Comprehensive Plan 2040
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Chapter 13

Water Resources Element

WATER RESOURCES Element

Purpose

During the 2006 legislative session, the Maryland General Assembly passed House Bill 1141 which requires that Maryland jurisdictions with zoning authority prepare a Water Resources Element (WRE) and adopt their WRE in the County's Comprehensive Plan.

Local jurisdictions must:

- Identify drinking water and other water resources that will be adequate for the needs of existing and future development proposed in the Land Use Element of the Plan; and

- Identify suitable receiving waters and land areas to meet the stormwater management and wastewater treatment and disposal needs of existing and future development proposed in the Land Use Element of the Plan.

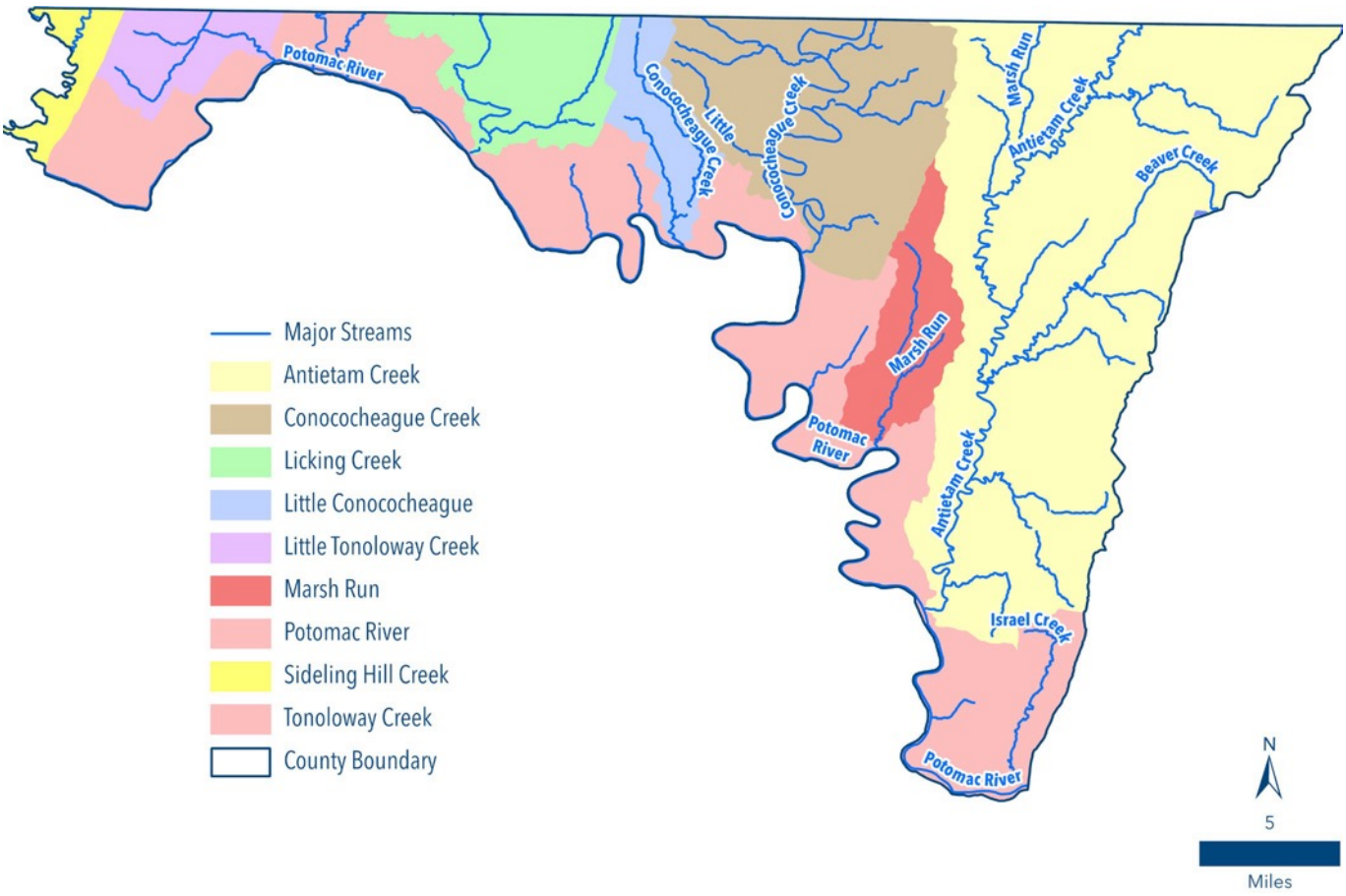
Municipal Coordination

There are nine (9) incorporated municipalities in Washington County: Boonsboro, Clear Spring, Funkstown, Hagerstown, Hancock, Keedysville, Sharpsburg, Smithsburg, and Williamsport. Each of these communities provides public water and wastewater services to their residents through various combinations of ownership and operation. To date Boonsboro, Hagerstown, Hancock, Keedysville, Smithsburg, and Williamsport have developed and submitted a WRE and Municipal Growth Element specific to their jurisdiction. To the extent possible, the County's WRE includes the most current data about each municipality to coordinate water resources, growth, and land-use planning.

Watersheds

Watersheds can be defined at many different scales. The United States Geological Survey (USGS) developed a ranked system for mapping all of the nation's watersheds. They are grouped from largest to smallest. These areas are called Hydrologic Units and are assigned a number known as a Hydrologic Unit Code (HUC) based on size. Currently, the most detailed level of nationwide drainage basin mapping available from the USGS is the 8-digit HUC. This Plan will utilize this system of 8-digit watersheds. As shown on Map 13-1 below there are nine different 8-digit watersheds located either, in whole or in part, in Washington County. Small portions of two other watersheds straddle the boundary between Washington and Frederick Counties. Catoctin Creek and the Upper Monocacy Creek have small portions of their watershed that are statistically irrelevant. Therefore, those sections are included throughout this section as part of the Antietam Creek watershed as part of a line and stream analysis.

Map 13-1: 8-Digit Watersheds in Washington County



Source: Maryland Department of Natural Resources

Drinking Water Assessment

Maintaining a sustainable water supply to meet current demands and provide for projected growth is vital to the future of Washington County. This means not only ensuring adequate water quantities but also that water quality is of a standard to provide safe drinking water. Evaluation of the County's water resources consider a variety of planning factors including jurisdictional boundaries, water service areas, designated growth areas, watersheds, and hydrogeomorphic areas. This section will describe the demand for drinking water in Washington County including public and private water systems, and water for agriculture, business and other uses.

Drinking Water Supply and Availability

Drinking water is obtained from both surface water and ground water sources in Washington County. Surface water is defined to include water resources that remain above ground in the form of rivers, lakes, streams, and other water bodies. Groundwater is located in subterranean aquifers and contained within rock layers below the water table. There is a public perception that because we have numerous, and highly visible, large stream systems in our area that there is an adequately abundant level of water resources available. However, quantity, quality, and availability must all be addressed to develop a safe and sustainable drinking water resource. Disruptions to the natural hydrologic cycle, such as droughts or severe flooding, can affect both the quantity and availability of these water supplies. Land use practices also have good and bad effects on the hydrologic cycle which makes sound land use planning essential to preserving water resources.

Surface Water

The largest surface water supply in Washington County is the Potomac River. The river drains a watershed of approximately 14,670 square miles that include parts of Maryland, West Virginia, Virginia, Pennsylvania, and the District of Columbia. The volume and consistency of flow is what makes the Potomac River the primary surface water resource for drinking water in the County. According to the Interstate Commission on the Potomac River Basin (ICPRB), the highest recorded flow on the Potomac was 275 billion gallons per day while the lowest recorded flow was 388 million gallons per day. They also report that the average flow of the river is approximately 7 billion gallons per day, not including water supply withdrawals. Overall, about 600 million gallons per day of water from the river is used for domestic water supply.

The Potomac River supply is augmented by two reservoirs: Jennings Randolph located on the North Branch of the Potomac in Garrett County, MD and Little Seneca Lake located on Little Seneca Creek near Boyds in Montgomery County, MD. Releases are made from the reservoirs when low flow conditions of 600-700 Mgd are present. Low flow conditions result from low summer rainfall, low groundwater levels, and low precipitation levels over the previous 12 months[1]. The Potomac River has a minimum flow-by requirement of 100 Mgd (the minimum flow needed to maintain suitable conditions for fish and aquatic communities); summertime demand ranges between 400 and 700 Mgd.

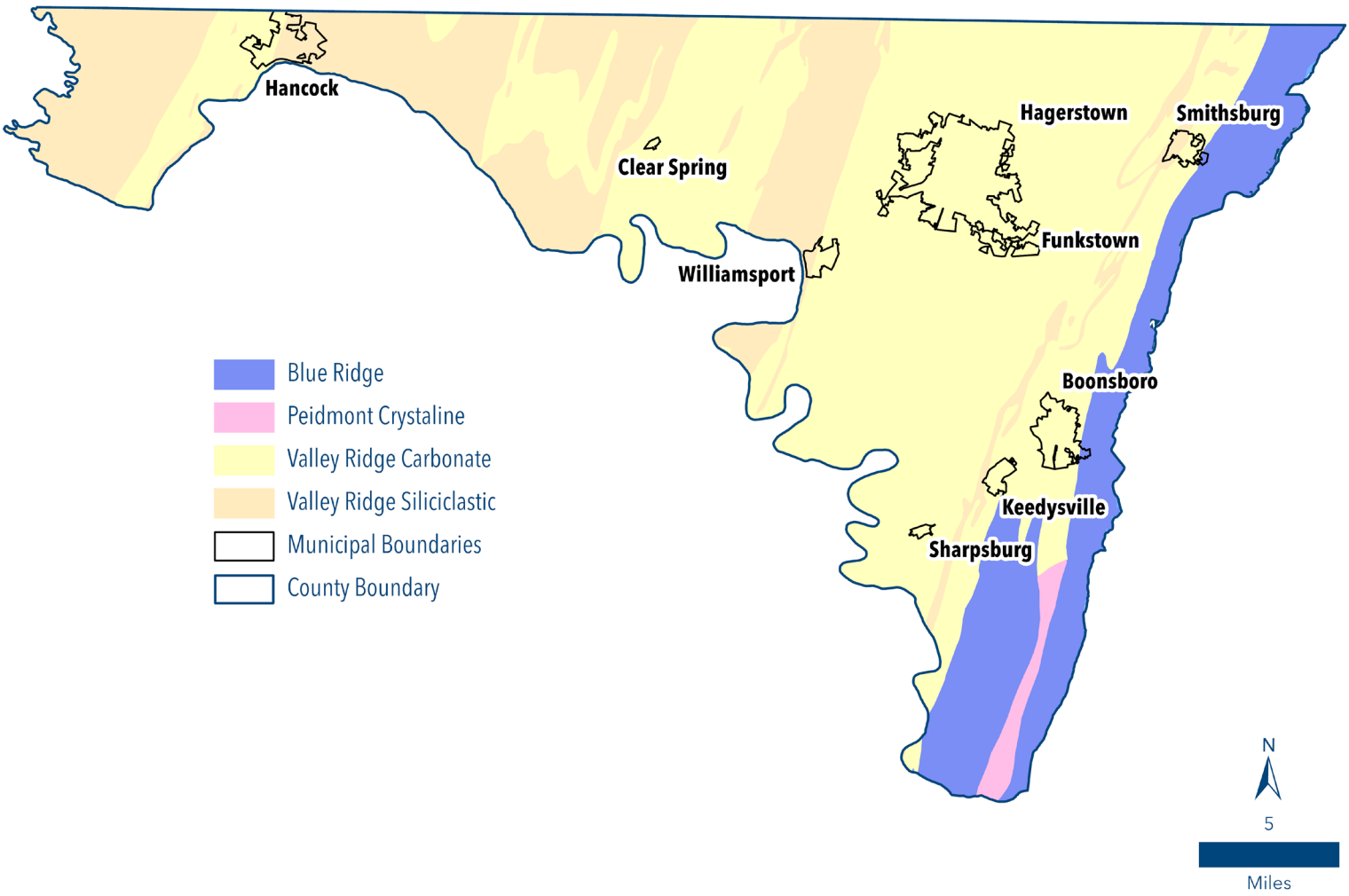
While there are other sources of surface water that could be used, seasonal variability of stream flow and the inability to meet flow by requirements established by the State limit their availability.

1 ICPRB Water Supply Outlook, October 2008.

Ground Water

Because the availability of ground water supply is commonly dependent upon the underlying geologic conditions of the area it is important to understand how water gets into the ground and how it flows and interacts with the subsurface. For this analysis, data from the USGS and the Maryland Geological Survey regarding water yield characteristics were used. According to the USGS, there are three (3) primary hydrogeomorphic regions within Washington County, the Blue Ridge, Valley and Ridge Carbonate, and Valley and Ridge Siliciclastic. There is a fourth, very small hydrogeomorphic region in southern Washington County in the Israel Creek watershed known as Piedmont Crystalline. Because the area is so small and does not have a high statistical variance from the geology surrounding it, this area is included in the Blue Ridge region for analysis purposes.

Map 13-2: Hydrogeomorphic Regions in Washington County



Source: USGS

Ground Water Characteristics

Within the Blue Ridge (BR) region only small differences exist in the water-bearing capacities of the geologic formations. According to compiled data, the mean yield from wells is less than 10 gallons per minute (gpm) with a range from 1 to 60 gpm. The best yields appear to be located in the Catoctin metabasalt formation in the Cascade-Highfield-Fort Ritchie area. Springs in this water province, although numerous, are generally small with discharges ranging from less than 10 to 100 gpm. The chemical quality of groundwater is considered suitable for most uses with spring water lower in mineral content, but slightly more acidic than well water.

The Valley and Ridge Carbonate (VRC) hydromorphic region is the largest section of geology in the County underlying nearly two-thirds of the total land area of the County. The quantity of groundwater available in the limestone and dolomite aquifers of the Hagerstown Valley is quite large. The typically karst characteristics of carbonate geology provide the highest storage and capacity of groundwater but also leave water resources vulnerable to contamination. Wells drilled in the Hagerstown Valley yield from 2 to 400 gpm, with the Tomstown dolomite, Conococheague limestone, and Stonehenge limestone producing the highest yields. Springs also occur throughout the Hagerstown Valley water province and have a low discharge range from 25-100 gpm to a high discharge range of 2000-3000 gpm.

The third major region in Washington County is the Valley and Ridge Siliciclastic (VRS) province. This area extends westward from the Fairview-Powell Mountains to the western border of the County. While the geologic materials in the subsurface are similar and consistent with a Siliciclastic province, in Washington County there is a distinct difference in water recharge calculations in areas west of Sideling Hill.

In the eastern portion of the VRS region from Fairview Mountain to Sideling Hill, shale is the dominant rock type. Groundwater recharge is low because shale soils typically contain a low to moderate moisture holding capacity and a relatively high direct surface runoff result. Hydrogeologic conditions, therefore, are unfavorable for large capacity wells of any sustained yield. Springs occur in all of the formations in the Hancock-Indian Springs water province, and are for the most part, gravity fed. The western portion of the VRS region between Sideling Hill and Sideling Hill Creek contains a geologic subsurface that produces a very low water yield. The best well in the province yields only 36 gpm which indicates the absence of any significant groundwater supplies.

Ground Water Supply Using The Water Balance Methodology

Groundwater supply is difficult to predict because of the many variables that effect the hydrologic cycle. Climate, vegetation, geology, and land use can all play significant roles in the potential capacity of underground water supplies. MDE has recommended using a water balance methodology to identify and estimate available groundwater supplies based on water recharge data for the different hydrogeomorphic regions within the State. Using the recommend methodology outlined in MDP's Models and Guidelines for the Water Resources Element (No. 26), the estimated groundwater availability for Washington County is illustrated in the table below.

Table 13-1: Hydrogeomorphic Region Recharge Rates

Hydrogeomorphic Region	Drought Recharge (in.)	7-day 10-year low flow (in.)	Basin Area (acres)	Conversion Variable	Available Recharge (gpd)
Blue Ridge (BR)	5.7	0.2	44,558	74.346	18,219,900
Valley & Ridge Carbonate (VRC)	7	2.8	181,076	74.346	56,541,560
Valley & Ridge Siliciclastic east of Sideling Hill (VRS-E)	6.9	1.4	55,930	74.346	22,869,945
Valley & Ridge Siliciclastic west of Sideling Hill (VRS-W)	3.7	0.8	17,958	74.346	3,871,806

Source: Maryland Department of Planning, Models and Guidelines #26 Water Resource Element

As noted in the Models and Guidelines document on page 61, there are some limitations and warnings on the accuracy of the data. First, it should be noted that this analysis calculates an "upper limit" of potential within an aquifer that many not be realistically extractable. Therefore, this analysis is meant to be used for planning purposes only and may not be used in place of site-specific analysis for withdrawal permit approval. This analysis may also have a high margin of error based upon extreme changes in climate (i.e. droughts, snowfall levels, flooding, etc.). Some hydrogeomorphic regions are more susceptible to significant changes in climate than others.

Drinking Water Demand and Capacity

There are multiple public and private water supply systems under varying degrees of ownership and operation in the County. They range in size from a few thousand gallons of withdrawal and usage per day to millions of gallons per day. As shown in Table 13-2, the majority of freshwater use and withdrawal is for public and private (domestic) drinking water.

Approximately 42,570 households in the County and municipalities receive drinking water from a public or private community water system.

Table 13-2:Freshwater Use and Withdrawals in Washington County

Type of Withdrawal	Surface Water (Mgd)	Ground Water (Mgd)	Total (Mgd)	Percent of County Withdrawals
Public Water Supply	16.29	0.98	17.27	61.1%
Domestic Supply	0	3.51	3.51	12.4%
Commercial	0	0	0	0.0%
Industrial	0	0.02	0.02	0.1%
Mining	0	0.64	0.64	2.3%
Livestock Watering	0.35	0.45	0.8	2.8%
Aquaculture	0	5.86	5.86	20.7%
Irrigation	0.06	0.1	0.16	0.6%
Totals	**16.7**	**11.56**	**28.26**	**100.0%**

Source: USGS Water Science Center, Freshwater Use and Withdrawals (2015)

Public Water Systems

Publicly owned and operated water systems exist mostly within designated growth areas of the County but also exist in rural areas where water quality and/or quantity issues have created the need for intervention. Public water systems in the County have a combined permitted allocation of over 17.2 million gallons per day and primarily depend upon surface water resources.

There are currently two water treatment facilities in the County that use surface water from the Potomac River as a raw water source for treatment, the City of Hagerstown and the Town of Sharpsburg. Currently, the City of Hagerstown holds a Water Appropriation and Use Permit for the withdrawal of water from the Potomac River in the amount of 15 Mgd. This is the sole public water drinking source for the Urban Growth Area. The County holds the appropriation permit for the Sharpsburg treatment facility in the amount of 200,000 gpd.

The only other surface water drinking resource is the Edgemont Reservoir. Also known as the Warner Gap Hollow Dam, it was built in 1902 and is currently owned by the City of Hagerstown. Water impounded and stored within the reservoir drains from Warner Hollow and Raven Rock Runs. Both streams are located within the larger Antietam Creek watershed. At full capacity the reservoir is estimated to be able to hold nearly 85 million gallons of water. The impounded water is transmitted to the William M. Breichner treatment facility located in the Town of Smithsburg. According to the City's Comprehensive Plan, this treatment facility has a maximum treatment capacity of 4.5 Mgd and has a permitted appropriation permit of 750,000 gpd. In 2015 the reservoir was drained due to ongoing seepage issues in the dam embankment and concerns with potential dam failure. The City is continuing to negotiate with MDE regarding the scope of repairs and amount of funding available for the reservoir to again be used as a surface water impoundment. Therefore, in the interim, this resource is not being included in potential drinking water availability.

The remainder of the publicly owned and maintained drinking water systems in the County rely upon ground water resources or purchase water as a wholesale user. Three municipalities who own and maintain drinking water distribution systems in the County purchase water from the City of Hagerstown and pay a wholesale rate based upon permitted allocation agreements. Those communities are Funkstown, Smithsburg, and Williamsport. Other municipalities that rely upon ground water resources include Boonsboro (which also serves the Town of Keedysville), Clear Spring, and Hancock. There are also four non-incorporated areas of the County with public water systems that rely upon groundwater for drinking water supplies. They include Elk Ridge, Mt. Aetna, Sandy Hook and Highfield/Cascade/Fort Ritchie areas.

The table below (Table 13-3) shows the existing and projected future drinking water demand as well as projected available capacity for each of the public water systems in the County. Projected capacities are derived from two growth scenarios described in the Land Use Element. For this Plan there are two growth scenarios being analyzed for projected growth and demand, a moderate growth and a high growth scenario. The moderate growth scenario assumes a historic level of growth to continue while the high growth scenario assumes a growth rate 50% above the moderate scenario.

Under a moderate growth scenario, there is one facility that may exceed its current permitted allocation. Two municipalities are projected to have demand exceed capacity under high growth scenarios. There are currently plans under way by both City of Hagerstown and the Town of Boonsboro to bolster future water demands. The potential deficits projected by this analysis highlights the need for collaboration between the County and the City to prepare for future anticipated needs.

Table 13-3: Water Resource Usage - Current and Projected

			City of Hagerstown	Boonsboro/ Keedysville[2]	Clear Spring	Hancock	Elk Ridge	Highfield/ Cascade/ Ft. Ritchie	Mt. Aetna	Sandy Hook	Sharpsburg
Existing	Permitted Capacity	MGD	15.000	0.683	0.200	0.300	0.011	0.450	0.170	0.022	0.266
		EDU	75,000	2,732	1,000	1,200	55	2,250	850	110	1,330
	Average Daily Flow[3]	MGD	12.210	0.453	0.123	0.225	0.008	0.117	0.037	0.014	0.126
		EDUs	61,050	1,812	615	900	38	583	187	72	631
	Available Capacity	**MGD**	**2.790**	**0.230**	**0.077**	**0.075**	**0.003**	**0.333**	**0.133**	**0.008**	**0.140**
		EDU	**13,950**	**920**	**385**	**300**	**17**	**1,667**	**663**	**38**	**699**
Moderate Growth	Projected Demand from Wholesale Customers[1]	MGD	0.570	0	0	0	0	0	0	0	0
		EDU	763	0	0	0	0	0	0	0	0
	Projected Demand 2040 (municipal)	MGD	0.450	0.265	0.003	0.016	0.000	0.000	0.000	0.000	0.003
		EDU	2,252	1,059	15	64	0	0	0	0	15
	Projected Demand 2040 (County)	MGD	1.4232	0.004	0.002	0.003	0	0.137	0.002	0.002	0
		EDU	7,116	15	10	10	0	687	10	10	0
	Projected Demand thru 2040	MGD	2.444	0.269	0.005	0.019	0.000	0.137	0.002	0.002	0.003
		EDU	10,131	1,074	25	74	0	687	10	10	15
	Projected Available Capacity 2040	**MGD**	**0.346**	**(0.038)**	**0.072**	**0.057**	**0.003**	**0.196**	**0.131**	**0.006**	**0.137**
		EDU	**3,819**	**(154)**	**360**	**226**	**17**	**980**	**653**	**28**	**684**
High Growth	Projected Demand From Wholesale Customers	MGD	0.572	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		EDU	2,858	0	0	0	0	0	0	0	0
	Projected Demand 2040 (municipal)	MGD	1.111	0.266	0.003	0.237	0.000	0.000	0.000	0.000	0.003
		EDU	5,556	1,063	15	1,184	0	0	0	0	15
	Projected Demand 2040 (County)	MGD	3.099	0.005	0.002	0.004	0.000	0.204	0.002	0.002	0.002
		EDU	15,495	20	10	15	0	1,018	10	10	10
	Projected Demand thru 2040	MGD	4.782	0.271	0.005	0.241	0.000	0.204	0.002	0.002	0.005
		EDU	23,909	1,083	25	1,199	0	1,018	10	10	25
	Projected Available Capacity 2040	**MGD**	**(1.992)**	**(0.041)**	**0.072**	**(0.166)**	**0.003**	**0.129**	**0.131**	**0.006**	**0.135**
		EDU	**(9,959)**	**(163)**	**360**	**(899)**	**17**	**649**	**653**	**28**	**674**

Unless otherwise noted, it is assumed that 1 EDU = 200 gpd
[1] Towns of Funkstown, Smithsburg and Williamsport purchase water from City as wholesale users
[2] Utility provider assumes that 1 EDU-250gpd
[3] All reported numbers are average daily flows with the exception of the City of Hagerstown. They use peak flow for planning purposes.

Private Community Water Systems

Privately owned and operated water systems typically exist in the rural areas of the County for a specific use or development that was established prior to regulatory health statues regarding water quality. Developments include uses such as mobile home parks, educational facilities, and community service facilities. These small private water facilities have a combined permitted allocation of just over 100,000 gpd and primarily depend upon ground water resources. Examples include Brook Lane, Conococheague Apartments, Saint James School, San Mar Children's Home, and Fahrney-Keedy Home and Village. In accordance with the adopted Water and Sewerage Plan for the County, expansion of existing/establishment of new private community water systems that are maintained by the County are prohibited. Facilities under private management are regulated and monitored by MDE.

Domestic Water Supply

County residents outside the available limits of public/private community systems depend primarily upon ground water extraction from a private on-site well. There are a few locations where cisterns are still used, however, the storage tank must be detached from a rooftop gathering system and may only contain potable water purchased from a certified hauler. The State no longer permits installation of new water holding tank systems such as cisterns as a potable water supply. Rainwater catchment systems such as rain barrels and other holding tanks may be used for non-drinking water uses such as irrigation.

The majority of private wells that serve residential, commercial and industrial uses in the County are located with the Valley and Ridge Carbonate geologic structure. These areas typically have the highest volume and recharge aquifers in the County. They are also the most susceptible areas for ground water contamination due to the karst characteristics of the rock formations.

Agricultural/Aquaculture Water Usage

The second largest category of water usage in the County is for agricultural purposes, more specifically related to aquaculture. A small amount of the agricultural water use in the County is associated with livestock watering and crop irrigation. The largest usage of agricultural demand is associated with the Albert Powell Fish Hatchery. The hatchery is one of three cold water fish hatchery facilities owned and operated by the State. Personnel at the hatchery hatch more than 600,000 trout eggs annually that are used to supply fall and spring stocking seasons across the State.

The water used by the hatchery is supplied by the second largest spring in the State which produces an average of 3,400 gallons of water per minute.

Water Quality/Source Water Assessments

In addition to water quantity evaluations, water quality of the ground water is an integral part of evaluating the drinking water supplies in the County. Different issues can exist for ground and surface water sources, however, most of the underlying geology of the County is karst in nature, therefore much of the County is potentially under the influence of surface water. Because of this unique geology, most areas of the County can be susceptible to a wide array of contaminants.

Surface water is typically vulnerable to contamination from non-point sources such as runoff from impervious surfaces and agricultural lands. These sources of contamination can cause water quality concerns such as sedimentation, fecal contamination, and contamination from potential spills. Ground water quality can be affected by more naturally occurring substances such as radon or iron but also can be contaminated by fecal coliform from septic systems that are prevalently used in the rural areas. As noted in the Mineral Resources Chapter, ground water can also be impacted by quarrying operations. The State has delineated zones of dewatering influence where operations may impact wells of individual residences or community systems.

Source Water Assessments have been completed by MDE to evaluate public drinking water systems and identify their vulnerabilities to contamination. They do not assess the treatment plant or the distribution system through which the water passes. These are assessed separately through other mechanisms. Details on each of these systems are available on MDE's website. The most common water quality concerns include sedimentation, nitrates, radon, fecal contamination (Cryptosporidium and Giardia), and microbiological.

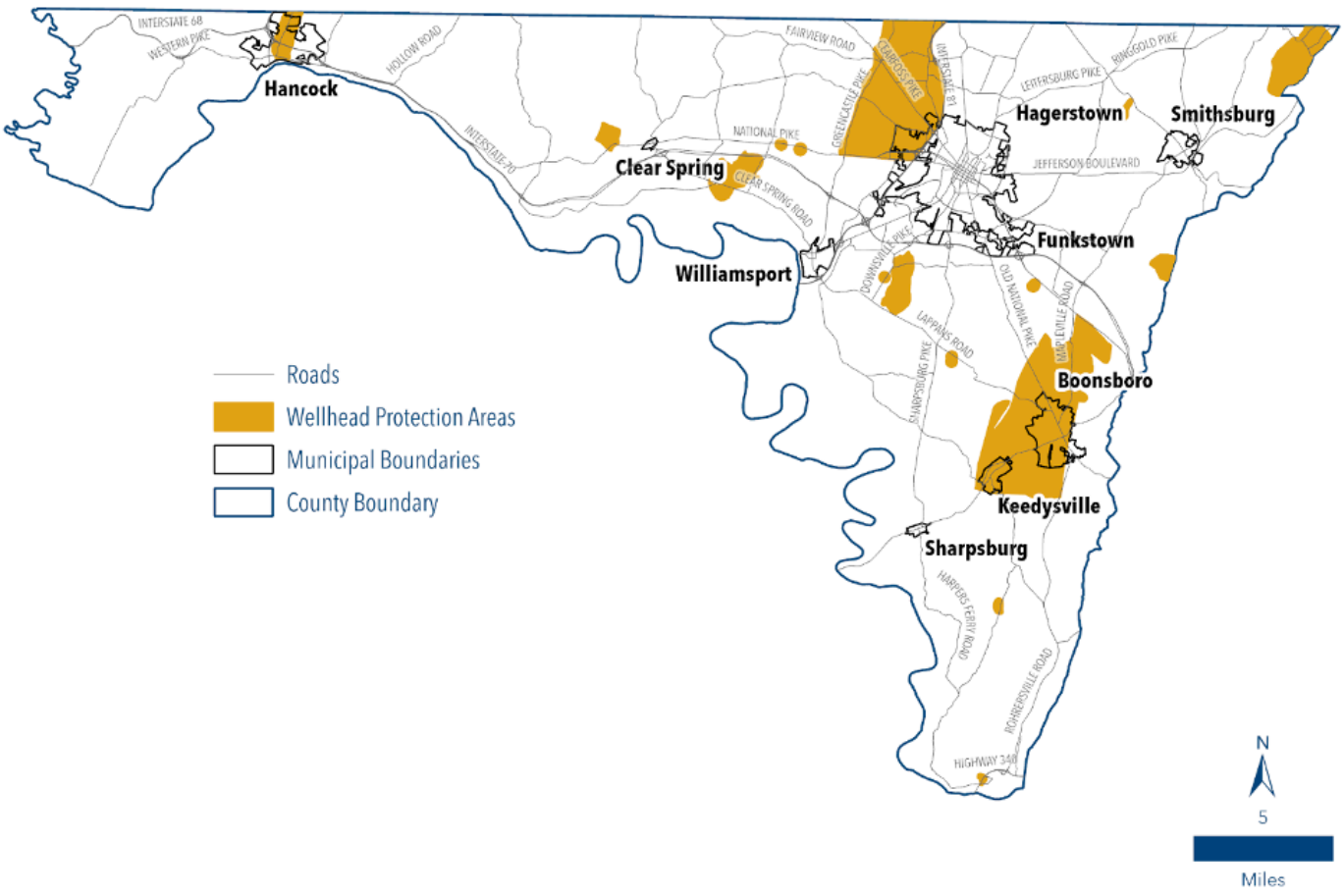
Wellhead Protection

Wellhead Protection is a strategy designed to protect public drinking water supplies by managing the land surface around a well where activities might affect the quality of the water. Between 2000 and 2005, the MDE published a series of assessments for each of the County's community water systems that rely on groundwater. Components of MDE's water supply assessment include:

1. Delineation of an area that contributes water to the source
2. Identification of potential sources of contamination, and
3. Determination of the susceptibility of the water supply to contamination.

Potential sources of contaminants include agricultural activities, gas stations, and industrial uses that store and use various liquids such as gasoline, diesel fuel, and kerosene. The improper use, storage, disposal, or release of these or other substances from agricultural, industrial, or residential activities can harm groundwater quality. The contaminants may include volatile organic compounds, radionucleotides, synthetic organic compounds, microbial contaminants, and nitrates. This Comprehensive Plan recommends adoption of a wellhead protection ordinance.

Map 13-3: Wellhead Protection Areas



Addressing Issues of Concern - Drinking Water

One of the major goals of the Water Resource Element is to better link land use plans with water and wastewater capacity management plans. As shown in Table 13-3, public water systems across the County could likely accommodate moderate growth scenario projections. There is a slight deficit within the Boonsboro growth area, however, improvements are currently being pursued by the Town to improve their water system through Inflow and Infiltration (I&I) mitigation. High growth scenarios provide a less optimistic view of available capacity.

While most systems have available capacity, a few are projected to fall short of meeting demand. The most concerning of these systems is the City of Hagerstown. As the largest utility provider of public water for the UGA and several municipalities, the large amount of unmet allocation could create long term capacity issues if steps are not taken presently. The city treatment is currently approved to treat 15 MGD and in the future can increase its withdrawal permit; however, treatment of the water supply is currently at its peak capacity due to the age of the system and that its transmission lines would need to be upgraded to handle the increased hydraulic capacity. Steps should be taken now to plan for future improvements that will be necessary to adequately service growth within the UGA and several municipalities. Recommendations are included at the end of the chapter that address these concerns.

Potential New Water Supplies

Surface Water Sources

- **Increased withdrawal from the Potomac River –** The City of Hagerstown currently has a water appropriation permit from the State of Maryland to withdrawal up to 15 Mgd. According to the City's Water Capacity Management Plan, once demand reaches 85% of the current appropriation, they can begin working with MDE on an increase in appropriation. The current treatment facility has capacity to handle up to 18 Mgd, however, deficiencies exist in the current distribution system that preclude an increase currently. Significant investment will need to be made by the City to the hydraulic capacity at the RC Willson WTP and its existing transmission mains to accommodate an increase in allocation. Some funding opportunities have been realized, however, additional resources will need to be investigated to fully fund the necessary upgrades. The City also notes in their Water Resources Element that additional system projects to address deteriorating pipe, system pressure and water quality will be necessary to handle the increase

- **Edgemont Reservoir –** Continued seepage issues in the earthen dam facility caused MDE to declare the structure unacceptable and the reservoir was drained in 2015. Other issues have been found in the spillways of the dam that will need to be addressed. The City is continuing to negotiate with MDE regarding the scope of repairs and amount of funding available to revive this facility as a drinking water source. At full capacity the facility can provide up to 750,000 gpd.

Potomac River Source: visithagerstown.com

Edgemont Reservoir - Source: hazenandsawyer.com

Ground Water Sources

The aquifers found in the Valley and Ridge Carbonate regions of the Hagerstown Valley are typically plentiful and have larger storage capacity than other areas making them a likely target for additional ground water supply. These areas have historically been adequate to service public systems and individual wells. While this region is generally the most prolific, it can also be erratic and susceptible to contamination due to the karst nature of the underlying geology.

With limitations in the City's treatment capacity and distribution system, the County may investigate options in establishing another public water source within the Urban Growth Area. A new system would likely require the drilling of wells and installation of appropriate water treatment facilities. Depending upon the gallons generated by the wells, the level of service could range from small and localized to modest and regional. No specific locations have been determined at this time.

Water Conservation and Reuse

Water conservation is a low-cost option for extending the life of existing water supplies. The Maryland Water Conservation Plumbing Fixtures Act (MWCPFA) requires that new plumbing fixtures sold or installed as part of new construction are designed to conserve water. Future efforts to upgrade the water distribution system will contribute to water conservation by reducing system water loss due to leaks.

Beyond these regulatory requirements and major capital projects, the County also proactively promotes water conservation through a concerted public education program, and by coordinating with the State to seek funding for upgrades to appliances and water fixtures. Careful planning of stormwater management techniques, as well as the location and species of landscaping on County streets can help to reduce or eliminate outdoor watering needs, thus reducing water demand.

Water reuse generally takes the form of what is known as graywater. According to State definitions, graywater includes bath/shower water and lavatory sink water but does NOT include toilets, kitchen sink, dishwasher or laundry water. Uses depend upon the level of treatment but may range from outdoor irrigation to toilet flushing. Graywater reuse is heavily recommended and sometimes required in LEED (Leadership in Energy and Environmental Design) certified development.

Wastewater Assessment

Wastewater management is a key service that influences land development patterns and impacts water resources. This section will describe the demand for wastewater serviced in the County, evaluate pollutant loading that can be discharged into stream and rivers, and consider areas of concern and potential solutions related to wastewater treatment and disposal.

Public Wastewater Systems

There are currently ten (10) public wastewater treatment plants (WwTPs) in Washington County. Treatment technology at these various facilities range from lagoon systems to enhanced nutrient removal systems (ENR). The table below summarizes these facilities, their discharge location and the current treatment technology.

Table 13-4: Wastewater Facilities

Wastewater Treatment Facility	Discharge Location	Treatment Technology
City of Hagerstown WwTP	Antietam Creek	ENR
Conococheague WwTP	Conococheague Creek	ENR
Antietam (Sharpsburg) WwTP	Antietam Creek	Oxidation ditch
C. William Winebrenner (Ft. Ritchie) WwTP	Falls Creek	ENR
Sandy Hook WwTP	Martins Run	Extended aeration with nutrient removal capabilities; Activated sludge
Smithsburg WwTP	Grove Creek	SBR with the ability to achieve ENR
Town of Boonsboro WwTP	Unnamed tributary to Little Antietam Creek	SBR with the ability to achieve ENR
Town of Clear Spring WwTP	Toms Run	Oxidation ditch
Town of Funkstown WwTP	Antietam Creek	SBR with the ability to achieve ENR
Town of Hancock WwTP	Tonoloway Creek	Aerated lagoon

The County owns and operates five (5) of the WwTPs including the Conococheague, Antietam, Smithsburg, Winebrenner, and Sandy Hook facilities. The remainder of the WwTPs are owned and operated by municipalities.

Private Community Wastewater Systems

Privately owned and operated wastewater systems typically exist in the rural areas of the County for a specific use or development that was established prior to regulatory health statues regarding water quality. Developments include uses such as mobile home parks, educational facilities, and community service facilities. These small private wastewater facilities generally have a very small treatment capacity and range in design capacity between 6,000 gpd to 50,000 gpd. Examples include Brook Lane, Hunter Hill Apartments, Highland View Academy, Greenbrier State Park, and Fahrney-Keedy Home and Village. In accordance with the adopted Water and Sewerage Plan for the County, expansion of existing/establishment of new private community wastewater systems that are maintained by the County are prohibited. Facilities under private management are regulated and monitored by MDE.

Private On-Site Septic Systems

Residences and businesses outside of the County's community sewerage service areas treat their wastewater with onsite sewer disposal systems (OSDS). It is estimated that there just over 21,000 residential septic systems in Washington County.

These systems are intended to be temporary in nature as an interim solution until public facilities can be extended to service the development. However, in rural communities such as Washington County, these systems have become more permanent due to the infeasibility of service extension to a large portion of our rural areas. Depending upon the age of the structure/development, these facilities vary in treatment process from cesspools and seepage pits to Best Available Technology (BAT) systems.

Wastewater Treatment Capacity and Demand

The following table (Table 13-5) depicts the current WwTP capacities, their current demand, and their projected demand. It is important to note that this table includes facilities not under the management of the County due to their inclusion in County designated growth areas. Information related to treatment facilities not under the management of Washington County has been extracted from each of the utility's jurisdictional Comprehensive Plans with the exception of Hancock. The Town of Hancock submitted a Water and Sewerage Plan amendment in 2021 that included data for a proposed increase in capacity. Data from that amendment has been used in this table.

The purpose of including the non-County managed facilities is to acknowledge impacts of potential development under County jurisdiction on municipal utilities. With the exception of the Urban Growth Area which surrounds the City of Hagerstown, there is very little anticipated impact on municipal wastewater utilities.

Photo: Wastewater Treatment Facility in Smithsburg

Table 13-5: Wastewater Treatment Plant Capacity - Current and Projected

			City of Hagerstown	Conococheague	Keedysville/ Sharpsburg	Highfield/ Winebrenner	Sandy Hook	Smithsburg[2]	Boonsboro[1]	Clear Spring	Funkstown	Hancock
Existing	Permitted Capacity	MGD	8.00	4.500	0.163	0.600	0.030	0.333	0.530	0.200	0.200	0.380
		EDU	40,000	22,500	815	3,000	150	1,417	2,120	1,000	1,000	1,900
	Average Daily Flow	MGD	7.320	3.914	0.114	0.115	0.014	0.323	0.290	0.082	0.052	0.300
		EDUs	36,600	19,570	570	575	70	1,374	1,160	410	260	1,500
	Adjustments for Flow Transfer and Capacity Improvements	MGD	(0.160)	4.160	0	0	0	0.117	0	0	0	0.150
		EDUs	(800)	20,800	0	0	0	498	0	0	0	750
	Available Capacity	**MGD**	**1.340**	**4.746**	**0.049**	**0.485**	**0.016**	**0.127**	**0.240**	**0.118**	**0.148**	**0.230**
		EDU	**4,200**	**23,730**	**245**	**2,425**	**80**	**541**	**960**	**590**	**740**	**1,150**
Moderate Growth	Projected Demand 2040 (municipal)	MGD	0.450	0.052	0.021	0.000	0.000	0.083	0.240	0.003	0.030	0.013
		EDU	2,252	258	103	0	0	355	960	15	150	64
	Projected Demand 2040 (County)	MGD	0.925	0.498	0.000	0.137	0.002	0.004	0.004	0.002	0.000	0.002
		EDU	4,625	2,491	0	687	10	15	15	10	0	10
	Projected Demand thru 2040	MGD	1.375	0.550	0.021	0.137	0.002	0.087	0.244	0.005	0.030	0.015
		EDU	6,877	2,749	103	687	10	370	975	25	150	74
	Projected Available Capacity 2040	**MGD**	**(0.035)**	**4.196**	**0.028**	**0.348**	**0.014**	**0.040**	**(0.004)**	**0.113**	**0.118**	**0.215**
		EDU	**(177)**	**20,981**	**142**	**1,738**	**70**	**171**	**(15)**	**565**	**590**	**1,076**
High Growth	Projected Demand 2040 (municipal)	MGD	1.111	0.052	0.021	0.000	0.000	0.407	0.240	0.003	0.30	0.237
		EDU	5,556	258	103	0	0	1,730	960	15	150	1,184
	Projected Demand 2040 (County)	MGD	2.014	1.085	0.000	0.204	0.002	0.005	0.005	0.002	0.000	0.003
		EDU	10,072	5,424	0	1,018	10	20	20	10	0	15
	Projected Demand thru 2040	MGD	3.126	1.136	0.021	0.204	0.002	0.411	0.245	0.005	0.030	0.240
		EDU	15,628	5,682	103	1,018	10	1,750	980	25	150	1,199
	Projected Available Capacity 2040	**MGD**	**(1.786)**	**3.610**	**0.028**	**0.281**	**0.014**	**(0.284)**	**(0.005)**	**0.113**	**0.118**	(0.010)
		EDU	**(8,928)**	**18,048**	**142**	**1,407**	**70**	**(1,209)**	**(20)**	**565**	**590**	(49)

Unless otherwise noted, it is assumed that 1 EDU = 200gpd
[1] Boonsboro assumes 1 EDU = 250 gpd
[2]Smithsburg assumes 1 EDU = 235 gpd

Point Source Nutrient Loads and Assimilative Capacity

Nitrogen and phosphorus (more generally referred to as "nutrients") from WwTPs, stormwater, and other sources are the primary contributors to degraded water quality in the Chesapeake Bay and its tributaries. Excess nitrogen and phosphorus in an aquatic ecosystem cause a wide range of problems, including algal blooms, loss of oxygen in the water, fish kills, and the loss of aquatic vegetation. This imbalance is called eutrophication, which is a widespread problem that can be remedied by decreasing input rates of nitrogen and phosphorus into the waters locally and therefore the Chesapeake Bay.

To address nutrient discharges into the Bay, MDE has developed Nutrient Caps for point source discharges that are discussed in this chapter. Water and sewer planning must consider the "assimilative capacity" of a receiving body of water. Assimilative capacity refers to the ability of a natural body of water to receive wastewater or toxic materials without harmful human effects and damage to the aquatic life of a water body. In basic terms, the total contribution of pollutants to the waters of Maryland (point and non-point combined) should not exceed the capacity of those waters to assimilate pollutants. This section describes the key limits on assimilative capacity as they apply to the County's WwTPs (some of these measures also apply to non-point nutrient sources, as described later in the chapter).

TMDLs

One measure of assimilative capacity is the Total Maximum Daily Load (TMDL), required under the Federal Clean Water Act. A TMDL is the maximum amount of pollutant that a water body can receive without resulting in impaired water quality. In essence it quantifies an upper threshold for pollutants or stressors. Whereas point source caps only address WwTPs and other point sources, a TMDL accounts for all sources of the given pollutant, including point sources and non-point sources (such as stormwater, agricultural runoff, or discharges from septic systems). Water bodies are classified as "impaired" when they are too polluted or otherwise degraded to support their designated and existing uses. (Defining designated uses will be discussed later in the chapter.) The impaired waters list is called the 303(d) list, in reference to the section in the Clean Water Act that establishes TMDLs.

Only one TMDL has been established in the County. The maximum daily loading of the nutrient phosphorous in the Antietam Creek watershed is 2,747 pounds per day[2].

Antidegradation

Another factor relating to assimilative capacity is antidegradation—the State policy that significantly limits new or expanded discharge permits that would degrade water quality. The focus of the antidegradation policy is on Tier II (high quality) waters, as defined by the US Environmental Protection Agency (EPA).

Maryland's antidegradation policy significantly limits new discharge permits and expansions of existing discharge permits that would degrade water quality. In these areas, new nutrient discharges can be permitted if they do not degrade existing water quality. Sideling Hill Creek is the only Tier II water segment in Washington County. There are currently no WwTP discharges into this stream segment nor are any proposed by the County.

Sideling Hill Creek Aqueduct. Credit: Jerry Edmundson, npplan.com

2 Total Maximum Daily Load of Phosphorous in the Antietam Creek Watershed, Washington County, Maryland; Maryland Department

Point Source Caps

To address nutrient loads from point sources such as WwTPs, the State has established Chesapeake Bay Tributary Strategy point source caps on all facilities that discharge greater than 0.500 Mgd. These caps are numerical limits on the amount of nitrogen and phosphorus that WwTPs can discharge to the Bay and its tributaries (expressed as pounds per year of nitrogen and phosphorus).

Nitrogen and phosphorous point source caps have been established for the Hagerstown and Conococheague WwTPs. Because there are no completed TMDLs for the receiving waters of these point sources, the point source caps determine the allowable nutrient discharges from these plants. The other County managed WwTP affected by point source caps is the Smithsburg WwTP. Currently, the plant has a permitted design capacity of 0.600 Mgd. However, treatment capacity of the facility is only built for treatment of 0.333 Mgd. It is anticipated that upgrade of the treatment plant will be accomplished in phases. There is currently a project underway that will upgrade the plant to meet ENR standards and expand capacity to 0.450 Mgd. Because the plant will remain below the 0.500 Mgd threshold, point source caps will not apply. At such time the WwTP is expanded above 0.500 Mgd, it will be classified as a significant facility and according to Maryland tributary point source strategies, a cap of 6100 lbs/yr of total nitrogen and 457 lbs/yr of total phosphorous will be implemented. While caps may not be currently applied, the County is diligent in obtaining and maintaining water quality standards set by State and Federal agencies for clean water.

Point Source Loading

The table below shows the existing and estimated future point source nutrient loads for the five (5) County managed WwTPs.

Table 13-6: Point Source Loading for County Owned WwTPs

		Facility				
		Conococheague	Winebrenner	Smithsburg[1]	Antietam	Sandy Hook
2020 Technology		ENR	ENR	SBR/Activated Sludge	Oxidation Ditch	Extended Aeration
Existing Demand (2020)	MGD	3.914	0.115	0.323	0.114	0.014
Existing Nutrient loading (lbs/year)	TN	47,658	1,400	17,698	6,246	767
	TP	3,574	105	2,950	1,041	128
2040 Anticipated Technology		ENR	ENR	ENR	Oxidated Ditch	Extended Aeration
Existing + Projected Demand (2040)	MGD	5.51	0.221	0.406	0.144	0.017
Projected Discharges (2040) (lbs/year)	TN	67,092	2,691	4,944	7,890	931
	TP	5,032	202	371	1,315	155
Approved Treatment Capacity	MGD	8.000	0.600	0.600	0.163	0.030
Nutrient Load Cap (lbs/year)	TN	97,411	7,306	6,100	8,931	1,644
	TP	7,306	548	457	1,489	274
Net Available Discharge (2040)	TN	30,319	4,615	1,156	1,041	712
	TP	2,274	346	86	174	119

[1] In accordance with MD Tributary Point Source strategies, expansion of non-significant facilities to significant facilities installs a point source cap of 6,100 lbs/yr of nitrogen and 457 lbs/yr of phosporous. Smithsburg WwTP is projected to expand to a significant treatment facility in the future.

Addressing Issues of Concern - Wastewater

Table 13-5 shows a similar pattern of resource capacity issues for public wastewater facilities across the County as those found in public water systems. According to the table, it appears that moderate growth scenario projections can be accommodated across the County with some minor potential deficits at the City of Hagerstown and Town of Boonsboro treatment facilities. Due to the amount of fluctuation that can occur with these types of calculations, these deficits are not alarming and could likely be absorbed.

High growth scenario projections show a more concerning pattern of available capacity. Two treatment facilities, Hagerstown and Smithsburg, show significant deficits in available capacity under this scenario. The Smithsburg WwTP has the loading capacity to increase their treatment permits up to 600,000 gpd but it would take a significant upgrades to the treatment facility to meet nutrient standards. There is currently a project underway at the treatment facility that will upgrade the method of treatment to meet ENR standards and increase its treatment capacity to 0.450 Mgd.

The City of Hagerstown, however, does not have the same capability. The City WwTP is built to meet the nitrogen standards for discharge at 10.5 Mgd. However, treatment capacity is limited by phosphorus standards to only be able to treat 8 Mgd. Effectively, they have reached the highest level of treatment possible based on today's limits of science and technology. The City is working closely with State to find alternative methods of mitigation to resolve the issue.

While this issue is concerning, it should be noted that the County has a large amount of capacity available that could accommodate high growth scenario projections for the UGA. An intercounty connection between the City and County wastewater treatment systems exists that could be used to resolve some capacity issues. It is anticipated that negotiations will occur between the two entities to ensure that long term growth goals can be met. Recommendations are included at the end of the chapter that address these concerns.

Photo: Wastewater Treatment Facility in Smithsburg

Unmet Needs/Limits of Science

Enhanced Nutrient Removal (ENR) is among the most efficient sewage treatment processes available to public treatment facilities. However, more stringent pollution limits established by Federal and State environmental agencies are causing severe limitations on wastewater treatment capacities that cannot currently be overcome due to limits of current scientific and technologic processes. This has become true for the City of Hagerstown WwTP with regard to nitrogen and phosphorous point source caps. While the City has design capacity to treat up to 10.5 Mgd, point source caps limit treatment capacity to 8.0 Mgd. As shown in the capacity Table 13-5, the City is nearing 90% of their total treatment capacity and may not have the ability to accommodate future land use demands. A combination of alternative options such as flow transfer, nutrient trading, or operational improvements related to I&I will likely be needed to address shortfalls within the City WwTP.

Inflow and Infiltration

All wastewater treatment systems experience some level of inflow and infiltration (I&I) problems. Cracked collection lines, leaky pipe joints, deteriorated manholes, and illegal stormwater connections are a few examples of I&I sources.

Washington County deploys several measures to help reduce the amount of added capacity from I&I issues such as routine manhole inspections, annual budgeting and maintenance of equipment (grinder pumps, pump stations, etc), televising various service lines, and implementation of a rehabilitation program that uses grant funding to repair old and deteriorated service lines in the system.

Upgrades and Expansions

Upgrades to WwTPs can have significant benefits to water quality by reducing nutrient loading into our waterways. Currently, the highest level of effluent treatment is through the Enhanced Nutrient Removal (ENR) process. Two (2) out of the five (5) County managed facilities (Conococheague and Winebrenner) have been upgraded to use ENR strategies while a third (Smithsburg) is due to be upgraded by 2024. The remaining two facilities will likely remain as secondary facilities due to the lack of new demand and the costly price of ENR upgrades.

Expansion of treatment facilities will be necessary in some growth areas of the County based on projected demand. Both the Conococheague and Smithsburg WwTPs are eligible for capacity expansions in the future.

Nutrient Trading

Under the State's Water Quality Trading Program credits can be generated through nutrient reductions related to nitrogen, phosphorus and sediment. Credits must first be certified by MDE (or MDA if agricultural credits are generated) and can then be placed on the State marketplace for trade or sale. However, the credits can only be used in the same TMDL watershed where the credit was generated. The State is currently working on a trading policy for potential exchange of credits from Wastewater Treatment Facilities, but nothing has been formally adopted.

The limitations and regulatory process of the trading program have made its use in Washington County unappealing to this point. Being an inland County with a significant agricultural industry, most BMPs and reduction techniques are being used to mitigate existing or projected on-site impacts. Additional efforts to implement nutrient reduction can be cost prohibitive or create a negative return on investment in rural areas due to the lack of significant development opportunity.

While the usage of the program seems to be unfeasible in the short term, the County will continue to monitor the trading program and potentially take advantage of opportunities as they may present themselves.

Septic Disconnection

The connection of homes and businesses with onsite sewage disposal systems to public sewer facilities significantly lowers the amount of nutrient pollution generated by point sources. The State estimates that the amount of nutrient reduction is dependent upon the location of the septic system as follows:

- Septic systems in the Chesapeake Bay Critical Area: approximately 12.2 lbs/year per EDU retired (equivalent to approximately 5 EDU in an ENR facility).
- Septic systems within 1,000 feet of any perennial surface water: 7.5 lbs/year per EDU retired (equivalent to approximately 3 EDU in an ENR facility).
- Any other septic system: 4.6 lbs/year per EDU retired (equivalent to approximately 2 EDU in an ENR facility).

Currently there are no Chesapeake Bay Critical Areas designated in Washington County and to the degree possible, newer septic systems are located to avoid proximity to any perennial surface waters. Therefore, most of the credits that we could expect to obtain would be from the third category of "other septic systems". While the estimated impact of connection is equivalent to 2 EDUS per one septic connection, the State only provides loading credits to WwTPs at a rate of 1 EDU per 2 septic systems retired. Areas targeted for potential retirement would likely coincide with areas determined to be localized hotspots through continued mapping of failing septic locations, as well as areas that become surrounded by new development using public facilities.

Land Application of Treated Wastewater

The application of treated wastewater effluent directly to the soil can allow pollutants to be absorbed before the effluent reaches receiving streams. Spray irrigation is the most common form of land application, although other options (such as drip irrigation or subsurface discharge) can also be considered.

Factors such as slope, soil depth and granularity, water table depth and behavior, and buffers from streams and developed areas are important in determining true suitability. Other important considerations for land application include storage and seasonal restrictions. Land application systems typically require large storage lagoons capable of holding several months' worth of effluent. Land application may not be permitted during winter months, when frozen soil cannot accept effluent, or during other months when water tables rise. Based on County discussions with MDE, the amount of land in Washington County that is suitable for spray irrigation is extremely limited.

Wastewater Reuse

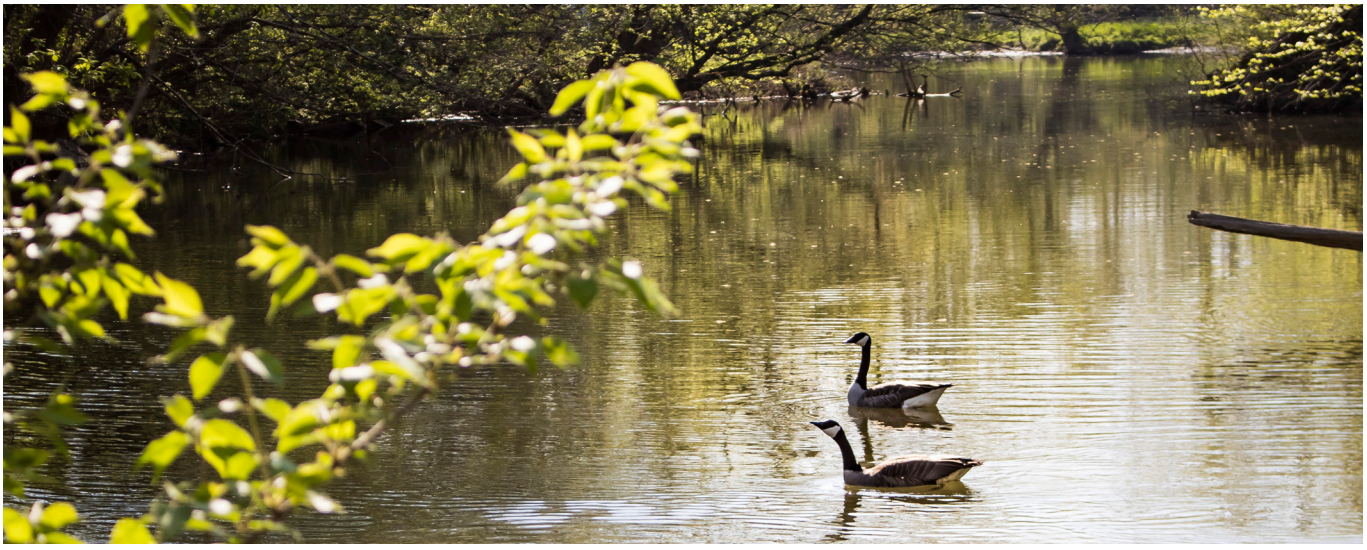
Properly treated wastewater can be reused to in many ways to help reduce stresses on surface and groundwater sources. Treated wastewater is distributed through infrastructure known as purple pipes (plumbing fixtures for reclaimed water are colored purple to distinguish them from potable water supply). This infrastructure can be installed to direct treated water for use in industrial process, watering of golf courses, and irrigation for farmland. In other parts of the United States, these resources have been used to recharge aquifers. This specific technique is not permitted in Maryland but may be a long-term consideration.

Non-Point Nutrient Loads

Another significant goal of the Water Resources Element is to more closely link land use and development policies with water quality goals. The Chesapeake Bay TMDL and Watershed Implementation Plan (WIP) identify the assimilative capacity of each body of water within and adjacent to Washington County and set interim and final goals for meeting that capacity. The majority of the land in the County's Priority Funding Areas (PFAs) falls within watersheds that are impaired by nutrients, particularly the Antietam and Conococheague Creek watersheds. However, Maryland's Smart Growth principles fundamentally encourage the continued concentration of new development within these already-developed areas. The County is specifically using its Phase II WIP and Municipal Separate Storm Sewer System (MS4) permit action plans to address water quality impairments caused by already developed areas.

Non-point source pollution occurs when rainfall, snowmelt, or irrigation runs off land or through the ground and gathers pollutants such as nutrients and sediment, which are carried with the runoff and deposited into surface water or leaked into ground water. The amount of stormwater runoff in developed areas is a function of the amount of impervious surface associated with the built environment, i.e., roads, parking areas, roofs, etc. The greater the percentage of impervious surface, the faster water flows over land. In wooded or heavily vegetated areas, the water is intercepted by undergrowth, plants and trees as it flows over land and it reaches streams more gradually, a process that underscores the importance of grass and forest riparian buffers, particularly on agricultural land. These natural impediments reduce flood-related stream discharges and enable lower, sustained flows which in turn reduce the potential for erosion caused by storm events. The slower pace of runoff from undeveloped land also allows time for vegetation to uptake the nutrients in the runoff, which results in lower nutrient loads being discharged into waterways.

Various technologies reduce nutrients from agricultural and developed lands. Nutrient reduction technologies for urban stormwater and non-point source pollution are generally referred to as "Best Management Practices" (BMPs). Examples of these technologies include urban and agricultural nutrient management, filtration systems, and erosion controls. Non-structural controls can be very effective in reducing the amount of pollutants that reach waterways. Woodlands and wetlands release fewer nutrients into the Bay than any other land use. For these reasons, forests, grasslands, and wetlands are critical to maintaining and restoring the health of the aquatic environment.



Identifying Suitable Receiving Waters

To maintain safe water quality standards, MDE has adopted guidance for Water Resources Management and have tasked local jurisdictions with creating their own water quality management plans in coordination with State and Federal efforts. Because the primary laws adopted to protect water resources are the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA), the State has recommended following this basic framework for analysis and planning for water resource protection. Figure 13-1 depicts the basic CWA framework.

Figure 13-1: Clean Water Act Framework

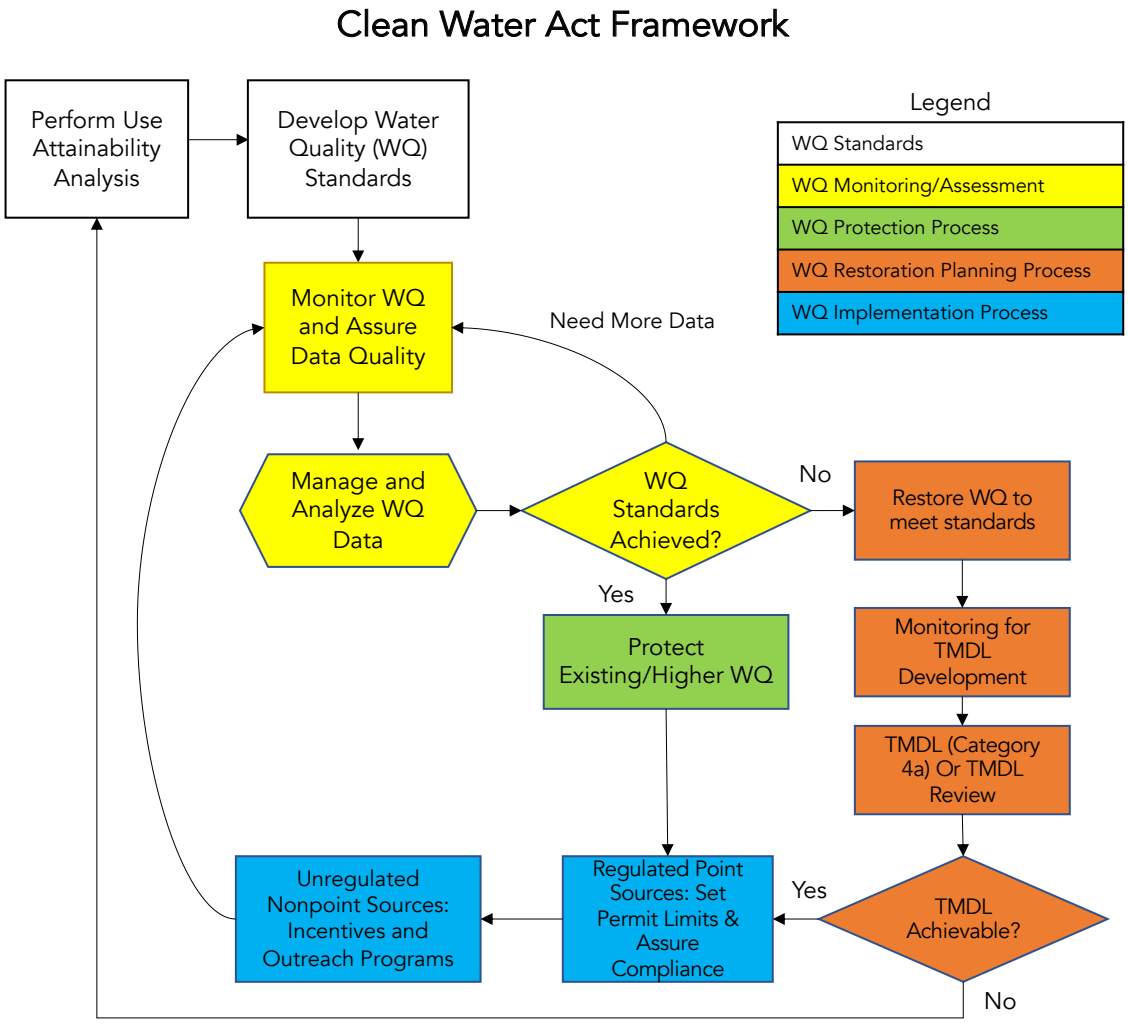


Figure 13-1: Clean Water Act Framework (Source: Maryland Department of Planning, 2022 Water Resources Element Guidance Update)

Water Quality Standards

According to the CWA Framework, the first step in planning for water quality is to develop Water Quality Standards (WQS). These standards consist of three components: designated uses, water quality criteria, and an antidegradation policy. WQSs should be identified in those areas where development is anticipated to occur so that appropriate land use strategies can be identified and implemented to ensure continued water quality.

Historic trends have shown that the majority of new development occurring within the County is within the Urban Growth Area. The boundaries of the adopted UGA currently exist within four identified 8-digit watersheds; Potomac River Direct, Conococheague Creek, Antietam Creek, and Marsh Run.

Sporadic development is also expected to occur within the rural areas of the County, however, there has been no consistent pattern of which watershed development has occurred. Therefore, our analysis will focus on the primarily effected watersheds in and around the Urban Growth Area with appropriate attention given to the other less effected watersheds in the County.

Designated Uses

MDE has designated four (4) primary Use Classes to the surface waters of the State. A separate designation of "P" is added to any Use Class that can also support a public water supply. A summary of the designated uses and their classifications are included in Figure 13-2.

	Use Classes							
Designated Uses	**I**	**I-P**	**II**	**II-P**	**III**	**III-P**	**IV**	**IV-P**
Growth and Propagation of fish (not trout), other aquatic life and wildlife	✓	✓	✓	✓	✓	✓	✓	✓
Water Contact Sports	✓	✓	✓	✓	✓	✓	✓	✓
Leisure activities involving direct contact with surface water	✓	✓	✓	✓	✓	✓	✓	✓
Fishing	✓	✓	✓	✓	✓	✓	✓	✓
Agricultural Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Industrial Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Propagation and Harvesting of Shellfish			✓	✓				
Seasonal Migratory Fish Spawning and Nursery Use			✓	✓				
Seasonal Shallow-Water Submerged Aquatic Vegetation Use			✓	✓				
Open-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Channel Refuge Use			✓	✓				
Growth and Propagation of Trout					✓	✓		
Capable of Supporting Adult Trout for a Put and Take Fishery							✓	✓
Public Water Supply		✓		✓		✓		✓

Figure 13-2: Chart of Designated Use Classifications of Surface Waters (Source: Maryland Department of the Environment)

Designated Uses Continued

The four (4) primary development impacted watersheds in Washington County have designations of I, III, and IV. The annotation of "P" after the classification number indicates that there are areas within the watershed used for public water supply. Below is a list of the designated use classifications for these four watersheds and tributaries.

Table 13-7: Designated Use Classifications

Watershed	Classification
Antietam Creek	IV-P
Little Antietam & Grove Creek (020700041004)	III-P
Beaver Creek, Little Beaver Creek and Black Rock Creek (02070041007)	III-P
Conococheague Creek	IV-P
Marsh Run	III-P
Potomac River Direct	I-P

Water Quality Criteria

Maryland has codified specific water quality criteria that are specific to the designated use categories. Table 13-8 illustrates the standards that are required to be met. Monitoring data for these criteria will be evaluated later in this section.

Standard		Class I-P	Class III-P	Class IV-P
Bacteria	Enterococci (fresh or marine) - culturable	130 counts per mL	130 counts per mL	130 counts per mL
	E. coli (fresh) - culturable	140 counts per mL	140 counts per mL	140 counts per mL
Dissolved O2		>5 mg/L	>5 mg/L	>5 mg/L
			Min daily ave >6mg/L	
Temperature		90 deg F max	68 deg F max	75 deg F max
			No thermal barrier that effects salmanoid fish	No thermal barrier that effects salmanoid fish
			Adjacent Riperian forest shall be retained when possible	Adjacent Riperian forest shall be retained when possible
pH		6.5-8.5	6.5-8.5	6.5-8.5
Turbidity		150 units singlar	150 units singlar	150 units singlar
		50 units monthly avg.	50 units monthly avg.	50 units monthly avg.
Color		75 units	75 units	75 units
Toxic Substances	Cannot exceed limits that must protect safety	Fresh water aquatic organisms;	Fresh water aquatic organisms;	Fresh water aquatic organisms
		Public water supplies and the whole-someness of fish for human consumption	Public water supplies and the wholesomeness of fish for human consumption	Public water supplies and the wholesomeness for human consumption

Table 13-8: Adopted Water Quality Standards for Maryland Waterways (Source: Code of Maryland Regulations Section 26.08.02.03-3)

In addition to the above adopted water quality standards, many states across the country including Maryland are beginning to analyze effects of polyfluoroalkyl (PFAs/PFOs) substances for potential adverse health effects in humans. PFAs, also known as 'forever chemicals' refer to a large group of chemicals that have been used since the 1940s in a range of products including water-resistant fabrics and carpeting, cleaning products, paints, food packaging and fire-fighting foams.

While there are no Federal or State regulations in place for these substances, MDE has been sampling water systems throughout the State to determine the extent and potential effects of them. Water service providers will need to closely monitor the advancement of these efforts that may require future implementation

Antidegradation Policy

In order to maintain and protect waterbodies across the State that meet or exceed WQSs, MDE has adopted an avoid, minimize, and mitigate approach to water quality impacts. Maryland designated high quality and other sensitive waters include:

- Tier II High Quality Waters
- Stronghold watersheds
- Within a Chesapeake Healthy Watersheds Assessment
- Drinking source water protection areas for both surface and groundwater sources
- Coldwater Resources
- Within Sensitive Species Project Review Areas (SSPRAs)
- Streams with significant freshwater mussel populations
- Anadromous fish spawning habitat
- Another factor relating to assimilative capacity is antidegradation—the State policy that significantly limits new or expanded discharge permits that would degrade water quality. The focus of the antidegradation policy is on Tier II (high quality) waters, as defined by the US Environmental Protection Agency (EPA).

As stated in the Wastewater Management section of this document, Maryland's antidegradation policy significantly limits new discharge permits and expansions of existing discharge permits that would degrade water quality. In these areas, new nutrient discharges can be permitted if they do not degrade existing water quality. Sideling Hill Creek is the only Tier II waters segment in Washington County. There are currently no WwTP discharges into this stream segment nor are any proposed by the County.

Water Quality Monitoring and Assessment

Washington County does not have the resources needed to continually monitor water quality; therefore, it relies upon the data collection efforts of the State. MDE in collaboration with local and federal government agencies, watershed organizations, and academia, collect data in accordance with established methodologies. This data is then published every two years as an assessment known as the Integrated Report (IR).

The IR is used as a combined report to federal authorities required under section 305(b) and 303 (d) of the CWA. These sections of the CWA require States to perform annual water quality assessments and to identify waters assessed as not meeting water quality standards. Tables 13-9 through 13-12 lists the surface water quality information found within the 2020-2022 IR for the four (4) primary development impacted watersheds.

Table 13-9: WQS for Antietam Creek Watershed		
Watershed	**WQS**	**Impairment Status**
Antietam Creek	Bacteria	4a - Impaired, TMDL Complete
	Dissolved O2 (BOD)	2 - Meets Water Quality Criterion
	Temperature	5 - Impaired, TMDL Needed (021405020192 segment only)
	pH	n/a
	Turbidity (sediment)	4a - Impaired, TMDL Complete
	Color	n/a
	Toxic Substances	n/a
	Nutrient-Nitrogen	n/a
	Nutrient-Phosphorus	4a - Impaired, TMDL Complete

Table 13-10: WQS for Conocoheague Creek Watershed		
Watershed	**WQS**	**Impairment Status**
Conococheague Creek	Bacteria	4a - Impaired, TMDL Complete
	Dissolved O2 (BOD)	2 - Meets Water Quality Criterion
	Temperature	n/a
	pH	5 -Impaired, TMDL Needed
	Turbidity (sediment)	4a - Impaired, TMDL Complete
	Color	n/a
	Toxic Substances	n/a
	Nutrient-Nitrogen	n/a
	Nutrient-Phosphorus	5a - Impaired, TMDL Complete

Table 13-11: WQS for Marsh Run Watershed		
Watershed	**WQS**	**Impairment Status**
Marsh Run	Bacteria	4a - Impaired, TMDL Complete
	Dissolved O2 (BOD)	n/a
	Temperature	n/a
	pH	n/a
	Turbidity (sediment)	4a - Impaired, TMDL Complete
	Color	n/a
	Toxic Substances	n/a
	Nutrient-Nitrogen	n/a
	Nutrient-Phosphorus	4a - Impaired, TMDL Complete

Table 13-12: WQS for Potomac River Direct Watershed		
Watershed	**WQS**	**Impairment Status**
Potomac River Direct	Bacteria	n/a
	Dissolved O2 (BOD)	n/a
	Temperature	n/a
	pH	n/a
	Turbidity (sediment)	4a - Impaired, TMDL Complete
	Color	n/a
	Toxic Substances	n/a
	Nutrient-Nitrogen	n/a
	Nutrient-Phosphorus	2 -Meets Water Quality Criterion

Water Quality Restoration and Protection

Protection

Federal law requires States to develop and adopt a statewide antidegradation policy that protects existing high quality water resources. These resources are defined by the Federal government as Tier II waterbodies. Currently, Sideling Hill Creek in the far western portion of the County is the only designated Tier II waterbody.

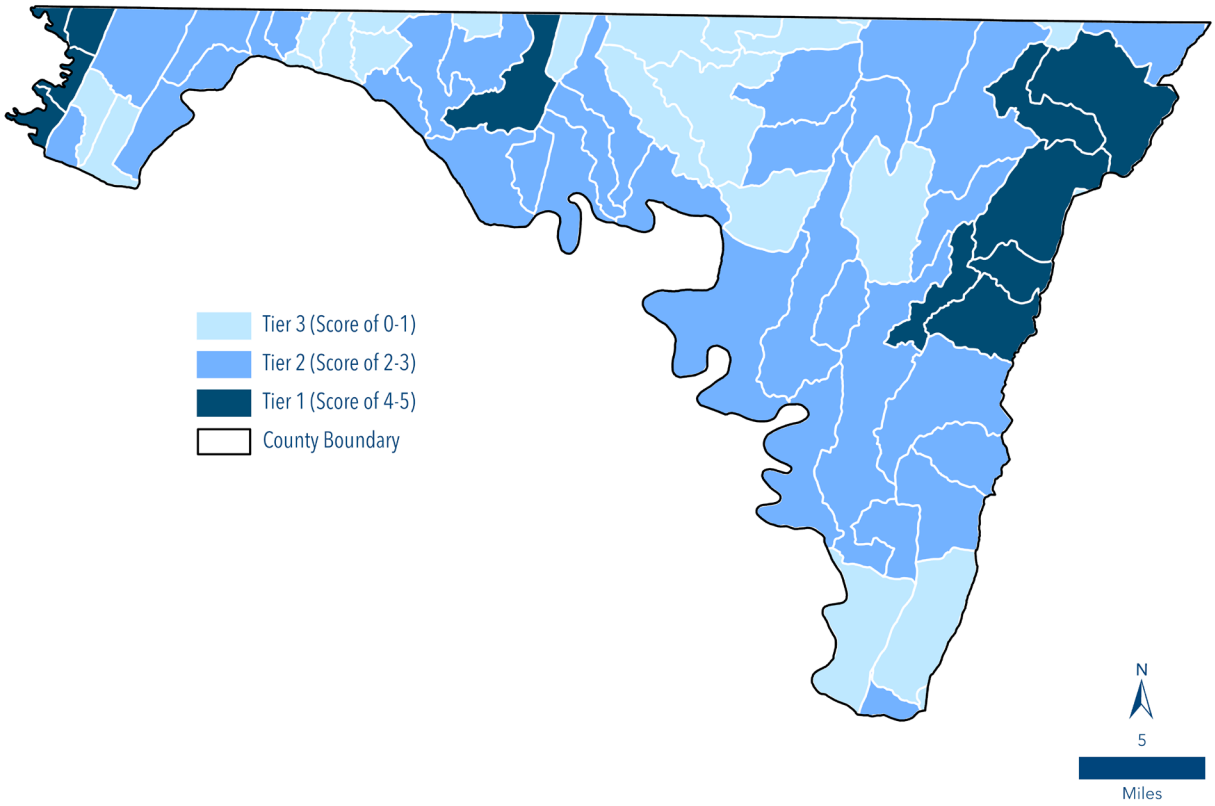
In addition to Tier II waters, the State has identified several other sensitive waterbodies that could be considered for protection efforts. As mentioned previously, these other high-quality waterbodies outlined in the MDP Water Quality Protection guidance documents include:

- ★ Stronghold watersheds
- ★ Within a Chesapeake Healthy Watersheds Assessment
- ★ Drinking source water protection areas for both surface and groundwater sources
- ★ Coldwater Resources
- ★ Within Sensitive Species Project Review Areas (SSPRAs)
- ★ Streams with significant freshwater mussel populations
- ★ Anadromous fish spawning habitat

Each of these high-quality waterbody factors were analyzed using Geographic Information Systems (GIS) data provided by various State agencies to provide each watershed with a score based on the occurrence of the data in that watershed. Each criterion was given equal weight in the analysis and those areas where there appeared to be several criteria present were delineated as areas of high priority for protection efforts.

Sideling Hill Creek: Photo Credit: Paul Graunke, nps.gov

Map 13-4: Map of Desirable Areas for Water Quality Protection



As shown on Map 13-4, three (3) particular areas of the County show multiple overlapping priority areas. Joining the Sideling Hill Creek are portions of Licking Creek and Antietam Creek. They each show strong indicators for cold water benthic macroinvertebrates, wild trout habitat and sensitive species. The County currently has policies in place within its Subdivision Ordinance which provide for additional review in some of these areas such as those in the Antietam Creek watershed outside of Smithsburg via the Beaver Creek and Edgemont planning areas. It should also be noted that a large portion of these identified watersheds is already under State ownership for recreation purposes. Protection is also enhanced by the Environmental Conservation zoning designation over the majority of these areas.

Protection Implementation

As stated previously, the State has adopted an avoid, minimize, and mitigate approach to watersheds that have met or exceeded their water quality standards. Washington County shares this approach to conservation and protection of high-quality water resources. Following this approach, the county has taken significant action to avoid and minimize development impacts on high quality water resources through implementation of strict zoning standards in our rural areas.

One significant action taken by the County to avoid and minimize development impacts was a Comprehensive Rural Area Rezoning completed in 2005. As part of that process, land in the Sideling Hill Creek, Potomac River Direct and Licking Creek area was rezoned to reduce residential density from 1 dwelling unit per 3 acres to 1 dwelling unit per 20 acres. Areas within the Antietam Creek/Marsh Run watersheds were also reduced to a residential density of 1 dwelling unit per 20 acres and in some areas of the watershed, 1 dwelling unit per 5 acres.

Protection Implementation Continued

Other efforts have included public and private investment in land preservation efforts. The State of Maryland continues to seek opportunities to purchase open space areas in and around existing priority resources. Private conservation groups such as the Nature Conservancy have purchased land adjacent to Sideling Hill and Licking Creeks thereby extinguishing potential development. And Washington County continues to use land preservation programs such as Maryland Agricultural Land Preservation Fund (MALPF), Conservation Reserve Enhancement Program (CREP), and Rural Legacy to purchase and extinguish development rights in the centralized areas of the county including the Conococheague and Antietam Creeks, Marsh Run, and the Potomac River Direct outside of designated growth areas.

Restoration

In cases where monitoring data indicates that WQSs are no longer being attained, those waterbodies are listed as impaired and are then required to develop a TMDL to quantify the assimilative capacity of that resource to begin the restoration process. Because pollution comes from both point and non-point sources, they can impact water quality in different ways. Point source facilities are generally associated with nutrient (nitrogen and phosphorous) and bacteria loads. Non-point sources can also affect nutrient and bacterial loads but also carry other pollutants such as sediment and toxic substances through stormwater runoff.

Devils Backbone Park in Washington County

Impervious Surface

Land development and its associated conversion of open space and agricultural land to impervious surface, has a direct impact on the quality of stormwater runoff. An increase in impervious cover can lead to an increase in the amount and intensity of stormwater runoff from the land during rainfall events. In addition, impervious surfaces accumulate pollutants deposited during dry weather from the atmosphere, leaked from vehicles or other storage containers, dumped or discharged directly onto the ground, or applied to the surface due to activities such as deicing.

Watershed impervious level has long been shown to be a relatively good indicator of the level of impairment of the aquatic surface waters. Research has shown that sensitive streams of high quality, stable channels, excellent habitat structure and diverse aquatic biota exist when watershed impervious cover is at or below 10%. Streams with watershed impervious cover ranging from 11 to 25% show clear signs of degradation including channel erosion, declining stream habitat and declining stream biodiversity, with most sensitive fish and aquatic insects disappearing from the stream. Once watershed impervious cover exceeds 25%, stream quality is so degraded that it can no longer support a diverse aquatic biological community.

Table 13-13 summarizes existing impervious surface area by watershed. Countywide, slightly less than 6% of all land is currently impervious. On a percentage basis, impervious coverage is highest in the Conococheague, Marsh Run, and Antietam Creek watersheds, where the majority of development has occurred. Catoctin Creek and Upper Monocacy Creek are included within the Antietam Creek watershed due to their small surface areas in Washington County. This is consistent with the CAST model distribution of nutrient loading. Impervious coverage is relatively low in the remaining watersheds with impervious coverage at or below

Table 13-13: Impervious Surface Area by Watershed

Watershed	Total Area of Watershed (ac)[1]	Percent of Total	Existing Conditions	
			Acres	Percent
Antietam Creek	119,063	39.8%	8,531	7.2%
Conococheague Creek	41,736	14.0%	4,036	9.7%
Licking Creek	17,696	5.9%	207	1.2%
Little Conococheague	10,720	3.6%	310	2.9%
Little Tonoloway Creek	9,883	3.3%	314	3.2%
Marsh Run	13,460	4.5%	1,025	7.6%
Potomac River	79,699	26.7%	2,324	2.9%
Sideling Hill Creek	5,204	1.7%	84	1.6%
Tonoloway Creek	1,334	0.4%	58	4.3%
Totals	**298,793**	**100.0%**	**16,918**	**5.7%**

[1] Excludes areas of open water within County boundary Source: Washington County GIS in coordination with CAST model

NPDES & MS4

After adoption of the 2002 Comprehensive Plan, Washington County was designated as a Phase II Municipal Separate Storm Sewer System (MS4) community. The newly mandated MS4 Phase II permit has added another opportunity to approach comprehensive watershed studies that focus on future restoration and conservation efforts. In accordance with the County's 2018 NPDES MS4 permit, there is a requirement to restore 20% (or 738 acres) of impervious surface within our urbanized area that are untreated or without modern day stormwater BMPs.

NPDES & MS4 Continued

A restoration plan has been developed by the County that identifies several methods of mitigation techniques including tree planting, stream restoration, Onsite Sewage Disposal System (OSDS) disconnections, installation of septic denitrification systems, and stormwater management BMPs (rain gardens, bioretention areas, dry wells, etc) to help reduce impacts from non-point pollution sources. Numerous projects have been identified that are projected to reach, and exceed, the 20% restoration requirement of the MS4 permit.

Photo of Rain Garden

Pollution Risk Assessment

Pollution loads from point sources and non-point sources are major contributors to degraded water quality in the Chesapeake Bay and its tributaries. The primary purpose of this Water Resources Element is to evaluate the water resources impacts of projected land use and development trends, and to provide input into the Comprehensive Plan's recommended future land use pattern. Ideally, the Water Resources Element should use measures of assimilative capacity, such as completed TMDLs for nutrients, to guide direction of growth and land use patterns within the County. Because TMDLs have not been completed for all of County's impaired 8-digit waterways, it is difficult to definitively identify appropriate receiving waters for the County's point and non-point source nutrient loads, or to direct future growth toward the corresponding watersheds. However, despite TMDLs not being available, the WRE must make recommendations based on the best available data.

As a basis for a pollution risk assessment, Staff used the State produced Chesapeake Assessment Scenario Tool (CAST) to determine pollution scenarios to guide future development. As shown in Table 13-14, three (3) scenarios are depicted to illustrate where we started, where we stand today, and what our goals are in reducing pollution in the County.

Based on these model scenarios, the County has been making steady progress over the last decade to meet the goals of the State Watershed Implementation Plan (WIP). Existing County smart growth policies and regulations have, and continue to be, implemented to reduce sprawl, inspire environmentally sensitive design and better mitigate pollution risks. This Plan is furthering those efforts by reducing the area of certain growth areas, increasing residential density, and promoting more environmentally sensitive design. It is anticipated that implementation of this Plan will further reduce risk of pollution in our waterways.

Table 13-14: CAST Model Pollution Scenarios

CAST Scenarios For Washington County						
2021 Progress	Nonpoint		Point		**Total**	
	TN	**TP**	**TN**	**TP**	**TN**	**TP**
Antietam Creek	1,281,074	75,017	54,878	7,960	**1,335,952**	**82,978**
Conococheague Creek	521,122	33,146	14,306	1,458	**535,428**	**34,604**
Marsh Run	153,551	10,304	5,549	1,189	**159,100**	**11,493**
Potomac Rive (WA)	429,282	29,296	5,989	996	**435,271**	**30,292**
Potomac River (FR)	77,529	3,587	154	22	**77,684**	**3,609**
Potomac River (AL)	42,847	3,716	68	9	**42,914**	**3,725**
Little Conococheague Creek	106,095	6,006	4,450	533	**110,544**	**6,539**
Licking Creek	78,601	6,420	-	-	**78,601**	**6,420**
Tonoloway Creek	6,324	312	9,280	4,222	**15,604**	**4,533**
Little Tonoloway Creek	48,459	4,298	228	20	**48,688**	**4,318**
Sideling Hill Creek	18,276	1,366	-	-	**18,276**	**1,366**
Totals For Combined Land River Segments When Run Seperately Grouped As Their 8 Digit Watershed	**2,763,161**	**173,468**	**94,902**	**16,410**	**2,858,063**	**189,877**
2012 Progress	Nonpoint		Point		**Total**	
	TN	**TP**	**TN**	**TP**	**TN**	**TP**
Antietam Creek	1,312,706	71,808	99,623	9,758	**1,412,329**	**81,565**
Conococheague Creek	531,904	31,447	27,847	2,429	**559,751**	**33,876**
Marsh Run	156,059	9,596	1	0	**156,060**	**9,596**
Potomac Rive (WA)	431,859	27,677	6,005	999	**437,864**	**28,676**
Potomac River (FR)	79,896	3,434	161	27	**80,056**	**3,461**
Potomac River (AL)	42,664	3,520	127	27	**42,791**	**3,547**
Little Conococheague Creek	106,178	5,672	3,714	564	**109,892**	**6,236**
Licking Creek	78,126	5,973	-	-	**78,126**	**5,973**
Tonoloway Creek	6,366	295	10,554	1,239	**16,921**	**1,534**
Little Tonoloway Creek	48,427	4,182	225	31	**48,652**	**4,214**
Sideling Hill Creek	17,974	1,289	-	-	**17,974**	**1,289**
Totals For Combined Land River Segments When Run Seperately Grouped As Their 8 Digit Watershed	**2,812,159**	**164,894**	**148,257**	**15,073**	**2,960,416**	**179,967**
WIP 3 Official	Nonpoint		Point		**Total**	
	TN	**TP**	**TN**	**TP**	**TN**	**TP**
Antietam Creek	1,162,048	47,946	112,348	8,799	**1,274,396**	**56,745**
Conococheague Creek	466,018	20,877	25,389	1,477	**491,407**	**22,354**
Marsh Run	136,703	6,529	5,549	1,189	**142,252**	**7,718**
Potomac Rive (WA)	389,250	19,609	5,989	996	**395,238**	**20,605**
Potomac River (FR)	72,719	2,481	9,255	-	**81,974**	**2,481**
Potomac River (AL)	40,204	2,516	-	-	**40,204**	**2,516**
Little Conococheague Creek	93,465	3,202	4,045	347	**97,511**	**3,549**
Licking Creek	73,000	4,100	-	-	**73,000**	**4,100**
Tonoloway Creek	6,030	242	17,098	1,876	**23,128**	**2,118**
Little Tonoloway Creek	44,476	2,822	57	19	**44,533**	**2,841**
Sideling Hill Creek	17,302	887	-	-	**17,302**	**887**
Totals For Combined Land River Segments When Run Seperately Grouped As Their 8 Digit Watershed	**2,501,216**	**111,211**	**179,730**	**14,703**	**2,680,947**	**125,915**

Restoration Implementation

To manage water quality restoration efforts in the County, a program called the Clean County Initiative was instituted. Washington County's Clean County Initiative is an integration of the County's compliance efforts for the Federal Clean Water Act. Regulations are set by the EPA and administered by MDE. Outlined below are some of the programs used in the County to collaboratively administer the program. Details of their progress and implementation can be found in annual reports submitted to MDE regarding our NPDES and MS4 permit.

Stormwater Management

The County's Stormwater Management, Grading, Soil Erosion and Sediment Control Ordinance, adopted in 2010, incorporates the management regulations outlined in the Maryland Stormwater Management Act of 2007. It applies to all new development and redevelopment projects that did not have final project approval for erosion and sediment control and stormwater management plans prior to May 4, 2010.

These regulations require the use of environmental site design (ESD) to the maximum extent feasible (MEP). Environmental site design is described by the MDE as "using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources." Environmental site design conserves natural drainage patterns, soils, and vegetation while minimizing developed areas, and reducing runoff volumes to more closely mimic natural conditions. The objective is to design a post-development site to have drainage characteristics that closely resemble natural conditions.

Stormwater Retrofits

Stormwater retrofits can help to reduce non-point source pollution, particularly in more densely developed areas, however, it is typically the costliest manner of remediation. The County should identify locations where such retrofits could address concentrations of non-point source pollution ("hot spots"), or where retrofits can help to protect environmentally sensitive areas that also provide an efficient return on investment. Future retrofit funds and implementation activities should be targeted to these priority areas.

Septic Denitrification

New technologies are available that can limit pollutant loads from OSDS, specifically related to nitrogen loading. While conventional OSDS can deliver over 23 pounds of nitrogen into groundwater supplies per year, BAT systems have shown to reduce that loading by half. In 2004, the Maryland General Assembly signed into law The Bay Restoration Fund. In 2012, the law was expanded to include OSDS users. The law establishes a fee collected annually from each user and the funds are used to provide grants to homeowners upgrading OSDS with BAT systems.

A negligible number of existing septic systems in the County currently utilize denitrification units, and the County does not currently require denitrification units for new septic systems. Maryland Senate Bill 554 (from the 2009 legislative session) now requires all new development on septic systems in the Chesapeake Bay Critical Area to include Best Available Technology (BAT) for nitrogen removal, as defined by MDE. Although there are no defined Critical Areas in the County, consideration should be given to require similar requirements in other areas, such as near perennial waterways, or in watersheds that are identified as high-quality watersheds.

Agricultural BMPs

Agriculture is important to the aesthetic and economic value of Washington County and is one of Maryland's largest and most important industries. However, runoff from cropland and livestock activities can carry nutrients, sediments, and pollutants from manure, fertilizers, and other sources into waterways.

In cooperation with the local Soil Conservation District and similar resource agencies, the County's agricultural community has proactively implemented Best Management Practices (BMPs) to minimize or eliminate runoff and pollution from active agricultural operations. Livestock owners are required to maintain nutrient management plans and sediment erosion control plans for their pasture lands. These agencies are also working with landowners who manage pastureland adjacent to waterways to install fencing and other deterrents to prevent direct access by livestock into local waterways. Over 74,000 acres of land in the County has been preserved and/or is owned by federal, state, and local government, and more than 80 percent of the County's cropland is dedicated to no-till or minimum-till crops—which have lower nutrient impacts than high-till crops.

Washington County is also home to one of several University of Maryland Extension sites that provides educational and problem-solving assistance to local farm operators and citizens based on research and experience generated at UMD College Park. They assist the community with practical application of agricultural BMPs through programs related to agricultural production, nutrient management, water quality and numerous other related programs.

Photo: Creek Bound Farm

Tree Plantings and Stream Restoration

Multiple locations have been identified across the County for potential stream restoration and tree planting efforts. Each month the county sponsors a "County Clean-Up" event in various locations to remove trash and debris from local streams and creeks. They have also worked with various governmental agencies to delineate areas where additional tree planting could occur. In 2022 alone, the County planted over 14,000 trees in an effort to increase our local tree canopy and improve water quality.

Photo: County Clean-Up Event

Photo: Rain Barrel

Stormwater Reuse

Stormwater reuse involves storing water runoff from storm events and using it for other purposes. This can be a complex challenge due to runoff flows potentially picking up harmful pollutants such as chemicals, oils, and dirt that can lead to environmental and health impacts. However, in locations with limited water supplies, water reuse can conserve water resources and benefit surface water quality. This reclamation of water can be used for a variety of purposes such as irrigation, groundwater replenishment, industrial processes, and environmental restoration. Washington County promotes the use of small, localized reuse options such as rain barrels that can be used to water gardens or irrigate lawns as a method of stormwater reuse.

Other Clean County Initiatives

In 2019, the County began a street sweeper program that has removed over 4.6 million pounds of debris from local roadways thereby diverting entrance into local waterways. Since the inception of the Clean County Initiative in 2019, over five (5) million tons of trash and debris have been removed from local highways and streams through street sweeping, tire removal, inlet cleaning and highway cleanup efforts.

Photo: Washington County Street Sweeper

Floodplain Management

In response to the adoption of the Comprehensive Flood Control and Watershed Management Program by the State in 1972, Washington County adopted a Floodplain Management Ordinance. The purpose of the Ordinance is primarily to protect public health and safety through encouragement of appropriate construction practices and prevention of unsuitable development in areas subject to flooding. Further floodplain protections were implemented as part of amendments made to the Subdivision and Zoning Ordinances declaring 100-year floodplains as designated sensitive areas.

The most notable areas of frequently repeating flooding occur primarily within federally designated 100-year floodplain areas identified by the National Flood Insurance Program (See Sensitive Areas Element for more details on the 100-year floodplain). As such, these would also be the primary areas to evaluate stormwater management facilities for potential inspection and possibly repair/retrofits.

WATER RESOURCE RECOMMENDATIONS

Water Resources

- ★ Coordinate with the City of Hagerstown to conduct a long-term comprehensive water and wastewater infrastructure plpan.
- ★ Coordinate with the City to explore funding opportunities such as loans or grants to upgrade the city water treatment facility to serve UGA.
- ★ Explore opportunities to supplement water supply to the UGA through study of potential surface and/or ground water sources and associated treatment facilities.
- ★ Work with the State in completion of Source Water Assessments for public water supplies. Using this data, the County should adopt a wellhead protection ordinance for those areas designated as community potable water supplies.
- ★ Incorporate water information from this Comprehensive Plan into the next revision of the County Water and Sewerage Plan.
- ★ Implement a water conservation education program.
- ★ Continue to work with the County Health Department to map well failures.

Wastewater Resources

- ★ Coordinate with the City on needed upgrades to their WwTP to determine if inter-county connection will be necessary.
- ★ Incorporate wastewater information from this Comprehensive Plan into the next revision of the County Water and Sewerage Plan.
- ★ Continue to identify and eliminate sources of inflow and infiltration to free up additional capacity at treatment plants.
- ★ Continue to pursue abatement of failing OSDS through connection to public sewer systems.
- ★ Work with MDE to ensure that the County receives nutrient credits for actions taken to reduce OSDS impacts.
- ★ Work with MDE to find suitable areas for land application of treated wastewater.
- ★ Promote opportunities for reuse of stormwater, rainwater, and treated water for purposes such as on-site irrigation and non-potable process water for industrial activities where appropriate.
- ★ Continue to work with the County Health Department to map septic failures.

Nonpoint Sources

- ★ Regulations should continue to require use of environmental site design (ESD) to the maximum extent feasible (MEP).
- ★ The County should identify locations where stormwater retrofits could address concentrations of non-point source pollution (“hotspots”), or where retrofits can help to protect environmentally sensitive areas hat also provide an efficient return on investment.
- ★ Continue to promote funding of retrofit program as an annual line item in the Capital Improvement Program.
- ★ Update local stormwater management ordinances to maintain the highest level of consistency with State and Federal Clean Water Act regulations.
- ★ Continue to encourage use of rain barrels as small, localized options for stormwater reuse.