Chapter 1 -
Current Water Quality Initiatives

1.1 Workshop Summaries

There were three workshops held in the Cape Fear River basin in July and August 1999. The workshops were held in Greensboro, Clinton and Wilmington. The DWQ, NC Cooperative Extension Services of Guilford, Sampson and New Hanover counties, and the Cape Fear River Assembly sponsored the workshops. A total of 198 people attended the three workshops. All workshops represented a wide variety of interests in the river basin.

Each workshop had four presentations pertaining to important issues to the region of the basin where the workshop was held. Workshop participants were asked to discuss a series of questions in small groups. The questions were as follows:

1) What are the most important issues to be addressed in the next basin plan?
2) Where are the problem areas or waters in the basin?
3) What recommendations do you have for addressing these problems?
4) What local agencies or organizations should be involved in addressing these problems?

The discussion on these questions was very productive. Comments and responses were recorded during each workshop. A general summary of the workshops, providing common ideas and viewpoints, is presented below.

- urban sprawl
- comprehensive watershed management
- nonpoint source pollution
- buffers
- algal blooms and nutrients
- Randleman Reservoir
- land-use planning
- seventeen dams on the Deep River
- sedimentation
- agricultural BMPs
- focusing on economic considerations
- focus on nonpoint source pollution
- better education for general public
- growth planning
- state agency and local community coordination
- tighter controls on variances/SOCs for permittees with tighter time limits
- point source dischargers bearing brunt of enforcement
- more control on development and construction in wetlands
- stormwater runoff

Workshop participants made recommendations for addressing water quality problems. These recommendations included urban BMPs, planning, incentives for agricultural operations, local enforcement, water recycling, education, riparian buffers, increasing regulatory staff and securing funding for enforcement.

DWQ considered these comments while drafting the revised Cape Fear River Basinwide Water Quality Plan and will continue to use these comments to guide water quality activities in the Cape Fear River basin.

For a copy of the summary of the three workshops, call DWQ at (919) 733-5083, ext. 360.

1.2 Federal Initiatives

1.2.1 Section 319 – Base 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 319 grant program, including application deadlines and requests for proposals, are available online at http://h2o.enr.state.nc.us/nps/bigpic.htm.

Table C-1 319 Projects in the Cape Fear River Basin

Fund Source	Project	Contractor	Grant
319 FY1998	Private Well Protection Project	NC Cooperative Extension Service	$34,555

Private Well Protection Project

Many private wells in eastern North Carolina are particularly susceptible to contamination because they are shallow (typically less than 50 feet deep) and poorly constructed. Previous studies of North Carolina private water supply wells indicate that up to 10% may contain nitrate-nitrogen at levels exceeding the safe drinking water standard of 10 mg/l.

A minimum of 300 private water supply wells will be screened for nitrate contamination over a two-year period in the Cape Fear River basin. Special emphasis will be placed on sampling high-risk wells that are shallow, poorly constructed, and located near potential pollution sources. A detailed survey of well construction and location characteristics will be completed for each well. All project participants will be educated on basic well protection measures including water testing, pollution prevention, water treatment and new well construction, if needed.

1.2.2 Clean Water Act Section 319 (h) – Incremental Program

In 1998, the President's Clean Water Action Plan Initiative required states to compile and rate water quality conditions at the 8-digit hydrologic unit scale. This evaluation by the state resulted in the identification of 23 HUs as 'needing restoration'. The Category I rating makes these areas eligible for additional funding through the incremental 319 program. There are six hydrologic units within the Cape Fear River basin (Table C-2); three of which were rated as needing restoration in the 1998 Unified Watershed Assessment. The Haw River was identified as a high priority restoration area, particularly due to the state designation as nutrient sensitive waters and the significant urban impacts.

Table C-2 Hydrologic Units within the Cape Fear River Basin

HU Name	HUC	UWA Rating
Haw	03030002	I-HP
Deep	03030003	I
Upper Cape Fear	03030004	II
Lower Cape Fear	03030005	I
Black River	03030006	II
Northeast Cape Fear River	03030007	II

Funding for implementation of the Clean Water Action Plan Initiative is provided through the Section 319 Incremental Grant Program. With a separate funding source, these grant resources are to be allocated by the state for assessment and implementation in Hydrologic Units defined as "Needing Restoration" in the 1998 North Carolina Unified Watershed Assessment. This funding was first available for FY 1999, and continued funding of this program will be decided by Congress. 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 319 grant program, including application deadlines and requests for proposals, are available online at http://h2o.enr.state.nc.us/nps/bigpic.htm.

1.2.3 Clean Water Act – Section 205 (j) Planning Grant

Section 205 (j) of the Clean Water Act allocates a small amount of money to states for water resource planning or demonstration. Only Councils of Government are eligible to apply for this funding. Annual funding for this program is approximately $100,000. Descriptions of these projects are included in Part 1.5 below.

1.2.4 USDA – NRCS Environmental Quality Improvement Program (EQIP)

The EQIP program is a federal cost share program that in many states is not augmented by a state agricultural cost share program. For this reason, EQIP funds are allocated to priority areas where current available funding is identified as inadequate. Through applications, the NRCS districts are able to compete for EQIP incentive funding. A team of state agencies reviews new

applications and reevaluates the performance of existing priority areas on an annual basis. Rankings are considered based upon performance; i.e., the value of contracts completed versus the amount of money allocated and environmental benefit. Initial allocations are set based upon ranking and proposal requests. The NRCS administers the local sign-up, environmental benefits ratings and contract administration.

Three areas within the Cape Fear River basin are included in the USDA – NRCS EQIP FY2000 Priority area budget. The Deep River, Northeast Cape Fear and Black River are included. Table C-3 includes descriptions of primary resource concerns, targeted practices and final FY 1999 contract allocations. NRCS district contacts are available in the NPS Contact Sheet, Appendix V.

Table C-3 Cape Fear River Basin EQIP Projects

Priority Area	Primary Resource Concern	Targeted Practices	Lead NRCS District	Final Allocation
Deep River 03030003	Soil erosion, animal waste, nutrient runoff and leaching	No-till, waste utilization, nutrient management, pest management, pasture and hay planting	Randolph County	$119,124
Black River 03030006	Animal waste, soil erosion, wildlife habitat, nutrient runoff	No-till, waste utilization, riparian buffer, nutrient management, wildlife habitat management	Sampson County	$105,945
Northeast Cape Fear 03030007	Animal waste, soil erosion, wildlife habitat, pesticide runoff	Waste utilization, no-till, wildlife habitat management, nutrient management, pest management	Duplin County	$118,214

1.3 State Initiatives

1.3.1 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 focus of the program is to improve water quality, flood prevention, fisheries, wildlife habitat and recreational opportunities. The NCWRP is not a grant program. Instead, the NCWRP funds wetland, stream and streamside (riparian) area projects directly through the Wetlands Restoration Fund.

Restoration sites are targeted through the use and development of the Basinwide Wetlands and Riparian Restoration Plans. These plans were developed, in part, using information compiled in DWQ's Basinwide Water Quality Plans. The Basinwide Wetlands and Riparian Restoration Plans are updated every five years on the same schedule as DWQ's Basinwide Water Quality Plans. As new data and information become available about water quality degradation issues in the Cape Fear River River basin, priority subbasins identified in the NCWRP's plans may be modified.

The NCWRP is also working to develop comprehensive Local Watershed Restoration Plans within the identified Priority Subbasins. These more locally-based plans will identify wetland

areas, contiguous reaches of stream, and contiguous strips of buffer that, once restored, will provide significant water quality and other environmental benefits to watersheds. The NCWRP will coordinate with local community groups, local governments and others to develop and implement these plans.

The NCWRP can perform restoration projects cooperatively with other state or federal programs or environmental groups. For example, the NCWRP's efforts can complement projects funded through the Section 319 Program. Integrating wetlands or riparian area restoration components with 319 funded or proposed projects will often improve the overall water quality benefits of the project.

For more information about participating in the NCWRP, please contact Crystal Braswell at (919) 733-5208 or visit the website at http://h2o.enr.state.nc.us/, then click on Wetlands Restoration Program.

1.3.2 Clean Water Management Trust Fund

The Clean Water Management Trust Fund offers approximately $40 million annually in grants for projects within the broadly focused areas of restoring and protecting state surface waters and protecting state surface waters and establishing a network of riparian buffers and greenways. In the Cape Fear River basin, twenty projects have been funded. The total amount of funds allocated to this basin through the CWMTF is $21,431,700. Descriptions of the basinwide projects are included in descriptions of current initiatives by major watershed in Part 1.5 below.

For more information on the CWMTF or these grants, call (252) 830-3222 or visit the website at www.cwmtf.net.

1.4 Local Initiatives

1.4.1 Cape Fear River Basin Associations

In complement to the DWQ's basinwide approach for planning and management of water resources, associations of NPDES dischargers are voluntarily forming in our state's river basins. The concept of these coalitions is to integrate instream sampling requirements as set forth in their NPDES permits with DWQ's basinwide management program. Monitoring sites and parameters are strategically located and established such that instream monitoring is more efficient, effective, basin-oriented, and potentially yields better quality, more usable data. A Memorandum of Agreement (MOA) specifies that one organization (usually a contract lab) conducts all the instream sampling and performs the required analyses, instead of each discharger conducting individual sampling. Three discharger associations are active in the Cape Fear River basin.

Each discharger association monitoring network is designed to complement the state's ambient sampling sites. The discharger association concept allows for a collective voice among the dischargers located in the Cape Fear River basin and fosters better communication within the association itself and with DWQ.

The Lower Cape Fear River Program (LCFRP) is comprised of 19 NPDES dischargers and began sampling in 1996. The LCFRP currently collects water quality data at 34 sites located throughout the lower portion of the basin. This association contracts with the University of North Carolina at Wilmington to collect the water quality samples and benefits from additional work that UNCW conducts, such as fisheries ecology and benthic community studies.

The Middle Cape Fear River Basin Association (MCFRBA) has 16 members and began sampling 30 stations in July 1998. Twenty-five of the stations are required in the MOA, and the other 5 stations are sampled voluntarily by the Association. The MCFRBA contracts with a commercial lab to collect the water quality samples and run the analyses.

The Upper Cape Fear River Basin Association started sampling 36 stations in 2000. DWQ will continue to work with the basin associations' water quality data in developing use support and identifying other water quality problems and solutions.

1.4.2 Cape Fear River Assembly

The Cape Fear River Assembly is a basinwide organization committed to achieving the highest quality of life possible for residents of the Cape Fear River basin through the proper management of the Cape Fear River, its tributaries and adjacent land uses. The Cape Fear River Assembly (CFRA) was founded 27 years ago and has several hundred members and a 34-member board of directors. The Assembly membership and the board are made up of representatives from throughout the Cape Fear River basin and with varying interests, including environmental and conservation organizations, academia, small business and industry, government (local, state and federal), and the general public. The Cape Fear River Assembly serves as the umbrella organization for the three discharger associations, including the Upper Cape Fear River Basin Association, the Middle Cape Fear River Basin Association and the Lower Cape Fear River Program.

The Assembly provides a basinwide context for resource management and a forum for discussion and issue resolution. In addition, it provides a basinwide commitment to facilitate the completion of needed scientific and economic study, to educate the public regarding the environmental and economic value of this natural resource, and to encourage the development of policy to maintain and improve the condition of the Cape Fear River and its tributaries for present and future uses and benefits. Programs and activities accomplished through the Cape Fear River Assembly include: 1) extensive, ongoing water quality monitoring (109 stations); 2) fisheries stock monitoring (lower); 3) Hurricanes Bonnie and Floyd storm event sampling; 4) clean metals sampling (mid); 5) a primary productivity study (mid); 6) a hydrologic modeling project; 7) numerous conferences; 8) a GIS/land use project; 9) Cape Fear River Basin highway signs; 10) Triangle area drinking water supply monitoring (upper); and 11) a Haw River/Jordan Lake watershed partnership (upper). For additional information, please see the Cape Fear River Assembly website www.cfra-nc.org or contact Executive Director, Don Freeman at (910) 223-4920 or by e-mail at cfra@faynet.com.

1.4.3 Cape Fear River Headwaters Group

The Cape Fear River Headwaters Group was formed in the fall of 1999 with the goal of determining the major water quality issues in this region and what projects the group can conduct to address these issues. The group has focused on the 303(d) impaired streams for the headwaters area of the Deep and Haw River and are currently prioritizing which 303(d) impaired streams the group can restore and develop a methodology in conjunction with DWQ to identify and correct the problems found in these streams. The group consists of the representatives from local governments, area universities, the Cape Fear River Assembly, DWQ, the Triangle J Council of Governments, and Piedmont Triad Council of Governments. The contact for this group is Carol Patrick of the Piedmont Triad Council of Governments at (336) 294-4950 or cpatrick@ptcog.org.

1.4.4 City of Greensboro Storm Water Services

The City of Greensboro is developing a watershed-based stormwater management program designed to be "proactive". The federal NPDES stormwater regulations mandate that municipalities take a comprehensive approach towards stormwater management issues within their jurisdiction and develop new programs that will prevent or minimize impacts to water quality from nonpoint pollution sources, such as urbanized areas. Regulatory mandates, along with local interest in developing an optimum stormwater management program, have served as initiatives for Greensboro to begin developing improved programs for both stormwater and watershed management.

The city's developing Stormwater Management Program includes the following key components:

- Implementation of a Stormwater Utility to serve as the dedicated funding mechanism for the new and improved stormwater management programs, including administration of the NPDES municipal stormwater permit.
- Development and implementation of a comprehensive GIS database of stormwater infrastructure and proactive stormwater infrastructure maintenance program.
- Development of a "Dynamic Stormwater and Watershed Management System", which includes interactive linkages between the GIS database and major hydrologic, hydraulic, water quality and stream restoration models.
- Implementation of an extensive public education and awareness program. The city has also developed partnerships with many area businesses to promote environmental and water quality protection goals through a program called the "Environmental Business Partners".
- Implementation of a watershed-based water quality monitoring program, including wet weather land use-based monitoring, ambient and wet weather stream monitoring, structural Best Management Practice (BMP) assessment monitoring, and biological/habitat assessment and monitoring. The city is also working with the United States Geological Survey to establish a citywide network of continuous monitoring rainfall and streamflow gaging stations to provide data for the watershed modeling and management program.
- Innovative restoration projects for local degraded streams including enhancement or creation of adjacent riparian wetland areas.
- Development of a comprehensive stormwater management ordinance.

For more information on the City of Greensboro Storm Water Services, contact Scott Bryant, City of Greensboro Storm Water Services, (336) 373-2988.

1.4.5 UNC-Wilmington – Center for Marine Science Research

The Center conducts research involving nutrients, plankton, aquatic microorganisms, and general water quality and pollution management issues in marine, estuarine and freshwater systems. Information about the program is available at: http://www.uncwil.edu/cmsr/aquaticecology.laboratory/. Descriptions of the ongoing research projects within the Lower Cape Fear River Hydrologic Unit are included below.

Lower Cape Fear River Program

Since 1995, the Center for Marine Science Research has regularly collected data on numerous physical, chemical and biological parameters at 35 locations throughout the Cape Fear River watershed. This data is entered into the EPA STORET system, and comprehensive reports are issued to interested parties on an annual basis. Research projects in this watershed include analysis of animal waste lagoon spills, effect of hurricanes and storms on the watershed, factors controlling phytoplankton production in the estuary and tributary rivers, effects of water chemistry on fungal breakdown of detritus, and the effects of nutrient loading on the biota and metabolism of blackwater streams. Related cooperative research projects are also conducted with the UNCW Biology Department and the UNCW Benthic Ecology Lab.

The New Hanover County Tidal Creeks Project

Since 1993, the Center has been conducting research on bacterial pollution, algal blooms, effect of tides on water quality parameters, nutrient limitation of phytoplankton productivity, and nutrient loading in five tidal creeks in New Hanover County, with published annual reports. A major accomplishment of this project has been publication of a set of management recommendations for environmentally sound coastal development practices. The project is funded by and works cooperatively with a citizen's group (the Northeast New Hanover Conservancy) and the New Hanover County Planning Department.

City of Wilmington Watersheds Project

In 1997, the Center began an ongoing project analyzing environmental quality of the City of Wilmington's drainage basins. This includes collecting baseline data on pollutants such as nutrients, fecal coliform bacteria, turbidity and other parameters; analyzing effectiveness of large stormwater detention ponds, runoff from golf courses, and effect of loadings on adjacent waterways. This project is funded by and designed in cooperation with the City of Wilmington Engineering Department and its stormwater runoff program.

1.4.6 Haw River Assembly

The Haw River Assembly is a nonprofit citizen organization working to restore the Haw River and protect Jordan Lake using education, citizen water monitoring and research as our tools. We share water monitoring information collected by our Haw River Watch volunteers with state

biologists, and are working with state and federal agencies in the areas of land conservation, nonpoint source pollution education and dam removal. We have been instrumental in drawing attention to the impaired streams in our river basin.

1.5 Current Initiatives by Major Watershed

1.5.1 Haw River (Subbasins 03-06-01 to 03-06-06)

Table C-4 highlights projects within the Haw River watershed. A description of each project follows.

Table C-4 Haw River Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Upper Cape Fear Riparian Buffer Protection Planning Grant	03-06-01 – 03-06-06	Triangle J COG	CWMTF	$70,000
	Upper Cape Fear Planning Initiative	03-06-01 – 03-06-06	Piedmont Triad and Triangle J COGs	205(j)	$31,119
2	New Hope Creek Corridor Riparian Buffer Acquisition	03-06-05 – 03-06-06	County of Durham	CWMTF	$750,000
	New Hope Creek Corridor Riparian Buffer Acquisition	03-06-05 – 03-06-06	Triangle Land Conservancy	CWMTF	$2,250,000
	New Hope Creek Corridor Riparian Buffer Acquisition	03-06-05 – 03-06-06	Town of Chapel Hill	CWMTF	$200,000
3	Sandy Creek Stormwater Control Project	03-06-05	Duke University and NCWRP	CWMTF	$582,500
4	South Buffalo Creek Regional Stormwater Wetland	03-06-02	Town of Greensboro	CWMTF	$800,000
5	Haw River Source Land Acquisition	03-06-01	Haw River Assembly	CWMTF	$24,500
6	Sedimentation Basin Design Improvements	03-06-06	North Carolina State University	319	$61,050
7	Cane Creek Reservoir Watershed Buffer Acquisition	03-06-04	Orange Water and Sewer Authority	CWMTF	$1,042,500
8	Robeson Creek Steward Education Campaign	03-06-04	Haw River Assembly	CWMTF	$6,000

Upper Cape Fear Riparian Buffer Protection Planning Grant

The Triangle J Council of Governments was awarded $70,000 to initiate a stakeholder program to quantify the extent and status of riparian buffers within the Jordan Reservoir watershed. The project will establish a priority listing of riparian buffer and stream restoration needs within the Haw River watershed. This initiative was augmented in 1998 with a planning grant through the Clean Water Act 205 (j) program. The three project components include: development and adoption of proposed comprehensive land use plans for portions of the upper Cape Fear River basin; development and distribution of informational materials for government officials and planners on the relationship between regional water quality and land use activities; and development of a water quality improvement strategy on one priority surface water area.

New Hope Creek Corridor Open Space Master Plan

Completed in 1991, the New Hope Creek Corridor Open Space Master Plan is a large regional effort between the counties of Durham and Orange, and cities of Durham and Chapel Hill to protect a riparian corridor and trail network between the two rapidly growing areas. The Master Plan was jointly funded and adopted by the four local governments and has received additional support through the Triangle Land Conservancy, Duke University and the New Hope Audubon Society. The City and County of Durham established a bond referendum to fund the acquisition of 170 acres. In 1997, the County of Durham obtained a land acquisition grant from the CWMTF for the acquisition of an additional 330 acres identified as priorities within the county.

Because Orange County and Chapel Hill do not have bond funds, the Triangle Land Conservancy recovered funds to acquire three high priority tracts of land totaling 392 acres. In 1998, the Town of Chapel Hill also received funds from the CWMTF to acquire an additional 84 acres. The CWMTF has invested $3.2 million to acquire conservation easements on more than 800 acres, contributing to the completion of the New Hope Creek Riparian buffer and greenway trail system. Commitment of these groups to protect the New Hope Creek Corridor will help buffer the impacts of commercial and residential development along the I-40 and 15-501 corridors.

Sandy Creek Stormwater Control Project

The North Carolina Wetlands Restoration Program and Duke University received a grant of $582,500 to collaborate on the restoration of degraded streambanks and riparian areas of Sandy Creek, within the New Hope Creek watershed. The project will treat stormwater runoff within the 25-acre project watershed adjacent to the University Campus. Treatment methods will include the installation of twelve biofiltration areas to receive and attenuate runoff from parking and trail areas, and a structure to create an instream stormwater wetland and support the restoration of degraded streambanks. The Wetland Program at Duke University will monitor water quality at 15 sites in the project area to determine the success of the project design.

City of Greensboro – South Buffalo Creek Regional Stormwater Wetland

The Clean Water Management Trust Fund's (CWMTF) grant funds of up to $800,000, supplemented by the City of Greensboro's matching funds of up to $160,000, will be used to acquire approximately 40 acres of property located south of I-40 and east of Rehobeth Church Road in Greensboro and to construct a 20-acre riparian wetland on the property. Vegetated riparian buffers will also be provided along the banks of the South Buffalo Creek in the project reach.

The objectives of the project are to improve the water quality in the 12-square mile urbanized watershed by reducing the pollutant loads and removal of sediment. Additional objectives are to achieve improvement in aquatic and terrestrial habitats through the development of the riparian wetland and vegetative stream buffers, which will provide shade and cooling of the water in the stream.

Haw River Source Land Acquisition

The project acquired a 3.7-acre parcel containing the source spring of the Haw River. The Haw River Assembly will establish a management trust to protect the source and riparian buffer along the first 800 feet of the stream. This project is expected to spawn additional protection of riparian areas in the headwaters portion of the Haw River.

Sedimentation Basin Design Improvements

One major source of sediment is soil erosion from construction sites. Sediment basins are constructed to remove sediment from stormwater before it leaves the construction site. The project funded through the 319 program is part of a larger scale demonstration and analysis of innovative construction site sediment control basin techniques for environmentally sensitive Piedmont area streams.

Several other approaches have been tested in Orange County to increase effective sediment trapping. An improvement to sediment basin function is to use gypsum to flocculate suspended materials prior to discharge. This approach is currently being tested in Orange County under a special grant from the Sediment Control Commission. Tests conducted so far have shown that gypsum significantly reduces suspended sediment and can clarify discharge water to the state turbidity standard of 50 NTU. The use of gypsum will be demonstrated under various combinations of skimmer and level spreader configurations.

Cane Creek Reservoir Watershed Buffer Acquisition

The Orange Water and Sewer Authority (OWASA) received CWMTF funding to assist and augment the OWASA capital improvement funds for the acquisition of easements on 'preferred properties' within the Cane Creek watershed. The purpose of the project is to protect the long-term quality of the Cane Creek Reservoir through the protection of three hundred-foot buffers on perennial and intermittent streams, and the reservoir itself. Protection of these buffers will be accomplished through fee simple purchases and conservation agreements.

Robeson Creek Stream Steward Education Campaign

The Haw River Assembly was awarded funds to initiate a watershed awareness campaign in the Robeson Creek watershed including Pittsboro. The stream is listed on the 2000 303(d) list and many of the pollution sources are nonpoint source in nature. The Haw River Assembly will seek cooperation from city and county agencies, the Triangle J Council of Governments, Cooperative Extension Service, and the Natural Resources Conservation Service to coordinate development of a broader restoration initiative. This funding will provide for landowner outreach and education and initiate broader opportunities for conservation and restoration.

1.5.2 Deep River Watershed (Subbasins 03-06-08 to 03-06-12)

Table C-5 highlights projects within the Deep River watershed. A description of each project follows.

Table C-5 Deep River Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Deep River Campaign	03-06-11	Triangle Land Conservancy	CWMTF	$1,189,000
2	McLendons Creek Watershed Project	03-06-10	North Carolina State University	319	$198,000
3	Riparian Buffer Acquisition in Richland and Muddy Creek	03-06-08	Piedmont Triad Regional Water Authority	CWMTF	$615,000
4	Buffalo Creek Riparian Protection and Greenway Project	03-06-11	Town of Sanford	CWMTF	$765,000
5	Sandy Creek Riparian Buffer Acquisition	03-06-09	Town of Ramseur	CWMTF	$134,000
6	Ramseur Sewer Rehabilitation Project	03-06-09	Town of Ramseur	CWMTF	$344,000

Deep River Campaign

The Clean Water Management Trust Fund provided monies for the acquisition and protection of permanent riparian buffers on 4.1 miles of the Deep River and its tributaries. Three tracts will be used as keystone properties to continue riparian protection efforts along the Deep River. Coordinated efforts between the Triangle Land Conservancy and other agencies will lead to establishment and continuity of a protected riparian corridor.

McLendons Creek Watershed Project

The McLendons Creek Watershed Project was a three-year effort (ended in 1999) to install and evaluate agricultural and urban BMPs targeted at reduction of phosphorus, nitrogen and sediment inputs to McLendons Creek. BMPs are land use practices such as vegetated stream buffers, fertilizer management, stormwater detention basins and others. Water quality monitoring before and after BMP implementation is used to evaluate overall effectiveness.

The education and outreach goals of the project were accomplished. As monitoring results are developed, the final report will be available online at http://www5.bae.ncsu.edu/programs/extension/wqg/ncwsheds/mlcw/.

Riparian Buffer Protection on Richland and Muddy Creek

The Piedmont Triad Water Authority secured a grant from the CWMTF for acquisition of 100 acres of riparian buffer along Richland and Muddy Creeks. These streams are located within the Randleman Reservoir watershed, and protection of existing riparian buffers is important for the region's proposed drinking water supply reservoir.

Buffalo Creek Riparian Protection and Greenway Project

The Town of Sanford will acquire and protect 7 miles and 250 acres of riparian buffers along the Deep River's Buffalo Creek. The CWMTF funds will acquire up to a 300-foot riparian buffer. Typical matches include acquisition of the nonriparian buffer portions of the land.

Sandy Creek Riparian Buffer Acquisition and Ramseur Sewer Rehabilitation Project

Ramseur has been active in establishing a local watershed protection program centered around the water supply reservoir on Sandy Creek. Sandy Creek drains into a section of the Deep River designated as High Quality Waters, just downstream of Ramseur. The town secured two grants from the Clean Water Management Trust Fund to purchase conservation easements on riparian corridors entering the Sandy Creek Reservoir. Up to 28,000 feet of easements could be purchased through this program. In 1998, the town received a grant to rehabilitate an existing sewer outfall, upgrading 7,500 feet of 8" to 12" line. The objective is to reduce infiltration and leakage from the existing system.

1.5.3 Upper Cape Fear River Watershed (Subbasins 03-06-07, 03-06-13 to 03-06-15)

Table C-6 highlights projects within the Upper Cape Fear River watershed. A description of each project follows.

Table C-6 Upper Cape Fear River Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Little Cross Creek Water Supply Watershed Land Acquisition	03-06-15	City of Fayetteville	CWMTF	$502,500
	Little Cross Creek Watershed Assessment	03-06-15	City of Fayetteville	CWMTF	$63,200
2	Cape Fear Botanical Garden Stream Restoration Project	03-06-15	Cape Fear Botanical Garden	CWMTF	$77,000

Little Cross Creek Water Supply Watershed Land Acquisition

Little Cross Creek is designated as WS-IV. Four reservoirs located in the watershed are used to supply water to the City of Fayetteville. In 1997, the city's Public Works Commission received a grant to purchase and secure property adjacent to its water supply reservoirs. A total of 101 acres were purchased as permanent easements with buffer areas defined.

In 1998, the city received funds to perform a complete pollutant source assessment of the Little Cross Creek watershed. The assessment will document watershed hazard areas and map susceptibility of pollution by nutrients, sediment and fecal coliform. Completion of this assessment will lead to implementation of a comprehensive watershed management plan.

Cape Fear Botanical Garden

The project will be used to stabilize the lowest portion of Cross Creek before draining into the mainstem of the Cape Fear River in Fayetteville. The Botanical Garden includes 85 acres of open space in an otherwise urban area and provides opportunity for demonstration of appropriate streambank protection and stabilization techniques in an urbanized setting.

1.5.4 Lower Cape Fear River (Subbasins 03-06-16, 03-07-17, 03-06-20 and 03-06-21)

Table C-7 highlights projects within the Lower Cape Fear River watershed. A description of each project follows.

Table C-7 Lower Cape Fear River Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Suggs Mill Pond Land Acquisition	03-06-16	Wildlife Resources Commission	CWMTF	$2,250,000
	Little Singletary Lake Land Acquisition	03-06-16	Wildlife Resources Commission	CWMTF	$1,033,000
2	Coastal Urban and Recreation BMP Demonstration Project	03-06-17 – 03-06-24	North Carolina State University	CWMTF	$145,632

Little Singletary Lake/Suggs Mill Carolina Pond Land Acquisition

The Lake Singletary/Suggs Mill Pond Complex drains to Ellis and Turnbull Creeks. In 1997, the Wildlife Resources Commission acquired more than 9,000 acres, including 6,400 acres of wetland and more than four miles of riparian buffers. A 1999 grant from the CWMTF funded the acquisition of an additional 391 acres, and one mile of riparian and wetland buffer surrounding Little Singletary Lake that were slated for development. Additional conservation activities in this area through The Nature Conservancy have resulted in the protection of the Carolina Bay Ecosystem from impending development. The land is dedicated as a nature preserve, significantly contributing to the protection of wildlife and aquatic resources in the Bladen Lakes Management Region.

Coastal Urban and Recreation BMP Demonstration Project

The Coastal Urban and Recreation BMP Demonstration Project Team was developed through this 319 funded project to address the issues of runoff control from developed sites. Following the pollutant source inventory and evaluation of impaired watersheds, the project team will evaluate and implement best management practices (BMPs) to protect coastal waters impaired by runoff from developed areas. Surveys of existing data and interviews with local officials and residents will be used to determine sites in four watersheds where BMPs can be installed and evaluated for nonpoint source pollution control.

The project will demonstrate BMPs to reduce pathogen, nutrient and pesticide inputs from urban and recreational development in coastal areas of the Cape Fear River basin. BMPs will include vegetation and other runoff reduction measures, nutrient and pest management to reduce pollutant sources, erosion control measures and stormwater retention.

Educational meetings, field days, demonstrations, fact sheets, displays and newsletters will be used to promote BMP implementation throughout the coastal region. Target audiences will include local government officials, developers, builders, lenders, professional landscapers and the general public. A team has coordinated a Coastal Urban Workshop scheduled for the

Wilmington area in March of 2000. Coastal environmental education and demonstration projects conducted by NCSU and UNC-Wilmington have been incorporated in the education and demonstration programs.

1.5.5 Black River Watershed (Subbasins 03-06-18 and 03-06-19)

Table C-8 highlights projects within the Black River watershed. A description of each project follows.

Table C-8 Black River Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Little Coharie Watershed Protection Project	03-06-19	North Carolina Cooperative Extension Service	319	$27,990
2	Black and South River Riparian Protection	03-06-18	The Nature Conservancy	CWMTF	$2,000,000
	Black River Land Acquisition	03-06-19	The Nature Conservancy	319	$100,350

Little Coharie Watershed Protection Project

The Little Coharie Watershed Project was initiated in 1995. The intent was to accelerate the adoption and use of vegetated buffers by providing educational and technical assistance in conjunction with a cost share assistance program. Findings from surface and groundwater monitoring of vegetative buffers in Duplin County showed that these management practices are effective at reducing nutrient and sediment delivery to water resources. The project set a basis for the utilization of state cost share money for implementation of riparian buffers to protect surface waters threatened based upon BOD, nutrient and sediment inputs from nonpoint sources.

Due to the demonstrations and public attention derived from the project, many of the practices first implemented in the Little Coharie Watershed are now being implemented countywide. For instance more than 40,000 feet of field edge buffers have been planned or installed in Sampson County (Rice, 1998).

The Nature Conservancy – Black and South River Land Acquisition and Riparian Protection

The Nature Conservancy has been very active in the Black and South River watersheds concerning land acquisition for riparian protection. The well-established organization has met acquisition needs with both private donations and public grants. In 1995, the Nature Conservancy acquired funding through the 319 program to demonstrate the water quality benefits of a 295-acre land acquisition within the Black River watershed. The project demonstrated how preservation of a riparian buffer along an ORW river protects a river from NPS pollution. Field sampling and nutrient export models were used to predict export coefficients and potential nutrient loading based upon conversion to more intensive land uses. Without purchase, the land was subject to conversion from forest to agriculture and clearing for development. The 1998 CWMTF funded project makes available up to two million dollars for land acquisition of riparian forested areas along Outstanding Resource Waters segments of the Black and South Rivers. Three hundred-foot buffers will be established to connect presently isolated lands with

continuous riparian corridors. The project will preserve at least 15 miles and 3,000 acres of riparian buffers in the project area.

1.5.6 Northeast Cape Fear River Watershed (Subbasins 03-06-22 to 03-06-24)

Table C-9 highlights projects within the Northeast Cape Fear River watershed. A description of each project follows.

Table C-9 Northeast Cape Fear Watershed Projects

	Project	Subbasin	Contractor	Funding Source	Grant
1	Northeast Cape Fear Riparian Buffer Protection	03-06-22	NC Wildlife Resources Commission	CWMTF	$1,070,000
2	New Hanover County – Constructed Wetlands for Landfill Leachate Treatment	03-06-24	New Hanover County – DEM	CWMTF	$785,000
3	New Hanover County Tidal Creeks Water Quality Enhancement Project	03-06-24	New Hanover County	CWMTF	$6,000,000

Northeast Cape Fear Riparian Buffer Protection

The Wildlife Resources Commission was awarded funding for acquisition of riparian buffers on 1,076 acres totaling 46,000 linear feet of buffers on the Northeast Cape Fear River. These purchases tie in with existing state and private protected areas within the river basin.

New Hanover County – Constructed Wetlands for Landfill Leachate Treatment

The county landfill was permitted to discharge 50,000 GPD of leachate to the Northeast Cape Fear River. The project funded a non-discharge solution including constructed wetland and spray field for leachate from the New Hanover County municipal solid waste landfill. The system will drastically reduce current loading of 14,000 lbs/yr of TN, 3,500 lbs/yr of BOD, and 1,800 lbs/yr of TSS. A requirement of funding is for the county to rescind its NPDES discharge permit and replace it with a non-discharge, land application permit.

New Hanover County Tidal Creeks Water Quality Enhancement Project

This extensive project is coordinated through New Hanover County Planning Department. This enhancement program will tie in with an ongoing monitoring program, the Tidal Creeks Project, managed by the UNC–Wilmington Center for Marine Science. The program concentration areas include acquisition of riparian buffers and easements and implementation of best management practices. The centerpiece of the program was the acquisition and development of the Airlie Garden property. This site will act as the focal point for education, research, implementation and demonstration of estuarine water quality protection and restoration programs. The program plans to acquire and preserve riparian buffers on five tidal creeks and to implement BMPs controlling stormwater runoff from these areas.