

Meandering with Mother Nature

For years, Louisburg cattle farmer Glenn Murphy has faced the same problems on his 32-acre spread just off Dyking Road. Rain, particularly catastrophic rain, such as those wrought by hurricanes Fran and Floyd, played havoc with a stream that runs through 1,800 linear feet at the heart of his property.

"There have been times when the stream has been completely washed out. Rain and water hydraulics kept cutting the stream deeper and deeper. We've had storms where we couldn't leave the house or get off the property," explained Murphy. "And there was no way to fence off the stream to keep cattle from getting to it."

Thanks to a joint effort by the NC Wetlands Restoration Program and the Franklin Soil Conservation District, Murphy's problems may be solved. Work crews have put the finishing touches on a month-long, \$170,000 project where Mother Nature's solutions are being used to help cure Mother Nature's problems.

The solution lies in reconfiguring the stream from its previously straight path, into a more meandering and natural flow, one that incorporates a series of meandering step pools that help diffuse the hydraulic velocity of the water, and address the additional problems of cattle access and stream bank erosion.

Cherri Smith, an environmental specialist with the NCWRP, who serves as project director at Murphy's farm, explained the process takes input from a lot of areas. "It takes biologists, engineers, botanists and experts in hydrology to come up with a good project like this," said Smith. "Basically, we are redirecting the flow of the stream and putting into place a means to improve the stream's

water quality before it discharges into the Tar River."

Using more than 800 tons of rock, designed to help build "rock veins" carved into the new corners and cuts of the stream, crews are also rebuilding the eroded banks of Murphy's stream by planting wetland grasses under a canopy of coconut fiber cloth. The grasses, along with the one-to-two ton boulders and trees to be planted later this year, are designed to strengthen the stream banks and prevent future erosion. A fence that will follow the newly carved course of the stream will be added by year's end, preventing cattle from entering the stream. A cattle road crossing also will be added to allow Murphy to rotate his livestock to various pasture sections that will be equipped with watering tanks.



Men at work on stream restoration project



“What we are trying to do here is create a more natural flow of the stream without taking up grazing space. We’re using natural materials to restore the stream and its banks as much as possible given the constraints we’re working with,” Smith said. “We’re committed to the long-term success of restoring wetlands and improving water quality in tributaries of the Tar-Pamlico River Basin.” “Developers help pay for this by paying the NCWRP to get the project done.”

For Murphy, the stream restoration project, now in its final phase, represents the perfect anecdote to a number of headaches. “This is already 100 times better than I imagined a solution could be,” he said. “I’m tickled to death. This is the best thing that ever happened to the farm. I won’t be marooned when the next storm comes along and the cattle will never again get into the stream, which eventually flows into the Tar River.”

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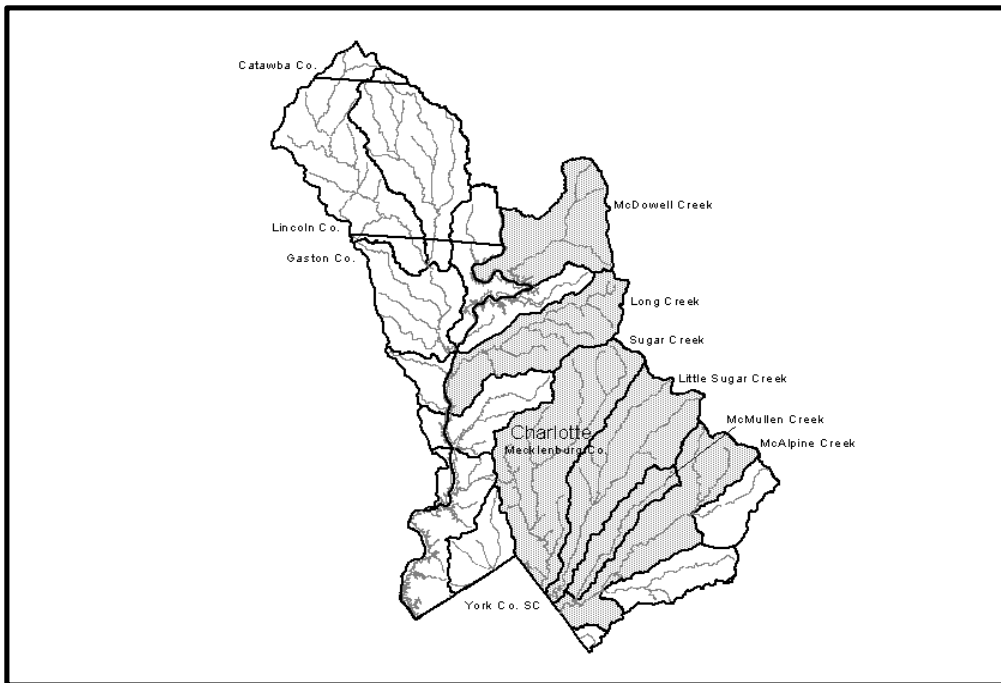
Landowner Glenn Murphy and Cheri Smith of the NCWRP

NCWRP Works to Revitalize Little Sugar Creek

The North Carolina Wetlands Restoration Program (NCWRP) is developing a stream restoration project on Little Sugar Creek in Charlotte. The project will incorporate natural channel design principles to re-establish a stable stream channel where Little Sugar Creek flows through Freedom Park. This stream has impaired water quality, and has been identified as a priority for restoration work by Mecklenburg County.

The consulting firm HDR of Charlotte is designing the project in Freedom Park. It is scheduled for construction during the winter of 2003. Nearly one mile of stream channel will be reconfigured to better handle stream flows and enhance in-stream habitat. The project includes the improvement of 5.7 acres of riparian buffer, the near-stream area that serves both as wildlife habitat and protection of the creek from adjacent land use activities.

The restoration project in Freedom Park is part of a larger NCWRP water quality improvement initiative in the Charlotte-Mecklenburg area. This effort, a Local Watershed Planning Initiative, is a partnership between the NCWRP, the city of Charlotte, and Mecklenburg County. The main goals are to develop a watershed assessment that will provide a comprehensive evaluation of water quality on a local watershed/subwatershed level, and identify and prioritize stream and wetlands restoration opportunities and other water quality and habitat enhancement opportunities. The project will complement and advance the water quality and habitat enhancement efforts currently underway in the city of Charlotte and Mecklenburg County. The NCWRP is contracting with CH2M Hill of Charlotte to produce a watershed characterization, develop water quality models, and to assist in the development of management plans for the six selected hydrologic units, which include the Sugar, Little Sugar, McMullen, McAlpine, Long, and McDowell Creek watersheds. The timeframe for the Local Watershed Planning Initiative is January 2002 to July 2003; project implementation will be ongoing throughout the planning process and after plan completion.



Charlotte Local Watershed Plan area with Targeted Local Watersheds highlighted

NCWRP Preserves Wetland Tract on the Haw River

Nestled along a wide bend of the Haw River in southeastern Rockingham County are 95 acres of bottomland hardwood wetlands and upland buffer that will never be bisected by a road or ravaged by a clear-cut. This recent acquisition by the NCWRP was made possible by the Bouchard family who believes that there are places that should be spared the bulldozer and the chainsaw.

This bottomland hardwood wetland provides important water quality and flood control benefits in a rapidly developing part of the piedmont. Protection of such tracts is crucial to protecting water quality in the watershed.

The Bouchards were offered a sizable sum for their bottomland timber but chose instead to work with the NCWRP to place a permanent conservation easement on their property. They intend to enjoy this undisturbed piece of land for the natural heritage and beauty that are made possible by the passage of time.

NCWRP Preserves Urban Wetland Buffer on Knobbs Creek



Knobbs Creek

As part of the Pasquotank River Local Watershed Plan, the NCWRP has preserved a 22.64-acre parcel on Knobbs Creek. The parcel is adjacent to the Morganview subdivision within the city limits of Elizabeth City. The donation of property was a gift of the late Calvin Lamb and Garland Scott.

The Pasquotank River arises from the Great Dismal Swamp along the Virginia/North Carolina border. The Pasquotank River Local Watershed Plan encompasses parts of Pasquotank, Camden, and Gates counties – Elizabeth City is the area’s

largest urban area. The plan seeks to restore streams and the rehabilitate watershed functions by focusing on tributaries and streams, such as Knobbs Creek, that flow into the Pasquotank River.

NCWRP sponsors Low Impact Development Workshop

Participants in a July workshop, sponsored by the NCWRP and the Upper Neuse River Basin Association, learned first-hand about an innovative development movement, which focuses on retaining hydrological conditions through the building process.

The workshop, made possible through funds provided by EPA grant#CD984375-98-0 was held July 23 and 24 at the North Durham Water Reclamation Facility.

Larry Coffman, associate director of Prince George's County, Maryland Department of Environmental Resources, Program and Planning Division, provided valuable insights on critical techniques employed as part of the Low Impact Development (LID) approach to water quality and resource protection and enhancement. Coffman, along with the work being done in Prince George's County, is on the cutting edge of the LID movement.

LID is often confused with several like-sounding monikers; Smart Growth, Better Site Design and Conservation Design come to mind. LID certainly can be used with these other philosophies. However, LID is not a technique to mitigate existing damage but rather a preplanning process that carefully looks at hydrology before development occurs and attempts to retain an area's original hydrology as opposed to dealing with hydrological change after the fact.

LID requires strategic and customized use of conservation measures and pollution prevention to address site-specific stormwater pollutant load, timing, flow rate, and volume issues. LID also looks to keep hydrology intact by using a decentralized approach and many different small-scale tools and techniques.

Examples of Low Impact Development techniques include:

- Reduction of the use of curbs and gutters
- Open space conservation
- Dispersion (rather than concentration) of drainage
- Use of infiltration swales
- Use of open drainage systems
- Green roofs (roofs with vegetation on them)
- Water barrels and cisterns (certainly more popular in times of drought)

Low Impact Development is more than just the sum of the above techniques. It is a change in development philosophy. The National LID Design Manual may be downloaded from the web at: <http://lowimpactdevelopment.org>

The less development alters an area's original hydrology the better it is for the riparian system and overall water quality. Degraded urban streams are often the most difficult to restore due to the severity of the problems and the constraints inherent in a built environment. To the degree that development can retain an area's original hydrology or reduce stormwater flows from urban areas—the less the impact on water resources.

LID is a great tool for places at the suburban fringe. More urban "built out" areas are certainly more complex and harder to restore, but many LID techniques will still work in the urban core by maximizing the time water has to infiltrate. Also, redevelopment and retrofits may present opportunities to disperse and/or slow down stormwater flows.

As our sprawling development patterns continue to stress water resources, a variety of approaches need to be used to protect our streams. LID is a tool we all need to learn more about.

NCWRP is one of several groups working to help Ellerbee Creek

Durham's Ellerbee Creek has more than its fair share of problems. Ellerbee is a 303(d) listed stream draining the heart of Durham that flows into a Water Supply Reservoir (Falls Lake). The NCWRP is working to produce a Local Watershed Plan for Ellerbee Creek – recommendations generated by this plan will address many of the nonpoint source pollution issues plaguing Ellerbee Creek.

The NCWRP is not the only organization concerned with Ellerbee Creek; the next few issues of *Restoration Review* will highlight the efforts made by the NCWRP as well as other groups working to improve Ellerbee Creek.



Ellerbee Creek, running through Hillandale Golf Course

Ellerbee Creek's in-channel habitat is getting improved

The NCDOT is widening I-85 in Durham from a four-lane divided highway to an eight-lane facility. Ellerbee Creek, South Ellerbee Creek and its tributaries are located within this area. Primarily due to its location in an urban area, these streams are degraded because of increased stormwater flows.

Large amounts of trash and several point sources of unknown origin are evident. As is typical of many urban streams, streambank erosion is common, the creeks are deeply incised and rarely overflow into the adjacent terrace except for significant storm events.

The widening of I-85 impacts 3,933 linear feet of Ellerbee Creek. To offset impacts to the streams, the NCDOT is relocating 2,684 linear feet of Ellerbee Creek. The location of the stream within the construction corridor and the constraints of an urban area limit the type of natural channel design that can be incorporated within the relocated channel. The main emphasis of the design is to create stable streams and increase overbank flooding into areas of created floodplain. Rock vanes and cross vanes are in-stream structures that are currently being installed within the relocated channel. These structures provide grade control and streambank protection by directing the deepest part of the channel away from the streambank and towards the center of the channel. North State Environmental Inc., a sub-contractor with stream and wetland restoration experience, is installing the rock vanes and cross vanes in the relocated channel.

The widening of I-85 through Durham is a high profile project, which has drawn attention from local newspapers and The Friends of South Ellerbee Creek, a group of local citizens dedicated to conserving the creek. The correct installation of in-stream devices is a critical portion of the stream relocation effort. Buck Engineering is providing technical assistance during construction of the relocated channel. Buck Engineering will coordinate through the Division Environmental Officer to provide a review of the stream relocation design, attend pre-dig meetings, provide on-site technical construction assistance/inspection and provide on-site training of NCDOT staff. Buck Engineering has provided the following services on the project since August 2001:

- Conducted a site visit to examine project objectives and construction limitations.
- Met with NCDOT Hydraulics Unit to discuss hydraulic concerns and design objectives.
- Provided general recommendations to NCDOT Division 5 personnel on the construction of the in-stream devices including right-of-way access limitations.
- Provided technical guidance to the sub-contractor concerning the specific location and construction of rock vanes and cross vanes.
- Inspected installed rock vanes and cross vanes.
- Presented a workshop on natural channel design and construction of in-stream structures to NCDOT personnel, prime contractor and sub-contractors.

The construction of the relocated channel including in-stream devices will continue throughout 2004. To date, a total of 10 in-stream structures have been installed for the project. This coordinated effort will ensure a better overall project that will meet the design objectives as well as successfully restore portions of Ellerbee Creek and South Ellerbee Creek within the project limits.

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