

# CITY OF WILMINGTON Stormwater Watch

PUBLIC SERVICES DEPARTMENT

STORMWATER SERVICES

Spring 2018

## Inside:

UNCW Surface Water  
Quality Annual Report



### STORMWATER SERVICES DIVISION

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Drainage/Maintenance **341-4646**  
Billing Questions **332-6550**  
(CFPUA)  
Report Stormwater **341-1020**  
Pollution Hotline

[wilmingtonnc.gov/reportstormwaterpollution](http://wilmingtonnc.gov/reportstormwaterpollution)

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CITY OF  
**WILMINGTON**  
NORTH CAROLINA

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## Stormwater 101: Understanding Your Bill

Impervious, or hard surfaces, such as roads, rooftops and parking lots, do not allow rainwater to soak into the ground, which results in stormwater runoff. Stormwater utility fees provide the funding necessary to provide comprehensive management of stormwater runoff within the City limits.

Stormwater fees are used exclusively for stormwater management activities including operation and maintenance of the stormwater drainage system, strategic planning and engineering, construction of drainage projects, routine and preventative maintenance, street sweeping, retention pond inspections, public outreach and education, GIS, and customer service.

City residents and businesses are billed a stormwater fee based on the amount of impervious surfaces on their property. Property owners receive

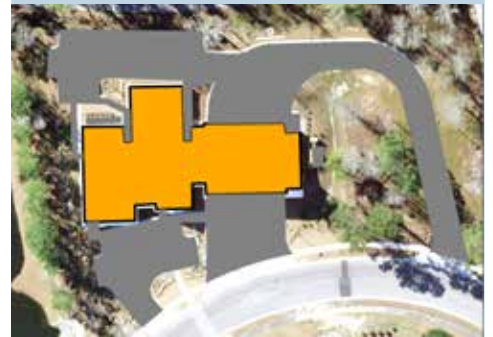
**SINGLE FAMILY HOUSEHOLDS**  
\$8.11 flat rate/per month  
(\$16.22 per bi-monthly bill)

**COMMERCIAL PROPERTIES**  
\$8.11 per month for every 2500 sq. ft.  
of impervious (hard) surface

a stormwater bill which is collected bi-monthly by Cape Fear Public Utility Authority (CFPUA) on behalf of the city. Stormwater fees are transferred to the city's Stormwater Utility Fund and used exclusively for stormwater management activities within the city.

Stormwater fees are calculated as an Equivalent Residential Unit (ERU). 1 ERU equals 2500 square feet and \$8.11 per month.

### COMMERCIAL PROPERTY EXAMPLE



45,000 sq ft impervious surface /  
2500 sq. ft. = 18 ERUs  
18 ERUs x \$8.11 = \$146 monthly  
(\$292 on bi-monthly bill)

Single-family residential property owners are billed a flat rate of 1 ERU per month, per property. All other properties are billed 1 ERU for every 2,500 square feet of impervious surface on the property per month. *There is a slight increase to the stormwater fee annually.*

Stormwater Services continually map and update impervious surfaces throughout the City. These updates are driven by the most recent aerial photography from the State of North Carolina. Stormwater Services employs a proactive approach to billing using aerial photos, site plans, new construction and demolition data to determine and update account information.

### STORMWATER BILLING QUESTIONS?

Stormwater Services  
910.343.4777  
[stormwaterbilling@wilmingtonnc.gov](mailto:stormwaterbilling@wilmingtonnc.gov)

# The State of Wilmington 2017 UNCW Surface

(Following is a summary of the condition of major creeks

## Water Classifications

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), fish and noncommercial shellfish consumption, fish/aquatic life propagation and survival, and wildlife.

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

**Class SA** Saltwaters used for commercial shellfishing and all Class SC/SB uses. SA waters are also High Quality Waters (HQW) by supplemental classification.

### Supplemental Classifications

**High Quality Waters (HQW)** Waters rated excellent based on biological, physical, and chemical characteristics and having primary or functional nursery areas.

**Outstanding Resource Waters (ORW)** Unique and special waters 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 newsletter is based on the NC 303(d) List, which is available for viewing at: <https://deq.nc.gov/about/divisions/water-resources/planning/modeling-assessment/water-quality-data-assessment/integrated-report-files>. Unfortunately, several of Wilmington's waterways are on the 303(d) list because of pollution, such as bacteria and nutrients, which is washed from the land by stormwater runoff.

The State of Wilmington's Waterways 2017 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 2017 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 all the watersheds sampled showed 18% to be in good condition, 14% to be in fair condition, and 68% in poor condition, an improvement from 2016 but still overall poor microbiological water quality. Dissolved oxygen conditions showed 64% of the sites were in good condition, 18% were in fair condition, and 18% were in poor condition, an improvement from 2016. For algal bloom presence, measured as chlorophyll a, 68% of the samples were rated as good, and 23% as fair and 9% as poor. For turbidity, all sites were rated as "good".

It is important to note that the water bodies with the worst water quality also have the most developed watersheds with the highest amount of impervious surface coverage: Burnt Mill Creek – 39% impervious; Greenfield Lake – 37% impervious; Bradley Creek – 28% impervious.

# 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:** 16,650 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 Rd. maintained good water quality in terms of dissolved oxygen and turbidity, and algal blooms were not a problem. However, the sampling site had high fecal coliform bacteria levels on 80% of occasions sampled.

### Burnt Mill Creek

**Size of watershed:** 4,207 acres

**State classification/Use:** C, Sw

**State Status:** Impaired. On NC 303(d) List

**Reason:** Does not meet standards for Class C waters, specifically for biological integrity for benthos

(bottom dwelling organisms) and Chlorophyll a  
**UNCW Sampling Summary:** Upper Burnt Mill Creek near Kerr Avenue showed high fecal bacteria levels. These levels dropped greatly below Ann McCrary Pond, then increased to moderately high levels downstream at Princess Place. The Princess Place section of the creek also maintained good dissolved oxygen levels but had two major algal blooms.

### Greenfield Lake

**Size of watershed:** 2,465 acres

**State classification/Use:** C, Sw

**State Status:** Impaired. On NC 303(d) List

**Reason:** Does not meet standards for Class C waters, specifically for Chlorophyll a

**UNCW Sampling Summary:** The lake had a green algal bloom in late winter 2017 and a massive blue-green algae bloom in summer 2017, which led to very high biochemical oxygen demand (a stressor on dissolved oxygen). Some of the main lake and most of the tributaries into the lake were polluted by high fecal bacteria levels. The tributaries also showed low dissolved oxygen levels.

### Barnards Creek

**Size of watershed:** 4,173 acres

**State classification/Use:** C, Sw

**State Status:** Currently supporting use

**Reason:** Meets standards for Class C waters

**UNCW Sampling Summary:** Not sampled in 2017.

### Mott Creek

**Size of watershed:** 3,342 acres

**State classification/Use:** C, Sw

**State Status:** Currently supporting use

**Reason:** Meets standards for Class C waters

**UNCW Sampling Summary:** Not sampled in 2017.



Intracoastal Waterway

## Watersheds that drain to the Intracoastal Waterway (ICW)

### Howe Creek

**Size of watershed:** 3,516 acres

**State classification/Use:** SA, ORW

**State Status:** Impaired. On NC 303(d) List; closed to shellfishing

**Reason:** Does not meet standards for Class SA waters, specifically for fecal coliform bacteria; a portion of the creek is also impaired for dissolved oxygen

**UNCW Sampling Summary:** Dissolved oxygen levels were generally good, but there was one major algal bloom in 2017. Fecal coliform bacteria levels were high at the upper creek sampling station.

### Bradley Creek

**Size of watershed:** 4,583 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, but dissolved oxygen levels were poor in the upper creek at College Acres Dr. There were excessive fecal bacteria counts at all three sites sampled in 2017.

### Hewletts Creek

**Size of watershed:** 7,478 acres

**State classification/Use:** SA, HQW

**State Status:** Impaired. On NC 303(d) List; closed to shellfishing

**Reason:** Does not meet standards for Class SA waters, specifically for fecal coliform bacteria

**UNCW Sampling Summary:** Dissolved oxygen levels were generally good and algal blooms were not a problem. However, the upper branches of the creek were all polluted by high fecal bacteria levels.

### Whiskey Creek

**Size of watershed:** 2,078 acres

**State classification/Use:** SA, HQW

**State Status:** Impaired. On NC 303(d) List; closed to shellfishing

**Reason:** Does not meet standards for Class SA waters, specifically for fecal coliform bacteria

**UNCW Sampling Summary:** Dissolved oxygen was generally good and there were no problematic algal blooms. Fecal bacteria levels were not a problem in 2017.

**\*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 from the water 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.

# Litter impacts wildlife.

Greenfield Lake



**Y'ALL  
STILL  
LITTER?  
PLEASE  
DON'T.**

There's no right way to litter.  
**BE the SOLUTION!**

ink 2018  
Johnson

Photo Credit: Robbie Johnson, Nature Link

*Remember, YOU are the solution to stormwater pollution!*

 [wilmingtonnc.gov/stormwater](http://wilmingtonnc.gov/stormwater)

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