COMPREHENSIVE STORMWATER MANAGEMENT PLAN

Town of Chestertown

June 2021

SHORE RIVERS

NFWF

CONTENTS

1 SUMMARY

The Chester River is polluted with nutrient and sediment runoff. With increasing intensity and frequency of rain events and increasing pressure from development and other sources, untreated polluted stormwater runoff will exacerbate existing water quality issues. On the other hand, a healthy Chester River enhances quality of life, provides recreational opportunities, boosts the economy, and supports a vibrant ecosystem. The Chestertown Comprehensive Stormwater Plan (the Plan), including the innovative and interactive Chestertown Stormwater Digital Atlas, provides a roadmap for the Town of Chestertown to implement stormwater management strategies to reduce polluted runoff and improve water quality in the creeks and streams in and around Chestertown, including the Chester River. The Town of Chestertown and partners should be commended on the steps already taken to improve water quality and should be supported in future efforts to equitably improve water quality through innovative stormwater management practices.

2 INTRODUCTION

The Chester River represents the nexus of productive land and water. A brackish tributary of the Chesapeake Bay, the Chester's landscape historically has been dominated by agricultural land and punctuated with small towns and villages. The Chester's 368-square mile watershed is home to oysters, catfish, striped bass, diamondback terrapin, blue heron, perch, and the famed Chesapeake blue crab.

While beautiful on the surface, a closer look reveals that the Chester River is at risk from pollution. Algal blooms fueled by nutrient pollution create de-oxygenated dead zones and associated fish kills. Sediment pollution smothers oysters and clouds the water blocking sunlight to habitat-creating submerged aquatic vegetation (SAV). Sources of pollution include poorly managed farms, failing septic systems, and untreated stormwater from towns like Chestertown.

2.1 PURPOSE OF PLAN

The Plan is a guide to improve water quality through stormwater practices and strategies and it is intended to assist the Town of Chestertown and Kent County achieve clean water goals. Secondary benefits of implementing the stormwater best management practices and strategies in the Plan include beautification of the Town, habitat creation, and increased climate resiliency.

The Plan was designed to be a simple, pragmatic guidance document that outlines the underlying water quality issues and provides a host of achievable practices and strategies to be implemented by the Town of Chestertown and partners. With the Chestertown Stormwater Digital Atlas (see Section 4.0) the list of proposed projects can be updated as projects are completed and priorities are updated. This Plan will be a living document to help the Town improve water quality for the next decade and beyond.

2.2 U.S. EPA WATERSHED PLANNING

In 2003, the U.S. Environmental Protection Agency (EPA) required that all watershed restoration projects funded under Section 319 of the federal Clean Water Act be supported by a watershed plan. EPA identified nine key elements that are critical for improving water quality and should be included in watershed plans that intend to address water quality impairments. These nine elements have come to be known as the "A-I criteria"2:

EPA A-I Criteria

A. Identification of Causes and Sources of Impairments
B. Expected Load Reductions
C. Proposed Management Measures
D. Technical and Financial Assistance Needs
E. Information, Education, and Public Participation Component
F. F/G. Schedule and Milestones
G. Load Reduction Evaluation Criteria
H. Monitoring Component

This watershed plan meets the A-I criteria and Table 4 shows where these criteria are addressed throughout this watershed plan.

Table 1: Location of A-I Criteria Within the Report

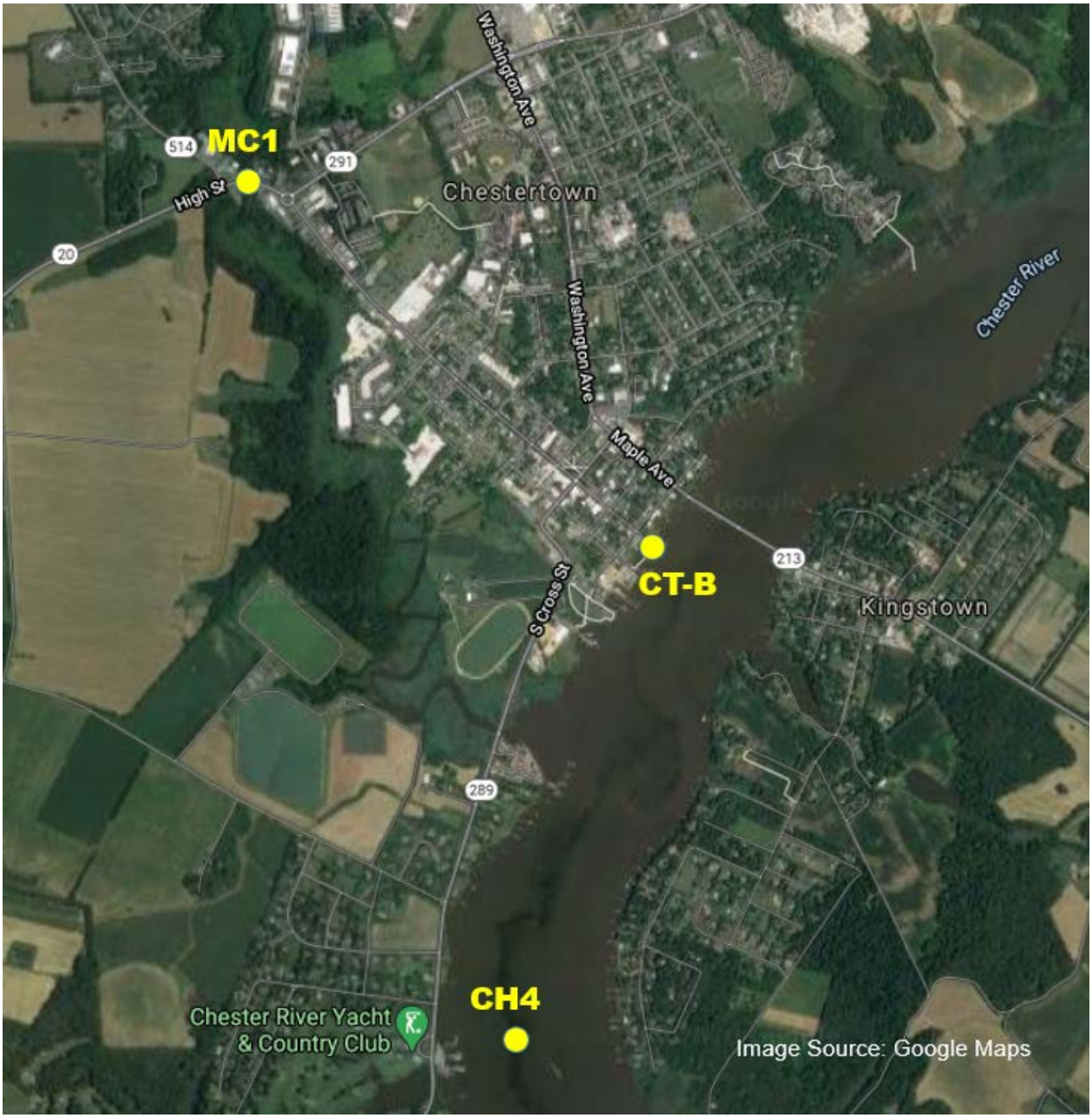
Section of the Report	A	B	C	D	E	F	G	H
Section 1	x							
Section 2								
Section 3			x		x			
Section 4		x	x					
Section 5		x	x	x		x	x	x
Appendix								

2.3 WATER QUALITY CONDITIONS

For more than a decade, ShoreRivers has monitored water quality on the Chester River and produced an annual River Report Card. Scientific analysis of water quality data shows a river that is impaired by nutrient pollution, sediment pollution, and bacteria pollution – all conditions which can be heavily influenced by untreated stormwater runoff. Recent annual River Report Cards are available for review at www.shorerivers.org/report-cards.

Specific to Chestertown, ShoreRivers monitors water quality at a tidal monitoring station in the Chester River (CH4), has decades of data collected from a non-tidal monitoring station at Radcliffe Creek (MC-1), and an enterococci bacteria monitoring station at the Port of Chestertown Marina (CT-B) depicted in the below sampling locations map.

2.3.1 STATION LOCATION MAP



2.3.2 WATER QUALITY MONITORING PROTOCOLS

Samples are collected following the ShoreRivers Water Quality Monitoring Quality Assurance Project Plan, which includes protocols detailed in the Chesapeake Monitoring Cooperative's Tidal Water Quality Methods Manual. Water quality health is analyzed using thresholds detailed in the Mid-Atlantic Tributary Assessment Coalition's Sampling and Data Analysis Protocols for Mid-Atlantic Non-Tidal Stream Indicators and the Sampling and Data Analysis Protocols for Mid-Atlantic Tidal Tributary Indicators.

2.3.3 TIDAL WATER QUALITY

In 2019, the most recent year with a full data set, ShoreRivers monitored water quality in the Middle Chester River every other week, April 1st through November 1st at stations CH4 and CH5 (not pictured). The following Table shows the Water Quality Index (WQI) for each parameter, indicating the percentage

of times water quality samples met or exceeded established healthy water quality pollution thresholds, as well as a corresponding letter grade based on a 0-100 scale, with 0 representing severely degraded water and 100 representing pristine water.

2019 Middle Chester River Report Card Summary					
Parameter	Summer Dissolved Oxygen	Total Nitrogen	Total Phosphorus	Water Clarity	Chlorophyll a (algae)
WQI	86%	57%	40%	53%	71%
Grade	A	C+	C-	C	B

2.3.4 PUBLIC HEALTH WATER QUALITY MONITORING

In addition to monitoring environmental water quality parameters, ShoreRivers monitors *enterococci* pollution at 11 sites on the Chester River to assess public health risks associated with recreational water activities, including the Port of Chestertown Marina (Station CT-B), and, as of May 2021, High Street Dock (no current data available). *Enteroccoci*, a fecal bacteria and recommended public health indicator by the US EPA pose threats to both water quality and public health. People who come in contact with bacteria- or toxin-laden water can contract eye, ear, and respiratory diseases, skin rashes, gastrointestinal issues, or brain or liver damage. To assess the health of our rivers and potential risks to human health, ShoreRivers and our water quality volunteers, the SwimTesters, regularly monitor bacteria pollution at sites throughout the mid- and upper- Eastern Shore and works closely with government agencies to track toxic algal blooms.

ShoreRivers utilizes the standardized US EPA criteria of 104 Most Probable Number (MPN) per 100 ml for collecting and analyzing bacteria samples. Monitoring data from the most recent completed season in 2020 enterococci levels exceeded the US EPA with 40% of samples. This indicates that, for 40% of samples collected, there was an elevated risk of infection or health issues associated with recreational water activities. This is a particular concern considering the area in and around Chestertown is popular for paddling, fishing, water skiing, swimming, and other activities.

As of November 2020, no direct source has been confirmed. The Town has not documented any permit violations or discharges associated with the wastewater treatment system, upgraded in 2008 and monitored by the Maryland Department of the Environment (MDE) as well as the Environmental Protection Agency (EPA). Other potential sources include waterfowl, dog waste, and manure.

2020 Chester Town Marina Bacteria Data (Station CT-B)			
Station Name	**Date**	Most Probable Number	**Pass Fail**
Chestertown Marina	5/22/2019	0	Pass
Chestertown Marina	5/29/2019	52	Pass
Chestertown Marina	8/6/2020	218	Fail
Chestertown Marina	7/16/2020	70	Pass
Chestertown Marina	7/30/2020	175	Fail
Chestertown Marina	6/17/2020	120	Fail
Chestertown Marina	8/21/2020	52	Pass
Chestertown Marina	6/4/2020	247	Fail
Chestertown Marina	7/1/2020	10	Pass
Chestertown Marina	5/21/2020	20	Pass
		Average = 96	**60% Pass Rate**

2.3.5 NON-TIDAL WATER QUALITY MONITORING

Similar to the tidal monitoring in Chestertown, Radcliffe Creek has significant nutrient and sediment pollution issues. Below is a summary from the *Chester River Watershed Assessment & Priority Restoration Plan*, completed in 2016, that analyzes 5 years of water quality data generated by ShoreRivers "Chester Tester" volunteers. Volunteers participate in a rigorous annual training and quality control/quality assurance program to ensure accurate data. Data is analyzed using a Water Quality Index (WQI) on a 0-100 scale, with 0 representing severely degraded water and 100 representing pristine water.

The below analysis shows an overall WQI of 48, indicating that water quality meets or exceeds healthy water thresholds only 48% of the time, with nutrient pollution (ammonia, nitrate, and phosphate) and turbidity (an indicator of sediment pollution) all scoring well below healthy levels. Recent monitoring confirms the findings of the Chester River Watershed Assessment & Priority Restoration Plan.

Radcliffe Creek

Tier	Station	Sub-watershed	Size (acres)	Tidal		3-yr WQI (%)	5-yr Trend	Pollution/ Complaints		Breakdown of 3-yr WQI Parameters (Avg. Scores) (%)				
										DO Score (Jun-Sep)	Nitrate Score	Ammonia Score	Phosphate Score	Turbidity Score
2	Radcliffe Creek	Middle	2,967	No		48	↓	No		67	29	45	55	43

The Radcliffe Creek stream station has poor water quality with a moderate, negative five-year trend. Water quality improved from 2012 to 2013 and then declined significantly from 2013 to 2014. The stream basin drains a large portion of Chestertown and includes two large shopping centers, several suburban developments, and part of Washington College. A series of step pools were completed in mid-2014 to filter stormwater from the two shopping centers; the step pools are located upstream of the Radcliffe Creek stream station. The developed area covers approximately 1/3 of the land area, with the remaining area being primarily agricultural land and a few scattered industrial sites.

Hypothesis

Radcliffe Creek's water quality is poor across the board. This is likely due to the development density and large swaths of impervious area. Other than the step-pools constructed in 2014, there is little to no stormwater management. The upstream agricultural area also likely contributes to the poor water quality.

Action

Due to this stream's location in Chestertown, there is high potential for project visibility and public engagement in restoration efforts. Targeted outreach will include increasing lawn fertilizer awareness in neighborhoods, approaching Washington College to reduce lawn fertilizer and partner on filtration restoration projects, and presenting to the town councilmen on the issue and potential projects. Additionally, we will conduct outreach with farmers in the agricultural area of the watershed to enhance stream buffers and plant cover crops.

It is also important to note the historical use of Wilmer Park, and adjacent marsh as the Town's municipal dump for decades. Legacy nutrients from this outdated land use could also be a contributing factor to water quality in the immediate area. A special thank you to the volunteers at Heron Point of Chestertown who collected and analyzed water quality samples at Radcliffe Creek.

2.3.6 CAUSES AND SOURCES OF POLLUTION

Surface water pollution in Chestertown is caused by a combination of point and non-point sources, including but not limited to impervious runoff, yard fertilizer, agriculture, permitted discharges including the Chestertown Wastewater Treatment Plant (upgraded to Enhanced Nitrogen Removal (ENR) in 2008) and other industrial sources. Increased development and increased frequency and intensity of rainfall events is expected to increase.

The following table of pollution loading is from the Maryland Department of the Environment's Total Maximum Daily Loads for the Upper and Middle Chester Rivers, 2006.

Nutrient Pollution Limits for the Middle Chester River Watershed		
Source	**Total Nitrogen (pounds/year)**	**Total Phosphorus (pounds/year)**
Point Sources	47,567	6,188
Non-Point Sources	217,447	10,047
Margin of Safety	10,424	474
Total Sources	275,437	16,709

The following table of projected non-point source pollution loading is from the 2015 Chestertown Comprehensive Plan.

Chestertown Estimated Non-Point Source Loading Rates and Loads		
Source	**Total Nitrogen (pounds/year)**	**Total Phosphorus (pounds/year)**
Point Sources	47,567	6,188
Non-Point Sources	217,447	10,047
Margin of Safety	10,424	474
Total Sources	275,437	16,709

2.3.7 EXISTING PLANS AND REFERENCES

In preparation of this plan, the following existing plans and documents were reviewed:

- Chester River Watershed Assessment and Priority Plan (2016)
  Climate Change and Sea Level Rise Adaptation Report (2016)
- Chestertown Environmental Committee Strategic Plan (2018)
- Chestertown Public Arts Master Plan (2014)
- Chestertown Sustainable Community Plan (2019)
- Kent County Phase III Watershed Implementation Plan (2019)
- Middle Chester River Watershed Restoration Action Strategy (2002)
- Preparing for Increases in Extreme Precipitation Events in Local Planning and Policy on Maryland's Eastern Shore (2020)
- ShoreRivers Chester River Report Cards (2014-2019)
- Total Maximum Daily Loads of Nitrogen and Phosphorus for the Upper and Middle Chester River, Maryland Department of the Environment (2006)
- Town of Chestertown Comprehensive Plan (2015)
- Washington College Sustainability Plan (2018)
- Urban and Community Forest Master Pan, Chestertown MD (2009)

3 WATERSHED GOAL, STRATEGIES AND RECOMMENDATIONS

3.1 PUBLIC INVOLVEMENT

Public outreach and participation are key to the success of any project, especially in micropolitan communities of strong character like Chestertown. COVID-19 limited opportunities for in-person interaction in 2020, so ShoreRivers solicited public input through primarily digital means. Specifically, ShoreRivers gathered stakeholder input via:

- Public Meetings with the Chestertown Mayor and Town Council Meetings (in person and remote)
- Public Meetings with the Chestertown Environmental Committee, which includes representatives of Washington College's Student Government Association (in person and remote)
- Listening Session with the Social Action Committee for Racial Justice (in person)
- Quarterly meetings of the ShoreRivers volunteer Chester Watershed Advisory Board (in person and remote)
- The Chester Riverkeeper Newsletter
- The ShoreRivers website
- A Press Release dated July 22, 2020

ShoreRivers will continue community engagement efforts through active membership on the Chestertown Environmental Committee, Kent County Basic Needs Working Group, Social Action Committee for Racial Justice, and leadership of our Watershed Advisory Board. We will also continue to work directly with Town leadership, the Downtown Chestertown Association, and Washington College. Collaboration across sectors and throughout the community will be an important part of the implementation strategy.

3.2 WATERSHED GOAL

A healthy Chester River, safe for swimming and fishing, and free from all water quality impairments.

3.3 STRATEGIES

1. **Quantify the problem in terms of nutrient loads**. Review water quality conditions and pollution sources.
2. **Public-private partnerships.** Leverage the town's resources in collaboration with the skills and expertise from the diverse group of watershed partners, including not-for-profit organizations, private citizens, and the business community.
3. **Increase the knowledge of government officials, businesses, homeowners, faith communities and school-aged students.** Education is essential for creating behavior change.
4. **Implement stormwater retrofit practices wherever space and site conditions permit**. Urban runoff is best treated when stormwater is forced to absorb into the ground and/or absorbed by plants.
5. **Increase public access to and awareness of the Chester River, Radcliffe Creek, and other creeks and streams**. Build an appreciation for the waterways and their value to the community.
6. **Incorporate climate change adaptation strategies in project planning and implementation.** Impacts of climate change will affect how restoration practices perform into the future.

3.4 RECOMMENDATIONS

This section describes 12 recommendations for Chestertown to implement to improve water quality in the Chester River. Not listed in priority order, these recommendations are the results of water quality data analysis, fieldwork findings, stakeholder interviews, Geographic Information Systems (GIS) analysis, and a review of existing public plans and information. Stormwater and other urban retrofits are both beneficial and expensive when implemented individually, so multiple recommendations should be implemented simultaneously to effectively bring about restored water quality. Combining these efforts with education and pollution prevention can lead to long-term behavioral change. Targeted outreach to homeowners and businesses can have a beneficial impact while additional funding can be secured for the more costly recommendations.

1. Install new stormwater facilities and retrofits on public lands, public streets and rights of way, institutional lands, commercial property, and private residential property. See Section 5 for specific proposed locations and concept plans.
    a. New stormwater features should follow environmental site design (ESD) and, conservation landscape techniques, as well as account for projected sea level rise and increasing frequency and intensity of storms.
    b. Stormwater improvements should be prioritized based on pollution reduction, cost, site feasibility, and equitable access to resources.
2. Outreach and Education
    a. Educate town staff on operations, maintenance, and value of stormwater facilities and conservation landscaping.
    b. Create training program, with annual refresher, specifically for town maintenance staff.
    c. Educate general public and business owners through ShoreRivers existing River-Friendly Yards programs and other means.
3. Increase town tree canopy.
4. Reduce impervious surfaces.
5. Create volunteer "Weed Warrior" group to help adopt and maintain public stormwater facilities.
6. Implement inlet stenciling program to mark storm drains.
7. Implement a stormwater utility fee to fund stormwater project implementation and maintenance.
8. Continue to monitor water quality in the Chestertown subwatershed area as a means of tracking progress and identifying future water quality issues.
9. **Hold developers accountable for stormwater best management practices.**
10. Review and update town code and ordinances with provisions to improve water quality and aid in achieving the above recommendations.
11. Conduct full engineering study and survey of existing Town stormwater infrastructure. This Plan includes a planning level survey for priority areas as shown in the Digital Atlas, but a full survey of as-built conditions would streamline the project selection and implementation process.
12. Continue to monitor and investigate source of enterococci bacteria pollution within Chestertown subwatershed areas.

4 CHESTERTOWN STORMWATER DIGITAL ATLAS

This Plan includes a digital mapping companion, the Chestertown Stormwater Digital Atlas, located at:

https://www.google.com/url?q=https://msrc.maps.arcgis.com/apps/dashboards/2249d3f3bc0541389405475f031ad321&sa=D&source=hangouts&ust=1623443543245000&usg=AFQjCNHJwlz08xD2oD7kyJVQZJF2pkw4FQ

The Digital Atlas was created as a public, dynamic resource to display the recommendations and progress of stormwater projects throughout Chestertown. The Digital Atlas includes a map based display of recommended projects, including project type, project location, estimated load reductions, and estimated costs. The Digital Atlas is designed to be updated as projects are completed and new projects are prioritized. The Digital Atlas also includes some planning level information on existing stormwater infrastructure for priority areas. The process for selecting projects, calculating load reductions, and estimating costs is detailed below in sections 5.1-1.3.

5 WATERSHED RESTORATION PRACTICES

This section provides an overview of the key recommended practices for the town of Chestertown. Successful restoration requires collaboration among local, county and state government, watershed partners, businesses, and residents. Local and state governments are able to implement capital projects such as large-scale roadway stormwater retrofits, and change ordinances and municipal operations to encourage continued restoration. Watershed partners, businesses, and residents are encouraged to implement smaller scale project and programs such as rain gardens, lawn care education, outreach, and restoration of streams and wetlands. The practices are organized in four phased groups:

- **Proposed** – projects that are currently planned but the design and permitting process has not yet begun.
- **Designed** – projects that have either a concept or engineered design.
- **Approved** – projects that have been permitted and approved by governing bodies.
- **Completed** – projects that have been designed, permitted, and installed.

The variety of practices recommended in this plan are primarily urban stormwater retrofits. Key elements are detailed below.

Green Streets

Green Street projects consist of installing a variety of stormwater features such as bioretention areas, tree pits, and other conservation landscaping in combination with other traffic calming and pedestrian-friendly features. Green Street practices can also be implemented on other linear impervious features, such as the Chestertown Rail Trail. In addition to improving water quality, green streets increase pedestrian safety, improve aesthetics, and create habitat, which is particularly important in densely developed urban areas.

Green Street in Bainbridge, WA that has bioretentions installed into the sidewalk with curb cuts.

While any street in Chestertown can and should be a green street, this report highlights a few priority streets to be targeted for priority implementation, including:

- 200 Block of South Queen Street (Site ID CH-24)
- Lower High Street (Site ID CH-25)
- Spring Street (Site ID CH-32)
- Kent Plaza (Site ID CH-33)
- Washington Square (Site ID CH-34)

New and Retrofit Bioretention Areas and Rain Gardens

Bioretentions are stormwater treatment facilities that capture and temporarily store runoff. Once it enters the BMP area, the water is slowly released and passed through a filter bed of sand, organic matter and

soil, often referred to as a bioretention mix. Depending on the design, the filtered runoff may continue to filter into the groundwater, or may be returned to the stormwater conveyance system via an underdrain. The treatment areas are typically planted with native grasses and plants that help to filter out any pollutants, as well as provide aesthetic and habitat benefits to the practice. Oftentimes native pollinator plants are used to attract butterflies and other beneficial pollinator species.

Forest Buffers/Habitat Creation

Forest buffers are used in urban areas where stormwater has the increased potential to travel and transport pollutants as surface runoff. Urban forest buffers refer to an area where a collection of trees are planted to help buffer a local waterway from surface runoff, or a location that separates two or more densely paved areas. Urban Tree Canopy (UTC) in general provides an important stormwater management function and can be a valuable tool in filtering and absorbing water.

Stormwater Wetlands

Stormwater wetlands are practices that include significant shallow wetland areas to treat urban stormwater runoff, but often may also incorporate small permanent pools and/or extended storage to achieve the full water quality benefit. Often referred to as pocket wetlands in urban areas, this best management practice (BMP) includes a variety of native wetland plants that help to absorb and filter stormwater runoff. As opposed to a bioretention area, stormwater wetlands are designed to hold water for a longer period of time in order to allow for adequate filtering. These wetlands provide an aquatic habitat in an otherwise terrestrial area.

Step Pool Systems

Also known as regenerative streamwater conveyance, coastal plain outfall, or regenerative step pool storm conveyance is a series of riffles, pools, and weirs that use surface pools and a subsurface sand seepage filter to reduce storm flows and infiltrate as much water as possible into shallow groundwater. RSCs are designed to safely convey stormwater from concentrated flow points (culvert, stream, or ditch) to a receiving waterbody while mitigating erosion and providing some degree of water quality improvement. They are implemented in steep topographies that are incised and present erosion issues that cannot be addressed using typical stream restoration techniques.

5.1 PROJECT SELECTION

This Plan is a living document. Projects are selected based on a combination of overall project feasibility and pollution reduction. Factors considered include but are not limited to: stakeholder input, project cost, pollution reductions, visibility and educational opportunity, site characteristics, and land use analysis. Projects are not listed in order of importance, impact, or feasibility.

5.2 OVERALL PROJECT LIST AND LOAD REDUCTIONS

As of the time of the completion of this report, the following projects are detailed in the Digital Atlas. Load reductions were estimated using FieldDoc (fielddoc.org). FieldDoc uses the Adapted Chesapeake Nutrient and Sediment Load Reduction Model algorithm that allows for the estimation of nutrient and sediment load reductions based off of approved Phase 6 Chesapeake Bay Watershed Model practices. To estimate reductions a user needs to input a practice name, practice area or area treated based on the practice, and FieldDoc returns isolation loads estimates for the given practice. The Adapted Chesapeake Nutrient and Sediment Load Reduction Model was created from default efficiencies and designed to balance ease of data entry with scientific rigor and it is useful in understanding a rough estimate of reductions if a practice were to be implemented based on size, type, and location[1].

If all the projects listed in this plan were to be implemented, they would reduce total nitrogen load by 3,874 lbs/yr, total phosphorus load by 621.5 lbs/yr, and total suspended sediment by 717,476 lbs/yr

[1] Information taken from the help section of FieldDoc, https://help.fielddoc.org/en/

Site ID	Name	Status	Property Information	Primary BMP	Drainage Area (Acres)	Sediment Reduction (pounds)	Nitrogen Reduction (pounds)	Phosphorus Reduction (pounds)
CH-1	Chestertown Marina 1	Planned	Public Land	Habitat Creation	1	918.2	6.5	0.9
CH-2	Bailey Park 1	Proposed	Public Land	Rain Garden	7.12	7360.3	52.9	7.2
CH-3	Bailey Park 2	Proposed	Public Land	Stream Restoration	26.69	22773.7	140.2	19.8
CH-4	Bailey Park 3	Proposed	Public Land	Habitat Creation	4.67	0.0	0.0	0.0
CH-5	Washington College 1	Designed	Institutional	Rain Garden	23.46	11444.8	27.7	7.7
CH-6	Washington College 2	Planned	Institutional	Rain Garden	0.44	2838.3	13.1	2.2
CH-7	Washington College 3	Proposed	Institutional	Bioswale	2.11	2879.2	13.3	2.1
CH-8	Washington College 4	Proposed	Institutional	Rain Garden	0.67	1028.5	4.9	0.8
CH-9	Washington College 5	Proposed	Institutional	Bioswale	24.24	33.1	153.0	24.5
CH-10	Washington College 6	Proposed	Institutional	Rain Garden	1.67	2563.7	12.1	2.0
CH-11	Washington College 7	Proposed	Institutional	Rain Garden	3.56	3680.1	26.5	3.6
CH-12	Washington College 8	Proposed	Institutional	Habitat Creation	0.63	0.0	0.0	0.0
CH-13	Carpenter Park 1	Proposed	Public Land	Rain Garden	80.84	124100.6	586.7	96.9
CH-14	Carpenter Park 2	Proposed	Public Land	Stream Restoration	81.29	104962.5	425.8	71.8
CH-15	Wilmer Park 1	Proposed	Public Land	Rain Garden	1.11	1147.5	8.3	1.1
CH-16	Wilmer Park 2	Proposed	Public Land	Shoreline	0.44	0.0	0.0	0.0
Ch-17	Remembrance Park 1	Proposed	Public Land	Rain Garden	86.4	89315.8	641.9	87.1
CH-18	High Street Landing	Proposed	Public Street	Step Pool	14.8	21977.7	112.3	18.9
CH-19	Elementary School 1	Proposed	Public Land	Rain Garden	46.81	29570.4	109.3	24.8
CH-20	Elementary School 2	Proposed	Public Land	Bioswale	43.14	39641.8	281.6	38.9
CH-21	Middle School 1	Proposed	Public Land	Rain Garden	1.89	1953.8	14.0	1.9
CH-22	Middle School 2	Proposed	Public Land	Rain Garden	2.34	2419.0	17.4	2.4
CH-23	South Queen St.	Proposed	Public Street	Green Streets	8.78	5546.4	20.5	4.7
CH-24	Lower High Street	Proposed	Public Street	Green Streets	0.41	259.9	1.0	0.2
CH-25	Upper High Street	Proposed	Public Street	Green Streets	1	938.1	2.3	0.6
CH-26	Rail Trail 1	Proposed	Public Street	Bioswale	36.25	67316.5	319.0	55.6
CH-27	Rail Trail 2	Proposed	Public Street	Bioswale	0.67	914.3	4.2	0.7
CH-28	Rail Trail 3	Proposed	Public Street	Bioswale	6.56	6028.1	42.8	5.9
CH-29	Rail Trail 4	Proposed	Public Street	Bioswale	2.67	2453.5	17.4	2.4
CH-30	Lawrence Preserve 1	Proposed	Institutional	Stormwater Wetland	20.35	16180.4	62.6	11.9
CH-31	Kent Plaza 1	Proposed	Commercial	Green Streets	2.34	2195.2	5.3	1.5
CH-32	Washington Square 1	Proposed	Commercial	Green Streets	3.45	3236.4	7.8	2.2

5.3 PERMITTED AND COMPLETED PROJECTS

With matching funds from a private donor, ShoreRivers is pleased to include four fully designed and constructed stormwater management facilities using ESD principles – three bioretention areas (Site ID CH-6) and one large pond retrofit (Site ID CH-5). In addition, with a generous grant from the Chesapeake Bay Trust's Green Streets, Green Jobs, Green Towns, the three bioretention areas associated with Site ID CH-6) have been installed (pictured right). Plan details are included in Appendix A.

5.4 CONCEPT PLANS

Several concept plans were prepared to advance priority projects towards implementation. Projects receiving concept designs were chosen based on a variety of factors, including nutrient reduction potential, visibility, stakeholder input, and landowner willingness.

The following concept plans are included in Appendix B:

- Baily Park Stream Restoration 1
- Bailey Park Stream Restoration 2
- Chestertown Marina River-Friendly Garden
- Washington College Tennis Court Bioswale
- Washington College Gymnasium Detention Pond Retrofit

5.5 WASHINGTON COLLEGE STORMWATER MANAGEMENT PLAN

In 2018 and 2019, ShoreRivers contributed to the Washington College Sustainability Plan. As part of that effort, ShoreRivers developed a basic concept plan for stormwater projects for the main campus area, included in this report as Appendix D.

5.6 PROJECT SCHEDULE

ShoreRivers and other partners will work with the Town of Chestertown to implement projects in priority order. As indicated, the Plan is designed to be dynamic, with new projects being added as community needs and water quality conditions change. ShoreRivers envisions this list being a relevant and empowering tool to help the town prioritize implementing stormwater upgrades.

Additionally, ShoreRivers, through participation on the Chestertown Environmental Committee, envisions reporting to the Mayor and Town Council on Plan progress at least once per year.

5.7 FUNDING STRATEGY

To best prepare the Town of Chestertown and watershed partners for implementing the projects and strategies identified in this plan, the below table provides funding sources that have historically supported similar efforts.

The Plan was designed to provide all of the project information necessary to seek design and implementation funding for the projects identified. The grant programs identified in the table below are made available state- and nation-wide depending on the program, and therefore it is a very competitive process. Watershed partners and project implementers are encouraged to engage businesses, local governments, churches, and community associations to create public-private-nonprofit partnerships to help achieve the goals of this plan.

As mentioned earlier, this plan includes all the elements of the EPA's A-I criteria which makes these projects eligible for funding under EPA's 319 Nonpoint Source Pollution Program. In Maryland the 319 Nonpoint Source Program is administered by MDE.

Funding Source	Grant Name	Notes
Chesapeake Bay Trust	Outreach & Restoration Grant	Supports outreach and community engagement activities that increase stewardship ethic of natural resources and on-the-ground restoration activities that demonstrate restoration techniques and engage Maryland citizens in the restoration and protection of the Chesapeake Bay and its rivers.
Chesapeake Bay Trust	Green Streets, Green Jobs, Green Towns	Supports design projects, financing strategies, and/or implementation of green street projects. The goal is stormwater management retrofits such as constructing green streets, greening of urban vacant lots, and urban tree canopy projects
Chesapeake Bay Trust & MD Dept of Natural Resources (administered by CBT)	Watershed Assistance Grant	Supports design assistance, watershed planning and programmatic development associated with protection and restoration programs and projects that lead to improved water quality in the Maryland portion of the Chesapeake Bay watershed
National Fish & Wildlife Foundation	Chesapeake Bay Stewardship Fund--Small Watershed Grant (SWG)	Supports community-based efforts to develop conservation strategies to protect and restore the diverse natural resources of the Chesapeake Bay and its watershed
National Fish & Wildlife Foundation	Chesapeake Bay Stewardship Fund--Innovative Nutrient & Sediment Reduction Grant (INSR)	Supports efforts within the Chesapeake Bay watershed to dramatically accelerate nutrient and sediment reductions by demonstrating innovative, sustainable, and cost-effective approaches.
National Fish & Wildlife Foundation	Technical Capacity Grants	Enhances the technical capacity of beneficiaries to implement more effective restoration through existing programs and/or future funding and project opportunities, including future INSR and SWG grant opportunities, through planning, prioritization, & design
Maryland Department of the Environment	319 Nonpoint Source Program	Provides financial assistance to local & state entities for the implementation of nonpoint source best management practices and program enhancements as a means of controlling the loads of pollutants entering the state's waterways

Appendix A: Permitted and Completed Projects

Appendix B: Concept Designs

Appendix C: GIS Mapping

Appendix D: Washington College Stormwater Plan