = Cleared D = Developed F = Forested							
				C	D	F					
03-07-04 cont'd	Grants Creek 03040103010010	Rowan Salisbury	83.5	38%	5%	56%	Yes	no	no	no	Buffer Acquisition; Fecal coliform TMDL
	Town Creek 03040103010020	Rowan Salisbury	79.2	33%	4%	62%	Yes	yes	no	no	
03-07-06	Fourth Creek 03040102030020	Rowan/Iredell Statesville	56	42%	7%	51%	Yes	no	no	no	Fecal coliform TMDL
	Middle Third Creek 03040102040030	Rowan/Iredell	41	46%	2%	52%	Yes	no	no	no	
	Lower Third Creek 03040102040040	Rowan/Iredell	12	36%	1%	61%	Yes	no	no	no	
	Lower South Yadkin River 03040102020070	Davie Cooleemee	11.8	34%	1%	64%	No, but impacts evident	no	no	no	Buffer Acquisition
	Lower South Yadkin 03040102030040	Rowan	9.2	38%	-	62%	Yes	no	no	no	Buffer Acquisition
	Upper North Second Creek 03040102050020	Rowan	65.0	58%	1%	41%	Yes	yes	yes	no	
	Lower North Second Creek 03040102050030	Rowan	28.8	36%	1%	62%	Yes	no	no	no	Buffer Acquisition
03-07-07	Swearing Creek 03040103020020	Davidson Lexington	70	39%	10%	51%	Yes	no	no	no	
03-07-08	Mountain & Little Mountain Creeks 03040104010010	Stanly Albemarle	36.7	31%	1%	67	No	yes	no	yes	
03-07-09	Upper Uwharrie River 03040103050010	Randolph Archdale, High Point	41.2	28%	3%	68%	No, but impacts evident	yes	no	yes	
	Back Creek 03040103050050	Randolph Asheboro	37.9	18%	4%	78%	Yes	yes	no	no	
03-07-10	Clarks Creek 03040104020020	Montgomery Mount Gilead	33.3	15%	1%	84%	No, but impacts evident	no	no	yes	
	Goulds Fork 03040104061040	Anson Wadesboro	25.1	9%	1%	89%	No Data	no	no	yes	
	Little Mountain Creek 03040104080020	Richmond Ellerbe, Norman	24.0	30%	1%	69%	No Data	yes	no	no	
03-07-11	Upper Rocky River & Dye Creek 03040105010010	Cabarrus, Iredell, Mecklenburg Mooresville, Davidson	48.5	32%	3%	65%	Yes	no	no	yes	Local Watershed Planning; Fecal coliform TMDL
	Clarke & Ramah Creeks 03040105010020	Cabarrus, Mecklenburg Huntersville, Charlotte	28.2	30%	3%	66%	No, but imminent threats	no	no	yes	Local Watershed Planning
	Rocky River 03040105010030	Cabarrus, Mecklenburg Concord	12.8	26%	17%	57%	Yes	no	no	yes	Possible inclusion in Local Watershed Planning

DWQ Subbasin	Local Watershed (Name and HU Code)	County Municipality	Land Area (sq mi.)	Land Cover			Impaired Waters? ¹	Public Water Supply ²	HQW or ORW ³	Aquatic NHP Element ⁴	Existing or Proposed Restoration Projects
				C = Cleared D = Developed F = Forested							
				C	D	F					
03-07-11 cont'd	Mallard Creek 03040105010040	Cabarrus, Mecklenburg Charlotte	41.5	22%	15%	63%	No, but imminent threats	no	no	yes	Possible UNCC Stream Restoration; Possible LWP
	Reedy Creek 03040105010050	Cabarrus, Mecklenburg	64.7	29%	4%	67%	No, but impacts evident	no	no	yes	Possible inclusion in LWP
	Coddle Creek 03040105020010	Cabarrus, Iredell, Rowan Concord	81.3	43%	4%	52%	Yes	yes	no	yes	Possible Stream Restoration opportunities; Possible LWP
03-07-12	Irish Buffalo Creek 03040105020040	Rowan, Iredell Kannapolis, Concord	46.2	30%	18%	51%	No, but impacts evident	yes	no	no	Buffer Acquisition
	Dutch Buffalo Creek 03040105020060	Rowan, Iredell suburban Concord	61.4	44%	1%	55%	No, but impacts evident	yes	no	yes	
	Goose Creek 03040105030020	Meckl., Union Charlotte, Mint Hill	42.3	44%	3%	53%	Yes	no	no	yes	WRC Buffers, LWP
	Crooked Creek 03040105040010	Mecklenburg, Union Matthews, Monroe	52.9	56%	9%	35%	Yes	no	no	yes	
03-07-13	Long Creek 03040105060030	Cabarrus, Stanly Albemarle	45.2	54%	1%	44%	No, but impacts evident	no	no	yes	
	Little Long Creek 03040105060040	Stanly Albemarle	29.0	38%	9%	53%	No, but imminent threats	no	no	no	
03-07-14	Upper Lanes Creek (3 HUs) 03040105081010-81030	Union	84.1	64%	--	36%	Yes	no	no	yes	
	Stewarts Creek 03040105070050	Union Monroe	35.3	66%	5%	28%	Yes	yes	no	no	
03-07-15	Cheek Creek 03040104050010	Montgomery	32.6	11%	--	89%	No, but impacts evident	no	no	yes	
03-07-16	Hitchcock Creek 030402010 10020	Richmond Rockingham	46	12%	4%	82%	No	yes	no	yes	
	Marks Creek 03040201010060	Richmond Hamlet	41.2	13%	4%	80%	Not Rated; Impaired in '98	yes	no	yes	Possible Preservation opp.
03-07-17	North Fork Jones & Bailey Creeks 03040201020020	Anson Wadesboro	35.8	15%	3%	81%	No, but imminent threats	yes	no	no	

¹ Stream segments (or entire streams) that do not support their designated uses and are therefore considered Impaired based on declining biological ratings [e.g., due to degraded aquatic habitat] and/or failure to meet NC DWQ water quality standards.

² Public Water Supply (WS) = waters used as water supply sources for drinking, culinary or food processing purposes.

³ ORW = outstanding resource waters. HQW = high quality waters.

⁴ Aquatic Natural Heritage elements are special species, habitats or community types identified by the NC Natural Heritage Program and that occur, or spend some portion of their life cycle, in wetlands, streams, riparian areas or estuarine waters.

Water Quality Problems

The NCWRP targets watersheds with existing and potential water quality problems resulting from nonpoint source pollution. To make this determination, the NCWRP evaluates DWQ use support ratings, the 303(d) List and DWQ basinwide assessment reports. NCWRP also uses land cover data to evaluate riparian buffer condition. The NCWRP believes that riparian buffers provide many water quality benefits, and streams that lack a well-vegetated riparian buffer are at greater risk for water quality degradation.

Cumulative Wetland and Stream Impacts

The cumulative impact of many wetland and stream impacts due to farming, development and road building can have a detrimental effect on water quality. The NCWRP is responsible for addressing these cumulative impacts and uses data from the 401 Wetlands Program database to locate those watersheds facing the greatest water quality threats due to unmitigated wetland and stream impacts.

Resource Values

The NCWRP recognizes that resource values beyond water quality should be considered in evaluating the restoration need and opportunity of a watershed. The resource values that the NCWRP considers in targeting local watersheds include public water supply, shellfish areas, outstanding or high quality resource waters, aquatic natural heritage elements and regulated trout waters.

Watershed Approach

The NCWRP watershed approach advocates concentrating multiple water quality projects in one small watershed to yield a greater cumulative impact on water quality. The NCWRP wants to tie wetland and stream restoration projects with other efforts such as agricultural best management practices, stormwater control and riparian buffer preservation to restore watersheds, not just streams and wetlands. For this reason, the NCWRP targets areas with existing watershed planning or protection initiatives already underway.

Partnership Opportunities

To assess the potential for partnership opportunities at the local watershed scale, the NCWRP reviews existing or planned Clean Water Management Trust Fund and Section 319 projects and also considers if a municipality is located in the watershed. Municipal governments often own good sites for water quality improvement projects, but lack the technical expertise and the resources to implement the projects. For these reasons, the NCWRP views municipalities as good potential partners for restoration projects. In addition, many cities are subject to Phase I or Phase II Stormwater Regulations and gather monitoring information that is useful in designing and measuring the long-term benefits of restoration efforts.

Land Cover

Water quality studies suggest that heavily forested watersheds regulate stormwater runoff reducing the likelihood for severe streambank erosion, nutrient runoff and sediment pollution. For this reason, the NCWRP uses the percentage of cleared land in a watershed as an indicator of restoration need and opportunity.

Local Watershed Planning

In 2000, the NCWRP initiated a Local Watershed Planning program to conduct detailed restoration planning in a limited number of Targeted Local Watersheds across the state. These locally-based plans include a comprehensive watershed assessment to identify causes and sources of nonpoint source pollution impairment. The plans also identify and prioritize wetlands areas, stream reaches and riparian buffer areas, and best management practices that will provide significant water quality improvement and other environmental benefits to local watershed. The NCWRP will coordinate with local community groups, local governments and others to develop and implement these plans. There are currently two local watershed planning efforts underway in the Yadkin River basin and they are described below.

Upper Yadkin Local Watershed Plan

The NCWRP initiated this planning effort in November 2001 to address water quality problems in five tributary watersheds to the W. Kerr Scott Reservoir and Yadkin River above the Town of Wilkesboro's Water Filtration Plant. The study area is located in Wilkes County in subbasin 03-07-01. The treatment plant struggles with filtration problems tied to turbidity, algae and high concentrations of total coliform bacteria. Animal agriculture, including poultry and beef cattle, and its associated land application of waste are a potential nonpoint source of nutrients and metals to the reservoir and tributary streams. In addition, many streambanks in the study area lack riparian vegetation and are severely eroding. The NCWRP is working with the Wilkes Soil and Water Conservation District and other local stakeholders to reduce nutrient, sediment and bacteriological pollution to the reservoir and the Yadkin River to ensure long-term protection of these resources for public water supply, recreation and aquatic life. As part of the planning effort, the NCWRP, in cooperation with DWQ, has initiated a comprehensive biological and chemical water quality monitoring program in the planning area. The NCWRP has also hired a technical consultant to conduct a detailed watershed assessment that will assess watershed conditions, estimate pollutant loads and identify, and prioritize restoration opportunities. The technical assessment will be completed in summer 2003 with the restoration plan completed in the fall of 2003.

Lower Yadkin-Pee Dee Local Watershed Plan

At present, the NCWRP's Local Watershed Planning project for the lower Yadkin-Pee Dee region is focused on the upper Rocky River and Clarke Creek watersheds in subbasin 03-07-11. Watershed protection issues within these two local watersheds include: aquatic habitat degradation due to sedimentation and stormwater flows; fecal coliform contamination; stream impacts from roadway construction and new development; and protection of high quality wetland and riparian buffer parcels. A group of local and regional resource agency professionals (primarily from Cabarrus, Iredell and Mecklenburg counties) forms the core of the local stakeholder team working with NCWRP and its consultants on this effort. The group expects to have a Local Watershed Plan drafted up for the two watersheds, including specific recommendations and strategies for watershed protection and improvement, by the summer of 2003.

Beginning in early 2003, four additional local watersheds (Coddle Creek, Mallard Creek, Reedy Creek, and a segment of the Rocky River) are being added to the NCWRP Local Watershed Planning project in the lower Yadkin-Pee Dee region. Together with the upper Rocky River and

Clarke Creek watersheds, these local watersheds constitute the complete area of DWQ subbasin 03-07-11, which forms the entire drainage system of the upper Rocky River. The watershed assessments and local watershed plan development should be completed by the fall of 2004.

Riparian and Wetland Restoration Projects

The NCWRP currently has eight restoration projects completed or underway in the Yadkin-Pee Dee River basin accounting for more than 49,500 feet of stream and 87 acres of buffer restoration. A summary of NCWRP restoration projects in the Yadkin-Pee Dee River basin is presented in Table C-4.

Table C-4 NCWRP Stream, Wetland and Buffer Restoration Projects in the Yadkin-Pee Dee River Basin

Subbasin	Name	County	Scope	Project Size ¹	Status	Partners
03-07-01	Stone Mountain: East Prong Roaring River	Wilkes	Stream restoration	S=10,600 ln. ft B=19.5 acres	Completed 10/2000; Post-construction monitoring	NC Parks and Recreation, NC State University
03-07-01	Little Bugaboo Creek	Wilkes	Stream restoration; cattle exclusion	S=5,500 ln. ft B=9.2 acres	Design complete; construction fall 2002	Wilkes SWCD
03-07-01	Warrior Creek	Wilkes	Stream restoration, cattle exclusion	S=8,500 ln. ft B=6.8 acres	Design underway; construction fall 2002	Wilkes SWCD
03-07-01	Purlear Creek	Wilkes	Stream and wetland restoration; cattle exclusion	S=17,000 ln. ft W=4 acres B=31 acres	Design underway; construction fall 2002	Wilkes SWCD
03-07-03	Beaver Creek	Surry	Stream restoration	S=4,000 ln. ft B=9.2 acres	Design complete; construction fall 2002	Surry SWCD
03-07-04	Brushy Fork	Forsyth	Stream restoration	S=5,000 ln. ft B=6.9 acres	Design underway; construction fall 2002	City of Winston-Salem
03-07-04	Silas Creek	Forsyth	Stream restoration	S=4,500 ln. ft B=5 acres	Design underway; construction fall 2002	City of Winston-Salem
03-07-11	Cato Farm	Mecklenburg	Stream restoration	S=2,400+ ln. ft B=5 acres	Design underway; construction fall 2002	Mecklenburg County; Cabarrus Co. NRCS

¹ S = stream; W = wetlands; B = buffer.

All NCWRP projects are permanently protected by conservation easements and are designed to improve water quality, floodwater retention, habitat or recreational opportunities. NCWRP implements restoration projects in urban and rural areas and on public and private land. Stream

restoration projects generally restore dimension (channel width and depth, floodplain access), pattern (meanders) and profile (riffles and pools) to channelized or severely incised streams. Wetland restoration projects restore wet soil conditions and wetland vegetation to areas with wetland soils that have been drained, cleared or otherwise altered to accommodate agriculture or other activities. For a more detailed description of each individual project, visit the NCWRP's website at <http://h2o.enr.state.nc.us/wrp/project/projects.htm>.

Although the NCWRP is not a grant program, it is always seeking sites that are suitable and feasible for restoration projects. Visit the NCWRP website at <http://h2o.enr.state.nc.us/wrp/> to view the criteria NCWRP uses to select restoration projects that provide ecological benefits in a cost-effective manner. If your project meets the site criteria, you can download a site proposal form for an on-site consultation by NCWRP staff.

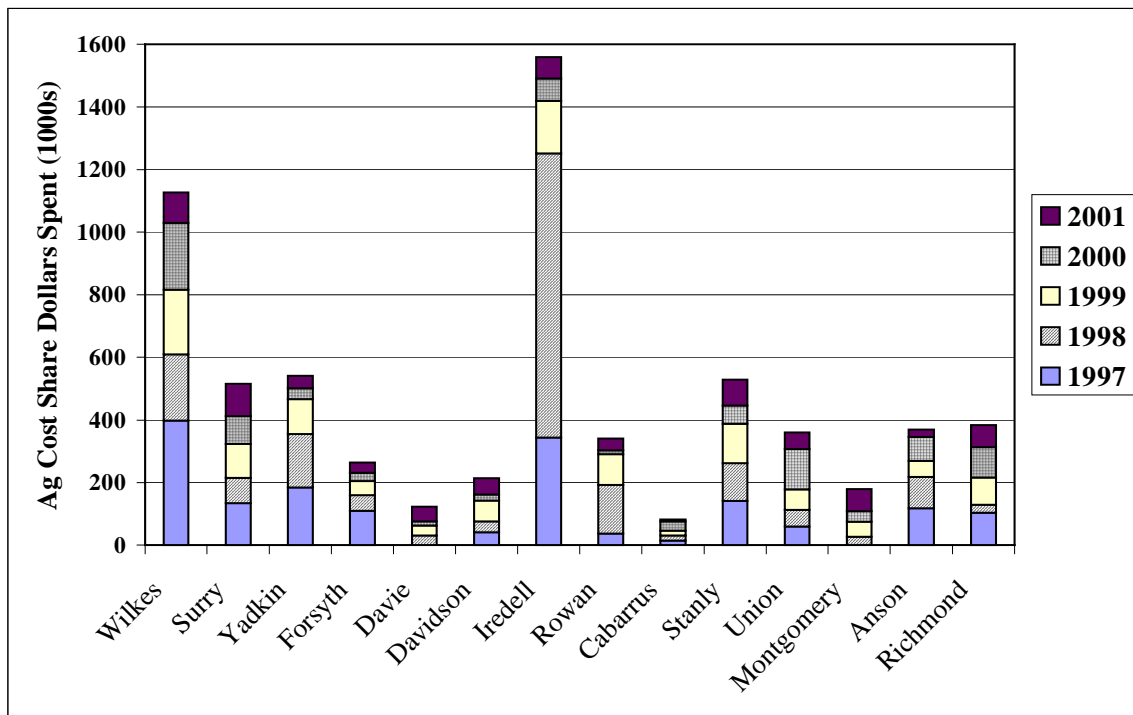
For more information about the NCWRP in the upper portion of the basin, contact Kristin Cozza at (919) 716-1922 or kristin.cozza@ncmail.net; or in the lower portion of the basin, contact Hal Bryson at (919) 715-7452 or hal.bryson@ncmail.net.

1.3.3 NC Agriculture Cost Share Program

The North Carolina Agriculture Cost Share Program was established in 1984 to help reduce the sources of agricultural nonpoint source pollution to the state's waters. The program helps owners and renters of established agricultural operations improve their on-farm management by using Best Management Practices (BMPs). These BMPs include vegetative, structural or management systems that can improve the efficiency of farming operations while reducing the potential for surface water and groundwater pollution. The Agriculture Cost Share Program is a voluntary program that reimburses farmers up to 75 percent of the cost of installing an approved BMP. The cost share funds are paid to the farmer once the planned control measures and technical specifications are completed. The annual statewide budget for BMP cost sharing is approximately 6.9 million.

Approximately \$6.6 million was expended in the Yadkin-Pee Dee River basin between 1997 and 2001 on a wide variety of nonpoint source pollution reduction projects. Figure C-6 presents Agriculture Cost Share Program dollars (in thousands) spent over the five-year period for counties of which more than 50 percent is located within the Yadkin-Pee Dee River basin.

Soil and Water Conservation District contacts for the Yadkin-Pee Dee River basin are included in Appendix VI or visit the website at <http://www.enr.state.nc.us/DSWC/files/acs.htm> for more information.



Note: 1997 data were not available for Montgomery County.

Figure C-6 Agriculture Cost Share Program Dollars Expended (1997-2001) for Selected Counties in the Yadkin-Pee Dee River Basin (Source: NC Division of Soil and Water Conservation)

Agricultural Sediment Initiative

In 2000, the NC Association of Soil and Water Conservation Districts and the NC Soil and Water Conservation Commission initiated an effort to assess stream channels and watersheds of streams on the state's 2000 303(d) list due to sediment where agriculture was included as a potential source. The primary objective of the Agricultural Sediment Initiative is to evaluate 303(d) listed waters in order to assess the severity of sedimentation associated with agricultural activities within the watershed and to develop local strategies for addressing sedimentation both in stream and in the watershed. The initiative involved 47 impaired stream segments in 34 counties and 11 river basins.

In 2001, the Soil and Water Conservation Commission allocated \$1 million of Agriculture Cost Share Funds to 17 soil and water conservation districts to implement agricultural BMPs in selected watersheds of impaired streams. This funding was complemented by funds from the Clean Water Management Trust Fund (\$1 million for agricultural BMPs in the Haw River and Ararat River Watersheds in Alamance and Surry counties) and the EPA 319 Program (\$367,900 for agricultural BMPs in six soil and water conservation districts).

Table C-5 summarizes the results of Agricultural Sediment Surveys for 21 watersheds in ten counties in the Yadkin-Pee Dee River basin. District staff requested approximately \$24.7 million for restoration and protection work in seven watersheds.

Table C-5 Summary of Agricultural Sediment Initiative Surveys

Stream	County	Problems Identified	Funds Requested by District
Fourth Creek	Iredell	<ul style="list-style-type: none"> • Streambank erosion • Development causing increased stormwater runoff 	\$9,600,000
Dye Creek	Iredell	<ul style="list-style-type: none"> • Streambank erosion • Development causing increased stormwater runoff 	\$6,600,000
Grants Creek	Rowan	Assessment not yet completed	
Town Creek (from SR 1526 to Crane Creek)	Rowan	Assessment not yet completed	
Brushy Fork	Davidson	<ul style="list-style-type: none"> • Sand dredging/pumping operations • Concrete block plant-direct discharge to stream • Livestock access to stream • Runoff from cropland • Development/construction • Stream channelization 	\$3,400,000
Hamby Creek (from source to Rich Fork)	Davidson	<ul style="list-style-type: none"> • Land-disturbing activities • Construction sites • Some streambank erosion 	\$10,000
Ararat River	Surry	<ul style="list-style-type: none"> • Streambank erosion • Land-disturbing activities • Urban development • Road construction 	\$3,300,000
Faulkner Creek (from source to Ararat River)	Surry	<ul style="list-style-type: none"> • Lack of riparian buffers • Urban development (encroachment into the floodplain) • Pasturing close/into the creek and tributaries 	\$1,700,000
Salem Creek (Middle Fork) (from Winston-Salem Water Supply Dam)	Forsyth	<ul style="list-style-type: none"> • Streambank erosion • Urban development • Road construction 	<ul style="list-style-type: none"> • BMP Cost share • Training • Urban Specialist
Richardson Creek	Union	Assessment not yet completed	
Lanes Creek (from SR 1929 to Marshville)	Union	No problems noted by district personnel	None
Richardson Creek	Anson	Streambank erosion	None
Brown Creek (from NC 74 to Pee Dee River)	Anson	<ul style="list-style-type: none"> • Prison construction directly above impaired segment • Timber harvesting 	None
South Fork Jones Creek (from Anson SR 1821 to Jones Cr)	Anson	No apparent sedimentation problems noted by district staff	None
North Fork Jones Creek	Anson	New residential development	None
McKee Creek	Cabarrus	<ul style="list-style-type: none"> • Construction on I-485 • Residential development • Erosion from overgrazed horse pasture 	None
Clear Creek	Cabarrus	<ul style="list-style-type: none"> • Residential development • Erosion from overgrazed horse pasture • Construction on NC 24/27 	None
McKee Creek	Mecklenburg	<ul style="list-style-type: none"> • Rapid urban development • Construction of I-485 	None
Clear Creek	Mecklenburg	<ul style="list-style-type: none"> • Rapid urban development • Construction of I-485 	None
Rocky River (from source to SR 2420)	Mecklenburg	<ul style="list-style-type: none"> • Rapid urban development • Construction of I-485 	None
Hitchcock Creek	Richmond	Streambank erosion	\$89,000

For further information about the Agriculture Sediment Initiative, contact David Williams by calling (919) 715-6103 or by email david.b.williams@ncmail.net.

1.3.4 Watershed Education for Communities and Officials

The Watershed Education for Communities and Officials (WECO) Program is dedicated to facilitating watershed planning at the local level in North Carolina. A program of the North Carolina Cooperative Extension Service at NC State University, WECO brings watershed stakeholders together to find collaborative solutions to water quality problems in their watershed. Current watershed projects have stakeholders seeking ways to restore streams and wetlands, protect an endangered mussel's habitat, and reopen closed shellfish beds for shellfishing.

The overall goal of the program is to improve water quality through education of citizens and government officials who live and work in the watershed. This involves three primary objectives:

- Delivery of technical information and educational material on water quality.
- Empowerment of local citizens by facilitating collaborative, policymaking partnerships at the watershed level between communities, local officials and state agencies.
- Facilitation of local stakeholder development of policy recommendations for the entire watershed to improve water quality.

Program guidelines for WECO projects:

- The project must be locally-empowered and stakeholder-based.
- The project must develop methods for sustainable, collaborative, community-based solutions.
- The project should partner with other state and local agencies to foster watershed-based solutions.
- The project must develop methods for the synthesis, integration and application of multidisciplinary scientific and technical information to support policymaking.
- The project should examine sustainability of policy alternatives by estimating economic costs and benefits.

In the spring of 2000, the North Carolina Wildlife Resources Commission contracted with WECO to conduct a stakeholder effort in the Goose Creek watershed in the Yadkin-Pee Dee River basin. Goose Creek is home to one of the only remaining populations of the Carolina Heelsplitter mussel (*Lasigona decorata*). This species is federally-listed as endangered. The purpose of the Goose Creek Watershed Advisory Committee was to make recommendations to local governments, state agencies and other appropriate organizations that will protect and improve water quality and wildlife habitat in the Goose Creek watershed. The committee began meeting and investigating water quality problems in Goose Creek in December 2000. Initial meetings explored the art of collaborative problem solving and defined the current status of water quality in Goose Creek.

The committee initially identified five priority goals for the Goose Creek Watershed. At meetings held early in the process, each goal was assigned a priority score by the committee and were ranked as follows:

1. Protect creek from runoff and urbanization.
2. Maintain and improve integrity of the stream.
3. Achieve a rating of "fully supporting" for Goose Creek.
4. Protect open space.
5. Preserve farmland.

WECO developed a "toolkit" document that highlights options for improving water resources in the Goose Creek watershed. The committee used this document to identify options that address the highest priority, which was to protect the creek from runoff and urbanization. The committee's recommendations are detailed in the *Goose Creek Watershed Management Plan* which was finalized in September 2002. Goose Creek is discussed in detail on page 228 of Section B. The committee's recommendations are summarized in Appendix V.

For more information about WECO or to obtain a copy of the Goose Creek Watershed Management Plan, visit the website at <http://www.ces.ncsu.edu/depts/agecon/WECO/goosecreek.html>. You may also contact Christy Perrin by calling (919) 515-4542 or by email Christy_Perrin@ncsu.edu.

1.3.5 NC Wildlife Resources Commission

The NC Wildlife Resources Commission (NCWRC) Division of Inland Fisheries manages the state's freshwater fisheries through fisheries research, fisheries management, hatchery operation and habitat conservation.

Stevens Creek is a tributary to Goose Creek, an impaired stream in Mecklenburg and Union Counties that harbors a federally endangered aquatic species, the Carolina Heelsplitter, as well as other rare mussels. The Stevens Creek watershed is being developed in residential use as part of Charlotte metropolitan area growth. The development increases stormwater flows and pollutant loading. The NC Wildlife Resources Commission developed a project to reduce peak stormwater and pollutant flows into Stevens Creek, restore degraded streambank, educate the community, and help them take ownership of further restoration and protection efforts for the stream. To reduce peak flows and pollutants, willing residential property owners would be sought at lots adjacent to the stream where bioretention or other stormwater facilities could be retrofitted. Also, a pasture operation in the watershed would be contacted in an effort to fence its cattle out of the stream.

Beginning in September 1999, the project conducted baseline biological, chemical and physical monitoring of Stevens Creek, selected a neighborhood for retrofits, made initial homeowner contacts, and found a willing participant. Finding significant homeowner resistance in the neighborhood, the contractor limited initial installation to one retrofit site, which was installed by June 2000. The contractor has since conducted community meetings and grade school presentations and published articles in the local Mint Hill newsletter. The contractor requested an extension of the project until September 2003 to allow replacement staff to carry out the

remaining project activities. This project is funded in part through the Section 319 program (see page 273 for details).

A related NC Wildlife Resources Commission project funded by the Clean Water Management Trust Fund (page 275) characterized stormwater systems in place throughout the entire Goose Creek watershed and evaluated stormwater retrofit and land conservation opportunities to restore and protect water quality.

In addition to these projects which are specific to the Yadkin-Pee Dee River basin, the NCWRC Habitat Conservation Program strives to protect and enhance wildlife and fisheries resources by: 1) assessing impacts and providing recommendations to avoid or minimize those impacts through permit and environmental document review; 2) providing technical guidance regarding habitat conservation to governmental and private agencies and to individuals; 3) restoring degraded streams by correcting problems in riparian corridors that have resulted in poor water quality, sedimentation, unstable stream banks, loss of aquatic habitat and diminished fish communities; and 4) encouraging adequate mitigation for losses of fish, wildlife, their habitats, and uses thereof resulting from land and water developments.

For more information, contact the Division of Inland Fisheries by calling (919) 733-3633 ext. 281 or visit the NC Wildlife Resources Commission website at <http://www.state.nc.us/Wildlife/>.

1.3.6 NC Construction Grants and Loans Program

The NC Construction Grants and Loans Section provides grants and loans to local government agencies for the construction, upgrade and expansion of wastewater collection and treatment systems. As a financial resource, the section administers two major programs that assist local governments, the federally funded Clean Water State Revolving Fund (SRF) Program and the NC Clean Water Revolving Loan and Grant Program. These programs can provide both low interest loan and grant funds for wastewater treatment projects.

As a technical resource, the Construction Grants and Loans Section, in conjunction with the Environmental Protection Agency, has initiated the Municipal Compliance Initiatives Program. It is a free technical assistance program to identify wastewater treatment facilities that are declining but not yet out of compliance. A team of engineers, operations experts and managers from the section work with local officials to analyze the facility's design and operation.

For more information, visit the website at <http://www.nccgl.net/>. You may also call (919) 715-6212 or email Bobby.Blowe@ncmail.net.

1.3.7 South Carolina Department of Health and Environmental Control

In 1991, the South Carolina Department of Health and Environmental Control (SCDHEC) Bureau implemented the Watershed Water Quality Management Strategy in order to more efficiently protect and improve the quality of South Carolina's surface water resources. This management strategy recognizes the interdependence of water quality and all the activities that occur in the associated drainage basin. Under the watershed management approach, monitoring, assessment, problem identification and prioritization, water quality modeling, planning,

permitting and other SCDHEC initiatives are coordinated by basin. A watershed water quality assessment document is produced for each basin on a five-year rotating schedule. The first Watershed Water Quality Assessment for the Pee Dee River basin was published in May 2000 and will be updated on a five-year rotational basis.

To obtain a copy of the Watershed Water Quality Assessment or for further information about water quality in the Pee Dee River basin in South Carolina, contact Colt Bowles at (803) 898-4142 or by email bowlescb@columb32.dhec.state.sc.us or visit the website at <http://www.scdhec.net/water>.

1.3.8 Rendezvous Mountain Educational State Forest

Rendezvous Mountain Educational State Forest in Wilkes County, managed by the NC Division of Forest Resources, encompasses over 3,000 acres of headwaters in the Purlear Creek subwatershed, which is a portion of the North Prong Lewis Fork watershed. Stream restoration funding has tentatively been encumbered for performing trial tests of new "sand wand" technology on a section of first-order stream on the forest property. This type of technology is useful in clearing out sediment from the stream channel that was deposited by historically poor logging practices, thought to have occurred nearly 60 or more years ago. The stream restoration project is scheduled to occur during the summer of 2003. Funding for this technology demonstration is provided by a grant award from the USEPA's Nonpoint Source Pollution Management Program.

1.3.9 Cabarrus Soil and Water Conservation District/Cabarrus County Watershed Improvement Commission

A three-member Watershed Improvement Commission, appointed by the Board of Commissioners, is charged with oversight of water quality and water quantity initiatives. Cabarrus Soil and Water Conservation District provides staff assistance to this watershed commission. Monthly commission meetings provide forums for coordinating water quality management efforts by local planners, water and sewer system managers, emergency management officials, and erosion control and stormwater program staff.

This commission installed and maintains water supply watershed boundary signs around the county's three drinking water reservoirs. One hundred signs are posted with the message "Water Supply Area, Yadkin River Basin, Spill Response 911". These signs are in Cabarrus, Iredell and Rowan counties along roads at boundaries for water supply reservoirs on Coddle Creek, Black Run/Dutch Buffalo Creek, and Chambers Branch/Patterson Branch/Cold Water Creek.

A planning group that was guided by the 1998 basinwide plan selected Clarke Creek as one of two streams in the lower Yadkin-Pee Dee River basin for focused efforts to protect and restore water quality. Cabarrus Soil and Water Conservation District and Cabarrus County Watershed Improvement Commission convened a steering committee that obtained a Clean Water Management Trust Fund grant to identify water quality problems in the watershed. The Clarke Creek steering committee merged into the Upper Rocky River Watershed planning effort initiated by the state Wetland Restoration Program in 2002. The Conservation District and Watershed Commission has continued to provide leadership for the Upper Rocky River Watershed planning group.

Agricultural sediment surveys have been conducted in the watersheds of two streams on the state's 303d list - Clear Creek and McKee Creek. The conservation district is assisting the state with development of fecal coliform TMDL's for these two creeks, including hosting public hearings on development of the TMDL's.

Adoption of a countywide erosion and sedimentation control ordinance was initiated by the Conservation District and Watershed Commission. The commission holds public hearings on appeals of fines levied for violations of this ordinance and provides oversight of the county's River Stream Overlay Zone stream buffer requirements. This buffer is a vegetated zone extending between 50 and 120 feet from the top of the bank on all perennial streams.

The conservation district contracted with Wildlife Resource Commission (WRC) aquatic biologists to survey selected streams as part of the natural heritage inventory conducted for the state Natural Heritage Program. Riparian corridors were collectively identified as locally important natural areas. The WRC is following up on this survey by introducing freshwater mussels into streams with suitable habitat and water quality where no mussels are present.

The conservation district maintains a database of over 70 local streams and is coordinating efforts to place stream identification signs at road crossings. The district also coordinates stream adoption in the county through the state Stream Watch Program. These groups are also being encouraged to participate in the annual North Carolina Big Sweep waterway cleanup day, the Oceans Conservancy's Storm Drain Sentries Program, and the annual Great American Secchi Dip-In water quality monitoring program. The Conservation District and Watershed Commission has coordinated Big Sweep in Cabarrus County since 1992.

Conservation education efforts in Cabarrus County that benefit water quality also include essay, poster and public speaking contests; Enviroscene; Envirothon; Project WET; and Soil and Water Stewardship Week. The conservation district staff includes a state-certified environmental educator.

1.4 Regional Initiatives

1.4.1 The LandTrust for Central North Carolina

The LandTrust for Central North Carolina is a nonprofit corporation with a volunteer Board of Directors from throughout a ten-county region (Anson, Cabarrus, Davidson, Davie, Iredell, Montgomery, Randolph, Richmond, Rowan and Stanly). Since 1995, The LandTrust has made a major impact in the Yadkin-Pee Dee River basin, protecting thousands of acres including natural areas, rivers and streams, wildlife habitats, farmland and historic sites. Conservation easements have been acquired on the nearly 2000-acre Cooleemee Plantation (a national historic landmark), miles of river front on the Yadkin, Pee Dee and Rocky Rivers, important lands adjacent to Morrow Mountain State Park and the Uwharrie National Forest, High Rock Lake Preserve, and the Clarke Creek Rookery, just to name a few. The LandTrust also:

- Educates landowners, public officials, opinion leaders and others on the need to preserve lands and natural areas.
- Serves as resource center and clearinghouse for conservation efforts in the region.

- Encourages regional planning and ensures that conservation of natural and cultural resources are included.
- Acts as a hub when organizations and public agencies collaborate on a preservation project.
- Lends its grant-writing expertise to obtain funds for conservation efforts.
- Spearheads efforts by adjoining landowners to create wildlife protection areas or to engage in other cooperative efforts.
- Works closely with other land trusts in the state to coordinate efforts, share best practices and promote conservation.

South Yadkin River/Yadkin River Corridor Conservation Plan

The LandTrust for Central NC (LTCNC) received a grant from the Conservation Trust for North Carolina and the Clean Water Management Trust Fund to develop a report evaluating the conservation needs and opportunities along the lower South Yadkin River and a section of the Yadkin River above High Rock Lake. The plan is complete and has been integrated into the daily efforts of LTCNC while pursuing conservation opportunities in the Yadkin-Pee Dee River basin.

For additional information about The LandTrust for Central North Carolina, call (704) 647-0302 or email Executive Director, Jason Wasler, jason@landtrustcnc.org. You may also visit the website at <http://www.landtrustcnc.org/>.

1.4.2 Piedmont Land Conservancy

The Piedmont Land Conservancy (PLC) is a nonprofit organization dedicated to preserving natural and scenic lands, farms and open spaces in the piedmont of North Carolina to enrich the quality of life for our communities and for future generations. The PLC represents nine North Carolina counties: Alamance, Caswell, Forsyth, Guilford, Randolph, Rockingham, Stokes, Surry and Yadkin. PLC strives toward the following goals:

- To acquire and manage natural areas in piedmont North Carolina.
- To protect endangered or significant native species of flora and fauna and to preserve areas with significant topographical features.
- To maintain the ecological integrity of the region, including its air and water quality and biological diversity.
- To fulfill the human need for scenic land and open space to provide opportunities for learning from and enjoying the natural world.
- To enhance and buffer our communities.

PLC is not affiliated with any other organization and is supported entirely by members and friends in the piedmont and has more than 600 members. It is the only local land trust serving the Piedmont Triad region of North Carolina. PLC builds partnerships with public agencies, private organizations, landowners and individuals to save the best of our natural heritage. Since incorporation, the PLC has protected more than 3,800 acres of land.

Mitchell River Watershed Protection Project

Awarded a \$1.9 million grant from the Clean Water Management Trust Fund, PLC is working with public and private agencies, private organizations and landowners to secure permanent protection along the Mitchell River, a headwater tributary of the Yadkin River and the region's only Outstanding Resource Waters. The grant monies are being used for a variety of projects within the Mitchell River watershed including conducting a riparian corridor inventory and developing a watershed protection plan. The purpose of the plan is to target critical areas for protection and restoration efforts.

For additional information about the Piedmont Land Conservancy, call (336) 691-0088 or email info@piedmontland.org. You may also visit the website at <http://www.piedmontland.org/>.

1.4.3 Yadkin-Pee Dee River Basin Association

The Yadkin-Pee Dee River Basin Association was formed in 1997 to protect and improve water quality in the North Carolina portion of the basin and to represent the interests of NPDES permitted dischargers (WWTPs). Over a five-year period, the association has accomplished the following:

- Successfully developed and implemented a comprehensive water quality monitoring program.
- Obtained significant funding from the Clean Water Management Trust Fund to assist with the restoration of impaired waters in the basin.
- Represented its members in discussions with DWQ, including effectively making the case against any nutrient management strategy that unfairly singles out point sources.
- Served as a clearinghouse and forum for the dissemination of information to and among its members.
- Developed relationships with other organizations and stakeholders in the basin.

Future initiatives include finding ways to increase communication between stakeholders across the basin, working with DWQ and others to develop and implement plans for the restoration of impaired waters, assist association members in identifying and addressing NPDES permit compliance problems, and continuing to strengthen and improve the monitoring program.

For more information about the Yadkin-Pee Dee River Basin Association, contact David Saunders by calling (336) 737-8418 or by email davids@cityofws.org.

1.4.4 Resource Conservation and Development (RC&D)

The mission of RC&D is to build public and private partnerships, create financial leverage, and increase the capacity of communities to meet their locally identified resource conservation and development needs. This is achieved by engaging the interests of the public and private sectors to balance the conservation and development of human and natural resources; and creating efficient community and natural resource management by bringing together cooperative action for a common benefit.

RC&D provides technical assistance with project planning, design and engineering. RC&D staff provides project planning assistance; however, RC&D coordinates assistance with NRCS, Soil and Water Conservation Districts, other agencies, private organizations and professionals to provide on the ground support. RC&D provides financial assistance for project implementation, grant writing and counseling assistance with public, private and corporate grant programs. The RC&D Council can sponsor project grants and administer project grant funds if needed.

Carolina Land and Lakes

Carolina Land and Lakes RC&D, Inc. was incorporated in 2001 as a local nonprofit, 501(c)(3) tax-exempt organization which serves Alexander, Burke, Caldwell, Catawba and Iredell counties in North Carolina.

The DWQ Nonpoint Source Pollution Program is working with Carolina Land and Lakes RC&D, Inc. and the Iredell Soil and Water Conservation District to implement management strategies outlined in the Fourth Creek fecal coliform TMDL. The main goal of the Fourth Creek TMDL Implementation Project will be to reduce the fecal coliform load to Fourth Creek from agricultural sources by excluding grazing cattle from the stream.

Results of modeling during DWQ's TMDL study suggest that in order to attain water quality standards, fecal coliform loading from grazing has to be reduced by 40-50 percent during dry weather conditions and by 95-98 percent during wet weather conditions. Such substantial reductions can be achieved by completely eliminating free access that cattle have to the stream and providing alternative watering sources. The project will include construction of the fences along the streambanks, reestablishing vegetation in the buffer zone to reduce erosion, construction of the stream crossing and installation of the water wells and waterers with associated infrastructure.

The Carolina Land and Lakes RC&D office is located in Conover, NC. For more information, call Wendell Kirkham, Council Chair, at (828) 464-5559.

Environmental Impact

Environmental Impact RC&D, Inc. was incorporated in 1988 as a local nonprofit, 501(c)(3) tax exempt organization which serves Anson, Montgomery, Moore and Richmond counties in North Carolina. The mission and purpose of Environmental Impact (RC&D), Inc. is to promote environmental quality and conservation while working to ensure sustained economic development, thereby, improving the economic opportunities of the people within the Environmental Impact RC&D project area. The mission is achieved by bringing local people and organizations together to identify natural resource problems and opportunities and seek solutions to those problems without sacrificing economic growth or environmental quality.

Counties in the lower Yadkin-Pee Dee River basin are some of the largest poultry producing counties in the state. Environmental Impact RC&D recognized that a surplus of nutrients in waste generated by these operations relative to crop needs in the area has generated concerns over improper storage and disposal, and over phosphorus and metal build-up in receiving soils. At the same time, a burgeoning industry in pine straw raised the need for nutrient additions to

harvested systems. Environmental Impact developed a demonstration program to evaluate the feasibility of applying poultry waste to longleaf pine communities to evaluate the potential for addressing both of these issues.

The RC&D established 59 small plots of ¼ to ½ acre on nine farms in Montgomery, Moore and Richmond counties in January 2000. Poultry litter was applied at three different rates for nitrogen – 40, 80 and 120 lb. N/ac/yr. Monitoring of nutrient levels for two to three years was to include shallow groundwater collected in piezometers in addition to soil and foliage sampling. Tree growth and straw production were also followed. This project was funded in part through the Section 319 program (see page 273 for details). The contractor had not provided an analysis of the data as of November 2002.

Other projects affecting the Yadkin-Pee Dee River basin include Geographical Information Systems (GIS) work on a utility information system for the Town of Star, located in Montgomery County, and an on-farm composting demonstration project.

The Environmental Impact RC&D office is located in Aberdeen, NC. For more information, visit the website at <http://www.environmentalimpact-rcd.com/>. You may also contact R. Lynn McCaskill by calling (910) 944-4787 or by email eircd@utinet.net.

Pilot View

The Pilot View Resource Conservation and Development, Inc. is a 501(c)(3) nonprofit organization supported nationally by USDA through the Natural Resources Conservation Service, and locally by the Boards of County Commissioners and the County Soil and Water Conservation Districts in Davie, Forsyth, Stokes, Surry and Yadkin counties. Organized in 1991, Pilot View RC&D, Inc. celebrated its ten-year anniversary during this basinwide planning cycle.

The Pilot View RC&D office is located in Winston-Salem, NC. For more information, visit the website at <http://www.rcdnet.org/PILOTVIEWINC/>. You may also contact Charles Anderson at (336) 750-0522 or by email pvica@triad.rr.com.

1.4.5 Yadkin River Basin Commission

For decades, the Yadkin River Valley remained essentially unchanged. However, throughout the 1980s, the river increasingly became the object of economic interests. It is now a magnet for new development and an increasingly important regional source of sand, bringing new treatment demands for drinking water and waste disposal. These issues are complicated by various municipal and county boundaries along the river. Residents in one county are often unaware of river-related plans in adjacent counties until they are affected by them. In 1991, county commissioners from Davie, Forsyth and Yadkin counties chartered the Yadkin River Commission which strives to overcome these problems by taking a cooperative, regional approach to issues affecting the Yadkin River Valley.

Currently, county commissioners from Davie, Forsyth, Surry and Yadkin counties appoint citizens with a variety of public and private river interests to serve on a seven-member board.

The board meets quarterly on the third Thursday of the month and special meetings are scheduled as needed.

In addition to an educational newsletter series, members began producing their second documentary video in 2001. The commission anticipates that the video will be ready for distribution in 2003. The video discusses:

- how the Yadkin River serves as a significant source of drinking water for many counties;
- harmful effects of sedimentation and erosion; and
- how local residents can use some simple techniques to protect the river.

For further information about Yadkin River Commission projects, visit the website at http://www.co.forsyth.nc.us/ccpb/YRC_page.htm. You may also contact Chris Murphy at the Winston-Salem/Forsyth City-County Planning Department by calling (336) 727-2087 or by email chrism@cityofws.org.

1.5 Local Government Initiatives

1.5.1 Charlotte-Mecklenburg

The key component in Charlotte's and Mecklenburg County's efforts to restore the quality and usability of its surface water resources is the Surface Water Improvement and Management (SWIM) Program which was established by the Mecklenburg County Department of Environmental Protection (MCDEP) in November 1995. The objective of this program is to produce measurably cleaner surface waters in Mecklenburg County and restore the usability of streams. The program utilizes a basin planning approach and focuses on:

- increasing public awareness of surface water quality conditions and current stream usability;
- engaging the public's direct involvement in efforts to restore streams;
- promoting intergovernmental cooperation and coordination to address the wide ranging and complex planning and development issues necessary to resolve the many problems associated with the use and protection of our surface waters;
- measuring water quality conditions and identifying specific pollution problems;
- identifying stakeholders and obtaining their direct input;
- participating in the development of basin plans designed to restore water quality and usability; and
- implementing activities identified in the basin plans.

Water Quality Index

To assess water quality in Mecklenburg County streams, MCDEP is using a general water quality index which includes nine water quality parameters: Biochemical Oxygen Demand, Dissolved Oxygen, Fecal Coliform Bacteria, pH, Temperature, Total Nitrate, Total Phosphorus, Total Solids and Turbidity. These parameters were selected through the combined judgment of a panel of water quality experts residing throughout the country. The lake water quality index includes the following nine parameters: Chlorophyll *a*, Dissolved Oxygen, pH, Secchi Disk

Depth, Specific Conductivity, Temperature, Total Alkalinity, Total Nitrate and Total Phosphorus.

MCDEP is collecting water samples from 40 stream sites and 17 lake sites each month. These water samples are analyzed by MCDEP's laboratory. The data generated from these sampling activities are used to produce the water quality index monthly throughout the year. These index values are used by MCDEP to compare stream and lake water quality conditions over space and time as well as to establish trends in water quality and to evaluate pollution prevention programs.

The Water Quality Index represents water quality on a scale of 0 to 100 with 0-25 representing Poor water quality; 26-50 Fair water quality; 51-70 Average water quality; 71-90 Good water quality; and 91-100 Excellent water quality. Both Excellent and Good water quality lakes and streams support a high diversity of aquatic life and are suitable for all forms of recreation.

Average water quality lakes and streams exhibit signs of stress including reduced diversity of aquatic organisms, increased nutrients and increased algae growth. Fair water quality lakes and streams support a low diversity of aquatic life and are experiencing water quality problems from point and nonpoint sources of pollution. Poor water quality lakes and streams may support only a limited number of organisms that are very tolerant to pollution and have abundant water quality problems. Poor water quality is not suitable for recreational activities involving frequent human body contact (i.e., swimming, wading, skiing, etc.).

Stream Buffer Ordinances

The purpose of the SWIM stream buffer network in Charlotte and Mecklenburg County is to ensure that the stream and adjacent lands will fulfill natural functions. Local ordinances for the protection of riparian buffer areas of varying widths, based on watershed drainage area, are currently being implemented throughout Mecklenburg County. The ordinances can be viewed on the following website at http://www.co.mecklenburg.nc.us/coenv/Water/swim_title_page.htm.

For more information about SWIM programs or stream buffer ordinances in Charlotte-Mecklenburg, contact Water Quality Program Manager, Rusty Rozzelle, at (704) 336-5500 or by email rozzers@co.mecklenburg.nc.us. You may also visit the Department of Environmental Protection website at <http://www.co.mecklenburg.nc.us/coenv/Inside.htm>.

1.5.2 Forsyth County Environmental Affairs Department

The Environmental Affairs Department's (EAD) Water Quality Program is designed to protect and evaluate the surface water quality of the county by addressing water quality problems relayed to us by citizens and by operating a stream monitoring program. Since 1988, Forsyth County has developed a countywide water quality monitoring program that serves as an informational database from which the impact of urban growth and other activities can be assessed. Beginning in 1996, EAD contracted with the Environmental Quality Institute (EQI) at the University of North Carolina-Asheville to perform the laboratory analysis and provide an annual summary for samples collected by the department at 12 sites throughout the county. Streams are monitored eight times annually with the aim of obtaining equal samples from base flow (no rain in more than 72 hours) and storm flow (attempting to sample within the first two hours of a storm event with greater than 0.1 inch of rainfall) conditions. All samples are

analyzed for 16 parameters using EPA approved methods, as well as for a number of volatile organic compounds.

The EAD also has a Memorandum of Understanding with the NC Department of Environment and Natural Resources (DENR) to act as first contact agents for investigations involving nonemergency citizen complaints. Many stream and lake related pollution problems are caused accidentally, naturally or unwittingly. In many cases, the problems can be resolved promptly during EAD's initial on-site visit. When enforcement actions are required, EAD turns its evidence over to the proper agency for their further investigation and enforcement action. EAD's Water Quality Division is focused on local water quality issues and the resolution of stream quality problems. We are dedicated to improving the quality of our streams, rivers, lakes, and downstream reservoirs and estuaries. Forsyth County's watershed system impacts communities downstream in three separate river basins: the Yadkin/Pee-Dee River basin, the Roanoke River basin and the Cape Fear River basin. Approximately 76 percent of Forsyth County is in the Yadkin/Pee-Dee River basin.

1.5.3 Surry County Soil and Water Conservation District

Soil and Water Conservation Districts are organized to plan and carry out a conservation program that local people need and want. District affairs are managed by individuals and groups involved in a coordinated conservation program, involving resources from local, state and federal agencies. In this way, governmental assistance in conservation practices remains under local control. The Surry Soil and Water Conservation District works throughout Surry County to prevent soil loss and protect watersheds.

South Fork Mitchell River Riparian Corridor Assessment

In 2001, the Surry County Soil and Water Conservation District received \$434,000 from the Clean Water Management Trust Fund for an assessment of the South Fork Mitchell River riparian corridor. The assessment was conducted in 2002 to assess the morphological, riparian and aquatic habitat conditions of selected streams within the South Fork Mitchell River watershed and to determine potential restoration and preservation sites. Data were collected along 20 miles of stream within the South Fork Mitchell River watershed and provide specific information regarding the condition of the watershed and potential methods to improve water quality. These stream-specific data and information are summarized on page 132 of Section B.

Stream restoration, exotic vegetation removal, planting and agricultural best management practices are all specific recommend management actions aimed at improving water quality. Stream restoration is recommended for 37 sites within the study area. It is estimated, based on a preliminary cost analysis, that the total cost to complete all of the recommended actions presented in this report is approximately six million dollars. A preliminary analysis indicates that stream restoration accounts for 78 percent of the total cost to complete all of the recommended actions presented in this report.

The data provided in the report, along with the Mitchell River Watershed Protection Plan which was developed by the Piedmont Land Conservancy (discussed on page 295) in 2001, provide the necessary information to implement a long-term restoration initiative to improve water quality in

the South Fork Mitchell River watershed. A comprehensive field assessment methodology such as the Riparian Corridor Assessment provided the necessary data to plan restoration actions over a large study area. Progress documented through measurable milestones and a timeframe for reaching them is essential to the success of future projects in the watershed. Flexible policies, understandings between agencies and landowners, and formal agreements between all stakeholders are key tools of watershed management. Developing an interface with the public through demonstration projects and regular open forum meetings will increase the likelihood of community support for water quality improvement projects within the South Fork Mitchell River watershed.

For more information about the Surry County Soil and Water Conservation District's watershed programs, contact Julie Elmore by calling (336) 386-8751, Ext. 3 or by email julia_elmore@hotmail.com.

1.5.4 City of Monroe

The City of Monroe in Union County created a constructed wetland demonstration project to evaluate its effectiveness as an alternative to wet detention ponds under the state's water supply watershed regulations. The 0.3-acre wetland treats the runoff from a 30-acre drainage area in the Lake Twitty water supply watershed. At the time of construction, the watershed was predominantly rural in nature; however, rapid urbanization of the Highway 74 corridor from Charlotte was underway, and high density development was planned for portions of the watershed. The constructed wetland was to be monitored and compared to wet detention pond performance.

Wetland construction was completed in November 1997, and monitoring was conducted from July 1998 through June 1999. Automated, flow-weighted sampling was performed at inlet and outlet, yielding storm-related pollutant removal efficiencies. Final monitoring results were not provided by the contractor; however, the initial six months of data were reported. For the June-December period, the wetland system showed lower removal efficiencies for Total Suspended Solids and several metals compared to values compiled nationwide for wet ponds. The wetland produced comparable removal efficiencies to wet ponds for nutrients. The contractor estimated that the wetland system required half the area of a wet detention pond for treatment of the same contributing area. This project was funded in part through the Section 319 program (see page 273 for details).

1.6 Citizen Efforts

1.6.1 Mitchell River Watershed Coalition

The Mitchell River Watershed Coalition was organized in September of 1997. It is made up of 18 local, state and federal agencies and organizations, and includes a number of landowners on its steering committee. The group came together as a result of a local initiative to have the Mitchell River reclassified as Outstanding Resource Waters in the late 1980s. However, there is continuing concern for the health of the river and its watershed and a desire to see water quality improvements in the South Fork Mitchell River.

The coalition has been successful in working with local landowners and gaining financial and technical support for education and the implementation of a variety of BMPs. Education outreach includes a number of brochures, handouts and newsletters aimed at helping landowners protect and improve water quality. The *Stream Notes* series on sediment, streambank erosion and riparian buffers has been a very useful tool. Workshops conducted by the coalition range from landowner tours of local demonstration sites to teaching sessions on conservation easements for attorneys, appraisers and realtors. The coalition also sponsored the first NC Stream Restoration Conference in 1998.

Currently, the coalition's primary focus is BMP implementation and land protection. The Surry Soil and Water Conservation District (page 301) has ten stream restoration projects completed or underway for a total of over 15,000 feet of restored stream. A number of livestock BMP systems have been installed or are under contract to be installed. Before and after fecal coliform monitoring is being done to document their effectiveness. Piedmont Land Conservancy (295) has a total of 3,052 acres of land in the watershed protected by conservation easement with work on several additional farms underway at this time. This work will continue with the recent commitment of grant funds for stream restoration and land protection efforts in the watershed.

For more information about the Mitchell River Watershed Coalition, contact J. Richard Everhart by email richard.everhart@nc.usda.gov or by calling (336) 386-8751, Ext. 3.

1.6.2 Yadkin-Pee Dee Lakes Project

In 1991, sprawling development had begun to encroach from the surrounding cities along Interstate 85 and Interstate 40 into the rural counties of the Yadkin-Pee Dee River basin. Historically divided by the river, residents of Rowan, Davidson, Randolph, Stanly, Montgomery, Anson and Richmond counties united to begin a strategic plan for balanced growth. This plan called for preservation of a shared quality of life defined by the river, the forests, and the open landscape and development of the region's economy through eco-tourism, outdoor recreation, heritage tourism and small business development.

In 1994, The Yadkin-Pee Dee Lakes Project was formally incorporated as a private, nonprofit organization to implement the plan. Since then, the project has been actively involved in working with public and private interests in finding ways for the region to grow its economy while preserving its natural and cultural assets. The purpose of The Yadkin-Pee Dee Lakes Project is to serve as a clearinghouse for information on sustainable economic development, support regional projects, garner public support for and understanding of long-term, regional planning, and to coordinate local, county and regional efforts. Its mission is to promote and support efforts to balance economic development and environmental management in the Uwharrie Lakes Region.

For more information about the Yadkin-Pee Dee Lakes Project, visit the website at <http://www.lakesproject.org/> or call (704) 422-3215. You may also email Office and Project Manager, Michele Ackerman, mackerman@vnet.net.