

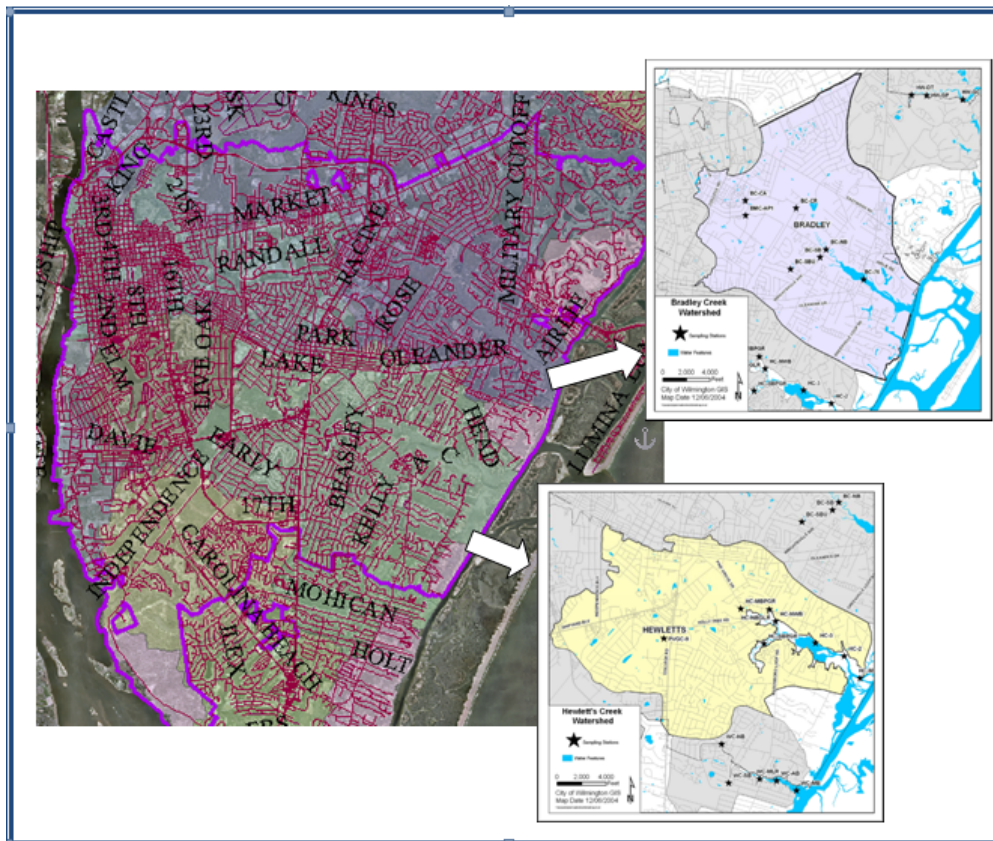
WILMINGTON GRAY TO BLUE

Phil Prete*

Background

Wilmington is situated on the divide of two major watersheds, the Cape Fear River and the Atlantic Intracoastal Waterway. All surface waters in Wilmington drain to one of these two water bodies and are divided into two groups: tidal creeks and Cape Fear River tributaries. Cape Fear River tributaries drain directly to the Cape Fear River and comprise the western portion of Wilmington's surface waters. Tidal creeks drain directly into the Atlantic Intracoastal Waterway and make up the eastern portion of Wilmington's surface waters.

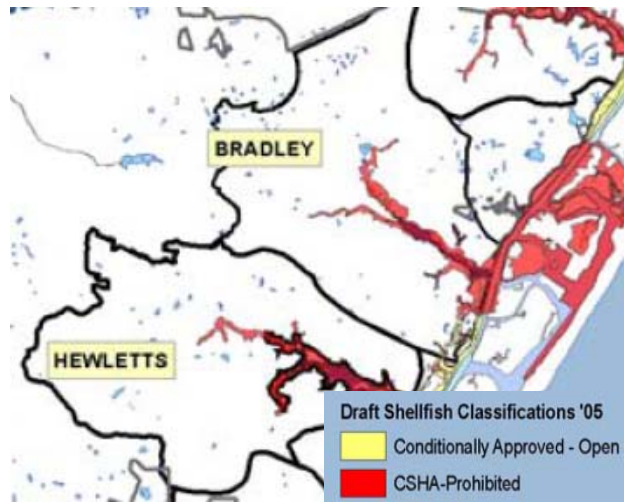
The City of Wilmington has a longstanding history of forming and participating in broad-based partnerships with the Coastal Federation and other non-profits, the University of North Carolina at Wilmington, NC State University, and local, state, and federal agencies to restore impaired water quality in the tidal creeks, an issue that has widespread public support.



This project has selected two of the tidal creeks to focus on – Bradley and Hewlett's Creek. At 9.4 square-miles, Bradley Creek watershed is the largest in Wilmington. It is also the most polluted. Hewlett's Creek, at 9.3 square-miles, is the second largest and second most polluted watershed in Wilmington.

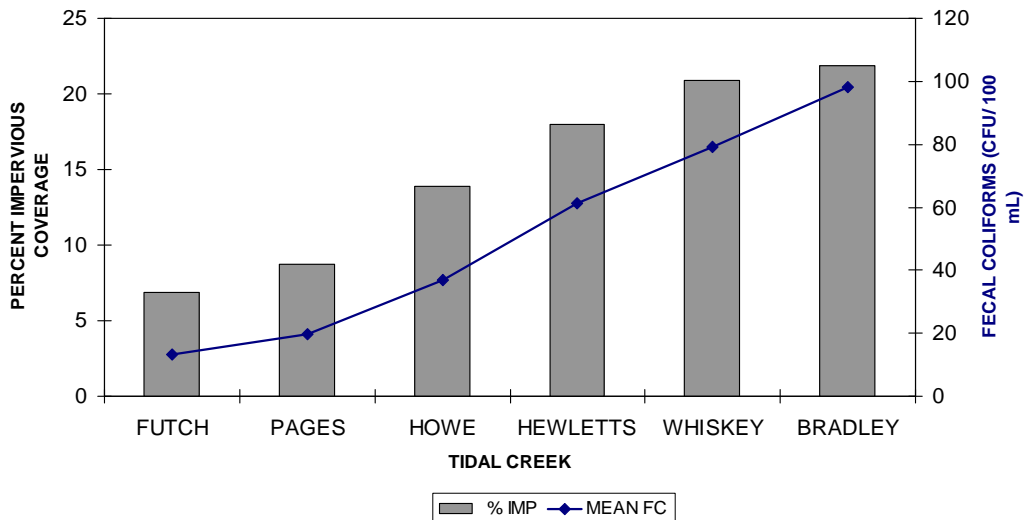
Since 1993 the City has contracted with UNCW to collect data on water quality in its creeks, focusing particularly on the tidal creeks. All tidal creeks in Wilmington follow a general spatial water quality pattern. Water quality near the mouth of a tidal creek, where salinity and flushing are high, tends to be good. Water quality tends to decrease farther up the creek, with areas near the headwaters generally exhibiting the poorest water quality. The areas of the creeks that are open to shellfishing have continued to recede to only the areas near the mouth of the creek. This is true for both Bradley and Hewlett's Creeks (see figure 2)

Figure 2: Closed shellfish areas in Hewletts and Bradley Creeks



It has been widely accepted that the amount of pollutants entering a waterway in runoff from impervious surfaces increases as the impervious surface coverage in a watershed increases. According to the Center for Watershed Protection (1998), water quality in streams, lakes, and wetlands is negatively impacted when impervious surface coverage in a watershed exceeds just 10 percent. Studies of the Wilmington watersheds show a direct correlation between impervious surface coverage in the watershed and fecal coliform bacterial contamination (see figure 3)

Figure 3. Percent watershed impervious surface coverage versus geometric mean fecal coliform bacteria counts for six New Hanover County tidal creeks (modified from Mallin et al. 2001).



Wilmington has stormwater quality regulations in place consistent with Phase II requirements and the more stringent NC Coastal Stormwater requirements for post construction controls for new development and redevelopment. In addition, the City has partnered with the Coastal Federation and New Hanover and Brunswick Counties to develop a low impact development (LID) guidance manual and a hydrology analytical model for LID projects. However, with a city that is nearly ninety percent built out, this will at best prevent further degradation, and will present few opportunities for improvement. In addition, much of the impervious surface area in the two target watersheds is

within the municipal right of way. Recognizing these challenges, this project has chosen to focus on opportunities to provide retrofits to couple with street and drainage improvement projects within the rights of way – reducing the effective impervious surface area running off into receiving streams.

Scope

This project -dubbed Gray to Blue – draws on Portland’s Green Streets Initiative. The Green Street Policy adopted in Portland, Oregon defines a “Green Street” as one that manages stormwater on site through the use of vegetated practices that provide water quality benefit and infiltration capacity. The objective of the Wilmington Gray to Blue project are to provide tools for improving water quality in the selected tidal creeks by reducing the impact of stormwater runoff from impervious surfaces.

This project will build on the foundation and momentum generated by earlier work by formalizing previous efforts into two watershed-based restoration plans that will allow comprehensive targeting of activities and resources and measurable criteria for evaluation of effort. The City recognizes that EPA and DWQ support watershed restoration plans as a way to address water quality problems in a proactive way. Accordingly, the City and NCCF now seek to develop two prototype watershed-based plans for Hewlett’s and Bradley Creek watersheds, following EPA and NC DWQ’s guidelines for such plans.

EPA’s Nine Elements for Watershed Plans (Source: US EPA, 2004 319 Supplemental Guidelines)

1. Identify causes & sources of pollution
2. Estimate load reductions expected
3. Describe management measures & targeted critical areas
4. Estimate technical and financial assistance needed
5. Develop education component
6. Develop project schedule
7. Describe interim, measurable milestones
8. Identify indicators to measure progress
9. Develop a monitoring component

The planning portion of the initiative will incorporate three main elements: (1) developing a set of design standards and a handbook to promote the use of sustainable stormwater management devices within the City; (2) watershed planning within the Bradley and Hewlett’s Creek watershed to identify retrofit opportunities and quantify anticipated water quality benefits; (3) establishing a City endorsed initiative to provide cost sharing opportunities for private businesses and citizens to offset cost of stormwater retrofits.

The planning elements will later be used as a foundation for implementation plans, community outreach, and public partnerships on stormwater retrofits and redevelopment projects

The plans will be designed to reduce nonpoint source pollution loadings that contribute to water quality impairments and provide the foundation for broader city-wide efforts to protect and restore water quality. The project team believes that the time- and cost-efficiency of this approach will have critical benefit to area water quality. By expediting the planning for these watersheds, the City’s water quality investments can be leveraged with additional federal and state funds.

Watershed Planning

This 319 Grey to Blue Project calls for the City and NCCF to develop two prototype watershed-based plans for Hewlett’s and Bradley Creek watersheds, following EPA and NC DWQ’s guidelines for such plans. The plans will identify pollutant point sources, retrofit opportunities, quantify anticipated water quality benefits, and meet the other EPA elements.

The plans will be designed to reduce nonpoint source pollution loadings that contribute to water quality impairments and provide the foundation for broader city-wide efforts to protect and restore water quality. By expediting the planning for these watersheds, the City’s water quality investments can be leveraged with additional federal and state funds.

Specific outputs of this project include: (1) a set of design standards and a handbook to foster the use of sustainable stormwater management devices on City street improvement projects; (2) a GIS/web-based stormwater retrofit atlas for the City of Wilmington, including a publicly accessible website component; (3) Public education materials, meetings, and workshops including a statewide cable show segment; (4) two DWQ-approved watershed-based plans for Bradley and Hewlett's Creek watersheds to identify pollutant point sources, retrofit opportunities, quantify anticipated water quality benefits and meet the other EPA elements; (5) an implementation plan and timeline, including construction drawings for up to five small-scale retrofit sites within the watersheds. Opportunities to leverage other funding sources will be identified and pursued for the implementation phase of the watershed-based plans.

By finding opportunities to add a water quality component into City CIP projects and developing a toolbox of design standards and criteria for their application, this project will attempt to change the way the City approaches projects by taking a holistic approach rather than a silo approach. Stormwater retrofits will reduce flooding and improve water quality by redirecting funds from culvert replacement projects where feasible to sustainable stormwater projects including permeable pavement, bioretention cells, green streets, and streetscape improvements. This project should provide a model for other jurisdictions in Southeast.

Philip J. Prete, R.E.P.
Senior Environmental Planner
City of Wilmington, NC
Planning Division
305 Chestnut Street, 3rd Floor
Wilmington, NC 28401, USA
Ph (910) 342-2779
Fax (910) 341-3624
Email: Phil.prete@wilmingtonnc.gov