Implementation Plan for the Anacostia River Watershed Trash Total Maximum Daily Load in Prince George's County

Prepared for:

Prince George's County
Department of the Environment
Largo, Maryland 20774

FINAL
March 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

ARP	Anacostia Restoration Plan
AWRP	Anacostia Watershed Restoration Partnership
AWS	Anacostia Watershed Society
AFF	Alice Ferguson Foundation
BMP	Best Management Practice
Caltrans	California Department of Transportation
CAPCOG	Capital Area Council of Governments
DCWASA	District of Colombia Water and Sewer Authority
DDOE	District's Department of the Environment
DoE	Department of the Environment
DPIE	Department of Permitting, Inspections, and Enforcement
DPW&T	Department of Public Works and Transportation
EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
KPGCB	Keep Prince George's County Beautiful
LA	Load Allocation
lb	Pound
lb/yr	Pounds Per Year
LID	Low Impact Development
MDE	Maryland Department of the Environment
MDP	Maryland Department of Planning
MGALEG	Maryland General Assembly
MNCPPC	Maryland-National Capital Park and Planning Commission
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer System
MWCOG	Metropolitan Washington Council of Governments
NCDC	National Climate Data Center
NCHRP	National Cooperative Highway Research Program
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
PSA	Public Service Announcement
SHA	State Highway Administration
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers

WLA	Waste Load Allocation
yr	Year

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Purpose of Report

In September 2010, the United States Environmental Protection Agency (EPA) approved the Anacostia River's Total Maximum Daily Load (TMDL) for Trash in Prince George's County (the County), Maryland. This trash TMDL was developed through a cooperative agreement between EPA Region 3, the District of Columbia's Department of the Environment (DDOE), and the Maryland Department of the Environment (MDE). The baseline load represents a typical annual load. The TMDL target is calculated to satisfy the narrative or qualitative water quality standards for trash in Maryland. In-stream monitoring for trash was used to establish the nonpoint source baseline load, and stormwater outfall monitoring was used to establish the point source baseline load. Compliance with this TMDL will require compliance with the County's Municipal Separate Storm Sewer System (MS4) permit; to remove 100 % of the Phase I tidal and non-tidal daily baseline trash load, calculated as an average of the measured or estimated removal rate from point sources.

The trash TMDL requirements for the County are presented in the Final TMDL document (MDE and DDOE 2010) and are split into two types: 1) the total waste load allocation (WLA), or point sources, includes any items small enough to have traveled through the storm sewer system; and 2) the load allocation (LA) is the nonpoint source load and includes larger items. There is also a 5% margin of safety (MOS) added to these values.

To determine the TMDL point source baseline loading rate (WLA), trash traps (fences) were placed at storm drain outfalls and the captured trash was weighed. While not completely dry, the trash weight value is considered dry because after the trash was taken from the fences, organic matter was removed and excess free water was poured/shook from the trash. The trash weights for each location were normalized to the drainage area and land use, as well as rainfall amounts, so that the values were given in pounds (lb)/acre/inch of rain. This process was repeated for various sampling events, and all events were averaged across the year to obtain a single waste loading rate for the land use for a particular drainage area. These values determined by the TMDL are used later in this report to equate land use to a loading rate. These loading rates can be found in Table 19 of the TMDL (MDE and DDOE 2010).

To determine the TMDL non-point source baseline (LA) loading rate, 500 feet (ft) of stream was surveyed per loading event and counts of items too large to fit through the sewer system were recorded. Counts for each material item were recorded and then averaged across all sampling events and all sites for the County. These counts were then extrapolated to cover total stream length within the watershed (882,226 linear ft within the County). Once total counts were determined, standardized trash weights were multiplied by the counts to determine the total WLA.

The total values for the Anacostia watershed in Prince George's County as determined by the TMDL (MDE and DDOE 2010) are:

Point source load = 314,055 lb/yr
Nonpoint source load = 347,958 lb/yr
MOS = 33,101 lb/yr
Total = 695,114 lb/yr

The point source WLA is further split into: Phase I MS4, Phase II MS4, Federal Facilities, the Maryland State Highway Administration (SHA), and Other Point Sources. The values for WLA for Prince George's County are:

Phase I MS4 Non-tidal = 159,293 lb/yr
Phase I MS4 Tidal = 11,335 lb/yr
Phase II MS4 = 113,578 lb/yr Federal
Facilities = 5,890 lb/yr
State Highway Administration = 13,461 lb/yr
Other Point Sources = 10,498 lb/yr

For compliance with MS4 permits, the Phase I MS4 Non-Tidal and Phase I MS4 Tidal trash must be removed from the watershed; therefore 170,628 lb/yr must be removed from the Anacostia Watershed. While this load will be the focus of this Implementation Plan, recommendations will be made to further remove trash from the watershed beyond what is required, including nonpoint source loading.

1.2 Anacostia Watershed Description

The Anacostia River runs through the County. Headwaters to the river and 10 major subwatershed basins are located within the County. These include Indian Creek, Beaverdam Creek, Upper Little Paint Branch, Lower Little Paint Branch, Lower Northwest Branch, Northeast Branch, Lower Beaverdam Creek (Upper), Lower Beaverdam Creek (Mainstem), Cabin Branch, and Watts Branch. The upper tributaries are classified as non-tidal freshwater, while the mainstream branch is classified as tidal freshwater. The tributaries within the County are in the Coastal Plains, containing flat land and rolling hills. There are two drainage types, one being slow drainage by meandering streams with shallow channels and gentle slopes, and the other being well drained sandy or silty loam soils. The watershed is highly urbanized with 45% of the watershed being residential (AWRP 2013), and within the County there are 19,151 acres of residential land, 5% of which is Low Density Residential, 62% Medium Density Residential, and 33% High Density Residential. The baseline loading rates calculated in the TMDL indicate that Medium Density residential areas have the highest loading rate followed by high density residential, and then commercial, industrial, and institutional areas. Due to the high loading rates noted in the residential areas, this plan will focus largely on eliminating litter from residential areas as well as industrial, institutional, and commercial areas.

1.3 Existing Conditions

As of 2013, the United States Census Bureau estimated the population of the County to be 890,081 people. Of this population, 6.7% are under the age of 5, 23.1% are under the age of 18, and 10.3% are over the age of 65. The county is primarily African American (65.3%), followed by Caucasian (26.5%), and Hispanic or Latino (15.7%) with 20.4% of homes speaking a language other than English at home. The median household income from 2008 to 2012 was reported at $73,568, and approximately 8.7% of the population lives below the poverty line.

EA Engineering, Science, and Technology, Inc. (EA) produced a survey and sent it to municipalities, agencies, and non-profits to receive information about current trash and litter prevention programs and monitoring data (Appendix A). This data were used to evaluate the trash reduction potential of various programs as well as costing for programs of which costs were given. The County does not currently have a sophisticated trash monitoring system. However, metrics of success, tracking, and reporting recommendations have been made in this

Implementation Plan, and a database is provided to record the success (or failure) of specific projects, in hope of fine tuning projects until they run efficiently.

1.4 Report Organization

The County has initiated this study to develop a practical and cost-effective Trash TMDL Implementation Plan for the Anacostia River Watershed that minimizes additional financial and human resource investments while cleaning up the environment to the best of its abilities. Chapter 2 provides a discussion on the effectiveness of existing trash reduction programs and practices that are currently being conducted within the Anacostia River Watershed in the County, while Chapter 3 identifies gaps in the existing data that will need to be filled prior to developing the full Anacostia Trash TMDL Implementation Plan for the County. Chapter 4 details 11 programs that could be instituted with estimated trash removal rates and associated costs. Chapter 5 presents a cost benefit analysis and provides recommended techniques for meeting permit requirements.

CHAPTER 2: EVALUATION AND EFFECTIVENESS OF EXISTING PROGRAMS

In order to determine the types and effectiveness of trash programs currently being used in the County, information gathered from an extensive literature review and the community survey results was compiled and evaluated (Appendix B).

The existing trash reduction programs are summarized in four sections and discussed below. Estimates of the total trash reduced from each of these methods are provided in Section 2.5.

- *Source Control*— Education and outreach, trash-reduction partnerships, and laws and ordinances
- *Cleanup Programs*— Volunteer and agency-sponsored cleanups of rivers or neighborhoods
- *Street Sweeping*— Manual and mechanical street cleaning by the County and municipalities
- *Structural Best Management Practices (BMPs)*— Structural devices in storm-drains or streams that trap trash already in the water

2.1 Source Control

2.1.1 Education and Outreach

The County and its municipalities have a variety of Education and Outreach programs aimed at schools and the general public to prevent litter at the source. Active education programs at both public and private schools were identified as useful programs by the Department of the Environment (DoE) Recycling Section, and survey results from College Park, Anacostia Watershed Society (AWS), Alice Ferguson Foundation (AFF), the Maryland-National Capital Park and Planning Commission (MNCPPC), and Keep Prince George's County Beautiful (KPGCB). These education programs range in depth from general environmental awareness to education events on litter control. For example, College Park has a program in Hollywood Elementary School.

KPGCB—a partnership between the Recycling Section and Citizens Concerned for a Cleaner County—provides and organizes public outreach programs, information, and speakers at community events. They disseminate information through social media and are involved in the County's cleanup events (Prince George's County 2012).

AFF's mission is "to connect people to the natural world, sustainable agriculture practices and the cultural heritage of their local watershed through education, stewardship, and advocacy" (AFF 2013a). AFF developed the Regional Litter Prevention Campaign in 2011 to change littering behavior in five Maryland counties including Prince George's County, which includes a community-scaled implementation program called Trash Free Communities in Capitol Heights and Suitland. They also have public outreach programs through the Trash Free Potomac Watershed Initiative, Trash Free Schools Project, and Students in Action; which all aim to reduce trash through education and outreach at the community and school levels. Within the Anacostia watershed portion of the County, the AFF programs have been implemented in one community (Trash Free Capitol Heights), and two schools (Trash Free Walker Mill Middle School and Cesar Chavez Elementary School). AFF has developed the Trash Free Schools Project that can provide worksheets and information for a successful school program. AFF also

offers a Trash Free Schools Project program toolkit that contains pre-made existing resources developed using social marketing research on attitudes toward littering in the Potomac River Watershed (AFF 2012a). This toolkit provides advertisements, communication materials, and outreach materials which a group, town, or community can use to promote a clean community and "drive behavior changes among litterers" (AFF 2013b).

In spring and summer 2013, the Trash Free Capitol Heights program arranged four presentations on litter reduction, displayed 11 banners encouraging no litter, and organized one cleanup event. The Trash Free Walker Mill Middle School program included seven presentations, one banner display, and one cleanup event. Presentations were given on a range of topics including techniques for writing persuasive letters to elected officials, the Regional Litter Prevention campaign, and AFF's trash network and volunteer service hours. The banners displayed anti-litter messages in a variety of styles including yard signs and 5 ft banners hung near a Metro Station.

Other education and outreach programs implemented by the County, and/or municipalities, are listed below. Information was obtained from survey results, unless otherwise specified.

Storm Drain Stenciling

The County requires new storm drains to be stenciled with the message, "Don't Dump - Chesapeake Bay Drainage". There have also been programs to stencil existing storm drains (76 in 2005) (AWRP and MWCOG 2007). The County will provide supplies to volunteer groups willing to stencil drains.

Information Dissemination

Several platforms exist in the County for information dissemination. New Carrollton, KPGCB, AFF and DoE stated that they use social media as a way to spread positive information. Informational topics include how to manage litter, benefits of recycling efforts, information about upcoming recycling and cleanup events, and group meetings in the area. Other outlets utilized by municipalities and agencies include printed flyers, brochures, promotions, press releases, and newsletters. The Town of Landover Hills also has a cable television station that often has anti-littering advertisements.

Recycling Campaigns

Recycling campaigns spread information about recycling efforts, benefits of recycling, and collection dates. Survey results show that Berwyn Heights, College Park, the City of Greenbelt, MNCPPC, AFF, KPGCB, and DoE have established or help with recycling campaigns. These efforts include distribution of information (via flyers or other media) on upcoming events, and the benefits of recycling. Efforts also include hosting collection days, and informing and educating patrons. Some agencies or groups (such as AWS) display informational tables at these events.

Education at Cleanup Events

Many groups use cleanup events to not only eliminate litter but also educate about litter management and recycling. Municipalities and agencies that assist in educating the public at these events include AFF, MNCPPC, AWS, DoE, KPGCB, and College Park. At some cleanup events, including one in Landover Hills, a dumpster is provided for individuals to dispose of

trash that would not regularly be picked up by a trash company; reducing their likelihood of illegal dumping or stockpiling litter.

Unused Items at Cleanup Events

College Park asks non-profits to attend collection events to facilitate the collection of potentially useful discarded items; helping to prevent litter from entering the trash stream. These events also target college students that may be purging items during times of transition.

Organizational Meetings, Conferences, Workshops, and Speakers

AWS and AFF hold meetings, campaigns, conferences, and workshops that focus on trash pollution and education. DoE Recycling Section and KPGCB also help by arranging speakers on litter management, recycling, and source control for events at which their attendance is requested.

Service Learning

Service learning events aim to engage teenagers in their community and educate them through participation. MNCPPC hosts "Conservation Clubs" in which Park Rangers hold events and meetings to educate teenagers on the impact of litter in the County, trash reduction strategies, and strategies for preventing litter build-up in the watershed. This event is largely educational; allowing teenagers to be inspired to help keep the County clean after learning the effects of litter and trash build-up. AFF helps to support Students In Action; which holds trash cleanup events and lessons in basic conservation, such as re-using plastic water bottles. Keep America Beautiful sponsors high school service-learning volunteer hours in which students learn and then teach about recycling and help with clean-ups at Buddy Attick Park.

Recognition and Awards

The DoE Recycling Section of the County, along with AFF and KPGCB formally recognize and award those organizations and individuals who have undertaken anti-litter and recycling projects.

Tours of Facilities

Other public education opportunities include tours of the County's Brown Station Road Landfill, publications issued to residents regarding solid waste management, and convenience centers located to reduce illegal dumping (AFF 2011).

2.1.2 Trash Reduction Partnerships

The Anacostia watershed includes parts of Montgomery County, the County, and Washington D.C. Because of the multi-jurisdictional nature of the watershed, multiple partnerships have been developed over the years to improve the health of the river. Notable partnerships include the Anacostia Watershed Restoration Partnership ([AWRP] 2013) and the Trash Free Potomac Watershed Initiative (AFF 2012a).

The AWRP includes representatives from Washington D.C., Montgomery County, the County, and the State of Maryland. The partnership has existed since 1987 and has adopted a comprehensive watershed restoration plan, cited extensively in Section 2 of this document

(AWRP 2013; U.S. Army Corps of Engineers [USACE] et al. 2010a). Specific to trash, in 2007 the AWRP and the Metropolitan Washington Council of Governments (MWCOG) released an Anacostia Watershed Trash Reduction Strategy (AWRP and MWCOG 2007). This strategy laid out six major objectives along with goals and plans for implementing them.

The Trash Free Potomac Watershed Initiative is a partnership between AFF, Washington D.C. and the Maryland jurisdictions along the Anacostia River. This initiative, started in 2005, is described as "a multi-faceted, watershed-wide approach involving regulation, policy, enforcement, public education, and market-based solutions to the trash problem" (AFF 2012b). AFF conducted a case study on their trash reduction programs in Washington D.C. in 2012, and many of their public outreach activities include areas in the State of Maryland. The case study program included research on littering attitudes using focus groups, interviews, a District-wide opinion poll, and interviews with businesses. Using the results of this research, a regional campaign was designed, and information was compiled into *Litter Prevention Toolkits* that included billboards, posters, radio public service announcements, decals, and school flyers. Several pilot programs were started in 2011 (AFF 2012b):

- **Trash Free Communities** was piloted in "several communities in the District and Maryland,"

- **Trash Free Schools** program was piloted in nine schools in the District and four in Maryland. This plan integrates solid waste reduction and litter prevention into the curriculum, and includes one school yard cleanup per year. The program began in 2011 was evaluated in 2013.

- **Trash Free Potomac Facilities** program was developed for businesses, non-profits, and governments to reduce solid waste.

All of the resources for these programs are available from AFF (described in Section 2.1.1) and have been implemented in the County in Capitol Heights, Walker Mill Middle School, and Cesar Chavez Elementary School.

2.1.3 Laws and Ordinances

Survey results from most jurisdictions indicate that town or city codes are enforced to combat littering and illegal dumping. Signage is also common at illegal dumping sites. MNCPPC uses cameras at common dumping sites in parks for enforcement and prevention purposes.

To prevent dumping, the County has tried to increase regional disposal areas to provide convenient sites for trash disposal. Public containers are available at the Brown Station Sanitary Landfill (Upper Marlboro) and 12701 Missouri Avenue in Cheltenham, both of which are heavily used. The County is planning to increase public awareness of these facilities. In addition, the County allows residents using personal vehicles to dispose of trash for free at the landfill in an effort to reduce illegal dumping. Residential disposal is allowed Monday through Saturday 8:00 am to 3:30 pm (Prince George's County 2012).

Dumping complaints are received from citizens, the County's police officers, Health Department Inspectors, and Refuse Collection Inspectors. There is a Strategic Multi-Agency Response Team, supported by the County, to coordinate efforts to resolve illegal dumping and littering issues. Three County ordinances are used to enforce the elimination of unauthorized dumping (Prince George's County 2012). One of these, the Anti-Litter and Weed Ordinance, is enforced by the County Department of Permits, Inspections, and Enforcement (DPIE) to prohibit the

accumulation of trash and debris on private property outside of incorporated municipalities within the County. A violation is issued to the owner, and if it is not cleaned up the County will have the property cleaned up with the expense billed to the homeowner (Prince George's County 2012).

Maryland laws are also used to prevent littering and dumping in the County. Maryland State Law CR 10-110 aims to prohibit the improper disposal of litter on public or private property and curb the desecration of the beauty of the State of Maryland. This law states that a person may not dispose of litter on a highway, public or private land unless the state specifies that it is acceptable. The penalty associated with this law is a misdemeanor, and on conviction, the person can be subjected to imprisonment not exceeding 30 days or a fine not exceeding $1500, or both for littering that does not exceed 100 lb or 27 cubic feet. If the amount of improperly disposed material is between 100 and 500 lb (27 and 216 cubic feet), the penalty is increased to 1 year imprisonment and/or a max fine of $12,500. Above 500 lb or 216 cubic feet, a person can be subjected to imprisonment not exceeding 5 years and/or a fine of $30,000. A court may also require the violator to remove or render the litter disposed of, repair and restore damaged property, perform public service relating to litter removal, suspend a license for up to 7 days for the type of conveyance used in the violation, or reimburse the State, County or Municipality for the cost of removing the violation (Maryland General Assembly Department of Legislative Services [MGALEG] 2013a).

The Maryland Motor Vehicle Law 21-111 is enforced in the County. This law states that it is illegal to place, drop, or dispose of an injurious substance on the roadway. It is also illegal to throw, discharge, or place refuse onto a roadway from a vehicle. If violated, a citation is issued that can result in a fine of up to $140 and two points on a driver's license. If the litter results in injury, the penalty can be increased up to $180 and three points on a driver's license (AFF 2009).

In addition, if solid waste disposal occurs at an unapproved site, there can be a civil charge of up to $1,000 per day (AFF Survey). If a load becomes unsecured from a vehicle, a fine of $90 can incurred based on Maryland Motor Vehicle Law (AFF Survey).

Litter Enforcement Month occurs each April in the Potomac Watershed (of which the Anacostia watershed is a sub-basin). AFF coordinates the program to bring additional attention to littering and dumping. Roll-call announcements are sent to police officers (approximately 800 sent in 2013) as a reminder of how to enforce litter, illegal dumping, and related codes. This information has also been provided to department supervisors in hopes of encouraging officers to increase enforcement codes during the month of April. For the 2013 Litter Enforcement Month in the County, seven litter related criminal citations, 10 littered area reports, 48 uncovered haul citations, and one conditions report were issued. Throughout the month, public education about litter enforcement is encouraged with information posted on the police department website, blog, Facebook, and Twitter accounts.

2.2 Trash Cleanup Programs

2.2.1 Survey Results

Many municipalities, agencies, and community groups participate in community cleanup events. Table 2.1 provides a summary of the cleanup events reported in the survey results, while additional details are listed in Appendix A about individual events. Events reported in the survey with geocoded locations are shown on Figure 2.1.

Several cleanup events coincide with Earth Day, with municipalities and groups hosting events individually or through partnerships. Many of the community events are the result of joint-efforts of larger organizations, such as the municipality of College Park teaming with sororities and fraternities from the University of Maryland. Smaller cleanup events often lack extensive budgets and/or volunteer numbers. Major cleanup event programs include the "Clean Up, Green Up" Beautification Initiative, the Comprehensive Community Cleanup Program, and Earth Day Cleanup events. Details on these programs were gathered from the survey results and the County and non-profit organization documentation.

"Clean Up, Green Up" is sponsored by the County's Department of Public Works and Transportation (DPW&T), Office of Highway Maintenance. Groups across the County are encouraged to sign up and bring volunteers to clean up the County on chosen dates in the spring and fall. At the most recent event, volunteers met at a designated location in the morning to receive directions and gather supplies of trash bags and gloves. The volunteers were then sent, in groups, to locations throughout the County. The event usually lasts from 8 am to 10 am, and has been successful in cleaning several areas in a relatively short amount of time. At previous events (such as the October 2012 event), a portion of the day's activities included community plantings and coordination of beautification activities throughout the County, as well as litter and trash pickup/removal (Prince George's County 2011).

Prince George's County Comprehensive Community Cleanup Program involves 21 concentrated cleanups each year in areas outside the County municipalities (Prince George's County 2012; AFF 2011). This program is a component of the County's National Pollution Discharge Elimination System (NPDES) permit conditions (AFF 2011). Through this program, DoE works with organized civic and homeowner groups to provide focus on cleanup and maintenance service in a selected community over a 2-week period; concentrations include housing code enforcement, abandoned vehicle tagging, litter collection, storm drain maintenance/checking for illegal discharges, and tree trimming. There are 90 active cleanups in the rotation, so a community is scheduled approximately every 4 years (Prince George's County 2012). In the 2011 Jurisdictional Report to the Alice Ferguson Foundation (AFF 2011), the County reported 127 tons of trash collected through the Comprehensive Community Cleanup in the preceding year. This value is consistent with the survey results for 2012; which was 53 tons for 6 months.

In April—and specifically on Earth Day—multiple groups hold cleanup events. AFF, AWS, and MNCPPC all reported locations and value for Earth Day cleanups in 2012 and 2013, and described in their surveys and correspondence that data on cleanup amounts are shared. AFF compiles the data from all these efforts, and their estimate for the Anacostia watershed cleanups in April 2013 in the County was 100,550 lb. AWS and MNCPPC both provided values for individual cleanup locations during this event (Table A-2 in Appendix A), which are checked to ensure that these quantities are not double-counted in the estimate of cleanup event trash computed later in this document (Section 2.5.2).

Budgets for the cleanup events vary greatly; from zero (having volunteers bring their own bags and gloves) to the larger "Clean Up, Green Up" events which cost $5,000 in planning (Appendix A). The budgets for some of the smaller community events are $100-250, while larger events, requiring more supplies and planning, could have budgets in excess of $1,000. In general, the events with larger budgets result in more trash removal.

Table 2.1 Summary of Trash Cleanup Programs from Survey Results

Event Name/Group	Number of Events	Dates	Reported Range or Total Trash Collected (lb)
"Clean Up, Green Up"	Two, with multiple locations each (DPW&T)	October 2012 and May 2013	35,640 and 22,740
Comprehensive Community Cleanups	21 per year (DoE with multiple events including Berwyn Heights)	June 2012 to June 2013	Total of 106,700[a]
Earth Day Cleanup Events from AFF, AWS, MNCPPC and municipalities	More than 19	April 2012/2013	20025 – 9,675; Total of 108,807
Other Community Events	42	January 2012 to June 2013	25 – 20,220

[a]Half year value, assumed to represent 10 events

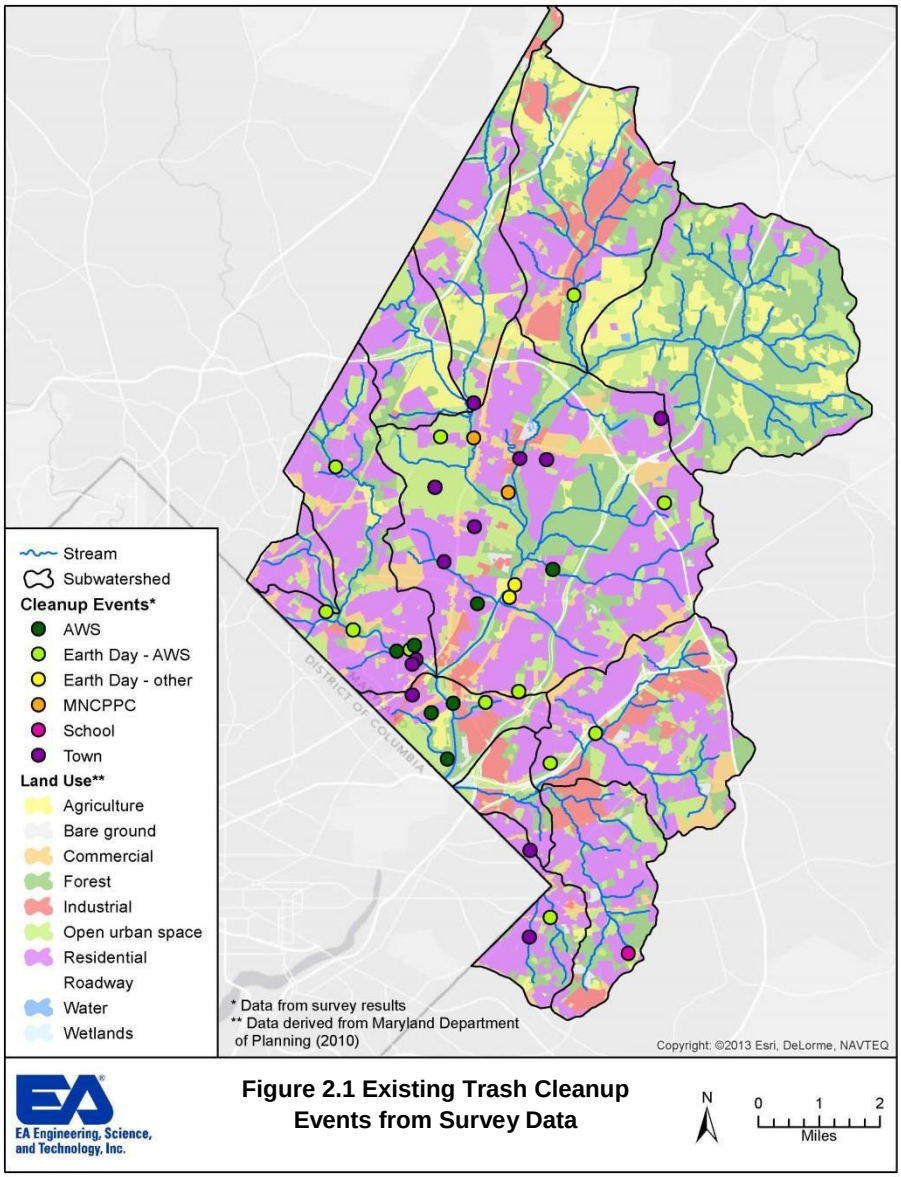

Figure 2.1 Existing Trash Cleanup Events from Survey Data

2.2.2 Road-Side Cleanups

Multiple programs exist for trash cleanup of roadside areas. In addition to street sweeping (Section 2.3), roadway cleanup is also conducted by DPW&T employees, volunteers, inmates, and the SHA. Roadway collection programs described by the DoE/Waste Management Division/Recycling Section include:

- Roadside cleanup on landfill approach roads that result in approximately 10 tons of waste collected each year.

- Removal of litter from the County roadsides by DPW&T employees.

- Adopt-a-Road and Adopt-a-Median programs that are coordinated by DPW&T with local organizations doing the cleanup twice per year using DPW&T supplies.

- Removal of litter from non-roadside County property by DPW&T employees.

- A Daily Inmate Program with five to seven inmates from the County Correctional Center and persons ordered by the court to conduct community service collecting litter on weekdays (supervised by DPW&T Special Services Division of Highway Maintenance).

- A SHA Roadside Cleanup program which is on a regular monthly cycle for interstate and primary roads, and a 6-week cycle for secondary roadways. In addition, there are two roving dump trucks to remove large items and accident debris from interstate/primary roads. This program includes inmate crews, contractors, and temporary employees.

In addition, according to DoE survey results, the County is responsible for some community non-roadside cleanups of "trash, debris, abandoned items, eviction debris from the County properties and right-of-ways other than roadsides." Overall, DoE provides a total value of 6,000 tons of trash clean-up annually from these roadside and community non-roadside events throughout the County.

2.2.3 AFF FieldScope Website

The AFF Trash Free Potomac Network is an online volunteer recruitment hub for trash-related events that maintains an interactive website called FieldScope (http://aff.fieldscope.org/) that allows communities to self-report trash cleanup events. A FieldScope query conducted on 23 December 2014 showed that there were 95 reported cleanups with the County's portion of the Anacostia River watershed since 2002.

2.3 Street Sweeping

The type and frequency of street sweeping varies across the communities in the Anacostia watershed portion of the County due to their varying sizes and needs (Table 2.2 and Figure 2.2). Four of the municipalities (New Carrollton, Greenbelt, College Park, and Berwyn Heights) have joined together to purchase a large sweeper and have coordinated an 8-week rotation of the sweeper among them – each municipality is swept for 2 out of every 8 weeks. Manual sweeping is used for other municipalities, as frequently as necessary. DPW&T uses a street sweeper on arterial, collector, and industrial roadways in the County approximately eight times a year.

Information on sweeping routes and curb miles swept was provided by DPW&T for October 2010 through November 2011 on arterial and collector roads. The data are available in a spreadsheet with the name of the road, the "from" and "to" designations to identify the portion of the road that was swept, curb miles, and dates of separate sweeping cycles from spring through fall. Although some data were missing, and the cycles occurred at different times on different roads (especially in the fall season), the information was used to identify street sweeping routes within the Anacostia watershed. Total tonnage of trash collected was not reported, but approximately 330 miles of roads are swept in the Anacostia watershed through the DPW&T program. Approximately 36% of the sweeping occurs in commercial areas and 34% occurs in residential areas based on 2010 Maryland Department of Planning land use data (MDP 2010).

Table 2.2 Street Sweeping Information and Frequency from Surveys

Jurisdiction	Method	Frequency	Notes
New Carrollton	Sweeper	six times/year (yr)	Shared with City of Greenbelt, College Park, and Berwyn Heights. Swept for 2 weeks every 8 weeks.
University Park	None		
Cottage City	Manual	When Necessary	
Riverdale Park	Unspecified	three times/week	
Fairmount Heights	Manually	one time/week	
Berwyn Heights	Sweeper	six times/yr	Shared with City of New Carrollton, College Park, and Greenbelt. Swept for 2 weeks every 8 weeks.
North Brentwood	Manually	one time/month	
College Park	Sweeper	six times/yr, plus five times/week in downtown	Shared with City of New Carrollton, Greenbelt, and Berwyn Heights. Swept for 2 weeks every 8 weeks.
Colmar Manor	Manually	Unknown	
Mount Rainier	Manually	When Necessary	
Greenbelt	Sweeper	six times/yr	Shared with City of New Carrollton, College Park, and Berwyn Heights. Swept for 2 weeks of every 8 weeks.
Prince Georges County DPW&T	Sweeper	eight times/yr	Arterial, collector, and industrial roadways throughout county

2.4 Structural BMPs

Different types of structural BMPs can be used for trash removal from the MS4 and waterways. "Start-of-pipe" BMPs are those that are typically implemented at the storm drain inlet to prevent trash from entering the piped MS4 system. "In-pipe" BMPs include those that collect trash from within the pipe (MS4) flow stream. "End-of-pipe" BMPs are located within streams or rivers and consist of trash nets, fences, and other traps. "Water quality" BMPs are stormwater management practices not designed specifically to trap trash, but often collect trash because they serve as spots where water flow slows down and debris can settle. Survey and other data suggest that several in-pipe and end-of-pipe BMPs for trash removal exist in the County. In addition, there are many water quality BMPs installed throughout the County.

The County has three mechanical in-pipe trash screens located at pumping stations (MDE 2009) (Table 2.3, Figure 2.3) within the Anacostia Watershed. Together, it was reported in the County's 2009 NPDES MS4 permit report that they collected 338 tons (676,000 lb) of floatables. This value likely includes a significant amount of organic debris in addition to trash.

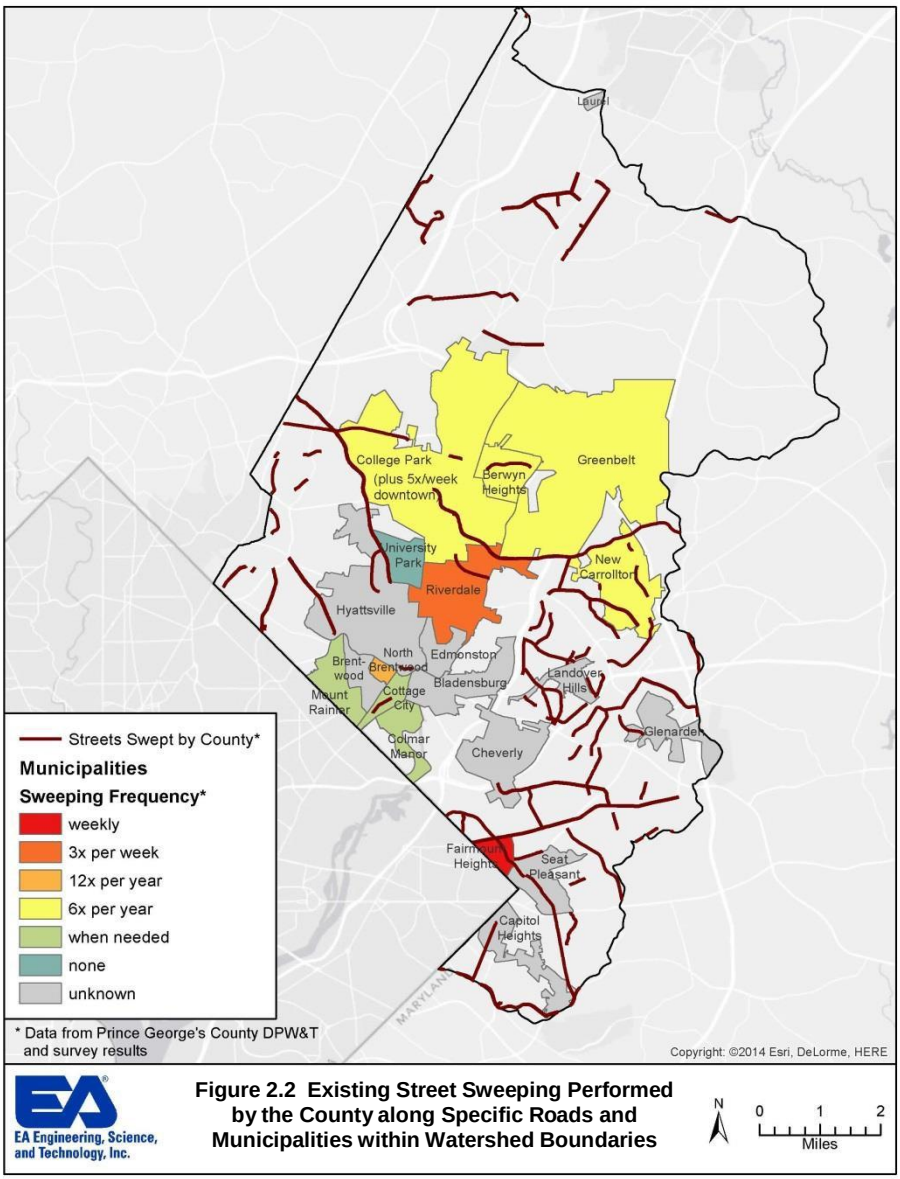

Figure 2.2 Existing Street Sweeping Performed by the County along Specific Roads and Municipalities within Watershed Boundaries

In the past, the County maintained two end-of-pipe structural BMPs (trash nets) in the Anacostia watershed that were at Ray Road in Hyattsville and Flagstaff Street in Landover (MWCOG 2009) (Table 2.4, Figure 2.3). In 2009 it was reported that they captured only 177 lb of trash over a 12-month period. The total debris collected in these traps included more than 95% organic material, but the weight of the trash portion of the collection was separated to quantify performance. The cost of these structures exceeded $284,000, and the annual maintenance cost was $35,000 (MDE 2009). In recent years, the County has decided to discontinue the use of these trash nets due to the high rate of organics which the net collects.

Two newer end-of-pipe BMPs were identified from survey results (Table 2.4, Figure 2.3). AWS installed a trash trap in 2012 on Paint Branch in College Park. AWS and the Paint Branch Elementary School Green Team are maintaining the trap, and from January to May 2013, 200 lb

of trash was collected during five maintenance visits. Estimated cost was $300 for materials, $500 for installation personnel, and $3,000 for personnel for annual maintenance—permitting costs not included. AWS noted that the permit process was difficult and took more than a year to obtain for this trash trap, making permit acquisition a large hidden cost in projects of this nature. A trash capture device was also reported on Dueling Creek, a combined maintenance effort of AWS and MNCPPC, although not as much information exists for this device. In 2012 University Park installed a temporary rebar fence on a stream that was maintained weekly. This fence was an experiment and is no longer in place. It collected an unspecified quantity of bags, bottles, and trash from the stream.

Table 2.3 Pumping Station Trash BMPs

BMP Name	BMP Type	Location	Materials Collected (tons/yr)	Materials Collected (lb/yr)
Edmonston Pumping Station	Mechanical Trash Screen	Hyattsville	338[a]	676,000[a]
Colmar Manor Pumping Station	Mechanical Trash Screen	Colmar Manor		
Brentwood Pumping Station	Mechanical Trash Screen	Brentwood		

[a] Represents floatables (trash and organic debris) captured by three trash screens combined.

Table 2.4 Summary of End-Of-Pipe Structural BMPs for Trash Reduction in County's Portion of Anacostia Watershed

BMP Name	BMP Type	Location	Drainage Area (acres)	Amount of Materials Collected	Date Installed	Source
Ray Road (removed)	End-of-Pipe Trash Net	Hyattsville	659	110 lb over 3 service dates[a]	Before 2009	MWCOG 2009
Flagstaff Street (removed)	End-of-Pipe Trash Net	Landover	41	67 lb over 3 service dates	Before 2009	MWCOG 2009
Paint Branch	Trash Trap	College Park	50	~40 lb/month	2012	Survey
Dueling Creek	Trash Capture Device	Colmar Manor	No Reported	Not Reported	Not Reported	Survey

[a] The amount of material collected is lower than expected due to damage to the system in June 2009

In addition to the BMPs designed specifically for trash collection, there are more than 550 existing water quality BMPs throughout the County's portion of the Anacostia watershed, based on geographic information system (GIS) data from DoE and DPW&T (Table 2.5, Figure 2.3). The County has three types of BMP inventories: a storm drain inventory that includes BMPs, a DPW&T database of public BMPs, and a DoE database of private BMPs. BMP type is identified in the DPW&T and DoE databases, but not in the storm drain inventory. There is some overlap between the storm drain inventory and the other databases, but this was resolved in GIS, and any storm drain BMP at the same location as a DoE or DPW&T BMP was counted as a DoE or

DPW&T BMP (Figure 2.3).

The trash removal potential of a stormwater BMP depends on the BMP type, location, and its maintenance. When trash enters a detention structure, wetland, or bioretention pond it, in theory, can become stuck in the vortex or in the settling sludge-like material in the bottom of the pond. Therefore, the County may want to explore with MDE and EPA if these structures may be considered trash BMPs for the County. Unless they have additional trash traps, filtering, hydrodynamic, and infiltration BMPs will simply slow the progression of trash to the stream, and therefore probably cannot be considered trash BMPs. If pond and wetland BMPs are maintained for trash, they could result in high trash removal efficiencies. The frequency of maintenance depends on the structure and the surrounding community. For example a pond near a trash hotspot would need to be cleaned more regularly than one in a small suburban neighborhood. No trash reduction data were available for the County's stormwater BMPs.

Finally, the County's Green Streets and Green Highways Program focuses on low-impact development (LID) techniques to treat stormwater pollutants generated by vehicle traffic

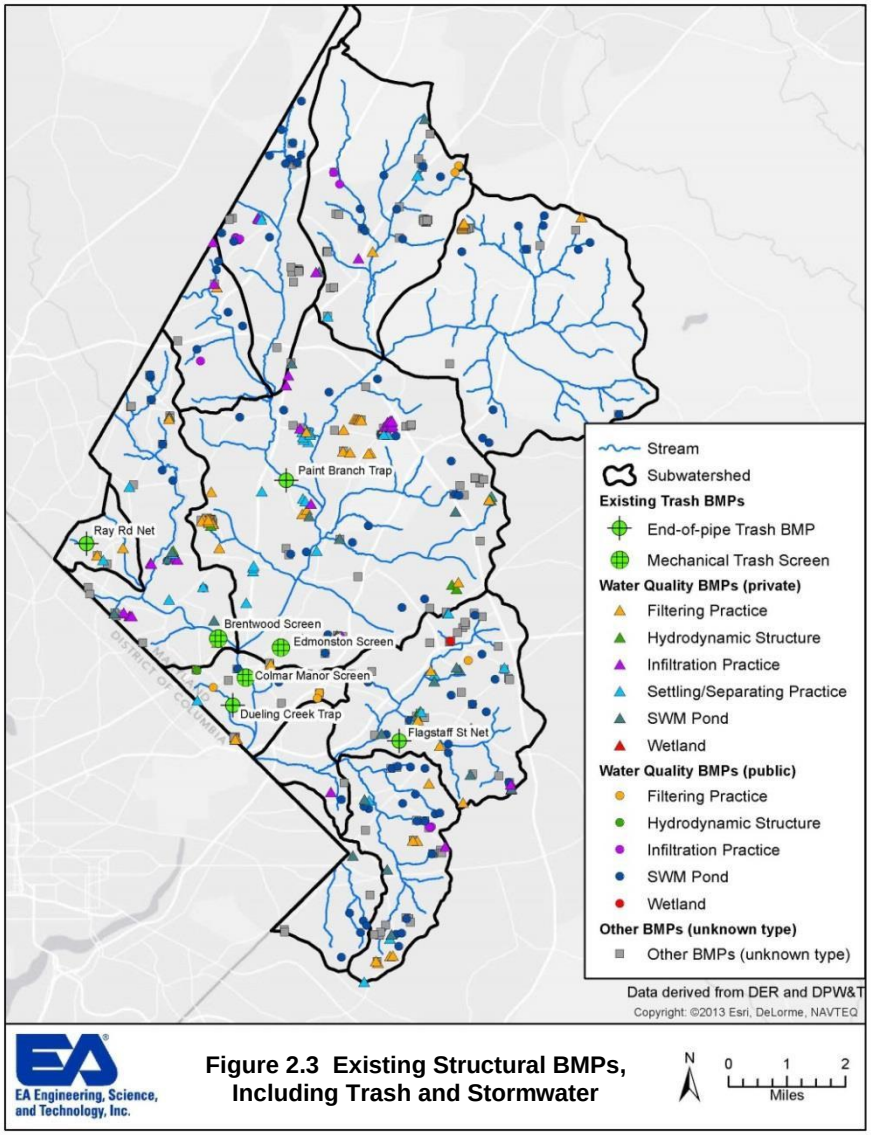

Figure 2.3 Existing Structural BMPs, Including Trash and Stormwater

(USACE 2010a). Some projects also incorporate trash management measures. For example, the Sligo Creek/Takoma Branch Green Street project completed in 2007, included implementation of a trash rack system at a road culvert in addition to bioretention/LID techniques implemented in street medians.

Table 2.5 Number of Stormwater BMPs in the Anacostia Watershed

Category	Type of BMP	DPW&T (public)	DoE (private)
Filtering Practice	Bioretention	7	65
	Aquafilter		1
	Sand Filter		1
	StormFilter		2
Hydrodynamic Structure	Underground Storage	1	7
	Vortechs		2
Infiltration Practice	Bioretention	1	
	Grass Swale		4
	Infiltration Basin	1	
	Infiltration Trench	7	31
Settling/Separating Practice	Oil/Grit Separator		19
	Stormceptor		23
Storm Water Management Pond	Extended Detention Structure - Dry	26	1
	Extended Detention Structure - Wet	26	2
	Detention Structure - Dry Pond	6	7
	Retention Pond - Wet Pond	42	14
Wetland	Shallow Marsh	1	
Other	Unknown	260[a]	

[a]From the Storm Drain Inventory List

2.5 Estimated Current Trash Reduction

In this section, estimates of current trash reduction are computed for the programs and devices described in Sections 2.1 to 2.4. For some programs (i.e., cleanup events and trash BMPs), the amounts of trash reported from survey results are summarized and converted into annual values with care to avoid duplication when more than one group reported results for the same program. For other programs (i.e., education programs and street sweeping), best estimates were made using the data available, estimation methods found in the literature, and reasonable assumptions. The purpose of this section is not to provide a comprehensive tonnage of trash removed, but to provide estimates from various activities in order to compare their efficiencies and help identify areas where additional programs could create a large benefit. Note that most of the programs and devices were in place before 2010 when the TMDL was written, and thus, these devices cannot be used for TMDL "credit" (as they were part of the "baseline" computation). A few programs and devices, however, were newly implemented in 2012 or 2013, and thus can be counted toward meeting the TMDL requirements.

2.5.1 Source Control Reductions

An estimate of the trash reduction was computed for the existing school programs. The spatial extent and impact of the other outreach programs listed in Section 2.1.1 are harder to quantify, although the same approach could be used for any proposed new program in a specific area, or across the entirety of the County. Although an estimate is provided here for only the school-based education source control programs, it should be recognized that there is additional current trash reduction due to the other County Source Control programs. The purpose of this section is to present a method that can be used to compute trash reduction from education programs, and generate trash reduction values for education programs that can be used to gauge the relative efficiency of education/outreach compared to other trash reduction techniques. Potential trash reductions for other Source Control options are presented in Section 3.3.1.

For trash reduction from education programs, the approach published in the Montgomery County TMDL Implementation Plan (Biohabitats 2012) was used. This approach assumes that education programs are 12% effective at reducing trash in a school's district. This percentage was computed by assuming "half of the residential land is influenced by school age kids, the effectiveness of messaging is 40% and the willingness to participate is 60%":

Percent Effectiveness = 50% x 40% x 60% = 12%

This falls within the 5-15% range cited by Taylor et al (2007) as the typical increase in knowledge/awareness in similar pollution-reduction educational campaigns. Assuming that knowledge of the consequences of litter will change the behavior of school children, the 12% reduction assumption is consistent with this study from the scientific literature.

Trash load reductions were computed for three schools (Table 2.6) based on the school boundary area, fraction of each boundary within the three different residential land uses, and the TMDL loading rates for residential land for the County(MDE and DDOE 2010). The programs at Walker Mill Middle School and Cesar Chavez Elementary School have been implemented since the TMDL was put into place, and hence will count toward the post-TMDL trash reductions. An estimated 2,350 lb of trash per year are removed from the Anacostia Watershed due to the programs at these three schools.

Table 2.6 Estimated Trash Reduction from Existing Education Programs[a]

School	Approximate School Boundary Area (ac)	Percent of the School Boundary Area[a]			Program Efficiency	Trash Reduction per School Boundary Area (lb/yr)
		Low Density Residential	Medium Density Residential	High Density Residential		
Hollywood Elementary School (District 2)	1,060	2%	32%	5%	12%	840
Cesar Chavez Elementary School (District 3)	480	0%	32%	12%	12%	410[b]
Walker Mill Middle School (District 6)	1,740[c]	4%	20%	17%	12%	1,100[b]
Total						**2,350**

[a]Trash reduction computation based on land-used based loads from the Final Total Maximum Daily Loads of Trash for the Anacostia River Watershed, Montgomery and Prince George's Counties, Maryland and the District of Columbia Report (MDE and DDOE 2010).
Formula for Trash Reduction per School Boundary Area is:
Trash Reduction per School Boundary Area= Efficiency x Area x [(LowDensityRes% x LowDensityLoad) + (MediumDensityRes% x MediumDensityLoad) + (HighDensityRes% x HighDensityLoad)]
Example: 840 lb/yr = (12%) (1,060 ac) [(1.19 lb/ac/yr x 2%) + (19.26 lb/ac/yr x 32%) + (7.88 lb/ac/yr x 5%)]

[b]Programs started in 2013, so trash reduction can be counted for TMDL credit.

[c]Some of the Walker Mill Middle district falls outside the Anacostia watershed. Values in this table are only for the Anacostia Watershed

2.5.2 Trash Cleanup Programs

The number of pounds of trash collected was not compiled for all cleanup events, therefore, the amount of trash collected from cleanup programs in the Anacostia watershed is an estimate. An estimate was also used to determine what portion of the cleaned area was outside the Anacostia watershed in the County. Data may also be missing from the list of cleanup events. Some assumptions were necessary to complete the computations.

The survey data were received from 2012 through June 2013. None of the programs were described as new in those years, so no new programs were identified post-TMDL development in 2010. Checks were made to ensure that only one year's worth of data was used for each program. When data were provided for half of the year (e.g., the Comprehensive Community Cleanup data from DoE was from January 2013 to June 2013), the half-year trash quantities were doubled to get annual estimates. Each data set was identified as being county-wide or specific to the Anacostia portion of the watershed. If the data was county-wide, an Anacostia-watershed estimate was approximated by multiplying the county-wide value by the fraction of the County's acreage that is within the Anacostia watershed (17%):

[Value in County's Anacostia watershed] = [Value in Entire County] x [17%]

For some of the cleanup events, there was no estimate of the quantity of trash collected. Instead of leaving these events out of the estimate, a median value was computed for the small community events of 1,600 lb per event, and this value was assigned to each of these 15

events. Efforts were also made to avoid duplication; specifically, survey results from AFF, AWS, and MNCPPC all included trash collected during Earth Day cleanups (Appendix A). After additional communication with AFF, it was determined that their Earth Day value included the amounts collected by the other groups as well. DoE also provided a county-wide value for "Community Cleanups" (Appendix A) which was not counted in the estimate in Table 2.7. DoE confirmed that these cleanups are either for residents to dispose of large items from their homes or are events that are otherwise accounted for in Appendix A.

Table 2.7 Estimate of Trash Collected During Stream Neighborhood Cleanups

Event/program	Municipality/ Agency	County-wide Annual Value (if provided by source)		County's Anacostia Watershed annual value	
		tons	lb	tons	lb
Clean Up, Green Up"	DPW&T	29	58,380	4.96	9,925
Comprehensive Community Cleanup[a]	DoE	107	213,400	18.14	36,278
Comprehensive Community Cleanup	Berwyn Heights			12.5	25,600
Earth Day	AFF, AWS, MNCPPC, and Riverdale Park			54.40	108,807
Other AWS cleanups	AWS			12.16	24,320
Park cleanups	MNCPPC			11.61	23,220
Town and School cleanups	Riverdale Park, Landover, and Walker Mill Middle School			26.2	52,403
Municipality/other cleanups with no total pounds[b]	15 events/groups			10.5	21,000
Total				**151**	**301,553**

[a] Multiplied half-year value by 2 to get an annual estimate.
[b] Estimated from median trash collection (1,400 lb) at small community events multiplied by number of events.

DoE provided an estimate of the amount of trash removed through roadway cleanups—6,000 tons/year—but the value also included the Comprehensive Cleanup Program and other DoE cleanup values. To estimate the annual amount of trash cleanup via the roadside programs in the Anacostia watershed portion of the County, those values were subtracted from the 6,000 tons/year. In addition, a value of 10 tons/year was provided by DoE for cleanups on landfill approach roads. Since neither landfill is in the Anacostia Watershed, that value was also subtracted out (Table 2.8).

Table 2.8 Roadway Trash Collection

Cleanup data	Location	Roadway Trash collected (tons)	Roadway trash collected (lb)
Total value provided by DoE	County	6,000	
Landfill approach roads	County (not Anacostia watershed)	-10	
DoE cleanup events and comprehensive cleanup estimate	County	-614[a]	
Roadway trash collected	County	= 5,376	
Roadway trash collected	Anacostia watershed portion of the County	5,376 x 17% = **914**	**1,828,000**

[a] Sum of half-year DoE-provided values of 506,560 lb for community group cleanups plus 106,700 lb for Comprehensive Community Cleanups multiplied by two to cover the entire year.

Altogether, in the Anacostia River watershed portion of the County, there are approximately 300,000 lb of trash collected through stream and community cleanups (Table 2.7), and 1,828,000 lb from roadways per year (Table 2.8). In summary, an estimated total of 2,128,000 lb (1,064 tons) of trash is cleaned up from roadways, streams, and neighborhoods by County, municipal, SHA, non-profit organization, and community group programs annually.

Many of the approximately 300,000 lb currently removed from the watershed through current cleanups occur within the streams and rivers which, even if occurring prior to the 2010 TMDL baseline event, can be counted as "credit" toward the trash TMDL. These in-stream cleanup values can be included because Trash TMDL monitoring occurred at the end of pipe, and cleanups were performed downstream of these end of pipe baseline monitoring report locations within the streams. Additionally, the Washington D.C. draft TMDL Implementation Plan accounts for trash removed by skimmer boats, even those occurring before 2010, which is similar to the in-stream cleanups. Table A-3 separates the collection events based upon in-stream and non-in-stream cleanups. These in-stream cleanup events have resulted in 140,475 lb of trash being removed from the Anacostia, and could count toward the implementation plan. This value represents both WLA and LA litter.

In summary, trash cleanup programs within the Anacostia Watershed are significant and are estimated to remove approximately 2,130,000 lb (1,165 tons) of trash per year. Of that amount, up to 140,475 lb of trash could count toward meeting the trash TMDL as long as the same cleanups are continued or new cleanups are added to replace ones that do not continue.

2.5.3 Street Sweeping

The current effectiveness of the County and municipal program street sweeping was computed using the estimated trash load on roadways, the acres of roads swept, the frequency of sweeping, and a method from the literature to determine effectiveness based on frequency of sweeping compared to rainfall events. The TMDL monitoring in Maryland did not include a separate estimate for trash load from roads; however, the Washington D.C. monitoring did include a land use labeled "Major Roads, Transport, Communication, Utilities" with a load of 31.12 lb/acre/year (MDE and DDOE 2010). The trash load on roadways likely varies substantially, but because most of the roads that are swept are major roads and/or in commercial areas, this number should be representative, on average, to generate a load estimate.

The total acres of roads throughout the watershed the County and in each municipality were identified using GIS (Figure 2.2). The average number of times per year that each jurisdiction's roads are swept was computed from the survey information presented in Table 2.2. The efficiency of street sweeping was computed using a method from the literature (Marais and Armitage 2004; Armitage, no date) that is based on the frequency of sweeping relative to rainfall frequency. The authors (Marais and Armitage 2004) conducted a study in Cape Town, South Africa and found that the maximum expected efficiency of street sweeping decreased with the ratio of street sweeping frequency to significant storm frequency. This approach assumes that street sweeping is 100% effective at removing trash, and that storms are 100% effective at washing trash off the roadway and into the piped MS4. In reality, this is rarely the case but the general approach is useful for reference and benchmarking.

The authors acknowledge that there are many factors that influence street sweeping effectiveness, including street and curb texture, material, and condition; sweeper operation speed; moisture of roads at time of sweeping; material distribution and type collected; and location of interfering parked cars and garbage cans (Pitt 1979, Zarriello et al. 2002). The technology used also affects performance, although according to EPA no definitive independent studies have been able to determine the "best" sweeping technologies, and each technology has its own pros and cons (EPA 2012).

To compute the efficiency of street sweeping in the County, the average frequency of significant storms (0.5 inches or greater) in the area was identified from the Community Collaborative Rain, Hail & Snow Network data at Takoma Park 2006 – 2013, accessed through the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) website (NOAA 2013). The assessment showed that the interval between storms 0.5 inch or greater was on average 11.5 days. The efficiency of sweeping is computed with the following equations, where F_{sw} is the average number of days between street sweeping and F_s is the average number of days between storms:

$$\text{Efficiency} = 1 - F_{sw}/2F_s \quad (\text{for } F_{sw} < F_s)$$

$$\text{Efficiency} = F_s /2\, F_{sw} \quad (\text{for } F_{sw} >= F_s)$$

This approach can also be represented graphically (Figure 2.4), which allows for visual comparison between the efficiencies of the various programs. Once the frequency of sweeping exceeds the average frequency of storms, the efficiency increases greatly; as seen in Fairmont Heights and Riverdale Park. Although this is an effective approach for these two communities, it is likely unrealistic to implement street sweeping on every County road one or more times a week.

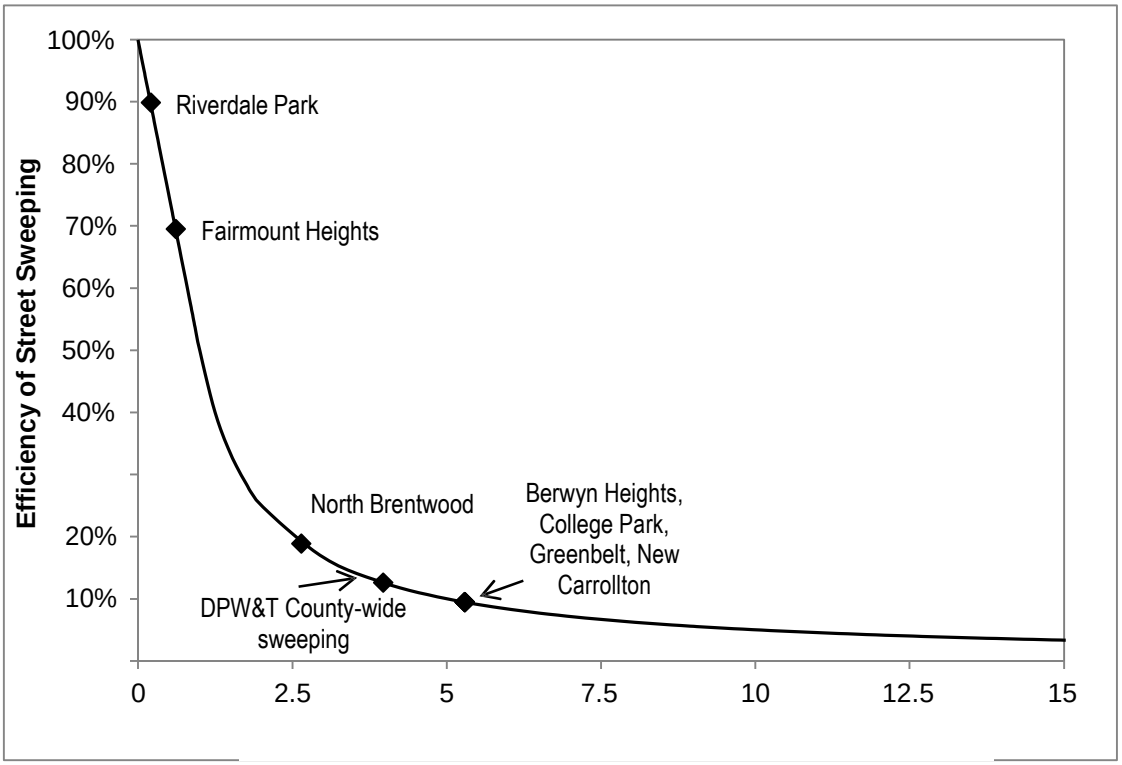

Figure 2.4. Estimated Efficiency of Street Sweeping in Residential Areas for Various County Jurisdictions (Figure based on Marais and Armitage (2004) and Table 2.2)

The acres of roads swept, frequency of sweeping, trash load, and efficiency computation were used to compute current trash collection via street sweeping with the following formula:

Estimated Trash Reduction (lb/yr) =Area Swept (acres) x Trash load (lb/acre/yr) x Efficiency

Results, presented in Table 2.9, show that an estimated 7,200 lb/yr of trash is collected from the current street sweeping programs in the Anacostia Watershed portion of the County.

Table 2.9 Trash Reduction from Current Street Sweeping Practices in Anacostia Watershed Portion of Prince George's County

Jurisdiction	Road area (ac)	Annual trash load (lb/yr)	Sweeps / yr	Notes about sweeping	F_{sw}	F_{sw}/F_s	Sweeping Efficiency	Estimated trash reduction (lb/yr)
Roads swept by County (DPW&T)	366	11,379	8		46	4.0	0.13	1,479
Municipalities:								
BERWYN HEIGHTS	46.9	1,459	6	6x per year	61	5.3	0.09	131
BLADENSBURG	65.1	2,025		unknown				
BRENTWOOD	31.5	980		unknown				
CAPITOL HEIGHTS	49.8	1,548		unknown				
CHEVERLY	89.2	2,777		unknown				
COLLEGE PARK	356.3	11,088	6	6x per year (plus 5x per week downtown)	61	5.3	0.09	998
COLMAR MANOR	18.0	560		manual when needed				
COTTAGE CITY	15.8	491		manual when needed				
EDMONSTON	25.3	788		unknown				
FAIRMOUNT HEIGHTS	20.7	645	52	manual weekly	7	0.6	0.69	445
GLENARDEN	54.6	1,701		unknown				
GREENBELT	348.2	10,837	6	6x per year	61	5.3	0.09	975
HYATTSVILLE	176.4	5,488		unknown				
LANDOVER HILLS	36.5	1,137		unknown				
MOUNT RAINIER	55.7	1,733		manual when needed				
NEW CARROLLTON	100.8	3,137	6	6x per year	61	5.3	0.09	282
NORTH BRENTWOOD	9.2	287	12	12x per year (manual)	30	2.6	0.19	54
RIVERDALE PARK	100.7	3,134	156	3x per week	2	0.20	0.90	2,820
SEAT PLEASANT	53.9	1,678		unknown				
UNIVERSITY PARK	37.5	1,166		none				
							Sum:	**7,184**

Note: This table assumes that the amount of trash/acre of road area is a constant 31 lb/yr/acre.

2.5.4 Structural BMPs

Mechanical screens are in place at three County pumping stations, removing 338 tons of floatables per year. Assuming that 95% of that material is organic (MDE 2009), an estimated 33,800 lb (17 tons) of trash is captured each year at the three pumping stations.

In addition, the reported trash removed from the two trash nets and the Paint Branch trash trap are repeated in Table 2.10. No data were available for the Dueling Creek Trash Trap, so an average of the other three removal amounts was used. An estimated total removal value for the trash traps and nets was calculated to be approximately 880 lb of trash removed per year.

Table 2.10 Estimated Trash Removal from Trash Structural End-of-Pipe BMPs

BMP	Trash Collected (lb/yr)
Ray Road Trash Net (removed)	110
Flagstaff Street Trash Net (removed)	67
Paint Branch Trash Trap	480
Dueling Creek Trash Trap	219[a]
Total	**876**

[a] Estimated as an average of the other three trash BMPs.

2.5.5 Summary

The computed trash reductions from each of the programs are best estimates, and should not be considered exact values. These estimates are instead a means of quantifying the relative effectiveness of the different programs, and should be used as a tool to identify gaps and the potential increases in trash reduction with new or modified programs. These total existing trash reductions are presented in Table 2.11. Of the total existing trash reduction estimates some of the pounds removed can be used as credit toward compliance with the Trash TMDL and MS4 permit due to being implemented after the monitoring for the Anacostia Watershed Trash TMDL (2009/2010). Since these programs were instituted after the TMDL determination they could count as part of the credit to meet the MS4 permit and ultimately the trash TMDL. These values are noted in Table 2.11.

Based upon the summary presented in Table 2.11, the largest reductions appear to be the result of roadway cleanups (e.g., inmate, DPW&T, SHA programs), community cleanups, and pumping station screens. This is not surprising because these programs are performed on a relatively large scale. The roadway and community cleanups also include many bulky, heavy items; increasing the tonnage of trash removed by these programs significantly. Education programs and trash BMPs remove much less trash, but are also smaller-scale and less expensive programs. These programs along with outreach programs are also required by the NPDES MS4 permit. Note that street sweeping removes a small amount of trash considering its large scale and substantial costs. A detailed summary table of Existing Programs can be found in Appendix B Table B-1.

Table 2.11 Summary of Estimated Annual Trash Reduction from Existing Programs

Category	Programs/BMPs	Trash Reduction Estimate (lb/yr)	New Post-TMDL Reduction Estimate (lb/yr)
Source Control	Programs at three schools	2,400	1,500
Trash Cleanup	Streams and Communities	301,553	Up to 140,475
	Roads	1,828,000	
Street Sweeping	County and Municipalities	7,300	
Structural BMPs	Trash nets and traps	900	500[a]
	Pumping stations	33,800	
Total		2,173,953	≤ 142,675[b]

[a] Includes Paint Branch Trash Trap and Dueling Creek Trash Traps (installed since 2010) which have since been removed, and therefore cannot count towards meeting the TMDL.

[b]This value could be compared to the 170,628 lb/yr removal criteria needed to comply with the MS4 permit (see Section 1.1)

CHAPTER 3: GAP ANALYSIS

A gap analysis is used to determine where gaps exist in the existing trash reduction programs, and determine room for improvement among the various programs. To perform the gap analysis the information from the existing programs (known from the survey and literature searches) was supplemented with information from other successful trash programs to determine where the County could improve trash reduction and stop the sources of litter into the MS4 system. This gap analysis details lessons learned from stakeholder surveys, hotspot locations throughout the watershed, and program enhancement opportunities.

3.1 Lessons Learned from Stakeholder Surveys

Survey results were obtained from 12 municipalities, 5 County departments, the AWS, and the AFF (Appendix A, Table A-1 and Figure A-1). Values and opinions for the survey gave information for the 2012-2013 year. Based upon these survey results (Appendix A), gaps in the existing programs and potential room for improvement to existing programs were identified and analyzed.

Stakeholders provided insight on successful structural and non-structural approaches for trash reduction in their survey responses. Structurally, it is important to have more available trash and recycling collections, and have more containers strategically located throughout communities. In-stream trash racks have been successful, and AWS recommends several smaller trash racks, with appropriately smaller areas of influence, instead of larger trash traps which are more difficult, time consuming, and expensive to maintain. Another stakeholder suggested that automatic cleaning equipment is a better use of man-hours, and that implementing a full-time street sweeping program has been successful.

Survey respondents also suggested that community pride is tied to the appearance and maintenance of the city; the cleaner the city, the lower the citizens' tolerance for trash. One municipality respondent said "litter breeds litter," suggesting that keeping the community clean helps prevent future littering. It was suggested in some survey results that stricter enforcement of the current laws would successfully decrease the amount of trash seen. Multiple stakeholders also recommended replicating the Washington D.C. Bag Fee to stop those in the community that believe that littering is acceptable and to decrease the amount of plastic seen in the waste stream.

As commonly noted by stakeholders, there are also barriers to these ideas; the two most common of which being financial and social/behavioral issues. Some smaller cities and communities do not have the funding to implement structural approaches. Also, behaviorally some people do not know that littering is bad. It was noted that environmentally conscious people do not typically litter, and it is a small percentage of the population that produces a large proportion of the trash.

The final barrier noted is the excessive length of time required for governmental permitting. These permits are needed to install small trash racks and trash traps in waterways, and the time it takes to get a permit can hinder efforts to reduce trash in the environment.

Taken together, the stakeholder suggestions point to the potential effectiveness of community-wide efforts. Public education, many small devices/containers for trash removal, and enforcement are all wide-reaching ideas. Because funding is a challenge, creative ideas are needed to implement these programs by taking advantage and better use of existing resources.

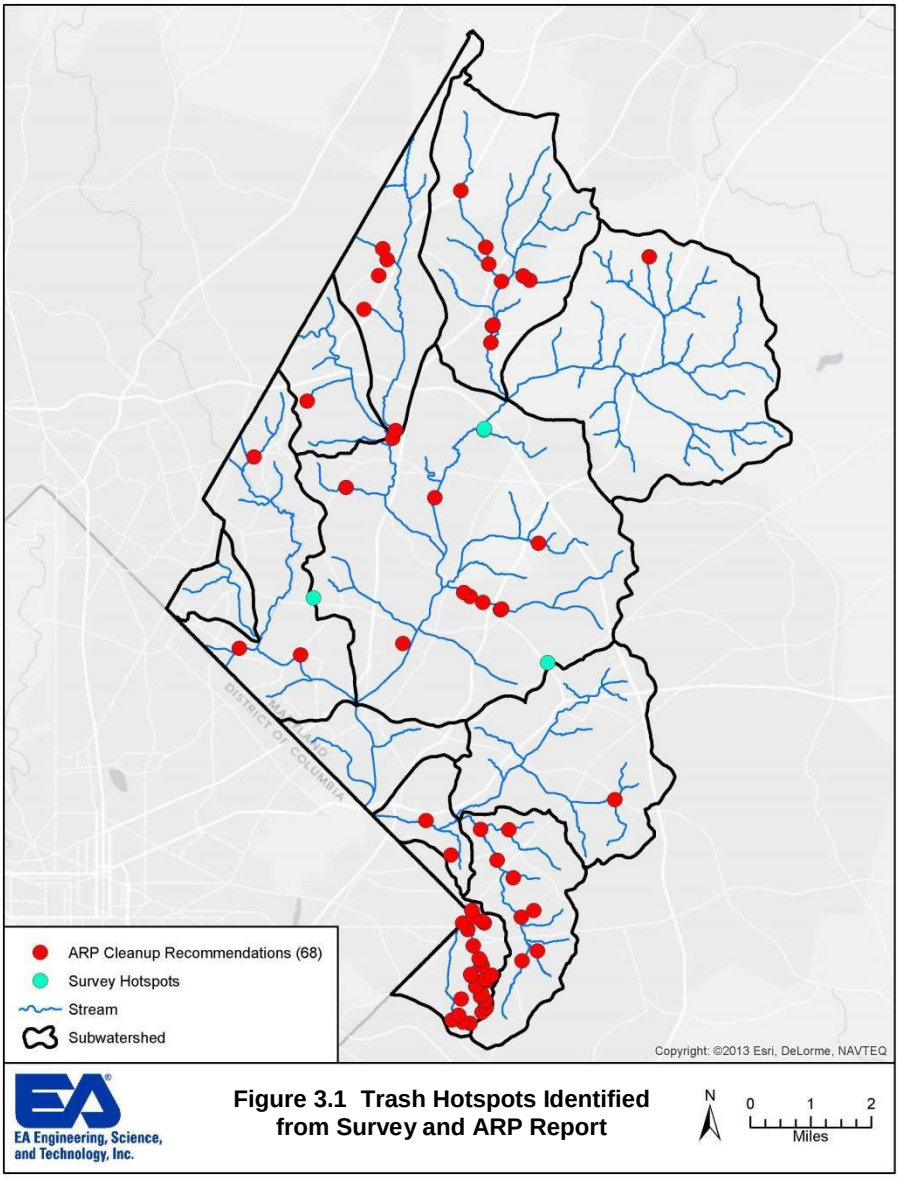

Figure 3.1 Trash Hotspots Identified from Survey and ARP Report

3.2 Trash Hotspots

3.2.1 Survey Results

Some survey respondents identified current hotspots throughout the county within the watershed. The areas noted are listed below and indicated in Figure 3.1:

- Springhill Lake Recreation Center (Greenbelt)
- Bus Stop across the street from Springhill Lake Recreation Center (Greenbelt)
- Prince George's Plaza (University Park)
- Commercial area on Route 450 from Riverdale Road to Ardwick Ardmore Road (New Carrollton)

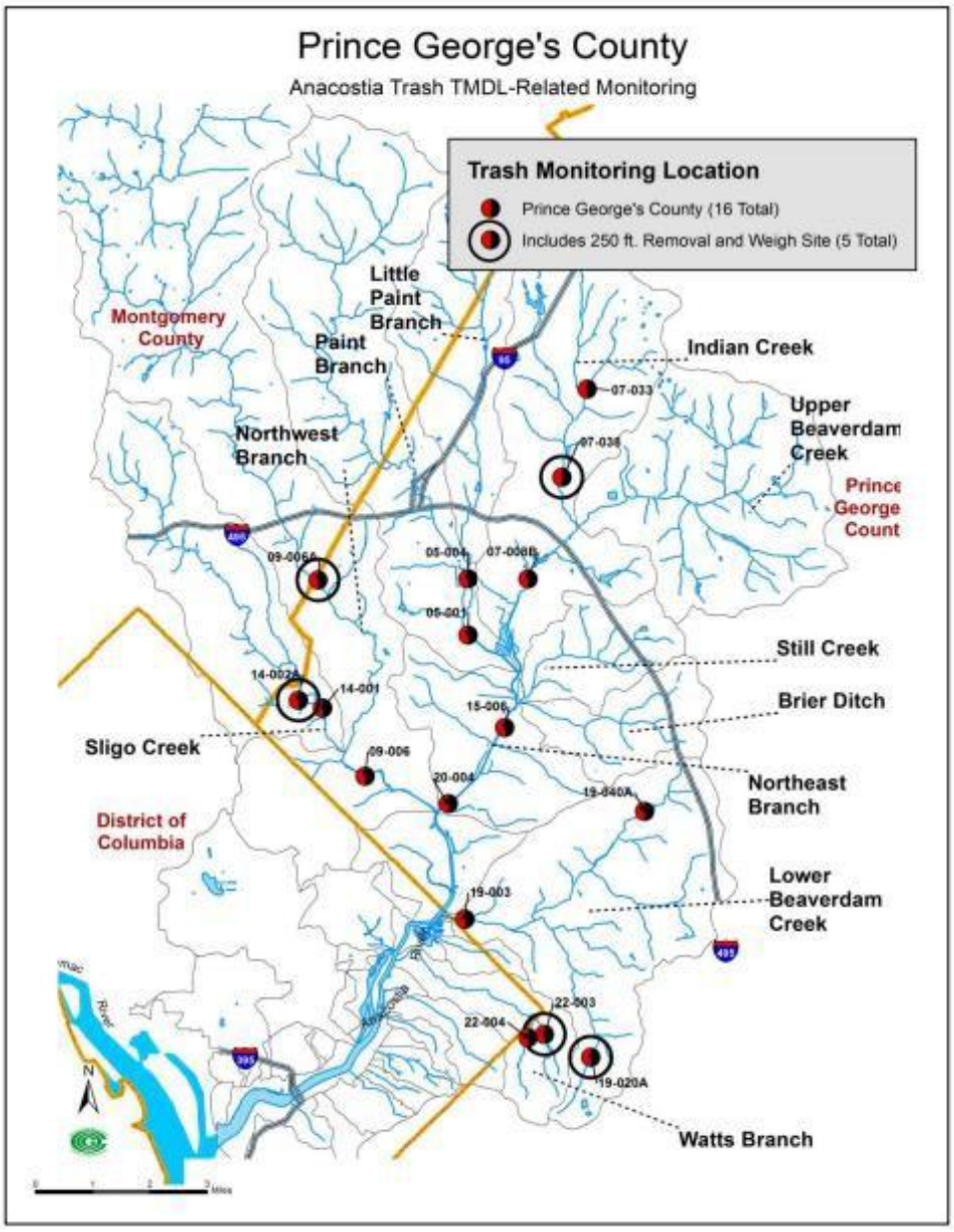

Figure 3.2 MWCOG Monitoring in Prince George's County.
Figure Courtesy of MWCOG (2012b).

3.2.2 COG Trash Survey

Both stream and windshield trash monitoring surveys have been conducted since 2011 by MWCOG (2013). The stream monitoring (Figure 3.2) is performed at the same locations as the original 2008 TMDL monitoring sites. A summary of the 2011–2013 stream trash counts for a 500 ft reach at each monitoring site indicates that there are some locations with consistently more trash than others. These appear to be clustered in the southeast corner of the watershed, and indicate an area where trash reduction efforts could be more effective. Dumping sites have been identified throughout the 144 miles covered by the windshield surveys. More detailed analyses of these areas, as well as areas indicated as "high" by the windshield survey results, could be used to better target neighborhoods and streams for more effective trash reduction activities.

3.2.3 Anacostia Restoration Plan

The Anacostia Restoration Plan (ARP) Report (USACE et al. 2010a) is a watershed-wide restoration plan, developed by the AWRP, to address multiple types of pollution and habitat degradation in the watershed. The partnership is between Washington D.C., Montgomery County, the County, MDE, District of Columbia Water and Sewer Authority (DCWASA), MWCOG, multiple federal agencies including EPA, and non-profits. The ARP is a 10-year plan that includes results from surveys conducted throughout the watershed and an analysis that ranks trash and other pollution-reduction projects based on potential effectiveness.

The ARP includes 126 projects specifically related to trash reduction in the County. Each project is ranked according to the level of trash at the site and the project's estimated contribution to the Anacostia Watershed Trash Reduction Strategy (MWCOG 2007). The main document (USACE et al. 2010a) contains a summary of the overall plan and approaches for implementation. Details on each proposed project, including photographs, are included in the sub-basin specific project inventories (USACE et al. 2010b), and GIS layers are available identifying the location and type of each project. Figure 3.3 presents all 126 trash-related projects in the ARP report within the County's portion of the watershed.

Of the 126 projects, 68 of them are described included trash removal as part of the project. Some of these suggested projects also include installation of signage, trash traps, or outreach. The 68 trash removal projects also form a comprehensive hot-spot list and were therefore added to the hotspot map (Figure 3.1).

3.3 Opportunities for Program Enhancements

Based on the information presented in Sections 3.1 and 3.2, this section summarizes which existing programs could be extended and where significant trash reduction could be achieved in the County. This section is organized in the order of the existing programs described in Chapter 1 of the document: Section 3.3.1 for Source Controls, Section 3.3.2 for Trash Cleanup Programs, Section 3.3.3 for Street Sweeping, and Section 3.3.4 for Structural BMPs.

3.3.1 Source Controls

Education

Multiple survey respondents described education programs throughout the County—both in schools and for the broader public. The clearest opportunity for immediate enhancement would be to expand participation in the AFF Trash Free Communities and Trash Free Schools Programs. With both of these programs, the County can use already-developed resources, while working closely with AFF using tools they have already established to achieve their trash reduction goals throughout the watershed. The AFF Trash Free program includes a toolkit of existing resources that were developed using social marketing research on attitudes toward littering in the Potomac River watershed (AFF 2012a). The toolkit contains three major categories of anti-litter education devices: 1) advertisements and visuals, 2) communication materials, and 3) community outreach materials. When a county, town, or community can combine all three of the above categories into one program, they can "build awareness among residents, community leaders, local media, and local businesses" as well as "drive behavior changes among litterers" (AFF 2013b). Based on survey responses, AFF is eager to work with the County using the toolkits they have developed.

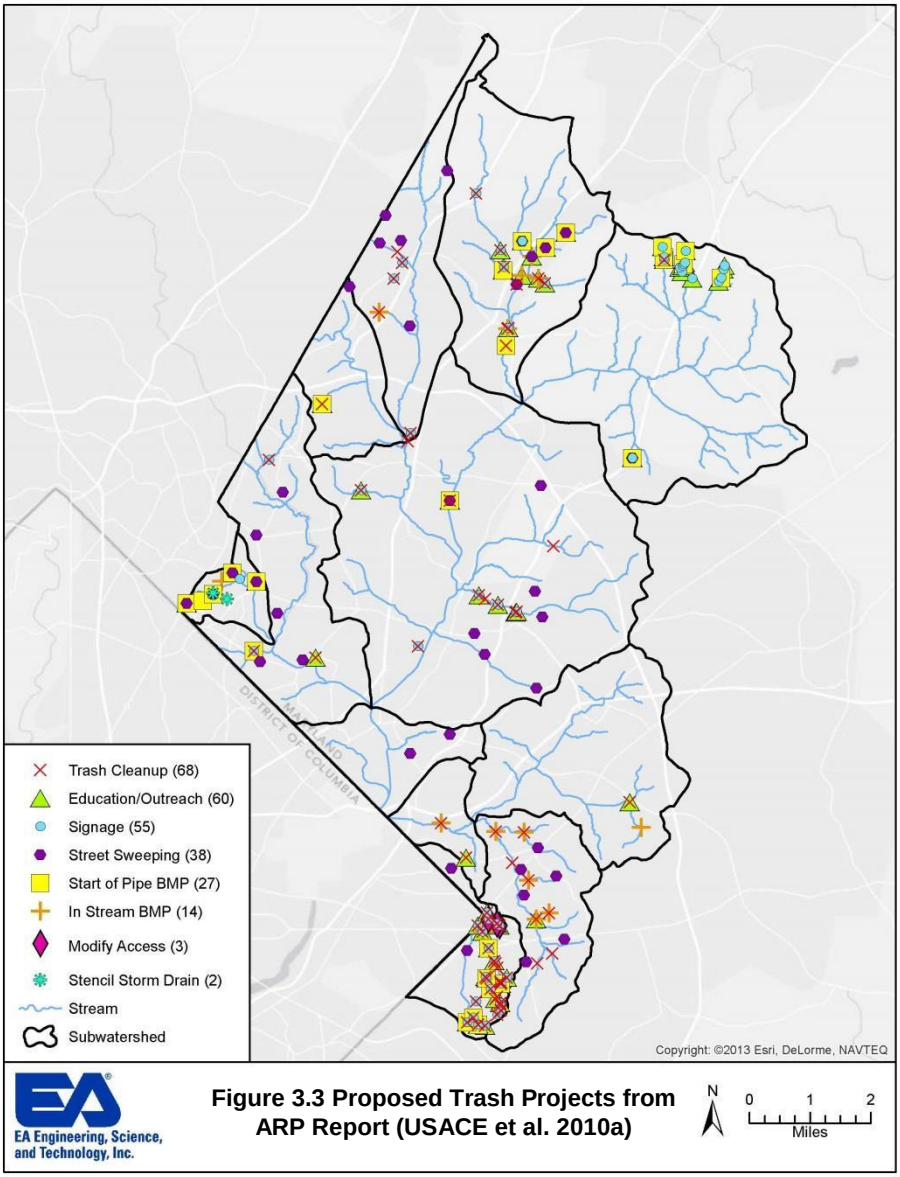

Figure 3.3 Proposed Trash Projects from ARP Report (USACE et al. 2010a)

Advertisements include:

- Billboards on major commuter roads
- Posters in a wide range of sizes, including 8 ½ inch X 11 inch papers and large bus shelter ads
- Flyers for public distribution
- Decals and bumper stickers
- Scripts for radio public service announcements (PSA)
- Ads on company and County websites
- School fliers promoting student engagement

Communication pieces include:

- Talking points to help educators speak with confidence

- E-Blasts—emails that can spread campaign messages
- Social media recommendations
- Media outreach types
- "Letter-to-the-editor" templates
- Sound-bites for public events

According to AFF, it is important to campaign on multiple levels and include items that relate to a broad cross section of the population. For example, having a "Cleanest Block Contest" can attract competitive people, while delivering a speech at a public event can attract a broader variety of people that are in attendance.

The Trash Free Schools program is comprised of eight steps to help schools implement a litter education, prevention, and cleanup program. If the school programs were implemented at every school in the watershed, using the calculation method described above (Section 2.5.1), an estimated 5,690 lb/yr of trash could be prevented (Table 3.1). This corresponds to 2% of the point source trash reduction required under the TMDL (calculated as the estimated removal divided by 314,055 point source loading); as the programs are implemented and more data are available on the success of these programs, a more accurate estimate can be computed. Furthermore, teaching children the consequences of littering could have a more long-term impact on the community than individual clean-up events.

Signage

A significant portion of the trash reduction needed for TMDL compliance is from the nonpoint load allocation. A total of 347,958 lb/yr plus a 17,398 MOS was determined during the baseline reporting, which together account for 52.5% of the total TMDL baseline. The nonpoint load allocation was computed with in-stream monitoring and by quantifying the weight of trash that was too large to fit through the storm drain. These trash items included cloth, clothing, and carpeting; oil containers and filters; antifreeze bottles; tires; bricks; concrete; lumber; appliances; metal; shopping carts; and sports equipment. Because some of the trash reduction efforts—such as street sweeping and BMPs—will not capture this type of litter, additional prevention measures are necessary.

Table 3.1 Trash Reduction Potential if Education Programs were Implemented at Schools Throughout Watershed

Land Use	Land Area in Prince George's County (ac) [a]	Loading Rate (lb/ac/yr) [a]	Program Efficiency	Trash Reduction Potential for Prince George's (lb/yr)[b]	Trash Reduction Potential for Anacostia Watershed (lb/yr)[c]
Low Density Residential	967	1.19	12%	138	24
Medium Density Residential	11,817	19.26	12%	27,311	4,643
High Density Residential	6,367	7.88	12%	6,020	1,024
Total					**5,690**

[a] Values for Land Area and Loading Rate come from MDE and DDOE (2010) Anacostia Trash TMDL Final.
[b] Calculated as Land Area x Loading Rate x Program Efficiency = Reduction Potential (see Table 2.6)
[c] Anacostia Watershed is 17% of land of Prince George's County.

In the ARP report (USACE et al. 2010a), 55 different locations in the watershed have been recommended as places that could benefit from "No Dumping" signage (Figure 3.3). These are ideal locations for combatting illegal dumping and reducing the nonpoint load significantly at a lower cost. In an evaluation of the effectiveness of "No Dumping" signs, a task force in central Texas found a reduction in dumping incidents of approximately 70% after appropriate signs (i.e., metal, large, strategically placed) were installed (Capital Area Council of Governments [CAPCOG] 2010). If we assumed an average 1,600 lb of trash at a dump site—based on the average amount of trash collected from single-site cleanup events in the stakeholder survey—installing signs at 55 locations with approximately 70% effectiveness could result in the prevention of 61,600 lb of littered trash; 17% of the nonpoint source load.

A critical element of increased signage is to ensure that dumping is stopped, and is not simply shifted to different locations. The County has made efforts to encourage legal disposal through free resident disposal at the County landfills, residential bulk material pickup, and by allowing residents to dispose of one-truck full of construction and demolition material free of charge annually. Including concise information on the "No Dumping" signage—such as "Call [number] for free, legal disposal options for residents"—could prove to be effective at increasing public awareness of these programs, as the County has indicated they would like to encourage (Section 2.1.3).

Enforcement

Increased enforcement of littering laws could substantially impact the reduction of trash accumulation in waterways. AFF has promoted a "Litter Enforcement Month" in April for the past three years, and they documented the number of citations in the County in April 2013 (Section 2.1.3). AFF's recommendations for expanding these efforts include: reaching out to district attorneys and judges about Litter Enforcement Month, finding opportunities to increase the value of litter laws in the court system, and advocating for legislation to improve enforcement of littering and illegal dumping (including items such as cigarette butts and construction materials) (AFF 2013c).

By becoming involved in AFF's recommendations, the County's actions would help bring additional attention to the consequences of littering. Together with a public education campaign (both in schools and in the community) and increased signage at dumping sites, this approach might complete a knowledge gap about what littering is, how it affects the community, and how individuals can be held accountable for breaking anti-litter laws. A committed campaign to educate the public about the consequences of littering, and several well-placed billboards that warn of the consequences of littering could be effective for those who will not stop littering on society's behalf, and make a significant impact.

Disposable Bag Law

Plastic bags are a common item in trash surveys. In the Anacostia River, 85% of the trash is plastic bags, Styrofoam, snack wrappers, bottles, and cans. In regional streams, plastic bags are even more dominant (greater than 45%) (AWS 2008). Plastic bag bans are frequently cited as a very effective, revenue gaining approach to reducing trash (MWCOG 2009, AWS 2008). There is, however, opposition to this type of legislation. In both 2012 and 2013, a Disposable Bag Law to tax disposable bags at 5-cents per bag failed to be approved in the County.

Between 2009 and 2012 there was rapid growth in the number of communities in the U.S. adopting plastic bag bans—increasing from 10 to 70 total communities (MWCOG 2012a). The

District of Columbia and Montgomery County, Maryland have passed and enforced 5 cent fees for both plastic and paper single-use disposable bags. The District of Columbia and Montgomery County are the only two localities in the United States we are aware of with fees on both paper and plastic bags.

Financial Reports from the District of Columbia's Office of Tax and Revenue estimated bag use for January 2010 dropped to 3 million bags, a significant decrease from an average of 22.5 million bags issued per month in the District before the law took effect (MWCOG 2012a). Furthermore, about 2 million dollars a year has been collected in the District during the 2 years the ban has been in place (MWCOG 2012a). AWS reported a steady decline in the number of plastic bags recovered from the Nash Run trash trap in the District after the ban was put in place in the District of Columbia from January 2010 to November 2012 (AWS 2013). In their stakeholder survey results, AFF describes an approximate 50% reduction in plastic bag litter in the two jurisdictions (note that more detailed numbers are expected soon from these groups).

A plastic bag fee in the County would likely have similar results, and could provide a significant step toward meeting the Trash TMDL. Recent data have been collected for the TMDL monitoring in 2011 and 2012 along five stream segments in five different sub-basins of the County that include plastic bag counts (MWCOG 2012b). The District of Columbia Draft Implementation Plan (January 2014) notes that the weight of a plastic bag, 0.013 lb wet weight, was multiplied by the number of plastic bags calculated. These data were summarized (Appendix B), and across three monitoring periods, plastic bags represented on average 29% of the trash along the streams. Assuming a similar 60% reduction in plastic bag litter, as observed by AFF after the plastic bag bans went into effect in the nearby jurisdictions, the potential trash reduction can be computed from a plastic bag ban/fee in the County:

[Point Source Load + MOS] x [60% reduction] x [29% of trash by wet weight] =

347,156 lb/yr x 60% x 29% = 60,400 lb/yr

The resulting 60,400 lb/yr is a potential 16% reduction in the point source trash load and also includes a revenue-generating effort for the County, which could be used for implementing other trash reduction programs. Since plastic bags are sold in urban areas serviced by the MS4, any trash reduction gained by passage of plastic/paper bag legislation could be applied to the MS4 permit requirements.

Bottle Bill

Bottles also dominate trash in the Anacostia River, with the Anacostia Trash Reduction Report (2008) stating that bottles constituted approximately 25% of surveyed trash in the Anacostia River. Many glass bottles end up broken, leaving fragments of glass in the stream bed, while plastic bottles and cans have been found in the river, along the stream banks, and caught up in bushes. Bottle refund bills have been recommended to reduce this type of trash (AWS 2008), but these are not in place anywhere in the Anacostia River watershed. A bottle refund bill failed in committee in the Maryland Senate in March 2013, but a plan to reintroduce it within the next few years has been added to the Greenhouse Gas Reduction Act Plan released by Governor O'Malley in July 2013 (MDE 2013). Support from the County could aid in the approval of this effort. In California, where a bottle refund bill has been in place since 1982, there is an 82% recycling rate for bottles. The goal for the proposed Maryland law is an 80% recycling rate.

If a bottle refund bill were approved in Maryland, it could have a significant impact on trash reduction throughout the Chesapeake Bay region. It has been shown in other states that have implemented similar bills that even if buyers do not take the bottles back individuals who need money, or groups such as Boy/Girl Scouts, will comb the road sides and bushes to collect these redeemable bottles for the monetary benefit of the refund (AWS 2008).

The baseline TMDL monitoring in the County included the weight of bottles compared to total trash weight in the two County trash nets (MWCOG 2009). Three monitoring surveys were conducted during 2008 to 2009. Plastic bottles were 16.9% and 19.5% of the total trash weight in these traps. Aluminum cans and glass bottles also were found. Plastic, glass, and aluminum drink containers constituted, on average, 31% of the trash weight in these traps. To be conservative the Anacostia Trash Reduction report value of 25% will be used. Following a similar approach as for plastic bags, if a return fee was in place for bottles, an estimated 69,400 lb/yr of point source trash could be prevented from entering the MS4 of the watershed, representing 22% of the point source trash load:

[Point Source Load + MOS] x [80% reduction] x [25% of trash by weight] =
347,156 lb/yr x 80% x 25% = 69,400 lb/yr

3.3.2 Trash Cleanup Programs

Trash cleanup programs are very effective in the County at collecting a large amount of trash (Section 2.5.2). The roadway cleanups by the County, SHA, and Department of Corrections contribute a very significant portion of the total trash credited as being collected through the trash cleanup programs. The most frequent of these pickups is performed monthly, and a study by the California Department of Transportation (Caltrans) found that weekly litter pickup along freeways reduced the amount of trash discharged at the outfall by 30% (by weight) compared to monthly litter pickup (Caltrans 2000). This suggests that increasing the number of clean-up events per year would have a substantial impact on reducing trash, which could then be used as credit toward meeting the Anacostia Trash TMDL.

A thorough analysis of potential cleanup locations has already been conducted and summarized in the ARP report (Table B-3). Making use of this list will be a cost-effective means of targeting locations for cleanups that could have a significant impact on meeting the TMDL. All ARP projects are grouped into tiers and ranked to aid in the selection of projects when resources are limited. In addition, many recommended cleanup locations are combined with preventative trash-reduction recommendations including signage, trash grates, and street sweeping. All recommended locations for trash cleanup from the ARP report are presented in Figure 3.4. From this overview map, targeting more cleanups in the southern portion of the region (Watts Branch and Cabin Branch subbasins), as well as the northern subbasins (Little Paint Branch and Indian Creek) could be beneficial both by covering areas where cleanups are not currently clustered and by more effectively involving the surrounding communities in these efforts.

Watts Branch subbasin is 70% residential (combined densities), which is the land use type with the highest trash loads from the TMDL monitoring (MDE and DDOE 2010). In this subbasin, there are 28 locations, within or near Capitol Heights, recommended for trash cleanup, many of them also with recommended signage and/or trash grate additions. In spring 2013, the Trash Free Capitol Heights program (Section 3.1.1) was initiated, providing a good mechanism for coordinating cleanups in these locations within that community.

The Cabin Branch subbasin (or the lower portion of Lower Beaverdam Creek) is also a highly developed and high density residential portion of the watershed. The recommended ARP trash removal projects are in Cheverly, Seat Pleasant, and Capitol Heights. These efforts could likely be teamed with those in the Watts Branch subbasin.
The Indian Creek and Little Paint Branch cleanup sites are all in the Beltsville area, with much more industrial or urban land. Commercial partnerships could be developed to maintain these sites. There is also a mixture of residential and forested area within these subbasins.

The estimated amount of trash that would be collected from additional cleanups varies greatly. The range for pounds of trash collected in the single-location events presented in Table A-2 is 25 lb to 9,675 lb. The average is 1,600 lb, and considering that these locations are already identified as trash-heavy, means that likely at least that amount could be collected. If trash was removed from 20 of these sites per year, the 32,000 lb collected would be an estimated 10% of the point source TMDL loading. Additional benefit and cost-savings would be gained if signs were put up at these same sites, and further credit may be gained if the amount of trash removed is more accurately tracked for each cleanup.

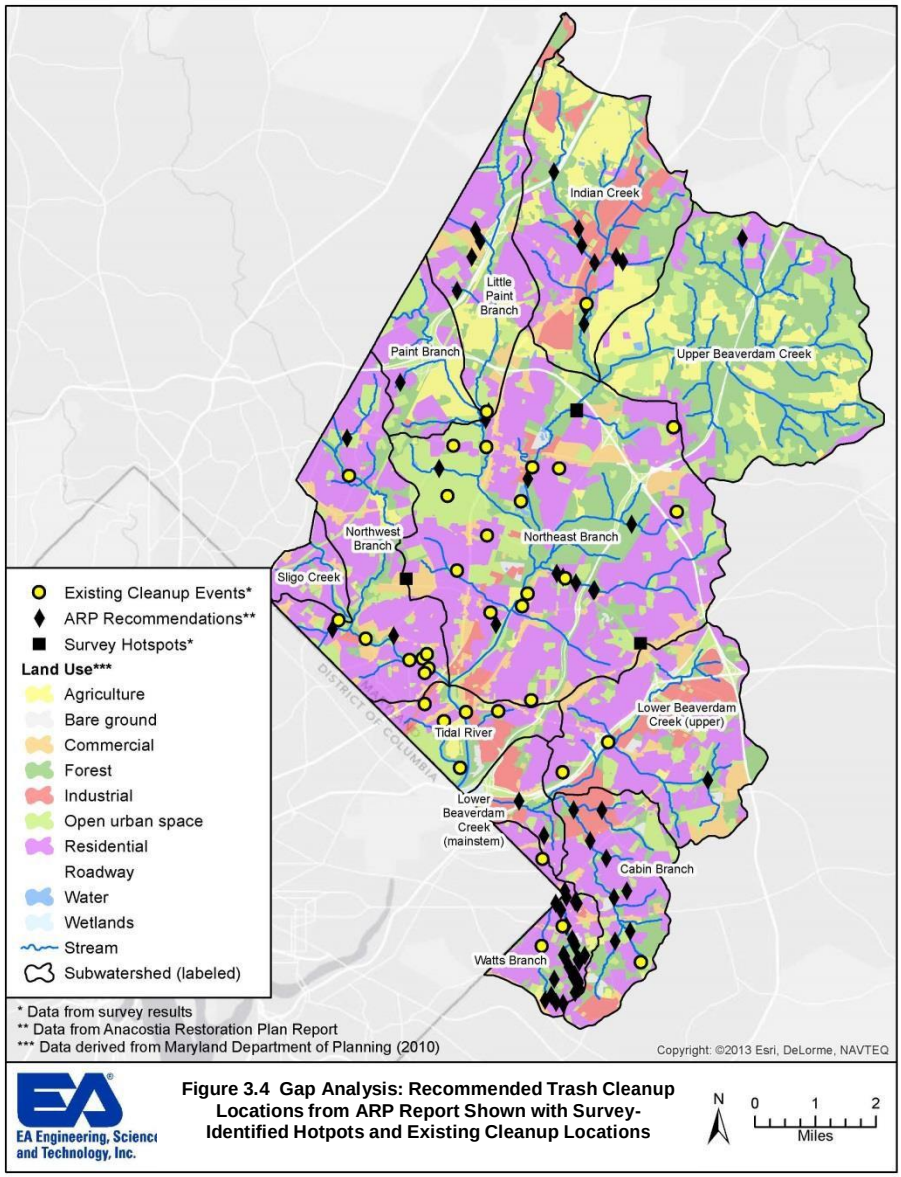

Figure 3.4 Gap Analysis: Recommended Trash Cleanup Locations from ARP Report Shown with Survey-Identified Hotpots and Existing Cleanup Locations

As stated in Section 2.5.2 there are also some cleanup events which have been occurring within the stream, downstream of the point of baseline loading determination. If the same cleanups occurred within the stream, up to 140,475 lb of trash (Table A-3) could be removed.

3.3.3 Street Sweeping

The estimated trash collected with the current street sweeping programs (7,300 lb/yr) is relatively low compared to some of the other trash reduction methods. Even if the DPW&T sweeping efforts were doubled in frequency, the computed additional trash reduction is only 1,400 lb/yr (0.4% of the point source load TMDL). These values are estimated based on an assumed roadway trash load and the efficiency curve (Section 2.5.3). Note however that other studies also suggest minimal trash reductions have been achieved with additional street sweeping. Caltrans conducted a study comparing the amount of litter in the stormdrain system from an Interstate stretch swept weekly compared to a similar stretch swept monthly (Caltrans 2000). The amount of trash was not significantly different in the storm drain system from these

roads swept at different frequencies. In a review of street sweeping studies that looked at large particle collection, researchers also found little correlation between the frequency of sweeping and the transport of gross pollutants into the stormwater system (Walker and Wong 1999).

Several locations within the County that would further benefit from street sweeping were identified in the ARP report (Figure 3.5) for a total of 50 additional miles of roadway recommended for regular sweeping. Despite the relative inefficiency of street sweeping documented in the previous paragraph, it may still be valuable to consider extending (or modifying) existing street sweeping routes that are near these recommended locations as part of a pilot study to better calibrate local results. If the amount of trash collected by the street sweepers at these new locations were to be accurately measured, there is a possibility that an increase in the total volume of trash removed by street sweeping efforts could be achieved with minimal additional effort.

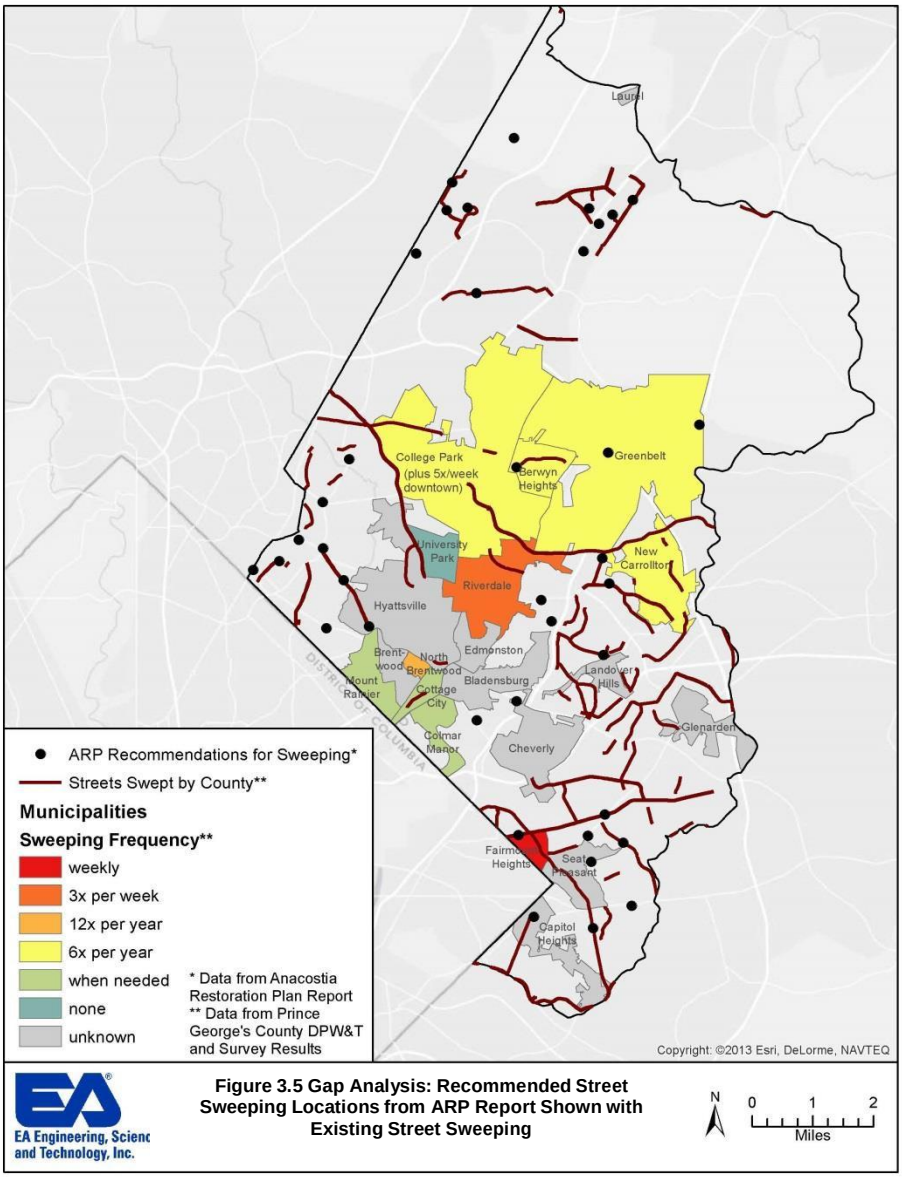

Figure 3.5 Gap Analysis: Recommended Street Sweeping Locations from ARP Report Shown with Existing Street Sweeping

3.3.4 Structural BMPs

The amount of trash collected with the downstream trash nets and traps currently in place in the County is relatively low compared to the amount collected from other current trash reduction methods (Table 2.11). In contrast, the amount of trash collected in the screens at the pumping stations is much higher and represents a more significant reduction (Table 2.11). This is likely due to the automated nature of the devices and the large amount of water flowing through the pumping stations. Although the cost could be quite high, installing these devices at other pumping stations could be effective in meeting a significant portion of the TMDL requirement, with an estimated 11,300 lb/yr reduced at one additional pumping station. This equates to 4% of the total point source load.

Success of in-stream trash BMPs in other jurisdictions suggests that these methods should still be considered in the County. In the District of Columbia, three in-stream trash BMPs have been

installed and are currently being maintained, while more are being planned with the goal of meeting a significant portion of the District of Columbia Trash TMDL requirement (DDOE 2013). The efficiencies of two of the District's trash traps (Nash Run and Watts Branch) at capturing the expected loads, based on the TMDL loading rates from their subbasins, were computed to be 56% and 54%, respectively, in 2012. The annual trash loads collected in these two facilities were 5,923 lb/yr and 1,960 lb/yr, respectively (DDOE 2013). These values are likely much higher than those achieved by the County traps because of the conditions of the watershed areas draining to them. Therefore, if additional in-stream trash BMPs were to be considered for the County, they should be located on streams draining a large amount of land area with a high percentage of high density residential and commercial land. Several locations are recommended in the ARP report for in-stream trash BMPs (Figure 3.6). Examining these locations by delineating the land area draining to them and computing the expected trash loads will be a first step in identifying location(s) that may benefit most from an in-stream structural BMP approach.

Incorporation of "start-of-pipe" trash removal BMPs with the County's Green Streets plans might also result in efficiencies. In Montgomery County, an approach is being tested in one watershed to incorporate modified inlet trays in LID roadside swales to collect trash (MCDEP 2013). The design involves cleaning frequencies of only once every 4 to 6 months, making them a low-maintenance approach. In Los Angeles, California (where a trash TMDL was implemented in 2007) incorporation of full capture devices in storm drains has been the foremost approach undertaken to meet the requirements, and many such devices have been designed and approved for this purpose (California Regional Water Quality Control Board [CRWQCB] 2012). In the County, the large number of existing storm drain inlets and BMPs currently in place could allow for a program of simple trash retrofits and maintenance plans to be implemented at these structures; which could result in a significant amount of additional trash reduction. Specific locations and types of retrofits or trash BMPs will be analyzed in the Implementation Plan.

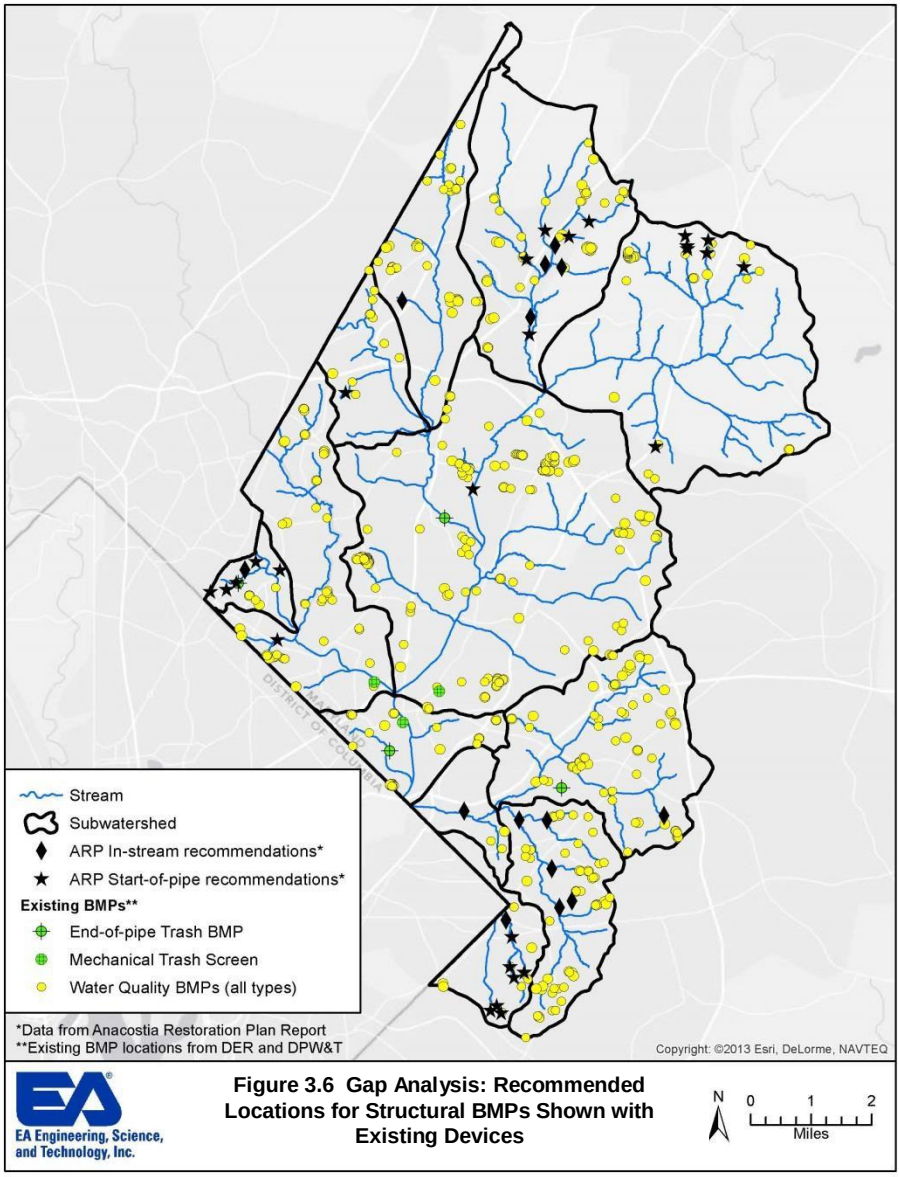

Figure 3.6 Gap Analysis: Recommended Locations for Structural BMPs Shown with Existing Devices

3.3.5 Program Enhancements Summary

General opportunities for program enhancements were identified in the preceding sections based on the survey results and literature data presented in Chapter 2. Two major local efforts, the AFF schools and communities programs and the Anacostia Restoration Plan (USACE et al. 2010a) were identified as potentially cost-effective resources to reduce duplication of efforts when developing and selecting new trash reduction projects. The general recommendations and estimates for potential trash reduction from Sections 3.3.1 to 3.3.4 are summarized in Table 3.2.

The potential reductions presented are simply for a general comparison and will be re-evaluated and explored further in the Implementation Plan. Source control efforts appear to have the most potential for relatively high load reductions, but their estimates are also the most uncertain.

Well-targeted cleanups will be necessary as well. Collaboration with law enforcement and local communities to address the nonpoint source loads is going to be particularly important, based on the estimated percent reductions described in Table 3-2.

Table 3.2 Summary of Program Enhancement Opportunities and Estimated Reductions Possible from Gap Analysis

Category	Suggested Enhancement	Estimated Point Source Load Reduction	Estimated Non-Point Source Load Reduction	Predicted Pounds Removed if implemented (lb/yr)
Source Control	Education program in every school	2%	0%	5,690
	Signage at 55 dumping sites	0%	17%	61,600 lb
	Increased litter law enforcement and billboards	Unk	Unk	Unk
	Disposable bag fee	16%	0%	60,400
	Bottle refund	22%	0%	69,400
Cleanups	Clean 20 additional sites	10%	0%	32,000
	Continue In-Stream Cleanup Events	40%	0%	140,475
Street Sweeping	Double County efforts	0.4%	0%	1,400
	Evaluate recommended sweeping locations from ARP	Unk	Unk	Unk
	Collect empirical data to see if increased sweeping would help	Unk	Unk	Unk
Structural BMPs	Stormwater BMP retrofits	Unk	Unk	Unk
	Additional trash screen at a pumping station	4%	0%	11,300

Unk – Unknown, percentage reduction has not been fully documented for these suggested enhancements.
All values in tables are the maximum predicted amount of trash that may be removed for the enhanced program. MDE may not approve the maximum value as stated and therefore a discounted value may be calculated in later sections to obtain approval.

CHAPTER 4: POTENTIAL ANACOSTIA RIVER WATERSHED TRASH TMDL PROGRAMS

Eleven programs were analyzed as potential opportunities to reduce or prevent littering within the watershed. Some programs indicate a higher success rate at cleaning up litter in the short-term, while other programs are aimed at long-term behavioral and educational changes. These 11 programs include: 1) in-stream cleanups; 2) illegal dumping signage; 3) educational campaigns in schools; 4) training and enforcement of county officials; 5) community outreach campaigns; 6) virtual outreach campaigns; 7) signage on buses, trucks, and billboards; 8) storm drain stenciling; 9) increased street sweeping; 10) installation of Bandalong™ BMPs; and 11) installation of FlashCAM cameras. Programs were evaluated by their estimated effectiveness in reducing or removing trash from the watershed. Planning level cost estimates were developed, which include the estimated cost to initiate the program and implement it for a 1-year period.

To be most successful, a variety of programs should be instituted to increase awareness visually (e.g., logo and slogan used on signage), physically (e.g., stream cleanups and street sweepers), and morally/educationally (e.g., outreach campaigns) to show all community members the negative effects of littering not only on the environment but also on human health and recreation. Additionally, the 2014 NPDES permit requires that education programs must be instituted as well as source control and innovative measures (MDE 2014). Fact sheets summarizing each of the programs presented below can be found in Appendix C.

Additionally, some of the programs evaluated collect both point source trash conveyed through the MS4, and nonpoint source trash. A discount factor was applied to these programs to estimate the amount of trash that could be credited toward the MS4 permit requirement of reducing 170,628 lb/yr of floatables and debris conveyed through the MS4. This ratio of MS4 trash to total trash was computed as the ratio of the TMDL's MS4 WLA to total trash as follows:

$$\textit{Portion of Total Trash Attributed to MS4} = \frac{\text{MS4 WL}A}{WLA + LA} = \frac{170{,}628 + 113{,}578}{662{,}013} = 43\%$$

4.1 Stream Cleanups

Trash cleanup programs are a very effective way of eliminating litter and removing it directly from the watershed using volunteer and community service hours. While it is important to eliminate litter at the source, it is just as important to clean portions of the watershed to promote a healthy, beautiful, litter free area. It has been shown that littering signs are not effective unless the area around the sign is clean of litter and debris, so the same attitude is expected for general County land and an anti-littering campaign (CAPCOG 2010). Therefore it is important to enhance all locations across the watershed by clearing the areas of litter. The key goals of continuing the 26 in-stream cleanup and new cleanup programs are to educate volunteers on the effects of litter (instituting an attitude change such that the sight of litter is repulsive), and prove to individuals that it is easier to initially dispose of trash correctly than to have to clean up litter later due to its effects. This program will target County residents, children and teens, community organizations, and individuals looking to volunteer their time to create a more aesthetically pleasing community.

Estimated Trash Removal

The EA Survey (2013) indicates that there were approximately 65 reported trash cleanup events across the watershed. Of these 65 events, 26 were instream cleanups within the banks of the stream and surrounding park land. Due to these cleanups occurring downstream of the end-of-pipe location (where the TMDL loading rates were determined) the pounds removed through these events can be counted toward meeting the MS4 permit and Trash TMDL. It has been assumed that for each year, the same cleanups occur and remove a similar amount of trash. From these 26 events, there were approximately 140,475 lb/yr of total trash removed from the system. Because the total trash removed consisted of both point source trash (floatables and debris) and nonpoint source trash, the 140,475 lb/yr was multiplied by the ratio of MS4 trash to total trash to obtain the MS4 portion of trash removed.

$$MS4\ Trash\ Removed = 140{,}475\ lb/yr \times 43\% = 60{,}404\ lb/yr$$

Therefore, the amount of trash removed from stream cleanups that could be credited toward the MS4 reduction goal is estimated to be 60,404 lb/yr.

Program Costs

Existing cleanups were shown to be relatively cost effective (Section 2.2.1), as they rely on volunteer hours and time. While some time, money, and effort is put into organizing the initial events, a similar plan can be used in subsequent years saving time and resources. Using survey costs provided in the EA survey (2013), the budget necessary to continue these 26 programs is estimated be $33,400 per year. Therefore this program will cost $0.55/pound removed due to many volunteer hours and organizations being used to execute the program.

Program Implementation

To institute this program, the 26 cleanup programs noted in Appendix A, Table A-3 should be continued; which will remove an estimated 60,404 lb of trash annually from the watershed. Additionally, any new trash cleanup programs (either within the stream or non-stream area) can be counted as long as the cleanup was not occurring prior to the 2010 TMDL determination survey. Should one of the 26 existing cleanup events be discontinued (or found to remove less poundage), another event should be started in its place to continue to collect the 60,404 lb total.

To have a successful cleanup program, the County should continue to nurture the existing partnerships with county and state park staff, municipalities, AWS, AFF, and other non-profit organizations. The County would also benefit from developing new partnerships with community organizations, after school programs, faith based organizations, and neighborhood and homeowner associations to get them involved in cleanup events to benefit the community.

Measurements of Success

To determine the success of this program, a quantitative measurement of the trash picked up will need to be completed and recorded with the County. A cleanup program can either weigh or count the number of trash bags collected and report this information to the County. The average weight of one 30 gallon trash bag is 25 lb (Appendix A, Table A-2). The County will then be better able to record and take credit for the value in the database which will calculate the pounds of trash removed over the course of the year.

4.2 Illegal Dumping Signage

Illegal dumping occurs when individuals do not know how to properly discard materials, or don't want to pay for tipping fees to dispose of items. It also can occur when items are turned away from a transfer station for being too "bulky". Instead of taking the items to a landfill, individuals find a location that they consider to be hidden and dispose of the items. To combat illegal dumping, the following program should be instituted. ARP identified 55 hotspot locations where signage should be installed (Figure 3.3). At each site the area must initially be cleaned, as litter breeds more litter; meaning an individual that is illegally dumping is more likely to dump items where other items have already been dumped (CAPCOG 2010). After cleaning up sites, signage should be installed. The signage needs to have the County's anti-littering slogan, a significant but not unreasonable fine, and information where the individual can legally dispose of their unwanted materials. These 55 ARP identified sites can be used for the first year as signage installation locations, but in subsequent years different sites would need to be researched based upon calls to the 311 hotline or reports on the website. Additionally, the cleanup sites in Figure 3.4 could benefit from signage installation in subsequent years.

Estimated Trash Removal

CAPCOG (2010) found that illegal dumping signs are approximately 70% effective as long as the site is cleaned prior to installation of the sign. ARP has identified 55 hotspots in which signage would be a successful way to better manage illegal dumping in the Anacostia Watershed. The average cleanup event in the County reported in the EA Survey was 1,600 lb of total trash (point source + nonpoint source). Therefore, as stated in Section 3.3.1, it is estimated that installation of illegal dumping signs at the 55 ARP sites could eliminate 61,600 lb of total trash each year. Due to some dumped items being classified as nonpoint source items, the 43% ratio of MS4 trash to bulk trash was applied to estimate the MS4 portion of trash removed. With this adjustment, a total of 26,488 pounds of liter could be removed from the watershed. Furthermore, the first year of initiating this program could clean up approximately 80,080 lb of total trash (34,434 lb MS4 trash) due to removing existing bulk trash from the site prior to installation of the signage.

Program Costs

Program costs were determined through cost estimation of production of 55 signs, installation of signs, cleanup of sites prior to installation, and measuring success (Appendix C). From this calculation it was estimated that the illegal dumping signage program would cost $52,710, which equates to $1.99 per pound of trash removed from the watershed.

Program Implementation

To implement a successful illegal dumping signage program the sites need to initially be cleaned and signage needs to be posted. With the help of volunteers, inmate cleanups, and volunteer cleanups, the costs for cleaning of sites can be minimized. Additionally, signage used should include the County's anti-litter slogan as well as bright colors to attract the attention of those illegally dumping. It is important to continue to nurture existing programs with Recycling Services, Waste Management Division, non-profit organizations, County Police, and Inmate Cleanup Groups. It would also be beneficial to develop a relationship with Neighborhood/Homeowner Associations near the dumping sites.

Measurements of Success

To measure the success of illegal dumping signs, the sites should be monitored twice per year. If sites continue to be used as a disposal location they should be cleaned as soon as possible to reduce the likelihood of additional disposal, and other deterrents (e.g., cameras) could be installed to catch those illegally dumping.

4.3 Education Campaigns in Schools

Education programs are one of the most effective ways to train young members of the communities about the consequences of littering. Several organizations already have strong educational campaigns in the County, and part of this implementation plan relies on support of these current programs. Education programs help to inform the entire community of the value of cleaning up litter, and how litter prevention is easier to implement than clean up. A strong message reiterating that allowing trash to accumulate can personify unhealthy conditions and create a negative public image will also support the idea that litter cleanup creates a more beautiful, vibrant, and economically sustainable community. To implement education campaigns throughout the watershed, schools should utilize AFF's 8 steps to becoming a Trash Free School to sign the pledge and work towards being recognized as a trash free school. Through the "green teams", creation of a school action plan, incorporating information into school curricula and participation in after school groups and events the schools can educate children of all ages K-12.

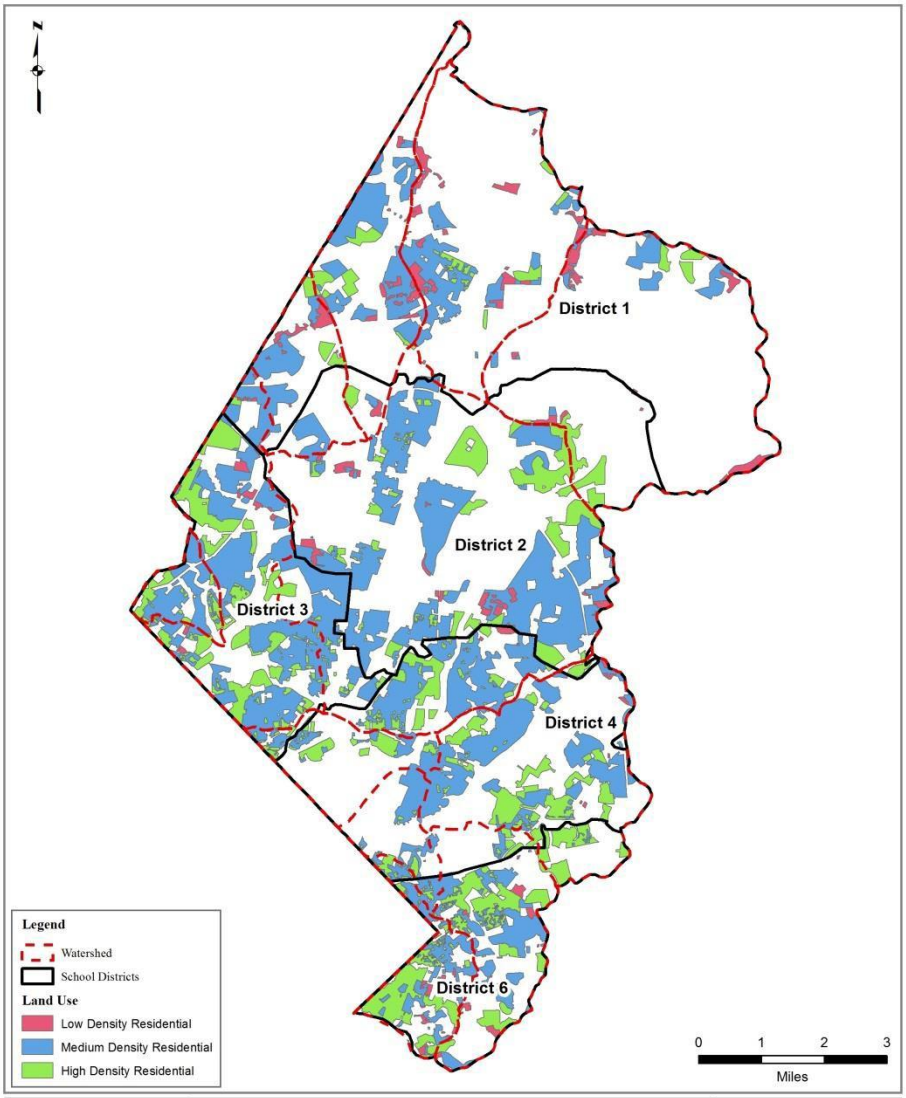

Figure 4.1 Residential Areas within School Districts in the Anacostia Watershed

Estimated Trash Removal

To estimate the trash removal resulting from education programs within the watershed, the program efficiency (12%) was calculated using the awareness, effectiveness, and willingness to participate percentages reported for anti-littering educational programs in Montgomery County (Biohabitats 2012). The total number of schools in each District within the watershed were counted and overlaid with the type of residential land use (low, medium, high) to estimate the percentages of the population who may be reached by education programs (Figure 4.1). Using this method, it was determined that 17,850 lb/yr of trash could be removed from residential areas if 50% of the schools participated in some type of anti-littering campaign either utilizing AFF's Trash Free Schools or similar proven technique. The details of these calculations are listed in Table 4.1.

Program Costs

Using estimates derived from similar County and non-profit programs implemented in Maryland, the yearly cost for supporting education campaigns in school districts throughout the watershed was estimated at $25,400/yr (Appendix C). This cost include administrative pre-planning fees, identification of target education and outreach collaborators, development and printing of supplemental material highlighting the County's mission, preparation of a pre/post survey to be used as part of educational activities, visits to a select number of schools each year, and the measurement of program success. When the anticipated amount of trash removed each year from this program was taken into consideration as part of the cost, it was estimated that supporting Education Campaigns in Schools would cost $1.42 per pound of trash removed (Appendix C).

Program Implementation

Since there are already education programs within the County, particularly through the non-profit AFF, it is recommended that the County partner with this organization and utilize their pre-made materials. By providing assistance in the form of materials, pre/post survey, some level of funding, and assistance at school events throughout the year, the County will help accelerate the success of these programs. It would also be beneficial for the County to develop education campaigns targeted to youth organizations, faith-based groups, and homeowner associations.

Measurements of Success

Program deliverables include providing additional material (posters, banners, etc.) to established education programs, a pre/post survey that can be distributed through the programs with results reported by to the County, and visits to a select number of schools each year. Direct metrics that can be monitored and used to evaluate program success include direct changes in behavior as reported on the surveys, a marked change in the number of citations issued and violations reported through the website, and an increase in the number of volunteers at cleanup days.

4.4 Training and Enforcement

The success of trash removal programs can be enhanced by targeted enforcement. While an increase in citations may not directly lead to revenue for waste managers, public awareness about anti-littering campaigns does change when citations are regularly issued (National Research Council 2009). The purpose of a training and enforcement program is to increase emphasis on the existing legal system for littering and illegal dumping violations through a strong enforcement message. With the knowledge that littering offenses will be enforced, illegal dumping is unacceptable, and trash dumpsters need proper management, a strong enforcement message will help discourage unacceptable behaviors.

Estimated Trash Removal

To estimate the trash removal within the watershed, the program efficiency (20%) was calculated using the awareness, effectiveness, and willingness to participate percentages reported for similar programs that use training and enforcement as part of their overall anti-littering campaign. Based upon this information, it was determined that 61,400 lb/yr of trash could be removed from residential, commercial, and institutional land within the watershed

through increased enforcement and proper training for the appropriate audience. The details of this calculation and relevant resources are listed on Table 4.1.

Program Costs

Using estimates derived from similar programs implemented in other Maryland counties, the cost for training and enforcement program was estimated to be $94,500/yr (Appendix C). This cost includes administrative pre-planning fees, coordination with relevant regulatory agencies and stakeholders, development of training materials (presentations, handouts, etc.), review of an electronic trash violation reporting form, training sessions for County and state employees, an increase in County staff (either one full-time or two part-time employees), and the measurement of program success. When the anticipated amount of trash removed each year from this program was taken into consideration as part of the cost, it was estimated that a training and enforcement program would cost $1.54 per pound of trash removed (Appendix C)

Program Implementation

The appropriate target audience needs to be identified and should include police officers, waste management employees, County and state park staff, and educators or outreach coordinators who could also serve as Litter Wardens for the respective programs. It would also be beneficial for the program to include private trash hauling companies, recycling services, and non-profit organizations that directly support waste removal. Youth organizations, faith-based groups, and homeowner associations could also benefit from a comprehensive enforcement message that could be reiterated to a wider audience.

Measurements of Success

Program deliverables include enforcement staff that are aware and familiar with the County's regulations and stance on littering and public dumping, one new employee (or two part-time employees) to focus on citation record keeping, an electronic trash violation reporting form available in the County's anti-littering campaign website, and increased revenue and/or occurrences of littering citations. Direct metrics that can be monitored and used to evaluate program success through changes in behavior include the number of citations issued, the rate of issuance of those citations over time, and the number of second offenders.

4.5 Community Outreach

The goal of community outreach campaigns is to effect changes in behavior such that individuals find it unacceptable to litter. Campaigns that educate in the proper disposal of trash at the source, and informing residents that littering laws will be enforced serve to strengthen the success of a public campaign and support anti-littering effectiveness. Although the messages are similar to a virtual outreach campaign (see Section 4.6), this type of campaign focuses heavily on printed material and personal interactions at community events.

Estimated Trash Removal

To estimate the trash removal expected from community outreach programs within the watershed, the program efficiency (11%) was calculated using the awareness, effectiveness, and willingness to participate percentages reported for similar programs that utilized components of the community outreach programs recommended here as part of their overall anti-littering campaign. Focusing on the residential areas within the watershed, it was

determined that 30,680 lb/yr of trash could be removed. The details of these calculations are listed in Table 4.1.

Program Costs

Using estimates derived from similar programs developed in other Maryland counties, and research on current costs associated with advertising and marketing, the yearly cost for supporting a community outreach campaign was estimated at $56,000 (Appendix C). This cost includes administrative pre-planning fees, identification of target list of community events and festivals, design of a campaign logo and slogan, design and translation of all material, attendance at 15 community events per year, and the measurement of success. When the anticipated amount of trash removed each year from this program was taken into consideration, it was estimated that a community outreach campaign would cost $1.83 per pound of trash removed per year (Appendix C).

Program Implementation

Community outreach programs in the County will target watershed residents of every age, those neighboring illegal dumping "hotspots", those who use trash receptacles, and community organizations. By effectively communicating the County's stance on littering through a dedicated marketing campaign that crosses over several of the proposed programs, the efficiency and success will increase. It is also recommended that the County develops new partnerships with the Chambers of Commerce, youth organizations and faith-based groups, homeowner associations, and the County Police Department to disseminate their message.

Measurements of Success

Program deliverables include the development of an anti-littering campaign logo and slogan, attendance at community events and festivals, multi-language fact sheets, brochures, and posters, and trash receptacle wrap around posters that will be distributed to high and medium residential areas throughout the watershed. Direct metrics that can be monitored and used to evaluate program success include a marked change in the number of citations issued and violations reported through the website, an increase in the number of volunteers at cleanup days, and improvement on attitude surveys.

4.6 Electronic/Virtual Outreach

The goal of a virtual outreach campaign is to create a visible online presence that will encourage behavior change which results in less litter in streams and more public participation in the County's anti-littering efforts. Electronic messages that involve taking care of trash at the source, letting residents know that littering laws will be enforced, and allowing trash to accumulate personifies negative public images, will strengthen the success of a virtual campaign and support anti-littering effectiveness. Although the messages are similar to the community outreach campaign mentioned above, this type of campaign focuses heavily on website, email, TV, radio, and cinema advertising to relay the County's goal of reducing trash within the watershed.

Estimated Trash Removal

To estimate the trash removal expected from virtual outreach programs within the watershed, the program efficiency (12 %) was calculated using the awareness, effectiveness, and

willingness to participate percentages reported for similar programs that used components of the recommended virtual outreach program as part of their overall anti-littering campaign. Focusing on the residential areas within the watershed, it was determined that 34,300 lb of trash could be removed each year. The details of these calculations are listed in Table 4.1.

Program Costs

Using estimates derived from similar programs developed in other Maryland counties, and research on current costs associated with advertising and marketing, the yearly cost for supporting a virtual outreach campaign was estimated at $85,350 (Appendix C). This cost includes administrative pre-planning fees; development and dissemination of an electronic distribution list; design and development of multi-language virtual materials (TV, radio, cinema advertisements and PSAs); design, development, and troubleshooting of a new County website dedicated to the broader anti-littering campaign (that includes online trash violation reporting form); and the measurement of success. When the anticipated amount of trash removed each year from this program was taken into consideration, it was estimated that a virtual outreach campaign would cost $2.49 per pound of trash removed per year (Appendix C).

Program Implementation

Virtual outreach programs in the County will target watershed residents of every age, those neighboring illegal dumping "hotspots", those who use trash receptacles, and community organizations. By effectively communicating the County's stance on littering through a dedicated marketing campaign that crosses over several of the proposed programs, the efficiency and success will increase. It is also recommended that the County develops new partnerships with the Business Districts and Chambers of Commerce, youth organizations and faith-based groups, homeowner associations, and the County Police Department to disseminate their message. Since businesses provide the original point-of-sale for much of the trash that ultimately ends up in the Anacostia River, the County should consider an outreach campaign to educate businesses in liter control and prevention. Outreach campaigns ought to be tailored to specific focus groups in order to develop campaign materials suitable to the intended audience.

Measurements of Success

Program deliverables include the development of electronic newsletters and email blasts, a dedicated website for the County's anti-littering campaign, an online reporting form for litter violations on the website, multi-language advertising material, virtual programs (PSAs, social media, etc.) that take advantage of the current trends, and a list serve that can be used for County notifications of upcoming programs and activities. Direct metrics that can be monitored and used to evaluate program success include the number of website hits each month, a marked change in the number of citations issued and violations reported through the website, an increase in the number of volunteers at cleanup days, and improvement on attitude surveys.

4.7 Signage (Billboards, Buses, Bus Shelters, Trucks)

Signage on buses, bus shelters, trucks and billboards should be instituted to provide another reminder to individuals about the adverse effects of littering. This program includes the installation of 25 county bus shelter signs, posting of anti-litter advertisements inside and outside of buses, 15 large advertisements on the sides of solid waste trucks, and 5 anti-littering billboards. To be most effective these would be placed in hotspots around the watershed and on highly commuted roadways. These varying types of signage are linked together in one program

because the more frequent an individual passes by signage, the greater the chance for the ideas to become engrained and for a behavioral change to occur.

Estimated Trash Removal

To estimate the trash removal within the watershed a calculation which included awareness, effectiveness, and willingness to participate was used to determine the program efficiency of bus signage, solid waste truck signage, and billboards; calculated as 7.5%, 7.5%, and 8.3% respectively (Table 4.1). These efficiencies were then multiplied by the corresponding acreage and loading rate for the typical location where the signage would be implemented, and in total it was determined that 69,000 lb/yr of trash could be removed from the watershed.

Program Costs

Other counties within Maryland have recently instituted similar signage campaigns to reduce litter, so similar costs were determined for this program. The total cost to institute all signage is $172,550/yr. This equates to $2.50 per pound of trash removed from the watershed. Since these signs can be implemented individually, costs per pound were computed separately for each signage type was instituted (Appendix C). It is important to implement as many signs in as many varying places as possible to have a successful program.

Program Implementation

To institute this program, it will first be necessary to create and print posters with the campaign slogan and logos. These slogans should include the litter logo and slogan produced in the community outreach program. To have continued success with this program it is important to nurture the existing partnerships with the Department of Transportation, municipalities, especially those in hotspots indicated by the ARP (USACE et al. 2010a) study, non-profit organizations, and the Waste Management Division. It would also be beneficial to the program to develop partnerships with sports franchises, county bus drivers, and neighborhood or homeowner associations to assist in supporting the County's anti-littering messaging.

Measurements of Success

To measure the success of this program, yearly windshield surveys will need to be completed by County employees to note if there is a decreased amount of trash in the areas where the signs were placed. Additionally, an increase in volunteers at cleanup days can be indicative of a successful signage program—as people are more likely to volunteer as they begin to place greater priority on their community's appearance. Finally, an increase in trash disposed in receptacles at bus shelters can also be seen as measure of success.

4.8 Storm Drain Stenciling

Storm drains are spread throughout the watershed, but many individuals pass by them and do not notice them. Storm drains serve to remove rainwater off streets and parking lots, and convey it through the MS4 to streams and rivers. Unfortunately, stormwater runoff entering a storm drain also carries trash that has been disposed in or near the storm drain. The Storm Drain Stenciling Notebook (Banks, no date provided) discusses the hazards of dumping waste materials into or near storm drains. Storm drain stenciling provides a frequent reminder that storm drains do not convey to a water treatment plan, but rather drain directly to local streams and rivers. Currently, all new drains within the county must be stenciled when constructed. The

educational benefits of stenciling the drain are important as it teaches children, teens, and adults that anything they see going into a storm drain ultimately ends up in the tributaries to the Chesapeake Bay.

Estimated Trash Removal

The percent effectiveness of storm drain stenciling was calculated as the product of awareness (40%), effectiveness (30%), and willingness to participate (60%) (Table 4.1).

Percent Effectiveness = 40% x 30% x 60% = 7%

It was assumed that storm drains servicing approximately 10% of the residential land use could be stenciled per year, so the total program efficiency was then estimated as

Total Program Efficiency = 10% x Percent Effectiveness = 10% x 7% = 0.7%

Program Costs

Program costs were determined based on material costs, and all labor hours were assumed to be volunteer hours. The cost calculation also included the time and effort to produce a survey and distribute it as a metric of success. Therefore, the cost to stencil 500 drains was estimated to be $6,250 or $3.29/lb (Appendix C).

Program Implementation

To implement this program the necessary paints and stencils need to be purchased. The program would also need to be advertised via the anti-littering website or other means so that community groups and organizations know about the possibility of using storm drain stenciling as a volunteer event. Also, a pre-stenciling baseline survey should be produced and sent to individuals who live in the Anacostia watershed to determine where the County is starting from and how success can be measured in the future. This survey can also help to locate areas which need to be stenciled in the first year, based on whether or not particular communities and residents of the watershed are less familiar about storm drains and their conveyances than other residents of the watershed. For this program to be a success, existing partnerships with MNCPPC, municipalities, non-profit organizations, and community organizations should be nurtured. Additional partnerships should be formed with groups such as community organizations, faith-based organizations, schools, additional non-profits, and schools.

Measurements of Success

Success of this program will be determined by behavioral, educational, and physical changes in littering habits after a year of stencils have been in place, as noted through a survey. By having a baseline survey it is possible to know how the storm drain stenciling program has helped to decrease littering and increase awareness in the community.

4.9 Street Sweeping

The County allows municipalities to institute their own sweeping program. While some municipalities within the watershed indicated that they have a street sweeping program, most do not. Also, some of the larger hotspot municipalities (such as Capital Heights) do not have a street sweeper. As reported in the survey, Greenbelt, College Park, Berywn Heights and New

Carrolton share a street sweeper that rotates sweeping of each municipality, ultimately sweeping specified areas of each municipality six times per year. Using this approach, the County could help four more municipalities institute a street sweeping program. If possible, this could be instituted in the larger, more populated municipalities with higher littering rates (as noted by the hot spot map in Figure 3.3), or in more than four smaller municipalities.

Estimated Trash Removal

The estimated trash removal calculation presented in Section 2.5.3 was not used here, and instead current tipping fees spent on street sweeper disposal for College Park (provided in the EA survey) were used to calculate the efficiency of the program. This is because the potential County program will mimic that of the street sweeping program described in the EA survey. Using this value, and knowing that the tipping at a nearby landfill is $59/ton (MDE 2012), the number of tons disposed of by the street sweeper in College Park was calculated. Since there are four municipalities which could use the same street sweeper, this value was multiplied by four resulting in an estimate of 21,400 lb/yr of trash that could be removed from the watershed with the addition of a street sweeper program.

Program Costs

Street sweeping programs have a large initial investment due to the cost of street sweeping equipment. The program also has a yearly labor and maintenance cost which must be factored in. All costs given by College Park were multiplied by four to determine the total cost of instituting the street sweeper program. Assuming a 20 year useful life for a street sweeper, the average annual cost of the program is estimated to be $85,000 or approximately $3.97 per pound of trash removed.

Program Implementation

To institute this program, County staff will need to determine the best municipalities and route for implementation. Four larger municipalities should be chosen or more than four smaller ones (so that the approximate size of the area swept and population density is similar to the four municipalities which already have a program). Additionally, by looking at the street sweeping map (Figure 3.5), hot spot locations or locations where no street sweeping currently occurs should be chosen. For example, currently no street sweeping occurs in the northern portion of the watershed, so if possible, municipalities in this area could be chosen. It is important that a long-term agreement is made between the municipalities and the County as to the frequency of sweeping and the payment for having street sweeping services occur (whether the municipalities pay for 100% of the program or if the County helps to support the program). For a successful street sweeping program, it is important to nurture the existing partnerships with the Department of Transportation and the Waste Management Division, as well as existing relationships with municipalities. It will also be important to assist in a new partnership amongst the municipalities chosen for the street sweeper program.

Measurements of Success

The amount of trash collected by the street sweepers can be quantified by keeping track of tipping fees in a database. Through the use of this database, the tipping fees can be equated to pounds removed and therefore the success rate of the street sweeping program can be determined. This program should result in a reduction of trash found on County roads and highways, which general attitude surveys suggest would provide residents a sense of pride in their community leading to a reduction in littering.

4.10 FlashCAM Camera Installation

Similar to Baltimore City's illegal dumping cameras, the County could consider instituting an illegal dumping camera program. This program involves purchasing solar powered FlashCAM cameras. These work by placing them at a reported site (determined from hotline complaints). The cameras are portable, so if the site becomes inactive it can be moved to another location. The cameras begin recording when it detects movement. If an individual drives a vehicle to the site to dump, the camera can capture the entire act including the license plate and the individual dumping. This footage can then be observed and used to convict someone of illegal dumping. In Maryland the maximum fine is $30,000 and/or 5 years in jail (Section 2.1.3).

Estimated Trash Removal

It was reported that in 2013, Baltimore City had 41 convictions from its 26 cameras (WMAR 2014). It was assumed that the illegal dumping site would have the same pounds disposed of as at the illegal dumping sites for signage (Section 4.2). Therefore, it was determined that 65,600 lb/yr of total trash (i.e., point source and nonpoint source) could be eliminated from illegal dumping sites due to the installation of 26 cameras. As described in Section 4, the estimated MS4 portion is therefore 43% of the total trash or 28,208 lb/yr of trash could be removed from the watershed.

Program Costs

The cost for installing FlashCAM cameras includes funding, hiring a full time employee (to determine placement of cameras, to move cameras throughout the County, and to review footage captured), purchasing the cameras, and measuring success. If 26 cameras were purchased, similar to that of Baltimore City, the program would cost $383,250 for the first year of operation, but would presumably be reduced greatly thereafter as the cameras would not have to be replaced annually. Assuming a 5 year useful life for a camera and an annual maintenance cost of 10% of the purchase cost 10%, the average annual cost of the program is estimated to be $140,000 or approximately $5.00 per pound of trash removed.

Program Implementation

To implement this program the number of cameras would initially have to be determined using the budget or the number of known sites within the county based upon hotline complaints. The program could also be based on the success of the illegal dumping signage program; cameras could be installed at sites that continue to be used as illegal dumping grounds. The cameras will then need to be purchased and installed, and an employee will need to review the footage captured on the camera. It will be important for success of this program to continue developing relationships with law enforcement officials and telephone hotline workers. It will also be

important to develop positive working relationships with individuals in the County that report the illegal dumping sites, or individuals who live near these illegal dumping sites.

Measurements of Success

The number of convictions based upon camera footage will determine the success of the program. When a conviction occurs it should be documented in the database so that at the end of the year the number of illegal dumping convictions attributed to the FlashCAM program can be determined.

4.11 Structural BMPs

Structural BMPs are devices that are placed in rivers to capture litter and debris flowing downstream to the inlet of the device. The County's trash traps mentioned in Section 2.5.4 were removed from the watershed due to high maintenance cost. However the District of Columbia has reported success with Bandalong™ capture devices; and therefore, Bandalong™ capture devices were investigated for this Implementation Plan. Bandalong™ trash capture devices funnel the trash and debris into a single area where it sits until it is cleaned out manually. Depending upon the season, the trash to debris ratio that is captured can vary but the responses to the EA Survey (2013) indicate that over 50% of collected matter is organic and non-litter. Therefore when a trash capture device is cleaned out, the organic matter (leaves, sticks, etc.) must be separated to get an accurate weight of how much trash was captured by the device.

Estimated Trash Removal

The District of Columbia has two Bandalong™ capture devices mentioned in Section 3.3.4. The two devices combined collected 7,883 lb of trash in 2012 (DDOE 2013). Therefore the installation of one capture device would remove approximately 3,940 lb/yr of trash from the watershed**.**

Program Costs

Program costs for installing a Bandalong™ trash capture device include the cost of determining the best location to place the BMP, purchasing and installing the trash BMP, placement of a sign near the BMP to inform residents of the device, and cleanout and maintenance of the device. Assuming a 10 year useful life for a Bandalong™ trash trap, the average annual cost of purchasing, installing, and maintaining a Bandalong™ trash capture device is estimated to be $53,000 over the 10 year period. This equates to $13.45 per pound of trash removed. A major factor in the cost (other than the initial purchasing) is the maintenance and cleanout of the BMP. This part of the program could potentially be reduced if volunteers or school groups cleaned out the devices instead of a hired employee.

Program Implementation

To implement this program the County will need to decide the best location to install the device. Once a location has been determined, a device must be purchased and a contractor will need to install the device as well as informational signage. Finally, a schedule for regular cleanout and maintenance will need to be determined and followed. To potentially reduce cost of cleanout as well as to implement this project, partnerships with after school programs, MNCPPC, Municipalities, and non-profits should be fostered. Additionally, new partnerships could be

developed with community organizations, faith-based organizations, and any additional non-profits.

Measurements of Success

The success of this program can be determined by weighing the trash that is removed from the device and keeping a record of what all is removed. This will involve separating organic matter and debris (e.g.; leaves, sticks) from the trash captured.

Table 4.1 Summary of Anti-Littering Program Efficiency Calculations for Prince George's County Trash Implementation Plan

Program	Planning Level Cost ($/yr)[a]	Trash Removed per Year (lb)[b]	Program Awareness (%)*	Program Effectiveness (%)*	Willingness to Participate (%)[c]	Total Program Efficiency (%)[d]	Land Use Type/ Location	References
Stream Cleanups*	$33,400	60,404[e,f]	--	--	--	--	Current In-Stream Cleanup	EA Survey (2013)
No Dumping Signage Installation*	$52,710	61,600[f]	--	--	--	70	55 hotspot locations	CAPCOG (2010); Biohabitats (2012); safetysign.com (2014)
Education Campaign In Schools	$25,400	17,850	50	40	60	12	Residential	Biohabitats (2012)
Training and Enforcement	$94,500	61,400	71	48	60	20	Residential, Commercial, Industrial, Institutional	National Research Council (2009); Belfast City Council (2008); Biohabitats (2012); Brook Lyndhurst (nd)
Community Outreach Campaign	$56,000	30,680	56	33	60	11	Residential	Sharp Hartwig Inc. (2001); Hansmann and Scholz (2003); Gershman Brickner & Bratton, Inc. (2005); Sustainability Victoria (2007); Belfast City Council (2008); Biohabitats (2012); Brook Lyndhurst (nd)
Virtual Outreach Campaign	$85,350	34,300	69	30	60	12	Residential	Sharp Hartwig Inc. (2001); ENCAMS (2008); Sustainability Victoria (2007); Keep Scotland Beautiful (2008); National Research Council (2009); Biohabitats (2012); Brook Lyndhurst (nd)
Bus Shelters and In/On Bus Signs	$172,550	69,000	53	23	60	7	Residential, Commercial, Industrial, Institutional	Brook Lyndhurst (nd); ENCAMS (2008), Belfast City Council (2008); Sibley, C. & Liu, J. (2003); Sustainability Victoria (2007); Too Lovely to Litter (2011); Biohabitats (2012)
Solid Waste Truck Signage			59	21	60	8	Residential	Biohabitats (2012); Brook Lyndhurst (nd); ENCAMS (2008), Trivision (2003), Belfast City County (2008); Sibley, C. & Liu, J. (2003); Gerard Prendergast (1999)
Billboards			59	21	60	8	Residential, Commercial, Industrial,	Biohabitats (2012); Brook Lyndhurst (nd); ENCAMS (2008), Trivision (2003), Belfast City County (2008);

Table 4.1 Summary of Anti-Littering Program Efficiency Calculations for Prince George's County Trash Implementation Plan

Program	Planning Level Cost ($/yr)[a]	Trash Removed per Year (lb)[b]	Program Awareness (%)*	Program Effectiveness (%)*	Willingness to Participate (%)[c]	Total Program Efficiency (%)[d]	Land Use Type/ Location	References
							Institutional	Sibley, C. & Liu, J. (2003); Gerard Prendergast (1999)
Storm Drain Stenciling	$6,250	1,900	40	30	60	0.7[g]	Residential	Biohabitats (2012); Banks (nd); Parker (1999)
FlashCAM Camera Installation*	$140,000	65,600[f,h]	--	--	--	---	Based upon convictions in nearby county	WMAR (2014)
Street Sweeping	$85,000[i]	21,400[j]	--	--	--	--	Municipalities where new sweeper instituted	EA Survey (2013)
Structural BMPs	$53,000	3,940[k]	--	--	--	--	River location	CAPCOG (2010); Biohabitats (2012), District Department of the Environment Stormwater Management Division (2014)

* Program Awareness and Program Effectiveness values were calculated when multiple values were available in the literature (average of literature values)

[a] Planning level cost associated with program development and implementation. Costs for the FlashCam, street sweeping, and structural BMPs include start-up costs that are averaged over the useful life of the program.

[b] Trash reduction computation based on land-use based loads from the Final TMDL of trash for the Anacostia River Watershed (MDE and DDOE 2010), and multiplied by the total program efficiency.

[c] Willingness to Participate (60%) percentage obtained from the approach used for education programs in the Montgomery County Implementation Plan (Biohabitats 2012)

[d] Total program Efficiency calculated as (% Awareness * % Effectiveness * % Willingness to Participate)

[e] Assumes that the same weights removed from the watershed in 2012-2013 reported in EA Survey (2013) will be removed if same programs are continued

[f] Trash reduction discounted by an additional 43% to reflect capture of nonpoint source trash as described in Section 4.

[g] Assumes that approximately 500 storm drains are stenciled draining approximately 10% of the residential land use drainage area within the watershed

[h] Calculation determined from number of convictions per camera for the year of 2013 in Baltimore City

[i] Planning level cost for street sweeping includes a one-time cost for purchasing a sweeper truck and program implementation for 1 year. Recurring costs following the first year of program implementation are estimated to be approximately $70,000/year. The average cost over an assumed 20 year useful life is approximately $85,000.

[j] From the EA Survey (2013) the tipping fees that current street sweeping programs were enduring were used to determine the amount of trash removed. Assumes the same amount will be removed by instituting same program in 4 more municipalities.

[k] Assumes the same amount of trash can be removed from a trash capture device in the Anacostia River as that mentioned in the DDOE report for District of Columbia

CHAPTER 5: RECOMMENDED IMPLEMENTATION PLAN

5.1 Cost Benefit Analysis

A cost benefit analysis comparison was conducted to compare the expected costs versus the expected benefits to help determine which programs would be most useful to implement to meet TMDL program requirements. This was accomplished by equating the efficiency of each potential program (pounds of trash removed each year) into a cost per pound of trash removed from the Anacostia watershed. This data set is shown in Table 5.1 below.

Table 5-1. Summary of Anti-Littering Programs Proposed in the Trash Implementation Plan for Prince George's County.

Program	Program Cost ($/yr) [1]	Total Trash Removed (lb/yr) [2]	Percent of Total Trash Attributed to MS4	MS4 Trash Removed (lb/yr)	Cost per Pound of Trash Removed ($/lb/yr)
Stream Cleanups	$33,400	140,475	43% [3]	60,404	0.55
Education Campaign In Schools	$25,400	17,850	100%	17,850	1.42
Training and Enforcement	$94,500	61,400	100%	61,400	1.54
Community Outreach Campaign	$56,000	30,680	100%	30,680	1.83
No Dumping Signage Installation	$52,710	61,600 [4]	43% [3]	26,488	1.99
Virtual Outreach Campaign	$85,350	34,300	100%	34,300	2.49
Bus, Truck, & Billboard Signage	$172,550	69,000	100%	69,000	2.50
Storm Drain Stenciling	$6,250	1,900	100%	1,900	3.29
Street Sweeping	$85,000	21,400	100%	21,400	3.97
FlashCAM Camera Installation	$140,000	65,600	43% [3]	28,208	4.96
Structural BMPs	$53,000	3,940	100%	3,940	13.45
TOTAL	**$804,160**	**508,145**		**355,570**	

[1] Planning level cost associated with program development and implementation. Costs for the FlashCam, street sweeping, and structural BMPs include start-up costs that are averaged over the useful life of the program.
[2] Trash reduction computed using land-use based loading rates obtained from the Final TMDL of Trash for the Anacostia River Watershed (MDE and DDOE 2010)
[3] Derived from ratio of MS4 WLA to Total WLA + LA (MDE 2010).
[4] Includes trash removed from initial cleanup of site, and reduction in littering (Section 4.2).

The table is sorted from the least cost per pound of trash removed to the greatest cost per pound of trash removed. From this table it can be seen that the most cost effective program by a significant margin is in-stream cleanups. However, the MS4 permit requires that source control, and education and outreach programs also are implemented (MDE 2014).

5.2 Selection of Programs

The County MS4 permit states that a work plan detailing a trash reduction program must institute ways of removing litter from "County storm drain systems and waterbodies, source control prior to entry of County storm drain system, and prevention of trash through collection, recycling, or other innovative measures" (MDE 2014). The County will use an adaptive management strategy to implement a combination of the trash reduction programs in Table 5-1 to achieve the target WLA reduction of 170,628 lb/yr by the fifth year of the permit term (2018). The County will administer the various programs so that the littered items are removed from the streets and education programs are implemented to deter future littering.

Fact Sheets on each of these programs can be found in Appendix C. It is anticipated that the implemented trash reduction programs will be initially targeted toward the hotspots noted in Figures 3.3 through 3.6. Implementation of the programs that prove to be both economically feasible and effective at reducing trash will then be expanded across the entire watershed within the County.

In addition to these implemented programs the County has passed legislation requiring landlords of multi-family housing to provide recycling pickup for residents. The County will monitor this program and include in their reports the effectiveness of the program. Pounds of trash diverted from littering will be calculated and included in the County's annual NPDES reporting.

5.3 Implementation Timeline and Milestones

The MS4 permit dictates yearly planning goals must be produced in the work plan, with the ultimate goal being that in the 5th year of the permit (2018) the implemented programs will remove 170,628 lb/yr of point source trash. The following schedule details the proposed timeline for implementing the trash reduction programs necessary for attaining the required trash reduction rate as well as target milestones in the 2nd and 4th years of the permit term.

Table 5-2. Implementation Timeline and Milestones

Year	Actions
2014	• Develop and evaluate the current trash reduction techniques within the County • Develop work plan that ensures that 170,628 lb/yr of trash will be removed annually by the fifth year of the permit (2018) • Develop a plan to account for trash reductions and begin populating data base with baseline values and pounds reduced from programs throughout the year. • Public participation process for work plan, including notification of work plan in newspaper(s) and website, 30 day comment period, and response to public comments document. • Continue all in-stream cleanups, and account for pounds removed from each cleanup event. • Identify funding and sponsorship sources and begin to secure funding for all programs • Develop and implement a public education and outreach strategy • Produce annual progress report detailing trash elimination efforts
2015	• Trash removal benchmark is 62,000 lb/yr of trash removed for the year 2015 • Ensure that stream cleanups are accounting for 60,404 pounds of trash removed and if not increase the number of cleanups • Select which additional program will be implemented during 2015/2016 and begin program development stages of those campaigns. • Produce and distribute baseline surveys for selected programs • Create applicable anti-littering campaign (slogan, logo, signs, website, etc.) to be used in selected programs • Begin initial stages of education campaign to reduce litter at its source • Update trash reduction database • Produce annual progress report detailing trash elimination efforts
2016	• Implement selected programs and track progress of programs to determine effectiveness • Update trash reduction database • Produce annual progress report detailing trash elimination efforts
2017	• The trash reduction benchmark is 125,000 lb/yr of trash removed for the year 2017 • Assess needs to meet reduction benchmark and institute appropriate programs to cover gap in existing programs • Update trash reduction database • Produce annual progress report detailing trash elimination efforts
2018	• Ensure that 170,628 lb/yr of trash is being removed from the watershed • Ensure that programs are implemented in the watershed to not only pick up litter but to reduce litter at its source • Update trash reduction database • Produce annual progress report detailing trash elimination efforts

The MS4 permit requires that benchmark trash removal values must be established for years two (2015) and four (2017). The trash removal benchmarks are 62,000 lb/yr in 2015, and 125,000 lb/yr in 2017. Based on this analysis, the 2015 benchmark will be achieved by continuing the same stream cleanups and continuing education of litter prevention that has been

initiated at Cesar Chavez Elementary and Walker Mill Middle. By implementing additional selected programs, it is expected that trash removal can be increased to 125,000 lb/yr by the end of 2017. Then, by instituting improved or additional programs, the entire 170,628 lb/yr will be attainable by the end of Year 5. It is important throughout the process to maintain records and yearly reports to ensure that program goals and the NPDES permit limits are being met and can be documented.

5.4 Additional Trash Reducing Programs to Consider

While the above implementation plan will remove over two times the amount of trash required by the MS4 permit, it does not remove the entire "baseline load" as required by the TMDL. Additional programs which have been evaluated and should be considered for future actions, (or to supplement the above implementation plan) include street sweeping, structural BMPs, FlashCAM camera systems, and legislative bills (bottle bill and plastic bag law).

As stated in Chapter 4, instituting street sweeping, structural BMP, and FlashCAM camera programs are estimated to remove an additional 53,548 lb/yr of MS4 point source trash from the watershed. Each of these programs can be instituted as stated in Chapter 4 (and Appendix C), but they can also be expanded to include sweeping more municipalities, installing more Bandalong™ trash BMPs, or installing more cameras to clean up additional trash. Each program has flexibility to be initiated at the County's discretion, allowing a project to be started when the time is appropriate and expanded in the future to collect more trash until a lasting behavioral change occurs.

Additionally, legislative action could also be taken within the County to help institute a bottle bill or a plastic bag law. As stated in the gap analysis section (Chapter 3) both of these laws have been instituted in other locations across the United States and have been proven successful. The bottle bill has made it to the Maryland House and Senate in fall 2013, but has not passed due to opposition from retailers. If the bottle bill was passed, it is estimated that approximately 69,400 lb/yr of plastic, glass bottles, and aluminum cans could be eliminated from the Anacostia watershed within the County. Similarly, the plastic bag law has also had opposition from retailers. If a plastic bag law was passed, an estimated 60,400 lb/yr of plastic bags could be eliminated from the Anacostia Watershed within the County. If both laws were passed (similar to California law) 129,800 lb/yr of trash could be eliminated from the MS4 system within the watershed.

5.5 Progress Tracking and Reporting

In a National Cooperative Highway Research Program (NCHRP) survey concerning performance measurement of roadside litter prevention programs, 60% of respondents said they have not and are not planning on conducting any evaluation study for their program (National Research Council 2009). The best way to measure the success of trash reduction programs will be achieved through monitoring specific activities. Table 5.3 highlights the recommended monitoring strategies for the proposed trash programs. While several programs can be monitored monthly, some of them would be better suited for a quarterly or bi-annual evaluation. These are the programs that rely on collecting data from collaborating public and private organizations and law enforcement agencies.

As stated in Section 3.2.2, MWCOG has been completing monitoring of trash in the Anacostia Watershed since before the TMDL. MWCOG has 15 monitoring locations in the County (Figure 3.4) in which 500 ft of stream are monitored to determine trash loading rates. An extension of

the MWCOG contract with the County is in the process of being renewed, and future trash monitoring data will be used to determine the success of the County's trash reduction programs. This monitoring is an integral part of determining how successful program implementation plan is progressing.

Table 5.3 Summary of Metrics and Frequency of Monitoring for Anti-Littering Programs Proposed in the Trash Implementation Plan for Prince George's County.

Program	No. of littering citations	No. of Litter Violations Reported through website (or 311)	Improvement on Attitude Surveys	Participation in Public Cleanup Events	Website Hits	Decrease in debris/litter at target locations*
Frequency of Monitoring	*Monthly*	*Monthly*	*Quarterly*	*Quarterly*	*Monthly*	*Bi-Annually*
Stream Cleanups				√		√
No Dumping Signage Installation		√				√
Education Campaign In Schools	√	√	√	√	√	
Training and Enforcement	√	√				
Community Outreach Campaign	√	√	√	√		
Virtual Outreach Campaign	√	√	√	√	√	
Bus, Truck, & Billboard Signage	√			√		√
Storm Drain Stenciling			√			√
FlashCAM Camera Installation	√	√				√
Street Sweeping						√
Structural BMPs						√

* Target locations include those identified in each program strategy, such as "hotspots', bus shelters, illegal dumping sites, streams, roads, and highways.

To assist with progress tracking, monitoring, and reporting of implemented programs, the County will develop a database (MS Access) linked to GIS applications. Tracked data will coincide with MS4 permit requirements and will enable easy reporting to MDE as required in the MS4 permit. It is suggested that the database be updated monthly, so that progress can be tracked and monitored during implementation for the 5 years covered in the permit. The County will be responsible for maintaining these databases.

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Appendix A
Survey Questionnaire and Results

SURVEY QUESTIONNAIRE

FOR

THE ANACOSTIA RIVER WATERSHED TRASH TMDL IMPLEMENTATION PLAN

PRINCE GEORGE'S COUNTY GOVERNMENT, DOE

PREPARED BY EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MAY 20, 2013

In September 2010, the US EPA approved the Anacostia River's Total Maximum Daily Loads (TMDL) for Trash in Prince George's County, Maryland. This trash TMDL was developed through a cooperative agreement between EPA Region 3, the District's Department of the Environment (DDOE) and the Maryland Department of the Environment (MDE). Compliance with the TMDL will require the removal of 100 percent of the daily baseline trash load in the Anacostia watershed, as computed from monitoring data. This survey is part of the development of a Trash TMDL Implementation Plan for the Anacostia River watershed in Prince George's County. It is designed to gather critical information about your organization, existing trash-reduction programs, lessons you have learned, and proposed projects for reducing trash in Prince George's County. With this information, it will be possible to develop an effective and stream-lined plan to remove trash from the Anacostia River and its tributaries.

The survey is being conducted by a team led by EA Engineering, Science, and Technology, Inc., Hunt Valley, Maryland. The survey includes 22 questions related to your organization or agency's trash-reduction activities.

Thank you for participating in this survey. Please direct any questions to Ross Farahi-Far (301-883-5819, rfarahifar@co.pg.md.us) or Mike Powell (410-584-7000, mpowell@eaest.com). Your feedback is very important to this process and greatly appreciated.

PRINCE GEORGE'S COUNTY TRASH TMDL INTERVIEW QUESTIONNAIRE

Contact information

Agency/organization: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Questionnaire contact: _____

Position/Title: _____

In case of questions, please provide contact information:

Tel: _____ email: _____

Organization information

1. Indicate which type of organization you represent:

   a) County government agency
   b) Municipality
   c) Nonprofit organization
   d) Civic/community organization
   e) Other, please describe:

2. Indicate which trash-reduction activities your agency/organization is involved in:

   a) Residential solid waste collection
   b) Residential recycling collection
   c) Government-provided cleanup such as street sweeping and regular litter collection
   d) Community-based cleanup activities
   e) Education/outreach campaigns
   f) Anti-litter enforcement
   g) Other, please describe:

3. What other parties do you collaborate with to address trash reduction? Please describe any formal agreements you have with partners to implement trash reduction strategies.

4. If applicable, what organizational units are responsible for trash TMDL implementation in your jurisdiction?

5. What is your overall budget for trash-reduction related activities?

6. In order to reduce costs and pool resources, would you be willing to contribute funds and participate in a joint program with other organizations and/or municipalities to reduce trash in Prince George's County (e.g., an anti-litter education campaign)? YES / NO

Community Events

7. Does your group organize or participate in any of the following trash cleanup efforts in Prince George's County?

    a) Adopt-a-Road or Adopt-a-Median
    b) Comprehensive Community Cleanup Program
    c) Stream Teams
    d) Anacostia River Watershed Cleanup
    e) Keep America Beautiful Cleanup Events
    f) Neighborhood Cleanup Program
    g) Other, please describe:

8. If you indicated any events in #7, please fill in the details about these events in the following table, separating existing and planned events. Add additional pages if more space is needed.

Cleanup Events Table

Cleanup-Event	Location(s)	Date(s)	Pounds of trash removed	Annual budget for program	Number of staff committed to the program (indicate full- or part-time)
Recurring events from the last 12 months					
Planned new events that will be recurring					

Outreach

9. Is your organization involved in any of the following education/public outreach campaigns for reducing trash and litter in Prince George's County?

    (a) Trash Free Potomac Watershed Initiative
    (b) Education efforts in public schools
    (c) Recycling campaigns
    (d) Other, please describe:

10. If you indicated any outreach activities in #9, please fill in data from your organization in the following table, separating existing and planned campaigns. Add additional pages if more space is needed.

Outreach Activities Table

Outreach	Location(s)	Date(s)	Evaluation method for program	Annual budget for program	Number of staff committed to the program (indicate full- or part-time)
Recurring events from the last 12 months					
Planned new events that will be recurring					

Enforcement

11. What trash/litter reduction enforcement regulations are in place in your jurisdiction?

12. What approaches are currently being used in your jurisdiction to combat illegal dumping and how could these be improved?

Public Agency Initiatives

13. How frequently are streets swept in your jurisdiction? Can you provide a route map?

14. Has your organization implemented or maintained any devices or structural BMPs to remove or prevent trash from entering waterways in Prince George's County? YES / NO

15. If YES to #14, please fill in data in the following table about the installation and maintenance of any structural BMPs for trash removal. Group the same types of devices as needed. Add additional pages if more space is needed.

Devices or Structural BMPs

Device/Structural BMP Type	Number	Years Installed	Installation cost (per unit)	Maintenance Program (e.g., weekly cleaned)	Annual maintenance cost	Pounds of trash removed (per year)
Existing Structural BMPs						
Planned Structural BMPs						

Data

16. Can you provide GIS data for any of the following:

    a) Structural BMPs (if not already included in the County GIS files)
    b) Street sweeping routes
    c) Cleanup locations
    d) Any other trash-reduction information

17. Have you identified any hotspot locations for litter generation in Prince George's County? If so, please list the locations or indicate if you could provide them in GIS format.

18. Do you have, or are you aware of, any data measuring the effectiveness of litter/trash reduction education campaigns?

19. Please recommend any studies or data that would aid us in identifying effective trash reduction techniques.

Lessons Learned

20. In your experience, what are the most effective structural and non-structural practices/technologies for reducing trash?

21. What successes have you had while implementing the existing trash reduction programs?

22. What are the most significant challenges to developing an effective trash reduction program?

a) Financial
b) Technical
c) Societal/behavioral
d) Inter-organizational coordination
e) Institutional capability/capacity
f) Other, please describe:

Prince George's County DoE

County Agency

MNCPPC
Community Cleanup Events, Education and Outreach Campaigns in Schools and Programs, Adopt-A-Park, Adopt-A-Trail, Liter Laws on Park Grounds

Office of Information Technology
Collection of Used Ink Cartridges

DoEWMD (Including KPGB)
County Cleanups (including Earth Day), Education Events and Campaigns at events, Anti-Litter Laws

Abandoned Vehicle Unit
Abandoned Vehicle Removal

DPW&T
Government Sponsored Cleanup Events, Community Based Cleanup Events, Adopt-A-Road, Adopt-A-Median, Anti-Litter Laws, Arterial collector, Industrial Roads Street Sweeping

Non-Profit

AWS
Community Cleanups, Stream Teams, Education and Outreach Campaigns in Schools and at Cleanups, Trash Trap Installation and Maintenance in College Park

AFF
Community Cleanups, Education and Outreach Campaigns, in schools and at Cleanups, Anti-litter Enforcement (Litter Enforcement Month), Source Reduction Legislation (bag fees, container deposit)

Municipality

City of New Carrollton
Solid Waste Collection, Recycling Collection, Government Sponsored Clean Ups, Anti-Litter Enforcement, Social Media, Newspapers Street Sweeper

Town of University Park
Solid Waste Collection, Recycling Collection, Government Sponsored Cleanups, Limited Signage, In Stream Temporary Rebar Collector, Community Cleanups

Town of Cottage City
Solid Waste Collection, Recycling Collection, Government Sponsored Cleanups, Community Based Cleanups, Anti-Litter Enforcement, Manual Sweep

Town of Riverdale Park
Recycling Collection, Government Sponsored Cleanups, Community Based Cleanups, Anti-litter codes, Street Sweeping

Town of Fairmount Heights
Solid Waste Collection, Recycling Collection, Government Sponsored Clean Up, Education Campaigns, Manual Weekly Sweep

Town of Berwyn Heights
Solid Waste Collection, Recycling Collection, Government Sponsored Clean Up, Community Based Cleanup, Education Campaigns with Brochures, Anti-Litter Laws, Streets Swept

Town of Mount Rainier
Solid Waste Collection, Recycling Collection, Anti-Litter Enforcement, Electronics Pick Up, Street Cleanup for Community Service Hours

North Brentwood
Recycling Collection, Community Clean Ups, Signage, Street Sweeping once a month

City of College Park
Solid Waste Collection, Recycling Collection, Government Sponsored Cleanups, Community Based Cleanups, Education Campaigns, Anti-litter Enforcement, Curbside Donation Events, Specialty Recycling, Events with University of Maryland, America Recycles Day, Street Sweeping, Adopt a Road, Education in Public Schools

Town of Colmar Manor
Solid Waste Collection, Anti-Litter Enforcement, Newsletter, Streets are kept clean by public works department

City of Greenbelt
Solid Waste Collection, Recycling Collection, Government Sponsored Cleanups, Community Cleanups, Education campaigns, Anti-litter Enforcement, Special Recycling Days, target dumping areas for enforcement, Street Sweeper

Town of Landover Hills
Solid Waste Collection, Recycling Collection, Government sponsored Cleanups, Community Cleanups, Education and Outreach, Monthly Newsletter and Cable Channel, Banners

Did not Respond to Survey
- City of Hyattsville
- Town of Edmonston
- Town of Landover Hills
- City of Glenarden
- City of Seat Pleasant
- Town of Capitol Heights
- Town of Bladensburg
- Department of Corrections
- States Attorney Office
- Fire Department
- Police Department
- Revenue Authority
- Health Department
- Office of Community Relations
- WSSC
- Office of County Executive

Table A-1. Survey Respondents

Category	Agency/Municipality
Municipality	Berwyn Heights Department of Public Works
	College Park
	Colmar Manor
	Cottage City
	Fairmount Heights
	Greenbelt
	Landover Hills
	Mount Rainier
	New Carrollton
	North Brentwood
	Riverdale Park
	University Park
County Agency	Department of the Environmental/Waste Management Division/Recycling Section/Keep Prince George's County Beautiful
	DoE/Property Standards Division/Abandoned Vehicle Unit
	DPW&T
	MNCPPC
	Office of Information Technology
Non-profit	Alice Ferguson Foundation
	Anacostia Watershed Society

Table A-2: Trash Cleanup Survey Results (including events reported by more than one group, as noted)

Clean-up Event	Municipality/ Agency	Location(s)	Date(s)	Pounds of Trash Removed	Annual Budget for Program	Notes
CLEANUP GREENUP						
Cleanup-Greenup Fall 2012	DPW&T	Multiple	10/22/2012	6,059	$5K	Reported value was 35,640 lbs COUNTY wide
Cleanup-Greenup Spring 2013	DPW&T	Multiple	5/7/2013	3,866	$5K	Reported value was 22,740 lbs COUNTY wide
COMPREHENSIVE COMMUNITY CLEANUP						
Comprehensive Cleanups	DoE	various	Jan 2013-June 2013	36,278		Reported value was 106,00 twice a year COUNTY wide
Comprehensive Community Cleanup	Berwyn Heights	Town-wide	20-Jun-12	25,600	$1,400	
EARTH DAY CLEANUP EVENTS						
Alice Ferguson Foundation (AFF) Earth Day	AFF and 2240 Volunteers	various	4/6/2013	100,550		This number includes all AWS and MNCPPC Earth Day cleanups.
Earth Day Clean-Up	MNCPPC	Bladensburg Waterfront Park/other sites	4/20/2013	80,000		Included in AFF value
Earth Day 2012.	Anacostia Watershed Society (AWS)	Old Beaverdam Creek	4/21/2012	9675		Included in AFF value
Earth Day 2012.	AWS	Bladensburg Waterfront Park	4/21/2012	5675		Included in AFF value
Earth Day	Town of Riverdale Park	6322 Kenilworth Ave/rear	4/20/2013	2000	$1,900 for all three events	
Earth Day 2012.	AWS	Riverdale Park	4/21/2012	1725		Included in AFF value
Earth Day 2012.	AWS	MD 450	4/21/2012	1630		Included in AFF value
Earth Day 2012.	AWS	Indian Creek, Beltsville	4/21/2012	1350		Included in AFF value
Earth Day 2012.	AWS	Briers Mill Run, William Wirt Middle School	4/21/2012	1350		Included in AFF value
Earth Day 2012.	AWS	Woodworth Park in Cheverly	4/21/2012	1240		Included in AFF value
Earth Day 2012.	AWS	West Hyattsville Metro	4/21/2012	1130		Included in AFF value
Earth Day 2012.	AWS	Chillum Tributary	4/21/2012	725		Included in AFF value
Earth Day 2012.	AWS	Adelphi Mill	4/21/2012	552		Included in AFF value
Earth Day 2012.	AWS	Greenbrook Lake at Schrom Hills Park	4/21/2012	375		Included in AFF value
Earth Day 2012.	AWS	Capitol Heights	4/21/2012	375		Included in AFF value
Earth Day 2012.	AWS	Paint Branch Stream Valley Park	4/21/2012	325		Included in AFF value
Earth Day 2012.	AWS	Northwest Branch	4/21/2012	280		Included in AFF value
Earth Day 2012.	AWS	Northwest Branch - Town of North Brentwood	4/21/2012	200		Included in AFF value
Earth Day 2012.	AWS	Quincy Run	4/21/2012	200		Included in AFF value
Earth Day	North Brentwood	Town-wide				
OTHER COMMUNITY EVENTS						
Community Cleanups	DoE	various	Jan 2013-June 2013	506560		This value is a sum of reported numbers from all community groups and duplicates other values in this table
Spring Clean-up	Landover Hills	Town-wide	5/4/2013	20220**	$1,200	Computed from 3 dumpsters
Community Cleanup	Riverdale Park	Town-wide	20-Apr-13	17,531	$1,900 for all three events	
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	Aug/Sept/Oct	16,000		
Fall Clean-up	Landover Hills	Town-wide	10/20/2012	13480**	$800	Computed from 2 dumpsters
Unnamed Cleanup	AWS	Briers Mill Run, William Wirt Middle School	9/22/2012	4,575		
Unnamed Cleanup	AWS	Northwest Branch - 38th St	9/23/2012	3,775		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	1/31/2012	3,600		
Unnamed Cleanup	AWS	Magruder Park	2/18/2012	3,125		

Clean-up Event	Municipality/ Agency	Location(s)	Date(s)	Pounds of Trash Removed	Annual Budget for Program	Notes
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	June 2013	2720		
Unnamed Cleanup	AWS	Colmar Manor	6/8/2012	2,000		
Unnamed Cleanup	AWS	Bladensburg Waterfront Park	7/21/2012	1,900		
Potomac Watershed Clean-Up	MNCPPC	Potomac River	4/20/2013	1,500	N/A	Not counted as Potomac River is not within Anacostia Watershed
Saturday of Service	MNCPPC	Lake Artemesia/Anacostia Trail System	Apr-13	1,400	N/A	
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	May 2013	1,400	N/A	
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	5/23/2012	1,375		
Unnamed Cleanup	AWS	Bladensburg Waterfront Park	9/29/2012	1,250		
College Park Scholars Day	MNCPPC	Anacostia Trail System	8/27/2012	1,000	N/A	
Good Neighbor Day	MNCPPC	Paint Branch Trail	4/6/2013	700	N/A	
Unnamed Cleanup	AWS	Riverdale Park	1/12/2012	695		
Trash Free Walker Mill Middle School	AFF and Walker Mill Middle School	900 Karen Boulevard	5/3/2013	672**		Computed from 11 bags of recyclables, 7 bags of trash
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	5/18/2012	500		
Unnamed Cleanup	AWS	Colmar Manor	6/5/2012	500		
Christmas In April	Town of Riverdale Park	6119 54th Ave	4/20/2013	500	$1,900 for all three events	
Canoe Cleanup	AWS	Bladensburg Waterfront Park	9/15/2012	375		
Unnamed Cleanup	AWS	Colmar Manor	6/21/2012	350		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	6/2/2012	275		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	7/14/2012	25		
Trash Free Capitol Heights	AFF and Trash Free Capitol Heights	3 sites in community	5/20/2013			
AFF	City of Greenbelt	3 locations in Greenbelt	April		0	
Anacostia River Watershed Cleanup	North Brentwood	Town-wide				
Fairmount Heights Bulk Pickup	Fairmount Heights	Town Wide	May		$3,000	
Neighborhood Cleanup Program	Berwyn Heights	Town-wide	Fall and Spring 2012		$250	
Anacostia River Watershed Cleanup	Berwyn Heights	Indian Creek in BH, MD	Spring 2012		$250	
Good Neighbor Day	College Park	College Park, Univ of MD			$150	
Stream Clean-up	College Park	College Park/Little Paint Branch	4/20/2013		Shares budget of $250	
Street Clean-up	College Park	Old Town/Calvert Hills, College Park			Shares budget of $250	
Community Fall Clean-Up Days	Cottage City	Cottage City Town Hall	Sept 21-22, 2013		free	
Community Spring Clean-Up Days	Cottage City	Cottage City Town Hall	March 9, 10 2013		free	
Abandoned Vehicle Cleanup and removals	DoE/PSD/Abandoned Vehicle Unit	Throughout County	Multiple			
Mission Blitz activity partnership with First Baptist Church	North Brentwood	Town-wide	Sept 2012 &2013		$0	
Community Service Workers	Town of University Park	Length of stream within town and various roadways	various			
Annual Stream Cleanup	Town of University Park	Length of stream within town	4/6/2013		$100	

** Values used to compute trash weight when number of bags or dumpsters was reported: Weight of recyclables = 139 lb/yd^3, 1 trash bag = 30 gallons, Weight of trash was an average of residential loose (225 lb/yd^3) and industrial/commercial loose (450 lb/yd3) therefore was 337 lb/yd3, 20 cubic yard dumpster assumed to be average dumpster size. (Recyclmaniacs)

Table A-3: Trash Cleanup Survey Results Organized by In-Stream and Non-In Stream Events (all events including duplicates reported, as noted)

Clean-up Event	Municipality/ Agency	Location(s)	Date(s)	Pounds of Trash Removed	Annual Budget for Program	Notes
In Stream						
Earth Day Clean-Up	MNCPPC	Bladensburg Waterfront Park/other sites	4/20/2013	80,000		
Earth Day 2012	Anacostia Watershed Society (AWS)	Old Beaverdam Creek	4/21/2012	9,675		
Earth Day 2012.	AWS	Bladensburg Waterfront Park	4/21/2012	5,675		
Earth Day 2012	AWS	Indian Creek, Beltsville	4/21/2012	1,350		
Earth Day 2012	AWS	Briers Mill Run, William Wirt Middle School	4/21/2012	1,350		
Earth Day 2012	AWS	Chillum Tributary	4/21/2012	725		
Earth Day 2012	AWS	Paint Branch Stream Valley Park	4/21/2012	325		
Earth Day 2012	AWS	Northwest Branch	4/21/2012	280		
Earth Day 2012	AWS	Northwest Branch - Town of North Brentwood	4/21/2012	200		
Earth Day 2012	AWS	Quincy Run	4/21/2012	200		
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	Aug/Sept/Oct	16,000		
Unnamed Cleanup	AWS	Briers Mill Run, William Wirt Middle School	9/22/2012	4,575		
Unnamed Cleanup	AWS	Northwest Branch - 38th St	9/23/2012	3,775		
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	June 2013	2,720		
Unnamed Cleanup	AWS	Bladensburg Waterfront Park	7/21/2012	1,900		
Potomac Watershed Clean-Up	MNCPPC	Potomac River	4/20/2013	1,500	N/A	Not counted as Potomac River is not within Anacostia Watershed
Saturday of Service	MNCPPC	Lake Artemesia/Anacostia Trail System	Apr-13	1,400	N/A	
Bladensburg Waterfront Park Clean-ups	MNCPPC	BWP- Anacostia	May 2013	1,400	N/A	
Unnamed Cleanup	AWS	Bladensburg Waterfront Park	9/29/2012	1,250		
College Park Scholars Day	MNCPPC	Anacostia Trail System	8/27/2012	1,000	N/A	
Good Neighbor Day	MNCPPC	Paint Branch Trail	4/6/2013	700	N/A	
Canoe Cleanup	AWS	Bladensburg Waterfront Park	9/15/2012	375		
Anacostia River Watershed Cleanup	Berwyn Heights	Indian Creek in BH, MD	Spring 2012		$250	
Stream Clean-up	College Park	College Park/Little Paint Branch	4/20/2013		Shares budget of $250	
Community Service Workers	Town of University Park	Length of stream within town and various roadways	various			
Annual Stream Cleanup	Town of University Park	Length of stream within town	4/6/2013		$100	
Not In Stream						
Cleanup-Greenup Fall 2012	DPW&T	Multiple	10/22/2012	6,059	$5K	Reported value was 35,640 lbs COUNTY wide
Cleanup-Greenup Spring 2013	DPW&T	Multiple	5/7/2013	3,866	$5K	Reported value was 22,740 lbs COUNTY wide
Comprehensive Cleanups	DoE	various	Jan 2013-June 2013	36,278		Reported value was 106,00 twice a year COUNTY wide
Comprehensive Community Cleanup	Berwyn Heights	Town-wide	20-Jun-12	25,600	$1,400	

Clean-up Event	Municipality/ Agency	Location(s)	Date(s)	Pounds of Trash Removed	Annual Budget for Program	Notes
Alice Ferguson Foundation (AFF) Earth Day	AFF and 2240 Volunteers	various	4/6/2013	100,550		This number includes all AWS and MNCPPC Earth Day cleanups. Therefore is not counted as some are in stream and some are out of stream.
Earth Day	Town of Riverdale Park	6322 Kenilworth Ave/rear	4/20/2013	2,000	$1,900 for all three events	
Earth Day 2012	AWS	Riverdale Park	4/21/2012	1,725		
Earth Day 2012	AWS	MD 450	4/21/2012	1,630		
Earth Day 2012	AWS	Woodworth Park in Cheverly	4/21/2012	1,240		
Earth Day 2012	AWS	West Hyattsville Metro	4/21/2012	1,130		
Earth Day 2012	AWS	Adelphi Mill	4/21/2012	552		
Earth Day 2012	AWS	Greenbrook Lake at Schrom Hills Park	4/21/2012	375		
Earth Day 2012	AWS	Capitol Heights	4/21/2012	375		
Earth Day	North Brentwood	Town-wide				
Community Cleanups	DoE	various	Jan 2013-June 2013	506,560		This value is a sum of reported numbers from all community groups and duplicates other values in this table
Spring Clean-up	Landover Hills	Town-wide	5/4/2013	20220**	$1,200	Computed from 3 dumpsters
Community Cleanup	Riverdale Park	Town-wide	20-Apr-13	17,531	$1,900 for all three events	
Fall Clean-up	Landover Hills	Town-wide	10/20/2012	13480**	$800	Computed from 2 dumpsters
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	1/31/2012	3,600		
Unnamed Cleanup	AWS	Magruder Park	2/18/2012	3,125		
Unnamed Cleanup	AWS	Colmar Manor	6/8/2012	2,000		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	5/23/2012	1,375		
Unnamed Cleanup	AWS	Riverdale Park	1/12/2012	695		
Trash Free Walker Mill Middle School	AFF and Walker Mill Middle School	900 Karen Boulevard	5/3/2013	672**		Computed from 11 bags of recyclables, 7 bags of trash
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	5/18/2012	500		
Unnamed Cleanup	AWS	Colmar Manor	6/5/2012	500		
Christmas In April	Town of Riverdale Park	6119 54th Ave	4/20/2013	500	$1,900 for all three events	
Unnamed Cleanup	AWS	Colmar Manor	6/21/2012	350		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	6/2/2012	275		
Unnamed Cleanup	AWS	Fort Lincoln Cemetery	7/14/2012	25		
Trash Free Capitol Heights	AFF and Trash Free Capitol Heights	3 sites in community	5/20/2013			
AFF	City of Greenbelt	3 locations in Greenbelt	April		0	
Anacostia River Watershed Cleanup	North Brentwood	Town-wide				
Fairmount Heights Bulk Pickup	Fairmount Heights	Town Wide	May		$3,000	
Neighborhood Cleanup Program	Berwyn Heights	Town-wide	Fall and Spring 2012		$250	
Good Neighbor Day	College Park	College Park, Univ of MD			$150	
Street Clean-up	College Park	Old Town/Calvert Hills, College Park			Shares budget of $250	
Community Fall Clean-Up Days	Cottage City	Cottage City Town Hall	Sept 21-22, 2013		free	
Community Spring Clean-Up Days	Cottage City	Cottage City Town Hall	March 9, 10 2013		free	
Abandoned Vehicle Cleanup and removals	DoE/PSD/Abandoned Vehicle Unit	Throughout County	Multiple			

Clean-up Event	Municipality/ Agency	Location(s)	Date(s)	Pounds of Trash Removed	Annual Budget for Program	Notes
Mission Blitz activity partnership with First Baptist Church	North Brentwood	Town-wide	Sept 2012 &2013		$0	

** Values used to compute trash weight when number of bags or dumpsters was reported: Weight of recyclables = 139 lb/yd^3, 1 trash bag = 30 gallons, Weight of trash was an average of residential loose (225 lb/yd^3) and industrial/commercial loose (450 lb/yd3) therefore was 337 lb/yd^3, 20 cubic yard dumpster assumed to be average dumpster size. (Recyclmaniacs)

Appendix B
Summary of Existing Programs and Literature Review

Table B-1. Summary of Existing Programs Identified from Surveys, Internet, and Literature Research

Program Type	Program	Agency/ Municipality/ Non-Profit	Current Estimated Removal (lb/yr)[a]	Source/Method	Results from Effectiveness Report -- Full analysis expected in Implementation Plan	
					Recommendation	Potential Increase (lb/yr)
Education/ Source Control	Hollywood Elementary School	College Park	840	Survey results identified the programs, but there were no estimates provided. Estimates were made similar to method in Montgomery County's Plan, assuming "half of the residential land is influenced by school age kids, the effectiveness of messaging is 40% and the willingness to participate is 60%" (Section 1.5.1, Table 1-6).	Expand the participation in the AFF Trash Free Communities and Trash Free Schools Programs.	School Programs: 33,500 lb/yr Trash Free Communities (point source)
	Trash Free Cesar Chavez Elementary School	AFF	410			
	Trash Free Walker Mill Middle School	AFF	1100			
	Trash Free Capitol Heights	AFF	--	Survey		
	Storm drain stenciling	County	--	AWRP and MCOG 2007		
	Social media	New Carrollton, KPGCB, and DoE	--	Survey		
	Cable television station ads about not littering	Town of Landover Hills	--	Survey		
	Recycling campaigns	Berwyn Heights, College Park, Greenbelt, MNCPPC, AFF, KPGCB and DoE	--	Survey		
	Speakers and booths at public events	MNCPPC, AWS, DoE, KPGCB, and College Park	--	Survey		
	"Conservation Clubs" with methods teaching teenagers how to reduce trash	MNCPPC	--	Survey		
Street Sweeping	Roads swept by County (DPW&T)	DPW&T	1,479	Survey results provided information about the frequency of street sweeping, and pounds removed was computed based on the estimated trash load on roadways, the acres of roads swept, the frequency of sweeping, and a method from the literature to determine effectiveness based on frequency of sweeping compared to rainfall events (Section 1.5.3, Table 1-9).	Targeted analysis of additional/alternative sweeping locations in hotspot watersheds (to come in Implementation Plan).	1,400
	BERWYN HEIGHTS	Municipalities	131			
	COLLEGE PARK		998			
	FAIRMOUNT HEIGHTS		445			
	GREENBELT		975			
	NEW CARROLLTON		282			
	NORTH BRENTWOOD		54			
	RIVERDALE PARK		2,820			
Structural BMPs - Trash Nets and Traps	Ray Road Trash Net	County	110	MWCOG 2009	NA - county not interested in trash traps	not estimated
	Flagstaff Street Trash Net	County	67	MWCOG 2009		
	Paint Branch Trash Trap	AWS	480	Survey reported value scaled to represent a full year.		
	Dueling Creek Trash Trap	MNCPPC	219	Estimated as an average of the other three trash BMPs.		
Structural BMPs - Pumping stations	Mechanical screens at 3 pumping stations	County	33,800	In County's 2009 NPDES MS4 permit report 338 tons of floatables per year was reported. Assuming that 95% of that material is organic (MDE 2009), an estimated 33,800 lb (17 tons) of trash is captured each year at the three pumping stations.	DoE investigating if any additional pumping stations exist.	11,300 for one additional pumping station

Table B-1. Summary of Existing Programs Identified from Surveys, Internet, and Literature Research

Program Type	Program	Agency/ Municipality/ Non-Profit	Current Estimated Removal (lb/yr)[a]	Source/Method	Results from Effectiveness Report -- Full analysis	
					Recommendation	Potential Increase (lb/yr)
Laws and Ordinances	Signage and cameras at dumping sites	MNCPPC	--	Survey	In the ARP (USACE et al. 2010a), 55 different locations in Anacostia Watershed within Prince George's County are recommended as places that could benefit from "No Dumping" signage. Investigate these areas and consider using roving cameras.	61,600
	Free residential disposal at County landfills	County	--	Prince George's County 2012	Advertise this service.	unknown
	Three County ordinances are used to enforce the elimination of unauthorized dumping	County	--	Prince George's County 2012	Billboards and enforcement campaign; bag fee; bottle bill.	bags: 60,400 (wet weight) bottles: 69,400
	Maryland laws	AFF	--	Survey		
Stream and Community Cleanup Events	*See separate Cleanup Events tables*		300,000	Survey results compiled and compared to avoid duplication	Targeted analysis of additional/alternative cleanup locations in hotspot watersheds (to come in Implementation Plan).	32000 if 20 more events; 140,475 lbs can be counted from current cleanup events in-stream
Road Cleanups	DP&W employees, volunteers, inmates, and the SHA	DoE/Waste Management Division/Recycling Section	1,828,000	Survey results provided a total of 6,000 tons/year for all roadway cleanup activities. This estimate was generated by subtracting removals included in Cleanup Events (DoE cleanups and comprehensive cleanups), subtracting value for landfill approach roads since they are not in the Anacostia watershed portion of the County, and reducing the remainder by 17% to represent only the Anacostia watershed portion of the County (see Table 2-8).		not estimated

Table B-1. Summary of Existing Programs Identified from Surveys, Internet, and Literature Research

Program Type	Program	Agency/ Municipality/ Non-Profit	Current Estimated Removal (lb/yr)[a]	Source/Method	Draft Results from Effectiveness Report -- Full analysis	
					Recommendation	Potential Increase (lb/yr)
Stormwater BMPS		DoE and DPW&T	--	GIS data from DoE and DPW&T.	Maintenance/upgrade plan to add trash removal to existing BMPs.	unknown

[a] For full details, see Chapter 2: Evaluation and Effectiveness of Existing Trash Reduction Programs

A "--" means that an estimate was not generated for the existing program because of uncertainty in programs scope and impact.

References:

Anacostia Watershed Restoration Partnership (AWRP) and Metropolitan Washington Council of Governments (MWCOG). 2007. *Anacostia Watershed Trash Reduction Strategy. Public Release.* April. http://www.anacostia.net/Archives/download/AnaTrashStrategy_final.pdf

Maryland Department of the Environment (MDE) Waster Management Administration 2009. *National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System Discharge Permit MD0068284: Review of Prince George's County 2009 Annual report.* http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/SedimentandStormwaterHome/Documents/Prince%20George%203-6%20Annual%20Report%20Review.pdf

Metropolitan Washington Council of Governments (MWCOG). 2009. *Anacostia Trash TMDL-Related Baseline Conditions Monitoring (June 2008 – July 2009).* Prepared for Montgomery County DEP and Prince George's County DoE. October. http://www.anacostia.net/restoration/Reports_and_Data/Trash_report_2010.pdf

Prince George's County. 2012. *Draft Ten-Year Solid Waste Management Plan (2012-2022).* http://www.princegeorgescountymd.gov/sites/EnvironmentalResources/Resources/TenYearSolidWastePlan/Documents/Ten%20Year%20Solid%20Waste%203-3-13%20-Final%20Draft.pdf

U.S. Army Corps of Engineers (USACE) – Baltimore District, Metropolitan Washington Council of Governments, Montgomery and Prince George's Counties, District of Columbia, Maryland-National Capitol Park and Planning Commission, Maryland Department of the Environment, and Maryland Department of Natural Resources. 2010a. *Anacostia River Watershed Restoration Plan and Report. Final Draft.* February. http://www.anacostia.net/Restoration_Plan/download/Anacostia-Report-Web-Quality.pdf

Table B-2. Plastic Bags in MWCOG Stream Surveys[a]

Survey Time Period	Survey Location	Item Count			Wet weight (lb)		
		total	plastic bags	percent bags	total	plastic bags	percent bags
Fall 2011	Takoma Branch	239	97	41%	53.9	12.3	23%
	NW Branch	8	3	38%	4.4	0.9	20%
	Edmonston and Powder Mill Rd	175	60	34%	53.4	13.5	25%
	Cabin Branch	141	71	50%	26.8	11.2	42%
	M-NCPPC Bulger St Playground	294	76	26%	119.4	22.2	19%
	Average			38%			26%
Spring 2011	Takoma Branch	426	208	49%	67.4	22.7	34%
	NW Branch	152	49	32%	59.7	11	18%
	Edmonston and Powder Mill Rd	318	164	52%	64.6	35.3	55%
	Cabin Branch	321	61	19%	57.6	19.8	34%
	M-NCPPC Bulger St Playground	248	94	38%	138.1	69.4	50%
	Average			38%			38%
Fall 2012	Takoma Branch	35	14	40%	2.7	0.6	22%
	NW Branch	8	2	25%	1	0.2	20%
	Edmonston and Powder Mill Rd	57	19	33%	10.9	2.9	27%
	Cabin Branch	82	14	17%	8.6	0.4	5%
	M-NCPPC Bulger St Playground	106	37	35%	18.8	8.6	46%
	Average			30%			24%

[a]Summarized from Metropolitan Washington Council of Governments (MWCOG). 2012b. Prince George's County Trash TMDL Monitoring Update Summary (April-June 2011, October 2011, October 2012). http://www.anacostia.net/temporary/Trash_Baseline.html

Table B-3: ARP Cleanups

Reference: U.S. Army Corps of Engineers (USACE) – Baltimore District, Metropolitan Washington Council of Governments, Montgomery and Prince George's Counties, District of Columbia, Maryland-National Capitol Park and Planning Commission, Maryland Department of the Environment, and Maryland Department of Natural Resources. 2010a. Anacostia River Watershed Restoration Plan and Report. Final Draft. February.

Project Type	Subwatershed	Name	Description	Proj_Desc	latitude	Longitude	POSTAL
Trash Reduction	Watts Branch	Outfall approximately 100 feet west of the stormwater outfall on Rollins Lane, Capitol Heights, MD	Trash Removal, Signage, Outreach	Trash	-76.90957802160	38.86685039860	20743
Trash Reduction	Watts Branch	Stormwater BMP approximately 300 feet north of Brooksquare Drive and Ashley Place, Brook Square townhouses, Capitol H	Trash Removal, Trash Grate, Signage, Outreach	Trash, Trash Grates	-76.91177375060	38.86711848230	20743
Trash Reduction	Watts Branch	Lexington Courts Apartments, Capitol Heights, MD	Trash Removal, trash Grate, signage, Outreach	Trash, Trash Grates	-76.91506527040	38.86769721000	20743
Trash Reduction	Watts Branch	5290 Lexington Courts Apartments, Capitol Heights, MD	Trash Removal, Trash Grate, Signage, Outreach	Trash, Trash Grates	-76.91314659200	38.86882560220	20743
Trash Reduction	Watts Branch	Forested valley starting north of Rollins Avenue, Capitol Heights, MD	Remove TrashInstall Signage	Trash	-76.90591207000	38.86947886970	20743
Trash Reduction	Watts Branch	Forested valley west of Upcot Court, Capitol Heights, MD	Remove TrashInstall Signage	Trash	-76.90472610980	38.87057883040	20743
Trash Reduction	Watts Branch	Forested valley west of Adeline Way, Capitol Heights, MD	Remove TrashInstall Signage	Trash	-76.90485410020	38.87175639960	20743
Trash Reduction	Watts Branch	Stream valley located approximately 100 feet west of Adeline Way, Capitol Heights, MD	Remove trash Install signage Community Outreach	Trash	-76.90497841030	38.87231891010	20743
Trash Reduction	Watts Branch	Three intermittent tributaries originating directly north of Northfield Road, Capitol Heights, MD	Remove Trash community Cleanup Install Signage	Trash	-76.91234358990	38.87270128980	20743
Trash Reduction	Watts Branch	Forested valley located approximately 250 feet east of Oakford Road, Capitol Heights, MD	Remove TrashCommunity Outreach	Trash	-76.90640710000	38.87325123040	20743
Trash Reduction	Watts Branch	Immediately south of BMP #0150, located approximately 150 feet west of Applegarth Place, Capitol Heights, MD	Remove Trash	Trash	-76.90602313030	38.87381121960	20743
Trash Reduction	Watts Branch	Corner of Mornington Place and Onslow Way, Capitol Heights, MD	Remove trash, Trash Grates, Signage, Community Outreach	Trash, Trash Grates	-76.90784425950	38.87562715960	20743
Trash Reduction	Watts Branch	Immediately north of the outfall located approximately 330 feet northwest of the Gladstone Way / Denise Drive intersection	Remove Trash, Install Trash Grates, Install Signage, Community Outreach	Trash, Trash Grates	-76.90471210990	38.87685737990	20743
Trash Reduction	Watts Branch	Intermittent tributary located approximately 300 feet north of the northern dead end of Denise Drive, Capitol Heights, MD	Remove Trash	Trash	-76.90468353000	38.87724419980	20743
Trash Reduction	Watts Branch	Forested area approximately 500 feet northwest of the northern dead end of Denise Drive, Capitol Heights, MD	Remove Trash	Trash	-76.90500790980	38.87741201040	20743
Trash Reduction	Watts Branch	Detention wet pond serving townhouse community located on Highview Place, Capitol Heights, MD	Remove Trash, Trash Grates, Install Signage, Community Outreach	Trash	-76.90911910140	38.87817672500	20743
Trash Reduction	Watts Branch	Tributary channel originating at the western dead end of District Avenue, Capitol Heights, MD	Remove Trash, Community outreach, Install Signage	Trash	-76.90294813940	38.87838405990	20743
Trash Reduction	Watts Branch	East of Highmount Lane on the west floodplain of the perennial tributary, Capitol Heights, MD	Remove Trash, Place Signage, Community Outreach	Trash	-76.90943371990	38.87855118990	20743
Trash Reduction	Watts Branch	West bank of the intermittent tributary located approximately 600 feet northwest of the western dead end of District Avenu	Remove Trash	Trash	-76.90589019020	38.88069495020	20743
Trash Reduction	Lower Beaverdam	Cabin Branch directly east of Cabin Branch Court, Seat Pleasant, MD	Trash Removal	Trash	-76.89369217040	38.88178250020	20743
Trash Reduction	Watts Branch	Tributary located approximately 150 feet northeast of Canada Lane / Ventura Avenue intersection, Capitol Heights, MD	Remove Trash	Trash	-76.90644582950	38.88178392030	20743
Trash Reduction	Watts Branch	Stream crossing on Ventura Avenue, approximately 100 feet north of the Canada Lane / Ventura Avenue intersection, Capito	Remove Trash, Place Signage, Community Outreach	Trash	-76.90680918040	38.88228691960	20743
Trash Reduction	Lower Beaverdam	Tributary located on the hiking trail between Wynnleigh Road and the Central High School running track, Seat Pleasant, MD	Trash Removal	Trash	-76.88899931030	38.88411099000	20743
Trash Reduction	Watts Branch	Stream crossing at 6115 Old Central Avenue Capitol Heights, MD	Remove Trash, Install Trash Grates, Place Signage, Community Outreach	Trash, Trash Grates	-76.90853149980	38.88536300010	20743
Trash Reduction	Watts Branch	Watts Branch from CentralAvenue to Davey street, Capitol Heights, MD	Remove Trash community outreach Install Signage and trash Net	Trash, Trash Grates	-76.91029814970	38.88928396990	20743
Trash Reduction	Watts Branch	Perennial tributary directly upstream of the Southern Avenue crossing	Remove Trash, Install Signage, Community Outreach	Trash	-76.91179218670	38.89080967670	20743
Trash Reduction	Watts Branch	The northern dead end of Coolidge Street overlooking the Chesapeake Beach railway trail, Capitol Heights, MD	Community Cleanup Install Signage Community Outreach Modify Access	Trash	-76.90524092980	38.89083286010	20743
Trash Reduction	Watts Branch	The northern dead end of Dade Street near 5819 Dade Street, overlooking the Chesapeake Beach Railway Trail, Capitol Heig	Community Cleanup, Install Signage, Community Outreach, Modify Access	Trash	-76.90592213030	38.89127928030	20743
Trash Reduction	Lower Beaverdam	Outfall located on Dateleaf Avenue at Weston Avenue, Seat Pleasant, MD	Trash Removal, Fence, Outreach	Trash	-76.89392712020	38.89225543010	20743
Trash Reduction	Watts Branch	The northeastern dead end of Early Street, Capitol Heights, MD	Community Cleanup Install Signage Community Outreach Modify Access	Trash	-76.90856737010	38.89231578020	20743
Trash Reduction	Lower Beaverdam	Dead end of Pepper Street, west of Hastings Drive, Capitol Heights, MD	Trash Removal, Fence	Trash	-76.89008259000	38.89382267980	20743
Trash Reduction	Watts Branch	Open lot on the southwest end of James Farmer Way, Seat Pleasant/Capitol Heights, MD	Remove Trash, Install Signage, Outreach	Trash	-76.90904162000	38.89385026040	20743
Trash Reduction	Lower Beaverdam	Tributary located between Booker Drive and Route 704, Seat Pleasant, MD	Trash Removal, Trash Net	Trash	-76.89628830020	38.90158600040	20743
Trash Reduction	Lower Beaverdam	Off of Cabin Branch Drive, west of Booker Terrace, Cheverly, MD	Trash Removal	Trash	-76.90123111000	38.90580125960	20785
Trash Reduction	Lower Beaverdam	Eastern dead end of Oates Street, Hyattsville, MD	Trash Removal, Outreach	Trash	-76.91536149000	38.90704522020	20743
Trash Reduction	Lower Beaverdam	Stream flowing north through the industrial park on Sheriff Road, approximately 2000 fet from the Sheriff Road / Route 704	Trash Removal, Trash Traps	Trash	-76.89763687060	38.91312059030	20785
Trash Reduction	Lower Beaverdam	Cabin Creek reach between Sheriff Road and the abandoned railway bridge downstream Cheverly, MD	Trash Removal, Trash Traps	Trash	-76.90625865970	38.91323182040	20785
Trash Reduction	Lower Beaverdam	Trash dump on the tributary flowing south into Lower Beaver Dam Creek mainstem, approximately 1,200 feet west of the Ch	Trash Removal, Trash Traps	Trash	-76.92300738000	38.91533065020	20785
Trash Reduction	Lower Beaverdam	Unmapped outfall west of Barlowe Road, 100 feet south of the intersection with Route 202, Hyattsville, MD	Manual Trash Pickup, Public Outreach	Trash	-76.86524908790	38.92026582830	20785
Trash Reduction	Northwest Branch	Hamilton Medical Building, Hamilton Road, Hyattsville, MD	Trash Removal, Education	Trash, Education	-76.96138500030	38.95489333320	20782
Trash Reduction	Northwest Branch	Approximately 220 feet east of Cypress Creek Drive and 16th Avenue, Hyattsville, MD	Trash Removal, Inlet Grates, Signage	Trash, Inlet Grates, Signs	-76.98020162950	38.95643767960	20782
Trash Reduction	Northeast Branch	Riverside Drive Park, Riverdale, MD	Trash Removal, Signage	Trash	-76.93005833330	38.95757499970	20737
Trash Reduction	Brier Ditch	Approximately 100 feet upstream of Fernwood Terrace to the northeast, New Carrollton, MD	Trash Removal, Outreach, Signage	Trash	-76.90017232550	38.96564297210	20737
Trash Reduction	Brier Ditch	Northwest of the intersection of Auburn Avenue and Riverdale Road, downstream of the northwest corner of parking lot, ap	Trash Removal Outreach, Signage	Trash	-76.89980643960	38.96580077020	20737
Trash Reduction	Brier Ditch	Approximately 100 feet northwest of dead end on 64th Avenue (PG#795204), East Riverdale, MD	Trash Removal Outreach, Signage	Trash	-76.90552767020	38.96744001990	20737
Trash Reduction	Brier Ditch	Approximately 200 feet southwest of Silk Tree Drive (PG #795208), Riverdale, MD	Trash Removal	Trash	-76.90951225990	38.96884809010	20737
Trash Reduction	Brier Ditch	Approximately 200 feet east of the parking lot adjacent to 6811 Sarvis Avenue (PG #795212), East Riverdale, MD	Trash Removal Outreach, Signage	Trash	-76.91137422010	38.96975493020	20737
Trash Reduction	Still Creek	Approximately 700 feet northwest of the intersection of Nashville Road and Newburg Drive, Hyattsville, MD	Trash Removal	Trash	-76.88849305000	38.98150804040	20706
Trash Reduction	Indian Creek	Stormwater outfall on Indian Creek close to residential park between Indian Creek and the dead end of Osage Street	Street Sweeping, Trash and Debris Removal, Trash Inlet Grates, Outreach	Street Sweeping = 1.299, Trash, Inlet Grates	-76.92025903990	38.99243744960	20740
Trash Reduction	Paint Branch	Approximately 500 feet north of Ellicott Road and Valley Drive, directly north of parking lot, College Park, MD	Trash Removal, Outreach, Signage	Trash	-76.94742980980	38.99485420010	20742
Trash Reduction	Northwest Branch	Approximately 625 feet south-southwest of the intersection of Greenspire Terrace and Metzerott Road, Adelphi, MD	Trash Removal, Signage	Trash, Signs	-76.97563609000	39.00213204040	20783
Trash Reduction	Little Paint Branch	Approximately 770 feet northwest of the Autoville Drive and Erie Street intersection, College Park, MD	Manual Trash Pickup	Trash	-76.93313305050	39.00661410020	20740
Trash Reduction	Little Paint Branch	Approximately 430 feet northwest of the Autoville Drive dead end, College Park, MD	Manual Trash Pickup, Signage	Trash	-76.93225320040	39.00850053040	20740
Trash Reduction	Paint Branch	Approximately 450 feet northwest of culvert under Falling Brook Terrace and Silver Lake Court, Hyattsville, MD	Trash Removal, Outreach, Inlet Grates	Trash, Grates	-76.95932230990	39.01549992040	20783
Trash Reduction	Indian Creek	Prince GeorgeÆs County Site 161104, 1500 ft downstream of Powder Mill Rd between Southard Dr and Edmonston Rd, Belts	Trash and Debris Removal, Trash Grates	Trash, Inlet Grates	-76.90297899000	39.02940022010	20705
Trash Reduction	Indian Creek	Small tributary leading to Indian Creek just downstream of Powder Mill Rd culvert, Beltsville, MD 20705	Trash and Debris Removal, Trash Net	Trash	-76.90254430050	39.03344733960	20705
Trash Reduction	Indian Creek	Prince GeorgeÆs County Sites 156101, 156102, 156103: Indian Creek Mainstem upstream of Powder Mill Rd culvert, Beltsvil	Trash and Debris Removal, Outreach, Signage	Trash	-76.90229385350	39.03363665360	20705
Trash Reduction	Little Paint Branch	Midway between Green Ash Court and Collier Road, Beltsville, MD	Manual Trash Pickup, Trash Netting System	Trash	-76.94190200650	39.03741399600	20705
Trash Reduction	Indian Creek	Indian Creek Mainstem trash area, at intersection of Linden Rd and Spruce Ave, Beltsville, MD	Trash Removal, Street Sweeping	Trash, Street Sweeping = 0.25	-76.89968606980	39.04407157030	20705
Trash Reduction	Indian Creek	Riparian area of Indian Creek tributary, upstream of an existing wet detention pond, 380 ft southwest of intersection of Am	Trash Removal, Signage, Outreach	Trash	-76.89103637020	39.04431984000	20705
Trash Reduction	Indian Creek	Approximately 40 yards off Edmonston Rd/Old Baltimore Pike intersection, close to Prince GeorgeÆs County Site 146201, Be	Trash Removal, Outreach, Trash Trap/Net	Trash, Trash trap	-76.89304199030	39.04540127020	20705
Trash Reduction	Little Paint Branch	Lowe's Theater, 4001 Powder Mill Road, Beltsville, MD	Manual Trash Pickup, Signage	Trash	-76.93739189960	39.04547973020	20705
Trash Reduction	Indian Creek	635 ft north of intersection of Highview Ave and Quimby Ave,, west of the FedEx facility on Rte 1,Beltsville, MD	Trash Removal, Signage, Outreach	Trash	-76.90366831970	39.04815992010	20705
Trash Reduction	Little Paint Branch	4050 Powder Mill Road and Route 212, Beltsville, MD	Manual Trash Pickup, Signage	Trash	-76.93479199960	39.04921361040	20705
Trash Reduction	Upper Beaverdam Creek	Stormwater outlet to tributary 230 ft southwest of Admiral Drive, Laurel, MD	Trash Removal, Inlet Grates, Outreach, Signage	Trash, Inlet Grates	-76.85441523500	39.04985131760	20708
Trash Reduction	Little Paint Branch	Immediately downstream of Beltsville Road, just north of the intersection with Calverton Boulevard, Beltsville, MD	Manual Trash Pickup	Trash	-76.93620837040	39.05189163010	20705
Trash Reduction	Indian Creek	Close to Prince GeorgeÆs County site #140101, 250 ft east of parking lot at end of Trolley Ln, Beltsville, MD	Trash Removal, Signage, Outreach	Trash	-76.90457892960	39.05222312990	20705
Trash Reduction	Indian Creek	Approx 300 ft northeast of end of Aitcheson Road,100 ft from Prince GeorgeÆs County site # 122101, Beltsville, MD	Trash and Debris Removal, Signage	Trash	-76.91213780990	39.06577130990	20707

Appendix C
Implementation Plan Program Fact Sheets

STREAM CLEANUP PROGRAMS	$33,400/yr *	60,404 lb trash/yr	$0.55/lb

Program Outcome: Encourage volunteers to pick up litter when seen in streams and in their everyday life. Instill a need for a clean litter-free community in which the act of littering is repulsive to community members.

Key Messages

- Litter cleanup creates a beautiful community
- Preventing litter in the first place is easier than cleaning up after
- Education of the effects of litter

Target Audience

- County Residents
- Children and Teens
- Community organizations
- Volunteers

Pre-Program Planning

- Continue current stream cleanups (or similar in frequency and effectiveness) to reduce litter in stream and on banks.

Program Planning

- Continue the current planning techniques which utilize internet, community resources, word of mouth to distribute information about upcoming trash cleanup opportunities.

Program Development

- Continue with current trash cleanup programs. If a reduction in programs is noted additional programs will need to be developed or implemented to remove the current tonnage of trash from river.

Program Implementation

- Implement program at same rate as before ($30,900)
- Measure success ($2,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Continue current cleanup programs listed in Implementation Plan Chapter 2.
- If a decrease in programs is noted, or if a program is discontinued ensure that another in-stream program is implemented.

Metrics of Success

- Decrease in debris/litter in stream
- Increase in volunteers attending cleanup days/events

Existing Partnerships to Nurture

- County/State Park Staff
- Municipalities
- Anacostia Watershed Society
- Alice Ferguson Foundation
- Other Non-profits

New Partnerships to Develop

- Community organizations
- Faith Based Organizations
- Neighborhood and Homeowner Associations

EDUCATION IN SCHOOLS	$25,400/yr *	17,850 lb trash/yr	$1.42/lb

Program Outcome: Promote the County's anti-littering campaign through established education programs with the aim to involve 50% of schools within the watershed.

Key Messages

- Litter cleanup creates a beautiful community
- Pick up litter to keep it out of your neighborhood and nearby streams
- Preventing litter in the first place is easier than cleaning up after
- Education is key to a successful campaign
- Allowing trash to accumulate personifies unhealthy conditions and creates a negative public image

Target Audience

- Children and teens (K-12)
- Schools that will participate in anti-littering campaigns
- Parents and teachers of students whom are educated by the program.

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Develop target list of education collaborators ($2,000)
- Develop list of schools to target ($1,000)
- Design campaign logo and slogan (costs included in Community Outreach)

Program Development

- Work with collaborators to coordinate material needed ($1,000)
- Printing of material ($2,500)
- Prepare pre/post survey questionnaire ($2,400)

Program Implementation

- Provide printed material to collaborators ($250)
- Visit targeted schools (5 visits/year) ($5,000)
- Measure success ($2,500)

Implementation

- Develop a list of education collaborators for funding support and volunteer times.
- Utilize the 8-step Alice Ferguson Foundation "Trash Free Schools" program at half of all schools within watershed (K-12)
- Assist in printing of materials needed for school

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Provide established education programs with additional County material (posters, banners, etc.)
- Create a pre/post survey to be used as an evaluation tool to measure effectiveness
- Visit a small number of schools each year (5)

Metrics of Success

- Marked behavior changes on as determined by pre/post surveys
- Decrease in the number of littering citations and reports (reported on website)
- Increase in volunteers at school sponsored clean up events
- Improvement on attitude surveys

Existing Partnerships to Nurture

- Alice Ferguson Foundation
- Trash Free Maryland
- Watershed organizations
- Recycling services
- Nonprofit Organizations
- County School Board

New Partnerships to Develop

- Youth organizations and groups
- Faith-based organizations
- Neighborhood and homeowner associations
- Prince George's County Police Department

Please Note: This program relies on the Alice Ferguson Foundation 8 steps to becoming a Trash Free School.

TRAINING AND ENFORCEMENT	$94,500/yr *	61,400 lb trash/yr	$1.54/lb

Program Outcome: Increase emphasis on the existing legal system for littering and illegal dumping violations through strengthened enforcement and a strong enforcement message.

Key Messages

- Littering offenses will be enforced
- Trash cans and dumpsters need proper management and oversight
- Illegal dumping is unacceptable and violators will be cited
- A strong enforcement message will discourage second offences

Target Audience

- WMD employees
- Prince George's County Police Department
- County/state Parks staff
- Educators and outreach coordinators who can serve as Litter Wardens

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Coordinate with WMD and Public Works to plan agenda ($750)
- Coordinate with Law Enforcement and Parks offices for training ($500)

Program Development

- Develop training material for 1 hr training sessions ($2,000)
- Design online reporting form (costs included in Virtual Outreach)

Program Implementation

- Cost to conduct training (30 pp for 2 hrs) ($7500)
- Five same WMD training to Police/Parks staff ($7,500)
- Increase staff (one 1.0 FTE or two 0.5 FTE) ($60,000)
- Measure success ($7,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Enforcement staff aware of anti-littering campaign
- One new full-time (or two part-time) employee to monitor enforcement program
- Online trash violation report form
- Increased revenue from littering citations

Metrics of Success

- Increased number of littering incidences reported online
- Initial increase, followed by a marked decrease in littering violations
- Decrease in number of second offenders

Existing Partnerships to Nurture

- Prince George's County Police Department
- County/State Park staff
- Private trash hauling companies
- Recycling services
- Alice Ferguson Foundation

New Partnerships to Develop

- Youth organizations and groups
- Faith-based organizations
- Neighborhood and homeowner associations
- Watershed non-profits

COMMUNITY OUTREACH CAMPAIGN	$56,000/yr *	30,680 lb trash/yr	$1.83/lb

Program Outcome: Behavior change throughout the County such that individuals find it unacceptable to leave litter unattended, resulting in less litter in streams.

Key Messages

- Taking care of trash at its source
- Littering laws are enforced
- Pick up litter to keep it out of your neighborhood and nearby streams
- Trash cans and dumpsters need proper maintenance and management
- Allowing trash to accumulate personifies unhealthy conditions and creates a negative public image

Target Audience

- County residents in the watershed
- Residences and business located within identified trash and dumping "hot spots"
- Those who use trash receptacles
- Community organizations
- Children and teens
- Neighbors to dumping locations

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Develop targeted list of community events and festivals ($1,000)
- Design logo and campaign slogan ($5,000)
- Gather information on translation services ($250)

Program Development

- Design flyers, posters, banners ($5,000)
- Coordinate staffing and materials for festivals and events ($2,500)
- Prepare Spanish versions of all material ($2,000)
- Printing of material ($5,000)

Program Implementation

- Staff festivals and events (paid staff and volunteers, 15 events) ($15,000)
- Disseminate material ($4,000)
- Measure success ($7,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Develop anti-littering campaign logo and slogan
- Attendance at community events and festivals
- Multi-language fact sheets, brochures and posters
- Trash can wrap around posters to be distributed to high and medium residential areas

Metrics of Success

- Initial increase, followed by a marked decrease in littering violations
- Decrease in the number of violations reported through website
- Increase in volunteers at clean up days
- Improvement on attitude surveys

Existing Partnerships to Nurture

- Alice Ferguson Foundation
- Trash Free Maryland
- Watershed organizations
- Recycling services
- Nonprofit Organizations
- Department of Transportation

New Partnerships to Develop

- Central Business Districts and Chambers of Commerce
- Youth organizations and groups
- Faith-based organizations
- Neighborhood and homeowner associations
- Prince George's County Police Department

NO DUMPING SIGNAGE INSTALLATION	$52,710/yr *	26,488 lb trash/yr	$1.99/lb

Program Outcome: Discourage illegal dumping by placement of no-dumping signs at hotspot locations and develop a relationship between those who formerly disposed illegally and the WMD.

Key Messages

- No illegal dumping
- Prevention of waste accumulation at hot spots
- Provide a free or discounted location which the litter can be taken legally
- Allowing trash to accumulate personifies unhealthy conditions and creates a negative public image

Target Audience

- County residents which dump litter rather than taking to landfill location or transfer stations
- Neighbors to dumping locations
- Contractors

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Identification of legal disposal locations near hot spot locations ($600)

Program Development

- Production/manufacturing of 55 signs ($2,750)

Program Implementation

- Cleanup of each location prior to sign installation ($19,360)
- Installation of signs at 55 hot spot locations ($13,750)
- Measuring Success [Quarterly visitation to dumping site to determine effectiveness and additional cleanup needed] ($7,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Determination of location where it is free or discounted to dispose of construction materials/other commonly dumped items
- Design and production of "no-dumping" signage that provides disposal location information and indicates use of cameras
- Cleanup of hotspot locations
- Installation of 55 signs at 55 hot spots identified in Implementation Plan

Metrics of Success

- Decrease in debris/litter discarded at hotspot locations
- Increased number of littering violations reported through website

Existing Partnerships to Nurture

- Recycling services
- Department of Transportation
- Waste Management Division
- Inmate Cleanup Groups

New Partnerships to Develop

- Prince George's County Police Department
- Neighborhood and Homeowner Associations near dumping sites

VIRTUAL OUTREACH CAMPAIGN	$85,350/yr *	34,300 lb trash/yr	$2.49/lb

Program Outcome: Create a visible online presence that will encourage behavior change which results in less litter in streams and more public participation in County's anti-littering campaign.

Key Messages

- Taking care of trash at its source
- Littering offenses can be enforced and reported online
- Pick up litter to keep it out of your neighborhood and nearby streams
- Trash cans and dumpsters need proper maintenance and management
- Litter cleanup creates a beautiful community
- When possible electronic copies should be used to reduce the litter stream in the community

Target Audience

- County residents in the watershed
- Residences and business located within identified trash and dumping "hot spots"
- Those who use trash receptacles
- Those who maintain trash receptacles (cans and dumpsters)
- Community organizations
- Children and teens
- Neighbors to dumping locations

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Obtain and refine electronic distribution list ($2,000)
- Coordinate email campaign with Public Works ($500)
- Coordinate with PSA campaign with Public Affairs ($1000)
- Coordinate press release schedule ($100)
- Coordinate with the County's web manager ($500)
- Gather information about website translation ($250)
- Develop scoping document for list serve tool ($1,000)

Program Development

- Develop newsletter content, layout, message ($2,500)
- Design cinema ads, electronic buttons/banners ($2,500)
- Create PSA campaign ($10,000)
- Draft press releases ($250)
- Develop website content and list serve tool (contractor) ($35,000)
- Prepare Spanish version of all materials ($2,000)

Program Implementation

- Newsletter and emails distribution (8 hrs/month) ($3,000)
- Run targeted cinema ad campaign (2 wks/month) ($5,500)
- Disseminate PSA campaign ($500)
- Distribute press releases periodically ($500)
- Post/troubleshoot web material and list serve ($2,000)
- Measure success ($7,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Electronic newsletters and email blasts
- Dedicated website for the County's anti-littering campaign (with incident reporting page)
- Multi-language electronic posters, banners, and buttons
- PSA campaign (radio, TV, cinema advertising, press releases)
- Social media campaign
- List serve for notifications

Metrics of Success

- Website hits
- Newsletter subscribers
- Decrease in the number of littering citations and reports (via website)
- Increase in volunteers at clean up days
- Improvement on attitude surveys

Existing Partnerships to Nurture

- Alice Ferguson Foundation
- Trash Free Maryland
- Watershed organizations
- Recycling services
- Nonprofit Organizations
- Department of Transportation

New Partnerships to Develop

- Central Business Districts and Chambers of Commerce
- Youth organizations and groups
- Faith-based organizations
- Neighborhood and homeowner associations
- Prince George's County Police Department

BUS, TRUCK, & BILLBOARD SIGNAGE	$172,550/yr *	69,000 lbs trash/yr	$2.50/lb

Program Outcome: Social change such that individuals are repulsed by littering and its affects due to signage and messaging at bus stops, shelters, busses, billboards, and on the sides of WMD trucks.

Key Messages

- Taking care of trash at its source
- Pick up litter to keep it out of your neighborhood and nearby streams
- Allowing trash to accumulate personifies unhealthy conditions and creates a negative public image
- When someone litters it affects all of us, and should be discouraged.

Target Audience

- County residents in the watershed
- Residences and business located within identified trash and dumping "hot spots"
- Commuters and residents which frequently drive or take transportation past billboards
- Those who use public transportation

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Design and Development of Signage (cost combined with program implementation cost)

Program Development

- Printing and Installation (cost combined with program implementation cost)

Program Implementation

- Post advertisement posters on County bus shelters where it is visible to the general public in 25 hot spot priority locations ($28,000)
- Post advertisement posters inside and outside of County busses ($15,500)
- Post large advertisement posters on 15 Solid Waste collection trucks within the County at hot spot locations ($16,800)
- Post 5 anti-littering billboards ($96,000)
- Measure success via attitude surveys and windshield trash surveys ($7,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Solid waste collection vehicle signage
- Posters inside and outside of busses
- Posters on bus shelters where it can be viewed by general public
- Billboards at 5 major hotspots

Metrics of Success

- Decrease in trash seen in vicinity of signs
- Increased use of trash receptacles at bus stops/shelters
- Initial increase, followed by a marked decrease of littering citations
- Increase in volunteers at clean up days

Notes:

- To institute just bus signage (at shelters and in/on buses it is $2.47/lb
- To institute just Solid Waste Collection Truck Signage it is $1.34/lb
- To institute just billboards it is $4.70/lb

Existing Partnerships to Nurture

- Department of Transportation
- Municipalities
- Non-profit Organizations
- Waste Management Division

New Partnerships to Develop

- Sports Franchises
- County Bus Drivers
- Neighborhood and Homeowners Associations

STORM DRAIN STENCILING	$6,250/yr *	1,900 lb trash/yr	$3.29/lb

Program Outcome: Mark 500 of the approximately 5,300 storm drains in the Anacostia Watershed within the County with messages that say "No Dumping, Drains to the Bay" (or similar). Volunteer hours and community group program.

Key Messages

- Litter cleanup creates a beautiful community
- Trash and litter placed or poured in the storm drains travels to the bay without being treated
- Targeting areas where motor oil would be poured down drains

Target Audience

- County Residents
- Children and Teens
- Community organizations
- Volunteers
- Individuals dumping motor oil

Pre-Program Planning

- Program already exists so pre-planning not necessary

Program Planning

- Sending emails to involve more community members/groups ($600)
- Sending baseline survey to know attitudes prior to stenciling storm drains ($2400)

Program Development

- Providing Stencils, spray paint, and directions to organized groups ($750)

Program Implementation

- Measuring success through a survey ($2,500)

*** Planning level cost includes program development, and implementation for 1 year.**

Deliverables

- Mark 500 storm drains per year, recording when and where marking occurs.

Metrics of Success

- Number of storm drains stenciled.
- Amount of used motor-oil being taken to motor-oil disposal or recycling facilities
- Social changes noted through a survey

Additional Information

- Storm drains also provide a form of education for those stenciling and individuals who read a stenciled storm drain (similar to a sign).
- Maryland DNR has a program established. (http://www.dnr.state.md.us/education/pdfs/stencil.pdf)
- After the first year surveys the subsequent years will cost $1.96/lb.

Existing Partnerships to Nurture

- MNCPPC
- Municipalities
- Anacostia Watershed Society
- Alice Ferguson Foundation
- Other Non-profits

New Partnerships to Develop

- Community organizations
- Faith Based Organizations
- Schools
- Additional non-profits

FlashCAM Camera Installation	$140,000/yr *	28,208 lb trash/yr	$4.96/lb

Program Outcome: Convict those who are illegally dumping throughout the Anacostia watershed to prevent people for illegally dumping in the future.

Key Messages

- Illegal dumping and littering is a crime
- Illegal dumping is being observed and is not acceptable within the County

Target Audience

- County Residents
- Those that illegally dump unwanted items

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Develop a list of location (Cost included in Full Time Employee Salary)
- Hire one full time employee ($60,000)

Program Development

- Purchase 26 FlashCAM cameras ($312,000)
- Assumed useful life is 5 years
- Assumed annual maintenance of 10% of purchase price

Program Implementation

- Install and Review Cameras (Cost included in Full Time Employee Salary)
- Measure success ($2,500)

Deliverables

- Hire full time employee
- Purchase cameras
- Install cameras
- Review camera footage
- Convict illegal dumping individuals

Metrics of Success

- Decrease in illegal dumping reports to hotline and website
- Initial increase followed by a marked decrease in the number of individuals being convicted for illegally dumping.

*** Planning level cost estimated as the average cost over a 5 year period, and includes both start-up and recurring costs.**

Existing Partnerships to Nurture

- Prince George's County Police Department
- Telephone hotline workers

New Partnerships to Develop

- County Residents
- Individuals which live near active hot spots or illegal dumping locations

STREET SWEEPING	$91,000/yr *	21,400 lb trash/yr	$4.25/lb

Program Outcome: Using a similar method that Berwyn Heights, College Park, Greenbelt, and New Carrollton already implement, set up an additional street sweeper to be shared by 4 other municipalities.

Key Messages
- Reduction of litter throughout the County

Target Audience
- County residents of all ages
- People within the community who see the street sweeper in use

Pre-Program Planning
- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning
- Identification expanded route ($1,200)

Program Development
- Purchasing a new sweeper ($112,280 per sweeper)
- Assumed useful life is 20 years

Program Implementation
- Labor Costs ($57,900)
- Maintenance Cost ($8,400)
- Tipping Fee ($650)
- Measurement of Success ($2,500)

*** Planning level cost estimated as the average cost over a 20 year period, and includes both start-up and recurring costs.**

Deliverables
- Determination of expanded route to use for street sweeper
- Purchasing an additional sweeper
- Implementing the extended route

Metrics of Success
- Decrease in litter seen on county roads and highways
- Quantify and record the amount of trash being disposed at the end of a route

Additional notes
- The majority of cost is associated with purchasing. In subsequent years cost would be approximately $70,000/yr or $3.27/lb

Existing Partnerships to Nurture
- Department of Transportation
- Waste Management Division

New Partnerships to Develop
- Assist in partnering 4 municipalities that are interested in the street sweeper program

STRUCTURAL BMPs	$53,000/yr *	3,940 lb trash/yr	$13.45/lb

Program Outcome: Installation of one structural Bandalong™ BMP in the Anacostia Watershed. Location should be chosen based on surveys that determined hot spot locations.

Key Messages

- Litter cleanup creates a beautiful community
- Preventing litter in the first place is easier than cleaning up after
- Education of the effects of litter

Target Audience

- County Residents
- Children and Teens
- Community organizations
- Volunteers

Pre-Program Planning

- Identify funding/sponsorship sources ($3,750)
- Secure funding from grantors, sponsors, and County sources ($5,000)

Program Planning

- Determine the location of the BMP ($600)

Program Development

- Purchasing and installation of Bandalong™ trash trap ($72,500)
- Sign and installation for BMP ($300)
- Assumed useful life is 10 years

Program Implementation

- Cleanout and Maintenance of BMP and measuring success($36,000)

Deliverables

- Purchase a Bandalong™ trash BMP.
- Create proposal for bid for contractor to install BMP
- Installation of Bandalong™ trash capture device
- Schedule for trash removal/maintenance

Metrics of Success

- Decrease in litter at target locations

*** Planning level cost estimated as the average cost over a 10 year period, and includes both start-up and recurring costs.**

Existing Partnerships to Nurture

- After-school programs
- MNCPPC
- Municipalities
- Anacostia Watershed Society
- Alice Ferguson Foundation
- Other Non-profits

New Partnerships to Develop

- Community organizations
- Faith Based Organizations
- Additional non-profits