

5 Summary of Watershed Plan Actions

5.1 Watershed Plan Goals, Issues, and Recommended Actions

Chapter 1 described the goals of the *Difficult Run Watershed Management Plan*:

5. To restore and protect the County's streams, 70 percent of which are in fair to very poor condition.
6. To position the County to meet state and federal water quality standards, including listed impairments for Difficult Run.
7. To support Virginia's commitment to the Chesapeake 2000 Agreement to clean the Chesapeake Bay.
8. To develop alternatives, where feasible, to the unbuilt regional ponds.

The goals were developed in partnership with Fairfax County staff and the Difficult Run Steering Committee. The plan provides a strategy to meet these goals, by identifying the watershed impairments and presenting solutions for restoration and preservation. This chapter describes the projects and policies recommended to achieve the goals of the watershed plan.

The goals and issues for the watershed were based on the project team's analysis of watershed conditions, and reviewed by the community in Steering Committee meetings and public forums, as described in Section 1.3 of this plan. The recommendations are those, which were developed for both capital improvements and Countywide policy implementation. Table 5.1 provides the list of proposed structural projects in the Difficult Run watershed. The project number, type, description and location are listed. If the project is part of a regional pond alternative, the regional pond number is also given.

The issues identified during the watershed management plan development process have been addressed in the plan as follows:

Issue 1: Stormwater runoff pollution

Structural Project Action: Carry out preliminary engineering, design, and construction of LID retrofit projects recommended in Table 5.1 below. Culvert retrofit, pond retrofit, and new pond projects will also have a positive effect on this issue.

Policy Action 4.3.5 Continue efforts to add LID design criteria and keep PFM up to date.

Issue 2: Increased stormwater runoff

Structural Project Action: Carry out preliminary engineering, design, and construction of culvert retrofit and pond retrofit projects recommended in Table 5.1 below.

Policy Action 4.3.1 Evaluate revising land development regulations to set a maximum impervious percentage for each type of development.

Policy Action 4.3.2 Evaluate requesting road construction projects to manage the whole roadway, not just the added lane widths.

Policy Action 4.3.3 Evaluate and implement incentives where appropriate for the use of pavers or porous pavement for seasonal or overflow parking.

Policy Action 4.3.4 Evaluate and implement incentives into County ordinances to consider establishing more stringent stormwater quality control standards for redevelopment.

Issue 3: Uncontrolled stormwater

Structural Project Action: Carry out preliminary engineering, design, and construction of new pond projects recommended in Table 5.1 below.

Non-Structural Measure 4.3.7 Conduct a drainage study and develop an improvement plan for the right fork of Dog Run.

Non-Structural Measure 4.5.1 In partnership with the Town of Vienna, conduct a drainage study and develop an improvement plan to reduce flooding in Vienna near Echols Street.

Issue 4: Erosion and streambank stability

Structural Project Action: Carry out preliminary engineering, design, and construction of stream restoration and drainage retrofit projects recommended in Table 5.1 below.

Non-Structural Measure 4.2.2 Enhance inspections of all outfalls and other interfaces between the man-made and natural drainage systems for scour and erosion and make repairs as necessary.

Watershed-Wide Action 3.38.2: Remove obstructions from stream corridors.

Watershed-Wide Action 3.38.4: Repair utility crossings.

Issue 5: Stream water quality

Structural Project Action: Carry out preliminary engineering, design, and construction of buffer restoration projects recommended in Table 5.1 below.

Non-Structural Measure 4.2.3 Continue and enhance the volunteer monitoring program.

Policy Action 4.4.1 Evaluate and implement incentives that could be applied locally to encourage lawn care companies in Fairfax to enroll in the Virginia Water Quality Improvement Program.

Non-Structural Measure 4.4.2 Education and outreach for proper lawn care.

Non-Structural Measure 4.4.3 Golf course nutrient management. Work with golf course managers within the watershed to evaluate turf management practices.

Non-Structural Measure 4.4.4 Develop an enhanced illicit discharge and sewer infiltration / inflow removal program to eliminate potential sewer leaks, overflows and illegal cross-connections.

Watershed-Wide Action 3.38.1: Remove dumpsites from stream corridors.

Issue 6: Stream habitat loss

Structural Project Action: Carry out preliminary engineering, design, and construction of stream restoration projects recommended in Table 5.1 below.

Watershed-Wide Action 3.38.3: Remove fish passage obstructions

Watershed-Wide Action 3.38.5: Restore riparian buffers

Issue 7: Natural resource protection measures

Policy Action 4.6.2 Continue efforts to develop a forest conservation ordinance that would preserve existing woodlands.

Issue 8: Stormwater regulatory compliance

Policy Action 4.3.5 Update and improve the County's database of all public and private SWM facilities.

Policy Action 4.3.6 Enhance SWM inspection, maintenance, and enforcement programs.

Table 5.1 Proposed Improvement Projects by Subwatershed

Project	Project Type	Description	Location	Site
Angelico Branch				
DF9051D	Culvert Retrofit	Redesign to allow for sediment transport and fish passage	Upstream of Cedar Pond Road	D-51
DF9051E	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-51
DF92117	Stream Restoration	2754 feet of stream regrading, buffer replanted	South of Whippoorwill Rd and north of Lawyers Rd	S117
Captain Hickory Run				
DF9005B	Culvert Retrofit	Additional storage volume	At Polo Place	D-05
DF9006B	Drainage Retrofit	Riprap outlet protection	At outfalls within this drainage area	D-06
DF9007A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-07
DF9007C	Culvert Retrofit	Use floodplain storage to settle out sediment and allow nutrient uptake	Upstream of Sunnybrook Drive	D-07
DF9007D	LID Retrofit	Reduce runoff pollutant loads	Commercial area west of Walker Road	D-07
DF9106A	Pond Retrofit	Create more storage for channel protection and water quality improvements	At Georgetown Pike	C06
DF9106B	Pond Retrofit	Create more storage for detention and water quality improvements	Downstream of Columbine Street	C06
DF9274	Stream Restoration	Excavating a new floodplain, re-meandering the stream	At end of Walker Glen Court	S74
DF9706	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C06

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9806	LID Retrofit	A bioswale, biofiltration retention/detention facility and natural channel improvement	North of Georgetown Pike	C06
Colvin Run				
DF9012	Pond Retrofit	Increase detention for peak flow reduction	Private property off of Crowell Road	D-12
DF9013	Pond Retrofit	Reduce peak flow rates and improve water quality treatment	In business development on Business Center Drive	D-13
DF9013A	Pond Retrofit	Increase detention and water quality treatment	In business development on Business Center Drive	D-13
DF9014A	Culvert Retrofit	Peak flow detention and increase nutrient removal	Upstream side of Little Run Court	D-14
DF9014B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-14
DF9118A	Pond Retrofit	Increase detention and water quality improvements	Culvert under Sunset Hills Road	C18
DF9118B	Pond Retrofit	Improve water quality treatment	Facility on south side of Dulles Toll Road	C18
DF9151	New Pond	Pond Retrofit	Improve water quality treatment and manage peak flows	C51
DF9152	Pond Retrofit	Increase detention and attenuate discharges, pollutant removal	Between Bennington Woods Road and Baron Cameron Avenue	C52
DF9213	Stream Restoration	2200 feet of streambank stabilization and trees replanted in riparian zone	In Lake Fairfax Park, west of Hunter Mill Road	S13
DF92135	Stream Restoration	1600 feet of bank stabilization and protection	South of North Shore Drive	S135
DF92136	Stream Restoration	1850 feet of bank stabilization and remove stream blockage	East of Wiehle Avenue and south of Yellowwood Court	S136
DF9249	Stream Restoration	700 feet of bank stabilization and trees replanted in riparian zone	South of Fairway Drive and west of Westbriar Drive	S49
DF9295	Stream Restoration	Adjust pattern and profile; bank protection	Mainstem, near confluence with Difficult Run	S95
DF9507B	Culvert Retrofit	Increase detention and water quality treatment	Culvert under Wiehle Avenue	C07
DF9508A	Culvert Retrofit	Induce ponding and time of concentration	Along Village Road and Baron Cameron Avenue	C08
DF9508B	Culvert Retrofit	Water quality improvements	Culvert under Baron Cameron Avenue	C08

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9512A	Culvert Retrofit	Increase detention and water quality treatment	Culvert under North Shore Drive	C12
DF9512B	Culvert Retrofit	Increase detention and reduce peak flows	Culvert under North Shore Drive	C12
DF9512C	Culvert Retrofit	Stormwater detention and vegetative uptake	Culvert under Wiehle Avenue	C12
DF9550A	Culvert Retrofit	Provide channel protection storage	Culvert under Baron Cameron Avenue	C50
DF9551	Culvert Retrofit	Allow solids to settle and regulate flow	Upstream of Gates Meadow Way	C51
DF9552A	Culvert Retrofit	Peak flow attenuation, sediment removal	Upstream of Bennington Woods Road	C52
DF9552B	Culvert Retrofit	Settle out solids and vegetative uptake	Upstream of North Shore Drive	C52
DF9707	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C07
DF9712	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C12
DF9750	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C50
DF9751	Drainage Retrofit	Energy dissipation at outlets to reduce scour and erosion	At outfalls within this drainage area	C51
DF9807	LID Retrofit	Rain garden	Wiehle Ave and North Shore Dr	C07
DF9808	LID Retrofit	Reduce impervious area and increase water quality	Intersection of Village Drive and North Shore Drive	C08
DF9809	LID Retrofit	Reduce imperviousness, increase flow path, improve water quality and quantity	South of the intersection of Village Drive and North Shore Drive	C09
DF9812	LID Retrofit	Reduce imperviousness, increase flow path, and plant vegetation for uptake	Between Isaac Newton Square and Wiehle Avenue	C12
DF9818	LID Retrofit	Reduce imperviousness, increase flow path, improve water quality and quantity	Throughout catchment north of the Dulles Toll Road	C18
Difficult Run, Lower				
DF9009A	Pond Retrofit	Increase detention and improve water quality	End of Lyons Street	D-09
DF9009B	Pond Retrofit	Increase detention and improve water quality	Near Wood Glade Drive	D-09
DF9009C	Drainage Retrofit	2424 feet of paved ditch and outlet protection	At outfalls within this drainage area	D-09
DF9010A	Culvert Retrofit	Increase time of concentration and decrease peak flows	Upstream side of Forestville Drive	D-10

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9010B	Culvert Retrofit	Increase time of concentration and decrease peak flows	Upstream side of Trotting Horse Lane	D-10
DF9010C	Pond Retrofit	Reduce peak flow rates and scour	Upstream side of Tackroom Lane	D-10
DF9010D	Drainage Retrofit	Reduce sediment load and outfall protection	At outfalls within this drainage area	D-10
DF9010E	Stream Restoration	Restore incised stream	Upstream of Tackroom Lane	D-10
DF9076A	Culvert Retrofit	Reduce erosion and the peak flow rate	Culvert under Falls Run Road	D-76
DF9076B	Pond Retrofit	Reduce erosion and the peak flow rate	Farm pond below Falls Run Road	D-76
DF9284	Stream Restoration	918 feet of streambank stabilization and reshaping	East of Old Dominion Drive	S84
DF9285	Stream Restoration	1101 feet of stream relocation and stabilization	Where Colvin Run Road intersects Leesburg Pike	S85
DF9289	Stream Restoration	Moderate regrading, bank protection on meanders	Confluence with Captain Hickory Run	S85
DF9515A	Culvert Retrofit	Increase detention and increase settling and nutrient uptake	Under Leesburg Pike	C15
DF9515B	Culvert Retrofit	Increase detention and allow pollutants to settle out	Upstream of Locust Hill Drive	C15
Difficult Run, Middle				
DF9011A	Pond Retrofit	Increase detention and reduce peak flow rate	Upstream of Windstone Drive	D-11
DF9011C	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-11
DF9122	Pond Retrofit	Redesign dry pond for channel protection and water quality improvements	Between Brittenford Drive and Hunt Country Lane	C22
DF92106	Stream Restoration	Stabilize streambanks and replant riparian area	Mainstem, north of Dulles Toll Road	S106
DF92108	Buffer Restoration	668 feet, replanting floodplain	South of Dulles Toll Road, east of Hunter Mill Road	S108
DF9522A	Culvert Retrofit	Increase detention time and allowing settlement of sediment and pollutants	Driveway off of Willow Crest Court	C22
DF9522B	Culvert Retrofit	Reduce peak discharges and settle out pollutants and sediment	Upstream of Brittenford Drive	C22
DF9522C	Culvert Retrofit	Increase detention time, settle out pollutants and sediment	At Brittenford Drive, east of Raleigh Hill Road	C22
DF9522D	Culvert Retrofit	Reduce peak discharges and settle out pollutants and sediment	At Brittenford Drive, east of Landon Hill Road	C22
DF9555A	Culvert Retrofit	Store runoff and settle out sediment	Upstream of Hunter Mill Road	C55

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9555B	Culvert Retrofit	Store runoff and settle out sediment	Upstream of Dulles Toll Road	C55
DF9555C	Culvert Retrofit	Reduce peak discharges and settle out pollutants and sediment	At Brittenford Drive, east of Rosaleigh Court	C55
DF9722	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C22
DF9755	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C55
Difficult Run, Upper				
DF9032A	Culvert Retrofit	Create storage, reduce peak flows	Upstream side of Miller Heights Road	D-32
DF9032B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-32
DF9033	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-33
DF9034A	Culvert Retrofit	Reduce peak discharges, reduce erosion	Upstream side of Miller Heights Road	D-34
DF9034B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-34
DF9035A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-35
DF9035B	LID Retrofit	Replace paved drainage swale with bioswale, create a bioretention facility	East side of Young Drive	D-35
DF9045A	LID Retrofit	Educational demonstration site for biofiltration facilities	Left of the drive at the Oakton Swim and Racquet Club	D-45
DF9045B	Pond Retrofit	Retrofit of dry facility for peak flows	By Waples Mill Road and Bronzedale Drive	D-45
DF9045D	Stream Restoration	Stabilize streambanks and replant riparian area	By Waples Mill Road	D-45
DF9059A	Pond Retrofit	Provide adequate detention for stormwater flows	Along Center Ridge Road	D-59
DF9059B	Drainage Retrofit	Energy dissipation at outlets, remove concrete ditches	At outfalls within this drainage area	D-59
DF9059C	Pond Retrofit	Increase detention, include water quality improvements	Upstream of Berryland Drive	D-59
DF9072A	Pond Retrofit	Re-build embankment, provide greater detention, nutrient uptake	Across Vale Road from Chris Wood Court	D-72
DF9141A	Pond Retrofit	Peak flow attenuation	On Fair Oaks Mall property, next to Lee Jackson Mem. Hwy	C41
DF9141B	Pond Retrofit	Provide more channel protection, water quality treatment	North side of US 50	C41
DF9142	Pond Retrofit	Enhance water quality, additional detention	East end of the Fair Oaks Mall property	C42

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9143A	Pond Retrofit	Water quality improvements for this and 8 other ponds	Eastern boundary of the Fairfax County Government Center	C43
DF9143B1	Pond Retrofit	Channel protection measures	South of project DF9143A and north of Rockaway Lane	C43
DF9143B2	Pond Retrofit	Increase detention, reduce peak flows	South of project DF9143A and north of Rockaway Lane	C43
DF9143C	Pond Retrofit	Increase available volume for storage	North of Government Center Parkway	C43
DF9143D	Pond Retrofit	Sediment forebays, remove concrete channels, increase detention volume	North side of the stream from project DF9143C	C43
DF9143E	Pond Retrofit	Retrofit for increased detention time, remove concrete channels, grass ditches	Between Glen Alden Road and Government Center Parkway	C43
DF9143F2	Pond Retrofit	Maximize detention time, create natural channels, water quality improvements	North of the Government Center building	C43
DF9143H	Pond Retrofit	Enhance water quality, additional detention s	Between Government Center Parkway and Legato Road	C43
DF9171	Pond Retrofit	Increase detention and attenuate discharges, pollutant removal	East of Pender Drive	C52
DF9172	New Pond	Increase detention time, enhance water quality features	East of Lower Park Drive	C57
DF9238	Buffer Restoration	593 feet of planting a forested buffer	North of intersection of Waples Mill Road and Fox Mill Road	S38
DF9244	Stream Restoration	1016 feet of reshaping streambanks and creating stable features	North of Government Center Parkway	S44
DF9245	Stream Restoration	587 feet of reshaping streambanks, plant floodplain with native trees and grasses	North of intersection of Fairfax Farms Road and Valley Road	S45
DF9263	Stream Restoration	255 feet of excavating floodplain bench, reshape streambanks, replant floodplain	Southwest of Lawyers Road before Hunters Crest Way	S63
DF9741	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C41
DF9841	LID Retrofit	Reduce imperviousness, lengthen flow times, and improve water quality	On and around Fair Oaks Mall	C41
DF9842	LID Retrofit	Reduce imperviousness, lengthen flow times, and improve water quality	Throughout the Fair Oaks Mall property	C42
DF9843	LID Retrofit	Inlet filtration, removal of pavement or porous pavement, bioretention	Entire parking area for the Government	C43

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location Center	Site
DF9871	LID Retrofit	Inlet filtration, removal of pavement or porous pavement, and bioretention	East of Pender Drive	C71
Dog Run				
DF9001A	Drainage Retrofit	Provide outfall protection	At outfalls within this drainage area	D-01
DF9001B	Pond Retrofit	Expand detention period, improve the water quality	End of Branton Lane	D-01
DF91135	Pond Retrofit	Increase the storage and the amount of treatment	Between Water Pointe Lane and the Reston Parkway	C135
DF9202	Stream Restoration	484' of stream restoration and bank stabilization	Southwest of Leesburg Pike and east of Reston Pkwy	S02
DF9278	Stream Restoration	558' of stream restoration and bank stabilization	By Georgetown Pike and Kimberly Place	S78
DF9279	Buffer Restoration	Restore buffer	E of Stones Throw Drive	S79
DF9501B	Culvert Retrofit	Dry detention facility with water quality improvements	Upstream of Stones Throw Drive	C01
DF9501C	Culvert Retrofit	Store and treat streamflow	End of Bright Pond Lane	C01
DF9701	Drainage Retrofit	Provide energy dissipation with outlet protection	At outfalls within this drainage area	C01
The Glade				
DF92104	Stream Restoration	Remove stormwater pipe in stream and stabilize banks	Southwest of Stirrup Road	S104
DF9540A	Culvert Retrofit	Increase the time of concentration, provide attenuation, settling solids	Upstream side of Steeplechase Drive	C40
DF9540B	Culvert Retrofit	Increase the time of concentration, settling solids	Upstream side of Colts Neck Road	C40
DF9740	Drainage Retrofit	Remove ditch channels, outfall protection	At outfalls within this drainage area	C40
Little Difficult Run				
DF9023A	Pond Retrofit.	Retrofit of dry facility for extended detention and water quality	Between Birdfoot Lane and Raccoon Ridge Court	D-23
DF9039A	Culvert Retrofit	Discharge control and water quality improvements	Upstream side of Westwood Hills Drive	D-38
DF9039B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-39
DF9043A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-43
DF9043B	Pond Retrofit	Retrofit of dry facility for peak flows and water quality	Between Wild Cherry Place and Black Fir	D-43

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
			Court	
DF9043C	LID Retrofit	Biofiltration swale	Next to parking lot of Fox Mill Swim and Tennis Club	D-43
DF9058A	Culvert Retrofit	Provide detention	Upstream side of Thoroughbred Road	D-58
DF9058B	Culvert Retrofit	Provide detention to reduce erosion, increase vegetative uptake	Upstream side of Folkstone Road	D-58
DF9061A	Culvert Retrofit	Provide detention and address water quality issues	At Stuart Mill Road	D-61
DF9061B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-61
DF9061C	Culvert Retrofit	Reduce peak discharges, increase vegetative uptake	Upstream of Foxclove Road	D-61
DF9061D	Pond Retrofit	Create storage to reduce peak discharges	Along Foxclove Road	D-61
DF92114	Stream Restoration	1115 feet of bank regrading, replant native vegetation	East of Colt Run Road before Stuart Mill Road	S114
DF9236	Stream Restoration	Excavating new floodplain, re-meandering the stream	West of intersection of Stuart Mill Road and Birdfoot Lane	S36
DF9265	Stream Restoration	Minor grading, revegetate buffer	West of Fox Mill Rd	S65
Old Courthouse Branch				
DF9119	New Pond	Dry facility design for channel protection	West of Gosnell Road	C19
DF9157	New Pond	Reduce peak flows	At Leesburg Pike and Laurel Hill Road	C57
DF9557	Culvert Retrofit	Water quality and channel protection improvements	Upstream of Laurel Hill Road	C57
DF9157A	Pond Retrofit	Dry retrofit of D-107	Crossing of Jarrett Valley Drive	C57
DF9757	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C57
DF9819	LID Retrofit	Porous pavement, inlet filters, bioretention parking medians	Intersection of Leesburg Pike and Chain Bridge Road	C19
Piney Branch				
DF9027A	Culvert Retrofit	Increase detention, water quality improvements	Two culverts upstream of Batten Hollow and Brookhill Roads	D-27
DF9027B	Drainage Retrofit	233 feet of ditch removal, energy dissipation at outfalls	At outfalls within this drainage area	D-27
DF9029A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-29

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9029B	New Pond	Modified regional pond	At site of original D-29	D-29
DF9073A	LID Retrofit	Reduce the runoff rate and volume	Madison High School and Flint Hill Elementary School	D-73
DF9073B	Drainage Retrofit	1389 feet of stream naturalization, ditch removal	At outfalls within this drainage area	D-73
DF9073C	Pond Retrofit	Redirect stream into existing farm pond	Along Riviera Drive	D-73
DF9074A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-74
DF9129	Pond Retrofit	Increase the storage and improve water quality treatment	At the bend in Liberty Tree Lane	C29
DF92110	Stream Restoration	Relocate the stream to the center of the natural valley	South off Fosbak Drive	S110
DF9729	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C29
DF9730	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C30
DF9830	LID Retrofit	Reduce runoff volume and pollutant loads	Along Maple Avenue and the W&OD Trail	C30
Piney Run				
DF9002A	Culvert Retrofit	Create a storage area to decrease peak velocities	Upstream of Riva Ridge Drive	D-02
DF9002B	Drainage Retrofit	Provide outfall protection	At outfalls within this drainage area	D-02
DF9003AA	Pond Retrofit	Facility retrofit for detention, channel protection	Near Tottenham Court	D-03
DF9003AB	Pond Retrofit	Create channel protection, storage volume	Near Tottenham Court	D-03
DF9003B	Drainage Retrofit	Improvements at manmade and natural channel interfaces	At outfalls within this drainage area	D-03
DF9064A	Pond Retrofit	Increase the detention volume, water quality improvements	Behind private residences by Challedon Road	D-64
DF9064B	Culvert Retrofit	Create storage area to reduce peak discharges	North of Brevity Drive	D-64
DF9064C	Pond Retrofit	Increase detention volume and water quality function	The end of Artemel Court	D-64
DF9064D	Drainage Retrofit	Improvements at manmade and natural channel interfaces	At outfalls within this drainage area	D-64
DF9103	Pond Retrofit	Modify outflow orifice for channel protection, reduce peak flows	Between Bright Pond Lane and Fieldview Drive	C03
DF9205	Stream Restoration	Reshape streambanks, plant native trees and shrubs	South of Walker Mill Road	S05
DF9280	Buffer Restoration	684' of stream to be replanted with native trees and shrubs	On either side of Bishops Gate Road	S80

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9503	Culvert Retrofit	Longer detention period, vegetative uptake of nutrients	Intersection of Hawthorne Court and Reston Parkway	C03
DF9504A	Culvert Retrofit	Increase detention time, reduction in the peak flows	Upstream side of Tiverton Circle	C04
DF9504B	Culvert Retrofit	Increase detention, reduce peak flows and pollutant loads	Culvert under Wiehle Avenue	C04
Rocky Branch				
DF9030A	Pond Retrofit	Retrofit of dry facility for water quality and channel protection	End of Martinhoe Court	D-30
DF9030B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-30
DF9031A	Pond Retrofit	Retrofit of dry facility for peak flows and water quality	Intersection of Oakton Ridge Circle and Oakton Ridge Court	D-31
DF9031C	LID Retrofit	Replace a grassed swale with a bioswale	Intersection of Oakton Ridge Circle and Oakton Ridge Court	D-31
DF9036A3	Pond Retrofit	Provide stormwater management	Near Miller Road	D-36
DF9139	Pond Retrofit	Increase the detention volume	Intersection of Rosehaven and Jermantown Roads	C39
DF92130	Stream Restoration	918 feet of stream naturalization	West of Mystic Meadow Road, south of Hunter Mill Road	S130
DF92131	Stream Restoration	1265 feet of stream naturalization, restore buffer	West of Hunter Mill Road before intersection with Vale Road	S131
DF9839	LID Retrofit	Reducing volume and peak rates of runoff, water quality improvements, restore natural regime	Around intersection of Jermantown and Route 123	C39
Rocky Run				
DF9019A	Drainage Retrofit	Reduce erosion at outfalls	At outfalls within this drainage area	D-19
DF9066A	Pond Retrofit	Peak flow reduction, enhance water quality treatment	Upstream of Daviswood Drive	D-66
DF9121	Pond Retrofit	Water quality retrofit	Regional pond	D-67 C21
DF9291	Stream Restoration	1760 feet of streambank stabilization and buffer restoration	North of Bellview Road, south of Galium Court	S91
Sharpers Run				
DF9020B	Drainage Retrofit	Energy dissipaters	At outfalls within this drainage area	D-20
DF9290	Stream Restoration	Stabilize streambanks and replant riparian area	Downstream of Bellview Road	S90
Snakeden Branch				
DF9024A	Pond Retrofit	Channel protection and water quality improvements	Existing facility near Clovermeadow Drive	D-24

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9024B	Culvert Retrofit	Detention storage and pollutant removal	Upstream of the W&OD Trail	D-24
DF9024C	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-24
DF9123B	Pond Retrofit	Peak flow reduction	Existing pond on upstream side of Sugarberry Court	C23
DF9124A	Pond Retrofit	Sediment removal, nutrient uptake	East of Barton Hill Road	C24
DF9124C	Pond Retrofit	Increase detention volume	Intersection of the Dulles Toll Road with W&OD Trail	C24
DF92101	Stream Restoration	1160 feet of bank stabilization, outfall reconfiguration, protect utility lines	North of Sunrise Valley Road	S101
DF92102	Stream Restoration	1404 feet of bank stabilization, buffer restoration	North of Sunrise Valley Road	S102
DF9225	Stream Restoration	2597 feet of bank stabilization and floodplain reconnection	East and west of Soapstone Drive	S25
DF9523	Culvert Retrofit	Extend detention, settle solids and vegetative uptake	Upstream side of Soapstone Drive	C23
DF9524	Culvert Retrofit	Channel protection for D/S project	N of Sunrise Valley Dr, E of Preston White Dr	C24
DF9535A	Culvert Retrofit	Detention storage and peak flow reduction	Upstream side of Colts Neck Road	C35
DF9535B1	Culvert Retrofit	Increase detention storage	Culvert under Glade Drive	C35
DF9535B2	Culvert Retrofit	Increase detention storage	Culvert under Glade Drive	C35
DF9723	Drainage Retrofit	Energy dissipation and stabilization at outlets	At outfalls within this drainage area	C23
DF9724	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C24
DF9728	Drainage Retrofit	Remove concrete ditches	Along Purple Beech Drive and Ridge Heights Road	C28
DF9735	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C35
DF9835	LID Retrofit	Reduce imperviousness, increase flow paths, reduce runoff by increasing infiltration	In and around Hunters Woods Village Shopping Ctr	C35
South Fork Run				
DF9040A	Pond Retrofit	Increase the level of stormwater management	End of Nathaniel Oaks Drive	D-40
DF9040B	Pond Retrofit	Retrofit of dry facility for peak flows and water quality	Near Falkirk Drive	D-40

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9040C	Pond Retrofit	Retrofit of dry facility for peak flows and water quality	Near intersection of Birdsboro Drive and Country Ridge Lane	D-40
DF9040D	Pond Retrofit	Retrofit of dry facility for peak flows and water quality	End of Navy Drive	D-40
DF9040E	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-40
DF9041A	Drainage Retrofit	Energy dissipation at outlets, remove concrete ditched	At outfalls within this drainage area	D-41
DF9041B	Pond Retrofit	Retrofit of facility for peak flows	Between Tilton Valley Drive and Hickory Hills Drive	D-41
DF9041C	Pond Retrofit	Retrofit of facility for peak flows	South Vale Road, east of Valewood Drive	D-41
DF9041D	LID Retrofit	Rain garden demonstration site	Along Brecknock Street	D-41
DF9041E	Pond Retrofit	Reduce erosive flows at outfall, manage peak flows	Along a private drive off Vale Road	D-41
DF9079A	Drainage Retrofit	Reduce scour and erosion at outfalls	At outfalls within this drainage area	D-79
DF9079B	Culvert Retrofit	Increase detention	Near the intersection of Honda Road and Lariat Lane	D-79
DF92120	Stream Restoration	446 feet of reshaping banks, establish forested buffer	East of Fox Mill Road, north of Deerfield Drive	S120
Wolftrap Creek				
DF9017A	Pond Retrofit	Increase detention and water quality features	Existing pond along Spring Ridge Lane	D-17
DF9017B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-17
DF9028A	Drainage Retrofit	Energy dissipation at outlets, 1685 feet of ditches removed	At outfalls within this drainage area	D-28
DF9028B	Culvert Retrofit	Eliminate larger discharges, add water quality measures	End of Ashgrove Lane	D-28
DF9028C	Pond Retrofit	Include more detention and water quality improvements	Along Lupine Den Road	D-28
DF9054A	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-54
DF9054B	New Pond	Modified regional pond	Site of original	D-54
DF9065A	New Pond	Implementation of planned regional facility	Near Pinstripe Court	D-65
DF9065B	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	D-65
DF9116A	Pond Retrofit	Improve channel protection and water quality treatment	Between Kilby Glen Drive and Shouse Drive	C16

Difficult Run Watershed Management Plan
Summary of Watershed Plan Actions

Project	Project Type	Description	Location	Site
DF9116B	Pond Retrofit	Improve channel protection and water quality treatment	Along Deramus Farm Drive	C16
DF9117	Pond Retrofit	Manage peak flows, plant vegetation	Between Shouse Drive and Towlston Road	C17
DF9133A	Pond Retrofit	Pollutant removal, additional detention	At the outlet to Catchment 33	C33
DF9133B	Pond Retrofit	Peak flow reduction, pollutant load removal	Upstream side of Silentree Drive	C33
DF92124	Stream Restoration	Plant native trees and shrubs in riparian zone, create nested channel, agreement with homeowners	South of Chain Bridge Road, west of Westwood Forest Road	S124
DF92125	Buffer Restoration	Plant the riparian zone with woody trees and shrubs	Within the Westbriar Country Club golf course	S125
DF92126	Stream Restoration	Bank stabilization, replant riparian area	West of Foxstone Drive	S126
DF9520A	Culvert Retrofit	Reduce peak flows, settle solids	Culvert under Dulles Toll Road	C20
DF9520B	Culvert Retrofit	Improve channel protection	Culvert under Dulles Toll Road	C20
DF9531B	Culvert Retrofit	Increase storage, eliminate road overtopping	Above Creek Crossing Road	C31
DF9532A	Culvert Retrofit	Increase detention, use floodplain to settle solids	Upstream side of Follin Lane	C32
DF9532B	Culvert Retrofit	Increase detention, use floodplain to settle solids	Upstream side of Woodford Road	C32
DF9558	Culvert Retrofit	Extend detention, improve water quality	Upstream side of Old Courthouse Road	C58
DF9716	Drainage Retrofit	Remove concrete ditches, outlet protection	Along Tuba and Laurin Courts	C16
DF9731	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C31
DF9758	Drainage Retrofit	Energy dissipation at outlets	At outfalls within this drainage area	C58
DF9831	LID Retrofit	Removal or renovation of parking lot	Rear parking lot on Follin Lane	C31
DF9831B	LID Retrofit	Reduce imperviousness, bioretention, rooftop detention, or green roofs	On both sides of Maple Street	C31
DF9832	LID Retrofit	Reduce imperviousness	Notre Dame and Our Lady of Good Counsel Catholic Church	C32
DF9833	LID Retrofit	Increase infiltration, reduce imperviousness	Upper third of Catchment 33	C33

5.2 Regional Ponds

In 1989, the County adopted a Regional Stormwater Management Plan, which included 134 sites for pond construction, most of which were in the Cub Run and Difficult Run watersheds. Sixty-two regional ponds were planned for eventual construction in Difficult Run. Only 10 of these were constructed leaving 52 planned facilities still unbuilt as of the date of this plan. In the areas that were to be treated by these 52 facilities, most on-site SWM facilities were waived for new development. As a result, these areas are similar to those developed before 1974, in that they have no stormwater controls.

One of the goals of the *Difficult Run Watershed Management Plan* is to find alternatives to the 52 unbuilt regional ponds in the watershed. At the beginning of the study, the drainage areas for these ponds were delineated as a catchment so that they could be assessed and modeled individually.

Each unbuilt regional pond site was treated as a candidate site for improvements. Site visits were made and alternative projects were developed where feasible. Projects were selected to provide water quality or channel protection improvements based on the type of impairment found at the site. At a number of sites, the stream system was found to be in good condition, and the drainage area to the pond was either forested or relatively undeveloped. For these locations, the recommendation was made to delete the proposed regional pond without alternatives.

The outcome of the projects is shown in Table 5.2

Table 5.2 Disposition of Unbuilt Regional Ponds

Disposition	No. of Ponds	Pond Sites
Recommend deletion of the proposed regional pond and implementation of a group of alternative projects.	10	D13, D23, D27, D32, D33, D34, D39, D41, D43, D59,
Recommend deletion of the proposed regional pond and no alternative projects are necessary.	8	D06, D16, D18, D20, D21, D69, D71, D151
Recommend deferral of the proposed regional pond and implementation of a group of alternative projects. If the alternative projects cannot be implemented, then a modified scope regional pond may be considered at a future date.	23	D01, D02, D05, D07, D09, D10, D11, D12, D14, D19, D24, D28, D30, D31, D35, D38, D40, D51, D58, D61, D66, D72, D74, D79
Recommend implementation of a reduced-size or modified regional pond. If the pond still cannot be implemented, then pursue implementation of a group of alternative projects. If an agreement has been executed to construct the pond, then the facility should be implemented as designed.	11	D03, D17, D29, D36, D45, D54, D64, D65, D73, D76

5.3 The Reston Watershed Plan

The *Reston Watershed Plan* (GKY, 2002) was completed in April 2002 by a team of consultants working with staff from the Reston Association and Fairfax County, assisted by the Reston Watershed Action Group (ResWAG), an ad hoc stakeholders group specifically established to oversee development of the Plan. ResWAG volunteers assisted in public outreach, data collection, fieldwork, and document review.

The Plan had its beginning with the report of the Reston Association's 2000 Watershed Subcommittee, entitled *Reston's Watersheds: An Assessment of Conditions and Management Strategies*, which recognized the need for a watershed management plan as a high priority to improve the quality and condition of Reston's watersheds. The report identified two significant problems throughout the watersheds:

- System-wide stream channel incision which effectively disconnects stream from their floodplains, in turn causing more stream erosion.
- High sediment loads from erosion, which are deposited in Reston's lakes, gradually filling them in.

In general, the study found that biological conditions were poor, and were caused primarily by poor habitat instead of water quality problems. The driving factor causing the habitat impairment was high stream flows from uncontrolled stormwater.

Methods

The technical approach to the Reston watershed analysis involved physical, biological, and water quality assessments of stream and lake conditions and hydraulic modeling of targeted stream reaches. Within the Difficult Run watershed, streams in the Colvin Run, Snakeden Branch, and The Glade subwatersheds were studied.

Physical Assessment The physical assessment of the streams was conducted in two phases. A broad-level stream assessment provided an inventory of general stream channel characteristics based on field observations, assessing the riparian zone, the stream channel, and stream banks.

The second phase was a characterization of stream condition, which was a more detailed assessment of stream stability, erosion potential, and sediment supply and deposition. Erosion potential was assessed using a modified version of the Bank Erosion Hazard Index developed in *Applied River Morphology* (Rosgen, 1996). Stream condition was also assessed by evaluating aquatic habitat using the United States Environmental Protection Agency's Rapid Bioassessment Protocols. This method is a qualitative rating performed concurrently with the stream assessments, resulting in a numerical score for habitat quality.

Hydraulic Modeling Computer models of rainfall, runoff, and streamflow were developed for several of the stream reaches under study, identified by ResWAG as the ones most impaired by urbanization. Modeling was performed by the consultant team. Model results provided information on the depth and velocity of flow in the reaches studied, which in turn allowed the modelers to estimate the degree of incision and the erosion potential for each reach.

Biological Assessment The health of the biological communities in streams can be an indicator of long-term or chronic problems with habitat or water quality. Reston began a systematic biological monitoring program in the fall of 2000, using the Virginia Save Our Streams protocol, which was developed for use by volunteers. In the spring of 2001, it

was modified to improve the accuracy of the results. The protocol included macro-invertebrate sampling, measurements of nitrate, nitrite, and turbidity, and general observations related to water appearance, odor, and flow.

Comparisons were made between the Save Our Streams results and the County's Stream Protection Strategy Countywide monitoring results, which uses a more detailed macroinvertebrate analysis. The modified Save Our Streams ranking scheme correlated reasonably closely. Where sites did not correlate, the County protocols consistently ranked Good or Excellent while the Save Our Streams rankings were Fair or Poor.

The biological assessment performed for the Plan was a snap-shot of stream conditions, with only about 1.5 years of data at the time the Plan was developed.

Lake Water Quality The Reston Association has been collecting water quality information on three of the four lakes in Reston (Lake Anne, Lake Audubon and Lake Thoreau) since 1982, with the fourth (Lake Newport) added in 1992. The plan analysis integrated results of stream assessments with lake quality to provide an overall perspective on watershed conditions.

Incorporation of Reston Assessment Data in the Difficult Run Watershed Plan

The results of the Reston watershed analysis were used to check and validate the findings from the Fairfax County Stream Physical Assessment and to corroborate the selection of candidate sites for stream restoration projects. Reston information came from the published Plan, and no review of raw data or field notes was made.

A short description of the Reston stream assessment is included in the Colvin Run, Snakeden and The Glade subwatershed condition descriptions in Chapter 3, immediately following the discussion of candidate sites for improvements.

Reston Watershed Plan Recommendations

The *Reston Watershed Plan* (GKY, 2002) addressed improvements to eight tributaries of Difficult Run in the Colvin Run, Snakeden Branch, and The Glade subwatersheds, which are in many ways complementary to the projects and programs developed for Difficult Run. This section describes the measures recommended in the Plan to reduce the impacts of uncontrolled stormwater on the stream system. The recommendations took four forms:

- Demonstration projects: Three sites were chosen to demonstrate the coordinated application of all of the recommendations.
- Reston-wide measures: Several measures were recommended to be carried out throughout the community without site-specific descriptions. These included outreach and education programs such as watershed advocacy programs, stream assessment and monitoring, coordination with Fairfax County development reviewers, and pollution prevention education.
- On-site stormwater controls: Recommendations were made to apply LID techniques to reduce the impacts of imperviousness and land development as close to the source as possible. For new development and redevelopment, the Plan recommends that design criteria for these types of controls be incorporated into the Reston Association's covenants. All the measures proposed are also effective for retrofit of existing sites without stormwater management controls; however, no specific retrofit projects were recommended in the Plan.
- Structural measures: The Plan recommended improvements for each of the eight tributaries assessed. These included stormwater attenuation structures and

floodplain spreaders to improve conditions in the riparian zone. Check dams were proposed to reduce erosion and gully creation in intermittent streams, and stream restoration projects were recommended for perennial streams.

More information on these projects is included in the subwatershed sections for Colvin Run, Snakeden Branch, and The Glade in Chapter 3.

5.4 Monitoring Program

This section describes the monitoring actions and targets for determining the success of failure of the future structural and non-structural plan actions. The monitoring will help to determine if the plan actions should be modified in the future because of a low success rate, or as watershed conditions change.

Structural Projects: Carry out preliminary engineering, design, and construction of culvert retrofit projects

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects designed and 50% of Group A projects completed within 5 years. 100% of Group B projects designed within 10 years.

Structural Projects: Carry out preliminary engineering, design, and construction of pond retrofit projects

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects designed and 50% of Group A projects completed within 5 years. 100% of Group B projects designed within 10 years.

Structural Projects: Carry out preliminary engineering, design, and construction of new pond projects.

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects designed and 50% of Group A projects completed within 5 years. 100% of Group B projects designed within 10 years.

Structural Projects: Carry out preliminary engineering, design, and construction of LID retrofit projects

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A project sites reviewed with private landowners within 2 years. Agreements reached and design completed on 50% of Group A project sites within 5 years.

Structural Projects: Carry out preliminary engineering, design, and construction of drainage retrofit projects.

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects completed within 5 years. 100% of Group B projects completed within 10 years.

Structural Projects: Carry out preliminary engineering, design, and construction of buffer restoration projects.

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects completed within 5 years.
100% of Group B projects completed within 10 years.

Structural Projects: Carry out preliminary engineering, design, and construction of stream restoration projects.

Monitor: Number of projects designed and completed.

Target: 100% of Implementation Group A projects designed and 50% of Group A projects completed within 5 years. 100% of Group B projects designed within 10 years. Both targets contingent on completion of upstream quantity reduction measures.

Non-Structural Measure 4.2.2 Inspect all outfalls and other interfaces between the man-made and natural drainage systems for scour and erosion and make repairs as necessary.

Monitor: Number of outfalls inspected.

Target: Inspect 20% of all outfalls each year for the next 5 years. Complete necessary repairs within 2 years of inspection.

Non-Structural Measure 4.4.2 Education and outreach for lawn care.

Monitor: Number of brochures distributed.

Target: Distribute brochures to 20% of the homeowners in the watershed each year for the next 5 years, beginning in the highest priority catchments.

Non-Structural Measure 4.4.3 Golf course nutrient management. Work with golf course managers to evaluate turf management practices with a watershed perspective.

Monitor: Review maintenance and landscaping plans to encourage watershed-friendly use of fertilizers and other materials for landscaping.

Target: Reduce amount of fertilizer used by 5% in the next 5 years.

Non-Structural Measure 4.4.4 Develop a stronger illicit discharge and sewer infiltration / inflow removal program to eliminate sewer leaks, overflows and illegal cross-connections.

Monitor: Number of outfalls inspected. (can be combined with Measure 4.2.2 above.)

Target: Visually inspect 20% of outfalls each year for the next 5 years. Complete any necessary repairs within 2 years of inspection.

Non-Structural Measure 4.5.1 In partnership with the Town of Vienna, conduct a drainage study and develop an improvement plan to reduce flooding in Vienna near Echols Street.

Monitor: Completed drainage study.

Target: Develop an improvement plan within the next 5 years.