Initial Subwatershed Strategies and Candidate Project Selection

Initial strategies were developed for Nichol Run and Pond Branch watersheds. The initial subwatershed strategies consist of two main components, identifying priority subwatersheds and identifying candidate restoration projects.

Priority Subwatershed Identification

Priority subwatersheds/candidate restoration areas were identified based on the results of Final Subwatershed Ranking, priority restoration elements from SPA, problem areas identified during subwatershed characterization and field reconnaissance, and input from the WAG team.

F.X. Browne, Inc. used the following data sources and indicators to identify priority subwatersheds/candidate restoration areas.

Table 1 Candidate Restoration Area Selection Criteria

Data Source/ Indicator	Selection Process
Subwatershed Ranking	Lowest 40% of overall objective composite scores
SPA	Best professional judgment, numerous impairments for habitat, CEM (type 2 or 3), stream crossings, erosion, bank stability/headcuts, or insufficient riparian buffer
Flooding	All subwatersheds with non-zero scores for SW Ranking flooding indicators.
Field Reconnaissance	Best professional judgment, problem areas identified during field reconnaissance
Public Comments	Subwatersheds with problem areas identified by WAG members or during the Introduction and Initial Scoping Forum

There are also many areas within Nichol Run and Pond Branch watersheds that would benefit from preservation strategies rather than solely restorative strategies. Preservation strategies target the less impacted and more pristine subwatersheds including key areas such as headwaters to prevent future degradation of the subwatershed and downstream areas.

F. X. Browne, Inc. is using the following data sources and indicators to identify priority subwatersheds for preservation strategies.

Table 2 Candidate Preservation Area Selection Criteria

Data Source/ Indicator	Selection Process
Subwatershed Ranking	Highest 20% of overall objective composite scores to identify less impacted subwatersheds
STEPL	Greatest increase in modeled pollutant loadings to identify subwatersheds (top 20%) at greatest risk for future impairments
Total Impervious Area	Total impervious area of less than 10% to identify pristine subwatersheds & Greatest increase in impervious area to identify subwatersheds (top 20%) at greatest risk for future impairments

Identifying Impairments & Preservation Qualities

Once priority subwatersheds were identified, F. X. Browne, Inc. reviewed the following data in order to identify impairments for each subwatershed.

Table 3 Impairment Data Reviewed for Each Priority Subwatershed

Data Format	Data/Indicator	Impairment/Preservation Quality Type
Table	Overall composite score	All
Table	Objective composite scores	All
Table	Flooding Indicators	Flooding & Water Quantity
Table	STEPL pollutant loads	Pollutant Loading & Water Quality
Table	STEPL streambank erosion loads	Habitat & Stream Condition
Table	% Imperviousness	All
Table	% Forest Cover	All
GIS	SPA CEM, Erosion, Headcuts	Habitat & Stream Condition
GIS	SPA Crossings, Ditch, Pipe	Habitat & Stream Condition
GIS	SPA Deficient Buffer, Habitat	Habitat & Stream Condition
GIS	SPS Fish IBI Score (Fish Community)	Habitat & Stream Condition
GIS	SPS IBI Score (Benthic Community)	Habitat & Stream Condition
GIS	E. coli	Pollutant Loading & Water Quality
GIS	303d Impaired Streams	Pollutant Loading & Water Quality
GIS	Subarea stormwater management controls	All

Reviewing the data directly removes the problems associated with relying on surrogate data used during SW Ranking. This is most notable with E. coli and SPS data that have limited data points.

Developing Strategies

General subwatershed characteristics and impairments were recorded for each priority subwatershed. Sources of subwatershed impairments were identified where evident and improvement goals/strategies were developed for each priority subwatershed. Improvement goals/strategies may include both structural and non-structural practices. The following table includes a summary of project types that may be included for the various improvement goals/ strategies.

Table 4 Summary of Subwatershed Strategies & Project Types

Strategies:	**Project Types (with Type ID #):**
Subwatershed Improvements	Stormwater Pond Retrofits (1) New Stormwater Pond (1) Culvert Retrofits*(7) Drainage Improvements^ (8) Low Impact Development Retrofits (9)
Stream Restoration	Streambank Stabilization (3) Natural Channel Restoration (2)
Road Crossing Improvements	Raising road bed (4) Increasing culvert sizes (4) Replacing damaged culverts (4) Rebuilding bridges with wider span (4)
Non-Structural Measures & Preservation Strategies	Buffer restoration Rain barrel programs Dumpsite/Obstruction removal Community outreach/Public education Conservation acquisition/easements Street sweeping Storm drain stenciling

*Culvert retrofits include designs similar to CWP Article 143, Figure 2.
^ Drainage improvements include improving outfall structures to dissipate more energy and replacing concrete channels with grass swales.

Subwatershed Improvement Strategies are intended to reduce stormwater impacts and may include retrofits to existing stormwater ponds, new stormwater ponds, culvert retrofits, drainage improvements, low impact development projects or a combination of the aforementioned project types.

Low impact development (LID) projects are Best Management Practices (BMPs) designed to provide water quality and quantity benefits for stormwater management on the site where stormwater is generated. LID projects, categorized under Subwatershed Improvement Strategies, represent a variety of project types and a single project may consist of a suite of smaller projects. Possible LID projects include:

- Sand and Sand/Peat Filters
- Rain Gardens/Bioretention
- Infiltration Basins/Trenches
- Vegetated Rooftops
- Porous/Permeable Paving

Stream Restoration Strategies are targeted at improving habitat, promoting stable stream geomorphology, and reducing in-stream pollutants due to erosion. Subwatershed Improvement Strategies are critical to the success of Stream Restoration Strategies by improving drainage and reducing peak flows. A major component of Stream Restoration Strategies is identifying and addressing the source of the impairments.

Road Crossing Improvement Strategies are intended to reduce the frequency of flooding of culverts and bridges. Wherever possible, we will first evaluate possible Subwatershed Improvement Strategies in order to reduce peak flows and minimize flooding.

Non-Structural Measures and Preservation Strategies are crucial to successful watershed management. Although it may be difficult to directly measure their benefits, Non-Structural Measures and Preservation Strategies can provide significant benefits to both the quality and quantity of stormwater runoff, improve habitat and stream quality, and help mitigate the potential impacts of future development. Because county-wide policy recommendations were adequately developed during the first round of Watershed Management Plans (WMPs), the Non-Structural Measures and Preservation Strategies developed for the Sugarland Run and Horsepen Creek WMP will focus on projects other than policy-related recommendations.

Priority Subwatersheds

Based on the data/indicators available as of the completion of this technical memorandum, the following subwatersheds have been identified as priorities for restorative or preservation strategies. Table 6 also indicates which selection criteria were used elevate the subwatershed to priority status.

Table 6 Priority Subwatersheds and Selection Criteria

	Preservation				Restoration					
Subwatershed ID	SW Ranking	Total Imperv. Area	% Increase Total Impervious	% Increase STEPL TSS	SW Ranking	SPA Data	Flooding	Public Comment/ Involvement	Field Recon/ Drainage Complaint	Field Recon/ ProRata
NI-HB-0001		X			X	X	X			X
NI-HB-0002		X								X
NI-JB-0001	X	X	X	X						
NI-JB-0002		X								
NI-JB-0003		X		X	X		X			
NI-JB-0004		X					X			
NI-JB-0005	X	X					X			
NI-JB-0006	X	X								
NI-NI-0001		X								
NI-NI-0002		X	X	X			X			
NI-NI-0003	X	X								
NI-NI-0004		X	X	X			X			
NI-NI-0005		X					X			
NI-NI-0006		X								
NI-NI-0007		X		X			X	X		
NI-NI-0008		X			X	X	X		X	X
NI-NI-0009	X	X								
NI-NI-0010		X				X	X			X
NI-NI-0011	X	X	X			X				

	Preservation				Restoration					
Subwatershed ID	**SW Ranking**	**Total Imperv. Area**	**% Increase Total Impervious**	**% Increase STEPL TSS**	**SW Ranking**	**SPA Data**	**Flooding**	**Public Comment/ Involvement**	**Field Recon/ Drainage Complaint**	**Field Recon/ ProRata**
NI-NI-0012	X	X	X						X	
NI-NI-0013		X								
NI-NI-0014		X								
NI-NI-0015		X			X	X		X	X	
NI-NI-0016							X		X	
NI-PO-0001		X								
NI-PO-0002	X	X								
NI-PO-0003	X	X								
NI-PO-0004	X	X	X	X						
NI-PO-0005	X	X								
PN-CL-0001		X	X	X	X	X	X	X		
PN-CL-0002		X	X							
PN-CL-0003		X			X					
PN-CL-0004		X			X			X		
PN-CL-0005		X	X		X					
PN-CL-0006		X			X		X			
PN-CL-0007		X			X					
PN-CL-0008		X			X			X		
PN-CL-0009		X	X		X			X		X
PN-MR-0001		X			X		X			
PN-MR-0002		X			X					
PN-MR-0003		X			X	X	X			
PN-MR-0004		X			X					
PN-MR-0005		X			X		X			
PN-MR-0006		X		X	X	X		X	X	

	Preservation				Restoration					
Subwatershed ID	**SW Ranking**	**Total Imperv. Area**	**% Increase Total Impervious**	**% Increase STEPL TSS**	**SW Ranking**	**SPA Data**	**Flooding**	**Public Comment/ Involvement**	**Field Recon/ Drainage Complaint**	**Field Recon/ ProRata**
PN-MR-0007		X	X	X	X		X			
PN-MR-0008		X		X	X				X	
PN-PN-0001		X					X	X		
PN-PN-0002		X								
PN-PN-0003		X		X						
PN-PN-0004		X		X		X	X	X		X
PN-PO-0001		X			X					
PN-PO-0002		X								
PN-PO-0003		X								
PN-PO-0004		X								
PN-PO-0005		X			X	X			X	
PN-PO-0006		X			X					X
PN-PO-0007		X			X					
PN-PO-0008	X	X								
PN-PO-0009		X								
PN-PO-0010		X								
PN-PO-0011		X						X		
PN-PO-0012		X	X					X		