

Section 1 Executive Summary

This report serves as an Action Plan for the protection and restoration of the 55 square mile South River watershed and is based four years of cooperative fieldwork and technical analysis (CWP,2002)(CWP,2005). The analysis has included fieldwork, land use, water quality and GIS analysis as well as public outreach efforts with Federation staff and volunteers. This report is the final product of the third and final assessment phase of a National Fish and Wildlife Foundation (NFWF) grant entitled “South River Watershed Community Restoration and Action Plan”.

The plan briefly and succinctly details the critical and specific actions necessary to improve conditions in the watershed and is based on a series of individual scientific assessments. The assessments performed included a stream habitat assessment (modified EPA rapid bioassessment protocol (RBP)), a stream impact inventory (Unified Stream Assessment - USA), an upland pollution source assessment (Upland Site and Source Reconnaissance – USSR), a contiguous forest and wetland assessment and an assessment of stormwater retrofit opportunities. Each of the plan recommendations presented in the executive summary is followed by an estimation of cost, potential benefit and responsible parties. Conceptual stormwater and restoration project plans are provided in Section 2 as well as details for a business outreach program (Appendix A) to help provide a more detailed blueprint for restoration efforts in the watershed. Additional appendices detail a draft schedule for implementation, expected benefits of implementation, and the prioritization of potential stormwater retrofits.

The 55 square mile South River watershed is truly an important state and local resource on the western shore of the Chesapeake Bay. Historically, serving as a stronghold for spawning yellow perch and other anadromous fish species, it also serves as a green infrastructure hub where large tracts of forest and wetlands have protected a historical source of good water quality in the river and protected breeding grounds for songbirds and wildlife dependant on large tracts of forest in the region (DNR, 2000). The South River historically supported important recreational and commercial fisheries and remains a destination for pleasure and sail boaters in the Annapolis area.

Much of the development in the South River has occurred without stormwater management (without sufficient filter to remove harmful stormwater pollutants before discharge to streams or the river itself). Impervious cover (% of roads, rooftops, parking lots, driveways), an indicator of the extent and pattern of growth in the watershed, has reached 15% and in the subwatersheds that ring the tidal creeks in the watershed has reached an average of 18%. Clear evidence development is taking its toll on the South River has emerged including a severe reduction in the population of yellow perch in the watershed, cancerous lesions on catfish in some of the urbanized tidal creeks, its placement on the State of Maryland’s 303d list of impaired waters for nutrients, sediment, PCBs and fecal coliform, loss of commercial fishing, loss of viable oyster beds, and the loss of historic SAV beds. Prior research has shown that stream and wetland quality begins to decline when the amount of impervious cover in a watershed exceeds 10%.

Untreated developed areas also represent an opportunity as much of the development can be retrofitted to provide stormwater management to improve water quality and reduce channel erosion where appropriate.

The principal effects of impervious cover in the South River include (CWP, 2003):

- Increased stormwater volume and erosion in streams, wetlands and floodplains
- Increased pollutant loads delivered in urban stormwater (bacteria, sediment, nutrients, petroleum products) resulting from runoff from roads, parking lots and urban areas
- Channel erosion in headwater streams and at outfalls
- Water level fluctuations that degrade wetlands
- Expansion of invasive plant species into floodplain and riparian areas
- Fragmentation of contiguous forests and loss of wildlife corridors
- Increased flooding

Priority Pollutants

As part of the watershed plan, a number of priority pollutants have been identified for the South River watershed. Table E-1 lists each of the pollutants, how it was identified, potential sources of contamination and the negative effects it has on the South River. Table E-4 the list of priority recommendations notes which pollutants may be reduced by implementation efforts. It should be noted that metals are not listed because it is unclear whether they have a toxic effect on the River and they will be reduced by many of the same practices that reduce nutrients and sediment. Hydrologic alteration is not listed because it is not considered a pollutant but it has considerable effects on streambank erosion and habitat loss.

Table E-1. Priority pollutants in the South River watershed			
Pollutant	Identified by	South River Sources	Effects
1. Nutrients (Nitrogen and Phosphorus)	MD 303d list	Urban runoff, turf grass and lawns, atmospheric deposition, septic systems, agriculture (minor input)	Eutrophication, dead zones, contribution to Chesapeake Bay pollution
2. Sediment	MD 303d list	Streambank erosion, urban runoff and shoreline erosion	Reduced depth in creeks, reduced light penetration for SAV growth
3. Bacteria	MD 303d list	Urban runoff, pet waste, wildlife, septic systems, improper disposal of boat waste	Swimming and water contact related illnesses and shellfish harvesting concerns
4. PAH – Polycyclic Aromatic Hydrocarbons	Potential cause of cancerous lesions	Urban runoff, 2-stroke engines, asphalt paving	Fish and shellfish contamination

Table E-1. Priority pollutants in the South River watershed			
Pollutant	Identified by	South River Sources	Effects
	on fish (U.S. Fish and Wildlife Service and South River Federation)	tar	
5. PCBs	MD 303d list State of Maryland Fish Advisories	Old electrical transformers, landfills	Fish and shellfish contamination
6. Mercury	State of Maryland Fish Advisories	Atmospheric Sources (coal fired power plants), urban runoff	Fish and shellfish contamination
Citations: MDE, 2004, USFWS, 2006; MDE, 2006			

Stakeholder Goals

Watershed residents and other stakeholders play a vital role in the creation of a watershed management plan. It is important to involve the citizens, businesses, and other interested parties in the development of a watershed plan, since they will have to live with the decisions which are made. Stakeholders also bring to the table the issues which are important to them. Their participation gives them a stake in the outcome and helps to ensure plan implementation. Two public meetings were held with watershed stakeholders; the first covered the baseline assessment and fieldwork which was performed by the Center and the Federation and a goal setting process for three sections of the watershed. Some of the key issues identified by stakeholders included poor erosion and sediment control, litter, proper enforcement of existing regulations including erosion and sediment control (ESC), land preservation in the headwaters, increased implementation of restoration projects, and education of homeowners and businesses on how to be better river stewards. The full set of issues and watershed protection and restoration goals identified by the stakeholders are presented in Table E-2:

Table E-2. Issues and goals identified by watershed stakeholders and South River Federation		
Watershed Area	Issues:	Goals*
Northern Watershed Church Creek (41.7%) Gingerville (31.2%) Duvall Creek (29.5%)	<ul style="list-style-type: none"> ❖ Excess Sediment ❖ High Stormwater Runoff Volumes ❖ Litter ❖ Poor Erosion and Sediment Control at Construction Sites ❖ New Development ❖ Stormwater Runoff 	<ol style="list-style-type: none"> 1. Reduce sediment leaving construction sites by increasing enforcement 2. Improve stormwater management and enforce existing stormwater management regulations for new development 3. Complete stream restoration and reforestation projects 4. Reduce litter by improving enforcement and establish a hotline for littering and dumping violations 5. Increase land preservation in the watershed 6. South River Federation to have more influence at County Level 7. Improve the incorporation of Better Site Design and

Table E-2. Issues and goals identified by watershed stakeholders and South River Federation		
Watershed Area	Issues:	Goals*
		environmentally sensitive development planning in the South River watershed 8. Reduce boat speeds that exacerbate shoreline erosion 9.Support public transportation in the form of bike path and greenways
Southern Watershed	<ul style="list-style-type: none"> ❖ Stormwater Runoff ❖ Litter and Refuse ❖ Development and Redevelopment of Individual Lots ❖ Loss of Trees ❖ “Derelict” Boats 	1.Enforce regulations Specifically construction inspection and enforcement for sediment controls 2.Create/Pass legislation for a Restoration Fund, encourage County to spend more resources on improving water quality Create tax incentives for businesses 3.Complete stream restoration/ stormwater retrofit /reforestation projects 4.Reduce litter with enforcement or trash cans at public access points 5.Land preservation in Headwaters 10.Develop an endorsement/certification process for businesses in the South River that are “River Friendly” 11.Conduct Federation outreach to homeowners by giving presentations at community associations 12.Educate landscapers to increase environmental awareness 13.Use media to educate people on fish/crab consumption issues in the River 14.Preserve water quality necessary to continue waterskiing on the South River 15.Create improved redevelopment controls for stormwater and erosion and sediment control
Upper Watershed	<ul style="list-style-type: none"> ❖ Low Public Awareness of How Runoff from Crofton/Crownsville Flows to the South River 	5. Protect the headwaters by protecting public and private land 11. Increase public awareness in Crofton/Crownsville about the South River
*Each individual goal is given number; goals that were duplicated are given the same number		

Process

The 55 square mile South River watershed was divided into 23 subwatersheds from one to eight square miles in area to create individual planning units (Figure 1). Land use and impervious cover were analyzed for each subwatershed in order to set expectations for current and future water quality and habitat conditions. Field conditions and conservation areas were evaluated to check expectations developed in the land use and impervious cover analysis. Together with the results of our conservation area work and the stream habitat assessment, draft goals were created for subwatersheds based on science, stakeholder input and the existing and potential future land use. It was determined that the South River watershed includes a mix of relatively high quality subwatersheds with considerable biodiversity, a number of subwatersheds where stream

conditions and habitat diversity have already been impacted to different degrees by development that often occurred without effective stormwater practices to control the flow of pollutants into the South River.

The South River watershed was divided into 23 subwatersheds in order to create smaller drainage based management units. Based on a widely used stream classification model, seven subwatersheds are currently classified as sensitive (impervious cover less than 10%), five subwatersheds classified as sensitive restorable (10-15% impervious cover and significant portions of forest), five subwatersheds were classified as impacted (10-25% impervious cover) and six subwatersheds classified as highly impaired (greater than 25% impervious cover) all of which drain to sensitive tidal creeks. The subwatersheds and their classification are located in Figure 1. Based on the future growth expected in the watershed following existing zoning, all seven subwatersheds currently classified as sensitive will become impacted.

A sensible philosophy was devised by the Center, stakeholders, and the Federation to: 1) protect the high quality streams and conservation areas using land use and conservation tools; 2) address existing degradation by pursuing stormwater retrofits, stream restoration, and river stewardship programs for businesses and homeowners; and 3) prevent further degradation of existing subwatersheds by improving the environmental design criteria used in new development and improving enforcement of existing regulations. It should be noted that even the highly developed tidal subwatersheds are critical for management due to the sensitive resources that exist in the tidal creeks including rearing grounds for juvenile fish, historic or current oyster beds, submerged aquatic vegetation and use by public in water contact recreation such as swimming and waterskiing. These highly developed subwatersheds are also where a disproportionate amount of the pollution in the watershed is coming from. The subwatershed specific goals shown in Table E-3 help to focus Federation efforts where they are most needed.

Table E-3. Subwatershed Goals			
Subwatersheds	Current Status / Future goal	Watershed Goals	Tools
Bacon Ridge Branch Bacon Ridge Branch 2 Flat Creek Bell Branch North River Chesterfield Unnamed Trib 2	Sensitive <i>less than 10% impervious cover</i>	Preserve important conservation areas, sensitive streams and contiguous forest, Reduce the limited impacts of existing development	Conservation easements, land acquisition, limit re-zoning, transfer of develop rights (TDR) program; when development does occur -- cluster and use improved stormwater criteria and environmentally sensitive site design

Table E-3. Subwatershed Goals			
Subwatersheds	Current Status / Future goal	Watershed Goals	Tools
Unnamed Trib 1 Crownsville Lusby Crossroads Tarnans Branch Harness Creek	Sensitive Restorable <i>10 -15% impervious cover</i>	Address existing developed areas, preserve important conservation areas, sensitive streams and contiguous forest	Conservation easements, land acquisition, limit re-zoning, TDR program, when development does occur -- cluster and use improved stormwater criteria and environmentally sensitive site design, Implement watershed education and stewardship programs in limited developed areas
Beards Creek Brewer Creek Crab Creek Broad Creek Upper Glebe Creek	Impacted <i>10-25% impervious cover</i>	Treat polluted stormwater from existing impervious cover, stabilize eroding streams and outfalls, protect streams from further degradation	Implement watershed education and stewardship programs, stormwater retrofits, on-lot stormwater practices, and stream restoration
Warehouse Church Creek Lower Portion of Broad Creek Aberdeen Selby Almshouse	Highly Impacted <i>greater than 25% impervious cover</i>	Address existing impervious cover and pollution sources, stabilize eroding stream banks Increase restoration efforts in redevelopment	Redevelop existing impervious areas, implement watershed education and stewardship programs, stormwater retrofits, on-lot stormwater practices, and stream restoration, may even consider limited up-zoning to transfer density out of sensitive watersheds

In the second stakeholder meeting, draft recommendations were presented and participants were asked to provide insight into how the public could increase their involvement in the implementation of the recommendations. Their recommendations were integrated into the 15 overall watershed recommendations and included several individuals recommending and stepping forward to form a cadre of individual tidal creek restoration leaders as well as establishing a speaker's bureau to expand public education efforts to residents and homeowner's associations.

Recommendations

Prioritized implementation recommendations for the South River watershed are summarized in Table E-4. Preliminary cost estimates and potential responsible parties have been identified so that financial resources needed for implementation can be assessed. Real watershed protection requires a multi-faceted approach which combines land use decisions with on-the-ground implementation, education and protection of watershed functions. This approach strives for permanent protection, and attempts to minimize long-term costs by implementing proactive, preventative solutions. This method is expensive, our estimate is \$2.2 million a year over 5 - 6 years, this number would increase with a larger open space acquisition or conservation easement program. Long-term protection of water quality, fisheries, quality of life and biodiversity have quantifiable community benefits including increased property values and enhanced quality of life, which compound over time.

Overall the expected benefits of the implementation of the watershed plan include:

- Protection of key conservation and headwater areas
- Restoration of eroding stream reaches and treatment of untreated stormwater from developed areas
- Education and behavior change of both residents and businesses
- Reduction in pollutant loads from current levels including
 - 23% decrease in nitrogen loading
 - 15% decrease in sediment loading
 - Reduction in the flow of other pollutants such as bacteria and hydrocarbons, in the river through addressing hotspots, runoff from businesses and human behavior such as pet waste cleanup for bacteria
- Reduction in the pollutants generated from new development through changes in site design practices and the use of low impact development practices
- Improved compliance with environmental laws including erosion and sediment control and illegal dumping
- Improved community aesthetics associated with the implementation of bioretention practices

Another key component of this watershed plan is measuring and monitoring the success of the plan. In the South River, this consists of continued monitoring of indicators in the estuary including bacteria and dissolved oxygen and fish and oyster health. Monitoring the effects of management measures on stream channel stability, water quality, anadromous fish species and

impervious cover will enable the Federation, county staff and state agencies to learn from the successes and challenges of plan implementation and craft better strategies in the future.

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
1	3,6 All	Establishment of a Watershed Restoration Fund for Anne Arundel County to support restoration efforts.	Watershed wide Particularly impacted and highly impacted subwatersheds	Expensive/ Federation costs small (advocacy)	South River Federation Anne Arundel County Anne Arundel County Watershed Network
2	2,5,6,7,10, 15 Nutrients, sediment, PAHs, bacteria, metals, habitat	Encourage Environmentally Sensitive Development across watershed (Better site design) <ul style="list-style-type: none"> • Provide workshops for developers and planning and zoning staff including plan reviewers • Include design criteria for outfalls to reduce future impacts of development Provide proactive review and input to presubmission development projects including site design, stormwater and ESC	County wide	Small 20k	South River Federation Anne Arundel County Planning and Zoning Public works Local Developers Center for Watershed Protection

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
3	5,7,9 Nutrients, sediment, bacteria, PAHs, mercury	Ask the County to prohibit up-zoning which increases impervious cover beyond underlying zoning in sensitive subwatersheds Consider requiring environmentally sensitive site design – including open section roads and bioretention	Sensitive subwatersheds	Minimal <i>Policy change</i>	South River Federation Anne Arundel County
4	5,9 All indirectly	Purchase conservation easements estimated 300 acres in the upper watershed (Id key parcels) and work toward the preservation of an additional 750-1000 acres in passive recreation or other protected status	Sensitive subwatersheds	Very Expensive (at least 500k year) <i>Goal: Preserve 50 acres a year over 6 years</i>	Scenic River Land Trust South River Federation Fish and Wildlife Service MD Environmental Trust County Ag Preservation officer
5	3,6,10,13 All indirectly	Hire a watershed planner/restoration coordinator for the South River Watershed Consider a split position between County and the Federation	South River watershed	Expensive 1.0 FTE Watershed Planner 75k a year <i>(could be paid for with WRF*)</i>	Anne Arundel County South River Federation

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
6	1,2,3,7,13 Nutrients, sediment, bacteria, PAHs, mercury	Continue homeowner education program to include lawn care and conversion, pet waste, car washing, 2 stroke engines and other watershed behaviors Establish an outreach campaign to reach >50% of watershed residents County should support the Federation financially in these efforts as it is a requirement of their NPDES permit	Watershed wide (particularly in watershed areas adjacent to the tidal creeks and mainstem river without stormwater management)	Medium 25k a year <i>(could be paid for with WRF*)</i>	South River Federation Anne Arundel County
7	2,3,6,7,10 Nutrients, sediment, bacteria, PAHs, mercury	Stormwater retrofits See list and concepts in Section 2	Selected subwatersheds Particularly impacted and highly impacted subwatersheds	Expensive \$1mil / year <i>Retrofit large capital project areas and smaller facilities for 5 years (could be paid for with WRF*)</i>	South River Federation Anne Arundel County State Highway Administration

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
8	2,3,6,7,15 Nutrients, sediment, bacteria, PAHs, mercury	Provide greater levels of treatment for redevelopment projects. Options include tax incentives, increasing the mandatory requirements to greater than 50%, or subsidizing the cost using WRF. (Cost of stormwater management in redevelopment is 25-50% less than in traditional retrofitting if planned landscape areas are converted to bioretention) (Hoyt personal communication, 2006)	Particularly impacted and highly impacted subwatersheds	Establishment of a restoration fund for cost share (50 -100k /yr + tax credits) <i>(could be paid in part with WRF*)</i>	Anne Arundel County City of Annapolis South River Federation
9	2,3,4,10, 12,15 Nutrients, sediment, bacteria, PAHs, mercury	River steward program for businesses – engage businesses in pollution prevention and stormwater retrofitting	Watershed-wide	Expensive \$50k -100k yr + incentives or tax credits Include Federation staff person and cost share money <i>(could be paid for in part with WRF*)</i>	South River Federation Anne Arundel County City of Annapolis State of Maryland

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
10	2,3,4,9,10, 11,12,13 PAHs, PCBs	Toxics plan Plan to address potential sources of toxicity in the river – to be created by a scientific panel Potential sources to be examined include highway and road runoff, hotspot runoff, asphalt sealant and 2-stoke boat engines.	Watershed-wide and particularly Broad Creek	30k	South River Federation Fish and Wildlife Service Smithsonian Environmental Research Center (SERC) UMD Chesapeake Biological Laboratory
11	2,3 Nutrients, sediment	Stream restoration Address existing headcuts and unstable outfalls Stormwater management and attenuation efforts should be completed prior to stream restoration efforts	Particularly impacted and highly impacted subwatersheds	Expensive \$300k a year for five years Geomorphic prioritization (\$30k or staff time) <i>(could be paid for with WRF*)</i>	Anne Arundel County South River Federation State Highway Administration CH2MHill/KCI/CWP**
12	4,11 PAHs	Increase signage and fines for littering “Litter ends up in our river” perhaps establish a hotline for illegal dumping – consider fine of \$5,000 or 30 days in jail.	Selected locations	10-15k 5k/yr for hotline	Anne Arundel County City of Annapolis South River Federation

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
13	1,8 Sediment, nutrients	Map existing tidal restoration areas and future restoration locations, advocate for lower boat speeds to reduce shoreline erosion	Watershed wide	10k (In process)	South River Federation Anne Arundel County Department of Natural Resources
14	2,3,7 Anadramo us fish	Fish passage construction & additional evaluation of culverts in North River and Bacon Ridge Branch	North River and Bacon Ridge Branch	Expensive \$300k (funding pledged) + 50k for evaluation 350k <i>(could be paid for with WRF*)</i>	Anne Arundel County State Highway Administration South River Federation CH2MHill/KCI/CWP**
15	1,3 Indirectly Nutrients, sediment, bacteria, PAHs, mercury, PCBs	Continue monitoring water quality indicators in the river and in subwatersheds ➤ Continue bacteria monitoring in the river ➤ Expand monitoring in tributaries where implementation is expected to occur ➤ Monitor to identify source areas for toxic pollutants	Watershed wide Specifically Broad Creek Tributary	Small Estimate of \$20 - \$25k/ year <i>Evaluate the effectiveness of protection and restoration efforts/criteria</i>	South River Federation Anne Arundel County MD Department of Natural Resources Smithsonian Environmental Research Center (SERC) Dept. of Agriculture

Table E-4. Priorities and Costs for Watershed Protection and Restoration in the South River					
Priority	Goals Achieved/ Pollutants addressed	Protection Tool or Evaluation Measure	Where	Overall Costs and Action/ South River Federation Costs	Responsible Party
		Overall cost estimate 8 million over 5-6 years with at least an additional 3 million in resources for Land Preservation Good opportunities to receive grants and County cost-share *The passage of a Watershed Restoration Fund is critical to the implementation of this plan ** Several of the recommendations could be addressed by the current County watershed planning efforts and the work being performed by consultants			

References

MDE, 2004. 2004 Integrated 303D List, Maryland Department of the Environment, Baltimore, MD. Accessed on the web at <http://www.mde.state.md.us/Programs/WaterPrograms/TMDL/Maryland%20303%20dlist/index.asp>

USFWS, 2006. Cancerous Lesions Confirmed in South River Fish. News Release. United States Fish and Wildlife Service. Chesapeake Bay Field Office. Accessed on the web at: <http://news.fws.gov/newsreleases/showNews.cfm?newsId=FC8E9441-65BF-03E7-23ACD2B302EED8FE>

Section 2 Priority Project Concepts

A series of 30 stormwater priority retrofit/stream repair projects have been identified in the fieldwork (Table 2-1). Additional shaded priority concepts are not presented due to several of the projects being in process or developed in a prior report. These profile sheets were created for projects that, based on best professional judgment, appeared to be viable projects for the overall South River watershed from a water quality, educational standpoint or both. It is anticipated that additional concepts would be developed for hotspot businesses and neighborhoods as willing business owners and homeowners are identified through recommended education and outreach efforts.

Table 2-1. Priority Restoration Concepts					
ID#	Primary Subwatershed	Location	Design Concept	Impervious Area (ac)	Priority
CH-8	Church Creek	Parole Plaza	On-site treatment of stormwater and green roofing	30.30	High
BC-4a	Broad Creek	Upstream of Rt. 665	Extended detention pond or shallow marsh wetland	40.50	High
BC-5	Broad Creek	Annapolis High School	Convert parking lot landscaped areas to bioretention facilities and investigate installation of extensive greenroof system and treatment of road runoff in unutilized turf area	7.80	High
BC-3	Broad Creek	Maryland Department of Agriculture	Treat on-site impervious areas and roadway runoff with series of bioretention facilities.	1.12	High
BC-6	Broad Creek	SHA Maintenance Depot	Create forebay for pretreatment and convert dry pond into exfiltrating bioretention if soils permit -- investigate treating adjacent runoff from restaurant at a minimum (improve on site pollution prevention measures)	5.10	High
CH-1	Church Creek	In between Home Depot and Festival at Riva	Manage untreated stormwater by expanding pond at Riva or creating a suitable alternative	57.30	High
CR-5	Crownsville	Fairfield Nursing Home	Diversion of parking lot runoff to bioretention or rain garden facility	0.98	High
CR-7	Crownsville	MD-178 Entrance Ramp	Treatment of highway runoff with linear bioretention facility.	0.75	High
BC-1	Broad Creek	Anne Arundel County Health Department Parking Lot	Construct bioretention facility to treat parking lot runoff.	1.30	High
CH-4	Church Creek	USI Internetworking	Convert existing dry pond into wet ed or infiltrating sand filter is soils are appropriate	3.00	High
H-2	Harness Creek	Hillsmere	Streetscape bioretention	5	High

Table 2-1. Priority Restoration Concepts					
		entrance			
CH-6	Church Creek	Near Whiton Court off Coybay Drive	Atlantic White Cedar restoration	42.80	High
CH-7	Church Creek	Forest Drive	Atlantic White Cedar restoration	41.80	High
CR-4	Crownsville	Day Care Center	Modification of existing drain inlet to provide detention and develop BayScapes planting plan.	0.75	Medium
TN-1	Tarnans Branch	SHA Park-n-Ride	Sand filter/ bioswale to treat parking lot runoff	2.21	Medium
CR-1	Crownsville	State Office Building	Improve drainage to existing stormwater pond.	1.10	Medium
NR-2	North River	Crofton Meadows Townhomes	Reconstruct stormwater management pond, repair on-site erosion, and replant an open area.	2.80	Medium
DC-2	Duvall Creek	Hillsmere 1 Streetscape	Streetscape bioretention	0.84	Medium
H-3	Harness Creek	Quiet Waters Park	Constructed wetland to treat untreated runoff from park roads and Hillsmere	5	Medium
NR-1	North River	Crofton Meadows Elementary School	Parking lot bioretention facilities and stormwater planters to treat rooftop runoff.	1.96	Medium
CH-2	Church Creek	Home Depot Parking Lot	Possible sand filter and bioretention in back corner	7.20	Medium
CH-3	Church Creek	Value City Parking Lot	Bioretention concept for existing stormdrain in corner of lot	0.68	Medium
H-1	Harness Creek	Hillsmere Library	Bioretention facility at Public Library	0.5	Medium
CR-8	Crownsville	South Shore Elementary School	Parking lot bioretention facilities and stormwater planters to treat rooftop runoff.	0.90	Medium
CH-5	Church Creek	Jewelry Store	Convert existing dry pond into exfiltrating and capture road runoff as well	1.90	Medium
GN-1	Gingerville Creek	Cinnamon and Clove Rds	Rain gardens to attempt to infiltrate road runoff	0.40	Medium
DC-1	Duvall Creek	Key School	Bioretention concept to treat parking lot and adjacent roads	0.73	Medium
BC-2	Broad Creek	Anne Arundel County Library	Install system of stormwater planters and rain barrels to treat and retain peak flows from library rooftop runoff.	0.35	Medium
DC-4	Duvall Creek	Hillsmere 3 Soccer Field	Formalize wet swale treatment near soccer field	3.70	Medium
DC-3	Duvall Creek	Hillsmere 2 Boat ramp	Create bioretention in existing gabion step near boat ramp	2.10	Medium
NR-3	North River	Fish Passage Barrier Removal	Replace existing culverts with road crossing that enables upstream migration of native yellow perch fish species.	--	High

Table 2-1. Priority Restoration Concepts					
BC-4	Broad Creek	Stream Repair downstream of Rt. 665	Use stream stabilization techniques such as Atlantic White Cedar restoration, bank grading and revegetation to reduce in-stream sediment sources.	3,000 linear feet of restoration	High
GN-2	Gingerville Creek	Failing dam at old stormwater pond	Fix dam structure and improve overflow structure	40.00	High
	Flat Creek	Homestead Gardens	As part of business outreach program	5	High
				Total acres 315.88	
Shaded cells do not have concepts because they are underway or have been presented in another document					