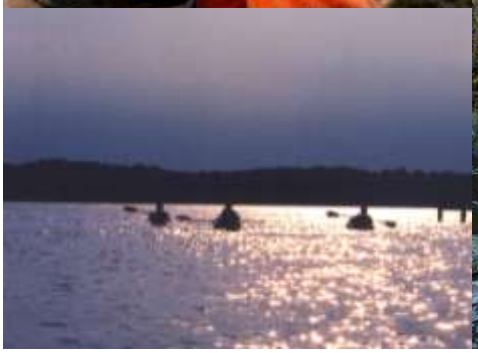
APPENDIX

water resources

NOVEMBER 2009

FUNCTIONAL PLAN



MONTGOMERY COUNTY PLANNING DEPARTMENT
THE MARYLAND–NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MontgomeryPlanning.org

abstract
This appendix contains background information and data in support of the Water Resources Functional Plan.

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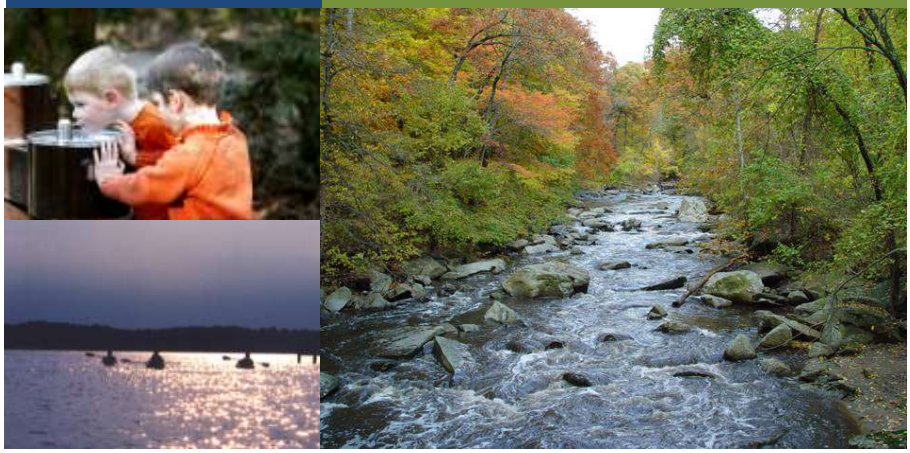
water resources



water resources

Functional Plan

Prepared by the Montgomery County Planning Department

November 2009

Contents

Introduction

Introduction

Appendices 1 through 4 contain selected excerpts, maps, and tables from the *Ten-Year Comprehensive Water Supply and Sewerage Systems Plan* (Water and Sewer Plan), with some additional water supply and wastewater information. The selected material presents water and sewer planning background information, and data pertaining to water and sewer capacities as the County continues to grow. The Water and Sewer Plan is the County's principal means for addressing all water and wastewater planning, policy, and technical issues, and documents ongoing efforts in Montgomery County to ensure a continued safe and adequate water supply.

The entire Water and Sewer Plan is available online at: www.montgomerycountymd.gov/waterworks

Appendices 5 and 6 contain WSSC information on water supply production and wastewater flow projections. Appendix 7 contains information pertaining to Agricultural Land protection and preservation in Montgomery County. Appendix 8 documents M-NCPPC's Nutrient Loading Analysis of existing land cover conditions and of two 2030 land cover scenarios. Appendix 9 summarizes the interagency coordination and public outreach that was undertaken during plan development.

Appendix 1

Information on WSSC Programs and Initiatives and Excerpts, Selected Maps, and Tables from Chapter 1 of the Water and Sewer Plan

Information on WSSC Programs and Initiatives

WSSC Capital Improvement Program (CIP)

WSSC submits a Six-Year Capital Improvements Program (CIP) annually to the County for interagency review and for modification and adoption by the County Council. WSSC prepares and submits the CIP for major community water and sewerage projects to the County as part of its responsibility to plan and finance the water supply and sewerage system. WSSC and the Executive work together in the preparation of relevant portions of the WSSC's proposed CIP and related facility plans. The County incorporates the adopted WSSC annual CIP and subsequent amendments as updates to the Water and Sewer Plan, which serve to substantially fulfill the fiscal planning requirements of state law and regulations. Public hearing advertisements shall indicate that the Council's action on WSSC's CIP is also an update to the Comprehensive Water Supply and Sewerage Systems Plan. WSSC implements the approved County CIP for major water and sewerage facilities by designing, constructing, operating, and maintaining water systems and acquiring facility sites and rights-of-way. The two County Councils annually review and adopt the WSSC CIP and operating budgets.

Appendix A of the Comprehensive Water and Sewerage Systems Plan contains a summary listing of major planned water and wastewater projects contained in the approved CIP for the Montgomery County portion of WSSC, and the City of Rockville. The CIP projects listed generally include planning, design, land acquisition, and construction of new facilities. These CIP projects include system improvements to comply with federal and/or state and local mandates, and new facilities to support new development in accordance with the County's approved plans and policies for orderly growth and development. The latest WSSC CIP documentation is available on the WSSC website at: www.wsscwater.com

WSSC Budget

WSSC prepares an annual budget for all its programs and operations. The latest WSSC budget documentation is available on the WSSC website at: www.wsscwater.com

WSSC Programs and Initiatives

WSSC Consent Decree

Sanitary systems overflow problems in recent years resulted in a remedial consent decree. On December 7, 2005 a civil consent decree was entered in the United States District Court for the District of Maryland to dramatically reduce, and eliminate where possible, sanitary sewer overflows from the WSSC sanitary sewer collection system. Under the terms of the consent decree, WSSC is required to implement over the next 14 years numerous reporting, monitoring, inspection, maintenance, repair and replacement remedial measures for its sewer collection system in order to eliminate sewer overflows. WSSC is required to perform supplemental environmental projects in the amount of $4.4 million toward the purchase or acquisition of Patuxent Reservoir buffer properties and easements for water supply protection, and private property inflow elimination. WSSC has worked closely with partners at the federal, state and local levels to develop a proactive plan that will augment our existing efforts to maintain, identify and repair problem areas within its 5,300-mile sewer system. For more information see the WSSC website:
http://www.wsscwater.com/info/sso/index.cfm

WSSC Utility and Asset Management Master Plan

Growing system rehabilitation needs due to aging buildings, tanks, facilities, and buried infrastructure have led WSSC to undertake a utility-wide master plan that will review all aspects of the water supply and wastewater treatment infrastructure. To ensure that the master plan meets the present and future needs of the service area, the planning process will consider changes in capacity, required maintenance, rehabilitation and replacement of existing infrastructure, process control, and energy conservation opportunities as a means of ensuring reliability and effectiveness. The plan will include an asset

management strategy to provide for the systematic planning, acquisition, deployment, utilization, control, and decommissioning of capital assets. It will integrate strategic-level, mid-level, and operational-level management decisions to maximize the value of the asset per dollar invested.

The project is planned to be completed in several phases, and will include:

- Development of a 30-year capital projection and 10-year financial plan that will form the basis for future budgeting and rate setting
- Development of a utility-wide master plan and asset management implementation strategy plan
- Development of subsystem and/or facility master plans
- Preparation of economic and technical analyses
- Development of requirements for sub-systems and facilities.

Water and Sewer Plan, Chapter 1: Objectives and Policies

Chapter 1 of the Water and Sewer Plan includes an introduction to the Plan, identifying its purpose, legal context, and governance issues. It outlines the plan's goals and objectives for the orderly and cost-effective development of community water supply and sewerage systems, and summarizes the Plan's structure and content. It describes the government responsibilities, coordination, general financing, and planning process used in Montgomery County to stage and implement water and sewer infrastructure improvements, including identification of policies and a review of the procedures for the adoption of amendments and/or modifications to the Plan. It also includes both general and special-condition policies that have been adopted by the County Council for the designation of community water and sewer service area, which regulate water and sewerage system extensions, connections, and their staging. For more information on these elements, see Chapter 1 of the Comprehensive Water and Sewerage Plan.

Excerpts from Chapter 1

1.II.C Water and Sewer Service Planning in the Development Review Process The provision of water and sewer service for new development is an integral part of the County's evaluation of development proposals. DEP's primary involvement in the County's development review process includes the following:

1.II.C.1 Development Plan Review The M-NCPPC Development Review Division manages the County's Development Review Committee (DRC), an interagency group which meets regularly to review and evaluate proposed development plans. DEP is the lead agency in the DRC with regard to water and sewer service planning issues. DEP staff report to the DRC on the consistency of the water and sewer service components of development proposals with respect to the County's Water and Sewer Plan. In order for a development proposal to proceed to the Planning Board for consideration, DEP and M-NCPPC staff need to confirm the consistency of the development plan with the policies and service area designations in the Water and Sewer Plan. WSSC staff also participates in this process with a focus on water and sewer systems design and capacity.

1.II.C.2 Record Plat Review and Approval Process Record plats legally establish subdivided properties in the County's land records. DEP staff review record plats prior to recordation to ensure that the type of water and sewer service intended to serve the development proposed by the plat is consistent with policies and service area designations in this Plan. As required by MDE, DEP staff also calculates a sewage treatment flow commitment for each plat which depends on community sewer service. MDE and WSSC track these flow commitments relative to the available treatment capacity at the appropriate sewage treatment plant in order to ensure that adequate treatment capacity is available for development approved by the County.

1.II.D.4 Consistency with Comprehensive Planning Policy Water and/or sewer service should be extended systematically in concert with other public facilities along the corridors as defined in the General Plan, to

accommodate growth only in areas covered by adopted local area master or sector plans. Guidance for the type, amount, location and sequence of growth is contained in the comprehensive planning policies of the County as adopted by the County Council. These policies are expressed in detail in the General Plan and the various master and sector plans which constitute amendments to the General Plan. Various functional plans, such as the Water and Sewer Plan, should be consistent with these comprehensive planning policies. In addition, the Water and Sewer Plan should consider other adopted or proposed policies of various agencies affecting land use, including guidelines for the administration of the Adequate Public Facilities Ordinance.

The Comprehensive Water and Sewerage Plan intends that water and sewer service decisions should follow and implement the land use and development guidance established in the County's General Plan and local area master plans. A variety of factors influence policy decisions concerning the density or type of development for a particular area: overall land use guidance; transportation and school capacity; environmental protection; local and county-wide housing and commercial demand; compatibility with existing development; and suitability for individual, on-site systems. The proximity of water and/or sewer mains to an area of the county, also one of these factors, should not serve as the primary driver of these policy decisions. The availability of community service can provide for development options, such as cluster, which might not be possible with the use of individual systems. [See Chapter 1 of the Water and Sewerage Plan for details on these polices.]

Other Water Supply and Sewerage Systems Policies

More specific policies regarding water supply issues may be found in Chapter 3 *Water Supply Systems*, while additional wastewater-related policies are incorporated into Chapter 4 *Sewerage Systems.* See Chapters 3 and 4 of the Water and Sewerage Plan for detailed information on these policies.

1.IV Water and Sewerage Systems Financing

A. Washington Suburban Sanitary District The planning, design, land acquisition, and construction of water supply and sewerage system infrastructure is financed by two separate programs in the WSSD: the Major Systems and General Construction Programs.

1. **Major Facilities Program** The WSSC major facilities program includes projects adopted in the WSSC CIP: water and sewage treatment plants, pumping stations, storage facilities, and program size mains. Program size mains are water mains 16 inches in diameter and larger and sewer mains 15 inches in diameter and larger. WSSC finances these projects through water supply and sewage disposal bonds, developer contributions, systems development charges (SDC), grant funds, and other less significant sources. Bonds to construct program-size facilities are amortized through revenues generated primarily by basic water and sewer user charges. Rate-supported debt is used to fund capital projects providing general system and environmental regulation-related improvements. Capital projects which support only new system growth are constructed through the System Extension Permit (SEP) process with either SDC funds or solely financed under Memoranda of Understanding (MOU) so that current water and sewer user rates do not support new growth. This also applies to capital projects which only in part support new growth to the extent that WSSC determines. During construction of major facilities, WSSC provides credit against SDC fees (in the amount of 50 percent of the estimated total construction fees) to the developer financing capital projects. Once the developer completes construction and WSSC performs a final audit, WSSC initiates quarterly reimbursements based on available SDC funds in the geographic area served by the facility.

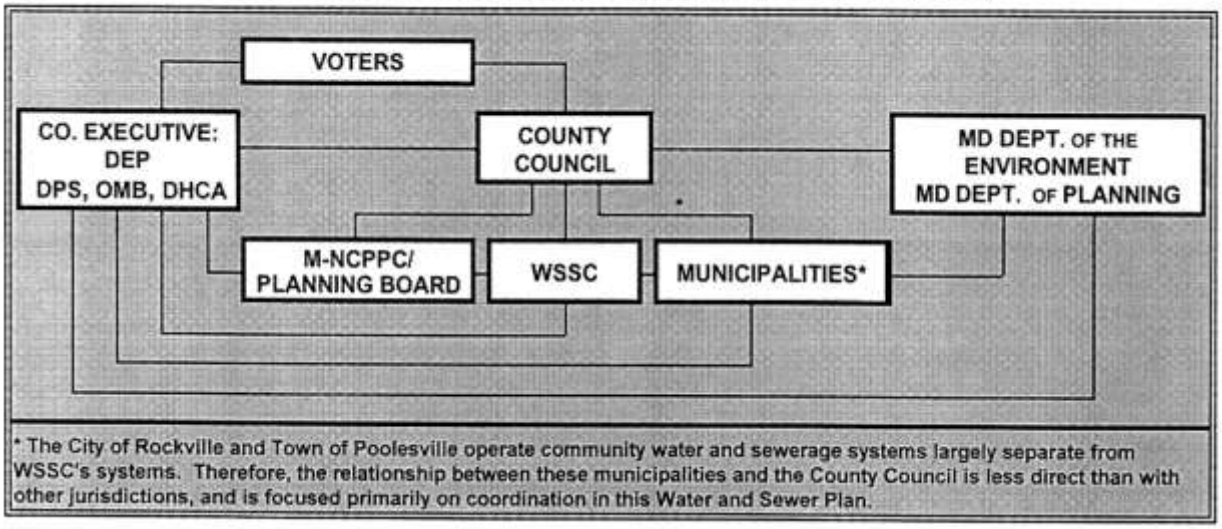
   In certain cases, WSSC may authorize a developer to not only construct, but to also maintain and operate, elements of the community system. Most often, these are private, on-site, central

wastewater pumping stations serving commercial development. WSSC may also authorize the construction of private interim wastewater pumping stations to serve residential development pending the construction of permanent, WSSC-owned and -operated facilities. WSSC shall coordinate the approval of these private facilities with DEP prior to their authorization, especially where those facilities could appear, or have appeared, as projects in the WSSC CIP.

Selected Maps and Tables from the Water and Sewer Plan, Chapter 1: Objectives and Policies

Table 1-T2: Service Area Categories	
Service Area Categories	**Category Definition and General Description**
W-1 and S-1	Areas served by community systems which are either existing or under construction. – This may include properties or areas for which community system mains are not immediately available or which have not yet connected to existing community service.
W-2 and S-2	**Categories W-2 and S-2 are not used in Montgomery County.** (State definition: Areas served by extensions of existing community and multi-use systems which are in the final planning stages.)

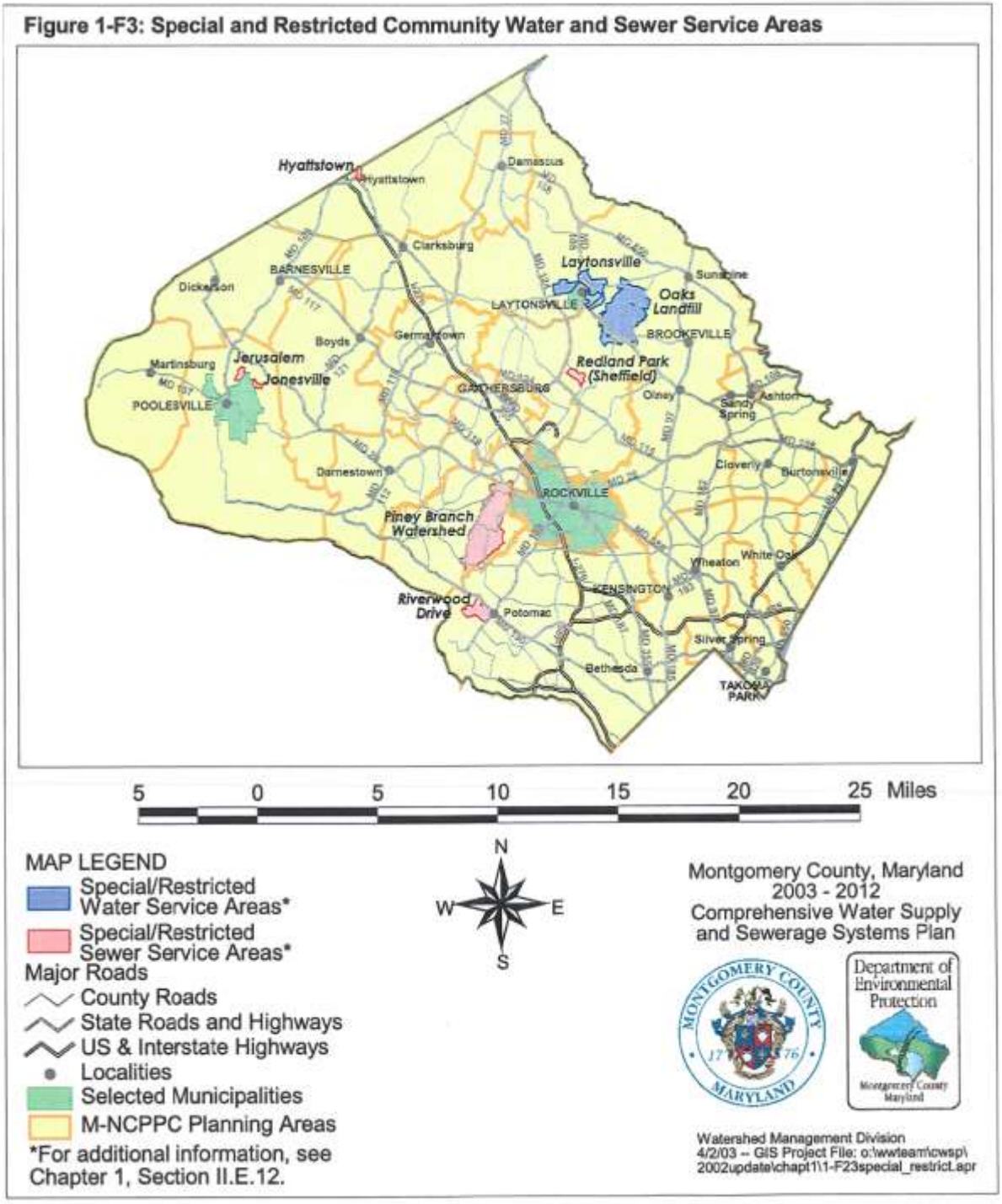
Figure 1-F1: Government Responsibilities for Water and Sewerage System Planning



* The City of Rockville and Town of Poolesville operate community water and sewerage systems largely separate from WSSC's systems. Therefore, the relationship between these municipalities and the County Council is less direct than with other jurisdictions, and is focused primarily on coordination in this Water and Sewer Plan.

Table 1-T2: Service Area Categories	
Service Area Categories	**Category Definition and General Description**
W-3 and S-3	Areas where improvements to or construction of new community systems will be given immediate priority and service will generally be provided within two years or as development and requests for community service are planned and scheduled.
W-4 and S-4	Areas where improvements to or construction of new community systems will be programmed for the three- through six-year period. – This includes areas generally requiring the approval of CIP projects before service can be provided.
W-5 and S-5	Areas where improvements to or construction of new community systems are planned for the seven- through ten-year period. – This category is frequently used to identify areas where land use plans recommend future service staged beyond the scope of the six-year CIP planning period.
W-6 and S-6	Areas where there is no planned community service either within the ten-year scope of this plan or beyond that time period. This includes all areas not designated as categories 1 through 5. – Category 6 includes areas that are planned or staged for community service beyond the scope of the plan's ten-year planning period, and areas that are not ever expected for community service on the basis of adopted plans.

Figure 1-F3: Special and Restricted Community Water and Sewer Service Areas



For more detailed information on water and sewer planning objectives, policies, interagency responsibilities and coordination, and financing, see Chapter 1 of the Water and Sewer Plan.

Appendix 2

Selected Maps and Tables from Chapter 2 of the Water and Sewer Plan

Water and Sewer Plan, Chapter 2: General Background

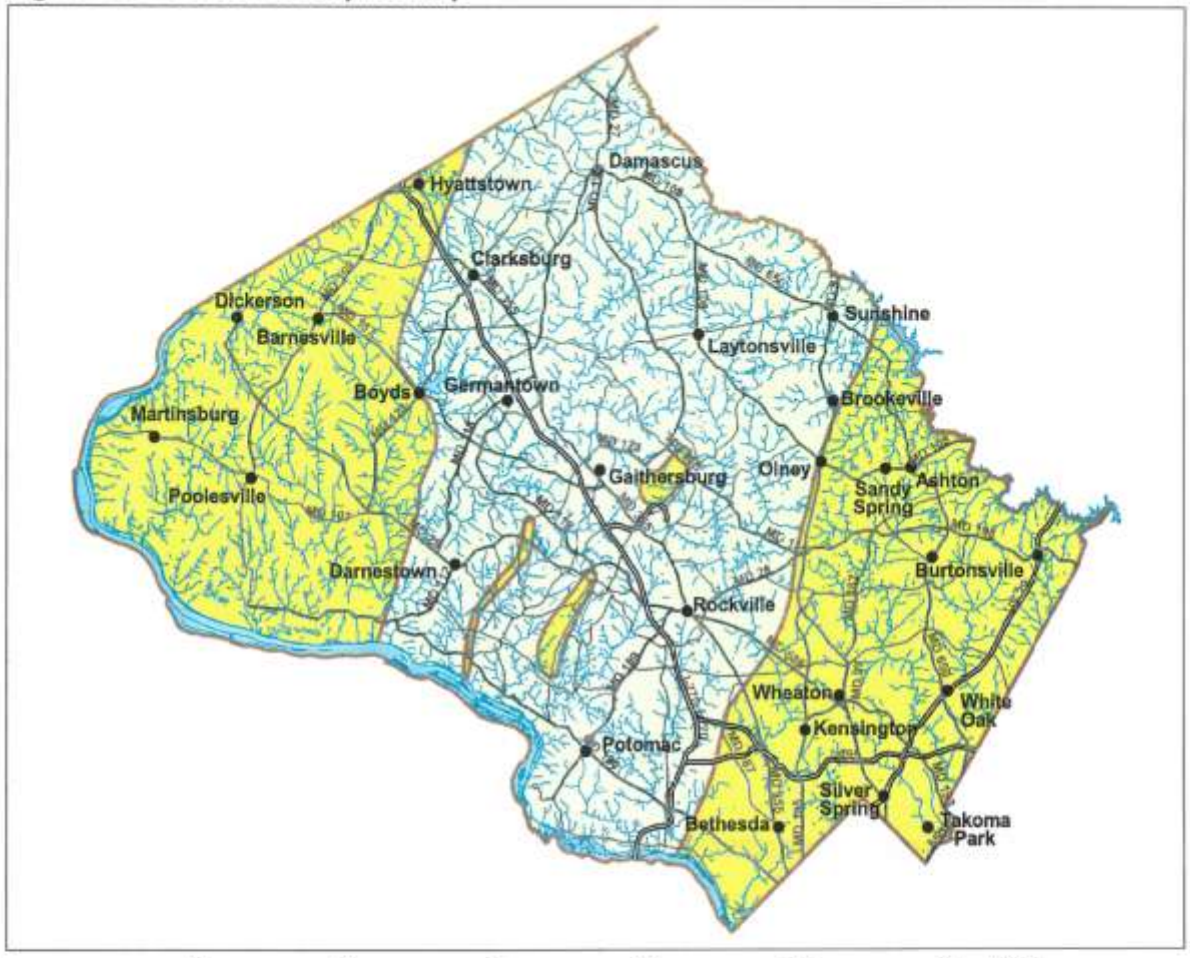
Chapter 2 of the Water and Sewer Plan provides an overview of the natural and cultural environments of Montgomery County "relevant to issues involving water supply, sewerage systems, rural sanitation planning, and water resources."

The following maps and other graphics depict information related to watersheds, stream classifications, topography, and other natural features such as soils, geology, and groundwater that are the background for resource protection.

This chapter also includes cultural background including planning issues demographics, land use, and development patterns. This information, in coordination with the policies adopted in the County's General Plan as amended by master and sector plans, is used to identify areas of the County subject to development, and that may require new or expanded water supply and sewerage systems.

Selected Maps and Tables

Figure 2-F4: Generalized Aquifer Map



5 0 5 10 15 20 Miles

MAP LEGEND

- Communities

Major Roads
- County Roads
- State Road and Highways
- US & Interstate Highways

Streams
Lakes - Ponds - Rivers

County Aquifer Units

Unit II: The yields of wells in this unit range from less than 1 gallon per minute (gpm) to about 320 gpm. In this unit there is about a 6% chance of getting a yield of 50 or more gpm.

Unit III: The yields of wells in this unit range from less than 1 gpm to 200 gpm. In this unit there is only a 2% chance of getting a yield of 50 or more gpm.

N W E S

Source: "The Quantity and Natural Quality of Groundwater in Maryland," - MD Dept. of Natural REsources, 1982

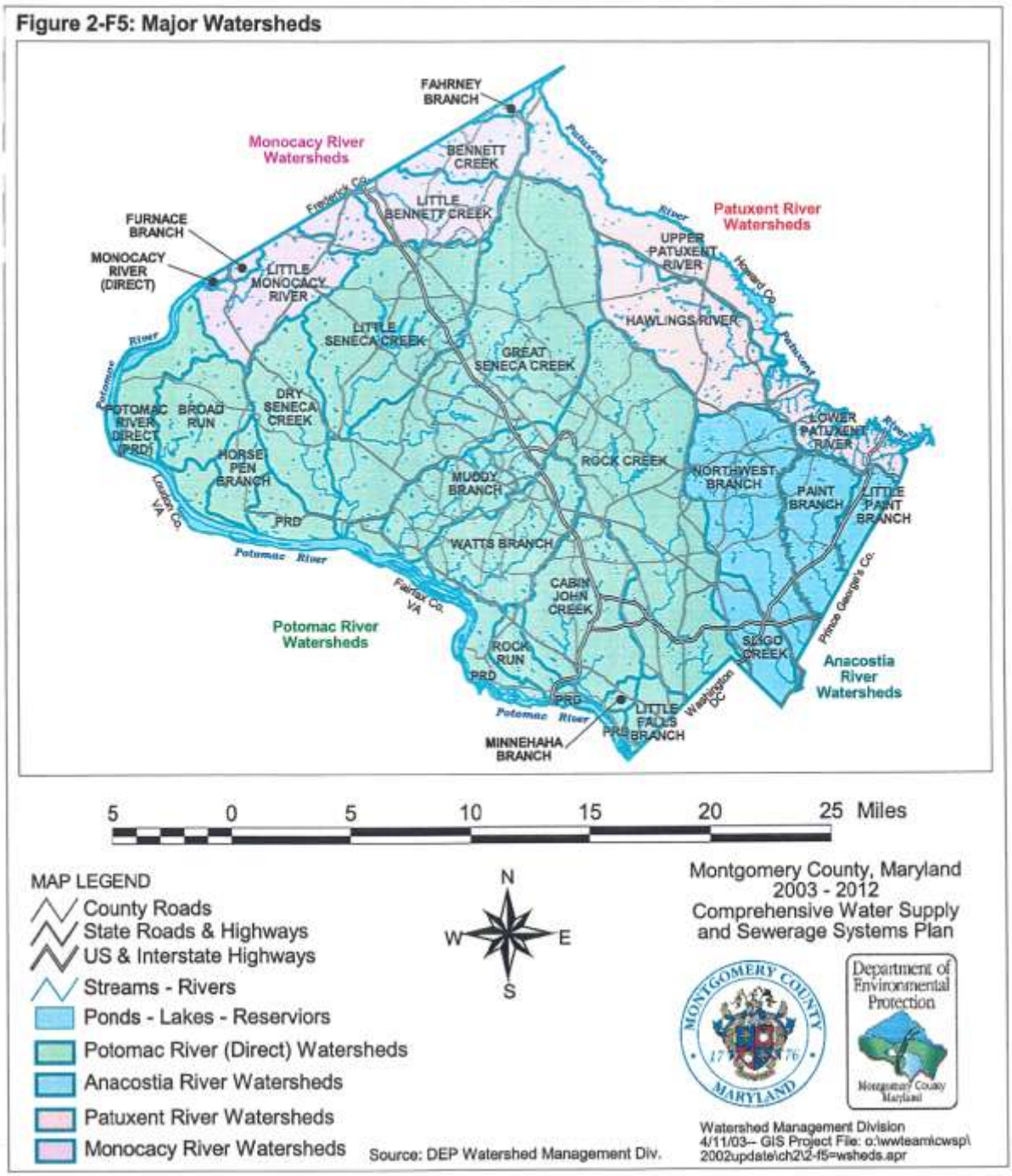
Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply and Sewerage Systems Plan

Department of Environmental Protection

Watershed Management Division
6/13/03-- GIS Project File: o:\wwteam\cwsp\2002update\chap[2\2-F4=aquifers.apr

Table 2-T2: County Watershed Drainage Areas			
Watershed	**Area** (acres)	**Watershed**	**Area** (acres)
Anacostia River Watersheds	**38,062**	**Potomac River (Direct) Watersheds**	**206,231**
Little Paint Branch	3,496	Broad Run	9,227
Northwest Branch	19,603	Cabin John Creek	15,836
Paint Branch	9,453	Dry Seneca Creek	12,335
Sligo Creek	5,510	Great Seneca Creek	45,679
Monocacy River Watersheds	**31,903**	Horsepen Branch	6,733
Bennett Creek	6,179	Little Falls Branch	3,184
Fahrney Branch	829	Little Seneca Creek	25,145
Furnace Branch	493	Minehaha Branch	909
Little Bennett Creek (2 parts)	12,831	Muddy Branch	12,163
Little Monocacy River	11,571	Potomac River Direct	18,155
Monocacy River Direct	340	Rock Creek	39,363
Patuxent River Watersheds	**38,498**	Rock Run	3,211
Hawlings River	18,017	Watts Branch	14,291
Lower Patuxent River	7,226		
Upper Patuxent River	13,255	**Total County Watersheds**	**314,694**
Source: Countywide Stream Protection Strategy, Feb. 1998			

Figure 2-F5: Major Watersheds



5 0 5 10 15 20 25 Miles

MAP LEGEND

- County Roads
- State Roads & Highways
- US & Interstate Highways
- Streams - Rivers
- Ponds - Lakes - Reservoirs
- Potomac River (Direct) Watersheds
- Anacostia River Watersheds
- Patuxent River Watersheds
- Monocacy River Watersheds

N W E S

Source: DEP Watershed Management Div.

Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply and Sewerage Systems Plan

Department of Environmental Protection
Montgomery County Maryland

Watershed Management Division
4/11/03-- GIS Project File: o:\wwteam\cwsp\2002update\ch2\2-f5=wsheds.apr

Table 2-T3: State Watershed Use Designations	
Designation	**Definition**
Use III	**Natural trout waters.** Waters which are suitable for the growth and propagation of trout, and which are capable of supporting self-sustaining trout populations and their associated food organisms.
Use III-P	**Natural trout waters and public water supply.** Waters which include all uses identified for Use III waters and are used as a public water supply.
Use IV	**Recreational trout waters.** Waters which are capable of holding or supporting adult trout for put and take fishing, and which are managed as a special fishery by periodic stocking and seasonal catching (cold or warm waters).
Use IV-P	**Recreational trout waters and public water supply.** Waters which include all uses identified for Use IV waters and are used as a public water supply.
Use I	**Water contact recreation and protection of aquatic life.** Waters which are suitable for: water contact sports, play and leisure time activities where the human body may come in direct contact with the surface water; fishing; the growth and propagation of fish (other than trout); other aquatic life, and wildlife; agricultural water supply; and industrial water supply.
Use I-P	**Water contact recreation, protection of aquatic life and public water supply.** Waters which are suited for all uses identified in Use I and are used as a public water supply.
Use II	**Shellfish harvesting waters.** Waters where shellfish are propagated, stored or gathered for marketing purposes; and where there are actual or potential areas for the harvesting of oysters, softshell clams, hardshell clams, and brackish water clams. (*Note: There are no Use II waters within Montgomery County.*)

Figure 2-F7: State Water Use Designations

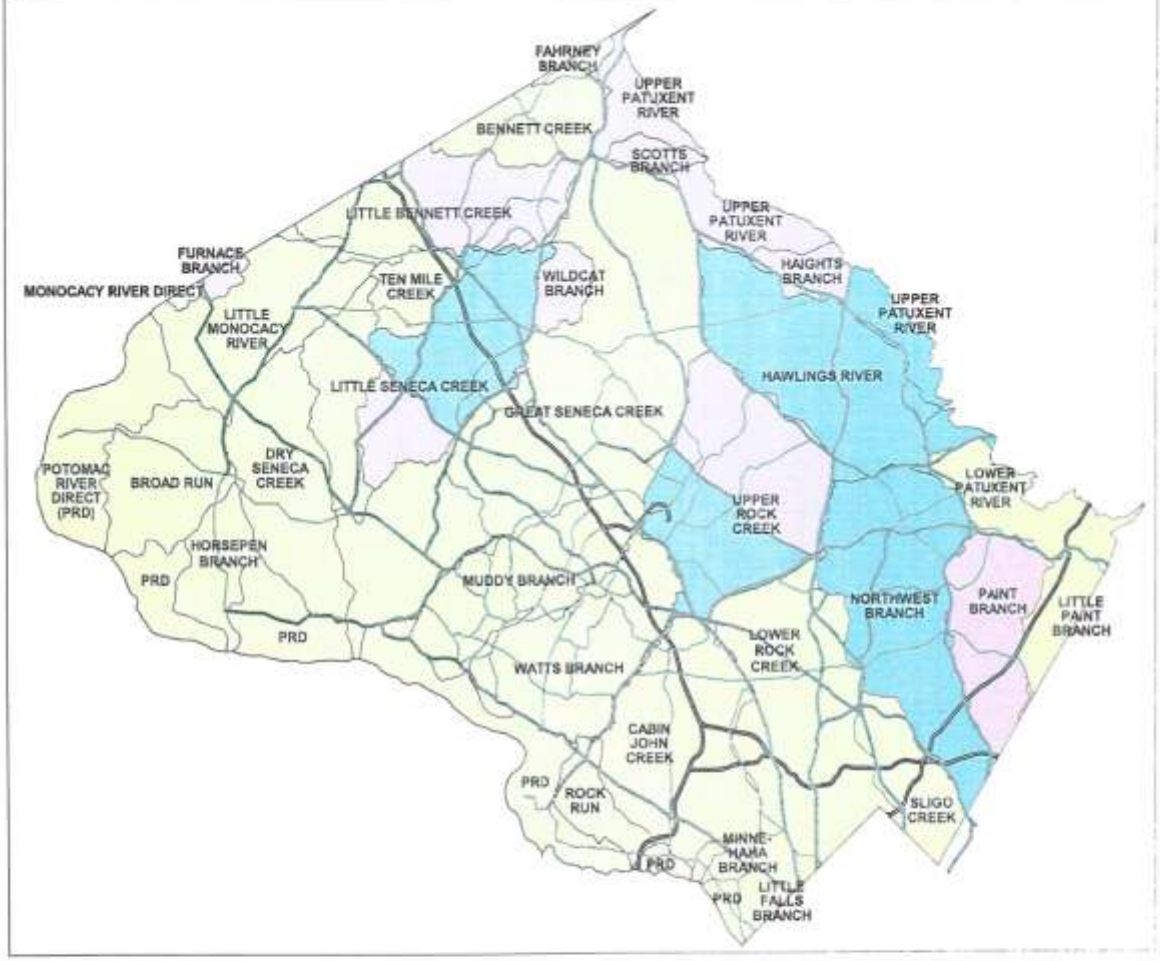


Figure 2-F9: Wedges & Corridors Geographic Componnents

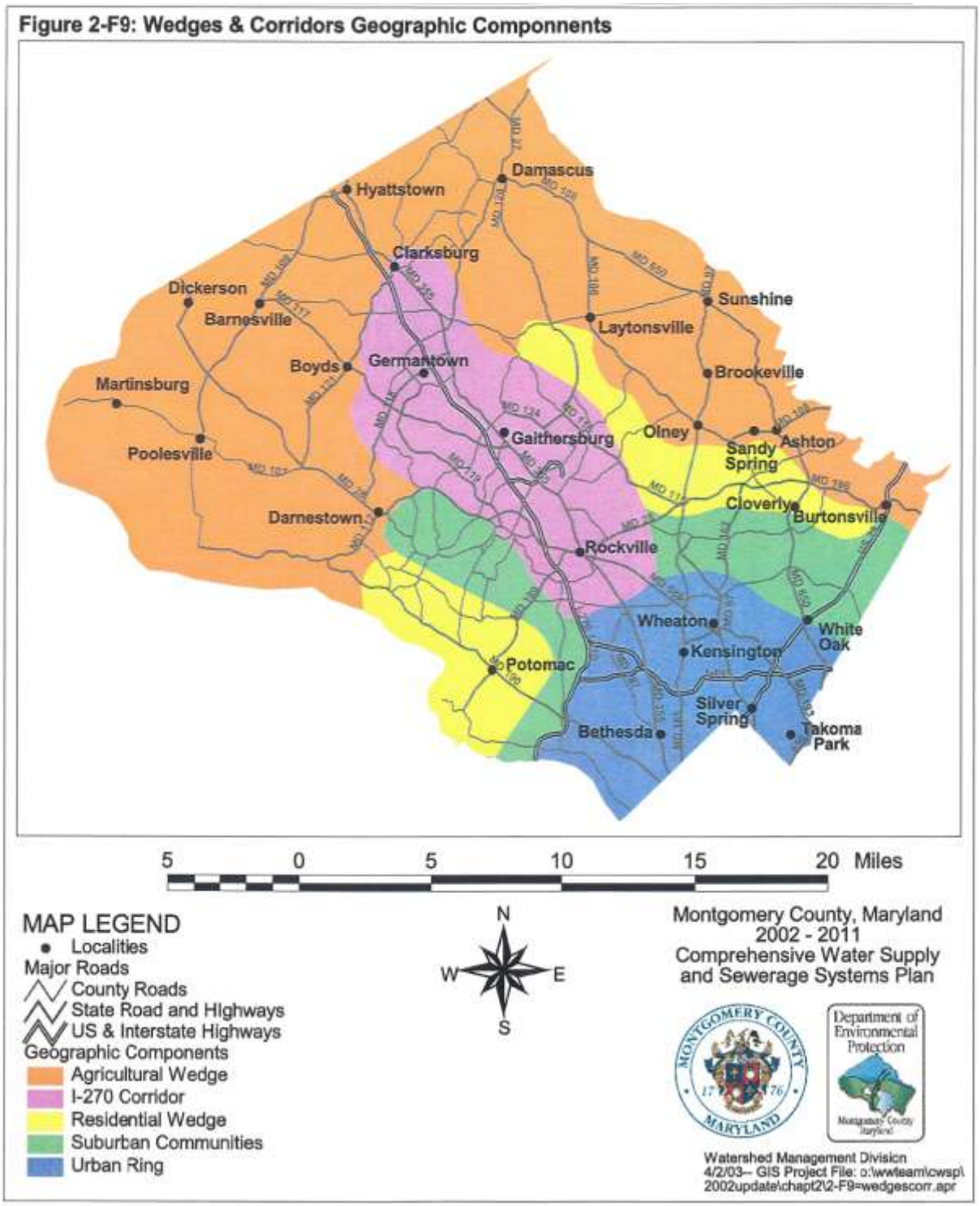


Figure 2-F10: Smart Growth Areas

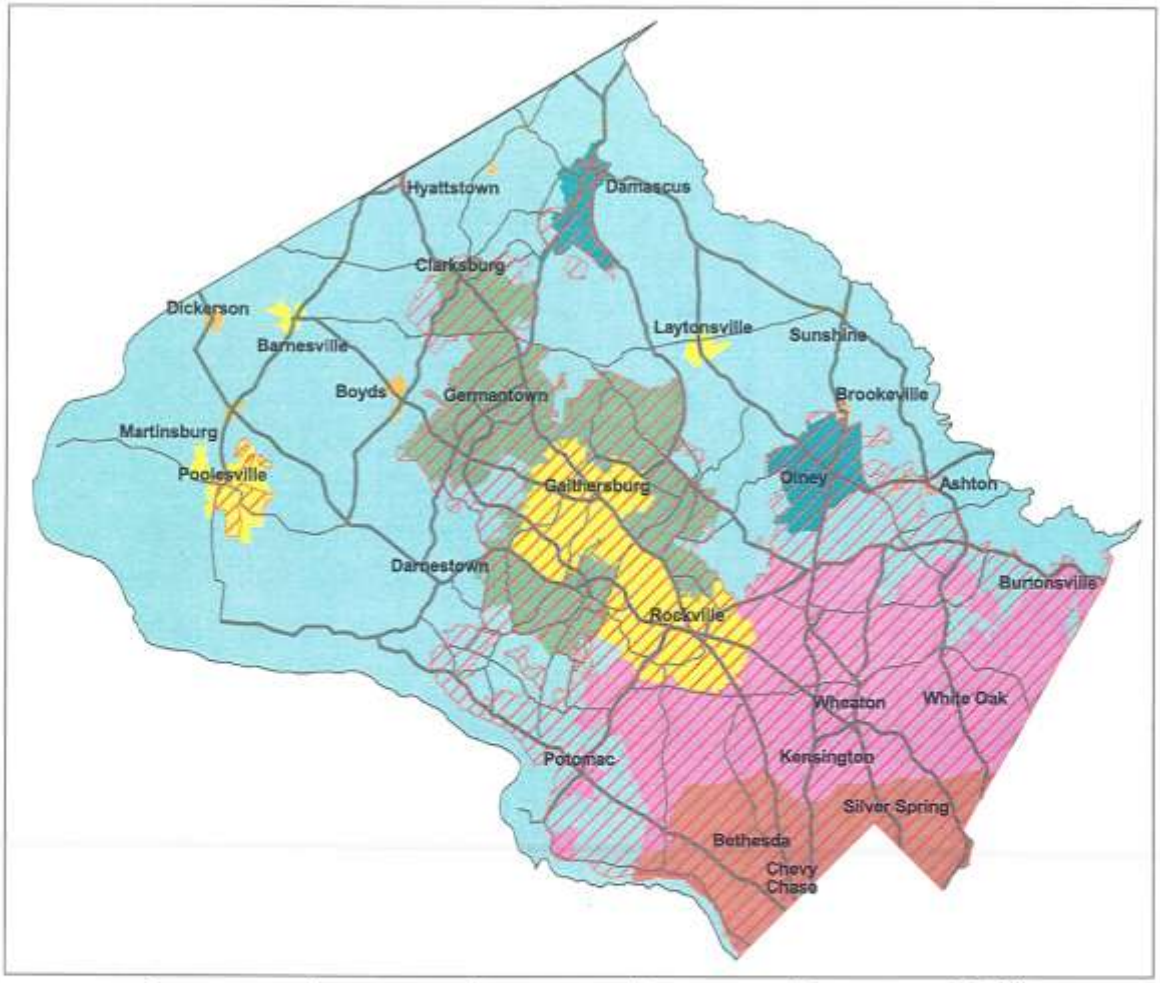
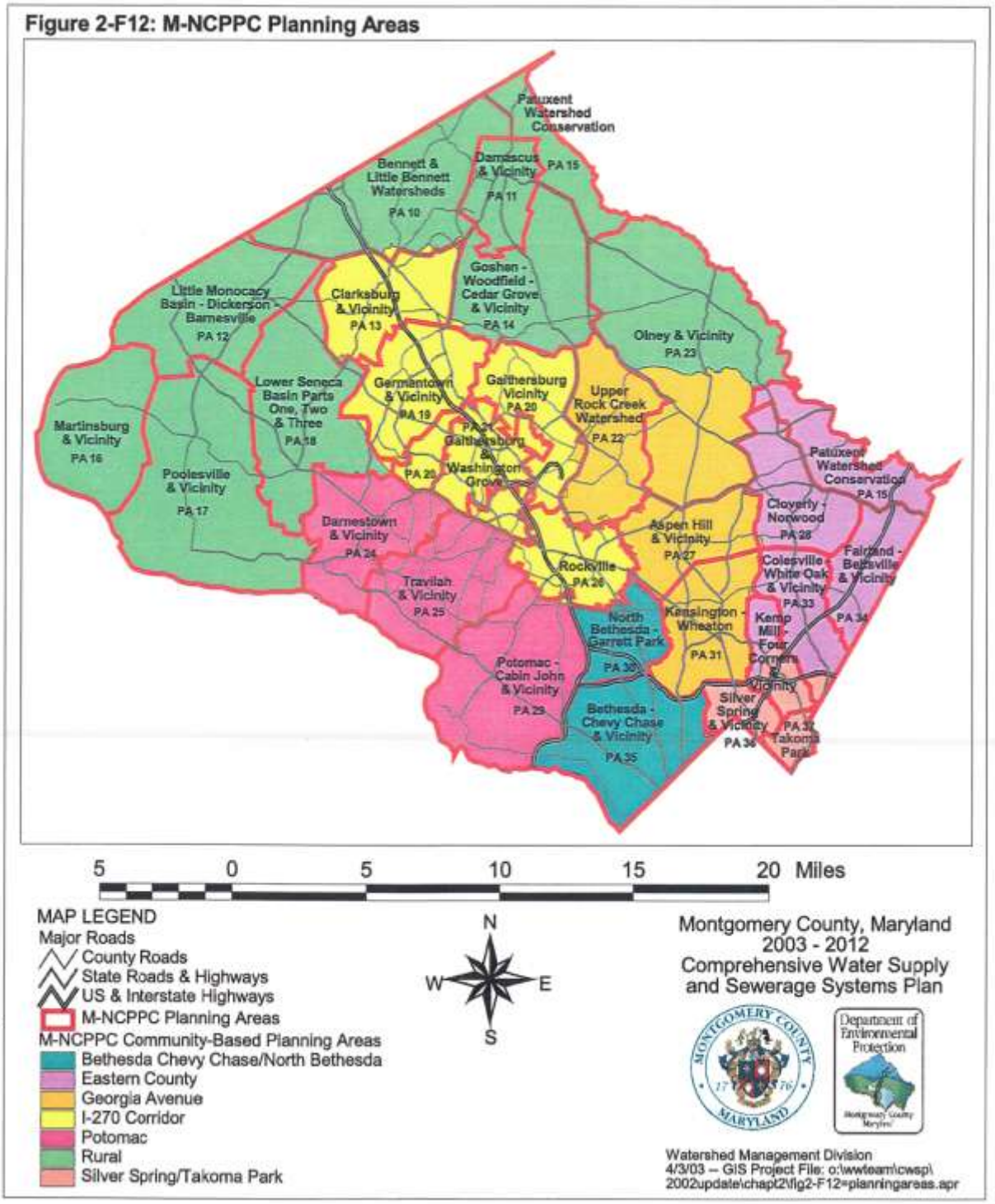


Figure 2-F12: M-NCPPC Planning Areas



For more detailed general background information, see Chapter 2 of the Water and Sewer Plan.

Appendix 3

Information on Water Supply Issues and Excerpts, Selected Maps, and Tables From Chapter 3 of the Water and Sewer Plan

Information on Water Supply Issues

Potomac Source Water Assessment

The following recommendations were made in the Maryland Department of the Environment's 2002 Source Water Assessment for the WSSC Potomac WFP to protect the watershed and river and ensure a safe and adequate water supply for WSSC customers (Responses to these recommendations to date are bulleted below each recommendation).

- Formulation of a watershed protection group representing all stakeholders. Among other things, this group should have aggressive involvement in upstream agricultural and animal farming Best Management Practices (BMP) implementation plans to address nutrient, bacteria, and pathogen loads.

    - The Potomac Drinking Water Source Protection Partnership was formed in 2004 and now includes 18 water suppliers and government agencies focused on protecting drinking water sources in the Potomac River basin.

    - This should be addressed by the Partnership. Partnership priority areas of focus are pathogens, emerging contaminants, disinfection by-products, early warning and emergency response, and agricultural and urban issues. The Ag workgroup is working on an initiative to educate the agricultural community on the risks presented to drinking water by Cryptosporidium. This will include identifying BMPs that can be implemented on farms to reduce the risk. In almost all cases, these BMPs would also help address nutrient and bacteria loads as well.

    - The Partnership received a grant from the EPA to conduct a crypto source monitoring project in 2006. The results of this research indicated that while crypto is present in our source waters, the species that is a human health risk was not found. At the same time, it was shown that a species known to infect cattle, is indeed present and therefore that there remains a risk to humans if cattle become infected with the species known to affect humans.

- Serious consideration should be given to an upgraded intake structure with flexibility to withdraw water from a submerged mid-channel location. As previously noted, such a structure would help moderate changes to raw water quality at the Potomac WFP intake.

    - A feasibility study is underway; however no funding was available in the WSSC's current fiscal year CIP.

- Preparation of a proactive spill management and response plan to minimize the risk of contamination resulting from spills in the watershed.

    - The Early Warning and Emergency Response workgroup continues to work with emergency response agencies and the water utilities to prepare for a hazardous spill within the basin. In 2008, an exercise was held in conjunction with the EPA, U.S. Department of Transportation, and Colonial Pipeline to improve communication and identify roles and responsibilities of the various players. Following up on this meeting, the intake locations in the Potomac River were sent to Colonial Pipeline for incorporation in to their intake database and further discussions were held with the EPA unified command and the metropolitan area utilities on the role of utilities in the event of a spill and how best to communicate accurate information.

- The Interstate Commission on the Potomac River Basin coordinates spill management and has a time-of-travel model. The Council of Governments has a Potomac River Spill Notification system.

- Consideration of appropriate source evaluation and management practices for fecal contamination to improve public health protection.

  - The Potomac Drinking Water Source Protection Partnership is investigating improvements in sampling, detection, and control of cryptosporidium in the Potomac River basin.

  - This would be addressed in a variety of ways through the Partnership Ag, Urban, and Pathogens workgroups that often address non-point source issues.

Patuxent Source Water Assessment

The following recommendations were made in the Maryland Department of the Environment's 2004 Source Water Assessment for the WSSC Patuxent WFP to protect the reservoirs and ensure a safe and adequate water supply for WSSC customers (Responses to these recommendations to date are bulleted below each recommendation).

- Strengthen the existing Patuxent Reservoirs Watershed Protection Agreement (established in 1996).

- Expand protected property within the watershed and improve management of forested lands.
  - WSSC to spend approximately $3.29 Million for property and/or conservation easements under Sanitary Sewer Overflow Consent Decree.

- Enhance WSSC's existing water quality sampling program.
  - Sampling is done twice per month for nine months per year and coordinated with routine raw water sampling done at the Patuxent Water Filtration Plant.

- Reduce phosphorus loadings.
  - There is a TMDL which addresses phosphorus.

- Implement controls for spills at major highway crossings.

- Analyze traffic accident statistics and patterns to identify potential problem/spill locations including potential impacts of the proposed Inter County Connector (ICC) on reservoir water quality.
  - The ICC alignment is now out of the Patuxent reservoir watershed.

- Establish notification and emergency response procedures for potential contaminant sources.

Functional Master Plan for the Patuxent River Watershed

The Functional Master Plan for the Patuxent River Watershed was approved and adopted in 1993 to implement the recommendations of the Patuxent River Policy Plan in Montgomery County. The plan detailed strategies and recommendations for the watershed, and established an interagency process for addressing issues related to the Patuxent River and its reservoirs, as well as the Patuxent River Primary Management Area (PMA). The Patuxent PMA is implemented through Montgomery County's Environmental Guidelines.

Patuxent Reservoirs Protection Group

In 1993, the Montgomery County Council approved a Function Master Plan for the Patuxent River Watershed including the Patuxent Reservoirs. One primary recommendation from this plan was the formation of an interjurisdictional partnership to protect the long-term integrity of the Patuxent Reservoirs system. As a result, the Patuxent Reservoir Protection Group (PRPG) formed later in 1993 to address watershed management issues addressed in the Functional Master Plan. The PRPG is comprised of the Patuxent River Reservoirs Policy Board, and the Patuxent Rivers Reservoirs Technical Advisory Committee (TAC) that advises the Policy Board and creates an annual report. The original PRPG consisted of representatives from local jurisdictions and completed an interim report called Developing a Patuxent Reservoir Protection Strategy in 1995.

In 1996, the Patuxent Reservoirs Watershed Protection Agreement was ratified by executives of seven agencies including Howard, Montgomery, and Prince George's Counties; Howard and Montgomery Soil Conservation Districts (SCD); the Maryland-National Capital Park and Planning Commission (M-NCPPC); and the Washington Suburban Sanitary Commission (WSSC). This agreement formalized the work accomplished by the PRPG and established a Policy Board and a Technical Advisory Committee (TAC) to implement the reservoir and watershed protection programs. The goal of the agreement was to develop a *multi-barrier watershed management approach* to assure the integrity of a continued supply of high quality, potable water at a reasonable cost by sharing equitably among all parties the benefits and responsibilities for necessary resource management actions. The scope of the agreement included the reservoirs and the contributing surface and groundwater resources; it also "recognized the importance of protecting the long-term biological, physical, and chemical integrity of the Patuxent Reservoirs Watershed."

In 1997, the *Comprehensive Management Planning Study for the Patuxent Reservoir Watershed* was completed. This report provided consensus recommendations for the long-term protection of the Patuxent Reservoirs and their watershed. Later that year, the Policy Board approved an action plan of resource protection strategies, which gave the partner agencies direction and focus for subsequent efforts.

In 2003, the Goals-Setting Workgroup of the TAC re-evaluated the original list of action items and proposed a revised action plan, which was approved by the Policy Board. This revised list of action items or work plan, titled *Performance Measures and Goals for Priority Resources*, represents a continuation of the commitment to coordinate protection efforts in coming years. The revised list contains goals, performance measures, implementation items, and a time line to achieve each goal for six priority resources selected by the TAC.

Those priority resources include:

- reservoirs and drinking water supply
- terrestrial habitat
- stream systems
- aquatic biota
- rural character and landscape, and
- public awareness and stewardship.

Since 1997, the TAC has completed an Annual Report to summarize its accomplishments and identify funding needs to address watershed priority resource issues. This annual report first provides an update for on-going efforts and then presents information on new initiatives for 2010. This Annual Report will be accompanied by a separate Technical Supplement to provide detailed background information and additional documentation for items summarized in this report; the Technical Supplement will be issued at the end of 2009.

Significant progress was made in 2009. The following are highlights of those accomplishments.

1. Versar, Inc. completed the *Patuxent Reservoirs Interim Watershed Management Report*, which will help direct and prioritize future TAC efforts. This report summarizes numerous, historical, resource protection reports and distills many recommendations from those reports into several common resource protection categories. In addition, using GIS technology, this report identified potential targets where BMPs may prove effective, thus helping to focus future funding and implementation efforts.

2. WSSC completed an evaluation of long-term water quality trends using monitoring data from 1993 through 2008.

3. Howard County's Department of Public Works, Bureau of Environmental Services completed the second phase of a stream channel restoration project in the Cherry Creek Watershed, which drains directly into Rocky Gorge Reservoir.

4. M-NCPPC, in cooperation with other volunteer organizations, planted another 1½ acres of trees that will act as a buffer to the Reddy Branch tributary of the Hawlings River.

5. Several successful outreach events occurred this year including the H2O Fest watershed festival held in April, which attracted more residents than past years

Maryland Piedmont Sole Source Aquifer

The Sole Source Aquifer (SSA) Program, which is authorized by Section 1424(e) of the Safe Drinking Water Act, allows communities to petition the US Environmental Protection Agency for protection when a community is dependent on a single source of drinking water and there is no possibility of a replacement water supply to be found. EPA regional offices review the petitions and, if merited, the Regional Administrator will designate an area as a Sole Source Aquifer. EPA defines a sole or principal source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s), which could physically, legally, and economically supply all those who depend upon the aquifer for drinking water. The SSA program provides federal overview of federally-funded projects within the designated area. According to the federal Safe Drinking Water Act, once SSA designation is obtained, projects that could contaminate that aquifer may not receive "federal financial assistance." Although it may not outright stop a project, it will at least put it within the purview of EPA, which will then work with the project to mitigate any adverse consequences. Projects and land uses which are not federally-funded are not subject to federal overview.

Whenever feasible, EPA coordinates the review of proposed projects with other federal, state, or local agencies that have a responsibility for ground water quality protection. This coordination helps EPA to understand local hydro-geologic conditions and specific project design concerns, and ensures that the SSA protection measures enhance and support existing ground water protection efforts.

One success story of SSA designation can be found in Montgomery County. In 1998, the citizens of Poolesville, Maryland successfully petitioned for and obtained SSA designation from EPA. Although designation of the Poolesville aquifer may not have necessarily stopped all development projects, SSA status provided a useful political tool for citizens in Montgomery County. For instance, Poolesville residents have been successful in facing proponents of certain projects by using SSA status to set forth the possibility of having to do additional work to address the aquifer's needs before moving forward on a project. The following EPA maps show the Maryland Piedmont Sole Source Aquifer in relation to Montgomery County, and the Poolesville Sole Source Aquifer.

Maryland Piedmont Sole Source Aquifer

Poolesville Sole Source Aquifer

Water and Sewer Plan, Chapter 3: Water Supply Systems

Chapter 3 of the Water and Sewer Plan contains information about the various aspects of the County's water supply systems including water supply sources, treatment and distribution systems. It identifies the regional nature of the supply sources and the agreements to address water demand and drought management. There is also a discussion of groundwater for both individual water supply systems and for the Town of Poolesville. The discussion of rural sanitation issues includes a summary table of known well water supply problem areas throughout the County, which is the basis for further investigations and actions to address rural sanitation problems.

Treatment, transmission, and storage for the County's three major community water supply systems—WSSC, Poolesville, and Gaithersburg—are examined in detail. In the extensive WSSC system, graphics relate the various pressure zones to County planning areas to relate the identified water supply projects to geographic areas and potential impacts in those areas. These system descriptions also include a summary of improvements and growth projects.

The chapter also reviews regional, bi-County, and Countywide supply system needs based on information from various reports and projected population growth. The chapter summarizes WSSC's planned capital improvements to meet these needs. The Chapter also presents policy recommendations related to water supply systems for future guidance.

Excerpts from Chapter 3

3.II.C.1 Regional Drought Management in the Potomac River Basin

In order to provide regional service during drought conditions and ensure that there is adequate flow in the River to meet the environmental flow-by, the Cooperative (CO-OP) Section of the Interstate Commission of the Potomac River Basin (ICPRB) coordinates releases from the Jennings Randolph Reservoir, located near Bloomington, Maryland, on the North Branch of the Potomac River, and the Little Seneca Lake in the County on Little Seneca Creek. These two sources of water augment the Potomac River during periods of extreme low flow in the Washington Metropolitan area. The agencies that have intakes in Montgomery County and which are considered the Regional Water Supply system during a drought are: 1) The Washington Suburban Sanitary Commission, 2) the Fairfax County Water Authority (FCWA), and 3) the Washington Aqueduct Division (WAD) of the Corps of Engineers that serve the District of Columbia, Arlington, Falls Church, and a small portion of Fairfax County. The City of Rockville and the Town of Leesburg also draw their water from the Metropolitan area of the Potomac River.

3.II.C.2 Regional Drought Operations – During times of declared drought, the regional water supply system will operate according to the Drought Operations Manual of the 1982 Water Supply Coordination Agreement. Operations rules and procedures for reducing the impacts of severe droughts in the Potomac River for the Washington Metropolitan Area Water Suppliers are as follows:

- Make the most efficient use of all water supply facilities, including but not limited to the Potomac River, Jennings Randolph Lake, Occoquan Reservoir, Triadelphia Reservoir, Rocky Gorge Reservoir, and Little Seneca Lake to meet all water supply needs for the Washington Metropolitan Area.
- Maintain the probability of invoking the Restriction Stage of the Potomac River Low Flow Allocation Agreement at less than 5 percent during a repeat of the historical stream flow record.
- Maintain the probability of entering the Emergency Stage of the Potomac River Low Flow Allocation Agreement at less than 2 percent with full reservoirs on June 1 of any year.
- Maintain the probability of not refilling any reservoir used for Washington Metropolitan Area water supply to 90 percent of useable capacity by the following June 1 at less than 5 percent during a repeat of the historical stream flow record.

- Maintain flows in the Potomac River below Seneca Pool as agreed to by the signatories to the Potomac River Low Flow Allocation Agreement.
- Minimize conflict between normal utility operations and drought operations.
- Provide consistency with the requirements of the Potomac River Low Flow Allocation Agreement.

The underlying principle in this operation procedure is to reduce unneeded reservoir releases by making larger releases only as necessary to meet water needs. The capability of existing suppliers can be substantially extended in this manner. The Water Supply Coordination Agreement for cooperative system management is the critical element which allows the users to obtain the maximum benefits and reduce water wastage.

During a drought, WAD and the CO-OP Section of the ICPRB play key roles in determining the operation of the Regional Water Supply System. The WAD is charged with determining when to declare alert, restriction, or emergency drought stages. If a restriction or emergency stage is declared, the WAD allocates each user's fair share of withdrawal based on previous usage. Prior to restriction or alert stage designation, the CO-OP Section is responsible for coordinating water withdrawals to make the most efficient use of all water supply facilities. To accomplish this objective, CO-OP produces forecasts of water supply and need and determines how much water the WSSC and FCWA should be withdrawing from non-Potomac River supplies on a daily basis. The CO-OP in consideration of the needs of the WAD, WSSC, and FCWA, also directs releases from Jennings Randolph Reservoir and Little Seneca Lake.

The signing of the Water Supply Agreements of 1982 and the completion of Little Seneca Lake in the fall of 1984 resulted in a regional consensus that area raw water supply needs are satisfied, at least through the year 2020. Recent water demand forecast and resource adequacy analysis by ICPRB/CO-OP confirms that presently available resources will be adequate for the region until approximately the year 2020 in the event of a repetition of the drought of record. Although ICPRB's recent analyses extended forecasts to 2040, the water demand forecasts beyond 2020 were considered to be only rough approximations based on extrapolations of population projections.

3.II.C.3 Potomac River Environmental Flow-By -- As a heavily-used water resource, the Potomac River requires careful management to ensure its value for the utilities which draw its water and the health of its natural ecosystem. Part of the purpose of the preceding group of agreements is to ensure that the river has an adequate flow-by through and downstream from the Washington region sufficient to maintain its biological health, even under severe drought conditions. These agreements have assumed a minimum flow-by requirement of 100 million gallons per day (MGD) necessary to support the biological health of the river system.

However, the scientific basis for and adequacy of the 100 MGD flow-by requirement is under review. Maryland DNR, supported by the U.S. Fish and Wildlife Service, ICPRB, and Montgomery County DEP, launched a study of the river's environmental flow-by needs. During the summer and fall of 2002, DEP staff supported this effort, participating in field research in and along the river. A task force will examine the study data in April 2003 with the intent of recommending the best way to establish appropriate low flows for the Potomac River. Montgomery County will continue to pursue vigorously these issues through appropriate forums, as necessary.

3.II.C.3 Potomac Water Filtration Plant Source Water Assessment MDE and WSSC recently completed a source water assessment (SWA) for the Potomac River and WSSC's water filtration plant. The SWA addresses issues involved with the quality and safety of the raw water the plant draws from the river for treatment and does not directly address finished water quality. From its findings, the SWA recommends the

development and implementation of a source water protection plan for the Potomac Plant and for other similar facilities which draw their source water from the river. The SWA predicts the following improvements as a result of the successful implementation of such a plan:

- Reducing the solids loading to the plant,
- Reducing the magnitude and frequency of high pH, high natural organic matter (NOM) events which result from algal, phytoplankton, and macrophyte activities in the Potomac and its tributaries
- Improving protection from pathogens including *Cryptosporidium* and *Giardia*
- Reducing the number and severity of taste and odor episodes which occur in the WSSC system
- Reducing ammonia levels and chlorine demand in the raw water.

3.II.F.2 Projected Water Supply System Needs WSSC has identified two mechanisms needed to address the forecasted water demands for the WSSD. The first involves projects which will upgrade and expand the elements of WSSC's water supply systems. Projects which respond to near-future and long-term needs (5- and 10-year priorities) are included in the WSSC FYs 2003 - 2008 capital improvement program (CIP). Appendix A of this Plan includes a summary listing of WSSC's current community water systems CIP projects affecting the county. For specific information on any of these projects, please contact the appropriate agency or municipality. The second mechanism involves reducing consumer demand for water. Under the Total Water Management Study, WSSC has investigated potential water demand reduction programs intended to conserve water resources, extend the usefulness of existing facilities, and reduce or delay the demand for future system improvements.

3.II.F.2 .c Programs for Sustained Water Conservation and Waste Reduction WSSC has a variety of programs to promote water conservation. These efforts include:

i. **Public Outreach and Education Programs** WSSC provides educational brochures which promote the importance of water conservation (including its relationship to reduction of waste water loads) and to acquaint County citizens with the "tools" available to accomplish conservation. Special projects focus on water-saving and to promote the use of "common sense" tools of conservation in existing customer units. These projects include the distribution of WSSC's Bottle Kit/Dye Pill distribution and 3 gpm shower flow controls, water-saving idea and conservation poster contests, sponsorship in cooperation with the Montgomery County Recreation Department of "Plumbing Repair Clinics"; and other activities timed to reinforce and to support the WSSC's public education efforts.

   WSSC is also a partner in COG's Wise Water Use campaign, a regional program which is coordinated with the 2002 Metropolitan Washington Water Supply and Drought Awareness Response Plan for the Potomac River System. The campaign represents the plan's response to "normal" water supply conditions and includes many ideas for water conservation by users. WSSC provides the largest single source of funding for the regional campaign.

ii. **Plumbing Code** Federal regulations require the installation of water saving fixtures (e.g., toilets, shower heads, and sink faucets) in new installations and in applications where plumbing fixtures are being replaced. The WSSC is proceeding with adoption of a model plumbing code that will enable greater regulatory consistency with surrounding jurisdictions.

iii. **Rate Structure** WSSC uses a conservation-oriented water/sewer rate structure, which is based on Average Daily Consumption (ADC) in each metered billing period. The rate structure, in effect, charges lower rates per 1,000 gallons for the individual customer unit's total volume of

consumption in the lower level of ADC. The billing rates are scaled up on progressively increasing 16 steps as the customer unit's ADC moves up.

iv. **Total Water Management Study** In 1999, WSSC conducted a Total Water Management Study, with the objectives of identifying and developing strategies to conserve water resources, extending the life of available capacity in existing capital facilities, and reducing future capital and operating costs. The study examined a variety of potential conservation measures and projects, including the promotion of and financial incentives for installing water-efficient appliances and fixtures, water-efficient retrofits for existing housing stock, and public education programs. The study's conclusion indicated that WSSC can best meet these objectives through programs designed to improve public education and community outreach concerning water conservation measures and programs.

3.II.V.B.1 Well Permitting The County's Department of Permitting Services (DPS), Well and Septic Section, is responsible for the administration and enforcement of County and State laws and regulations governing on-site, individual water supply systems. This authority is delegated from the State's Department of the Environment (MDE). Relevant regulations are included in COMAR 26.03.01, 26.03.05, and 26.04.02 -.04, and in County Executive Regulation 28-93AM, “On-Site Water Systems and On-Site Sewage Disposal Systems in Montgomery County.”

DPS accomplishes these responsibilities by reviewing preliminary plans and record plats for properties served by on-site systems; issuing permits for, and inspecting, the construction of new and replacement wells; sampling water supplies for potability; and by responding to complaints about on-site systems. New wells for potable uses are normally sampled for nitrates, coliform bacteria, and turbidity. On-going well monitoring is done when some subsequent licensure or approval is required, such as child care licenses, group or nursing homes, food service facilities, or swimming pools. There are no requirements for ongoing monitoring of wells used solely for single family residences.

MDE maintains a permitting authority for commercial, institutional, and community systems projects though its Water Appropriation and Use permit. This permit is also required for wells for non-potable uses such as irrigation or commercial uses. As the County authority responsible for water and sewer service planning, DEP reviews and signs off on these permits to ensure that they comply with the Water and Sewer Plan.

Selected Maps and Tables

Figure 3-F1: Montgomery County Water Service Areas

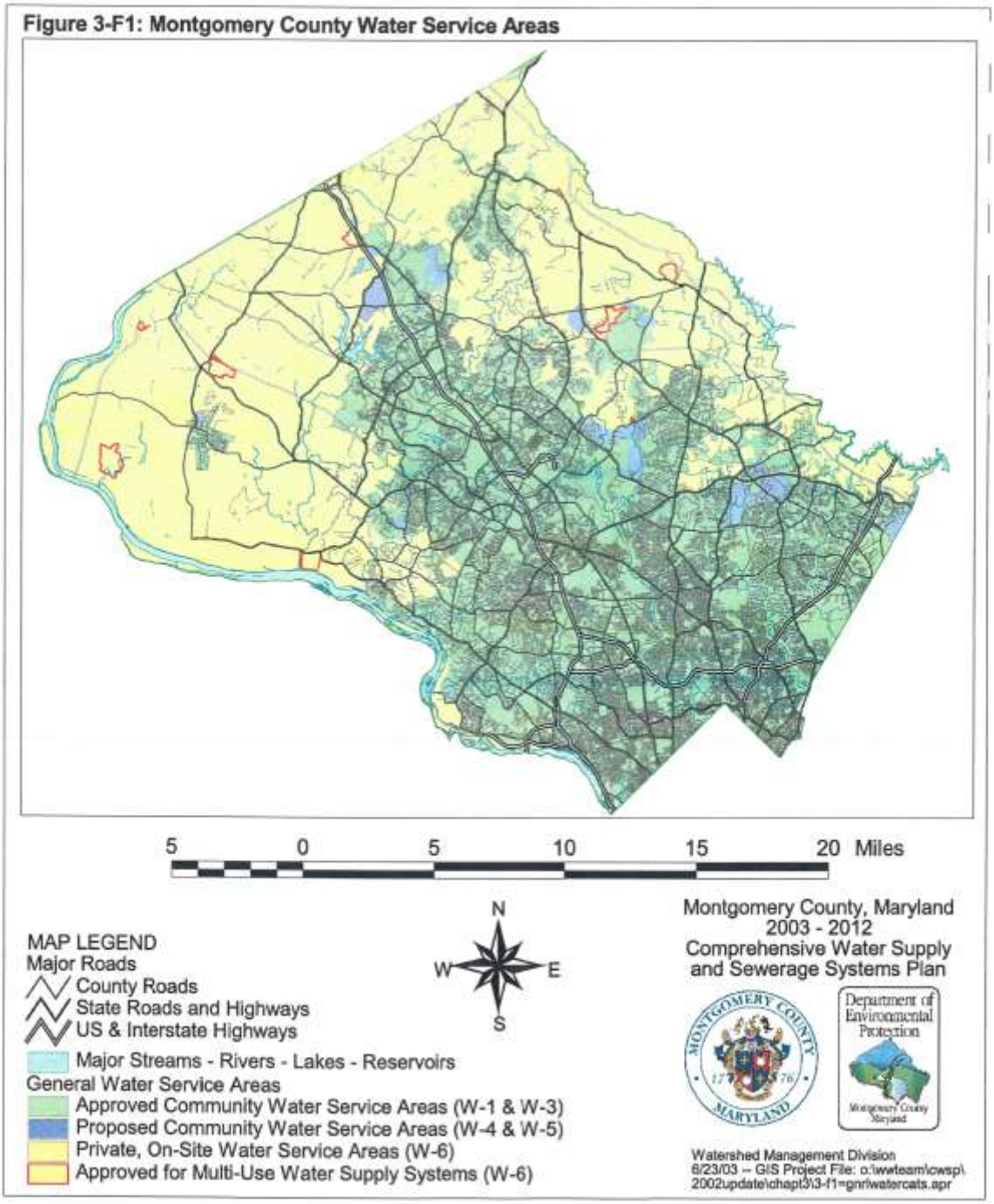


Figure 3-F2: Sanitary Districts Within Montgomery County

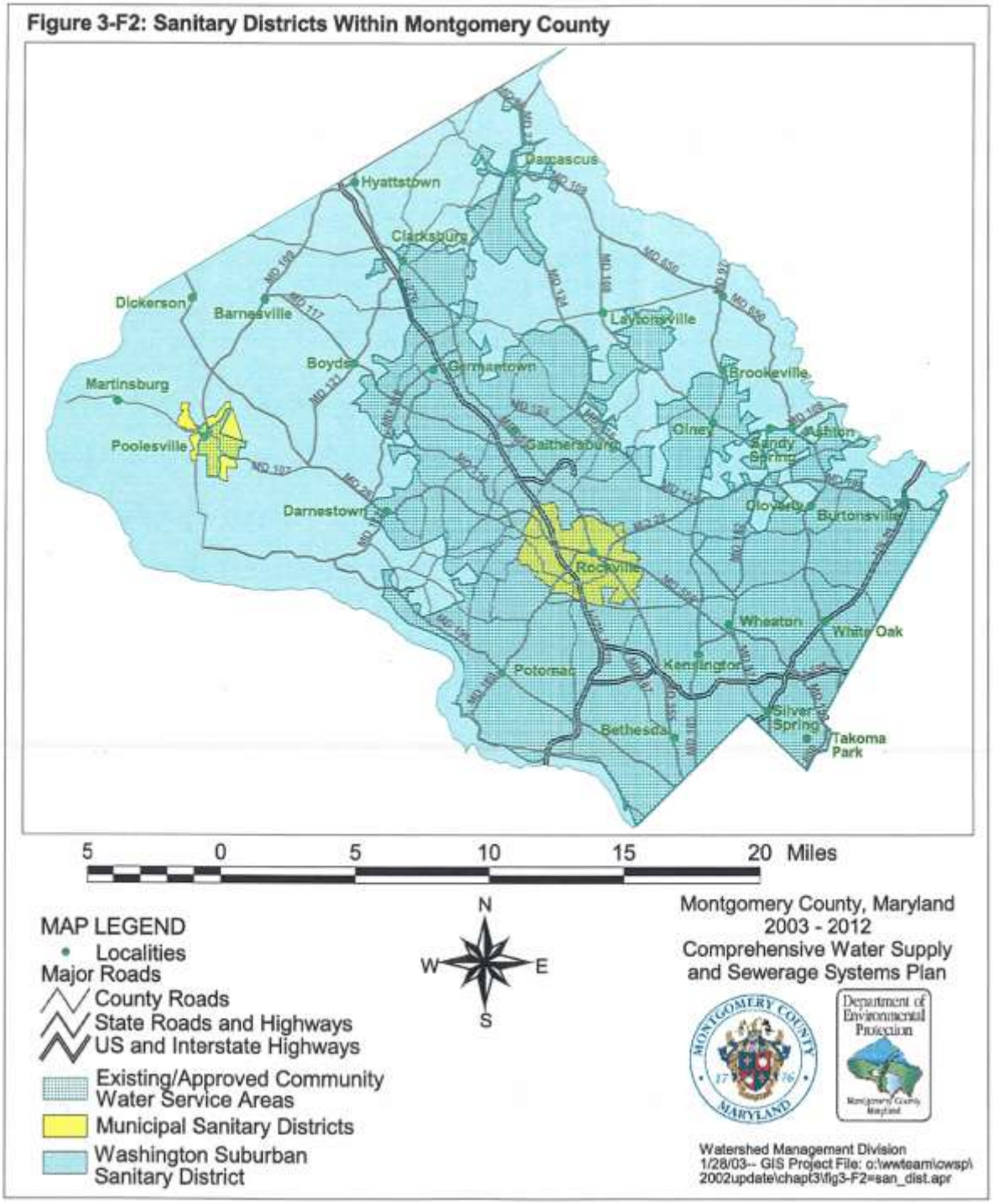


Figure 3-F3: WSSC Surface Water Supply Sources

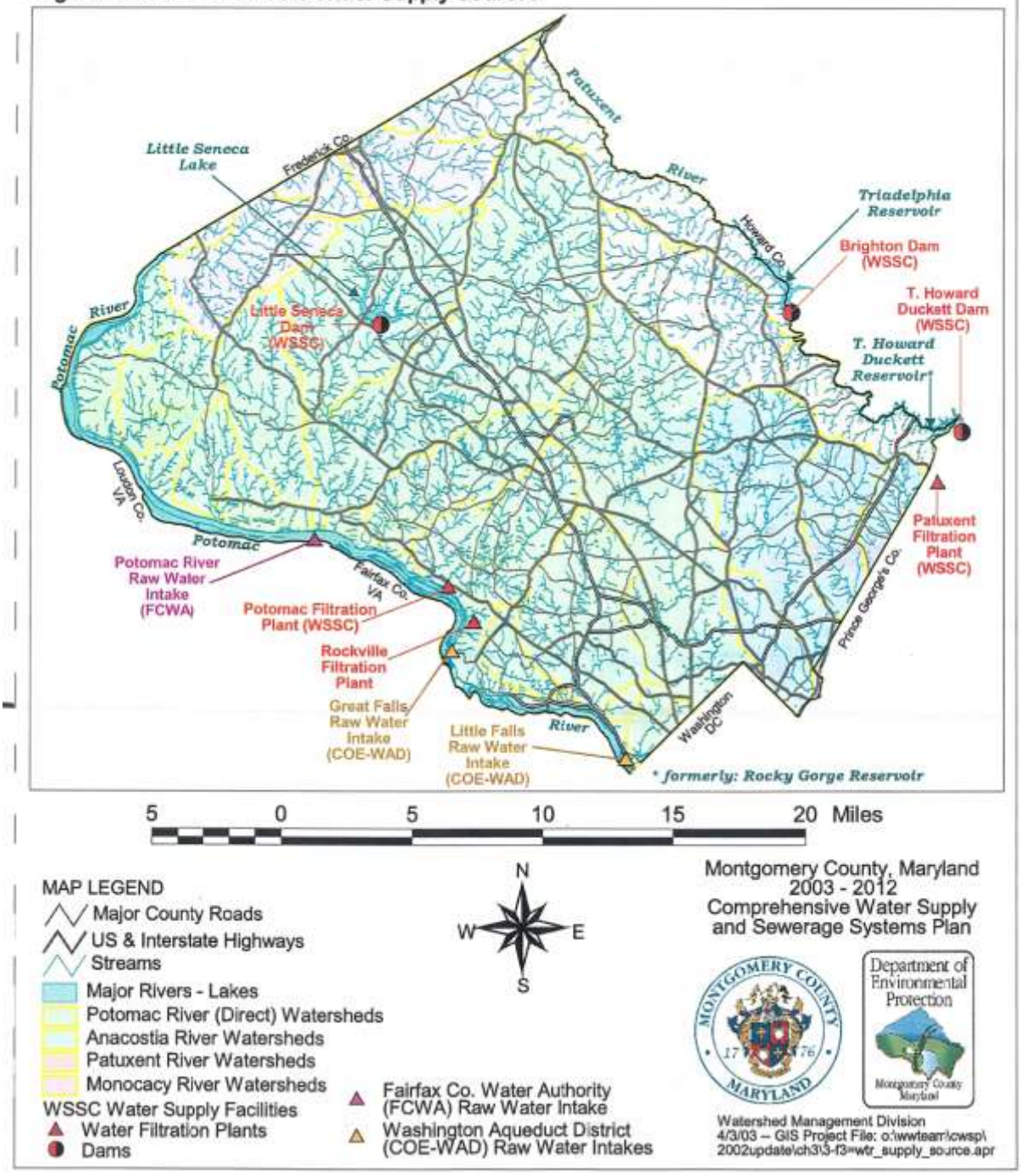


Table 3-T1: Inventory of Existing Impounded Supplies in Montgomery County			
Source	**Potomac River**	**Patuxent River**	
Owner **Name**	Public: [A] **Little Seneca Lake** (Little Seneca Dam)	WSSC: **Triadelphia Reservoir** (Brighton Dam)	WSSC: **T. Howard Duckett Reservoir** [D] (T. Howard Duckett Dam)
Crest Elevation (above sea level)	385 feet	366.45 feet	286.45 feet
Spillway Length	300 feet	234 feet	189 feet
Total Length of Dam	600 feet	995 feet	840 feet
Height of Crest Above Stream Bed	77 feet	66.45 feet	125.45 feet
Flooded Area at Crest Elevation	530 acres	800 acres	810 acres
Shore Line Length at Crest Elevation	-	19 miles	35 miles
Area of Land Owned	530 acres [A]	2,963 acres	3,023 acres
First Overflow of Dam Crest	-	1944	1955
Capacity of Reservoir	4.5 billion gallons [C]	5.5 (7.0 [B]) billion gallons	5.2 (6.4 [B]) billion gallons
		Total Capacity = 10.7 (13.4 [B]) billion gallons	
Safe Yield	-	45.3 MGD	
Average daily withdrawal	-	42 MGD	

[A] Financed by WSSC, District of Columbia, and Fairfax County Water Authority.
[B] Total volume; additional volume in excess of water supply capacity is used for flood mitigation.
[C] Total capacity of reservoir is 4.5 billion gallons; useable capacity is 4 billion gallons.
[D] Formerly Rocky Gorge Reservoir

Figure 3-F4: Major Water Supply Reservoirs Serving the Washington Region

25 0 25 50 75 100 Miles

N
W E
S

MAP LEGEND

Water Supply Intakes
- Washington Surburban Sanitary Commission
- Fairfax County Water Authority
- U.S. Army Corps of Enginneers - Washington Aqueduct District
- City of Rockville

Reservoirs
Rivers
Streams

Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply and Sewerage Systems Plan

Department of Environmental Protection
Montgomery County Maryland

Watershed Management Division
4/8/03 -- GIS Project File: o:\wwteam\cwsp\2002update\ch3\3-f_metroarea_reservoirs.apr

Table 3-T2: Potomac River Regional Drought Agreements	
Signatories	**Major Provisions**
Low Flow Allocation Agreement (LFAA) (1978)	
▪ State of Maryland ▪ State of Virginia ▪ District of Columbia ▪ U.S. Army Corps of Engineers ▪ WSSC ▪ FCWA	This agreement establishes allowable withdrawals among major water users of the Potomac River during periods when there is not sufficient supply to allow unrestricted withdrawals. As a result of the 1982 Regional Water Supply Agreements, the chance of invoking the LFAA is projected to be less than 5 percent during a repeat of the worst drought of record.
Modification No. 1, Potomac River Low Flow Allocation Agreement (1982)	
▪ State of Maryland ▪ State of Virginia ▪ District of Columbia ▪ U.S. Army Corps of Engineers	This amendment to the LFAA provides for releases from the Jennings Randolph and Savage Reservoirs and Little Seneca Lake to be subject to the allocation formula of the LFAA. Most importantly, as long as there are legally enforceable Regional Water Supply Agreements, the 1988 freeze provision of the LFAA will be inoperative. The 1988 freeze provision would have limited FCWA, WSSC, and District of Columbia withdrawal ratios to 1988 actual levels unless a water supply agreement was reached. Since the District of Columbia is the largest withdrawer of water, the District would have attained a disproportionately large share of water versus need over time. The Regional Water Supply Agreements are predicated on all water users obtaining water as needed and the sharing of resources.

Table 3-T2: Potomac River Regional Drought Agreements	
Signatories	**Major Provisions**
Water Supply Coordination Agreement (1982)	
▪ Corps of Engineers ▪ Fairfax Co. Water Authority ▪ WSSC ▪ District of Columbia ▪ ICPRB.	This agreement establishes the precedents that the major water suppliers will operate systems in a coordinated manner during a drought and that water withdrawal will be based on need, not on the relative share paid for water storage facilities. This agreement also identifies the CO-OP section of the Interstate Commission of the Potomac River Basin (ICPRB) as the agency to administer provisions of the Drought Related Operations Manual, such as issuing long-range water supply projections and directing releases from Jennings Randolph and Little Seneca lakes during a drought. The water utilities fund the activities of the CO-OP section as follows: WSSC - 50 percent, FCWA - 20 percent, and WASA - 30 percent.
Agreement for Future Water Supply Storage Space in the Bloomington Reservoir (1982)	
▪ District of Columbia ▪ Corps of Engineers ▪ WSSC ▪ Fairfax Co. Water Authority	This agreement entitles the District of Columbia, the Fairfax County Water Authority and the WSSC to 36.78 percent of Jennings Randolph Reservoir storage capacity known as future supply. The Metropolitan Areas share would equal 13.37 billion gallons when the reservoir is full. In return, the three non-federal signatories are required to pay 27.4% of the construction cost (local share estimated at $54.2 million, includes interest over 50 years), 34.75% of the cost of major replacement items and 28.56% of the annual operation and maintenance costs. Jennings Randolph water not contracted for water supply is used for water quality improvement in the North Branch of the Potomac River. Water Quality releases upstream also indirectly benefit local jurisdictions by delaying the time when low flows are experienced in the Washington area. The WMA water utilities fund the capital, operations, and maintenence costs for the water supply storage in the Jennings Randolph Reservoir.
Note: The Maryland Potomac Water Authority (MPWA) was created in 1978 to coordinate local governments in the acquisition of water storage of the Jennings Randolph Reservoir. However, the agreements of 1982 which provided for purchasing of storage by the District of Columbia, the Fairfax County Water Authority and WSSC have made the function of the MPWA unnecessary.	
Bloomington Payment Agreement (1982)	
▪ Fairfax Co. Water Authority ▪ District of Columbia ▪ WSSC	This agreement delineates the three major water users individual responsibility to pay for Jennings Randolph water supply in the agreed to ratios. This agreement was necessitated because the Corps of Engineer required that payments had to be guaranteed. The District of Columbia was unable to make such a guarantee because their budget must be approved annually by Congress. Under the provisions of the agreement, should a user default in payment, another user can make the payment and sue the defaulter for payment plus penalty. In addition, the defaulter loses right to use Jennings Randolph water supply while in default.
Little Seneca Lake Cost Sharing Agreement (1982)	
▪ District of Columbia ▪ Fairfax Co. Water Authority ▪ WSSC	This agreement establishes the cost shares and payment mechanisms to fund construct on of Little Seneca Lake in Montgomery County. Capital and operating and maintenance cost were distributed according to the following ratios: WSSC 50%; District of Columbia 40%; and Fairfax County Water Authority 10%.

Table 3-T2: Potomac River Regional Drought Agreements	
Signatories	**Major Provisions**
Savage Reservoir Maintenance and Operation Cost Sharing Agreement (1982)	
▪ District of Columbia ▪ Fairfax Co. Water Authority ▪ WSSC ▪ Allegany County, Md. ▪ Upper Potomac River Commission (UPRC)	This agreement addresses water releases from the Savage Reservoir, which as relatively basic, were intended to neutralize releases from the Jennings Randolph Reservoir, which were expected to be acidic due to upstream mine drainage. This dilution effect can be viewed as additional water supply gained without requiring local funds for the construction of the Savage Reservoir. The signatories exclusive of the UPRC have agreed to fund the annual operations and maintenance, and replacement and repair costs of Savage Reservoir according to the following percentages: Fairfax County Water Authority 16%; District of Columbia 24%; WSSC 40%; and Allegany County 20%. (See the preceding discussion of the reservoir for additional information.)
Metropolitan Washington Water Supply Emergency Agreement (1994)	
▪ District of Columbia ▪ Arlington, Fairfax, Loudoun, Montgomery, Prince George's and Prince William Counties ▪ Towns or Cities of Alexandria, Bowie, College Park, Fairfax, Falls Church, Gaithersburg, Greenbelt, Manassas, Rockville, Takoma Park, and Vienna ▪ Council of Governments ▪ Fairfax Co. Water Authority ▪ Loudoun Co. Sanitation Auth. ▪ WSSC	This agreement establishes three plans for coordinating regional actions in the event of emergencies that affect water supply from the Potomac River to the Washington Metropolitan Region. The first plan provides a regional response mechanism for health-related emergencies in the Washington Aqueduct Division system. The second plan provides a mechanism for emergencies that affect more than one of the utilities that withdraw raw water from the Potomac River. The final plan describes the routine planning and cooperative operating procedures which have significantly reduced the risk of drought affecting the region's water supply. Background information describing the conditions leading up to the plan and the procedures for updating it is also provided.
Metropolitan Washington Water Supply and Drought Awareness Response Plan: Potomac River System (2000)	
▪ District of Columbia ▪ Arlington, Fairfax, Loudoun, Montgomery, Prince George's and Prince William Counties ▪ Towns or Cities of Alexandria, Bowie, College Park, Fairfax, Falls Church, Gaithersburg, Greenbelt, Manassas, Rockville, Takoma Park, and Vienna ▪ Council of Governments ▪ Fairfax Co. Water Authority ▪ Loudoun Co. Sanitation Auth. ▪ WSSC	This COG plan provides implementation steps during drought conditions for the purpose of coordinated regional response. The Plan consists of two interrelated components: a regional year-round plan emphasizing wise water use and conservation, which is currently under development; and a water supply and drought awareness and response plan. The water supply and drought awareness plan contains four stages: • Normal: Wise Water Use Program • Watch: voluntary water conservation measures • Warning: voluntary water restrictions • Emergency: mandatory water restrictions This plan is primarily designed for those customers who use the Potomac River for their drinking water supply source. The Plan will eventually be expanded to incorporate all water supply systems throughout the region.

Table 3-T3: WSSC Water Treatment Facilities				
Facility Owner/Operating Agency Plant Location & Coordinates	**Water Source Treatment Type**	**Rated Plant Capacity Average Production Maximum Peak Flow Storage Capacity**	**Sludge and/or Filter Backwash**	**Status/Comments**
Potomac Filtration Plant WSSC River Road N439,000/E727,000	Potomac River lime, alum, flocculation, filtration, chlorination, fluoridation	capacity: 285 MGD production: 109.3 MGD peak flow: 161.7 MGD storage: 22.05 MGD	discharged to Potomac River after solids are removed	Various treatment processes are currently being upgraded (see Section II.F.2.a.).

Table 3-T3: WSSC Water Treatment Facilities				
Facility Owner/Operating Agency Plant Location & Coordinates	**Water Source Treatment Type**	**Rated Plant Capacity Average Production Maximum Peak Flow Storage Capacity**	**Sludge and/or Filter Backwash**	**Status/Comments**
Patuxent Filtration Plant WSSC Sandy Spring Road (Prince George's Co.)	Patuxent River (Rocky Gorge Reservoir) lime, alum, flocculation, filtration, chlorination, fluoridation	capacity: 56.0 MGD production: 35.4 MGD peak flow: 47.7 MGD storage: 18.36 MGD	discharged to sanitary sewer	The plant is currently under extensive renovation and upgrade.
See Figure 3-F3 for the locations of these facilities. See Table 3-T11 for information on the City of Rockville's filtration plant.				

Figure 3-F6: WSSC Water Distribution System and Facilities

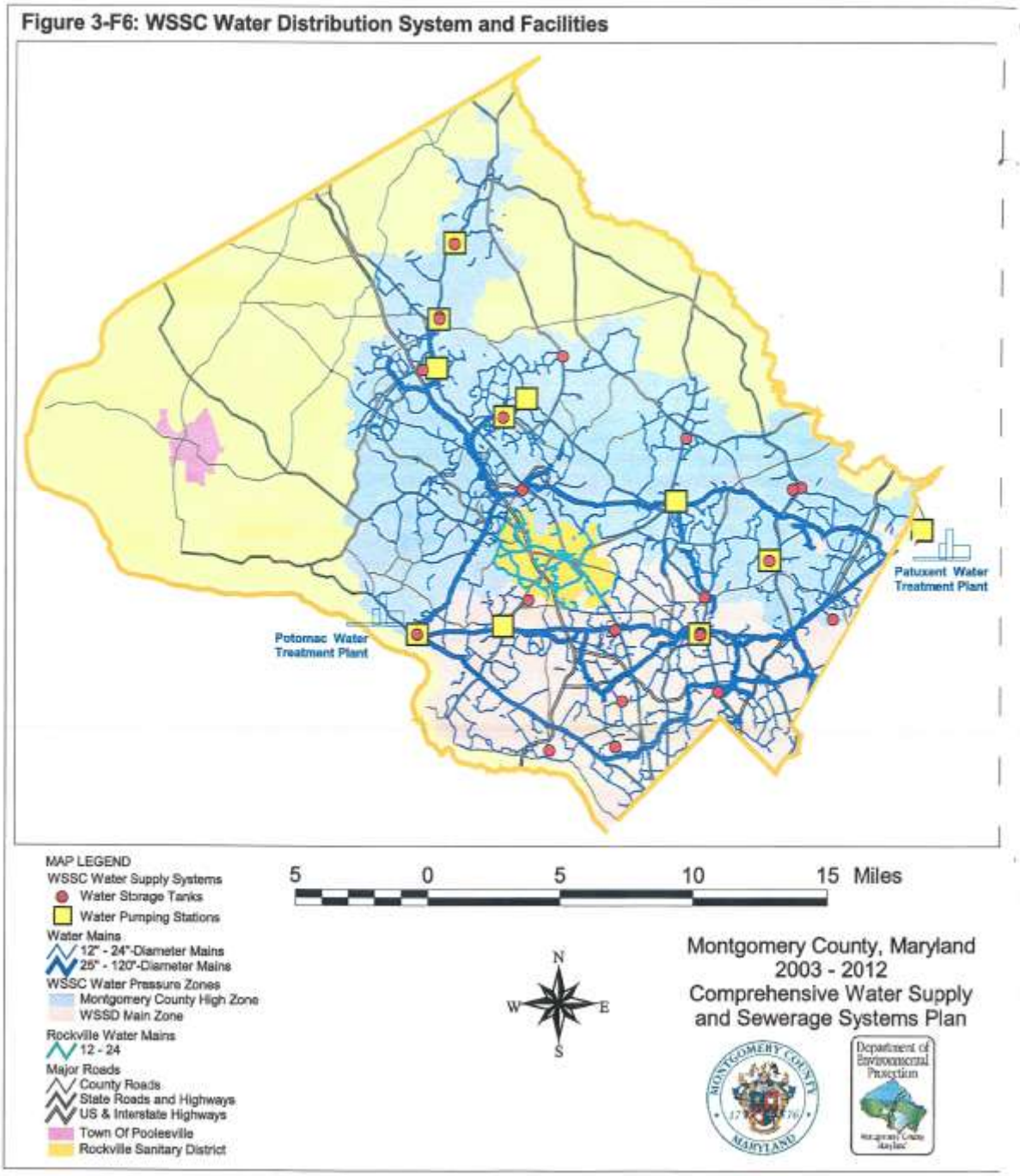
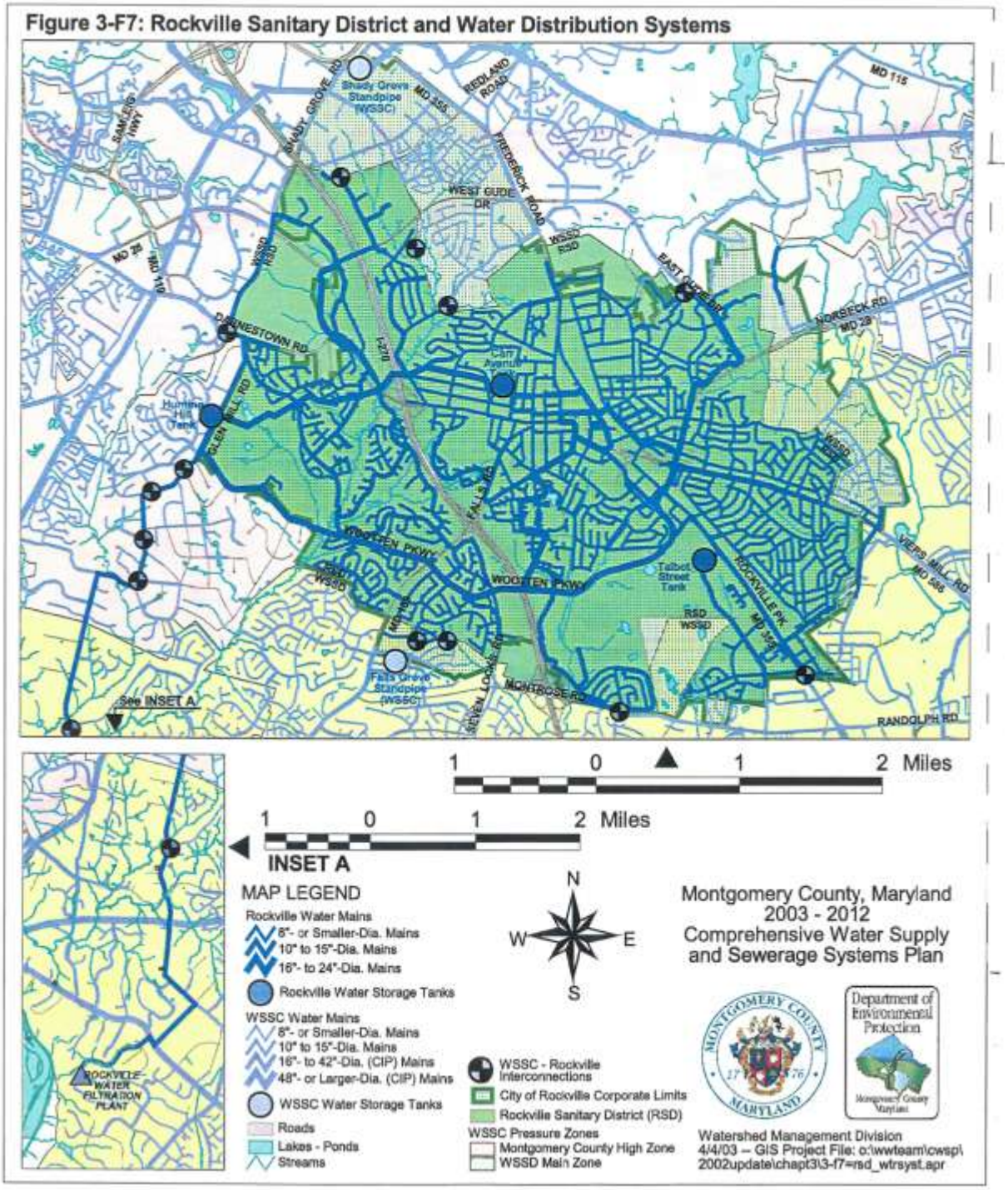


Table 3-T8: WSSC Historic Water Production							
Calendar Year	Average Production (mgd)	Maximum Day Production (mgd)	Maximum to Average Ratio	Calendar Year	Average Production (mgd)	Maximum Day Production (mgd)	Maximum to Average Ratio
1980	143	193	1.35	1991	171	256	1.5
1981	140	187	1.33	1992	162	220	1.36
1982	142	196	1.38	1993	167	243	1.45
1983	147	215	1.46	1994	173.5	231	1.33
1984	145	199	1.38	1995	167.1	234	1.4
1985	149	197	1.33	1996	161.3	199	1.24
1986	161	227	1.41	1997	164.7	245.8	1.49
1987	163	239	1.46	1998	166.6	219.8	1.32
1988	170	267	1.57	1999	168.2	263.4	1.57
1989	165	228	1.38	2000	162	200.8	1.24
1990	167	235	1.41	2001	167.4	253.2	1.51
Note: Data includes all of the WSSC service area (Montgomery and Prince George's counties) Source: WSSC- Planning Group							

Table 3-T9: Projected Average Daily Water Demands for Montgomery County			
Calendar Year	Total Production (MGD)		
	Main Zone	High Zone	Total
2005	49.13	47.53	96.66
2010	50.59	51.03	101.62
2015	51.62	54.03	105.65
2020	52.65	56.46	109.11
Source: WSSC Planning Group			

Table 3-T10: Projected Water Supply Demands and Planned Capacity Washington Suburban Sanitary District			
Calendar Year	Projected Demand (MGD)		Planned Capacity (MGD)* Daily Maximum
	Daily Average	Maximum Daily	
2005	178.7	266.2	341
2010	188.3	280.5	357
2015	196.6	292.9	357
2020	205.2	305.7	357
Source: WSSC Planning Group ** This is planned treatment capacity at both Potomac and Patuxent treatment facilities*			

Figure 3-F7: Rockville Sanitary District and Water Distribution Systems



Water and Sewer Plan Recommendation

As in the 1999 - 2008 Water and Sewer Plan, this Plan recommends that the County, City, and WSSC begin discussions on aligning the city's corporate and sanitary district boundaries. This recommendation–which calls for discussions only--is made with the understanding that Rockville generally opposes an actual realignment of the city's corporate and/or sanitary boundaries.

Table 3-T11: RSD Water Treatment Facility

Facility Owner/Operating Agency Plant Location & Coordinates	Water Source Treatment Type	Rated Plant Capacity Average Production Maximum Peak Flow Storage Capacity	Sludge and/or Filter Backwash	Status/Comments
Rockville Filtration Plant City of Rockville Sandy Landing Road N433,000/E734,500	Potomac River sodium hydroxide, polyaluminum chloride, flocculation, filtration, chlorination, fluoridation	capacity: 8.0 MGD production: 4.7 MGD peak flow: 8.0 MGD storage: 12.2 MGD	land application	Expansion to 14 MGD capacity approved in 2002. Interconnections with WSSC allow the City to draw up to an additional 6 MGD in emergencies.

See Table 3-T3 for information on WSSC's filtration plants.

Table 3-T14: Projected Water Supply Demands and Planned Capacity City of Rockville

Calendar Year	Population (RSD)*	Projected Demand (MGD)		Planned Capacity (MGD) Daily Maximum
		Daily Average	Maximum Daily	
2005		7.0	8.2	14.0
2010		7.1	8.2	14.0
2015		7.1	11.9	14.0

Source: Water Demand Forecast, Rockville Dept. of Public Works, April 2000
*Note: This data for the RSD only; does not include properties served by WSSC; population data pending from Rockville.

TABLE 3-T15: Immediate, 5-, and 10-Year Priorities for Water Supply Development City of Rockville

Fiscal Year -- Project Number	Location	Description	Estimated Costs*			Project Status - Construction Start	
			Total	Federal and/or State	Local	Immediate Priority Projects	Five and Ten Year Period Projects
Before 2004	Sandy Landing Road -- Glen Mill Road	Treatment Plant Improvements	$4,000,000	$4,000,000	none	Replace Pumps & Construct new Pump Station	none
Before 2009	Varies	New Water Mains (18,430 feet)	$3,609,200	none	$3,609,200	Adclare Rd. , N. Horners Lane, & Beall Ave/Park Rd	Jefferson St. & Lewis Ave.
Before 2010	Varies	Clean & Line Water Mains (8,930 feet)	$376,000	none	$376,000	Nelson St & Mannakee St.	Crawford Dr
NA	Fallsgrove Pump Station	Northwest Booster Pump Station	$779,000	none	$779,000	none	none

* Based on Costs from Adopted 2003-2008 CIP

Table 3-T16: Available Groundwater Supply By Watershed -- Town of Poolesville						
Watershed - Community System Wells	Area (Acres)	Theoretically Available Groundwater (GPD)	Ave. Daily Allocation (GPD)	Max. Monthly Average Allo-cation (GPD)	Potential Well Yields (GPD)	Remaining Available Groundwater (GPD)
Horsepen Branch Wells 2,4,6, & 8	588	149,000	293,000	410,000	468,000	0
Broad Run (No Wells)	551	140,000	0	0	0	140,000
Dry Seneca Creek Wells 3 & 5	973	247,000	142,000	199,000	230,000	17,000
Russell Branch Wells 7, 9, & 10	450	115,000	115,000	161,000	359,000	0
Totals	2,562	651,000	550,000	770,000	1,057,000	157,000

Table 3-T17: Inventory of Existing Community System Wells -- Town of Poolesville								
MDE Appropriation Permit	Well*** Name or Number	Aquifer	Coordinate Location	Depth (Feet)	Diameter (Inches)	Ave. Constant Sustainable Yield (gpm) *	Potential Daily Yield (gpd) **	Water Quality
#M01970G007(10)	2	New Oxford Formation	N477,190 E682,120	453	6	(100)****	(144,000)****	****
#M01970G107(01)	3		N477,190 E685,030	285	6	60	86,400	Good
#M01970G007(10)	4		N477,000 E680,000	600	6.5	35	50,400	Good
#M01970G107(01)	5		N479,350 E681,850	500	6	100	144,000	Good
#M01970G007(10)	6		N474,000 E684,000	500	6	130	187,200	Good
#M01970G207(01)	7		N543,500 E687,500	700	8	50	72,000	Good
#M01970G007(10)	8		N472,000 E637,500	500	8	60	86,400	Good
#M01970G207(01)	9		N534,100 E1,198,275	800	8	124	179,600	Good
#M01770G207(01)	10		N532,950 E1,198,360	762	8	75	108,000	Good
TOTAL						634	1,057,000	

* Based on well yield data and pump tests performed by the Town.
** Assumes 24 hours of pumping per day.
*** The Town removed Well #1 from service due to turbidity and fecal coliform contamination.
**** The Town uses Well #2 only intermittently, when in dry weather and when tests show no evidence of coliform contamination.

Source: Town of Poolesville.

Figure 3-F8: Pooleville Community Water Supply Systems

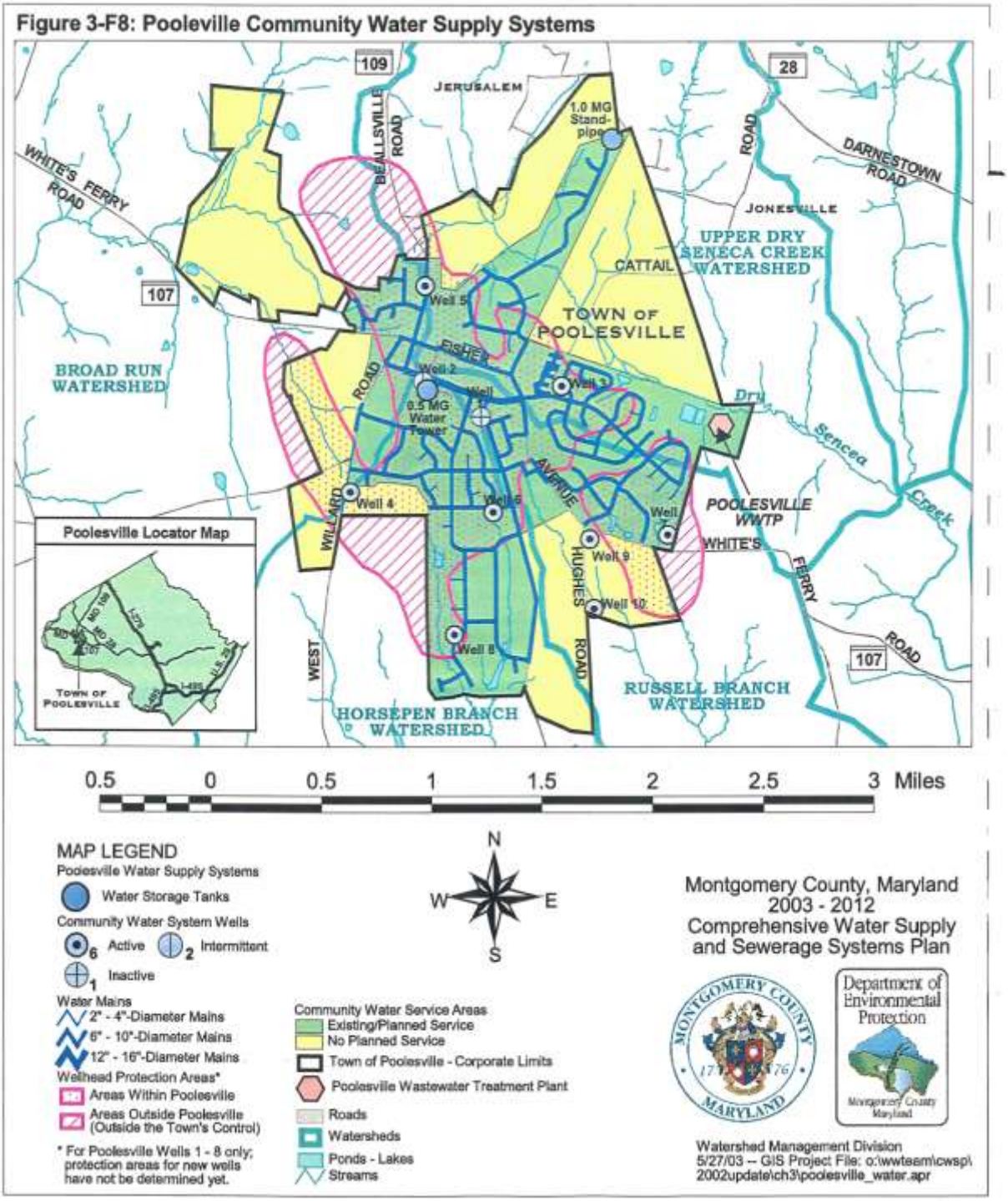


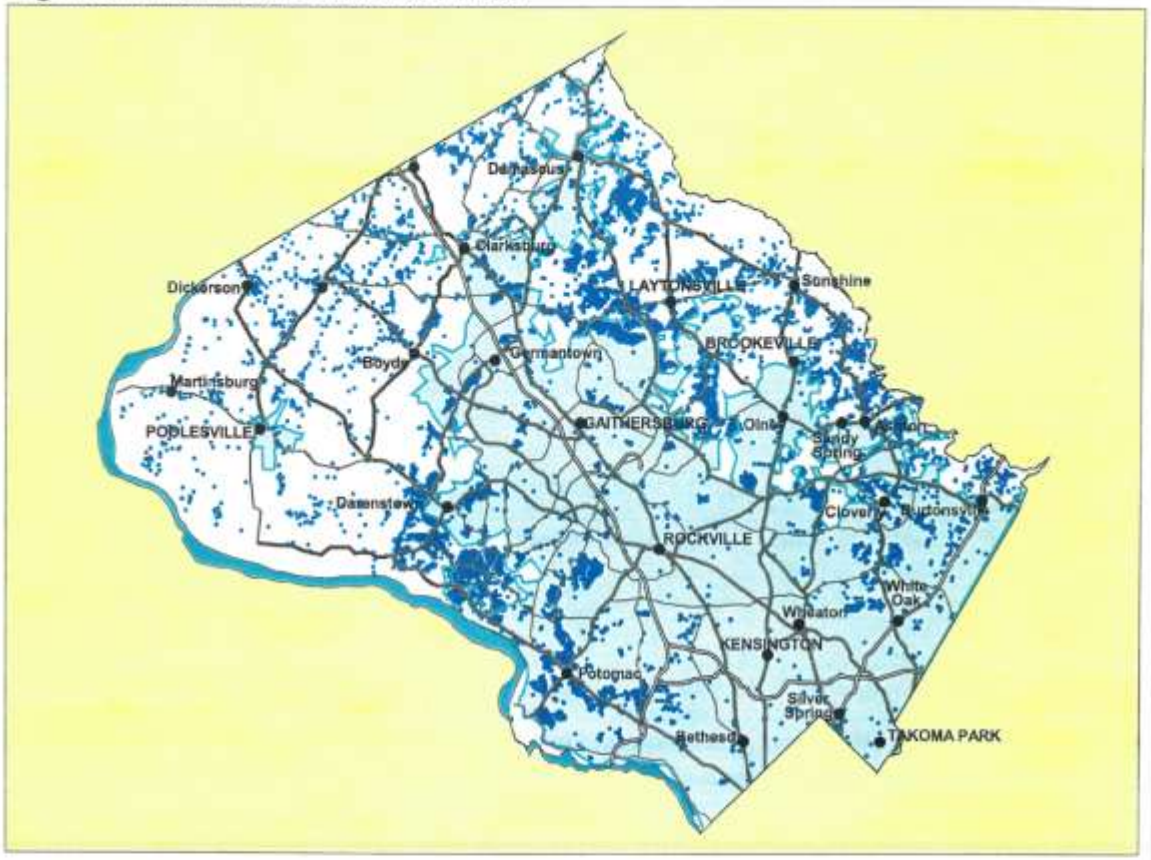
Table 3-T18: Projected Water Supply Demands and Planned Capacity --Town of Poolesville						
Design Year	Population			GPCD (gallons)	CAPACITY (MGD)	
	Total	Served	Unserved		Average	Peak Monthly Demand
2000	5,151	5,050	50	94	0.480	0.720
2005	5,500	5,450	50	100	0.550	0.770
2010	5,500	5,450	50	100	0.550	0.770
2015	5,500	5,450	50	100	0.550	0.770
2020	5,500	5,450	50	100	0.550	0.770

- Gallons Per Capita Per Day (GPCD) for the year 2000 based on actual data. Future GPCD projections estimated by the Town.
- For planning purposes, the Town estimates the peak monthly demand to be 1.5 times the average monthly demand.
- The Town may reconsider their population projections for the year 2005 and beyond when they update their Master Plan in 2002.
- Unserved population utilizes private, individual wells.

TABLE 3-T19: Immediate, 5-, and 10-Year Priorities for Water Supply Development Town of Poolesville							
Fiscal Year	Location	Description	Estimated Costs*			Project Status - Construction Start	
			Total	Federal and/or State	Local	Immediate Priority Projects	Five and Ten Year Period Projects
2003	To be determined	Well #11 & well House	$450,000		$450,000	X	
2005	To be determined	Well #12 & well House	$450,000		$450,000	X	
2006*	West Willard	Water main	$171,000		$171,000		X
2006*	Fisher Avenue	Water main	$135,000		$135,000		X
2006*	West Willard	Water main	$116,000		$116,000		X

* This water main extension project could be completed sooner than projected if the extension is needed to place a new well into service

Figure 3-F9: Permitted Groundwater Wells



5 0 5 10 15 20 25 Miles

N
W E
S

MAP LEGEND
- Permitted Groundwater Wells*
- Communities

Major Roads
- County Roads
- State Roads and Highways
- US & Interstate Highways

General Community Water Service Envelope

* As verified by DPS well permit records.

Source: Mont.Co. Groundwater Protection Strategy (DEP)

Montgomery County, Maryland
2003-2012
Comprehensive Water Supply and Sewerage Systems Plan

Department of Environmental Protection

Watershed Management Division
5/26/04 -- GIS Project File: o:\wwteam\cwsp\2002update\ch3\3-f9-groundwatar_wells.apr

Figure 3-F10: US EPA Sole Source Aquifer in Montgomery County

Figure 3-F11: Well Problem Areas

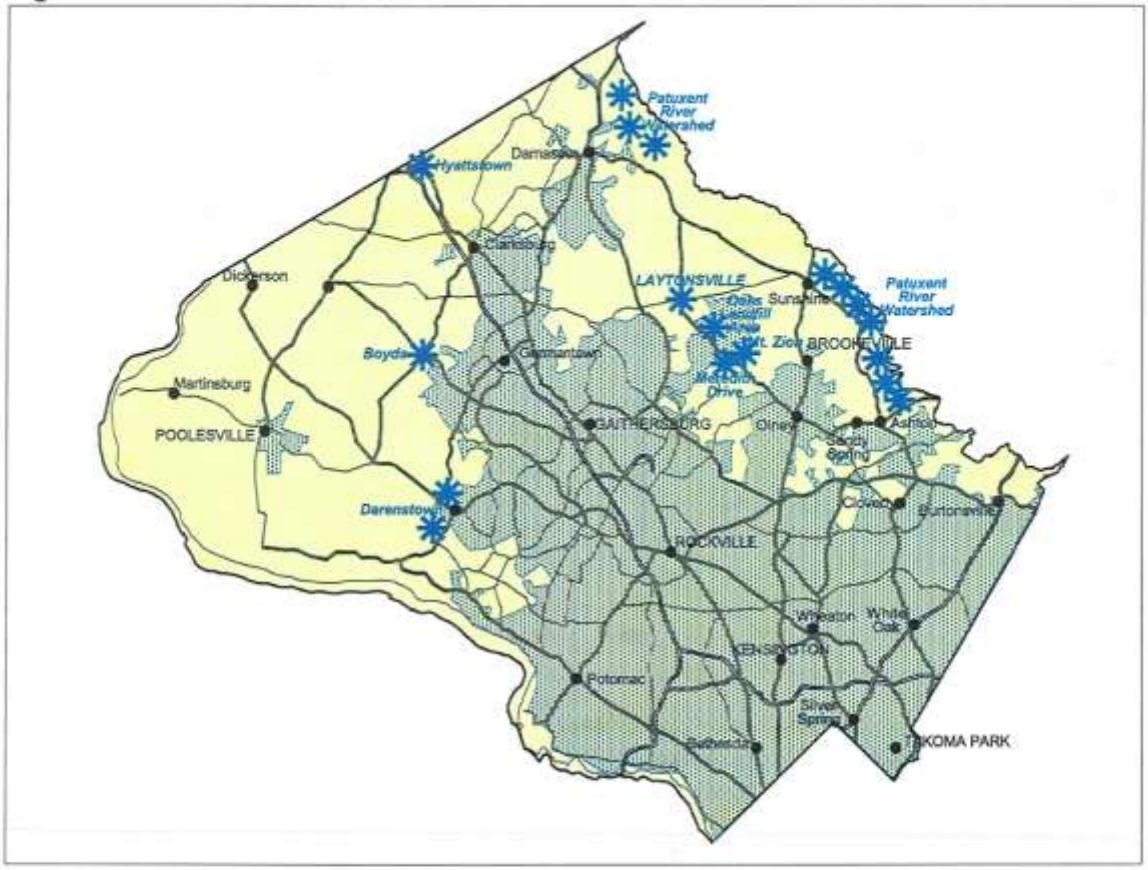


Table 3-T20: Groundwater and Well Problem Areas			
Location	**Problem**	**Potential Solutions**	**Actions Taken**
Oaks Landfill Vicinity -- near Mt. Zion, between Olney and Laytonsville	▪ contaminated wells; DEP's groundwater monitoring confirmed leakage from the northwest quadrant of the Oaks Sanitary Landfill as the contamination source ▪ Mt. Zion: old, hand-dug wells out of date with State and County regulations	▪ bottled water ▪ community water service	The County has extended community water service to properties in the vicinity of the landfill, as per the County's agreement with the local community. Community service replaced bottled water service, also provided by the County.
Meredith Drive, Mt. Zion - east of Muncaster Road	contaminated wells (hydrocarbons)	▪ community water service ▪ individual GAC filters	As part of the extension of service to the Oaks Landfill vicinity (see above), the County was also able to provide community water service to this street.
Town of Laytonsville	polluted aquifer (hydrocarbons and nitrates)	▪ community water service ▪ individual GAC filters ▪ handle old wells properly	The County and WSSC are investigating the extension of community water service to the town and nearby properties. (See Section II.F.2.b.iii.)
Town of Boyds	polluted aquifer	▪ community water service ▪ individual GAC filers	
Hyattstown	contaminated wells	▪ community water service ▪ appropriate on-site treatment	
Patuxent River Watershed ▪ northeast of Damascus ▪ Between Routes 108 and 97	low well yields		DPS requires pretesting of wells for adequate yields in these areas. Some areas have limited access to community water service.
Western & Southern Darnestown	elevated nitrate levels		DPS has required advanced treatment on larger, multi-use septic systems in this area. Properties near Routes 28 and 112 have access to community water service.
Jerusalem Terrace	polluted aquifer	community water service	
CAG: granular activated carbon			

For more detailed information on water supply systems, see Chapter 3 of the Water and Sewer Plan.

Appendix 4

Information on Sewerage Systems Issues, and Excerpts, Selected Maps, and Tables from Chapter 4 of the Water and Sewer Plan

Water and Sewer Plan, Chapter 4: Sewerage Systems

Chapter 4 describes the planning basis for the sewerage systems in the County. It addresses the County's three major community sewerage systems—WSSC , Rockville, and Poolesville.

It defines the County's sewerage systems according to the treatment plant service areas: Blue Plains, Seneca, Damascus, Hyattstown (operated by WSSC), and Mill Bottom (operated by Frederick County). The WSSC system provides most of the County's community sewer service, excepting the Rockville Sanitary District and the Town of Poolesville. Accordingly, the Plan outlines the regional agreements and policies pertaining to the WSSC system, and how they relate to planning and providing sewer service and capital projects to meet anticipated needs, including the Inter-Municipal Agreement (IMA), the Bi-County Agreement, the Strategic Sewerage Plan, and the District of Columbia legislation that created the District of Columbia Water and Sewer Authority (WASA). The Plan includes the details of issues, terms, and conditions of these agreements and their implications for the future.

Over ninety percent of the County's wastewater is conveyed to the Blue Plains Wastewater Treatment Plant in Washington D.C. Accordingly, the IMA provisions that govern the shared use of this facility with the District of Columbia, Fairfax County, and other regional entities is described in detail. Issues important to the County include peak and average flow, allocated treatment capacities, and planned capital improvement projects. Related issues involve the use of the Potomac Interceptor and managing sewage treatment by-product—sewage sludge, also known as biosolids.

The Water and Sewer Plan reviews needs for the sewerage system on a sewershed basis, highlighting parts of their sewerage systems requiring relief, either now or in the future. In addition, the discussion of rural sanitation issues includes a table which summarizes known septic system problem areas throughout the County. This information provides a basis for further investigations and actions to address these rural sanitation problems. In addition, the plan presents policy recommendations and directions related to sewerage systems for future guidance.

Excerpts from Chapter 4

4.1.A Sewer Service Area Categories As discussed in Chapter 1, this Plan classifies all areas of the county into one of five category designations for sewer service areas. The categories range from areas served by community systems (S-1) to areas where improvements to or construction of new community systems will be planned in the future (S-3, S-4, and S-5) to areas where there is no planned community service (S-6). (In practice, Montgomery County does not use category S-2, which designates areas where community sewerage system projects are in the final planning stages.) Figure 4-F1 shows a generalized distribution of sewer service area categories throughout the county. For additional detailed information on sewer service area categories, please refer to Chapter 1.

4.1.B Sanitary Districts A sewer service area can be defined by a sewage system operating authority, and/or by a geographic or structural separation of a group of related treatment and transmission facilities. The county is divided into three publically-operated and largely separate sanitary service areas or districts: the Washington Suburban Sanitary District (WSSD), the largest system, serving most of the county; and two smaller municipal districts operated by the City of Rockville and the Town of Poolesville. (See Figure 3-F2.) Each district is served by its own sewage collection and transmission systems. Sewage from the WSSD is treated at several local plants operated by WSSC and at one regional facility, the Blue Plains Wastewater Treatment Plant (WWTP), located in the District of Columbia. Flows from Rockville eventually enter the WSSD system for transmission to and treatment at the Blue Plains WWTP. Poolesville's treatment plant, for

the most part, serves only the town itself. Information for the districts serving Rockville and Poolesville has been provided primarily by those municipalities and is incorporated into this Plan consistent with State law.

Some properties within each sanitary district are served by individual, on-site systems, rather than community systems. The vast majority of these individual systems are within the WSSD. Information on individual, on-site systems follows at the end of the chapter.

4.1.C Wastewater Treatment Service Areas Based on function, there are two components to a wastewater disposal system: collection/conveyance facilities and treatment facilities. A wastewater treatment service area is a geographic region comprised of a section of one or several sewer basins, where both collection/conveyance and treatment are provided. Presently six community wastewater treatment service areas provide service within Montgomery County: Blue Plains, Seneca, Damascus, Hyattstown, and Mill Bottom within the WSSD, and Poolesville, largely separate from the WSSD, as shown in Table 4-T1. The Rockville Sanitary District (RSD) is located within the Blue Plains service area. Figure 4-F3 shows the areas served by each of these six wastewater treatment plants.

4.1.D Watersheds and Sewersheds: The County is bounded by two rivers: the Potomac to the southwest and the Patuxent to the northeast. Most of the county's streams flow into the Potomac River, either through local tributaries, such as Watts Branch, Rock Creek, Cabin John Creek, and Great Seneca Creek, or through watersheds that drain to two major tributaries outside the county: the Anacostia and Monocacy Rivers. The southeastern part of the county, south of Olney and east of Georgia Avenue, slopes toward the Anacostia River, and includes the Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch watersheds. Portions of the northwest part of the county slope toward the Monocacy River, and include the Little Monocacy River, Bennett Creek, and Little Bennett Creek watersheds. The northeastern part of the county, along the border with Howard County, slopes toward the Patuxent River.

To take advantage of gravity to the greatest extent possible, sewage collection and conveyance systems generally follow streams and waterways within various drainage basins. Because of this, the sewer basins (or sewersheds) in this chapter are often referred to by the name of their related watershed (*e.g.*, Watts Branch, Seneca Creek, etc.). Through major trunk lines and pumping facilities the sewage flows from individual sewersheds are collected, combined, and conveyed for their eventual treatment at a wastewater treatment plant. The major drainage basins in the county are shown in Figure 4-F4.

The county is also divided into 27 land use planning areas, each area forming a fairly cohesive district bounded by a major highway or natural border such as a stream valley. These planning areas have been established by legislative action of the County Council. An overlay of the drainage basins and planning areas is shown in Figure 4-F5. All of the county's community sewerage systems, wastewater treatment service areas, sewersheds, and planning areas contained in each community sewerage systems, are listed in Table 4-T1.

4.II WASHINGTON SUBURBAN SANITARY DISTRICT

The Washington Suburban Sanitary District (WSSD), established by State law, includes most of Montgomery and Prince George's Counties, encompassing a total area of approximately 1000 square miles. Within Montgomery County, areas excluded from the WSSD include most of the City of Rockville and some surrounding areas, and the Town of Poolesville. Sewer service areas managed by the Washington Suburban

Sanitary Commission (WSSC) within Montgomery County include the Blue Plains, Seneca, Damascus, and Hyattstown service areas. WSSC also manages a small portion of the WSSD served by the Poolesville WWTP. The City of Rockville, also part of the Blue Plains service area, manages its own collection and conveyance systems, but relies on Blue Plains for treatment. The Town of Poolesville manages its own sewerage system, including collection, conveyance and treatment systems.

Guided by policies specified in this Plan, the provision of community sewer service within Montgomery County generally follows the patterns established by the County's General Plan for development, "On Wedges and Corridors." Community service is established and planned for the central and southern part of the county, following three major transportation corridors of higher density development north from the District of Columbia:

- the U.S. Route 29 (Columbia Pike) corridor to Burtonsville
- the Georgia Avenue (State Route 97) corridor to Olney
- the U.S. Interstate 270/State Route 27 (Ridge Road) corridor to Clarksburg and Damascus.

Elsewhere, primarily in the western and northeastern areas of the county, wastewater disposal service generally depends on individual, on-site systems, which discharge their effluent to the ground.

4.II.A Government Responsibilities The responsibilities for planning for and providing water service within the WSSD are multi-jurisdictional and depend on the cooperative efforts of municipal, County, State, federal, and regional authorities. This is especially true with regard to the Blue Plains WWTP, a wastewater treatment facility shared by several jurisdictions.

These agencies include:

- Montgomery County Government
  - Department of Environmental Protection (DEP)
  - Department of Permitting Services (DPS)
- Washington Suburban Sanitary Commission (WSSC)
- Maryland - National Capital Park and Planning Commission (M-NCPPC)
- District of Columbia Water and Sewer Authority (WASA)
- Metropolitan Washington Council of Governments (COG)
- State of Maryland
  - Department of the Environment (MDE)
  - Department of Planning (MDP).

These agencies, and their primary responsibilities and programs, are described in detail in Chapter 1, Section I.D. of the Comprehensive Water and Sewerage Systems Plan.

4.II.3 Wastewater Flow Analysis Flow projections are based on the County's adopted land use plans and approved service areas for future growth, and are in accordance with the County's latest master plans for development. The projected future flows are estimated in proportion to population projections with an allowance for planned commercial and industrial growth and factors such as infiltration (extraneous groundwater) and inflow (water discharged into sewer systems from roof leaders, area drains, etc.). WSSC is responsible for conducting wastewater

flow measurements and flow analysis for all areas within the WSSD. Various aspects of WSSC's flow management system are discussed in the following sections.

a. Flow Monitoring WSSC's program for field monitoring of sewage flows provides continuous data on the status of peak and average wastewater flows throughout the WSSC system. The current monitoring system consists of permanent stations which telemeter flow data to a central computer, reducing labor-intensive field collection of data and analysis of charts, and providing greater reliability through immediate reporting of any malfunctions. Fifty permanent sewer flow monitors and seven permanent rain gauges have been installed throughout the various sewer basins in Montgomery County. In addition, WSSC uses temporary flow meters which it can install at various locations for special studies.

The WSSC Planning Section is responsible for the maintenance and operation of part of the Consolidated Engineering System (CES), a computerized record keeping system which tracks the status of unconnected sewer commitments by geographic area (basin), type of future connection (residential, commercial, etc.), estimated average daily flow contribution, and expected connection date. WSSC uses data from CES to calculate remaining available treatment capacity in a particular service area, and to assist in projecting future sewage flows at various points in the transmission system, once appropriate peaking factors and existing peak flows have been established.

Currently, CES tracks future additional flow on the basis of authorizations granted by the WSSC, plumbing permits and actual hookups. A review of the CES system with Montgomery and Prince George's counties staff is recommended (see subsection b, below). The CES system is frequently the process by which needs and priorities for sewer infrastructure are identified and linked with population projections.

b. Flow Reporting WSSC generates the following reports on a regular basis:

- Quarterly Available Capacity Report – This report consolidates and replaces three separate WSSC reports: Sewage Flow to Blue Plains; Quarterly Addendum for WSSC Operated Plants, Mattawoman, Poolesville, and Hyattstown; and Uncommitted Capacity Summary, which summarized WSSC's available sewage transmission capacity for which connection permits have not yet been issued.

- Report to MDE on Sewage Flows and Record Plat Commitments – This quarterly report for the State tabulates existing flows, flows committed through record plat, and remaining uncommitted flows at each of the wastewater treatment plants receiving flows from the WSSC sewerage system.

- Flow Forecast for Montgomery County Sewer Service Areas – This report is issued on an as-needed basis. Forecasts are by major basin and mini-basins or some other small geographical unit, as determined by WSSC staff. Predicted sanitary flow is based on current M-NCPPC growth forecasts and the latest unit flow factors projected for 5-, 10-, and 20-year periods.

- Unit Flow Factor Report for Montgomery County Sewer Service Areas – This report is produced periodically and presents current unit flow factors to be used in the sewage flow report. It includes evaluation of the prior winter's water consumption for various user categories to detect any trends in projected sanitary flow. This report includes a reasonable allowance for unit infiltration/inflow based on rainfall and groundwater level probability analyses.

c. Flow Modeling WSSC conducts wastewater flow modeling primarily in conjunction with facility planning studies. WSSC maintains a sewer model which consists of sewer pipe inventory data throughout the sanitary system, as well as data from the comprehensive flow monitoring system described above. This information is used to determine existing and baseline flow conditions. Then land use and demographic data obtained from the M-NCPPC are superimposed on the existing flows to project future flow conditions for a particular study area.

In addition, WSSC applies various levels of more finite sewage flow modeling. For selected sewer basins, available capacity reports are produced periodically. These reports track plumbing permits, hook-ups, and outstanding authorizations for development, by study point, and link this information to the physical capacity of trunk sewer segments within a particular sewer basin. Other analyses include investigation of trunk sewers that are operating at or near capacity. The results provide information regarding the relative risk of surcharge and overflow in the selected sewer segments.

4.II.4 Transmission System Capacity Requirements and Moratorium Policies For planning purposes, the WSSC conducts comprehensive analyses on a regular basis to determine the wastewater transmission needs within the WSSD. In conjunction with these analyses, Montgomery County has developed and adopted policies to prioritize the County's transmission capacity needs. WSSC must follow these criteria and policies for each basin classification, by designating part or all of each sewered drainage basin in the county as either an **Adequate Capacity Basin, Potential Overflow Basin,** or **Existing Overflow Basin**, depending upon the transmission system's ability to handle sewerage flows. For existing and potential overflow basins these designations will be limited to the area above and tributary to the problem that causes the designation. References to the "Director" refer to the Director of the Montgomery County Department of Environmental Protection.

4.II.5 Sanitary Sewer Overflows -- Sanitary sewers serve a vital function in the transport of wastewater from the customer to the treatment plant. Wastewater either flows by gravity or is pumped to the nearest wastewater treatment plant. WSSC's wastewater collection system is comprised of over 5,000 miles of sewer line and forty-four wastewater pumping stations. When sewers become blocked by things like grease or tree roots, wastewater can back up in the line and eventually overflow from a manhole. This is known as a sanitary sewer overflow (SSO). There are a number of other possible causes of SSOs including pipe deterioration, undersized sewer lines, excess infiltration or inflow of stormwater and power outages at sewage pumping stations.

Most of WSSC's overflows are due to blockages caused by grease, tree roots, or other foreign objects and a small percentage are caused by power outages. Less than one percent are caused by "wet weather," i.e. the inflow of storm water. This attests to WSSC's commitment to

maintaining and upgrading its system to keep up with the infrastructure needs of its expanding customer base.

Over the past several years the Environmental Protection Agency (USEPA) has developed specific Federal regulations to address SSOs. In 1999, EPA released "strawman" regulations for comment. These proposed regulations would require utilities to develop and implement a “Capacity, Management, Operation, and Maintenance (CMOM)” program. The CMOM will outline specific ways a utility such as WSSC will prevent and respond to SSOs. WSSC already has a number of procedures in place to minimize the occurrence of SSOs and to mitigate their impacts when they do occur. WSSC has started the process of adapting its procedures to EPA’s proposed CMOM requirements.

The USEPA and the U.S. Department of Justice have initiated the development of an enforcement strategy for all major sewer systems with reported SSOs. In Maryland, this federal policy has included WSSC. Presently the WSSC is negotiating a consent agreement (order) with the U.S. Department of Justice to address past overflows and to adopt a monitoring and management system to prevent the occurrence of SSOs in the future.

The State of Maryland has placed new emphasis on its requirement to report all SSOs to the Department of the Environment (MDE) within twenty-four hours of their occurrence, as well as the need to notify the public whenever an SSO has any significant potential to affect public health or the environment. MDE has provided guidance suggesting that wastewater utilities need to work closely with local environmental and health departments to identify any such potential impacts and to notify the public when warranted. WSSC, in conjunction with Montgomery and Prince George's Counties, has developed procedures for this coordination and public notification.

Montgomery County DEP and WSSC are fundamentally committed to excellence in the safeguarding of public health and the protection of the environment and are committed to aggressive sanitary sewer overflow programs.

4.II.8 Infiltration and Inflow (I/I) Control Program -- Infiltration of groundwater into aging, defective or damaged sewers and the inflow of water from sources such as direct connections of roof leaders, area drains, drains from springs and swampy areas, and manhole covers may contribute to sewage collection system overloading or may stress the capacities of wastewater conveyance and treatment facilities.

WSSC has reviewed its collection system data and is aware of excess I/I in several of the sewer basins in the WSSD. In the past few years, WSSC focused a significant effort on evaluating the county's Rock Creek basin, which led to the development of a Sewer System Evaluation Survey (SSES) for that basin. The SSES recommendations included corrective actions for specific problems identified in manholes and sewer pipelines. The total estimated cost to rehabilitate the system defects identifies in the study area was approximately $10.6 million.

WSSC has identified other sewer basins in the WSSD as priority basins requiring SSES work. However, limited financial resources have limited WSSC’s ability to address these issues in a timely fashion. In the FY 2003 WSSC budget both Montgomery and Prince George’s Counties identified funding policies to begin addressing these I/I problems through the Sewer

Reconstruction Program. Accordingly, WSSC has begun an SSES in the Cabin John basin and has agreed to provide the Counties with a list of problem basins and their priority for future SSESs. Analysis of the Cabin John basin flows revealed not only a problem with I/I, but also a potential sewage exfiltration problem.

The I/I control program also directly supports renewed federal initiatives for controlling Sanitary Sewer Overflows (SSOs) which include facility and manhole overflows as well as basement back-ups. Using I/I assessment techniques, WSSC explores the causes for each SSO event, and seeks resolutions to preclude future occurrences. Survey tools deployed during I/I or related work (physical inspection of manholes, TV inspection of sewers) yield rehabilitation recommendations which are implemented in the Sewer Reconstruction Program. In this manner, WSSC routinely detects and corrects leaking as well as non-leaking structural defects.

4.II.9 Industrial Pretreatment Program -- WSSC implements a federally-required pretreatment program, the Industrial Discharge Control Program (IDCP). The IDCP has four primary goals:

- To monitor and control the discharge of industrial waste into the sanitary sewer system.
- To prevent the discharge of pollutants which will interfere with the operation of wastewater treatment plants, including interference with sludge use and disposal.
- To prevent the discharge of pollutants which will pass through the treatment works or otherwise be incompatible with such works.
- To improve opportunities to recycle and reclaim municipal and industrial wastewater and sludge.

The program also helps protect WSSC personnel and WSSC sewerage systems by regulating the discharge of toxic, corrosive, and other prohibited substances into the sanitary sewer.

IDCP requirements apply to all industrial users within the WSSD, and include those industrial users whose wastewater is treated at the District of Columbia's Blue Plains WWTP. WSSC regulates industrial users in the WSSD through a variety of activities including field investigations and sampling, permitting, compliance reviews, and enforcement measures. In order to comply with WSSC discharge limitations, some industrial users are required to install pretreatment equipment to treat their wastewater prior to discharging it to WSSC's sanitary sewers. In some cases, the equipment may be relatively minor (e.g., silver recovery units or grease traps); in other cases, the required level of pretreatment can be extensive.

4.II.10 Wastewater Treatment System Requirements: General Provisions In addition to discharge and construction permit requirements on existing and new treatment plants administered by the State of Maryland, Montgomery County shall review and approve all new facilities and all significant modifications to existing facilities within the county. All new community and multi-use treatment systems and points of discharge shall be specifically delineated in this Plan prior to the issuance of final construction and discharge permits by the State of Maryland. In addition, the County government may require stricter levels of treatment where warranted by projected receiving water quality impacts resulting from the discharge. These requirements also apply to all individual systems exceeding 1,500 gallons per day average daily flow and all individual systems of any size requiring a groundwater or surface water discharge permit, except heat pump discharges. Permit applicants have the burden of

adequately demonstrating to the County that the proposed facilities will not have a significant, detrimental impact on the surrounding community or receiving waters.

Proposed modifications to existing treatment facilities, including both system upgrading and expansion, are also subject to the County's approval. This includes any proposed community multi-use or individual system treatment facility or discharge point modification which requires a State construction and/or discharge permit. Any modifications requiring MDE's review and approval shall also require prior incorporation of the proposed modification in this Plan, as either a text amendment or as an adopted capitol improvement program (CIP) project. Specific proposals for new or modified facilities shall be submitted to the Director of DEP with supporting documentation as required by the Director.

The State of Maryland, as part of its efforts to improve the ecological health of the Chesapeake Bay, is investigating the impact of lowering the wastewater treatment plant nitrogen discharge standard from 8 milligrams per liter (mgl) to 3 mgl. This new standard would affect all of the wastewater treatment plants serving Montgomery County, and would have significant financial implications for WSSC and WASA with regard to the facility upgrades and treatment process improvements needed to comply with the lowered standard.

4.II.11 Financing Sewerage Systems WSSC uses several methods to fund the construction and operation of the sewerage system. Detailed information concerning WSSC's funding methods is included in Chapter 1, Section IV.A.

4.II.11.C Existing and Planned Sewerage Systems and Projected Needs The sewage collection and conveyance system within the WSSD consists of over 4,000 miles of gravity and force mains ranging from 6 to 102 inches in diameter and 52 wastewater pumping stations, including 26 stations in Montgomery County. This section presents an overview of the County's long-term sewerage system needs and anticipated constraints within each service area and individual sewershed. The anticipated sewerage system needs and constraints discussed in this section focus on the major components of WSSC's transmission and treatment facilities. The information presented here is based on the results of various studies as referenced at the end of this chapter.

The planned projects programmed in the WSSC CIP are intended to address the county's current and/or short-term wastewater conveyance or treatment needs. The CIP projects include funding and schedules for planning, design, land acquisition, and construction of facilities. These facilities often support new development in accordance with the County's approved plans and policies for orderly growth and development. Other projects are for system improvements and/or for compliance with environmental regulations and policies.

Flow projections within the WSSD are based on the County's adopted plans and approved service areas for future growth, and are in accordance with the County's latest master plans for development. M-NCPPC provided the population and growth estimates used in WSSC's studies. WSSC has developed flow projections to determine the approximate time a planning decision for each facility should be made. Wastewater flow forecasts are developed from detailed analyses of existing flow records and projected additional future flow based on projected demographics, wastewater flow per household and per employment, and other factors such as infiltration (extraneous groundwater) and inflow. Population forecasting and flow projection are

based on the best available data at the time the planning is conducted. WSSC re-evaluates actual conditions, project needs, etc. before implementing proposed projects.

Projected flows for all sewered basins in Montgomery County are summarized in a table included for sewershed. WSSC based these findings on an 80th percentile of historical flows and on Round 6 Cooperative demographic forecasts. The data also includes updated information regarding I/I control. WSSC' evaluation of the County's long-range sewerage system needs is based on these projections.

A comprehensive long-range strategic plan is under development at WSSC in coordination with Montgomery and Prince George's counties to evaluate the validity of adopted planning concepts, many of which were developed over twenty years ago and have not undergone a comprehensive review since their original adoption. These issues include sewage flow factors, capacity of regional facilities, updated environmental regulations, etc. This long range plan will also incorporate the results of the Potomac Interceptor Study. Relevant to this evaluation are the recent changes in water consumption patterns. The study will provide the WSSC and Montgomery and Prince George's Counties with a valuable tool for planning long-term sewage treatment needs, addressing concerns such as transmission capacity to and treatment capacity at the Blue Plains WWTP, and the timing and need for major capital investments. This comprehensive plan will be coordinated with the Blue Plains regional long-term Wastewater Management Plan which COG initiated in 2002.

4.V.A Septic Systems Permitting -- The County's Department of Permitting Services (DPS), Well and Septic Section, is responsible for the administration and enforcement of County and State laws and regulations governing on-site, individual sewerage systems. DPS authority is delegated from MDE. Relevant regulations are included in COMAR 26.03.01, 26.03.05, and 26.04.02 -.04, and in County Executive Regulation 28-93AM,"On-Site Water Systems and On-Site Sewage Disposal Systems in Montgomery County."

DPS fulfills these responsibilities by reviewing preliminary plans and record plats for properties served by on-site systems, issuing permits for, and inspecting, the construction of new and replacement systems, and by responding to complaints concerning on-site systems. Testing a property for a new septic system involves two tests: 1) the water table test to determine the probable highest level of water-saturated soil, and 2) the percolation test to determine the speed at which fluids percolate through the soil. The percolation test may be done at almost any time of the year. The water table test can only be done the late winter through early spring when the water table is at its highest level. The duration of the water table testing period depends on overall precipitation conditions for the preceding year or years. Dry conditions, particularly prolonged droughts, can require DPS to shorten the duration of the water table testing period.

4.V.C **Multi-Use Sewerage Supply Systems** -- Multi-use sewerage supply systems are individual, on-site wastewater disposal systems with a capacity of 1,500 or more gallons per day. Because of their greater potential for environmental impacts, these systems require approval in the Water and Sewer Plan. These facilities are generally large-capacity septic systems, although some facilities use more advanced treatment systems. DEP coordinates the Plan approvals for these systems with DPS. Appendix B of the Water and Sewer Plan includes a listing of the multi-use sewerage facilities in Montgomery County that are approved in this Plan.

Selected Maps and Tables from the Water and Sewer Plan, Chapter 4: Sewerage Systems

Figure 4-F1: Montgomery County Sewer Service Areas

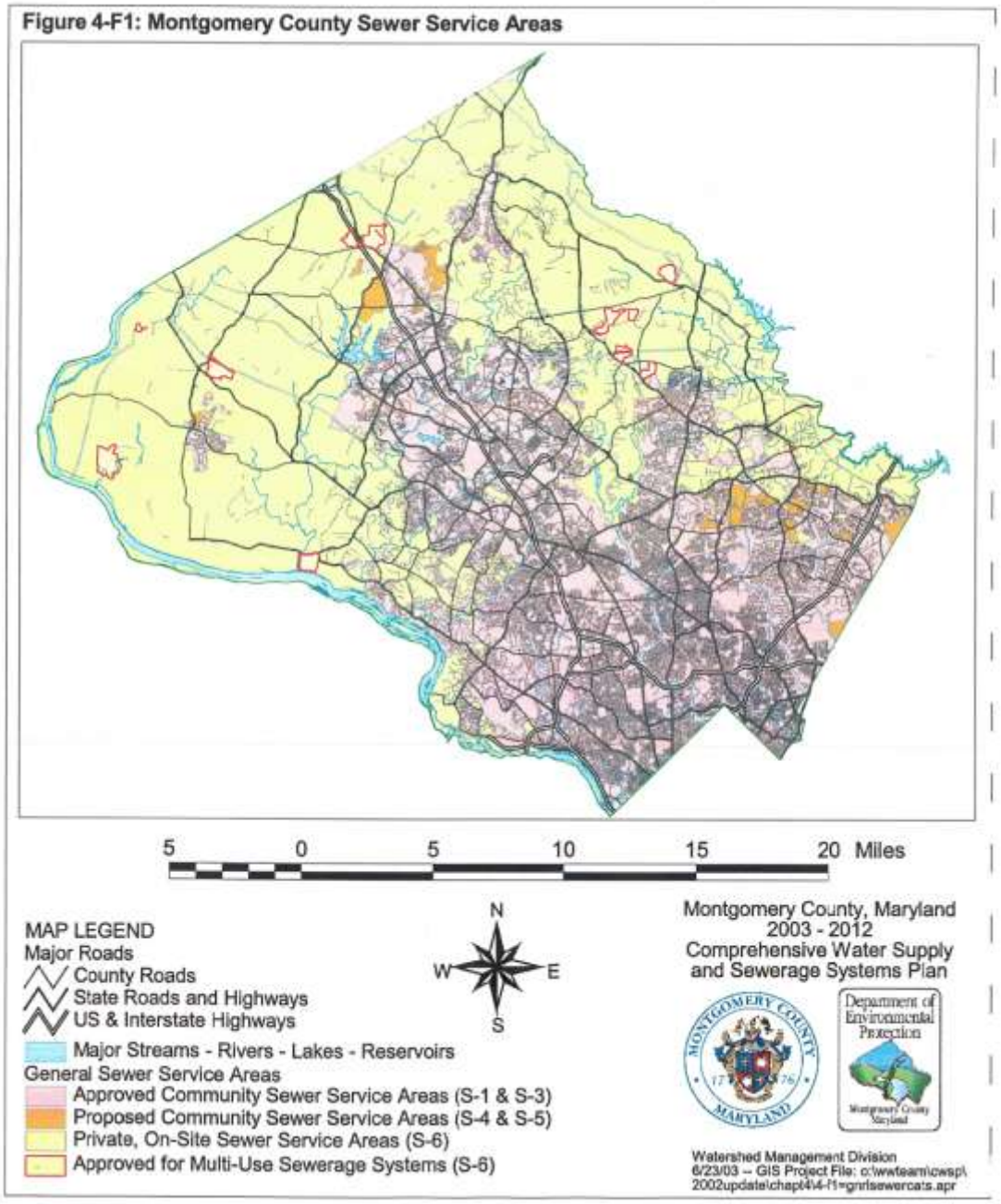


Figure 4-F2: Community Sewerage Systems

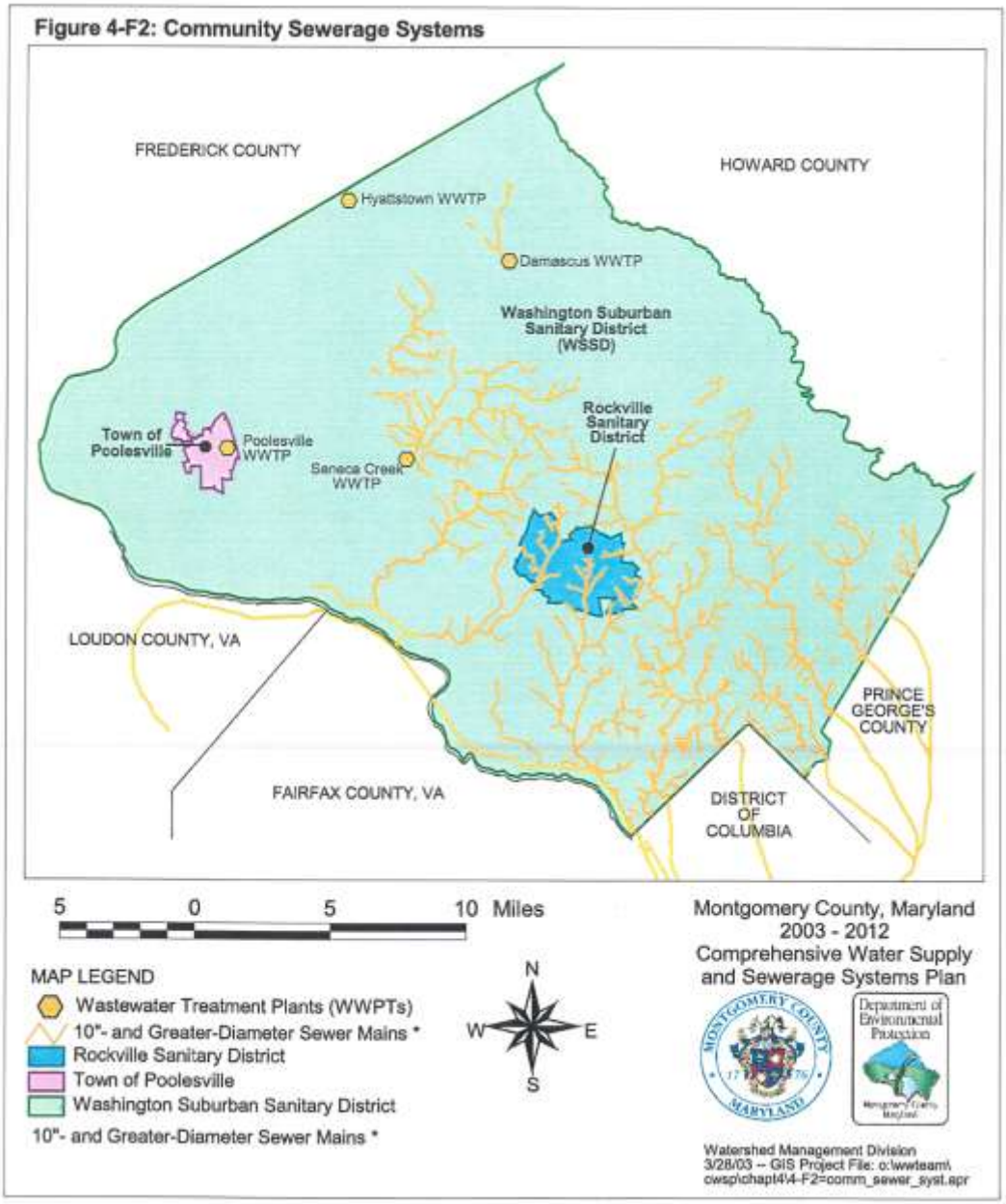


Figure 4-F3: Community Wastewater Treatment Service Areas

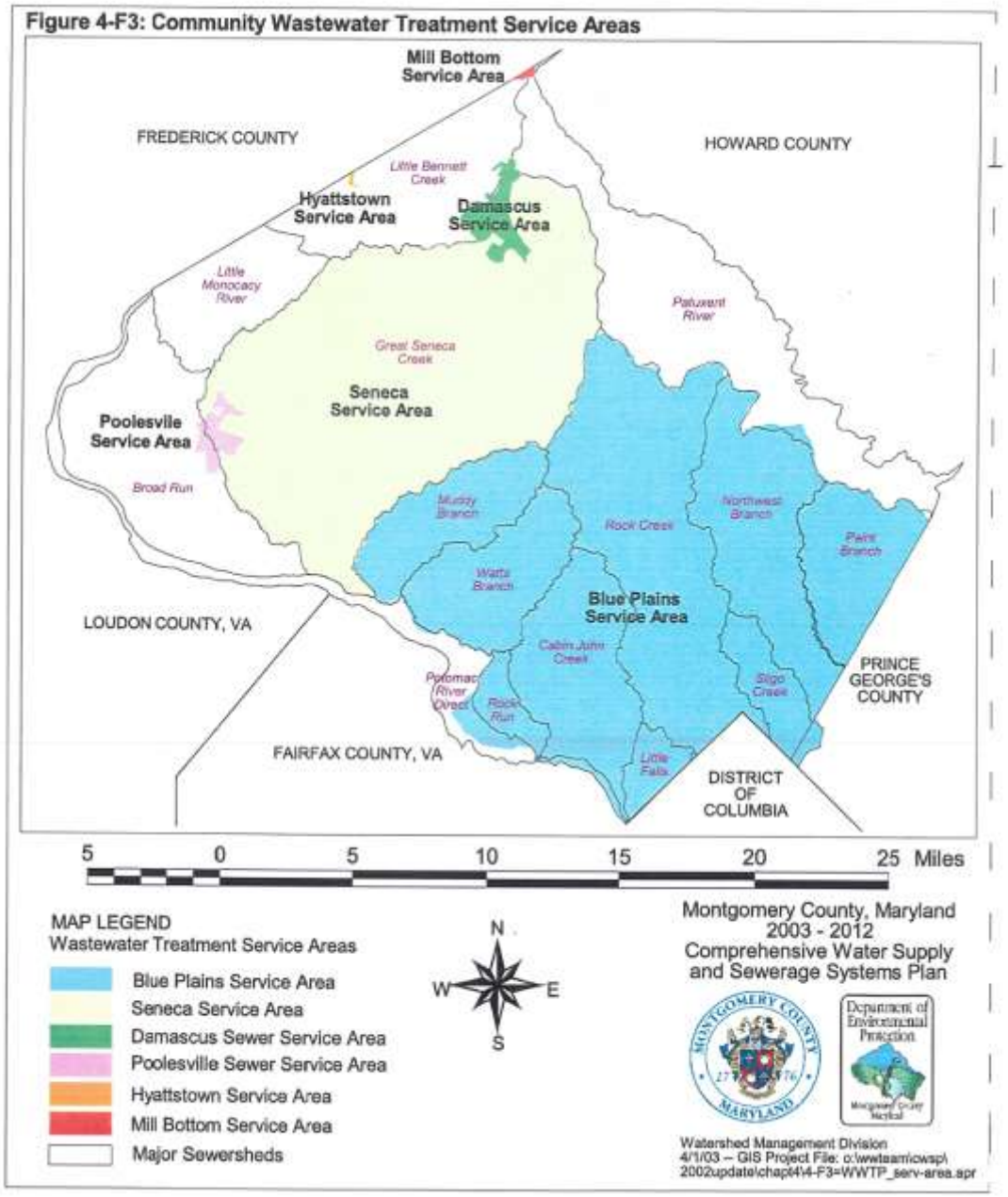


Table 4-T1: Montgomery County Sewer Service Areas

Community Sewerage Systems	Treatment Plant Service Area	Sewer Basins	Planning Areas
WASHINGTON SUBURBAN SANITARY DISTRICT	BLUE PLAINS	Muddy Branch Rock Creek Watts Branch Cabin John Creek Rock Run Little Falls Branch Sligo Creek Paint Branch Northwest Branch *Note: See Figure 4-F5 for detailed information on the relationships between sewer basins and planning areas in the Blue Plains and other treatment plant service areas.*	Aspen Hill (PA 27) Bethesda-Chevy Chase (PA 35) Cloverly - Norwood (PA 28) Colesville - White Oak (PA 33) Fairland - Beltsville (PA 34) Gaithersburg Vicinity (PA 20) Gaithersburg & Washington Grove (PA 21) Germantown (PA 19) Kemp Hill Four Corners (PA 32) Kensington - Wheaton (PA 31) North Bethesda - Garrett Park (PA 30) Olney (PA 23) Patuxent Watershed Conservation (PA 15) Potomac -Cabin John (PA 29) Rockville (PA 26) Silver Spring (PA 36) Takoma Park (PA 37) Travilah (PA 25) Upper Rock Creek Watershed (PA 22)
	SENECA	Seneca Creek*	Darnestown (PA 24) Clarksburg (PA 13) Gaithersburg Vicinity (PA 20) Gaithersburg & Washington Grove (PA 21) Germantown (PA 19)
	DAMASCUS	Portions of Seneca Creek, Patuxent, and Monocacy River	Damascus (PA 11)
	HYATTSTOWN	Monocacy River	Bennett & Little Bennett (PA 10)
	POOLESVILLE**	Portions of Seneca Creek	Poolesville (PA 17)
	MILL BOTTOM	Portions of Patuxent River and Bennett Creek	Damascus (PA 11)
ROCKVILLE SANITARY DISTRICT	BLUE PLAINS	Portions of Cabin John, Watts and Rock Creek	Rockville (PA 26)
TOWN OF POOLESVILLE	POOLESVILLE	Portions of both Seneca Creek and Potomac River	Poolesville (PA 17)

*** The Seneca Creek WWTP currently offloads and treats flows from the Blue Plains Service Area, but will be separate and independent from the Blue Plains system in 2003.**
**** The Poolesville WWTP serves the communities of Jonesville and Jerusalem in the WSSD.**

Figure 4-F4: Major Sewerage Basins (Sewersheds)

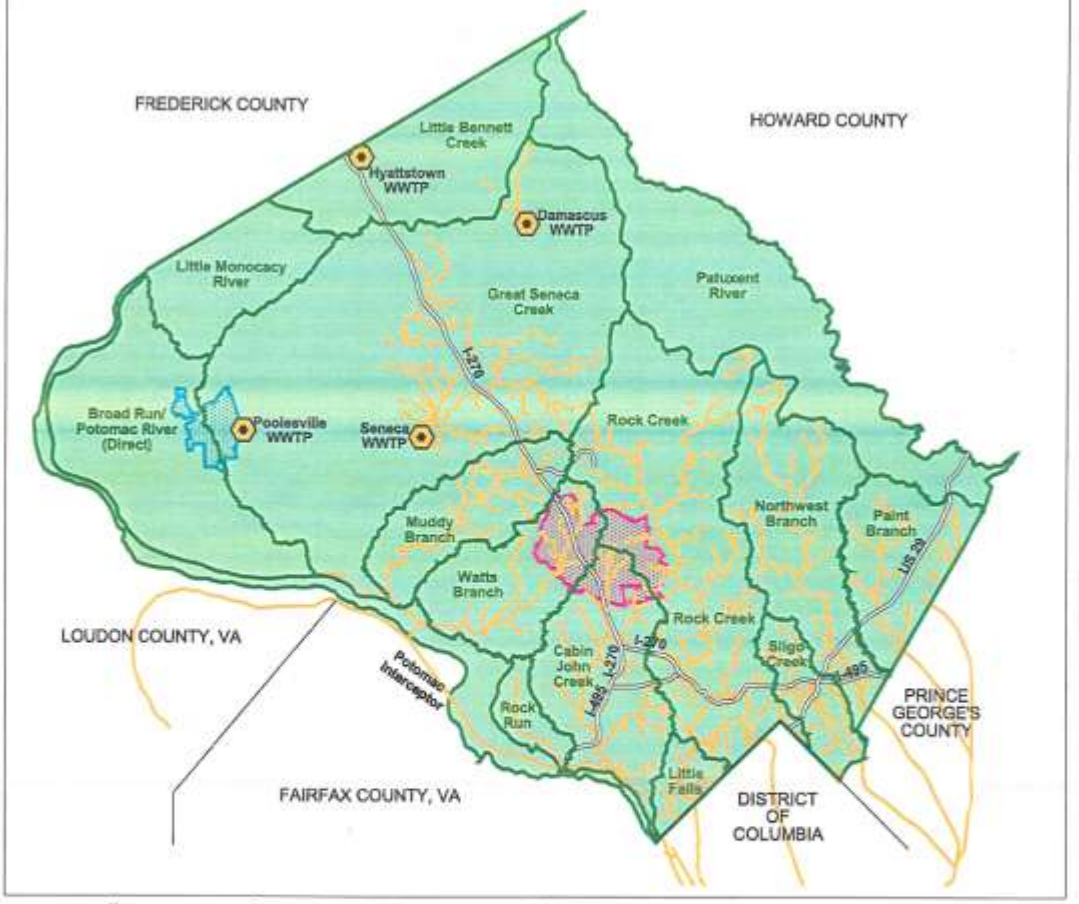


Figure 4F-5: Major Sewerage Basins and Planning Areas

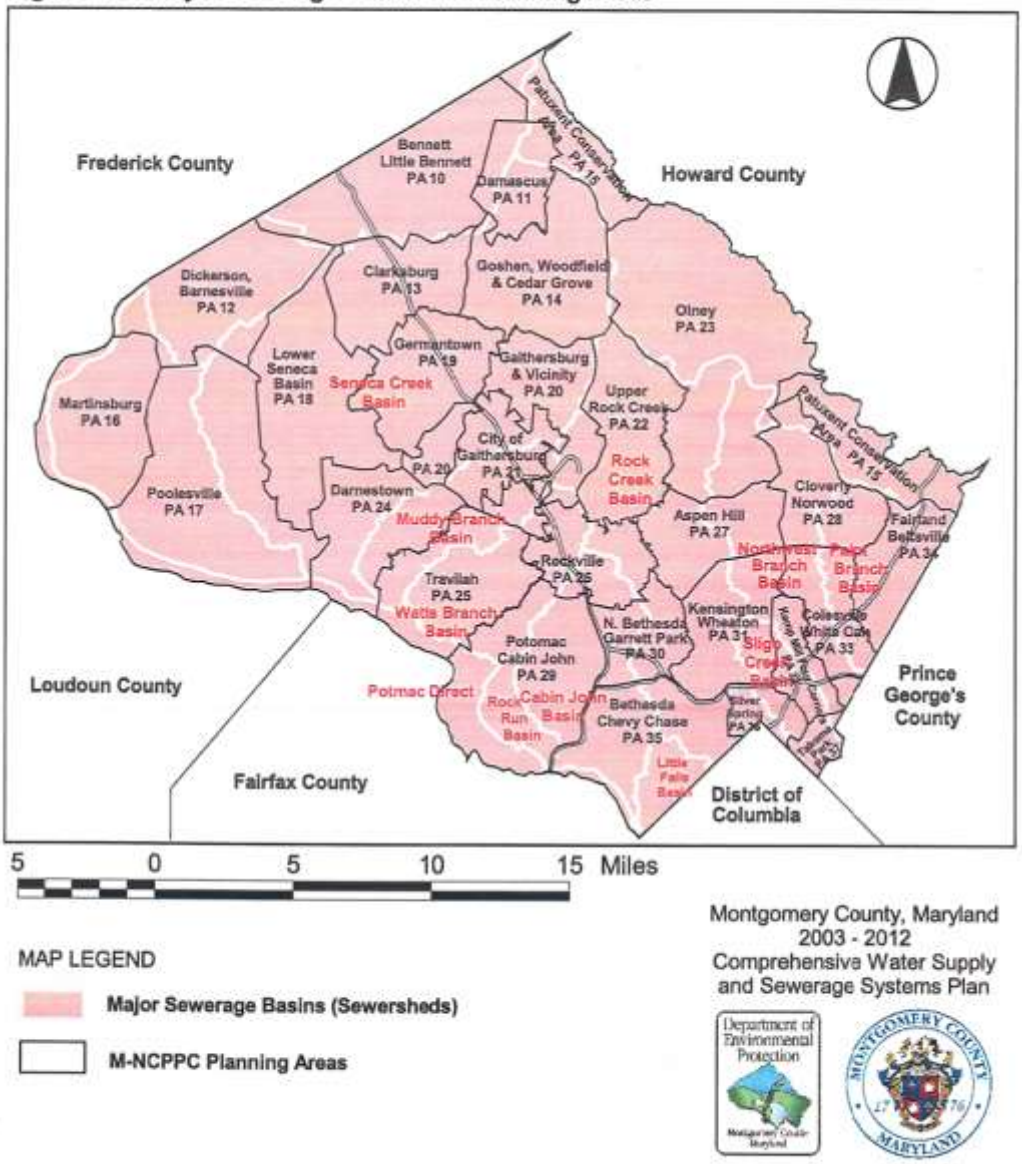


Table 4-T2: Blue Plains IMA Capacity Allocations		
IMA Participants	**Blue Plains WWTP Capacity Allocations at:**	
	309 mgd	**370 mgd**
WSSC	153.3 mgd	169.6 mgd
District of Columbia	135.0 mgd	148.0 mgd
Fairfax County	16.0 mgd	31.0 mgd
Other Potomac Interceptor Users	4.7 mgd	11.4 mgd
Reserved for Potomac Interceptor Users	--	10.0 mgd*
* Approximately 5.0 mgd reserved for Loudoun County, Virginia.		

Table 4-T3: WSSC Blue Plains Capacity Allocations by Jurisdiction	
Jurisdiction	**Allocation (mgd)**
Montgomery County	77.6
Prince George's County	66.4
City of Rockville	9.3
WSSC Total	153.3

Table 4-T5: WSSC Sewerage Basin Designations and Policies		
Designation	**Description**	**Policy**
Adequate Capacity Basin	Part or all of any basin in which regular overflows and user backups have not been experienced and the observed or calculated peak sewage flow, allowing for an appropriate wet weather reserve, does not exceed the sewer operating capacity.	WSSC may permit additional sewer hookups and commitments subject to the availability of adequate treatment capacity.
Potential Overflow Basin	Part or all of any basin which has not experienced regular overflows or user backups, but for which the calculated or observed peak sewage flow, allowing for an appropriate wet weather reserve, exceeds the peak sewer operating capacity	WSSC, after consultation with the Director, should declare by resolution that it will **not** permit additional sewer hookups or commitments which would significantly increase the probability of sewer overflows or user backups until a facility plan is initiated or relief measures are under construction. The WSSC may continue to permit additional sewer hookups or commitments which would result in peak sewer operating capacity being exceeded if the calculated peak sewage flow will not result in an increased significant probability of overflows or user backups prior to completion of a relief project. The identical exemptions defined for immediate public health hazards, public service buildings, and individually-owned abutting lots in the policy for Existing Overflow Basins below also apply to this policy for Potential Overflow Basins.
Existing Overflow Basin	Part or all of any basin which is experiencing regular sewage overflows or user backups such that an immediate public health problem exists. "Regular" is defined as having already occurred and projected to occur more than once in ten years, other than maintenance-related occurrences.	WSSC, after consultation with the Director, should declare by resolution that it will **not** permit additional sewer hookups or commitments which would increase the frequency of overflows or user backups until relief measures are underway with a projected completion date of a year or less. Exemptions: public service buildings approved by the Director, and existing unconnected buildings creating immediate public health hazards as determined by the WSSC or the Director are exempt from any sewer hookup or commitment prohibition. Lots serving existing or proposed individually-owned single-family dwelling units abutting an existing sewer line and which the applicant owned or contracted for prior to the date of the moratorium resolution are exempt from any sewer hookup or commitment prohibition.

Figure 4-F6: Blue Plains Regional Boundaries

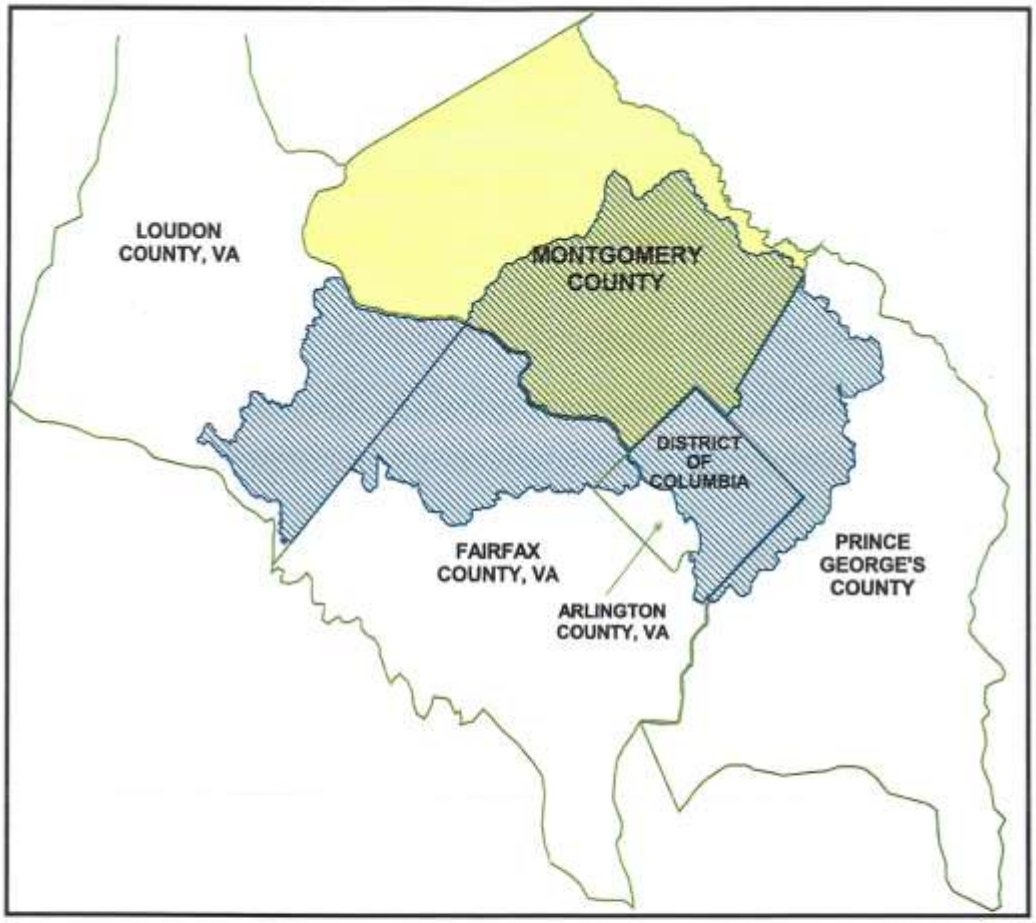


Figure 4-F7: Blue Plains Service Area in Montgomery County

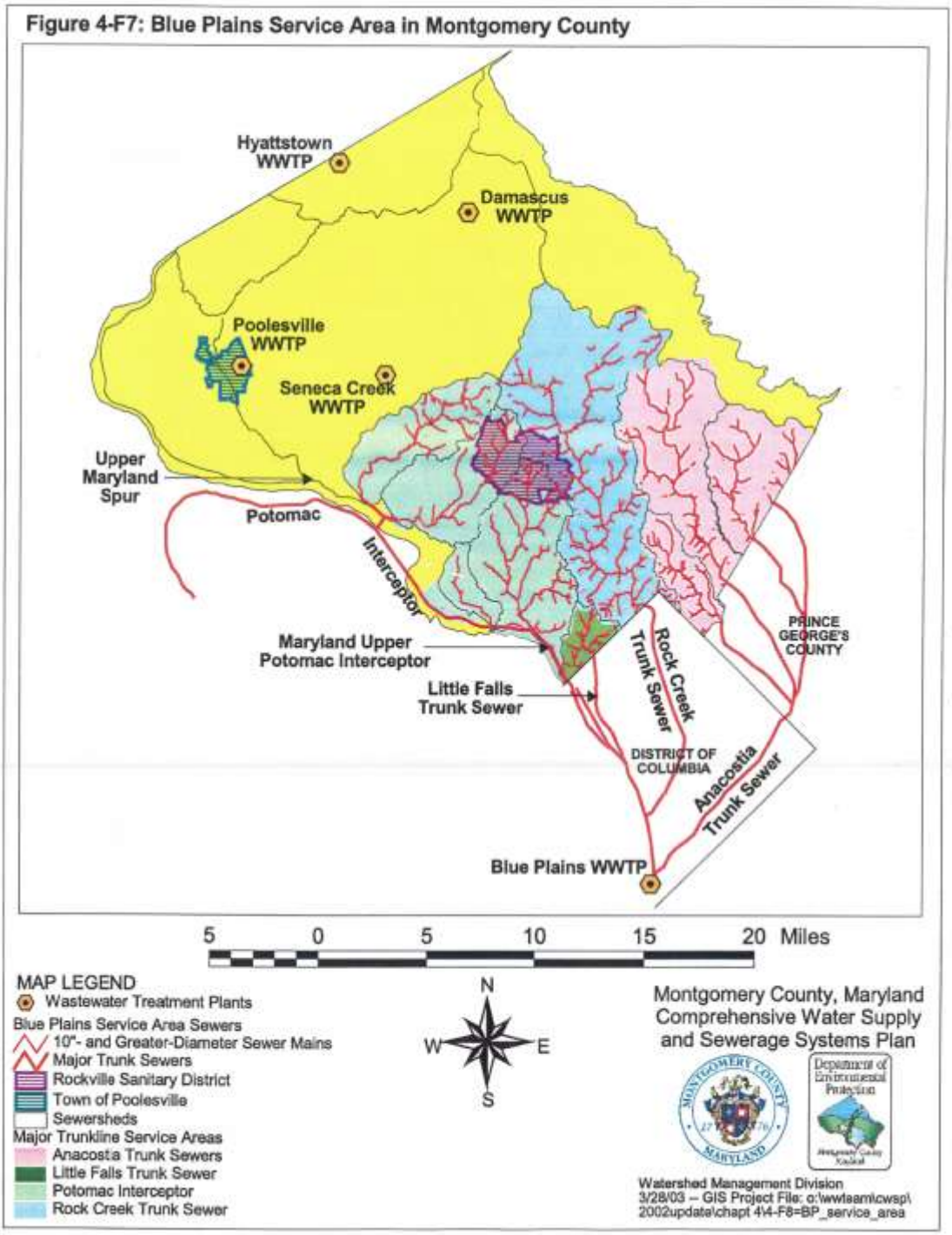


Table 4-T6: Average Basin Flows and IMA Limitations for the Montgomery County Portion of the Blue Plains Service Area

Sewer Basin	Receiving Interceptor	IMA Limit (mgd)	
		Annual Average	Peak
Muddy Branch*	PI	15.5	40.3
Cabin John	MUPI & PI	11.0	48.3
Rock Run	PI	0.9	3.7
Watts Branch	PI	4.5	14.2
Little Falls	UPI	7.6	20.8
Rock Creek	RCTS	33.5	56.6
Other Basins**	Anacostia & PI	NA	NA
Total to Blue Plains WWTP		NA	**NA**

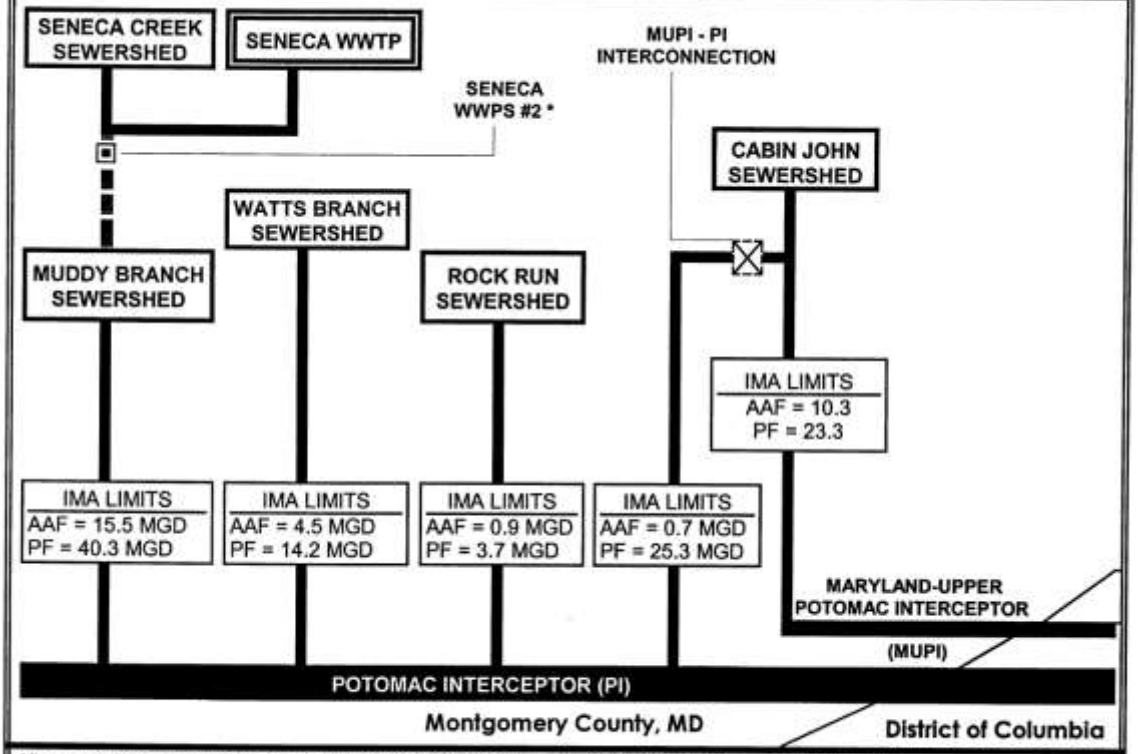
* Current flows to Blue Plains from Muddy Branch includes flows from the Seneca Basin. This will discontinue in mid-2003 after the Seneca WWTP expansion is completed.

** Other Basins include flows from Anacostia and direct connections to the Potomac Interceptor.

- All data include flows from the City of Rockville.
- Anacostia is a Bi-County Basin and capacity is available to both Counties on first come-first served basis. Flows from Montgomery County to the Anacostia Trunk Sewer are from the Northwest Branch, the Paint Branch, and the Sligo Creek sewer basins.

PI = Potomac Interceptor MUPI = Maryland Upper Potomac Interceptor
RCTS = Rock Creek Trunk Sewers NA = Not Analyzed or Not Applicable

Figure 4-F8: Montgomery County Sewage Flow to the Potomac Interceptor



All sewage flows are in millions of gallons per day (MGD): AAF = Annual Average Flow PF = Peak Flow
* The majority of pumpover of flows from the Seneca sewershed into PI via the Muddy Branch sewershed will cease in mid-2003 on the completion of the Seneca WWTP expansion. Pumped flows from the Lower Seneca Basin will continue until a new trunk sewer connecting that basin with the Seneca WWTP is completed in Spring 2006.

Table 4-T14: Community Wastewater Treatment Facilities in Montgomery County

• Facility Name & Owner/Operating Agency • Facility Location • Facility Coordinates	Type of Treatment	• Point of Discharge • Permit No.	Design Capacity (mgd)	Comments/Status
SENECA SERVICE AREA FACILITIES				
Seneca WWTP -- WSSC Great Seneca Highway - Germantown N475,200/E721,900	Activated Sludge	Great Seneca Creek 91-DP-0156	5.0	Expansion to 20 MGD by Summer 2003; until then, the plant treats flows offloaded from the Blue Plains WWTP service area. Ultimate design capacity is 26.0 MGD.
DAMASCUS, HYATTSTOWN, AND POOLESVILLE SERVICE AREA FACILITIES				
Damascus WWTP -- WSSC Log House Road - Damascus N514,500/E741,500	Activated Sludge	Magruder Branch 93-DP-0162	1.5	
Hyattstown WWTP -- WSSC Routes 355 & 109 - Hyattstown N527,000/E710,500	Physical/Biological	Little Bennett Creek 96-DP-3200	0.015	
Poolesville WWTP -- Town of Poolesville Fisher Avenue - Poolesville N476,250/E688,100	Sequencing Batch reactor	Dry Seneca Creek 95-DP-0781	0.625	MDE issued draft permit for process upgrade and expansion to 0.75 MGD.

Figure 4-F18: 2001 Daily Average Wastewater Treated in Montgomery County

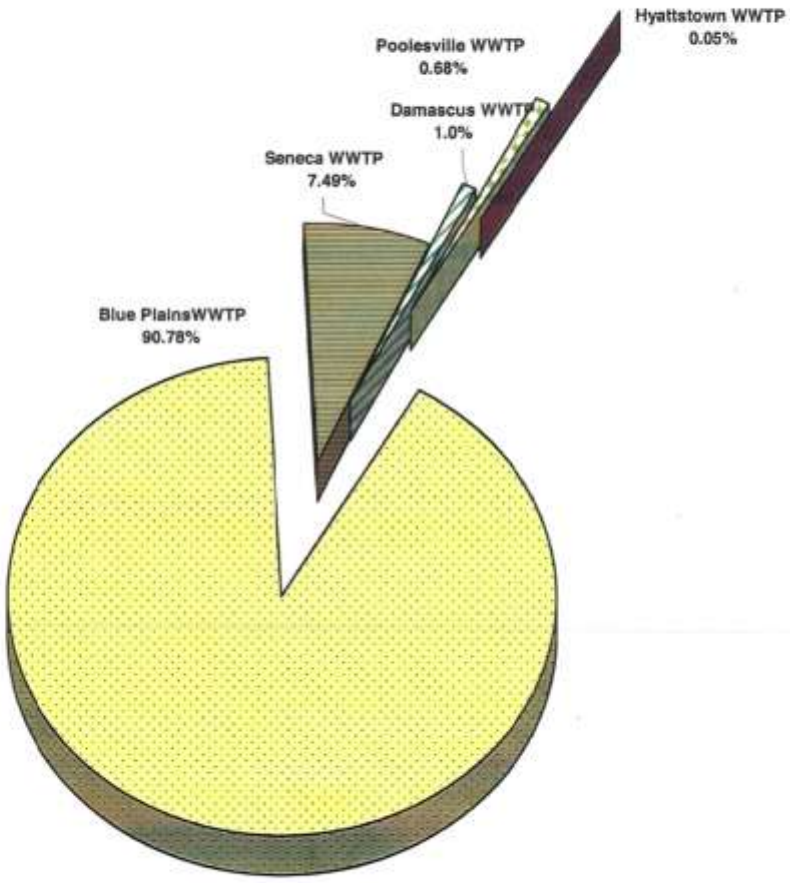


Table 4-T17: Projected Flows and Available Treatment Capacity in the Blue Plains Service Area [1]			
Sewer Basin	Projected Flows (mgd)		
	2005	2010	2015
Anacostia [6]	60.39	62.02	63.73
Cabin John [2]	11.92	12.24	12.6
Little Falls	4.27	4.48	4.56
Muddy Branch	5.69	6.37	6.92
Rock Creek [2]	30.4	31.39	32.06
Rock Run	0.97	1.0	1.03
Watts Branch [2]	4.87	5.53	5.76
Other Montgomery County Flows [5]	0.44	0.44	0.45
Flows from Prince George's County [4]	8.06	8.26	8.47
TOTAL	127.01 [3]	131.73 [3]	135.58 [3]
Blue Plains WWTP	Treatment Capacity (mgd)		
	169.6	169.6	169.6
	Available Capacity (mgd)		
	42.59	37.87	34.02

[1] Data are based on latest (2002) WSSC projections.
[2] Projected flows in Rock Creek, Cabin John and Watts Branch include flows from Rockville.
[3] The allocated capacity to WSSC includes 9.3 mgd for the City of Rockville.
[4] Other flows from Prince George's County include flows from Oxon Run, Piney Branch and Watts Branch.
[5] For flows from smaller basins directly connected to the Potomac Interceptor.
[6] Anacostia flows include flows from the Prince George's County.

Figure 4-F21: Rockville Sanitary District and Sewerage Systems

MAP LEGEND

Rockville Sewer Mains
- 8-Inch or Smaller Diameter
- 10-Inch or Greater Diameter
- Wastewater Pumping Stations

WSSC Sewer Mains
- 8-Inch or Smaller Diameter
- 10-Inch or Greater Diameter
- Wastewater Pumping Stations
- Sewer Force Mains
- Sewersheds

Major Roads
- County Roads
- State Roads and Highways
- US & Interstate Highways

- City of Rockville Corporate Limits
- Rockville Sanitary District (RSD)

Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply and Sewerage Systems Plan

Department of Environmental Protection

Watershed Management Division
4/11/03 -- GIS Project File: o:\wwteam\cwsp\2002update\ch4\4-f21=rockville_sewers.apr

Table 4-T19: Projected Wastewater Flows from the City of Rockville and WSSC-Rockville Flow Limitations.

YEAR		Cabin John Basin		Rock Creek Basin		Watts Branch Basin	
		Average (MGD)	Peak (MGD)	Average (MGD)	Peak (MGD)	Average (MGD)	Peak (MGD)
2005	Projected Flow	2.21	6.21	2.3	6.84	2.32	6.62
	WSSC-Rockville Flow Limitation	n/a	6.8*	n/a	9.84	n/a	8.0
	Balance	n/a	0.59	n/a	3.00	n/a	1.38
2010	Projected Flow	2.25	6.28	2.16	7.09	2.42	7.2
	WSSC-Rockville Flow Limitation	n/a	6.8*	n/a	9.84	n/a	8.0
	Balance	n/a	0.52	n/a	2.75	n/a	0.8
2015	Projected Flow	2.28	6.37	2.35	7.12	2.64	7.23
	WSSC-Rockville Flow Limitation	n/a	6.8*	n/a	9.84	n/a	8.0
	Balance	n/a	0.43	n/a	2.72	n/a	0.77

n/a: The agreements between the City and WSSC only specify peak sewage flow limitations for each sewer basin; the average flows limitation is for the City as a whole, not for each basin.
* The City's allowed peak flow downstream of Booze Creek is 8.0 MGD.

Figure 4-F22: Poolesville Community Sewerage Systems

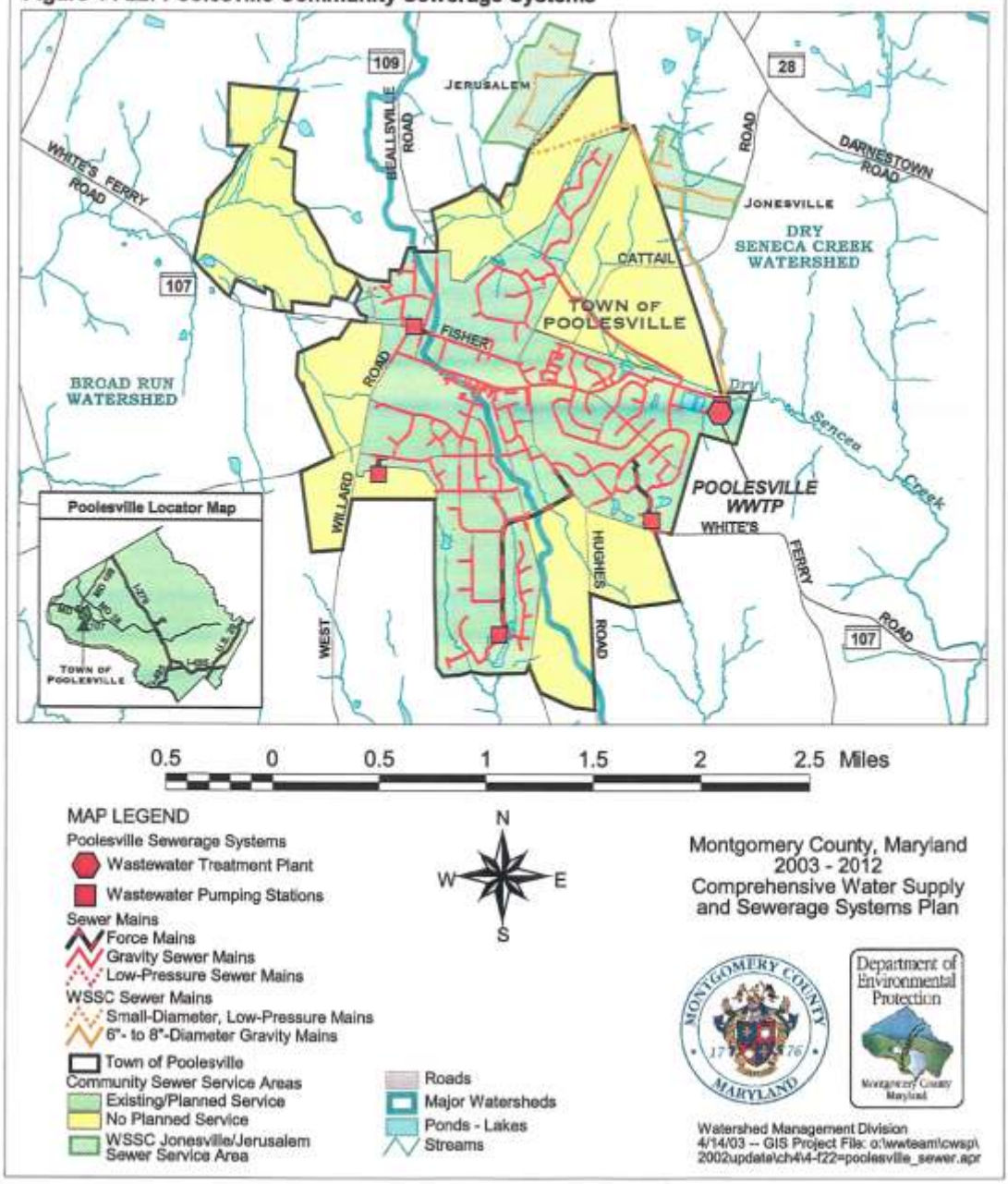
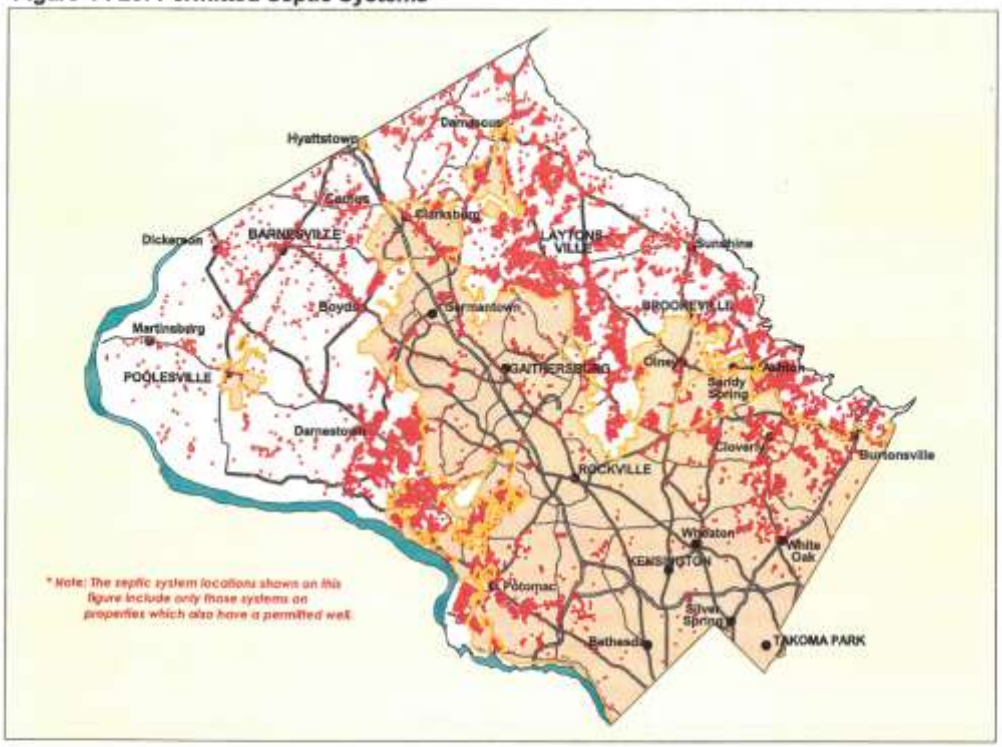


Figure 4-F23: Permitted Septic Systems



5 0 5 10 15 20 Miles

N
W E
S

MAP LEGEND
- Septic System Locations *
- Communities

Major Roads
- County Roads
- State Roads and Highways
- US & Interstate Highways

General Community Sewer Envelope

Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply
and Sewerage Systems Plan

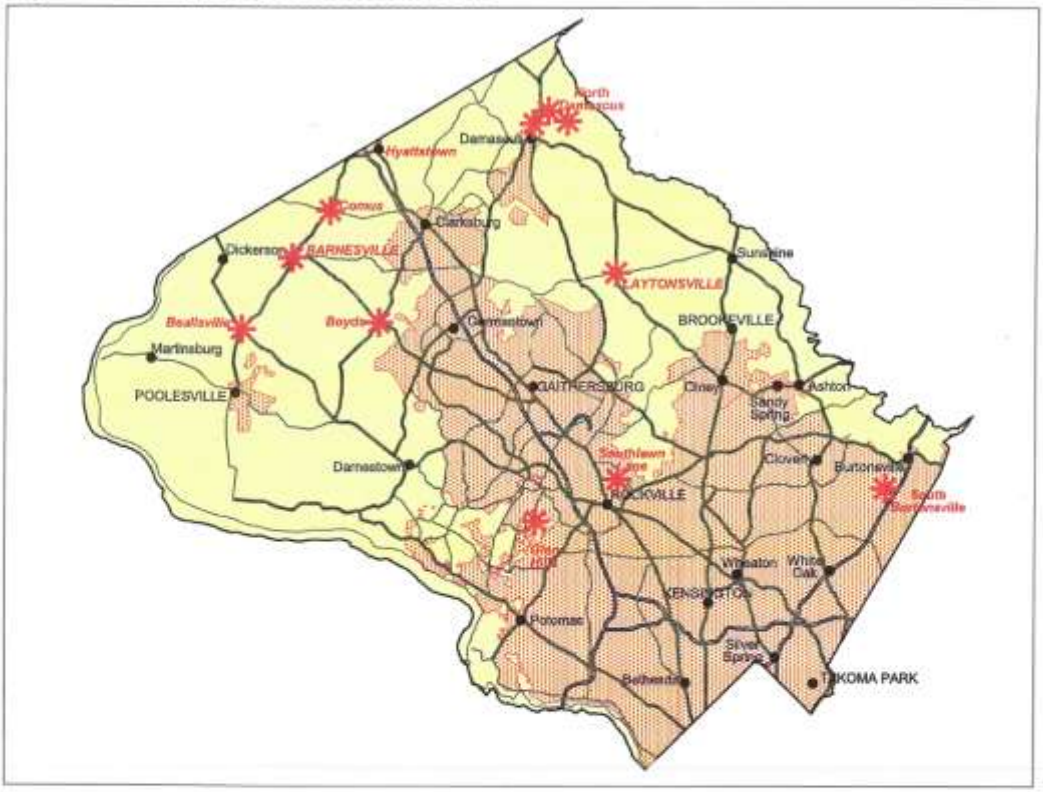
Department of Environmental Protection

Watershed Management Division
5/28/04 -- GIS Project File: o:\wwteam\cwsp\2002update\chapt4\4-f23=septicsystems-final.apr

Table 4-T20: Septic Problem Areas			
Location	**Problem**	**Potential Solutions**	**Recommendations/Actions Taken**
Town of Boyds	▪ failing septic systems, some on relatively small lots	DPS recommends: ▪ community sewer service	This will require further investigation by DEP and DPS. Sewer extension issues to this part of the county could have dramatic effects on development demand.
Hyattstown	▪ failing septic systems, most on relatively small lots	▪ community sewer service ▪ innovative/alternative (I/A) systems for properties outside the sewer envelope	Provided sewer service to replace failing septic systems.
Town of Laytonsville	polluted aquifer (hydrocarbons and nitrates)	▪ community water service ▪ individual GAC filters ▪ handle old wells properly	The County and WSSC are investigating the extension of community water service to the town and nearby properties. (See Section II.F.2.b.iii.)
South Burtonsville: Miles Rd., Duvall Rd., Tolson Pl., and Maple Hill Rd.	failing septic systems	▪ community sewer service	DEP continues to approve sewer category change requests within this area. The pending development of a new residential subdivision along Miles Rd. will bring additional sewer mains into the area, expanding the availability of service.
Damascus: Gue rd., Howard Chapel Dr., Ridge Rd. and adjacent areas	failing septic systems - unable to repair	DPS recommends: ▪ community sewer service	Because of the implications of providing sewer service to these areas, they should be studied as part of the upcoming Damascus Master Plan revision.

Table 4-T20: Septic Problem Areas			
Location	**Problem**	**Potential Solutions**	**Recommendations/Actions Taken**
Glen Hills - southwest side of Rockville	failing septic systems, poor soils	▪ community sewer service ▪ innovative/alternative on-site systems	The 2002 Potomac Subregion Master Plan calls for a comprehensive sanitary study of Glen Hills prior to the further extension of sewer mains into the area. The earliest DEP and DPS could undertake such a study is summer 2003.
Southlawn La. - Northeast side of Rockville	failing septic systems, poor soils	DPW and County DPS recommend community sewer service	Rockville is initiating a water and sewer feasibility study. The study will identify alternative locations for community water and sewer extension and recommend a specific project. Rockville will pursue main extensions via the special assessment process in 2004.
Rural communities - Barnesville, Comus (Slidell Rd.), and Beallsville	failing septic systems - unable to repair	DPS recommends: ▪ community sewer service ▪ innovative/alternative on-site systems	These communities are beyond the reach of the County's existing and proposed community sewerage systems. Solutions for these problems may require a Hyattstown-type approach or different concepts such as community-based septic systems.

Figure 4-F24: Septic System Problem Areas



5 0 5 10 15 20 Miles

MAP LEGEND

- ***Septic System Problem Areas****
- INCORPORATED COMMUNITIES
- Unincorporated Communities

Major Roads

- County Roads
- State Roads and Highways
- US & Interstate Highways
- General Community Sewer Service Envelope

* For additional information, refer to Table 4-T20.
Source: DPS Well and Septic Section

N W E S

Montgomery County, Maryland
2003 - 2012
Comprehensive Water Supply
and Sewerage Systems Plan

Department of Environmental Protection

Watershed Management Division
6/23/03 -- GIS Project File: o:\wwteam\cwsp\2002update\chap4\4-f24=problem_areas.apr

Appendix 5
WSSC Approved Water Supply Projections

This Appendix contains the latest WSSC water production projections and provides background information on how the projections were developed. In subsequent planning efforts, these water production projections will be used to analyze the adequacy of the existing water system to meet future needs and to determine the timing and sizing of needed improvements.

APPROVED

2006 Water Production Projections

Washington Suburban Sanitary Commission

Planning Group

July, 2006

Executive Summary

WSSC's average water production is expected to increase by about 1% per year, reaching 224 million gallons per day (mgd) in the year 2030. These latest projections are slightly lower than the previous projections done in 2001 (Water Productions Projections, WSSC, Planning Group, April, 2001).

The actual water production of 171.9 mgd in 2005 was the second highest in WSSC history, behind 1994. After declining and flat water productions from 1994 to 2003, recent years have shown steady increases. Per (household) unit water production has remained flat over the past 5 years after significant decreases during the preceding 15 years. If per unit production continues to hold steady, total production will continue to increase as new units are added.

The ratio applied to projected average production to obtain a future year's projected maximum day production has been recalculated by including the most recent actual data. The resulting ratio of 1.48 is a very slight (<1%) decrease from the previous ratio. As has been the case since 1994, the calculation of this ratio incorporates a 20% probability that it will be exceeded by the actual ratio in any given year.

Water supply to other jurisdictions (wholesale) recently increased (due to supply interruptions from alternate sources) to 3.92 mgd (2.3% of current production) and outstanding commitments are about 12.4 mgd (7% of our current production). Such supplies and potential requests for additional supplies present possibilities for additional future increases in our production requirements.

Introduction

This report provides the latest WSSC water production projections and provides background information on how the projections were developed. In subsequent planning efforts, these water production projections will be used to analyze the adequacy of the existing water system to meet future needs and to determine the timing and sizing of needed improvements.

The development of water production projections involves these major steps:

- Development of per unit water production factors.
- The allocation of units provided by demographic growth forecasts to water system pressure zones.
- The calculation of annual average water production, by pressure zones, the grouping of pressures zones, and the calculation of group and system totals.
- The calculation of maximum day ratios for the system and pressure zone groups.
- The accounting for supplies to other jurisdictions.

Per Unit Water Production Factors

This is a critical step in the development of water production projections. Per unit production factors are multiplied by the number of forecasted units to calculate projected water production. These factors reflect whether WSSC customers are using more or less water per unit and what those use patterns are expected to be in the future.

The units for which per unit production data are developed are: single family households, multi family households and employees. These types of units are included in the Cooperative Growth Forecasts provided by the Metropolitan Washington Council of Governments and the Maryland National Capital Park and Planning Commission.

Here, it is important to distinguish between water production and water consumption. Water production is the amount of water leaving the treatment plants and entering the distribution system. Water consumption is the amount of water being measured as it leaves the distribution system. The difference between the two is the water leaving the distribution system without being measured. This water is sometimes called unaccounted-for water. The ratio of production divided by consumption is referred to here as the production factor.

Since production is the amount of water that must flow through the distribution system, water production is usually more relevant than water consumption for the purposes of water system analysis and planning. To obtain per unit production data, per-unit consumption is calculated from customer service data and then multiplied by the production factor.

One problem when comparing production data with consumption data is a lack of synchronization. Since the hundreds of thousands of customer meters in the WSSC system are read on different schedules, there is no single time interval for which total system consumption is available. To minimize the inaccuracies from asynchronous meter readings, a year's worth of consumption is averaged and compared with the corresponding production data. For this report, consumption data from January 2005 to December 2005 was used.

The term “DAC” refers to daily average consumption. Figure 1 shows a pie chart of 2005 DAC for the entire system, divided by unit type.

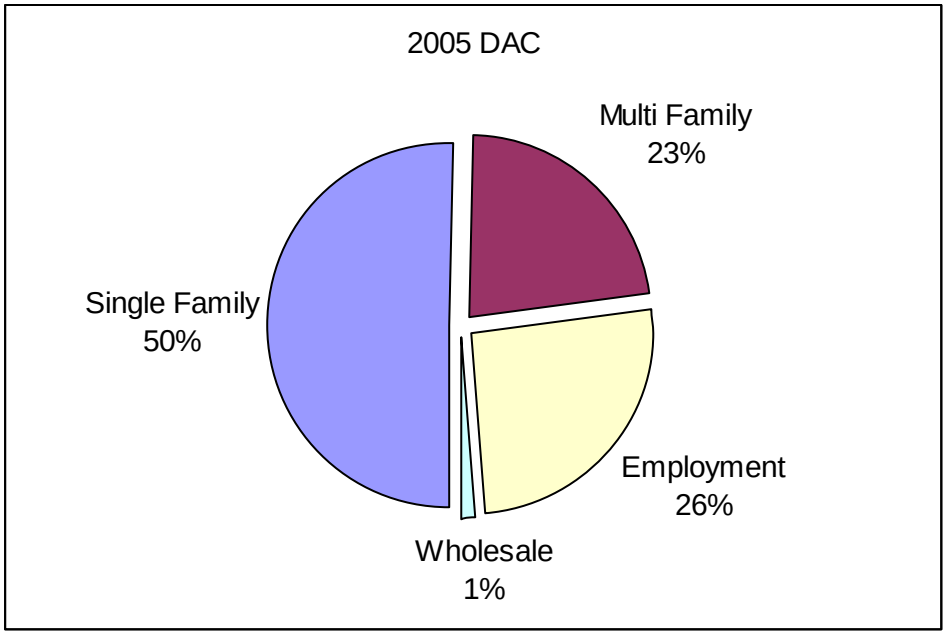


Figure 1, DAC Pie Chart

The production factor (production divided by consumption) for the year was calculated at 1.196. This is within the range of production factors calculated over the previous 10 years, as shown in Figure 2. (note: since this calculation was not done using all “known” water uses, only “metered” water uses, it should not be considered a complete water audit appropriate for all purposes).

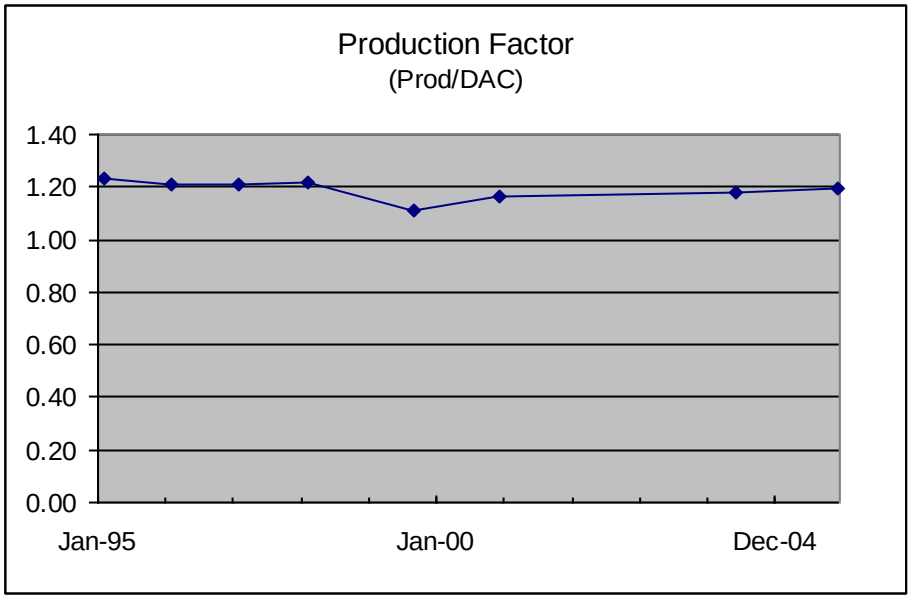


Figure 2, Production Factors

The per unit production factors for all existing units were calculated (in gallons per day) to be: Single family – 218; Multi family – 194; and Employee – 56. Graphs showing these numbers in the context of historical trends over the past 20 years are shown in figures 3, 4 and 5. The trends for Single family and Multi family show the factors have been consistent over the most recent 5 years after steady decreases over the first 15 years. The factor for employees is more variable, probably because water use is less strongly a function of the number of employees and the number of employees must be derived from demographic data rather than WSSC's customer service data.

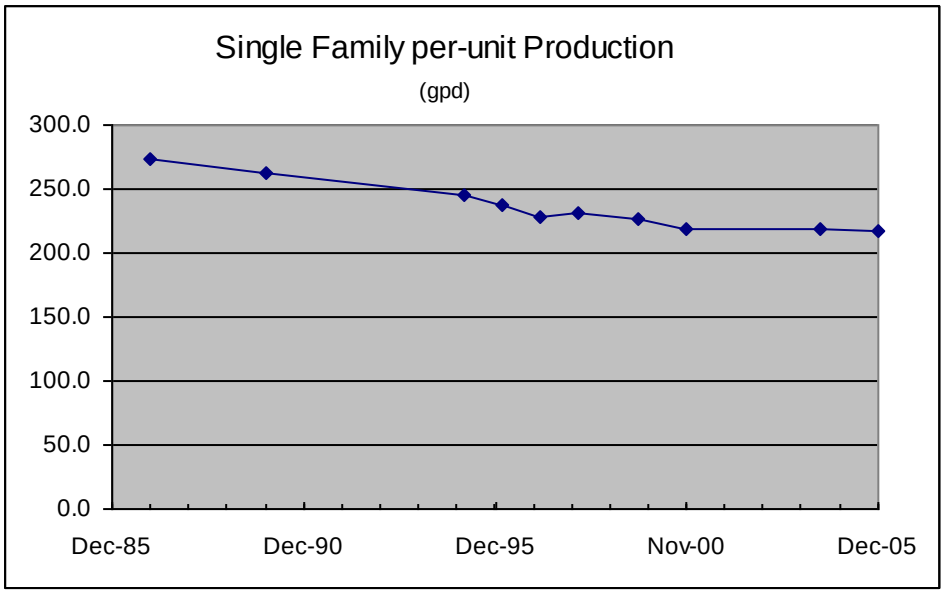


Figure 3, Single Family Unit Production

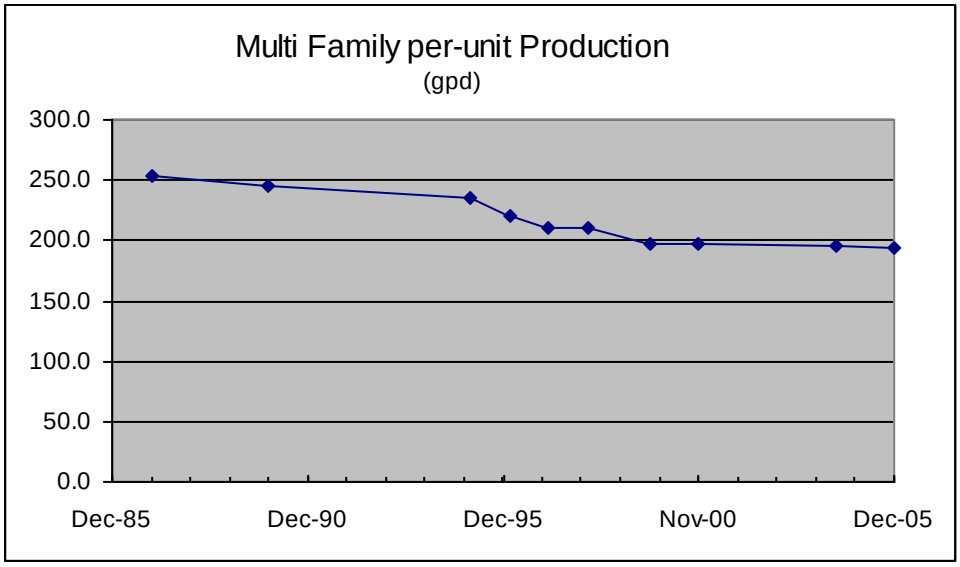


Figure 4, Multi Family Unit Production

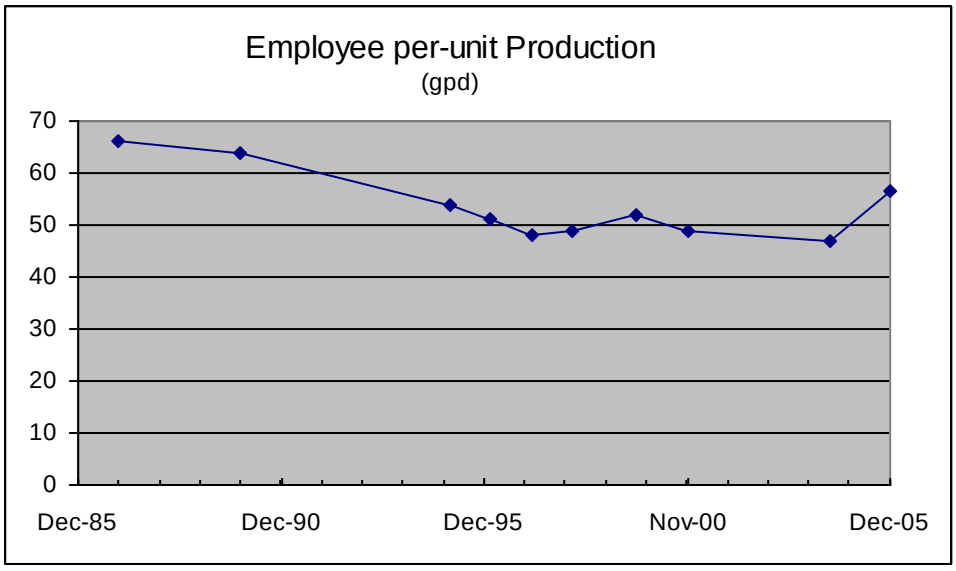


Figure 5, Employee Unit Production

From 1994 to 2003 actual water production declined or remained flat due to decreasing per unit production offsetting increases in the number of units served. Since 2003, production has increased moderately resulting in a total production of 171.9 mgd in 2005, the second highest in WSSC history. Given the recent (flat) trends in per unit production, it is expected that total production will increase as new units continue to be added. Because of factors such as weather and economics, the increase in actual production will likely be somewhat erratic.

In an effort to predict the per unit production for future units, a per unit analysis was done only for units built since 1994. The results (in gpd) were: Single family -228; Multifamily – 181; no such analysis for employees. Interestingly, for single family units, the usage for the newer units is greater than usage for all existing units, while for multifamily units, this usage for newer units is lower than the usage for all existing units.

For projecting future average production, the factors developed from the newer units will be applied to units forecasted after 2005 while the factors developed from all existing units will be applied to units included in the forecast for 2005, as shown in the following table.

	Single Family	Multi Family	Employment
For units existing as of 2005	218	194	56
For units added after 2005	228	181	56

Table 1. Recommend Per-Unit Production Factors (in gpd).

Growth and Average Production Forecasts

Round 7.0 Growth Forecasts have been provided by the M-NCPPC for both Prince George's and Montgomery counties. This data includes single family and multifamily households, employees and population in 5 year increments through 2030. (Although population data is not used in the calculation of projected water production, it is often useful data with regard to the water system).

The demographic data is provided by geographic units called COG Analysis Zones (CAZs). In general, these geographic units have no relationship to the water system boundaries, so the demographic data must be allocated to water system pressure zones. In past analysis, the allocation process involved tedious and time consuming manual calculations. Today, WSSC's Geographical Information System (GIS) automates this process and vastly increases the speed at which these allocations are made.

Table 2 shows the number of units allocated to the WSSC water pressure zones, as used for water production projections, and population. For each 5 year increment, the table shows units for each county and the total. Based on these numbers and overall population projections, as of 2005, WSSC served 90% of the Montgomery County population, 95% of the Prince George's County population and 93% of the bi-county population.

Projected Units Served

3/20/2006

Year	County	Single Family	Multi Family	Employees	Population
2005	Montgomery	215,851	102,380	428,079	850,770
	Prince George's	195,861	98,357	350,971	812,859
	Totals	**411,712**	**200,738**	**779,050**	**1,663,629**
2010	Montgomery	222,909	114,896	461,860	899,299
	Prince George's	201,549	105,736	382,000	832,710
	Totals	**424,459**	**220,631**	**843,860**	**1,732,009**
2015	Montgomery	229,849	124,968	490,478	931,463
	Prince George's	205,983	113,824	415,584	853,101
	Totals	**435,832**	**238,792**	**906,062**	**1,784,565**
2020	Montgomery	234,262	135,606	516,289	960,543
	Prince George's	210,361	121,074	451,873	873,648
	Totals	**444,624**	**256,680**	**968,162**	**1,834,190**
2025	Montgomery	236,243	149,510	541,189	995,052
	Prince George's	215,570	129,575	491,698	907,794
	Totals	**451,813**	**279,085**	**1,032,888**	**1,902,846**
2030	Montgomery	237,027	164,718	561,822	1,031,925
	Prince George's	226,348	135,661	534,741	950,098
	Totals	**463,375**	**300,379**	**1,096,563**	**1,982,024**

Table 2, Projected Units Served

By applying the per-unit production factors, the demographic data is converted to average water production data, then allocated to water system pressure zones. The resulting water production projections, by pressure zone, are shown in Table 3. In this table, Wholesale represents supplies to other jurisdictions, which are discussed in more detail later. The wholesale number included for 2005 represents the average actual usage for that year while the number included for the remaining years represents the last 3 months, when usage increased noticeably.

Projected Average Water Production

Based on Round 7.0 Growth Forecasts and Per-Unit Production:
through 2005 SF-218 MF-194 Emp-56; after 2005 SF-228 MF-181 Emp-56

Group	Zone	2005	2010	2015	2020	2025
mchigh	560A	6.29	6.41	6.61	6.8	6.88
	660A	35.9	37.69	39.77	41.79	44.05
	685A	2.12	2.2	2.24	2.27	2.32
	760A	1.13	1.34	1.54	1.7	1.82
	836A	0.71	1.48	2.18	2.55	2.79
	960A	0.79	0.81	0.86	0.9	0.9
		46.93	**49.93**	**53.19**	**56.01**	**58.76**
mcmain	350A	0.47	0.48	0.48	0.48	0.48
	495A	44.97	47.8	49.79	51.6	53.45
	552A	0.64	0.65	0.65	0.65	0.65
		46.09	**48.92**	**50.92**	**52.73**	**54.58**
pghigh	280A	1.66	1.86	2.1	2.32	2.72
	290B	3.64	3.89	4.28	4.73	5.07
	317A	7.44	8.31	8.74	9.09	9.71
	328A	0.52	0.61	0.7	0.77	0.81
	355B	1.43	1.48	1.51	1.57	1.64
	385B	7.04	7.8	8.35	8.84	9.46
	450A	16.3	16.49	16.95	17.56	18.45
		38.04	**40.44**	**42.62**	**44.88**	**47.86**
pgmain	320A	31.26	32.68	33.98	35.14	36.44
	350E	3.58	3.81	4	4.17	4.25
	415A	6.84	7.11	7.56	8.08	8.46
		41.68	**43.6**	**45.54**	**47.39**	**49.15**
Wholesale		1.92	3.62	3.62	3.62	3.62
System Totals		**174.6**	**186.5**	**195.9**	**204.6**	**214**

Table 3, Projected Average Production

Although analysis of the impact of these projections on specific projects is beyond the scope of this report (and will be conducted on a project by project basis, as needed), some comparison of this data with past projections is appropriate. In general these water production projections represent a slight decrease in system totals from the previous projections done in 2001. For the year 2005, the decrease is 4.3 mgd (2%); for 2020 the decrease is 0.8 mgd (0.4%). The breakdown of the system totals between the major zone groups (2 in each county) is very consistent with the previous projections.

The year 2005 projection of 174.6 mgd is slightly greater than the 2005 actual production of 171.9 mgd (a difference of 2.7 mgd or 1.6%) because there are more units from the demographic data allocated within the water service boundaries than are contained in our customer service data. This possibly is due to existing units currently using wells and other factors. Since units using wells may convert to public water, no adjustment for this difference has been made.

Maximum Day Projections

For many water system analyses and planning tasks, it is necessary to use the highest anticipated daily flow into the distribution system. This value is calculated by multiplying the projected average production by the ratio of the highest daily to average flow, as derived from historical data. This ratio is called the maximum day ratio.

Table 4 shows historical water production data including the actual system wide maximum day ratios experienced for the period 1985 through 2005. A statistical analysis of historical maximum day ratios can provide the probability of any selected ratio being exceeded during a single year. A statistical analysis can also yield a design maximum day ratio resulting from a selected exceedance probability. This is the method used to determine the maximum day ratios for maximum day production projections.

Year	Average Production	Maximum Day Production	Ratio	Date of Maximum Day
1985	148.6	197.4	1.33	8-Sep
1986	160.8	226.7	1.41	11-Jun
1987	163.3	238.8	1.46	23-Jul
1988	169.9	267.3	1.57	8-Jul
1989	165.3	227.6	1.38	11-Sep
1990	166.9	235.2	1.41	30-Jun
1991	171.0	255.9	1.50	20-Jul
1992	162.5	220.4	1.36	20-Jul
1993	167.0	242.7	1.45	11-Jul
1994	173.5	230.6	1.33	14-Jun
1995	167.1	233.9	1.40	4-Aug
1996	161.3	198.9	1.23	12-Mar
1997	164.7	245.8	1.49	15-Jul
1998	166.6	219.8	1.32	30-Aug
1999	168.2	263.4	1.57	8-Jun
2000	162.0	200.8	1.24	11-Jun
2001	167.4	253.2	1.51	11-Sep
2002	164.8	221.8	1.35	13-Aug
2003	164.3	206.5	1.26	21-Jan
2004	168.1	210.4	1.25	29-Aug
2005	171.9	226.2	1.32	26-Jun

Table 4, Historical Maximum Day Ratios

The implications of using different exceedance probabilities were addressed in a 1992 study, The Peak Water Consumption Management Study, by O'Brien and Gere. In summary, it concluded that increasing the exceedance probability resulted in a tradeoff between reduced water system cost and the increased possibility of limitations on outdoor water use during dry summers. WSSC management directed that a 20% exceedance probability be used to calculate the projected maximum day ratio. In others words, it was decided to plan the water system based on production projections that, on average, will be exceeded once in 5 years, with the expectation that outdoor water use or other limitations will then be implemented.

The maximum day ratios for the 4 pressure zone groups would normally be calculated as part of this effort. Unfortunately, a significant gap in the data needed to calculate these ratios was created when Project 80 flow into Prince George's county was initiated, but not recorded, in November, 2000. This data gap was closed in November, 2004 but it may be several more years before a statistically significant data sample will be available again. In the absence of available new data, it is recommended that the results from the previous 2001 report continue to be used. (The ratios for the different zones and the system ratio need not occur on the same day, so it is mathematically permissible for all zone ratios to be greater than the system ratio.)

Zones	Maximum Day Ratio
System	1.48
MC High*	1.51
MC Main*	1.73
PG High*	1.56
PG Main*	1.53

Table 5, Calculated Maximum Day Ratios for Projections
*from 2001 report, see preceding paragraph

This new system maximum day ratio represents a very slight decrease from the previous ratio of 1.49, calculated in 2001.

Figure 6 provides a graph of the projected average and maximum day production through 2030 and historical average and maximum day production since 1980.

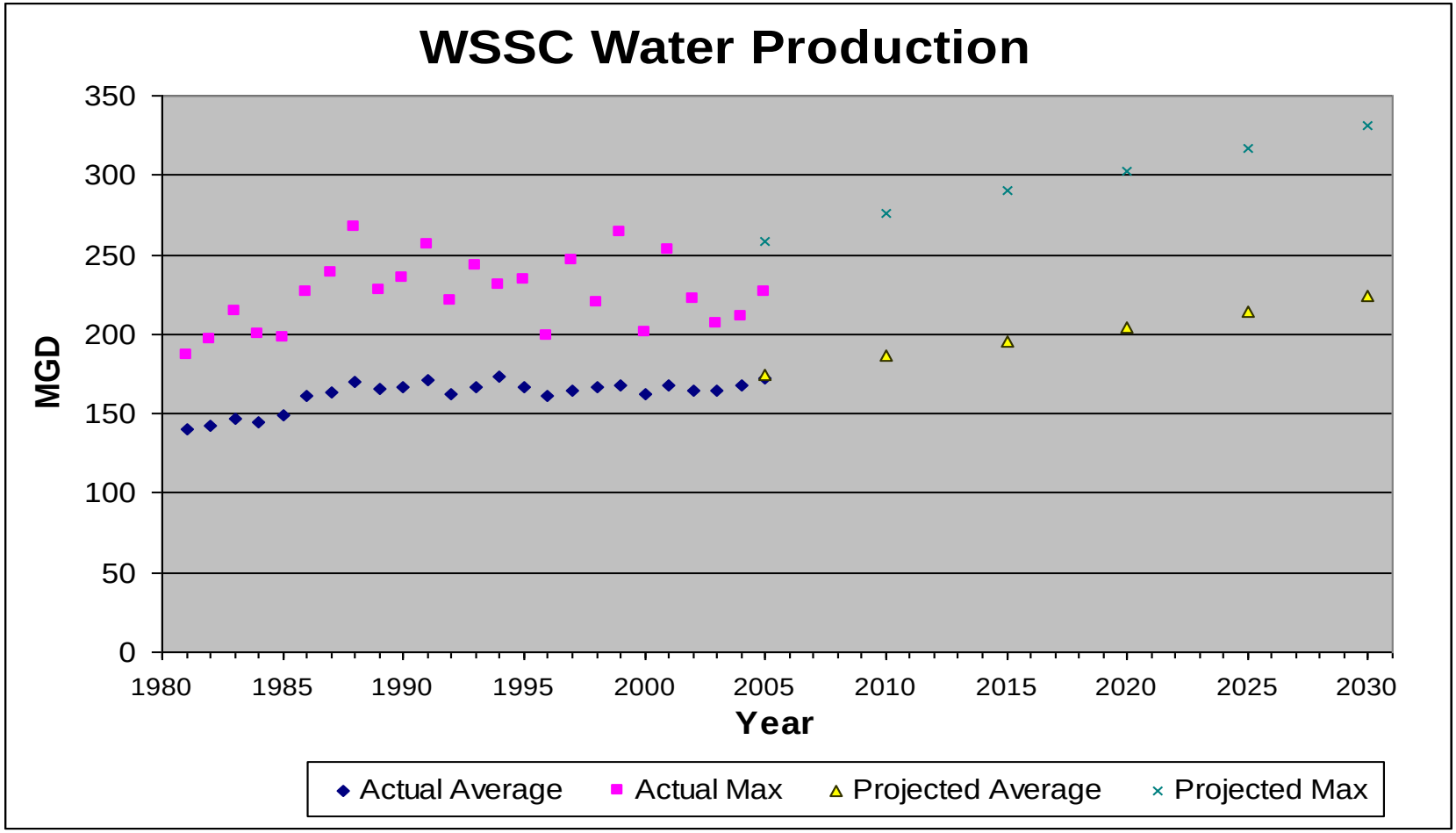


Figure 6, Historical and Projected Water Production

Supplies to Other Jurisdictions

The WSSC has water system interconnections with several other jurisdictions. Some of these interconnections are subject to formal agreements while others operate based on informal understandings. Some of these supply arrangements are used as an everyday supply, some are for emergencies only and some are used to meet the other jurisdiction's peak demands. In cases where the interconnections are used to meet the other jurisdiction's peak demands, the cost to the WSSC may exceed the revenue recovered from the per-gallon cost of the water used and other compensation should be arranged.

Jurisdiction	Allowable Withdrawal (mgd)	Average Withdrawal* (mgd)	WSSC Pressure Zone
City of Bowie	Not specified – emergency only	Not currently metered	Hg350E
Charles County	1.4	0.001	Hg328A
Howard County	5.0	3.07	Hg415A
City of Rockville	6.0	Negligible	Hg660A
DC-WASA	Not specified	0.01	Hg495A

*based on meter readings from March 2005 to February 2006

Table 6, Supplies to Other Jurisdictions

Appendix 6

WSSC Adopted Wastewater Flow Projections

This Appendix contains the wastewater flow projections to 2030 for the wastewater treatment plants serving the Sanitary District, prepared by the Wastewater Planning Unit of WSSC's Planning Group.

WASHINGTON SUBURBAN SANITARY COMMISSION

Interoffice Memorandum

TO: CRAIG A. FRICKE, GROUP LEADER
PLANNING GROUP

FROM: KENNETH DIXON, PLANNING UNIT COORDINATOR
PLANNING GROUP

DATE: MAY 8, 2008

SUBJECT: ADOPTION OF DRAFT 2006 WSSC WASTEWATER FLOW PROJECTIONS

The Planning Group's Wastewater Planning Unit developed wastewater flow projections for the wastewater treatment plants serving the Sanitary District. Using the same methodology as used in the December 2001 projections report, wastewater treatment flow projections were made from 2005 to 2030 using "sewered area" Round 7 demographic forecasts for single- and multi-family households as well as employees in the Bi-County service area.

Attached are the most recent projections conducted in 2006, at five-year increments, with the accompanying charts indicating the current (2006) projection and the previous projection made in 2001.

I recommend that these 2006 Wastewater Flow Projections be approved for wastewater planning purposes.

Endorsed and transmitted to the Chief Engineer:

Recommend approval CAF 5-9-08

cc:

Approved
Jerry J. Gaines, P.E.
Chief Engineer 5/30/08

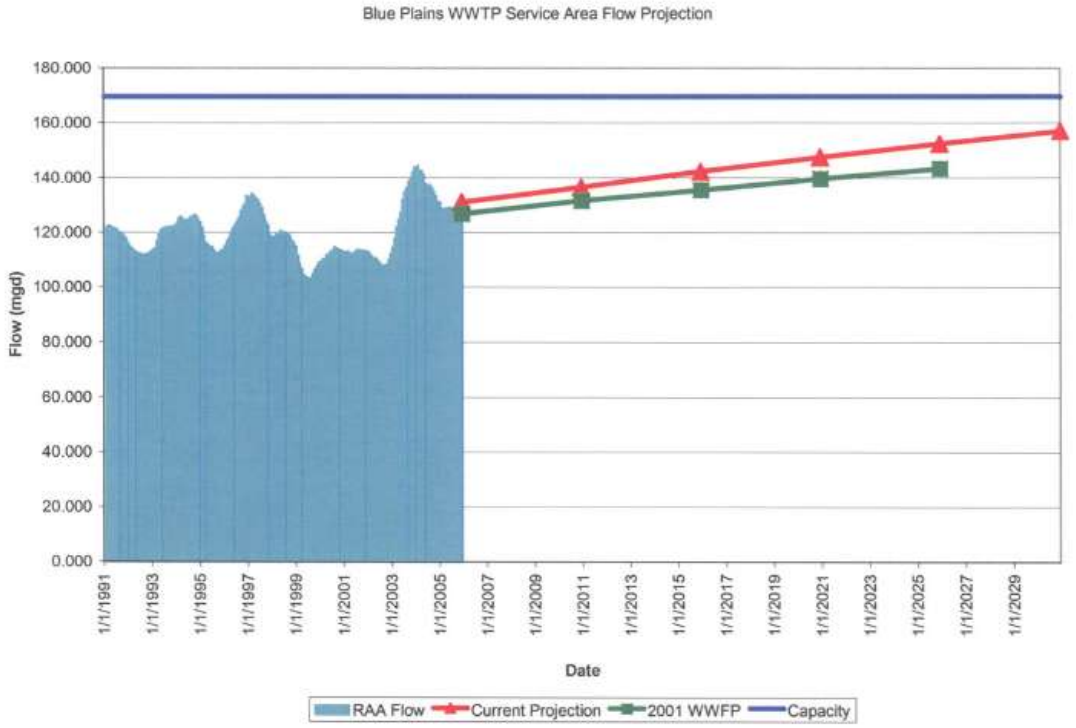
Blue Plains

Existing Flow 2005	131.12	mgd
Total	131.12	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

Year	SFDU	MFDU	EMP	AWF		2001 WWFP	Capacity
2005	238032	140016	570796	131.12	mgd	127.08	169.6
2010	247504	151189	595271	136.50	mgd	131.8	169.6
2015	249759	168198	647286	142.19	mgd	135.67	169.6
2020	253280	182086	691923	147.34	mgd	139.74	169.6
2025	256506	195270	735747	152.26	mgd	143.34	169.6
2030	258884	209906	772129	156.93	mgd	#N/A	169.6



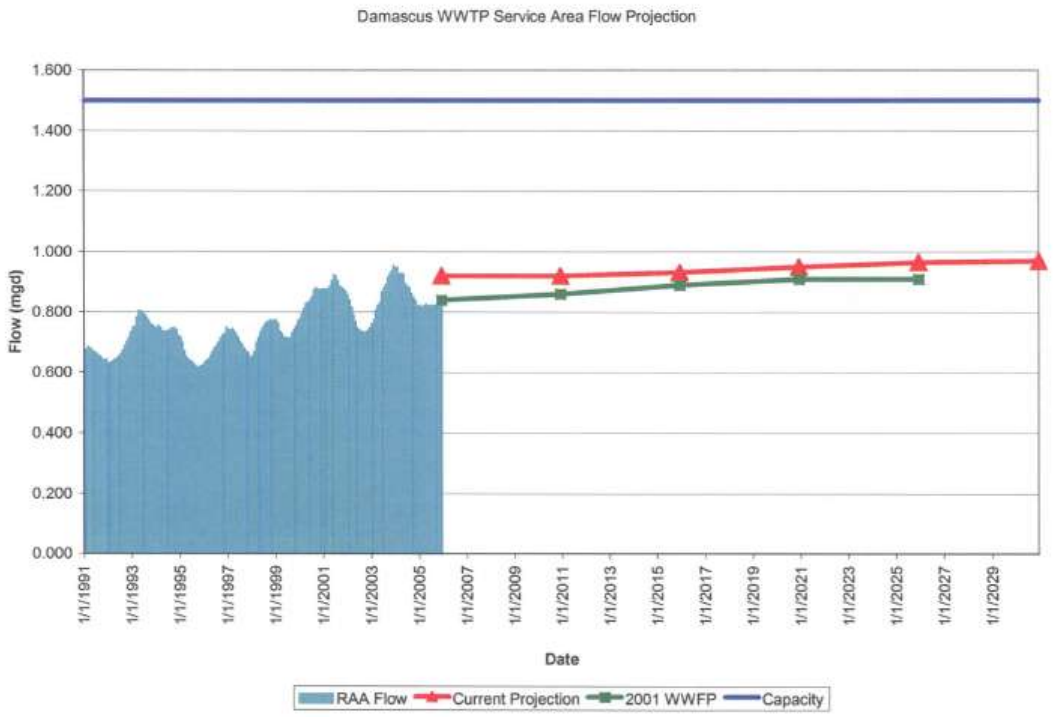
Damascus

Existing Flow 2005	0.92	mgd
Total	0.92	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

Year	SFDU	MFDU	EMP	AWF	2001 WWFP	Capacity
2005	1436	188	777	0.92 mgd	0.84	1.5
2010	1436	188	777	0.92 mgd	0.86	1.5
2015	1481	188	781	0.93 mgd	0.89	1.5
2020	1519	234	785	0.95 mgd	0.91	1.5
2025	1547	279	790	0.96 mgd	0.91	1.5
2030	1561	279	807	0.97 mgd	#N/A	1.5



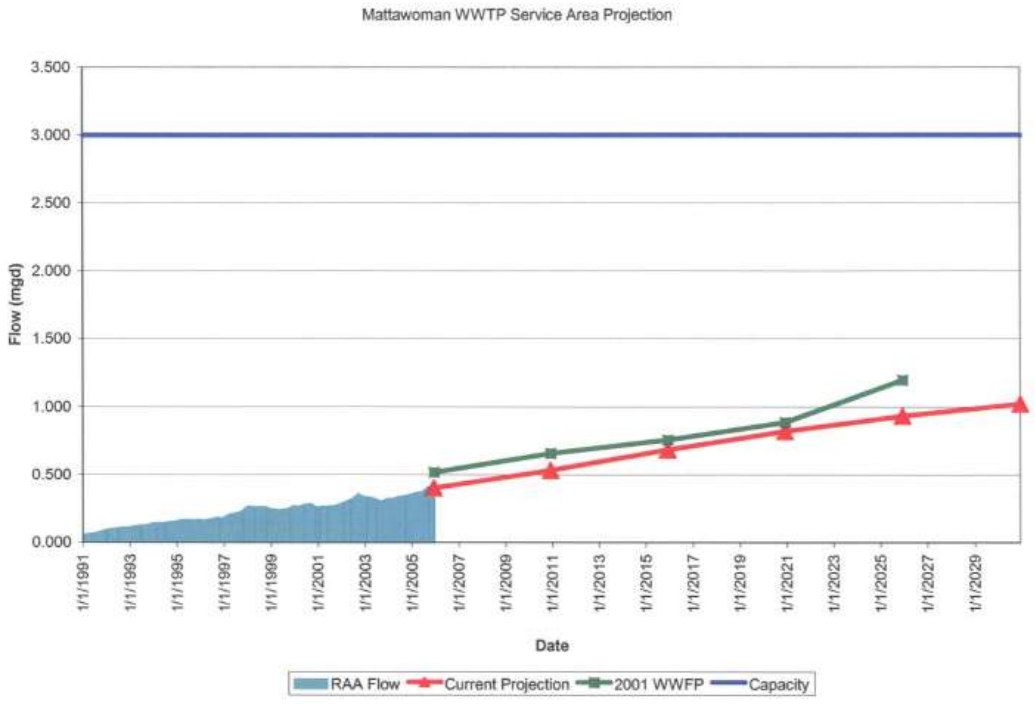
Mattawoman

Existing Flow 2005	0.40	mgd
Total	0.40	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

	Units						
Year	SFDU	MFDU	EMP	AWF		S.S.Study Projections	Capacity
2005	1074	3	2312	0.40	mgd	0.52	3
2010	1489	3	2958	0.53	mgd	0.66	3
2015	1894	58	3952	0.68	mgd	0.76	3
2020	2275	63	4923	0.82	mgd	0.89	3
2025	2567	63	5842	0.93	mgd		3
2030	2761	227	6127	1.02	mgd		3



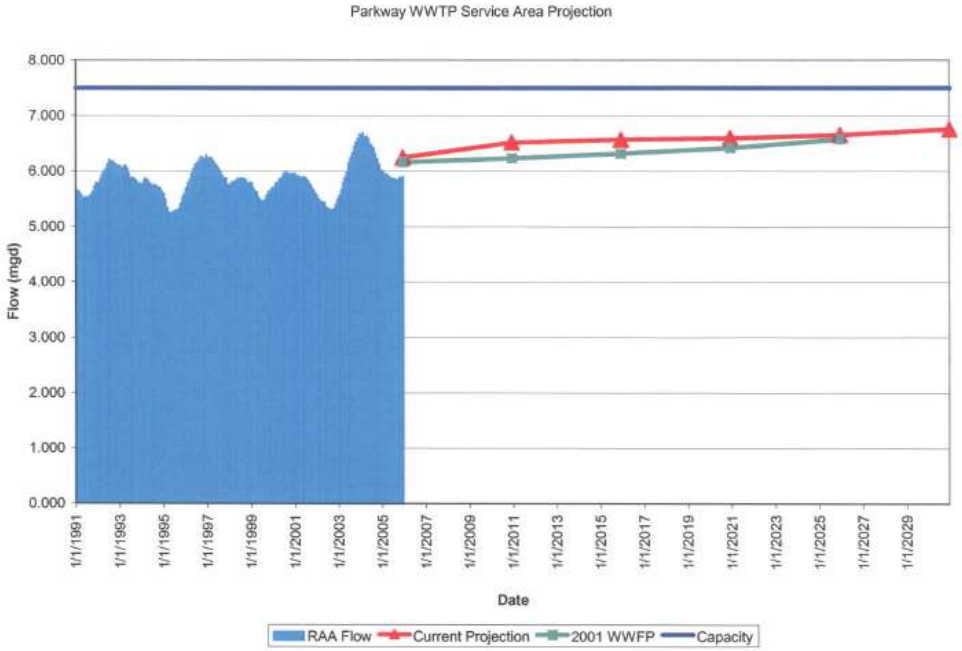
Parkway

Existing Flow 2005	6.24	mgd
Total	6.24	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

Year	SFDU	MFDU	EMP	AWF	2001 WFP	Capacity
2005	9537	6917	18097	6.24 mgd		7.5
2010	10154	7216	19607	6.51 mgd		7.5
2015	10466	7088	19438	6.56 mgd		7.5
2020	10594	6989	19751	6.59 mgd		7.5
2025	10693	7038	20417	6.65 mgd		7.5
2030	10789	7230	21445	6.75 mgd		



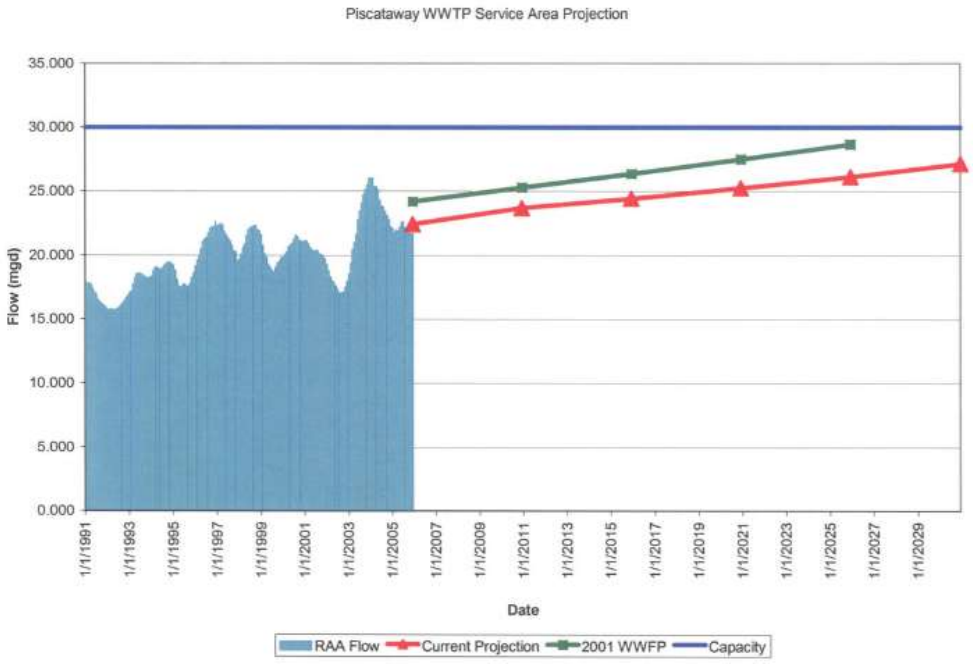
Piscataway

Existing Flow 2005	22.42	mgd
Total	22.42	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

Year	SFDU	MFDU	EMP	AWF	2001 WWFP	Capacity
2005	42373	12679	52134	22.42 mgd	24.22	30
2010	46095	13516	56081	23.68 mgd	25.32	30
2015	46945	14635	63993	24.41 mgd	26.38	30
2020	47764	16726	69938	25.23 mgd	27.52	30
2025	48747	18601	76952	26.10 mgd	28.68	30
2030	50226	20764	83488	27.12 mgd	#N/A	30

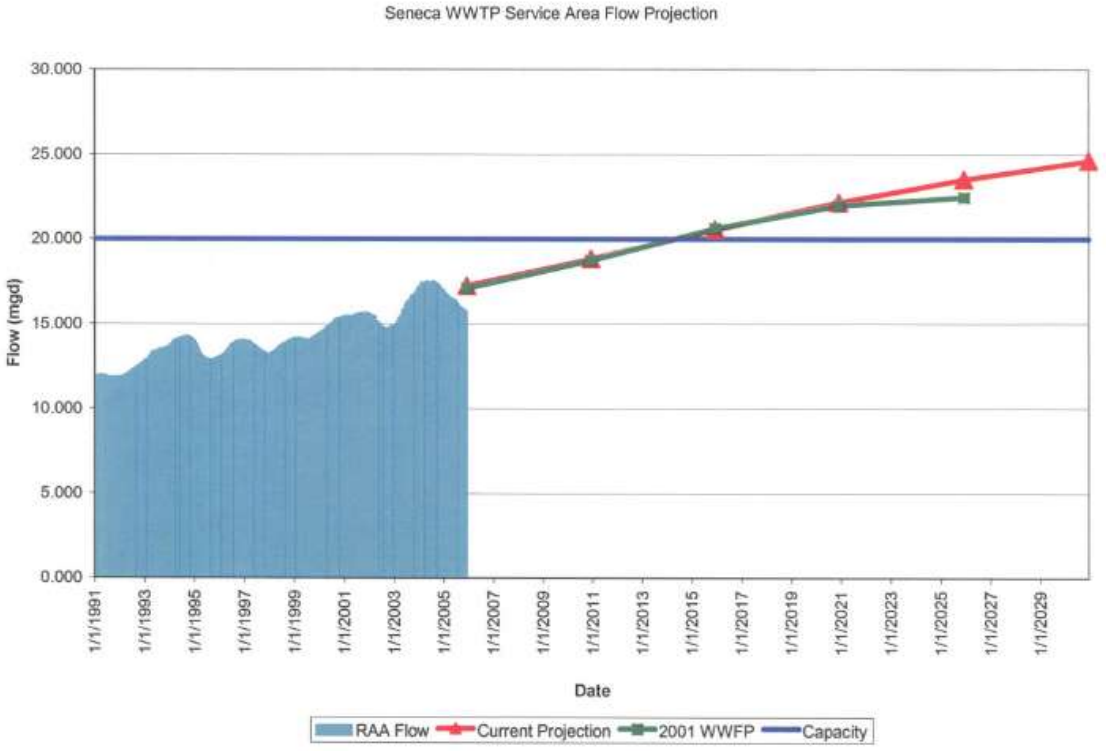


Seneca

Existing Flow 2000 17.23 mgd
Total 17.23 mgd

Flow Factors
SFDU = 255 gpd/sfdu
MFDU = 178 gpd/mfdu
EMP = 40 gpd/emp

Year	SFDU	MFDU	EMP	AWF	2001 WWFP	Capacity
2005	38717	18884	70361	17.23 mgd	17.11	20
2010	42188	21178	77739	18.82 mgd	18.76	20
2015	46102	22754	89501	20.57 mgd	20.64	20
2020	48865	24760	102010	22.13 mgd	21.99	20
2025	49610	28585	114153	23.49 mgd	22.48	20
2030	49744	32565	122968	24.58 mgd	#N/A	20



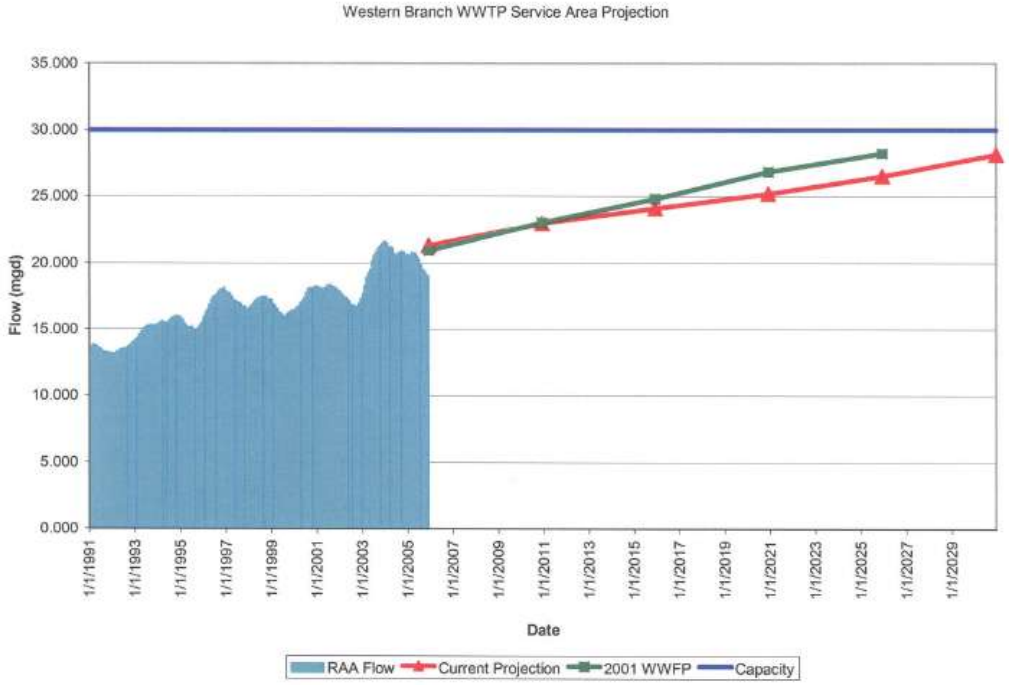
Western Branch

Existing Flow 2000	21.29	mgd
Total	21.29	mgd

Flow Factors

SFDU =	255	gpd/sfdu
MFDU =	178	gpd/mfdu
EMP =	40	gpd/emp

Year	SFDU	MFDU	EMP	AWF	2001 WWFP	Capacity
2005	67514	11100	81517	21.29 mgd	20.96	30
2010	71766	12612	88859	22.94 mgd	23.03	30
2015	74447	14209	92842	24.06 mgd	24.83	30
2020	76582	16176	98270	25.17 mgd	26.87	30
2025	78653	17890	110674	26.50 mgd	28.25	30
2030	82600	19859	117509	28.13 mgd		30



Appendix 7

Agricultural Protection and Preservation

This Appendix contains information pertaining to various protection and preservation issues in Montgomery County's Agricultural Reserve.

It includes:

- a summary of the principles and themes identified in the Final Report of the Ad Hoc Agricultural Policy Working Group, January 2007
- 2008 Report of the Agricultural Advisory Committee
- Montgomery Farmland Preservation Annual Report 2008
- Agriculture Fact Sheet 2009

Tasks, General Principles, and Key Themes identified in the Final Report of the Ad Hoc Agricultural Policy Working Group, Montgomery County, Maryland, January 2007

In response to agricultural and other trends affecting the County's Agricultural Reserve, the County Council appointed the Ad Hoc Agricultural Policy Working Group in April 2006 to "provide comprehensive advice on ways to ensure the long-term protection of the Agricultural Reserve and preservation of our agricultural industry."

In particular, the Council charged the Group with addressing a cluster of specific and inter-related issues by performing the following tasks:

- Undertake a thorough review of pending and potential legislation concerning the Rural Density Transfer (RDT) zone, the child lot program, the proposed Building Lot Termination program (BLT), uses of sand mound technology, and technical tracking and use issues associated with the TDR program.
- Assure that this review provides a clear understanding of how the individual proposals interact with each other and considers the potential for unanticipated negative consequences.
- Proceed in a way that respects the concerns of all stakeholders.
- Update the Council on its progress and submit a final report to the Council within calendar year 2006.

General Principles Identified by the Working Group

1. The economic viability of the agricultural industry is critical to the preservation of the Agricultural Reserve.
2. The open space and environmental protection goals of the Master Plan are unlikely to be achieved unless we can sustain the health of agriculture.
3. Agriculture in the County has and will continue to evolve and requires an environment that recognizes that fact.
4. The equity farmers hold in their property is not only important to them personally but an important asset for their businesses, and consequently an important factor in the success of the agricultural industry in the County.
5. Fragmentation of farmland should be avoided. Contiguous areas of farmland are desirable for traditional agriculture.
6. If the Agricultural Reserve is to survive permanently, policies must protect both farming and farmland, while fostering a deep commitment to stewardship that looks beyond current generations and current landowners.

Key Themes Identified by the Working Group

If implemented, the Working Group believes their recommendations will accomplish the following:

- Allow the continued use of child lots intended for the children of farmers (but with stricter assurance that those lots will be owned by the children of the property owner, and will not prevent future use of a significant portion of the property for farming);
- Limit the use of sand mounds, decreasing their potential use by as much as one-fourth;

- Create a Building Lot Termination (BLT) easement program to create an incentive to further reduce residential development in the Agricultural Reserve while providing an acceptable level of equity to property owners, giving them the resources that may be needed for farm investment; and
- Improve the TDR program, including expanding it to commercial and industrial zones (including Research and Development zones), mixed-use zones, and floating zones, and creating a non-residential use component to, among other things, help support the BLT easement program.

The full Final Report of the Ad Hoc Agricultural Working Group is available online at: www.montgomerycountymd.gov/content/council/pdf/doc/aggroup_finalreport.pdf

Montgomery Farmland Preservation Annual Report 2008

Montgomery Farmland Preservation
Annual Report
FY1980 - FY2008

Being County Executive provides me a great opportunity to work closely with a diversity of businesses and citizens throughout the County. Many people recognize that the County is the The ***SMART***Business Location for biotech and information technology businesses. What many people are not aware of, however, is that Montgomery County also has a thriving agricultural industry that contributes over $252 million to the local economy.

The continued viability of the agricultural industry is strengthened through a variety of programs offered by the Department of Economic Development - Agricultural Services Division. Our agricultural preservation programs help to ensure that the economic contribution from agriculture will continue for many years to come. I am proud that Montgomery County has permanently reached our farmland preservation goal by protecting 70,093 acres within our Agricultural Reserve as outlined in this *Montgomery County Farmland Preservation Program Report (FY1980-2008).*

The Agricultural Preservation Programs, as referenced in this report, are integral to the County's public land use policy and key to the sustainability of the agricultural sector. Whether you enjoy purchasing fresh locally grown products or appreciate a beautiful vista as an open space amenity, all of us benefit from agricultural preservation.

We are proud that Montgomery County's Farmland Preservation Programs are recognized nationally as a leader in farmland preservation and we continue to work with the agricultural community to find avenues that will enhance the protection of this valuable resource.

The agricultural community should be commended for its stewardship in farmland preservation. The continued success of the preservation of farmland within the County could not be accomplished without this important and vital community.

Isiah Leggett
County Executive

The Honorable Isiah Leggett, County Executive
Executive Office Building
101 Monroe Street, 2nd Floor
Rockville, Maryland 20850

Dear Mr. Leggett:

It gives us great pleasure to present *The Montgomery County Farmland Preservation Program Report (FY1980-2008)*. This report details the progress we have made in our agricultural land preservation programs and initiatives over the past 28 years. The Agricultural Preservation Advisory Board (APAB) is encouraged by the continued program participation and quality of productive farms protected by easements under many of the programs that are available.

Many farmers have acknowledged the benefits our easement programs provide. We are very proud of the vital role these programs play in keeping important family farms in continued operation throughout Montgomery County. Our programs continue to focus on the preservation of farms with good soils which are threatened by development, while at the same time offering a protection opportunity to owners of small farms.

This year, the APAB is pleased to report that the has reached its goal of preserving 70,000 acres in the Agricultural Reserve, nearly two years ahead of schedule. We believe the achievement of this goal benefits all citizens by striking a balance between the preservation of agricultural and open spaces while promoting economic viability throughout the entire County. With the strong commitments from Montgomery County and with the agricultural community's willingness to participate in our programs, we look forward to an ongoing partnership that will help to protect our vital agricultural resources.

The APAB sincerely appreciates your demonstrated commitment to Agricultural Preservation and under your leadership we look forward to enhancing the protection of these important agricultural resources for many years to come.

Sincerely,

David Scott, Chairman Bruce Connelly Vince Berg

William Willard Diana Bercholli

John P. Zawitoski
Director of Planning and Promotions
Department of Economic Development
Agricultural Services Division

The Montgomery County Farmland Preservation Program Report FY1980-FY2008 Executive Summary

For over two hundred years, Montgomery County has been the home to a strong agricultural industry. There is a long and rich farming heritage in the County; a heritage and tradition that has contributed greatly to the incredibly high quality of life the residents of Montgomery County enjoy today. Preserving that heritage and encouraging its growth, through land preservation efforts and public policy, continues to be a top priority in Montgomery County.

The most significant initiative began 28 years ago in 1980 when almost a third of the County, more than 93,000 acres of land, was designated as the County's Agricultural Reserve. The vision was to preserve this land not only for the benefit of the County's farmers, but to ensure future generations of residents would enjoy the environmental and esthetic benefits of this wondrous open space. The vision has become a reality. Montgomery County is recognized as a national leader in the field of land preservation by preserving over 70,093 acres of farmland to date.

We have done this incredible work by partnering with rural landowners to utilize several agricultural land preservation programs. The programs are designed to work with the landowner to place agricultural and conservation easements on land to prevent future commercial, residential or industrial development of the property.

The most revolutionary tool created by the County to fight the battle against suburban sprawl, was the designation of a bona-fide agricultural zone, known as the Rural Density Transfer (RDT) Zone. This first-of-its-kind zoning became the predominant zoning in the Agricultural Reserve. By law, RDT zoning sets a 25 acre density for subdivision of land, but allows landowners to sell development rights based on the previous zoning designation of 1 unit per 5 acres to areas designated for higher density growth elsewhere in the County. The results are that the rural landowner can recapture some of the lost equity which resulted from the 1980 down-zoning, while centering development in strategic areas where the existing infrastructure can accommodate the increased density. While this "transferable development rights" program has been successful, further protection measures have been necessary to protect farmland.

To keep Montgomery County's Farmland Preservation programs adequately funded, a combination of funding sources has been used, including:

Agricultural Transfer Taxes: Beginning with the certification of our farmland preservation program in *FY1990* and through *FY2008*, a total of *$29,604,220* of agricultural transfer taxes have been retained by the County for agricultural land preservation.

Investment Income: Agricultural Transfer Taxes that are retained by Montgomery County are placed into an interest bearing account. Beginning in *FY1994*, the income generated by the interest was invested back into the agricultural land preservation program. As of *FY2008*, a total of *$4,392,854* of interest has accrued. Investment Income has been used to fund preservation initiatives, emergency agricultural economic development initiatives and staffing costs. As of the end of FY2008, the fund balance of Investment Income is about *$2,331,468* and is available to the program.

General Obligation Bonds: One alternative farmland preservation funding source is General Obligation Bonds. While no G.O Bonds are currently being authorized and appropriated for this project, they may be sought in the future as cash revenues funding the preservation program dwindle.

State and Federal Grants: Beginning in 1997, the State's Rural Legacy Program was enacted as part of the State's Smart Growth and Neighborhood Conservation initiative to protect our natural resources. Since the first grants were awarded during the FY1998-1999 grant cycle, Montgomery County has been awarded/allocated a total of *$19.3* million in State Grant Funds. The Federal Farmland Protection Program (FPP) was first created for the State of Vermont and then in 1996, was finally expanded to include all States and Counties in the U.S. While Montgomery County Government has been an active participant within the FPP since its first year in 1996, changes to the program have made many jurisdictions across the United States ineligible or unable to qualify for Federal Funding. Unfortunately, Montgomery County and the State of Maryland are included among the jurisdictions which are unable to apply for Federal funds due to the new funding eligibility requirements. It is our hope that changes recommended in the 2007 Farm Bill will correct the deficiencies with this program to once again enable Montgomery County to be eligible for Federal Funds. While since the inception of the Federal program, Montgomery County has been awarded a total of *$792,363* in Federal Funds, a total of $92,500 was returned to the Federal Government due to changes in eligibility requirements.

Programs and Program Administration

The Agricultural Services Division was created to support and promote the viability of the agricultural industry in Montgomery County. The Division works to increase the public's awareness of the value and economic impact of agriculture. In order to preserve working farmland, the Division is responsible for the administration of a variety of agricultural and conservation easement programs. To oversee the public policy for agricultural preservation, Chapter 2B of the Montgomery County Code provides for the establishment of an Agricultural Preservation Advisory Board (APAB). The role of the APAB is to promote the preservation of agriculture within the County. In general, the APAB sets priorities for easement acquisition, provides guidance for setting program policies, and makes recommendations on proposed regulations as well as mediation for certain review and approvals for easement servicing.

There are 7 primary land preservation programs available to landowners within Montgomery County.

		Total Acreage Protected
1.	Maryland Agricultural Land Preservation Foundation (MALPF)	4,036
2.	The Montgomery County Agricultural Easement Program (AEP)	7,266
3	Rural Legacy Program (RLP)	4,875
4	Maryland Environmental Trust (MET), and other private trust organizations.	2,086
5	Transferable Development Rights Program (TDRs)	51,830
6	Montgomery County Legacy Open Space Program (LOS)	0
7.	Conservation Reserve Enhancement Program (CREP)	1,909*

* CREP Contract Phase Only

Farmland Preservation Programs:

1. ***The Maryland Agricultural Land Preservation Foundation (MALPF)*** was established in 1977 by the State Legislature as a result of concern over decreasing farmland acreage caused by development. Through *FY2008, 4,036* acres of farmland has been protected by this program within the County. The MALPF purchases agricultural land preservation easements directly from landowners for cash. Following the sale of the easement, agricultural uses of the property are encouraged to continue.

In 2007, State legislative changes to the program eliminate the need to create agricultural districts as a program eligibility requirement. Landowners can now apply directly to the County for selling an easement through MALPF. This administrative change will simplify the review and approval process which will save time. Once the easement is acquired, landowners retain title to the land and can sell the property in the future. However; future development of the property is limited to agriculture.

In order to determine the value of an easement, the MALPF employs the use of two fair market appraisals. The two appraisals are then averaged to arrive at the Fair Market Value of the property. Once the "Fair Market Value" is determined, the Restricted Value or "Agricultural Value" is determined by the use of a formula. The difference between the Fair Market Value and Agricultural Value represents the MALPF easement value. The restricted or "Agricultural Value" is generally considered to be the value of the land that remains once the development potential has been restricted from the easement property. In other words, since the development potential has been restricted, the highest and best use for the easement property would be limited to those uses associated with agricultural production and, therefore, the sales price would reflect the lower restricted "agricultural" value. Typically, an easement under this program can be settled within *12 - 24* months.

The Chart below details a summary of MALPF Acquisitions for *FY2002* through *FY2008*

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MALPF Acquisition Summary
FY02-FY08 Program Cycle

Landowner	MALPF Program Cycle	Acres	FMV/Acre	Max Easement Value/Acre	Discounted Easement Offer/Acre	Discount Value
James & Meg Evans	FY02	234	4,995	4,195	3,700	$115,830.00
Cross Farm LLC	FY03	100	6,100	5,460	4,250	$121,000.00
Cerino et al	FY03	109	5,300	4,506	3,700	$87,854.00
Stabler et al	FY03	170	5,300	4,506	3,850	$126,608.00
Carlin Farm LLC	FY03	130	5,300	4,505	3,900	$78,650.00
Laney	FY03	12	4,402	3,608	3,608	$0.00
MDR Friendly Acres	FY04	109.539	5,000	4,215	4,215	$0.00
MDR Friends Advice	FY04	150.97	5,100	4,313	4,300	$1,962.61
MDR Friends Ahoy	FY04	231.07	5,000	4,213	4,100	$26,110.91
Bernard Mihm	FY05	272.84	5,200	4,406	3,900	$137,045.04
Shiloh Farms LLC	FY06	140	7,192	6,327	5,800	$73,817.00
Richard Biggs	FY08	137.85	10,920	10,282	7,049	$445,831.90
John Doody Et al	FY08	165.02	9,939	9,415	7,455	$323,503.87
		1,985	**$6,134**	**$5,381**	**$4,602**	**$768,877.56**

In general, values for settled easements during this time frame have typically averaged from about *$3,600* per acre upwards to *$10,000* per acre. It is important to note that the values paid for MALPF easements as noted above, represent a landowner's discounted easement offer. As land values increase, it is highly likely that higher easement values for MALPF easement purchases will result. However, the same is true in reverse; as the economy declines, easement values can be expected to decline as well. We will be monitoring the land values very closely as the slowing of the economy deepened during the latter part of 2008.

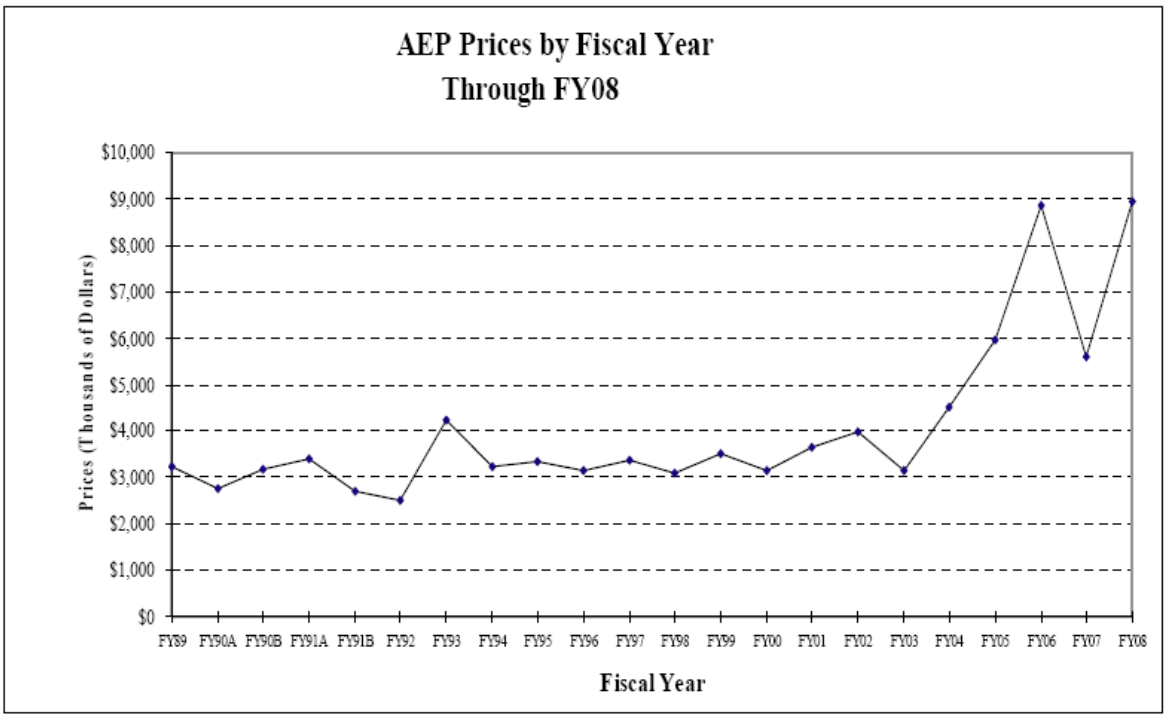
2. Montgomery County Agricultural Easement Program (AEP)- Established in 1987, this program gives the County the ability to Purchase agricultural land preservation easements to preserve land for agricultural production. Lands eligible for participation in this program must be zoned Rural, Rural Cluster, or Rural Density Transfer, or must be determined to possess significant agricultural value. The program was created to increase both the level of voluntary participation in farmland preservation programs and expand the eligibility of farmland parcels. Through *FY2008, 7,266* acres of farmland have been protected by this program.

In addition, beginning in *FY91*, Montgomery County implemented a change in the Executive Regulation, 66-91 "Agricultural Land Preservation Districts & Easement Purchases" which enabled the County to create, acquire and account for Transferable Development Rights (TDRs) as a part of the easement acquisition process. The TDRs created through the easement acquisition process are held by the County and represent an asset with the potential to be a source of future revenue for the program. Through *FY2008*, the County has acquired *758* Transferable Development Rights in association with the County's AEP program.

This program has provided the means by which the County has effectively achieved its farmland preservation goal by targeting exceptional and/or key properties for preservation. Since the funding for this program is not dependent upon the availability of State matching funds, the County can respond more efficiently to landowners needs, typically settling easements within *6 to 10* months.

Determining Easement Values for AEP

An important feature of this program is that easement values are determined by using an added value formula in conjunction with the Base Easement value determined by the County Executive annually as outlined on the following page. The added value formula method attempts to put in place a numerical scoring system that evaluates the suitability of the property for agricultural use. Added value formulas can also be used as a mechanism to rank properties in order of their priority for easement acquisition. These formulas "add value" to a calculated easement price base upon the extent of coverage that exists for each attribute being evaluated under the formula.



Outlined below is a summary of the AEP Base Value over time.

History of AEP Base Value

FY	Base Value/Acre
1989	$700 per acre
1991	$750 per acre
1999	$800 per acre
2004	$900 per acre
2005	$1,500 per acre (1st 6 months FY05) $1,700 per acre (2nd 6 months FY05)
2006/2007/2008	$1,700 per acre

Easement applications are received by the County during open purchase periods corresponding to the fiscal year and then ranked. Easement acquisitions are ranked in order of the amount by which the landowner's offer price is lower than the maximum easement value as determined for each easement. Under this program easement values may range from *$1,700* per acre to *$8,942* per acre.

3. Montgomery County Rural Legacy Program (RLP)- In 1997, the Rural Legacy Program (RLP) was enacted as part of the Governor's Smart Growth and Neighborhood Conservation Act. This State program provides competitive grants to Counties/Sponsors for preserving areas that are rich in agricultural, forestry, natural and cultural resources which, if protected, will promote a resource-based economy, protect greenbelts and greenways and maintain the fabric of rural life. Through *FY2008,* 4,875 acres have been protected by this program. As with the County's AEP program, the Montgomery County Rural Legacy Program provides the mechanism for the County to create, acquire and account for Transferable Development Rights (TDRs) as a part of the RLP easement acquisition process. The TDRs created through the easement acquisition process are held jointly by the State/County and represent an asset and potential source of future revenue for the program. Through *FY2008*, the State/County has acquired *351* Transferable Development Rights through the County's RLP program.

As with the County's AEP program's Added Value Forumla, the Rural Legacy Easement Valuation System (EVS) must also be modified over time to ensure that it is properly calibrated to value properties for easement acquisition. Since program inception in 1998-99, modifications have been made to the RLP EVS formula's base value. These adjustments were made so that the RLP EVS formula could be properly calibrated to value farmland for easement acquisitions.

Below is a summary of the history of the adjustments to the RLP Base Value.

History of RLP Base Value

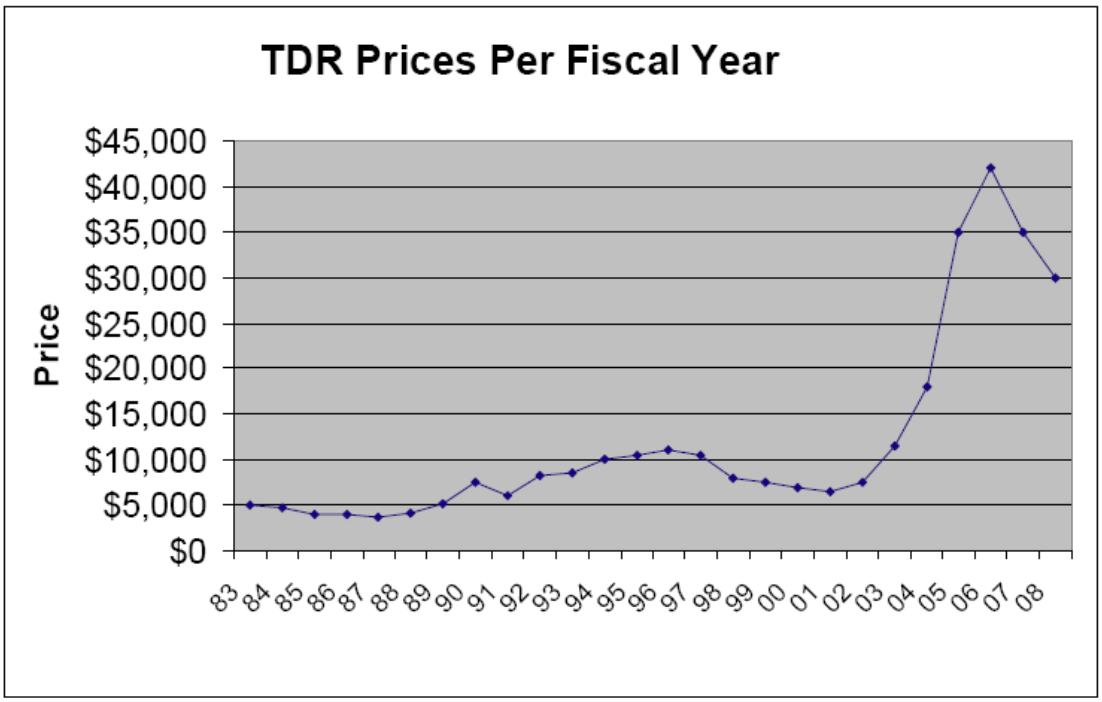
FY	Base Value $ per point
1998/99	$4.56 per Point
2002	$5.50 per Point
2004	$7.50 per Point
2005/2006/2007/2008	$10.00 per Point

Under this program, easement values may range from *$3,500* per acre to *$8,000* per acre and can take between *8 to 12* months to complete settlement.

4. Maryland Environmental Trust (MET)- was established by the State Legislature in 1967 to encourage landowners to donate an easement on their properties. In return, landowners are eligible for certain income, estate, gift, and property tax benefits. A donated conservation easement to MET protects natural resources and preserves scenic open space including farm and forest land, wildlife habitat, waterfront, unique or rare areas and historical sites. A landowner who donates a conservation easement limits the right to develop and subdivide the land, now and in the future, but still retains title to the farm. By accepting the easement, MET agrees to monitor it forever to ensure compliance with its terms. Through *FY2008*, a total of *2,086* acres have been protected by this program.

5. Montgomery County Transferable Development Rights (TDR) Program -

The Transfer of Development Rights (TDR) program allows landowners to transfer a development right from one parcel of land to another parcel. For agricultural land preservation, TDRs are used to shift development from agricultural areas ("TDR sending areas") to designated growth zones or ("TDR receiving areas") which are located where we have public services. When rights are transferred from a parcel within the designated "TDR sending area," the land is restricted by a permanent TDR easement. The land to which the rights are transferred are called the "receiving area." A TDR program represents the private sector's investment in land preservation, as the price paid for TDRs are negotiated between a landowner and a developer. A developer who purchases TDRs is permitted to build at a higher density than permitted by the "base zoning." The funds paid for a TDR by the developer to a landowner creates a wealth transfer from the developed areas back into the rural economy. Through *FY2008*, a total of *51,830* acres have been protected by this program. Please note that MNCPPC reports that 64,566 acres are recorded under TDR easements and this total includes properties that are also protected through the programs listed 1 through 4.



6. Montgomery County Legacy Open Space Program (LOS)- While distinctly different from the Rural Legacy Program (RLP), the LOS program was established by the Maryland National Capital Park and Planning Commission in October 2000. The objective of this program is to conserve the County's most significant open spaces. The program identifies natural resources, open space, agricultural and historic lands for conservation and creates a comprehensive strategy to protect the County's "green infrastructure." Acquisitions can be both "In Fee" and through "Conservation and Agricultural Easements." While this program focuses on the protection of special, natural and environmental resources within 6 separate categories through the Legacy Open Space Master Plan, the only category directly related to farmland conservation is resource Category 5. As of 2008, LOS has not been directly involved in purchasing easements on farm properties.

7. Conservation Reserve Enhancement Program (CREP)- As part of a partnership between the United States Department of Agriculture and the State of Maryland, this program was developed beginning in 1997 to focus attention on a streamside buffer restoration initiative which would protect water quality and critical wildlife habitat. This program consists of two parts. The first part is the contract phase:

- Under CREP, a landowner contracts with USDA through the Farm Service Agency (FSA) or Soil Conservation District (SCD) to take land out of production and install conservation practices adjacent to streams and waterways. In return, a landowner receives annual rental payments for a period of 10 to 15 years.

- Through May 2008, *a total of 51 farms* covering *1,909* acres are under active CREP contracts.

The County is attempting to meet the objectives of the CREP program through the acquisition of 4,875 acres of Rural Legacy Conservation Easements. This program compliments CREP and draws from the same source of funds. It incorporates mechanisms to protect the natural resources by either maintaining or establishing a 65-foot buffer along both sides of the linear length of streams.

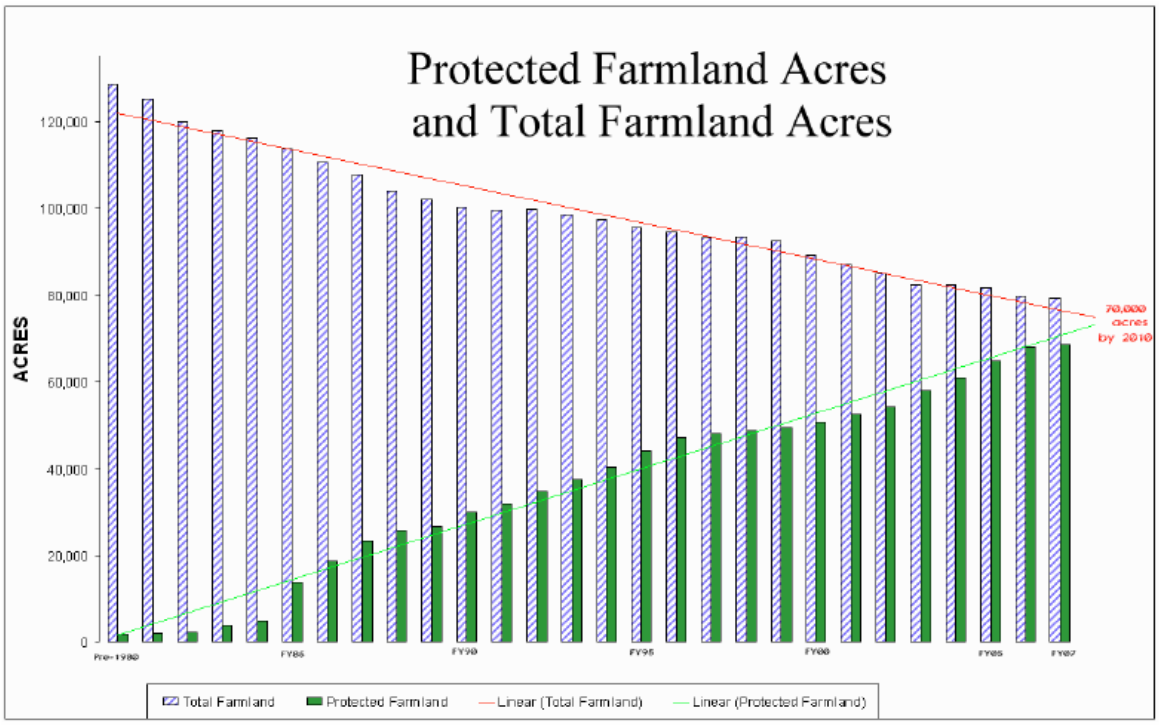
While one of the objectives of the Rural Legacy program is to promote the CREP program, landowners are given the option of choosing which program they prefer in order to implement the required riparian buffers. In all settled easements thus far, the landowners have chosen to implement the riparian buffer provisions through the Rural Legacy conservation easement and not through CREP. While CREP may not be the preferred vehicle by which riparian buffers are established and protected, the objectives of CREP are met through the Rural Legacy conservation easement provisions. Through *FY2008*, over *20* miles of buffers are permanently protected under the RLP program.

Achievement of 70,000 Acres of Farmland in Preservation:

Montgomery County's established goal of protecting 70,000 acres of farmland reached completion of this milestone during FY2008. Achievement of the goal has been attained two years ahead of our projected schedule. A press event will be scheduled early in 2009 to announce the achievement of the goal.

Agricultural Easement Stewardship:

Once the land is protected by an agricultural or conservation easement, the job of protecting the land is far from over. All easement properties must be monitored to ensure landowner compliance with all of the easement covenants. As part of the County's easement acquisition program, easement properties are periodically inspected. Easement stewardship is an ongoing requirement of any easement program and it will be necessary long after the last easement is purchased by the County or State. The dedication of local resources, including staff, must be provided to ensure that the investment in the protection of the agricultural resources is achieved. This vital programmatic component will ensure that all citizens within the County are the beneficiaries of farmland preservation. In *FY2008*, over *4,000* acres of farmland in agricultural preservation easements were inspected by DED staff for compliance with program guidelines. All easement holders who were inspected were cooperative and helpful with the process and no significant issues were found on these farms. The only easement violation still unresolved is held over from 2006 report. The landowners have been very cooperative and are diligently working to ensure all corrective measures are achieved.



Future Initiatives:

VI. Future Initiatives

The success of our farmland preservation programs depends on several factors including the amount of funding available and the state of our local economy and real estate market. Tradition has shown that farmland preservation program participation increases at times when the local economy and real estate market is experiencing downward trends. Having appropriate preservation tools in place at the right time represents a critical challenge for us in assuring our preservation goals are met. Exploration of innovative program changes, alternative funding sources, policy changes, regulatory relief, and the expansion of both private/public sector investments all may be required in order to continue a successful farmland preservation program in Montgomery County.

Now that we have achieved our goal of 70,000 acres of farmland preserved, Montgomery County ranks second in the nation in the number of acres of preserved farmland, and is first in the nation for the percentage of County land that is in agricultural preservation. While this recognition is a great accomplishment for the County and the farmers who live here, our work is not done. We must take steps to provide an enhanced level of protection to lands that are only protected by TDR easements. These properties may still be fragmented at a rate of one house per every twenty-five acres. This means that the APAB may wish to establish a new goal for enhancing the level of protection of lands only protected by TDR easements. This enhanced level of protection can be achieved through programs like MALPF, AEP, RLP and the BLT programs.

Innovative Changes and Enhanced Farmland Preservation Programs

Enhanced Farmland Preservation Programs:

Action Item #1 – Legislative and Regulatory Amendments

In May of 2007, the Maryland General Assembly approved House Bill 1331, which changed the application process for the Maryland Agricultural Land Preservation Foundation program. This change of State Law provided the impetus for Montgomery County to introduce Bill 39-07 in December of 2007, in order to make the local agricultural preservation program consistent with the new State law, and to incorporate a new agricultural preservation initiative called the Building Lot Termination (BLT) Program.

The BLT Easement is another method to preserve agricultural land by reducing the fragmentation of farmland resulting from residential development. However, a BLT Easement provides an enhanced level of compensation to a landowner who can demonstrate that their land is capable of residential development and agrees, as part of the BLT Easement, to forego residential development and also agrees to restrict other types of development on their land.

The introduction of Bill 39-07 to the County Council in December of 2007 was followed by a public hearing in January of 2008. In September of 2008, the Bill went before the Planning, Housing, and Economic Development (PHED) Committee for review, and in November it was approved by the County Council. Following the approval of Bill 39-07, the Chief Administrative Officer for Montgomery County sent an invoice to the City of Gaithersburg for the $2.0 million the city had received from the developer of the Crown Farm as part of the Annexation Agreement. This money was to be used for agricultural preservation in Montgomery County, and it is hoped the $2.0 million will provide seed money to the new BLT program. In addition, the PHED Committee met in January 2009 to discuss the use of Advanced Land Acquisition Revolving Fund (ALARF) monies for BLT, in the amount of $5.0 million.

Action Item #2 Building Lot Termination Program (BLT)

The County Government approved the Legislative Act of January 6, 1981 creating the RDT Zone including the ability for landowners to develop their properties at a density of one house per twenty-five acres. Simultaneously to the creation of the RDT zone, the County created the Transferable Developments Rights (TDR) program as a mechanism for landowners to recapture a portion of the equity lost resulting from the change in zoning. Landowners, who voluntarily elect to sell TDRs, encumber their property with a TDR easement that prevents the land from being re-zoned to a higher density. At the end of FY08, a total of 51,830 acres of agricultural land have been protected by TDR easements. Also during FY08, the County reached its preservation goal of protecting 70,000 acres of farmland through agricultural easements, including TDRs.

While we are very proud of achieving the 70,000-acre preservation goal, we also recognize that about 74 percent of the 70,000 acres are lands protected by TDR easements. While TDR easements prevent lands from being rezoned to higher development density, the

lands protected by TDR easements often retain development potential consistent with the permitted density of the RDT zone. The heightened value associated with these tangible development rights combined with a growing number of residents who would like to see lower development density in the Agricultural Reserve prompted the development of a new program. Referred to as the Building Lot Termination Program (BLT), this program will provide enhanced compensation to landowners for the extinguishment of potential lots in the RDT zone.

The purpose of the Building Lot Termination Program (BLT) is to develop another mechanism that will enhance the farmland preservation programs and initiatives offered to the County's farmers and rural landowners. This initiative focuses on specific ways to encourage the preservation of farmland owned by individuals that have decided, for a variety of reasons, to not protect or encumber their farms through our traditional easement programs that are currently available. DED is currently in the process of drafting Executive Regulation 03-09- Agricultural Land Preservation Easement Purchases which will serve to implement changes to Chapter 2B.

Action Item # 3 - Modification of the County's Added Value Formula

The APAB recommends annually to the County Executive the established Base Easement Value to the added value formula. The APAB will need to closely monitor the real estate market to determine if the current base value is in need of adjustment. The APAB recognized changes to the Added Value Formula for determining easement values require action by the County Council as part of the regulation promulgation process and implementation. These specific recommended changes are outlined below:

Changes to the AEP Added Value Formula

Staff recommends the adoption of certain changes to parts of the added value formula valuation system. These changes provide greater flexibility in valuing the easements as well as considering an opportunity for landowners to extend long term leasing agreements with the local farming community. These changes are outlined below:

- Modification of the Land Tenure component to include consideration for point value when the land is being farmed by an operator under a long term lease agreement with the landowner.

- Modification of the Agricultural Zone Edge component to include the maximum point value award when a property inside the RDT zone is within one (1) mile of the border with other zones in the County, including incorporated towns.

We believe the expansion of the land tenure component will provide a financial incentive by which long term leasing agreements can be executed between the rural landowner and the farm community. In addition, it is also time to expand the Agricultural Zone Edge component from 1/2 mile to 1 mile. Since 1989 this has not changed and we believe the time has come to now consider expanding the zone edge requirement. Executive Regulation 03-09, once promulgated, will serve to implement changes to Chapter 2B that were adopted by the County Council on November 18, 2008. This approach provides another financial incentive which we hope will attract more landowners into this program. We have purchased 19 easements under

AEP that are located within 1/2 mile of the RDT zone border. This enhanced value has led to the preservation of these properties because we could offer a higher easement value in recognition of a greater threat of development.

Action Item # 4 - Changes to Owner's and Child Lot Provisions within the Executive Regulation 03-09

Under an easement, the grantor of an Agricultural Preservation Easement retains certain rights to construct dwellings needed on the farm. The grantor must apply in writing to the Agricultural Preservation Advisory Board for approval to use. The APAB recommends the following changes relating to any release executed for an owner's lot or child lot under the program:

- Any release or preliminary release issued under this regulation shall include:

    i. A statement that the owner's or child's lot may not be transferred for 5 years from the date of the final release, except on:

        1. Approval by the Agricultural Preservation Advisory Board (APAB); or

        2. a lender providing notice to the APAB of a transfer pursuant to a bona fide foreclosure of a mortgage or deed of trust or to a deed in lieu of foreclosure.

It is important to note that in 2003, the MALPF changed their regulations regarding releases for owners and children's lots to reflect a similar restriction on transfers. We believe the recommended changes as outlined above are consistent with the State program and would provide the County greater protection from potential abuse. It is important to note that a similar restriction is under consideration with regard to children's lot rights provided under zoning. We are also recommending as part of the change in Executive Regulations to reduce the number of future reserved residences for children as required by MALPF from a maximum of ten (10), to a maximum of three (3) depending on the size of the farm property. Executive Regulation 03-09 once promulgated will serve to implement changes to Chapter 2B that were adopted by the County Council on November 18, 2008.

Expand Agricultural Economic Support Initiatives to Promote Farmland Viability

Expansion of the Private Sector and Public Sector Investment in Farmland Preservation.

Since we have achieved our goal of 70,000 acres of preserved farmland, it will become more challenging to preserve the remaining unprotected land and the land only protected by TDR easements. We must strive to adopt changes that will serve as incentives to foster greater participation in farmland preservation on the lands that remain. This includes the expansion of both the private sector and public sector investments in farmland preservation.

Action Item #5 - Implement Improvements to our TDR programs, Promote Non Residential Uses for TDRs through the expansion of Urban Growth Areas.

Montgomery County's TDR program has long been admired nationally as the model for Transferable Development Rights programs. Many jurisdictions across this country have studied our example and worked towards implementing programs of their own. While we have benefited from this exposure, we have not been working aggressively enough to ensure its continued viability. Any program that has existed for over 26 years must be modified on occasion to enhance its effectiveness in meeting the needs of the citizens. The TDRs are responsible for protecting over 51,830 acres of farmland, which represents about 74% of the farmland preservation properties protected to date. The outcome of this TDR program represents an economic development initiative into the rural economy from the private sector investing $115 million and TDRs play a pivotal role in our public policy objectives.

We must continue to expand the use of TDRs within the County wherever possible and not continue to erode capacity (referenced in MNCPPC TDR reports as diminished capacity) that has already been approved within the various Master Plans. By promoting the concept of non residential uses for TDRs, it is anticipated that values for non-residential TDRs would be higher and more in line with the level of compensation that is necessary to encourage preservation. This expanded approach can help establish a private sector investment in the further protection of agricultural land by providing a financial mechanism will approach a fair and equitable exchange for those rights that will entice landowners to forgo residential development retained on farms where only the buildable TDRs remain (1 unit for every 25 acres.)

The County must also enhance planning and implementation efforts in our urban growth areas. By re-investing in our urban growth areas we can ensure that our citizens are exposed to healthy and sustainable communities. To this end, the recommendations in the Ad Hoc Agricultural Policy Working Group Report must become a part of our future planning goals.

A new zoning text amendment is being proposed which will both provide opportunities for non-residential TDRs and re-focus attention on urban growth areas. This new ZTA will create the Transit Mixed-Use Zone, which will be centered around transit corridors and will serve as new receiving areas for non-residential TDRs.

Action Item #7 – Increase the number of acres of preserved farmland that are inspected for compliance with program guidelines.

In order to update the schedule of biannual easement inspections and continue with the ongoing effort to monitor the integrity of agricultural easements in Montgomery County, we will increase the number of acres inspected in FY08 by 50%, to reach a goal of at least 6,000 acres of preserved farmland inspected in FY09.

The Winds of Change:

The agricultural industry within the County is constantly evolving. We must recognize that changing trends in agriculture are not unique to Montgomery County, nor is change a sign of

demise of the agricultural industry. Changes are a normal part of an evolving market-driven system. The key for any industry to survive is dependent upon its ability to adapt to these changes. The County must be in a position to adapt to these changes as well. One of the main philosophies the County employs for farmland preservation is to protect the agricultural land base and let the industry focus on the direction it wants to go. We do not protect farmland for any particular type of agriculture activity or use.

If the County recognizes the importance of agriculture within its borders then government must assume the responsibility of recommending and implementing measures to ensure its survival. A key recommendation within the 1980 Functional Master Plan for the Preservation of Agriculture and Rural Open Space details on page iv is that there must be *"application of incentives and regulations to preserve farmland and rural open space and to encourage agricultural use of the land."*

These future initiatives and the decisions that are made will have a profound impact on the future of agriculture. We must ensure the next generation will be the beneficiaries of productive farmland and open space amenities. To this end we will have protected an important part of our heritage as well as enhancing the quality of life for all citizens of Montgomery County.

Summary of Appendices:

Appendix A: Montgomery County Agricultural Easement Program
(County AEP and State MALPF)
Actual Expenses for Pre FY 1989-2008

Appendix B: Montgomery County Agricultural Easement Program
(County AEP and State MALPF)
Revenue Collections/Expenses (Beginning with Certification)

Appendix C: Montgomery County Agricultural Easement Program
All Funding Sources (Local/State)
(County AEP and State MALPF and RLP)
Actual Expenses for Pre FY 1989-2008

Appendix D: Montgomery County Agricultural Land Preservation Map

Montgomery County Agricultural Easement Program (County AEP and State MALPF)
Actual Expenses for Pre FY 1989-2008
August 2008

Fiscal Year	Easement Acres Purchased	Operating Expenses	Operating Expenses as Percent of Total Program Expenses	Easement Expenses	Easement Expense as Percent of Total Program Expense	AG Transfer Tax Expense	Allocation Investment Income	Total Program Expense
Pre1989	*1,678MALPF*	-	-	*$420,546*	-	*$420,546*	N/A	*420,546*
1989	0	$58,772	100.0%	0	0.0%	58,772	N/A	$ 58,772
1990	1,016 AEP	120,456	3.7%	3,178,628	96.3%	3,299,084	N/A	3,299,084
1991	1,105 AEP	111,150	3.1%	3,436,429	96.9%	3,547,579	N/A	3,547,579
1992	822 AEP	99,793	3.9%	2,458,548	96.1%	2,558,341	N/A	2,558,341
1993	447 AEP	96,874	7.8%	1,141,722	92.2%	1,238,596	N/A	1,238,596
1994	701 AEP	101,818	3.4%	2,900,854	96.6%	3,002,672	N/A	3,002,672
1995	400 AEP	125,166	8.5%	1,339,264	91.5%	1,464,430	N/A	1,464,430
1996	573 AEP *128 MALPF*	99,412	5.2%	1,798,585	94.8%	1,839,109 58,888 Private Contributions*	N/A	1,897,997
1997	66 AEP	125,185	36.0%	222,804	64.0%	313,190 +	34,799 =	347,989
1998	0	165,852	97.8%	3,675	2.2%	152,574 +	16,953 =	169,527
1999	*268 MALPF*	7,872	1.7%	455,105	98.3%	361,044 + 61,817 Federal FPP#	40,116 =	462,977
2000	514 AEP	0	0%	1,785,889	100%	1,614,757 +	171,132 =	1,785,889
2001*	624 AEP	4,068	.19%	2,151,252	99.81%	2,035,292 + 115,960 Federal FPP#	4,068 =	2,155.320
2002*	187AEP 234 MALPF	90,303	8.63%	955,566	91.37%	955,566 +	90,303=	1,045,869
2003*	223 AEP 523 MALPF	153,955	11.08%	1,235,359	88.92%	1,235,359 +	153,955 =	1,389,314
2004	491 MALPF	163,259	9.88%	1,489,083	90.12%	1,489,083 +	163,259 =	1,652,342
2005	121 AEP 272 MALPF 30.83 RLP	193,180	9.89%	1,760,441	90.11%	1,760,441 +	193,180 =	1,953,621
2006	110 AEP 517 RLP	222,573	24.59%	904,994	75.41%	904,994 +	222,573 =	$1,127,567

Montgomery County Agricultural Easement Program (County AEP and State MALPF)
Actual Expenses for Pre FY 1989-2008
August 2008

2007	86 AEP	234,307	43.86%	534,153	56.14%	534,153 +	234,307 =	$768,460
2008	271 (AEP) 302 (MALPF) 427 (RLP)	236,743	7.3%	3,262,440	92.7%	3,262,440 +	236,743 =	$3,499,183
Totals	7,266 AEP *4,036 MALPF* 4,875 RLP	$2,410,738		$31,435,337		$32,048,022 58,888* 61,817 # 115,960#	1,561,388	33,609,410

* A change in Investment/Interest Income Policy by OMB/DED by Memorandum dated August 15, 2003 directs Investment/Interest income to be used to fund 100% of the administration expenses associated with this project. The policy was applied retroactive to FY01 and FY02 resulting in the changes as noted above. Prior to FY2001, this policy allocated 10% annually.

a:aepactualexp2007(AUG007)

Montgomery County Agricultural Easement Program (County AEP and State MALPF)
Revenue Collections/Expenses (Beginning with Certification)

	Ag Transfer Tax		Interest	Expenses	Acres Acquired
	County	Total			
FY 1990	$2,475,994	$3,713,991	0	$3,299,084	1,016
FY 1991	147,181	196,242	0	3,547,579	1,105
FY 1992	197,016	262,688	0	2,558,341	822
FY 1993	533,960	711,947	0	1,238,596	447
FY 1994	934,322	1,245,763	151,356	3,002,672	701
FY 1995	1,400,765	1,867,687	192,295	1,464,430	400 (195 acres AFT)
FY 1996	1,041,580	1,388,773	187,230	1,839,109 Ag. Tax 58,888 Pri. Cont.	573 (128 MALPF)
FY 1997	364,210	485,613	151,989	313,190 Ag. Tax 34,799 Int. Inc.	66
FY 1998	401,491	535,321	169,733	152,574 Ag. Tax 16,953 Int. Inc.	0
FY 1999	1,016,102	1,354,802	174,051	361,044 Ag. Tax 40,116 Int. Inc. 61,817 Fed. FPP 462,977	268 (MALPF)
FY2000	2,846,362	3,795,149	264,176	1,614,757 Ag. Tax 171,132 Int. Inc. 1,785,889	514
FY 2001	1,605,855	2,141,140	408,208	2,035,292 Ag. Tax 4,068 Int. Inc. 115,960 Fed. FPP 2,155,320	624
FY 2002	2,132,485	2,843,313	167,940	955,566 Ag. Tax 90,303 Int. Inc. 1,045,869	421 (AEP/MALPF)
FY 2003	2,431,432	3,241,910	123,405	1,235,359 Ag Tax 153,955 Int. Inc. 1,389,314	746 (AEP MALPF)
FY2004	1,936,800	2,582,400	94,293	1,489,083 Ag Tax 163,259 Int. Inc 1,652,343	491 (MALPF)

Montgomery County Agricultural Easement Program (County AEP and State MALPF)
Revenue Collections/Expenses (Beginning with Certification)

FY2005	1,774,915	2,366,553	187,318	1,760,441 Ag Tax 193,180 Int. Inc 1,953,621	393 (AEP MALPF)
FY2006	7,434,337	9,912,449	627,555	904,994 Ag Tax 222,573 Int. Inc 1,127,567	110 (AEP)
FY2007	303,011	404,015	843,338	534,153 Ag Tax 234,307 Int. Inc 768,460	86 (AEP)
FY2008	626,402	835,203	649,967	3,262,440 Ag Tax 236,743 Int Inc 3,499,183	271 (AEP) 302 (MALPF)
TOTALS	$29,604,220	$39,884,959	$4,392,854	$33,366,757	01/08/09

Agricultural Emergency Assistance Program (Ag. EAP) (Not included in total listed above)

FY 1998 67 applicants – 26,254 acres	$ 499,999.26 Int. Inc.
FY 2000 95 applicants – 36,703 acres	$1,000,000 General Fund
FY2007	$2,000,000 General Fund

a:aeprevenueexp2006 (jan2005)

Montgomery County Agricultural Easement Program (County AEP and State MALPF and RLP)
Actual Expenses for Pre FY 1989-2008

August 2008

Fiscal Year	Easement Acres Purchased	Operating Expenses	Operating Expenses as Percent of Total Program Expenses	Easement Expenses	Easement Expense as Percent of Total Program Expense	AG Transfer Tax Expense	Investment Interest Income 10% Annually	Total County Program Expense	Total Rural Legacy Program Expense	Total Easement Program Expense
Pre1989	*1,678MALPF*	-	-	*$420,546*	-	*$420,546*	N/A	*420,546*	-	*420,546*
1989	0	$58,772	100.0%	0	0.0%	58,772	N/A	$ 58,772	-	58,772
1990	1,016 AEP	120,456	3.7%	3,178,628	96.3%	3,299,084	N/A	3,299,084	-	3,299,084
1991	1,105 AEP	111,150	3.1%	3,436,429	96.9%	3,547,579	N/A	3,547,579	-	3,547,579
1992	822 AEP	99,793	3.9%	2,458,548	96.1%	2,558,341	N/A	2,558,341	-	2,558,341
1993	447 AEP	96,874	7.8%	1,141,722	92.2%	1,238,596	N/A	1,238,596	-	1,238,596
1994	701 AEP	101,818	3.4%	2,900,854	96.6%	3,002,672	N/A	3,002,672	-	3,002,672
1995	400 AEP	125,166	8.5%	1,339,264	91.5%	1,464,430	N/A	1,464,430	-	1,464,430
1996	573 AEP *128 MALPF*	99,412	5.2%	1,798,585	94.8%	1,839,109 58,888 Private Contributions*	N/A	1,897,997	-	1,897,997
1997	66 AEP	125,185	36.0%	222,804	64.0%	313,190 +	34,799 =	347,989	-	347,989
1998	0	165,852	97.8%	3,675	2.2%	152,574 +	16,953 =	169,527	-	169,527
1999	*268 MALPF*	7,872	1.7%	455,105	98.3%	361,044 + 61,817 Federal FPP#	40,116 =	462,977	-	462,977
2000	514 AEP	0	0%	1,785,889	100%	1,614,757 +	171,132 =	1,785,889	-	1,785,889
2001	624 AEP 876 RLP	4,068	.19%	2,151,252	99.81%	2,035,292 + 115,960 Federal FPP#	4,068 =	2,155,320 +	$2,227,548 =	$4,382,868
2002	187AEP 234 MALPF 979 RLP	90,303	8.63%	955,566	91.37%	955,566+	90,303=	1,045,869 +	$2,890,746 =	$3,936,615
2003	223 AEP 523 MALPF 1,531 RLP	153,955	11.08%	1,235,359	88.92%	1,235,359+	153,955=	1,389,314 +	$6,046,246 =	$7,435,560
2004	491 (MALPF) 517 (RLP)	163,259	9.88%	1,489,083	90.12%	1,489,083 +	163,259 =	1,652,342 +	$1,313,617 =	$2,965,959

August 2008 Fiscal Year	Easement Acres Purchased	Operating Expenses	Operating Expenses as Percent of Total Program Expenses	Easement Expenses	Easement Expense as Percent of Total Program Expense	AG Transfer Tax Expense	Investment Interest Income 10% Annually	Total County Program Expense	Total Rural Legacy Program Expense	Total Easement Program Expense
2005	121 (AEP) 272 (MALPF) 30.83 (RLP)	$193,180	9.89%	$1,760,441	90.11%	$1,760,441 +	$193,180 =	$1,953,621 +	$288,692 =	$2,243,313
2006	110 (AEP) 517 (RLP)	$222,573	24.59%	$904,994	75.41%	$904,994 +	$222,573 =	$1,127,567 +	$3,115,604 =	$4,243,171
2007	86 (AEP)	$234,307	* 43.86%	$534,153	56.14%	$534,153 +	$234,307 =	$768.460 +	0 =	$ 768,460
2008	271 (AEP) 302 (MALPF) 427 (RLP)	$236,743	7.2%	$3,262,440	92.7%	$3,262,440 +	$236,743 =	$3,499.183 +	$1,786,445 =	$5,285,628
Totals	7,266 AEP *4,036 MALPF* 4,875 RLP	$2,410,738		$31,435,337		$32,048,022 58,888* 61,817 # 115,960#	1,561,388	33,609,410	$17,668,898	$51,278.308

- Settlement of Edward Byrd et al property on 8/8/2007 in the amount of $2,255,207 was intended to settle late in FY07, however delays with his estate planning pushed settlement to the beginning of FY08. Operating expenses if settlement had occurred in FY07 would bring the percentage of operating costs as a function of total program cost down to about 8.4%

a:aepactualexplandscape2007(aug2007)

Agriculture Fact Sheet 2009

MONTGOMERY COUNTY, MARYLAND

Preserving Our Agricultural Heritage

Connecting Our Past…With Our Future

www.montgomerycountymd.gov/agservices

Montgomery County's agricultural reserve is an important environmental resource for future farm enterprises. A strong agricultural heritage provides a diverse business community and a strong economic base. Combining these strengths with the commitment for farmland preservation makes Montgomery County an attractive place to live and work.

Agricultural activities occupy about one-third of Montgomery County's land area. Over three quarters of the 93,000-acre agriculture reserve is preserved through transfer of development rights or easement purchase initiatives. The County's diverse agricultural industry – 561 farms and 350 horticultural enterprises – produce millions of dollars in economic contribution from farm products and operations. The majority of Montgomery County farms are family-run operations, many reaching back several generations, which employ more than 10,000 residents. The County has 561 farms, of which 43 percent are farmed as a primary occupation.

Horticulture

During the past 25 years, the Horticultural Sector has grown dramatically. The 350 horticultural businesses employ more than 7,000 of the people working in agriculture. Horticulture is one of the largest sectors in agriculture and includes nurseries and landscaping companies, arborists, sod farms and lawn care firms, and green house businesses.

Twenty percent of the horticultural industry in Maryland is in the County and Montgomery County ranks second in the State in total number of horticultural firms.

Equine Industry

Horses have become a major component of the agricultural industry numbering over 12,000 horses. Horses represent a tremendous opportunity for farmers in terms of the supplies, services and products needed to support the horse population which exceeds the population of cows. The growing hay industry in Montgomery County is directly proportional to the growing number of horses. High quality veterinarians that provide services to horses are now available for other livestock operations in the County.

Agriculture for the Future

Montgomery County is committed to sustaining a viable agricultural industry. The Agriculture Reserve established in 1981 by the Preservation of Agriculture and Rural Open Space Functional Master Plan, provides 93,000 acres for farming. A variety of private organizations assist farmers to prosper in Montgomery County: Farm Bureau, Farm Tour Committee, Agricultural Promotion and Marketing Council, Agricultural Advisory Committee, Agricultural Preservation Advisory Board and Montgomery County Farmers Markets Association work together with the Cooperative Extension Service, Soil Conservation District, Department of Economic Development, and Farm Service Agency.

Farmland Preservation	**Acres Protected**
Montgomery County Agricultural Easement Program (AEP)	7,638
Montgomery County Transfer of Development Rights (TDR)	52,052
Maryland Environmental Trust (MET)	2,086
Maryland Agricultural Land Preservation Foundation (MALPF)	4,181
Rural Legacy Program (RLP)	4,875
	70,832

Economic Contribution to County's Economy

Over 174 County farms have annual sales of $10,000 or more. The average farm size is 121 acres and 35 percent of the farms are greater than 50 acres in size.

Traditional Agriculture		$ 33,193,000
Horticultural Industry		$125,330,000
Equine Industry		$ 84,855,896
	Total	**$243,378,896**

Montgomery County Statistics

www.montgomerycountymd.gov/agservices

Total Land in Montgomery County	316,800 acres
Agriculturally Assessed Lands	79,011 acres
Land in Farms	67,613 acres
Percent of Land in Farms	21.3 %
Number of Farms	561 farms
Number of Horticultural Business	350
Average Farm Size	121 acres
Average Market Value of Agricultural Products Sold Per Farm	$59,168 dollars
Total Cropland	48,563 acres
Harvested Crop Land	41,599 acres
Pasture Land	12,922 acres
Woodland-(Public 31,513 and Private 57,487)	89,000 acres
Average Age of Operator	60 years
Percentage of Principal Occupation Farms	43 %
Publicly Owned Lands (Federal, State, County, WSSC)	58,500 acres

Farms by Type of Enterprise

Crop or Livestock	Number of Farms		Amount Produced
Beef	80		2,423 Cows
Horse	783		12,000 Horses
Dairy	5		703 Cows
Sheep	37		741 Sheep
Corn for Grain	44	1.09 Million Bushels	12,675 Acres
Corn for Silage	13	9,042 Tons	871 Acres
Wheat	30	244,446 Bushels	4,161 Acres
Soybeans	35	279,039 Bushels	11,688 Acres
Hay	165	23,926 Tons	10,737 Acres
Sod	7		677 Acres
Vegetables, fruits, nuts	49		
Christmas Trees	17		
Greenhouse, Nursery, and Floriculture Production	58		
Landscape, Arborist, Lawn Care	150 businesses		

Statistics provided by Ag Census 2002/2007 United States, Department of Agriculture, USDA-NASS, University of Maryland Cooperative Extension Service.
Prepared by: Montgomery County Department of Economic Development
Agricultural Services Division 301-590-2823

June 30, 2009

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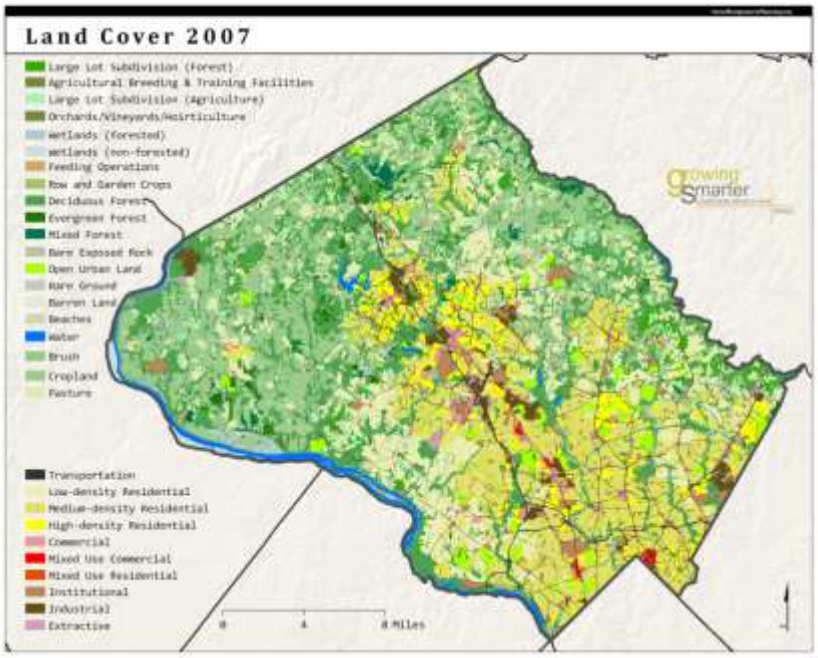
Appendix 8

Nutrient Loading Analysis

This Appendix contains the technical information on the nutrient loading analysis for existing and 2030 land cover conditions required by the State as part of fulfilling the requirements of HB 1141.

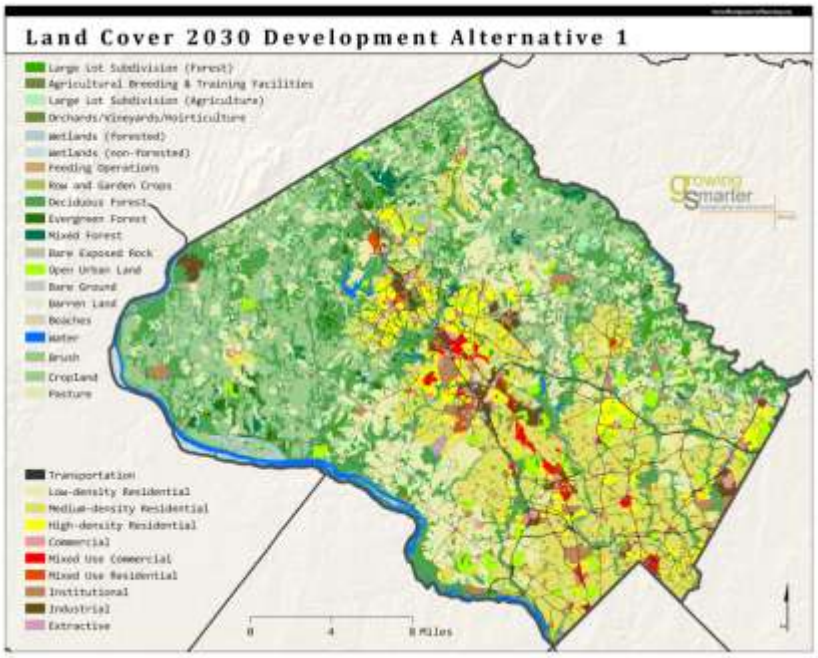
The first section deals with the land cover and septic system data analysis for the nutrient loading spreadsheet tool. The second section covers the modifications that were made to the spreadsheet tool, assumptions regarding the land cover and septic data, coordination with municipalities, 2030 Land Cover Scenarios, wastewater treatment plant nutrient discharge data, summary input data tables, summary output data tables, and summary output data charts.

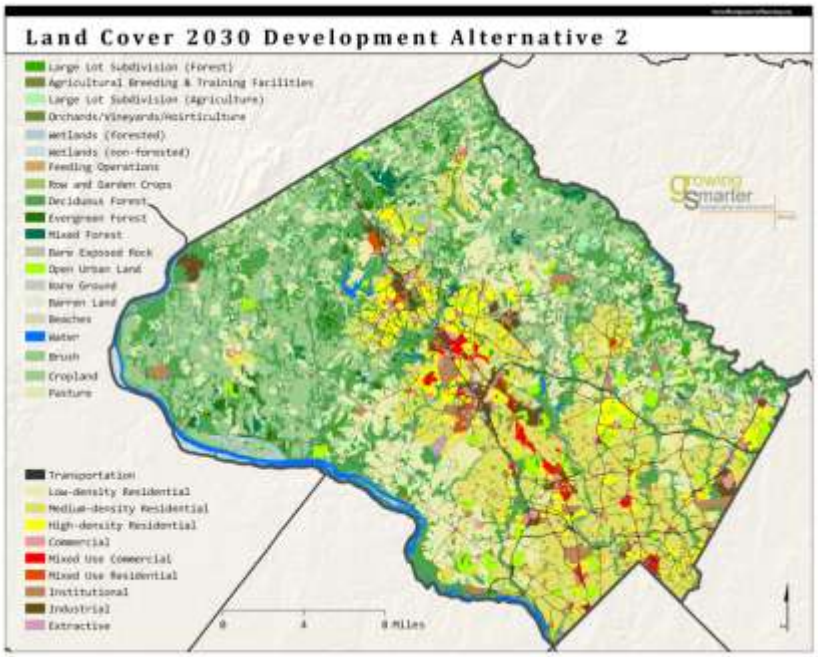
Land Cover and Septic System Data Analysis



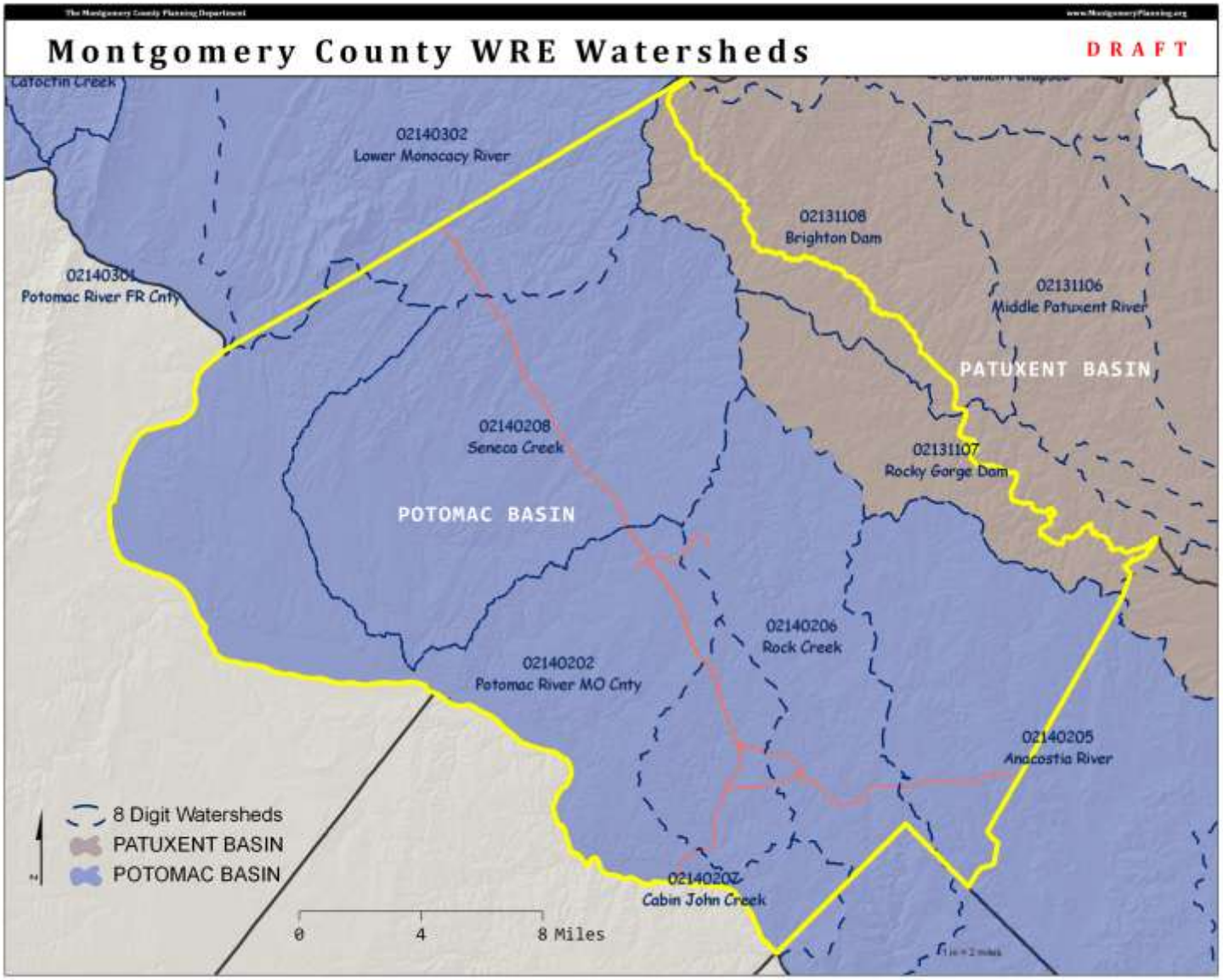
The following are the present and future Land Cover maps. The two future development scenarios are arrived at with inputs from our Master Plans, the development pipeline, the transportation pipeline, and with input from our internal municipalities.

The second alternative land cover goes beyond the first scenario to include additional development and redevelopment opportunities that were identified in our 2009 Growth Policy report.





For Nutrient modeling, Land Cover types and the Septic analyses are broken down by the following watershed geographies:

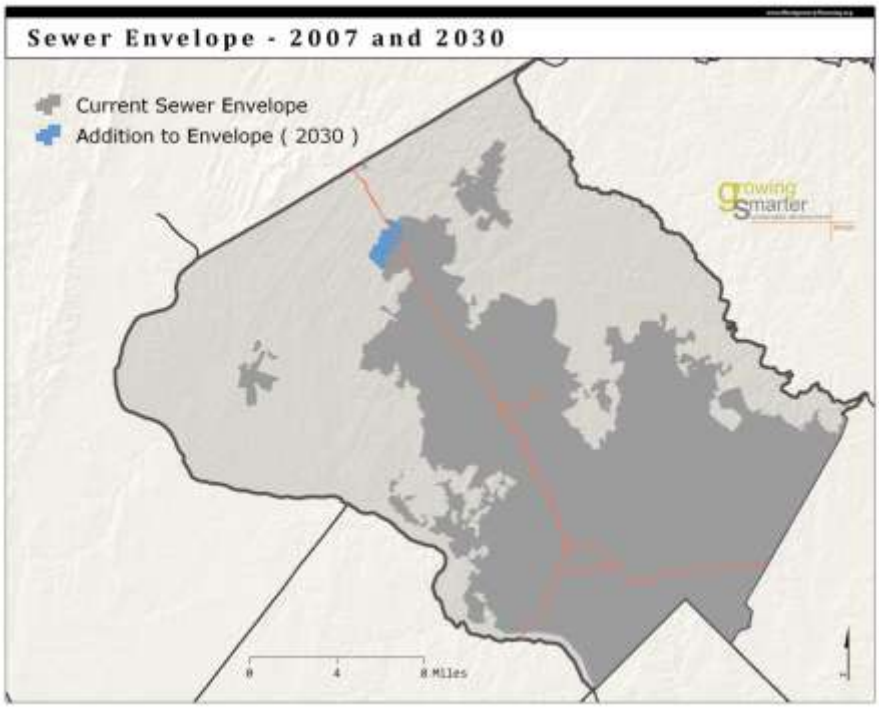

Montgomery County WRE Watersheds
DRAFT
02140302
Lower Monocacy River
02131108
Brighton Dam
02131106
Middle Patuxent River
PATUXENT BASIN
02140208
Seneca Creek
02131107
Rocky Gorge Dam
POTOMAC BASIN
02140206
Rock Creek
02140202
Potomac River MO Cnty
02140205
Anacostia River
02140207
Cabin John Creek
8 Digit Watersheds
PATUXENT BASIN
POTOMAC BASIN
0
4
8 Miles

2007	8-Digit Watersheds (Acreages)											Grand Total	Patuxent Drainage	Potomac Drainage
Land Cover	02130908	02131104	02131107	02131108	02140202	02140205	02140206	02140207	02140208	02140301	02140302	(Acres)	(Acres)	(Acres)
11-Low-density residential	5.54	40.64	4,259.83	1,076.45	12,331.06	6,244.39	4,249.20	3,298.85	9,392.67		1,456.22	**42,354.85**	5,382.46	36,972.39
12-Medium-density residential		11.42	1,426.46	69.39	9,719.07	12,365.53	14,172.00	6,100.43	6,577.11		225.91	**50,667.32**	1,507.27	49,160.05
13-High-density residential			269.55		1,858.00	3,323.07	2,451.60	731.53	5,148.74		15.03	**13,797.52**	269.55	13,527.97
14-Commercial			213.69	36.34	1,405.85	1,029.85	1,067.10	703.66	1,605.59		58.79	**6,120.87**	250.03	5,870.84
15-Industrial			47.41	0.83	1,332.36	653.31	1,238.20	355.26	1,313.19		24.79	**4,965.35**	48.24	4,917.11
16-Institutional			761.51	56.14	2,539.03	2,416.53	2,968.87	922.18	1,892.13		102.94	**11,659.33**	817.65	10,841.68
17-Extractive					327.69	44.93		12.94				**385.56**	0	385.56
18-Open urban land	0.56		373.37	94.02	2,010.72	2,382.70	1,917.08	1,277.44	1,426.61		265.77	**9,748.27**	467.95	9,280.32
21-Cropland			4,350.92	4,893.28	15,146.12	599.69	1,762.32		19,562.82		6,080.14	**52,395.29**	9,244.20	43,151.09
22-Pasture		4.33	1,364.56	813.11	4,728.08	440.4	581.7	82.57	4,461.46		1,878.22	**14,354.43**	2,182.00	12,172.43
23-Orchards/vineyards/horticult.			96.55		21.55	8.89	4.22		123.02			**254.23**	96.55	157.68
24-Feeding operations+fisheries													0	0
25-Row and garden crops													0	0
41-Deciduous forest		0.99	7,172.54	4,103.15	19,404.09	6,187.42	5,610.23	1,889.02	20,349.25	7.08	5,993.54	**70,717.31**	11,276.68	59,440.63
42-Evergreen forest			135.67	207.73	698.83	13.98	13.51	16.65	1,292.03		618.89	**2,997.29**	343.4	2,653.89
43-Mixed forest			18.85	506.64	611.13	222.49	15.33		688.46		838.97	**2,901.87**	525.49	2,376.38
44-Brush			63.68	120.5	532.62	239.92	52.16	66.63	771.91		183.09	**2,030.51**	184.18	1,846.33
50-Water			289.53	324.05	5,824.86	47.07	157.61	29.84	738.43	13.11	17.84	**7,442.34**	613.58	6,828.76
60-Wetlands			103.65	92.78	1,434.81	34.68	172.15	6.18	658.1		138.8	**2,641.15**	196.43	2,444.72
70-Barren land													0	0
71-Beaches													0	0
72-Bare exposed rock													0	0
73-Bare ground					90.15	114.4	6.99	11.98	13.92			**237.44**	0	237.44
80-Transportation	0.36		345.01	113.37	1,537.75	1,297.44	1,322.02	740.69	1,715.04		201.13	**7,272.81**	458.74	6,814.07
129-Mixed Use Residential													0	0
149-Mixed Use Commercial					87.18	82.6	234.93	85.98				**490.69**	0	490.69
191-Large lot subdivision(AG)		3.39	1,851.39	652.68	1,894.64	518.15	281.85	35.84	2,024.31		1,195.75	**8,458.00**	2,507.46	5,950.54
192-Large lot subdivision (forest)			1,910.37	210.15	960.7	283.52	120.33	42.8	1,457.03		471	**5,455.90**	2,120.52	3,335.38
241-Feeding operations			8.19		114.67	16.89			82.37			**222.12**	8.19	213.93
242-Breeding and Training				7.84	65.63				32.52		23.51	**129.5**	7.84	121.66
601-Wetlands (Forested)			490.84	213.48	3,011.74	326.71	853.93	13.6	1,411.46	2.3	292.75	**6,616.81**	704.32	5,912.49
Grand Total (Acres)	**6.46**	**60.77**	**25,553.57**	**13,591.93**	**87,688.33**	**38,894.56**	**39,253.33**	**16,424.07**	**82,738.17**	**22.49**	**20,083.08**	**324,316.76**	**39,212.73**	**285,104.03**

2030 Scenario 1	8-Digit Watersheds (Acreages)											Grand Total	Patuxent Drainage	Potomac Drainage
Land Cover	02130908	02131104	02131107	02131108	02140202	02140205	02140206	02140207	02140208	02140301	02140302	(Acres)	(Acres)	(Acres)
11-Low-density residential	5.54	40.64	4,367.03	1,075.86	12,431.40	6,241.41	4,514.26	3,298.85	10,157.09		1,456.21	43,588.29	5,489.07	38,099.22
12-Medium-density residential		11.42	1,425.87	69.39	9,520.49	12,656.89	14,243.15	6,099.86	6,933.03		224.27	51,184.37	1,506.68	49,677.69
13-High-density residential			269.55		2,114.73	3,311.82	2,436.75	762.64	5,419.24		49.8	14,364.53	269.55	14,094.98
14-Commercial			142.26	35.38	916.83	1,097.83	757.22	512.61	1,428.51		58.79	4,949.43	177.64	4,771.79
15-Industrial			47.41	0.83	1,322.58	551.57	1,147.71	229.29	1,165.51		24.79	4,489.69	48.24	4,441.45
16-Institutional			760.65	54.64	2,751.37	2,469.20	2,718.28	914.46	1,830.82		102.54	11,601.96	815.29	10,786.67
17-Extractive					327.69	39.9		12.94				380.53	0	380.53
18-Open urban land	0.56		373.37	94.02	2,007.03	2,080.46	1,941.14	1,280.73	1,406.52		264.31	9,448.14	467.95	8,980.19
21-Cropland			4,294.90	4,889.64	15,058.88	585.86	1,459.08		18,392.86		6,041.58	50,722.80	9,184.54	41,538.26
22-Pasture		4.33	1,320.44	813.11	4,491.39	438.83	522.78	82.57	4,188.02		1,878.22	13,739.69	2,137.88	11,601.81
23-Orchards/vineyards/horticult.			96.55		21.55	8.89	4.22		123.02			254.23	96.55	157.68
24-Feeding operations+fisheries													0	0
25-Row and garden crops													0	0
41-Deciduous forest		0.99	7,159.23	4,102.90	19,388.43	5,846.79	5,448.79	1,869.66	19,646.95	7.08	5,992.04	69,462.86	11,263.12	58,199.74
42-Evergreen forest			135.67	207.73	698.83	13.98	13.51	16.65	1,290.43		618.84	2,995.64	343.4	2,652.24
43-Mixed forest			18.85	506.64	611.13	222.49	15.33		688.46		838.97	2,901.87	525.49	2,376.38
44-Brush			63.68	119.33	368.91	234.94	52.16	66.63	771.91		183.09	1,860.65	183.01	1,677.64
50-Water			289.53	324.05	5,825.04	47.07	157.61	29.84	739.8	13.11	17.84	7,443.89	613.58	6,830.31
60-Wetlands			103.65	92.78	1,435.30	30.26	171.51	6.18	657.08		138.8	2,635.56	196.43	2,439.13
70-Barren land													0	0
71-Beaches													0	0
72-Bare exposed rock													0	0
73-Bare ground					90.15	114.4	6.99	11.98	13.92			237.44	0	237.44
80-Transportation	0.36		353.68	121.48	1,544.23	1,615.57	1,565.78	759.19	1,946.87		209.98	8,117.14	475.52	7,641.62
129-Mixed Use Residential			71.43		323.6		228.81	16.89	319.45			960.18	71.43	888.75
149-Mixed Use Commercial					395.5	167.21	599.35	360.96	654.46			2,177.48	0	2,177.48
191-Large lot subdivision(AG)		3.39	1,851.39	652.68	1,892.57	518.15	281.85	35.84	2,001.17		1,195.75	8,432.79	2,507.46	5,925.33
192-Large lot subdivision (forest)			1,910.31	210.15	960.7	277.51	120.33	42.8	1,456.30		471	5,449.10	2,120.46	3,328.64
241-Feeding operations			8.19		114.67	16.89			82.37			222.12	8.19	213.93
242-Breeding and Training				7.84	65.63				32.52		23.51	129.5	7.84	121.66
601-Wetlands (Forested)			489.93	213.48	3,009.70	306.64	846.72	13.5	1,391.86	2.3	292.75	6,566.88	703.41	5,863.47
Grand Total (Acres)	**6.46**	**60.77**	**25,553.57**	**13,591.93**	**87,688.33**	**38,894.56**	**39,253.33**	**16,424.07**	**82,738.17**	**22.49**	**20,083.08**	**324,316.76**	**39,212.73**	**285,104.03**

2030 Scenario 2	8-Digit Watersheds (Acreages)														
Land Cover	02130908	02131104	02131107	02131108	02140202	02140205	02140206	02140207	02140208	02140301	02140302	Grand Total (Acres)	Patuxent Drainage (Acres)	Potomac Drainage (Acres)
11-Low-density residential	5.54	40.64	4,550.13	1,075.86	12,431.40	6,241.41	4,514.26	3,298.85	10,157.09		1,456.21	**43,771.39**	5,672.17	38,099.22
12-Medium-density residential		11.42	1,425.87	69.39	9,520.49	12,656.89	14,243.15	6,099.86	6,933.03		224.27	**51,184.37**	1,506.68	49,677.69
13-High-density residential			269.55		2,114.73	3,311.82	2,436.75	762.64	5,419.24		49.8	**14,364.53**	269.55	14,094.98
14-Commercial			142.26	35.38	916.83	1,085.14	751.21	512.61	1,428.51		58.79	**4,930.73**	177.64	4,753.09
15-Industrial			47.41	0.83	1,322.58	551.57	1,147.71	229.29	1,263.60		24.79	**4,587.78**	48.24	4,539.54
16-Institutional			760.65	54.64	2,751.37	2,547.57	2,737.66	914.46	1,830.82		102.54	**11,699.71**	815.29	10,884.42
17-Extractive					327.69	39.9		12.94				**380.53**	0	380.53
18-Open urban land	0.56		373.37	94.02	2,007.03	2,080.46	1,941.14	1,280.73	1,406.52		264.31	**9,448.14**	467.95	8,980.19
21-Cropland			4,235.26	4,889.64	15,058.88	585.86	1,459.08		18,392.86		6,041.58	**50,663.16**	9,124.90	41,538.26
22-Pasture		4.33	1,318.83	813.11	4,491.39	438.83	503.4	82.57	4,117.26		1,878.22	**13,647.94**	2,136.27	11,511.67
23-Orchards/vineyards/horticult.			96.55		21.55	8.89	4.22		123.02			**254.23**	96.55	157.68
24-Feeding operations+fisheries													0	0
25-Row and garden crops													0	0
41-Deciduous forest		0.99	7,035.77	4,102.90	19,388.43	5,768.42	5,448.79	1,869.66	19,608.43	7.08	5,992.04	**69,222.51**	11,139.66	58,082.85
42-Evergreen forest			135.67	207.73	698.83	13.98	13.51	16.65	1,290.43		618.84	**2,995.64**	343.4	2,652.24
43-Mixed forest			18.85	506.64	611.13	222.49	15.33		688.46		838.97	**2,901.87**	525.49	2,376.38
44-Brush			63.68	119.33	368.91	234.94	52.16	66.63	771.91		183.09	**1,860.65**	183.01	1,677.64
50-Water			289.53	324.05	5,825.04	47.07	157.61	29.84	739.8	13.11	17.84	**7,443.89**	613.58	6,830.31
60-Wetlands			103.65	92.78	1,435.30	30.26	171.51	6.18	657.08		138.8	**2,635.56**	196.43	2,439.13
70-Barren land													0	0
71-Beaches													0	0
72-Bare exposed rock													0	0
73-Bare ground					90.15	114.4	6.99	11.98	13.92			**237.44**	0	237.44
80-Transportation	0.36		353.68	121.48	1,544.23	1,615.57	1,565.78	759.19	1,946.87		209.98	**8,117.14**	475.52	7,641.62
129-Mixed Use Residential			73.04		323.6		228.81	16.89	330.64			**972.98**	73.04	899.94
149-Mixed Use Commercial					395.5	179.9	605.36	360.96	654.46			**2,196.18**	0	2,196.18
191-Large lot subdivision(AG)		3.39	1,851.39	652.68	1,892.57	518.15	281.85	35.84	2,001.17		1,195.75	**8,432.79**	2,507.46	5,925.33
192-Large lot subdivision (forest)			1,910.31	210.15	960.7	277.51	120.33	42.8	1,456.30		471	**5,449.10**	2,120.46	3,328.64
241-Feeding operations			8.19		114.67	16.89			82.37			**222.12**	8.19	213.93
242-Breeding and Training				7.84	65.63				32.52		23.51	**129.5**	7.84	121.66
601-Wetlands (Forested)			489.93	213.48	3,009.70	306.64	846.72	13.5	1,391.86	2.3	292.75	**6,566.88**	703.41	5,863.47
Grand Total (Acres)	6.46	60.77	25,553.57	13,591.93	87,688.33	38,894.56	39,253.33	16,424.07	82,738.17	22.49	20,083.08	**324,316.76**	39,212.73	285,104.03

Present and future residential and employment septic loads were determined by cross referencing the land cover layers against the sewer envelope. This layer was obtained from Montgomery County DEP as seen below:



The septic (non-sewered) Household and Employment totals were then broken down by the two drainage basins; Potomac and Patuxent.

2007	Patuxent	Potomac
Households	5,781.47	20,912.76
Employees	3,429.57	10,066.25

2007	Patuxent	Potomac
Residential Acreage	4,099.05	20,296.20
Employment Acreage	655.01	2,499.05

2030	Patuxent	Potomac
Households	**6,829.32**	**24,183.12**
Employees	4,003.21	10,155.54

2030	Patuxent	Potomac
Residential Acreage	4,388.31	20,797.38
Employment Acreage	655.01	2,415.96

WRE datasets:
1) 2007 MDP Land Cover
2) 2007 Amended MDP Land Cover
3) 2030 alt1 Land Cover
4) 2030 alt2 Land Cover
5) Septic MWCOG
6) Septic Landcover

1) 2007 MDP Land Cover

The 2007 Land Cover update was obtained from Melissa Appler of the Maryland Department of Planning. MDP describes it as:

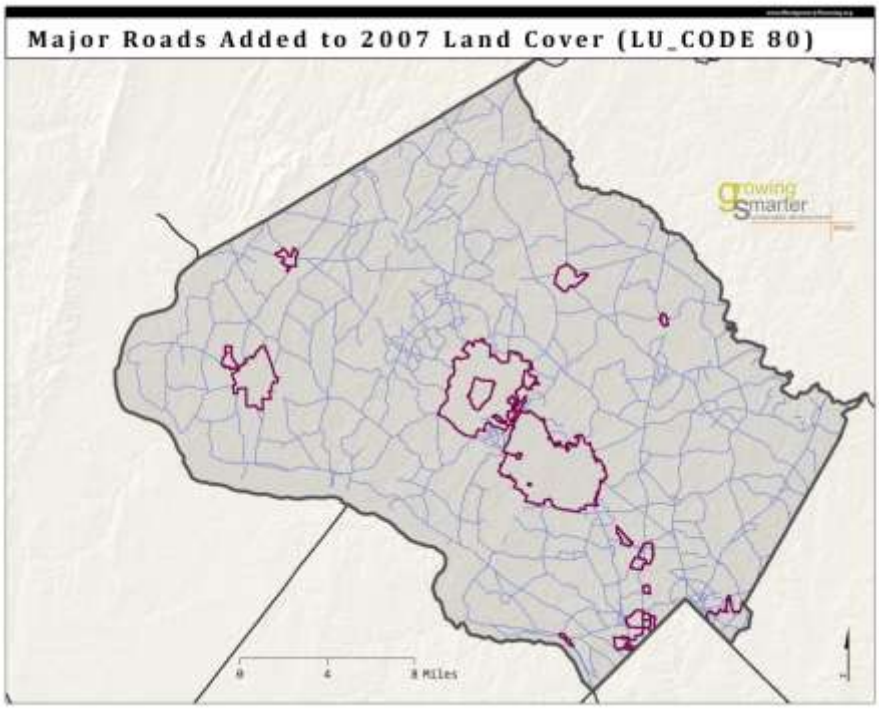
Beginning with the 2002 Land Use/Land Cover as a starting point for the update, MDP utilized updated aerial imagery in conjunction with parcel information to develop the 2007 Land Use/Land Cover. Aerial photography collected in 2005 serves as the imagery to underlie all land use change. Parcel information from Maryland Property View 2006, in tandem with the imagery, helped to classify land use information into specific categories. Throughout the process, the 2002 Land Use/Land Cover layer was edited to be consistent with land use information presented by the aerial imagery and the parcel information.

2) 2007 Amended MDP Land Cover

Using the MDP Land Cover layer as a starting point, a number of additional modifications were made by the Planning Department as well as from the municipalities.

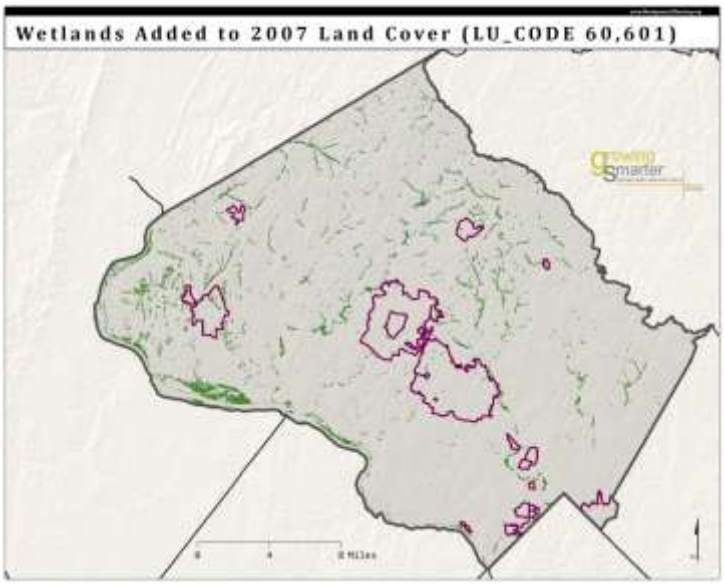
For transportation, the Right of Way of various major roads were stamped into the 2007 land cover as LC_TYPE 80 (transportation). The ROW added were arrived at from the County centerline layer where:

> *"FTYPE_NAME" = 'Parkway' OR "FTYPE_NAME" = 'Controlled Major Highway' or "FTYPE_NAME" = 'Major Highway' or "FTYPE_NAME" = 'Arterial' or "FTYPE_NAME" = 'Country Arterial' or "FTYPE_NAME" = 'Country Road' or "FTYPE_NAME" = 'Rustic Road' or "FTYPE_NAME" = 'Exceptional Rustic Ro*



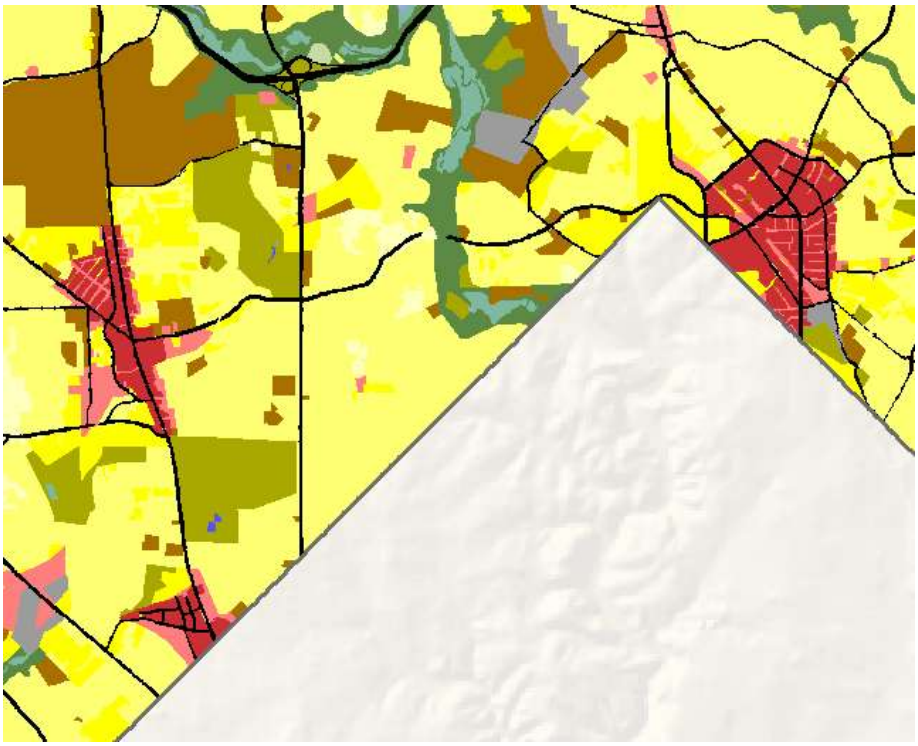
Additional wetland data was added to the existing layer from the Wetlands GIS layer maintained in the environmental planning division of MNCPPC. This included a second type of Wetland. This new Land Cover was coded 601 – Wetlands (Forested). This layer overwrites whatever was present in the MDP land cover layer, whether it was a wetland or not.

The figure below depicts the wetlands stamped into the existing Land Cover layer. Our layer differentiates between a normal wetland and forested wetland. Wetlands are coded as LC_CODE=60, Forested wetlands are coded LC_CODE-601.

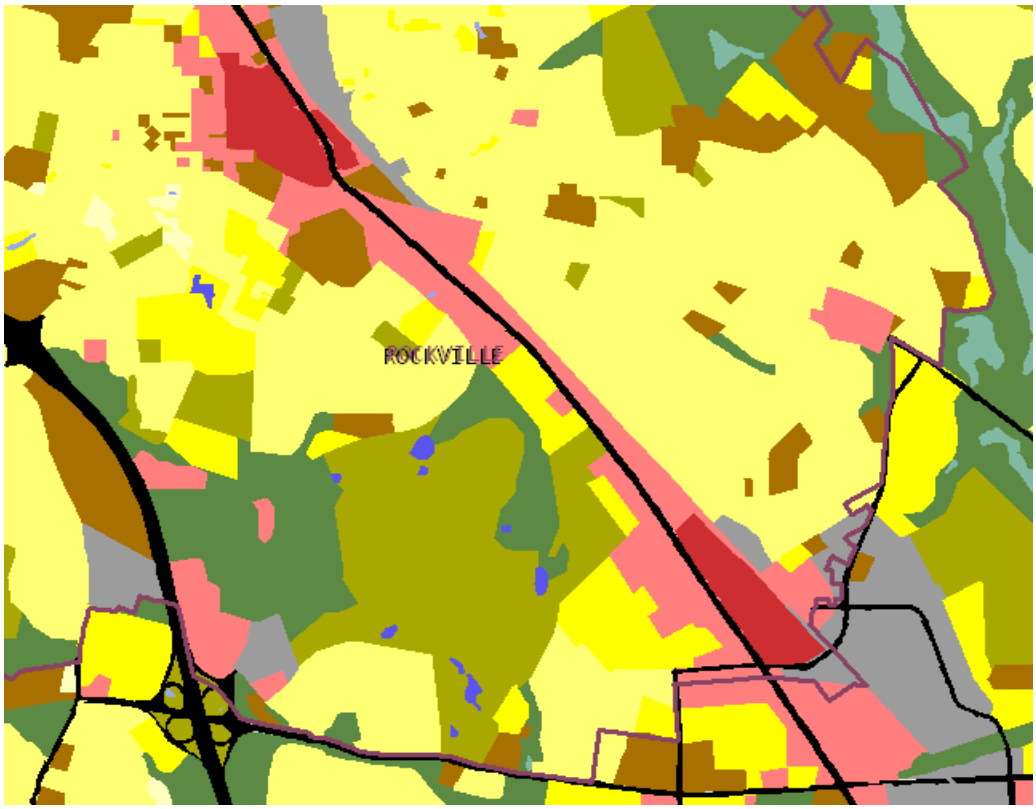


A mixed use commercial land cover designation (149) was added to the 2007 Land cover layer. This use represents a mixed use urban development with a FAR of 1.5 or greater.

For the purposes of the 2007 land cover, the 149 code was applied to the Silver Spring CBD, Bethesda CBD, Chevy Chase CBD, Rockville Town Center, and the Twinbrook Town Center. Generally, this land cover changed what was previously coded commercial.



(Silver Spring, Chevy Chase and Bethesda CBDs in Mixed-Use Commercial Land Cover in Red)



(Rockville Town Center and Twinbrook Mixed-Use Commercial Land Cover in Red)

Lastly, a few minor adjustments were made to the existing Land Cover by municipalities in Montgomery County with planning and zoning authority (see Nutrient Loading Analysis section of this Appendix for a list of municipalities).. County Planning staff provided the municipalities with hard copies and digital versions of the 2007 Land cover layer which included all the modifications described above. Existing land cover tweaks were made in a few places by the Cities of Rockville and Gaithersburg.

3) 2030 Scenario (Alternative) 1 Land Cover

Using the 2007 Amended MDP Land cover layer as a base, various modifications were made to arrive at the "2030 Scenario (Alternative) 1 Land Cover".
Inputs for this step included:

- Municipality guidance
- Transportation planning guidance
- County Housing and Commercial Development Pipeline
- Current and ongoing Master plans

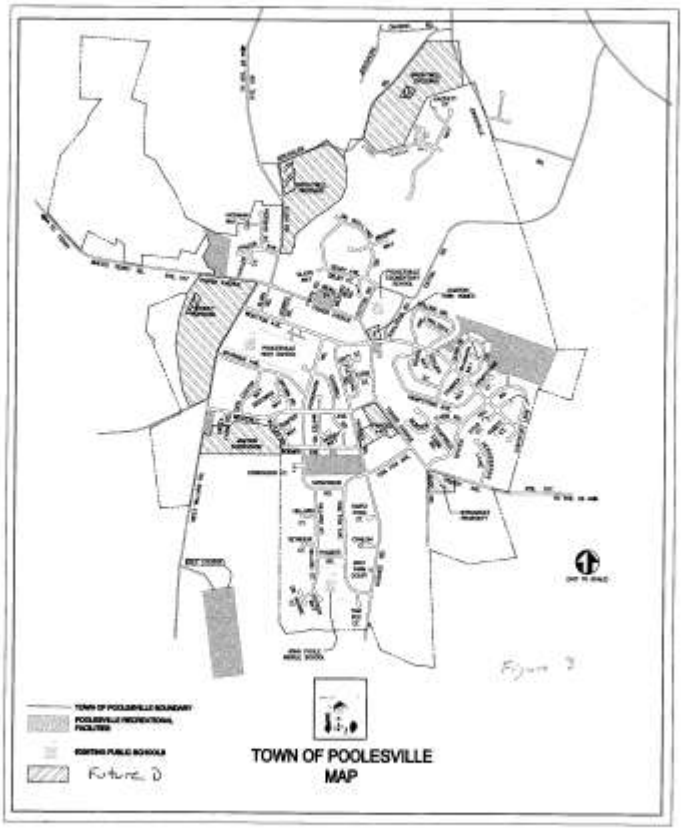
Municipalities with planning and zoning authority in the County that anticipate 2030 land cover changes submitted them for incorporation into the County-wide land cover layer, in each case starting with the output from Step 2 above (Amended 2007 Land Cover).

Gaithersburg submitted its forecasted Land Cover digitally.

Rockville, Laytonsville and Brookeville transmitted their projected land cover changes on paper.
Poolesville provided a digital printout it had already prepared showing its expected land cover changes.
The other municipalities communicated that they had no forecasted 2030 land cover changes.
All municipality Land cover forecast data was coalesced into the master GIS layer for 2030.

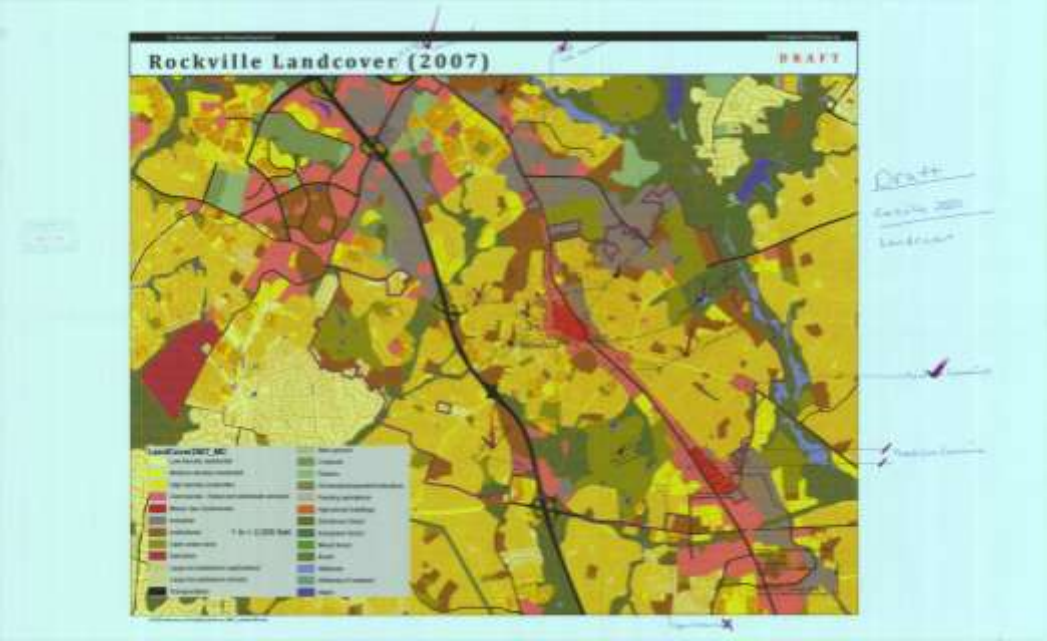
Poolesville Planning Commission
Draft Approved January 20, 2009

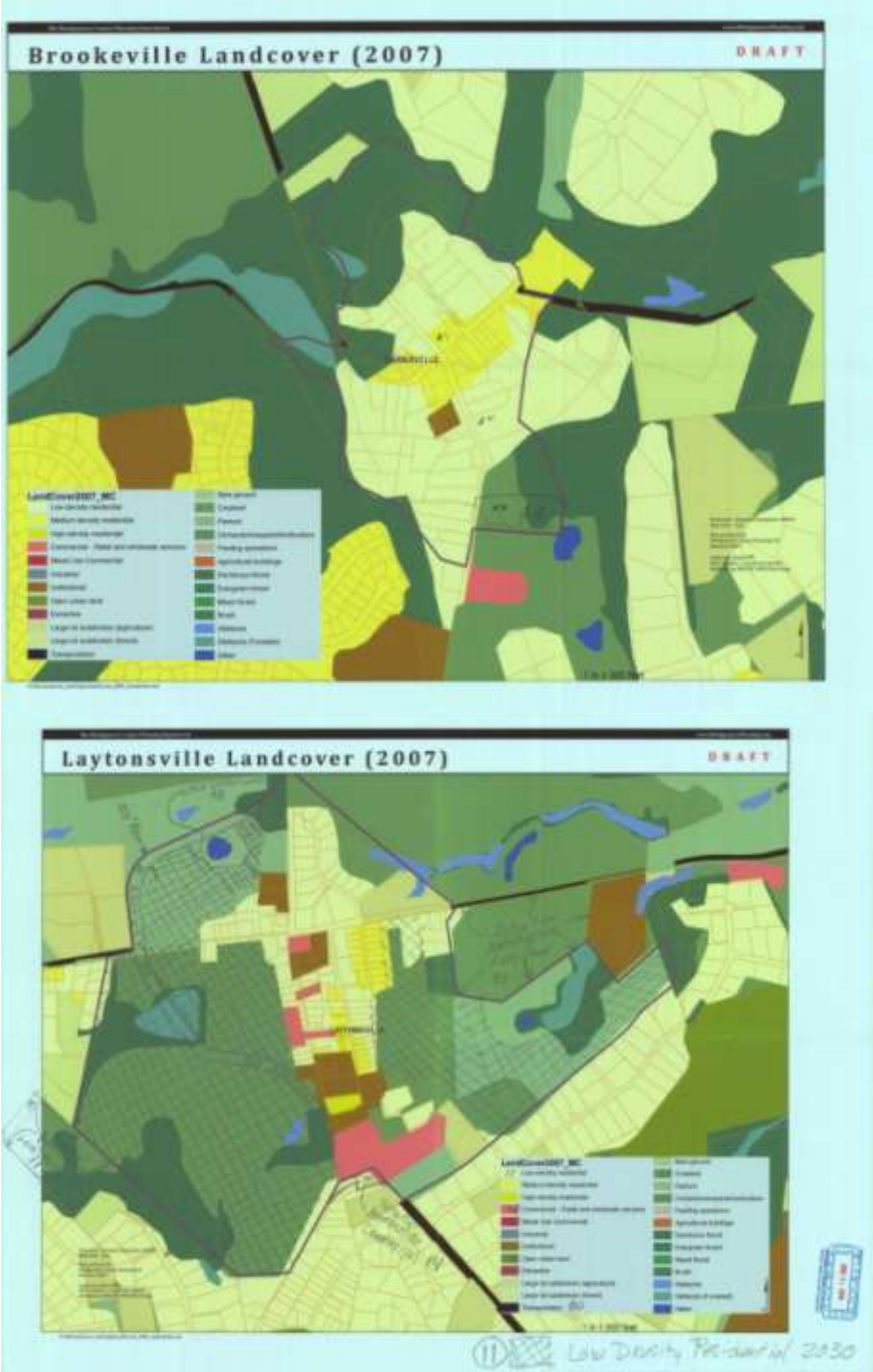
Appendix B – Location of Proposed Developments



15

Future Land Cover submittals from Municipalities



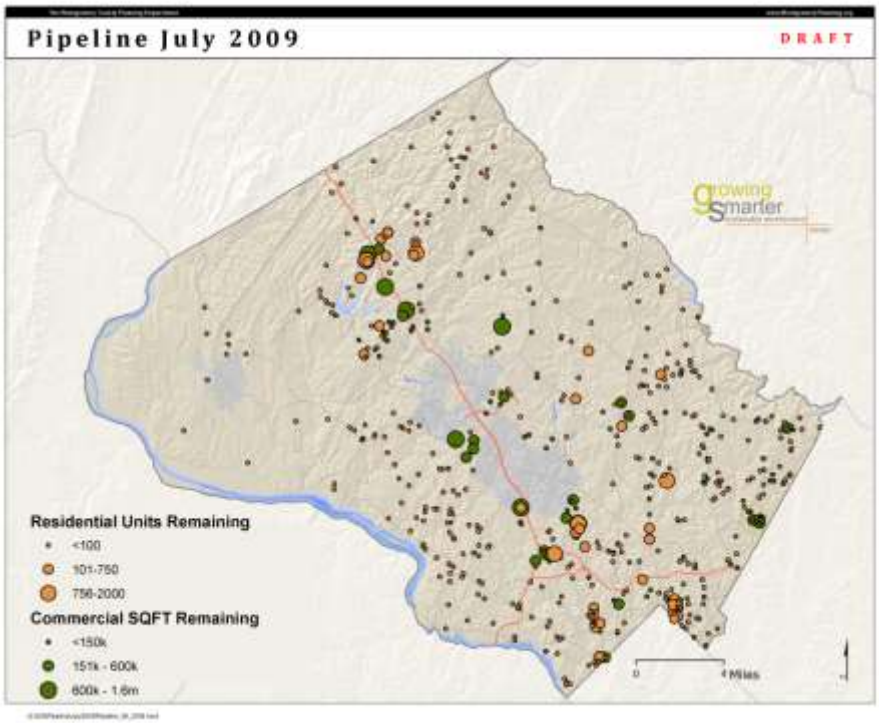


After the municipality input, MNCPPC transportation planning data for future road construction was incorporated. This was stamped into the existing landcover as Land Cover Code 80-Transportation. The selection from our 'Master Plan of Highways' GIS layer included:

LABEL_NAME
Brookeville Byp (Proposed)
Intercounty Connector (Proposed)
Midcounty Hwy (Proposed)
Montrose Pkw (Proposed)
New Cut Rd Extended
Observation Dr Extended
Snowden Farm Pkwy (Proposed)
Woodfield Rd Extended

Figure 1 - 2030 Transportation Additions

Land cover information from the County Housing and Commercial Development Pipeline was stamped in next. This included the Commercial and Housing Pipelines. This GIS layer includes the type and magnitude of the development, as well as the location.



Housing and Commercial Development Pipeline Information

Commercial Pipeline for Montgomery County, June 2009. This is actually a subset of the total pipeline where SQFT_REMAINING > 195000.

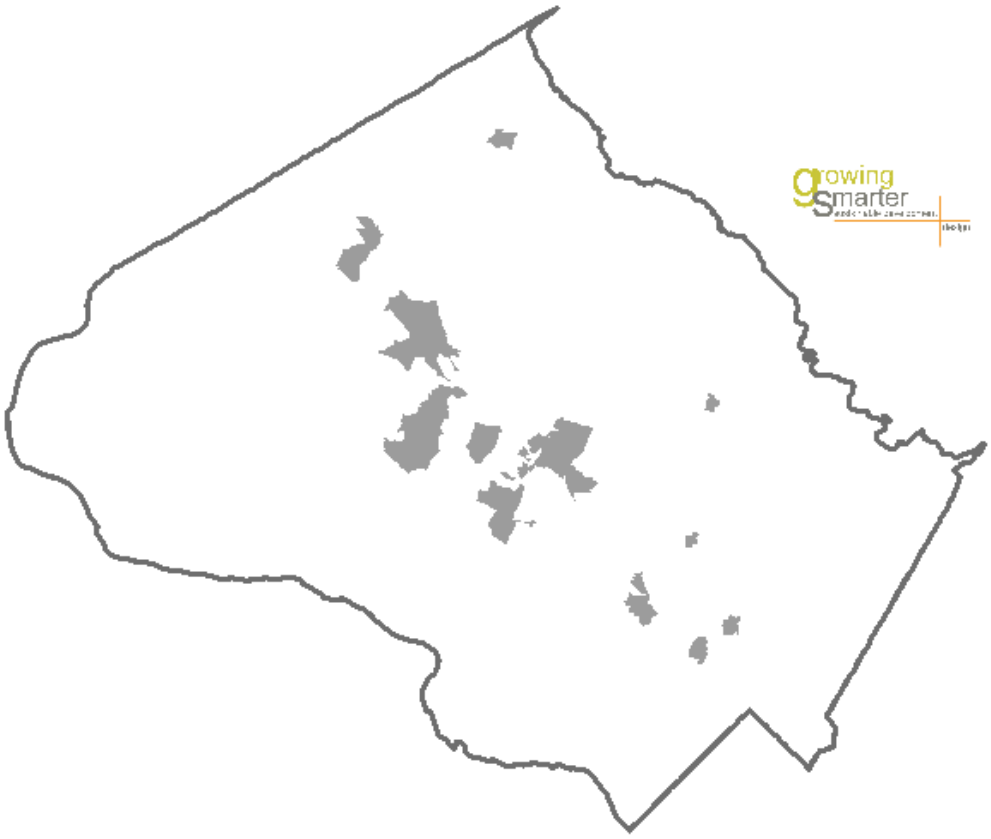
APPROVAL DATE	PROJECT_NAME	OFFICE	RETAIL	INDUSTRIAL	OTHER
7/29/2008	Wilgus East	313,900	0	0	0
4/10/2003	Friendship Place (Hecht's)	305,000	138,812	0	20,500
7/26/2007	City Place	299,307	0	0	0
7/19/2007	Montgomery County Medical Center	0	0	0	894,63
4/3/2008	Cabin Branch	762,000	120,000	0	0
9/30/2004	North Bethesda Town Center	1,148,000	202,037	0	80,000
6/30/2004	Cabin Branch	1,538,500	0	0	0
10/11/2007	Shady Grove Parcels 6 & 7	329,300	0	0	0
7/24/2008	Rock Spring Park	1,617,100	0	0	18,000
11/7/1996	Johns Hopkins Research Campus (Banks Farm)	0	0	1,800,000	0
10/21/1982	Kaiser Permanente	579,409	0	0	0
12/2/2004	Washington Christian Society	0	0	0	291,00
3/8/2001	Traville	1,221,201	99,299	0	12,000
11/16/1995	Churchill Far North Village	1,300,000	0	0	0
4/27/2006	White Flint Crossing	0	223,000	0	0
7/18/1991	West Farm (I-1) MCPS	260,028	0	0	0
7/15/2004	North Airpark Business Park	559,300	0	708,911	0
1/27/2005	Westfield Montgomery Mall Addition	0	500,000	0	0
7/28/2005	Burtonsville Shopping Center	10,000	200,000	0	0
7/3/2003	Fortune Parc	470,000	145,000	0	235,00
12/14/1989	Gateway 270 Corporate Park	1,000,000	0	0	0
12/18/1997	Seneca Meadows Corporate Center	1,577,000	83,000	0	0
6/18/2004	Spring Lake Park (Fishers Place)	444,915	5,540	288,105	0
2/25/1999	Friendship Commons	295,743	0	0	0
11/13/2008	Century XXI	235,000	0	0	0
7/27/2006	Lockheed Martin Conference Center	0	0	0	209,03
5/6/2004	Shady Grove Adventist Hospital	0	0	0	203,26

Housing Pipeline for Montgomery County, June 2009.

This is actually a subset of the pipeline where the number of total units is greater than 160 per project.

PROJECT_NAME	APPROVAL DATE	TOTAL REMAINING UNITS	Single Family Units	Townhome Units	Multi-Family Units
Silver Spring Gateway	3/17/2004	468	0	0	468
Woodmont East Phase II	3/6/2008	250	0	0	250
White Flint View	7/12/2007	183	0	0	183
Midtown Silver Spring	12/6/2007	317	0	0	317
Cabin Branch	4/3/2008	1,946	792	654	500
Indian Spring	9/21/2006	773	471	302	0
Bethesda Center North/ LCOR White Flint Metro	9/30/2004	1,350	0	0	1,350
1050 Ripley Street	7/3/2008	316	0	0	316
Cameron House	12/8/2005	246	0	0	246
8400 Wisconsin Avenue	12/22/2005	198	0	0	198
The Galaxy	7/28/2005	321	0	0	321
White Flint Crossing	4/27/2006	440	0	0	440
Lot 31&Lot31A Bethesda	9/20/2007	250	0	0	250
Downtown Silver Spring	9/17/1998	222	0	0	222
Bowie Mill Estates	1/11/2007	186	158	28	0
Fortune Parc (Wheel of Fortune)	7/3/2003	388	0	18	370
Clarksburg Town Center	9/28/1995	450	52	0	398
Linthicum West Property	3/31/2005	252	252	0	0
Clarksburg Village (Phase II)	2/1/2007	1,660	766	450	444
Rock Spring Center Avalon Bay	5/27/1999	860	0	0	860
Greenway Village (part)	2/7/2002	565	369	0	196
8021 Georgia Avenue	5/4/2006	210	0	0	210
1200 East/West Highway	6/30/2005	247	0	0	247
Greenbriar @ Norbrook Crossing	5/21/2009	262	23	95	144
Wheaton Forest	4/7/2005	180	0	0	180
EastSide	6/22/2006	265	0	75	190
National Park Seminary	4/7/2005	232	7	56	169
Clarksburg Village (Phase I)	12/23/2004	344	116	214	14
Friendship Commons (Geico)	2/25/1999	500	0	200	300
Monty	3/12/2009	200	0	0	200
Cabin Branch - Winchester Phase	6/19/2008	427	0	0	427
Gateway Commons	8/4/2005	198	27	5	166
Hoyles Mill Village Phase I & 2 (King Hargett Property)	12/9/1993	275	160	115	0
Air Rights Residential	1/4/2001	182	0	12	170

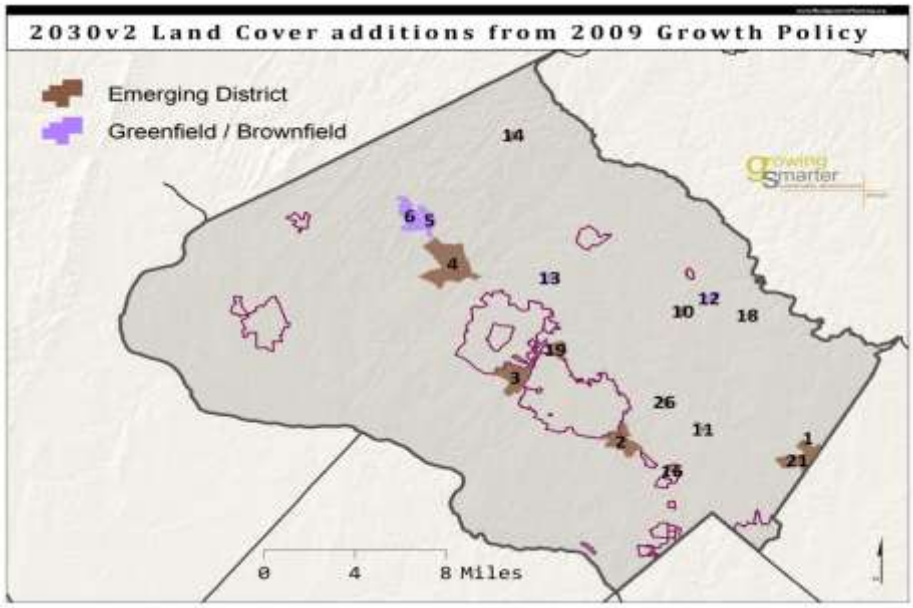
The last addition to complete the 2030 Scenario (Alternative) 1 land cover is the build out of proposed zoning for our current and ongoing master plans. The zoning for the master plans used comes from the plan itself or from in process SMA to the zoning layer.



4) 2030 Scenario (Alternative) 2 Land Cover

A second version of the 2030 Land cover was also established for the purposes of modeling a slightly different build out scenario. This version of the Land Cover was arrived at using the result of the 2030 alt1 as a starting point.

The Montgomery County Growth Policy Report identified a number of additional development opportunities. These were stamped into the version one layer and expressed as the buildout land cover for each area's existing zoning. The following graphic shows the areas used from that Growth Policy Report:



Name	Category	Number
Site 2 / Percontee	Emerging District	1
White Flint / Twinbrook	Emerging District	2
Gaithersburg West	Emerging District	3
Germantown	Emerging District	4
COMSAT	Greenfield/Brownfield	5
Cabin Branch	Greenfield/Brownfield	6
Olney Town Center	Emerging District	10
Glenmont	Emerging District	11
Mess Property	Greenfield/Brownfield	12
Webb Tract	Greenfield/Brownfield	13
Damascus Town Center	Emerging District	14
Kensington	Emerging District	16
Ashton	Emerging District	18
Shady Grove	Emerging District	19
Federal Research Center at White Oak	Emerging District	21
Aspen Hill	Emerging District	26

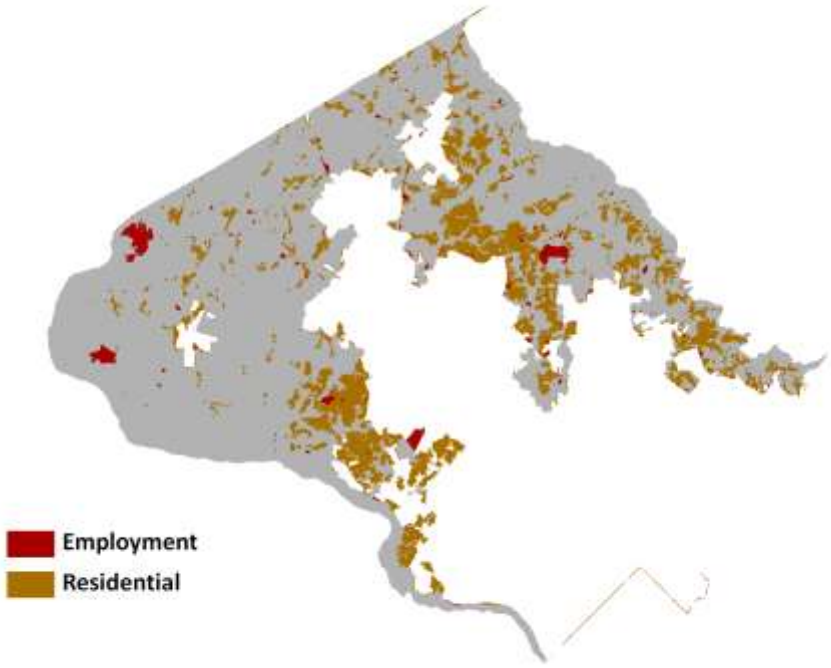
5) MWCOG Septic Analysis

One of the two septic analyses was performed using the present and future household and employment data found in the Round 7.2 MWCOG data supplied from the Research division of the Montgomery County Planning Department. This data is on a TAZ boundary level. This version of the septic analysis yields numbers of households and employees that fall outside the sewer system.

The 2005 Round7.2 forecast was intersected with the present sewer envelope. TAZ boundaries that were split by this boundary had their numbers estimated in proportion to each TAZ's [SQFT in Septic / Original SQFT]. This was then done again for the 2030 forecast and the 2030 sewer envelope.

6) Land Cover Septic Analysis

A similar septic analysis was established using the same sewer envelopes against the Land Cover layer for 2007 and 2030 as well. Specifically, we find the intersection of the land cover layer that is not covered by the sewer system, then total out the two classifications by the drainage basins.
This model yields acres of employment and residential that is not covered by the sewer system.


Employment
Residential

Nutrient Loading Analysis

For the required Nutrient Loading Analysis, the State Nutrient Loading Spreadsheet provided for Montgomery County was used with modifications. The State spreadsheet was created using 2002 land cover data. Subsequently, more current State land cover data (2007) became available. The County requested and received the updated 2007 data from the State and found it to be accurate. As a result, the 2007 land cover data was used in the nutrient analysis.

Using the 2007 land cover data in the State loading spreadsheet, however, involved some assumptions. In 2007, the State added two new land cover types: 70-Barren Land, and 192-Large Lot Subdivision (forest). In the nutrient analysis, 70-Barren Land was combined with 73-Bare Ground, and 192-Large Lot Subdivision (forest) was combined with 41-Deciduous Forest.

In addition, three additional land cover types not used by the State in 2007 were incorporated in the County's 2007 Land Cover Map because County-specific data were available. These additional land cover types include: 121-Mixed Use Residential, 149-Mixed Use Commercial, and 601 Wetlands (forested). Again, in using the State Nutrient Loading Spreadsheet, these were combined with land cover types already in the spreadsheet. This was necessary to avoid disrupting the operation of the spreadsheet, but also because the loading rates from these additional land cover types were not available. The loading rates from these new cover types would, however, be expected to be quite similar to the cover types with which they were combined. Accordingly, 121-Mixed Use Residential was combined with 13-High Density Residential, 149-Mixed Use Commercial was combined with 14-Commercial, and 601 Wetlands (forested) was combined with 60-Wetlands.

Land Cover Codes

The 2007 land cover codes (with additional codes), along with the land cover codes used in the State nutrient loading spreadsheet are listed below.

2007 Land Cover Codes (with 3 additional codes)	State Nutrient Loading Model Land Cover Codes
11-Low-density residential	11-Low Density Residential
12-Medium-density residential	12-Medium Density Residential
13-High-density residential	13-High Density Residential
14-Commercial	14-Commercial
15-Industrial	15-Industrial
16-Institutional	16-Institutional
17-Extractive	17-Extractive
18-Open urban land	18-Open Urban Land
21-Cropland	21-Cropland
22-Pasture	22-Pasture
23-Orchards/vineyards/horticulture	23-Orchards
24-Feeding operations+fisheries	24-Feeding Operations
25-Row and garden crops	25-Row and Garden Crops
41-Deciduous forest	41-Deciduous Forest
42-Evergreen forest	42-Evergreen Forest
43-Mixed forest	43-Mixed Forest

44-Brush
50-Water
60-Wetlands
70-Barren land
71-Beaches
72-Bare exposed rock
73-Bare ground
80-Transportation
129-Mixed Use Residential
149-Mixed Use Commercial
191-Large lot subdivision(AG)
192-Large lot subdivision (forest)
241-Feeding operations
242-Breeding and Training
601-Wetlands (Forested)

44-Brush
50-Water
60-Wetlands
71-Beaches
72-Bare Rock
73-Bare Ground
80-Transportation
191-Rural Residential
241-Feeding Operations
242-Agricultural Buildings

Land Cover Types and Descriptions

The following table presents a general description of the land codes and associated land cover types:

Land Code	Description
11	Low-density residential - Detached single-family/duplex dwelling units, yards and associated areas. Areas of more than 90 percent single-family/duplex dwelling units, with lot sizes of less than five acres but at least one-half acre (.2 dwelling units/acre to 2 dwelling units/acre).
12	Medium-density residential - Detached single-family/duplex, attached single-unit row housing, yards, and associated areas. Areas of more than 90 percent single-family/duplex units and attached single-unit row housing, with lot sizes of less than one-half acre but at least one-eighth acre (2 dwelling units/acre to 8 dwelling units/acre).
13	High-density residential - Attached single-unit row housing, garden apartments, high-rise apartments/condominiums, mobile home and trailer parks; areas of more than 90 percent high-density residential units, with more than 8 dwelling units per acre.
14	Commercial - Retail and wholesale services. Areas used primarily for the sale of products and services, including associated yards and parking areas.
15	Industrial - Manufacturing and industrial parks, including associated warehouses, storage yards, research laboratories, and parking areas.
16	Institutional - Elementary and secondary schools, middle schools, junior and senior high schools, public and private colleges and universities, military installations (built-up areas only, including buildings and storage, training, and similar areas), churches, medical and

health facilities, correctional facilities, and government offices and facilities that are clearly separable from the surrounding land cover.

17 Extractive - Surface mining operations, including sand and gravel pits, quarries, coal surface mines, and deep coal mines. Status of activity (active vs. abandoned) is not distinguished.

18 Open urban land - Urban areas whose use does not require structures, or urban areas where non-conforming uses characterized by open land have become isolated. Included are golf courses, parks, recreation areas (except areas associated with schools or other institutions), cemeteries, and entrapped agricultural and undeveloped land within urban areas.

129 Mixed Use Residential—Mixed use with an emphasis on residential uses. Areas mapped as Mixed Use Residential are taken from information provided by Gaithersburg and Rockville, County Area and Sector Master Plans, and information from the development pipeline.

149 Mixed Use Commercial—Mixed use with an emphasis on commercial uses. Areas mapped as Mixed Use Commercial are Central Business Districts (CBDs), and redevelopment areas in Town Centers.

191 Large lot subdivision (agriculture) - Residential subdivisions with lot sizes of less than 20 acres but at least 5 acres, with a dominant land cover of open fields or pasture.

192 Large lot subdivision (forest) - Residential subdivisions with lot sizes of less than 20 acres but at least 5 acres, with a dominant land cover of deciduous, evergreen or mixed forest.

Agriculture

21 Cropland - Field crops and forage crops.

22 Pasture - Land used for pasture, both permanent and rotated; grass.

23 Orchards/vineyards/horticulture - Areas of intensively managed commercial bush and tree crops, including areas used for fruit production, vineyards, sod and seed farms, nurseries, and green houses.

24 Feeding operations - Cattle feed lots, holding lots for animals, hog feeding lots, poultry houses, and commercial fishing areas (including oyster beds).

241 Feeding operations - Cattle feed lots, holding lots for animals, hog feeding lots, poultry houses.

242 Agricultural building breeding and training facilities, storage facilities, built-up areas associated with a farmstead, small farm ponds, commercial fishing areas.

25 Row and garden crops - Intensively managed truck and vegetable farms and associated areas.

Forest

41 Deciduous forest - Forested areas in which the trees characteristically lose their leaves at the end of the growing season. Included are such species as oak, hickory, aspen, sycamore, birch, yellow poplar, elm, maple, and cypress.

42 Evergreen forest - Forested areas in which the trees are characterized by persistent foliage throughout the year. Included are such species as white pine, pond pine, hemlock, southern white cedar, and red pine.

43 Mixed forest - Forested areas in which neither deciduous nor evergreen species dominate, but in which there is a combination of both types.

44 Brush - Areas which do not produce timber or other wood products but may have cut-over timber stands, abandoned agriculture fields, or pasture. These areas are characterized by vegetation types such as sumac, vines, rose, brambles, and tree seedlings.

Water

50 Water - Rivers, waterways, reservoirs, ponds, bays, estuaries, and ocean.

Wetlands

60 Wetlands - non-forested wetlands, including tidal flats, tidal and non-tidal marshes, and upland swamps and wet areas.

601 Wetlands – Forested

Barren Land

70 Barren land

71 Beaches - Extensive shoreline areas of sand and gravel accumulation, with no vegetative cover or other land use.

72 Bare exposed rock - Areas of bedrock exposure, scarps, and other natural accumulations of rock without vegetative cover.

73 Bare ground - Areas of exposed ground caused naturally, by construction, or by other cultural processes.

Transportation

80 Transportation – Road ROW for secondary roads, primary roads, arterial roads, highways, etc. (does not include tertiary roads, neighborhood roads, sidestreets, etc.).

In addition, County transportation data pertaining to major roads and highways were used to add to the Transportation Land Cover. This provides better data relating to imperviousness, since such roads are not accounted for in the other land cover types. The imperviousness associated with Transportation land cover was also modified from that used in the spreadsheet model. County GIS analysis using total pavement divided by total Right of Way (ROW) area yielded a higher imperviousness value of 0.50.

Coordination with Municipalities

The County's Nutrient Loading Analysis was coordinated with the municipalities that have planning and zoning authority:

- Rockville
- Gaithersburg
- Poolesville
- Washington Grove
- Laytonsville
- Brookeville
- Barnesville.

Each municipality reviewed and provided any needed modifications to the 2007 land cover data from the State, and provided 2030 land cover projections for use in the County 2030 loading scenarios.

Other Modifications Made to the State Nutrient Spreadsheet

The State nutrient spreadsheet for Montgomery County designated a portion of the County as being below the Fall Line. The Fall Line is a physiographic feature that separates the Piedmont physiographic province from the Upper Coastal Plain province. The State loading spreadsheet uses different nutrient loading factors (taken from the Chesapeake Bay Model) for the Piedmont and the Coastal Plain provinces.

Although generally referred to as a "line", the Fall Line is actually a narrow zone, and not a distinct line feature. In fact, the Fall Line is sometimes referred to and mapped by geologists, more accurately, as the Fall Zone. The Fall Zone, then, is a transitional zone between the Piedmont and Coastal Plain provinces, and has features that grade from Piedmont on the western side of the Zone, to more Upper Coastal Plain in nature on the eastern side. The Fall Zone occupies a very narrow portion of the easternmost part of the County, and because of it, the Piedmont physiography of the County does not substantially give way to Coastal Plain characteristics until the County border with Prince George's County, if not somewhat east of the border itself.

Because fully developed Coastal Plain characteristics do not exist in Montgomery County and the areal coverage of the Fall Zone is very small compared with the entire County, it makes more sense, especially with a generalized loading model, to make the simplifying assumption that the entire County is "above

the Fall Line." This modification was also made because close inspection of the State nutrient loading spreadsheet revealed that the area considered as "below the Fall Line" in the spreadsheet actually extended well into the Piedmont Province itself, to include all the watersheds that drain to the Fall Zone, rather than including only that portion of County watersheds below the "Fall Line" (i.e. the western side of the Fall Zone). This approach was evidently a simplifying assumption, made at a Chesapeake Bay scale for the purposes of the Bay Model. This approach doesn't make sense at the County scale, and would only serve to introduce much greater error into local calculations than any error introduced by considering the entire County as being within the Piedmont Province.

As a result, for the purposes of the nutrient loading analysis, the whole of Montgomery County is considered to be above the Fall Line.

2030 Land Cover Scenarios

2030 Land Cover Scenarios

As requested by the State, two alternative 2030 Land Cover Scenarios were prepared for input into the nutrient spreadsheet model. Because there is little vacant land left in the County, the two 2030 land cover scenarios were not very different.

Scenario 1
Scenario 1 was based on information contained in County area and sector master plans, municipality projections, and the development pipeline in conjunction with demographic and employment projections for 2030.

Scenario 2
Scenario 2 is similar to Scenario 1, but with additional areas of development and redevelopment as identified in the County's Growth Policy.

Septic Systems Data

Septic system data were projected for 2030 based on the methodology described in the Land Cover and Septic System Data Analysis section of this appendix. In order to use septic loadings for Existing and 2030 Land Cover that are consistent in methodology, the septic loadings for Existing Conditions were calculated using the same methodology as used for 2030.

Wastewater Treatment Plant (WWTP) Nutrient Discharge Data

Data received from WSSC pertaining to yearly existing and 2030 WSSC WWTP discharges were used in the spreadsheet analysis. In addition, data pertaining to private WWTPs that discharge to surface waters in the County were also added to the County total. It should be noted that most of the collected wastewater in Montgomery County is routed to the Blue Plains WWTP, which is located in the District of Columbia. Consequently, most of the processed sewage from Montgomery County is not discharged to Montgomery County waters. Nevertheless, the Montgomery County contribution to the Blue Plains facility was included in the nutrient spreadsheet analysis so the County's total nutrient contributions could be accounted for, regardless of discharge point.

The following table summarizes the WWTP nutrient discharge data that were used to calculate a total Nitrogen and Total Phosphorus contribution from public and private WWTPs, for use in the spreadsheet. Loads for the private WWTPs were taken from State permit data on Tributary Strategies allocations.

Wastewater Treatment Plants (WTTPs) Nutrient Discharges

WWTP	Operator	Existing TN lb/yr	Existing TP lb/yr	2030 TN lb/yr	2030 TP lb/yr
Damascus	WSSC	7,897	973	11,925	894
Hyattstown	WSSC	500	72	500	72
Seneca	WSSC	192,889	9,369	298,116	22,359
Blue Plains (M.C. only)	D.C. WASA	1,368,475	16,746	1,149,142	21,378
Mill Bottom (In Frederick Co., but treats sewage from Rattlewood Golf Course in M.C.)	Frederick County	27	7	27	7
Poolesville	Municipal	9,137	685	9,137	685
NIH	Private	3,377	563	337	563
Federal Regional Center	Private	11	2	11	2
Bretton Woods	Private	579	97	579	97
KPC Buddhist Temple	Private	49	8	49	8

2007 Landuse, Septic and Point-Source Load Data

Land Use/Cover	Patuxent AFL (acres) Nitrogen	Potomac AFL (acres) Nitrogen	TOTAL (acres) Nitrogen
LULC11 (Low Density Residential)	5,382	36,972	42,355
LULC12 (Medium Density Residentia	1,507	49,160	50,667
LULC13 (High Density Residential)	270	13,528	13,798
LULC14 (Commercial)	250	6,362	6,612
LULC15 (Industrial)	48	4,917	4,965
LULC16 (Institutional)	818	10,842	11,659
LULC17 (Extractive)	0	386	386
LULC18 (Open Urban Land)	468	9,280	9,748
LULC21 (Cropland)	9,244	43,151	52,395
LULC22 (Pasture)	2,182	12,172	14,354
LULC23 (Orchards)	97	158	254
LULC24 (Feeding Operations)	0	0	0
LULC25 (Row and Garden Crops)	0	0	0
LULC41 (Deciduous Forest)	13,397	59,441	72,838
LULC42 (Evergreen Forest)	343	2,654	2,997
LULC43 (Mixed Forest)	525	2,376	2,902
LULC44 (Brush)	184	1,846	2,031
LULC50 (Water)	614	6,829	7,442
LULC60 (Wetlands)	901	8,357	9,258
LULC71 (Beaches)	0	0	0
LULC72 (Bare Rock)	0	0	0
LULC73 (Bare Ground)	0	237	237
LULC80 (Transportation)	459	6,814	7,273
LULC191 (Rural Residential)	2,507	5,951	8,458
LULC241 (Feeding Operations)	8	214	222
LULC242 (Agricultural Buildings)	8	122	130
TOTAL	**39,213**	**281,769**	**320,981**

Septic Systems	Patuxent AFL (acres) Nitrogen	Potomac AFL (acres) Nitrogen	TOTAL (acres) Nitrogen
Residential Septic Systems - Number, Conventional	5,781	20,913	26,694
Residential Septic Systems - Number, Denitrifying			0
Non-Residential Septic Systems - Acres, Conventional	655	2,499	3,154
Non-Residential Septic Systems - Acres, Denitrifying			0

Point-Source Information	2007	2030
Total Nitrogen Load (lb/yr)	1,582,923	1,463,863
Total Phosphorus Load (lb/yr)	28,522	46,065

Scenario 1 Landuse, Septic and Point-Source Load Data

Land Use/Cover	Patuxent AFL		Potomac AFL		TOTAL	
	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen
LULC11 (Low Density Residential)	5,382	5,489	36,972	38,099	42,355	43,588
LULC12 (Medium Density Residentia	1,507	1,507	49,160	49,678	50,667	51,184
LULC13 (High Density Residential)	270	341	13,528	14,984	13,798	15,325
LULC14 (Commercial)	250	178	6,362	6,949	6,612	7,127
LULC15 (Industrial)	48	48	4,917	4,441	4,965	4,490
LULC16 (Institutional)	818	815	10,842	10,787	11,659	11,602
LULC17 (Extractive)	0	0	386	381	386	381
LULC18 (Open Urban Land)	468	468	9,280	8,980	9,748	9,448
LULC21 (Cropland)	9,244	9,185	43,151	41,538	52,395	50,723
LULC22 (Pasture)	2,182	2,138	12,172	11,602	14,354	13,740
LULC23 (Orchards)	97	97	158	158	254	254
LULC24 (Feeding Operations)	0	0	0	0	0	0
LULC25 (Row and Garden Crops)	0	0	0	0	0	0
LULC41 (Deciduous Forest)	13,397	13,384	59,441	61,528	72,838	74,912
LULC42 (Evergreen Forest)	343	343	2,654	2,652	2,997	2,996
LULC43 (Mixed Forest)	525	525	2,376	2,376	2,902	2,902
LULC44 (Brush)	184	183	1,846	1,678	2,031	1,861
LULC50 (Water)	614	614	6,829	6,830	7,442	7,444
LULC60 (Wetlands)	901	900	8,357	8,303	9,258	9,202
LULC71 (Beaches)	0	0	0	0	0	0
LULC72 (Bare Rock)	0	0	0	0	0	0
LULC73 (Bare Ground)	0	0	237	237	237	237
LULC80 (Transportation)	459	476	6,814	7,642	7,273	8,117
LULC191 (Rural Residential)	2,507	2,507	5,951	5,925	8,458	8,433
LULC241 (Feeding Operations)	8	8	214	214	222	222
LULC242 (Agricultural Buildings)	8	8	122	122	130	130
TOTAL	**39,213**	**39,213**	**281,769**	**285,104**	**320,981**	**324,317**

Septic Systems	Patuxent AFL		Potomac AFL		TOTAL	
	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen
Residential Septic Systems - Number, Conventional	5,781	6,829	20,913	24,183	26,694	31,012
Residential Septic Systems - Number, Denitrifying					0	0
Non-Residential Septic Systems - Acres, Conventional	655	655	2,499	2,416	3,154	3,071
Non-Residential Septic Systems - Acres, Denitrifying					0	0

Point-Source Information	2007	2030
Total Nitrogen Load (lb/yr)	1,582,923	1,463,863
Total Phosphorus Load (lb/yr)	28,522	46,065

Scenario 2 Landuse, Septic and Point-Source Load Data

Land Use/Cover	Patuxent AFL		Potomac AFL		TOTAL	
	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen
LULC11 (Low Density Residential)	5,382	5,672	36,972	38,099	42,355	43,771
LULC12 (Medium Density Residentia	1,507	1,507	49,160	49,678	50,667	51,184
LULC13 (High Density Residential)	270	343	13,528	14,995	13,798	15,338
LULC14 (Commercial)	250	178	6,362	6,949	6,612	7,127
LULC15 (Industrial)	48	48	4,917	4,540	4,965	4,588
LULC16 (Institutional)	818	815	10,842	10,884	11,659	11,700
LULC17 (Extractive)	0	0	386	381	386	381
LULC18 (Open Urban Land)	468	468	9,280	8,980	9,748	9,448
LULC21 (Cropland)	9,244	9,125	43,151	41,538	52,395	50,663
LULC22 (Pasture)	2,182	2,136	12,172	11,512	14,354	13,648
LULC23 (Orchards)	97	97	158	158	254	254
LULC24 (Feeding Operations)	0	0	0	0	0	0
LULC25 (Row and Garden Crops)	0	0	0	0	0	0
LULC41 (Deciduous Forest)	13,397	13,384	59,441	61,411	72,838	74,795
LULC42 (Evergreen Forest)	343	343	2,654	2,652	2,997	2,996
LULC43 (Mixed Forest)	525	525	2,376	2,376	2,902	2,902
LULC44 (Brush)	184	183	1,846	1,678	2,031	1,861
LULC50 (Water)	614	614	6,829	6,830	7,442	7,444
LULC60 (Wetlands)	901	900	8,357	8,303	9,258	9,202
LULC71 (Beaches)	0	0	0	0	0	0
LULC72 (Bare Rock)	0	0	0	0	0	0
LULC73 (Bare Ground)	0	0	237	237	237	237
LULC80 (Transportation)	459	476	6,814	7,642	7,273	8,117
LULC191 (Rural Residential)	2,507	2,507	5,951	5,925	8,458	8,433
LULC241 (Feeding Operations)	8	8	214	214	222	222
LULC242 (Agricultural Buildings)	8	8	122	122	130	130
TOTAL	**39,213**	**39,336**	**281,769**	**285,104**	**320,981**	**324,440**

Septic Systems	Patuxent AFL		Potomac AFL		TOTAL	
	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen	2007 (acres) Nitrogen	2030 (acres) Nitrogen
Residential Septic Systems - Number, Conventional	5,781	6,829	20,913	24,183	26,694	31,012
Residential Septic Systems - Number, Denitrifying					0	0
Non-Residential Septic Systems - Acres, Conventional	655	655	2,499	2,416	3,154	3,071
Non-Residential Septic Systems - Acres, Denitrifying					0	0

Point-Source Information	2007	2030
Total Nitrogen Load (lb/yr)	1,582,923	1,463,863
Total Phosphorus Load (lb/yr)	28,522	46,065

Nutrient Analysis Results

The following charts and tables summarize the results of the nutrient analysis.

Nutrient Loading Analysis Spreadsheet - Summary Results

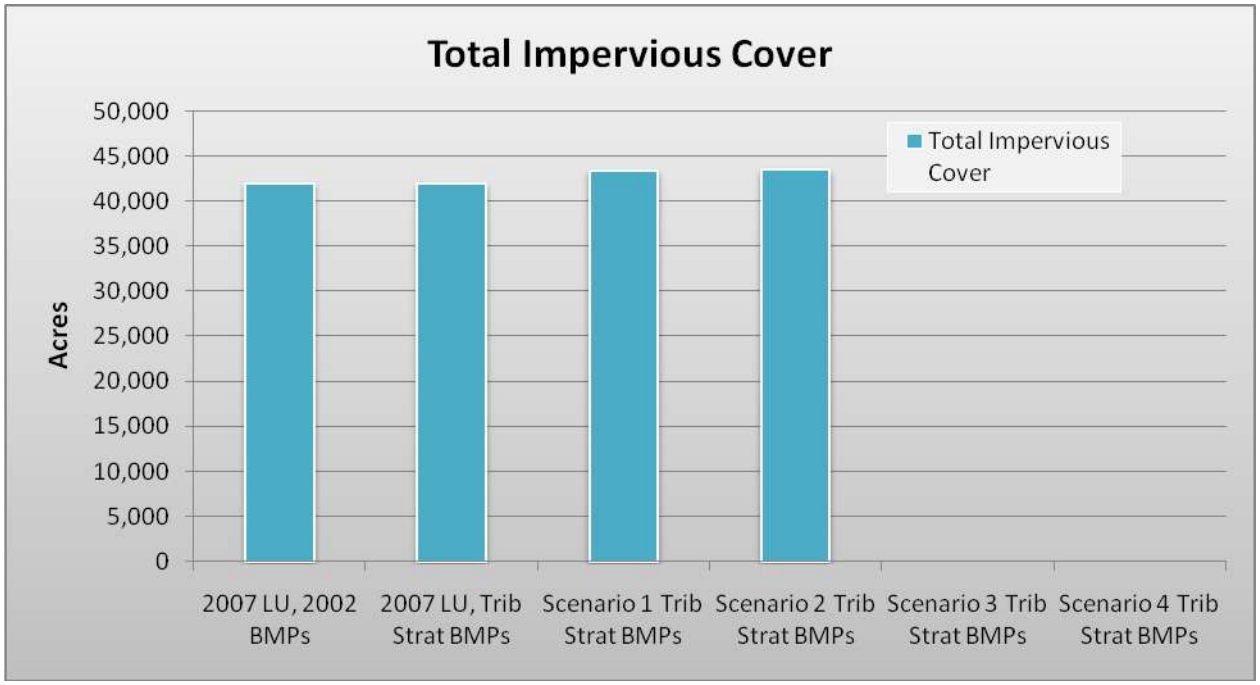
Land Use and Septic Systems				
	2007 LU, 2002 BMPs (Acres)	2007 LU, Trib Strat BMPs (Acres)	Scenario 1 Trib Strat BMPs (Acres)	Scenario 2 Trib Strat BMPs (Acres)
Development	134,127	134,127	138,264	138,558
Agriculture	67,356	67,356	65,068	64,917
Forest	90,025	90,025	91,873	91,756
Water	7,442	7,442	7,444	7,444
Other	22,031	22,031	21,668	21,766
Total Area	**320,981**	**320,981**	**324,317**	**324,440**
Residential Septic (EDUs)	26,694	26,694	31,012	31,012
Non-Residential Septic (EDUs)	7,885	7,885	7,677	7,677

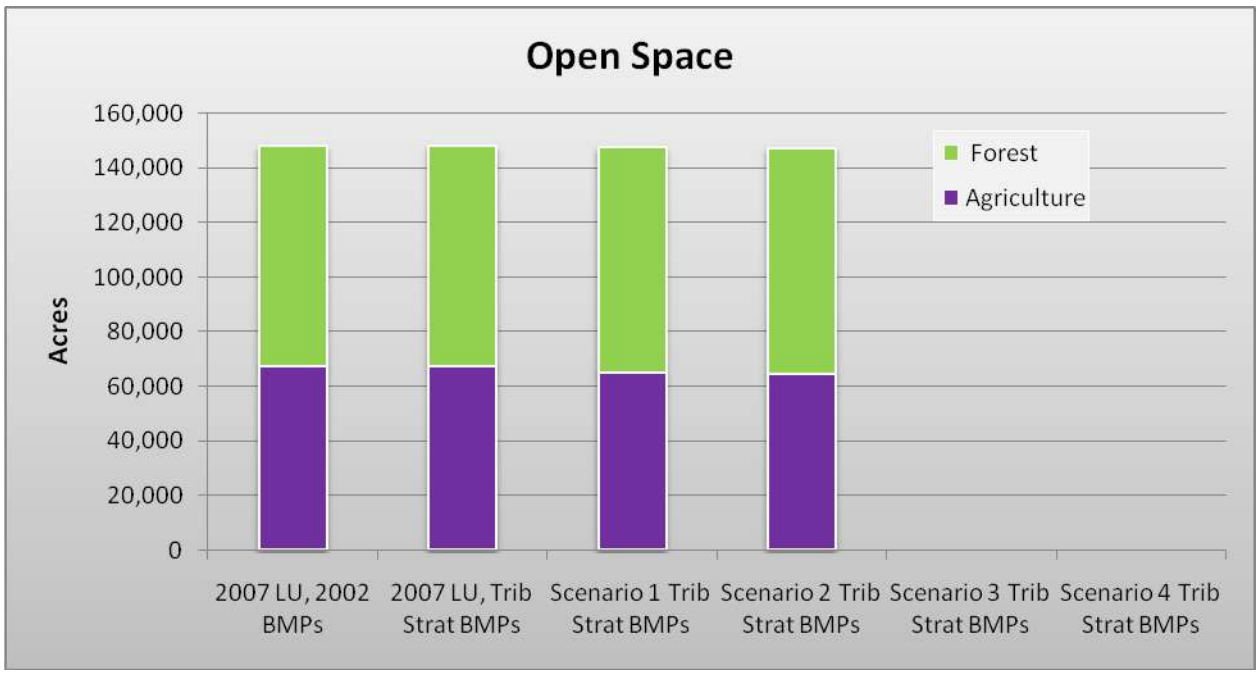
Total Nitrogen Loading				
	2007 LU, 2002 BMPs (Lbs/Yr)	2007 LU, Trib Strat BMPs (Lbs/Yr)	Scenario 1 Trib Strat BMPs (Lbs/Yr)	Scenario 2 Trib Strat BMPs (Lbs/Yr)
Development Stormwater Load	1,321,564	955,337	984,220	986,346
Agriculture Non-Point Source	1,202,109	817,490	790,476	788,616
Forest Non-Point Source	189,623	176,079	179,803	179,568
Other Terrestrial Non-Point Source	220,192	159,284	156,622	157,307
Total Terrestrial Load	**2,933,488**	**2,108,190**	**2,111,121**	**2,111,837**
Residential Septic (EDUs)	269,825	269,825	299,332	299,332
Non-Residential Septic (EDUs)	28,438	28,438	26,440	26,440
Total Septic Load	**298,263**	**298,263**	**325,772**	**325,772**
Total Non-Point Source Nitrogen Load	**3,231,752**	**2,406,454**	**2,436,892**	**2,437,609**
Total WWTP Load	**1,582,923**	**1,582,923**	**1,463,863**	**1,463,863**
Total Nitrogen Load (NPS+PS)	**4,814,675**	**3,989,377**	**3,900,755**	**3,901,472**

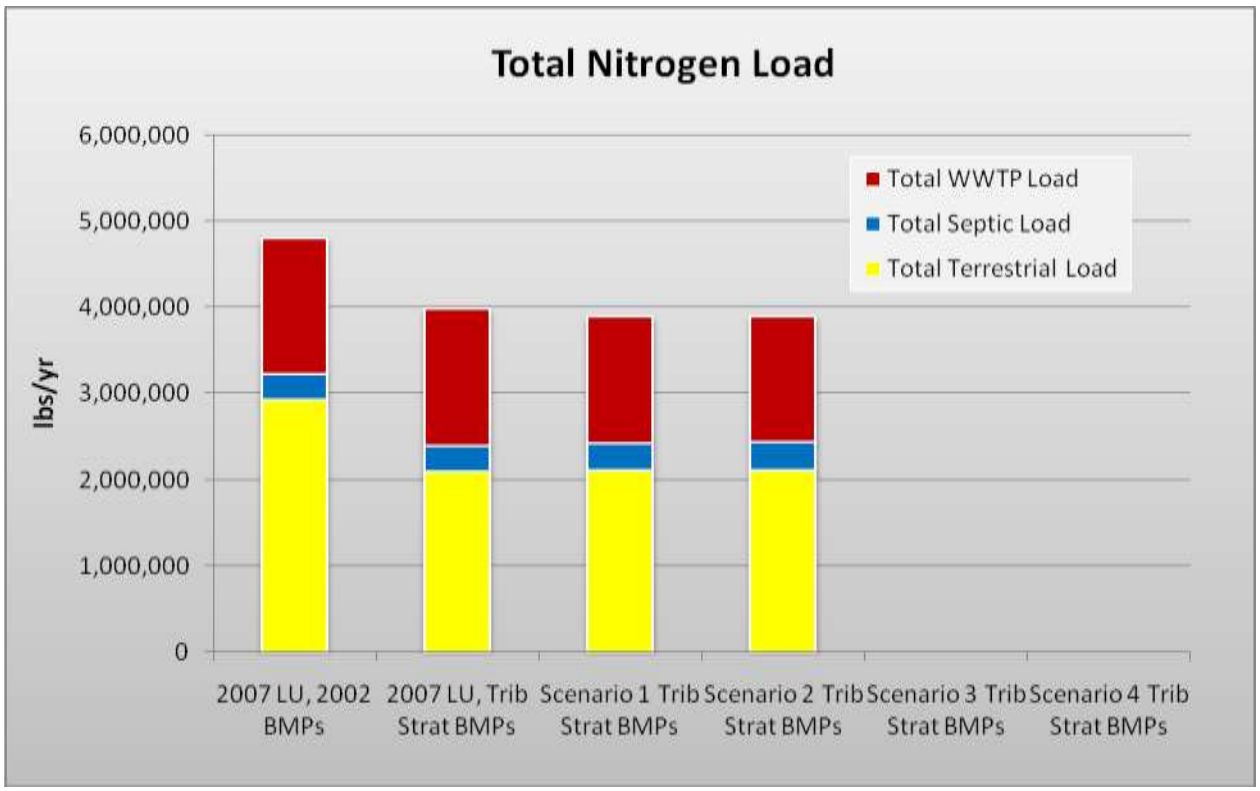
Total Phosphorus Loading				
	2007 LU, 2002 BMPs (Lbs/Yr)	2007 LU, Trib Strat BMPs (Lbs/Yr)	Scenario 1 Trib Strat BMPs (Lbs/Yr)	Scenario 2 Trib Strat BMPs (Lbs/Yr)
Development Stormwater Load	125,705	83,960	86,445	86,625
Agriculture Non-Point Source	85,047	81,498	78,703	78,520
Forest Non-Point Source	2,235	1,943	1,984	1,982
Other Terrestrial Non-Point Source	21,424	14,291	14,047	14,106
Total Terrestrial Load	234,412	181,693	181,179	181,233
Total WWTP Load	28,522	28,522	46,065	46,065
Total Phosphorus Load (NPS+PS)	262,934	210,215	227,244	227,298

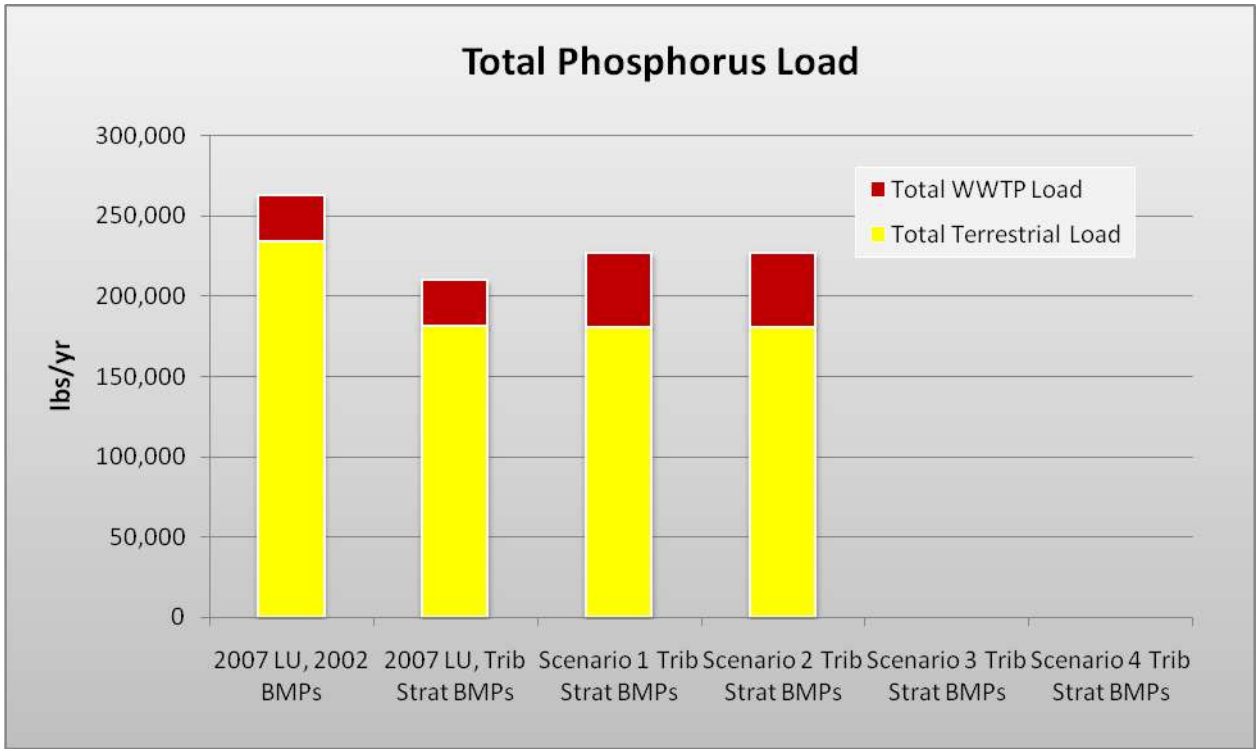
Impervious Cover and Open Space				
	2007 LU, 2002 BMPs	2007 LU, Trib Strat BMPs	Scenario 1 Trib Strat BMPs	Scenario 2 Trib Strat BMPs
Total Impervious Cover	42,019	42,019	43,456	43,572
Open Space - Agriculture	67,356	67,356	65,068	64,917
Open Space - Forest	80,768	80,768	82,670	82,553

Additional Summary Output data Charts (See Plan text for other summary output charts.)









Additional Output Data Summary Charts may be found in the Water Resources Plan text.

Appendix 9

Interagency Coordination and Public Outreach

Water Resources Master Plan Interagency Coordination

The Plan's proposed policies and recommendations were drafted collaboratively with stakeholders and responsible agencies, including the County's departments of Environmental Protection (DEP), Permitting Services (DPS), Transportation (DOT), and Economic Development (DED). The Montgomery Soil Conservation District (MSCD), the Washington Suburban Sanitary Commission (WSSC), and the Parks Department also participated in this process.

Each agency has its own piece of the water resources picture, and brought its own perspective, responsibilities, and needs to crafting these draft policies and recommendations. Each agency, through more detailed existing plans and programs, such as the County's General Plan, master plans, Growth Policy, MS-4 Permit, and the Water and Sewer Plan, will provide the more detailed analysis and implementation efforts needed to achieve the goals of this Water Resources Plan.

Public Outreach

The Plan's recommendations were also developed through public outreach on the purpose, scope, goals, schedule, and strategies. Planning staff met with various stakeholder groups to present policies and recommendations for discussion and comment.

These groups included:

- The Patuxent River Commission
- The Middle Potomac Tributary Team
- The Patuxent Reservoirs Technical Advisory Committee
- Montgomery County Water Quality Advisory Board
- Maryland-National Capital Building Industry Association (MNCBIA)
- Anacostia Watershed Citizens Advisory Committee
- Agriculture Advisory Committee
- Forest Advisory Committee
- MC GREENetwork (for environmental educators in the County)
- Chesapeake Bay Program Stormwater Workgroup
- Stormwater Partners Network (with representatives from):
    - Audubon Natualist Society
    - Patuxent Riverkeeper
    - Little Falls Watershed Alliance
    - Clean Water Action
    - Anacostia Watershed Society
    - Neighbors of the Northwest Branch
    - Potomac Conservancy
    - Friends of the Earth
    - Friends of Rock Creek's Environment (FORCE)
    - Potomac Riverkeeper
    - Earth Conservation Corps
    - Montgomery County Civic Federation
    - Friends of Sligo Creek
    - Natural Resources Defense Council (NRDC)
    - Save the Bay

Water Resources Functional Plan

Appendix

November 2009

The Maryland-National Capital Park and Planning Commission
MontgomeryPlanning.org

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