



# **Smith Creek Watershed Management Plan**

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## **ACKNOWLEDGEMENTS**

### **Smith Creek Planning Initiative Working Partners**

New Hanover County Planning  
City of Wilmington Planning  
City of Wilmington Stormwater Services  
New Hanover Soil and Water Conservation District  
UNCW  
Coastal Land Trust  
North Carolina Ecosystem Enhancement Program  
North Carolina Coastal Federation  
Cape Fear River Watch

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# **Smith Creek Watershed Management Plan**

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## **Introduction**

An area of land that drains into a particular water body is known as a watershed. Wilmington and New Hanover County are located at the meeting of two major watersheds, the Cape Fear River and the Atlantic Intracoastal Waterway. All surface waters in New Hanover County drain to one of these two water bodies and are divided into two groups: tidal creeks and Cape Fear River tributaries. Tidal creeks drain directly into the Atlantic Intracoastal Waterway and make up the eastern portion of Wilmington's surface waters. Cape Fear River tributaries drain directly to the Cape Fear River or Northeast Cape Fear River and comprise the western portion of the County's surface waters.

Located in north-central New Hanover County, Smith Creek drains into the lower Northeast Cape Fear River, just north of the Northeast Cape Fear River's confluence with the Cape Fear River. The watershed has been predominately rural; however, in recent years intense development pressures and subsequent water quality impairments have resulted in increased attention on Smith Creek. The watershed drains land within the Wilmington City limits and the unincorporated County, so planning efforts were identified as being a joint City-County initiative. In 2007, the New Hanover County Watershed Management Advisory Board, at the recommendation of their Technical Committee, supported the initiative for a comprehensive watershed planning initiative.



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## **Planning Goals and Objectives for the Smith Creek Watershed**

- I. Assess the watershed condition, threats and opportunities**
    - Inventory initiatives and plans that include areas within the Smith Creek watershed.
    - Expand the knowledge base of the natural heritage of the watershed.
    - Identify locations for stream restoration, BMPs and water quality enhancement projects.
    - Assemble historical water quality monitoring data.
    - Identify current and projected future land use and impervious surface area coverage in the watershed.
  
  - II. Improve, restore, and protect the water quality and habitat of Smith Creek.**
    - Establish water quality monitoring priorities and enhancements.
    - Identify point and non-point pollution sources within the Smith Creek watershed and work toward eliminating or reducing the impact of these sources.
    - Identify areas that have the greatest impact on water quality in the watershed and prioritize them for acquisition according to their respective hydrologic/ecological merits.
    - Identify and protect vacant lands and areas of important habitat located along Smith Creek or within the Smith Creek watershed.
    - Identify grant seeking opportunities and other funding resources.
  
  - III. Educate residents, businesses, and developers about the importance and opportunities for stewardship in the Smith Creek Watershed**
    - Identify major landowners, stakeholders, community groups, and environmental stewards to become partners in planning and stewardship.
    - Identify public outreach opportunities for the stakeholders and the general community.
    - Create a public outreach / communications plan.
    - Educate potential developers about the value of complying with regulations and LID practices.
    - Establish a volunteer program for Smith Creek cleanup, monitoring, and stewardship.
  
  - IV. Develop recreational water access pedestrian trail opportunities on Smith Creek.**
    - Define the role of Smith Creek in a regional ecotourism resource.
    - Identify public access opportunities within the Smith Creek watershed for pedestrian access and kayak and canoe access.
    - Instill a sense of watershed appreciation and environmental stewardship by providing access, informational brochures, and guided tours on Smith Creek.
      - Identify grant seeking opportunities and other funding resources.
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# **Smith Creek Watershed Management Plan**

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## **PART I: Watershed Assessment**

# Smith Creek Watershed Management Plan

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## Watershed Information

**Miles of stream:** 55.2

**Watershed Area:** 13,818 acres

**Population:** 25,904



### **Water Classification: C SW**

**C:** Waters protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture and other uses suitable for Class C. There are no restrictions on watershed development or types of use (NCDENR, 2001).

**SW:** Swamp Waters. Waters which are topographically located so as to generally have very low velocities and other characteristics different from adjacent streams draining to steeper topography (NCDENR 2003).

### **Water Quality Rating**

Smith Creek is listed on the 303(d) list. Section 303(d) of the Clean Water Act requires states to develop a list of waters not meeting water quality standards or which have impaired uses. Listed waters must be prioritized and a management strategy or total maximum daily load (TMDL) must subsequently be developed for all listed waters. Smith Creek has been listed due to impaired biological integrity with potential sources

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# Smith Creek Watershed Management Plan

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being WWTP and NPDES locations. The major pollutants listed by the State include fecal coliform bacteria and NPDES point sources.

Listing:	From Source to Cape Fear River
Use Support Category:	Aquatic life
Use Support Rating:	Impaired
Reason for Rating:	Biological Criteria Exceeded
Parameter of Interest:	Ecological/Biological Criteria – Benthos
Collection Year:	2003
Listing Year:	2006

## CAMA Land Classification

The land classification system is a means of assisting in the implementation of the CAMA Land Use Plan and its policies. The system allows the local government and its citizens to specify those areas where certain policies will apply. The land classification system is intended to be supported and complemented by zoning, subdivision and other land use management tools. Together they provide the guidance to help realize the desired future land uses. The following are the land classifications located within the Smith Creek Watershed.

**Urban 43.23%** - The purpose of the Urban class is to provide for continued intensive development and redevelopment of existing urban areas. These areas are already developed at a density approaching 1,500 dwelling units per square mile. Urban services are already in place or scheduled within the immediate future. Development may exceed the 25% impervious surface area limit and density limits of 2.5 units per acre within the Urban class. Mixed use, cluster and higher density development may be appropriate within Urban areas.



**Transition 33.71%** - The purpose of the Transition class is to provide for future intensive development on lands that have been or will be provided with necessary urban services. The location of these areas is based upon land use planning policies requiring optimum efficiency in land utilization and public service delivery. Residential development can exceed the 25% impervious surface limit and density limits of 2.5

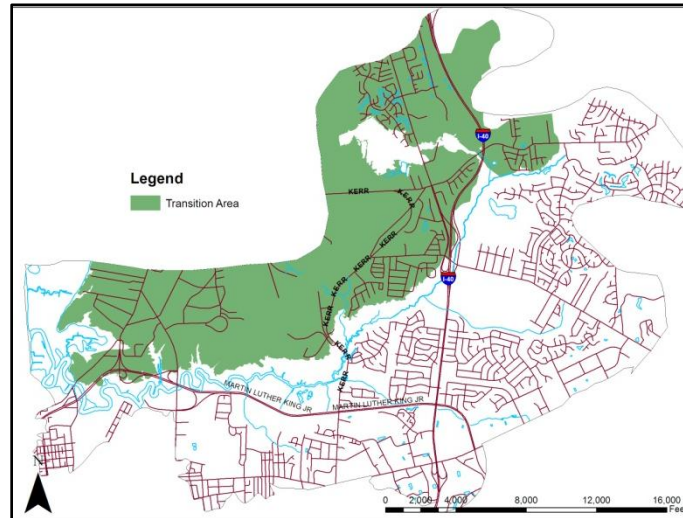
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units per acre within the Transition area provided the development is adequately designed to be compatible with existing and proposed surrounding land uses and it is served by sewer, municipal or County water system and direct access to a minor arterial or large access road.



**Conservation 14.19%** - The purpose of the Conservation class is to provide for effective long-term management and protection of significant, limited or irreplaceable natural resources while also protecting the rights of the property owner. Management of these areas may be required for a number of reasons including natural, cultural, recreational, productive or scenic values, but are primarily flood prone areas. Lands within the Conservation class are often the most desirable from a development perspective and they may be, at the same time, the most undesirable to develop from an environmental or public safety perspective. In order to promote the highest and best use while preventing a negative impact on water quality, site specific flexibility and creativity is desirable.

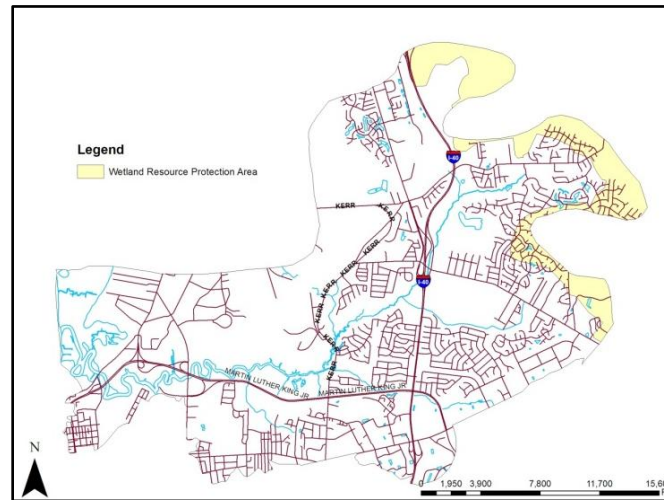


**Wetland Resource Protection 8.70%** - This class primarily is intended to be protected. The impact from which protection is needed is loss of wetland areas to development. The primary resource protection strategies focus on encouraging preservation of wetland and wetland functions.

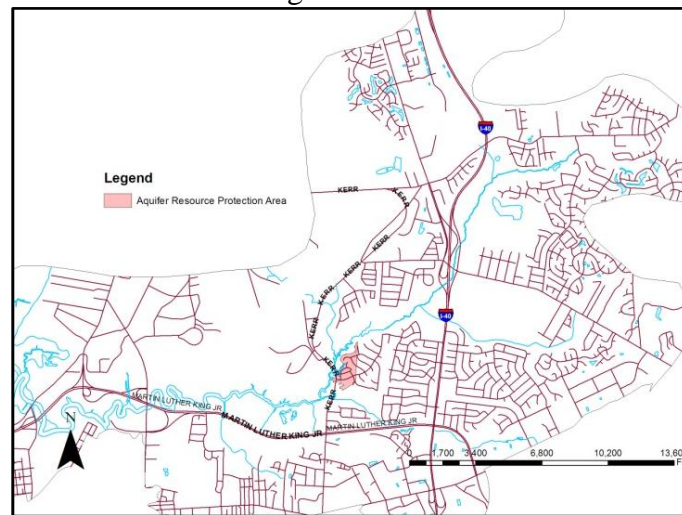
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**Aquifer Resource Protection .26%** - This class primarily occurs in the Northwest part of the County, north of Smith Creek, and is the area where the Castle Hayne and Pee Dee Aquifers secondary recharge occurs. The impacts that the resource is being protected from is diminished recharge of the aquifer and contamination of the aquifer by inappropriate land uses. The focus of strategies to protect this class is encouraging larger lot development if septic systems are used to prevent cross contamination of wells, extension of water and sewer service to curtail septic system use, prevention of uses that pose risk of spill of hazardous materials, and encouraging development practices that promote sustained recharge.

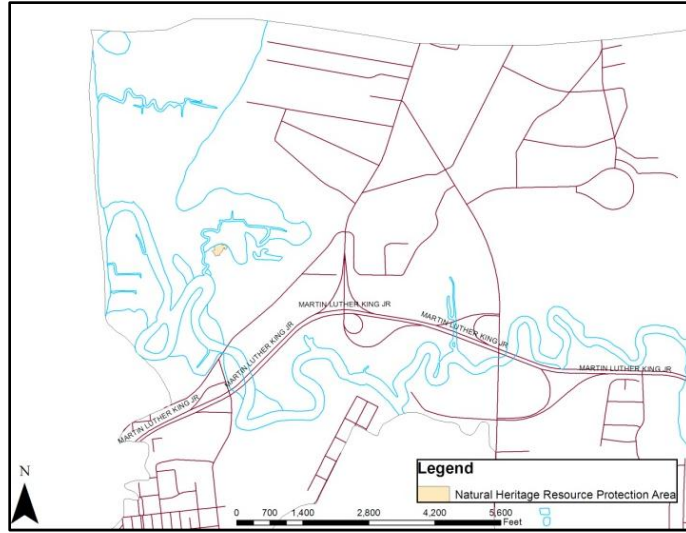


**Natural Heritage Resource Protection .01%** - This class is predominantly in the northwest part of the County and is identified by the NC DENR Natural Heritage Program as generally unique habitats that warrant special attention and protection. The threat to these areas is loss of habitat or fragmentation of habitat that may be crucial to a particular natural community identified as important. The focus of strategies for this subclass is to better identify these areas and develop specific protection strategies.

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# Smith Creek Watershed Management Plan

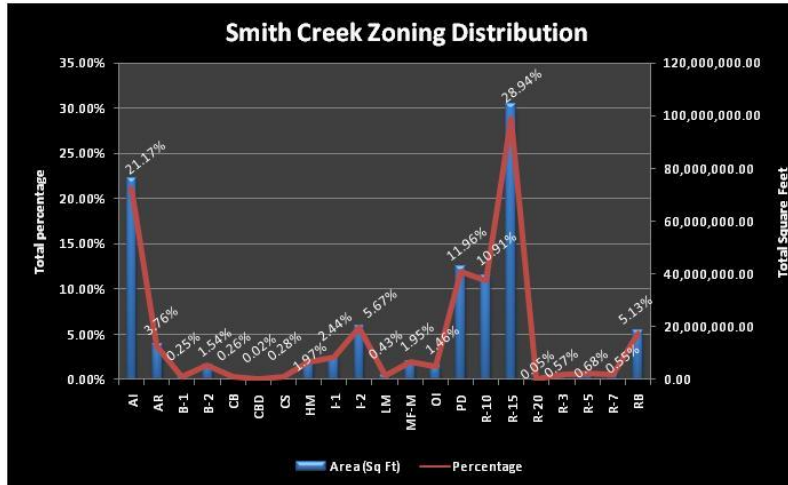
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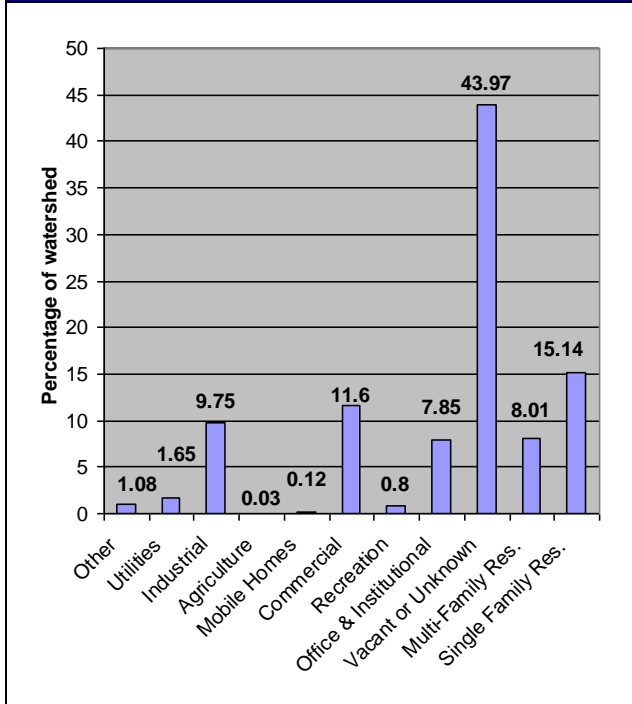
# Smith Creek Watershed Management Plan

## Zoning and Land Use

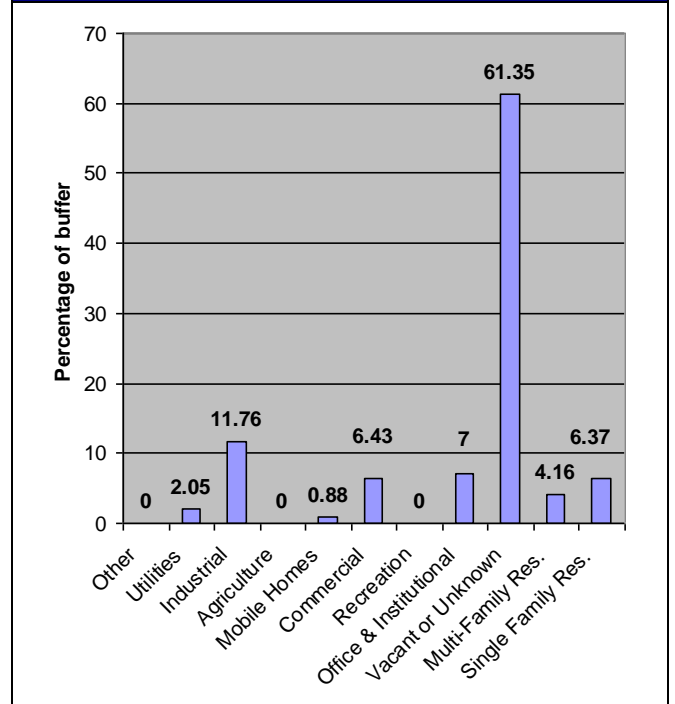
The majority of the acreage (55%) within the Smith Creek watershed is comprised of residential zoning districts. Industrial zoning districts follow at 32% and business zoning districts account for only 13% of the watershed. The largest percentage of land use within the watershed is vacant, followed by residential and commercial. Within the 1000 foot buffer, vacant land use is most represented.



**Figure 5.4.1 Smith Creek – Land use in the watershed**



**Figure 5.4.2 Smith Creek – Land use in the 1000-foot buffer**



# **Smith Creek Watershed Management Plan**

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## **Review of Past Studies**

### **New Hanover County Local Watershed Planning Initiative, 2001**

The New Hanover County Local Watershed Planning Initiative (*attachment*) was initiated by the North Carolina Ecosystem Enhancement Program (Wetland Restoration Program) and completed by KCI Associates in 2001. The intent of the study was to develop Local Watershed Plans to provide a localized framework for utilizing various management tools and financial resources to implement solutions for water quality protection and improvement. The lower and upper Smith Creek watersheds were included in the study area.

Areas of concern that were taken into account when creating the report included: water quality, wildlife habitat, flooding, growth and development, education and community and quality of life. Maps were developed for each area of concern in the watersheds. The maps analyzed water quality, growth and development, flooding and wildlife habitat.

#### **Findings from the Study:**

Stormwater best management practices such as stormwater wetlands, grassed swales and bioretention areas can decrease the amount of pollutants in the stormwater runoff generated by the impervious surfaces in the developed areas in the Smith Creek Watershed. The potential for water quality improvements would be particularly high if there area areas available within the 12% of the 200-foot riparian buffer area.

Stormwater best management practices would be more feasible in the Upper Smith Creek watershed than Lower watershed. Encouraged BMP's included stormwater wetlands, grassed swales, and bioretention devices in order to decrease the amount of pollutants in the stormwater runoff generated by the impervious surfaces within the developed areas.

Restoration of stream buffers in the Upper Smith Creek watershed would be highly beneficial in the reduction of pollutant loading. Preserving green space or restoring wetlands, streams, or riparian buffers can offset habitat loss and degradation resulting from the urban development that occupies approximately half of the Lower Smith Creek watershed. Habitat conditions are considered poor or moderate and improvement potential is considered high if degraded areas are available for revegetation with appropriate species.

### **New Hanover County Local Watershed Plan, 2002**

The Local Watershed Plan, completed by the Watershed Education for Communities and Local Officials (WECO) and the North Carolina Ecosystem Enhancement Program (EEP) provides recommendations for restoration efforts in Burnt Mill and Smith Creek.

#### **Findings from the Study:**

The Lower Smith Creek watershed particularly shows signs of a system under stress, but does not appear to be particularly degraded. The natural features of the system are relatively intact with contiguous riparian buffers along the main branches of the creek. The channel was found to be relatively stable.

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Tributaries feeding into the Smith Creek had undergone significantly greater degradation as a result of increased stormwater flows and human alteration. Localized bank erosion was reported and unnatural deepening resulting in increased pollutant loads in the main branch and loss of in-stream habitat for aquatic species was observed widespread across the watershed. Base flow flushing had become limited and some pollutants had built up in the system between rainfalls.

Water quality degradation was found to originate in Upper Smith Creek and then be exacerbated by the tributary influence in Lower Smith Creek. The main branch of Smith Creek was found to accommodate increased flows associated with urbanization and maintain a relative degree of stability, but the tributaries were being degraded by increased urbanization and human alteration.

Stream restoration efforts should emphasize preservation of the main natural features, while minimizing the impacts of urbanization on the tributaries with projects such as wetland and stream restoration.

## **Specific Project Identification** *(not in order of significance):*

1. Stream Restoration Opportunity at Barclay Hills Drive in Maides Park. The stream was straightened at one time, the channel is unstable and large amount of sand were found in the streambed. 3,718 feet could be stabilized with the City's involvement. Loads of trash should also be removed.
2. Wetland Restoration Opportunity on Castle Hayne Road southwest of Brentwood Road.
3. Water quality stormwater improvements in the Northchase community
4. Black Swamp and Caney Branch stream restoration opportunity (located adjacent to Laney High School on property owned by the NHC School Board
5. Best management practice at Ann McCrary Park (implemented by City of Wilmington)
6. Restoration of riparian wetlands on Candlewood buyout properties

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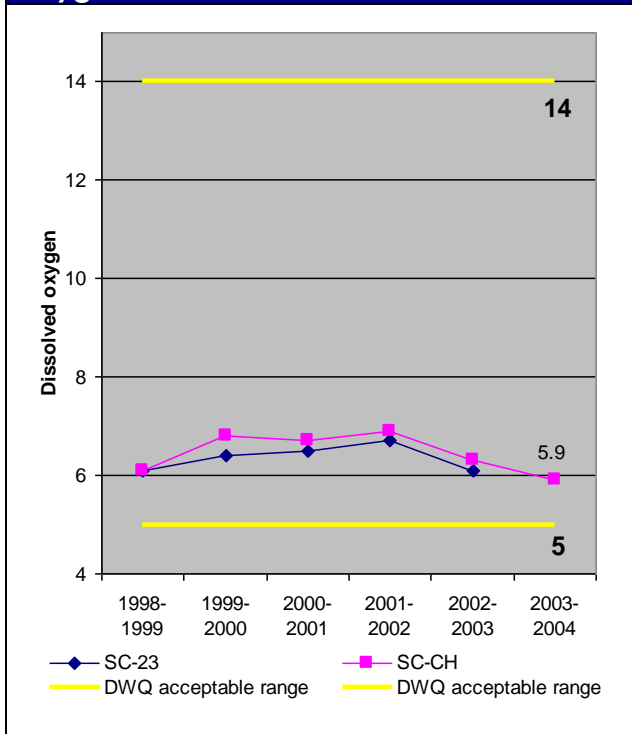
## Water Quality Trends

### UNCW Center for Marine Sciences Water Quality Monitoring Program

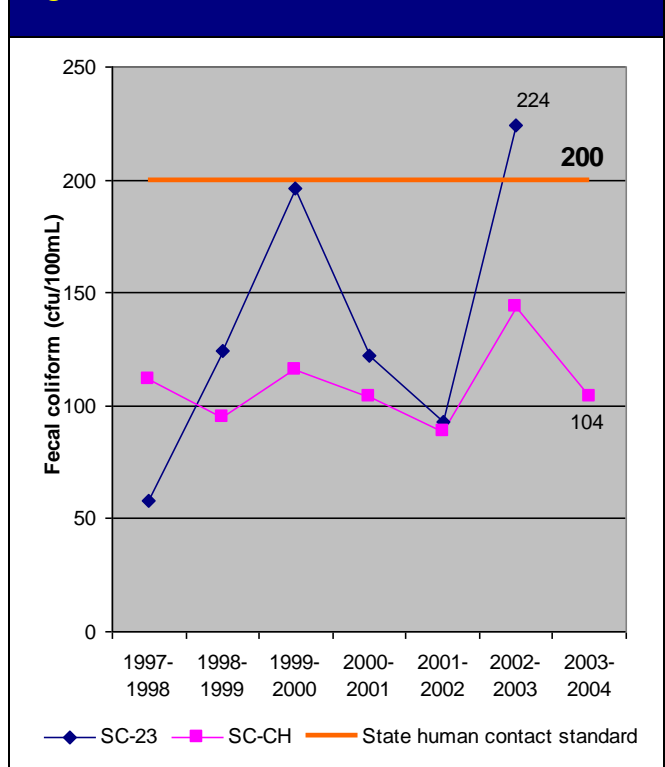
UNCW has historically sampled water quality at six locations, with two being routine locations that have been sampled since 1999. The routine locations include Castle Hayne Road and N. 23<sup>rd</sup> Street. Water quality parameters sampled at these locations include: Salinity, Dissolved Oxygen, Turbidity, TSS, Nitrate, Ammonium, Total Nitrogen, Orthophosphate, Total Phosphorus, Chlorophyll, Fecal Coliform, BOD5, BOD20.

Water quality data from UNCW has indicated fluctuations in low dissolved oxygen levels, high fecal coliform levels and periodic minor algal blooms. In addition, the State turbidity standard has been exceeded on multiple occasions and fecal coliform levels have also exceeded the state standard for human contact. In addition, Smith Creek has maintained some of the highest levels of suspended solids of all the area watersheds. (Mallin et al. 2004).

**Figure 5.4.3 Smith Creek – Dissolved oxygen**



**Figure 5.4.4 Smith Creek – Fecal coliform**



### 2007-2008 Water Quality Data

In November 2007, New Hanover County contracted with an environmental consultant to conduct water quality monitoring on Smith Creek. Samples are taken from the same historical UNCW monitoring locations, with the addition of two new sites.

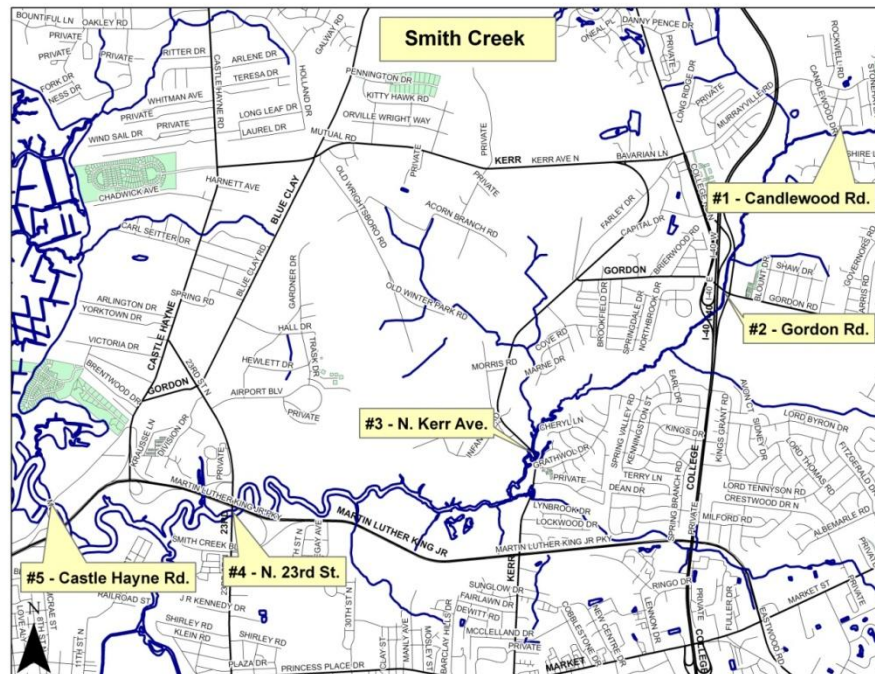
Water quality parameters measured include: Nitrate + Nitrite, Orthophosphate, Chlorophyll a, Enterococcus, Temperature, Salinity, Conductivity, pH, Dissolved Oxygen, and Turbidity.

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Beginning in November 2007, samples have been taken on a monthly basis at the following locations:

1. Smith Creek at Candlewood Road
2. Smith Creek at Gordon Road
3. Smith Creek at N. Kerr Avenue
4. Smith Creek at N. 23<sup>rd</sup> Street
5. Smith Creek at Castle Hayne Road

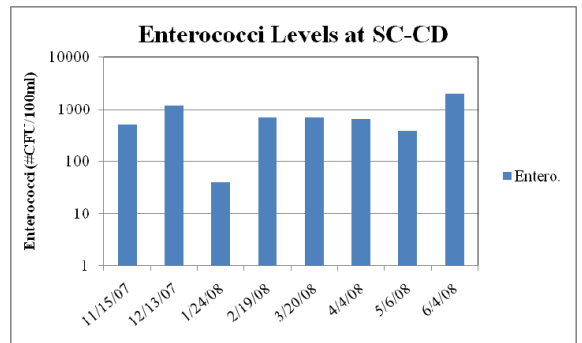
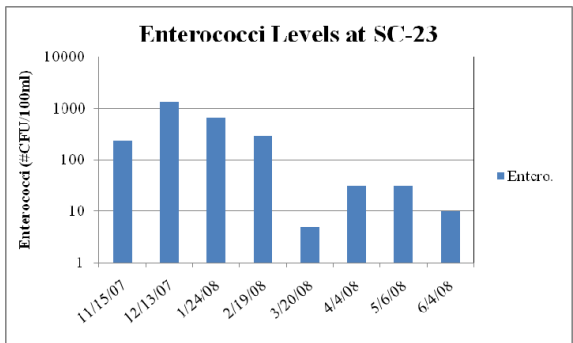
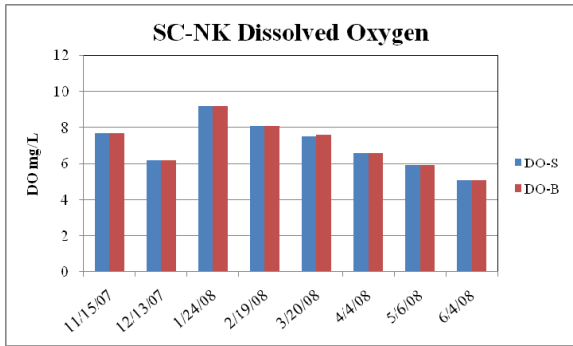
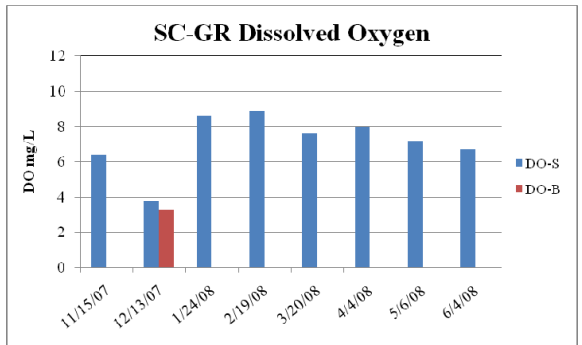
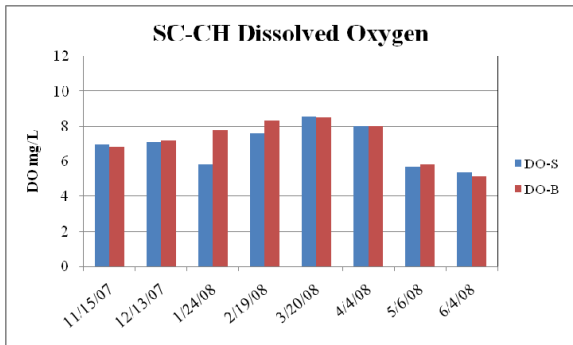
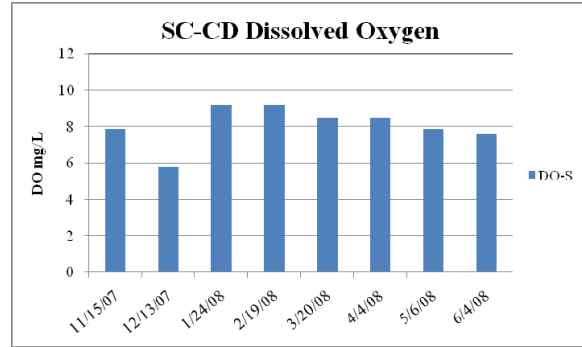
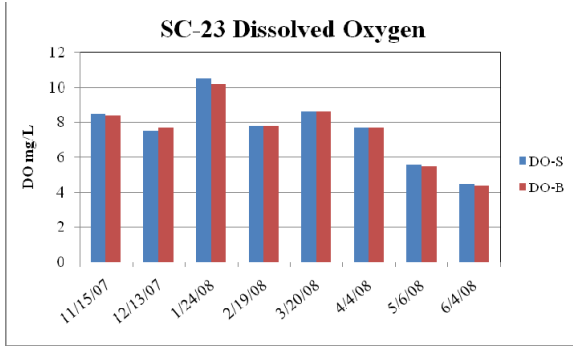


From November 2007-September 2008, surface dissolved oxygen with the creek ranged between 3.8 mg/l and 10.5 mg/l with a mean value of 7.4 mg/l. With the exception of one observation from the Gordon Road sampling location, all dissolved oxygen levels measured were within the acceptable standards of 4.0 mg/l for C SW waters as designated by the State. Chlorophyll-a ranged between 1.0 ug/l and 34.2 ug/l, with a mean value of 8.0 ug/l. The only value that approached the State's standard was taken at N. Kerr Avenue and measured 34.2 ug/l. Enterococci was measured at each location and measured between 5 CFU/100ml and 7701 CFU/100 ml with a geometric mean of 161 CFU/100ml. Eleven samples since November 2007 have exceeded the State's standard of 500 CFU/100ml for Tier III waters. Two of these exceedances occurred at N. Kerr Avenue, three occurred at N. 23<sup>rd</sup> Street and six occurred at Candlewood Road. Turbidity, nitrate and orthophosphate levels have all been measured within ideal ranges.

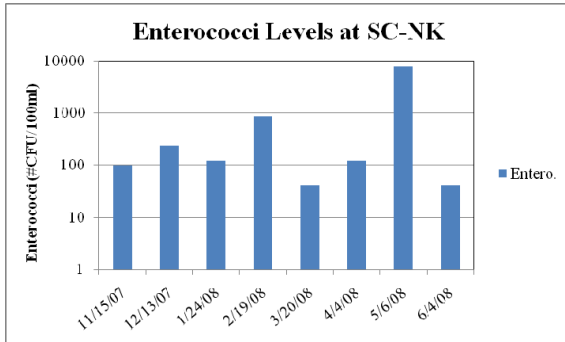
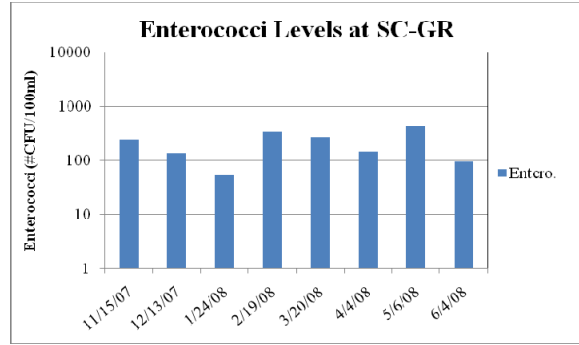
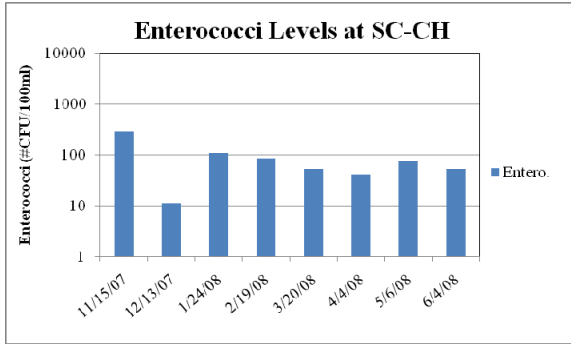
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## Ratings of parameters within sampling stations within Smith Creek

Parameter	SC-23	SC-CD	SC-CH	SC-GR	SC-NK
Turbidity	GOOD	GOOD	GOOD	GOOD	GOOD
Dissolved Oxygen	GOOD	GOOD	GOOD	FAIR	GOOD
Chlorophyll- <i>a</i>	GOOD	GOOD	GOOD	GOOD	GOOD
<i>Enterococci</i>	POOR	POOR	GOOD	GOOD	FAIR

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## Pollution Sources

### Point Sources

A point source is a single, identifiable localized source of pollution. To help manage pollutants that are discharged into surface waters in the U.S., the EPA established the National Pollutant Discharge Elimination System (NPDES). NPDES is a permitting system for point sources that discharge into surface waters. In North Carolina, the system is administered through the NPDES Unit of the Point Source Branch of NCDENR's Division of Water Quality, Water Quality Section. The NPDES Unit is responsible for reviewing and either approving or denying permit applications. The NPDES Unit determines the quality and quantity of wastewater discharges a stream may assimilate. Permits for point sources are designed to include flow, pollutant, and toxicant limitation levels. The permitting process is coordinated with the basinwide planning process, with permits issued and renewed concurrently every five years (NCDENR 2004).

There is currently one (1) active NPDES discharge permits in the Smith Creek watershed.

1. Corning Inc. (permit #NC0003794): discharges cooling water into Spring Branch of Smith Creek.

National Pollutant Discharge Elimination System (NPDES) Permits				
Permitted Facility	Discharge	Effluent Limits	Additional Monitoring (no specified limits)	Receiving Waters
Corning Inc. #NC0003794	Cooling water	pH: between 6 and 9 standard units	Flow Temperature Total residue solids	Smith Creek

### Nonpoint Sources

Nonpoint source pollution is water pollution that affects a water body from diffuse sources, rather than point sources which discharge into water bodies at a single location. Nonpoint sources are the largest contributors of water quality degrading pollutants. Unlike point source discharges, where substances enter surface waters from discrete, identifiable, and easily monitored sources, nonpoint sources contribute substances to surface and ground waters through less obvious means and diffuse sources, such as infiltration and storm water surface runoff. Urban and suburban stormwater runoff from nonpoint sources are the source of most concern in the Smith Creek watershed. Contaminants deriving from nonpoint sources are summarized in the table below.

Urban Nonpoint Pollutants		
Category	Parameters	Potential Sources
Bacteria	Total and fecal coliforms, fecal streptococci, other pathogens	Animals, birds, soil bacteria, humans
Nutrients	Nitrogen and phosphorous	Pets, birds, animals; lawn fertilizers; decomposing organic matter (leaves and grass clippings); urban street refuse, atmospheric deposition
Biodegradable chemicals	Biological oxygen demanding wastes, chemical oxygen demanding wastes,	Leaves, grass clippings, animals, street litter, oil and grease

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	total organic carbon	
Organic chemicals	Pesticides, PCBs, PAHs	Pest and weed control, packaging, leaking transformers, hydraulic and lubricating fluids, coal-tar based pavement sealcoat
Inorganic chemicals	Suspended solids, dissolved solids, toxic metals, chloride	Erosion (lawns, stream banks and channels, construction sites), dust and dirt on streets, atmospheric deposition, industrial pollution, illegal dumping during storms, traffic
Physical and aesthetic	Thermal, discoloration, odors	Heated streets, parking lots, sidewalks, and rooftops (summer only), runoff from industrial sites, animal wastes and organic matter, hydrocarbons

Source: Barnes et al. (2001). Adapted from:

Novotny, V. & Chesters, G. (1981). *Handbook of urban nonpoint pollution: Sources and management*. New York: Van Nostrand Reinhold Company.

Hansen, N.R., Babcock, H.M., & Clark II, E.H. (1988). *Controlling Nonpoint-source water pollution: A citizen's handbook*. Washington D.C.: The Conservation Foundation and the National Audubon Society.

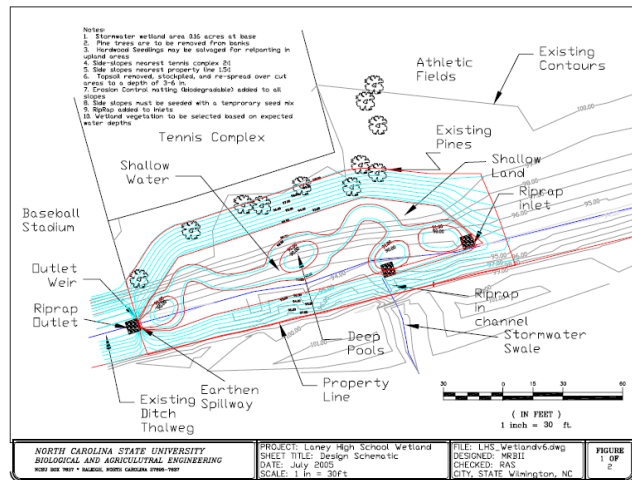
Whipple Jr., W. (1977). *Planning of water quality systems*. Lexington, MA: Lexington Books.

## Established Water Quality Improvement Projects

### Laney High School Constructed Stormwater Wetland

A constructed wetland was designed by NCSU Biological and Agricultural Sciences staff and installed in 2005 to drain the parking lot and ball fields at Laney High School. Funding for the project was made possible by a Water Quality Cooperative Agreement Grant from the Environmental Protection Agency. The wetland is positioned just downstream of a stormwater pipe that drains the parking lot and ball fields.

The wetland was designed to include deep pools, shallow water and shallow or emergent land and is approximately 170' long and 70' wide. The pools were designed to trap sediment, provide anaerobic conditions to improve nitrate removal, and to provide habitat diversity for wetland plants, amphibians, and fish. Water quality sampling has shown that the wetland appears to be successfully removing nutrients and sediment.



The Earth Science department at Laney High School once integrated the stormwater wetland into the Earth Science curriculum. Students collected and analyzed water samples for nitrate and dissolved oxygen, and used traps in the deep pools to capture and study benthic organisms. They also created maps to calculate the storage of the wetland and learn the functions of the different elevations. Since the inception of this program, the earth science teacher responsible

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for it has left her job. It is recommended that this program be reinstated and strengthened to include additional educational opportunities.

The Laney wetland is also a regular tour stop on stormwater BMP tours conducted in the area. It is in a high profile area due to its proximity to athletic facilities so it increased public awareness about stormwater pollution and the importance of wetlands.



## Trask Middle School Bioretention Area

A bioretention area or raingarden was designed by NCSU Biological and Agricultural Sciences staff and installed to drain the parking lot at Trask Middle School. Funding for the project was made possible by the same EPA Water Quality Cooperative Agreement Grant. The project was constructed in a semi-grassed swale that collects runoff from the parking lot and roofs of Trask Middle School. The bioretention method was chosen since it is designed to hold water for 1-2 days, eliminating concerns due to the proximity to the school.

Currently, the bioretention area has not been instilled into the curriculum of the middle school. It is recommended that environmental educators within the Smith Creek watershed group work with the faculty and students at the school to facilitate a program.



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## NCDOT Wetland Mitigation

The Department of Transportation completed a 4-5 acre wetlands mitigation site on Spring Branch as part of the Martin Luther King Jr. Parkway project.

## Completed Acquisition Projects

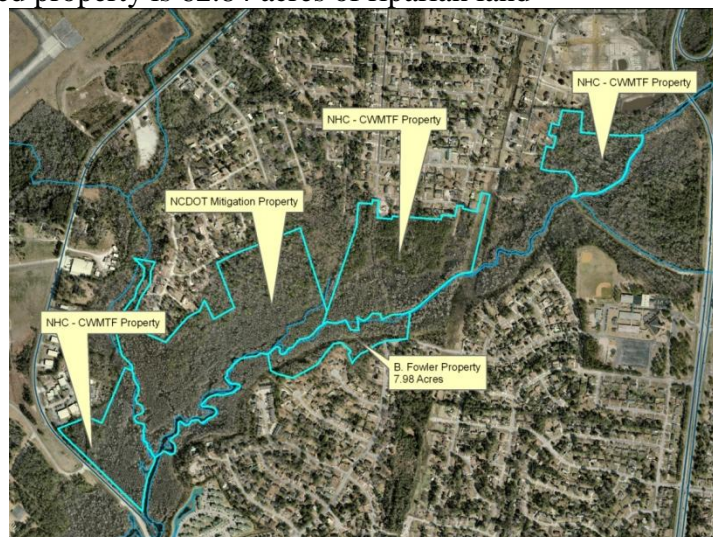
### Hazard Mitigation Grant Program properties

Nine properties were purchased by New Hanover County following Hurricane Floyd on Candlewood Rd. These properties sustained substantial damage from Hurricane Floyd. As a result, property owners were offered fair market value of their properties. The properties may not be developed and the County is obligated with maintaining the properties.



### Clean Water Management Trust Fund properties

In 2007, New Hanover County received grant funding from the North Carolina Clean Water Management Trust Fund to purchase two tracts of riparian land within the Smith Creek Watershed. As a match, a second property owner donated a third tract of land to the County. All three tracts of land have since been placed into conservation easement. In 2008, a fourth tract of land was donated by a third property owner. The total acreage combined of the donated and acquired property is 62.84 acres of riparian land



**PART II: Watershed Opportunities**

# Smith Creek Watershed Management Plan

## Water Quality Improvement Goals

### Perpetual Goals

- Restore and maintain water quality in Smith Creek to enable the creek to support the uses designated by its classification as a C, SW waterbody by restoring the water quality so that it is suitable for secondary recreation and suitable to sustain a healthy aquatic environment
- Restore the natural hydrology of creek to alleviate flooding problems
- Restore the aquatic habitat
- Conserve and restore the riparian buffer and existing wetlands
- Conserve and protect the critical habitat

<b>Perpetual Goal</b>	<b>Cause or Source of Impact</b>	<b>Management Objective</b>
Support designated uses	Elevated bacteria, low dissolved oxygen causing decreased benthic diversity	Track sources of bacteria contamination with enhanced water quality monitoring and source tracking techniques, preserve riparian buffers and limit development activities adjacent to creek, identify and eliminate stormwater outfalls, identify and eliminate failing septic tanks
Reduce flooding	Channelization, inadequate storm water controls	Complete stream restoration projects, complete water quality improvement projects, continue to buy out properties that are habitually flooded
Restore aquatic habitat	Sediment erosion, streambank erosion, near-stream land disturbance, elevated bacteria, wetland degradation	Reduce sediment loads, enhance riparian buffers, enhance stream banks, restore wetlands
Conserve and restore the riparian buffer and existing wetlands	Development of wetland areas	Restore wetlands to predevelopment function to improve habitat and increase filtration of runoff, purchase and receive donation of riparian lands, place critical areas into conservation easement or other land protection measure
Conserve and protect the critical habitat	Development, inadequate stormwater controls	Maintain and improve critical habitat through conservation easements and other land protection measures



# **Smith Creek Watershed Management Plan**

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## **Long-term Goals**

- Increase and maintain dissolved oxygen levels
- Reduce bacterial pollution to levels below the State's designated standard
- Control levels of suspended solids
- Complete stream restoration projects to decrease flooding potential
- Pursue donation and acquisition of riparian properties and place properties in conservation easements or other land protection measures

## **Short-term Goals**

- Improve dissolved oxygen levels
  - Identify and reduce sources of bacteria contamination
  - Identify and manage sources of suspended solids
  - Restore wetlands and complete stream restoration project on Candlewood buyout properties
  - Complete wetland restoration opportunity on Castle Hayne Road southwest of Brentwood Road
  - Create an adopt-a-stream program
  - Provide creek clean-up events
  - Complete connection of Smith Creek Greenway project with purchase or donation of remaining properties
  - Work with staff from Laney High School and Trask Middle School to instill the existing water quality improvement projects into their course curriculum
  - Determine presence and viability of native stock of fish utilizing data from 70's and 80's for comparison
  - Determine presence of bass, sunfish, American shad, striped bass, hickory shad and other species
  - Evaluate what contributes to the food cycle within the creek
  - Conduct volunteer benthic monitoring on creek
  - Work with CFCC Marine Technology Club to determine a project for the creek for course curriculum
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# Smith Creek Watershed Management Plan

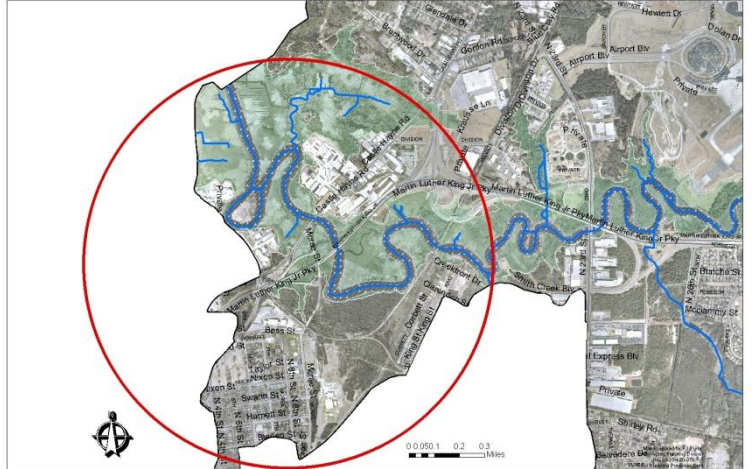
## Smith Creek Lower, Middle and Upper Segments

The character of Smith Creek, including its hydrology, upland land types, and adjacent land uses naturally divide the creek into three segments with different opportunities and planning objectives. The overall objectives can be separated into each of these three segments.

### **Lower Reach: From Burnt Mill Creek confluence upstream to the confluence with Cape Fear River downstream**

#### **Lower Reach Priorities**

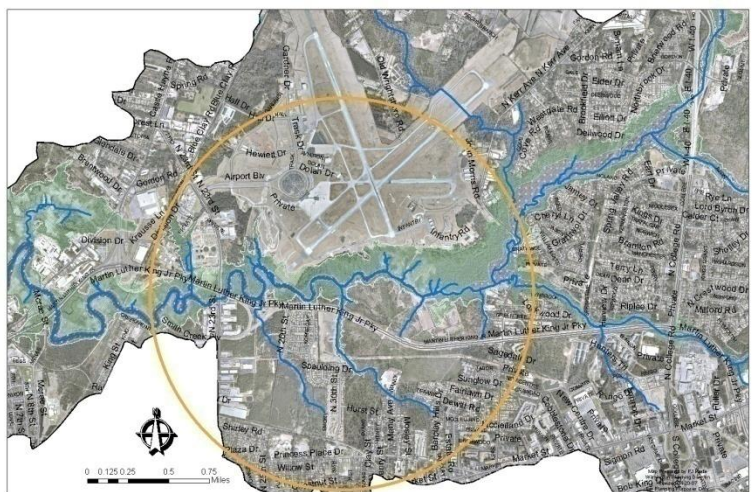
- Continue water quality monitoring and enhance in areas of concern
- Conserve and enhance riparian buffer
- Conserve and enhance wetlands
- Create water access site to serve as gateway access site
- Emphasize “blueway” link to Cape Fear River with this segment serving as the gateway to the River
- Encourage groups to adopt segments of the creek
- Conduct benthic analysis
- Prescribe land use controls in the riparian buffer



### **Middle Reach: From Burnt Mill Creek upstream to Kerr Ave**

#### **Middle Reach Priorities**

- Inventory natural heritage areas
- Conserve natural heritage areas
- Work with Wilmington International Airport to preserve and restore the riparian buffer and wetlands on airport land
- Conserve and enhance the riparian buffer
- Conserve and enhance wetlands
- Complete streambank restoration projects in areas where creek has been channelized
- Encourage groups to adopt segments of the creek



# Smith Creek Watershed Management Plan

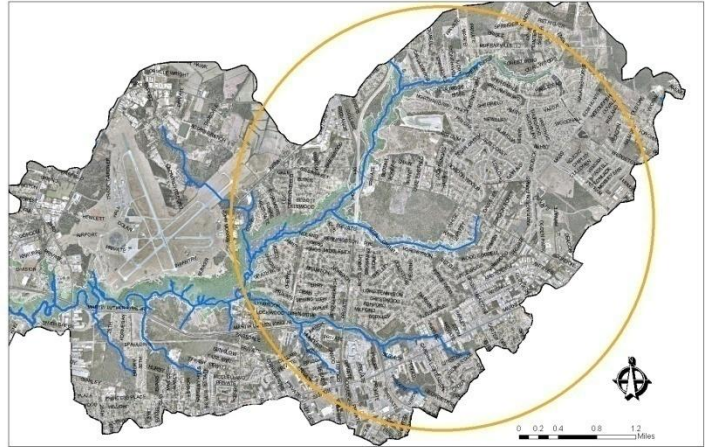
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- Eliminate stormwater outfalls
- Continue water quality monitoring and enhance in areas of concern
- Construct Best Management Practices (BMPs) to protect water quality in targeted areas

## Upper Reach: From Kerr Ave to headwaters

### Upper Reach Priorities

- Manage for long-term water quality and stream stability
- Conserve and enhance the riparian buffer
- Conserve and enhance wetlands
- Continue to acquire and receive donations of land in order to create a connection of the Smith Creek Greenway
- Develop trail system through Smith Creek Greenway
- Continue water quality monitoring program and enhance in areas of concern
- Complete stream restoration and wetland enhancement project on Candlewood properties
- Complete stream restoration projects in other areas where creek has been channelized and flooding concerns exist
- Conduct benthic monitoring
- Conserve and protect the critical habitat
- Encourage groups to adopt segments of the creek
- Create public access opportunity at N. Kerr Avenue



# **Smith Creek Watershed Management Plan**

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## **Recreation**

### **Smith Creek Paddle Trail**

Phase 1 – Middle Smith Creek

Phase 2 – Lower Smith Creek

Phase 3 – Upper Smith Creek

### **Phase 1 – Middle Smith Creek Love Grove Park**

The City of Wilmington received a CAMA Access Grant to construct a regional neighborhood park and regional access site for canoe and kayak access site on Burnt Mill Creek near the confluence with Smith Creek on the former Love Grove Landfill redevelopment site. Design is underway and the projected is scheduled for completion in 2008. The site will serve as an access location for non-motorized boats such as kayaks and canoes. This site is envisioned as the downstream access point of Phase 1 of the proposed Smith Creek Paddling Trail.

### **Phase 2 – Upper Smith Creek - North Kerr Ave Access Point**

New Hanover County received a CAMA Access Grant to construct a Neighborhood Access Site for canoe and kayak access on N. Kerr Ave. The site will serve as an access location for non-motorized boats such as kayaks and canoes. This site is envisioned as the upstream access point of Phase 1 of the proposed Smith Creek Paddling Trail.



### **Phase 3 – Lower Smith Creek**

A priority of the Smith Creek watershed planning initiative is to identify a gateway public access location. Several options have been identified, but grant funding would have to be secured in order to construct the access sites, and the majority of the sites would require property acquisition.

After all sites have been constructed, it is envisioned that a Smith Creek Paddle Trail will be created. Signage would be installed along the creek bank at various locations along the paddles trail. The signage would indicate how far the paddler is to the next access point and provide information about the habitat or cultural significance of the area. It is also envisioned that a paper map would be created with general information including locations of access points, safety precautions and interesting facts for all that are interested in the paddle trail.

# Smith Creek Watershed Management Plan

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## Implementation

The Smith Creek plan provides a blueprint for the future of the Smith Creek watershed. Collectively, the goals and recommendations provide guidance for both short and long range decisions. It is envisioned that the goals and recommendations in this document will help guide the decisions and actions of those that have been a part of this planning effort.

Many of the recommendations in the plan are dependent on funding. The following is an implementation matrix for the next five years. The matrix will require updates after five years, taking into account implementation of the strategies contained within.

Goal	Objective	Responsible Party	Estimated Completion
<b>I-Assess the watershed conditions, threats and opportunities</b>	Inventory initiatives and plans that include areas within the Smith Creek watershed.	NHC Planning, City Planning	2008
	Expand the knowledge base of the natural heritage of the watershed.	Entire group	2009
	Identify locations for stream restoration, BMPs and water quality enhancement projects.	NHC Planning, City Planning, City Stormwater NHSWCD, NCEEP, CFRW	2009
	Assemble historical water quality monitoring data.	UNCW, NHC Planning, City Stormwater	2008
	Identify current and projected future land use and impervious surface area coverage in the watershed.	NHC Planning, City Planning	2010
<b>II – Improve, restore, and protect the water quality and habitat of Smith Creek</b>	Establish water quality monitoring priorities and enhancements.	UNCW, NHC Planning, City Stormwater, City Planning, NCDENR	2009
	Identify point and non-point sources within the Smith Creek watershed.	UNCW, NHC Planning, City Stormwater, City Planning, NCDENR	2009
	Identify areas that have the greatest impact on water quality in the watershed and prioritize them for acquisition according to their respective hydrologic/ecological merits.	NHC Planning, City Planning, NC EEP, NHCSWCD, NCCLT, CFRW	2009
	Identify and protect vacant lands and areas of important habitat located along Smith Creek or within the Smith Creek watershed.	NHC Planning, NHSWCD, NC EEP, CFRW, NCCLT	2013
	Identify grant seeking opportunities and other funding resources.	NHC Planning, NHSWCD, CFRW	Ongoing

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# Smith Creek Watershed Management Plan

<b>III-Educate residents, businesses, and developers about the importance and opportunities for stewardship in the Smith Creek watershed.</b>	Identify major landowners, stakeholders, community groups, and environmental stewards to become partners in planning and stewardship.	NHSWCD, City Stormwater, CFRW, NHC Planning, City Planning	2009
	Identify public outreach opportunities for the stakeholders and the general community.	NHSWCD, City Stormwater, CFRW, NHC Planning, City Planning	2009
	Create a public outreach/communications plan.	NHSWCD, City Stormwater, CFRW	2009
	Educate potential developers about the value of complying with regulations and LID practices.	NHC Planning, City Planning, NHSWCD, City Stormwater, CFRW	Ongoing
	Establish a volunteer program for Smith Creek cleanup, monitoring, and stewardship.	CFRW, NHSWCD, City Stormwater, NHC Planning, City Planning	2010
<b>IV-Develop recreational water access paddle trail opportunities in Smith Creek.</b>	Define the role of Smith Creek in a regional ecotourism resource.	UNCW, NHC Parks, City Parks, CFRW, NHSWCD, NHC Planning, City Planning	2009
	Identify public access opportunities within the Smith Creek watershed for pedestrian access and kayak and canoe access.	UNCW, NHC Parks, City Parks, CFRW, NHSWCD, NHC Planning, City Planning	2009
	Instill a sense of watershed appreciation and environmental stewardship by providing access, informational brochures, and guided tours on Smith Creek.	UNCW, CFRW, NHC Parks, City Parks, NHC Planning, City Planning, NHSWCD	Ongoing
	Identify grant seeking opportunities and other funding resources.	CFRW, NHSWCD, NHC Planning	Ongoing

# Smith Creek Watershed Management Plan

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## Appendix

### Schools:

Blount Pre-K Center  
Dorothy B. Johnson Elementary  
E.A. Laney High School  
Eaton Elementary  
Emma B. Trask Middle School  
Freeman Elementary  
Murrayville Elementary  
Virgo Middle School  
Wilmington Christian Academy

### Parks:

Cape Fear Optimist Park  
Ogden Park  
Parkwood Recreation Area

### Churches:

Brookfield Church of God  
Church of Christ Christian  
Church of God of Prophecy  
Cornerstone Assembly of God (North  
Pointe Community Church)  
Ebenezer Missionary Baptist Church  
Emmanuel Presbyterian Church  
Jehovah's Witnesses, Wrightsboro  
Macedonia Missionary Baptist Church  
Marketplace Fellowship  
Mt. Hermon Missionary Baptist Church  
Northside Baptist Church  
Olivet Baptist Church  
Springview Pentecostal Freewill Baptist  
Church  
St. Pauls Missionary Baptist Church  
Wilmington Christian Center



# Smith Creek Watershed Management Plan

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## Neighborhoods:

Abbotts Run  
Alamosa Place  
Azalea Trace  
Barclay Hills  
Belmar Forrest  
Belvedere  
Bent Tree  
Birchwood Park  
Brassfield  
Brierwood  
Brittany Woods  
Brookfield  
Churchill Estate  
Colony Woods  
Courtney Pines  
Creekwood  
Crestwood  
Dutch Square  
Fairlawn  
Farmington  
Farrington Farms  
Forrest Park at Murrayville Station  
Glynwood  
Greenview Ranches  
Hidden Pointe on the Lake  
Hunters Crossing  
Kings Grant  
Lakemoor  
Long Ridge  
Love Grove  
McClelland Woods  
McLeeland Estates  
Meadowbrook  
Montgomery Place  
Murray Farms  
Newbury Woods  
Newton Place  
Northchase Park  
Berkleigh

Heatherridge  
Bridgeport  
Harnett Pointe  
Clarendon  
Winchester  
Greenhow Woods  
Cambridge  
Compton Crossing  
Dominion Place  
Laurenplace Townhomes  
Olsen Farm Tracts  
Parkwood Estates  
Potomac Woods  
Quailwoods  
Saratoga Place  
Shenandoah Woods  
Smith Creek Village  
Springview  
Stones Edge  
Summer Glen  
Suncoast  
Watts Landing  
Weatherwood  
Weaver Acres  
West Bay  
Whitney Pines  
Wildflower  
Windchase

