

CITY OF WILMINGTON Stormwater Watch

PUBLIC SERVICES DEPARTMENT

STORMWATER SERVICES

Spring 2017

Inside:

UNCW Surface Water
Quality Annual Report

? Questions?

STORMWATER SERVICES DIVISION

Administration **343-4777**

Drainage/Maintenance **341-4646**

Billing Questions **332-6550**
(CFPUA)

Report Stormwater **341-1020**
Pollution Hotline

wilmingtonnc.gov/reportstormwaterpollution

City of Wilmington
Public Services Department
P.O. Box 1810
Wilmington, NC 28402

Public Services Department Director
Dave Mayes

Stormwater Services Division Manager
Derek Pielech

Stormwater Watch Editor
Jennifer Butler

i 910-343-4777
wilmingtonnc.gov/stormwater



WILMINGTONNC.GOV/STORMWATER

HOW Program installs neighborhood rain garden

The Heal Our Waterways (HOW) Program is the city's effort to implement the Bradley & Hewletts Creek Watershed Restoration Plan. The HOW Program works with partners and the community to reduce polluted runoff flowing into the creeks in order to improve water quality, restore shellfishing, and reduce swimming advisories. Soaking up stormwater in the landscape prevents polluted runoff from getting into the creeks in the first place.



To support this goal, City Stormwater crews completed construction of a large scale bioretention area (aka rain garden) in the Glen Meade neighborhood at 2124 Lynnwood Drive. Completed in mid-January, the bioretention area naturally treats 33.4 acres of polluted stormwater runoff in the Hewletts Creek Watershed.

This "stormwater solution" is landscaped with native plants and helps keep harmful bacteria from entering Hewletts Creek by collecting and soaking in runoff.

To help fund the project, the City partnered with the North Carolina Coastal Federation and the North Carolina Cooperative Extension for an Environmental Enhancement Grant. The grant paid for acquisition of the Lynnwood Drive property, with City Council passing a resolution to accept the property in November 2015.



An outreach/education campaign to increase understanding and awareness about stormwater runoff pollution and the need for a bioretention area/rain garden was an important component of the project. Residents received educational mailings and door hangers, surveys were conducted to assess stormwater and watershed awareness, and rain barrels were given away to encourage residents to capture and utilize runoff.

To finalize the project, staff and volunteers from the NC Coastal Federation, Stormwater Services, and neighborhood residents assisted in planting trees, shrubs, and grasses in the rain garden.

HEAL OUR WATERWAYS

healourwaterways.org

Find us on
Facebook and Twitter

Water Classifications

The State of Wilmi 2016 UNCW Surface

(Following is a summary of the condition of major creeks

The NC Division of Water Resources applies classifications to waterways which define the best uses to be protected within those waters (i.e. swimming, fishing, drinking water supply, aquatic life). These classifications have an associated set of water quality standards to protect their designated uses. These standards may be designed to protect water quality, fish and wildlife, the free flowing nature of a stream, or other special characteristics.

In addition, there may be a **supplemental classification** applied to protect several different uses or special characteristics within the same waterbody. Listed below are the freshwater and saltwater classifications that apply to Wilmington's waterways. For more information, visit: <https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications>.

Freshwater Classifications

Class C Waters protected for secondary recreation (fishing, boating and other activities involving minimal and infrequent skin contact), wildlife, agriculture, biological integrity, and fish/aquatic life propagation and survival.

Supplemental Classification

Swamp Waters (Sw) Waters that naturally have low flow and other characteristics which differ from creeks draining land with steeper topography.

Saltwater Classifications

Class SC Saltwaters protected for secondary recreation (such as fishing, boating, and other activities involving minimal skin contact) and fish/aquatic life propagation and survival.

Class SB Saltwaters used for primary recreation such as swimming, and all Class SC uses.

Class SA Saltwaters used for commercial shellfish harvesting, primary recreation such as swimming, and all Class SC/SB uses. SA waters are also High Quality Waters (HW) by definition.

Supplemental Classifications

High Quality Waters (HW) Saltwaters rated excellent based on biological, physical, and chemical characteristics and having primary or functional fish habitat and nursery areas.

Outstanding Resource Waters (ORW) Unique and special saltwaters having excellent water quality and being of exceptional state or national ecological or recreational significance.

State Status/Reason

Indicates whether or not a creek is supporting its State classification/use and the reason why.

NC 303(d) List of Impaired Waters

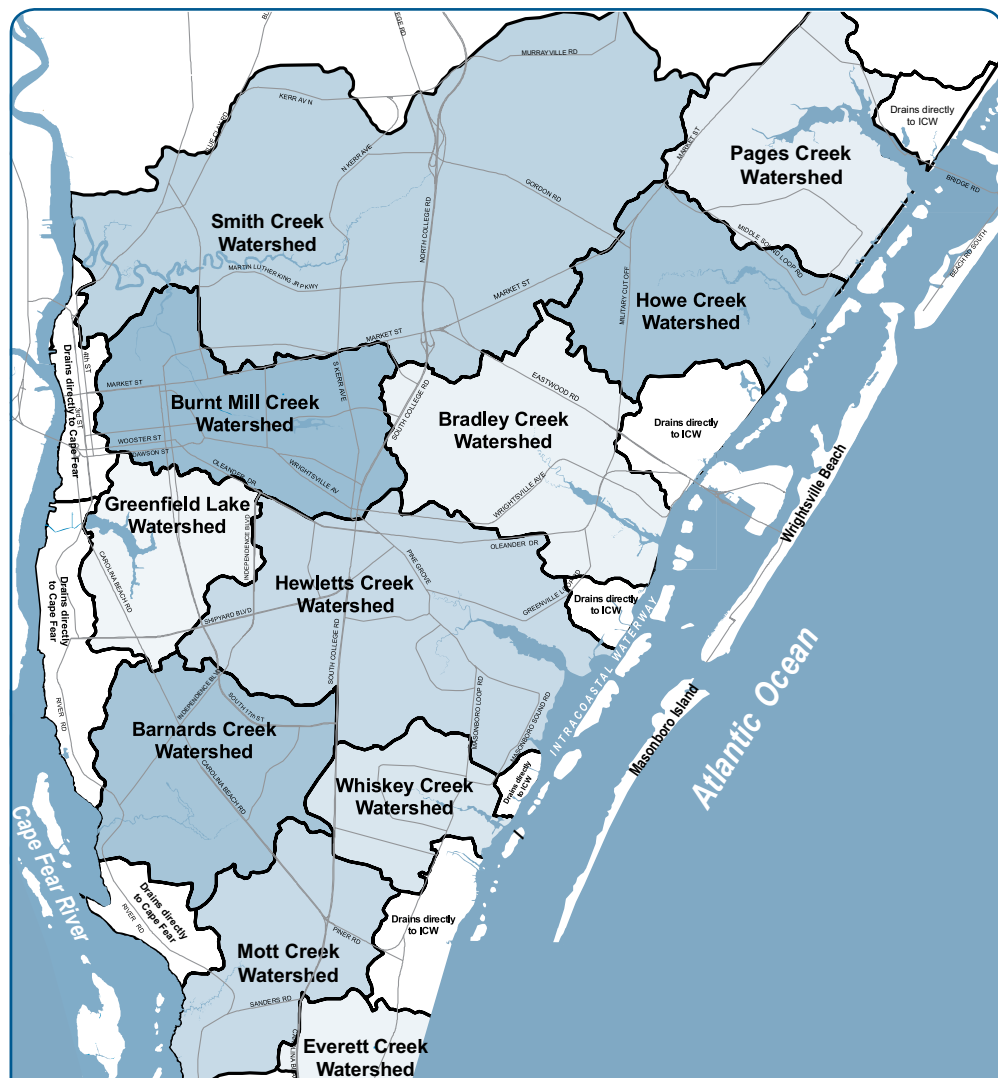
Section 303(d) of the Clean Water Act requires states to develop and frequently update a list of waters that do not meet water quality standards or have impaired uses. This report is based on the 2014 303(d) List, which is available for viewing at: <https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/303d>. Unfortunately, several of Wilmington's waterways are on the 303(d) list because of pollution, such as bacteria and nutrients, carried by stormwater runoff.

The State of Wilmington's Waterways 2016 UNCW Surface Water Quality Report is a summary of the current health and condition of the major creeks and waterbodies that fall within Wilmington's city limits. UNCW water quality sampling information was provided by Dr. Michael Mallin of the UNCW Center for Marine Science and lead scientist for the Wilmington Watersheds Project. Each water quality sampling summary is based on data collected between the months of January-

December 2016 and is presented from a watershed perspective, regardless of political boundaries.

The summary describes each watershed by size, state classification, state status, reason for impairment, and UNCW sampling summary. For more information on the current health of Wilmington's waterways and to read Dr. Mallin's entire report, please visit:

<http://uncw.edu/cms/aelab/research.html>



UNCW Results Summary: Fecal coliform bacterial conditions for the entire Wilmington Watersheds system showed 5% of sampling stations to be in fair condition, but 95% were rated as poor, worse than in 2015. Dissolved oxygen conditions system-wide showed 32% of sampling sites were in good condition, 41% were in fair condition, and 27% were in poor condition, an improvement from 2015. For algal bloom presence, measured as chlorophyll a, 73% of the 22 stations sampled were rated as good, and approximately 14% as fair and 14% as poor. For turbidity, all sites sampled were rated as good. It is important to note that the water bodies with the worst water quality have the most developed watersheds with the highest amounts of impervious (hard) surface coverage; Burnt Mill Creek, Greenfield Lake, and Bradley Creek.

Wilmington's Waterways Water Quality Report

(and waterways, not drinking water, within the City limits.)



Cape Fear River

Watersheds that drain to the Cape Fear River (CFR)

Smith Creek

Size of watershed: 13,896 acres

State classification/Use: C, Sw

State Status: Currently supporting use

Reason: Meets standards for Class C waters

UNCW Sampling Summary: Lower Smith Creek, near Castle Hayne Road, had high fecal coliform bacteria levels on 42% of occasions sampled. Dissolved oxygen was also low on several occasions, however there were no algal blooms and turbidity levels were low.

Burnt Mill Creek

Size of watershed: 4,252 acres

State classification/Use: C, Sw

State Status: Impaired. On 303(d) List

Reason: Exceeds standards for Class C waters, specifically biological integrity for benthos or bottom dwelling organisms and Chlorophyll a
UNCW Sampling Summary: Upper Burnt Mill Creek, near Kerr Avenue, showed high fecal bacterial pollution; these levels dropped greatly below Randall Pond, then increased to high levels again at Princess Place Drive. That section of the creek also suffers from low dissolved oxygen and periodic algal blooms; algal blooms were also seen mid-creek below Ann McCrary Pond.

Greenfield Lake

Size of watershed: 2,551 acres

State classification/Use: C, Sw

State Status: Impaired. On 303(d) List

Reason: Exceeds standards for Class C waters, specifically Chlorophyll a
UNCW Sampling Summary: The lake hosted a large blue-green algae bloom in summer 2016, which led to very high biochemical oxygen demand (a stress on the amount of dissolved oxygen available in water). Some of the main lake and most of the tributaries were polluted by high fecal bacteria levels, and the lake tributaries also had low dissolved oxygen levels.

Barnards Creek

Size of watershed: 4,161 acres

State classification/Use: C, Sw

State Status: Currently supporting use

Reason: Meets standards for Class C waters

UNCW Sampling Summary: Not sampled in 2016.

Mott Creek

Size of watershed: 3,328 acres

State classification/Use: C, Sw

State Status: Currently supporting use

Reason: Meets standards for Class C waters

UNCW Sampling Summary: Not sampled in 2016.



Intracoastal Waterway

Watersheds that drain to the Intracoastal Waterway (ICW)

Howe Creek

Size of watershed: 3,518 acres

State classification/Use: SA, ORW

State Status: Impaired. On 303(d) List;

closed to shellfishing

Reason: Fecal coliform bacteria, portion of creek impaired for dissolved oxygen

UNCW Sampling Summary: Dissolved oxygen levels were generally fair and there were no major algal blooms in 2016, but fecal bacteria levels were high at the mid-creek and upper creek sampling stations.

Bradley Creek

Size of watershed: 4,631 acres

State classification/Use: SC, HQW

State Status: Currently supporting use

Reason: Meets standards for Class SC waters

UNCW Sampling Summary: There were no excessive algal blooms and dissolved oxygen levels were fair to good. However, there were excessive fecal bacteria levels in the upper creek.

Hewletts Creek

Size of watershed: 7,435 acres

State classification/Use: SA, HQW

State Status: Impaired. On 303(d) List;

closed to shell fishing

Reason: Fecal coliform bacteria

UNCW Sampling Summary: Dissolved oxygen levels were good to fair and algal blooms were not a problem. However, the middle and north branches of the creek were polluted by high fecal bacteria levels.

Whiskey Creek

Size of watershed: 2,095 acres

State classification/Use: SA, HQW

State Status: Impaired. On 303(d) List;

closed to shellfishing

Reason: Fecal coliform bacteria

UNCW Sampling Summary: Dissolved oxygen was generally good and there were no problematic algal blooms. However there were occasional elevated fecal bacteria levels in the mid-creek.

***All waters in the State of North Carolina are impaired for mercury, based on high levels found in the tissues of several fish species.**

Water Definitions

Algal Bloom Rapidly occurring growth and accumulation of algae in a waterway resulting from excess nutrients that can lead to low dissolved oxygen levels and fish kills. (Sources: fertilizers, grass clippings, pet waste)

Biological Integrity The ability of an ecosystem to support and maintain a balanced and indigenous community of organisms.

Best Management Practice (BMP) An action or landscape modification that reduces the amount of pollution and/or the quantity of stormwater flowing into waterways. BMPs can be actions, such as picking up after your pet, or on-the-ground practices, such as rain barrels and rain gardens.

Chlorophyll a Allows plants to photosynthesize and gives plants their green color. Waters that have high chlorophyll a levels are typically high in nutrients (phosphorus and nitrogen), which cause algae to grow or bloom. When algae die, it depletes oxygen and can cause fish kills.

Dissolved Oxygen (DO) The amount of oxygen available in water. Fish and aquatic organisms require adequate levels of DO to survive.

Fecal Coliform Bacteria Bacteria present in the intestines and feces of warm-blooded animals. High levels of fecal coliform bacteria in a waterway indicate the presence of other disease-causing pathogens which can cause sickness and disease in humans. (Sources: pet & animal waste, sewer overflows, septic system failure)

Hypoxia Low dissolved oxygen levels in a waterway which can result in fish kills.

Nutrients Substances (i.e. nitrogen and phosphorus) needed by plants and animals for growth; however, excessive nutrients in a waterway can lead to harmful aquatic weed and algae growth, low DO levels and fish kills. (Sources: fertilizers, yard waste, pet waste)

Pathogens Disease-causing organisms such as bacteria and viruses. (Sources: pet waste)

PAHs (Polycyclic Aromatic Hydrocarbons) Toxic by-products of petroleum and fossil fuels, which can be harmful to humans and aquatic life and can persist in the environment for a long time. (Sources: auto exhaust, motor oil, parking lot sealcoats, roofing tars, coal power plants)

Sediment Particles of silt, clay, dirt, or sand that wash into waterways caused by land-disturbing activities or natural weathering. Sediment can settle to the bottom or remain suspended in water. (Sources: construction sites with failing/erosion control, eroding streambanks, and exposed soil)

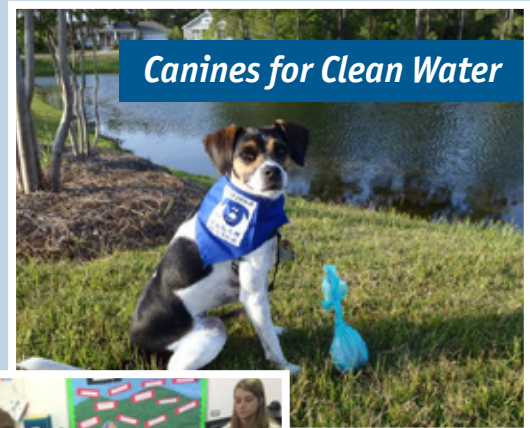
Tidal Creek A saltwater creek that is influenced by tides. Many tidal creeks have oyster reefs along their shorelines.

Turbidity A cloudy condition in water caused by suspended sediment.

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

Outreach & Education

Stormwater Services offers many outreach and education programs for the Wilmington community. Learn more at wilmingtonnc.gov/stormwater



Publications & Videos

Stormwater 101 Speakers Bureau

Remember, YOU are the solution to stormwater pollution!

 wilmingtonnc.gov/stormwater

**WILMINGTON**
CITY OF
STORMWATER SERVICES