The Heat is On!

What: 2007 Earth Day Celebration

When: Saturday, April 21st, 2007
Noon-6pm

Where: Hugh MacRae Park
Wilmington, NC

The event will feature 40+ environmental exhibits focused on everything from global warming to gardening to local water quality. There will be a fun and educational Kid's Eco Zone, live local bands, free workshops, and great food and drink from some of the area's favorite restaurants.

Stormwater Services is a major sponsor of this event. Please stop by our booth and say hello!

Earth Day info? Jennifer O'Keefe, Keep America Beautiful of NHC, 798-4404.

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Stormwater Services

Stormwater Services maintains and improves the public drainage system for the protection of our community and the environment.

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Rain Barrel Sale
65-gallon, $95
Pre-order by March 16th
Call 798-6032 or email
rain@nhswcd.org

CITY OF WILMINGTON STORMWATER SERVICES

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Stormwater Watch Newsletter

2007 Winter/Spring ~ Annual Water Quality Report Issue

The State of Wilmington's Waterways

2005-2006 Water Quality Report

The following water quality summary was provided by Dr. Michael Mallin of the UNCW Center for Marine Science. Dr. Mallin is the lead scientist for the Wilmington Watersheds Project. Water quality data is presented from a watershed perspective, regardless of political boundaries. For more information, please visit: www.uncwil.edu/cmsr/aquaticecology/laboratory/

Barnards Creek drains into the Cape Fear River.

- Only one site was sampled during the year, lower Barnards Creek at River Road.
- This sampling site showed no algal blooms, BOD or turbidity problems, but did show poor water quality in terms of fecal coliform counts and low dissolved oxygen.
- It also had among the highest suspended solids, ammonium, nitrogen and phosphorus levels of all the local creeks.

Bradley Creek drains a large tidal creek watershed (including most of the UNCW campus) into the Atlantic Intracoastal Waterway (ICW).

- Six sites were sampled along Bradley Creek.
- Turbidity was not problematic and dissolved oxygen was good to fair at all sites, except portions of the creek near College Acres and the north branch at Wrightsville Avenue, where there was ongoing bridge construction.
- Elevated nitrogen and phosphorus levels entered the creek in both the north and south branches, and one major algal bloom occurred in the south branch of the creek.
- Fecal coliform bacterial samples were collected at all sites, with poor conditions at four of the six sampling sites.

Burnt Mill Creek drains an urbanized watershed which flows into Smith Creek, then into the Cape Fear River.

- The number of sites sampled on Burnt Mill Creek increased from three to six because of additional funding from an EPA 319 grant through NC State University.
- Burnt Mill Creek showed no turbidity or suspended solids problems, but did indicate poor water quality in terms of substandard dissolved oxygen at a majority of sites 25% of the time.
- High fecal coliform counts were also a major problem in the creek. Algal blooms occurred at the Wallace Park and Princess Place sampling sites.
- The effectiveness of Ann McCrary wet detention pond as a pollution control mechanism was poor. The pond led to a significant reduction in nitrate and turbidity and an increase in dissolved oxygen, but it failed to reduce other nutrient concentrations including ammonium, total nitrogen and phosphorus.
- The Kerr Avenue Stormwater Wetland led to a large decrease in nitrate, but none of the other nutrient species.
- Sediments in the creek were sampled for metals (such as copper, zinc, lead) and polycyclic aromatic hydrocarbons (PAHs - urban-derived toxic compounds). Most of the sites had sediment metal concentrations that were well below levels considered potentially toxic to benthic organisms. One exception was lead, which exceeded known potentially toxic levels at the Wallace Park and Princess Place sites. Potentially toxic levels of copper were also an issue at a few sites.
- All of the PAH sediments sampled exceeded known toxic concentrations, except for one sampling site, which was below the detection limit.

Glossary of Water Quality Terms

Algal Bloom Rapidly occurring growth and accumulation of algae in a waterway, which usually results from excessive nutrients and can result in low dissolved oxygen conditions.

Aquatic Macrophyte Large vascular, rooted aquatic plant; visible to the eye (i.e. algal bloom).

Biochemical Oxygen Demand (BOD) A measure of the amount of oxygen used by microorganisms to break down organic matter. High BOD can indicate organic pollution.

Chlorophyll *a* A measure of the abundance of algae in the water.
State standard: 40 µg/L

Dissolved Oxygen (DO) The amount of oxygen available in the water. Aquatic organisms require adequate levels of DO to survive.
State standard: 5 mg/L

Fecal Coliform Bacteria Bacteria that are present in the intestines or feces of warm-blooded animals. They are used as indicators water quality.
State standard for shellfish waters: 14 CFU/100mL
State standard for human contact: 200 CFU/100mL

Heavy Metals Elements that are carried into waterways via urban runoff that, in concentration, can harm living organisms.

Hypoxia Very low oxygen levels.

Nutrients Chemicals needed by plants and animals for growth (i.e. nitrogen and phosphorous); however, excessive nutrients in waterways can lead to harmful aquatic weed and algae growth, low dissolved oxygen levels, etc.

Polycyclic Aromatic Hydrocarbons (PAHs) A large class of chemicals generated by the burning of petroleum fuels, wood, or charcoal (i.e. from cars)

Pathogens Disease-causing organisms (i.e. bacteria, viruses).

Sediment Particles of silt, clay, or sand that wash into waterways as a result of land-disturbing activities or natural weathering. Sediment can settle to the bottom or remain suspended in water.

Turbidity A measure of how clear the water is.
State standard: 25 NTU (tidal saltwater) and 50 NTU (freshwater).

Watershed An area of land that drains into a specific body of water such as a creek.

mg/L Stands for milligrams per liter.
µg/L Stands for micrograms per liter.
CFU Stands for colony forming unit.
NTU Stands for nephelometric turbidity unit.

Greenfield Lake drains a highly urbanized watershed into the lake, which then drains into the Cape Fear River.

- It is sampled at three in-lake sites and at three tributary sites that flow into Greenfield Lake.
- All three tributaries of Greenfield Lake suffered from severe low dissolved oxygen levels, a few algal blooms, and high fecal coliform bacteria counts with averages in excess of the State standard for human contact.

- The in-lake sampling sites revealed low dissolved oxygen levels. High fecal coliform counts were found only at the uppermost lake site; however, high biochemical oxygen demand (BOD) occurred frequently at all in-lake sampling sites.

- Algal blooms are periodically problematic in Greenfield Lake, and have occurred during all seasons, but are primarily a problem in spring and summer. Eight algal blooms exceeding the State standard were recorded in 2006, but the former heavy surface covering of duckweed was removed due to remedial action by the City.
- One fish kill of less than 100 fish occurred in February 2006 from unknown causes.
- Thus, during 2006, Greenfield Lake was impaired by algal blooms, high fecal coliform counts, high BOD and low dissolved oxygen concentrations.

Hewletts Creek drains a very large watershed into the Atlantic Intracoastal Waterway.

- The creek was sampled at eight tidal sites and five non-tidal freshwater sites.
- Several incidents of hypoxia were observed near Greenville Loop Road and Pine Grove Road. Three minor algal blooms also occurred. In February, a sewage leak occurred in the middle branch of the creek which led to high fecal coliform counts in the upper creek.
- Since January 2004, five additional non-tidal sites have been sampled in the Hewletts Creek watershed. The Pine Valley Country Club sampling site showed no dissolved oxygen, turbidity, or algal bloom problems, but had relatively high nitrate levels. Fecal coliform bacteria counts exceeded State standards 71% of the time.
- Four other sites are being sampled to gain data on the water quality of streams that enter and exit a constructed wetland/future park area known as the Dobo/Bethel Road Wetland. This area drains into the headwaters of Hewletts Creek. Resulting data suggest that fecal coliform bacteria and nitrogen should be targeted for removal by the constructed wetland.

Howe Creek drains into the Intracoastal Waterway.

- Five sites were sampled in this creek.
- Turbidity did not exceed North Carolina water quality standards at any sites and dissolved oxygen concentrations were generally good in lower Howe Creek and fair in upper Howe Creek. Nutrient levels were generally low, except for showing an increase in nitrate in the uppermost part of the creek.
- Fecal coliform bacteria were low near the Intracoastal Waterway, moderate in mid-creek, and high in the uppermost sites; a worsening in fecal coliform counts after somewhat better bacterial water quality in Howe Creek in the previous year. In addition, there was one minor algal bloom at a sampling site.
- Since wetland enhancement was performed above Graham Pond in 1998, the sampling site below the pond has had fewer and smaller algal blooms than before the enhancement.

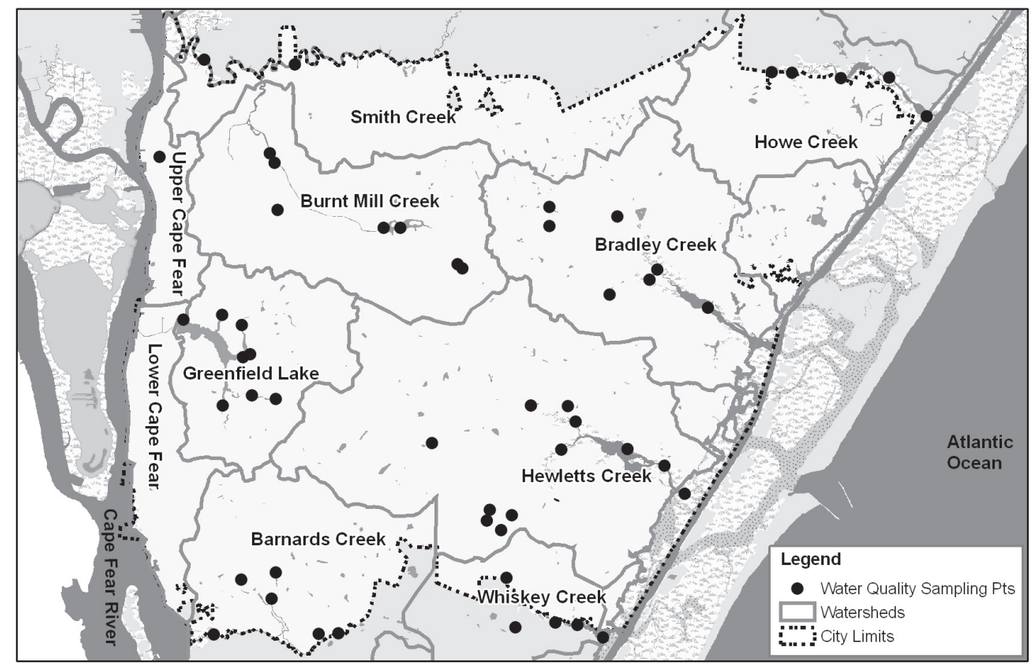
Smith Creek drains a very large watershed into the Cape Fear River. The watershed falls partially within the City limits.

- Smith Creek was sampled at eight sites.
- Low dissolved oxygen was a minor water quality problem at a few sampling sites.
- The NC turbidity standard was not exceeded and nutrient concentrations remained similar to previous years. One major algal bloom did occur in 2006.
- Fecal coliform bacteria concentrations were above the State standard for human contact on two occasions at each site, somewhat poorer than the previous year.
- BOD did show an improvement over the previous year at one sampling site.

Whiskey Creek is the southernmost large tidal creek that falls partially in the City limits and drains into the Intracoastal Waterway.

- Five sites are sampled from shore along this creek.
- The creek had moderate nutrient loading but generally low chlorophyll *a* concentrations and no algal blooms.
- Dissolved oxygen concentrations were below the State standard on a few occassions.
- High turbidity was not a problem. Fecal coliform bacteria were not sampled.

Wilmington Watersheds & UNCW's Water Quality Sampling Sites



A watershed is an area of land that drains runoff to a particular body of water, such as a creek, river, lake or ocean. For instance, if you live in the Hewletts Creek Watershed, runoff from your property will drain into Hewletts Creek, which flows into the Atlantic/Intracoastal Waterway.

Water quality sampling & research performed by UNCW Aquatic Ecology Lab: www.uncwil.edu/cmsr/aquaticecology/laboratory/