Windmill Branch Assessment and Watershed Action Plan

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Section 1. 0 Introduction

The *Windmill Branch Assessment and Watershed Action Plan* (the Plan) is the result of a 1- year effort to develop a strategy to protect and restore the Windmill Branch watershed within the Town of Easton. A set of recommended actions are based on information generated from existing studies, field assessments, and input from key stakeholders and organizations in the watershed. Actions include a combination of capital improvement projects, citizen awareness campaigns and volunteer activities. A list of priority projects for implementation, their cost per pound pollutant removed, and a timeline for implementation is provided. Overall, the success of the watershed plan is determined over the long-term as projects are implemented and stakeholders are engaged throughout the process.

This work was funded by a grant from the National Fish and Wildlife Foundation (NFWF) Technical Assistance Program provided to the Town of Easton.

1.2 Plan Outline

The *Plan* is organized as follows:

Section 1. Introduction & Background – Presents the goals and objectives for the Windmill Branch Watershed Plan and describes the regulatory context for pollutant load reductions. An overview of the conditions in the watershed is provided.

Section 2. Field Assessment & Results – Briefly describes the methods used to identify pollutant sources and identify stormwater management projects to reduce pollutant loadings to Windmill Branch.

Section 3. Action Plan – Presents a watershed implementation strategy to implement priority projects in support of the watershed plan goals.

Appendices A through C provide supplemental information to support the Watershed Plan to include: EPA's "A-I" watershed planning criteria, Glossary of best management practices (BMPs), and description of stormwater project concepts and cost information.

1.3 Intended Use

The Plan is intended as a guide for project implementation to maintain and restore watershed and stream conditions within Windmill Branch in the Town of Easton. The Plan is a living document and should be adapted to reflect implementation progress and reflect changing conditions in the watershed.

Appendix A shows where the Plan meets the Environmental Protection Agency's watershed planning criteria, "A through I" that are used to determine funding eligibility for projects using the Clean Water Act Section 319 funds.

Caveats

It is important to keep in mind that this plan is based on the information available at the time of development. Recommendations are based on desktop analysis and observations made during targeted upland and stream assessments. While representative sites from across the watershed were assessed in targeted areas, all stream miles and upland areas were not assessed. In the future, additional assessments should be conducted in areas of concern and this plan should be updated to reflect watershed changes and developments.

1.4 Existing Conditions

Land use

The Windmill Branch watershed is located on Maryland's Eastern Shore (**Error! Reference source not ound.**). Windmill Branch has an estimated 12.8 miles of streams that drain into the Tred Avon River, a tributary of the Lower Choptank River. It has an area of 2,277 acres (3.6 square miles). The Town comprises a little over half of the watershed area (56%). The remaining area is within Talbot County's jurisdiction. The watershed is bisected by U.S. Route 50, a main transportation corridor to and from the Eastern Shore.

The primary land uses are cropland, residential, forest and commercial (Table 1). The mix of land uses result in approximately 16% impervious land cover. This level of impervious cover classifies the Windmill Branch in the Town of Easton as an impacted watershed (Schueler et al 2008). An impacted watershed has 10 to 25% impervious cover and the streams show signs of degradation such as erosion, channel widening and decline in stream habitat. The soils in the watershed have moderate to low infiltration rate based on the Hydrological Soil Group (HSG) classification (Natural Resources Conservation Service, no date). Soil types can impact the type and location of best management practices (BMPs) based on their ability to store and infiltrate runoff.

Water quality

There is limited monitoring data to evaluate the current water quality conditions in Windmill Branch. Water quality and biological data collected for the Maryland Biological Stream Survey (MBSS) provides data from 1994 to 1997 at a sampling site located in the headwaters of the Windmill Branch watershed, Site TA-N-999-108-97. The benthic macroinvertebrate index of biotic integrity at this site was identified as "poor" and the physical habitat index was "very poor." The water quality measurements for dissolved oxygen fell below the Maryland Department of Environment criteria for Use I Waters but was

within acceptable pH levels for Use Class I[1] waters (Table 2). Nitrate concentrations of 0.809 mg/L were also deemed unacceptable based on the Creekwatchers water quality criteria of 0.2 mg/L (http://www.talbotrivers.org/watercriteria.shtml).

Table 1: Land Use in the Windmill Branch Watershed

Land Use	Area (acres)	Percent
Cropland	696.1	30.6%
Residential	748.5	32.9%
Large lot subdivision (forest)	10.7	0.5%
Large lot subdivision (agriculture)	60.7	2.7%
Commercial	228.9	10.1%
Institutional	91.8	4.0%
Industrial	61	2.7%
Transportation	25.3	1.1%
Forest	326.1	14.3%
Open urban land	14.4	0.6%
Wetlands	6.9	0.3%
Pasture	6	0.3%

[1] GIS data from Maryland Department of Planning (2010).

[1] Determined by the Maryland Department of Environment, Use Class I designation is " Water Contact Recreation, and Protection of Nontidal Warmwater Aquatic Life". Criteria for Use I waters in Maryland can be found: http://www.dsd.state.md.us/comar/comarhtml/26/26.08.02.03-3.htm

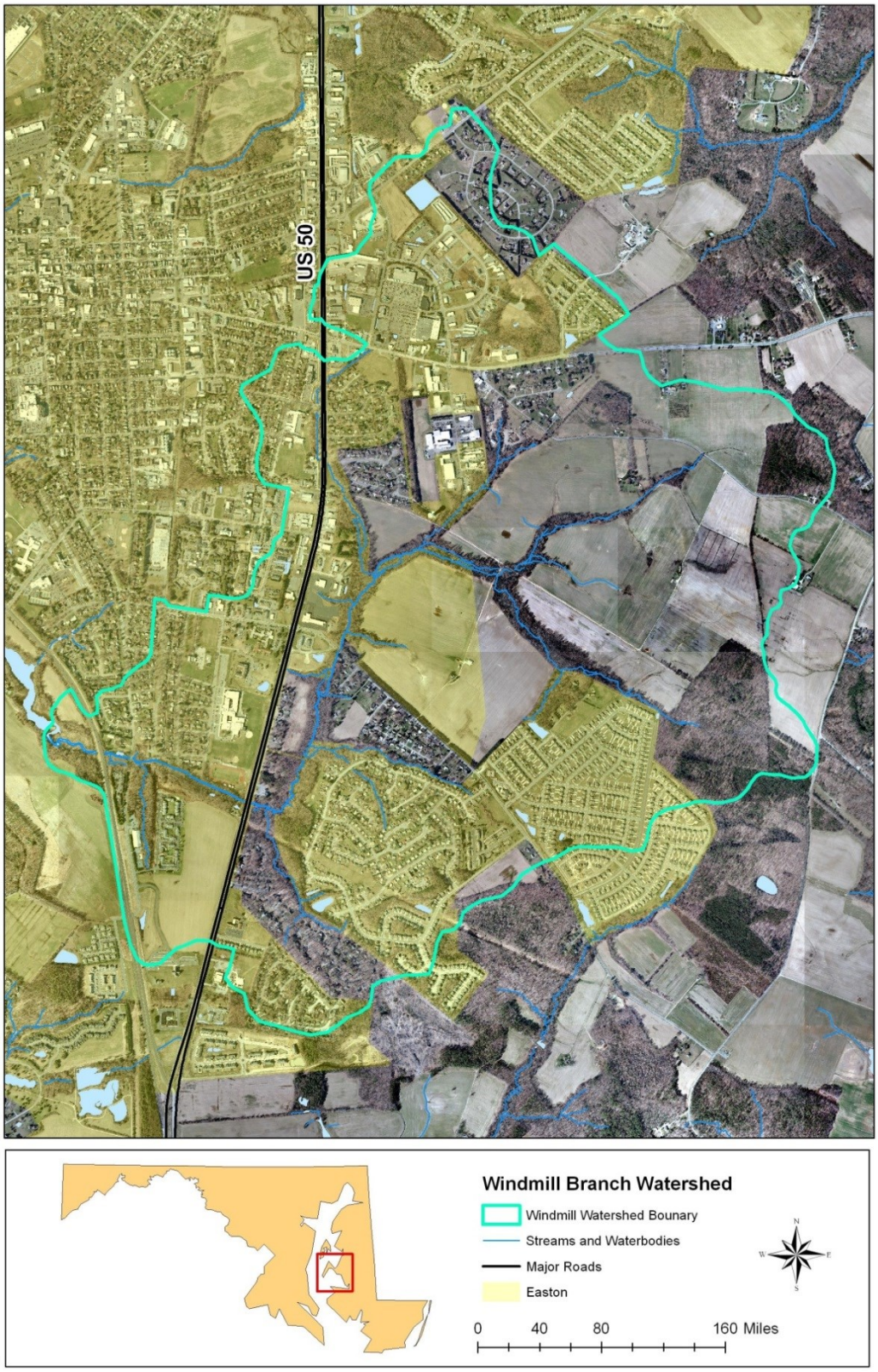


Figure 1: Location of the Windmill Branch Watershed in Talbot County, MD

Table 2. Summary of water quality conditions.		
Data	**Dissolved oxygen**	**pH**
MBSS data (1994-1997)	3.6 mg/L	7.03
MDE water quality criteria	No less than 5.0 mg/L	No less than 6.5 and no greater than 8.5

The macroinvertebrate and water chemistry sampling data, however, may not be representative of current conditions in the watershed with only one sampling location and the period of data collection ending more than 7 years ago. Therefore, the results should be interpreted with caution for any recommendation basis in the watershed.

The nearest water quality sampling site is located downstream of Windmill Branch and is part of the Talbot County Creekwatchers Program (http://www.talbotrivers.org/water.shtml). The data for this site (i.e., TA02) provides monthly to biweekly water quality grab samples from July 28, 1999 to April 24, 2001 Given the lack of documentation to interpret the results, the extreme range in values reported, and that the sampling site is located downstream of the watershed, this data is excluded from the watershed plan to characterize water quality in Windmill Branch.

Total Maximum Daily Loads (TMDL)

In order to fulfill the Clean Water Act, Section 303(d) requirements, all states are required to maintain and update a list of impaired and threatened waters (stream segments) and submit the list to the EPA for approval every two years. This list is then used to develop total maximum daily loads (TMDLs), which quantify the maximum amount of a pollutant that a waterbody can receive and still meet its designated uses. A TMDL also involves a detailed investigation into the sources of the impairment and reductions required to achieve the TMDL. TMDLs must be developed for every stream listed as impaired on the 303(d) list of the Clean Water Act.

There are two types of TMDLs relevant to the Windmill Branch watershed plan and include the Chesapeake Bay TMDL and local TMDLs for the Lower Choptank River.

Chesapeake Bay TMDL and Talbot County Watershed Implementation Plan

The Chesapeake Bay TMDL (Bay TMDL) was finalized in 2010 by the EPA to restore the Chesapeake Bay and local waterbodies by 2025. This TMDL allocates nutrient and sediment reductions for each Bay state such that a 25 percent reduction in nitrogen, 24 percent reduction in phosphorus and 20 percent reduction in sediment is achieved by 2025. These load reductions were further broken down by county

and major river basin. Under the Bay TMDL, Talbot County developed a Watershed Implementation Plans (WIP) that describes actions to reduce its allocated total nitrogen (TN) and total phosphorus (TP) reduction target. There is no load reduction required for sediment. To assist in this effort, Talbot County engaged the local jurisdictions to develop Town-specific watershed implementation strategies (i.e., mini-WIPs) for the Towns of Easton, Oxford, Saint Michaels, and Trappe. Table 3 summarizes the load reductions for the Town of Easton and Windmill Branch. The load reduction for Windmill Branch represents 4.4% of the total Talbot County load reduction for TN and TP. The load reduction for Windmill Branch is estimated based the proportion of watershed area within the Town of Easton (e.g., 18.9%).

Table 3: Nutrient Load Reduction for the Chesapeake Bay TMDL.

	TN (lb)	TP (lb)
Talbot County	47,396	3,900
Town of Easton	10,972	900
Windmill Branch	2,073	170

Local TMDLs

The Tred Avon River, to which Windmill Branch drains, is included in TMDL for fecal coliform for the restricted shellfish harvesting area in the Lower Choptank River Basin in Talbot and Dorchester Counties, MD (MDE, 2006). The required reductions are 78.3% each for human, pets and livestock and 0% for wildlife (MDE, 2006) [2]. However, to date, there are no specific allocations to reduce the bacterial load for any jurisdiction (pers. comm, W. Wolinski, Department of Public Works, Talbot County, MD and Jim George, MDE). In 2011, MDE reclassified an area of the Tred Avon River and parts of other nearby waterways in Talbot County to allow oysters and clams to be harvested at any time. The opening however, did not include the area just downstream of Windmill Branch.

According to MDE (2006), nutrient, biological and sediment impairments for the Lower Choptank River basin will be addressed at a future date. There are no updates on the development of these TMDLs at the time this plan was written.

[2] This TMDL addresses the Lower Choptank River. It is listed on Maryland's list of impaired waters for not meeting water quality standards for it designated use (US EPA, 2005). The Surface Water Use Designation for the Lower Choptank River is Use II: *Shellfish Harvesting Waters* (Code of Maryland Regulations, COMAR, 26.08.02.08M). Maryland's water quality standards provide bacteriological criteria for Use II waters, stating that a public health hazard will be presumed if the most probable number (MPN) of fecal coliform organisms exceeds a the water quality standard. http://www.dsd.state.md.us/comar/getfile.aspx?file=26.08.02.03-3.htm http://www.epa.gov/waters/tmdldocs/25539_LChoptankBasinAL_DR.pdf.

1.5 Watershed Plan Goals

The goals of a watershed plan are to guide development of the action strategies to ensure restoration and protection opportunities align with local environmental, community and economic policies, regulatory requirement and general interests. Four goals were defined for the Windmill Branch Watershed Assessment and Action Plan based on the existing conditions and opportunities to implement stormwater management, public education and stewardship opportunities.

Goal 1: Maintain and improve water quality conditions.

Water quality for the Windmill Branch should achieve the load reductions to support the Chesapeake Bay TMDL and its Use Class I designation. In general, land development has a negative impact on water quality if it is not managed to reduce or prevent pollutants from entering local water bodies. The overall water quality in the Windmill Branch watershed is in fair to poor condition based on the limited data available. Land and water draining Windmill Branch watershed into the Tred Avon River and then into the Lower Choptank River may contribute elevated bacteria levels associated with the TMDL for the Lower Choptank River.

Objectives:

1. Meet Talbot County WIP load allocations in Windmill Branch of 4.4% for both TN and TP
2. Keep informed of progress to establish future TMDL load reductions associated with the Lower Choptank River Basin

Goal 2: Protect high quality natural resources or sensitive areas

The natural setting of the Town of Easton along the Eastern Shore presents opportunities to continue to protect high quality natural resources or sensitive areas as a coastal community through federal, state and local actions. Development within, and around the Town needs to balance the protection of habitat to support endangered species and benefits provided through floodplain, stream buffer and woodlands and other Chesapeake Bay water resource features.

Objectives:

1. Continue to support and enforce regulations within the designated Critical Area
2. Provide adequate stream buffers to protect 100% of streams on public land

Goal 3: Protect and restore streams

The Chesapeake Bay is an integral part of the Town of Easton character where water draining from the upland areas affects the quality, use and enjoyment of local waters and the Bay, itself. Land use activities and management should be conducted to protect and restore streams to ensure their use, their enjoyment and support biological communities needed for a healthy watershed and Bay. The

watershed's 16% impervious cover suggests that land development may be negatively impacting stream health to include increased pollutant loadings, more pollution tolerant species and enhanced streambank and channel erosion if stormwater management practices (e.g., BMPs) are not in place.

Objectives:

1. Identify opportunities to implement BMPs in developed areas
2. Support efforts to implement conservation programs and BMPs on agricultural land
3. Apply Environmental Site Design (ESD) guidance as provided in the Maryland State Stormwater Design Manual (2009) to future development projects

Goal 4: Provide stewardship and educational opportunities to engage the public on watershed protection and restoration efforts

Involvement of the community in stewardship activities to protect and restore the Windmill Branch is a key part to the success of the Plan. Information and educational resources need to be available to increase the number and types of opportunities people can take in their community, neighborhoods or individual properties to enhance water quality and monitor stream conditions.

Objectives:

1. Identify target audiences for specific education and outreach efforts
2. Identify appropriate BMPs for homeowners to voluntarily implement
3. Support proper buffer management (e.g., tree planting, invasive plant removal) on public and private property
4. Create community-wide opportunities to participate in environmental activities (e.g. tree planting, stream clean-ups)

Section 2. Field Assessment and Results

Field work was conducted in March 2013 by staff from the Center, Town of Easton, and Talbot County to assess the Windmill Branch watershed's pollution sources and restoration opportunities in upland areas and streams. A general letter explaining the field assessment work as part of the watershed planning effort was provided by the Town of Easton for all field assessment teams. A few property owners provided additional assistance to discuss site conditions and proposed actions during field assessments. The upland assessment included 15 neighborhoods, 5 commercial, 3 institutional areas in the watershed and 13 candidate stormwater retrofit sites. A stormwater retrofit survey also included eight stormwater detention ponds with a specific focus on their maintenance needs and use of floating wetlands.

The field assessment sites were identified based on a GIS-analysis using parcel-data, land use and a determination of publicly accessible streams within the watershed, along with recommendations from the Town of Easton. These sites are illustrated on Figure 2. A summary of the field work is presented in Sections 2.1 through 2.4. The projects identified by the field assessments are listed in Tables 3-5 and 9 and are eligible for pollutant load reduction for the WIP.

2.1 Neighborhood Source Area Assessment (NSA)

A total of 15 neighborhoods were assessed in Windmill Branch by a field team that drove down every street in each defined neighborhood. Each neighborhood included information on the four potential pollution source areas: 1) yards and lawns; 2) driveways, parking lots, sidewalks and curbs; 3) rooftops; and 4) common areas.

All of the neighborhoods provided some opportunity to implement stormwater management practices to reduce pollutant loadings to streams. In general, the type of practices included rain gardens, tree planting, BayScaping[3] or alternatives to turfgrass and fertilizer management. Specific locations for these practices would require additional site visits to determine their implementation potential. The implementation potential also includes factors such as homeowner willingness to implement the practice. Table 4 summarizes the list of recommended actions in the neighborhoods and includes specific stormwater retrofit practice where applicable (i.e., RRI reference site number). The specific criteria to identify actions for fertilizer management, rain gardens and tree plants are provided below:

[3] BayScaping promotes environmentally-friendly landscapes that create wildlife habitat, conserve water and prevent pollution . More information about BayScaping can be found at *http://allianceforthebay.org/wp-content/uploads/dlm_uploads/2013/06/BayScapes_Homeowners_Design_Property.pdf*

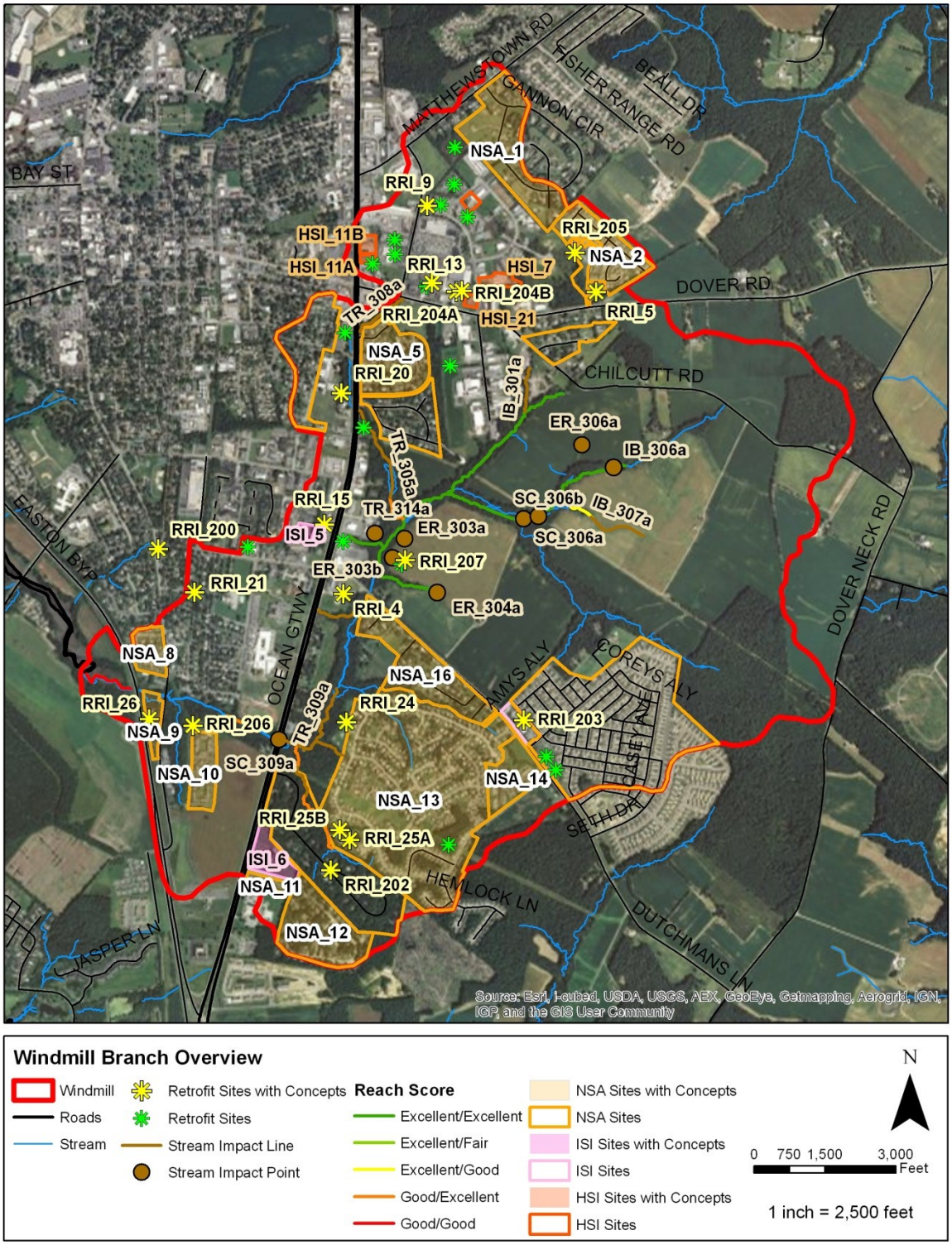


Figure 2. Location of upland assessment and stormwater retrofit sites.

- Fertilizer management was recommended based on the field assessment benchmark where 20 percent or more of the neighborhood yards had a high turf management status (e.g., use of fertilizers, weed control). See Figure 3 for examples of high and low residential turf management status;
- Rain gardens were recommended for neighborhoods where 20 percent or more of the lawn area down gradient of a roof leader could accommodate a rain garden; and
- Tree planting or BayScaping was recommended if turfgrass cover was greater than 50 percent of yard area, had limited forest canopy cover, and there was available space.
- Stormwater retrofits were recommended along streets and open spaces when appropriate. Three neighborhoods included development of a specific practice, whereas additional site visits are needed for the remaining neighborhoods.

a)

b)

Figure 3: Examples of a) High and b) Low Management Status for Residential Turf

Table 4: Recommendation Actions from the Neighborhood Source Area Assessments.

Neighborhood	Fertilizer Management	Rain Garden	Tree Planting or BayScaping	Stormwater Retrofit	Reference to Stormwater Retrofit site ID (see Section3 and Appendix C for detailed description)
NSA_1	x	X	x	x	
NSA_2	x	X	x	x	
NSA_3				x	RRI_205
NSA_5		X			
NSA_8	x	x	x*		
NSA_9	x			x	
NSA_10			x*	x	
NSA_11	x	x	x		
NSA_12	x			x	

NSA_13			x	x	
NSA_14			x*	x	
NSA_15	x	x	x*	x	RRI_203
NSA_16				x	
NSA_300				x	RRI_202
NSA_301			x	x	
*The asterisk indicates tree planting in open spaces/common spaces. All other sites include recommended actions on individual lots in the neighborhood.					

2.2 "Hotspot" and Institutional Site Assessments

A "hotspot" site was defined as a commercial, industrial, municipal or transport-related site that has a high potential to contribute contaminated runoff to the storm drain system or directly to receiving waters. Five hotspot candidate sites were investigated in the Windmill Branch watershed and all of the sites were rated as non-hotspots.

Institutional sites consist of public or privately-owned facilities that tend to have large parking space, landscaping, or turf cover (e.g., schools, churches, hospitals). The pollution generated from these sites tends to be nutrients and pesticides from fertilizer use, waste management, materials storage and disposal. Of the three institutional sites assessed, two sites have recommended actions that are summarized in Table 5.

Table 5: Sites and Recommended Actions for Institutional Site Investigations.

Site ID	Location Name	Follow-Up Action	Description
ISI_6	Immanuel Lutheran Church & School	Tree Planting & Education	780 trees and education
ISI_7	Neighborhood Center	Stormwater Retrofit	RRI_203

2.3 Stormwater Retrofit Inventory

Stormwater retrofits are structural stormwater management practices that can be used to reduce pollutants entering local streams and ultimately the Chesapeake Bay from existing development. A definition and example of the types of BMPs considered for retrofits is provided in Appendix B with a detailed description of projects in Appendix C. The sandy soils and high water table conditions within the watershed may limit use of BMPs requiring excavation of depths greater than 2-ft or less.

Table 6 summarizes the 12 stormwater retrofits and a tree planting project identified in the Windmill Branch watershed in addition to four actions for stormwater pond maintenance. Additional details for these projects are described in Section 3 and Appendix C.

Table 6. Summary of Stormwater Retrofits Identified from the Field Assessment

Type	RRI Site Reference ID
Permeable Pavement	13
Raingarden[1]	204A, 204B
Bioretention	9, 20, 21, 26, 200, 202, 203
Impervious Cover Removal	15
Regenerative Stormwater Conveyance	205
Tree Planting	24
Stormwater Pond Maintenance and Floating Wetland Retrofit	4, 5, 20, 25

[1] A rain garden differs from a bioretention stormwater retrofit in the level of design and construction requirements. A rain garden is recommended as part of a simple, downspout disconnection practice.

Pond Maintenance

The Center team identified general maintenance needs at seven of the eight ponds visited and a specific request to evaluate the potential to add a floating wetland to the ponds. These projects are not accounted for in the pollutant load reduction estimates as they are not BMPs or retrofits with a detailed design specifications or pollutant removal efficiencies by the State of Maryland or Chesapeake Bay Program. Maintenance, however, is critical to ensure the continued function of a BMP and that its pollutant load reduction is credited. General maintenance includes addressing minor erosion along banks, cleaning out small amounts of sediment from the inlet, removing debris that may clog the outlet, trash removal, repositioning of rip-rap or other energy dissipation materials, etc.

Observations suggest general and more detailed maintenance of all stormwater ponds in the Town's responsibility. Continued maintenance will reduce large, future expenditures by fixing small problems before they require more significant investment of resources. Additionally, continual maintenance can improve practice efficiency for nutrient and sediment removal and possibly localized flooding. Specific examples of required maintenance include the following:

1. Pond in the northwest corner of NSA_10.
    a. The outlet structure of this pond was severely damaged and as a result the pond does not function as designed. The repair should be relatively inexpensive (requiring a mason to replace concrete blocks). Minor maintenance at this site could include removal of sediment in the rip-rap inflow and removal of built up sediment near the inflow.

2. Pond included in RRI_5 assessment.
    a. This pond is functioning as designed; however, sediment has deposited around the inlet, which could impact water delivery to the pond if deposition continues.
    b. A wet portion between Dover Road and the pond could be planted with trees. Excluding mowers from this area should reduce wear on equipment. Subsurface or surface drainage could also be added to ensure health of planted materials.

3. Pond included in RRI_25A assessment.
    a. The southern and southeastern portion of this pond could be left to grow grass and other plants. A reduced mowing schedule could also be implemented on the rest of the facility without impacting maintenance access.

4. Pond included in RRI_25B assessment.
    a. This pond should be generally inspected and the inlets cleaned. This brief field assessment indicated there may be need to restore storage volume to this pond with potential sediment and organic matter accumulation on the bottom of the facility.

5. Pond included in RRI_4 assessment.
    a. Sediment accumulation along the road excludes a portion of water from entering the pond. A more permanent inlet could eliminate this problem in the future.
    b. A three to five foot vegetated buffer could be included around this facility by limiting mowing.

Floating Wetland Pond Retrofit

At the Town's request, the Center team evaluated existing stormwater management ponds for potential floating wetland retrofits. A floating wetland is designed to enhance nutrient removal by encouraging plant uptake and denitrification. Specific reductions are difficult to estimate without knowing nitrogen concentrations in the pond and existing pond design specifications (e.g. geometry, water quality treatment volume) that are needed to size the floating wetland for targeted nutrient removal; however, reports show reductions of 0.12 lbs/year/ft^2 for nitrate (Floating Island International, 2011a) and 0.03 to 0.05 lbs/year/ft^2 of total phosphorus (Floating Island International, 2011a & b). Non-growing season performance will likely be negligible. The floating wetland practice is currently under review by the Chesapeake Bay Program and recommendations for a nutrient and sediment pollutant removal efficiencies are expected in 2014.

This retrofit may be beneficial for all of the ponds assessed. There are two examples of ponds with floating wetlands in Easton on the southeast side of town just north of Dutchmans Lane. The community associated with these ponds has fully adopted the addition of floating wetlands. Figure 4 shows an example of a floating wetland in the center of the pond located in a Town of Easton residential development.

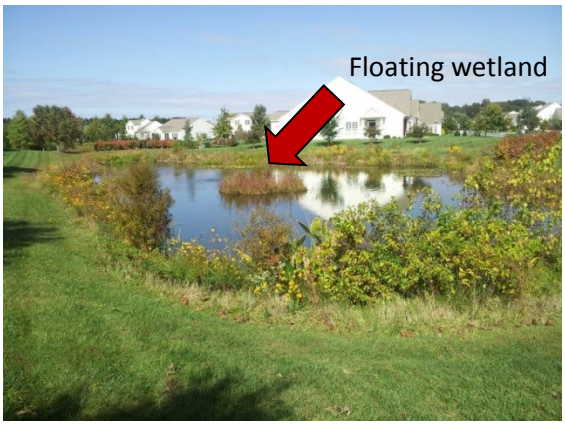


Figure 4. Example floating wetland in Easton, MD.

2.4 Stream Assessment

The Center, Town of Easton and Talbot County staff completed a stream assessment of 16 reaches to evaluate habitat conditions and identify impacts within the stream corridor affecting stream health (e.g., severely eroded stream banks, utility crossings, stormwater outfalls, impacted riparian buffers, excessive trash accumulation and dumping, stream crossings, and channel modifications). The Town of Easton provided written notification and requests from property owners to access their property for the stream assessments. Restoration opportunities for discharge prevention, stream restoration, stormwater retrofits, and riparian reforestation were also identified are eligible for pollutant load reductions for the WIP.

The condition of each stream reach was assigned a score based on an evaluation for overall stream health and buffer/floodplain. A ranking from excellent to poor was assigned based on a maximum of 80 points for each score (Table 7). When added together, the best reach score in the study area was for RCH_306 and RCH_309, which scored 146 out of 160 total possible points. This can be considered a representative score for the best attainable condition for a reach within the watershed. A reach scoring a few points higher than another may be placed in a higher category. However the qualitative aspects of the method make differences of a few points insignificant. The stream reach scoring criteria for Windmill Branch provides a qualitative method to compare streams for this Plan.

Table 7. Stream Reach Scoring Criteria.	
Classification	**Point Threshold**
Excellent	60-80
Good	40-59
Fair	20-39
Poor	<20

Overall, the stream reaches are in good or better condition with the exception of two stream reaches and buffer/floodplain sites that ranked "fair" (RCH_301, RCH_308). Stream reaches scoring higher had favorable habitat conditions, large intact buffers, wetland habitat and river access to the floodplain. Figure 5 through Figure 7 contrasts stream reaches in Windmill Branch for overall stream health, impacted buffers and erosion. In general, streams scoring lower had problems with buffer encroachment, trash, and erosion. Figure **8** illustrates the ranking of each stream reach as the result the assessment with a summary of conditions included in Table 8.

Table 9 lists the stream reaches with proposed restoration actions. A detailed description of the stream projects is provided in Appendix C. The estimated load reduction from these projects is 327lbs TN and 53 lbs TP representing 15% and 31% of the TN and TP load allocation for Windmill Branch.

b)

Figure 5. Two Stream Reaches in Windmill Branch with 'Excellent' (RCH 309) and 'Good' (RCH 311) Stream Conditions (RCH_309).

a) b)

Figure 6. (a) Impacted buffer (IB307a) where cropland extends to the edge of the channel along the upstream portion of RCH_307 and (b) Impacted buffer (IB311a) where riparian vegetation has been removed through the utility easement.

a) b)

Figure 7. (a) Erosion (ER303a) is an actively expanding headcut into a crop field adjacent to RCH_303 and (b) Erosion (ER306a) is a muddy drainage channel that flows to RCH_306.

Figure 8. Stream rankings for Windmill Branch.

Table 8. **Windmill Brach Stream Assessment Scores and Rating.**

Reach ID	Location	Overall Stream Condition Score	Overall Buffer / Floodplain Score	Total Score (out of 160)	Rating (Stream Condition / Buffer & Floodplain)	Notes
RCH_306	Brooks Property	75	71	146	Excellent/Excellent	Good stream buffer and floodplain connection. Channel is braided and wetland is present. A grass watershed may address the muddy drainage channel that likely transports sediment to the reach from adjacent crop field See project ER306a in Section 3.
RCH_303	Brooks Property parallel to Rt 50	72	72	144	Excellent/Excellent	Good stream buffer and floodplain connection. Proposed actions to address erosion in adjacent agricultural field caused by drainage. See projects ER303a and ER 303b in Section 3.
RCH_302	Spring & Associates/Brooks Property	71	69	140	Excellent/Excellent	Good stream buffer and floodplain connection.
RCH_312	Between Rt 50 and Longmount Pl	70	66	136	Excellent/Excellent	Stream has wetland floodplain in good condition. Slight downcutting near Rt 50.
RCH_314	East of Rt 50 between car dealership and self-storage	69	64	133	Excellent/Excellent	Stream has good floodplain connection. Trash dumped at stormwater pond behind mini storage. The buffer width is to the extent practical given the adjacent commercial land use constraints.
RCH_309	Between NSA_13 and Rt 50	68	78	146	Excellent/Excellent	Stream has good buffer and floodplain connection. Localized bank scour and sediment deposition.
RCH_304	Town owned property adjacent to Brooks property	64	66	130	Excellent/Excellent	Good stream buffer and floodplain connection along most of reach.

Table 8. **Windmill Brach Stream Assessment Scores and Rating.**

Reach ID	Location	Overall Stream Condition Score	Overall Buffer / Floodplain Score	Total Score (out of 160)	Rating (Stream Condition / Buffer & Floodplain)	Notes
	and parallel to Dutchmans Lane					Action recommended to address upstream portion of reach has a headcut[1] due to drainage from agricultural field. See projects ER304a in Section 3.
RCH_307	Brooks Property	67	57	124	Excellent/Good	Downstream portion of reach has a good buffer. Action recommended to addressed upstream is lacking a buffer and the channel is entrenched from crop field drainage. See project IB307a in Section 3.
RCH_301	Spring & Associates	67	33	100	Excellent/Fair	Good buffer coverage to the extent practical and overall stream condition is good. Property owner is open to the option of expanding the buffer on the left bank. Buffer expansion on the right bank is not possible due to the location of existing structures and equipment. See project IB301a in Section 3.
RCH_308	Between Dover Rd and Rt 50	62	36	98	Excellent/Fair	Slight downcutting at culvert where stream emerges on the south side of Dover Rd. Commercial, residential, and crop land uses are adjacent to the channel and impacting the buffer. Trash was present along this reach. See project IB308a to address the impacted buffer on the left bank.
RCH_305	Adjacent to Brooks Property, south of Bartlett Ave and	58	66	124	Good/Excellent	Good stream buffer and floodplain connection. Evidence of sediment

Table 8. **Windmill Brach Stream Assessment Scores and Rating.**

Reach ID	Location	Overall Stream Condition Score	Overall Buffer / Floodplain Score	Total Score (out of 160)	Rating (Stream Condition / Buffer & Floodplain)	Notes
	parallel to Rt 50					deposition in floodplain. Trash is scattered throughout this reach and there is mowing to the edge of the channel along the upstream portion.
RCH_402	South of Easton High School near track	58	61	119	Good/Excellent	Good buffer and floodplain connection. Slight bank erosion and undercutting.
RCH_311	Between NSA_13, Rt 50, and Woodridge Dr	54	66	120	Good/Excellent	Action is recommended to address the downcutting in the utility easement where trees and vegetation are cleared. Upstream of the easement there is a headcut and the channel then becomes shallow with good floodplain access and wetland area. See project ER311a in Section 3.
RCH_310	Between NSA_13 and RCH_309	43	72	115	Good/Excellent	Unmapped tributary to RCH_309 that originates from an outfall draining the Chesapeake neighborhood. The downstream portion of the reach is eroding and a significant amount of sediment is deposited at the confluence with RCH_309. Trash is present throughout the reach.
RCH_313	NSA_13 road crossing	56	49	105	Good/Good	Buffer impacts due to homeowner mowing. Trash present at road crossing.
RCH_401	West of Easton Bypass near Easton High School	52	59	111	Good/Good	Good floodplain connection. Headcut on eastern portion of reach where channel begins to widen.

Table 8. **Windmill Brach Stream Assessment Scores and Rating.**						
Reach ID	**Location**	**Overall Stream Condition Score**	**Overall Buffer / Floodplain Score**	**Total Score (out of 160)**	**Rating (Stream Condition / Buffer & Floodplain)**	**Notes**
[1] A headcut (or knickpoint): The erosion of the channel bed, progressing in an upstream direction, manifested by pronounced drops in elevation or abnormally steepened channel segments.						

Table 9. Summary of Stream Restoration Opportunities from the Stream Assessment.	
Type	**Stream Reach Site Reference ID (ER = erosion site IB = impacted buffer site)**
Grass waterway/swale	ER306a, ER 303b
Stream Restoration	303a, 304a, ER311a
Stream Buffer	IB301a, IB305a, IB307a, IB 308a

In addition to the stream restoration projects, opportunities to reduce trash and invasive species were also identified. Trash from urban/suburban areas are transported during rain events and was found in the streams and adjacent riparian areas throughout the watershed. There were also a couple of dumping locations identified in commercial areas. A total of 6,107 feet of the stream corridor recorded trash impacts. Although prevalent in and around many streams, trash deposition was not extensive and could easily be cleaned up by the Town and/or volunteers. In addition, invasive species are a concern throughout the watershed and were documented in all the assessed reaches. Invasive species are a problem because they displace native species and degrade the unique and diverse biological resources of the area.

Section 3. Action Plan

The action plan describes a watershed implementation strategy and priority actions for the Town of Easton and its project partners to meet the watershed plan goals and objectives defined in Section 1.

3.1 Watershed Implementation Strategy

Implementation of a watershed plan is a long-term process and will need significant monetary and staff resources to implement. However, the burden on the Town can be reduced by resources and technical assistance from external funding sources and partnering with other organizations and Talbot County. The watershed implementation strategy describes key areas the Town of Easton may focus on to further their efforts to restore and maintain water quality in the Windmill Branch watershed.

The strategy helps addresses the financial, technical and programmatic needs to implement actions recommended in the Windmill Branch Watershed Plan. It is also acknowledged that additional actions may be identified in the long-term implementation efforts as opportunities with local organizations arise.

A survey of key partners in watershed restoration was completed to evaluate the capacity of the Town and other local organizations to implement actions recommended in the Plan. The results of the survey identified financial, technical and programmatic needs that were used to develop the implementation strategy. The person interviewed for the survey, their affiliation, and organization are provided:

- Zach Smith, Planner, Town of Easton;
- Bill Wolinski, Environmental Engineer, Talbot County;
- Amy Scaroni, Watershed Restoration Specialist, University of MD Sea Grant; and
- Drew Koslow, Choptank Riverkeeper, MidShore Riverkeeper Conservancy (MSRC).

The watershed implementation strategies are described below along with actions for their implementation (Table 10).

1. *Support voluntary implementation of BMPs on private property for credit in the WIP.* Over the next decade, the Town needs to build upon their success of demonstration projects on public lands to facilitate implementation of BMPs and stewardship actions on private land through environmental education and outreach efforts and incentive programs. Broad-based participation in implementation of the watershed plan is needed to achieve the pollutant load reductions in the WIP from existing sources. The priority actions for implementation listed in the next section include a number of different stakeholders to include residents, business owners, and local government. The development of targeted education and outreach efforts will increase BMP adoption on priority sites and subsequent maintenance. For example, not all residential lawns would benefit from urban nutrient management (UNM) practices, rain gardens or buffer management.

2. *Improve coordination of project and program implementation with local watershed organizations such as MSRC, UMD Extension, Sea Grant and the County.* The Town along with the County and MSRC have successfully acquired over $1 million funding over the last 3 years to implement BMPs in the town and county. Many of these projects serve as demonstration projects to showcase new technologies (e.g., ditch conversion retrofits, floating wetlands, bioretention). Demonstration projects are also opportunities to engage and educate the general public on stormwater management (e.g., tree planting). The demonstration projects have focused on public lands in urban and agricultural land uses, with less emphasis on private, residential land uses and relied on limited Town and County staff resources. Improved coordination amongst the major organizations and inter-departmental staff is needed. This coordination will enhance and streamline the implementation process by targeting efforts while taking advantage of each organization's technical and resource capabilities.

3. *Review and modify existing regulations and programs that may strengthen tree protection or other natural resources during land development process.* Overall, there is a high level of local sensitivity to protecting natural resources. Talbot County and the Town of Easton state that resource protection is a strong factor in local land use decisions, redevelopment incentives and transportation planning. While there are local regulations to reduce impact of development on natural resources (e.g. stormwater management requirements, buffer regulation), the Town may consider strengthening efforts to further protect natural vegetation during new and redevelopment.

4. *Monitor progress in watershed restoration*. The continued implementation of this Plan relies on measuring success throughout the process. There are a variety of indicators to measure success in the short (1-2 years), medium (3-5 years) and long term (over 5 years). These indicators include the number of people that participate in local events, the number of practices implemented and/or the measured water quality and biology of stream conditions.

5. *Develop sustainable funding sources for program development and BMP implementation, to include stream restoration.* The Town relies heavily on external funding sources to implement BMPs. The continued need to reduce pollutant loading from developed land will likely persist through the year 2025 when the Talbot County Watershed Implementation Plan (WIP) load reductions are to be met. Over the next decade, an aggressive implementation schedule is needed to meet the 2025 target. This implementation plan can be accomplished using a variety of funding approaches.

Table 10. Summary of Watershed Implementation Strategy (short term = within 1 year; mid-term = 2 – 5 years; long term = more than 5 years)	
Action	**Timeframe**
Strategy 1: Support voluntary implementation of BMPs on private property for credit in the WIP	
1) Review Chesapeake Bay Program approved homeowner BMPs that may receive pollutant load reduction credits for the WIP.	Short-term
2) Town staff coordinate with Maryland Extension and/or MSRC to revisit neighborhoods listed in Table 4 and evaluate potential for the number and types of homeowner BMPs	Mid-term
3) Meet with Talbot County and Maryland Extension to identify information needs to credit homeowner BMPs as part of the Chesapeake Bay Program TMDL and County WIP	Short-term
4) Provide BMP information and maintenance information on Town website and distribution to Homeowner Associations (HOAs) at annual meetings and in newsletters	Mid-term
5) Schedule two "community action days" for stream clean-up to engage student, clubs and organizations. This event may be associated with other watershed-based activities to draw a wider audience and higher participation levels	Mid-term
Strategy 2: Improve coordination of project and program implementation (inter-departmental and with partner organizations)	
6) Convene and participate two times per year in a roundtable-type meeting with major watershed organizations and stakeholders to identify priorities for implementation and to provide project updates	Short-term
7) Evaluate opportunities to enhance existing BMPs, such as pond maintenance, pond retrofits with floating wetlands (Table 13)	Short-term
8) Identify inter-department and agency roles and responsibilities needed to implement and maintain BMPs, specifically with right-of-way and stormwater pond retrofits	Mid-term
9) Partner with UMD Extension to develop 'homeowner BMP' campaign to include technical assistance, cost-share or full rebates for practice implementation; highlight individual projects with a recognition reward system, such as sign, plaque, presentation of certificate and/or press coverage.	Long-term
Strategy 3: Review and modify local ordinances and programs to strengthen tree protection or other natural resources during the land development process	
10) Develop a program for buffer management to encourage private landowners to plant native plants and remove/ control invasive plants	Mid-term
11) Work with Maryland Extension (Master Gardeners, Sea Grant) to develop invasive species removal program	Long-term

Table 10. Summary of Watershed Implementation Strategy (short term = within 1 year; mid-term = 2 – 5 years; long term = more than 5 years)	
Strategy 4: Monitor progress in watershed restoration	
12) Implement 2-3 priority stormwater retrofit projects each year, focusing on high priority projects as funding becomes available (see Table 12 for list of projects)	Ongoing
13) Work with Talbot County to streamline BMP reporting, tracking and verification for annual progress reports and for milestones to meet the Chesapeake Bay TMDL	Mid-term
14) Work with MSRC to identify a monitoring location and begin water quality and biological monitoring in the watershed as part of the Creekwatchers program	Long-term
15) Assist UMD Extension develop survey or other method to quantity turfgrass areas that qualify for the Chesapeake Bay Urban Nutrient Management pollutant load reductions. For example, turfgrass that is fertilized according to the Maryland Fertilizer Act, 2011 by commercial applicators may receive a 9% TN load reduction credit, while turfgrass managed by 'do-it-yourself' applicators may receive a 4.5 TN load reduction credit.	Short-term
Strategy 5: Develop diversified and sustainable funding sources for program development and BMP implementation	
16) Review grant funding opportunities for program development through the Chesapeake Bay Trust Outreach and Community Engagement program	Short-term
17) Identify funding opportunities to include cost-share programs for project implementation such as the Maryland Department of Agriculture (e.g., MACS)and Natural Resources Conservation Service (e.g., CREP	Mid-term
18) Investigate feasibility of nutrient trading program (http://www.mdnutrienttrading.com/) as part of County-wide WIP load reduction effort	Long-term
19) Evaluate feasibility to adopt a stormwater fee to help offset the cost of stormwater management services (implementation and maintenance)	Long-term
20) Continue grant funding applications	Ongoing

3.2 Watershed Priority Projects for BMP Implementation

A description of the watershed priority actions is provided in the profile sheets in Appendix C. Each profile sheet includes a project description, location, estimated cost, pollutant load reductions and site images. The Center, in consultation with the Town of Easton developed a set of criteria to prioritize identified management and restoration practices. Projects were ranked based on the following criteria: costs, pollutant removal efficiency, support local planning efforts; benefit provided by community education and outreach for a project, land ownership and habitat value. Appendix D summarizes the method used to rank project priorities as high, , medium and low.

The following 26 projects were identified as potential restoration opportunities:

- 12 stormwater retrofits
- 2 tree planting areas
- 3 stream restoration/repair stream headcuts
- 4 stream buffer enhancements
- 2 grassed waterways
- Neighborhood urban nutrient management
- Neighborhoood residential rain gardens

An additional 5-acre tree planting opportunity was identified and implemented during the writing of this Plan and is not included in the list of priority actions.

Table 11 summarizes the priority BMPs for implementation and their total cost and pollutant load reduction for each project. Individual projects are listed in Table 12 with their ranking of high (green), medium (yellow) and low (grey). Additional projects are identified in **Table 13** for pond maintenance. The total cost for the high priority projects was estimated at $60,201 and included the implementation of the 5-acre tree planting project for an estimated TN, TP and TSS load reduction of 91.6 lbs/year, 10.6 lbs/year and 31,924 lb. yrs, respectively. The total load reduction from all of the Town of Easton projects would reduce the load allocation from Talbot County through their WIP by a approximately 30% TN and 42% TP. There is no load reduction for total sediment. The costs and pollutant load reductions are based on planning-level estimates for individual project design. Urban nutrient management, grass waterways on the agricultural land uses, stream buffers and tree planning are the most cost-efficient projects to implement with an estimate $8 to $165 per lb TN removed.

The *Windmill Branch Assessment and Watershed Action Plan* developed a strategy to protect and restore the Windmill Branch watershed. The research, desktop assessments, field assessments, stakeholder surveys, and data analysis support the Plan's recommendations. The Watershed Implementation Strategies and Watershed Priority Actions include a combination of capital improvement projects, program evaluation, citizen awareness campaigns and volunteer activities. The implementation schedule provides the priority project ranking, and cost per pound pollutant removed. These implementation strategies, actions, and schedules can be used directly to apply for grant funds, to appeal to Town and/or County Council for appropriations, and to discuss with watershed groups and landowners with the goal to implement projects in targeted areas that realize WIP pollutant load reduction goals as well as community goals. Overall, the success of the watershed plan is determined over the long-term as projects are implemented and stakeholders are engaged throughout the process.

Table 11. Summary of priority project costs and annual pollutant load reduction.

	Number of projects	Cost	TN (lb/yr)	TP (lb/yr)	TSS (lb/yr)
High priority projects[1]	6	$60,201.80	91.6	10.6	31,924.08
Medium priority projects[2]	14	$322,413	476.3	58.8	188,026.01
Low priority projects[2]	7	$202,879	42.8	2.4	899.5
Total	26	$ 585,494	610.6	71.8	220,849.54

[1] Includes the 5-acre tree planting project on city-owned property north of Dutchmans Lane
[2] The cost and load reductions include cost per rain garden installed and all high maintenance yards implementation UNM on an acre basis

Table 12. Priority Stormwater Retrofit Opportunities in the Windmill Branch (color coded cells indicate project ranking (green = high; yellow= medium; grey = low)

Site ID	Location	Retrofit Concept	Drainage Area (ac)	Cost	TN Removal (lb/yr)	TP Removal (lb/yr)	TSS Removal (lb/yr)	$/lb TN Removal
ISI_6	7215 Ocean Gateway	Tree Planting	3.90	$3,900	26.6	1.35	295	$147
RRI_21	Between Walnut Ln. and Wayside Ave. south of Dutchmans Ln.	Bioretention	1.49	$18,459	3.1	0.29	98	$5,979
ER303a	Publicly owned land adjacent to Brooks Property	Stream Restoration	0.00	$10,140	20.0	6.80	31000	$507
RRI_24	Northwest of the intersection of Corbin Parkway and 4th Street.	Tree Planting	0.92	$919	6.3	0.32	70	$147
RRI_200	Southeast of the intersection of Dutchmans Ln. and S. Washington St.	Bioretention	0.75	$21,784	1.6	0.18	83	$13,933
RRI_203	Across from house 29574 Charles Drive	Bioretention	0.44	$51,891	1.0	0.20	147	$52,919

Table 12. Priority Stormwater Retrofit Opportunities in the Windmill Branch (color coded cells indicate project ranking (green = high; yellow= medium; grey = low)								
RRI_15	North of the intersection of Dutchmans Ln. and Ocean Gateway - Mr. Tire parking lot	Impervious Cover Removal	0.33	$21,558	0.2	0.21	178	$89,023
RRI_13	Wal-Mart and Giant parking lots. Northeast of the intersection of Dover Rd. and Elliott Rd.	Permeable Pavement	0.18	$43,067	0.3	0.04	61	$137,146
IB305a	Adjacent to Brooks Property, south of Bartlett Ave and parallel to Rt 51	Urban Buffer	0.00	$580	3.5	0.24	69	$165
RRI_9	Northeast intersection of Teal Dr. and Elliott Rd. - Bank parking lot	Bioretention	0.44	$50,778	1.0	0.19	141	$51,780
ER304a	Town owned property adjacent to Brooks property and parallel to Dutchmans Lane	Stream Restoration	0.00	$10,140	20.0	6.80	31000	$507

Table 12. Priority Stormwater Retrofit Opportunities in the Windmill Branch (color coded cells indicate project ranking (green = high; yellow= medium; grey = low)								
ER306a	Brooks Property	Grass Waterway (Ag)	0.00	$1,452	102.3	3.06	720	$14
ER311a	Utility easement between NSA_13, Rt 50, and Woodridge Dr	Stream Restoration	0.00	$50,000	100.0	34.00	155000	$500
IB307a	Brooks Property	Stream Buffer (Ag)	0.00	$1,380	41.6	0.88	208	$33
Per NSA UNM	Generic	Urban Nutrient Management	138.00	$1,450	192.9	11.87	0	$8
RRI_204A	South side of Walmart building - along stream	Rain Garden	0.11	$4,776	0.2	0.05	35	$19,516
RRI_204B	South side of Walmart building - along stream	Rain Garden	0.19	$8,475	0.4	0.08	62	$19,782
RRI_202	Near 29389 Woodridge Dr.	Bioretention	6.14	$76,867	12.7	1.18	404	$6,057
Per NSA Rain Garden	Generic	Rain Garden	0.10	$1,288	0.2	0.04	28	$5,866
RRI_20	St. Peters and Pauls High School - Nears Stream to the northeast of sports fields	Bioretention	4.67	$72,293	9.7	0.94	349	$7,469

Table 12. Priority Stormwater Retrofit Opportunities in the Windmill Branch (color coded cells indicate project ranking (green = high; yellow= medium; grey = low)

ER303b	Brooks Property	Grass Waterway (Ag)	0.00	$5,068	10.2	0.31	72	$495
IB301a	Spring & Associates	Urban Buffer	0.00	$585	5.4	0.37	105	$109
IB308a	Between Dover Rd and Rt 50	Stream Buffer (Ag)	0.00	$240	14.6	0.31	73	$16
RRI_26	Near 1175 South Washington St.	Bioretention	1.21	$81,442	2.6	0.39	243	$31,270
RRI_205	Village of Waylands	Regenerative Stormwater Conveyance	0.55	$41,964	0.1	0.04	30	$380,819

[1] The color coded cells indicate project ranking. Green = High; Yellow= Medium; Grey = Low

Table 13. Recommended Projects for Pond Maintenance			
Location	**Action**	**Ownership**	**Cost Estimate**
Pond in the northwest corner of NSA_10.	The outlet structure of this pond has been destroyed and as a result the pond does not function as designed. The repair of outlet structure (requiring a mason to replace concrete blocks). Minor maintenance at this site could include removal of sediment in the rip-rap inflow and removal of built up sediment near the inflow.	Private - Community stormwater management.	$5,000 - 10,000 to repair outlet structure and will require professional estimate to determine extent of repairs needed Hourly rate for labor to manually remove sediment in riprap and pond inflow location.
Pond included in RRI_25A	The southern and southeastern portion of this pond could be left to grow. A reduced mowing schedule could also be implemented on the rest of the facility without impacting maintenance access.	Neighborhood Association – Town maintained.	No cost as it would be a request from the HOA management company to its contractor to modify its landscaping practices.
Pond included in RRI_25B assessment.	Inspect and clean the inlets and assess need to dredge pond to restore storage volume to this pond given the potential sediment and organic matter accumulation on the bottom of the facility.	Neighborhood Association – Town maintained.	The cost for dredging stormwater management ponds is high ($50,000) with the use of heavy equipment.
Pond included in RRI_4 assessment.	Sediment accumulation along the road excludes some water from entering the pond. A more permanent inlet could eliminate this problem in the future. A three to five foot vegetated buffer could be included around this facility by limiting mowing	Private – Royal Farms and unused building site contributing to pond.	Tree planting estimate is $1,000 per acre depending on the size of tree planted and use of volunteers. Additional assessment needed to recommend design for permanent inlet. No cost estimated is given at this time.

Appendix A: US EPA “A through I” Criteria

U.S. EPA Watershed Planning "A-I Criteria"

The Windmill Branch Watershed Action Plan is developed to meet the US. Environmental Protection Agency watershed planning "A-I Criteria" that will enable the Town of Easton to apply for Section 319 grant funds to implement projects recommended in this plan.

Section 319 Nonpoint Source Management Program of the Clean Water Act provides opportunities for states, tribes, and territories to receive grant money for the development and implementation of programs aimed at reducing nonpoint source (NPS) pollution. In 2003, the U.S. Environmental Protection Agency (EPA) established a requirement that all watershed restoration projects funded under Section 319 of the federal Clean Water Act to be supported by a watershed plan that includes the following nine minimum elements, known as the "A-I criteria." The criteria include:

A. Identification of the causes and sources that will need to be controlled to achieve the load reductions estimated in the watershed plan
B. Estimates of pollutant load reductions expected through implementation of proposed nonpoint source (NPS) management measures
C. A description of the NPS management measures that will need to be implemented
D. An estimate of the amount of technical and financial assistance needed to implement the plan
E. An information/education component that will be used to enhance public understanding and encourage participation
F. A schedule for implementing the NPS management measures
G. A description of interim, measurable milestones
H. A set of criteria to determine load reductions and track substantial progress towards attaining water quality standards
I. A monitoring component to determine whether the watershed plan is being implemented

Table A- 1 shows how these criteria are addressed throughout this document.

Table A- 1. U.S. EPA Watershed Planning "A-I" Criteria. 1. U.S. EPA Watershed Planning "A-I" Criteria.

Section of the report	A	B	C	D	E	F	G	H	I
Section 1. Introduction	X								
Section 2. Field Assessment Results		X							
Section 3. Action Plan			X	X	X	X	X	X	X

Appendix A. EPA “A through I” Critieria									
Appendix B. BMP Glossary									
Appendix C. Project Descriptions and Design Concepts		X	X						

Appendix B: BMP Glossary

BMP Glossary- Windmill Branch

Bioretention: Bioretention is an innovative urban stormwater practice that uses native forest ecosystems and landscape processes to enhance stormwater quality. Bioretention areas capture sheet flow from impervious areas and treat the stormwater using a combination of microbial soil processes, infiltration, evapotranspiration, and plants.

Permeable Pavement: Permeable pavement allows rain water and snow melt to infiltrate through it to be filtered and recharged into the ground as groundwater. Permeable pavement is asphalt or concrete mixed with fewer fine particles to create more air space which allows water to permeate through it. It can greatly decrease stormwater runoff. (Permeable Pavement:

http://www.crwa.org/projects/bmpfactsheets/crwa_permeable_pavement.pdf)

Rain Gardens: Rain gardens are low cost on-site retrofits that homeowners can add to their property. Rain gardens provide treatment of roof runoff.

Tree Planting: Tree planting is a good retrofit to educate residents about urban stream impacts and restoration potential. Tree planting is always a preferred option at open spaces in the stream corridor that lack enough room for storage retrofits.

Stream Restoration: A stream restoration practice is defined as one component of an overall restoration project. Most stream restoration projects include many different practice types, as well as many applications, of the same practice type. Stream restoration projects are broadly classified into four practice groups based on their intended restoration objective: bank protection, grade control, flow deflection/ concentration and bank stabilization.

Severely eroding stream banks (right) and restored stream (left) in Minebank Run, Baltimore County, MD

Stream Buffer: The stream buffer is the region immediately beyond the banks of a stream that serves to limit the entrance of sediment, pollutants, and nutrients to the stream itself. When forested, a stream buffer promotes bank stability and serves as a major control of water temperature.

Urban Nutrient Management: Urban nutrient management is defined as identifying how the major plant nutrients (nitrogen, phosphorus, and potassium) are to be annually managed for expected turf and landscape plants and for the protection of water quality.

Impervious Cover Removal: The goal is to minimize impervious cover and mass grading, and maximize retention of forest cover, natural areas and undisturbed soils.

Grass Waterways: Grass Waterways are a type of conservation buffer; they downhill grassed channels, generally broad and shallow, designed to prevent soil erosion while draining runoff water from adjacent cropland. As water travels down the waterway, the grass vegetation prevents erosion that would otherwise result from concentrated flows. Grass waterways also help prevent gully erosion in areas of concentrated flow. (Conservation Practices Minnesota Conservation Funding Guide: http://www.mda.state.mn.us/protecting/conservation/practices/waterway.aspx)

Regenerative Stormwater Conveyance: Regenerative Stormwater Conveyance is an innovative approach to provide stormwater treatment, infiltration, and conveyance within one system. It has been used as an ecosystem restoration practice for eroded or degraded outfalls and drainage channels.
(4.2.7. Regenerative Stormwater Conveyance System (RSC): http://www.dep.wv.gov/WWE/Programs/stormwater/MS4/Documents/Specification_4.2.7_Regenerative_Stormwater_Conveyance_WV-SW-Manual-11-2012.pdf)

Image Sources and References:

1. Urban Subwatershed Restoration Manual Series- Manual 3: Urban Stormwater Retrofit Practices, Center for Watershed Protection, Inc.
2. Urban Stream Restoration Practices: An Initial Assessment
3. Urbanization, Stream Buffers, and Stewardship in Maryland
4. Recommendations of the Expert Panel to Define Removal Rates for Urban Nutrient Management: CBP Approved Final Report
5. Picture for Regenerative Stormwater Conveyance is from http://www.ecosystemrestoration.com/central_sanitation.html
6. Stream restoration picture from: http://www.mde.state.md.us/programs/Water/TMDL/Documents/www.mde.state.md.us/assets/document/Appendix_H2_Baltimore_County_Stream_Restoration.pdf
7. Urban nutrient management: http://www.jamesriverbasin.com/projects/view/3
8. Example Commercial Urban Nutrient Management from http://mda.maryland.gov/
9. Impervious cover removal picture from here: http://www.erthproducts.com/dnn/dnn/EngineeredSoils/BioRetentionRainGardensSoil/tabid/90/Default.aspx

10. Urban buffer picture from here: http://www.clemson.edu/extension/horticulture/nursery/remediation_technology/veg_buffer_strip.html
11. Stream buffer picture from http://stormwater.allianceforthebay.org/take-action/structural-bmps/riparian-buffers/

Appendix C: Project Concepts and Descriptions

Site IDs: ER303a	Location: Publicly owned land adjacent to Brooks Property		
	Drainage Area: n/a		
Retrofit Recommended:	Headcut repair to stop the erosion of the channel bed, progressing in an upstream direction at 3 locations		
Cost Estimate: $10,140	Water Quality Volume Treated: n/a		
Estimate Pollutant Reduction (lbs/yr):	TN: 20	TP: 6.8	TSS: 31,000

Top Left: Proposed locations of headcut repair

Top Right: ER303a

Project Description

Drainage channels are prevalent throughout the agricultural areas. Several of these drainage channels were found to have headcuts (or knickpoints), which is the erosion of the channel bed, progressing in an upstream direction, manifested by pronounced drops in stream elevation or abnormally steepened channel segments. Headcuts are an indicator of active channel erosion and can contribute a significant amount of sediment to the stream channel. This site is an actively expanding headcut into the adjacent crop field from field drainage. The most severe erosion began in 2011/2012; prior to that it was relatively stable. Good restoration candidate because it is easily accessible and publicly-owned land. Buffer width will depend on town input.Grade controls are recommended for channel stabilization, along with buffer plantings, to prevent the erosion from moving further into the agricultural fields. Stabilization measures at these sites will likely limit the existing land use activities within these areas (e.g., use of agricultural equipment moving across those areas).

Site IDs: ER303b	Location: Brooks Property		
	Drainage Area: n/a		
Retrofit Recommended:	Headcut repair to stop the erosion of the channel bed, progressing in an upstream direction		
Cost Estimate: $5,068	Water Quality Volume Treated: n/a		
Estimate Pollutant Reduction (lbs/yr):	TN: 10.2	TP: 0.31	TSS: 72

Left: Proposed locations of headcut repair

Right: ER303b

Project Description

Drainage channels are prevalent throughout the agricultural areas. Several of these drainage channels were found to have headcuts (or knickpoints), which is the erosion of the channel bed, progressing in an upstream direction, manifested by pronounced drops in stream elevation or abnormally steepened channel segments. Headcuts are an indicator of active channel erosion and can contribute a significant amount of sediment to the stream channel. There is a small headcut into adjacent crop field from field drainage. Although small now, it would be good to stabilize to prevent future erosion. Buffer width will depend on property owner. Grade controls are recommended for channel stabilization, along with buffer plantings, to prevent the erosion from moving further into the agricultural fields. Stabilization measures at these sites will likely limit the existing land use activities within these areas (e.g., use of agricultural equipment moving across those areas).

Site ID: ER306a	Location: Brooks Property		
	Drainage Area:		
Retrofit Recommended:	Agricultural Grass Waterway		
Cost Estimate: $1,452	Water Quality Volume Treated: n/a		
Estimate Pollutant Reduction (lbs/yr):	TN: 102.3	TP: 3.1	TSS: 720

Left: Proposed location of grass waterway.
Right: Existing muddy drainage channel.

Project Description

A muddy channel draining a crop field on the Brooks Property discharges into Reach 306. This channel is approximately 5 ft wide and 500 ft in length. A grassed waterway is recommended to help stabilize the channel and trap sediment before it enters Reach 306. Farm equipment crosses this area, which may be a constraint to project implementation.

Site IDs: IB301a, IB305a, IB307a, IB308a	Retrofit Recommended: Stream Buffer

Left: Proposed locations of stream buffer restoration

Right: IB307a

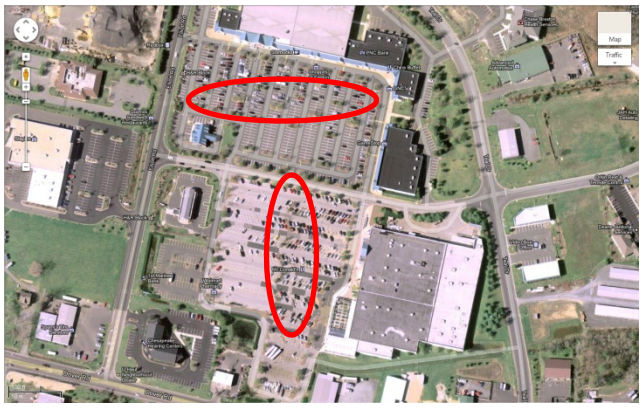
Site ID	Location	Description	Cost Estimate
IB301a	Spring & Associates	Buffer width is adequate, but could be improved by expanding. There is no potential for expansion along the right bank due to existing structures. However, the property owner is open to expanding the buffer along the left bank.	$585
IB305a	Adjacent to Brooks Property, south of Bartlett Ave and parallel to Rt 51	Mowing to edge of channel along right bank. There is potential to increase the buffer through tree planting and no-mow area. The restorable width to be determined by the town.	$580
IB307a	Brooks Property	Cropland extends to edge of channel along upstream portion of RCH_307. There is no buffer and the channel is entrenched. Recommend tree planting to create a buffer to prevent further channel erosion. The restorable area will depend on input from the property owner.	$1,380
IB308a	Between Dover Rd and Rt 50	There is no opportunity for buffer expansion on the right bank due to the adjacent commercial land use. The buffer may be able to be expanded along the left bank that is currently cropland. This	$250

		land is private, so the feasibility and restorable area would require feedback from the property owner.	

Project Description

The majority of the stream reaches assessed contained good buffer coverage. However, there were some areas of buffer encroachment from agricultural and urban/suburban land uses to streams throughout the watershed. Stream buffers are important to stabilize banks, create habitat, and remove pollutants. Buffer management practices include active reforestation and control of invasive species. Restoration may be limited due to existing structures/buildings and use of the buffer in current agricultural or urban activities.

Site ID: RRI_13	Location: Wal-Mart and Giant parking lots. Northeast of the intersection of Dover Rd. and Elliott Rd.		
	Drainage Area: 0.18 ac (up to 20 individual locations each at 0.18 ac)		
Retrofit Recommended:	Permeable Pavement		
Cost Estimate: $43,067/location	Water Quality Volume Treated: 103%		
Estimate Pollutant Reduction (lbs/yr) for each location	TN: 0.3	TP: 0.04	TSS: 61



Left: Potential locations of up to 20 permeable pavement additions (parking islands with an associated catch basin). Picture from Google Maps.
Right: Example location with permeable pavement in blue surrounding existing catch basin.

Project Description

There are up to 20 locations for potential inclusion of permeable pavement in the Wal-Mart and Giant parking lots. Each proposed location has a parking lot island and a catch basin associated with it. Most parking lot islands have a catch basin on two sides, which would allow permeable pavement underdrains to be easily outlet into the existing stormwater system. Excess water not moving through the permeable pavement will follow the current flow path by entering the existing catch basin via surface flow. Approximately four parking stalls in front of each existing catch basin would be converted to permeable pavement.

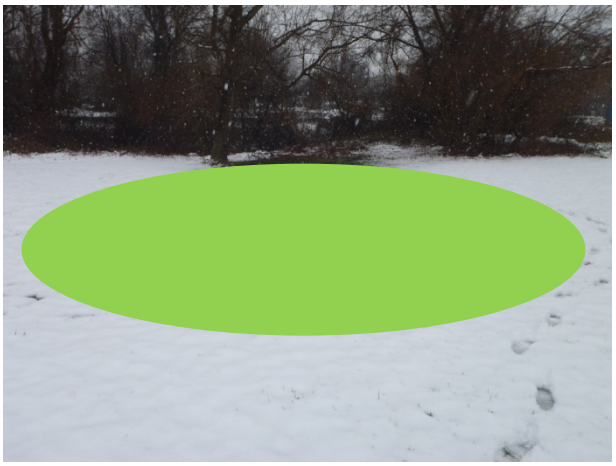
Site ID: RRI_15	Location: North of the intersection of Dutchmans Ln. and Ocean Gateway - Mr. Tire parking lot		
	Drainage Area: 0.33 acres		
Retrofit Recommended:	Impervious Cover Removal		
Cost Estimate: $179,022	Water Quality Volume Treated: 95%		
Estimate Pollutant Reduction (lbs/yr):	TN: 0.2	TP: 0.21	TSS: 178

Large parking lot is lightly/not used. Picture from Google Maps.

Project Description

The large parking lot associated with Mr. Tire does not look used. A portion (approximately 120 ft square) could be removed without limiting travel parallel to Highway 50. Though this pavement could be replaced with permeable pavement, it would likely be faster and easier to simply remove the existing pavement. The area could then be put into turf or trees.

Site ID: RRI_20	Location: St. Peters and Pauls High School - NearsStream to the northeast of sports fields		
	Drainage Area: 4.67 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $231,399	Water Quality Volume Treated: 64%		
Estimate Pollutant Reduction (lbs/yr):	TN: 9.7	TP: 0.94	TSS: 349



Left: Highlights the potential location of the bioretention practice. Picture taken from the corner of a storage shed looking southeast.
Right: Potential scale of the biretention practice. Picture taken from just east of the sidewalk connecting the overflow parking lot with the school – sports fields are opposite this picture.

Project Description

This practice would use an existing low area receiving runoff from the drainage area. The bioretention would be installed with an underdrain outlet into the stream to the east. This practice could be made 3 feet deep due to the amount of drop to the stream. The main concern in this spot is that it may be lightly used during the lacrosse season for practice.

Site ID: RRI_200	Location: Southeast of the intersection of Dutchmans Ln. and S. Washington St.		
	Drainage Area: 0.75 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $95,004	Water Quality Volume Treated: 54%		
Estimate Pollutant Reduction (lbs/yr):	TN: 1.6	TP: 0.18	TSS: 83

Picture of potential location of a bioretention area. Picture taken from South Washington Street looking southeast.

Project Description

This triangular area between South Washington Street and South Aurora Street is currently lightly used. Additionally, the proximity to a catch basin makes the space appealing for adding a bioretention area since the underdrain could easily be outlet into the existing infrastructure. The estimated contributing drainage area is large allowing for treatment of a substantial amount of water. A curb cut would be added to direct water into the practice and another to let water out.

Site ID: RRI_202	Location: Near 29389 Woodridge Dr		
	Drainage Area: 6.14 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $261,293	Water Quality Volume Treated: 35%		
Estimate Pollutant Reduction (lbs/yr):	TN: 12.7	TP: 1.18	TSS: 404

Left: Location of proposed bioretention. Picture taken from the split in Woodridge Dr. looking southeast. Right: Existing outlet of the two ditches draining this portion of the neighborhood. Blue arrows indicate the flow direction. Picture taken looking northwest looking at the split in Woodridge Dr.

Project Description

This project would utilize an open area where the neighborhood road splits. Since there are already drainage ditches flowing past this area, no additional work would be needed to bring water to the practice. The main concern at this site would be the distance the underdrain would be routed – under the road to the north and over to the stream to the west. This would be required as the available ditches are not deep enough to provide a suitable outlet. There may be additional opportunities to address some erosion at the outfall of the existing ditch during underdrain installation.

Site ID: RRI_203	Location: Across from house 29574 Charles Drive		
	Drainage Area: 0.44 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $155,624	Water Quality Volume Treated: 28%		
Estimate Pollutant Reduction (lbs/yr):	TN: 1.0	TP: 0.20	TSS: 147

Left: Triangular shaped grass area with potential to host a bioretention practice. Picture taken from northwest portion of the parking lot looking east.
Right: The practice could be located as to not interfere with the trees/bushes. Picture taken from northwest portion of the parking lot looking east.

Project Description

The neighborhood center has several open/green spaces, but the one called out here has potential as a stormwater practice. There are two catch basins that could be diverted to push water to this location and an underdrain would be routed to one of these catch basins as well. The primary concern at this location would be to fit the practice into the existing location and make it look like a landscape feature (the area is highly manicured) without losing any trees.

Site IDs: RRI_204A & RR1_204B	Location: South side of Walmart building (A) & along stream (B)		
	Drainage Area: Area: 0.11 ac (204A) & 0.19 ac (204B)		
Retrofit Recommended:	Rain Garden		
Cost Estimate: $9,957 (204A) & $18,651 (204B)	Water Quality Volume Treated: 107% (204A) & 76% (204B)		
Estimate Pollutant Reduction (lbs/yr):	TN: 0.2 (204A), 0.4 (204B)	TP: 0.05 (204A), 0.08 (204B)	TSS: 35 (204A), 62 (204B)

Potential locations of rain gardens south of the Wal-Mart building near the existing stream. Picture from Google Maps.

Project Description

Add two rain gardens to intercept downspout runoff from the Wal-Mart building roof. The water currently runs over the grass to the stream so the addition of rain gardens should be a relatively easy addition. Underdrains would outlet at the stream and the north/west sides of the rain gardens could be lined if there is concern about water intrusion into the building foundation. The only constraint may be access for maintenance during establishment and annually.

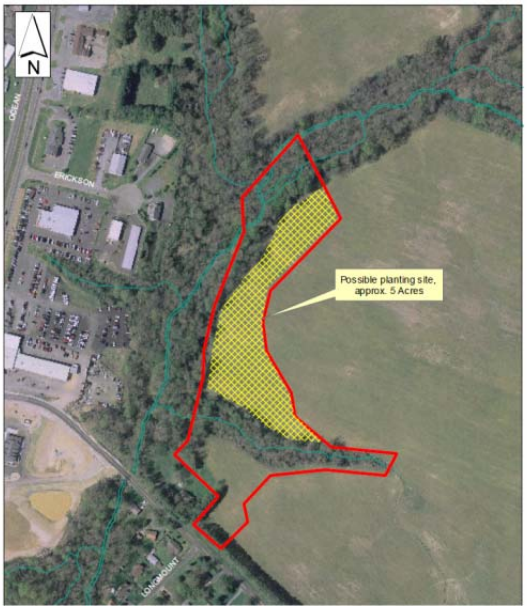
Site ID: RRI_205	Location: Village of Waylands (Northwest of June Road)		
	Drainage Area: 0.55 acres		
Retrofit Recommended:	Regenerative Stormwater Conveyance		
Cost Estimate: $41,964	Water Quality Volume Treated: 56%		
Estimate Pollutant Reduction (lbs/yr):	TN: 0.1	TP: 0.04	TSS: 30

Potential location of a regenerative stormwater conveyance system in a ditch adjacent to a boggy area. Picture taken from west of June Way looking Northwest.

Project Description

Construct a regenerative stormwater conveyance system in an existing surface drainage ditch. This system will convey water from parking and rooftop areas to a boggy area. To capture this drainage area, the catch basin would be modified or removed to allow water into the practice. This practice would be approximately 100 feet long and 20 feet wide. The practice will provide water quality treatment by allowing additional water to infiltrate. There are no known access constraints to this site based on the fieldwork completed to date.

Site ID: RRI_207	Location: Northeast of the intersection of Ocean Gateway and Dutchmans Lane		
	Drainage Area: 5.0 acres		
Retrofit Recommended:	Tree Planting		
Cost Estimate: $5,000	Water Quality Volume Treated: n/a		
Estimate Pollutant Reduction (lbs/yr):	TN: 34.1	TP: 1.73	TSS: 379



City owned property currently being farmed.

Project Description

This area, which is currently being farmed, could be planted with trees. This would additionally increase the width of the stream buffer at this location and limit future erosion. Buffer enhancements could add an additionally 150 feet to the existing stream buffer. Planning estimates for the cost of tree planting is approximately $1,000 per acre bringing this project cost to around $5,000. Due to the remote location, costs may increase slightly over this figure.

Site ID: RRI_21	Location: Between Walnut Ln. and Wayside Ave. south of Dutchmans Ln.		
	Drainage Area: 1.49 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $138,054	Water Quality Volume Treated: 96%		
Estimate Pollutant Reduction (lbs/yr):	TN: 3.1	TP: 0.29	TSS: 98

Left: Proposed location and approximate extent of practice. Picture taken from Google Maps.
Right: Depressional area planned for a trail extension – currently used by neighborhood residents to walk dogs. Picture taken from the center of the depressional area looking south.

Project Description

This area is planned for a trail extension in the near future. The specifics of the trail will impact design of any stormwater system; however, the ideal location would be in the center of the existing park/depression between Walnut Ln. and Wayside Ave. The trail could either be a bridge over the practice or run along one edge. Since there is substantial room here, the bioretention could be made longer to compensate the width of the trail. Due to this being an intricate site, a full site survey would be required to determine drainage area to the practice and the available space for the practice. The primary concern at this location is a stormwater pipe running the length of the park/depression that may limit the depth of a bioretention area.

Site ID: RRI_24	Location: Northwest of the intersection of Corbin Parkway and 4th Street.		
	Drainage Area: 0.92 acres		
Retrofit Recommended:	Tree Planting		
Cost Estimate: $920	Water Quality Volume Treated: n/a		
Estimate Pollutant Reduction (lbs/yr):	TN: 6.3	TP: 0.32	TSS: 70

The entire open area could be planted with trees. Picture taken from the existing playground area looking north.

Project Description

In addition to tree planting, there has also been some thought put into adding a trail through this area for kids to get to school. Though not an extremely large area, the addition of trees here would extend the width of the riparian zone along the stream (to the left in the picture above). Local sources suggest this area is not heavily used for recreational activities.

Site ID: RRI_26	Location: Near 1175 South Washington St.		
	Drainage Area: 1.21 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $95,918	Water Quality Volume Treated: 14%		
Estimate Pollutant Reduction (lbs/yr):	TN: 2.6	TP: 0.39	TSS: 243

Left: Proposed area for bioretention. Picture taken from parking lot in front of house 1175 looking west. Right: Portion of drainage area showing existing flow directions. Picture taken from parking lot in front of house 1175 looking southwest.

Project Description

The proposed bioretention would utilize an existing low spot at this privately owned property. The bioretention would be undersized for the drainage area; however, the existing drainage patterns would make it possible to have the bioretention partially off line (if it is full, water would bypass the practice). Removal of one or two specimen trees may be necessary to install the practice. An underdrain would be trenched along the existing ditch and outlet at the stream to the north of the property. The primary concern at this location would likely be tree damage.

Site ID: RRI_9	Location: Northeast intersection of Teal Dr. and Elliott Rd. - Bank parking lot		
	Drainage Area: 0.44 acres		
Retrofit Recommended:	Bioretention		
Cost Estimate: $170,587	Water Quality Volume Treated: 88%		
Estimate Pollutant Reduction (lbs/yr):	TN: 1.0	TP: 0.19	TSS: 141

Proposed location of a bioretention area. Picture taken from Google Maps.

Project Description

This location, though privately owned, has potential to be seamlessly integrated into the bank's landscaping. The stream is piped underground at this point so connecting an underdrain to the existing infrastructure should be relatively easy. Although the stream runs under this property, the depth is unknown, which makes the primary concern for this site enough depth to design an effective practice. This practice would treat water from a large portion of the parking lot and part of the building.

Appendix D: Priority Project Ranking Criteria

Table D- 1 provides a summary of the project ranking criteria used to evaluate each project. The ranking system was based on eight criteria for a maximum of 125 points. Projects were ranked based on the following criteria: costs, pollutant removal efficiency, support local planning efforts; benefit provided by community education and outreach for a project, land ownership, and habitat value. The greatest weight was assigned to the estimated project costs and water quality improvement. Each project was assigned a categorical ranking based on the distribution of individual project scores that included: low (<70); medium (71-80); and high (>80). A total of seven projects were ranked as low, nine projects ranked as medium, and 20 projects scored as high.

Additional consideration was given to projects and their potential to meet the watershed plan goals, engage stakeholders or other partners to implement a project, the practice is currently a Chesapeake Bay Program approved to take credit for in the Talbot County Watershed Implementation Plan (WIP). These factors were not directly considered as part of the project ranking, but provide information to support implementation efforts. The final project ranking is provided in electronic format as an addendum to this plan.

Urban nutrient management and the residential rain garden projects are shown as 'generic' project rather than individual site specific projects. The cost and nutrient load reduction for these generic practices was based on the estimated number of parcels where the practice would be applicable to implement across the entire watershed. The water quality volume treated for each of the stormwater retrofit projects (i.e., RRI) was constrained to treat a maximum of 100% (of the water quality volume), even though the retrofit inventory found that additional water quality volume may be accommodated at some of the sites. An "*" for these projects indicates where a project site may accommodate additional water quality treatment. The upper limit of 100% was applied for the following two reasons: 1) provides standardization across projects for comparison purposes and 2) provides standardization for the volume of water treated and associated cost; the water quality volume that treats greater than 100% inflates the cost of the retrofit project because a higher volume of water treated results in a higher project cost. The estimated costs are preliminary and should be used to guide the watershed stakeholders. These estimates should be adapted to include more appropriate local cost estimates where available.

Table D- 1. Scoring criteria for highlighted practices in Windmill Branch.			
Project Screening Factor	**Total Weight**	**Scoring Criteria**	
Cost[1]	20	Low cost (<$30,000)	20
		Medium cost ($30,000 – $100,000)	10
		High cost (>$100,000)	5
Community Education and Involvement	10	High potential to involve community in project implementation and good candidate for interpretive signage	10
		Moderate educational benefit or limited potential to involve community in project implementation	5
		Low educational benefit or no potential to involve community in project implementation	2
Visibility	10	High visibility with public access and/or integrated with public access sites/trails/parks.	10
		Moderate visibility and located on public or private property	5
		Low visibility, limited use area by the public due to physical obstructions, difficult to access located on public or private	2
Ease of Implementation	15	Readily implemented, no physical or utility constraints, limited design, no permit or permit easy to acquire	15
		Requires design, few physical or utility constraints, ease of permitting	10
		Requires in-depth design, and possibly numerous permits	5
Ownership	15	Public lands	15
		HOA, church, private with existing practice	10
		Industrial/business (private)	5
		Add for any projects draining to headwater streams	*5*
Water Quality Improvement[2]	30	High potential for treatment or prevention of pollutants	30
		Medium potential for treatment or prevention of pollutants	15
		Low potential for treatment or prevention of pollutants	5
Ecological Benefit	10	High ecological, natural resource protection, or habitat benefit provided	10
		Medium ecological, natural resource protection, or habitat benefit provided	5

		Low ecological, natural resource protection, or habitat benefit provided	2
Protection Priority[3]	15	Project is located in High Priority Protection Area	15
		Project is located in Priority Protection Area	10
		Directly adjacent to High Priority or Priority Protection Area	5
Total Points	125		
Goal 1		Water quality improvement	Yes/No
Goal 2		Protect high quality natural resources or sensitive areas in the town	Yes/No
Goal 3		Protect or restore streams	Yes/No
Goal 4		Educate the public on watershed restoration efforts	Yes/No
Partnering Potential		Is there potential to partner with another group on project implementation	Yes/No
Credit for WIP		Is the practice recognized as a practice in MAST	Yes/No
Potential Funding Source		TBD based on NCA and input from Lori Lilly	Volunteer, Internal (County/City/ HOA), External (grant)

[1]Cost – The cost associated with project implementation. Project costs represent only planning level estimates and were determined based on guidance provided in Schueler et al. (2007), Wright et al. (2005), Kitchell and Schueler (2004), and King and Hagan, 2011.
[2] Water quality improvement factor is based upon three factors: percent runoff volume treated, reduction in nitrogen load and if the project is reported to treat bacteria.
[3]Protection Priority – Project is located in a high priority or priority protection area (see Section 2).