



**CITY OF WILMINGTON,
NORTH CAROLINA**

STORMWATER MANAGEMENT PLAN

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NPDES Permit No.: NCS000406

Reporting Year: March 1, 2009 – February 28, 2010

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.
Manager, Stormwater Services

Date

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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, 2009 to February 28, 2010.

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 3 compliance with requirements of NPDES Phase II permit NCS000406. Primary areas of work include:

- Adoption of new 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 has been preparing for these requirements since 1998 when City Council approved the formation of a stormwater utility. We have had a public outreach and participation program since then. We have also contracted with UNCW Center for Marine Science for ambient monitoring of water quality on creeks within the City. Therefore, we were already well underway prior to NCDWQ issuing Wilmington's permit.

CHANGES/JUSTIFICATION

1) Proposed Change – Illicit Discharge Detection and Elimination

Current Requirement –

- (a) BMP (h) Establish procedures to identify and eliminate failed septic system and sanitary sewer overflows.

Measurable Goal – 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.

Change - The measurable goal was to be completed in year 3. The City adopted a new illicit discharge ordinance in September 2009 that was implemented on November 1, 2009. The new ordinance addresses illicit discharge detection and elimination procedures which includes site access and enforcement language. At this time, the City has regulatory enforcement on sites with failing septic systems but needs to further establish final procedures for reporting and communication with New Hanover County Health Department. This is anticipated to be completed in spring 2010.

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

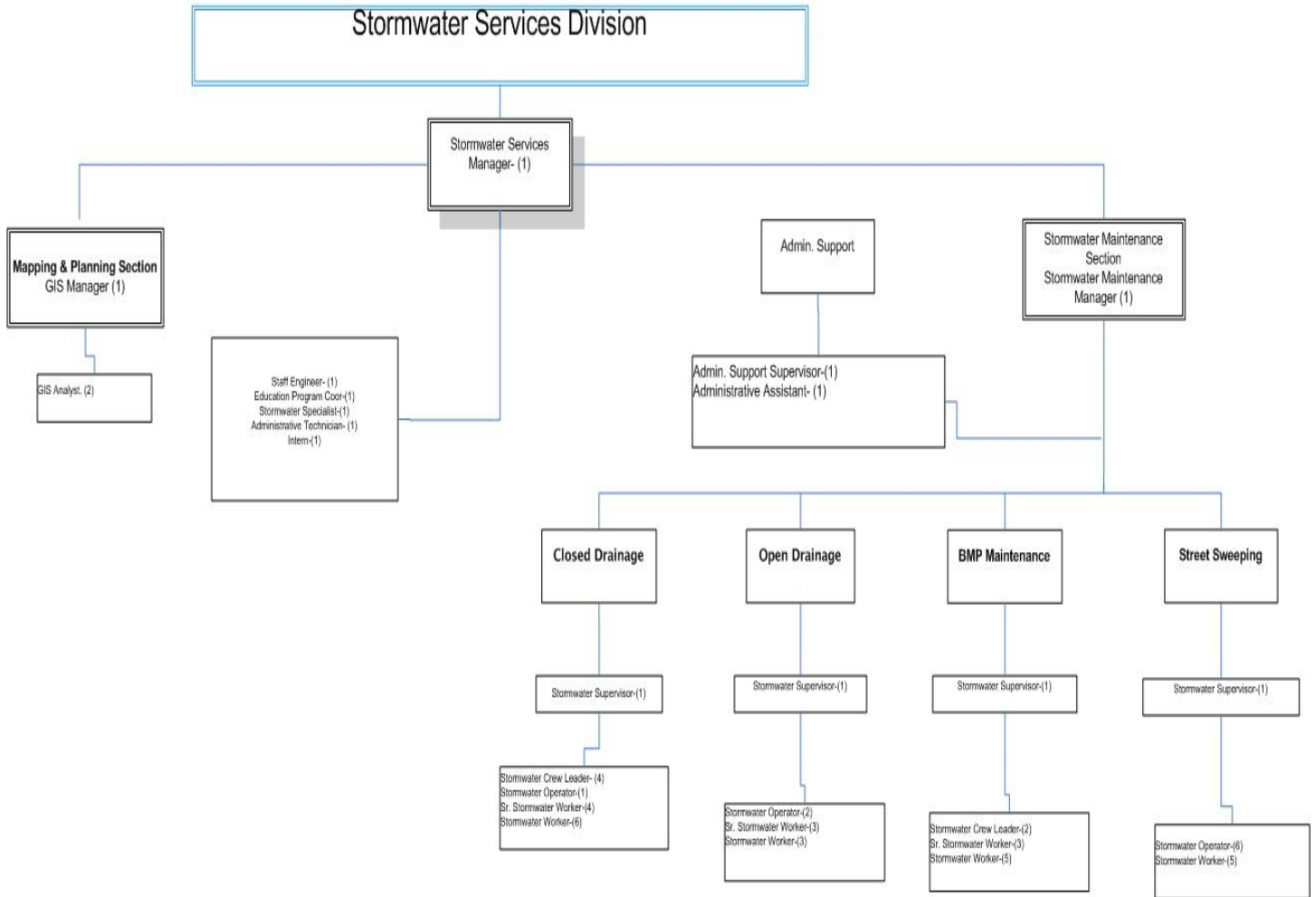
The City of Wilmington's Maintenance Division is responsible for maintaining the public drainage system. Maintenance activities consist of open drainage, closed drainage, street sweeping, and best management practices (BMPs). The open drainage system consists of roadside swales, ditches, channels, creeks, 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**

	<u>FY 09-10</u> <u>Adopted</u>	<u>FY 10-11</u> <u>Estimated</u>
REVENUES		
Storm Water Utility Fees	5,104,012	5,406,647
City Streets Storm Water Fees	1,377,221	1,466,740
Storm Water Discharge permits	10,000	43,200
NCDOT Drainage Maintenance	37,000	37,000
Transfer from Payment in Lieu	30,000	30,000
Interest Earnings	63,460	36,964
Miscellaneous	-	
Appropriated Fund Balance	(-127,083)	0
TOTAL REVENUES	6,494,610	7,020,551
EXPENDITURES		
Public Services	4,258,249	4,511,049
Nondepartmental	628,325	599,243
Debt Service	1,347,036	1,835,259
Contingency	61,000	75,000
Transfer to Capital Project Fund	<u>200,000</u>	0
TOTAL EXPENDITURES	6,494,610	7,020,551

Note: Estimated Budget for FY 2009-10 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

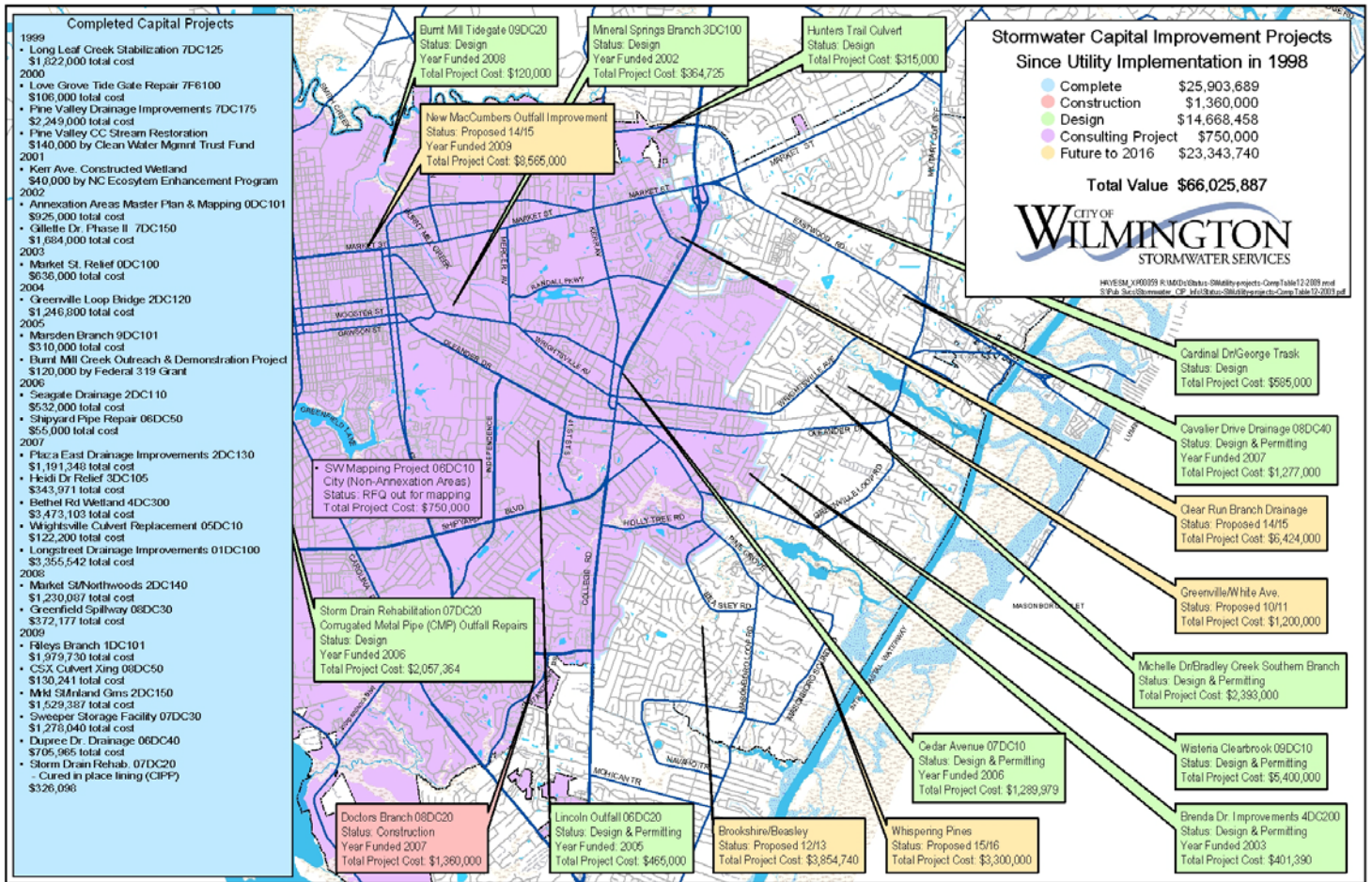
The City's new stormwater ordinance required by this permit is complete and has been effective beginning November 1, 2009. We have also implemented the Stormwater Hotline and the webpage reporting form, and have had an increase in stormwater reports. All complaints received by the Stormwater Division either from the public or from City staff are 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 Authority

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.

CAPITAL IMPROVEMENT PROJECTS

Capital Projects Summary Map



In- House Projects

<u>Location</u>	<u>Installed/Constructed</u>	<u>Description</u>	<u>Total Cost</u>
3 rd St. & Ann St.	Installed pipe, structure	19 ft. pipe, 1 basin	\$4,795.92
3926 Sweetbriar Rd.	Installed pipe	16 ft. pipe	\$204.28
5445 Efird Rd.	Installed pipe	47 ft. pipe	\$3371.89
3820 Antelope Trail Dr.	Installed pipe	27 ft. pipe	\$1,589.87
6624 Market St.	Installed pipe	4 ft. pipe	\$964.91
Coye Alley	Installed pipe, structure	878 ft. pipe, 6 basins, 7 manholes	<u>\$263,753.94</u>
			\$274,680.81

OPERATIONS AND MAINTENANCE

Yearly Maintenance Activities Chart

<u>Activity</u>	<u>Amount</u>	<u>Unit of Measure</u>	<u>Labor Hours</u>	<u>Total Cost</u>
INSPECTION				
BMP	497	Each	314.50	\$6,599.25
Closed			3867.00	\$101,558.90
Open			445.00	\$9,724.70
Tidegate			73.00	<u>\$2,521.83</u>
				\$120,404.68
MAINTENANCE				
Culvert	456	Each	337.00	\$8,443.59
Ditch (Manual)	328,702	Ft.	6,214.25	\$149,582.90
Ditch (Mechanical)	19,706	Ft.	2,158.75	\$79,955.39
Structure	15,830	Each	4,729.75	\$308,953.55
Haul waste	441	Load	512.50	\$19,079.32
Mowing	377,546	Ft.	1,804.00	\$65,262.24
Pipe	170,129	Ft.	4,003.50	\$110,025.48
BMP			3,797.00	\$92,703.28
Lake			466.00	\$17,309.16
Tidegate			89.00	\$2,155.59
Sweeping (191.75 loads)	9,654.40	Mile	7,745.86	<u>\$414,557.88</u>
				\$1,268,028.38
REPAIR				
Pipe Failure	147	Each	5,241.50	\$173,724.58
Erosion	1032	Ft.	445.00	<u>\$17,606.18</u>
				\$191,330.76

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).

**ENVIRONMENTAL QUALITY OF WILMINGTON AND
NEW HANOVER COUNTY WATERSHEDS,
2009**

by

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Executive Summary

This report represents combined results of Year 11 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 2009.

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 12,600. There was one station sampled in this watershed during 2009, lower Barnard's Creek at River Road. Based on 23 samples collected during 2009, there was only one algal bloom, and minor turbidity problems. Dissolved oxygen was below the state standard on 39% of occasions sampled. Fecal coliform bacteria exceeded the NC standard of 200 CFU / 100 mL on 35% of the sampling trips; in general water quality in this creek was poor in 2009.

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. Three sites were sampled, all from shore. In 2009 there were no problems with turbidity or algal blooms exceeding the state standard. Average dissolved oxygen

was good to fair at the three sites. The 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 2009. This creek has very poor water quality, with large 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 > 83% of occasions sampled. These levels of pollution have characterized the system for the past several years. On a positive note, dissolved oxygen concentrations were greatly improved in 2009 compared to the previous several years.

The effectiveness of Ann McCrary wet detention pond on Randall Parkway as a pollution control device for upper Burnt Mill Creek was mixed in 2009. Comparing inflows to outflows, there was a significant decrease in fecal coliform bacteria, and 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. 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 2009 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 2009 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, as well as the tributary stream stations.

Algal blooms are periodically problematic in Greenfield Lake, and have occurred during all seasons, but are primarily a problem in spring and summer. In 2007 algal blooms were not as common as in previous years, but in 2008 algal blooms exceeding the North Carolina water quality standard increased. In 2009 several blooms exceeding the state standard occurred (at GL-P and GL-YD); however, on average, overall bloom activity in the lake showed a slight decrease from 2008. In 2007-2009 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 impact the lake, particularly Station GL-2340. 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. In recent years this system has been plagued by a number of sewage spills. In 2009 the creek was sampled at four tidal sites and one non-tidal freshwater site. There were only two incidents of low dissolved oxygen seen in our sampling; in July and September; one at SB-PGR (the south branch at Pine Grove Rd.) and one at MB-GLR (middle branch at Pine Grove Rd.); although none were severe (below 3.6 mg/L). Turbidity was low and no major algal blooms were seen at these stations in 2009. Fecal coliform bacterial pollution continued to impact Hewletts Creek in 2009, with all stations with the exception of HC-3 exceeding the North Carolina standard of 200 CFU/100 mL 33% of the time or more. 5

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. Three stations were sampled in Howe Creek in 2009. 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 83% or more of the times sampled. The lower station HW-FP was rated fair, exceeding the standard on one occasion only. Dissolved oxygen concentrations were fair in Howe Creek in 2009. 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. This creek was sampled 23 times at one station at River Road in 2009 as a result of funding from the private sector. Dissolved oxygen concentrations were below the state standard of 5.0 mg/L on 39% of the sampling occasions in 2009. Neither turbidity nor suspended solids were problematic in 2009, and there was only one algal bloom encountered in the sampling. However, fecal coliform bacteria contamination was a major problem in Motts Creek, with the State standard of 200 CFU/100 mL exceeded on 74% of the occasions sampled; 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 2009 this creek showed poor water quality based on dissolved oxygen issues and major 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 proper, SC-CH, was sampled by UNCW under the auspices of the Lower Cape Fear River Program (LCFRP) 2009. Overall the water quality in 2009 can be described as good, with no violations of NC water quality standards.

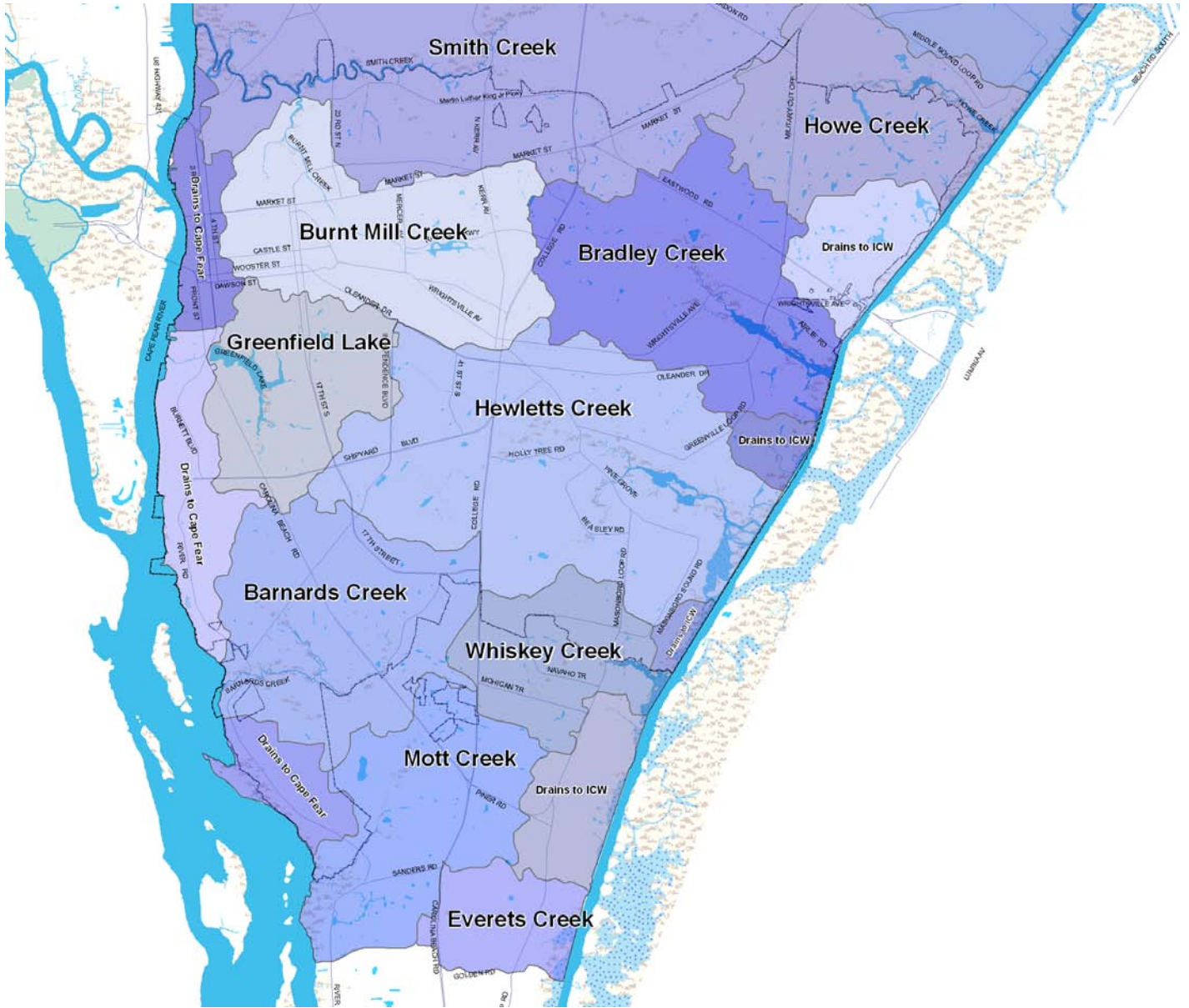
Whiskey Creek – Whiskey Creek is the southernmost large tidal creek in New Hanover County that drains into the ICW. It has a watershed of 2,095 acres, a population of about 7,100, and is covered by approximately 19% impervious surface area. One station, on Masonboro Loop Road, was sampled from shore along this creek in 2009. This site had low to moderate nutrient concentrations and no algal bloom problems. Dissolved oxygen was substandard (4.3 mg/L) only in July. Fecal coliform bacteria counts were generally good at this site in 2009.

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 2009 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 10% to be in good condition, 14% in fair condition, but **76%** in poor condition. Dissolved oxygen conditions system-wide (24 sites) showed 42% of the sites were in good condition, 33% were in fair condition, and 25% were

in poor condition. For algal bloom presence, measured as chlorophyll *a*, 80% of the 20 stations sampled were rated as good, 0% as fair and 20% as poor (all in Greenfield Lake or Burnt Mill Creek). In terms of turbidity 93% of the 24 sites sampled were rated as good, 17% as fair and 0% as poor. 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 STORMWATER PERMIT BMPs & 09/10 REPORTING

2009-2010 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
- 65 school presentations were conducted in 8th grade science classes for approximately 2,000 students in New Hanover County Schools.

Public Involvement & Participation

- 8 watershed clean-ups and invasive species removal events were held utilizing 134 volunteers and resulting in 247 bags of trash and 45 bags of invasive aquatic plant species collected
- 9 stakeholder public meetings were held to during the ordinance revision process
- The Stormwater Pollution Prevention Hotline and webform was implemented this year to enable the public to report stormwater pollution in the community.

Illicit Discharge Detection and Elimination

- Stormwater infrastructure mapping is continuing 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. Methods & procedures for mapping are continuing to evolve and improve as are approaches to outfall monitoring using joint tables to record observations. Cooperative efforts within our organization are being fostered to enable identification of source areas using GIS when illicit discharges are observed.
- City Council adopted new ordinance on September, 15, 2009, to implement illicit discharge and elimination controls (Chapter 12, Article III, Sec. 12-22).
- Established lines of communication with the newly formed Cape Fear Public Utilities Authority regarding sanitary sewer overflows to the City's stormwater system.
- Conducted several training sessions for City staff and Cape Fear Public Utilities staff for identifying illicit discharges.

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 August 2009, 303 sites were inspected with 49 requiring corrective action. In Dec./Jan. 2009/10, 303 sites were inspected with 32 requiring corrective action.
- Amended the City's 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

- Drafted several Standard Operations Procedures for City Stormwater Maintenance Operations. SOPs anticipated to be completed in Summer 2010.
- Conducted inspections on Cape Fear Transit Authority to meet SPPP site requirements. Conducted training of Cape Fear Public Utilities and Stormwater Services staff for municipal operations in order to ensure good housekeeping procedures.
- Finalized SPCC plans for Police Headquarters and Operations Complex.

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
(b) 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				

09-10 Accomplishments

This comprehensive summary of target pollutants, sources, and target audience was accomplished in Year 1 and is included in the Public Education & Outreach Appendix section. The 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 programs. For instance, this year we have been using the target pollutant summaries for pet waste and yard waste to implement outreach strategies with the adoption of the City's new stormwater ordinance.

This BMP will be updated as the target audience for each pollutant evolves and changes. The internet and social media may play a role in the evolution and demographics of particular audiences.

10-11 Proposed Objectives

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

(c) Identify target audiences	Identify the target audiences likely to have significant storm water impacts and why they were selected.	X				
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09-10 Accomplishments

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

10-11 Proposed Objectives

Modify audiences as this variable changes over time.

(d) 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				
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09-10 Accomplishments

In the fall of 2009, the City of Wilmington launched a re-designed and updated city website. Stormwater Services staff was responsible for creating brand new stormwater webpages as part of this revamp. The new look and navigation were a necessary improvement over the previous website. Stormwater staff continues to maintain and update a website, particularly news, on a regular basis. The new, shortened web address for Stormwater Services is www.wilmingtonnc.gov/stormwater. This website address is included on all educational stormwater literature and materials to drive traffic to the website.

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.

One of the main objectives of the new site was to give the public an opportunity to interact with Stormwater Services via the website. Citizens can email and contact staff through better navigation on the website. They can also report stormwater pollution in the community through the online web-based form. Finally, there is a new section of stormwater videos featuring documentaries, public service announcements, and slide shows.

10-11 Proposed Objectives

Continue to add updated, relevant content to the website on a regular basis. Staff would like to roll out a Stormwater Smarts contest in which citizens would visit the stormwater website to answer education questions. Staff will need to work with city IT staff to develop this contest for the web.

(e) 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			
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businesses.	materials, as available, when implementing its own program.					
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09-10 Accomplishments

Stormwater Services developed educational posters targeted to specific audiences when the new stormwater ordinance was adopted. The following large format posters and letters were created and distributed:

- Pet Waste – distributed to veterinarians, pet stores, pet sitters, and other pet professionals. Also posted on website.
- Yard Debris – distributed to landscapers and property management companies. Also posted on website.
- Illicit Discharge – Restaurant practices – distributed to restaurant association and managers. Also posted on website.

This past year, Stormwater Services launched an educational pet waste outreach campaign in Halyburton Park that included public contact, passive education, and code enforcement spot checks. The campaign occurred in Summer and Fall and included newspaper media coverage.

Stormwater education staff is working closely with code enforcement to develop materials that support issues being addressed in the field.

The current offering of stormwater brochures and publications include:

- Large format posters for pet waste, yard waste, and restaurants (illicit discharge)
- Citizen’s Guide to Protecting Wilmington’s Waterways
- Stormwater Tips for Homeowners
- Structural BMPs for Homeowners
- Stormwater Tips for Businesses
- Stormwater Top 10 List
- What is a Watershed?
- What Puts the Green in Greenfield Lake?
- Pet Waste
- Car Care
- Lawn Care & Landscaping BMPs
- Yard Waste Disposal
- Household Hazardous Waste
- Think Before you Put it in the Sink or Trash
- Illicit Discharge
- The Shortnose Sturgeon: An Endangered Species of the Cape Fear River
- Lower Cape Fear Stewardship Program
- Stormwater Services General Brochure
- Clean Waterways bookmarks, post-its, water bottles, pens, and magnets, etc.

10-11 Proposed Objectives

Staff plans to develop educational materials for auto professionals, carpet cleaners and pressure washers.

In addition, we will have the restaurant and yard debris posters translated to Spanish and will post on the website. The Homeowner brochure and Structural BMP brochure will be combined and reprinted for distribution to the public.

Continue to send targeted mailings in response to neighborhood complaints and citizen requests for high priority pollutants- pet waste, yard waste, and lawn care.

(f) 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		
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09-10 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.

This past year with the adoption of the new stormwater ordinance, the city developed new radio messages to include information about the new rules and associated penalties. The state’s “Johnny Fishpatrick” ad aired in a paid campaign on a broadcast TV station.

We also advertised in a new market, Mayfaire 16 Regal Cinemas. A 15-second stormwater spot aired for 6 weeks in 560 movies shown each week.

Finally, Going Green publications partnered with the city to include a Stormwater 101 article series. Two articles included in the quarterly magazine were “The Basics of Stormwater” and “What is a Watershed?”

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.

Stormwater Services is building on watershed marketing research which indicates that mass media outlets are effective mediums for reaching and influencing a diverse public audience. Research also suggests that the public prefers the comfort and perceived legitimacy of the mass media, particularly television, above all other forms. In addition, Stormwater Services regularly develops and airs a media campaign on the City's cable access channel, GTV-8, to broadcast clean water PSAs, documentaries, and educational slide shows. Utilizing GTV-8, we are able to air a variety of stormwater messages and to repeat messages more frequently. In addition, these videos and PSAs also appear on our website and are available for viewing and downloading. Visit the Appendix to view media campaign information, including documented reach and frequency of each campaign.

10-11 Proposed Objectives

Develop TV public service announcements that highlight the new pet waste and yard waste ordinances to air on broadcast TV through a paid campaign and on the City's cable access channel (GTV-8). Post on the website.

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

(g) Establish Hotline/Help line	Maintain a stormwater hotline/helpline.			X		
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09-10 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 city advertised the hotline via the City’s cable TV channel, media press release, and on educational giveaway items.

10-11 Proposed Objectives

This BMP has been satisfied with the establishment of the stormwater pollution prevention hotline. It will continue to be advertised to the public and operate via the web and phone.

(h) Establish a Public Education and Outreach Program and implement within 12 months of the permit issue date.	<p>The permittee’s outreach program, including those elements implemented locally or through a cooperative agreement, must include at least two of the following:</p> <ul style="list-style-type: none"> • Newspaper articles, press releases and/or paid advertisements (i.e., inserts) • Kiosks and signage • Targeted direct mail • Displays at the point-of purchase • Utility bill inserts <p>The permittee’s outreach program, including those elements implemented locally or through a cooperative agreement, must include at least two of the following:</p> <ul style="list-style-type: none"> • Public meetings • Community events • Contest • Storm drain marking • Stream and Litter cleanups • Group presentation and/or speeches <p>The permittee’s outreach program,</p>	X	X	X	X	X
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	<p>including those elements implemented locally or through a cooperative agreement, must include at least three of the following:</p> <ul style="list-style-type: none"> • News coverage • Workshops and class room outreach • Distributing promotional giveaways and specialty items • Brochures, displays, signs, welcome packets, and pamphlets • Local cable access • Newsletters <p>For each media, event or activity, including those elements implemented locally or through a cooperative agreement, measure and record the extent of exposure.</p>					
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09-10 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.

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

10-11 Proposed Objectives

Continue to take part in annual events like Earth Day and Paw Jam, as well as community meetings and storm drain marking activities.

Continue to deliver Enviroscope watershed presentations to 8th grade science classes in New Hanover County Schools.

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

- (a) 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
(a) Administer a Public Involvement Program	Develop and implement a Public Involvement and Participation Program, as outlined in (b) through (e) below.	X	X			
(b) 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			

09-10 Accomplishments

New city stormwater regulations impacting development, illicit discharges, pet waste, and yard waste were adopted by City council on 9/15/09. Prior to adoption of the ordinances, the city held a series of public meetings and stakeholder groups to review the proposed stormwater ordinance and gather public input. These meetings occurred in the spring of 2009.

Staff incorporated input from public meetings and presented the final ordinance during a public hearing at a city council meeting on 9/1/09; the ordinances were officially adopted on 9/15/09. Public meetings were advertised in the local newspaper, on the web, via listserv and email and on the city’s cable tv channel.

(c) 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,	X				
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	storm drain stenciling, and poster contest					
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09-10 Accomplishments

For the past few years, the City of Wilmington has contracted 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 these agencies through activities such as watershed clean-up events (i.e. Big Sweep), invasive species removal, volunteer creek monitoring, wetland monitoring and plantings, educational workshops for the HOAs, schools, and city employees, implementation of a local stewardship program, eco-tours and 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).

10-11 Proposed Objectives

Continue to contract with Cape Fear River Watch to help us meet NPDES public involvement and public education requirements. Develop additional partnerships with agencies in the County to conduct stormwater education.

(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				
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09-10 Accomplishments

Staff engaged citizens and businesses during the stormwater ordinance revision process through public meetings and stakeholder groups to gather input and feedback from the public.

In addition, staff implemented the Halyburton Park Pet Waste Pilot Project in the summer and fall, to show the community the amount of pet waste in the park and to educate citizens to clean up after their pets. The Stormwater Compliance Officer made regular visits to inquire if citizens were aware of the new pet waste ordinance and to see if they were carrying a clean-up device and picking up after pets.

Staff also began the 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.

In addition, Stormwater Services removed the deteriorating plastic storm drain awareness markers in the downtown area and Greenfield Lake. A few volunteers and employees have started replacing them with new stainless steel awareness markers.

10-11 Proposed Objectives

Staff plans to initiate an online web-based contest to engage the public in learning about stormwater via a website quiz and rain barrel giveaway.

(e) Establish Hotline/Help line	Maintain a stormwater hotline/helpline.			X		
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09-10 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 website address is www.wilmingtonnc.gov/reportstormwaterpollution. Phone hotline and web reports are routed to the Stormwater Compliance Officer who tracks, investigates, and responds to these complaints.

Stormwater Services promoted the new pollution prevention hotline to the public via press release, TV coverage, website and promotional items.

10-11 Proposed Objectives

Stormwater code enforcement will continue to track, investigate, and respond to hotline reports.

Continue to advertise the stormwater hotline during public meetings, HOA and school presentations, special events like Earth Day, etc.

ILLICIT DISCHARGE DETECTION AND ELIMINATION

1. Objectives for Illicit Discharge Detection and Elimination

- (a) Detect and eliminate illicit discharges, including spills and illegal dumping to the Permittee's MS4.
- (b) 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.
- (c) Implement appropriate enforcement procedures and actions.
- (d) Develop a map showing the permittee's major MS4 outfalls to state waters receiving discharges.
- (e) 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		

09-10 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.

In addition the City began to draft 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, there will be provisions for program assessment and evaluation.

Mapping of the stormwater system has continued throughout the past year and outfall identification and mapping are running concurrently with the system mapping effort.

10-11 Proposed Objectives

Finalize the IDDE policy.

Continue to coordinate efforts with CFPUA for 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. Work will continue with CFPUA to establish lines of communication for controlling and correcting SSOs to the City MS4.

Utilize the amended Stormwater Ordinance to address the investigation, identification and elimination of illicit discharges and illicit connections to the City’s stormwater system.

Evaluate the program for effectively eliminating and correcting illicit discharges to the City MS4.

Preliminary outfall locations along the Cape Fear River will be visited to verify location, size, condition, etc. and appropriate upgrade monitoring locations for each outfall will be identified.

(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		
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09-10 Accomplishments

See BMP (a) Illicit Discharge Detection and Elimination.

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.

10-11 Proposed Objectives

Implement the newly amended stormwater ordinance to address the identification and elimination of illicit discharges.

(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	
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09-10 Accomplishments

All receiving waterbodies have been identified and mapped. The stormwater system GIS database design is completed with the need for typical modifications when improvements to the approach are needed or additional functionality is required. Digital terrain model analysis and GPS mapping of drainage infrastructure and open channel systems is continuing in order to meet our year four (4) goal of having a system base map and inventory of major outfalls. In-house GPS data collection routines are in place to facilitate updates to the stormwater system inventory and enable data collection resulting from monitoring efforts. The multiple stormwater system

inventory 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 outfall identification, dry flow observations, non-standard tie-ins, and status as related to NPDES Phase II outfall monitoring.

GIS layer produced for industrial or non-industrial type source areas to be used as background data during outfall mapping efforts. Beta version of ArdPad form to be used to record observations at outfall points.

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.

10-11 Proposed Objectives

Continuing GPS data collection and associated refinements to field routine and database design to accommodate outfall location verification and monitoring efforts.

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.

(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		
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09-10 Accomplishments

The City began to draft 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.

10-11 Proposed Objectives

Finalize the data of the IDDE policy during Summer of 2010. Use the regulatory and enforcement mechanisms as outlined in Chapter 12 of the newly amended stormwater ordinance to address identified illicit discharges.

Within the next year, the City will be developing a GIS database to help track dry weather flows and illicit discharges.

(e) Employee training	Conduct training for appropriate municipal staff on detecting and reporting illicit discharges.			X		
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09-10 Accomplishments

The City conducted three training sessions for CFPUA and City Staff during this reporting year. See Appendix C.

10-11 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.

(f) Provide public education	Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.				X	
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09-10 Accomplishments

Stormwater Services developed educational posters targeted to specific audiences when the new stormwater ordinance was adopted. The following large format posters and letters were created and distributed:

- Pet Waste – distributed to veterinarians, pet stores, pet sitters, and other pet professionals. Also posted on website.
- Yard Debris – distributed to landscapers and property management companies. Also posted on website.
- Illicit Discharge – Restaurant practices – distributed to restaurant association and managers. Also posted on website.

This past year, Stormwater Services launched an educational pet waste outreach campaign in Halyburton Park that included public contact, passive education, and code enforcement spot checks. The campaign occurred in Summer and Fall and included newspaper media coverage.

10-11 Proposed Objectives

Staff plans to develop educational materials for auto professionals, carpet cleaners and pressure washers.

In addition, we will have the restaurant and yard debris posters translated to Spanish and will post on the website.

Continue to send targeted mailings in response to neighborhood complaints and citizen requests for high priority pollutants- pet waste, yard waste, and lawn care.

(g) Establish a public reporting mechanism	Establish and publicize reporting mechanism for the public to report illicit discharges. Establish citizen request response procedures.				X	
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09-10 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 city advertised the hotline via the City’s cable TV channel, media press release, and on educational giveaway items.

10-11 Proposed Objectives

This BMP has been satisfied with the establishment of the stormwater pollution prevention hotline. It will continue to be advertised to the public and operate via the web and phone.

(h) 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	
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09-10 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.

In addition the City has begun to draft 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.

The City is finalizing coordination and documentation efforts with New Hanover County Health Dept. for addressing failed septic systems.

10-11 Proposed Objectives

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

The City is anticipating concluding coordination efforts with New Hanover County for reporting and documentation of failed septic systems with the City's jurisdiction area.

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.

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
(a) 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			

09-10 Accomplishments

A stormwater ordinance drafting team was formed which included the City Stormwater Services Manager, Environmental and Long Range Planners, a Plan Review Engineer, a Staff Engineer, a Stormwater Specialist, an Outreach & Education Coordinator and a Code Enforcement officer.

The team completed drafting two ordinances:

- The first ordinance amended the City's 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.
- The second ordinance amended the City's Utility Code to include a new pet waste ordinance, an ordinance prohibiting placing debris in the drainage system, and a new illicit discharge detection and illumination code. Civil penalties were stipulated.

The drafting process was delayed for a considerable length of time while the Coastal Stormwater rules were being debated, and subsequently went through the legislative process and an extension to the permit deadline was granted by DWQ. Both ordinances went through an extensive public input and stakeholder review process. They were reviewed and approved by DWQ in July, 2009. The City Planning Commission voted unanimously to recommend their approval on August 5, 2009, and City Council adopted them on September 15, 2009 with a November 1, 2009 effective date.

10-11 Proposed Objectives

Continue to implement the two newly amended ordinances.

(b) 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			
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09-10 Accomplishments

The newly amended stormwater ordinance 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, permittees 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.

10-11 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 the State how our compliance inspections are conducted in order to determine the information that would be relevant to them when reviewing our program.

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.

(c) Establish nutrient sensitive waters (NSW) protection measures (for programs with	Develop, adopt, and implement an ordinance (or similar regulatory mechanism) to ensure that the best management practices reduce nutrient		X			
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development or redevelopment draining to NSW waters)	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.					
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09-10 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.

10-11 Proposed Objectives

Staff will continue to track this issue through NCDWQ.

(d) 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			
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09-10 Accomplishments

The City established a domestic animal waste ordinance as part of ordinance revision process.

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.

10-11 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.

(e) City Code, Permitting Regulations, Easement, and/or Deed Restrictions and Protective Covenants	Ensure development activities will maintain the project consistent with approved plans.		X			
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09-10 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.

10-11 Proposed Objectives

Continue to implement new Land Development Ordinance and its requirements.

(f) 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
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09-10 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.

10-11 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 continue to put together all O&M plans, permit renewal dates and any other relevant information regarding City owned BMPs for review by the appropriate personnel.

(g) 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. 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).		X			
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09-10 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.

10-11 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
(a) 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			

09-10 Accomplishments

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.

The City began developing SOPs for maintenance activities for stormwater municipal operations. City stormwater crews were assigned maintenance activities to be written for their respective predetermined groups. These groups met on several occasions with the purpose of determining the tasks required to complete a maintenance activity. To date, stormwater crews have finished 12 of 23 SOPs. The crews will be meeting again to finish the remaining SOPs in the spring of 2010.

10-11 Proposed Objectives

Complete in summer of 2010 the compilation of DWQ permit information for the O&M manual for BMP field crew use.

Finish writing remaining SOPs (Spring 2010) for stormwater maintenance activities and begin to implement these procedures with field crews.

(b) 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		
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09-10 Accomplishments

The City currently holds one Stormwater Pollution Prevention plan (SP3) for one of its municipal facilities to address the above goal:

- Wilmington Transit Authority -NPDES General Permit NCG080000 (date of issuance 7/13/03)

The City is currently undertaking the necessary actions to transfer the permit responsibility to the Cape Fear Public Transportation Authority (formerly Wilmington Transit Authority). A *Permit Name/Ownership Change Form* was submitted to the State in March 2010.

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 is currently undertaking the necessary requirements to obtain a NPDES General Permit for this site.

The City finalized two SPCC plans for its Operations Complex and Police Headquarters.

10-11 Proposed Objectives

Implement the SPCC plans for the Operations Complex and Police Headquarters.

The City will have to pursue a new NPDES General Permit for the Fleet Management building located at the Operations Complex. The SIC code, prior to this, for the facility was reported erroneously by a previous consultant doing work for the SPCC plans on the Operations Complex. Therefore, the City was advised that a SPPP for the site was not necessary. The State DWQ Wilmington Office has corrected the SIC code for the site and the City will be submitting the necessary paperwork to rectify this oversight and completing a SPPP for the Fleet Management building. The City hopes to complete this July of 2010.

(c) 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	
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09-10 Accomplishments

The newly implemented SPCC for the Operations Complex and the Police Headquarters will address this BMP. The plans are reviewed each year and updated as necessary with regard to any changes to the existing plan.

10-11 Proposed Objectives

Upon the review of a private consultant hired by the City, the Fleet Management site may be required to implement an SPPP plan in addition to the SP3 required for the Operations Complex.

Continue monitoring City operated sites for compliance with existing SP3 and SPCC plan. Update as needed.

(d) Conduct staff training	Conduct staff training specific for pollution prevention and good housekeeping procedures.		X			
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09-10 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).

10-11 Proposed Objectives

The City has 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 CFPUA staff.

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

(e) 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 follow-up actions at the facilities.			X	X	X
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09-10 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.

10-11 Proposed Objectives

The City will address this measure in the event anything changes.

(f) 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			
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09-10 Accomplishments

The City’s Operations Complex and the Police Headquarters each required an SPCC plan as recommended by our hired consultant. The City finalized the two plans in late 2009 and will begin implementing them in 2010. Each plan addresses spill response procedures for each site.

In addition the City may be required to implement a SPPP for the Fleet Management site as a result of a NPDES General Permit that the City will be pursuing.

10-11 Proposed Objectives

The City will be hiring a consultant to make recommendations regarding a SPPP for the Fleet Operations site in 2010.

The City will conduct employee training for those involved with the newly implemented SPCC and SPPP for the Operations Center in 2010. The City will follow through on plans for each site with appropriate staff and their related to duties outlined in plans.

<p>(g) Prevent or Minimize Contamination of Stormwater Runoff from all areas used for Vehicle and Equipment Cleaning</p>	<p>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 source discharges of the washwater into the storm drains or surface waters.</p> <p>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.</p> <p>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.</p>		X			
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10-11 Accomplishments

Maintenance and cleaning conducted at the City’s Operations complex, which was completed in 2006, 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, compactors, 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.

10-11 Proposed Objectives

Continue monitoring each respective SP3 and SPCC plan for compliance. Update as needed. Conduct employee training for Fleet Management staff on Pollution Prevention /Good Housekeeping requirements under new SPPP.

SECTION H: THREATENED OR ENDANGERED SPECIES

1. 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.
2. 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.
3. 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.

09-10 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.

Informational bookmarks and brochures were distributed at speaking engagements and community events such as Earth Day and homeowners association presentations.

Stormwater Services partnered with Cape Fear River Watch and New Hanover Soil & Water Conservation District to include information about the sturgeon on their respective websites: <http://cfrw.us/restore.html> and <http://nhswcd.org/education.html>.

A video featuring the Shortnose Sturgeon was posted on the City's newly revamped website. This video also continues to air on GTV-8, the city's cable access channel.

A Wilmington Star News article on 2/7/2010 mentioned the Shortnose Sturgeon and that the "Wilmington Harbor project is in violation of the Endangered Species Act for threatening the existence of the endangered shortnose sturgeon". The article highlighted the stimulus funds that were allocated to the Army Corps to install a fish bypass in the Cape Fear River.

In addition, information about the Shortnose Sturgeon was included in 8th grade Enviroscope presentations to eighth graders in New Hanover County Schools

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.

10-11 Proposed Objectives

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

APPENDIX

APPENDIX A - PUBLIC EDUCATION AND OUTREACH

APPENDIX B - PUBLIC INVOLVEMENT & PARTICIPATION

APPENDIX C - ILLICIT DISCHARGE DETECTION & ELIMINATION

APPENDIX D - CONSTRUCTION SITE RUNOFF CONTROL

APPENDIX E - POST-CONSTRUCTION SITE RUNOFF CONTROLS

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

APPENDIX G - THREATENED & ENDANGERED SPECIES

APPENDIX H – ENFORCEMENT ACTIONS

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
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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					
9/1/2009	City of Wilmington Stormwater Services Webpages	General public; website viewers	Stormwater staff	Created new Stormwater Services webpages for City website re-design and launch	Created all new pages, all content, files, documents, and images for the Stormwater Services website
Fall 2009	City of Wilmington Stormwater Services Webpages	General public; website viewers	Stormwater staff	Added feature news article	Added article and pertinent links to new city stormwater ordinances and fines
Ongoing/ Monthly	City of Wilmington Stormwater Services webpages	General public; website viewers	Stormwater staff	Update website with stormwater news & events, and other pertinent content	Updated: News & Events NPDES Publications & Reports Newsletters Capital Projects Watershed Boundaries Citizen's Guide

BMP(d) Develop & Distribute Public Education Materials to Identified User Groups					
In addition to public outreach efforts in this category, the Compliance/Code Enforcement Officer distributes materials to targeted user groups (i.e. pet owners, auto shops, etc). Code enforcement also distributes information 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 section.					
3/3/09	Targeted Direct Mail	Property Managers	Stormwater staff	Direct mailing to property managers	Offering our Stormwater 101 presentation
4/8/09	Targeted Direct Mail	Princess, Kenwood, 26th, and Chestnut	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
5/15/09	Targeted Direct Mail	1200 block of Princess Place	Stormwater staff	Doorhanger for citizen/businesses	Notification of drainage improvement project with stormwater pollution tips
7/1/09	Targeted Direct Mail	Wisteria, Dogwood Lane	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
9/1/09	Targeted Direct Distribution	Costco (Business)	Stormwater staff	Business requested stormwater education materials for their Green/Environmental Day.	Provided 75 Waste Disposal , Pet Waste, and Homeowners Brochures and magnets and pens for Costco environmental event.
9/12/09	Targeted Direct Presentation	American Association of University Women (AAUW)	Stormwater staff	Powerpoint presentation and talk to civic group	Distributed NC CCAP and stormwater education information to 40 attendees
Fall 2009	Targeted Direct Mail	All veterinarians in the County, pet professionals, pet stores, pet sitters, etc.	Stormwater staff	Pet waste letter and large format poster mailed to all veterinarians in county	Inform veterinarians of the City's new pet waste ordinance and fines, and request to pass on info on to clientele
Fall 2009	Targeted Direct Mail	Landscaping companies, large property management companies	Stormwater staff	Yard care practices letter and large format poster mailed to landscapers in county	Inform landscapers of the City's new yard waste ordinance and fines. Offer BMPs for proper yard waste disposal
Fall 2009	Targeted Direct Mail	Restaurants	Stormwater staff	Illicit discharge poster for restaurants; delivered to clients during downtown restaurant association meeting & throughout the year	Inform restaurants of improper practices that affect water quality and the drainage system. Inform managers about fines.
Fall 2009	Targeted Direct Distribution	Pet professionals, landscapers, restaurants, businesses	Stormwater staff Code Enforcement	Developed letter for pet waste, yard waste, and illicit discharge	Letter accompanied poster distribution
11/20/09	Targeted Distribution - all employee email	City employees	Stormwater staff	Emailed information to all employees about new stormwater ordinances	Direct email to employees

BMP(e) Media Campaign					
Mar - June 2009	TV - WECT-6	TV viewers ages 35-65 in Wilmington	State Stormwater TV Spot featuring Johnny Fishpatrick	:30 second stormwater PSA on network TV 39 spots total	<u>Target Audience:</u> General public <u>Reach:</u> 86.5% for viewers age 25-64 <u>Frequency:</u> 3.7 <u>Total cost:</u> \$5515
Mar - June 2009	Radio - Cumulus Broadcasting/WGN I	Landscapers, homeowners, pet owners, general public	Yard Waste & Pet Waste :30-second PSAs	Two :30 second stormwater PSAs on broadcast radio stations 120 ads total: (60 purchased, 60 free)	<u>Target Audience:</u> Yard caregivers, pet owners, general public <u>Reach:</u> 87,100 adults <u>Frequency:</u> 4.0 <u>Total cost:</u> \$4875
Summer 2009	Going Green Magazine	General public, adults,	Stormwater 101: The Basics of Stormwater	Article series (#1)	<u>Target Audience:</u> Adults/general public Environmental groups <u>Reach & Frequency:</u> 6000 printed, also available online <u>Total cost:</u> Free
Dec-Jan 2010	Mayfaire 16 Theatres	Moviegoers	Stormwater Public Service Announcement	30-second animated stormwater ad	<u>Target Audience:</u> General public <u>Reach & Frequency:</u> Shown in 560 movies per week reaching an average of 18,000 people per week for 6 weeks <u>Total cost:</u> 31 cents per ad
Fall 2009	Going Green Magazine	General public, adults,	Stormwater 101: What is a Watershed?	Article series (#2)	<u>Target Audience:</u> Adults/general public Environmental groups <u>Reach & Frequency:</u> 6000 printed, also available online <u>Total cost:</u> Free
Jan - Feb 2010	Cumulus Broadcasting (97.3 & 94.5)	Pet owners, homeowners, landscapers, yard maintenance personnel	Pet Waste & Yard Waste :30 second PSAs	Two :30 second PSAs on broadcast radio stations 200 ads total: 100 purchased, 100 free	<u>Target Audience:</u> Landscapers, Pet owners, General public <u>Reach:</u> 81,500 adults <u>Frequency:</u> 2.7 times <u>Total cost:</u> \$875
Jan-Feb 2010	TV - WECT-6	TV viewers ages 35-65 in Wilmington	State Stormwater TV Spot featuring Johnny Fishpatrick	:30 second stormwater PSA on broadcast TV 25 spots total	<u>Target Audience:</u> General public <u>Reach:</u> 89% for viewers age 25-64 <u>Frequency:</u> 3.3 <u>Total cost:</u> \$1655
Ongoing	City GTV-8 and City website	GTV-8 cable access TV viewers	Stormwater Pollution Messages	Educational PSAs, documentaries, narrated slide shows. Several different PSAs airing concurrently or alternating	<u>Target Audience:</u> General public <u>Reach & Frequency:</u> varies due to government programming <u>Total cost:</u> 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 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.

BMP(g) Establish Public Outreach & Education Program & Implement Within 12 Months.*Newspaper Articles, Press Releases, or Paid Advertisements*

3/5/09	Lumina News	General public	No discharge zone sought by city council	News article	No discharge zone for Intracoastal Waterway sought to reduce fecal coliform pollution
3/10/09	Star News	General public	New city street sweeper garage to showcase green technology	News article	New street sweeper facility
3/20/09	Star News	General public	Every bit of green makes a difference	News article	Editorial
4/9/09	Star News	General public	Cartoon about pet waste violations	News article	Cartoon
4/17/09	Lumina News	General public	Pet fines stiffen	News article	New Wrightsville Beach pet penalties
4/17/09	Lumina News	General public	Cartoon about pet fines	News article	Cartoon
4/22/09	Star News	General public	Human fecal contamination stymies water cleanup	News article	Stormwater runoff problems in local creeks as documented by UNCW research
4/28/09	Star News	General public	Wrightsville Beach puts more bite in dog regulations	News article	New fines for pet penalties at Wrightsville Beach
4/28/09	Star News	General public	UNCW tests find high levels of fecal bacteria around Wrightsville Beach	News article	High fecal coliform counts at the beach
4/29/09	Star News	General public	Debating dog days at the beach	News article	Editorial
5/19/09	Star News	General public, creek residents	Riverkeeper Doug Springer works to preserve Cape Fear River	News article	About Cape Fear River Watch staff
5/14/09	Lumina News	General public	Water quality issues explored at workshop	News article	Information about the Coastal Growth Strategies training for elected officials
5/7/09	Star News	General public	Swap shower heads to save water, money	News article	Mentioned we would be selling rain barrels at the event
5/5/09	Star News	General public	Critters: You are the solution to pollution?	News article	Editorial
7/7/09	Star News	General public	Residents find mulch and water stains at flooded homes	News article	Coverage of the flooding near UNCW

8/1/09	Star News	General public	Rain Barrel Sale	News blurb	Monthly rain barrel sale mentioned in gardening article
8/18/09	Star News	General public	Another Monday, another deluge	News article	Flooding after storms in Wilmington
9/10/09	Star News	General public	Lack of fish bypass could hurt other Cape Fear River projects	News article	Mentions shortnose sturgeon as reason for needing fish ladders
9/16/2009	Star News	General public	Stormwater regulations approved in Wilmington, will take effect Nov. 1	News article	New stormwater ordinance regulations
9/17/09	Lumina News	General public	Wilmington meets state permit requirements	News article	City meets requirements for NPDES by passing new stormwater regs
9/21/09	Star News	General public	Who handles yard waste disposal in NHC?	My Reporter question	How to properly dispose of yard waste in NHC
10/1/09	Star News	General public	My Reporter inquiry - With new pet waste law, does the city plan to add more waste receptacles and waste bags around Greenfield Lake?	My Reporter question	Question asked after new city pet waste ordinance was implemented
10/16/09	Star News	General public	Newspaper article - Poop Patrol! Doggie Deposits Flagged in City Clean Water Push	News article	Highlighted the Halyburton Park pet waste project
10/21/09	Star News	General public	Letter to the Editor #1 - Poop Patrol?	News article	Letter about Poop Patrol article
10/21/09	Star News	General public	Letter to the Editor #2 - Poop Patrol?	News article	Letter about Poop Patrol article
10/22/09	Star News	General public	My Reporter inquiry - What is the new pooper scooper law in Wilmington?	News article	Question asked after new city pet waste ordinance was implemented
11/2/09	Greater Wilmington Business Journal	General public	Publication article - Residents face fines for dirty drains Nov. 1st	News article	Question asked after new city pet waste ordinance was implemented
2/2/10	Star News	General public	Newspaper article - Wilmington opens pollution hotline	News article	Highlighted Wilmington's new stormwater ordinances
2/16/10	Star News	General public	Newspaper article - Fish bypass in Cape Fear River to cost \$12 million	News article	Mentioned Shortnose Sturgeon needing bypass
2/19/2010	Star News	General public	My Reporter inquiry - Are there plans to dredge Burnt Mill Creek?	My Reporter question	Citizen question about dredging BMC

4/20/09	Press release; news advisory	General public, homebuilders, environmental groups, etc.	Public Information Office staff	Distributed to local mass media news outlets	Public meeting announcement for stormwater ordinance revision update
8/21/09	Press release - news advisory	General public	Public Information Office staff	Distributed to local mass media news outlets	City opens first "green" (street sweeper) building
9/22/09	Press release - news advisory	General public, homebuilders, environmental groups, etc.	Public Information Office staff	Distributed to local mass media news outlets and to special interest groups	Public notice about new stormwater ordinances and penalties adopted by City Council
10/23/2009	Press release - news advisory	General public, residents near drainage project	Public Information Office staff	Distributed to local mass media news outlets	City completes Dupree Drive drainage project
2/1/2010	Press release - news advisory	General public, area businesses and industry	Public Information Office staff	Distributed to local mass media news outlets	New hotline to help prevent stormwater pollution

Targeted Direct Mail

3/3/09	Targeted Direct Mail	Property Managers	Stormwater staff	Direct mailing to property managers	Offering our Stormwater 101 presentation
4/8/09	Targeted Direct Mail	Princess, Kenwood, 26th, and Chestnut	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
5/15/09	Targeted Direct Mail	1200 block of Princess Place	Stormwater staff	Doorhanger for citizen/businesses	Notification of drainage improvement project with stormwater pollution tips
7/1/09	Targeted Direct Mail	Wisteria, Dogwood Lane	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
Fall 2009	Targeted Direct Mail	All veterinarians in the County, pet professionals, pet stores, petsitters, etc.	Stormwater staff	Pet waste letter and large format poster mailed to all veterinarians in county	Inform veterinarians of the City's new pet waste ordinance and fines, and request to pass on info on to clientele
Fall 2009	Targeted Direct Mail	Landscaping companies, large property management companies	Stormwater staff	Yard care practices letter and large format poster mailed to landscapers in county	Inform landscapers of the City's new yard waste ordinance and fines. Offer BMPs for proper yard waste disposal
Fall 2009	Targeted Direct Mail	Restaurants	Stormwater staff	Illicit discharge poster for restaurants; delivered to clients during downtown restaurant association meeting & throughout the year	Inform restaurants of improper practices that affect water quality and the drainage system. Inform managers about fines.

Displays at Point of Purchase

Fall 2009	All veterinarians in New Hanover County	Pet Owners; veterinarians	Stormwater staff Code enforcement staff	Display pet waste ordinance poster at veterinarian offices in New Hanover County	Educate pet professionals and pet owners about new city pet waste ordinance
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Utility Bill Inserts

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

Public Meetings

3/5/2009	Coastal Carolina Tomorrow	Stakeholder group	Planning staff	Stakeholder meeting about stormwater ordinance	Review stormwater ordinance draft
4/30/2009	Public Meeting in city council chambers	General public, businesses, developers, HOAs	Stormwater staff Planning staff	Public meeting including staff presentation for ordinance update with oral and written public input	Public opportunity to review draft stormwater ordinance revision; gather additional input/concerns
5/5/2009	Business Alliance for a Sound Economy (BASE)	2 (GADs)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
5/14/2009	Coastal Carolina Tomorrow	5 (GAD, engineers, lawyer, members)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
6/18/2009	Coastal Carolina Tomorrow	20+ members	Planning staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
7/29/2009	Business Alliance for a Sound Economy (BASE)	2 (Government Affairs Directors - GAD)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
7/31/2009	Wilmington Regional Association of Realtors	1 (GAD)	Planning staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
8/5/2009	Coastal Carolina Tomorrow	4-5 (GAD plus engineers, lawyer, landscape architect)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
9/1/2009	City Council Meeting	City Council, General public, Development groups	Planning staff Stormwater staff	Public hearing at City Council meeting	Consideration/adoption of new stormwater ordinances

Community Events

4/18/09	Lower Cape Fear Earth Day Celebration at Hugh MacCrae 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
8/20/09	Street Sweeper Building Dedication	Media, Council, environmental groups	Stormwater staff	Dedication ceremony	City opens new "green" street sweeper facility
8/25/09	Pooch Plunge	Pet owners	Stormwater staff	Interactive event with pet owners to have them sign pledge to be Clean Water Canines	Pet owners sign pledge and dogs receive bandana and chance to be featured on city website

Ongoing	Monthly Rain Barrel Sales	General public	Stormwater staff NHSWCD	Monthly rain barrel sale to the general public; held 2nd Thursday of each month	Stormwater runoff collection and education
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Contest

N/A					
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Storm Drain Marking

Ongoing	Campaign to place storm drain markers and educational doorhangers throughout the City	City residents, businesses, landscapers	Stormwater staff Code enforcement staff Stormwater interns	Stormwater awareness and pollution prevention	Staff removed deteriorated plastic markers and began replacing them with stainless steel storm drain markers throughout the city
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Stream & Litter Clean-ups

3/1/2009-2/28/2009	8 watershed clean-up event, including annual Big Sweep event	Volunteers	Cape Fear River Watch	Watershed clean-up and/or Invasive species removal	<u># of clean-ups and/or invasives removal:</u> 8 <u>Watersheds:</u> Greenfield Lake, Smith Creek, Cape Fear River. <u>Total # of volunteers:</u> 134 <u>Total # of volunteer hours:</u> 454 <u>Total # of bags of trash collected:</u> 247 bags <u>Total # of bags of invasive plants removed:</u> 45 bags
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Group Presentations, Speeches

4/20/09	Wade Wetland	Adventure Pathways Senior Hiking Club	Stormwater staff	Presentation about wetland and history of installation	Educate hiking club participants; short hike around wetland to discuss water features
9/3/09	CFPUA	Field Staff	Beth Nunnally, Code Enforcement	Illicit Discharge Powerpoint presentation	Educated field staff to detect illicit discharges
9/12/09	Northeast Public Library	American Association of University Women	Stormwater staff	Stormwater 101 Powerpoint Presentation	40 women in attendance
12/1/09	EOC Training Room	City stormwater crews	Cape Fear River Watch trainers Stormwater staff	Illicit Discharge Detection & Elimination training for staff via powerpoint presentation and discussion	20 staff in attendance
1/5/10	EOC Training Room	City stormwater crews	Cape Fear River Watch trainers Stormwater staff	Illicit Discharge Detection & Elimination training for staff via powerpoint presentation and discussion	20 staff in attendance

News Coverage

4/9/08	WWAY-TV3	General public, creek residents	Steps being taken to keep animal waste from polluting our waterways	News coverage	Animal waste control efforts at Wrightsville Beach
7/7/09	WECT	General public	Flooding on Racine/New Centre	News coverage	Coverage of the flooding near UNCW
8/25/09	City Website News Rotator	General public	Legion pool goes to the dogs	News article	Info about Canines for Clean Water at the Pooch Plunge event
11/2/09	WECT TV 6	General public	Gavin Johnson	News segment - Wilmington pet owners can clean up or pay up	TV news story highlighting new City stormwater ordinances
2/2/10	WECT TV 6	General public	Scott Saxton	News segment - Wilmington opens stormwater pollution hotline	Highlighted new stormwater ordinances

Workshops and Classroom Outreach

Feb 2009-February 2010	All New Hanover County Middle Schools	8th grade science classes	Stormwater Services, NHSWCD, CFRW	Enviroscape Presentations	65 presentations given to approximately 2000 eighth grade students
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Distributing promos/giveaways

5/1/09	WGNI & WAAV Beach Bag & Cooler Giveaways	Radio listeners	Cumulus/102.7 FM radio staff	500 stormwater education magnets distributed	Media partnership
9/1/09	Targeted Direct Distribution	Costco (Business)	Stormwater staff	Business requested stormwater education materials for their Green/Environmental Day.	Gave 75 Think , Pet Waste, and Homeowners Brochures and magnets and pens.
9/12/09	Northeast New Hanover Library	American Association of University Women (AAUW)	Stormwater staff	Powerpoint presentation with Q&A period	Distributed stormwater education materials & NC CCAP information to 40 attendees
Ongoing	Public meetings, displays, city buildings, Dog Jog	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

4/18/09	Lower Cape Fear Earth Day Celebration at Hugh MacCrae Park	Festival attendees, general public	Stormwater staff (SWS is an annual sponsor of Earth Day)	Display booth to promote Stormwater Pollution Prevention	Stormwater information & giveaways distributed. 4,000+ attendees
Fall 2009	New stormwater ordinance education	Pet owners, pet industry professionals, general public	Pet waste poster	Large format poster developed in InDesign	Distributed to pet owners, veterinarians, pet stores, pet sitters, etc.
Fall 2009	New stormwater ordinance education	Landscapers, homeowners	Yard debris poster	Large format poster developed in InDesign	Distributed to landscapers, homeowners, etc.
Fall 2009	New stormwater ordinance education	Restaurants	Restaurant/Illicit discharge poster	Large format poster developed in InDesign	Distributed to restaurants, local restaurant association, etc.
Winter 2009	New stormwater ordinance education	Pet owners, pet industry professionals, general public	Pet waste station signage	Ordinance sign with rules and fines	Placed on 46 pet waste stations in city parks

Local Cable Access

Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	Stormwater staff GTV-8 Staff	Stormwater ordinance - public meeting announcement slides	Notification on GTV of upcoming public meeting
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 new ordinance rules and fines	Inform public of new 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 new ordinance rules and fines	Inform public of new 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 new ordinance rules and fines	Inform public of new 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 new 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	7 part documentary series 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	Narrated slide show	Shortnose Sturgeon - federally listed endangered fish species
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	:30 second PSA	Ashtray/Litter PSA
Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	Stormwater staff GTV-8 Staff	30 minute documentary	Best Management Practices
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 PSA
Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	Stormwater staff GTV-8 Staff	:30 second PSA	Pet Waste PSA UNCW pigs
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
Airs on rotating schedule	GTV-8 City's cable access channel	Cable access TV viewers	Stormwater staff GTV-8 Staff	Narrated slide show	Yard Waste video

Newsletters

Spring 09	Citywide Public Information Report	City residents Public library Special events	Stormwater staff PIO Staff	40,000+ distributed	UNCW Water Quality Report What is Stormwater? New "Green" Street Sweeper Building
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Citizen Contacts

Ongoing	Stormwater Office via phone or email	Citizen	Stormwater staff	Email or phone responses to requests for information, literature, etc.	33 contacts recorded. Information provided for specific nature of contact
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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 18 Weekly Updates
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Stormwater Staff Training

12/1/09	EOC Training Room	City stormwater crews	Cape Fear River Watch trainers Stormwater staff	Illicit Discharge Detection & Elimination training for staff via powerpoint presentation and discussion	20 staff in attendance
1/5/10	EOC Training Room	City stormwater crews	Cape Fear River Watch trainers Stormwater staff	Illicit Discharge Detection & Elimination training for staff via powerpoint presentation and discussion	20 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.

<u>Target Pollutant</u>	<u>Pollutant Source</u>	<u>Target Audience(s)</u>
Bacteria, viruses, parasites, and nutrients	Pet Waste (Education regarding sanitary sewer overflows is conducted by CFPUA)	-Pet owners -Pet industry professionals -General public
Nutrients such as nitrogen and phosphorous	Fertilizer	-Homeowners/residents -Landscape/Turf Maintenance Professionals -General public
Toxic chemicals including herbicides, fungicides, and insecticides	Pesticides	-Homeowners/residents -Landscapers -Pest Control Applicators -General public
Organic materials including leaves, grass clippings, pine straw, sticks, limbs, and other yard trimmings	Yard Waste/Debris	-Homeowners/residents -Landscape/Turf Maintenance Professionals -General public
Sand, dirt, gravel, clay, soil, etc.	Sediment	-Homeowners/residents -Businesses -Construction/developers -Landscape/Turf Maintenance Professionals -General public
Plastics, paper, cigarette butts, etc.	Litter	-Smokers -Youth -General public
Motor oil, antifreeze, grease, gas, and other vehicle fluids	Auto Fluids	-Do-it-yourself oil changers -Vehicle owners -Vehicle maintenance & repair shops -General public
Phosphorous, soaps, grime	Car Washing Soaps	-Homeowners/residents -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 $\frac{3}{4}$ 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 *Toxoplasma 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*):

1. 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."

2. 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

3. 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.

1. Homeowners

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”).

2. 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

1. 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.

2. 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 stories 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. Responses to the survey were broken down by education level, with the largest percentages as 'High School Graduates' and 'Some College' (Bartlett, C-21).

1. Lawn Maintenance and Landscape Industry Professionals

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.

2. Homeowners

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: Sand, dirt, gravel, clay, soil

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.

1. 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.

2. 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:

1. General, Encompassing Audience

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.

2. 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.

3. 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

1. 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).

2. 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.

3. 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 Soap

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

1. Homeowners/Do-it-Yourself Car Washers

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.

2. Do-it-Yourself Boat Washers

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.

3. Businesses Related to Home, Car, and Boat Cleaning

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

4. 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
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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					
3/5/2009	Coastal Carolina Tomorrow	Stakeholder group	Planning staff	Stakeholder meeting about stormwater ordinance	20+
4/30/2009	Public Meeting in city council chambers	General public, businesses, developers, HOAs	Stormwater staff Planning staff	Public meeting including staff presentation for ordinance update with oral and written public input	Public opportunity to review draft stormwater ordinance revision; gather additional input/concerns
5/5/2009	Business Alliance for a Sound Economy (BASE)	2 (GADs)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
5/14/2009	Coastal Carolina Tomorrow	~5 (GAD, engineers, lawyer, members)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
6/18/2009	Coastal Carolina Tomorrow	20+	Planning staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
7/29/2009	Business Alliance for a Sound Economy (BASE)	2 (Government Affairs Directors - GAD)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
7/31/2009	Wilmington Regional Association of Realtors	1 (GAD)	Planning staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance

8/5/2009	Coastal Carolina Tomorrow	4-5 (GAD plus engineers, lawyer, landscape architect)	Planning staff Stormwater staff Engineering staff	Stakeholder meeting about stormwater ordinance	Updating stakeholder groups about stormwater ordinance
9/1/2009	City Council Meeting	City Council, General public, Development groups	Planning staff Stormwater staff	Public hearing at City Council meeting	Consideration/adoption of new stormwater ordinances

BMP(c) Organize a Volunteer Community Involvement Program					
<p>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 specified deliverables that enable the City to meet many 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:</p>					
<p>CFRW - implement creek/watershed cleanups, monitor/maintain/provide public education for Kerr Avenue Wetland, coordinate workshops for City personnel, provide educational programs for City residents (i.e. Saturday seminars, Greenfield Lake eco-tours, presentations for civic groups, etc.), 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, conduct a volunteer watershed monitoring program and report on problem areas in watersheds, participate and provide assistance for public meetings, hearings, and additional outreach conducted by Stormwater Services, provide quarterly reports for all deliverables.</p>					
<p>NHSWCD - conduct Enviroscape presentations for 8th grade science classes, 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 promote outstanding environmental stewardship and implement yearly banquet, promote LID education, administer statewide CCAP program in area watersheds, 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 field days and teacher workshops, develop an outdoor BMP demonstration site at a local elementary school, expand NHSWCD website to include additional stormwater info, and conduct watershed-based community outreach.</p>					

[Visit the Appendix to review the contracts and accomplished deliverables of each organization.](#)

BMP(d) Establish a Mechanism for Public Involvement					
4/30/2009	Stormwater ordinance public information meeting	General public, citizens, businesses	Stormwater and planning staff	Public information meeting	Public opportunity to review draft stormwater ordinance revision
9/26/09	Big Sweep Nationwide Cleanup	Greenfield Lake & Area Beaches	Volunteers	Streambank, shoreline, inlet streams, and canoe cleanup of Greenfield Lake	72 volunteers contributed a total of 216 hours. Collected 20 bags of trash; approximately 600 lbs and 60+ bags of invasive plants removed.
9/1/2009	City Council Meeting	City Council, General public, Development groups	Planning staff Stormwater staff	Public hearing at City Council meeting	Consideration of new stormwater ordinance; public hearing (stormwater ordinances adopted on consent agenda at 9/15/09 meeting)

9/3/09	CFPUA	Field Staff	Beth Nunnally, Code Enforcement	Illicit Discharge Power point presentation	Trained field staff of CFPUA to detect illicit discharges
9/12/09	Northeast New Hanover Library	American Association of University Women (AAUW)	Stormwater staff	Powerpoint presentation with Q&A period	Distributed NC CCAP and stormwater education information to 40 attendees
9/17/2009	New Hanover Coop Extension Office	Property owners affected by drainage project on Cavalier Drive	Stormwater staff	Direct contact meeting	Approximately 20 people
11/16/2009	Bradley Creek Elementary School	Property owners affected by drainage project on Michele Drive and vicinity	Stormwater staff	Direct contact meeting	Approximately 25 people
4/28/2009	Bradley Creek Elementary School	Property owners affected by drainage project in the Wisteria Lane/Clearbrook Drive area.	Stormwater staff	Direct contact meeting	Approximately 50 people
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
3/1/2009-2/28/2009	Riverine Watershed Clean-ups	Volunteers	Cape Fear River Watch	Watershed cleanup and/or Invasive species removal event	<u># of clean-ups and/or invasives removal:</u> 8 <u>Watersheds:</u> Greenfield Lake, Smith Creek, Cape Fear River. <u>Total # of volunteers:</u> 134 <u>Total # of volunteer hours:</u> 454 <u>Total # of bags of trash collected:</u> 247 bags <u>Total # of bags of invasive plants removed:</u> 45 bags

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 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.



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

RE: Annual Request Letter, FY 09/10

February 20, 2009

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 09/10. 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 2009- 2010 will build on the significant progress made over the last three years.

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

CFRW's contributions to the city's NPDES goals during the 2007-2008 included:

- 9 clean-ups completed by 225 volunteers who removed over 6 Tons of trash from Wilmington watersheds. This is a 46% growth in volunteers and a 100% growth in trash removed compared to 06-07.
- 125 outreach and educational programs that served 494 adults and 872 students.

At this point, CFRW is on track to duplicate and improve on all 2007-2008 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,

Jane Hartley, President



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

Annual Service Contract: July 1, 2009 - June 30, 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, 2009** through **June 30, 2010** 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.

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.

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, 2009. 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. 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.

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. 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.

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.

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

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, 2008; October 1 - Dec. 31, 2008; January 1 - March 31, 2009; April 1 - June 30, 2009. 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.



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

Quarterly Progress Report #2: October 1 – December 31, 2009

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, 2008** through **June 30, 2009** 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, 2009

Creek/Watershed Clean-ups				
Date	Watershed	Area Cleaned	Volunteers/Hours	Trash Collected
Sept. 26, 09	Greenfield Lake	Shoreline from water and land	72/ 216 hrs	20 bags/600 lbs. 60+ bags of invasive plants

October 1 – December 31, 2009

Creek/Watershed Clean-ups				
Date	Watershed	Area Cleaned	Volunteers/Hours	Trash Collected
Oct. 25, 09	Cape Fear River	Island 13 shoreline from water and land, accessible interior areas	74/ 292 hrs	120 bags/2800 lbs 1000 lbs recycled
Nov 4, 09	Greenfield Lake	Medical Center Drive drainage	10/ 40 hrs	10 bags/ 300 lbs
Nov 14, 09	Smith Creek	Evans St. between Hurst and Gaston	8/ 24 hrs	46 bags/ 1500 lbs.
Nov 17, 09	Greenfield Lake	Shoreline from water and land	2/ 6 hrs	15 bags of invasive plants
Nov 19, 09	Greenfield Lake	Shoreline from water and land	3/ 6 hrs	20 bags of invasive plants
Nov 20, 09	Greenfield Lake	Shoreline from water and land	2/ 4 hrs	10 bags of invasive plants

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, 2009

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

October 1 – December 31 2009

Monitoring Reports for October and November were completed and submitted.

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, 2009. Target workshop dates will be November and/or April.

October 1 – December 31, 2009

City of Wilmington Personnel Workshops			
Date	Topic	Attendance	Comments
Dec. 2, 09	Illicit Discharge	20	

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, 2009

First Saturday Seminars			
Date	Organization	Topic	Attendance
Sept. 5, 09	CFRW, Joe Abatte	Invasive Plants of Greenfield Lake	42
Greenfield Lake School Field Trips			
June 29, 09	Girls, Inc.	Eco-education tour	17/ 5 th graders
July 7, 09	Pender County	Eco-education tour	12/4 th graders
July 10. 09	Surf Camp	Eco-education stations	10/8 & 9 year olds

July 17, 09	Surf Camp	Eco-education stations	10/ 8 & 9 year olds
July 24, 09	Surf Camp	Eco-education stations	10/ 8 & 9 year olds
July 31, 09	Surf Camp	Eco-education station s	10/ 8 & 9 year olds
July 31, 09	New Hanover County	Eco-education stations	8/ 3 rd graders
Aug 7, 09	Surf Camp	Eco-education stations	10/ 8 & 9 year olds
Aug 14, 09	Surf Camp	Eco-education stations	10/ 8 & 9 year olds
Sept 23, 09	Friends School	Eco-education stations	35/ 5 th graders
Sept 25, 09	Calvary School	Eco-education stations	18 / 6 th graders
Other Presentations by CFRW Staff			
Aug 8, 09	Power Squadron	Introduction to the Northeast Cape Fear	30

July: 4 eco-tours for 16 people, August: 8 eco-tours for 20 people

October 1 – December 31, 2009

First Saturday Seminars			
Date	Organization	Topic	Attendance
Oct. 3, 09	Beverly Tetterton	History of Wilmington waterfront	30
Nov.7, 09	Chris Tryon	Kayak Fishing	15
Dec.5, 09	Chris Vonvele	Early European Exploration of Cape r	35
Other Presentations by CFRW Staff			
Oct 1,09	Coastal Water Watch	Introduction to the Northeast Cape Fear and rain Gardens	8
Oct 14, 09	Cornerstone Student Community UNCW	Storm water education/Rain Garden	30
Oct 20, 09	Leadership Wilmington Chamber of Commerce	Environmental issues in the Lower Cape Fear River Basin	40
Oct 27, 09	Members Social	State of the River	70
Dec 3, 09	New Hanover High School	Fish restoration on the Cape Fear River	20
Dec 4, 09	New Hanover High School (Lyceum)	Fish restoration on the Cape Fear River	95

October-December 09: 3 eco-tours for 8 people

Service #5: 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, 2009

Completed rain event water quality monitoring of Burnt Mill Creek BMPs on 8/12, 8/31, and 9/12. CFRW staff and 5 volunteers installed a rain garden on August 5th in the Bottoms Community. Native plants were utilized extensively in this rain garden.

October 1 – December 31, 2009

Rain event water quality monitoring of Burnt Mill Creek BMPs was completed on 10/5/09, 11/10, and 11/11/09.

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.

October 1 –December 31, 2009

8 th Grade Enviroscape Presentations				
Date	School/Event	Grade	# of presentations	# of students
Oct. 14, 09	Murray MS	8th	2	44
Oct. 16, 09	Murray MS	8th	2	58
Nov. 17, 09	Roland Grise MS	8th	2	40
Nov. 18, 09	Roland Grise MS	8th	1	23

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, 2009

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

July 1 – December 31, 2009

Monitoring Reports for October and November were completed and submitted.

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, 2009

There was no volunteer monitoring activity in the first quarter. Significant improvements were implemented at one of the sites monitored through the Muddy Waters volunteer monitoring of a closed construction site on River Road. This site was identified as a site in need of improvement through a filed Muddy Waters site report card. Volunteer monitoring activity will resume in October.

October 1 – December 31, 2009

On November 1 – November 7 the 5th Annual Birch Creek Week program was conducted by CFRW volunteer and “creek keeper” Tom Tewey. Tom completed “a creek keeper” training program presented during the winter months in 2005. Tom focused his interests and steady observations on the Downey Branch of Burnt Mill Creek which flows through his housing development.

Each of the 5 Birch Creek Week programs has focused on water quality, storm water run off and the function of urban water shed through a wide variety of educational programs, speakers, panel discussions, and field trips for Birch Creek property owners. Tom and his wife Stephanna have successfully involved Cape Fear River Watch, the North Carolina Coastal Federation, New Hanover County Arboretum, Cape Fear Group of the Sierra Club, Keep America Beautiful of New Hanover County and the City of Wilmington Storm Water Services as supporters and contributors to Birch Creek Week programs.

These programs have successfully provided education and information that has changed the attitudes of many Birch Creek property owners about the Downey Branch from being a necessary and tolerated drainage ditch to being a functioning watershed and green belt that enhances their development.

Other accomplishments and improvements that have been achieved through Birch Creek Week programs and Tom Tewey’s consistent and proactive voice for the Downey Branch include:

- A strong and complimentary relationship with the City of Wilmington Storm Water Services.
- The installation of 2 pet waste stations, 1 in Birch Creek I, 1 in Birch Creek II
- Bank stabilization projects
- Removal of invasive species growing on the stream bank and the within the City ROW
- Planting River Birch and other desirable trees on adjacent community property
- Developed a community garden as a feature along the bank and adjacent to the City ROW

Tom is not resting on these accomplishments he understands and recognizes that there is still more to be done. He and the Birch Creek property owner committees that have been formed to address landscape and drainage issues will continue to be proactive in their approach to working with the City to solve these problems and continue to improve the Downey Branch.

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

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, 2008; October 1 - Dec. 31, 2008; January 1 - March 31, 2009; April 1 - June 30, 2009. 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
Bill Murray*

Date: January 7, 2010



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

RE: Annual Request Letter, FY 09/10

February 10, 2009

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 **09/10**. The requested amount of funding is **\$25,000**.

The New Hanover Soil and Water Conservation District has served as a valuable and productive partner to the City of Wilmington Stormwater Services Department for the past five years. Accomplishments include: assisting Stormwater Services in implementing additional public outreach, education, involvement, and participation activities required by federal NPDES stormwater permit, establishing a monthly rain barrel sale, providing pet waste information at events including the annual Pet Expo, receiving over \$4,800 in additional cost share funds through the NC Community Conservation Assistance Program (CCAP) (\$72,679 acquired to date), providing outreach to numerous community groups, educating over 1,000 NHC students and more!

The District hopes to continue to provide these services and more in the future, but this can only be accomplished through your continued support. As our programs grow and expand, so do our operating expenses and staff needs. 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. The New Hanover Soil and Water Conservation District is therefore requesting \$25,000 for FY 09/10 to assist in these areas identified in our Services Contract and to support the Stormwater Services with its NPDES federal stormwater permit requirements.

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, 2009 – June 30, 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, 2009** through **June 30, 2010** for the agreed amount of **\$25,000**. 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. 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 on the issue of fecal coliform "Pet Waste" pollution. Assist with the education and outreach of a new City pet waste ordinance including an intensive outreach and media campaign to occur once the ordinance passes, establish and maintain communication and engage in contact education and with vets, pet stores, adoption agencies, etc., and develop and maintain educational displays and materials at local veterinarian offices and pet-related businesses. Attend pet related events including the Pet Expo, Paw Jam, Bark in the Park and the Dog Jog.

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. NHSWCD promotes LID to developers and engineers through the county planning Technical Review Committee, 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 (\$69,751 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: Participate as a member of the Smith Creek Watershed Planning Initiative to develop a watershed plan, identify potential stormwater BMP locations, and grant opportunities. NHSWCD staff will serve on the education and outreach and recreation committees to assist with developing comprehensive public outreach programs and publications.

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. In addition, NHSWCD assists with TreeFest, an annual program which distributes over 10,000 tree saplings to New Hanover County citizens.

Service #10: Serve as the lead agency for managing land conservation easements, stormwater education and outreach in the Hewletts Creek Watershed. To date, the district has protected 33 acres along the "Conservation Greenway" through grant-funded acquisitions or donations. FY09-10 goals are to monitor and manage conservation easements and identify management goals for the YWCA easement area, including collecting input from area stakeholders about potential projects on the easement. In addition, staff will partner with YWCA education staff 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.

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.

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. Topics include aquatics, forestry, wildlife, soils, and other environmental issues.

Service #16: 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 "Soil & Water – The Living Soil"

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.

Service #18: Expand and maintain agency website. Maintain current website and expand site to include additional education materials specifically designed for stormwater education, stormwater BMPs, fecal coliform education materials, K-12 and community based educational programs, teacher workshop information, a link to the City of Wilmington's education website, as well as, other local, regional and national environmental organizations. A new "Water Quality" link will be added to highlight stormwater 101 presentations, pet waste brochures, the City of Wilmington's Citizen's Guide to Protecting Wilmington's Waterways and the endangered short nosed sturgeon. In addition, the site will display local environmental events and pictures and locations of local stormwater BMP projects such as the J.E.L. Wade Stormwater Wetland and Community Park.

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: Submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30, 2009; October 1 - Dec. 31, 2009; January 1 - March 31, 2010; April 1 - June 30, 2010. Quarterly distributions will be paid once quarterly progress report and invoice are received and reviewed for adequate progress. Also provide 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 #1: October 1st- December 31st, 2009

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, 2009** through **June 30, 2010** for the agreed amount of **\$25,000**. 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.

October 1 - December 31, 2009

8 th Grade Enviroscape Presentations				
Date	School/Event	Grade	# of presentations	# of students
10/13/09	Murry Middle	8 th	2	67
10/15/09	Murry Middle	8 th	2	65
10/20/09	Virgo	8 th	2	38
11/18/09	Roland Grise	8 th	1	24

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, 2009

Stormwater 101 Presentations			
Date	Organization	Topic	Attendance
7/7/2009	WB Surf Camp	SW 101	12

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. 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, 2009

The District held monthly rain barrel sales during July (12 barrels sold), August (14 barrels sold) and September (7 barrels sold).

October 1 – December 31, 2009

The District held monthly rain barrel sales during October (7 barrels sold), November (5 barrels sold) and December (5 barrels sold).

Service #4: Increase awareness and public education on the issue of fecal coliform “Pet Waste” pollution. Assist with the education and outreach of a new City pet waste ordinance including an intensive outreach and media campaign to occur once the ordinance passes, establish and maintain communication and engage in contact education and with vets, pet stores, adoption agencies, etc., and develop and maintain educational displays and materials at local veterinarian offices and pet-related businesses. Attend pet related events including the Pet Expo, Paw Jam, Bark in the Park and the Dog Jog.

October 1 – December 31, 2009

Staff distributed *Canines for Clean Water* information at annual Dog Fest held October 24th at Empie Park.

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, 2009

Staff is currently involved with several sub-committees of the program including the Events Committee, Finance Committee, and Awards Committee. Staff planned and attended Judges Orientation and 2 days of judging site visits. Staff is working with several donors to raise money for this year’s banquet as well as coordinating event details.

October 1 – December 31, 2009

Staff attended 9 committee meetings during October through December. Staff ensured that all details of the annual banquet were implemented. This year’s event was attended by 147 people.

Service #6: Promote LID to developers, architects, engineers, etc. NHSWCD promotes LID to developers and engineers through the county planning Technical Review Committee, as well as additional educational avenues.

July 1 – September 30, 2009

Staff attended 5 TRC meetings and reviewed 6 subdivision plans. LID recommendations were made to all subdivision based on site plans and the types of soils found on the sites.

October 1 – December 31, 2009

Staff attended 3 TRC committee meetings and reviewed 5 site plans. In addition, staff conducted one site visit to ensure soil types were applicable for LID techniques.

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 (\$69,751 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, 2009

A bioretention area was installed at Believers Destiny Church (\$16,913) along Smith Creek. This applicant has been reimbursed and the DENR engineer approved the final installation of the bioretention area.

Contracts were submitted and approved for the following: UNCW Recreation Center rain garden, New Hanover County Government Complex cistern project and the Wildlife Resource Commission Federal Point Public Access for a constructed wetland. 5 new applications have been approved including a rain garden at the YWCA.

The District worked with the City of Wilmington's Planning Department to submit a new BMP proposal to the CCAP Technical Review Committee for bioretention planters (Filtera) to be placed on North Front Street. DENR accepted the proposal as a new District CCAP BMP and the District is moving forward with submitting a CCAP contract to cost share this project.

October 1 – December 31, 2009

The District cost shared a 2,500 gallon cistern (\$3,901) at the New Hanover County Government Complex to capture stormwater off a portion of the building. The cistern was installed on October 5th and 6th. The District is working with NHC staff to train staff on how to use the cistern for outdoor and indoor irrigation.

In partnership with NC Coastal Federation, the District cost shared the installation of a bioretention area (\$14,260) October 19th at Alderman Elementary that will serve as an outdoor learning center for students.

District staff met with NC Coastal Federation to discuss additional CCAP funding for 2009-2011 EEG grant provided by the NC Attorney Generals office (\$23,750).

The District submitted a contract to The City of Wilmington to cost share bioretention planters for the Front Street revitalization project (\$20,000).

The District designed and cost shared a 212 square foot rain garden (\$716) on UNCW's campus as part of a class project.

District staff met with NHC Cooperative Extension to discuss installing a cistern this spring in an effort to reduce their irrigation cost.

District staff met with DENR engineers to discuss possible CCAP BMPs at the YWCA site. Engineers concluded that the major issue on the site related to the stormwater pipes on site and CCAP BMPs would not provide sustainable solutions to their stormwater runoff problems. Once the issues are resolved, CCAP can cost share critical planting to reduce existing erosion.

District staff submitted a CCAP Engineering request for Bradley Creek Elementary school.

Service #8: Participate as a member of the Smith Creek Watershed Planning Initiative to develop a watershed plan, identify potential stormwater BMP locations, and grant opportunities. NHSWCD staff will serve on the education and outreach and recreation committees to assist with developing comprehensive public outreach programs and publications.

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. In addition, NHSWCD assists with TreeFest, an annual program which distributes over 10,000 tree saplings to New Hanover County citizens.

July 1 - September 30, 2009

Community Outreach Events				
Date	Location	Event	Attendance	Theme/Comments
9/26/2009	Hewletts Creek (Park Ave)	Big Sweep	5	Litter Pick Up

October 1 - December 31, 2009

Community Outreach Events				
Date	Location	Event	Attendance	Theme/Comments
10/28-11/7	Airport/Fair Grounds	Cape Fear Fair and Expo	1,000+	Western: Water Conservation. Won 2 nd place for display.

Service #10: Serve as the lead agency for managing land conservation easements, stormwater education and outreach in the Hewletts Creek Watershed. To date, the district has protected 33 acres along the “Conservation Greenway” through grant-funded acquisitions or donations. FY09-10 goals are to monitor and manage conservation easements and identify management goals for the YWCA easement area, including collecting input from area stakeholders about potential projects on the easement. In addition, staff will partner with YWCA education staff 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, 2009

Staff met with a local realtor to identify potential conservation easements along Old Military Road and Mocking Bird Lane. Several landowners along Old Military Road are interested in learning more about the benefits of conservation easements. In addition, 5.5 acres for sale along Hewletts Creek have been identified and staff is seeking funding sources for purchasing this property.

Staff identified two rain garden sites at the YWCA. Staff is currently designing 2 rain garden areas as well as educational programs for YWCA staff and members.

At the request of the City of Wilmington Stormwater Services, staff submitted several project proposals for the Hewletts Creek Watershed including the following: residential rain gardens, school stormwater demonstration sites and potential BMPs for the City of Wilmington’s Municipal Golf Course.

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 CFPWA with its Water Conservation ordinance and efforts including the landscaper water conservation and certification initiative.

July 1 – September 30, 2009

District participated in the Smart Irrigation workshop held July 29th, 2009 at the NHC Cooperative Extension Service. Around 20 citizens attended the event.

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.

July 1 – September 30, 2009

Teacher Workshop			
Dates	Topics/Activities	Attendance	Comments
8/18-8/10	FLP Workshop at NCDEA Annual Workshop	9	

October 1 – December 31, 2009

Teacher Workshop			
Dates	Topics/Activities	Attendance	Comments
10/15/09	Middle School Science Teacher Meeting	8	Met with science teacher reps to distribute information
10/20/09	Elementary Science Teacher Meeting	32	
12/2/09	Noble Middle School	6	Envirothon Promotion

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, 2009

Environmental Education Presentations				
Date	School/Event	Grade	# of presentations	# of participates
7/2/09	YWCA Summer Camp~ forestry	4-9	1	4
7/7/09	YWCA Summer Camp~ wildlife	K-3	1	5
7/9/09	YWCA Summer Camp~ population	K-3	1	5
7/14/09	YWCA Summer Camp	4-9	1	
7/16/09	YWCA Summer Camp	4-9	1	
7/29/09	CFPUA Middle Sound Loop Community Meeting	n/a	1	80

October 1 -December 31, 2009

Environmental Education Presentations				
Date	School/Event	Grade	# of presentations	# of students
10/2/09	Brunswick County Field Day Bolivia Elm	3 rd	4	102
11/3/09	Airlie water quality	8th	1	22
11/13/09	Airlie soils and plants	3rd	1	30
11/13/09	Pine Valley Elm Soils	3 rd	3	75
12/10/09	Pine Valley Elm Erosion	5 th	1	26
12/14/09	Pine Valley Elm Erosion	5 th	2	48
12/16/09	Anderson Elm Soils	3 rd	5	100

Service #15: Organize and facilitate at least one Environmental Field Day a year serving over 90 New Hanover County School students. Topics include aquatics, forestry, wildlife, soils, and other environmental issues.

October 1 - December 31, 2009

Environmental Field Day				
Date	School(s)	Grade	Attendance	Topics/Activities
10/12/09	Alderman Field Day	3 rd	100	Plants, Water Cycle, Soils Field day in conjunction with bioretention installation.
10/29/09	Anderson Field Day	3 rd	100	Forestry, soils, aquatics, wildlife

Service #16: 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 “Soil & Water – The Living Soil”

July 1 – September 30, 2009

Staff sent emails and information regarding this year’s contest to the NHC Science Coordinator as well as teachers on the District’s education mailing list.

October 1 – December 31, 2009

District staff provided contest information to NHC teachers that received individual presentations listed above.

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.

July 1 – September 30, 2009

Staff continues to work with Alderman Elementary staff and teachers to design an education field day when the bioretention/rain garden area is installed October 15, 2009.

Staff met with NC Coastal Federation, NC State University Engineers and the principal of Bradley Creek Elementary in an effort to mimic the stormwater education project at Alderman Elementary. Staff will move forward with drafting a CCAP contract to cover some of the expenses of this demonstration project.

October 1 – December 31, 2009

In partnership with NC Coastal Federation, a bioretention area was installed that will serve as an outdoor classroom for students at Alderman Elementary School.

Service #18: Expand and maintain agency website. Maintain current website and expand site to include additional education materials specifically designed for stormwater education, stormwater BMPs, fecal coliform education materials, K-12 and community based educational programs, teacher workshop information, a link to the City of Wilmington's education website, as well as, other local, regional and national environmental organizations. A new "Water Quality" link will be added to highlight stormwater 101 presentations, pet waste brochures, the City of Wilmington's Citizen's Guide to Protecting Wilmington's Waterways and the endangered short nosed sturgeon. In addition, the site will display local environmental events and pictures and locations of local stormwater BMP projects such as the J.E.L. Wade Stormwater Wetland and Community Park.

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, 2009

Staff attended the Wilmington City Council meeting September 1, 2009 to express our support for the NPDES permit revisions.

Service #20: Submit cumulative quarterly progress reports and invoices (for 1/4 of annual contracted funding amount) according to the following schedule: July 1 - Sept 30, 2009; October 1 - Dec. 31, 2009; January 1 - March 31, 2010; April 1 - June 30, 2010. Quarterly distributions will be paid once quarterly progress report and invoice are received and reviewed for adequate progress. Also provide a compiled Year End Summary Report.

Report compiled by: Jennifer Braswell ___Date: December 31, 2009

APPENDIX C

ILLICIT DISCHARGE DETECTION AND ELIMINATION

September 3, 2009

Conducted training for Cape Fear Public Utilities Field Crews (34) on Illicit Discharge Detection and Elimination. Public Services Code Enforcement Officer provided the presentation at the monthly safety meeting located at the City's Operations Complex.

December 1, 2009

Conducted training for Stormwater Field Crews (20) on Illicit Discharge Detection and Elimination. Cape Fear River Watch provided presentation at the City's Operation Complex.

January 5, 2010

Conducted training for Stormwater Field Crews (21) on Illicit Discharge Detection and Elimination. Cape Fear River Watch provided presentation at the City's Operation Complex.

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:

- 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.
- 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.
- More restrictive rules shall apply.* Whenever conflicts exist between federal, state, or local laws, ordinances, or rules, the more restrictive provision shall apply.
- 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.
- 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

2009 BMP Compliance Inspection Summary

Dates of Inspections	Aug-09	Dec./Jan-09/10
Total # Sites Inspected	303	303
<i>Response Letter Severity</i>		
Level 1 (first letter)	32	18
Level 2 (second letter)*	17	9
Level 3 (third letter)**	0	5
# of Sites Requiring Maintenance	49	32

*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

209 Coleman Drive, PO Box 1810, Wilmington, NC 28402
Phone: (910) 343-4777 Fax: (910) 341-0099

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**

September 3, 2009

Conducted training for Cape Fear Public Utilities Field Crews (34) on Illicit Discharge Detection and Elimination and Good Housekeeping Procedures. Public Services Code Enforcement Officer provided the presentation at the monthly safety meeting located at the City's Operations Complex.

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					
Nov 2009-Feb 2010	Website	General public	Stormwater staff	Featured Shortnose Sturgeon Slideshow on main stormwater webpage	Shortnose Sturgeon education for the public
Ongoing	City's Cable Access Channel (GTV-8)	TV Viewers	Stormwater staff GTV staff	Aired Shortnose Sturgeon narrated slideshow on GTV-8	Shortnose Sturgeon education for the public
Ongoing	New Hanover County Schools	8th grade science classes	Stormwater staff NHSWCD staff CFRW staff	Highlight the Shortnose Sturgeon during classroom presentations and/or direct teachers to online resources about fish	Shortnose Sturgeon education for the public
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	New Hanover Soil & Water Conservation District	Web viewers	NHSWCD staff	Posted info about the Shortnose Sturgeon on website	Education about Shortnose Sturgeon provided to the public
Ongoing	Cape Fear River Watch website	Web viewers	CFRW staff	Posted info about the Shortnose Sturgeon on website	Education about Shortnose Sturgeon provided to the public
2/7/2010	Wilmington Star News	Newspaper readers	Star News reporter	Article	Information about fish bypass for Cape Fear River

APPENDIX H

**REGULATORY & ENFORCEMENT ACTIONS
REGULATORY & ENFORCEMENT ACTIONS**

Included in this section:

- Enforcement Action Reporting Summary
- Enforcement Letters

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 09-10, the Public Services Department investigated approximately 148 stormwater complaints. The majority of reports consisted blowing yard waste in the storm drain and improper management of yard waste. 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. A summary of this year’s activities are as follows:

ENFORCEMENT ACTIONS 2009-2010

Nature of Complaint	Number of reports	Resolved thru Public Education	NOV Issued	Referred to DWQ
Yard Waste	48	100%	0	0
Illicit Discharge/ Sediment	47	97%	1	2
Illicit Connection	3	60%	1	0
Pet Waste	6	100%	0	0
Blockages	23	100%	0	0
SSO	5	Corrected	0	0
Litter/Illegal Dumping	7	100%	0	0
Other	9	100%	0	0

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