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I. INTRODUCTION:

Chapter 2 presents general background information about the County relevant to issues involving water supply, sewerage systems, rural sanitation planning, and water resources. The chapter presents this information in two general categories: the natural environment and the cultural environment. The various characteristics of the natural environment including geology, topography, soils and water resources–strongly affect water supply, sewerage, and rural sanitation needs, problems, and solutions in the County. A second group of relevant characteristics are classified as the cultural, or human-made, environment, which include patterns and density of existing and proposed residential, commercial, and institutional development; and the various legal requirements, policies, and plans that shape the cultural environment. However, it should be noted that much of the data presented in this chapter are generalized information about Montgomery County's 500-square-mile area.

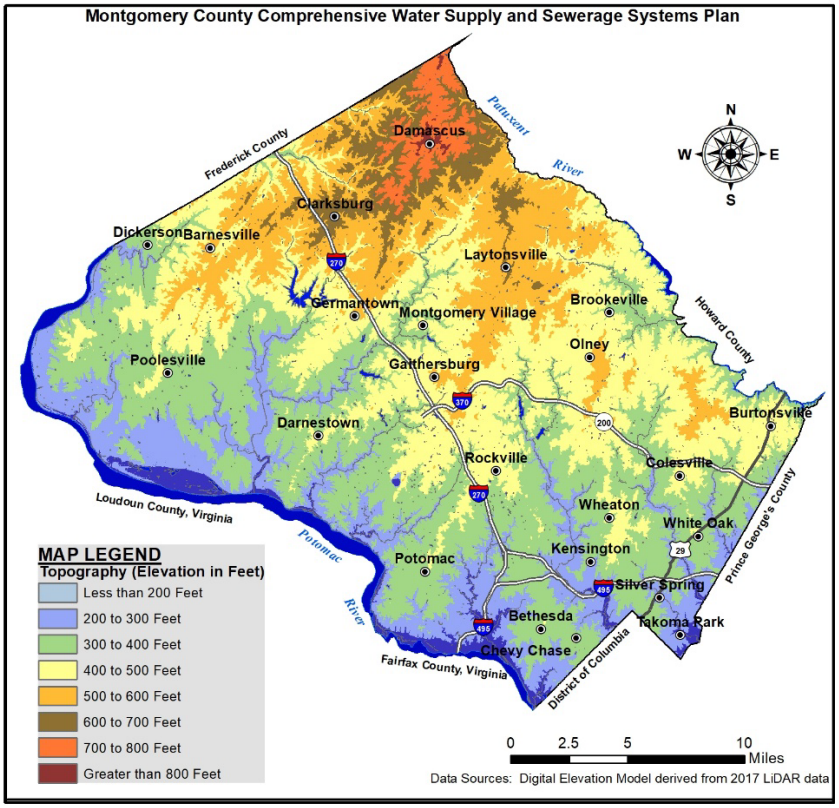
II. NATURAL ENVIRONMENT:

This section addresses natural, physical features of the County which affect the feasibility, nature, location, design, and implementation of community and individual water and sewerage systems. For example, the basic topography of the County is a significant factor in determining the location and design of water storage facilities and wastewater pumping stations and sewer lines. Soil and geologic characteristics are a major factor in determining the suitability of specific areas of the County for on-site wastewater systems such as septic tanks. Other data presented are similarly relevant to the Plan's subsequent chapters.

II.A. Topography:

The general topography of Montgomery County, as illustrated in Figure 2-F1, is dominated by

Figure 2-F1: Topography



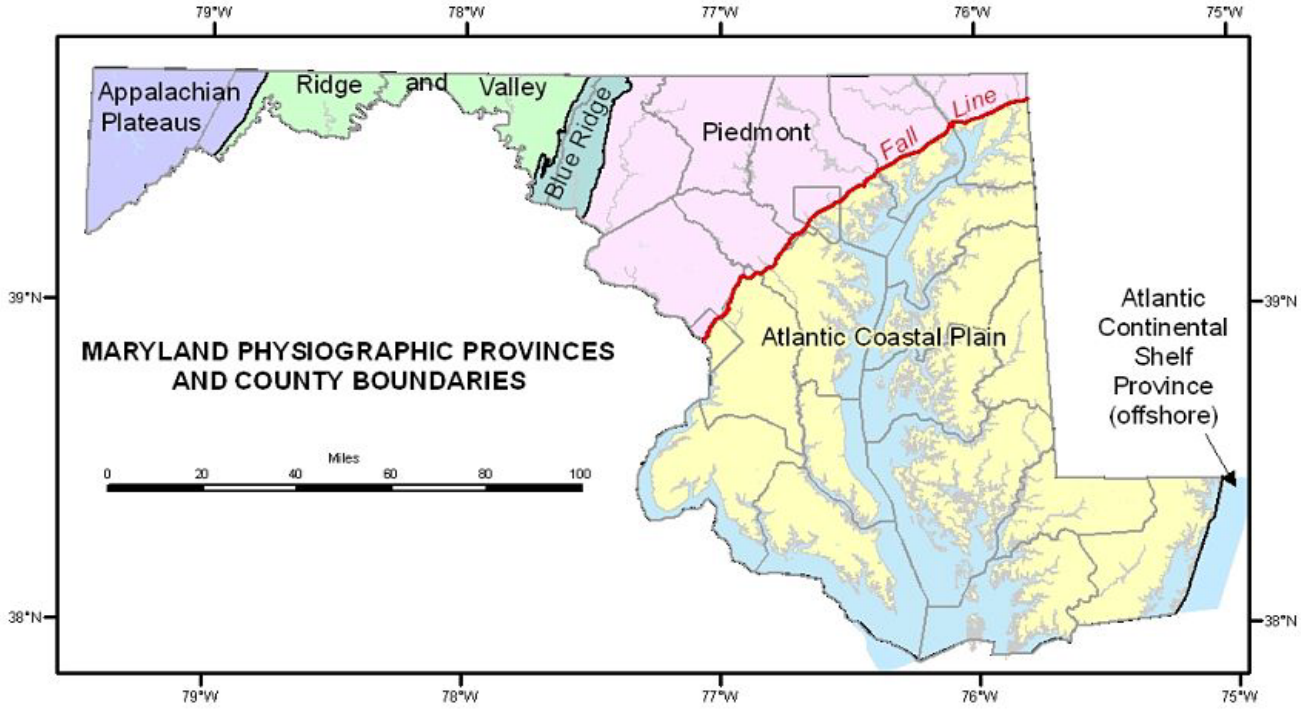
a rolling plain or "low hill" landscape. Hills are concentrated in the northern part of the County adjacent to the major stream valleys. The highest point in the County is 873 feet above sea level; the lowest point, 52 feet above sea level. The average elevation gradient is 29 feet per mile.

II.B. Climate:

Montgomery County's average winter temperature is 35 degrees Fahrenheit (F), with an average daily minimum of 25 degrees F. The summer average temperature is 74 degrees F, with an average daily maximum of 86 degrees F. Average total annual precipitation is approximately 40 inches. Of this, more than 22 inches (55 percent) usually falls during the period from April through September.

II.C. Geology:

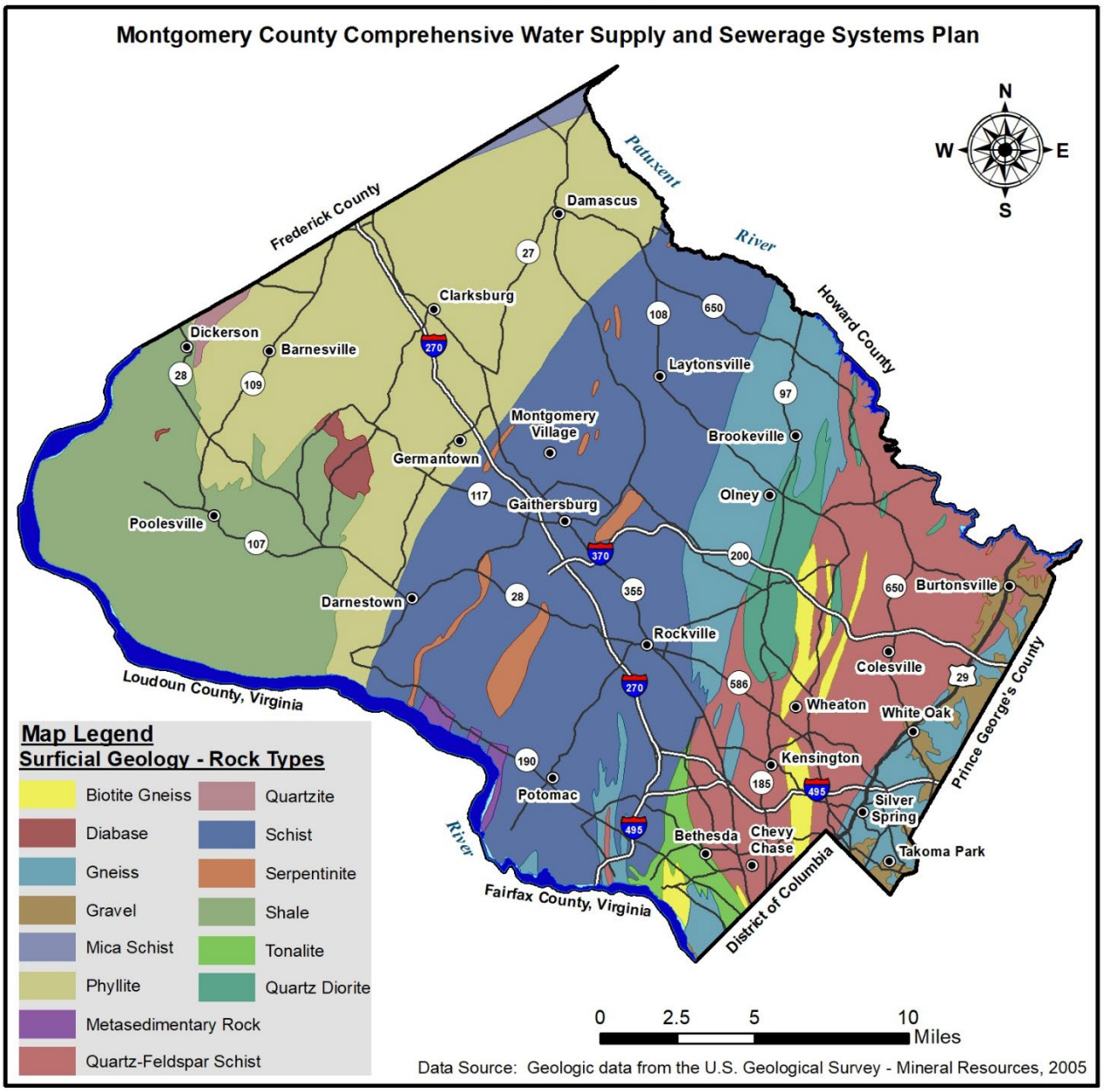
From the Atlantic coast on the east to the Appalachian Plateau on the west, Maryland has a great variety of geology and landforms. Maryland is part of six physiographic provinces (shown in the figure below). A physiographic province is a geographic area in which the geology (including lithology and structure) and climate history have resulted in landforms that are distinctly different from adjacent areas.



As shown the County lies almost entirely within the Piedmont physiographic province where the bedrock consists predominantly of metamorphic rocks of Paleozoic age.

Consolidated sedimentary rocks of Early Triassic age occupy a down-faulted basin in the western part of the County. On hills and ridges along the County's eastern border, small erosional remnants of unconsolidated Cretaceous sedimentary rocks extend westward from the Coastal Plain in Prince George's County. Please refer to Figure 2-F2 for additional information.

Figure 2-F2: Geologic Map



II.D. Soils:

A general description of Montgomery County soil types/groups and the areas where these soil types can be found are provided in Table 2-T1.

Table 2-T1: County Generalized Soils Descriptions

Soil Groups	Area*	Description
Glenelg-Gaila-Occoquan	41%	Nearly level to strong sloping, well drained, deep and very deep soils that are loamy throughout. This soil type is found in the central part of the County and extends to the east and south. It is found on broad ridge-tops and side slopes.
Brinklow-Baile-Occoquan	16%	Nearly level to moderately steep, well and poorly drained, moderately deep soils that are loamy throughout. This soil type is found in the northern part of the County. It is found on broad ridge-tops and side slopes.
Urban land-Wheaton-Glenelg	16%	Nearly level to strongly sloping, well drained, very deep soils that are loamy throughout. This soil type is found in primarily in the Germantown area and in southern and eastern portions of the County. It is found on broad ridge-tops and side slopes.
Penn-Brentsville-Readington	14%	Nearly level to steep, well and moderately well drained, moderately deep and deep soils that are loamy throughout. This soil type is found in the western part of the County. It is found on broad ridge-tops and side slopes.
Blocktown-Brinklow-Linganore	10%	Gently sloping to steep, well drained and moderately deep soils that are loamy throughout. This soil type is found in the northern part of the County. It is found on broad ridge-tops and side slopes.
Chillum-Croom-Beltsville	3%	Nearly level to steep, well drained and moderately well drained, very deep soils. This soil type is found in the eastern part of the County along the Prince George's County line. It is found on broad ridge-tops and side slopes.

** Percent area of the County.*

II.E. Water Resources:

The County's water resources affect many aspects of its water supply and wastewater management needs. Surface water flows, influenced by the underlying geology, have created the County's hills and valleys, establishing its watersheds. The resulting topography strongly influences the structure and alignment of wastewater collection systems and the need for various water supply pressure zones. Surface water resources provide the majority of the County's community water supply. Surface waters also receive treated flows from several water resource recovery facilities (wastewater treatment plants). Groundwater depth and availability strongly affects individual water supply and sewerage systems, municipal water systems dependent on wells (such as Poolesville), and also provides the base flow to surface waters and streams.

II.E.1. Groundwater: Groundwater is an abundant, but finite natural resource that sustains the County's natural ecosystems. It is the source of crucial, continuous base flows to County's streams and wetlands as well as providing drinking water for about 10% of the County's residences.

As indicated previously, the County lies almost entirely within the Piedmont physiographic province where the bedrock consists predominantly of metamorphic rocks of Paleozoic age. A good portion of the groundwater in these units occurs in the soil and weathered surface mantle which has an average thickness of 10-75 feet. Most groundwater is stored in cracks, fractures, joints, and pores of the underlying rock.

Groundwater in the Piedmont is predominantly derived from precipitation that percolates downward through the soil and rock until it reaches the water table (the point below which the ground is saturated with water). The saturated zone below the water table is called an aquifer. Most aquifers in the County are unconfined aquifers, meaning that there is no overlying impermeable layer to protect ground water from surface-based sources of contamination.

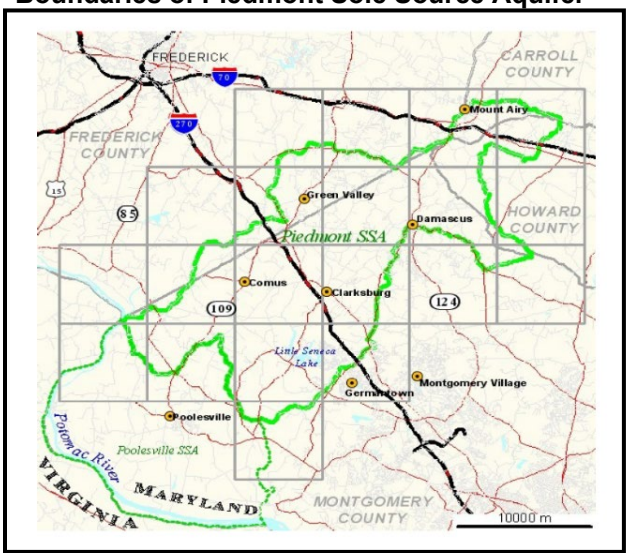
The average annual depth of the groundwater table in Montgomery County varies considerably from place to place depending on the type of geology, soil cover, soil, and the topographic situation, as well as the annual rainfall. For example, at an observation well at Fairland, in the Wissahickon schist of the eastern part of the County, average annual depth to groundwater is between 8 to 10 feet. The comparable depth at an observation well at Damascus in the Ijamsville phyllite, in a more rugged topography, is between 30-45 feet. In scattered wells in the Manassas (New Oxford) siltstones and sandstones, the water table lies at about 70-120 feet.

Wells in the County are unlikely to cost-effectively provide sufficient quantities of water for municipal supply. Only the Town of Poolesville municipal water supply system depends on groundwater supply. Depending upon the host rock, groundwater well yields average from less than 1 gallon per minute to more than 25 gallons per minute. Under the County's regulations, permitted domestic wells must yield a minimum of 1 gallon per minute.

II.E.1.a. Maryland Piedmont and Poolesville Sole Source Aquifers: The Safe Drinking Water Act gives the U.S Environmental Protection Agency (EPA) the authority to designate aquifers which are the sole or principal drinking water source for an area, and which, if contaminated, would create a significant hazard to public health.

In August 27, 1980, EPA announced the designation of sections of western Montgomery County as part of the Maryland Piedmont Sole Source Aquifer. Most of the County that is outside of the water and sewer service envelope is in the Maryland Piedmont SSA. The boundaries of the Maryland Piedmont Sole Source Aquifer are shown below.

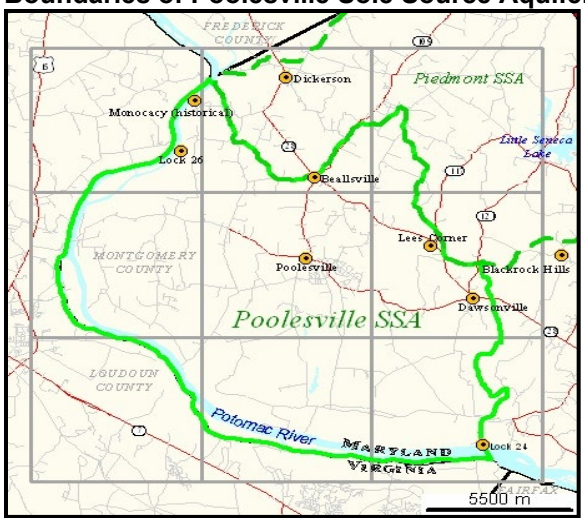
Boundaries of Piedmont Sole Source Aquifer



The EPA defines a Sole Source Aquifer (SSA) as one which supplies at least 50% of the drinking water consumed in the area overlying the aquifer. EPA guidelines also require that these areas have no alternative drinking water sources(s) which could physically, legally, and economically supply water to all who depend on the aquifer for drinking water. The Sole Source Aquifer Program provides federal overview of federally-funded projects within SSA's. Projects that could potentially contaminate areas designated as SSA's cannot receive federal funds.

In 1998, the citizens of Poolesville, Maryland successfully petitioned for extending the Maryland Piedmont Sole Source Aquifer to include the Town of Poolesville as a Sole Source Aquifer. As a result, the Regional Administrator of Region III of the U.S. Environmental Protection Agency (EPA) determined that the portion of the Piedmont aquifer system that underlies Poolesville and the surrounding area in western Montgomery County, Maryland (denominated as "Poolesville Area Aquifer System") is the sole or principal source of drinking water for this area and if the aquifer system were contaminated would create a significant hazard to public health. The addition of the Poolesville Area Aquifer System to the existing SSA, shown in the following figure extended the Maryland Piedmont SSA from State Route MD28 (approximate boundary) to the Potomac River, between Little Monocacy River and Seneca Creek's confluence with the Potomac River.

Boundaries of Poolesville Sole Source Aquifer



The aquifer system underlying the Poolesville area is within the Piedmont Lowland physiographic province. All municipal drinking water in the Poolesville area is supplied by ground water which is extracted from the underlying aquifer system by a series of public water supply wells. Residents outside of Poolesville obtain their drinking water from private wells. (For more information on the SSA, see Chapter 3, section V.B.2).

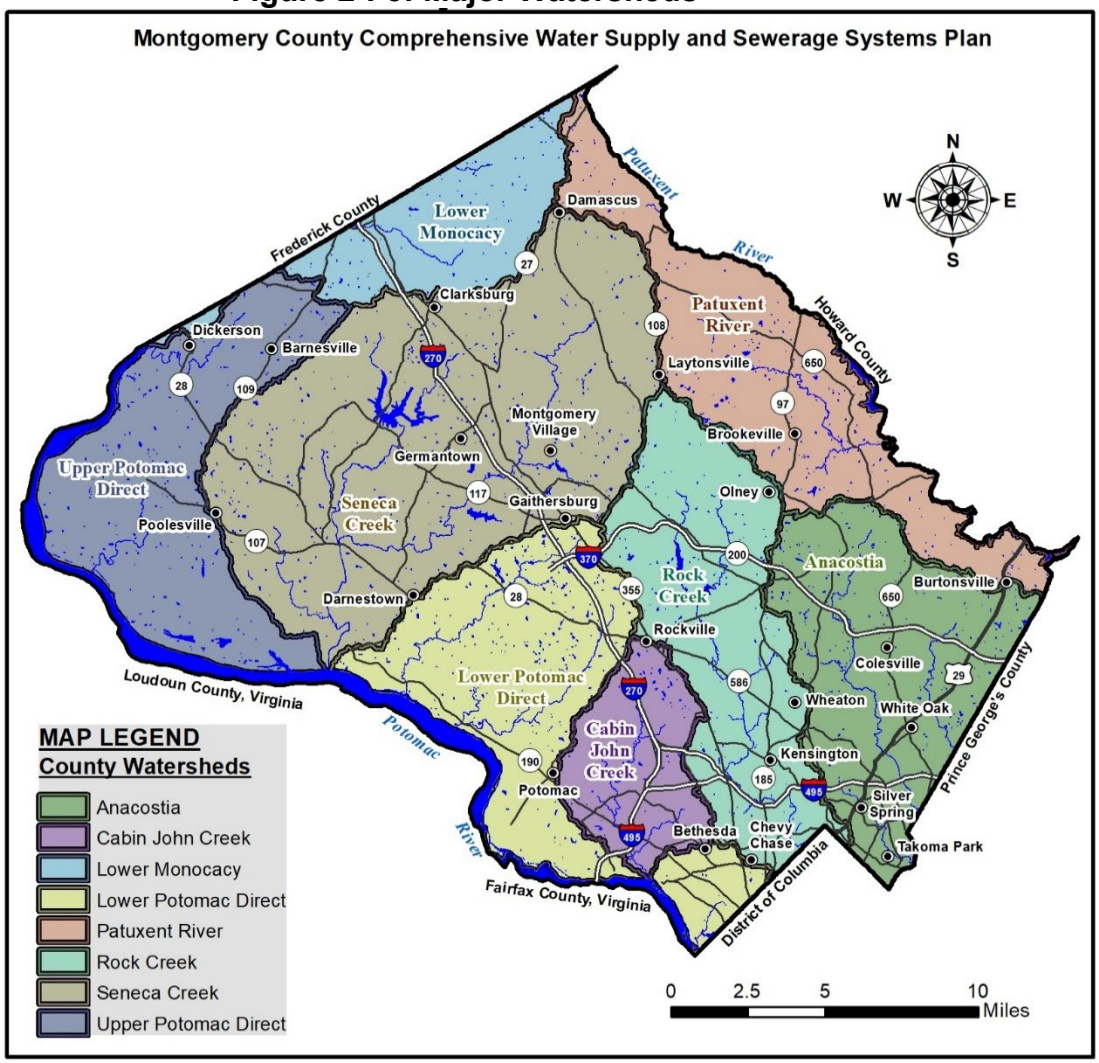
II.E.2. Surface Water and Watersheds:

The County's rivers, lakes, and streams provide drinking water, recreational opportunities, and vital habitat for aquatic and terrestrial wildlife. Surface water resources from the Potomac and Patuxent Rivers provide the majority of the County's community water supply needs of the County through WSSC Water and the City of Rockville water treatment facilities.

Surface water comes from both groundwater influx, which provides the base flow in streams, and from precipitation events and related run-off from rain and snow, which provide additional flows in excess of the base flow. Essentially all water impoundments in the County, including large lakes and small ponds are man-made. The largest lakes were built for flood and sediment control and water supply. Ultimately, all waterways within the County flow into the Chesapeake Bay.

As shown in Figure 2-F3, surface waters in Montgomery County flow within 9 major watersheds, which include 1500 miles of streams flowing into four major rivers: the Anacostia, the Monocacy, the Patuxent, and the Potomac River.

Figure 2-F3: Major Watersheds



The Potomac River borders the County to the west and southwest, the Patuxent River borders the County to the northeast. Twelve percent (12%) of the County drains to the Anacostia River which, in turn, drains to the Potomac River. Ten percent (10%) of the County drains to the Monocacy River which, in turn, drains to the Potomac River just upstream of the Montgomery-Frederick County border. Twelve percent (12%) of the

County drains to the Patuxent River. The remaining sixty-six percent (66%) of the County drains wither directly into the Potomac River or one of its major tributaries within the County. The County's watersheds and their associated drainage areas are listed on Table 2-T2.

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	Upper and Lower 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	**Total County Watersheds**	**314,694**
Upper Patuxent River	13,255		

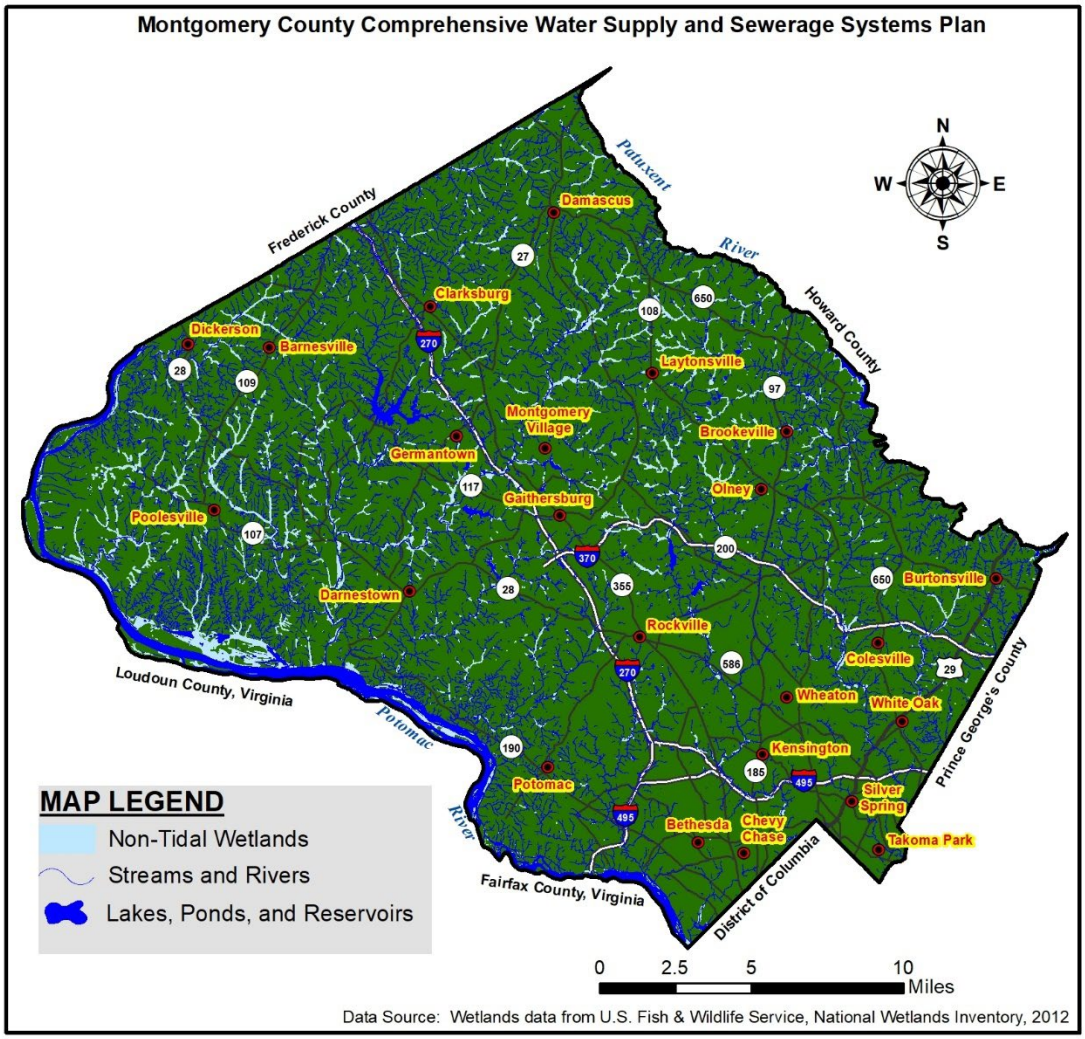
Source: Countywide Stream Protection Strategy, Feb. 1998

The County's surface water drainage pattern provides a template for the alignment of much of its community sewer transmission main network. Most sewer mains operate by gravity and generally follow the "low flow" path downhill towards treatment or pumping facilities. This, of necessity, often requires the construction of sewer mains in close proximity to the County's rivers and streams. Surface waters also receive treated flows from the County's four publicly-owned water resource recovery facilities (wastewater treatment plants) which include Seneca, Damascus, Poolesville and Hyattstown water resource recovery facilities.

II.E.3. Wetlands:

The important role of wetlands as natural filters in maintaining water quality is acknowledged at the federal, state, and local levels. It is recognized that loss of wetlands leads to decreased water quality protection, flood control, and wildlife habitat. Wetlands are vulnerable to off-site, indirect impacts such as hydrologic alterations and pollution. The County's wetland areas are shown in Figure 2-F4, Non-Tidal Wetlands.

Figure 2-F4: Non-Tidal Wetlands



Regulations regarding the definition of, and allowable impacts to wetlands, continue to evolve. Wetlands are defined by the Planning Board's *Guidelines for Environmental Management of Development in Montgomery County*, January 2000, as "an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation."

Information on the location of major wetland areas in the county is available through National Fish and Wildlife Service maps. The M-NCPPC, Montgomery County Planning Department requires more accurate delineations of wetlands by a developer's engineer during the development review process. This detailed delineation is also required by federal and state agencies as a part of their wetland permit review processes

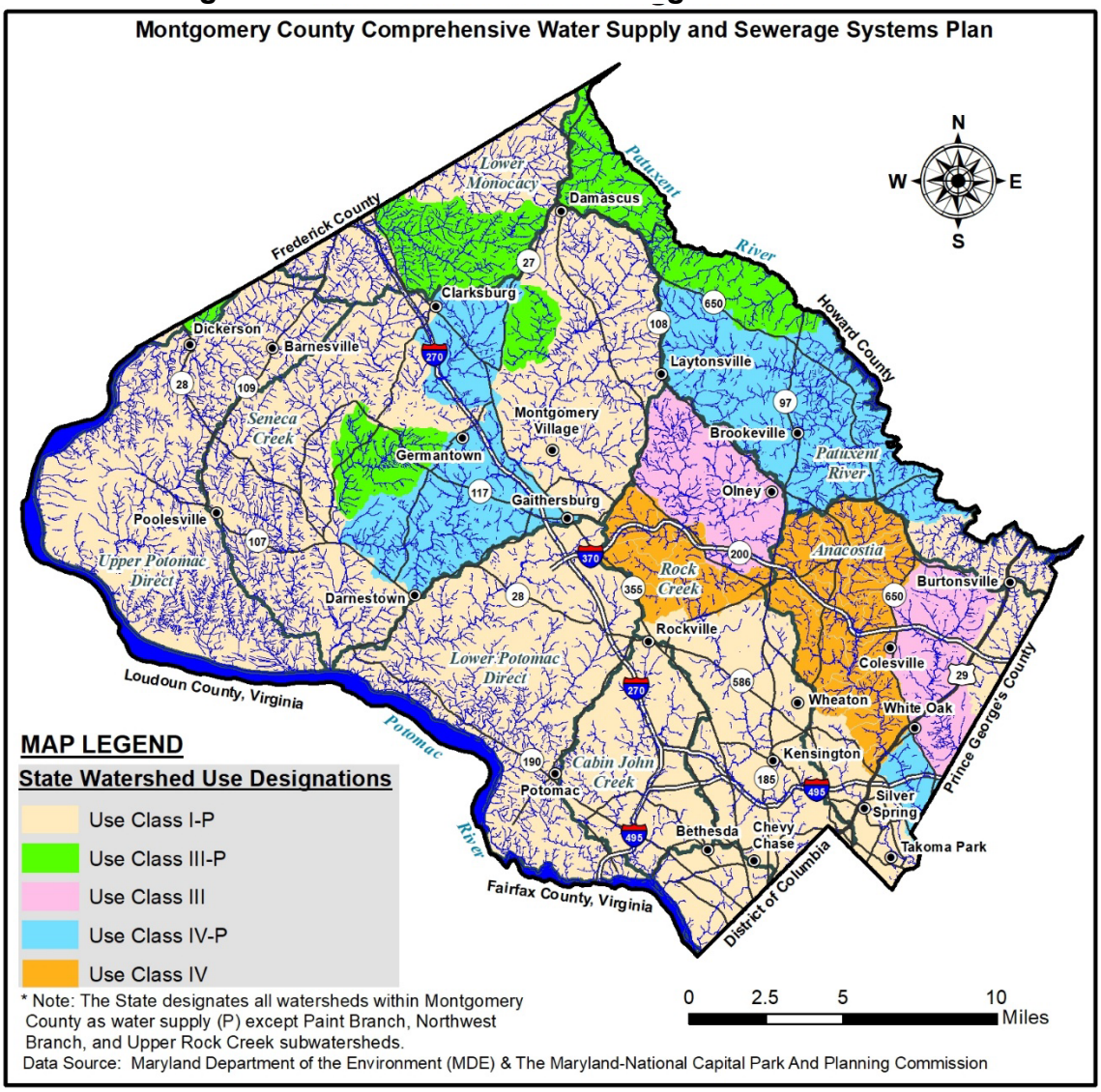
II.E.4. State Water Use Class Designations:
Maryland Department of the Environment (MDE) water quality standards place the surface waters of the State into water use designations with specific water quality criteria. The County's waters are covered under use designations listed below in Table 2-T3 and mapped on Figure 2-F5. More detailed information regarding the County's water quality conditions can be accessed at:

https://www.montgomerycountymd.gov/water/

Table 2-T3: State Watershed Use Designations

Designation	Definition
Use Class 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 Class 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 Class 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 Class 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 Class 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 Class 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 Class 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-F5: State Water Use Designations



II.E.5. Water Quality Programs:

Since the 1990s, Montgomery County has maintained a stream monitoring program measuring biological communities (fish and benthic macroinvertebrates), physical habitat, and other physiochemical parameters.

Fish and benthic macroinvertebrate communities are excellent indicators of water quality. They must survive and reproduce in the full range of water quality and habitat conditions that occur throughout the year. If water quality or habitat conditions are poor for too long, sensitive species cannot survive and won't be collected during sampling.

Over the course of 5-year cycles, samples are collected from all the County's sub-watersheds. The data from these samples, including the number and type of organisms found, are input into a multi-metric analysis called an Index of Biotic Integrity (IBI). Scores are generated from these IBIs categorize stream conditions as Poor, Fair, Good, or Excellent.

- **Poor stream condition** is a combined IBI score (fish and bugs) of 0-41. Poor conditions most often occur in places where changes made by humans to the natural environment have substantially altered the structure of the biological community. These areas are often highly developed or urban and don't have good stormwater management.
- **Fair stream condition** is a combined IBI score of 42-63. These conditions occur most often in places anthropogenic stressors have impacted an area, but the area still supports viable biological communities. This condition describes many streams in suburban areas with some stormwater management, as well as areas that have had major agricultural impacts. The biological communities in fair streams are dominated by species that are tough and can survive in most conditions but may have a few organisms that are sensitive to stressors left.
- **Good stream condition** is a combined IBI score of 64-88. These conditions are often found in the less developed areas of the county, suburban areas with the latest stormwater management techniques, and areas with lots of protected land in their watershed. Many of the County's sensitive species can survive in these streams. Stream bugs like dragonflies and caddisflies are common. Fish like sculpins, darters, and longnose dace are common in these streams as well.
- **Excellent stream condition** must have a combined IBI score of 89-100. Most often, only highly forested watersheds with minimal development are in excellent condition. Here our most sensitive fish and stream bugs live. Fish like trout, shield darters, and comely shiners are found. Highly sensitive stream bugs like stoneflies and mayflies are common in these watersheds.

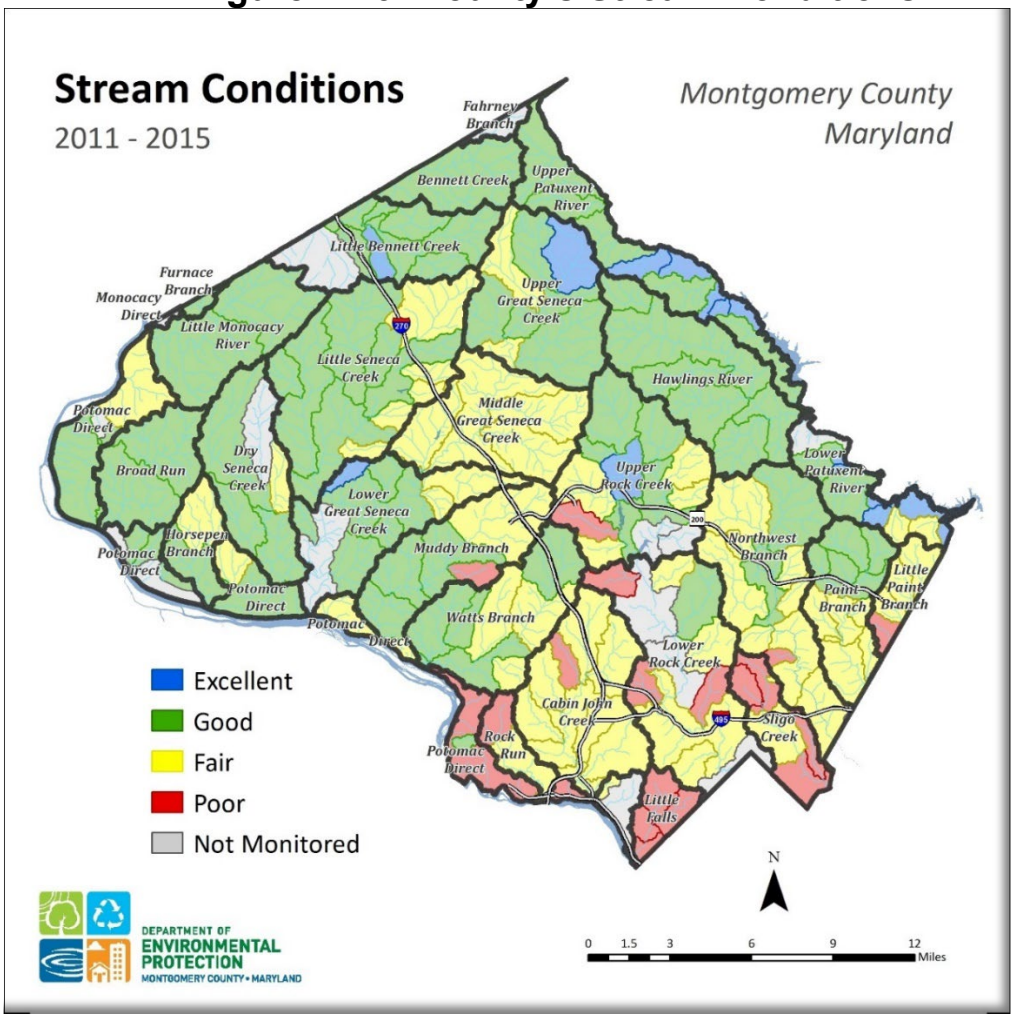
Based on the collected information and results, the County assesses and prioritizes the potential for improving conditions in degraded streams. Potential for improvements and work prioritization was based upon the degree of existing or planned watershed development and the estimated effectiveness of practical and appropriate management tools available for mitigation. The County's current ratings of stream conditions, based on biological monitoring, are shown in Figure 2-F6.

The County has also long recognized the need to protect its groundwater resources. Approximately 80,000 County residents rely on groundwater as their only source of water supply.

In 2002, the DEP along with citizens, work groups, and the County Council, developed the Water Quality Protection Charge to fund the maintenance of stormwater management facilities and alleviate the dangerous impacts of stormwater pollution.

From 2003-2012, all residential properties and approximately 40% of nonresidential properties including non-profit organizations, places of worship and private schools paid the WQPC.

Figure 2-F6: County's Stream Conditions



In order to meet state water quality regulatory requirements and to comply with the new State Law (Section 4-202-1 of the Environment Article of the Maryland Code), in 2013 Montgomery County expanded the WQPC to include all property owners in the County. Further, the WQPC was changed for residential properties from a flat rate to an equitable system based on how much impervious area is on the property.

II.E.5.a. County Water Quality Goals:

In November 1994, Montgomery County adopted water quality goals as follows (Montgomery County Code, Chapter 19, Article IV):

- Protect, maintain, and restore high quality chemical, physical, and biological conditions in the waters of the state in the County;
- Reverse the past trends of stream deterioration through improved water management practices;
- Maintain physical, chemical, biological, and stream habitat conditions in County streams that support aquatic life along with appropriate recreational, water supply, and other water uses.

- Restore County streams, damaged by inadequate water management practices of the past, by reestablishing the flow regime, chemistry, physical conditions, and biological diversity of natural stream systems as closely as possible.
- Help fulfill interjurisdictional commitments to restore and maintain the integrity of the Anacostia River, the Potomac River, the Patuxent River, and the Chesapeake Bay.
- Promote and support educational and volunteer initiatives that enhance public awareness and increase direct participation in stream stewardship and the reduction of water pollution.

These goals are applied to guide the planning and implementation of the County's water resources protection programs.

II.E.5.b. Water Resources Management Programs:

Several local agencies administer coordinated programs to manage and protect County water resources. These programs help protect streams, water quality, and aquatic life by regulating and mitigating the impacts of land use change as it occurs in County watersheds. For example, requirements for stormwater management and Environmental Site Design applied at the time of new land development involve a variety of active and passive techniques to reduce the amount of surface runoff, sediment and pollutants generated and introduced into the stream system, and involve the use of small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of development on water resources.. These measures are designed to maximize runoff infiltration into the soil profile and reduce peak runoff flows delivered to streams. They also help maintain stream base flows, limit erosion and other damage to stream habitat and aquatic resources and complement localized flood protection. Some programs regulate wells and septic systems to protect groundwater water quality. Others apply a variety of monitoring, inspection, enforcement, maintenance, and educational programs to track water quality and limit pollution discharges.

II.E.5.c. State and Federal Programs:

For most urban areas like Montgomery County, what goes into our storm drains (stormwater) makes its way into our local streams. Those streams are part of larger watersheds that lead to major rivers, like the Potomac River, and eventually the Chesapeake Bay. Because our waters are interconnected and not defined by county or state lines, the federal government regulates everything that goes through storm drain systems. The federal government regulates storm drains through a permit process called the National Pollutant Discharge Elimination System (NPDES), Municipal Separate Storm Sewer System (MS4) Permit Program.

In Maryland, the U.S. Environmental Protection Agency (EPA) has delegated the authority for issuing all NPDES permits in the state, including the MS4 Permits, to the Maryland Department of the Environment (MDE). Read more about the Maryland MS4 Permitting program.

The MS4 Permit Program was established to reduce stormwater pollution throughout the United States. The primary goal of the program is to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

The County's Permit requires the prohibition of pollutants in stormwater and unauthorized discharges to the MS4, restoration of poor-quality streams by achieving required pollutant reduction, and other activities to help meet water quality protection goals. Runoff must be captured, slowed and treated by stormwater best management practices.

The Department of Environmental Protection is the lead department coordinating a multi-department/agency response to meet the requirements of the MS4 Permit. The permit is a key driver of the County's strategic watershed restoration program.

II.E.5.d Montgomery County's MS4 Permit:

The Department of Environmental Protection is the lead department coordinating the County's multi-department/agency response to meet the requirements of the MS4 Permit. The permit is a key driver of the County's strategic watershed management program. The MS4 Permits are issued for a five-year cycle. The County's current MS4 Permit was issued on November 5, 2021, by the Maryland Department of the Environment and expires on November 4, 2026. During the permit term, the County is required to:

- By November 4, 2026, the County shall complete the restoration of 1,814 impervious acres that have not been treated to the maximum extent practicable by implementing stormwater BMPs, programmatic initiatives, or alternative control practices in accordance with the 2021 Accounting Guidance
- Show progress toward meeting the Total Maximum Daily Loads (TMDLs) Wasteload Allocations (WLAs) approved by the U.S. Environmental Protection Agency (EPA).
- Reduce trash and litter county-wide.
- Develop and implement a public outreach and education program that focuses on reducing stormwater pollution and litter
- Conduct preventive maintenance inspections of all Stormwater management facilities
- Implement laws and programs to reduce stormwater and pollution
- Submit annual progress reports to MDE.

II.E.5.e. Chesapeake Bay Protection:

Maryland, Virginia, Pennsylvania, Washington D.C., the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission signed the 1987 Chesapeake Bay Agreement to provide comprehensive guidance for minimizing the negative impacts of land activities in the Chesapeake Bay drainage area. The Agreement provides specific goals for improving the Bay such as a 40 percent reduction in nutrient pollution by the year 2000.

Montgomery County is a member of the Mid-Potomac Tributary Team and Patuxent River Commission which Maryland established to develop the agency/citizen/business partnerships necessary to meet this target in these Bay tributaries. Additional information on the principal government agencies which help manage the County's water resources are included in Chapter 1, Section I.E.

III. CULTURAL ENVIRONMENT:

This section presents data on projected growth and densities required for planning the public facilities addressed by this Plan. For example, the projected population of the County is a major determinant of future water supply demands and wastewater flows and needs. Projected changes in land use from rural categories to suburban and urban uses direct where community water and sewerage systems will be needed in the future. The changes can result in impervious areas, increasing peak stormwater runoff flows that affect streams and create stormwater management needs.

III.A. Legal Requirements and Other Policy Guidance:

Legal and policy guidance and requirements for water supply, sewerage, stormwater management, and rural sanitation planning are provided by Federal, State, and County governments and by regional agreements. The County government's major relevant policy vehicles are outlined below. The staging mechanisms of these policy and regulatory tools provide for managing the timing and extent of growth in the County. As an important element in growth management and staging, the Comprehensive Water Supply and Sewerage Systems Plan (CWSP) accounts for the land use plans and staging policies of individual areas of the County, for the current status of development in each area, and for the future expectations of population, employment, and housing trends. In this way, the Water and Sewer CWSP can project the County's future water supply and sewerage systems needs and coordinate those needs with development in the County.

III.A.1. General Plan: The General Plan provides a comprehensive framework for guiding physical development and managing limited resources in the County. The main purpose of the General Plan includes:

- the general location, function, intensity, and pattern of various land uses,
- provides direction for integrating future development and redevelopment with existing development,
- addresses the relationship between human activity and the built and natural environment,
- addresses the varying needs and desires of a diverse and changing County population and economic community,
- promotes connections among all areas of the County and between the County and the region.

The current Montgomery County's comprehensive land use plan, the General Plan, was adopted in 1964 and refined in 1993. Currently the Montgomery County is undertaking an update/revision to its General Plan, the revision is being called **Thrive 2050**. Thrive 2050 is the update to Montgomery County's long-range policy framework for guiding future land use and growth for the next 30 years. Thrive Montgomery 2050 will help guide future land use planning; countywide policies and associated future infrastructure decisions and initiatives. The link below provides access to the latest draft version of Thrive 2050 plan.

https://montgomeryplanning.org/wp-content/uploads/2020/06/Final-staff-report-vision-goals-policies-and-actions-for-6-11-20-PB-.pdf

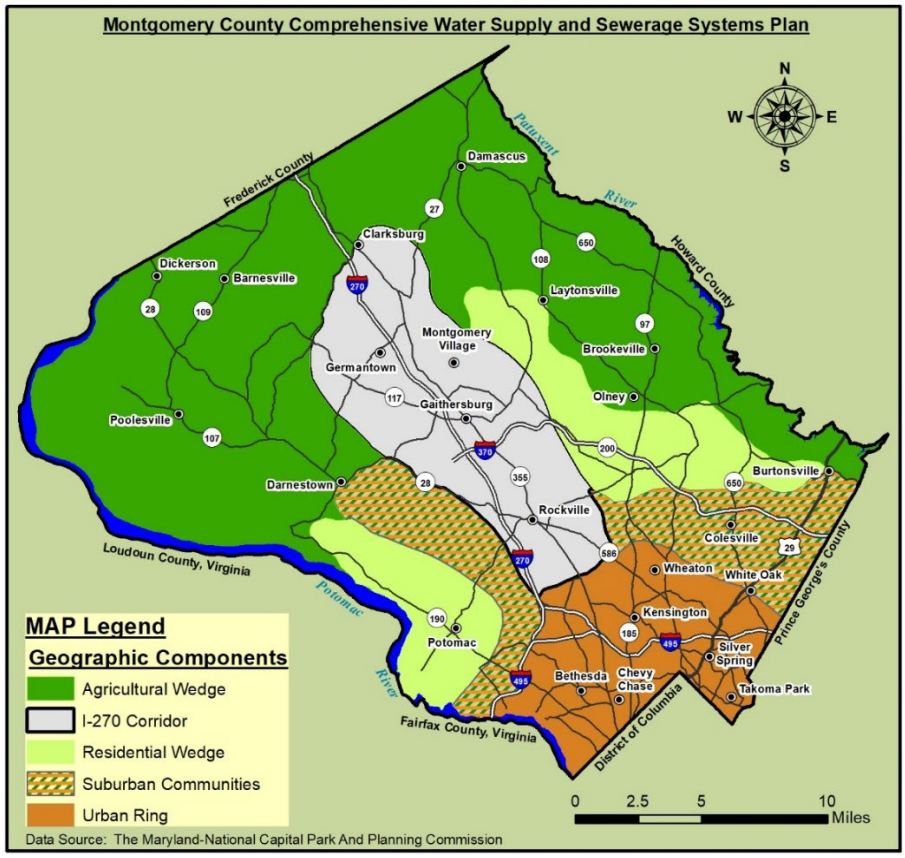
The General Plan is an evolving and dynamic policy document containing generalized concepts that provide the basis for more specific area master plans, functional plans, and sector plans. Each of these master plans, sector plans, and functional plans, after

approval by the County Council and adoption by the M-NCPPC, constitutes an amendment to the General Plan. Master plans can provide specific water and sewer policies which are then implemented by the CSWP. As the county's longest-range and most visionary document, the General Plan provides a broad image for the county's evolution and establishes a framework to make that vision become a reality. It is specific enough to provide clear guidance for realizing its vision, while retaining enough flexibility to respond to unforeseeable circumstances as they arise.

The General Plan establishes a basic policy of concentrating development in a ring around the District of Columbia, and along major transportation corridors extending outward from this ring. The corridors are separated from each other by rural or low-density wedges. The initial 1964 General Plan developed this Wedges and Corridors Concept, which the County reaffirmed in a 1969 update and refined in1993. This concept is viewed as the means to avoid sprawl, and, instead, to achieve an efficient, orderly, and attractive pattern of development.

During the 1993 General Plan Refinement the County was divided into four geographic components: the Urban Ring, the Corridors, the Suburban Communities, and the Wedges. With the exception of the Wedges, the borders between these areas are gentle transitions, not stark interruptions of an otherwise continuous pattern. Each area is defined in terms of appropriate land uses, scale, intensity, and function. The geographic components are illustrated in Figure 2-F7.

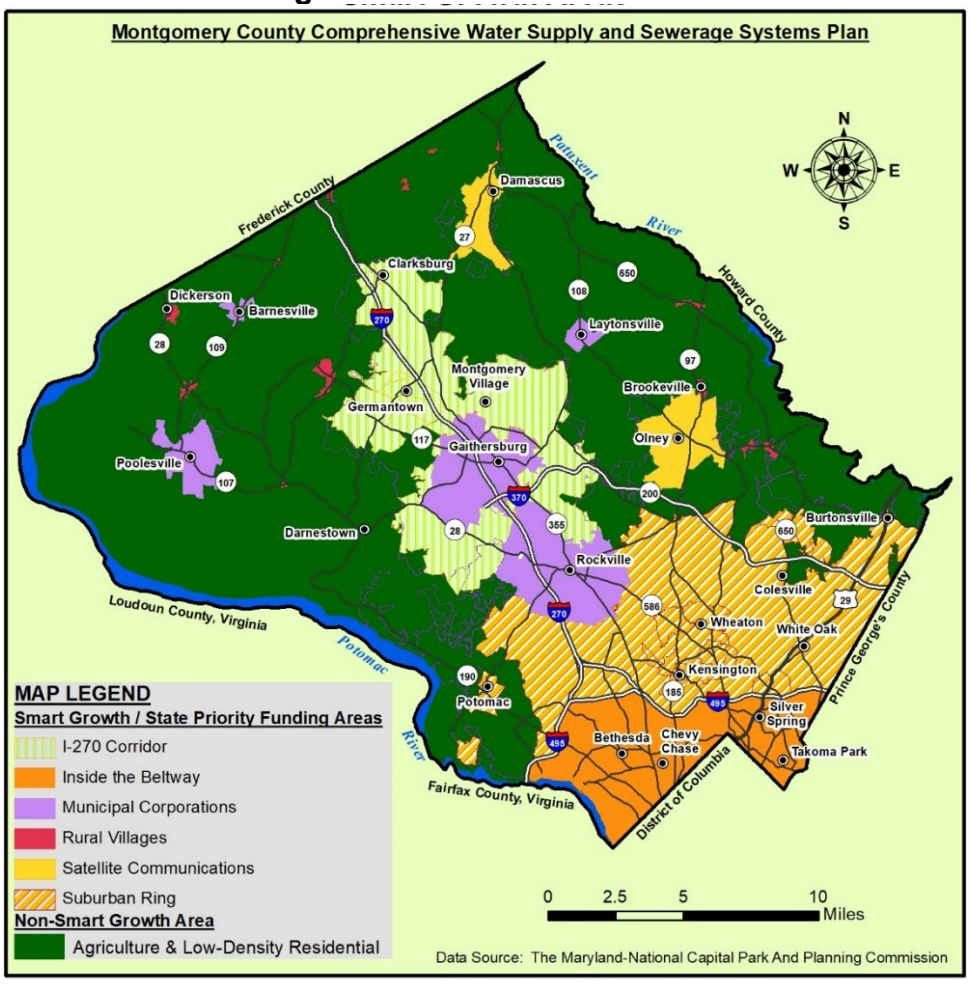
Figure 2-F7: Wedges & Corridors Geographic Components



An objective of the CSWP is to plan for community service to implement and reinforce the Wedges and Corridors Concept. Wedge preservation policies are complemented by the limitation of community water and sewer service, except as may be necessary to resolve public health problems and permit limited expansion of existing settlements.

The Wedges and Corridors concept reinforces and coordinates closely with Maryland's Smart Growth program. Under the Smart Growth Priority Funding Areas Act of 1997, the program's purpose is to limit sprawl development by directing State funding to areas where local governments want State investment to support future growth: higher-density development areas, redevelopment areas, and municipalities identified as Priority Funding areas. The legislation covers growth-related projects under most State programs that encourage or support growth and development. These can include highways, water and sewer construction, economic development assistance, and State leases or construction of new office facilities. In practice, State funding for water and sewer infrastructure in Montgomery County is primarily focused on improvements to water filtration and water resource recovery facilities. In following the guidance of the General Plan and its accompanying local area master and sector plans, this Water and Sewer Plan supports the Smart Growth program. The County's designated State Smart Growth/Priority Funding areas are shown in Figure 2-F8.

Figure 2-F8: Smart Growth Areas



III.A.2. Water Resources Element for the General Plan: The Water Resources Element (WRE) is one of several major new local planning requirements added to state law in 2006. Section 1.03 (iii) of Article 66B of the Annotated Code of Maryland mandates that all Maryland counties and municipalities that exercise planning and zoning authority prepare and adopt a water resources element in their comprehensive plans.

The purpose of the Water Resources Element is to ensure that future County and municipal comprehensive plans and opportunities and limitations presented by local and regional water resources. WREs are intended to improve local jurisdictions' contribution to the protection of state land and water resources; to the protection of public health, safety and welfare; and to meeting local and state smart growth policies. It provides a link between the Land Use Plan and plans for the provision of drinking water supplies, wastewater treatment and discharge and capacity and stormwater management.

The County fulfilled its WRE requirement with the Water Resources Functional Master Plan (WRFMP), which amends the County's General Plan. The approved and adopted WRFMP provides information on County water and sewer service capacity in light of planned growth to 2030, summarizes an estimate of nutrient loadings on watersheds for existing and future conditions, and identifies policies and recommendations that are needed to maintain adequate drinking water supply and wastewater treatment capacity to 2030, and meet water quality regulatory requirements as the County continue to grow. The WRFMP, plus other related documents, can be accessed on line at:

http://www.montgomeryplanning.org/environment/water_resources_plan/index.shtm

III.A.3. Staging Plans and Policies: Guidance for the staging of development is contained in the General Plan, in the Annual Comprehensive Planning Policies Report, in various master plans, and in policies developed to guide the administration of the Adequate Public Facilities Ordinance.

III.A.4. Adequate Public Facilities Ordinance: The Adequate Public Facilities Ordinance (an adjunct to the Subdivision Ordinance) places conditions on the County Planning Board's subdivision or recordation of land based on the availability of existing and programmed public facilities, such as transportation systems, water and sewerage systems, schools, police, fire and health facilities.

III.A.5. Capital Improvements Program: The Capital Improvements Program (CIP) is the document through which the County government decides the extent and timing of the provision of its public facilities. This is a six-year planning document that identifies the extent, timing, and funding of approved capital projects. The water supply and sewerage systems capital planning originate at WSSC Water with coordination with County agencies. This WSSC Water CIP is reviewed and approved jointly by the Prince George's County Council and the Montgomery County Council. Appendix A provides a listing and brief description of currently approved capital water supply and sewerage systems projects throughout the County.

III.B. Land use and Zoning:

The amount of land in Montgomery County is fixed; how it is used is not. Every piece of land in the County is subject to zoning laws that determine how the land can be used and what

public facilities and amenities are needed to provide service to the community. The County Council is the final authority on land use matters. The Council approves changes in the Zoning Ordinance.

The land area of the County is approximately 505 square miles, or about 323,000 acres. The county is populated by one million people and projected to gain an additional 200,000 residents in the next 25 years. It has settled into a slower growth phase as dwindling supplies of developable land and burdened transportation capacity no longer sustain rapid growth. Only 18 percent of the county is available for development on undeveloped land. This percentage is a huge reduction from the last General Plan revision, when more than 40 percent of the county was available undeveloped land.

The pattern of residential growth in the County has basically followed the Wedges and Corridors Concept since the adoption of the General Plan. Figures 2-F9 and 2-F10 represent the geographic distribution of households, population densities, and general boundaries of community water and sewer envelopes in 2015. Approximately 97% of the population in Montgomery County is served by community water and approximately 93% of the population in Montgomery County is served by community sewer.

Figure 2-F9 – Land Use, Zoning, Population density, and General community Water Service Envelope

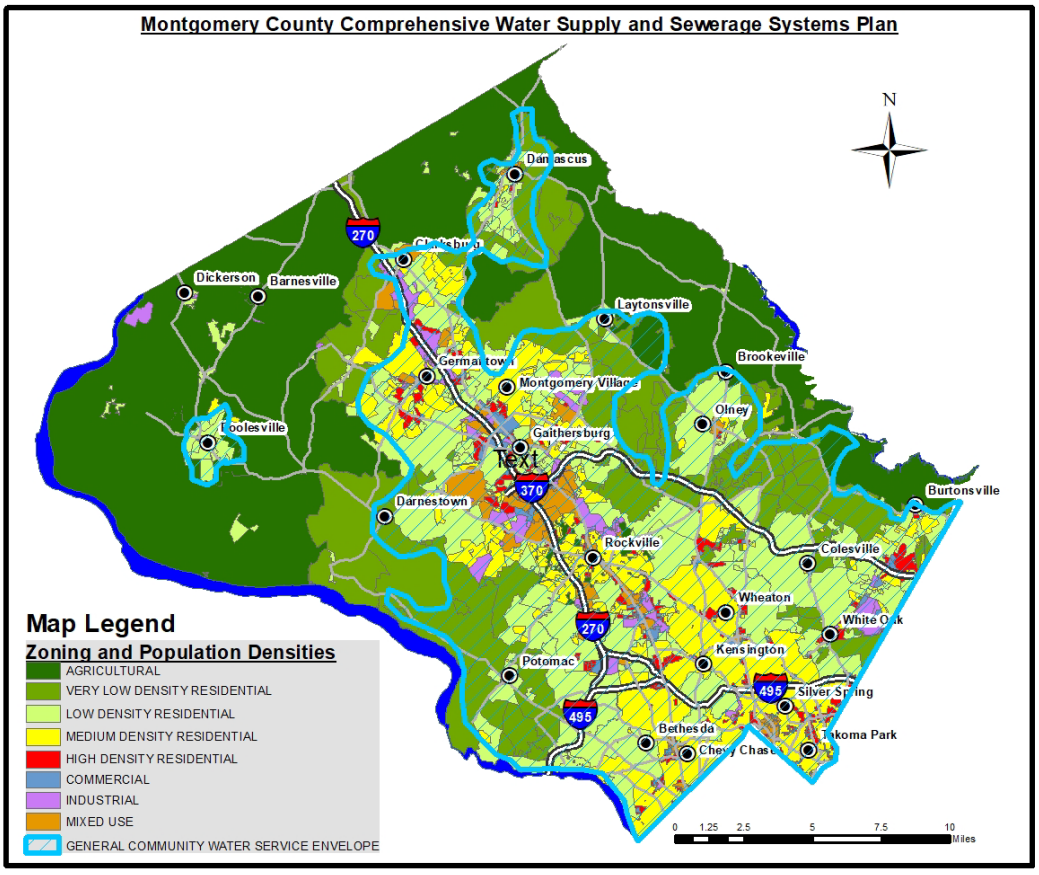
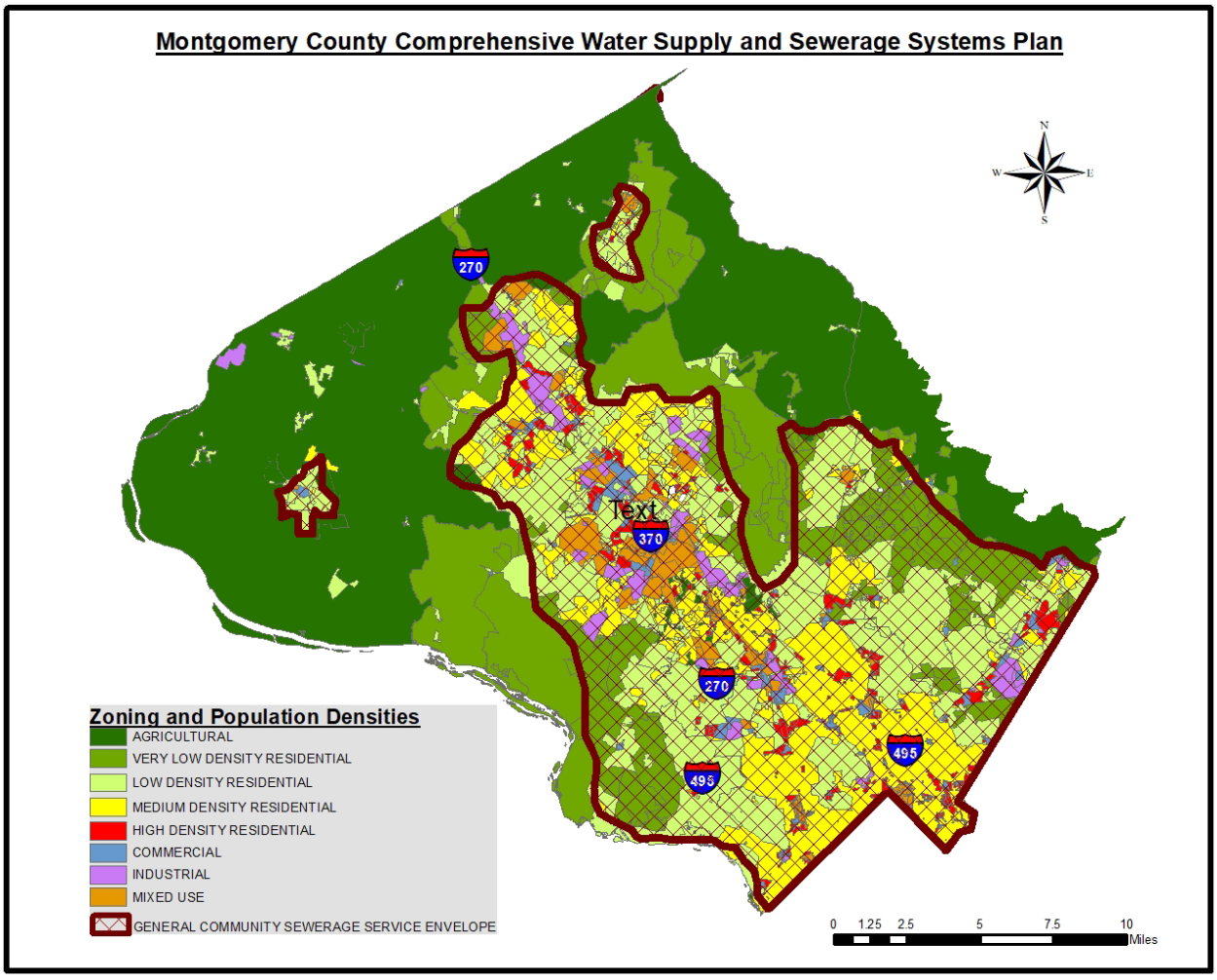


Figure 2-F10 – Land Use, Zoning, Population density, and General Community Sewerage Service Envelope

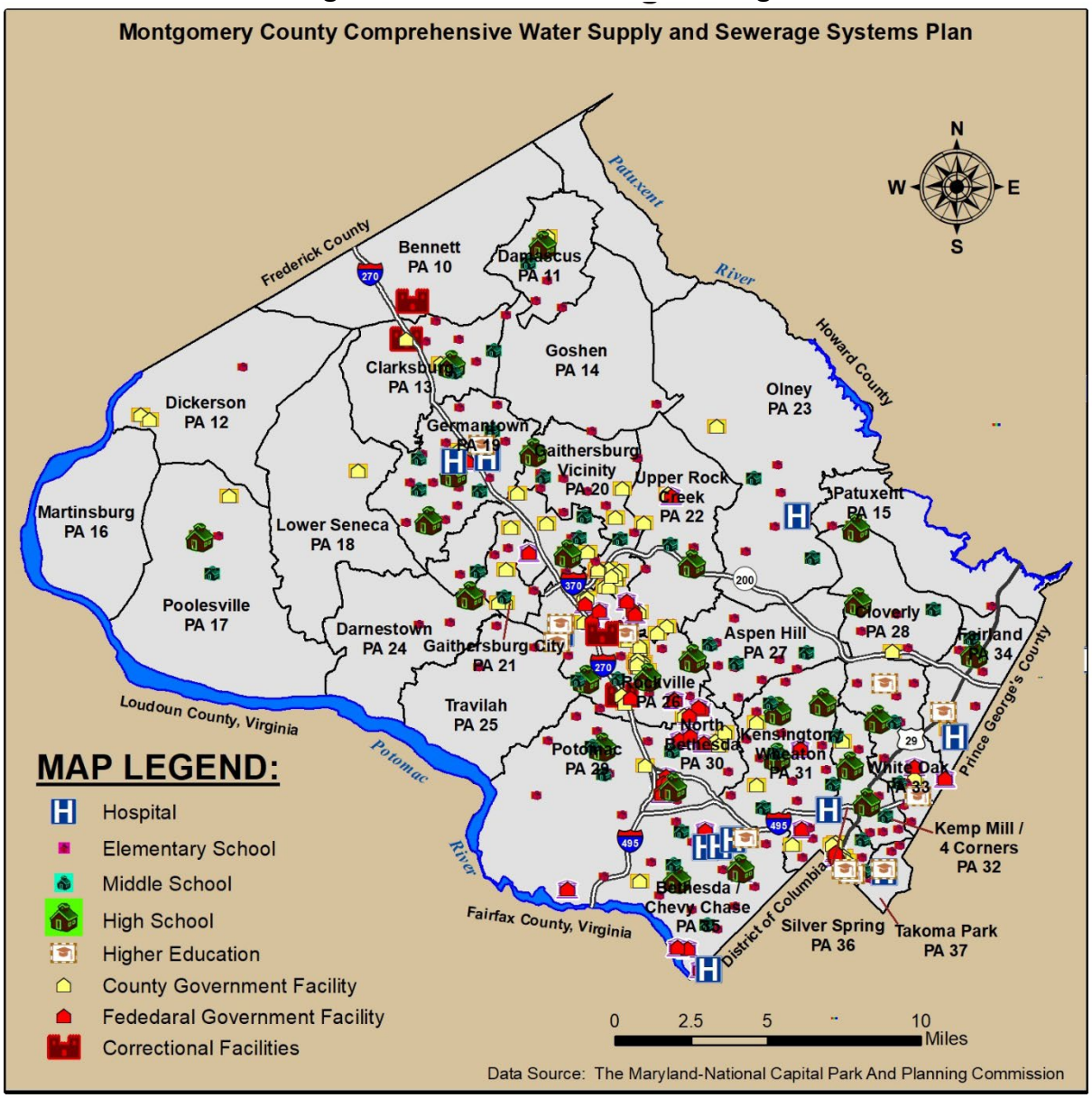


III.B.1 Planning Areas:

The Montgomery County Planning Department is responsible for developing master plans for development and analyzing various types of information to help public officials plan for Montgomery County's future. Each community within Montgomery County has a master plan that creates a comprehensive view of land use trends and future development.

Plans recommend land uses, zoning, transportation, schools, parks, libraries, and fire and police stations as well as address housing, historic preservation, pedestrian and trail systems and environmental issues. The County's Planning Areas are shown in Figure 2-F11. Also, shown in figure 2-F11 are major public institutions and facilities such as public schools, hospitals, and major government complexes. A listing of all major public institutions and facilities can be found in Appendix E.

Figure 2 – F11: M-NCPPC Planning Areas



III.C. DEMOGRAPHICS:

Population dynamics and forecasting is one of the main factors in developing plans for the County's future water supply and sewerage system needs. In cooperation with the Metropolitan Washington Council of Governments (MWCOG), the Research and Special Projects Division of M-NCPPC produces long-range forecasts of population, employment and housing for Montgomery County and areas within the County. Forecasts are based on analysis of data from a variety of sources, including local development, population and economic trends; models of the Washington, D.C. area population and economic base; and published state and federal statistical resources.

The latest forecasts (Round 9.1 Cooperative Forecasting) of population, households, and employment were developed and published by MWCOG in October 2018 through a

cooperative process involving the Council of Governments, its member jurisdictions, the Baltimore region, the states and other planning agencies.

Table 2-T4 include a summary of Population, households and at-place (place of work) employment data for Montgomery County produced through Round 9.1 Cooperative Forecasting. Data is presented in five-year increments from 2015 (Base Year) through 2045. For the most current population forecasting publications or to obtain additional details on MWCOG Round 9.1 Cooperative Forecasting, please refer to the following link:

https://www.mwcog.org/documents/2018/10/17/cooperative-forecasts-employment-population-and-household-forecasts-by-transportation-analysis-zone-cooperative-forecast-demographics-housing-population/

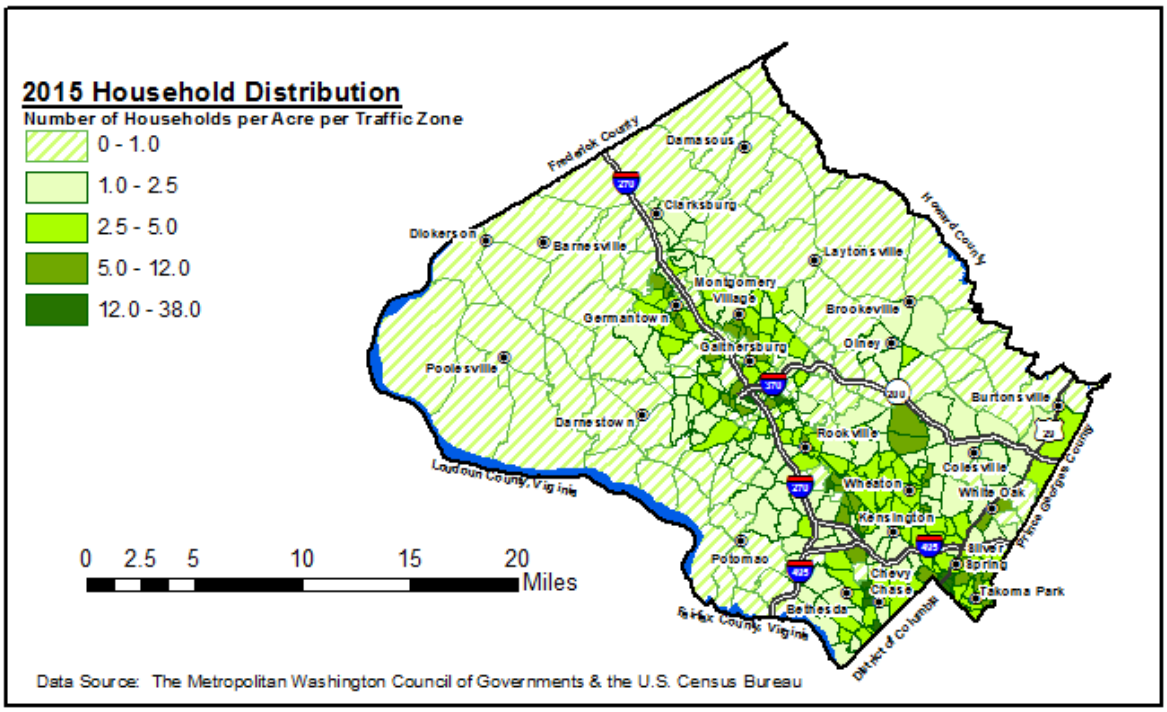
Also, for a more specific population trends in different jurisdictions or planning areas within Montgomery County, please refer to:
https://montgomeryplanning.org/tools/research/forecasting/

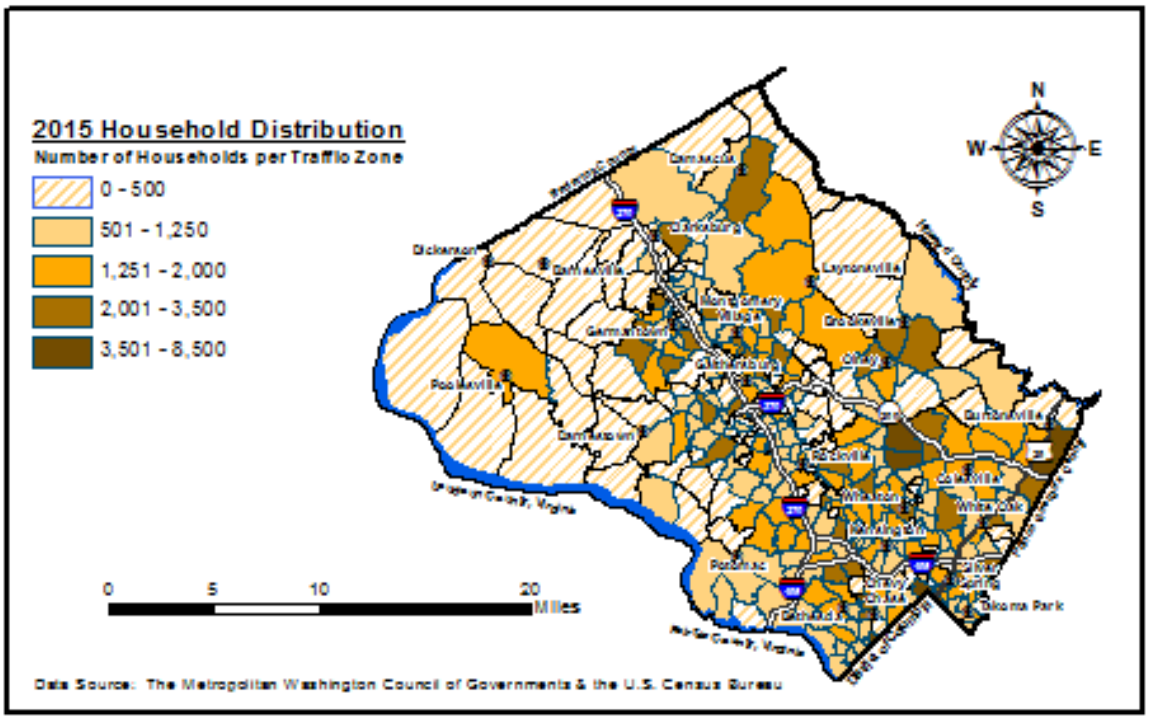
Table 2-T4: County-Wide Population, Household and Employment Forecasts

Year	2015	2020	2025	2030	2035	2040	2045
Total Population	1,015.3	1,052.0	1,087.3	1,128.8	1,167.7	1,197.1	1,223.3
No. of Households	374.9	391.2	405.7	422.3	438.1	450.9	461.9
Total Employment	520.2	543.5	572.5	604.5	627.4	653.9	678.8

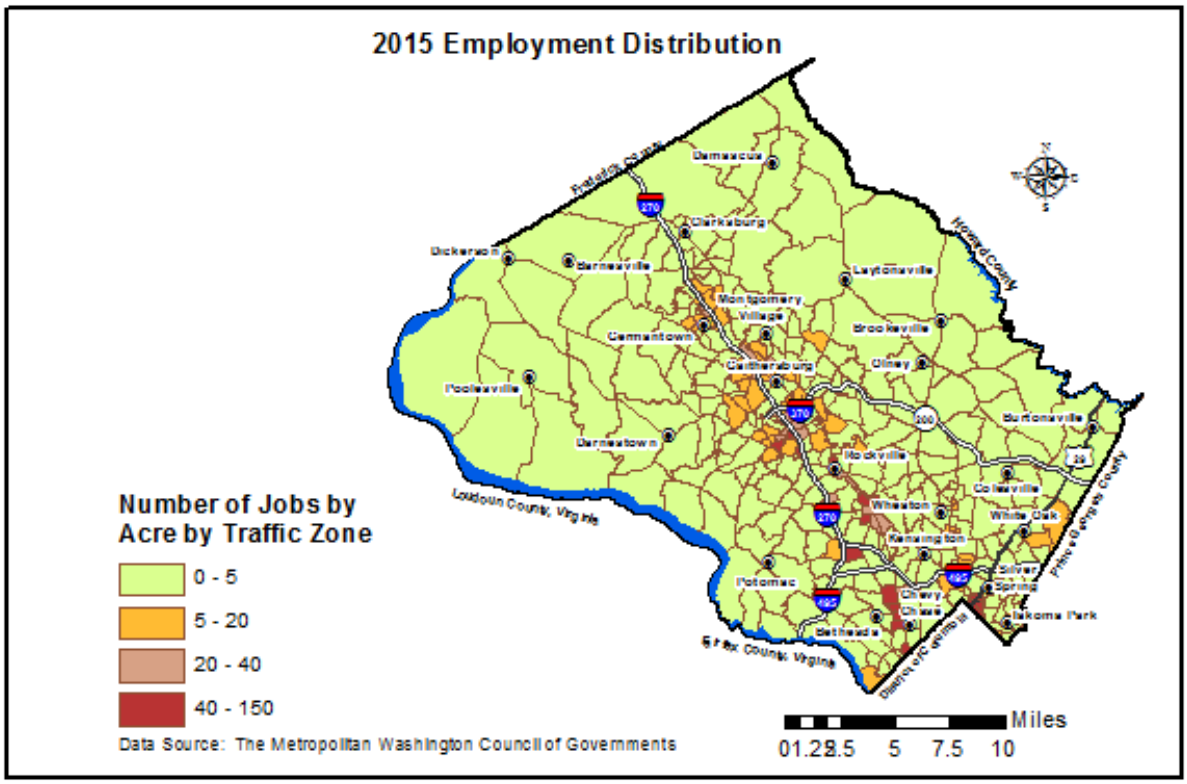
Note: "Total Population" includes all residential population from households and institutions.
Source: Round 9.1 Forecast (M-NCPPC, Research and Technology Center, & MWCOG – October 2018)

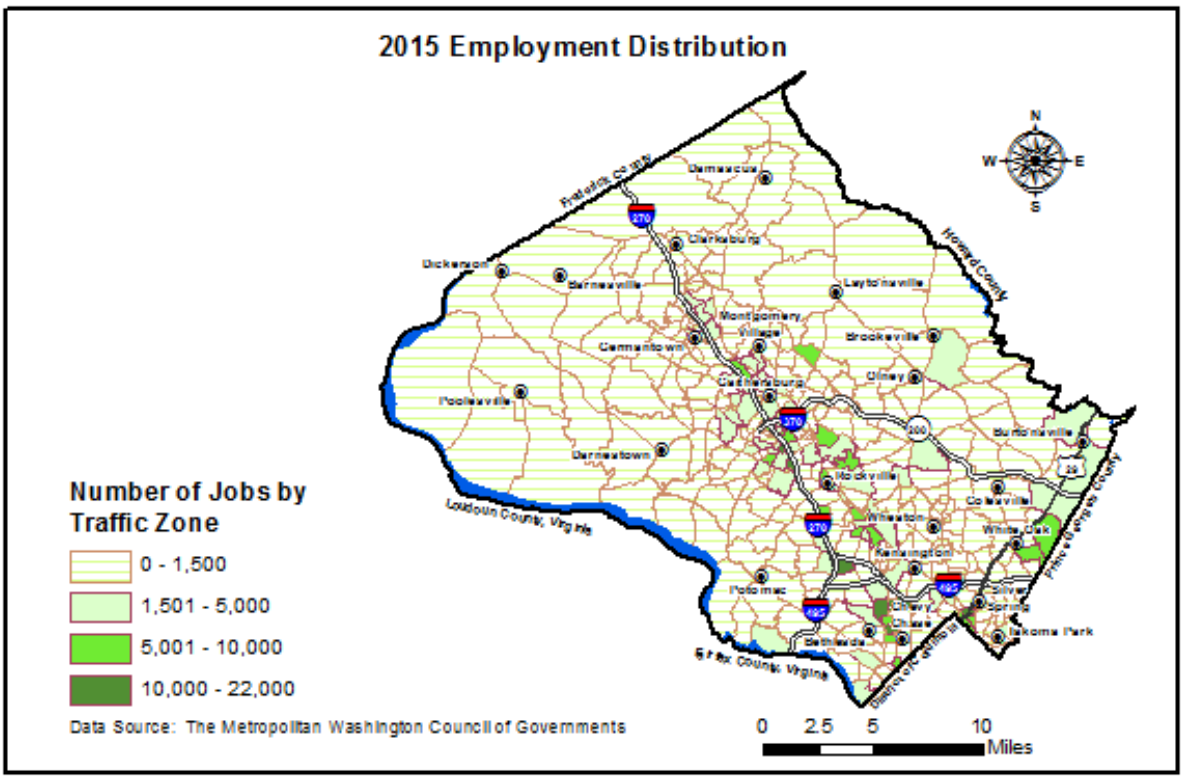
As shown in the following figures; consistent with past trends, the I-270 Corridor is expected to lead all other planning areas in household population growth over the 2015 to 2045 forecast period, both in the rate of growth and in actual household population. Most of this population growth will occur in areas with sanitary service from existing or proposed community water and sewerage systems.





Also, the distribution of employment locations in the County has followed the Wedges and Corridor pattern of the General Plan, as illustrated in the following figures.


2015 Employment Distribution
Number of Jobs by Acre by Traffic Zone
0 - 5
5 - 20
20 - 40
40 - 150
Data Source: The Metropolitan Washington Council of Governments
Miles
0 1.25 2.5 5 7.5 10
Frederick County
Howard County
Prince George's County
Loudoun County, Virginia
Fairfax County, Virginia
District of Columbia
Damascus
Clarksburg
Dickerson
Barnesville
Laytonsville
Montgomery Village
Brookeville
Germantown
Gaithersburg
Olney
Poolesville
Burtonsville
Rockville
Beltsville
Darnestown
Colesville
Wheaton
White Oak
Kensington
Potomac
Silver Spring
Chevy Chase
Takoma Park
Bethesda


2015 Employment Distribution
Number of Jobs by Traffic Zone
0 - 1,500
1,501 - 5,000
5,001 - 10,000
10,000 - 22,000
Data Source: The Metropolitan Washington Council of Governments
Miles
0 2.5 5 10
N
W
E
S
Frederick County
Howard County
Prince George's County
Loudoun County, Virginia
Fairfax County, Virginia
District of Columbia
Damascus
Clarksburg
Dickerson
Barnesville
Laytonsville
Montgomery Village
Brookeville
Germantown
Gaithersburg
Olney
Poolesville
Burtonsville
Rockville
Beltsville
Darnestown
Colesville
Wheaton
White Oak
Kensington
Potomac
Silver Spring
Chevy Chase
Takoma Park
Bethesda

The darkest patterns indicate the highest concentration of jobs. Traffic zones with more than 5,000 jobs are generally located in the Urban/Suburban Ring and in the I-270 Corridor. In the Ring, the highest concentrations are in the four central business districts, the City of Rockville, and the Rock Spring and West Farm office/industrial park areas. Employment is generally intense throughout the I-270 Corridor and centered along I-270 for the most part, with the Airpark to the northeast the most distant intensive location. In addition, the larger town and the satellite communities of Olney and Damascus have significant numbers of jobs, generally providing goods and services to local residents.