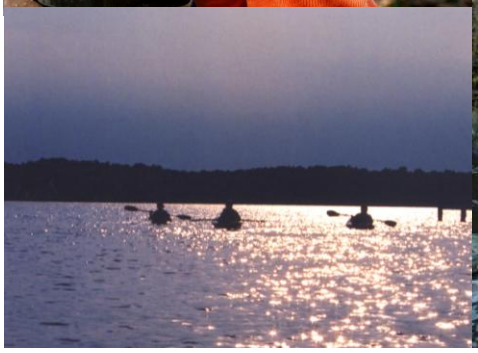
APPENDIX

water resources

MAY 2010

FUNCTIONAL PLAN



Appendix 3

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

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

MontgomeryPlanning.org

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.

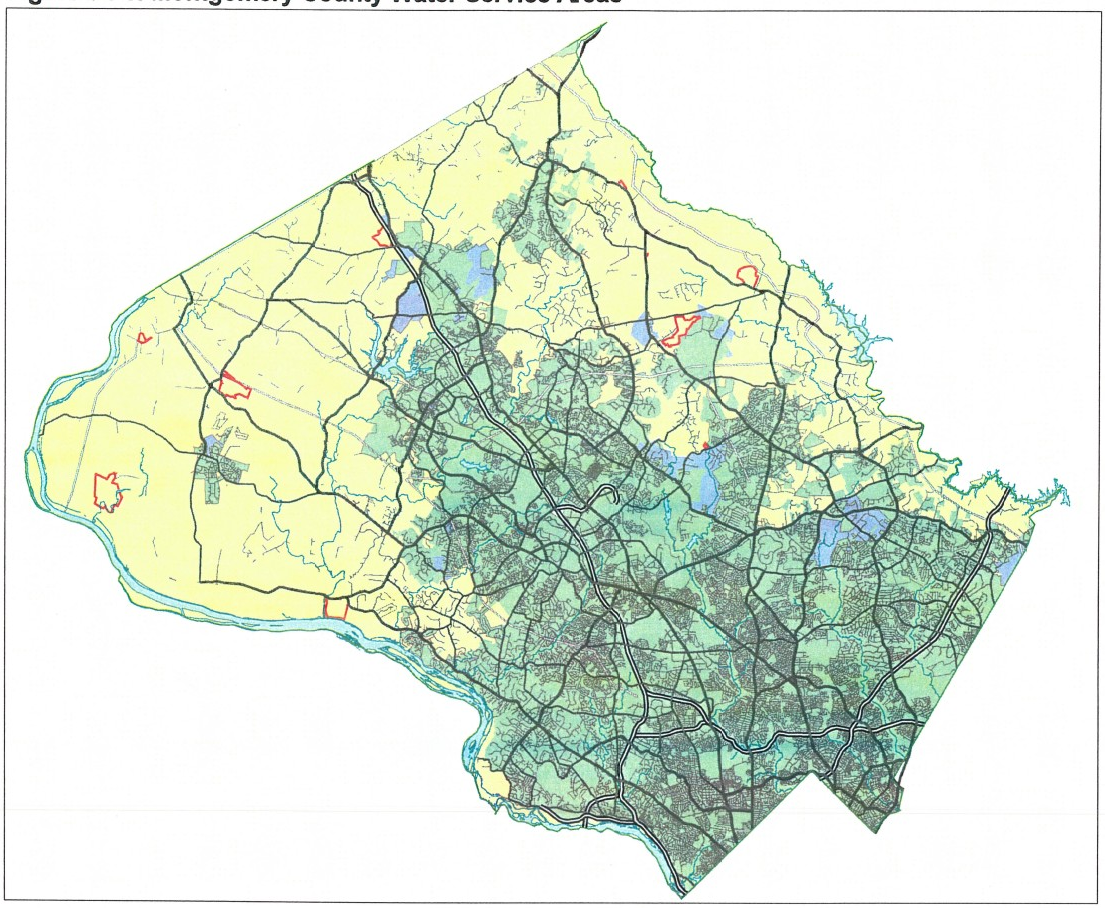
iv. **Total Water Management Study** In 1999, WSSC conducted a Total Water Management Study, with the objectives of identifying and developing strategies to conserve water resources, extending the life of available capacity in existing capital facilities, and reducing future capital and operating costs. 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.

Figure 3-F1: Montgomery County Water Service Areas



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MAP LEGEND
Major Roads
County Roads
State Roads and Highways
US & Interstate Highways
Major Streams - Rivers - Lakes - Reservoirs
General Water Service Areas
Approved Community Water Service Areas (W-1 & W-3)
Proposed Community Water Service Areas (W-4 & W-5)
Private, On-Site Water Service Areas (W-6)
Approved for Multi-Use Water Supply Systems (W-6)

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

Department of Environmental Protection
Montgomery County Maryland

Watershed Management Division
6/23/03 -- GIS Project File: o:\wwteam\cwsp\2002update\chapt3\3-f1=gnrlwatercats.apr

Figure 3-F2: Sanitary Districts Within Montgomery County

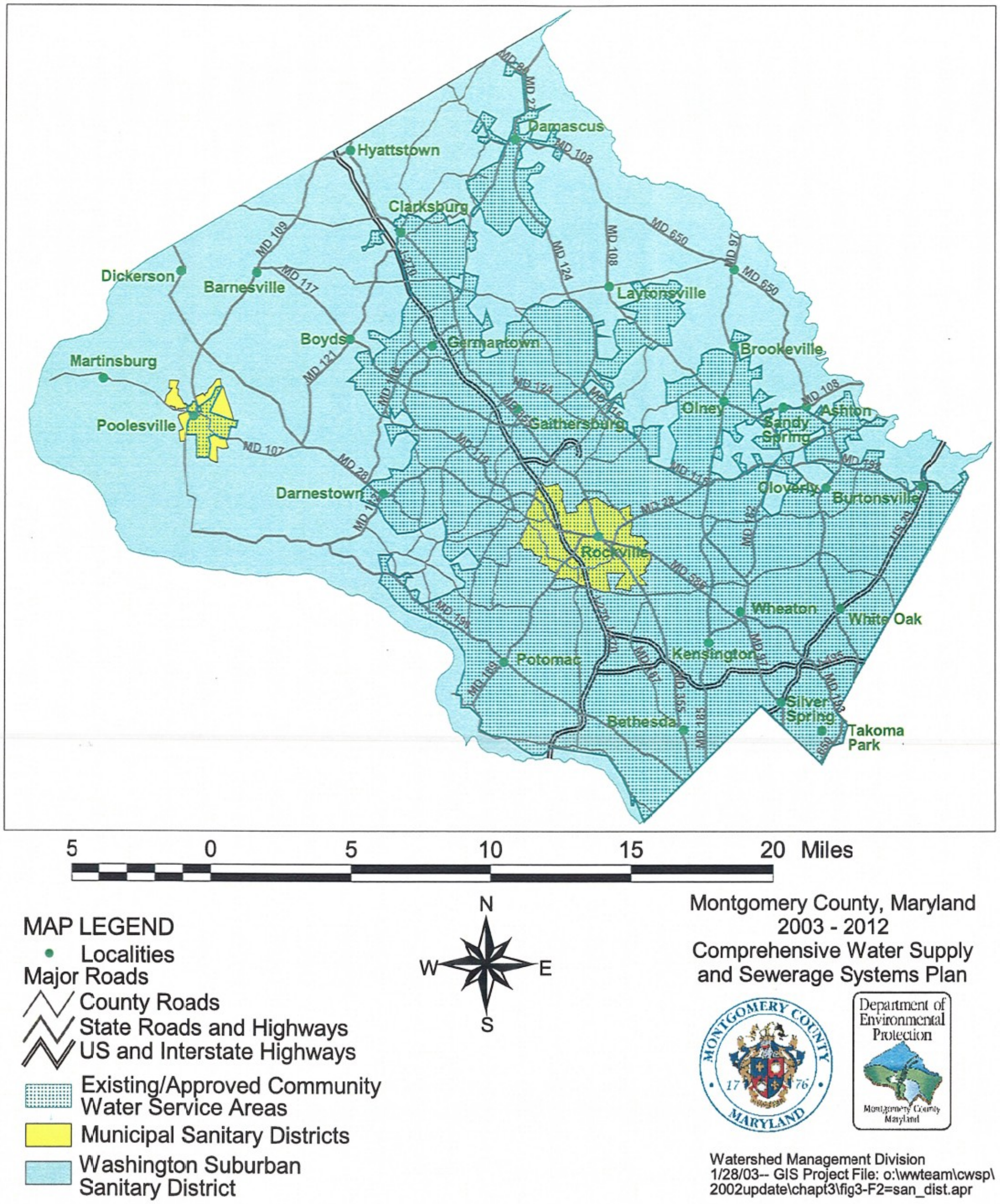


Figure 3-F3: WSSC Surface Water Supply Sources

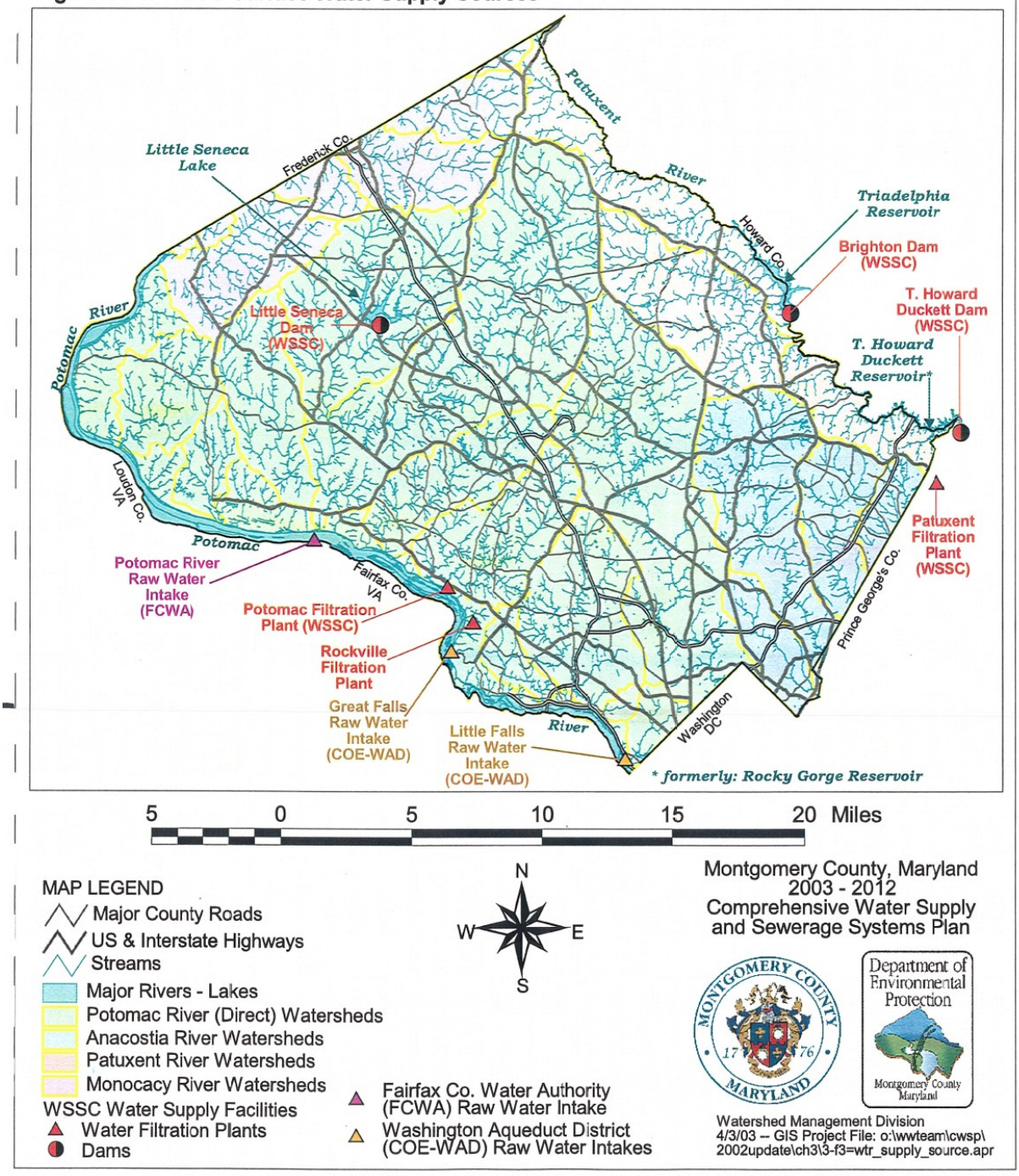
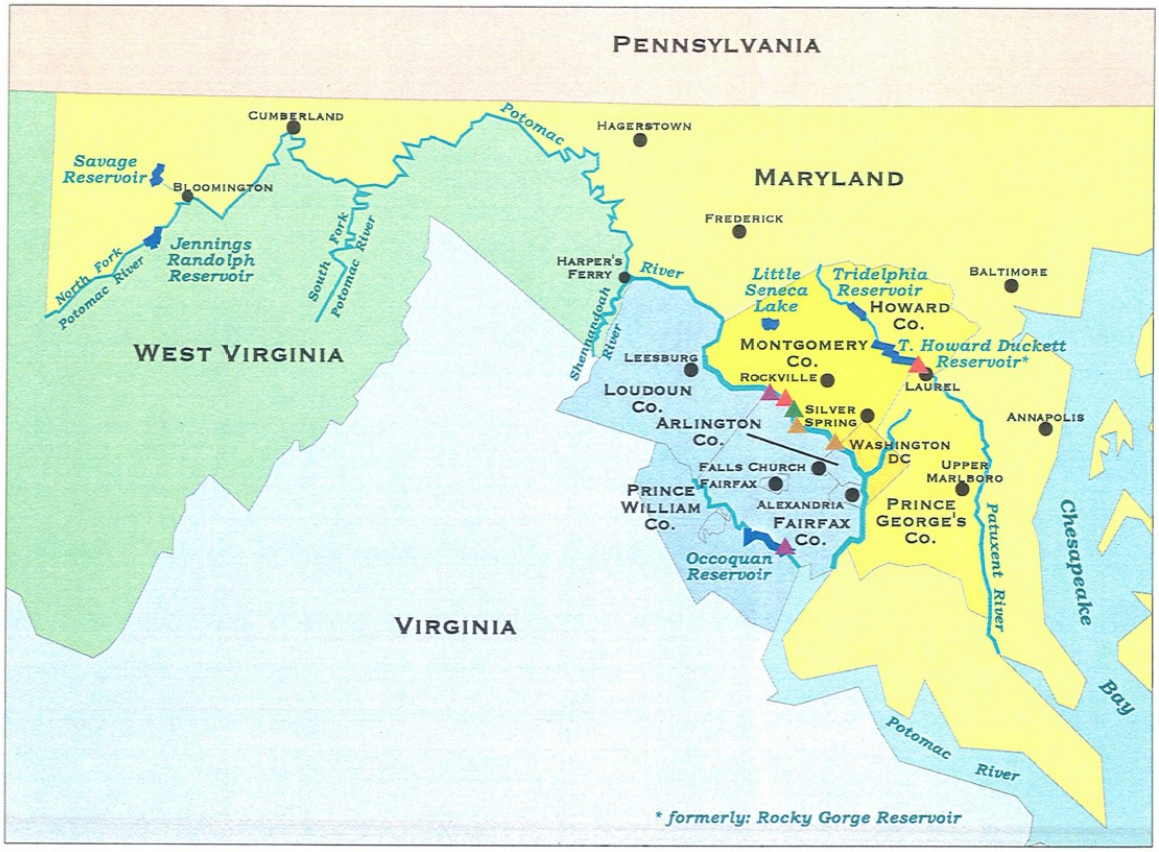


Table 3-T1: Inventory of Existing Impounded Supplies in Montgomery County			
Source	**Potomac River**	**Patuxent River**	
Owner **Name**	Public: [A] **Little Seneca Lake** (Little Seneca Dam)	WSSC: **Triadelphia Reservoir** (Brighton Dam)	WSSC: **T. Howard Duckett Reservoir** [D] (T. Howard Duckett Dam)
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



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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

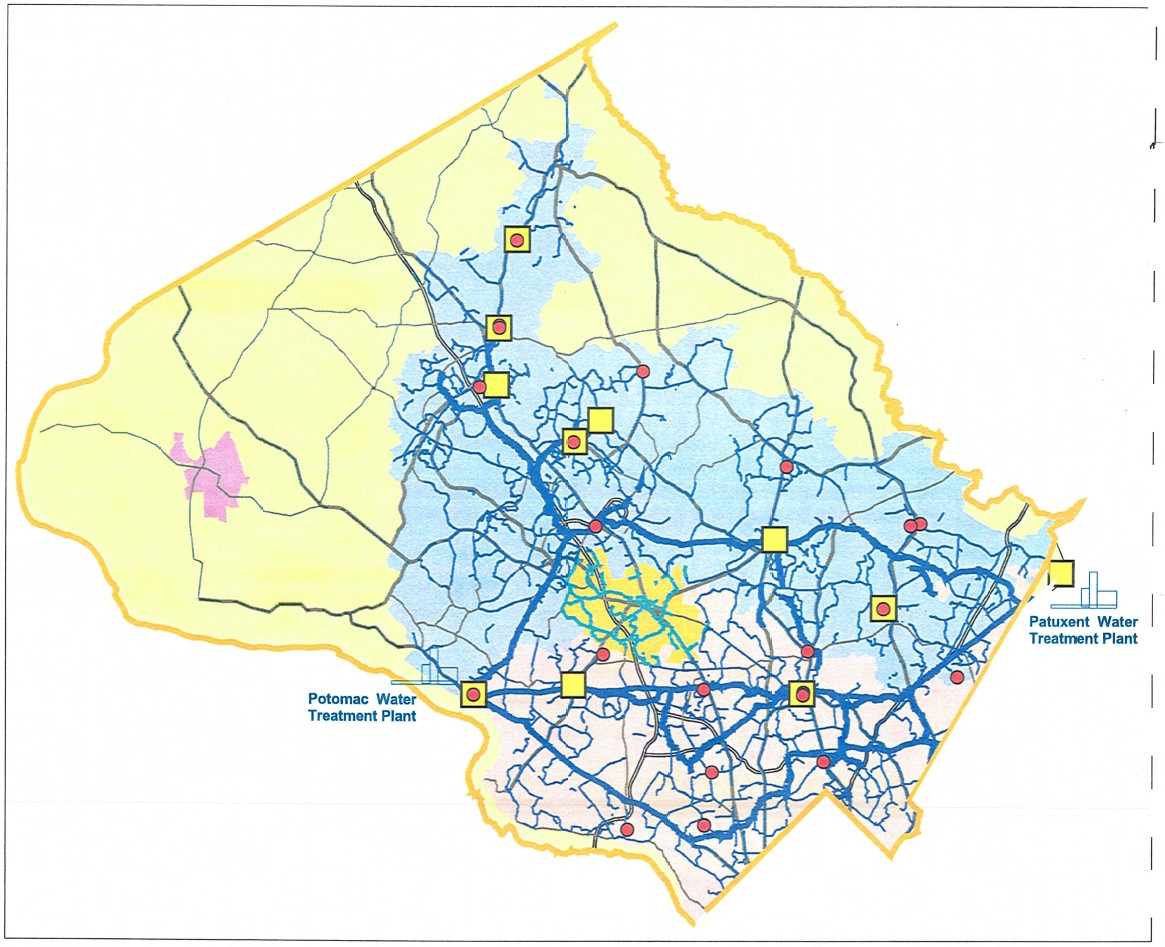
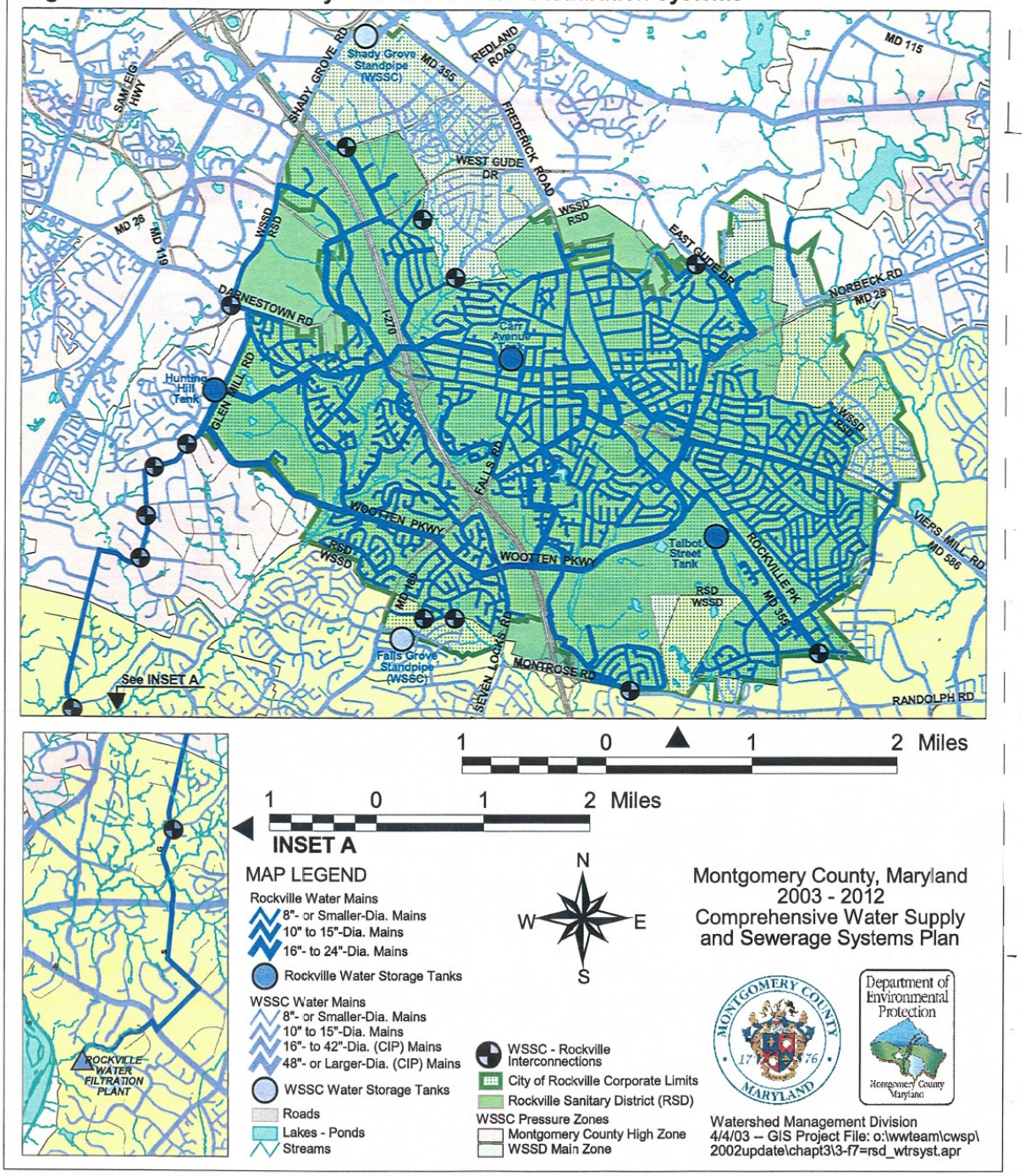


Table 3-T8: WSSC Historic Water Production							
Calendar Year	Average Production (mgd)	Maximum Day Production (mgd)	Maximum to Average Ratio	Calendar Year	Average Production (mgd)	Maximum Day Production (mgd)	Maximum to Average Ratio
1980	143	193	1.35	1991	171	256	1.5
1981	140	187	1.33	1992	162	220	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

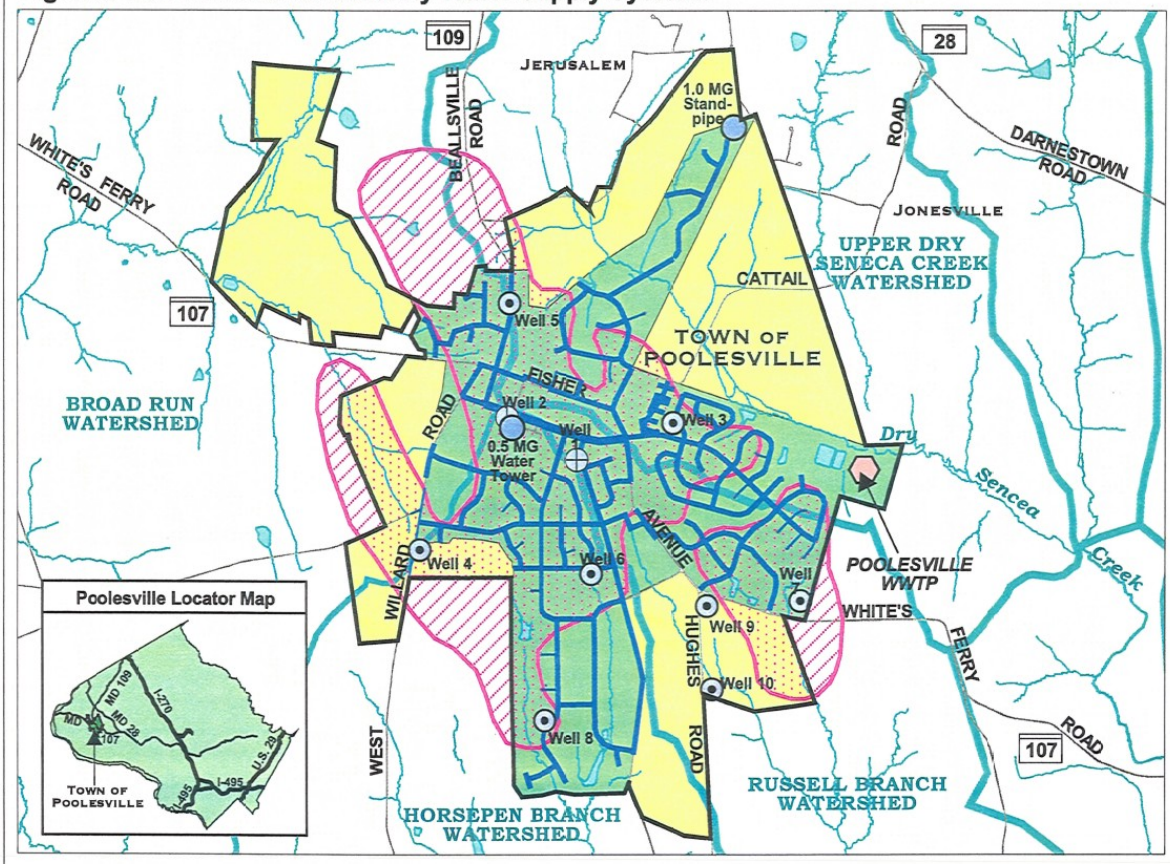


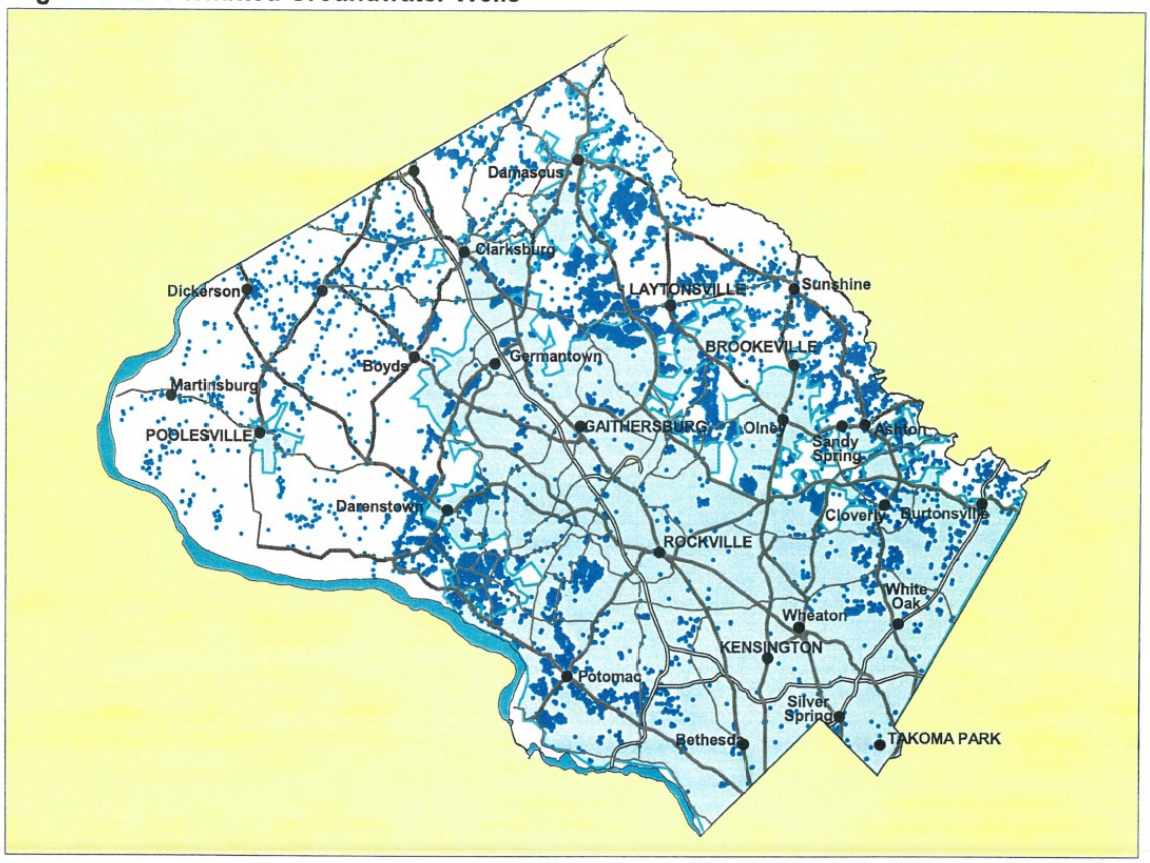
Table 3-T18: Projected Water Supply Demands and Planned Capacity --Town of Poolesville						
Design Year	Population			GPCD (gallons)	CAPACITY (MGD)	
	Total	Served	Unserved		Average	Peak Monthly Demand
2000	5,151	5,050	50	94	0.480	0.720
2005	5,500	5,450	50	100	0.550	0.770
2010	5,500	5,450	50	100	0.550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

MAP LEGEND
- Permitted Groundwater Wells*
- Communities

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

General Community Water Service Envelope

N
W E
S

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

Department of Environmental Protection
Montgomery County Maryland

* As verified by DPS well permit records.
Source: Mont.Co. Groundwater Protection Strategy (DEP)

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

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

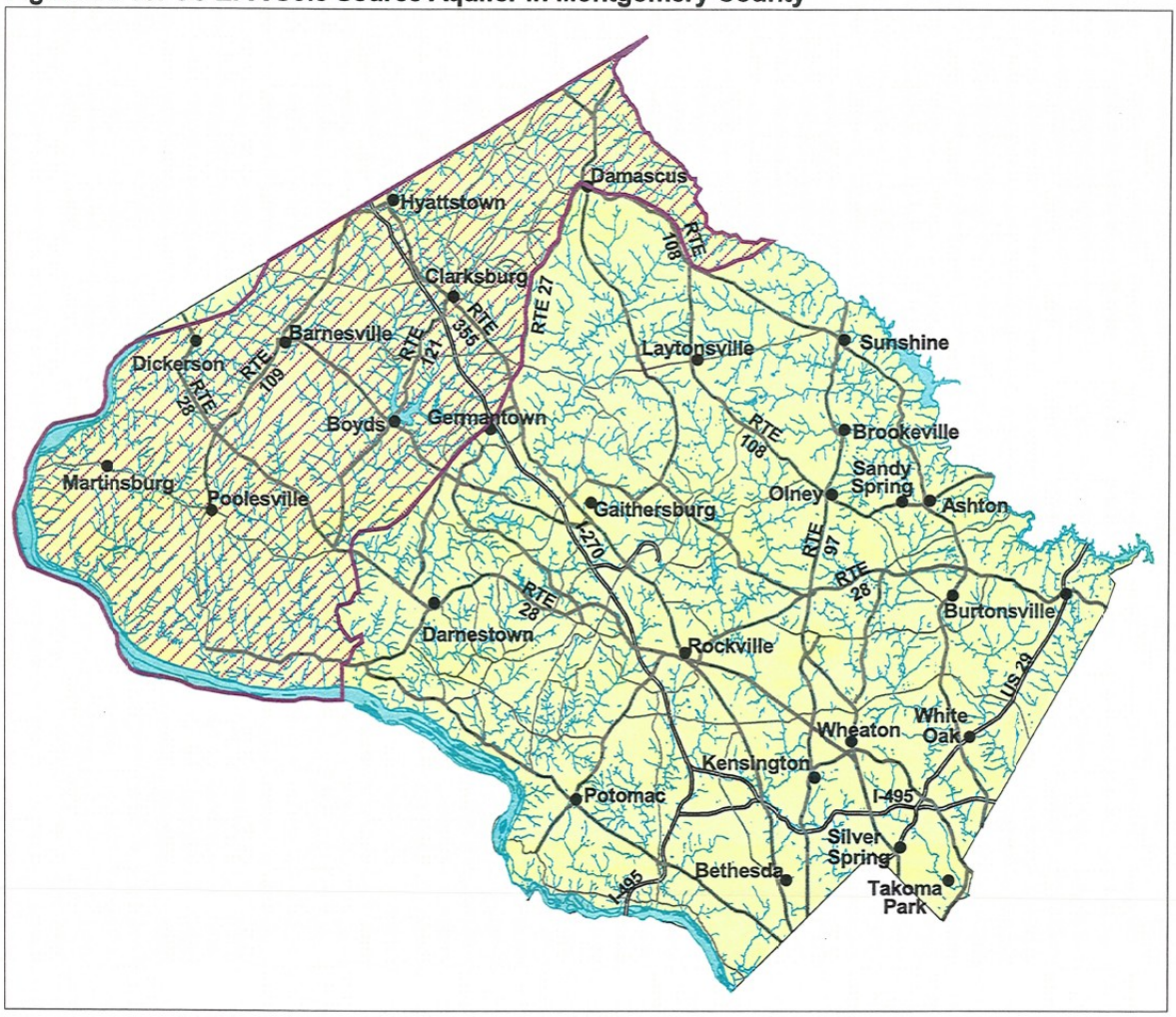
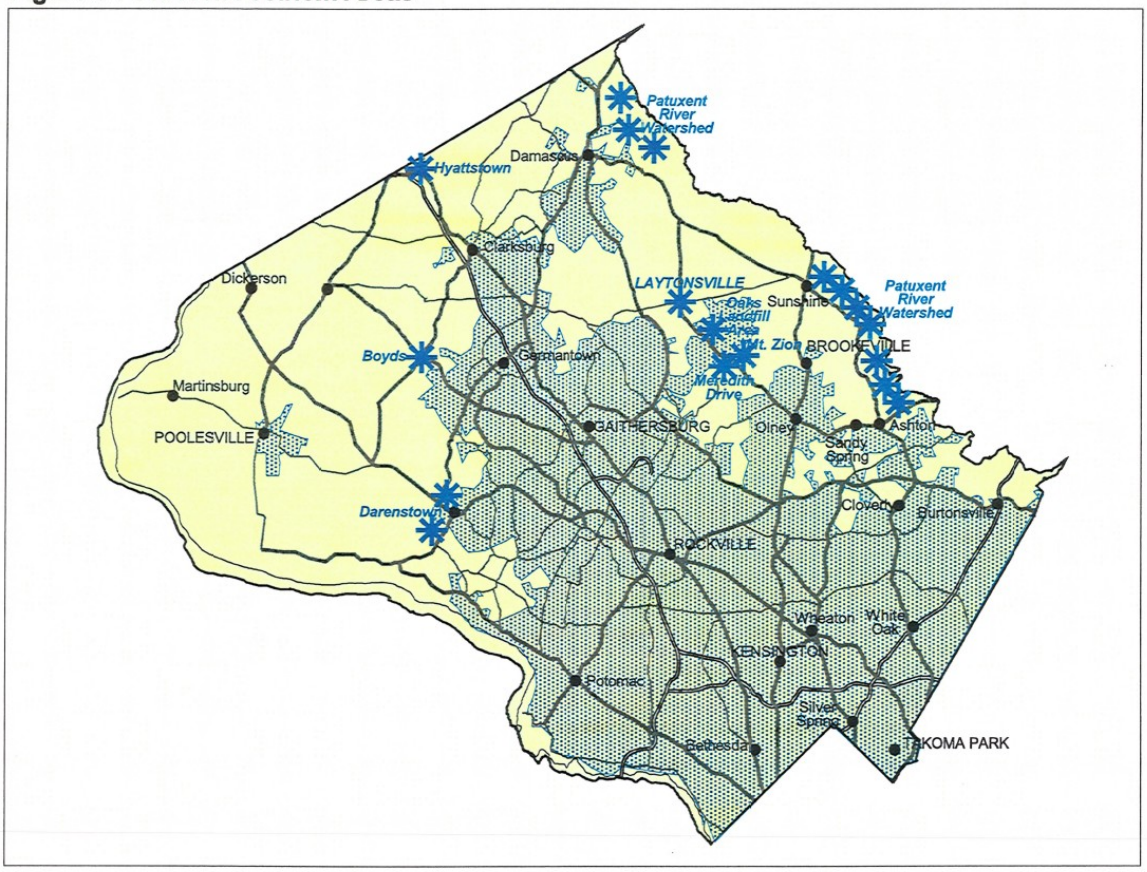


Figure 3-F11: Well Problem Areas



5 0 5 10 15 20 25 Miles

N
W E
S

MAP LEGEND

- ✱ ***Well Problem Areas****
- • INCORPORATED COMMUNITIES
- • Unincorporated Communities

Major Roads

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

* For additional information, refer to Table 3-T20
Source: DPS Well and Septic Section

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

Department of Environmental Protection
Montgomery County Maryland

Watershed Management Division
3/27/03 -- GIS Project File: o:\wwteam\cwsp\2002update\ch3\well_problem_areas.apr

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.