



Monitoring Matters

There is considerable debate about the magnitude of pollutant loading from various land uses in the Neuse Basin. Because the Upper Neuse Basin encompasses several large urban areas, documenting pollutant contributions from various land uses is especially important. The best and most defensible way to quantify loads from land uses is to monitor streams. For smaller areas, such as 10 – 20 houses in a development, stormwater runoff is monitored. Therefore, one of the goals of the Upper Neuse River Watersheds project is to characterize pollutant runoff from residential (medium and low density), construction, commercial, industrial, recreational, and natural land use areas.

Stream monitoring consists of collecting about 1.5 quarts of water from locations along Swift, Crabtree, and Walnut creeks and some of their tributaries once every other week. The samples are then analyzed for nitrogen, phosphorous, and solids (sediment). These data are used to characterize water quality in relatively large urban areas with a mixture of land uses. Thus far, the Crabtree creek has had the highest median sediment phosphorous and nitrogen concentrations, followed by Walnut and Swift creeks.

In order to assess individual land uses, automated storm samplers were installed in ditches and pipes that drain relatively small (less than 10 acres) industrial, residential, construction, parking lot, and golf course land use areas. These samplers monitor the flow of water and collect a small portion of the water that is then taken to the Cary Wastewater Treatment Plant for analysis. Sample analysis has documented varying levels of nitrogen, phosphorous, and sediment in the runoff. Thus, there has not been enough data collected to make generalizations about relative contributions of pollutants from land uses.

– Dan Line

Planning for Water Quality

Water quality research has identified urbanization as one of the most challenging areas in environmental mitigation and restoration. The impacts associated with urbanization are multi-faceted. Sedimentation and erosion during construction begin the degradation cycle. When we build, we compact soils, remove vegetation, and create impervious surfaces with roads, sidewalks, and roofs. Rainwater that once soaked into the ground to be filtered, to recharge water supplies and to provide essential baseflow to streams runs off as stormwater – carrying oils, sediment, grease, metals, nutrients and pathogens.

These issues have created an interest in land use planning as a tool for pollution prevention and mitigation. Conservation easements, cluster development, and neo-urbanism are some of the general approaches that have the potential to reduce stormwater and building on sensitive lands. Nested within these approaches are a series of site planning tools – reduced street widths, grassed swales (instead of curbs) stream buffers, stormwater retention, low-maintenance landscapes. The manner in which these and other components are arranged is the art of planning. How they are used is the science of restoration.

Carpenter Village of Wake County is home to much of this research in the Triangle Area. The Division of Water Quality and the

Division of Land Quality of Department of Environment and Natural Resources jointly fund the research. WW Partners and Ferrel Land Development are the private industry cooperators with this North Carolina Cooperative Extension Service effort.

Carpenter Village is a 400-acre, neo-urban project. Because the urban BMPs planned for



This picture shows one way Carpenter Village is planning for water quality – narrow street width. Narrow streets mean less pavement. Less pavement means less impervious surface area. This reduces stormwater runoff by allowing more of the water to soak into the non-paved ground.

use in this project will affect the overall look of the neighborhood, the plans for implementation must be developed to blend smoothly with the development/ neighborhood design.* As these best management practices are put into place, readers of “Urban Waterfronts” will see the evolution of both the water quality impacts and homeowner’s responses to this new way of neighborhood living.

*A bioretention filter, diagram on back, is an example of an urban BMP.

– Nancy White

- * NC Cooperative Extension Service • NC State University • NC Sea Grant • Town of Apex • Town of Cary • Town of Morrisville • City of Raleigh • Wake County Government • Wake Soil and Water Conservation District • NC Farm Bureau Federation • NC Division of Water Quality • NC League of Municipalities • US Environmental Protection Agency • Austin Quality Foods • Carpenter Village (W&W Partner’s Inc. and Ferrel Development) • Coventry Homeowners’ Association and Centex Homes • Raleigh-Wake County Homebuilders Association • Prestonwood Country Club • Shepherd’s Vineyard Homeowners’ Association

Pilot Program Teaches Homeowners to be "Water Wise"

While the Department of Environment and Natural Resources has identified agriculture as a major source of non-point source pollution in the Neuse River, urban areas also hold the potential of negatively impacting water quality in the Neuse Basin. Overapplication of fertilizer and a general lack of knowledge about effective watering practices among homeowners and lawn care and landscape professionals have created negative environmental consequences.



WaterWise field day. Participants learn about environmentally responsible fertilization practices.

"I just never gave it a thought," says homeowner Terry Wynn of Cary referring to an important fact that most residents do not usually think about: what we do on and to our lawns and landscapes affects the water quality of the Neuse River.

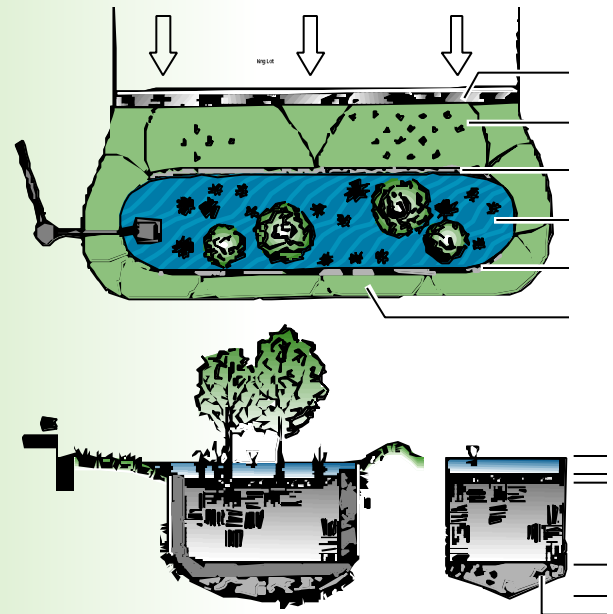
Coordinated by North Carolina Cooperative Extension Service agents Carl Matyag and Mitch Woodward and Jennifer Platt from the town of Cary, the WaterWise program is meant to show people how to maintain a healthy lush landscape, while protecting the water quality of the Neuse River.

The program is partnering with the Town of Cary's Water Conservation Program to help spread the word. The Water Wise program encourages best management, or environmentally beneficial, practices through:

- Presentations to homeowner association groups
- Identification of "volunteer landscapes" to serve as demonstration sites
- Training of Master Gardeners in WaterWise principles

Future plans include expanding the program to include training for the 150 Master Gardeners and the hundreds of lawn care and landscape professionals that serve homeowners in Wake County.

– Andy Fisher



Definition Box

- Berm** - The mound of soil that contains the water.
- Biofilter** - Biological treatment for stormwater. A biofilter helps clean water runoff and returns it back to the soil.
- Bioretention area** - This is where the water is collected. It looks like a planted garden bed. At this point water is returned to the soil and back to the plants.
- Grass filter strip** - This part of a biofilter serves as a second level for filtering. The type of grass that is used varies by region.
- Gravel curtain drain over flow** - This part of the bioretention area handles overflow from major storm events that exceed the design capacity.
- Layer of gravel** - This part of a biofilter reduces the erosive impact of runoff water. This layer also helps filter sediments.
- Sand layer** - The purpose of this layer is to facilitate infiltration and cleaning.

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