# CITY OF WILMINGTON, NORTH CAROLINA

# STORMWATER MANAGEMENT PLAN

Prepared by:
Stormwater Services
PO Box 1810
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Wilmington, NC 28412

**NPDES Permit No.:** NCS000406

**Reporting Year:** March 1, 2010 – February 28, 2011

# REPORTING CERTIFICATION

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

_____ _____

David B. Mayes, P.E. Date
Manager, Stormwater Services

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## INTRODUCTION

### STORMWATER MANAGEMENT PLAN OVERVIEW

The North Carolina Division of Water Quality issued NPDES Phase II Permit NCS000406 to the City of Wilmington effective March 1, 2007. The Stormwater Management Plan is the City of Wilmington's program to comply with NPDES Phase II permit NCS000406 for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The plan defines strategies and guidelines necessary for protecting water quality and reducing pollutant discharges to the maximum extent practicable. The plan also includes reporting results for the current yearly reporting period from March 1, 2010 to February 28, 2011.

The plan is a guidance document to be used by the City staff and the general public. The plan is evolving and will address needs and priorities that will be reflected in compliance programs and revised ordinances over the 5 year implementation schedule.

As required by EPA regulations for the NPDES Phase II stormwater programs, the following six minimum measures are addressed in the plan:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention and Good Housekeeping for Municipal Operations

### STATUS OF IMPLEMENTATION

The City of Wilmington is pleased to report excellent progress for year 4 compliance with requirements of NPDES Phase II permit NCS000406. Primary areas of work include:

- Continued implementation of amended ordinances related to Post Construction and Illicit Discharge BMPs.
- Continued stormwater infrastructure mapping is for selected portions of the City where mapping priorities are highest. Concurrent with this effort, major outfalls are being located and verified according to standards for industrial or non-industrial source areas as required.
- Continuation of Public Outreach and Public Participation efforts.

Wilmington continues to move forward with implementing the necessary goals and objectives as outlined in their permit. Considerable progress related to Illicit Discharge Detection and Elimination has been made during the past two years and will continue to improve during the following years. We continue to have success with our public outreach and participation program and education to the public. The City remains focused on improving the water quality for the areas surrounding water bodies as indicated by UNCW's Center for Marine Science ambient monitoring of water quality on creeks within the City.

**CHANGES/JUSTIFICATION**

Proposed Change – Illicit Discharge Detection and Elimination – BMP (C)
Current Requirement –

| BMP | **Measurable Goals** | **YR 1** | **YR 2** | **YR 3** | **YR 4** | **YR 5** |
|---|---|---|---|---|---|---|
| (c) Develop a Storm Sewer System Base Map and Inventory of Major Outfall. | Map identifying major outfalls and stormwater drainage system components. At a minimum, components include major outfalls and receiving streams. Established procedures to continue to identify, locate, and update map of drainage system. | | | | X | |

Measurable Goal – Map identifying major outfalls and stormwater drainage system components. At a minimum, components include major outfalls and receiving streams. Established procedures to continue to identify, locate, and update map of drainage system.

Change - The measurable goal was to be completed in year 4. The City has mapped a significant portion of the major outfalls throughout the City's MS4, but has not completed this effort. Over the next year, the City proposes to complete mapping of major outfalls to meet this requirement and by the end of year five have a map identifying all major outfalls.

| | | | | | |
|---|---|---|---|---|---|
| (c) Develop a Storm Sewer System Base Map and Inventory of Major Outfall. | Map identifying major outfalls and stormwater drainage system components. At a minimum, components include major outfalls and receiving streams. Established procedures to continue to identify, locate, and update map of drainage system. | | | | X |

## CITY OF WILMINGTON STORMWATER SERVICES OVERVIEW

### Comprehensive Stormwater Management

Comprehensive stormwater management takes into account both the quantity and quality of stormwater runoff and is reflected in five core components of the Wilmington's Stormwater Services program:

**MANAGEMENT AND PLANNING**

Master planning utilizes the existing stormwater system inventory to develop a long range plan to improve drainage and water quality within an entire watershed. When planning on such a large scale, Stormwater Services seeks involvement and input from citizens and stakeholders. Management activities also include customer service – responding to customer concerns or inquiries and administrative services required for operation of the City stormwater utility.

**REGULATORY AND ENFORCEMENT**

Regulatory and enforcement activities are outlined in the City's existing stormwater ordinance requiring comprehensive stormwater management and creating technical standards for design and maintenance of private stormwater facilities. Stormwater Services also provides two semi-annual inspections for privately permitted stormwater retention facilities. These inspections are performed in order to ensure compliance with city maintenance standards. Compliance with NPDES Phase II stormwater regulations also fall into this category.

**CAPITAL IMPROVEMENTS**

The stormwater utility provides dedicated funding and staff resources for planning, designing, and constructing capital projects. These projects are necessary when the existing storm drainage system is inadequate and can result in flooded streets, houses, and businesses. Capital improvement projects require collaboration among City departments, outside agencies, and citizens in affected areas. Whenever possible, capital projects incorporate innovative design or best management practices (BMPs) to improve water quality and reduce the quantity of stormwater runoff.

**OPERATIONS AND MAINTENANCE**

The City of Wilmington's Maintenance Division is responsible for maintaining the public drainage system. Maintenance activities consist of open drainage, closed drainage, street sweeping, and best management practices (BMPs). The open drainage system consists of roadside swales, ditches, channels, creeks, and ponds. The closed drainage system consists of pipes, culverts, catch basins, and manholes. Both of these systems are maintained using manual and mechanical techniques to insure that they remain open for proper drainage. Street sweeping provides preventative maintenance to minimize the amount of trash, debris, sediment, and other pollutants entering open or closed drainage

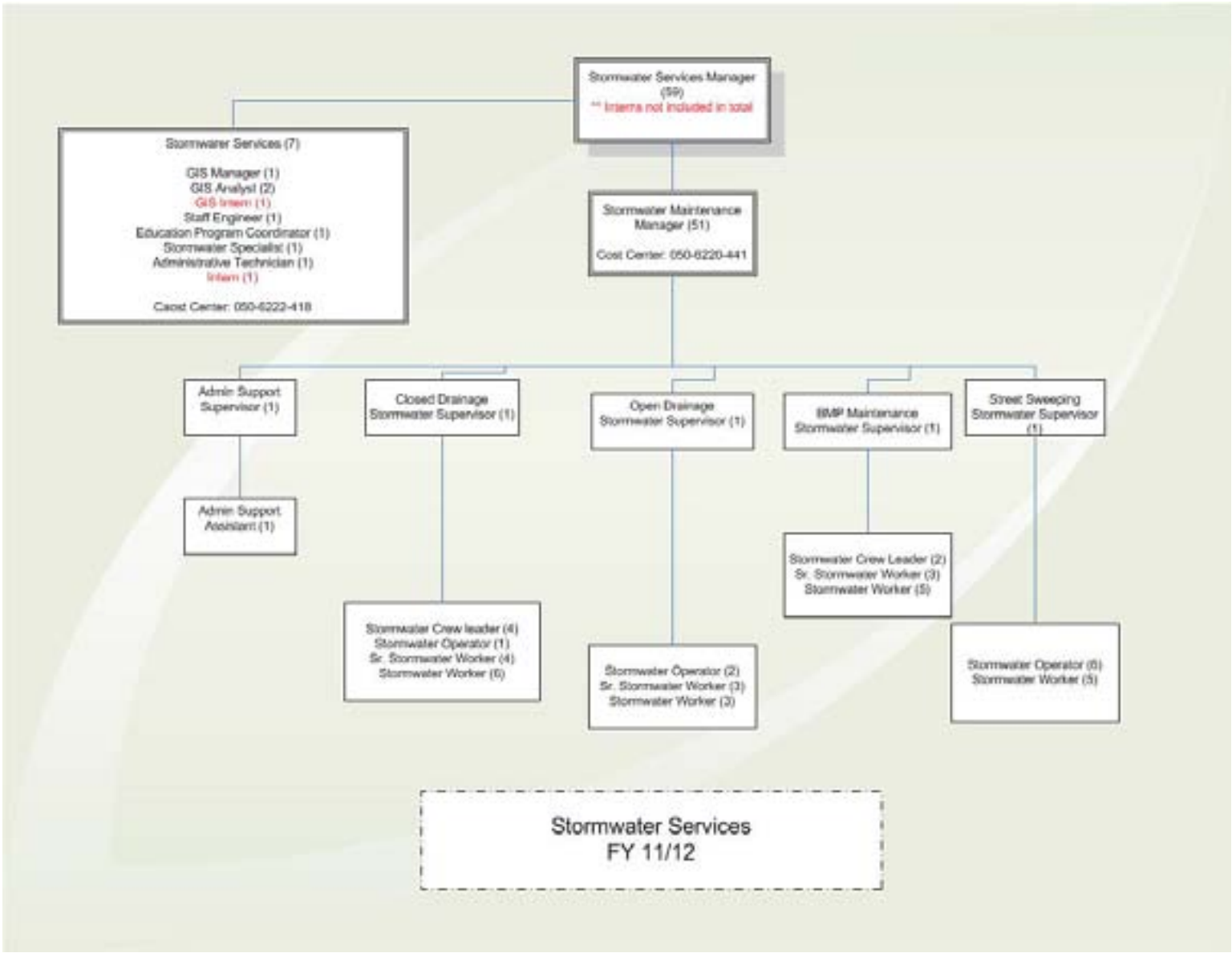
routes. BMP maintenance consists of activities necessary to keep over 40 ponds, wetlands, and bio-retention areas in fully-functioning condition.

## WATER QUALITY

Water quality monitoring is executed by the University of North Carolina at Wilmington under annual contract with the City. Monitoring is performed on specific creeks and waterways within the City limits. Monitoring tests for specific pollutants and resulting data is used to plan capital improvement projects, guide outreach and education efforts, assess water quality at the sites monitored, identify persistent pollutant discharge areas or points, help to build a framework for future detection and tracing of pollutant sources and obtain grant funding. In addition, Stormwater Services implements an extensive outreach, education, and public involvement program that serves the citizens of Wilmington and includes a wide array of water quality education programming and materials. These programs include school presentations, homeowner association outreach, stormwater publications and giveaways, mass media advertising, special event exhibits, workshops, volunteer cleanups and storm drain marking, and collaborative efforts such as grant projects. These efforts strive to educate and engage citizens in protecting and improving local water quality through awareness, education, behavior modification and action.

**Management and Planning**

***Organization Chart of the Stormwater Services Division***



***Current FY Budget and Next Year's Anticipated Budget****

Estimated FY 11-12 Stormwater Management Fund Budget for NPDES

| | FY 10-11 Adopted | FY 11-12 Estimated |
|---|---|---|
| REVENUES | | |
| Storm Water Utility Fees | 5,406,647 | 5,919,738 |
| City Streets Storm Water Fees | 1,466,740 | 1,627,935 |
| Storm Water Discharge permits | 43,200 | 43,200 |
| NCDOT Drainage Maintenance | 37,000 | 37,000 |
| Transfer from Payment in Lieu | 30,000 | 30,000 |
| Interest Earnings | 36,964 | 28,397 |
| Miscellaneous | - | - |
| Appropriated Fund Balance | - | - |
| TOTAL REVENUES | 7,020,551 | 7,686,270 |
| EXPENDITURES | | |
| Public Services | 4,523,088 | 4,515,282 |
| Nondepartmental | 599,243 | 687,947 |
| Debt Service | 1,823,220 | 1,544,541 |
| Contingency | 75,000 | 75,000 |
| Transfer to Capital Project Fund | - | 863,500 |
| TOTAL EXPENDITURES | 7,020,551 | 7,686,270 |

Note: Estimated Budget for FY 2011-12 has not yet been presented to City Council for approval and is provided in this report in draft form.

*Source: HTE System Application

**Regulatory and Enforcement**

***Public Services Code Enforcement***

The City's new stormwater ordinance required by this permit is complete and has been effective beginning November 1, 2009. We have also implemented the Stormwater Hotline and the webpage reporting form, and have had an increase in stormwater reports. All complaints received by the Stormwater Division either from the public or from City staff is investigated; corrective action is prescribed, and followed up to ensure resolution and documentation. A Penalty /Enforcement Guidance Matrix has been developed to help with consistency and to guide through the decision making process for NOV issuance. Any complaints received that have environmental impacts other than stormwater or fall outside the City's regulatory authority are referred to DENR DWQ Wilmington Regional Office. In an effort to maximize voluntary compliance, we have, and continue to, develop and distribute educational material to targeted populations in an aggressive manner. Consequently all complaints provide the opportunity to educate the public on the issues which threaten stormwater, the best management practices for prevention, the awareness of our city's stormwater program, and the new ordinance.

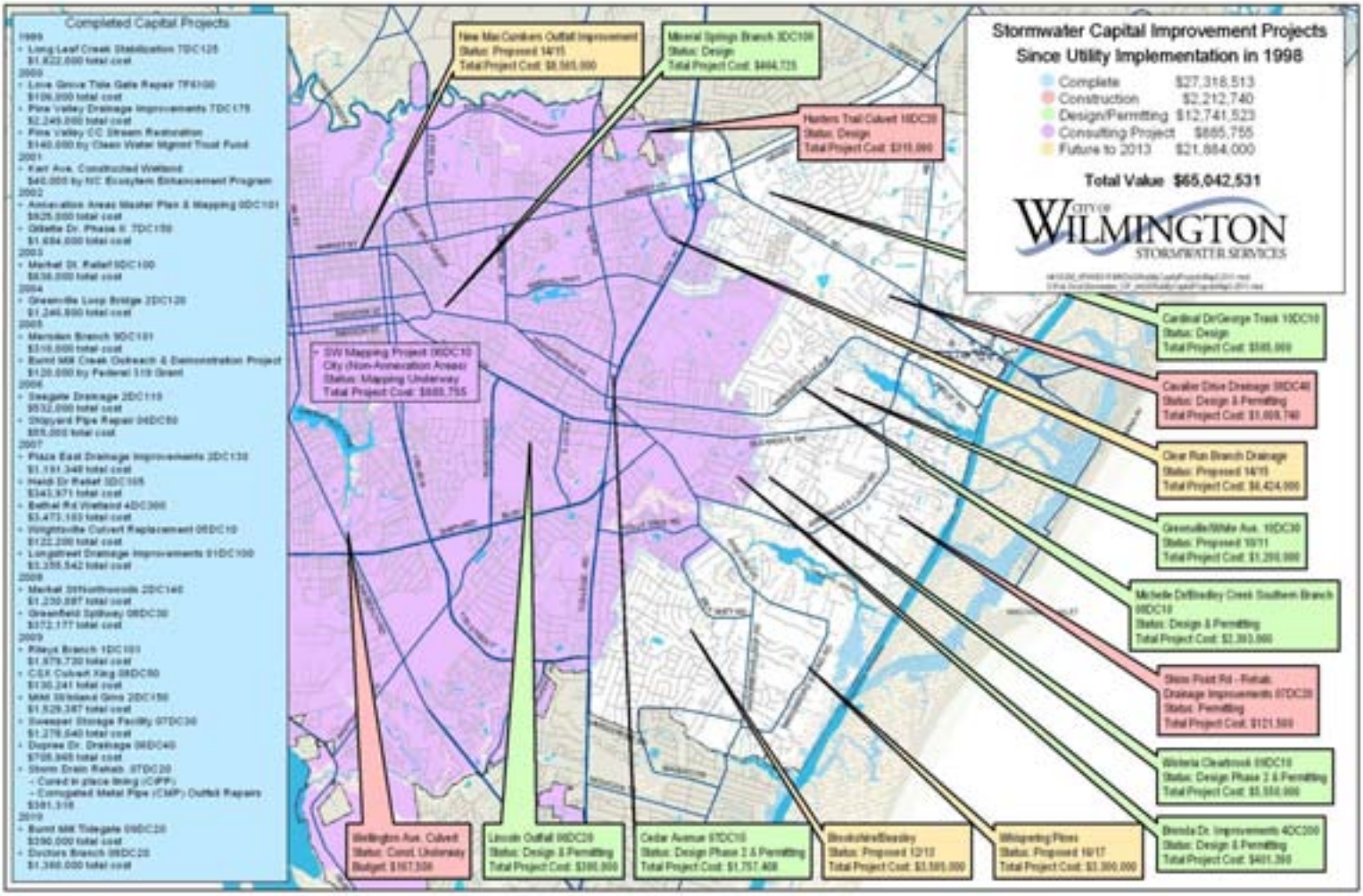
***Cape Fear Public Utility***

The Cape Fear Public Utility Authority currently employs 6 Environmental Compliance Officers that's duty it is to implement and enforce elements of the City's NPDES Wastewater Discharge Permit, the City's Collection System Permit. As part of those requirements the group regulates sanitary sewer overflows (SSOs) and eliminates any wastewater or other polluted waters from leaving their system. They respond to reports and investigate leads generated by the public or monitoring results as part of their permit requirement and respond using public education, enforcement and maintenance. The CFPUA copies the City on all SSOs and follows up with monitoring results and clean up measures. The CFPUA has maintained right of entry on the properties that it services. We are working together with them to keep open lines of communication, continue to build relationships and combine resources in a continued effort to locate chronic leaks and minimize release to MS4.

In January 2011, the CFPUA and the City established a policy for the reporting and documentation of SSOs and leaks. This policy provides procedures for CFPUA to follow regarding reporting and documentation of SSOs the impact the City's MS4. These guidelines will enable the City to comply with Phase II reporting requirements as well as provide assistance to CFPUA in mitigating any potential threat to public health and environment. This policy is attached in Appendix C.

## Capital Improvement Projects

### *Capital Projects Summary Map*



***In- House Projects***

| **Location** | **Installed/Constructed** | **Description** | **Total Cost** |
|---|---|---|---|
| Dram Tree Park | Installed pipe, structures | 277 ft. pipe, 3 manholes, 3 basins | 25,494.53 |
| 2708 Shandy Lane | Installed pipe | 50 ft. pipe | 13,935.16 |
| 445 Shipyard Blvd. | Installed pipe, structures | 62 ft. pipe, 2 basins | 10,927.51 |
| 3rd St & Ann St. | Installed pipe, structures | 61 ft. pipe, 1 manhole, 1 basin | 22,663.76 |
| Verbenia Dr. | Installed pipe, structures | 422 ft. pipe, 5 basins | 54,919.95 |
| 1305 Bar Harbor Dr. | Installed pipe, structures | 8 ft. pipe, 1 basin | 3,489.03 |
| | | | **$131,429.94** |

## Operations and Maintenance

### *Yearly Maintenance Activities Chart*

| Activity | Amount | Unit of Measure | Labor Hours | Total Cost |
|---|---|---|---|---|
| **INSPECTION** | | | | |
| BMP | 389.00 | Each | 288.00 | $6,004.07 |
| Closed | 15541.00 | Ft. | 4,539.00 | $120,583.16 |
| Open | 85.00 | | 830.00 | $18,377.62 |
| Tidegate | | | 105.50 | $3,710.20 |
| | | | | **$148,675.05** |
| **MAINTENANCE** | | | | |
| Culvert | 694.00 | Each | 284.00 | $6,495.32 |
| Ditch (Manual) | 416,960.00 | Ft. | 7,820.00 | $174,268.46 |
| Ditch (Mechanical) | 16,265.25 | Ft. | 2,040.50 | $76,368.61 |
| Structure | 12,765.00 | Each | 3,984.12 | $103,088.17 |
| Haul waste | 381.00 | Load | 482.50 | $17,901.23 |
| Mowing | 425,598.00 | Ft. | 1,822.75 | $62,429.47 |
| Pipe | 146,382.50 | Ft. | 3,779.75 | $103,357.28 |
| BMP | | | 4,025.50 | $105,496.30 |
| Lake | | | 930.50 | $30,269.27 |
| Tidegate | | | 304.50 | $6,906.94 |
| Sweeping | 11,276.08 | Mile | 6,227.25 | $389,926.19 |
| | | | | **$1,076,507.24** |
| **REPAIR** | | | | |
| Pipe Failure | 237.00 | Each | 7,243.75 | $229,865.83 |
| Erosion | 1,542.00 | Ft. | 517.65 | $19,767.92 |
| | | | | **$249,633.75** |

## Water Quality

### *Monitoring Program Overview*

In October 1997, the City of Wilmington contracted with the UNCW Center for Marine Science for a project with the goal of assessing water quality in Wilmington City watersheds under base flow conditions. Also, certain sites were analyzed for sediment heavy metals concentrations (EPA Priority Pollutants). New Hanover County also participated in this effort for tidal creeks outside of City jurisdiction. UNCW produced a combined report of results entitled Environmental Quality of Wilmington and New Hanover County Watersheds. Immediately below is an overview of their work methods. Following this overview is the executive summary of their most recent report.

The water quality data in these reports are presented from a watershed perspective. Some of the watersheds cross political boundaries (i.e. parts of the same watershed may lie in the County but not the City). Howe and Whiskey Creeks are examples. Water quality parameters analyzed in the tidal creeks include water temperature, pH, dissolved oxygen, salinity/conductivity, turbidity, nitrate, ammonium, orthophosphate, chlorophyll *a*, and in selected creeks fecal coliform bacteria. Similar analyses were carried out in the City watersheds with the addition of total Kjeldahl nitrogen (TKN), total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS) and biochemical oxygen demand (BOD) at selected sites.

### *Water Quality Methods*

Field parameters were measured at each site using a YSI 6920 Multiparameter Water Quality Probe (sonde) linked to a YSI 650 MDS display unit. Individual probes within the instruments measured water temperature, pH, dissolved oxygen, turbidity, salinity, and conductivity. YSI Model 85 and 55 dissolved oxygen meters were also used on occasion. The instruments were calibrated prior to each sampling trip to ensure accurate measurements. The UNCW Aquatic Ecology laboratory is State-Certified for field measurements (temperature, conductivity, dissolved oxygen and pH) and for laboratory chlorophyll *a* measurements.

The analytical method used to measure chlorophyll *a* is described in Welschmeyer (1994) and US EPA (1997). Chlorophyll *a* concentrations were determined from the 1.0 micrometer glass fiber filters used for filtering samples for nitrate+nitrite and orthophosphate analyses. All filters were wrapped individually in aluminum foil, placed in an airtight container and stored in a freezer. During the analytical process, the glass filters were separately immersed in 10 ml of a 90% acetone solution. The acetone was allowed to extract the chlorophyll from the material for 18-24 hours. The solution containing the extracted chlorophyll was then analyzed for chlorophyll *a* concentration using a Turner AU-10 fluorometer. This method uses an optimal combination of excitation and emission bandwidths that reduces errors in the acidification technique.

Nutrients (nitrate, ammonium, total Kjeldahl nitrogen, total nitrogen, orthophosphate, and total phosphorus) and total suspended solids (TSS) were analyzed by a state-certified contract laboratory using EPA and APHA techniques. We also computed inorganic nitrogen to phosphorus molar ratios for relevant sites (N/P). Fecal coliform concentrations were determined using a membrane filtration (mFC) method (APHA 1995).

For a large wet detention pond (Ann McCrary Pond on Burnt Mill Creek) and for a constructed wetland on Kerr Avenue (at the headwaters area of Burnt Mill Creek) UNCW collected data from input (control) and outfall stations. This data was used to test for statistically significant differences in pollutant concentrations between pond input and output stations. The data were first tested for normality using the Shapiro-Wilk test. Normally distributed data parameters were tested using the paired-difference t-test, and non-normally distributed data parameters were tested using the Wilcoxon Signed Rank test. Statistical analyses were conducted using SAS (Schlotzhauer and Littell 1987).

*Wilmington Watersheds Yearly Monitoring Report*

# ENVIRONMENTAL QUALITY OF WILMINGTON AND NEW HANOVER COUNTY WATERSHEDS 2010

by

Michael A. Mallin, Elizabeth A. Steffy, Matthew R. McIver and Mary I. Haltom

CMS Report 11-01
Center for Marine Science
University of North Carolina Wilmington
Wilmington, N.C. 28409
www.uncw.edu/cmsr/aquaticecology/tidalcreeks

April 2011

Funded by:

The City of Wilmington and the Newland Corporation

## Executive Summary

This report represents combined results of Year 12 of the Wilmington Watersheds Project. Water quality data are presented from a watershed perspective, regardless of political boundaries. The program involved 9 watersheds and 24 sampling stations. In this summary we first present brief water quality overviews for each watershed from data collected between January and December 2010.

Barnards Creek – Barnards Creek drains into the Cape Fear River Estuary. It drains a 4,161 acre watershed that consists of about 17% impervious surface coverage, and a population of approximately 12,200. There was one station sampled in this watershed during 2010, lower Barnard's Creek at River Road. Based on 3 samples collected between January and June 2010, there was one minor algal bloom and no major turbidity problems. Dissolved oxygen was below the state standard on 33% of occasions sampled. Fecal coliform bacteria exceeded the NC

standard of 200 CFU / 100 mL on one of the sampling trips and equaled it on another; in general water quality in this creek was poor in 2010.

Bradley Creek – Bradley Creek drains a watershed of 4,631 acres, including much of the UNCW campus, into the Atlantic Intracoastal Waterway (ICW). The watershed contains about 23% impervious surface coverage, with a population of about 16,470. Three sites were sampled, all from shore. In 2010 there were no problems with turbidity or algal blooms exceeding the state standard. Average dissolved oxygen was good to fair at the three sites. However, all three sites sampled were all rated poor due to high fecal coliform bacteria, with the south branch site on Wrightsville Avenue, BC-SB, having especially high counts. We note that construction activity has been ongoing upstream of BC-NB, the north branch site on Wrightsville Avenue.

Burnt Mill Creek – Burnt Mill Creek drains a 4,252 acre watershed which is extensively urbanized (36% impervious surface coverage) into Smith Creek. Three locations were sampled during 2010. This creek has very poor water quality, with algal blooms occurring on several occasions at two of the three sites sampled, and major issues with high fecal coliform counts, with two of the three sites exceeding the human contact standard > 60% of occasions sampled. These levels of pollution have characterized the system for the past several years. Dissolved oxygen concentrations were fair in 2010. Sediment sampling showed that significant pollution by toxic compounds called polycyclic aromatic hydrocarbons (PAHs) occurred throughout the creek, and the lower creek sediments were also polluted by high lead, zinc and mercury concentrations.

The effectiveness of Ann McCrary wet detention pond on Randall Parkway as a pollution control device for upper Burnt Mill Creek was not strong for 2010. Comparing inflows to outflows, there was a significant increase in dissolved oxygen and pH. However, there were no significant decreases in nutrients. Several water quality parameters showed a worsening in pollutant levels along the creek from where it exited the detention pond to the downstream Princess Place sampling station, including dissolved oxygen, fecal coliform bacteria, nitrogen and phosphorus.

Greenfield Lake – This lake drains a watershed of 2,551 acres, covered by about 36% impervious surface area with a population of about 10,630. This urban lake has, over the years, suffered from low dissolved oxygen, algal blooms, periodic fish kills and high fecal bacteria counts. The lake was sampled for physical parameters at three tributary sites and for all parameters at three in-lake sites. The three tributaries of Greenfield Lake (near Lake Branch Drive, Jumping Run Branch, and Lakeshore Commons Apartments) all suffered from low dissolved oxygen problems.

From 2005 to 2010 several steps were taken by the City of Wilmington to restore viability to the lake. Sterile grass carp were introduced to the lake to control (by grazing) the overabundant aquatic macrophytes, and four SolarBee water circulation systems were installed in the lake to improve circulation and force dissolved oxygen from the surface downward toward the bottom. Also, on several occasions a contract firm and City staff applied herbicides to further reduce the amount of aquatic macrophytes. These actions led to a major reduction in aquatic macrophytes lake wide. In 2010 there was good to fair dissolved oxygen at two of the lake stations (especially nearest the SolarBees), but low dissolved oxygen concentrations were common at GL-2340, in the upper lake.

Algal blooms are periodically problematic in Greenfield Lake, and have occurred during all seasons, but are primarily a problem in spring and summer. In 2010 algal blooms did occur in the lake, but we note that chlorophyll *a*, as well as average total nitrogen and total phosphorus were lower than they had been in the past three years.

In the period 2007-2010 there was a statistically significant relationship within the lake between chlorophyll *a* and BOD5, meaning that the algal blooms are likely an important cause of low dissolved oxygen in this lake, along with stormwater runoff of BOD materials into the streams feeding the lake. Thus, a challenge for Greenfield Lake is to continue to reduce the frequency and magnitude of the algal blooms, which will lead to continuing dissolved oxygen improvements. High fecal coliform counts continue to periodically impact the lake, although average fecal coliform counts in 2010 were lower than in the previous two years. Non-point source pollution control should be targeted to reduce nitrogen, suspended materials and fecal bacteria to the lake.

Hewletts Creek – Hewletts Creek drains a large (7,435 acre) watershed into the Intracoastal Waterway. This watershed has about 19% impervious surface coverage with a population of about 20,210. In recent years this system has been plagued by a number of sewage spills. In 2010 the creek was sampled at four tidal sites and one non-tidal freshwater site. There was only one month where incidents of low dissolved oxygen were seen in our sampling (September) although none were severe (below 3.6 mg/L). Turbidity was low and no major algal blooms were seen at these stations in 2010. Fecal coliform bacterial pollution continued to impact Hewletts Creek in 2010, with three of the five sites (one at NB-GLR, the north branch at Greenville Loop Rd., one at MB-GLR, the middle branch at Pine Grove Rd., and one at PVGC-9, draining Pine Valley Golf Course); exceeding the North Carolina standard of 200 CFU/100 mL 80% of the time or more. Fecal coliforms at the south branch site, SB-PGR, did not exceed the State standard. Sediment sampling in Hewletts Creek found no sites with concentrations of metals, PCBs or PAHs that are considered dangerous to aquatic life.

During 2007 the 7.6 acre JEL Wade wetland was constructed to treat stormwater runoff from a 589 acre watershed within the Hewletts Creek drainage. Drainage for this wetland enters the south branch of the creek, upstream of the SB-PGR sampling site. A rain event sampling program was carried out in 2009-2010 to evaluate the efficacy of the wetland in reducing pollutant loads (fecal bacteria, nutrients, suspended solids and metals) from the stormwater runoff passing through the wetland. During the eight storms sampled, the wetland served to retain and/or remove 50-75% of the inflowing stormwater volume within the wetland. High removal rates of fecal coliform bacteria were achieved (based on “first flush”), with an average load reduction of 99% and overall concentration reduction of > 90%. Particularly high (>90%) load reductions of ammonium and orthophosphate loads also occurred, and lesser but still substantial reductions of total phosphorus (89%) and TSS loads (88%) were achieved. Removal of nitrate was seasonally dependent, with lower removal occurring in cold weather and high percentage (90%+) nitrate load removal occurring in the growing season when water temperatures exceeded 15$^{o}$C. Most metals tested had concentrations too low to be measured in inflowing and outflowing waters, except for zinc, for which an average load reduction of 87% was achieved. Since the principal source of impairment in Hewletts Creek is fecal bacteria contamination, and a secondary source is algal blooms (limited by nitrogen in this system), this

constructed wetland appears to be very successful in reducing both concentrations and loads of polluting substances to the receiving waters. Additionally, data for Station SB-PGR showed a statistically significant decline in both ammonium and nitrate after completion of the wetland.

Howe Creek – Howe Creek drains a 3,518 acre watershed into the ICW. This watershed hosts a population of approximately 4,230 with about 19% impervious surface coverage and a population of about 6,460. Three stations were sampled in Howe Creek in 2010. Only one major algal bloom was seen, at the uppermost station HW-DT in May. Both upper stations, HW-DT and HW-GP were rated poor due to high fecal coliform bacteria counts, exceeding the state standard on 40% and 60% of the times sampled, respectively. The lower station HW-FP was rated good, not exceeding the standard in 2010. Dissolved oxygen concentrations were fair in Howe Creek in 2010. Since wetland enhancement was performed in 1998 above Graham Pond the creek below the pond at Station HW-GP has had fewer and smaller algal blooms than before the enhancement.

Motts Creek – Motts Creek drains a watershed of 3,328 acres into the Cape Fear River Estuary with a population of about 9,530. This creek was sampled 3 times at one station at River Road in 2010 as a result of funding from the private sector. Dissolved oxygen concentrations were above the state standard of 5.0 mg/L on all three of the sampling occasions in 2010. Neither turbidity nor suspended solids were problematic in 2010, and there was only one major algal bloom encountered in the sampling and a consequent pulse of 10 mg/L of BOD5. However, fecal coliform bacteria contamination was a problem in Motts Creek, with the State standard of 200 CFU/100 mL exceeded on 67% of the occasions sampled and the geometric mean above the NC standard. Failing septic systems in upper areas of the creek have been considered by County Health authorities to be one source of this contamination. Thus, in 2010 this creek showed poor water quality based on periodic algal blooms and fecal coliform problems.

Smith Creek – Smith Creek drains into the lower Northeast Cape Fear River just upstream of where it merges with the Cape Fear River. It has a watershed of 13,896 acres that has about 28% impervious surface coverage, with a population of about 26,000. One estuarine site on Smith Creek, SC-CH, was sampled by UNCW under the auspices of the Lower Cape Fear River Program (LCFRP) 2010. The water quality in 2010 was generally good, but having a few elevated fecal coliform counts.

Whiskey Creek – Whiskey Creek is the southernmost large tidal creek in New Hanover County that drains into the ICW. It has a watershed of 2,095 acres, a population of about 8,000, and is covered by approximately 19% impervious surface area. One station, on Masonboro Loop Road, was sampled from shore along this creek in 2010. This site had low to moderate nutrient concentrations and no algal bloom problems. Dissolved oxygen was substandard (4.0 mg/L) only in September. Fecal coliform bacteria counts were generally good at this site in 2010.

Water Quality Station Ratings – The UNC Wilmington Aquatic Ecology Laboratory utilizes a quantitative system with four parameters (dissolved oxygen, chlorophyll *a*, turbidity, and fecal coliform bacteria) to rate water quality at our sampling sites. If a site exceeds the North Carolina water quality standard for a parameter less than 10% of the time sampled, it is rated Good; if it exceeds the standard 10-25% of the time it is rated Fair, and if it exceeds the standard > 25% of the time it is rated Poor for that parameter. We applied these numerical standards to the water

bodies described in this report, based on 2010 data, and have designated each station as good, fair, and poor accordingly (Appendix B).

Fecal coliform bacterial conditions for the entire Wilmington City and New Hanover County Watersheds system (21 sites sampled for fecal coliforms) showed 24% to be in good condition, 14% in fair condition, but 62% in poor condition. Dissolved oxygen conditions system-wide (24 sites) showed 29% of the sites were in good condition, 50% were in fair condition, and 21% were in poor condition. For algal bloom presence, measured as chlorophyll *a*, 75% of the 20 stations sampled were rated as good, 10% as fair and 15% as poor (sites in Greenfield Lake, Burnt Mill Creek, and Motts Creek). In terms of turbidity all 100% of the 24 sites sampled were rated as good. It is important to note that the two water bodies with the worst water quality in the system also have the most developed watersheds with the highest impervious surface coverage; Burnt Mill Creek – 36% impervious coverage; Greenfield Lake – 36% impervious coverage.

***Wilmington Watersheds Map***

**NPDES STORWMATER PERMIT BMPs & 10/11 REPORTING**

**2010-2011 PROGRAM HIGHLIGHTS**

**Public Education & Outreach**

- Targeted public outreach was conducted for pet waste, yard waste, and illicit discharge after the city adopted a new stormwater ordinance in Fall 2009
- 66 school presentations were conducted in 8th grade science classes for approximately 2,000 students in New Hanover County Schools.

**Public Involvement & Participation**

- 10 watershed clean-ups and invasive species removal events were held utilizing 163 volunteers donating 535 hours of volunteer time
- 4 public meetings were held to involve citizens in the process to implement capital projects
- 19 calls were placed to the Stormwater Hotline (910-341-1020). See appendix C.

**Illicit Discharge Detection and Elimination**

- Stormwater infrastructure mapping has continued with the eventual goal of mapping the public drainage system throughout the City. Concurrent with this effort, major outfalls are being located and verified according to standards for industrial or non-industrial source areas as required. Methods & procedures for mapping have continued to advance. Progress has been made towards developing our data model to accommodate the requirements of the NPDES program while also addressing other organizational needs.
- Finalized Illicit Discharge Detection and Elimination Policies and Procedures Manual.
- Finalized reporting and communication procedures with the Cape Fear Public Utilities Authority regarding sanitary sewer overflows to the City's stormwater system.

**Post Construction Site Runoff Control**

- Conducted bi-annual inspections on privately owned BMPs located within the City limits in order to ensure that maintenance requirements were being met by property owners. In June 2010, 304 sites were inspected with 27 requiring corrective action. In Dec./Jan. 2010/11, 315 sites were inspected with 23 requiring corrective action.
- Continued implementing the City's amended Land Development Code to provide post construction controls to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the new Coastal Stormwater Legislation. City Council adopted new ordinance on September 15, 2009 (Sec. 18-737)

**Pollution Prevention and Good Housekeeping**

- Finalized Standard Operations Procedures for City Stormwater Maintenance Operations.
- Finalized transfer of General Stormwater Permit to Cape Fear Public Transit Authority along with SPPP site requirements.
- Conducted site investigation on City's Vehicle Maintenance Facility for Stormwater Pollution Prevention Plan. Plan will be finalized in Spring 2011.

**PUBLIC EDUCATION AND OUTREACH**

## 1. Objectives for Public Education and Outreach

(a) Distribute educational materials to the community.
(b) Conduct public outreach activities.
(c) Raise public awareness on the causes and impacts of stormwater pollution.
(d) Inform the public on steps they can take to reduce or prevent stormwater pollution.

## 2. BMPs for Public Education and Outreach

The permittee shall implement the following BMPs to meet the objectives of the Public Education and Outreach Program and shall notify the Division prior to modification of any goals.

| BMP | Measurable Goals | YR 1 | YR 2 | YR 3 | YR 4 | YR 5 |
|---|---|---|---|---|---|---|
| (a) Identify target pollutants and target pollutant sources | Identify the target pollutant and target pollutant sources the permittee's public education program is designed to address and why they are an issue. | X | | | | |

**10-11 Accomplishments**

This comprehensive summary of target pollutants, sources, and target audience is included in the Public Education & Outreach Appendix section. This summary identifies the non- point source pollutants that our public education program addresses, an explanation of why these particular pollutants were chosen, the target audience(s) for each pollutant, and suggested strategies for educating the public about each pollutant. Staff regularly uses the information as a guide for planning outreach and education efforts.

**11-12 Proposed Objectives**

The target pollutant summary will continue to guide education and outreach efforts and will be modified and updated as audience demographics and other variables change over time.

| | | | | | | |
|---|---|---|---|---|---|---|
| (a) Identify target audiences | Identify the target audiences likely to have significant stormwater impacts and why they were selected. | X | | | | |

**10-11 Accomplishments**

This BMP was completed in Year 1 (see explanation above). This comprehensive summary of target pollutants, sources, and audiences is included in the Public Education & Outreach appendix.

In addition, this BMP is updated as the target audience for each pollutant evolves and changes. The internet and social media often play a role in the evolution and demographics of particular audiences.

**11-12 Proposed Objectives**
Modify target audiences as this variable changes over time. The internet and social media often play a role in the evolution and demographics of particular audiences.

| | | | | | | |
|---|---|---|---|---|---|---|
| (b) Informational Web Site | Promote and maintain internet web site. Examples include, but are not limited to: Post newsletter articles on stormwater, information on water quality, stormwater projects and activities, and ways to contact stormwater management program staff. | X | | | | |

**10-11 Accomplishments**
The internet is a powerful tool for disseminating stormwater education and information. Stormwater staff continues to maintain and update our well-developed website on a regular basis. The website features general stormwater education info, news and events, capital projects, brochures, newsletters, local watershed map and information, drainage projects, best management practices (BMPs), school programs, storm drain marking information, UNCW monitoring data, maintenance activities, and more.

The What's New? section has enabled staff to add pertinent and timely information related to stormwater projects and education efforts. In addition, the shorter web address for Stormwater Services (wilmingtonnc.gov/stormwater) has proven invaluable and easier for driving citizens to our website. This website address is included on all educational stormwater brochures, and mass media promotions to drive traffic to the website.

In conjunction with the Enviroscape watershed program for eighth grade science classes, a dedicated Enviroscape website has been established to provide teachers and students with resources related to the presentation. This web address is wilmingtonnc.gov/enviroscape

Citizens can make reports of stormwater pollution (aka illicit discharges) via a contact form on the website. wilmingtonnc.gov/reportstormwaterpollution

**11-12 Proposed Objectives**
Continue to add updated, relevant content to the website. Promotion of the web-based illicit discharge reporting tool is a priority for the coming permit year.
Staff would like to roll out an online contest in which citizens would visit the Stormwater Services website to answer education questions. Staff will need to work with city IT staff to develop this contest for the web.

| | | | | | | |
|---|---|---|---|---|---|---|
| (c) Develop and distribute public education materials to identified user groups. For example, schools, homeowners, and/or | Develop general stormwater educational material to appropriate target groups as likely to have a significant stormwater impact. Instead of developing its own materials, the permittee may rely on state-supplied Public Education and Outreach | | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| businesses. | materials, as available, when implementing its own program. | | | | | |

**10-11 Accomplishments**

Staff worked in coordination with Code Enforcement to develop targeted educational materials and direct mailings for distribution to auto professionals, carpet cleaners, vehicle detailers, pressure washers and owners of swimming pools.

Work was completed on the Homeowner and Structural BMP brochure to combine them into one publication that will be printed in spring 2011.

In addition, the existing restaurant and yard waste posters were translated to Spanish and posted on our website on the "Publications & Videos" page.

**11-12 Proposed Objectives**

Continue to send targeted mailings in response to neighborhood and citizen complaints and code enforcement requests for stormwater pollutants - pet waste, yard waste, lawn care, illicit discharge, etc.

| | | | | | | |
|---|---|---|---|---|---|---|
| (d) Media Campaign | Document campaign reach and frequency to public for each broadcast media like radio and TV, (including those elements implemented locally or through a cooperative agreement). | | | X | | |

**10-11 Accomplishments**

Stormwater Services funds an annual media outreach campaign on major network and broadcast stations including television, radio, and print media. Utilizing mass media outlets has proven to be an effective tool for targeting specific audiences with tailored stormwater messages. Stormwater Services has established valuable partnerships with television and radio stations which have enabled us to extend our dollars by receiving "buy one, get one free" ads or "comped" ads.

In the spring of 2010, two new television public service announcements (PSAs) were produced for pet waste and yard waste. These PSAs were aired on broadcast television stations through a paid campaign and on the City's cable access channel (GTV-8). They were also posted on the Stormwater Services website for online viewing.

Stormwater Services continues to partner with Going Green magazine on the "Stormwater 101" series. This past spring, we featured a stormwater ad featuring a fish, and this fall included an article about pet waste. In addition, a stormwater ad was featured in WECT's Cape Fear Lifestyles magazine.

Visit the Appendix to view media campaign information, including documented reach and frequency of each campaign.

**11-12 Proposed Objectives**
Work with Wave Transit to post stormwater posters in 22 public transit buses.

Continue to partner with Going Green magazine on the Stormwater 101 series.

Continue to partner with local television and radio stations to air stormwater PSAs.

| | | | | | | |
|---|---|---|---|---|---|---|
| Establish Hotline/Help line | **Maintain a stormwater hotline/helpline.** | | | X | | |

**10-11 Accomplishments**
The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and reports of stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to hotline reports from citizens. The hotline and webform are advertised on the City's cable TV channel and through newsletters, media press releases, and educational giveaway items. Nineteen calls were placed to the City's Stormwater hotline for this reporting year. The results of those calls are found in Appendix C.

**11-12 Proposed Objectives**
The hotline will continue to be advertised to the public and code enforcement staff will respond to phone and web reports.

| | | | | | | |
|---|---|---|---|---|---|---|
| Establish a Public Education and Outreach Program and implement within 12 months of the permit issue date. | **The permittee's outreach program, including those elements implemented locally or through a cooperative agreement, must include at least two of the following:**<br><br>**Newspaper articles, press releases and/or paid advertisements (i.e., inserts)**<br>**Kiosks and signage**<br>**Targeted direct mail**<br>**Displays at the point-of purchase**<br>Utility bill inserts<br><br>The permittee's outreach program, including those elements implemented locally or through a cooperative agreement, must include at least two of the following:<br><br>Public meetings | X | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Community events<br>Contest<br>Storm drain marking<br>Stream and Litter cleanups<br>Group presentation and/or speeches<br><br>The permittee's outreach program, including those elements implemented locally or through a cooperative agreement, must include at least three of the following:<br><br>News coverage<br>Workshops and class room outreach<br>Distributing promotional giveaways and specialty items<br>Brochures, displays, signs, welcome packets, and pamphlets<br>Local cable access<br>Newsletters<br><br>For each media, event or activity, including those elements implemented locally or through a cooperative agreement, measure and record the extent of exposure. | | | | | |

**10-11 Accomplishments**

Stormwater Services engages in many of these educational activities, above and beyond the required minimum guidelines established by our NPDES permit. These activities are listed in detail in the Public Education and Outreach Appendix.

**11-12 Proposed Objectives**

Continue to deliver Enviroscape watershed presentations to all 8th grade science classes in New Hanover County Schools through a partnership with outside agencies.

Continue to take part in annual events like Earth Day and Paw Jam.

Utilize partner agencies to implement storm drain marking initiatives, staff trainings, stream and litter cleanups, and community pet waste education.

Publish the annual Stormwater Watch Newsletter in the spring edition of the citywide public information report.

**PUBLIC INVOLVEMENT AND PARTICIPATION**

## 1. Objectives for Public Involvement and Participation

Provide opportunities for the public, including major economic and ethnic groups, to participate in program development and implementation.
(b) Comply with applicable state and local public notice requirements.

## 2. BMPs for Public Involvement and Participation

The permittee shall implement the following BMPs to meet the objectives of the Public Involvement and Participation Program and shall notify the Division prior to modification of any goals.

| BMP | Measurable Goals | YR 1 | YR 2 | YR 3 | YR 4 | YR 5 |
|---|---|---|---|---|---|---|
| Administer a Public Involvement Program | Develop and implement a Public Involvement and Participation Program, as outlined in (b) through (e) below. | X | X | | | |
| Allow the public an opportunity to review and comment on the Stormwater Plan | Conduct at least one public meeting in year 2 to allow the public an opportunity to review and comment on the Stormwater Plan. | | X | | | |
| Organize a volunteer community involvement program | Organize and implement a volunteer stormwater related program, locally or through a cooperative agreement, to promote ongoing citizen participation. Examples include, sponsoring and participating in Big Sweep, Forming partnerships with local businesses, Adopt a stream, Adopt a street, promoting volunteer presentations, Creek crawls, storm drain stenciling, and poster contest | X | | | | |

This deliverable was accomplished in Year 2.

**10-11 Accomplishments**

The City of Wilmington Stormwater Services contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement public involvement and participation activities, as well as education and outreach activities. Both organizations sign a yearly contract with specified deliverables that enable the City to meet many

of its NPDES public education and public involvement requirements. Annual service contracts and a quarterly progress report for each agency are included in the Public Involvement and Participation Appendix.

This particular BMP was accomplished by CFRW & NHSWCD through activities such as volunteer watershed clean-up events (i.e. Big Sweep0, invasive species removals, volunteer creek monitoring, wetland monitoring and plantings, educational workshops for the schools and city employees, implementation of a local stewardship awards program, eco-tours and high school Envirothons, installing a BMP demonstration site at a local school, website updates, and the installation of stormwater BMPs on citizen property through NCCCAP Program (administered by NHSWCD).

**11-12 Proposed Objectives**

Continue to contract with Cape Fear River Watch and New Hanover Soil & Water Conservation District to help the City fulfill NPDES public involvement and public education requirements.

| | | | | | | |
|---|---|---|---|---|---|---|
| (d) Establish a mechanism for Public involvement | Established mechanism for public involvement, for example, a citizens' or stakeholders' group(s) that provide input on stormwater issues and the stormwater program. | X | | | | |

**10-11 Accomplishments**

Staff engaged citizens and businesses through public meetings for capital stormwater improvement projects in Bradley Creek, Cardinal Drive, and Wisteria/Clearbook area.

In conjunction with the North Carolina Coastal Federation, Bradley Creek school students and parents were involved in planting a rain garden and taking part in watershed education activities on the Bradley Creek School campus.

Cape Fear River Watch implemented volunteer watershed cleanups, invasives removals, and creek monitoring.

Staff continued the newly implemented Canines for Clean Water program to engage pet owners in signing a public pledge to clean up after their pets. Owners and dogs received a clean water bandana, dog bones, pet waste brochure, water bottle, and other freebies. As an incentive, pet owners can submit photos of their pets as a Canine for Clean Water to post on our website. Staff attended several pet related events including the Pet Expo, Aunt Kerry's Pet Stop event, and Paw Jam.

Finally, staff continues to partner with New Hanover Soil & Water Conservation District to offer a monthly rain barrel sale to the public on the 2nd Thursday of every month. This fulfills both a stormwater reduction and water conservation objective.

**11-12 Proposed Objectives**

Continue to implement Canines for Clean Water, monthly rain barrel sale, and other volunteer initiatives (i.e. cleanups) through contract agency partnerships.

Staff would still like to implement an online web-based contest to engage the public in learning about stormwater via a website quiz and rain barrel giveaway. This is dependent on cooperation from the Information Technology Dept.

| | | | | | | |
|---|---|---|---|---|---|---|
| (e) Establish Hotline/Help line | **Maintain a stormwater hotline/helpline.** | | | X | | |

**10-11 Accomplishments**

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and reports of stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to hotline reports from citizens. The hotline and webform are advertised on the City's cable TV channel and through newsletters, media press releases, and educational giveaway items.

**11-12 Proposed Objectives**

The hotline will continue to be advertised to the public and code enforcement staff will respond to phone and web reports.

**ILLICIT DISCHARGE DETECTION AND ELIMINATION**

## 1. Objectives for Illicit Discharge Detection and Elimination

Detect and eliminate illicit discharges, including spills and illegal dumping to the Permittee's MS4.
Address significant contributors of pollutants to the MS4. The permittee may require specific controls for a category of discharges, or prohibit that discharge completely, if one or more of these categories of sources are identified as a significant contributor of pollutants to the MS4.
Implement appropriate enforcement procedures and actions.
Develop a map showing the permittee's major MS4 outfalls to state waters receiving discharges.
Inform employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

## 2. BMPs for Illicit Discharge Detection and Elimination

The permittee shall implement the following BMPs to meet the objectives of the Illicit Discharge Detection and Elimination Program and shall notify the Division prior to modification of any goals.

| BMP | **Measurable Goals** | **YR 1** | **YR 2** | **YR 3** | **YR 4** | **YR 5** |
|---|---|---|---|---|---|---|
| (a) Develop/Implement Illicit Discharge Detection and Elimination Program | Develop and implement an Illicit Discharge Detection and Elimination Program including provisions for program assessment and evaluation. | | | X | | |

**10-11 Accomplishments**
The City passed the Ordinance to address illicit discharges to the stormwater system and to protect public water and sewer systems. This Ordinance change went into effect on November 1, 2009.

The City has finalized the Illicit Discharge Detection Elimination (IDDE) Policy and Procedures manual. The purpose of this document is to provide field guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination (IDDE) Program within the City of Wilmington.

The City is currently finalizing reporting and documentation procedures through *Intelligov*, our data management system. All details reported are entered in at the time of the report and as the investigation progresses until it is closed. This database will allow for more efficient reporting and assessment of elements of the program as the program evolves.

**11-12 Proposed Objectives**

Begin training of City personnel on the IDDE policy.

Continue to work with CFPUA and improve working relationship and documentation of SSOs to the City's stormwater system and continue with follow up field visits to insure proper monitoring procedures and clean up measures have been restored to pre-existing conditions.

Continue to utilize the amended Stormwater Ordinance to address the investigation, identification and elimination of illicit discharges and illicit connections reported to the City, or discovered through proactive inspection of stormwater system.

Continue to exercise the data extraction capabilities of the *Intelligov* database for more detail in assessment of the program. The *Intelligov* capabilities, for example, can help to sort data based on the assessment, reporting, and corrective actions involved with an incident. The City will evaluate this data while looking for areas of program improvements if necessary.

| | | | | | | |
|---|---|---|---|---|---|---|
| (b) Establish and maintain appropriate legal authorities | Establish and maintain adequate ordinances or other legal authorities to prohibit illicit discharges and enforce the approved Illicit Discharge Detection and Elimination Program. | | | X | | |

**10-11 Accomplishments**

The City passed the Ordinance to amend Chapter 12 of the City Code on 9/15/2009 to address illicit discharges to the stormwater system and to protect public water and sewer systems. This Ordinance change went into effect on November 1, 2009.

The current Cape Fear Public Utility Authority (CFPUA) ordinance defines wastewaters that are required to be discharged into the sanitary sewer system. The City utilizes CFPUA's ordinance to address discharges of regulated wastewaters to the City's MS4 and other natural outlets.

**11-12 Proposed Objectives**

Educate City employees on the use of the recently finalized IDDE Policies and Procedures Manual so that they may identify, report, and help eliminate illicit discharges.

Continue to address illicit discharges under the Chapter 12 Ordinance.

Continue to work with CFPUA addressing SSOs in the City stormwater system so that communication and documentation procedures between the two agencies remains priority.

| | | | | | | |
|---|---|---|---|---|---|---|
| (c) Develop a Storm Sewer System Base Map | Map identifying major outfalls and stormwater drainage system components. | | | | | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| and Inventory of Major Outfall. | At a minimum, components include major outfalls and receiving streams. Established procedures to continue to identify, locate, and update map of drainage system. | | | | | |

**10-11 Accomplishments**

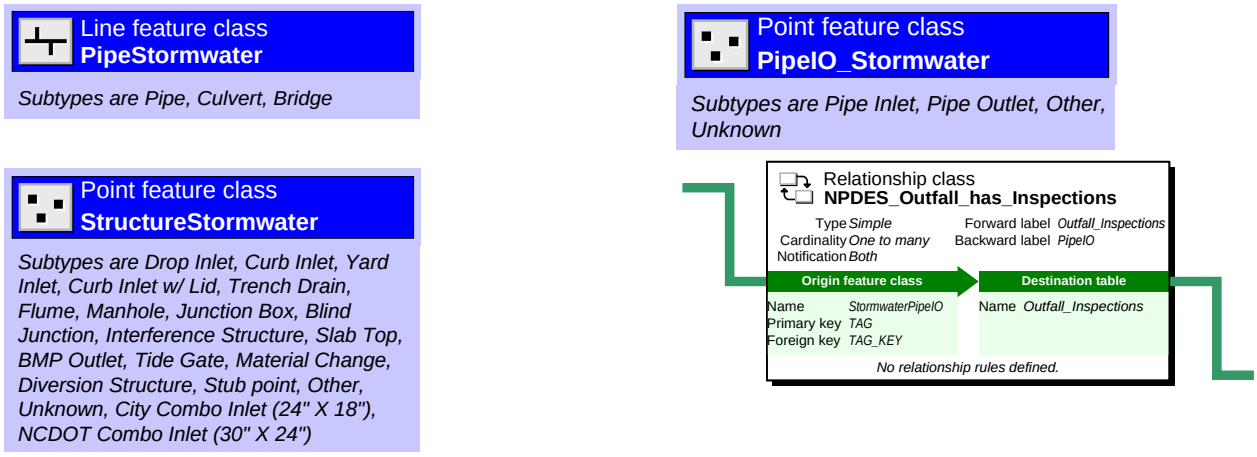
All receiving waterbodies have been identified and mapped. The stormwater system GIS database design is continuing to evolve as modifications are needed to address multiple needs of our program. Digital terrain model analysis and GPS mapping of drainage infrastructure and open channel systems has continued and steady progress is being made towards mapping the entire public system. In-house GPS data collection routines are in place to facilitate updates to the stormwater system GIS database and enable tabular data collection resulting from dry weather outfall monitoring efforts.

Out of the total City area of 52.8 square miles, 30.9 square miles have been mapped since the year 2000. Roughly 19 square miles remains to be mapped since some areas of the City have no MS4 infrastructure.

The City's multiple stormwater system GIS data layers have been consolidated to a single dataset on the City's GIS server and fields are available to store information relevant to NPDES Phase II requirements. The diagrams below show the main structural elements of our stormwater system GIS and the relationship to the dry weather outfall monitoring records. See Changes/Justifications section.

**GEODATABASE STRUCTURAL ELEMENTS & RELATIONSHIPS**

Pipe System Components



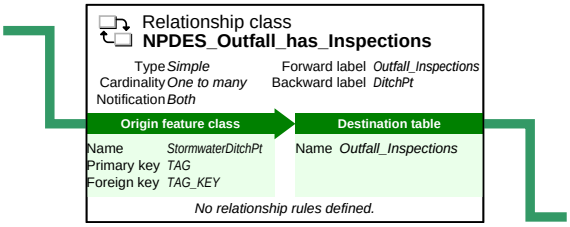

Open System Components

Line feature class
**ChannelStormwater**

*Subtypes are Channel >2' depth, Swale-Ditch <2' depth, Stream, Pond Reach*

Point feature class
**DitchPointStormwater**

*Subtypes are Dimension Change, Classification Change, Direction Change, Illicit Discharge Observed, Tie-In (non-standard pipe), Junction, Terminus (end), Outfall, NPDES Outfall, Easement Begin, Easement End, Obstruction, Photo (see photo link), Other (see comments), Weir, Configuration Change, Stub to Area Not Mapped, Stub from Private, Lining Change*




## Ponds

Polygon feature class
**BMP_Stormwater**

*Subtypes are Wet, Infiltration, Underground Detention, BioRetention, Wetland, Natural, Other*

## Cross Pipes/Interference

Line feature class
**CrossPipeStormwater**

*Subtypes are SANITARY SEWER, GAS, WATER, UNKNOWN*

## Areas Not Mapped

Polygon feature class
**UnmappedAreaStormwater**

A GIS layer showing parcels that are industrial type source areas is available to be used as a background layer to guide identification of outfalls as industrial source or non-industrial source.

No TMDLs have been approved as yet for water bodies in the City's area of responsibility. Water Quality Recovery Programs and associated monitoring efforts would be set up to address those needs should that become necessary.

## 11-12 Proposed Objectives

Continue GPS data collection and associated refinements to field routine and database design for mapping of the public stormwater system.

Complete mapping of major outfalls throughout the City's MS4.

Acquire and process any GIS data sources providing higher quality data for streams, water bodies, and terrain.

Field visits to mapped outfall points for verification of location and recording observations. Establish dry weather monitoring points that are appropriately upgrade from outfalls that are submerged, tidally influenced or otherwise inappropriate for dry weather monitoring.

Continue to establish appropriate dry weather flow monitoring locations as the inventory of major outfalls is developed. Begin recording inspection observations using customized data entry forms in *ArcPad* to store records in a table related to the mapped outfalls.

| | | | | | | |
|---|---|---|---|---|---|---|
| (d) Inspection/detection program to detect dry weather flows at MS4 outfalls | Establish written procedures for detecting and tracing the sources of illicit discharges and for removing the sources or reporting the sources to the State to be properly permitted. | | | X | | |

**10-11 Accomplishments**

The City has completed an Illicit Discharge Detection Elimination (IDDE) Policy and Procedures document. The purpose of this document is to provide guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination Program within the City of Wilmington. The document outlines the investigation, testing, coordination with other authorities, GIS inventory, follow up, and documentation procedures to be taken to resolve a questionable dry weather flow.

The City worked on finalizing reporting and documentation procedures through *Intelligov*, our data management system. All details reported are entered in at the time of the report and as the investigation progresses until it is closed. This documentation into *Intelligov* will allow for the extraction of data for evaluation and assessment for future needs.

Development of the data tables to store dry weather inspections that are related to associated outfalls is complete. The following diagram shows the fields contained in the table.

Table
**NPDES_Outfall_Inspections**

| Field name | Data type | Allow nulls | Default value | Domain | Prec-ision | Scale | Length |
|---|---|---|---|---|---|---|---|
| OBJECTID | Object ID | | | | | | |
| TAG_KEY | Long integer | Yes | | | 0 | | |
| InspectionID | Long integer | Yes | | | 0 | | |
| INSPECTOR_NAME | String | Yes | Joe Inspector | NPDES_INSP_NAME | | | 100 |
| GPS_UNIT | String | Yes | GeoXH-4632491981 | | | | 50 |
| DRY_48HR | String | Yes | YES | YESNO_UNK | | | 16 |
| RAINFALL_AMT24 | Double | Yes | 0.0 | | 0 | 0 | |
| RAINFALL_AMT48 | Double | Yes | 0.0 | | 0 | 0 | |
| SUBMERGED | String | Yes | NO | YESNO_UNK | | | 16 |
| BURIED | String | Yes | NO | YESNO_UNK | | | 16 |
| ILLICIT_DISCHARGE | String | Yes | NO INDICATION | NPDES_DISCHARGE | | | 100 |
| REFERRED | String | Yes | NO | YESNO_UNK | | | 16 |
| SAMPLE | String | Yes | NO | YESNO_UNK | | | 16 |
| INSPECT_DATE | Date | Yes | %Date% | | 0 | 0 | 8 |
| ODOR | String | Yes | NA | NPDES_ODOR | | | 100 |
| COLOR | String | Yes | NA | NPDES_COLOR | | | 100 |
| TURBIDITY | String | Yes | NA | NPDES_TURBIDITY | | | 100 |
| DEPOSITS | String | Yes | NA | NPDES_DEPOSITS | | | 100 |
| PIPE_GROWTH_COLOR | String | Yes | NA | NPDES_PIPE_GROWTH | | | 100 |
| DESCRIPTION | String | Yes | %String% | | | | 254 |

**11-12 Proposed Objectives**

Begin implementing the IDDE policy. Use the regulatory and enforcement mechanisms as outlined in Chapter 12 of the amended stormwater ordinance to address identified illicit discharges.

Fully begin entering illicit discharge incidents into *Intelligov* for tracking, reporting and assessment needs.

Visit outfalls along the Cape Fear River and Smith Creek to verify outfall mapping location and description and/or map new points for outfalls that have not previously been mapped. Utilize the custom data entry forms in *ArcPad* to store records in the NPDES Outfall Inspections table that will relate to the mapped outfalls.

Develop schedule for outfall inspections/dry weather flow observations.

| | | | | | | |
|---|---|---|---|---|---|---|
| (e) Employee training | Conduct training for appropriate municipal staff on detecting and reporting illicit discharges. | | | X | | |

**10-11 Accomplishments**

The City conducted training sessions for the Streets Department and Code Enforcement Department on detecting and reporting Illicit Discharges. See Appendix A.

**11-12 Proposed Objectives**

The City will continue to reinforce to the field crews the need to report any questionable flows into the City's MS4. Continue to educate City Staff on identifying illicit discharges and provide periodic training refresher sessions to meet year 3 requirements.

The City will educate the stormwater crews on the recently finalized IDDE Policy and Procedures Manual.

| | | | | | | |
|---|---|---|---|---|---|---|
| (f) Provide public education | Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. | | | | X | |

**10-11 Accomplishments**

Staff worked in coordination with Code Enforcement to develop targeted educational materials and direct mailings for distribution to auto professionals, carpet cleaners, vehicle detailers, pressure washers and owners of swimming pools.

Work was completed on the Homeowner and Structural BMP brochure to combine them into one publication that will be printed in spring 2011.

In addition, the existing restaurant and yard waste posters were translated to Spanish and posted on our website on the "Publications & Videos" page.

**11-12 Proposed Objectives**

Continue to send targeted mailings in response to neighborhood and citizen complaints and code enforcement requests for stormwater pollutants - pet waste, yard waste, lawn care, illicit discharge, etc.

| | | | | | | |
|---|---|---|---|---|---|---|
| (g) Establish a public reporting mechanism | Establish and publicize reporting mechanism for the public to report illicit discharges. Establish citizen request response procedures. | | | | X | |

**10-11 Accomplishments**

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and reports of stormwater pollution. The hotline phone # is 910-341-1020 and the web address is www.wilmingtonnc.gov/reportstormwaterpollution.

Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to hotline reports from citizens. The hotline and webform are advertised on the City's cable TV channel and through newsletters, media press releases, and educational giveaway items.

**11-12 Proposed Objectives**

The hotline will continue to be advertised to the public and code enforcement staff will respond to phone and web reports.

| | | | | | | |
|---|---|---|---|---|---|---|
| Established procedures to identify and eliminate failed septic system and sanitary sewer overflows. | Establish procedures to identify and report to the County health department failed septic systems located within the permittee's planning jurisdiction. Establish procedures to identify and report sanitary sewer overflows and sewer leaks to the system operator. | | | | X | |

**10-11 Accomplishments**

The City passed on 9/15/2009 the Ordinance to amend Chapter 12 of the City Code to address illicit discharges to the stormwater system and to protect public water and sewer systems. This Ordinance change went into effect on November 1, 2009. The ordinance allows for right of access and sampling for any property which may be in question regarding failing septic systems. Field investigation and subsequent sampling by appropriate agencies will allow for determination of a failed system. The City's Public Services Code Enforcement Officer would then follow up regulatory requirements with property owners to make any corrections.

The City also finalized an Illicit Discharge Detection Elimination (IDDE) Policy and Procedures document. The purpose of this document is to provide guidance and information for the effective and efficient implementation of the Illicit Discharge Detection and Elimination (IDDE) Program within the City of Wilmington. Within this document are included provisions for assessing and identifying dry weather flows and SSOs that may occur as a result of a failing septic system.

**11-12 Proposed Objectives**

The City will work to finalize the IDDE Policy and Procedures document for future use.

The City is anticipating finalizing coordination efforts with New Hanover County for reporting and documentation of failed septic systems with the City's jurisdiction area. A joint effort between the City and CFPUA with New Hanover County is in the process of being finalized for receiving reports of failed septic systems.

The City is working on a GIS database for illicit discharges for tracking purposes. Initial detection of illicit discharges to final removal of source will be discussed so that procedures for eliminating discharges are documented. Sanitary sewer overflows as reported to the City from CFPUA will also be added to this database.

The City will work with the County GIS to obtain any information failed septic systems information that is available so that we may keep these address points at our disposal for observation and any investigation if needed. The City will also work to determine where existing septic systems are located in its jurisdiction (if present) in order to observe potential impacts to the City's MS4 or waters of the State. In addition, the City is currently finalizing reporting protocol with the County Health Dept. and the CFPUA in order to obtain copies of work order reports from the County on failed septic systems.

**CONSTRUCTION SITE RUNOFF CONTROLS**

The permittee relies on New Hanover County to comply with this minimum measure. The New Hanover County Sediment and Erosion Control Program effectively meets the requirements of the Construction Site Runoff Controls by permitting and controlling development activities disturbing one or more acres of land surface and those activities less than one acre that are part of a larger common plan of development. This program includes procedures for public input, sanctions to ensure compliance, requirements for construction site operators to implement appropriate erosion and sediment control practices, review of site plans which incorporates consideration of potential water quality impacts, and procedures for site inspection and enforcement of control measures.

New Hanover County Erosion Control Program information supplied in Appendix D.

**POST-CONSTRUCTION SITE RUNOFF CONTROLS**

## 1. Objectives for Post-Construction Site Runoff Controls

(a) Manage stormwater runoff from new development / redevelopment that drains to the MS4 and disturbs an acre or more of land surface, including projects less than an acre that are part of a larger common plan of development or sale.
(b) Provide a mechanism to require long term operation and maintenance of BMPs.
(c) Ensure controls are in place to minimize water quality impacts.

## 2. BMPs for Post-Construction Site Runoff Controls

The permittee shall implement the following BMPs to meet the objectives of the Post-Construction Stormwater Management Program.

| BMP | **Measurable Goals** | **YR 1** | **YR 2** | **YR 3** | **YR 4** | **YR 5** |
|---|---|---|---|---|---|---|
| Establish a Post-Construction Stormwater Management Program | Develop and adopt by ordinance (or similar regulatory mechanism) a program to address stormwater runoff from new development and redevelopment. Implement and enforce the program within 24 months of the permit issue date. | | X | | | |

**10-11Accomplishments**
The City's Land Development Code was amended and adopted on September 15, 2009 to provide post construction controls to meet the requirements of the City's Phase II permit and to bring the ordinance into compliance with the new Coastal Stormwater Legislation
**11-12 Proposed Objectives**
Continue to implement the amended ordinances.

| | | | | | | |
|---|---|---|---|---|---|---|
| Establish strategies which include BMPs appropriate for the MS4 | Develop strategies that include a combination of structural and/or non-structural BMPs. Implement them within 24 months of the permit issue date. Provide a mechanism to require long-term operation and maintenance of structural BMPs. Require annual inspection reports of permitted structural BMPs performed by a qualified professional (i.e., someone trained and certified by NC State for BMP Inspection & Maintenance). | | X | | | |

**10-11 Accomplishments**

The amended stormwater ordinance from 2009 contains provisions addressing the use of combinations of structural and non-structural BMPs to manage stormwater runoff. Some examples of these include providing peak attenuation flow for the 2, 10 and 25 year storm event, requiring (new development) a 50 foot set back from surface waters, and stricter built-upon requirements for projects near SA waters.

Under the current stormwater management ordinance of the City, permitees of structural BMPs are required to properly maintain their stormwater management systems to ensure long term operation. The City conducted biannual compliance inspections for privately owned stormwater BMPs in order to ensure maintenance responsibilities are being undertaken by property owners. Inspections were conducted by a City Staff member who has completed the Stormwater BMP Inspection and Maintenance Certificate offered through NC State's Biological and Agricultural Engineering Department (certification #182). An inspection summary is included in Appendix F. In addition, sample inspection reports are provided.

**11-12 Proposed Objectives**

Continue biannual inspections for next year to ensure compliance with maintenance requirements and report items of non-compliance to property owners.

Discuss with City staff that are responsible for the review of stormwater management plans, the effectiveness of previously permitted BMPs based on observations of 10 years worth of biannual compliance inspections.

| | | | | | | |
|---|---|---|---|---|---|---|
| Establish nutrient sensitive waters (NSW) protection measures (for programs with development or redevelopment draining to NSW waters) | Develop, adopt, and implement an ordinance (or similar regulatory mechanism) to ensure that the best management practices reduce nutrient loading to the maximum extent practicable. Develop and include a nutrient application (fertilizer and organic nutrients) management program in the Post-construction Stormwater Management Program. In areas where the Environmental Management Commission has approved a Nutrient Sensitive Water Urban Stormwater Management Program, the provisions of that program fulfill the nutrient loading reduction requirement. | | X | | | |

**10-11 Accomplishments**

Per NCDWQ staff, there are no current NSW requirements for our area in the Cape Fear River Basin and there are none on the immediate horizon.

**11-12 Proposed Objectives**

Staff will continue to track this issue through NCDWQ.

| | | | | | | |
|---|---|---|---|---|---|---|
| Establish a program under the Post-Construction minimum measure to control the sources of fecal coliform to the maximum extent practicable | Coordinate with County health department to control the known sources of fecal coliform to the maximum extent practicable. Implement within 24 months of the permit issue date. | | X | | | |

**10-11Accomplishments**
The City established a domestic animal waste ordinance in 2009 as part of ordinance revision process and continues to use the ordinance to address pet waste.

The City has worked into its modified stormwater ordinance requirements for structural BMPs in SA watersheds that help to control sources of fecal coliform to the maximum extent practicable.

**11-12 Proposed Objectives**
City staff will be working to maintain and update their technical standards for structural BMPs that are determined to be effective for removal of fecal coliform.

City Staff will continue implementing its domestic animal waste ordinance and try to determine the effectiveness of the program.

| | | | | | | |
|---|---|---|---|---|---|---|
| City Code, Permitting Regulations, Easement, and/or Deed Restrictions and Protective Covenants | Ensure development activities will maintain the project consistent with approved plans. | | X | | | |

**10-11 Accomplishments**
Current City of Wilmington stormwater management ordinance stipulates among other requirements for stormwater management after construction that:
Record (as-built) drawings (reproducible mylar) for all stormwater management facilities certified by an authorized registered professional must be provided to the City for permanent record.
When deemed necessary by the City, an easement in a form approved by the City attorney, granting the City and its agents and representatives adequate and perpetual access to the facility and sufficient area for inspection and maintenance, if necessary, by the City, its agents and representatives. Said easement shall be filed in the New Hanover County Registry, at the expense of the applicant, and shall bind all subsequent owners and assigns of the facility and of the property on which the facility is located.

The following excerpt from the new stormwater ordinance became operational upon adoption City Council:

*The approval of the stormwater permit shall require an enforceable restriction on property usage that runs with the land, such as recorded deed restrictions or protective covenants, to*

*ensure that future development and redevelopment maintains the site consistent with the approved project plans.*

Additionally, the new ordinance has provisions to ensure that conveyance of the property does not terminate the original developer's obligations until a replacement permit has been issued. The original developer will be required to record in the deed conveying the property a notice of the existence of any stormwater devices and the purchaser's obligations to maintain and inspect them and to obtain a permit. There are also specific and detailed special requirements for property owner associations regarding operation and maintenance of stormwater devices, escrowing funds to ensure maintenance and remedies for the City in the event of failed compliance.

**11-12 Proposed Objectives**

Continue to implement new Land Development Ordinance and its requirements.

| | | | | | | |
|---|---|---|---|---|---|---|
| Operation and Maintenance Plan | Implement or require an operation and maintenance plan that ensures the adequate long-term operation of the structural BMPs required by the program. The operation and maintenance plan may require the owner of each structural BMP to submit a maintenance inspection report on each structural BMP annually to the local program. | | | | | X |

**10-11 Accomplishments**

The City currently conducts its own compliance inspections for BMP maintenance and operations as addressed above in item (b). Maintenance plans are required in the new ordinance as part of the permitting requirement.

**11-12 Proposed Objectives**

City staff will continue to inspect all privately owned BMPs and submit inspection reports as necessary for this annual report.

The City will finalize the compilation all O&M plans, permit renewal dates and any other relevant information regarding City owned BMPs for review by the appropriate Staff. This will be accomplished in late spring 2011.

| | | | | | | |
|---|---|---|---|---|---|---|
| Setbacks for Built-upon Areas | Require built upon areas to be located at least 30 feet landward of all perennial and intermittent surface waters except as provided for in the Permittee's approved Post-Construction Stormwater Ordinance. | | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | For purposes of this section, a surface water shall be present if the feature is shown on either the most recent version of the soil survey map prepared by the Natural Resources Conservation Service of the United States Department of Agriculture or the most recent version of the 1:24,000 scale (7.5 minute) quadrangle topographic maps prepared by the United States Geologic Survey (USGS). Relief from this requirement may be allowed when surface waters are not present in accordance with the provisions of 15A NCAC 02B .0233(3)(a). | | | | | |

**10-11 Accomplishments**

The new ordinance requires a 50 foot setback for new development and a 30 foot setback for redevelopment consistent with the Coastal Stormwater legislation.

**11-12 Proposed Objectives**

Continue to enforce set back requirements per new Land Development Ordinance.

**POLLUTION PREVENTION AND GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS**

## 1. Objective for Pollution Prevention and Good Housekeeping for Municipal Operations

Prevent or reduce stormwater pollution from municipal operations.

## 2. BMPs for the Pollution Prevention and Good Housekeeping for Municipal Operations

The permittee shall implement the following BMPs to meet the objectives of the Pollution Prevention and Good Housekeeping Program and shall notify the Division prior to modification of any goals.

| BMP | Measurable Goals | YR 1 | YR 2 | YR 3 | YR 4 | YR 5 |
|---|---|---|---|---|---|---|
| Develop an operation and maintenance program | Develop an operation and maintenance program for structural stormwater BMPs, storm sewer system maintenance which may include street sweeping, and municipal operations such as recycling and household hazardous waste and oil collection. | | X | | | |

**10-11Accomplishments**

The City currently has a program for the operation and maintenance of all City owned structural BMPs, storm sewer system, and street sweeping. In addition, there is a recycled oil program for City operations and an annual Household hazardous waste collection day (conducted in cooperation with New Hanover County).

The City is compiling State DWQ stormwater permits and O&M plans for all of their owned BMPs in order to document maintenance requirements, permit renewal dates and any documentation requirements needed. This information will provide the City with a manual to be reviewed by all BMP maintenance crews. This is currently about 50% complete.

The City finalized SOPs for its maintenance activities for stormwater municipal operations. City stormwater crews were assigned maintenance activities to be written for their respective working groups. These groups met on several occasions with the purpose of determining the tasks required to complete a maintenance activity.

**11-12 Proposed Objectives**

Complete O&M manual for BMP field crew use in late spring of 2011.

Present SOPs back to the field crews to determine that if all steps, equipment and material have been adequately considered for the task to be completed. Modify, if necessary, any of the SOPs .

| | | | | | | |
|---|---|---|---|---|---|---|
| Develop Site Pollution Prevention Plan for Municipal Facilities | Develop and implement Site Pollution Prevention Plan for Municipal Facilities owned and operated by the permittee with the potential for generating polluted stormwater runoff that has the ultimate goal of preventing or reducing pollutant runoff. | | | X | | |

**10-11 Accomplishments**

The City submitted necessary forms in March 2010 to the NC DWQ for transfer of the Wilmington Transit Authority -NPDES General Permit NCG080000 (date of issuance 7/13/03). The general permit and associated SPPP is now being implemented by the Cape Fear Public Transit Authority (formerly the Wilmington Transit Authority).

The State also rescinded the NPDES General Permit for the former Fleet Management Garage facility (900 Fanning Street) in a letter dated February 12, 2010. This site is no longer active. The new Fleet Management Garage is currently located at the City's Operations Complex (205 Operations Center Drive). The City hired a consultant to conduct the necessary SPPP plan review for the site. The SPPP is currently being finalized for this site and should be completed in early Spring 2011. The General Permit application has been sent to the State.

**11-12 Proposed Objectives**

Train staff on SPCC and SPPP for their respective locations.

Begin implementing and making necessary changes to site BMPs per SPPP recommendations. Conduct employees training.

| | | | | | | |
|---|---|---|---|---|---|---|
| Inspection and evaluation of facilities, operations, and the MS4 system and associated structural BMPs. | Maintain an inventory of facilities and operations owned and operated by the permittee with the potential for generating polluted stormwater runoff, including the MS4 system and associated structural BMPs. Conduct inspections at facilities and operations owned and operated by the permittee for potential sources of polluted runoff, the stormwater controls, and conveyance systems. Evaluate the sources, document deficiencies, plan corrective actions, implement appropriate controls, and document the accomplishment of corrective actions. | | | | X | |

**10-11 Accomplishments**
The newly implemented SPCC for the Operations Complex and the Police Headquarters and the soon to be finalized SPPP will address this BMP. The plans are reviewed each year and updated as necessary with regard to any changes to the existing plan.

**11-12 Proposed Objectives**
Begin implementing and making necessary changes to site BMPs per plan recommendations.

Continue monitoring City operated sites for compliance with existing SPPP and SPCC plan. Update as needed.

| | | | | | | |
|---|---|---|---|---|---|---|
| Conduct staff training | Conduct staff training specific for pollution prevention and good housekeeping procedures. | | X | | | |

**10-11 Accomplishments**
The City opted to conduct staff training for department supervisors and crew leaders on Pollution Prevention and Good Housekeeping for its City facilities in year one. City staff has followed up site inspections for City municipal operations and have addressed areas of concerns with individual site managers. In addition, some of this year's Illicit Discharge training addressed Good Housekeeping procedures as well (See Appendix F).

The City submitted the necessary forms to the State in order to transfer the SPPP responsibility to the Cape Fear Public Transit Authority (Wilmington Transit Authority site). The City will continue to help with monitoring the requirements of the current SPPP at the site which would include providing training to CFPTA staff if the need arises.

**11-12 Proposed Objectives**

The City will provide staff training to Fleet Management Staff upon completion of the anticipated SPPP for that site.

| | | | | | | |
|---|---|---|---|---|---|---|
| Review of municipality owned or operated regulated industrial activities | Conduct annual review of the industrial activities with a Phase I NPDES stormwater permit owned and operated by the permittee. Review the following aspects: the Stormwater Pollution Prevention Plan where one is required, the timeliness of any monitoring reports required by the Phase I permit, and the results of inspections and subsequent | | | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| | follow-up actions at the facilities. | | | | | |

**10-11 Accomplishments**
No Phase I NPDES stormwater permit is owned and operated by the permittee now that the wastewater treatment plants and the water treatment facility have been turned over to CFPUA.

**11-12 Proposed Objectives**
The City will address this measure in the event anything changes.

| | | | | | | |
|---|---|---|---|---|---|---|
| Spill Response Procedures | Establish spill response procedures for municipal operations owned and operated by the permittee with the potential to generate polluted stormwater runoff. | | X | | | |

**10-11 Accomplishments**
The City's Operations Complex and the Police Headquarters each required an SPCC plan and addresses this requirement. The City began implementing these plans in 2010. Each plan addresses spill response procedures for each site.

The City began the site investigation for the SPPP for the Fleet Management site as a result of a NPDES General Permit that the City is be pursuing for the site. This plan will meet the requirement of the above BMP for the Fleet Management site.

**11-12 Proposed Objectives**
The City will finalize the SPPP for the Fleet Management site in early Spring 2011.

The City will conduct employee training for those involved with the newly implemented SPCC and SPPP for the Operations Center in late Spring 2011. The City will follow through on plans for each site with appropriate staff and their related to duties outlined in plans.

| | | | | | | |
|---|---|---|---|---|---|---|
| Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning | Describe measures that prevent or minimize contamination of the stormwater runoff from all areas used for vehicle and equipment cleaning. Perform all cleaning operations indoors, cover the cleaning operations, ensure washwater drain to the sanitary sewer system, collect stormwater runoff from the cleaning area and providing treatment or recycling, or other equivalent measures. If sanitary sewer is not available to the facility and cleaning operations take place outdoors, the cleaning operations shall take place on grassed or graveled areas to prevent point | | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | source discharges of the washwater into the storm drains or surface waters.<br><br>Where cleaning operations cannot be performed as described above and when operations are performed in the vicinity of a storm drainage collection system, the drain is to be covered with a portable drain cover during clean activities. Any excess ponded water shall be removed and properly handled prior to removing the drain cover.<br><br>The point source discharge of vehicle and equipment wash waters, including tank cleaning operations, are not authorized by this permit and must be covered under a separate NPDES permit or discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements. | | | | | |

**10-11 Accomplishments**

Maintenance and cleaning conducted at the City's Operations complex continues to occur at a wash down station equipped with an oil water separator that accepts wash water and directs it to the sanitary sewer.

Small engine repair (line trimmers, blowers, chain saws, compacters, etc.) and cleaning for various City activities occurs in individual departments maintenance garages. In the event of an accidental discharge, the garages have drains located within the floor that connect to an oil water separator located on each site within the Operations Complex.

Vehicle maintenance for all City vehicles is conducted at the Fleet Maintenance building located at the Operations Complex. In the event of an accidental spill, floor drains are connected to on site oil water separators. Used vehicle fluids are collected and disposed and/or recycled of properly in their respective, protective containers.

The future SPPP plan and the current SPCC plans for the individual City sites address the above concerns for Good Housekeeping procedures.

**11-12 Proposed Objectives**

Continue monitoring each respective SPPP and SPCC plan for compliance. Update as needed.

Conduct employee training for Fleet Management staff on Pollution Prevention /Good Housekeeping requirements under new SPPP.

**THREATENED OR ENDANGERED SPECIES**

Certain waters provide habitat for federally-listed aquatic animal species that are listed as threatened or endangered by the U.S. Fish and Wildlife Service or National Marine Fisheries Service under the provisions of the Endangered Species Act, 16 U.S.C. 1531-1544 and subsequent modifications.

The shortnose sturgeon (*Acipenser brevirostrum*) was listed as endangered on March 11, 1967 (32 FR 4001) and remained on the endangered species list with enactment of the ESA in 1973. Shortnose sturgeon occur in most major river systems along the eastern seaboard of the United States. Shortnose sturgeon inhabit the main stems of their natal rivers, migrating between freshwater and mesohaline river reaches. Spawning occurs in upper, freshwater areas, while feeding and overwintering activities may occur in both fresh and saline habitats.

Under the provisions of the Final Recovery Plan published by the National Marine Fisheries Service (NMFS) in December 1998, the permittee shall implement measures to increase awareness of shortnose sturgeon and their status by formulating a public education program that generates public interest in sturgeon and sturgeon recovery by contacting media outlets, suggesting feature stories, and using existing forums for educating the public (e.g., public aquaria, FWS Partners for Wildlife Program, private foundations). Articles, posters, and pamphlets should be published to increase public knowledge of shortnose sturgeon and their unique and complex life history. This information may include identifiable features of the species, listing status, range, susceptibility to incidental captures, and a number or address to report sightings or captures. The permittee shall offer to work with schools to develop and evaluate educational materials and curricula that introduce students to sturgeons, the river/estuarine environment, and the ESA.

**10-11 Accomplishments**

Stormwater Services staff continued to implement several key strategies established in the Shortnose Sturgeon Education Plan. The plan guides public education efforts about the endangered Shortnose Sturgeon. Education materials produced by the city incorporate the following information about the Shortnose Sturgeon: federal listing status, identifiable features, life history, range/local habitat, reasons for decline in species population, susceptibility to incidental captures, barriers to recovery (threats and solutions), and a contact agency/phone number to report sightings or captures.

Informational bookmarks and brochures were distributed at speaking engagements and community events such as Earth Day and homeowners association presentations. The Shortnose Sturgeon video continues to play on GTV-8.

**11-12 Proposed Objectives**

Continue to feature information about the Shortnose Sturgeon on website, TV, through partner/contract agencies, and during 8$^{th}$ grade school presentations.

# Appendixes

## APPENDIX A: PUBLIC EDUCATION AND OUTREACH

Included in this section:
BMP Reporting Table
Identification of Target Pollutants, Sources, And Target Audiences

| DATE / TIME | PLACE / EVENT | AUDIENCE | ACTIVITY OR STAFF | TECHNIQUES/ METHODS USED | RESULTS OF ACTIVITY OR INFO COLLECTED OR COMMENTS |
|---|---|---|---|---|---|
| **BMP(a) Identify Target Pollutants & Sources** | | | | | |
| Pollutants and sources are identified in the Appendix. | | | | | |
| **BMP(b) Identify Target Audiences** | | | | | |
| Target audiences for each pollutant are identified in the Appendix. | | | | | |
| **BMP(c) Stormwater Website** | | | | | |
| Ongoing/ Regular Updates | City of Wilmington Stormwater Services web pages | General public; website viewers | Stormwater staff | Keep website regularly updated with fresh content | Post info on website - stormwater news, events, education publications, videos, printed material, etc. |
| **BMP(d) Develop & Distribute Public Education Materials to Identified User Groups** | | | | | |
| In addition to public outreach efforts in this category, the Stormwater Code Enforcement Officer distributes education materials to targeted user groups (i.e. pet owners, auto shops, restaurants, residents, etc). Code enforcement distributes this info to citizens and businesses that have been identified as non-compliant with the City's stormwater codes. Information is included in the Enforcement Actions Appendix. | | | | | |
| 4/22/10 | Direct distribution | Bradley Creek Elementary School students, teachers, volunteers | Stormwater staff | Rain garden installation with education component | Event participants received watershed education, stormwater educational giveaways |
| 6/1/10 | Targeted direct mail | Shandy Lane neighborhood | Stormwater staff | Pet waste letter and brochures mailed to neighborhood in response to complaint | Residents complained of neighbors letting dogs go in people's yards |
| 6/1/2010 | Poster creation for targeted direct distribution | Hispanic population | Stormwater staff | Translated Restaurant and Yard Waste posters to Spanish | Distribute among Hispanic community |
| 6/1/2010 | Poster creation for targeted direct distribution | Auto care professionals | Stormwater staff | Auto care poster | Inform auto care professionals of improper practices that impact water quality |
| 7/1/2010 | Poster creation for targeted direct distribution | Carpet cleaning professionals | Stormwater staff | Carpet cleaning poster | Inform carpet cleaning operations of improper practices that impact water quality & CFPUA regulations |

| | | | | | |
|---|---|---|---|---|---|
| 8/1/2010 | Poster creation for targeted direct distribution | Pressure washers | Stormwater staff | Pressure washing poster | Inform pressure washing operations of improper practices that impact water quality |
| 1/20/2011 | Targeted direct mail | Carpet cleaners | Stormwater staff | Letter and poster | Mailed to carpet cleaning professionals that serve the Wilmington area |
| 2/17/11 | Targeted direct mail | French Road area | Stormwater staff | Letter and pet waste brochure | Inform/educate residents of violations of pet waste ordinance |

| **BMP(e) Media Campaign** | | | | | |
|---|---|---|---|---|---|
| April - May 2010 | TV - WECT-6 | TV viewers ages 25-65 in Wilmington | Pet Waste PSA (How to Train a Human) | :30 second stormwater PSA on network TV<br><br>74 spots total, plus free bonus ads on WECT Weather Plus | Target Audience: General public<br>Reach: 71.8% for viewers age 25-64<br>Frequency: 3.1<br>Total cost: $4500 |
| April - June 2010 | Mayfaire 16 MovieTheatre | Moviegoers | Stormwater Public Service Announcement | 30-second stormwater ad | Target Audience: General public<br>Reach & Frequency: Shown in 560 movies per week reaching an average of 18,000 people per week for 6 weeks<br>Total cost: 31 cents per ad |
| Mar - May 2010 | Cumulus Broadcasting (97.3 & 94.5FM) | Pet owners, homeowners, landscapers, yard maintenance professionals | Pet Waste & Yard Waste :30 second PSAs | Two :30 second PSAs on broadcast radio stations<br><br>228 ads total: 114 purchased, 114 free | Target Audience: Landscapers, Pet owners, General public<br>Reach: 81,500 adults<br>Frequency: 2.7 times<br>Total cost: $4000 |
| July - Sept 2010 | TV - WECT-6 | TV viewers ages 35-64 in Wilmington | Yard Waste (Blown It!) PSA | :30 second stormwater PSA on network TV<br><br>148 spots total, including free bonus ads on WECT Weather Plus | Target Audience: General public<br>Reach: 69% of viewers age 35-64<br>Frequency: 6.2<br>Total cost: $4000 |
| July - Sept 2010 | TV - WECT-6 Weather Plus cable station | TV viewers ages 35-64 in Wilmington | Yard Waste (Blown It!) PSA | :30 second stormwater PSA on network TV<br><br>40 spots total; all bonus free ads! | Target Audience: General public, cable viewers |
| Winter/Spring 2010 | Going Green Magazine | General public, adults | Stormwater "Bon Appetit Fish" Educational Advertisement | Magazine ad with graphics | Target Audience: Adults/general public Environmental groups<br>Reach & Frequency: 6000 printed, also available online<br>Total cost: Free |
| April Earth Day Edition | Going Green Magazine | General public, adults | "Stormwater Pollution Prevention Hotline" article highlighting the City's online and telephone hotline | Magazine article | Target Audience: Adults/general public Environmental groups<br>Reach & Frequency: 6000 printed, also available online<br>Total cost: Free |

| | | | | | |
|---|---|---|---|---|---|
| Summer/Fall 2010 | Going Green Magazine | General public, adults | "Did You Drop Something?" pet waste article highlighting Wilmington's new pet waste disposal ordinance | Magazine article | Target Audience: Adults/general public Environmental groups Reach & Frequency: 6000 printed, also available online Total cost: Free |
| Sept - Dec 2010 | Cumulus Broadcasting (97.3 & 101.3) | Pet owners, homeowners, landscapers, yard maintenance personnel | Pet Waste & Yard Waste :30 second PSAs | Two :30 second PSAs on broadcast radio stations<br><br>334 ads total: 167 purchased, 167 free | Target Audience: Landscapers, Pet owners, General public Reach: 49,221 adults / 22.7 times Frequency: 5.9 times Total cost: $4000 |
| Fall 2010 | WECT Cape Fear Lifestyles Magazine | General Public; mailed to NHC residents | "What Goes in Here" storm drain ad | Color ad | Free stormwater ad in magazine distributed to 30,000+ residents |
| Ongoing | City GTV-8 and City website | GTV-8 cable access TV viewers | Stormwater Pollution Messages | Educational PSAs, documentaries, narrated slide shows<br><br>Several different PSAs airing concurrently or alternating | Target Audience: General public Reach & Frequency: varies due to government programming Total cost: Free |

## BMP(f) Establish Hotline / Helpline

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports.

| | | | | | |
|---|---|---|---|---|---|
| Fall 2010 | Stormwater Hotline info | General public | Stormwater staff | Hotline Billboard poster and promo items (pen, magnet, sticky notes) | Developed to raise public awareness about the stormwater hotline and web reporting form |

## BMP(g) Establish Public Outreach & Education Program & Implement Within 12 Months.

***Newspaper Articles, Press Releases, or Paid Advertisements***

| | | | | | |
|---|---|---|---|---|---|
| 3/3/10 | Star News | General public | Cave-ins plaque sewer line along Smith Creek | News article | Water quality problems as a result of sewer leaks |
| 3/11/10 | Star News | General public | Sediment could be hurting oyster population | News article | Sediment harming oysters |
| 3/15/10 | Star News - My Reporter question | General public | Why is the city of Wilmington clearing out trees behind Stonewall Jackson Drive in Pine Valley? | Star News reporters answer citizen questions on website | Response about drainage access along city easement |
| 3/22/10 | Star News - My Reporter question | General public | How many people have been cited for littering in and around Wilmington? | Star News reporters answer citizen questions on website | Response with local littering statistics |
| 5/2/10 | Star News | General public | Parched Pooch at Paw Jam | Color photo | Photo of dog wearing Canines for Clean Water bandana at the Paw Jam event |

| | | | | | |
|---|---|---|---|---|---|
| 6/1/10 | Press release; news advisory | General public, Greenfield Lake visitors | Public Information Office staff | Distributed to local mass media news outlets | Public notification about Greenfield Lake herbicide treatment |
| 7/13/10 | Star News - My Reporter question | General public | Is there a fine for putting grass clippings in storm drains in New Hanover County? | Star News reporters answer citizen questions on website | Response about local ordinances regarding yard waste |
| 7/16/10 | Star News - My Reporter question | General public | How can Randall Pond be used as an effective flood control tool when it appears to be at maximum capacity all the time? | Star News reporters answer citizen questions on website | Response about adequate flood storage capacity of the pond |
| 7/21/10 | Star News - My Reporter question | General public | Why is Greenfield lake no longer being cared for? It is supposed to be one of the attractions in the Wilmington area, yet it looks like a swamp | Star News reporters answer citizen questions on website | Response about aquatic weed control efforts and stormwater runoff inputs |
| 7/22/10 | Star News | General public | Raw sewage dumped into Wilmington storm drain | News article | Illegal sewage dumping detected in headwaters of Bradley Creek |
| 8/1/10 | Star News | General public | Letter to the Editor - Defeating the Purpose | Letter to editor | Citizen questioning using plastic bags for dog waste instead of composting |
| 8/27/10 | Press release; news advisory issued by NCCF | General public | Wetland Planting Set at Bradley Creek Elem. School | Distributed to local mass media news outlets | Public notification about volunteer wetland planting project |
| 9/8/10 | Star News | General public | School cultivates wetland project to protect creek | News article | Planted wetlands will absorb runoff pollution |
| 11/21/2010 | Star News | General public | City saving energy costs with solar-powered building | News article | Street sweeper building uses solar energy |
| 12/22/2010 | Star News | General public | City hopes to nab drain cover thieves | News article | Theft of storm drain covers |
| 2/1/2011 | Star News - My Reporter question | General public | Are the fish in the Cape Fear River safe to eat? | Star News reporters answer citizen questions on website | Response from Cape Fear River Watch about mercury levels in fish |
| 2/15/11 | Star News - My Reporter question | General public | If the fish are not safe to eat from the Cape Fear River, how can the water be safe to drink? | Star News reporters answer citizen questions on website | Response from Cape Fear Public Utility Authority |

***Targeted Direct Mail***

| | | | | | |
|---|---|---|---|---|---|
| 6/1/10 | Targeted direct mail | Shandy Lane neighborhood | Stormwater staff | Pet waste letter and brochures mailed to neighborhood in response to complaint | Residents complained of neighbors letting dogs go in people's yards |
| 1/20/2011 | Targeted direct mail | Carpet cleaners | Stormwater staff | Letter and poster | Mailed to carpet cleaning professionals that serve the Wilmington area |

| | | | | | |
|---|---|---|---|---|---|
| 2/17/11 | Targeted direct mail | French Road area | Stormwater staff | Letter and pet waste brochure | Inform/educate residents of violations of pet waste ordinance |

***Displays at Point of Purchase***

| | | | | | |
|---|---|---|---|---|---|
| N/A | | | | | |

***Utility Bill Inserts***

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| The Cape Fear Public Utility Authority bills the public for stormwater utility fees. The city no longer sends out bills. |

***Public Meetings***

| | | | | | |
|---|---|---|---|---|---|
| 4/7/2010 | New Hanover Cooperative Extension Office | Property owners along south branch of Bradley Creek | Stormwater staff Dewberry Consulting | Direct contact meeting | Public meeting to show citizens the conceptual drainage plans for the south branch of Bradley Creek. 12 attendees. |
| 6/29/2010 | NH County Administration Office | Property owners along Cardinal Drive & George Trask | Stormwater staff | Direct contact meeting | Public meeting to discuss drainage project. 20 attendees |
| 8/10/2010 | Noble Middle School | Residents in proposed annexation areas | Stormwater staff | Direct contact meeting | Public meeting to discuss proposed annexation. 50 attendees |
| 10/27/10 | New Hanover Cooperative Extension Office | Property owners affected by Wisteria-Clearbrook drainage project | Stormwater staff Kimley-Horn Consulting | Direct contact meeting | 40 citizens attended Show citizens the preliminary plans for the Wisteria-Clearbrook drainage project. |
| 12/14/10 | NH County Administration Office | Property owners along Cardinal Drive & George Trask | Stormwater staff | Direct contact, follow-up meeting | Public meeting to discuss drainage project. 10 attendees |

***Community Events***

| | | | | | |
|---|---|---|---|---|---|
| 4/17/10 | Lower Cape Fear Earth Day Celebration at Hugh MacRae Park | Festival attendees, general public | Stormwater staff (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival) | Display booth to promote stormwater pollution prevention | Stormwater information distributed. 4,000+ attendees |
| 4/22/2010 | Bradley Creek Elementary School | Bradley Creek students, teachers, community volunteers | NC Coastal Federation Stormwater staff Bradley Creek School students | Rain garden planting | Volunteers, staff, and school students planted campus rain garden. Stormwater giveaways were supplied to all participants. |
| 5/1/10 | Paw Jam event | Pet owners | Stormwater staff | Canines for Clean Water booth - interactive event where pet owners sign a pledge to be clean up after their pets | 114 pet owners signed pledge and received dog bandana, treats, and stormwater literature. Dogs have a chance to be featured on city website |

| | | | | | |
|---|---|---|---|---|---|
| 9/17/10 | Aunt Kerry's Pet Stop event | Pet owners | Stormwater staff | Canines for Clean Water booth - interactive event where pet owners sign a pledge to be clean up after their pets | 35 pet owners signed pledge and received dog bandana, treats, and stormwater literature. Dogs have a chance to be featured on city website |
| 2/27/11 | Pet Expo | Pet owners | NHSWCD staff | Canines for Clean Water booth - interactive event where pet owners sign a pledge to be clean up after their pets | 65 pet owners signed pledge and received dog bandana, treats, and stormwater literature. Dogs have a chance to be featured on city website |
| Ongoing - 2nd Thursday of every month | Monthly Rain Barrel Sales | General public | Stormwater staff NHSWCD | Monthly rain barrel sale to the general public; held 2nd Thursday of each month at NHC Government Center with partner agency, NHSWCD | Stormwater runoff and water conservation education and collection |

***Contest***

| | | | | | |
|---|---|---|---|---|---|
| N/A | | | | | |

***Storm Drain Marking***

| | | | | | |
|---|---|---|---|---|---|
| Ongoing campaign | Campaign to place storm drain markers and educational doorhangers throughout the City | City residents, businesses, landscapers | Stormwater staff Code enforcement staff Stormwater interns CFRW NHSWCD | Stormwater awareness and pollution prevention | This year, several markers were placed in the Greenfield Lake Watershed. Also trained partner agencies to implement the program |

***Stream & Litter Clean-ups***

| | | | | | |
|---|---|---|---|---|---|
| 9/25/10 | Big Sweep Nationwide Cleanup | Greenfield Lake & Area Beaches | CFRW volunteers (adults, students from 2nd grade +) | Streambank, shoreline, inlet streams, and canoe cleanup of Greenfield Lake | 45 volunteers contributed a total of 135 hours.<br><br>Collected 200, 30lb bags of trash; approximately 600 lbs and 60+ bags of invasive plants removed |
| 7/10/10 | Greenfield Lake | Invasive plant species removal | CFRW volunteers (adults, students from 2nd grade +) | Streambank, shoreline, inlet streams, and canoe invasive species removal on Greenfield Lake | 15 volunteers contributed a total of 45 hours<br><br>Collected 100 bags of invasives totaling approximately 3,000 lbs |
| 8/14/11 | Cape Fear River | Area along the shoreline from Nun to Princess | CFRW volunteers (adults, students from 2nd grade +) | Riverine cleanup | 12 volunteers contributed a total of 36 hours<br><br>Collected 75 bags of trash totaling approximately 2,250 lbs |

| | | | | | |
|---|---|---|---|---|---|
| 9/25/11 | Greenfield Lake | Around entire lake | CFRW volunteers (adults, students from 2nd grade +) | Riverine cleanup | 45 volunteers contributed a total of 135 hours<br><br>Collected 200 bags of trash totaling approximately 6,000 lbs |
| 10/9/10 | Burnt Mill Creek Watershed | Birch Creek | CFRW volunteers Birch Creek condo owners | Invasive species and trash removal from 300 yards of stream | 15 volunteers contributed a total of 45 hours |

***Group Presentations, Speeches***

| | | | | | |
|---|---|---|---|---|---|
| 4/27/10 | City Streets Division | Streets field staff | Beth Nunnally, Code Enforcement | Illicit Discharge powerpoint presentation | Educated Streets Division staff to detect illicit discharges in the field |
| 10/26/10 | Residents house (Mayes) | PEO Group | Stormwater staff | Speaker-led presentation and powerpoint slides | 25 women in attendance |

***News Coverage***

| | | | | | |
|---|---|---|---|---|---|
| May-June 2010 | Dog Living Magazine | Dog owners | Going Green staff | Canines for Clean Water and Stormwater Services mentioned in article | Pet waste education |
| 9/2/10 | Lumina News | General public | My Thoughts | Editorial | Editorial about HHW |
| 12/23/10 | WECT TV-6 | General public | Thieves have to heave to steal these | On air coverage | Theft of storm drain covers |
| 12/23/10 | Lumina News | General public | Environmental stewardship leaders awarded for projects | News article | Wade Park/Stormwater Wetland receive a Lower Cape Fear Stewardship Award |

***Workshops and Classroom Outreach***

| | | | | | |
|---|---|---|---|---|---|
| 7/30/10 | UNCW Friday Hall | Marine Quest 12-14 year olds | Enviroscape watershed presentation | Speaker-led presentation | 20 students in attendance |
| March 2010-February 2011 | All New Hanover County Middle Schools | 8th grade science classes | Stormwater Services, NHSWCD, CFRW | Enviroscape Presentations | 65 presentations given to approximately 2,000 eighth grade students |
| 1/14/11 | Virgo Middle School | All middle school students | Engineering Career Fair | Display booth | 200 students |
| 2/17/11 | Cape Fear Academy | 9th grade AP Environmental classes | Stormwater staff | Enviroscape Presentations | 3 presentations to 50 students |
| 2/22/11 | Cape Fear Academy | Girl Scout Troop (5th graders) | Stormwater staff | Enviroscape Presentations | 15 Girl Scouts and 4 adult troop leaders |

***Distributing promos/giveaways***

| | | | | | |
|---|---|---|---|---|---|
| 12/9/2010 | Stewardship Development Awards Ceremony | Realtors, Developers, Environmentalists, Politicians | Stormwater staff Halyburton staff | Outstanding Stewardship Award presentation | 100 people in attendance |
| 10/26/10 | Resident's house | PEO Women's Group (Mayes) | Stormwater staff | Speaker-led presentation and Powerpoint | Distributed stormwater education materials information to 25 attendees |

| | | | | | |
|---|---|---|---|---|---|
| Ongoing | Public meetings, displays, city buildings, pet events | General public | Stormwater staff | Distribute items or leave in strategic locations where citizens will pick them up | Spread stormwater messages via freebies/promos |

***Brochures, Displays, Signs, Welcome Packets, Pamphlets***

| | | | | | |
|---|---|---|---|---|---|
| 3/1/10 | New stormwater ordinance education | Auto care professionals | Auto Care poster | Large format poster developed in InDesign | Distributed to auto care professionals to educate about illicit discharges |
| 4/17/10 | Lower Cape Fear Earth Day Celebration at Hugh MacRae Park | Festival attendees, general public | Stormwater staff (SWS is an annual sponsor of Earth Day) | Display booth and interactive game to promote Stormwater Pollution Prevention | Stormwater information & giveaways distributed.<br><br>4,000+ attendees |
| 6/1/2010 | Poster creation for targeted direct distribution | Hispanic population | Restaurant and Yard Waste posters translated to Spanish | Larget format InDesign posters | Distribute among Latino community & during the Latino Festival |
| 7/1/2010 | Poster creation for targeted direct distribution | Carpet cleaning professionals | Carpet Cleaning posters | Large format poster developed in InDesign | Inform carpet cleaning operations of improper practices that impact water quality & CFPUA regulations |
| 8/1/2010 | Poster creation for targeted direct distribution | Pressure washers | Pressure Washing poster | Large format poster developed in InDesign | Inform pressure washing operations of improper practices that impact water quality |
| 1/10/2011 | Stormwater "Who to Call?" business card | General public | Stormwater staff | Business card for citizens | Distributed during special events, meetings, presentations, etc. |

***Local Cable Access***

| | | | | | |
|---|---|---|---|---|---|
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Pet waste ordinance slides, detailing ordinance rules and fines | Inform public of pet waste ordinance |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Yard waste ordinance slides, detailing ordinance rules and fines | Inform public of yard waste ordinance |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Illicit discharge ordinance slides, detailing ordinance rules and fines | Inform public of illicit discharge ordinance |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Stormwater hotline slides | Inform public of pollution prevention hotline and web-based reporting tool |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Scrolling slides | Upcoming events slides (i.e. monthly rain barrel sale) |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | 7 part documentary series<br>Aired beginning in March 2009 | It's Our Water (looks at all aspects of water thru teams of 8th grade students) |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | :30 second PSA | Cigarette Butts PSA - birds (KAB) |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | :30 second PSA | Cigarette Butts PSA - gunfighters |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | :30 second PSA | Fertilizer PSA UNCW |

| | | | | | |
|---|---|---|---|---|---|
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | :30 second PSA | Johnny Fishpatrick PSA - NC DENR |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | :30 second PSA | Keep America Beautiful Grasshopper PSA |
| Airs on rotating schedule | GTV-8 City's cable access channel | Cable access TV viewers | Stormwater staff GTV-8 Staff | Narrated slide show featuring 7 stormwater pollutants | Stormwater 101 Slideshow series |

***Newsletters***

| | | | | | |
|---|---|---|---|---|---|
| Spring 2010 | Citywide Public Information Report | City residents Public library Special events | Stormwater staff PIO Staff | 40,000+ distributed | UNCW Water Quality Info Stormwater Hotline Pet Waste ad |
| Fall 2010 | Citywide Public Information Report | City residents Public library Special events | Stormwater staff PIO Staff | 40,000+ distributed | Doctor's Branch Stream Restoration Project article |

***Citizen Contacts***

| | | | | | |
|---|---|---|---|---|---|
| Ongoing | Stormwater Office via phone or email | Citizen | Stormwater staff | Email or phone responses to requests for information, literature, etc. | Information provided to 15 citizens regarding specific nature of contact |

***Weekly Update Articles for City Council / Media / City Staff***

| | | | | | |
|---|---|---|---|---|---|
| Weekly | Email | City Council, City employees Media | City staff | Weekly update of city news, events, projects, etc. | Stormwater information was included in 9 Weekly Updates |

***Stormwater Staff / Employee Trainings***

| | | | | | |
|---|---|---|---|---|---|
| 3/3/2010 - 3/4/2010 | EOC Training Room | City stormwater crews | Cape Fear River Watch trainers & Muddy Waters Trainer/Riverkeeper | Muddy Waters - Sedimentation & Erosion Control training for staff via powerpoint presentation, discussion, field trip | 20 staff in attendance (Group #1) |
| 4/27/10 | City Streets Division | Streets field staff | Beth Nunnally, Code Enforcement | Illicit Discharge powerpoint presentation | Educated Streets Division staff to detect illicit discharges in the field |
| 4/12/2010- 4/13/2010 | EOC Training Room | City stormwater crews | Cape Fear River Watch trainers & Muddy Waters Trainer/Riverkeeper | Muddy Waters - Sedimentation & Erosion Control training for staff via powerpoint presentation, discussion, and field trip | 20 staff in attendance (Group #2) |
| 12/2/2010 | Code Enforcement Division | City Code Enforcement Officers | Cape Fear River Watch staff & Public Services Code Enforcement Officer | Illicit Discharge Detection & Elimination training | 10 staff in attendance |

**Identification of Target Pollutants, Sources and Audiences**

The following pollutants have been identified as significant sources of pollution in our waterways. Many of these pollutants also negatively impact the proper function of the storm drainage system. These particular pollutants were chosen to be the focus of our education program based on several sources of data including UNC-Wilmington water quality monitoring data, New Hanover County Animal Control statistics, and the 2006 NC Statewide Stormwater Survey of North Carolina residents. This particular survey has provided valuable insight and documentation into residents' awareness, perceptions, and behaviors about stormwater runoff pollution in NC.

| **Target Pollutant** | **Pollutant Source** | **Target Audience(s)** |
|---|---|---|
| Bacteria, viruses, parasites, and nutrients | Pet Waste<br>(Education regarding sanitary sewer overflows is conducted by CFPUA) | -Pet owners<br>-Pet industry professionals<br>-General public |
| Nutrients such as nitrogen and phosphorous | Fertilizer | -Homeowners/residents<br>-Landscape/Turf Maintenance Professionals<br>-General public |
| Toxic chemicals including herbicides, fungicides, and insecticides | Pesticides | -Homeowners/residents<br>-Landscapers<br>-Pest Control Applicators<br>-General public |
| Organic materials including leaves, grass clippings, pine straw, sticks, limbs, and other yard trimmings | Yard Waste/Debris | -Homeowners/residents<br>-Landscape/Turf Maintenance Professionals<br>-General public |
| Sand, dirt, gravel, clay, soil, etc. | Sediment | -Homeowners/residents<br>-Businesses<br>-Construction/developers<br>-Landscape/Turf Maintenance Professionals<br>-General public |
| Plastics, paper, cigarette butts, etc. | Litter | -Smokers<br>-Motorists<br>-Young Adults<br>-General public |
| Motor oil, antifreeze, grease, gas, and other vehicle fluids | Auto Fluids | -Do-it-yourself oil changers<br>-Vehicle owners<br>-Vehicle maintenance & repair shops<br>-General public |
| Phosphorous, soaps, grime | Car Washing Soaps | -Homeowners/residents<br>-General public |

**Target Pollutant:** Bacteria, Viruses, Parasites, Nutrients
**Pollutant Source:** Pet Waste
*Pet waste contains a host of bacteria, viruses, parasites and nutrients that contribute to surface water pollution and public health risks.*

**Pollutant Info**
Animal waste is generated from the natural biological processes of domesticated and wild animals. Although waste from wild animals contributes to pollutant levels in our waters, the focus of our efforts are to inform the public of the problems and solutions associated with waste from domesticated pets.

**Problem/Issue**
According to 2006 data provided by New Hanover County Animal Control Services, there were 53,630 registered dogs and cats in New Hanover County (33,828 registered dogs and 19,802 registered cats). In addition, it is estimated that there are 5 unregistered pets for every 1 registered pet.

These numbers, in conjunction with the average defecation rate of pets, are a significant source of bacterial pollution draining to our area waterways. Canines produce an average of ¾ lb of waste per day; applying that rate to the number of dogs registered in New Hanover County in 2006 equates to 25,371 pounds of excrement produced daily by canines in New Hanover County. If we consider the estimated number of unregistered dogs, that figure climbs significantly.

Stormwater contamination from pet waste poses serious health risks for humans. When pet waste is left on the ground, stormwater runoff can carry viruses, bacteria, and parasites from pet waste into local surface waters via the stormwater drainage system. Humans can become ill by swimming or recreating in waters contaminated by pet waste, eating shellfish from contaminated waters, coming in direct contact with pet waste, or from flies which spread diseases. Wilmington's creeks and waterways are regularly monitored by UNCW Center for Marine Science Research staff, and surface waters in the Wilmington area consistently exceed the state standards for fecal coliform counts in human contact waters as set by NC DEHNR (Mallin et. al). High fecal coliform counts in Wilmington's waterways are a direct result of pet waste contaminated stormwater runoff. The health risks to humans associated with the bacteria and parasites polluting surface water from pet-waste contaminated stormwater runoff make education and outreach on pet waste a top priority.

Several diseases that humans can contract from pathogens in pet waste include:

***Toxoplasmosis*** - Toxoplasmosis is a parasitic disease caused by the protozoan *Toxoiplasma gondii* and infects most warm-blooded animals including humans. The primary host is the felid (cat) family. Humans can contract the disease by ingestion of infected animal (especially cat) feces through hand-to-mouth contact following activities that involve touching anything that has come into contact with animal feces such as gardening, cleaning a litter box, etc. Humans can also contract the disease by ingestion of water contaminated with Toxoplasma, such as contact recreation in water contaminated with the Toxoplasma. A person suffering from acute toxoplasmosis show flu-like symptoms, swollen lymph nodes, or muscle aches and pain that lasts for a month or more. Young children, elderly people, pregnant women, and immuno-compromised patients, such as those with HIV/AIDS, are especially susceptible to

toxoplasmosis. Severe toxoplasmosis can cause damage to the brain or the eyes and birth defects in newborns ("Toxoplasmosis: Fact Sheet" CDC Division of Parasitic Diseases).

***E. Coli*** - Escherichia coli (E. coli) are one of the main species of bacteria living in the lower intestines of mammals such as dogs and cats. Humans can contract E. coli through ingestion of water contaminated with the bacteria through drinking or contact recreation. People generally become ill from E. coli two to eight days after being exposed to the bacteria, and infection often causes severe bloody diarrhea and abdominal cramps; complications from severe E. coli infection can lead to death. In some people, E. coli infection can cause a complication called hemolytic uremic syndrome (HUS), a life-threatening condition that is usually treated in an intensive care unit through blood transfusions and kidney dialysis. A small percentage of persons with HUS have immediate complications with lifelong implications such as blindness, paralysis, persistent kidney failure, and mild abnormalities in kidney function ("Disease Listing, Escherichia Coli O157:H7, General Information" CDC Division of Bacterial and Mycotic Diseases).

***Salmonella*** - Salmonellosis is an infection of the intestines caused by Salmonella bacteria, which are found in the feces of people and animals infected with Salmonella. Humans can contract Salmonella infections through contact with infected animals or their feces, including contact recreation or drinking water contaminated with the bacteria. Salmonella in humans can cause diarrhea, stomach pain, nausea and vomiting, and fever and headache, usually within 6 to 72 hours after exposure to Salmonella ("Disease Listing, Salmonellosis, General Information" CDC Division of Bacterial and Mycotic Diseases).

***Gastroenteritis*** - Gastroenteritis is a general term referring to inflammation or infection of the gastrointestinal tract, primarily the stomach and intestines. Gastroenteritis is the most common illness associated with swimming in water polluted by sewage and/or pet waste, and it occurs in a variety of forms that can have one or more of the following symptoms: nausea, vomiting, stomach ache, diarrhea, headache, and fever ("Viral Gastroenteritis" Center for Disease Control and Prevention, Respiratory and Enteric Virus Branch.).

***Roundworm*** - Roundworms, or nematodes, are a group of invertebrates whose larvae can be found in animal feces. Human can contract roundworm infections either by ingestion or through the skin ("Toxocariasis: Fact Sheet" CDC Division of Parasitic Diseases).

Some of the most common parasitic roundworms that can be transmitted to humans are:
*Enterobius vermicularis*, the pinworm that causes **enterobiasis**
*Ascaris lumbricoides*, the large intestinal roundworm that causes **ascariasis**
*Necator* and *Ancylostoma*, two types of hookworms that cause **ancylostomiasis**
*Trichuris trichiura*, the whipworm that causes **trichuriasis**
*Strongyloides stercoralis* that causes **strongyloidiasis**
*Trichinella spiralis* that causes **trichinosis**
Pet waste also seriously impacts a waterway by contributing nutrients that spur excessive weed and algae growth. When algal biomass decomposes, it consumes large amounts of dissolved oxygen (DO) from the water that can lead to dangerously low dissolved oxygen levels and fish kills. This nutrient-rich water impairs aquatic habitat and is unattractive and unhealthy for drinking, swimming, fishing, and other recreational activities.

**Target Audience**
Based on the results of the 2005 Survey of North Carolina residents' stormwater behaviors and the City of Wilmington demographics, it was determined that education and outreach efforts should target the following audiences *(Note: A target audience is subject to modification over time pending results of periodic assessment and evaluation):*

Pet Owners
Pet owners are considered the primary focus for outreach and education. By right of ownership, a pet owner is empowered with the ability to reduce pet waste-contaminated stormwater runoff by cleaning up after his/her pet. Successful and continued education and outreach to pet owners has the potential to significantly reduce bacterial pollution and eutrophication of Wilmington's waterways.

Pet owners offer a variety of reasons for not picking up after their pets, including:
Not wanting to touch it
Thinking of it as fertilizer
Believing it will decompose quickly and go back into the soil
Being unaware of the health risks
Feeling it is their private property and therefore can do whatever they wish

The habit of NC pet owners cleaning up after their pets reflects these attitudes. Significantly more than half of each demographic (age, sex) in the survey responded to picking up after their pet as "Sometimes," "Rarely," or "Never" (Bartlett C-51). This data leads to the conclusion that the primary target audience for education and outreach should be broad initially, and adjusted to target more specific demographics pending the results of assessment and evaluation of education efforts.
18 to 64 year olds: Based on the survey results, the target audience's age is very broad. Pet owners aged 65 and older exhibit slightly better waste clean-up habits; the survey did not include pet owners under the age of 18.

Males and Females: Females were reported as having slightly better pet waste clean-up habits than males, but significantly more than half of each group still reported cleaning up after their pet as "Sometimes," "Rarely," or "Never."

Pet Industry Professionals/Businesses/Events
Education and outreach to pet industry professionals is extremely important because of their regular contact with pet owners. Targeting businesses, professionals, and events that cater to pet owners will enable us to educate those in the profession as well as have them serve as a conduit to deliver education and outreach messages. Businesses, professionals, and events that should be targeted include:
Veterinarians
Animal hospitals
Pet sitters
Doggie day cares
Pet trainers
Pet exercisers

Kennels and animal shelters
Groomers and pet spas
Pet supply stores
Pet magazines
Dog Jog, Paw Jam and other special events for pets
Local adoption agencies
Animal Control & the Humane Society

General Audience
By targeting a general audience for education and outreach efforts, we will be able to encourage more environmental stewardship of citizens in the community. Both pet owners as well as non-pet owners will understand the connection between pet waste and poor water quality, and as a result more pet owners will feel obligated to clean up after their pet as they will feel pressure from other citizens to do so. As more citizens are aware of the health consequences as well as the impacts to Wilmington's waterways, the more likely they are to report pet waste violators, or interject when witnessing a pet waste violation.

**Key Messages for Pet Waste Education**
Uncollected pet waste pollutes Wilmington's waterways and threatens public health.
Bacteria in pet waste can cause diseases and infections in humans and other animals.
Bacteria and nutrients in pet waste can cause serious water quality problems.
Pet owners/custodians should always clean up and properly dispose of pet waste by methods such as bagging, burying waste, using a pet waste digester, using a covered letterbox, etc.
Pet waste should not be flushed down the toilet in New Hanover County.

**Message Distribution**
Distribute pet waste education brochures through all veterinarian offices in New Hanover County.
Add more pet waste educational signs to the pet waste stations in City Parks.
Revise pet waste ordinance and require pet owners to pick up after their pet on public property. Include a clause that requires pet owners to show they have something on their person to do so (i.e. bag, scooper, etc).
Mail a pet waste education brochure to all registered pet owners in New Hanover County.
Using male-oriented media, target males, ages 18-64 through a mass media campaign for pet waste.
Establish contact with pet industry professionals and businesses to disseminate pet waste education messages, such as mailing them informational and educational materials, giving presentations at their businesses or community events, meeting with them and highlighting education outreach materials, etc.
Participate annually in the Wilmington Dog Jog event and Paw Jam event to disseminate pet waste messages.
Include blurbs in the citywide newsletter mailed quarterly to all citizens.
Contact local media outlets to suggest feature stories and/or articles regarding the importance of proper pet waste disposal
Develop and distribute public service announcements on pet waste on cable access and paid media as the budget permits

**Assessment and Evaluation**

Periodically assess the habits of pet owners and pet industry professionals by:
Direct observation of habits *(collects vs. doesn't collect, where dispose, etc.)*
Count of citations issued for pet waste violations
Count of reported complaints to Stormwater Hotline regarding pet waste violations
Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting, specifically Fecal Coliform counts in local waters

**Target Pollutant:** Nutrients (nitrogen, phosphorous)
**Target Pollutant Source:** Fertilizer
*Nutrients found in fertilizer, including phosphorous and nitrogen, cause algal blooms, low dissolved oxygen levels, fish kills, and poor aquatic habitat.*

**Pollutant Info**

Fertilizers are substances spread on or worked into soil to increase its capacity to support plant growth. Fertilizers can be composed of organic and inorganic chemicals and compounds, and typically provide, in varying proportions, three major plant nutrients: nitrogen, phosphorous, and potassium. Sources of fertilizers include residential and commercial applications, applied by a wide variety of people ranging from the novice homeowner and gardener to professionally-trained landscapers and turf maintenance workers. Although not typically found in the City of Wilmington, another major source of fertilizer application is the farming of crops.

**Problem/Issue**

Proper application of fertilizer results in minimal environmental concerns, however negligent or improper application of fertilizers results in the introduction of nutrients and chemicals into local waterways via stormwater runoff. Improper application includes over-applying by frequency or volume, applying the wrong fertilizer compound, applying before rain, and failure to clean excess fertilizer from driveways and streets after application.

The chemicals and nutrients in fertilizers wash into surface waters during rain events or irrigation practices and result in eutrophication, which is the abundant accumulation of nutrients that support a dense growth of algae and other organisms. Decaying algae depletes dissolved oxygen from the water, resulting in a decrease of available oxygen for aquatic inhabitants like fish. This leads to a decline in aquatic organism populations from oxygen deprivation, or hypoxia.

Harmful algal blooms also prevent sunlight from penetrating surface waters, making it difficult for benthic, or bottom dwelling plants, to perform photosynthesis, which also further reducing the oxygen content of the water. Some algal blooms can be toxic to plant and animals, including humans.

**Target Audience**

The target audience for fertilizer education and outreach includes homeowners, business owners, and landscape and turf maintenance professionals. Generally, trained landscape business professionals have had some training and special knowledge on proper fertilization measures, however continuing education for alternatives to fertilizer application and frequent over-application is still very necessary for this sector. Homeowner education should be a top priority.

<u>Homeowners</u>

About 5% of residents who apply fertilizer to their yard apply it monthly. The majority of responses to “monthly” were of the highest income level of the survey respondents. The most responses to applying fertilizer 2-3 times per year were from the two highest income brackets in the survey (Bartlett 14).

Male homeowners who spend less than $500 per year on lawn care are the group that applies the most fertilizer themselves and not by hiring a professional service. Those who spend more tend to hire a professional service (“Toolbox – Audience Data”).

Landscape and Turf Maintenance Professionals

Professionals employed in landscaping and turf maintenance should be a target audience due to their frequent use of fertilizers.

**Key Messages for Fertilizer Education**

There is a direct link between improper fertilizer application and poor water quality impacts, including fish kills, habitat destruction, and water quality degradation.

Promote time and money-saving alternatives to traditional fertilizer application including "grasscycling" (leaving grass clippings on the lawn as a natural fertilizer and soil conditioner), composting, using organic fertilizers, and getting a free soil test to determine the correct nutrient needs of a lawn and the proper application rates.

If you use fertilizer, read the label and apply correctly (i.e. not before it rains).

Fertilizer should be collected off of paved surfaces such as sidewalks and driveways.

Yard waste is also a source of nutrients because of the fertilizer attached and the nature of the organic matter, so yard waste should always be disposed of properly.

Citizens should employ a sense of responsibility and environmental stewardship to apply fertilizer properly.

**Message Distribution**

Distribute fertilizer education brochures to all yard maintenance and turf management businesses in New Hanover County.

Mail a fertilizer education brochure to all City of Wilmington residents.

Include blurbs in the citywide newsletter mailed quarterly to all Wilmington citizens.

Establish contact with local homeowners associations to disseminate fertilizer education messages through mailings, newsletters, presentations, and meetings, etc.

Establish contact with yard maintenance and turf management businesses to disseminate fertilizer education messages and encourage and ensure proper staff training.

Establish contact with management staffs of the golf courses in New Hanover County to disseminate fertilizer education messages and ensure proper staff training.

Contact local media outlets to suggest feature stories and/or articles regarding the importance of proper fertilizer application.

Develop and distribute public service announcements on the importance of proper fertilizer application.

**Assessment and Evaluation**

Periodically assess the habits of homeowners and landscape industry professionals by:

Direct observation of the fertilizer application habits of homeowners and landscape industry professionals in the Wilmington area

Surveys of the fertilizer application habits of homeowners and landscape industry professionals in the Wilmington area

Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting, specifically nitrogen, phosphorus, BOD, and algal bloom frequencies and locations

**Target Pollutant:** Toxic chemicals
**Target Pollutant Source:** Pesticides
*Pesticides include herbicides, fungicides, and insecticides which are chemicals that can persist in the environment and disrupt aquatic habitat, contaminate water resources, and cause toxicity in humans, animals and aquatic habitat.*

**Pollutant Info**
Pesticides are applied by homeowners, business owners, landscape and turf maintenance professionals, and exterminators and pest control professionals.

As defined by the Environmental Protection Agency (EPA), a pesticide is "any substance or mixture of substances intended for preventing, destroying, repelling, or lessening the damage of any pest." Sources of pesticides include applications to homes and businesses by homeowners, business owners, or commercial pesticide professionals. Agricultural application of pesticides is not considered a source in Wilmington because of the absence of agricultural operations in the area.

**Problem/Issue**
Commonly used organophosphate pesticides are present in urban stormwater runoff and are responsible for toxicity to aquatic life in receiving water bodies. Pesticides can bio-accumulate up the food chain and pose a threat to beneficial bugs, the aquatic environment, wildlife, and humans.

**Target Audience**
Homeowners and Residents
A majority of the target pollutant pesticides are commonly available from home improvement and gardening stores and do not require training or licensing as a prerequisite to purchase or application. Thus, home and residential applications by citizens potentially contributes to the contamination of stormwater and surface water from pesticides. Education and outreach to Wilmington's residents on the proper application techniques and practices for pesticides would potentially reduce improper application, and thus reducing the potential for contamination of stormwater runoff. Owners or operators of small businesses that perform their own landscape maintenance should be addressed in this target audience group also.

Yard Maintenance, Turf Management, Exterminator/Pest Control Professionals
It can be assumed that professionals in this industry have been properly trained and educated in application practices for pesticides and thus this group is the second tier priority target audience. However, due to the frequency of applications by members of this target audience group, the potential for contamination of stormwater runoff by pesticides through improper application by members of this target audience group is still present. Consequently, education and outreach on proper application techniques to this target audience group is needed.

**Key Outreach and Education Messages for Pesticides**
Awareness of the impact of pesticides on surface waters via stormwater runoff.
A direct link exists between animal and habitat impacts and the application of pesticides.
Citizens/landscapers should be encouraged to use native plants which don't require pesticides, use natural controls such as ladybugs and weeding by hand, using organic pesticides, reading the label to apply correctly (i.e. not before it rains) and using pesticides as a last resort.

Citizens should employ a sense of responsibility and environmental stewardship to apply pesticides properly.

**Message Distribution**
Establish contact with yard maintenance, turf management, and exterminator/pest control professionals in New Hanover County to disseminate pesticide education messages and encourage and ensure proper staff training.
Distribute pesticide education brochures to all yard maintenance, turf management, exterminators, and pest control professionals in New Hanover County.
Establish contact with local homeowners association and property management companies to disseminate pesticide education messages.
Mail a pesticide education brochure to all Wilmington residents.
Include blurbs in the citywide newsletter mailed quarterly to all Wilmington citizens.
Work with NC Cooperative Extension Service to implement educational workshops focused on proper pesticide use for professionals needing NC Pesticide credits.
Contact local media outlets to suggest feature stores and/or articles regarding the importance of proper pesticide application.
Develop and distribute a public service announcement on the importance of proper pesticide application.

**Assessment and Evaluation**
Periodically assess the pesticide application habits of homeowners, yard maintenance, turf management, and exterminator/pest control professionals by:
Direct observation pesticide application habits of homeowners, yard maintenance, turf management, and exterminator/pest control professionals
Surveys of pesticide application habits of homeowners, yard maintenance, turf management, and exterminator/pest control professionals
Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting, specifically nitrogen, phosphorus, BOD, and algal bloom frequencies and locations

**Target Pollutant:** Organic material, nutrients (nitrogen, phosphorous)
**Target Pollutant Source:** Yard Waste/Debris
*Organic matter such as grass clippings, leaves, and other yard trimmings contribute nutrients to waterways that result in aquatic weed and algae growth, low dissolved oxygen levels, fish kills, and impaired habitat. Sediment is often attached to this organic matter.*

**Pollutant Info**
Yard waste is produced as a result of landscaping, mowing, clipping, pruning, and gardening around homes and businesses. Yard waste consists of organic matter such as grass clippings, leaves, and branches, etc., and is produced by landscape maintenance performed by homeowners and commercial landscapers.

**Problem/Issue**
Yard waste can clog the storm drainage system causing flooding of streets, homes and businesses.

Yard waste that ends up traveling all the way through the drainage system ends up in local surface waters, which impacts aquatic life and habitat by introducing excess nitrogen and phosphorus to the water. This overabundance of nutrients is called eutrophication and can lead to severe algal blooms. As the algal blooms decompose, it uses up the dissolved oxygen in the water that aquatic organisms, like fish, need to survive. In addition, yard waste often carries fertilizers, pesticides, and sediment attached to it that compounds the problem of eutrophication and threatens the flora and fauna in our waterways.

**Target Audience**
96% of North Carolina residents surveyed reported having a yard that they personally mow. 95% of urban respondents to the survey reported either leaving their grass clippings on their lawn, collecting them and throwing them in the garbage, or using them for mulch and/or compost. Less than 2% of urban respondents reported as to blowing or raking their yard waste down the storm drain. Reponses to the survey were broken down by education level, with the largest percentages as ‘High School Graduates’ and ‘Some College’ (Bartlett, C-21).

<u>Lawn Maintenance and Landscape Industry Professionals</u>
Since lawn maintenance professionals are more frequent to generate yard waste than the average home owner, they are potentially a greater contributor to the introduction of yard waste into the storm drainage system.

<u>Homeowners</u>
Based on survey results, as well as the fairly even distribution of respondents by education level who reported to rake or blow their yard waste down the storm drains, the target audience should be a broad, encompassing audience. A slight priority may be given to high school and college aged audience. Based on the survey results, audience members with experience in a vocational or technical school should be given the lowest priority.

**Key Outreach and Education Messages for Yard Waste**

A direct link exists between fish kills and aquatic habitat destruction as a result of improper yard waste disposal habits.

A direct link exists between flooding of streets and property as a result of improper yard waste disposal habits.

Landscapers/citizens should practice proper disposal methods such as grasscycling, composting, collecting/containing yard waste for pick-up and not blowing or placing debris into any part of the storm drainage system.

Citizens should employ a sense of responsibility and environmental stewardship to dispose of yard waste properly.

**Message Distribution**

Establish contact with yard maintenance and turf management professionals in New Hanover County to disseminate yard waste education messages and encourage and ensure proper staff training.

Distribute yard waste educational brochures to all yard maintenance, turf management, and property management professionals in New Hanover County.

Establish contact with local homeowners association and property management companies to disseminate yard waste education messages.

Mail a yard waste educational brochure to all Wilmington residents.

Include blurbs in the citywide newsletter mailed quarterly to all citizens.

Contact local media outlets to suggest feature stories and/or articles regarding the importance of proper yard waste disposal habits.

**Assessment and Evaluation**

Elicit counts of Stormwater Maintenance Department responses to clogged stormwater system components as a result of yard waste

Periodically assess the yard waste disposal habits of property owners and landscape/maintenance industry professionals in Wilmington by:

Direct observation of habits

Surveys of habits

Count of citations issued pertaining to improper yard waste disposal habits

Count of reported violations to Stormwater Hotline

Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting, specifically nitrogen, phosphorus, BOD, and algal bloom frequencies and locations

**Target Pollutant:** Sediment **(**Sand, dirt, gravel, clay, soil particles)
**Target Pollutant Source:** Sediment
*Sediment includes particles of sand, dust, dirt, gravel and soil that cause turbidity and problems for aquatic life.*

**Pollutant Info**

Sediment is generated by the processes of natural or accelerated erosion. Natural erosion is the process of weathering that forms soil. Accelerated erosion is a result of land-disturbing activities by humans that loosens topsoil and makes it more prone to erode; construction-related activities are an example of accelerated erosion. Another example is an eroding stream bank caused by lack of a vegetated buffer.

While natural erosion contributes sediment to our waterways, the majority of the sediment comes from areas where accelerated erosion has occurred. Other sources of sediment include poorly vegetated areas in yards of homes and businesses.

**Problem/Issue**

Sedimentation occurs when stormwater runoff carries soil particles from an area, such as a construction site, and transports them to surface waters such as a stream or creek. Sediment can fill in a waterbody or clog the storm drainage system, which can lead to flooding of streets and property.

Excessive sedimentation clouds the water, a condition known as turbidity. Increased turbidity causes problems for aquatic plants and animals. Aquatic plants, like all other plants, require sunlight to perform photosynthesis. As water turbidity increases, the amount of sunlight able to penetrate through the water column decreases. This reduces the amount of sunlight that reaches aquatic plants, and therefore impairing plants' abilities to photosynthesize. Turbid water impairs the vision of animals, like fish, and their ability to hunt prey. Sediment in the water also impairs the ability of fish and other animals to breathe because sediment can clog their gills.

As sediment in water settles, it covers the benthic (bottom-dwelling) environment. Settling sediment smothers fish eggs, shellfish, coral, and benthic plants.

Sediment also serves as a vehicle for other pollutants like phosphorus, pathogens, and heavy metals to enter the aquatic environment. These other pollutants are often attached to sediment that ends up in surface waters, and as a result, cause their own myriad of problems to the environment.

**Target Audience**

Sources of sediment in our surface waters are primarily the result of accelerated erosion or erosion from any land-disturbing activity such as gardening, planting, construction, etc. The environmental consequences of sedimentation of surface waters are not widely understood by citizens, and an effective education and outreach campaign should convey the key messages to a wide target audience.

Homeowners and Business Owners

A broad audience should be blanketed by education and outreach efforts. Addressing citizens and businesses that only have bare spots in their yards is unfeasible and impracticable, and therefore the efforts for education and outreach should be as far-extending as possible, relaying the key messages in a package rather than tailoring key messages to specific target audience groups. These messages should also target homeowners that live along water conveyances that have significant erosion due to lack of a vegetated buffer to stabilize the bank.

Construction, Landscape, and Related Business Professionals

Due to the high amount of construction and development in Wilmington, a second-tier target audience group should be addressed that includes construction, landscape, and related industry professionals. The activities executed by members of these industries have very high potential to significantly contribute to sediment loading of stormwater runoff. Sediment and erosion control techniques are generally legally required when performing construction and landscape activities, and targeting this group with education and outreach on the environmental and legal importance of these methods can prevent a potentially large amount of sediment from being carried off by stormwater runoff.

**Key Outreach and Education Messages for Sediment**

A direct link exists between sediment and poor water quality.
Sedimentation impacts aquatic life and habitat.
Citizens can plant groundcover, shrubs, and trees to hold soil in place and reduce erosion.
Sediment should be collected off streets, driveways and other hard surfaces.
Developers should follow all sedimentation and construction site laws and practices.
Citizens and businesses should employ a sense of responsibility and environmental stewardship to contain and control sources of sediment.

**Message Distribution**

Promote the NC Division of Land Resources “1-866-STOP-MUD” toll free hotline to report possible violations of the Sedimentation Pollution Control Act.
Establish contact with construction, landscaping, and related business professionals in New Hanover County to disseminate sediment education messages and encourage and ensure proper staff training.
Distribute sediment educational brochures to all construction, landscaping, and related business professionals in New Hanover County.
Establish contact with local home owners associations and property management companies to disseminate sediment education messages.
Include blurbs in the citywide newsletter mailed quarterly to all citizens.
Contact local media outlets to suggest feature stories and/or articles regarding the problems caused by sediment entering the stormwater drainage system.

**Assessment and Evaluation**

Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting, specifically Total Suspended Solids (TSS)

**Target Pollutant:** Plastic, paper, cigarette butts, etc.
**Target Pollutant Source:** Litter
*Litter includes plastics, paper, cigarette butts, and any other trash not properly disposed of that can end up in waterways and affect aquatic habitat, wildlife, and water quality.*

**Pollutant Info**
Litter is generated as a result of the intentional or unintentional disposal of trash, cigarette butts, paper scraps, food wrappers, etc. onto the open ground or anywhere other than a trash can, dumpster, or recycling bin.

**Problem/Issue**
Litter is carried by stormwater runoff into the drainage system where it can clog storm drains and drainage routes and cause flooding onto streets and property.

Litter that travels all the way through the drainage system ends up in local surface waters where it causes many problems:
Fish, birds and other wildlife often mistake litter for food and become sick or die from ingesting it.
Fish, birds and other wildlife become entangled in litter and perish because they become strangled or are not able to properly ingest their food.
Litter can introduce chemical pollutants into waterways. Cigarette butts can leach chemicals such as cadmium, lead, and arsenic into the marine environment within one hour of contact with water.
Litter is extremely costly to clean up, yet very easy to prevent. The North Carolina Department of Transportation alone spent $16 million in 2006 cleaning up roadside litter.

**Target Audience**
Although no surveys has been performed in Wilmington or North Carolina targeting the litter habits of citizens, other research can be considered applicable in defining the target audience. Based on an inquiry to the North Carolina Administrative Office of the Courts, a summary of the littering offenses for calendar year 2006 showed that there were 218 littering charges including six offense codes, with 81 convictions. The majority of the offenses were: *Littering not more than 15 pounds* (132) and *Improper Loading/Covering of Vehicle* (69) ("Litter Data").

Research on litter habits of Victoria, Australia citizens has shown that men litter more than women, students are more likely to litter than other people, most littering occurs in transport sites, smoking areas and market sites, and the most common reasons for littering are: "too lazy" (24%), " no ashtray" (23%), and "no bin" (21%) ("VLAA – Facts About Butt Litter"). Finally, an abundance of research has shown that cigarettes are the largest source of litter. The public education and outreach for litter should target the following audiences:

<u>General, Encompassing Audience</u>
Despite several surveys and research, there is no such thing as a stereotypical litterbug. Litter habits cannot be confined to a particular demographic, and therefore education and outreach efforts should extend to every citizen in Wilmington.

Smokers
Cigarette butts are the largest environmental litter problem both locally and worldwide. Smokers should be educated that cigarette butts are a major source of litter and that they negatively impact the environment.

Drivers of Pickup Trucks and/or Open Trailers
A lot of roadside litter in North Carolina results from poor securing of cargo loads. Drivers that may be transporting loads of debris, yard waste, trash, etc often do not secure their loads in their truck beds or open trailers and then the load gets blown off of the vehicle and onto the roads and surrounding areas *(Keep It In Your Bed…).*

**Key Outreach and Education Messages for Litter**
A direct link exists between animal kills, habitat destruction, and water quality degradation as a result of littering.
There is a direct link between flooding of streets/property as a result of litter being carried by stormwater into the drainage system.
Messages should encourage the use of trash bins and reducing, reusing, and recycling.
Messages should include the specific impacts of litter on local waterways and inhabitants (i.e. plastic bags get mistaken as jellyfish by sea turtles) and litter decomposition rates to raise awareness of the longevity of litter in our environment.
Citizens should employ a sense of responsibility and environmental stewardship to dispose of yard waste properly to dispose of litter properly and encourage the reporting of litter violators and the enforcement of litter offenses.

**Message Distribution**
Distribute pocket ashtrays to residents of New Hanover County to encourage proper cigarette butt disposal.
Work with Keep America Beautiful of New Hanover County to develop and implement a public service campaign for litter education and outreach.
Develop and distribute posters to disseminate litter education and outreach messages
Distribute educational giveaways (i.e. pencils) about littering to students in New Hanover County.
Include blurbs in the citywide newsletter mailed quarterly to all citizens.
Educate citizens and students about using North Carolina's Swat-A-Litterbug program.
Establish contact with local sanitary disposal services to disseminate messages on proper load securing.
Contact local media outlets to suggest feature stories and/or articles regarding problems caused by litter entering the stormwater drainage system
Working with other local agencies, conduct volunteer litter clean-ups.

**Assessment and Evaluation**
Elicit count of Stormwater Maintenance Department responses to clogged stormwater sewer system components as a result of litter.
Have Stormwater Maintenance crews continually provide field observations of problem litter areas for clean-up by KAB community service workers or Cape Fear River Watch.
Periodically assess the litter disposal habits of Wilmington residents by:

Direct observation of habits
Surveys of habits
Count of citations issued pertaining to improper litter disposal habits
Count of reported violations to Stormwater Hotline
Count of reported violations to Keep America Beautiful of NHC
Count of reported violations to Swat-a-Litterbug from New Hanover County
Water quality levels, specifically litter quantities observed
Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting

**Target Pollutant:** Motor oil, antifreeze, grease, gas, and other vehicle fluids
**Target Pollutant Source:** Auto Fluids
*Auto fluids include gas, motor oil, gear oil, grease, and antifreeze which do not dissolve in water. These fluids can spread quickly in water poisoning fish and other organisms and bonding to birds. Petroleum products are especially harmful to plants, wildlife, and humans.*

**Pollutant Info**
Vehicle fluids and chemical pollutants can come from intentional or unintentional disposal of fluids such as motor oil, antifreeze, grease, gas, and other vehicle fluids. Sources of these fluids are leaking vehicles or machinery, leaking oil containment devices, industrial facilities, vehicle and machinery repair facilities, storage areas (including marinas), fuel stations, parking lots, and improper disposal of chemicals by homeowners or businesses, such as the do-it-yourself homeowner.

**Problem/Issue**
The types and sources of this pollutant class vary considerably. As of April 2, 2007, there were 178,091 registered vehicles in New Hanover County and 83,087 within the City of Wilmington limits (Cochran, D.).

Vehicles have seals and gaskets that are leaking or have the potential to leak a variety of fluids. An accumulation of oil and grease on roadways and parking lots gets carried away by stormwater runoff. Once in water, it forms a film and makes oxygen transfer difficult and toxic for aquatic animals and plants. In fact, 1 quart of motor oil can contaminate 250,000 gallons of water.

Chemicals can also enter surface waters by accumulating on sediment that is picked up by runoff. In this case, the sediment eventually settles to the bottom of the water column and adversely affects benthic organisms.

**Target Audience**
Do-It-Yourself Oil Changer
Citizens who perform maintenance on their own vehicles should be given a high priority for education and outreach efforts based on the potential for improper disposal methods. Only about a fifth of respondents who reported owning a vehicle also reported servicing the vehicle at home; the remainder of the respondents reported using a commercial oil change facility. Males are the typical at-home vehicle oil-changer, grouped by following age brackets (listed from the largest group to smallest): 35-44, 45-54, 18-24, over 65, 55-64, and 25-34. Race could also be considered in defining the target audience; Asian respondents reported the highest percentage of pouring used oil down the stormwater drain following servicing their vehicle. White respondents reported the highest percentage of pouring used oil in a designated section of their yard following servicing their vehicle (Bartlett C-37).

Vehicle Maintenance and Repair Businesses
It could be assumed that the highest density of vehicles leaking oils and greases are located in and around commercial businesses that perform maintenance and repair on vehicles and machinery. While these vehicles await repair, they are usually stored in open (non-covered) parking lots; the runoff from large parking lots are a large contributor to oil and grease entering

our surface waters. Also, these businesses generally have on-site storage for both new and used oils, and both have the potential to leak during filling, emptying, and storage unit failure.

Owners of Vehicles, Machinery, and Equipment
This target audience is large, broad, and encompassing of residents and businesses. All vehicles, machinery, and equipment that utilize oil and grease for operation have the potential to leak and contribute to stormwater pollution. In particular, vehicle owners should be educated to check for leaks, keep vehicles tuned up, repair leaks, check tire pressure and recycle vehicle fluids and batteries. In addition, citizens should be encouraged to utilize the stormwater hotline (future) to report instances of illegal fluid dumping.

**Key Outreach and Education Messages for Chemicals**
There is a direct link between plant and animal kills, habitat destruction, and water quality degradation as a result of the introduction of vehicle fluids into stormwater runoff.
Vehicle owners should be educated to check for leaks, repair them, keep vehicles tuned up, check for proper tire pressure and recycle vehicle fluids and batteries.
Citizens should employ a sense of responsibility and environmental stewardship to dispose of yard waste properly to dispose of litter properly and encourage the reporting of litter violators and the enforcement of litter offenses.

**Message Distribution**
Develop and distribute educational brochures to the community.
Distribute educational brochures to vehicle repair/maintenance facilities to disseminate proper chemical storage and disposal messages.
Establish contact with local home owners association and property management companies to disseminate chemical education messages.
Include blurbs in the citywide newsletter mailed quarterly to all citizens.
Contact local media outlets to suggest feature stories and/or articles pertaining to problems caused by chemicals entering the stormwater drainage system.
Distribute educational brochures on chemicals to all automobile owners in New Hanover County to encourage proper vehicle maintenance and chemical storage/disposal methods.

**Assessment and Evaluation**
Periodically assess vehicle fluid disposal habits of Wilmington residents and businesses
Direct observation of habits
Surveys of habits
Count of citations issued pertaining to improper chemical disposal habits
Count of reported violations pertaining to chemical leaks or disposal habits to Stormwater Hotline
Assess and evaluate local water quality utilizing yearly UNCW Center for Marine Science annual water quality reporting

**Target Pollutant:** Phosphorous, Dirt/Grime, Detergents
**Target Pollutant Source:** Car Washing Soaps/Detergent
*Soaps used to wash vehicles often contain phosphorous, a primary nutrient of aquatic weeds and algae. Dirt and grime from vehicle washing activities are also washed into waterways.*

**Pollutant Info**
Washing cars, boats, homes, and driveways can send soap, dirt and grime into our waterways via stormwater runoff or hose water. Some cleaning agents are more toxic to aquatic and marine organisms than others, but improper washing of cars or boats utilizing cleaning agents of any toxicity level can negatively affect water quality by contaminating the water with sediment, debris, or chemicals washed off of vehicles, driveways, etc.

**Problem/Issue**
Chemicals and cleaning agents that wash into storm drains and then our waterways can destroy the external mucus layers of fish that protect them from bacteria and parasites. This leads to fish kills as a result of bacterial or parasitic infections.

Many detergents also contain phosphates which promote excessive algae and aquatic weed growth. Phosphates are nutrients that promote the growth of plants and cause the growth of algae and aquatic weeds.

During the process of washing cars, boats, etc, other pollutants such as sediment, heavy metals, and chemicals may be washed away too. These pollutants are then picked up by stormwater runoff and cause their own negative consequences to the aquatic ecosystems in our area.

**Target Audience**
<u>Homeowners/Do-it-Yourself Car Washers</u>
The most important group to target concerning this pollutant is citizens that wash their cars in residential areas. Based on the survey of NC residents' habits, the members of this target group that should be given priority are people in the income bracket of $35,000 to $75,000, age group 35-44, and female (Bartlett C-37). These groups accounted for the most responses to letting their soapy water run into the street or driveway.

<u>Do-it-Yourself Boat Washers</u>
Although the survey did not include any questions on the washing habits of boat owners, this group should be given a high priority because of the potential to directly contaminate surface waters when washing their boats at moor. Boat owners that wash their boats at home on the trailer should be included in the same group as the do-it-yourself car washer.

<u>Businesses Related to Home, Car, and Boat Cleaning</u>
It is important to include businesses that perform cleaning or detailing of cars and boats in education and outreach efforts. These businesses include:
Mobile Cleaning Businesses, including pressure washing and boat cleaning services
Car Detailing Facilities (stationary)
Automobile Sales Businesses

General, Encompassing Audience

A general target audience is necessary because all residents and/or businesses have the potential to contribute to this target pollutant through simply washing something outdoors, such as driveways, homes, lawn furniture, or just about anything else.

**Key Outreach and Education Messages for Soaps and Detergents**

Create awareness of the impact of the vehicle washing activities into surface waters either directly or via stormwater runoff.

There is a direct link between aquatic impacts such as algal blooms and fish kills as a result of improper vehicle care habits.

Messages should encourage citizens to wash vehicles on the grass, use a phosphate-free detergent, and/or use a commercial car wash.

Citizens should employ a sense of responsibility and environmental stewardship to practice vehicle washing so that it does not harm the environment or our waterways.

**Message Distribution**

Distribute educational brochures to automobile owners in New Hanover County to disseminate messages on proper automobile washing practices.

Distribute educational brochures to boat owners in New Hanover County to disseminate messages on proper boat washing practices.

Establish contact with business related to automobile or boat cleaning and pressure washing to disseminate messages on cleaning agents entering the stormwater drainage system.

Partner with commercial car wash businesses to promote their use as an alternative to washing on the street or driveway.

Develop and distribute advertisements about vehicle washing to run in print media.

Establish contact with local home owners associations and property management companies to disseminate educational messages on cleaning agents.

Include blurbs in the citywide newsletter mailed quarterly to all citizens.

Contact local media outlets to suggest feature stories and/or articles pertaining to problems caused by cleaning chemicals/agents entering the stormwater drainage system.

**Assessment and Evaluation**

Periodically assess vehicle washing and exterior home washing habits of Wilmington residents by:

Direct observation of habits

Surveys of habits

## APPENDIX B: PUBLIC INVOLVEMENT AND PARTICIPATION

Included in this section:
BMP Reporting Table
Contracts/Cooperative Agreements with:
New Hanover Soil & Water Conservation District
Cape Fear River Watch

| DATE | PLACE/EVENT | AUDIENCE | INDIVIDUALS WHO PERFORMED ACTIVITY/CONTENT | TECHNIQUES/ METHODS USED | RESULTS OF ACTIVITY/ INFO COLLECTED |
|---|---|---|---|---|---|

| **BMP(a) Administer a Public Involvement Program** |
|---|
| This requirement is being met as outlined in b-e below |

| **BMP(b) Allow the Public an Opportunity to Review & Comment on Stormwater Plan** |
|---|
| This requirement was satisfied in Year 3. |

| **BMP(c) Organize a Volunteer Community Involvement Program** |
|---|
| The City of Wilmington contracts annually with Cape Fear River Watch (CFRW) and New Hanover Soil & Water Conservation District (NHSWCD) to implement public involvement and participation activities, as well as education and outreach activities. Both organizations sign a yearly contract with the City of Wilmington that includes specific deliverables that enable the City to meet many of the NPDES BMP requirements. Copies of these contracts and yearly reports are included in the Appendix. Below is a summary of each organization's deliverables in regards to NPDES: |
| **CFRW** - Coordinate volunteer watershed cleanups and invasive species removal; monitor, maintain, and provide public education for the Kerr Avenue Wetland; coordinate workshops for City personnel; provide educational programs for City residents (i.e. Saturday seminars, Greenfield Lake eco-tours, presentations to civic groups); partner on grant projects (i.e. 319 grant, CWMTF grant); conduct Enviroscape presentations for 8th grade science classes; monitor and report monthly on Greenfield Lake conditions; conduct a volunteer watershed monitoring program and report on problem areas in watersheds; participate and provide assistance for public meetings and additional outreach activities; and provide cumulative quarterly progress reports for all deliverables. |
| **NHSWCD** - Conduct Enviroscape presentations for 8th grade science classes and assist in training instructors; provide Stormwater 101 powerpoint presentations to community groups; implement monthly rain barrel sale to the public; increase awareness about fecal coliform bacterial pollution (pet waste); serve on the Stewardship Development Program Coalition to recognize developers that implement environmental responsible projects; promote LID education to developers, architects, and engineers; administer statewide CCAP BMP program in area watersheds; serve as an active partner on water quality initiatives and projects; participate in local community outreach events; serve as lead agency for land conservation efforts in the Hewlett's Creek Watershed; assist in implementing volunteer Storm Drain Marking citizen involvement program; assist CFPUA with water conservation initiatives; organize/facilitate environmental teacher workshops, student field days, local contests, and other education presentations; develop an outdoor BMP demonstration site at a local elementary school; expand NHSWCD website to include additional stormwater info; assist with additional NPDES activities; and provide cumulative quarterly progress reports for all deliverables. |

**Visit the Appendix to review the contracts and accomplished deliverables of each organization.**

| BMP(d) | Establish a Mechanism for Public Involvement | | | | |
|---|---|---|---|---|---|
| 4/7/2010 | New Hanover Cooperative Extension Office | Property owners along south branch of Bradley Creek | Stormwater staff Dewberry Consulting | Direct contact meeting | Show citizens the conceptual drainage plans for the south branch of Bradley Creek |
| 4/17/10 | Lower Cape Fear Earth Day Celebration at Hugh MacRae Park | Festival attendees, general public | Stormwater staff (SWS is an annual sponsor of Lower Cape Fear Earth Day Festival) | Display booth to promote stormwater pollution prevention | Stormwater information distributed. 4,000+ attendees |
| 4/22/2010 | Bradley Creek Elementary School | Bradley Creek students, teachers, community volunteers | NC Coastal Federation Stormwater staffBradley Creek School students | Rain garden planting | Volunteers, staff, and school students planted campus rain garden. Stormwater giveaways were supplied to all participants. |
| 6/29/2010 | NH County Administration Office | Property owners along Cardinal Drive & George Trask | Stormwater staff | Direct contact meeting | Public meeting to discuss drainage project. 20 attendees |
| 8/10/2010 | Noble Middle School | Residents in proposed annexation areas | Stormwater staff | Direct contact meeting | Public meeting to discuss proposed annexation. 50 attendees |
| 9/25/10 | Big Sweep Nationwide Cleanup | Greenfield Lake & Area Beaches | CFRW volunteers (adults, students from 2nd grade +) | Streambank, shoreline, inlet streams, and canoe cleanup of Greenfield Lake | 45 volunteers contributed a total of 135 hours.<br><br>Collected 200, 30lb bags of trash; approximately 600 lbs and 60+ bags of invasive plants removed. |
| 7/10/10 | Greenfield Lake cleanup/invasives removal | Invasive species removal | CFRW volunteers (adults, students from 2nd grade +) | Streambank, shoreline, inlet streams, and canoe invasive species removal on Greenfield Lake | 15 volunteers contributed a total of 45 hours<br><br>Collected 100 bags of invasives totaling approximately 3,000 lbs |
| 8/14/11 | Cape Fear River cleanup | Area along the shoreline from Nun to Princess | CFRW volunteers (adults, students from 2nd grade +) | Riverine cleanup | 12 volunteers contributed a total of 36 hours<br><br>Collected 75 bags of trash totaling approximately 2,250 lbs |
| 9/17/10 | Aunt Kerry's Pet Stop event | Pet owners | Stormwater staff | Interactive event with pet owners that can sign a pledge to be clean up after their pets. | Pet owners sign pledge and dogs receive bandana and chance to be featured on city website |
| 9/25/11 | Greenfield Lake | Around entire lake | CFRW volunteers (adults, students from 2nd grade +) | Riverine cleanup | 45 volunteers contributed a total of 135 hours<br><br>Collected 200 bags of trash totaling approximately 6,000 lbs |

| | | | | | |
|---|---|---|---|---|---|
| 10/9/10 | Burnt Mill Creek Watershed | Birch Creek | CFRW volunteers Birch Creek condo owners | Invasive Species and trash Removal from 300 yards of stream | 15 volunteers contributed a total of 45 hours |
| 10/27/10 | New Hanover Cooperative Extension Office | Property owners affected by Wisteria-Clearbrook drainage project | Stormwater staff Kimley-Horn Consulting | Direct contact meeting | 40 citizens attendedShow citizens the preliminary plans for the Wisteria-Clearbrook drainage project. |
| 12/14/10 | NH County Administration Office | Property owners along Cardinal Drive & George Trask | Stormwater staff | Direct contact, follow-up meeting | Public meeting to discuss drainage project. 10 attendees |
| 2/27/11 | Pet Expo | Pet owners | NHSWCD staff | Canines for Clean Water booth - interactive event where pet owners sign a pledge to be clean up after their pets | 65 pet owners signed pledge and received dog bandana, treats, and stormwater literature. Dogs have a chance to be featured on city website |
| Ongoing - 2nd Thursday of every month | Monthly Rain Barrel Sales | General public | Stormwater staff NHSWCD | Monthly rain barrel sale to the general public; held 2nd Thursday of each month at NHC Government Center with partner agency, NHSWCD | Stormwater runoff and water conservation education and collection |
| Ongoing | Stormwater office via phone or email, public meetings, etc. | General public, citizens, businesses | Stormwater staff | Email or phone responses to citizen requests for information, literature, etc. | Information provided for specific nature of contact |

**BMP(e) Establish a Hotline/Helpline**

The Stormwater Pollution Prevention hotline was established in January 2010 to field calls from the citizens, businesses, and city employees regarding illicit discharges and other reports of stormwater pollution. The hotline phone # is **910-341-1020** and the web address is **www.wilmingtonnc.gov/reportstormwaterpollution.** Hotline/web reports are routed to the Stormwater Code Compliance Officer who tracks, investigates, and responds to all hotline reports.

| | | | | | |
|---|---|---|---|---|---|
| Fall 2010 | Stormwater Hotline info | General public | Stormwater staff | Hotline Billboard poster<br>Hotline promos (pen, magnet, sticky notes) | Developed educational items to raise awareness about the stormwater hotline and web reporting form |


**CAPE FEAR RIVER WATCH**
**617 Surry Street**
**Wilmington, NC 28401**
**(910) 762-5606**
**www.cfrw.us**

**RE: Annual Request Letter, FY 10/11**

February 20, 2010

Dave Mayes, Manager
City of Wilmington, Stormwater Services
PO Box 1810 / 305 Chestnut Street
Wilmington, NC 28402

Dear Dave,

**Enclosed is the Annual Service Contract proposal for FY 10/11. The requested amount of funding is $15,000.**

CFRW is proud of the mutually beneficial and valued partnership we have grown together. The scope of services proposed for 2010- 2011 will build on the significant progress made over the last four years.

The services that CFRW will provide address specific requirements of the City's Permit to Discharge Storm Water under the National Pollutant Discharge Elimination System. (NPDES).

CFRW will submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30; October 1 - Dec. 31; January 1 - March 31; April 1 - June 30. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. The 4th quarter progress report will serve as a compiled year end summary report.

CFRW's contributions to the city's NPDES goals during 2009 included:
7 clean-ups completed by 171 volunteers who removed over 5200 pounds of trash from Wilmington watersheds.
25 plus outreach and educational programs that served 535 adults and over 353 students.

CFRW is on track to duplicate and improve on all prior FY accomplishments.

This is an investment that provides great return in volunteer hours and documented expansion of public understanding, support, and action through outreach and education.

Yours truly,

Elise Rocks, President

**CAPE FEAR RIVER WATCH**
**617 Surry Street**
**Wilmington, NC 28401**
**(910) 762-5606**
**www.cfrw.us**

**Annual Service Contract: July 1, 2010 - June 30, 2011**

Cape Fear River Watch, Inc. (CFRW), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2010** through **June 30, 2011** for the agreed amount of $**15,000**. These contracted services assist the City in meeting requirements of the federal NPDES Stormwater Permit.

**Service #1: Coordinate volunteer clean-ups of local watersheds**.
These cleanups will focus on Greenfield Lake, Smith Creek, Burnt Mill Creek, Barnards Creek, the Cape Fear River, and as the need is discovered by the City or volunteer watershed monitors. This will include the coordination of at least one site for Big Sweep, an annual international clean-up. A minimum of 7 clean-ups will be completed. Local watershed clean-ups may include volunteer efforts to remove wetland and aquatic invasive plants with a focus on Greenfield Lake, Kerr Ave, and the Mary Bridger Wetland. A summary of each clean-up will be completed and submitted to Stormwater Services. The summary will include the specific areas/waterways cleaned, number of participants, hours worked, estimate of quantity of waste materials removed, and if possible photographs to document the work completed. Efforts will also be initiated to invite media coverage of significant clean-ups and provide press releases documenting volunteer efforts and accomplishments.

**Service #2: Monitor, maintain, and provide outreach/education for the Kerr Avenue Stormwater Wetland.** Activities include supporting school group clean-ups, maintenance of plants as needed, evaluation and consulting on larger maintenance needs. A brief monitoring report will be sent monthly via e-mail to Stormwater Services for the period of April through November. The monitoring report will include observations such as water clarity, invasive species, algae, wildlife, maintenance/restoration opportunities, photographs, and if applicable, the number of participants, hours worked, and brief description of the work/activity completed. Outreach/education activities will include presentations to groups or periodic outreach such as an informative newsletter to educate business owners/operators and property owners in close proximity to the Kerr Ave wetland of problems, progress, and activity.

**Service #3: Coordinate Stormwater Workshops for City of Wilmington personnel**. CFRW will plan and conduct educational and when appropriate hands-on workshops for city personnel during the year. Other City departments, such as the Streets Division, will be encouraged to

attend these workshops. Topics and specific dates for these workshops will be presented for approval not later than September 15, 2010. Target workshop dates will be November and/or April.

**Service #4: Provide educational programs for Wilmington residents.** Educational programs will include First Saturday Seminars, presentations to community and civic organizations, and other scheduled talks in the community. Educational programs for homeowners associations should be planned and coordinated with Stormwater Services. Educational programs will also include eco-tours at Greenfield Lake and winter, spring, and fall birding tours and Smith Creek paddling tours. Efforts will be made to invite the local media to participate in and report on educational programs and eco-tours.

**Service #5: Continue to serve as an active partner organization on local grant projects and water quality initiatives.**

**Service #6: Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each school year.** Presentations will focus on specific NC 8th grade science goals and objectives for the hydrosphere/water quality and will be done in coordination with other environmental educators. CFRW will complete a minimum of 1/3 of the presentations to 8th grade science classes in New Hanover County Schools. CFRW will also work cooperatively with Stormwater Services to provide additional presentations in addition to the 8th grade program as requested. A summary will be provided for each presentation given that is not a part of the 8th grade initiative. Summary information will include the date, location and number of student participants.

**Service #7: Monitor, evaluate, and consult on aquatic vegetation management techniques implemented to improve the water quality of Greenfield Lake.** A brief monitoring report will be sent monthly via e-mail to Stormwater Services for the period of April through November. The monitoring report will include observations from various locations around the lake highlighting water clarity, invasive species, algae, wildlife, maintenance/restoration opportunities, and photographs.

**Service #8: Conduct a volunteer watershed monitoring program and alert Stormwater Services when volunteers find problem areas.** Monthly Wilmington Watershed Watch volunteer monitoring activities will be conducted during the fall and spring seasons. Volunteer monitoring of target high priority creeks or creek sections identified in cooperation with Stormwater Services will produce monthly monitoring reports. The Waterkeeper Alliance *Muddy Waters Program* will be included as an integral part of volunteer monitoring. A monitoring report with basic field observations and photo documentation will be maintained and submitted for review to Storm Water Services with the Year End Report. In addition, significant water quality problems identified during observation monitoring will be reported immediately to the appropriate officials. The number, frequency, and quality of monitoring reports will increase as the number of volunteers involved increases and as their skills and abilities grow. Efforts will be made to invite the local media to participate in and report on volunteer monitoring activities.

**Service #9: Participate in and provide support and assistance for public meetings and hearings conducted by Stormwater Services.**

**<u>Service #10</u>: Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit.** Summary reports and information may be included in the City's NPDES yearly report to the State.

**<u>Service #11</u>: Submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30; October 1 - Dec. 31; January 1 - March 31; April 1 - June 30. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed for adequate progress.** The 4th quarter progress report will serve as a compiled year end summary report.

**CAPE FEAR RIVER WATCH**
**617 Surry Street**
**Wilmington, NC 28401**
**(910) 762-5606**
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## Quarterly Progress Report #2: *October 1- Dec. 31, 2010*

Cape Fear River Watch, Inc. (CFRW), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2010** through **June 30, 2011** for the agreed amount of $**15,000**. These contracted services assist the City in meeting requirements of the federal NPDES Stormwater Permit.

**Service #1: Coordinate volunteer clean-ups of local watersheds**.
These cleanups will focus on Greenfield Lake, Smith Creek, Burnt Mill Creek, the Cape Fear River and as the need is discovered by the City or volunteer watershed monitors. This will include the coordination of at least one site for Big Sweep, an annual international clean-up. A minimum of 7 clean-ups will be completed. Local watershed clean-ups may include volunteer efforts to remove wetland and aquatic invasive plants. A summary of each clean-up will be completed and submitted to Stormwater Services. The summary will include the specific areas/waterways cleaned, number of participants, hours worked, estimate of quantity of waste materials removed, and if possible photographs to document the work completed. Efforts will also be initiated to invite media coverage of significant clean-ups and provide press releases documenting volunteer efforts and accomplishments.

*July 1- September 30, 2010*

| **Creek/Watershed Clean-ups** | | | | |
|---|---|---|---|---|
| **Date** | **Watershed** | **Area Cleaned** | **Volunteers/Hours** | **Trash Collected** |
| July 10, 2010 | Greenfield Lake | Invasive Species removal from Lake | 15/45 | 100 bags (dried)/ 3000lbs. |
| August 14, 2011 | Cape Fear River | Area Along the Shoreline from Nun to Princess Street | 12/36 | 75 bags/ 2250 lbs |
| Sept. 25, 2010 | Greenfield Lake | Around the entire lake | 45/135 | 200 baqs/ 6000 lbs. |

*October 1- December 31, 2010*

| **Creek/Watershed Clean-ups** | | | | |
|---|---|---|---|---|
| **Date** | **Watershed** | **Area Cleaned** | **Volunteers/Hours** | **Trash Collected** |
| October 9 | Cape Fear | Birch Creek | 15/ 45 hours | Invasive Species and trash Removal from 300 yards of stream |

**Service #2: Monitor, maintain and provide outreach education for the Kerr Avenue Stormwater Wetland.** Monitoring reports will be completed on a monthly basis from a monthly basis excluding the months of December, January and February**.** Activities include supporting school group clean-ups, maintenance of plants as needed, evaluation and consulting on larger maintenance needs. A summary of these activities will be completed and submitted to Stormwater Services. The summary will include the number of participants, hours worked, brief description of activity, and if possible photographs to document the work completed. Outreach education will include of presentations to various groups, such as conference attendees, homeowner associations, students at all levels, and periodic outreach to inform and educate business owners/operators and property owners in close proximity to the wetland.

*July 1- September 30, 2010*

Monitoring Reports for July, August, and September were completed and submitted.

*October 1- December 31, 2010*

Monitoring Reports were submitted for October and November.

The Kerr Ave., monitor, Bill Murray has discussed suggestions for remediation at the Kerr Ave. wetland with COW. CFRW hopes to lead a remediation project at the wetland and involve volunteers in those efforts.

**Service #3: Coordinate Stormwater Workshops for City of Wilmington personnel**. CFRW will plan and conduct educational and when appropriate hands-on workshops for city personnel during the year. Other City departments, such as the Streets Division, will be encouraged to attend these workshops. Topics and specific dates for these workshops will be presented for approval not later than September 15, 2010. Target workshop dates will be November and/or April.

*July 1 – September 30, 2010*
*October 1 – December 31, 2010*

| **Presentations by CFRW Staff** | | | |
|---|---|---|---|
| **Date** | **City Personnel** | **Topic** | **Attendance** |
| December 2, 2010 | COW Code Enforcement Office | Illicit Discharge | 7 |

**Service #4: Provide educational programs for Wilmington residents.** Educational programs will include First Saturday Seminars, presentations to community and civic organizations, and other scheduled talks in the community. Educational programs for homeowners associations should be planned and coordinated with Stormwater Services. Educational programs will also include eco-tours at Greenfield Lake and winter, spring, and fall birding tours and Smith Creek paddling tours. Efforts will be made to invite the local media to participate in and report on educational programs and eco-tours.

*July 1 – September 30, 2010*

| **First Saturday Seminars** | | | |
|---|---|---|---|
| **Date** | **Organization** | **Topic** | **Attendance** |
| July 3, 2010 | Nita Brown | Steam Boats on the Cape Fear | 65 |
| August 7, 2010 | Chris Wilfong from Nature Conservancy | Management Plan for Black River Tracks | 50 |
| Sept. 4, 2010 | Professor Roger Shew | Aquifer and Titan's Affect on the Castle Hayne Aquifer | 50 |
| **Other Presentations by CFRW Staff** | | | |
| July 21, 2010 | Wednesday on Water | Water quality | 7 |
| Sep. 21, 2010 | Brewery Dinner | Water quality | 30 |
| Sep. 23, 2010 | Cruise on Wilmington | Water quality | 40 |
| **Greenfield Lake School Field Trips** | | | |
| July 2, 2010 | Surf Camp | Storm water education | 14 |
| July 8, 2010 | School group | Storm water education | 18 |
| July 9, 2010 | Surf Camp | Storm water education | 16 |
| July 16, 2010 | Surf Camp | Storm water education | 14 |

*October 1- December 31, 2010*

| **First Saturday Seminars** | | | |
|---|---|---|---|
| **Date** | **Organization** | **Topic** | **Attendance** |
| October 2, 2010 | Angie Carl | (Fire Specialist for The Nature Conservancy) discusses Fire Ecology of Pine Savannahs | 60 |
| November 6, 2010 | Cucalorus Film Festival | Preview of the film "Shelter in A Place" | |
| December 4, 2010 | Chris Fonvielle | History of the Cape Fear River | 70 |
| **Other Presentations by CFRW Staff** | | | |
| October 13, 2010 | Lakeshore Commons | Intro to the Cape Fear (all issues) | 25 |
| October 16, 2010 | Issac Bear Early College Eco Club | Intro to the Cape Fear (all issues) | 20 |
| December 16,2010 | OSHER @ UNCW | Intro to the Cape Fear (all issues) | 40 |
| **Greenfield Lake School Field Trips** | | | |

**<u>Service #5</u>: Continue to serve as an active partner organization on local grant projects and water quality initiatives.** These projects include the Clean Water Trust Fund Planning Grant for Burnt Mill Creek, the Smith Creek Initiative, and may include new grants the City is successful in partnering/securing.

*July 1- September 30, 2010*

City Stormwater Services trained CFRW employees when, how and where to apply new Stormwater Drain Plaques. CFRW will train volunteers to work with Stormwater Services and assist them in the initiative to re-mark stormwater drains, and educate the public about runoff.

*October 1 – December 31, 2010*

Thanks to a Five Star Grant from New Hanover County, Cape Fear River Watch and 20 volunteers were able to remove invasive species from the Candlewood Drive area and replace them with hundreds of full grown native plants. While this is out of city limits, it does greatly affect the water quality within city limits.

**Service #6: Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each school year.** Presentations will focus on specific NC 8th grade science goals and objectives for the hydrosphere/water quality and will be done in coordination with other environmental educators. CFRW will complete a minimum of 1/3 of the presentations to 8th grade science classes in New Hanover County Schools. CFRW will also work cooperatively with Stormwater Services to provide additional presentations in addition to the 8th grade program as requested. A summary will be provided for each presentation given that is not a part of the 8th grade initiative. Summary information will include the date, location and number of student participants.

*July 1-September 30, 2010*

| **8th Grade Enviroscape Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of students** |
| 09/22/2010 | Murray Middle School | 8th | 2 | 44 |
| **Other Enviroscape Presentations** | | | | |

*October 1- December 31, 2010*

| **8th Grade Enviroscape Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of students** |
| October 12, 2010 | Virgo | 8th | 2 | 54 |
| October 13, 2010 | Holly Shelter | 8th | 2 | 48 |
| November 17, 2010 | Roland Grise | 8th | 2 | 44 |
| December 2, 2010 | Roland Grise | 8th | 2 | 61 |
| **Other Enviroscape Presentations** | | | | |
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of students** |
| October 15, 2010 | Murrayville Elementary | 3rd | 2 | 75 |

**Service #7: Monitor, evaluate, and consult on aquatic vegetation management techniques implemented to improve the water quality of Greenfield Lake.** Monitoring will include monthly, weekly and daily observations as applicable and as coincides with the assignment of staff and volunteers to Greenfield Lake. A brief monitoring report will be sent via email to Stormwater Services for the period from April through November.

*July 1- September 30, 2010*

Monitoring Reports for July, August, and September were completed and submitted.

*October 1- December 31, 2010*

Monitoring Reports for October and November were submitted. Recommendations were made for remediating the area along Sherwood Drive.

**Service #8: Conduct a volunteer watershed monitoring program and alert Stormwater Services when volunteers find problem areas.** Monthly Wilmington Watershed Watch volunteer monitoring activities will be conducted from September through June. Volunteer monitoring of target high priority creeks or creek sections identified in cooperation with Stormwater Services will produce monthly monitoring reports. The Waterkeeper Alliance *Muddy Waters Program* will be included as an integral part of volunteer monitoring. A monitoring report with basic field observations and photo documentation will be maintained and submitted for review. The number, frequency, and quality of monitoring reports will increase as the number of volunteers involved increases and as their skills and abilities grow. Efforts will be made to invite the local media to participate in and report on volunteer monitoring activities.

*July 1- September 30, 2010*
*October 1- December 31, 2010*
Cape Fear River Watch (CFRW) began a pilot Creek Keeper's Program for home school students on December 1st, 2010. 6th grader, Nikolas Fort, will continue to learn baseline monitoring skills throughout the first half of 2011 during our monthly watershed watches.

**Service #9: Participate in and provide support and assistance for public meetings and hearings conducted by Stormwater Services.**

*July 1- September 30, 2010*
CFRW has included a link on our website under Education to the Stormwater Services Educational brochure on Short nose Sturgeon since January and will continue to do so.

*October 1- December 31, 2010*

**Service #10: Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit.** Summary reports and information may be included in the City's NPDES yearly report to the State.

**Service #11: Submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30, 2010; October 1 - Dec. 31, 2010; January 1 - March 31, 2011; April 1 - June 30, 2011. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed for adequate progress. Also provide a compiled Year End Summary Report by June 30.**

***Report compiled by: Carrie A. Frohling*** ***Date: December 23, 2010***

**New Hanover Soil & Water Conservation District**
**230 Government Center Drive**
**Suite 100**
**Wilmington, NC 28403**

**RE: Annual Request Letter, FY 10/11**

Dave Mayes, Manager
City of Wilmington Stormwater Services
PO Box 1810
Wilmington, NC 28402

Dear Mr. Mayes,

Enclosed is the Annual Service Contract proposal for FY **10/11**. The requested amount of funding is **$26,500**.

The New Hanover Soil and Water Conservation District has served as a valuable partner to the City of Wilmington Stormwater Services Department for the past six years. Accomplishments in 2009-2010 include: assisting Stormwater Services in meeting requirements of the federal NPDES stormwater permit by providing education and outreach programs to residents and students as well as participating in numerous public events to promote the city pet waste ordinance.

In addition, the District partners with the City to provide a monthly rain barrel and composting bin sale, participates in City Technical Review Committee to promote LID and other conservation techniques and assist city staff with providing Enviroscape programs at local schools. Since 2006, the District has brought in over $138,957 in cost share funds through the NC Community Conservation Assistance Program (CCAP). This year, the District cost shared 9 BMPs in the city limits including a rain garden that serves as an outdoor classroom at Alderman Elementary School in an effort to protect local water quality.

Growing demands for our cost share and school and public education programs exemplify our need for additional District funds to assist with program implementation and related travel cost. In addition, the District will be participating in new events to promote the pet waste ordinance including the C*anines for Clean Water* program. The New Hanover Soil and Water Conservation District is therefore requesting $26,500 for FY 10/11 to assist in these areas identified in our Services Contract and to support the Stormwater Services with its NPDES federal stormwater permit requirements.

NHSWCD will submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. The 4th quarter progress report will serve as a compiled year end summary report.

Sincerely,

Dave Thomas, Board Chairman
cc: Jennifer Butler, Stormwater Services Outreach & Education Program Coordinator

**NEW HANOVER SOIL & WATER CONSERVATION DISTRICT**
**230 Market Place Drive, Suite 100**
**Wilmington, NC 28403**

**Annual Service Contract: July 1, 2010 – June 30, 2011**

New Hanover Soil & Water Conservation District (NHSWCD), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2010** through **June 30, 2011** for the agreed amount of **$26,500**. These contracted services assist the City in meeting requirements of the federal NPDES Stormwater Permit.

**Service #1: Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each school year.** Efforts also include training instructors, assisting with outreach, and teacher relations.

**Service #2: Conduct at least three "Stormwater 101" powerpoint presentations to HOAs, garden clubs, community/civic groups, developers, or during watershed-wide meetings.** Coordinate with the City to implement marketing, initiate contact, and schedule presentations.

**Service #3: Partner with the City of Wilmington Stormwater Services and Rainwater Solutions, Inc. to hold a monthly public rain barrel sale for New Hanover County residents. Provide compost bins at the monthly sale to increase conservation opportunities to local residents.** NHSWCD will utilize local government television, local events including Earth Day and the Cape Fear Garden Show and our website to promote the sale.

**Service #4: Increase awareness and public education about fecal coliform bacteria.** Assist with providing education and outreach materials related to the City of Wilmington's pet waste ordinance. In partnership with the City, the District will implement an intensive outreach and media campaign including: providing educational materials to the public through our website, public meetings, K-12 education programs and attending at least two pet related events, such as, Pet Expo, Paw Jam, Bark in the Park, or Pooch Plunge.

**Service #5: Serve as an integral partner to facilitate the Lower Cape Fear Stewardship Development Award Program which recognizes developers for demonstrating outstanding environmental stewardship through the protection and awareness of our natural resources.**

**Service #6: Promote LID to developers, architects, engineers, etc.** Promote LID to developers and engineers by attending City and NHC Technical Review Committees, as well as additional educational avenues.

**Service #7: Administer the NC Community Conservation Assistance Program (CCAP) in New Hanover County. Provide assistance with the demonstration, purchase, and installation of stormwater Best Management Practices (BMPs) for City/County residents.** Activities include serving on the CCAP technical review committee to identify new BMPs/standards and update cost estimates, develop conservation plans for CCAP clients, designing and installing stormwater BMPs in New Hanover County and City of Wilmington Watersheds using CCAP funds ($56,216 left to spend), managing CCAP BMP project sites, provide technical assistance and annual spot checks for CCAP BMPs, and providing outreach for the City's Stormwater BMP Demonstration Sites. In addition, NHSWCD staff will promote CCAP and City Stormwater Demonstration sites through our website, educational programs, publications and public/local government television.

**Service #8: Continue to serve as an active partner organization on local projects and other local water quality initiatives related to improving local water quality.** NHSWCD staff will work with local and regional partners to enhance and improve local water quality. This includes, but is not limited to, providing education and outreach programs related to a grant and its implementation.

**Service #9: Participate in local annual community outreach events.** NHSWCD is a founding member of the Earth Day Alliance which organizes, implements, fundraises, and provides publicity for the Lower Cape Fear Earth Day Festival each spring. NHSWCD staff will attend and provide BMP and rain barrel sale information at the annual Cape Fear Garden Expo. NHSWCD assists with TreeFest, an annual program which distributes over 10,000 tree saplings to New Hanover County citizens. In addition, NHSWCD will display program and educational information at the annual Cape Fear Fair and Expo.

**Service #10: Serve as the lead agency for managing land conservation easements, stormwater education and outreach in the Hewletts Creek Watershed.** FY10-11 goals are to monitor the 33 acres of conservation easements and develop and distribute conservation easement information to Hewlett Creek residents in an effort to expand existing conservation areas and inform residents of the purpose of conservation easements. Staff will continue to partner with YWCA to provide outdoor education programs on the 2 district-owned conservation easements. NHSWCD will continue to provide a watershed newsletter to residents in the Hewletts Creek Watershed in an effort to promote and encourage installation of BMPs throughout the watershed. NHSWCD will work with local organizations to provide stormwater education programs at the J.E.L. Wade Stormwater Wetland and Community Park as the need arises.

**Service #11: Assist Stormwater Services in implementing a volunteer Storm Drain Marking awareness program to encourage public involvement.** District staff will assist in identifying and training volunteers to mark drains and help provide oversight of the program.

**Service #12: Assist the CFPUA with its Water Conservation ordinance and efforts including the landscaper water conservation and certification initiative.** Serve on the Green Team and Public Relations Committee in an effort to assist CFPUA with implementing their annual water conservation goals.

**Service #13: Organize and promote at least one Teacher Workshop a year to include an annual week long summer workshop.** Workshops will include at least one of the following curricula: Project Wet; Food, Land and People; Project Learning Tree, Waste in Place, and Wonders of Wetlands. Staff will provide certification renewal credits to current Certified Environmental Educators at qualifying workshops.

**Service #14: Develop and facilitate additional environmental education presentations**. Topics include, but are not limited to, natural resource management, sustainability, and wildlife. Presentation topics will tie into water quality and conservation issues. Educational programs will be offered to teachers, local residents and business owners.

**Service #15: Organize and facilitate at least one Environmental Field Day a year serving over 90 New Hanover County School students. Provide Envirothon competition information and guidance to teachers and interested student organizations.** Topics include aquatics, forestry, wildlife, soils, and other environmental issues.

**Service #16: Provide an opportunity for 3-8$^{th}$ grade students to learn about watersheds, water quality, and stormwater through the Statewide District Poster, Essay and Speech contests.** This year's theme is "Water the Cycle of Life".

**Service #17: Establish a stormwater BMP Outdoor Education Demonstration Site on a NHC elementary school campus.** This site will be used to increase hands-on education on stormwater, water quality, wildlife habitat through the establishment of a rain garden and cistern. In addition, interpretative signage will be placed at each BMP. Target sites for 2010-2011 include Bradley Creek Elementary School.

**Service #18: Expand and maintain agency website.** Maintain current website and update site educational materials specifically designed for stormwater education. CCAP project pictures will be displayed on the "Cost Share" link. In addition, a watershed map of types of CCAP BMPs and where they are located within local watersheds will be available. The "Water Quality" links will display websites and publications regarding water quality testing information such as the New Hanover County Water Quality Monitoring site. The website will also provide links to websites that provide similar education materials in Spanish in an effort to reach more minorities in our region.

**Service #19: Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit.** Summary reports and information may be included in the City's NPDES yearly report to the State.

**Service #20: NHSWCD will submit cumulative quarterly progress reports and invoices (for) 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. The 4th quarter progress report will serve as a compiled year end summary report.**

**NEW HANOVER SOIL & WATER CONSERVATION DISTRICT**
**230 Market Place Drive, Suite 100**
**Wilmington, NC 28403**
**www.nhswcd.org**

## Quarterly Progress Report #2: October 1, 2010 – December 31, 2010

New Hanover Soil & Water Conservation District (NHSWCD), under contract with the City of Wilmington Stormwater Services, will provide the following services for the time period consistent with the City's fiscal year from **July 1, 2010** through **June 30, 2011** for the agreed amount of **$26,500**. These contracted services assist the City in meeting requirements of the federal NPDES Stormwater Permit.

**Service #1: Conduct Enviroscape Presentations for at least 1/3 of 8th grade science classes in New Hanover County Schools each school year.** Efforts also include training instructors, assisting with outreach, and teacher relations.

*July 1-September 30, 2010*
Staff assisted with training and orientation of presenters before the school year started.

| **8th Grade Enviroscape Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of students** |
| 9/21/10 | Murray Middle | 8th | 2 | 68 |
| 9/22/10 | Murray Middle | 8th | 1 | 32 |
| | | | | |
| | | | | |

*October 1-December 31, 2010*
Staff provided comments and edits to presentation photo aids.

| **8th Grade Enviroscape Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of students** |
| 10/13/10 | Holly Shelter | 8th | 2 | 57 |
| 10/14/10 | Holly Shelter | 8th | 2 | 55 |
| 11/17/10 | Roland Grise | 8th | 1 | 24 |
| 11/18/10 | Roland Grise | 8th | 2 | 51 |

**Service #2: Conduct at least three "Stormwater 101" PowerPoint presentations to HOAs, garden clubs, community/civic groups, developers, or during watershed-wide meetings.** Coordinate with the City to implement marketing, initiate contact, and schedule presentations.

*July 1-September 30, 2010*
*October 1-December 31, 2010*
Staff provided comments and feedback to edits to the Stormwater 101 power point presentation.

**Service #3: Partner with the City of Wilmington Stormwater Services and Rainwater Solutions, Inc. to hold a monthly public rain barrel sale for New Hanover County residents. Provide compost bins at the monthly sale to increase conservation opportunities to local residents.** NHSWCD will utilize local government television, local events including Earth Day and the Cape Fear Garden Show and our website to promote the sale.

*July 1-September 30, 2010*
The District held monthly rain barrel sales during July (1 barrel sold), August (2 barrels sold) and September (1 barrel sold).
Staff also updated and redistributed fliers around the county and city government complexes regarding the sale.

*October 1- December 31, 2010*
The District held monthly rain barrel sales during October 14th, 2010 (3 barrels sold), November 4th, 2010 (3 barrels sold) and December 2nd, 2010 (3 barrels sold).

**Service #4: Increase awareness and public education about fecal coliform bacteria.** Assist with providing education and outreach materials related to the City of Wilmington's pet waste ordinance. In partnership with the City, the District will implement an intensive outreach and media campaign including: providing educational materials to the public through our website, public meetings, K-12 education programs and attending at least two pet related events, such as, Pet Expo, Paw Jam, Bark in the Park, or Pooch Plunge.

*July 1-September 30, 2010*
Staff and Intern attended Aunt Kerry's 4th Anniversary Celebration, held September 18th, 2010 and distributed *Canines for Clean* Water information, signed citizen's up for the program, and provided information regarding the new ordinance.

*October 1- December 31, 2010*

**Service #5: Serve as an integral partner to facilitate the Lower Cape Fear Stewardship Development Award Program which recognizes developers for demonstrating outstanding environmental stewardship through the protection and awareness of our natural resources.**

*July 1-September 30, 2010*
Staff is currently involved with several sub-committees of the program including the Events Committee and Finance Committee. Staff assisted with edits of the contact distribution list for the "save the date" for the event. Staff is working with several donors to raise money for this year's banquet as well as coordinating event details. Staff attended 3 general SDC meetings and 2 sub-committee meetings where topic details of the annual banquet as well as winners were discussed.

*October 1- December 31, 2010*
Staff is currently involved with several sub-committees of the program including the Events Committee and Finance Committee. Staff was responsible for coordinating invites to the event. The event was held December 9th, 2010 at the Brunswick County REALTORS ® Association Building. The following awards were given: two outstanding, one significant achievement, and

one special recognition award. Staff attended 2 general SDC meetings and the event where topic details of the annual banquet as well as winners were discussed.

**Service #6: Promote LID to developers, architects, engineers, etc.** Promote LID to developers and engineers by attending City and NHC Technical Review Committees, as well as additional educational avenues.

*July 1-September 30, 2010*
Staff attended 2 City TRC and 3 NHC TRC committee meetings. 5 concept reviews and 2 First reviews were reviewed for the City Planning Department. Soils information and LID technique recommendations were shared with concept review plans. Soils maps and LID technique information were provided to the First Review plans. 5 site plans were reviewed for NHC Planning Department. LID technique recommendations were made for all site plans reviewed.

*October 1 - December 31, 2010*
Staff attended 1 City committee meeting. 2 concept reviews were reviewed for the City Planning Department. Soils information and LID technique recommendations were shared with concept review plans. Soils maps and LID technique information were provided to the First Review plans.

**Service #7: Administer the NC Community Conservation Assistance Program (CCAP) in New Hanover County. Provide assistance with the demonstration, purchase, and installation of stormwater Best Management Practices (BMPs) for City/County residents.** Activities include serving on the CCAP technical review committee to identify new BMPs/standards and update cost estimates, develop conservation plans for CCAP clients, designing and installing stormwater BMPs in New Hanover County and City of Wilmington Watersheds using CCAP funds ($56,216 left to spend), managing CCAP BMP project sites, provide technical assistance and annual spot checks for CCAP BMPs, and providing outreach for the City's Stormwater BMP Demonstration Sites. In addition, NHSWCD staff will promote CCAP and City Stormwater Demonstration sites through our website, educational programs, publications and public/local government television.

*July 1-September 30, 2010*
A new contract was approved for a 4$^{th}$ BMP at Bradley Creek Elementary School. This will be the final phase of the project at the school and complete the treatment of all the stormwater runoff from the 15 acre property.

In partnership with NC Coastal Federation, the District cost shared the installation of a stormwater wetland ($21, 000) September 8th at Bradley Creek Elementary that will serve as an outdoor learning center for students.

Staff gave a presentation to Cape Fear Green Building Alliance July 14$^{th}$ regarding the NC CCAP program. Approximately 40 people were in attendance, and further interest in the program was promoted.

In partnership with the NC Coastal Federation and NHC Schools staff presented the Bradley Creek Elementary Project to the NHC school board on September 3. The completed CCAP

projects at Alderman Elementary as well as the ongoing project at Bradley Creek Elementary were showcased during the presentation. The meeting aired on the School TV network.

Staff met with a builder/developer of a sub-division in the Myrtle Grove area (July 30) as well as the Town of Carolina Beach staff (September 3) regarding the NC CCAP program. Staff provided the Town of Carolina Beach with promotional materials to distribute to citizens regarding the program.

*October 1-December 31, 2010*

Two new applications have been received and approved. One application is for a Cistern at a private residence, the other is for a Cistern at Airlie Gardens.

In partnership with NC Coastal Federation, the District cost shared the installation of a Drought Tolerant Stormwater Wetland ($10, 000) October 25th at Bradley Creek Elementary that will serve as a visible model for the community.

Staff also met twice with the NCCF regarding the current EEG grant the District is helping administer. This funding has been used for the BMPs installed at Bradley Creek Elementary. The District has submitted a funding request over $100,000 for a similar grant being written by the Division of Soil & Water. These funds would be used to continue to install BMPs throughout New Hanover County.

**Service #8: Continue to serve as an active partner organization on local projects and other local water quality initiatives related to improving local water quality.** NHSWCD staff will work with local and regional partners to enhance and improve local water quality. This includes, but is not limited to, providing education and outreach programs related to a grant and its implementation.

*July 1-September 30, 2010*

| **Smith Creek Meetings** | | |
|---|---|---|
| **Date** | **Topic/Discussion** | **Progress Made/Next Steps** |
| 9/28/10 | Contact with Murrayville Elem School | Plans for Environmental Field day in connection to Candlewick property restoration project within Smith Creek |

*October 1- December 31, 2010*

| **Smith Creek Meetings** | | |
|---|---|---|
| **Date** | **Topic/Discussion** | **Progress Made/Next Steps** |
| 10/9/10 | Candlewood Property Restoration | Invasives that were previously eradicated were replaced with native plants. Staff helped install native plants on the property. |

**Service #9: Participate in local annual community outreach events.** NHSWCD is a founding member of the Earth Day Alliance which organizes implements, fundraises, and provides publicity for the Lower Cape Fear Earth Day Festival each spring. NHSWCD staff will attend and provide BMP and rain barrel sale information at the annual Cape Fear Garden Expo. NHSWCD assists with TreeFest, an annual program which distributes over 10,000 tree saplings

to New Hanover County citizens. In addition, NHSWCD will display program and educational information at the annual Cape Fear Fair and Expo.

*July 1-September 30, 2010*

| **Community Outreach Events** | | | | |
|---|---|---|---|---|
| **Date** | **Location** | **Event** | **Attendance** | **Theme/Comments** |
| 9/25/10 | Hewletts Creek (NHSWCD Property on corner of Holly Tree & College | Big Sweep | 3 | Litter Pick Up |

*October 1- December 31, 2010*

| **Community Outreach Events** | | | | |
|---|---|---|---|---|
| **Date** | **Location** | **Event** | **Attendance** | **Theme/Comments** |
| 10-27-10 thru 11/7/10 | Wilmington Airport/Fair Grounds | Cape Fear Fair & Expo | 40,000 + | Fair theme was "Going Green" District distributed information on Rain Barrel/Compost Bin Sale. Won 2nd place for Display. |
| 11/9/10 | Myrtle Grove Christian School | Science Fair Judge 6th-8th Grade | n/a | Reviewed 45 projects. Picked top 3 projects to advance to the county science fair. |
| 12/10/10 | Codington Elementary | Science Fair Judge 3rd-5th Grade | n/a | Reviewed 30 projects. Picked top 6 to advance to county science fair. |
| 12/14/10 | Williston | Science Fair Judge 6th-8th Grade | n/a | Reviewed over 90 projects. Picked top 7 to advance to the county science fair. |

**Service #10: Serve as the lead agency for managing land conservation easements, stormwater education and outreach in the Hewletts Creek Watershed.** FY10-11 goals are to monitor the 33 acres of conservation easements and develop and distribute conservation easement information to Hewlett Creek residents in an effort to expand existing conservation areas and inform residents of the purpose of conservation easements. Staff will continue to partner with YWCA to provide outdoor education programs on the 2 district-owned conservation easements. NHSWCD will continue to provide a watershed newsletter to residents in the Hewletts Creek Watershed in an effort to promote and encourage installation of BMPs throughout the watershed. NHSWCD will work with local organizations to provide stormwater education programs at the J.E.L. Wade Stormwater Wetland and Community Park as the need arises.

*July 1-September 30, 2010*

Supervisors and Staff continued to work with CFPUA regarding the cutting on the Holly Tree property. Due to this situation CFPUA will now post notices on the CFPUA website regarding cutting and clearing on property throughout the county.

Staff also presented two different environmental education programs to YWCA summer camps. One presentation focused of the importance of water conservation and pollution, the other presentation focused on the uses and importance of soil. Both presentations tied in education and information on YWCA conservation easement.

*October 1- December 31, 2010*

**Service #11: Assist Stormwater Services in implementing a volunteer Storm Drain Marking awareness program to encourage public involvement.** District staff will assist in identifying and training volunteers to mark drains and help provide oversight of the program.

*July 1-September 30, 2010*
Staff provided input regarding storm-drain marking brochure.

*October 1- December 31, 2010*

**Service #12: Assist the CFPUA with its Water Conservation ordinance and efforts including the landscaper water conservation and certification initiative.** Serve on the Green Team and Public Relations Committee in an effort to assist CFPUA with implementing their annual water conservation goals.

*July 1-September 30, 2010*
*October 1- December 31, 2010*
Staff continued to support CFPUA by providing input on the organization's long range plan. Staff attended the final comment meeting 10/18/10.

Staff presented a water conservation presentation to the St. Marks Cub Scouts Troop 12/6/10.

**Service #13: Organize and promote at least one Teacher Workshop a year to include an annual week long summer workshop.** Workshops will include at least one of the following curricula: Project Wet; Food, Land and People; Project Learning Tree, Waste in Place, and Wonders of Wetlands. Staff will provide certification renewal credits to current Certified Environmental Educators at qualifying workshops.

*October 1- December 31, 2010*
*July 1-September 30, 2010*

**Service #14: Develop and facilitate additional environmental education presentations**. Topics include, but are not limited to, natural resource management, sustainability, and wildlife. Presentation topics will tie into water quality and conservation issues. Educational programs will be offered to teachers, local residents and business owners.

*July 1-September 30, 2010*

| **Environmental Education Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of participates** |
| 7/2/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 9 |
| 7/9/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 10 |

| | | | | |
|---|---|---|---|---|
| 7/16/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 8 |
| 7/23/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 12 |
| 7/30/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 11 |
| 8/6/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 9 |
| 8/13/10 | WB Surf Camp ~ Enviroscape | 1-4 | 1 | 13 |
| 9/28/10 | Union Elementary School (Brunswick Co.) | 5 | 1 | 90 |

*October 1-December 31, 2010*

| **Environmental Education Presentations** | | | | |
|---|---|---|---|---|
| **Date** | **School/Event** | **Grade** | **# of presentations** | **# of participates** |
| 10/4/10 | New Hanover High School Science Club | 9th-12th | 1 | 8 |
| 11/1/10 | St. Mark's Cub Scout Troop ~ Soil Conservation & The Living Soil | 2nd-3rd | 2 | 10 |
| 11/30/10 | Mary C. Williams Elementary ~ Soil Conservation | 3rd | 3 | 59 |
| 12/3/10 | Pine Valley Elementary ~ Soil Conservation | 3rd | 4 | 115 |
| 12/13/10 | Sunset Park Elementary ~ Erosion | 5th | 1 | 23 |
| 12/14/10 | Sunset Park Elementary ~ Erosion | 5th | 1 | 26 |
| 12/15/10 | Sunset Park Elementary ~ Erosion | 5th | 1 | 25 |

**<u>Service #15</u>: Organize and facilitate at least one Environmental Field Day a year serving over 90 New Hanover County School students. Provide Envirothon competition information and guidance to teachers and interested student organizations.** Topics include aquatics, forestry, wildlife, soils, and other environmental issues.

*July 1- September 30, 2010*

*October 1- December 31, 2010*

| **Environmental Field Day** | | | | |
|---|---|---|---|---|
| **Date** | **School(s)** | **Grade** | **Attendance** | **Topics/Activities** |
| 10/15/10 | Murrayville Elementary | 3rd | 120 | Field Day regarding soil conservation, stormwater runoff, and flora & fauna |
| 11/1/10 | Anderson Elementary | 3rd | 110 | Field Day with the following Stations: Forestry, Water Cycle, Soils & Wildlife |

**<u>Service #16</u>: Provide an opportunity for 3-8th grade students to learn about watersheds, water quality, and stormwater through the Statewide District Poster, Essay and Speech contests.** This year's theme is "Water the Cycle of Life".

*July 1-September 30, 2010*

Staff contacted new Science Coordinator to establish a working relationship. Staff informed the new coordinator of programs offered by the District and scheduled time to present information about District education programs at the upcoming county science teacher meetings.

*October 1- December 31, 2010*

Staff attended Elementary, Middle, & High school curriculum meetings on 10/26, 10/27, and 10/28 to promote the Poster, Speech and Essay Contest. Staff distributed information on District programs and contest at these meetings.

**Service #17: Establish a stormwater BMP Outdoor Education Demonstration Site on a NHC elementary school campus.** This site will be used to increase hands-on education on stormwater, water quality, wildlife habitat through the establishment of a rain garden and cistern. In addition, interpretative signage will be placed at each BMP. Target sites for 2010-2011 include Bradley Creek Elementary School.

*July 1-September 30, 2010*
In partnership with NC Coastal Federation and Bradley Creek Elementary School staff helped install a stormwater wetland (BMP #2 from the overall plan) that will serve as another outdoor education classroom that promotes wildlife habitat and water quality. This BMP area may also be incorporated into a trail system around the school.

Staff met with NC Coastal Federation, NC DENR engineers and the staff of Bradley Creek Elementary & NHC schools to continue work on the overall project on the school grounds. NC Coastal Federation, the District, and engineers are currently working on BMP #3, a drought tolerant stormwater wetland, near the entrance of the school. This BMP will be installed before 12-31-10.

*October 1- December 31, 2010*
Bradley Creek Elementary School Drought Tolerant Wetland (BMP #3) was completed 10/25/10. This BMP is one of three areas on the school campus that teachers can use as an outdoor classroom.

**Service #18: Expand and maintain agency website.** Maintain current website and update site educational materials specifically designed for stormwater education. CCAP project pictures will be displayed on the "Cost Share" link. In addition, a watershed map of types of CCAP BMPs and where they are located within local watersheds will be available. The "Water Quality" links will display websites and publications regarding water quality testing information such as the New Hanover County Water Quality Monitoring site. The website will also provide links to websites that provide similar education materials in Spanish in an effort to reach more minorities in our region.

*July 1-September 30, 2010*
Staff has requested that new employees and interns conduct an audit of the website. This audit will provide information regarding items or topics that maybe unclear as well as ideas for new or expanded information on the site. Once all information is received from those conducting the audit, the website will be updated.

*October 1- December 31, 2010*
Staff has completed the audit of the website. The District has also purchased a new computer and software to update the website. Staff will be training mid-January on how to use the software in order to update the website.

**Service #19: Assist Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit.** Summary reports and information may be included in the City's NPDES yearly report to the State.

*July 1-September 30, 2010*
*October 1- December 31, 2010*
Staff assisted and provided input regarding a new publication regarding stormwater education and disconnecting down spouts from impervious surfaces.

**Service #20: NHSWCD will submit cumulative quarterly progress reports and invoices (for) 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30; October 1 - Dec. 31; January 1 -March 31; April 1 - June 30. Each quarterly distribution will be paid once quarterly progress report and invoice are received and reviewed by the City for adequate progress. The 4th quarter progress report will serve as a compiled year end summary report.**

***Report compiled by:*** **Dru Harrison** **Date:** **1/5/11**

**APPENDIX C: ILLICIT DISCHARGE DETECTION AND ELIMINATION**

*Employee Training*

April 27, 2010
Conducted training for the City's Streets Division on Illicit Discharge Detection and Elimination. Public Services Code Enforcement Officer provided the presentation to 21 employees at the meeting located at the City's Operations Complex.

December 2, 2010
Conducted training for 10 employees of the City's Code Enforcement Division on Illicit Discharge Detection and Elimination located at the City's 305 Chestnut St. Building.

*Hotline Calls (910-341-1020)*

| Hotline Calls | | |
|---|---|---|
| # of Calls | Type of Call/Complaint | % |
| 3 | Out of Jurisdiction | 16.0 |
| 2 | Pet Waste | 10.5 |
| 2 | Leaf Blowing | 10.5 |
| 2 | Illicit Discharge/Dumping | 10.5 |
| 2 | Yard Waste | 10.5 |
| 4 | Maintenance Call | 21.0 |
| 2 | Questionable Odor | 10.5 |
| 2 | General Stormwater Question | 10.5 |
| 19 | TOTALS | 100 |

Policy for Reporting and Documentation of Sanitary Sewer Overflows and System Leaks
Cape Fear Public Utility Authority and City of Wilmington

*Purpose:*

The purpose of this document is to establish agreed upon procedures for the Cape Fear Public Utility Authority (CFPUA) to follow regarding reporting and documentation of sanitary sewer overflows (SSO) that impact the City of Wilmington Municipal Separate Storm Sewer System (MS4). These guidelines will enable the City to comply with NPDES Phase II Stormwater permit reporting requirements as well as to provide assistance to CFPUA in mitigating any potential threat to public health or the environment.

*Reporting Requirements:*

All SSOs resulting in discharge to the City of Wilmington MS4, or causing possible contamination of stormwater discharging to the storm system, must be reported to the City within 48 hours of occurrence in accordance with City Code Chapter 12, section 12-24. Failure to comply may result in an notice of violation (NOV) for the CFPUA. Fines for non compliance range up to $10,000 based on quantity, risk to the public, environment damage and degree of negligence as documented in the City Code. The following table documents the minimum information required for sanitary sewer overflows and sewage leaks that may impact the City's MS4.

| | Date of Spill/Leak | Location | Volume | Corrective Action | NCDWQ Form | Analytical Data |
|---|---|---|---|---|---|---|
| SSO | | | | | | |
| < 1000 gal | x | x | x | x | | |
| > 1000 gal | x | x | x | x | x | x |
| System Leak | x | x | x | x | x | as needed |

Spills greater than 1,000 gallons require an additional completed copy of the DWQ's Collection System Sanitary Sewer Overflow Reporting Form (CS-SSO) provided at the same time as when provided to the State. Failure to comply may result in an NOV for CFPUA. Clean up requirements are in accordance with the CFPUA's Clean up Procedure Policy. This information will also be used in documenting the compliance with the City of Wilmington's annual NPDES Phase II Stormwater report to NCDWQ.

*City of Wilmington Contact Information:*

**Spills less than 1,000 gallons**

Use the Pollution Prevention Hotline: 910-341-1020
Or go to: www.wilmingtonnc.gov/reportstormwaterpollution and fill out the on line form.

**Spills greater than 1000 gallons or system leaks**

1) Beth Nunnally
Stormwater Compliance Officer
910-341-0092
beth.nunnally@wilmingtonnc.gov

2) Jim Quinn
Stormwater Specialist
910-341-4694
Jim.quinn@wilmingtonnc.gov

3) Harvey London
Drainage Manager
910-341-4646
Harvey.london@wilmingtonnc.gov

4) David Mayes
Stormwater Services Manager
910-341-5880
Dave.Mayes@wilmingtonnc.gov

## APPENDIX D: CONSTRUCTION SITE RUNOFF CONTROL

Included in this section:
New Hanover County Erosion & Sedimentation Control Ordinance

**New Hanover County Ordinance:**
The following are excerpts culled from the New Hanover County Erosion and Sedimentation Control Ordinance:

The New Hanover County erosion and sedimentation control ordinance is adopted for the purposes of:
(1) Regulating certain land disturbing activity to control accelerated erosion and sedimentation in order to prevent the pollution of water and other damage to lakes, watercourses, and other public and private property by sedimentation; and
(2) Establishing procedures through which these purposes can be fulfilled.

General requirements of the permit include among others:

(a) *Plan required.* No person shall initiate any land disturbing activity which uncovers more than one acre without having an erosion control plan approved by the county. No land disturbing activity may be initiated until the county is notified of the date that the land disturbing activity will begin.
(b) *Protection of property.* Persons conducting land disturbing activity shall take all reasonable measures to protect all public and private property from damage caused by such activity.
(c) *More restrictive rules shall apply.* Whenever conflicts exist between federal, state, or local laws, ordinances, or rules, the more restrictive provision shall apply.
(e) *Inspections.* Any and all applicable intermediate inspections may be held in any trade (building, mechanical, electric and/or plumbing) if any land disturbing activity, on a tract, including single-family residences, is found not to be in compliance with any part of this article.
(f) *Building finals.* Building finals and/or certificates of occupancy may not be issued if any land disturbing activity, including single-family residences, is found not to be in compliance with any part of this article.

Mandatory standards for land disturbing activity
No land disturbing activity subject to the control of this article shall be undertaken except in accordance with the following mandatory standards:
(1) *Buffer zone*.
a. No land disturbing activity during period of construction or improvement to land shall be permitted in proximity to a lake or natural watercourse unless a buffer zone is provided along the margin of the watercourse of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearer the land disturbing activity. Waters that have been classified as trout waters by the environmental management commission shall have an undisturbed buffer zone 25 feet wide or of sufficient width to confine visible siltation within the 25 percent of the buffer zone nearest the land disturbing activity, whichever is greater. Provided, however, that the county may approve plans which include land disturbing activity along trout waters when the

duration of said disturbance would be temporary and the extent of said disturbance would be minimal. This subdivision shall not apply to a land disturbing activity in connection with the construction of facilities to be located on, over, or under a lake or natural watercourse.
b. Unless otherwise provided, the width of a buffer zone is measured from the edge of the water to the nearest edge of the disturbed area, with 25 percent of the strip nearer the land disturbing activity containing natural or artificial means of confining visible siltation.
c. The 25-foot minimum width for an undisturbed buffer zone adjacent to designated trout waters shall be measured horizontally from the top of the bank.
d. Where a temporary and minimal disturbance is permitted as an exception by subsection (1)a. of this section, land disturbing activities in the buffer zone adjacent to designated trout waters shall be limited to a maximum of ten percent of the total length of the buffer zone within the tract to be distributed such that there is not more than 100 linear feet of disturbance in each 1,000 linear feet of buffer zone. Larger areas may be disturbed with the written approval of the director.
e. No land disturbing activity shall be undertaken within a buffer zone adjacent to designated trout waters that will cause adverse temperature fluctuations, as set forth in 15 NCAC 2B.0211 "Fresh Surface Water Classification and Standards", in these waters.
*(2) Graded slopes and fills*. The angle for graded slopes and fills shall be no greater than the angle, from zero to nineteen degrees, which can be retained by vegetative cover or other adequate erosion control devices or structures. Only when approved by the county may slopes be steeper than two foot of run to one foot of rise. In any event, slopes left exposed will, within 15 working days or 30 calendar days, whichever is shorter, of completion of any phase of grading, be planted or otherwise provided with ground cover, devices, or structures sufficient to restrain erosion.
*(3) Ground cover*. Whenever land disturbing activity is undertaken on a tract comprising more than one acre, if more than one acre is uncovered, the person conducting the land disturbing activity shall install such sedimentation and erosion control devices and practices as are sufficient to retain the sediment generated by the land disturbing activity within the boundaries of the tract during construction upon and development of said tract, and shall plant or otherwise provide a permanent ground cover sufficient to restrain erosion after completion of construction or development. Except as provided in section 23-238(b)(5), provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days following completion of construction or development whichever period is shorter.
*(4) Prior plan approval.* No person shall initiate any land disturbing activity on a tract if more than one acre is to be uncovered unless, 30 or more days prior to initiating the activity, an erosion and sedimentation control plan for such activity must be both filed with and approved by the county. The county shall forward to the director of the division of water quality a copy of each erosion and sedimentation control plan for a land disturbing activity that involves the utilization of ditches for the purpose of dewatering or lowering the water table of the tract.

Design and performance standards.
(a) Except as provided in subsection (b)(2) of this section, erosion and sedimentation control measures, structures and devices shall be so planned, designed and constructed as to provide protection from the calculated maximum peak of runoff from the ten-year storm. Runoff rates shall be calculated using the procedures in the USDA, Soil Conservation Service's "National Engineering Field Manual for Conservation Practices," or other acceptable calculation procedures.

(b) In high quality water (HQW) zones, the following design standards shall apply:
(1) Uncovered areas in HQW zones shall be limited at any time to a maximum total area within the boundaries of the tract of 20 acres. Only the portion of the land disturbing activity within an HQW zone shall be governed by this section. Larger areas may be uncovered within the boundaries of the tract with the written approval of the director.
(2) Erosion and sedimentation control measures, structures and devices within HQW zones shall be so planned, designed and constructed to provide protection from the runoff of the 25-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Service's "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.
(3) Sediment basins within HQW zones shall be designed and constructed such that the basin will have a settling efficiency of at least 70 percent for the 40-micron (0.04 mm) size soil particle transported into the basin by the runoff of that two-year storm which produces the maximum peak rate of runoff as calculated according to procedures in the United States Department of Agriculture Soil Conservation Services "National Engineering Field Manual for Conservation Practices" or according to procedures adopted by any other agency of this state or the United States or any generally recognized organization or association.
(4) Newly constructed open channels in HQW zones shall be designed and constructed with side slopes no steeper than three horizontal to one vertical if a vegetative cover is used for stabilization unless soil conditions permit a steeper slope or where the slopes are stabilized by using mechanical devices, structural devices or other acceptable ditch liners. In any event, the angle for side slopes shall be sufficient to restrain accelerated erosion.
(5) Ground cover sufficient to restrain erosion must be provided for any portion of a land disturbing activity in a HQW zone within 15 working days or 60 calendar days following completion of construction or development, whichever period is shorter.

Responsibility for maintenance.
During the development of a site, the person conducting the land disturbing activity shall install and/or maintain all temporary and permanent erosion and sedimentation control measures as required by the approved plan or any provision of this article, the act, or any order adopted pursuant to this article or the act. After site development, the land owner or person in possession or control of the land shall install and/or maintain all necessary permanent erosion and sediment control measures, except those measures installed within a road or street right-of-way or easement accepted for maintenance by a governmental agency.

The full text of this article can be found under Chapter 23, Article VI of the
Code of Ordinances County of New Hanover, North Carolina.

**APPENDIX E: POST-CONSTRUCTION SITE RUNOFF CONTROLS**

Included in this section:
Inspection Reporting Summary
Inspection Letter
Stormwater Detention Facility Compliance Inspection Report

**2010 BMP Compliance Inspection Summary**

| **Dates of Inspections** | **June-10** | **Dec./Jan-10/11** |
|---|---|---|
| **Total # Sites Inspected** | 304 | 315 |
| ***Response Letter Severity*** | | |
| Level 1 (first letter) | 26 | 23 |
| Level 2 (second letter)* | 1 | 0 |
| Level 3 (third letter)** | 0 | 0 |
| # of Sites Requiring Maintenance | 27 | 23 |

*If no response from first letter after 60 days, second letter is sent

**If no response from second letter after 60 days, third letter is sent

**SAMPLE LETTER**

Date

«OWNER»
«CO_OWNER»
«OWN_ADDR»
«OWN_CITY», «OWN_STATE» «OWN_ZIP»

RE: Storm Water Maintenance Inspection - «SUBD_NAME»
(Parcel # «PIN»)

The City of Wilmington Storm Water Services Section has recently completed a routine inspection of the storm water management facilities at «SIT_ADDR» for the above referenced site. The facility was inspected for compliance with the operation and maintenance requirements as outlined in the City's Technical Standards Manual. The City will be conducting these inspections a minimum of twice a year. Our ---------- (date) inspection indicates that the storm water facilities at the above property does not comply with current maintenance standards as listed on the attached Compliance Inspection Report.

According to the storm water management specifications and standards and the inspection and maintenance agreement from the responsible entities, corrective action must be taken within a reasonable time period. The City will be reinspecting the above storm water facilities to track the progress of any corrective action. I will be happy to work with you toward a satisfactory resolution of this matter. If you have questions, please contact me at 341-4694. Your cooperation and assistance in the City's storm water management efforts is greatly appreciated.

Sincerely,

Jim Quinn
Stormwater Specialist
Stormwater Services

# Stormwater Detention Facility

## Compliance Inspection Report

**SITE:**
**DATE:**
**LOCATION:**

**The Stormwater Management for Post-Construction Ordinance requires a bi-annual inspection of all structural water quality detention facilities to ensure that they are being properly maintained and are functioning as originally designed.**

**The results of this inspection are as follows:**

☐ **Visual inspection found no apparent problems with the facility.**

☐ **Please complete the following repairs and/or maintenance items within 60 days of this report**

***Slopes***
- ☐ Repair eroded pond slopes
- ☐ Repair erosion at pond inlet
- ☐ Repair erosion at outlet structure
- ☐ Re-seed and/or repair bare areas
- ☐ Mow and regularly maintain vegetation
- ☐ Regrade slopes and/or aquatic shelf

***Inlets***
- ☐ Remove vegetative obstruction
- ☐ Remove sediment accumulation within pipes

***Emergency Spillway***
- ☐ Remove debris located in spillway
- ☐ Remove trees and woody vegetation
- ☐ Repair eroded areas and/or rip-rap

***Outlet Structure***
- ☐ Remove debris obstructing outlet structure
- ☐ Remove obstruction to orifice
- ☐ Repair and/or replace trash rack
- ☐ Repair trash screen for lower orifice
- ☐ Remove vegetation around outlet structure

***Pond Main Body***
- ☐ Repair vegetative shelf
- ☐ Remove sediment accumulation
- ☐ Remove floating debris and/or debris on slopes
- ☐ Remove vegetation in pond that has reduced surface area

***Other***
- ☐ _____
- ☐ _____

Additional comments and maintenance concerns:

_____
_____
_____
_____
_____
_____
_____

Proper operation and maintenance are the sole responsibility of the property owner, and a vital part of ensuring the effectiveness of your detention facility. If you fail to complete the above maintenance in a timely manner, please be advised that the City of Wilmington reserves the right to complete the maintenance, and assess the owner for any costs or damages incurred. You will be notified if the City chooses to pursue this action.

Please inform this office of the date when work is completed, and if you should have any questions or comments concerning these items or future maintenance issues, please feel free to contact me at (910) 341-4694.

Inspected by: Jim Quinn Title: Stormwater Specialist

**APPENDIX F: POLLUTION PREVENTION & GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS**

## APPENDIX G: THREATENED & ENDANGERED SPECIES (Shortnose Sturgeon)

Included in this section:
BMP Reporting Table

| DATE / TIME | PLACE | AUDIENCE | INDIVIDUALS WHO PERFORMED ACTIVITY | TECHNIQUES/ METHODS USED | RESULTS OF ACTIVITY OR INFO COLLECTED |
|---|---|---|---|---|---|
| **Create Public Education Program to Increase Awareness of the Shortnose Sturgeon** | | | | | |
| Ongoing | New Hanover County Schools - 8th grade science classes | 8th grade science classes | Stormwater staff NHSWCD staff CFRW staff | Highlight the Shortnose Sturgeon during classroom presentations and/or lead teachers to online resources about the endangered fish | Shortnose Sturgeon education for the students |
| Ongoing | Community events; speaking engagements | General public | Stormwater staff | Distribute Shortnose Sturgeon brochure and bookmark at community events and speaking events | Education about Shortnose Sturgeon provided to the public |
| Ongoing | City's Cable Access Channel (GTV-8) | TV Viewers | Stormwater staff GTV staff | Air Shortnose Sturgeon narrated slideshow on GTV | Shortnose Sturgeon education for cable access channel viewers |
| March - July 2010 | Website | General public | Stormwater staff | Narrated slideshow, brochure, and bookmarks posted on Publications Page of stormwater website | Shortnose Sturgeon education for the public |
| 4/3/10 | NC Aquarium at Fort Fisher | Highschool - 9th-12th grade | Aquarium staff | Habitat Hunt - question about the Shortnose Sturgeon | Educational activity for high school students while visiting the aquarium |
| Ongoing | New Hanover Soil & Water Conservation District website | Web viewers | NHSWCD staff | Features information about the Shortnose Sturgeon on website | Education about Shortnose Sturgeon provided to the public thru partner agency |
| Ongoing | Cape Fear River Watch website | Web viewers | CFRW staff | Features information about the Shortnose Sturgeon on website | Education about Shortnose Sturgeon provided to the public thru partner agency |

## APPENDIX H: REGULATORY & ENFORCEMENT ACTIONS

The Public Services Department added to its staff a Code Enforcement officer in anticipation of the new Phase II requirements and Stormwater Ordinances regulating illicit discharges that became effective November 2009. The Stormwater Ordinance Enforcement Program currently consists of enforcing Wilmington's Code of Ordinance Chapter 12, Sec 12-22 which prohibits illicit discharges, illicit connections, pet waste on public property, obstructions and organic yard waste from purposefully being placed into any stormwater conveyance. Any other water quality concerns that are reported are investigated and resolved through our public education program.

In 10-11, the Public Services Department investigated approximately 263 stormwater complaints. The majority of reports consisted of Sanitary Sewer Overflows, Yard Waste and Illicit Discharges. When the department receives a complaint the date, time, location, contact, nature of the complaint, actions, recommendations and follow up are documented, as well as distribution of educational material, and enforcement actions. This is the first year of a new city wide data collection system which will improve the overall record keeping ability for this program. A summary of this year's activities are as follows:

ENFORCEMENT ACTIONS 2010-2011

| Nature of Complaint | Number of reports | Resolved thru Public Education | NOV Issued | Referred to DWQ |
|---|---|---|---|---|
| Yard Waste | 54 | 100% | 0 | 0 |
| Illicit Discharge/ Sediment | 69 | 94% | 4 | 1 |
| Illicit Connection | 2 | 100% | 2 | 0 |
| Pet Waste | 22 | 100% | 0 | 0 |
| Blockages | 19 | 100% | 0 | 0 |
| SSO | 35 | | 0 | 0 |

DEFINITIONS: Nature of Complaint

Yard Waste (Part 2, Sec. 12-29)
Yard waste complaints include calls the City received reporting violations of the City's stormwater ordinance which prohibits the intentional raking, sweeping, blowing, washing, directing or placing of yard waste into any part of the public drainage system which might impede the flow of water through the system or compromise water quality. Resolution of an incident includes distribution of educational material and/or explanation of the ordinance with the possible fines.

Illicit Discharge/Sediment (Part 1, Sec. 12-22)
Complaints include issues reported as illicit discharges as defined by the ordinance. Reports include legal as well as illegal discharges which was determined after the investigation was completed. Resolution of an incident includes education to the public regarding stormwater

pollution and awareness of the City ordinance with the potential fines for non compliance and repeat offenders. Written NOVs may be issued for more serious offences.

Illicit Connection (Part 1, Sec. 12-23)
Reports were the result of an illicit connection that impacted the City's stormwater system with a non-allowable discharge. All complaints in this category are the result of an investigation and the confirmation of illicit connection. Resolution of an incident includes education on the impacts to water quality, the City's ordinance requirements, and the potential fines for a violation. Additionally, follow up to the incident would include making sure the illicit connection was permanently closed.

Pet Waste (Part 2, Sec. 12-28)
The pet waste complaint category included any report of violation of the City's Pet Waste Ordinance. These complaints which were called in by citizens or City employees, due to their nature, may or may not have been substantiated after the investigation. Resolution of an incident includes education to all parties involved on the potential adverse health effects of pet waste pollution, prevention, the City's ordinance requirements and the potential fines for each violation.

Blockages (Part 2, Sec. 12-29)
Blockage reports include any complaint reported which were thought to have the potential to impede the flow of stormwater in the City's maintained drainage system. Resolution of the incident includes education to citizens involved directly or within the immediate area of the incident explaining how to prevent willful blockages of the stormwater system.

SSO (Part 1, Sec.12-24)
Sewer overflows from the CFPUA system, both reportable and not reportable. Resolution of the incident includes reviewing the DWQ reporting form for completion of corrective action items and review of educational material distributed near the incident.

City of Wilmington

# Civil Penalty Citation

| **Name** (First, Middle, Last) | **DOB** | **Sex** M F |
|---|---|---|
| **Address** (Street) | **City** **State** | **Zip** |
| **Telephone** | **License #** | **State of License** |
| **Description:** | | |

*Pursuant to Wilmington City Code Chapter 12, you are charged with the following violation(s) occurring at*

| **Location** | **Date** | **Time** |
|---|---|---|

- ☐ **Illicit Discharge** (Chapter 12-22; up to $10,000 per offense)
- ☐ **Domestic Animal Waste** (Chapter 12-28; $250 per offense)
- ☐ **Debris in Storm Drainage System** (Chapter 12-29; $250 per offense)

**Penalty** **$**

| Officer's Name | City Dept. |
|---|---|

NO. _____

City of Wilmington

# CIVIL PENALTY CITATION

**Citations may be paid by one of the following methods:**

**MAIL TO:**

**City of Wilmington - Collections**
**PO Box 1810**
**Wilmington, NC 28402-1810**

If paying by mail, send check or money order made payable to "City of Wilmington". Do not send cash through the mail. Include this citation, or a copy of it, with payment and indicate the citation number on your check.

**IN PERSON:**

**City of Wilmington - Collections**
**305 Chestnut Street (across from Thalian Hall)**
If paying in person, bring this citation, or a copy of it, with your payment.

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**Failure to remit payment within ten (10) days after being cited may result in the City filing a civil action to recover the debt. An appeal must be made to the City Manager in writing within 30 thirty days after the date the notice is received.**

If you have any questions regarding this matter, please call Stormwater Services at (910) 343-4777 and ask for the Stormwater Compliance Officer.

**CERTIFIED MAIL**
**RETURN RECEIPT REQUESTED**

<HIGHEST RANKING RESPONSIBLE OFFICIAL>, <TITLE>
<COMPANY>
<ADDRESS>
<CITY, STATE, ZIP>

Subject: **NOTICE OF VIOLATION**
WILMINGTON CITY CODE
Chapter 12, Article III, Division 2,
Illicit Discharge and other Prohibited Wastes, Section 12-( )<a,b,c or d>
<insert Illicit Discharge(s) and Disposal(s), Illicit Connection(s), Accidental Discharge(s), Domestic Animal Waste, or Debris in the Storm Drainage System>

Dear <RESPONSIBLE OFFICIAL>:

North Carolina General Statute 160A-459 authorizes cities to adopt and enforce a storm water control ordinance to protect water quality and control water quantity.

On <DATE>, <INVESTIGATOR'S NAME> of Wilmington Storm Water Services conducted an investigation of your property located at <ADDRESS> in Wilmington, North Carolina. The investigation was conducted by authority granted under the City of Wilmington Storm Water Pollution Control Ordinance ("Ordinance"), Section 12-3(b) Enforcement of Chapter. As a result of that inspection, the conditions described below were found on the property in violation of the Ordinance, Section 12-22( )<a,b,c or d>,
<insert Illicit Discharge(s) and Disposal(s), Illicit Connection(s), Accidental Discharge(s), Domestic Animal Waste, or Debris in the Storm Drainage System >:

<State condition(s) causing the violation, including facts, findings and environmental impacts.>

<You were verbally notified of the violation on <DATE> and directed to immediately cease the discharge(s) causing the violation.> To achieve compliance with the legal requirements of the Ordinance, you must immediately cease the discharge(s) if you have not done so already. You must also implement the corrective actions listed below by
<DATE>. Furthermore, you must provide this office with written notification explaining the corrective actions taken. Please send your letter to the address on this letterhead to the attention of <SUPERVISOR'S NAME>.

Restore areas affected by the violation, as described above, to their pre-discharge condition.
Take appropriate remedial or preventive actions to prevent future illegal discharges.

In accordance with the Ordinance, Section 12-1( ) >a,b,c,d, Civil Penalties, you are subject to civil penalties of up to >Ten Thousand Dollars ($10,000.00) per day from the date the violation occurred forward. Each day of violation shall constitute a separate violation. Wilmington Stormwater Services will take any steps necessary to secure compliance with the Ordinance. One such step is that The City of Wilmington or a contractor designated by Wilmington Stormwater Services may abate a violation and/or restore impacted areas to their pre-violation condition should you fail to do so within the established compliance deadline, and any expense incurred for such restoration work in addition to the civil penalty shall be charged to you.

You may request a meeting with Wilmington Stormwater Services to present any information relevant to the violation. To request a meeting, contact <INVESTIGATOR'S NAME> at <PHONE #>. The meeting shall be requested before the established compliance deadline and will be scheduled at a time determined in the discretion of Wilmington Stormwater Services.

If you have any questions, please call me at <PHONE #>. You should not assume that your property is in compliance with the Ordinance until Wilmington Stormwater Services has notified you.

Your prompt cooperation in this matter is requested.

Sincerely,

Dave Mayes
Stormwater Services Program Manager
Wilmington Storm Water Services

<YOUR INITIALS>

Dear Landscape Industry Professional,

As a professional in the landscape industry, it is important that you are aware of recent changes made to the City of Wilmington's yard waste and debris ordinance. Debris is defined in the City Code as yard waste (i.e. leaves, pine straw, grass clippings, etc), sediment, trash, litter or debris of any kind.

As you may know, storm drains and ditches drain directly into our creeks and waterways. Yard waste in particular, can clog the stormwater drainage system resulting in flooded homes and businesses. In addition, yard waste that flows through the drainage system causes severe algal blooms, low oxygen levels, fish kills, and impaired aquatic habitat in our waterways.

As of **November 1, 2009**, the following provisions will be enforced:
**It is unlawful to rake, sweep, blow, wash, direct or place any debris into the storm drainage system.**
*(The storm drainage system consists of streets, storm drains, ditches, swales, creeks, lakes, rights-of-way, dedicated easements, etc).*
**Property owners shall keep all ditches, drains, swales, and other drainageways on their property free from obstructions which would impede the flow of water.**
**Fines for non-compliance with the City's yard waste ordinance are $250 per occurrence.**

Suggested methods for complying with yard waste law include:
**Direct or blow yard waste back onto a lawn or landscape area.**
**Sweep, rake, and/or collect yard waste off of hard surfaces.**
**Grasscycle - leave grass clippings on the lawn to decompose quickly and act as a natural fertilizer and to conserve moisture in the soil.**
**Compost yard waste to use in the lawn, garden, or landscape.**
**Collect and contain for city yard waste collection service (if available) according to specific yard waste collection policies. Do not use the city trash cart for yard waste or debris.**
**Collect and dispose of waste at a legally authorized yard waste collection facility.**

As an important liaison between the City and your employees and clients, we request that you share this information with them as well. In addition, we have included a poster for you to display in your place of business. Thank you for your time and consideration regarding this important matter. If you have any questions, please don't hesitate to contact me.

Sincerely,

Beth Nunnally
Stormwater Compliance Officer
City of Wilmington Public Services
910-341-0092

Dear Restaurant or Bar Manager/Owner:

As a business professional operating in the city, it is important that you are aware of recent changes made to the City of Wilmington's Stormwater Ordinance regarding Illicit Discharge Chapter 12-22. These changes may affect the way you conduct daily business. An **illicit discharge** is described as "anything that enters the storm drainage system which is not composed entirely of rainwater."

As of **November 1, 2009**, the following provisions will be enforced regarding illicit discharges:
Any person or business found responsible for causing or allowing a polluting substance to enter the storm drainage system will be subject to a fine up to $10,000 per violation.
The city will have the authority to enter property to inspect for illicit discharges, and if found, to require that they be disconnected and permanently closed.
Allowable exceptions that *can* enter the drainage system include water from firefighting, waterline flushing, irrigation water, air conditioning condensate, de-chlorinated swimming pool water, etc. For a complete list of exceptions, visit www.wilmingtonnc.gov/publicservices/stormwater
The following examples of this ordinance include:
Commercial businesses will not be permitted to wash vehicles, equipment, or any other surfaces with any soaps or solvents or dislodge any other substance that may be harmful to surface waters, unless the resulting wastewater is collected and discharged to the sanitary sewer system.
Restaurants will not be permitted to discharge any washwater or wastewater outside.
Dumpster lids must be kept closed and dumpster plugs in place.
Swimming pool water must be de-chlorinated before discharging.
Floor drains in old buildings, connected to the storm drainage system, will be required to be disconnected and permanently closed.
Residents and businesses will be expected to prevent harmful substances from entering the storm drainage system.
**Fines for non-compliance with this ordinance are up to $10,000 per offense.**

Please make the necessary adjustments to your procedures to comply with the new ordinance. Violations to this ordinance, based on the nature, can result in a maximum fine of up to $10,000.00 per violation. We request that you share this information with your employees as well. Thank you for your time and consideration regarding this important matter. If you have any questions, please don't hesitate to contact me.

Sincerely,

Beth Nunnally
Stormwater Compliance Officer
City of Wilmington Public Services
910-341-0092