



Upper Shallote River Project

Introduction: Water quality in the Lumber River Coastal Drainage is highly variable. Portions are rated as excellent, supporting areas classified as Outstanding Resource Waters (ORW) and High Quality Waters (HQW), but water quality has suffered as a consequence of urbanization, population growth and development. These conditions have caused an increase in flooding, streambank erosion, incidents of shellfish closures, and sedimentation.

A 20-acre watershed on the Shallote River, which is the drainage area for three perennial streams, is slated for an intensive, neo-urban, multi-use development. Impervious surface area in the watershed will exceed 80% upon completion of the project. Preliminary sampling data collected in this tributary show that the water quality is good, but the construction of this development will affect storm water runoff velocity and volume. These hydrologic alterations will increase bacterial, nutrient, and sediment loads to the Shallote River. Data collected during the clearing process is beginning to show elevated levels of sediment, bacteria, and nutrients.

Objectives: To install and evaluate urban nest management practices for water quality and cost effectiveness for reducing hydrologic impacts, sediment, nutrients, and pathogen loads in a coastal developing watershed.

Methods: The developer, The Milliken Company, has agreed to incorporate constructed wetlands, bio-retention areas, landscape filters, and streambank restoration BMPs into the development program in an effort to mitigate the effects of urbanization. Water quality monitoring to evaluate the effectiveness of these techniques will include bi-weekly grab samples taken upstream, mid-stream and downstream of the targeted stream reaches before and after BMP implementation. In addition, single-event, composite storm samples will be collected using automatic samplers for eight storms per year in two streams. The pre- and post-BMP monitoring periods will be approximately one year each. These samples will be compared statistically to

pre-disturbance data collected prior to the initiation of construction activities. Samples will be analyzed for nutrients, sediment and fecal coliform bacteria. This monitoring design will quantify pre and post development water quality, as well as the effectiveness of BMP techniques on hydrologic alterations and pollutant parameters. In addition, detailed records of BMP installation costs will be kept during the construction phase. This cost information, in combination with water quality data from before and after BMP installation, will allow for an analysis and comparison of BMP cost-effectiveness.

Output:

1. 1000 linear feet of streambank will be repaired from previous hydrologic alteration, erosion, slumping and undercut banks and monitored for restored hydrology, sediment, nutrients, and pathogens.
2. 25,000 square feet of pocket wetlands and / or wet-storm retention will be installed. Also to be included are bioengineering techniques to restore slopes, forest, wetland hydrology, littoral vegetative benches and/or

FY	99
Agency	NC Cooperative Extension Service
Funding:	
Federal:	\$123,847
Nonfederal:	\$82,565
Total:	\$206,412
Contract:	EW20010
Expiration:	14 September 2002
Project Area:	Brunswick County
NC Basin:	LUMBER
Subbasin:	030759
HUC-14:	03040207020060
NPS Category:	400 – Urban Runoff
Functional Category:	
000 – Demonstration Projects	
400 – Planning	
Task BMPs:	
580 – Streambank Protection	
590 – Nutrient Management (urban)	
906 – Urban Filtration Basin	
911 – Urban Stormwater Wetland	

buffers. Water quality monitoring will be used to evaluate effectiveness in restoring hydrology, reducing sediment, nutrients, and pathogen loads.

3. 3,500 square feet of sand filter / bio-retention will be installed and monitored to demonstrate effectiveness for hydrologic restoration, bacterial and nutrient removal
4. Pollution prevention measures will also include innovative site design practices such as curb cuts or curb removal with inverted crowns; pavement reduction with reduced curve radii, street widths, and grassed walkways; and mounded vegetative storm water collection zones. Water quality monitoring will evaluate effectiveness in reducing sediment, nutrients, and pathogen loads.
5. Nutrient management BMPs will include education on residential fertilizer management and use of native species. Water quality monitoring will be used to evaluate effectiveness in reducing sediment and nutrients.
6. Economic costs of BMPs will be recorded during installation. Analysis of the cost-effectiveness of various stormwater control options will provide estimates of their efficiency for use in making recommendations to developers by the

Town of Shallotte. This will be suitable for generalization to the coastal region.

7. 2 educational meetings and 1 field day will be conducted to inform approximately 50 elected officials, public works officials, local leaders, citizens, resort managers and students about the purpose and effectiveness of urban BMPs and innovative stormwater controls.
8. The Final Project Report shall include the following: an abstract; an evaluation of success in preventing and controlling NPS pollution; an estimate of the water quality improvement, where appropriate; a summary of costs for installation, operation and maintenance of BMPs, and overall estimated BMP economic cost-effectiveness; a technology transfer plan; and photo-documentation of project successes.

Expected Outcome: The Town of Shallotte will participate in an economic study with NCSU economists to determine the feasibility of incorporating these innovative techniques into their stormwater management plan. Policy alternatives will be explored with the Town's participation. Following completion of the 319(h) project, the educational program will be continued under the leadership of the Cooperative Extension Service with emphasis on implementation of recommended BMPs.

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