



EMPLOYEE SPOTLIGHT

A vital part of the Stormwater Services mission is to bring awareness about stormwater pollution to the public. Jesse Hart, Education and Outreach Intern, works to raise community awareness by educating citizens on a variety of environmental concerns. Her focus areas include nonpoint source pollution, pet waste, fertilizers, and using stormwater solutions, like rain gardens, to absorb runoff on residential properties.

Jesse has worked to promote environmental education and stewardship by delivering instructional videos for 8th grade science classes in New Hanover County. She also maintains the city's Stormwater Demonstration Site within Anne McCrary Park, which enables the public to view landscape features that could be installed on their own property to soak in stormwater. She is currently working to administer and analyze responses to a community pet waste survey (on right).



Jesse Hart, Education and Outreach Intern

Jesse is currently working on a dual master's degree in Environmental Studies and Public Administration at UNCW. The long-term internship with the city has provided multiple opportunities to apply her studies to real-world environmental issues within Wilmington. ■

Learn more about stormwater education programs: wilmingtonnc.gov/departments/public-services/stormwater/education-outreach

Earth Day Festival Returning in April

Wilmington's annual Earth Day Festival is returning to an in-person event on Saturday, April 23, 2022, from noon to 6 p.m. at Long Leaf Park. This year's theme is Love Your Mother.



Stormwater Services and the city's Heal Our Waterways Program are major sponsors of the event and will host interactive exhibits.

The Earth Day Festival will feature environmental information and activities with 70 exhibitors. This FREE family fun-filled event offers live music, food trucks, raffle prizes and a Kid Zone for children to make art, with an accompanying children's parade.

On-site free parking and trolley shuttles from satellite locations are planned. ■

Learn more at wilmingtonearthday.com



UNCW LEADS COMMUNITY PET SURVEY

Do you love dogs? We do!

Please help UNCW and Stormwater Services understand dog owner awareness, attitudes and behaviors related to pet waste.

Complete the ANONYMOUS online survey by **June 5th** using the the link or QR code. The mostly multiple-choice survey should take less than 5 minutes to complete.

<https://tinyurl.com/petwaste2022>

Take the survey



Wilmington, NC | Spring 2022

STORMWATER WATCH

GRANT PROJECTS AIM TO IMPROVE BRADLEY CREEK

As development in Bradley Creek Watershed continues, polluted runoff continues to be a concern. Of particular concern is fecal coliform bacteria which is carried from the land into the creek by stormwater runoff. Bacterial pollution impacts shellfish harvesting waters near the mouth of the Bradley Creek, which are currently closed.

In the first of two grant projects funded by the Environmental Protection Agency (EPA) 319 grant program, NC State University is partnering with the City to retrofit stormwater systems on public and private properties in the watershed. The upgrades aim to reduce pollution flowing into the creek and include converting a wet pond to a wetland, improving a second wet pond to increase stormwater retention time, and enhancing a drainage swale (a stormwater conveyance that is wider and shallower than a ditch).

This project will also work with nearby neighborhoods to encourage rerouting downspouts to let stormwater soak into the ground naturally instead of running off. The grant totals over \$250,000 in EPA funding, including staff support and resources from the City.

In another grant project benefiting Bradley Creek, UNCW is continuing its work to improve the health of the creek with the help of North Carolina Coastal Federation and the City of Wilmington. UNCW is the largest landowner in the watershed and is installing additional stormwater projects on campus to absorb and reduce polluted runoff.

The new grant builds upon a previous grant project that installed rain gardens, a bioretention area and permeable pavement on campus. New, similar installations will provide additional opportunities for student



UNCW students and faculty help plant a large rain garden on campus.

and faculty participation, educational displays and stormwater awareness on campus.

Installations will begin in 2022 thanks to \$240,000 in funding from the EPA and grant partners (NCCF, UNCW and HOW). ■

healourwaterways.org

VEGETATED "YOGA MATS" INSTALLED IN GREENFIELD LAKE



Nitrogen and phosphorus are nutrients that are essential for plant growth, and are found in fertilizers used in residential and commercial landscapes. However, when nutrients wash into Greenfield Lake in stormwater runoff, it can cause pollution problems like harmful algal blooms.

This past fall, NC State University partnered with the City to install Floating Treatment Wetlands (FTW) in Squash Branch, the northernmost tributary of Greenfield Lake. FTWs are aquatic systems that use vegetation on floating mats, similar to yoga mats, to absorb nutrients from water. As the plants on the wetlands grow, nutrients in the water are taken up by the roots and stored in the tissues. Periodic harvesting of the mature plants prevents nutrients from re-entering the water when the plants die and decompose.

In addition to absorbing nutrients, FTWs are quickly becoming popular because they do not interrupt rainfall flow or require heavy equipment to install. They also provide improved habitat and biodiversity in a waterbody. Stormwater Services crews can easily unhook and move the mats to access Squash Branch to perform maintenance activities.

NC Land & Water Fund provided grant funding to purchase, install, and monitor the efficacy of the FTWs and water quality in Squash Branch. ■

NC State University partnered with the City to install Floating Water Treatment Wetlands (FTW) in Greenfield Lake.

CONTACT

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Report Stormwater Pollution Hotline

910. 341.1020
wilmingtonnc.gov/reportstormwaterpollution

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THE STATE OF WILMINGTON'S WATERWAYS

2021 UNCW SURFACE WATER QUALITY REPORT

(The following is a summary of the condition of major creeks and waterways, not drinking water, within the City limits.)

The State of Wilmington's Waterways 2021 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. The water quality sampling summary is based on data collected between the months of January-December 2021 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 or to read Dr. Mallin's entire report, please visit:

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

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)

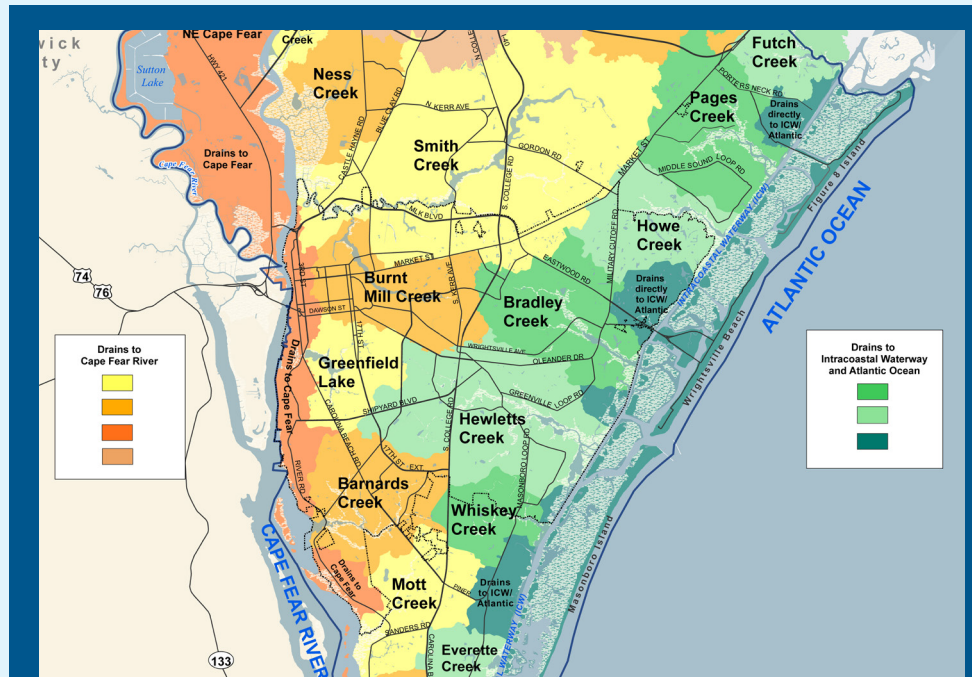
Biological Integrity The ability of an ecosystem to support and maintain a balanced and indigenous community of organisms.

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 counts of fecal coliform bacteria in a waterway indicate the presence of other disease-causing pathogens which can cause sickness and disease in humans and animals. (Sources: pet/animal waste,



UNCW Results Summary:

Lower Burnt Mill Creek and upper Bradley Creek maintain some of the most polluted waters in the City. Note that upper Bradley Creek is targeted by the City for future restoration work including a large capital improvement project and two simultaneous EPA grant projects.

Greenfield Lake continues to host nuisance algal blooms and the tributary creeks, Jumping Run Branch and Squash Branch, load high fecal bacteria and nutrients into the lake. Currently the state is funding a coalition including the City, Cape Fear River Watch, UNCW, NCSU and Moffat & Nichol in efforts to restore Jumping Run Branch and reduce nutrients and fecal bacteria draining into the lake from this tributary.

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 phosphorous) 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.

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/water-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.



Cape Fear River



Intracoastal Waterway

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: Smith Creek was sampled at the Castle Hayne Street bridge on eight occasions. Dissolved oxygen and fecal coliform bacteria only violated the State standard once. Turbidity was low and there were no algal blooms.

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 of benthos (bottom dwelling organisms)

UNCW Sampling Summary: The upper portion of the creek had good dissolved oxygen levels and low turbidity, but had occasional fecal bacteria issues and algal blooms. The lower creek has high fecal bacteria counts, low dissolved oxygen, and occasional algal blooms. Previous studies show high metals and chemical levels buried in the sediments of the creek.

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 tributary streams flowing into the lake are impacted by low dissolved oxygen, high fecal bacteria counts, and are the main source of elevated nitrogen and phosphorus entering the lake. The lake itself suffers from algal blooms, high biochemical oxygen demand (which causes low dissolved oxygen levels), and high fecal bacteria.

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: Sampling of upper Barnards Creek near Carriage Hills show some issues with dissolved oxygen and fecal bacteria.

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 2021.

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 Howe Creek is also impaired for dissolved oxygen

UNCW Sampling Summary: Not sampled in 2021.

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: Bradley Creek is sampled at two sites along Wrightsville Avenue and two sites in the upper north branch (Clear Run area). The Wrightsville Avenue stations are moderately impacted by fecal bacteria and low dissolved oxygen, but the two Clear Run sites have low dissolved oxygen and very high fecal bacteria pollution levels.

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: Hewletts Creek did not experience algal blooms or elevated turbidity levels. There were occasional minor issues with dissolved oxygen and fecal bacteria counts.

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: Fecal coliform bacteria

UNCW Sampling Summary: Not sampled in 2021.

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