5 Water Resources Element

The purpose of the Water Resources Element, as defined in Maryland House Bill 1141[1], is to establish a clear relationship between existing and proposed future development, the drinking water sources and waste water facilities that will be necessary to serve that development, and measures to limit or control the stormwater and non-point source water pollution that will be generated by new development. This chapter identifies drinking water sources and wastewater treatment facilities needed to support the existing and future development described in the Plan's Land Use Element (Chapter 3). It also identifies suitable receiving waters for existing and future wastewater and stormwater discharges.

Coordination with Garrett County's Municipalities

The eight incorporated Municipalities in Garrett County all offer public water and sewer service to residents and businesses within their boundaries. The Garrett County Department of Public Utilities (DPU) owns and operates all water and wastewater systems (including transmission and collection infrastructure) in Garrett County except for those in the Towns of Accident, Grantsville, and Oakland (DPU provides operator supervisory services in Accident). In addition, the Towns of Mountain Lake Park and Loch Lynn Heights own the wastewater collection lines within their boundaries.

The municipalities are preparing their own Comprehensive Plans, including Water Resources Elements that link future growth in the Towns with the availability of water and sewer resources to serve that growth. However, because of the critical need for the County and the municipalities to coordinate their efforts to address water resources, this County Water Resources Element compiles—to the greatest degree possible—the data necessary to link water resources, growth, and land use for the County and for the towns. The water resources policies for unincorporated portions of the County are listed in this element, while water resources policies for the incorporated municipalities, are set forth in each town's Comprehensive Plan.

5.1 Goals and Objectives

The Water Resources goals for the County are to:

In cooperation with the County's municipalities, maintain a safe and adequate water supply, and adequate amounts of wastewater treatment capacity to serve projected growth.

Take steps to protect and restore water quality, and to meet water quality regulatory requirements in the county's rivers and streams.

Objectives to support the goals are listed below.

1. Assure that existing and planned public water systems meet projected demand.
2. Assure that existing and planned public wastewater collection and treatment systems meet projected demand without exceeding their permitted capacity.
3. Assure that the County's stormwater management policies reflect the most recent state requirements.
4. Pursue land use patterns that limit adverse impacts on water quality.

[1] HB 1141 approved by the Maryland legislature in 2006 requires that a Comprehensive Plan contain a "Water Resources Element".

5.2 Drinking Water Assessment

This section describes existing conditions and projected future demand for drinking water in Garrett County.

5.2.1 Public Water Systems

Approximately 4,300 dwelling units in Garrett County and its towns (24 percent of the County total) receive drinking water from public water systems. Map 5.1 shows existing and proposed public water service areas. Table 5.1 summarizes the water sources, treatment technology, and general needs of the County's public water systems (described according to watershed in this section). Table 5.2 shows drinking water capacity, existing demand, projected future demand, and the projected water surpluses and deficits for each of the County's public water systems. A more detailed description of the aquifers used by these public systems is included in the Water Resources section of the Comprehensive Plan Appendix.

Youghiogheny River Watershed

Crellin

Water for the community of Crellin is drawn from a spring source, with groundwater wells in the Allegheny and Pottsville formations as a back-up. The maximum daily permitted capacity is 45,000 gallons per day (gpd) with demand of 13,500 gpd. Due to concerns over the water quality of the spring source, the County has plans for a new well and upgraded treatment. No expansions to the service area are planned.

Friendsville

The source water for the Town of Friendsville is the Youghiogheny River. The County is permitted to withdraw up to 150,000 gpd for the Friendsville system, but the water treatment plant has a capacity of only 100,000 gpd. The current demand for Friendsville is 83,000 gpd. There are no planned system upgrades or service area expansions.

Keyser's Ridge

As described below, Grantsville currently supplies water to the Keyser's Ridge area. However, the County is exploring the feasibility of developing a chlorination station and new wells on DNR-owned land near Puzzley Run, to provide water to Keysers Ridge and the schools. The size of this future water system has yet to be determined, but will be adequate to serve existing and potential future demand in the Keyser's Ridge Business Park, and in the commercial area surrounding the I-68/US-219 interchange. The Grantsville and Keyser's Ridge water systems would be linked to provide redundant water supply in case of system failure.

Bear Creek Watershed

Accident

The Town of Accident (including the Central Garrett Industrial Park) draws its water from two groundwater wells in Hampshire formation. The Accident water treatment plant has a production capacity of 108,000 gpd, with a permitted withdrawal capacity of 70,000 gpd. The current water demand for Accident is 60,000 gpd. There are no planned system upgrades or service area expansions.

Map 5.1 Water Service Areas in Garrett County

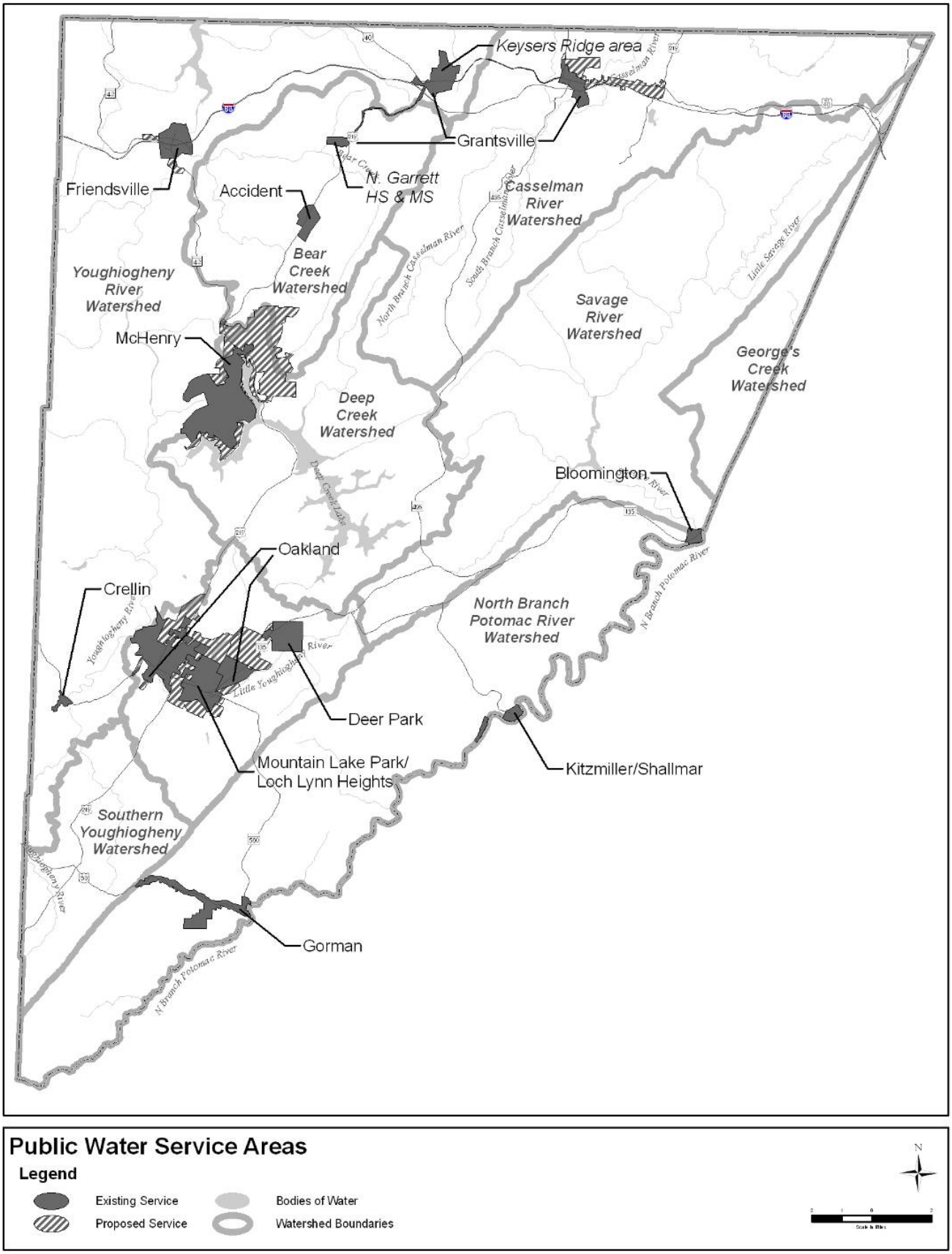


Table 5.1: Public Water System Characteristics

Water System	Source	Treatment Technology	Planned/Potential System Upgrades or Expansions	Water Quality Concerns	Planned/Potential Service Area Extensions
Youghiogheny River Watershed					
Crellin	Groundwater wells in the Allegheny and Pottsville formations.	Chlorination and iron removal	Planned new well, iron filter, chlorine contact tank, and emergency generator.	High iron levels.	None
Friendsville	Youghiogheny River	Sand filter	None	None	Future Growth Area (see Chapter 3) along MD 42 south of town.
Bear Creek Watershed					
Accident	Groundwater wells in the Hampshire formation.	Chlorination	Planned replacement of water storage tank	None	None
Little Youghiogheny River Watershed					
Deer Park	Groundwater wells in the Greenbrier formation.	Chlorination, iron removal	None	None	None
Mountain Lake Park/Loch Lynn Heights	Springs and groundwater wells in the Pocono and Greenbrier formations.	Chlorination	Rehabilitation of water distribution lines to reduce system water loss. Additional wells and filtration. New wells at Landon's Dam.	Sedimentation and poor water quality.	None
Oakland	Youghiogheny River and Broadford Lake	Chlorination	None	None	Planned extension to the Lowes store (US 219 north of the Town), areas along MD 135 east of Mountain Lake Park.
Casselman River Watershed					
Grantsville	Springs and groundwater wells in the Allegheny and Pottsville formations.	Chlorination and filtration	Potential need for additional treatment and storage capacity to support system expansion	None	Planned extension MD 669 to Pea Vine Road and Dorsey Hotel Road; east along US 40.
North Branch Potomac River Watershed					
Bloomington	Savage River	Slow sand filter	Potential need to replace 1980 treatment plant	None	None
Gorman	Groundwater wells in the Greenbrier and Mauch Chunk formations.	Chlorination	Potential need for additional well to support system expansion to 50,000 gpd.	None	Planned extension to Table Rock Road and a portion of Fairview Church Road.
Kitzmiller/ Shallmar	Groundwater wells in the Allegheny and Pottsville formations, impoundment on Wolf Den Run	Activated carbon filter	Potential need for additional well to replace the Wolf Den Run source.	Sedimentation (Wolf Den Run impoundment).	None
Deep Creek Watershed					
McHenry	Groundwater wells in the Greenbrier formation.	Chlorination	Additional wells and treatment facilities (see Section 4.7.1)	None	Planned extension to a large area surrounding McHenry and the Wisp Resort (see Section 4.7.1)

Table 5.2: Drinking Water Demand and Capacity

		Crellin	Friendsville	Accident	Deer Park	Mountain Lake Park/ Loch Lynn Heights[7]	Oakland[7] (Includes expansion to Lowe's site and surrounding areas	Grantsville (Includes Chestnut Ridge, Schools, Pea Vine Road extension)	Keysers Ridge (current service: Grantsville; future service: new source)	Bloomington	Gorman	Kitzmiller/Shallmar	McHenry[8]
Existing Water Production[3]	gpd[1]	45,000	100,000	70,000	72,000	343,000	590,000		100,000	43,000	40,000	63,000	215,000
	ERU[2]	172	380	267	274	1,307	2,248		380	164	152	240	819
Demand, 2007	gpd	13,500	83,000	60,000	37,000	252,000	400,000	47,000	13,000	38,000	35,000	20,000	150,000
	ERU	51	316	229	140	960	1,524	179	50	145	133	76	571
Net Available Capacity, 2007	gpd	31,500	17,000	10,000	35,000	91,000	190,000		40,000	5,000	(8,000)	43,000	-
	ERU	120	64	38	134	347	724		151	19	(30)	164	-
Projected New Residential Demand, 2030[4]	gpd	4,544	6,563	6,563	19,688	90,300	109,988	72,250	-	5,564	4,732	7,877	740,250
	ERU	17	25	25	75	344	419	275	-	21	18	30	2,820
Projected New Non-residential Demand, 2030[5]	gpd	-	1,000	3,338	-	7,500	63,150	18,950	63,000	-	-	-	106,050
	ERU	-	4	13	-	29	241	72	240	-	-	-	404
Total Projected Demand	gpd	18,044	90,563	69,900	56,688	349,800	573,138	138,200	76,000	43,564	39,732	27,877	996,300
	ERU	69	345	266	216	1,333	2,183	526	290	166	151	106	3,795
Future Capacity, 2030[6]	gpd	45,000	100,000	70,000	72,000	343,000	590,000	100,000	0	43,000	50,000	63,000	1,000,000
	ERU	171	381	267	274	1,307	2248	381	0	164	190	240	3,810
Net Available Projected Capacity (Deficit), 2030	**gpd**	**26,956**	**9,438**	**100**	**15,313**	**(6,800)**	**16,863**	**(38,200)**	**TBD**	**(564)**	**10,268**	**35,123**	**3,700**
	ERU	**103**	**36**	**0.4**	**58**	**(26)**	**64**	**(146)**	**TBD**	**(2)**	**39**	**134**	**14**

Source: Garrett County Department of Public Utilities and ERM

1: gpd = gallons per day

2: One Equivalent Residential Unit (ERU) equals 262.5 gallons per day (gpd). An ERU represents the average amount of water used by one household. ERUs are used by the Department of Public Utilities to calculate residential and non-residential (e.g., businesses) water demand on a common basis—to enable an "apples to apples" comparison of water supply and demand. For example, in 2007, there were are approximately 180 residential units in Deer Park, and 274 ERU of water demand—indicating almost 100 ERU of demand from Deer Park's businesses.

3: Indicates the more restrictive of either MDE's groundwater appropriations permit, or the system's design capacity.

4: For towns: reflects projected housing units added by 2030, from Table 2.3, plus any specific system expansions listed in Table 5.1. See the Water Resources section of the Plan Appendix for detailed methodology for unincorporated areas.

5: Future non-residential demand based on Table 11.5. See Water Resources section of the Plan Appendix for detailed methodology.

6: Incorporates all ongoing or planned capacity upgrades.

7: Oakland, Mountain Lake Park, and Loch Lynn Heights have all indicated interest in annexing unincorporated land that lies in between and around the three jurisdictions, as shown in Chapter 3, the Land Use Element (Map 3.8). There are approximately 338 existing residences in this Future Growth Area. This plan assumes that approximately half of those units would be served by the Oakland water system, with the other half being served by the Mountain Lake Park/Loch Lynn Heights system.

8: Please see section 4.7.1 for more detailed discussion of the McHenry water system.

Little Youghiogheny River Watershed

Deer Park

The Town of Deer Park draws its water from groundwater wells in the Greenbrier formation, with a permitted withdrawal capacity of 72,000 gpd. The current water demand for Deer Park is 37,000 gpd. There are no plans for system upgrades or expansions of the Deer Park water service area.

Mountain Lake Park/Loch Lynn Heights

The towns of Mountain Lake Park and Loch Lynn Heights draw water from groundwater wells in the Pocono and Greenbrier aquifer and springs, located some two and half miles southeast of the town of Loch Lynn Heights on the western slopes of Backbone Mountain. Maximum daily permitted withdrawal for this area is 343,000 gpd, with a current demand of 252,000 gpd. The Department of Public Utilities (DPU) has had to issue "boil water" warnings in the past, due to poor water quality from the springs due to sedimentation. In an effort to eliminate the reliance on the spring sources, additional wells and a possible filtration plant are being planned. According to DPU, the wells, which would be drilled near Landon's Dam, could supply as much as 275,000 gpd of drinking water. The County and Town also plan to rehabilitate the system's water distribution lines to reduce system water loss, which currently accounts for as much as 50 percent of produced water. There are no plans to expand the service area at this time.

Oakland

The Town of Oakland withdraws water from Broadford Lake and the Youghiogheny River. The maximum permitted withdrawal from Broadford Lake is 420,000 gpd, while the maximum permitted withdrawal from the Youghiogheny River is 170,000 gpd, for a total permitted withdrawal of 590,000 gpd. Oakland's water treatment plant can process up to 2 million gallons per day (MGD) of water. The Oakland system also serves the Southern Garrett Industrial Park, the Southern Garrett Business and Technology Park, the former Bausch and Lomb property, and the new Roads Department facility (all on MD Route 135, east of Mountain Lake Park), and the Wood Products, Inc. site southeast of Oakland. The Town is planning to extend water service north along US-219 to the site of a new Lowes store (including nearby residential areas with failing well and septic systems), which would consume approximately 50,000 gpd of water.

Casselman River Watershed

Grantsville

The Town of Grantsville draws its water from groundwater wells in the Allegheny and Pottsville formations and natural springs. Grantsville also supplies water to the Northern Garrett Industrial Park, the Keyser's Ridge area, and Northern Garrett High School and Middle School. The maximum daily withdrawal for the Town of Grantsville is 100,000 gpd. The current demand for Grantsville is 60,000 gpd, including 13,000 gpd for Keyser's Ridge. A service expansion along Route 669 to Pea Vine Road and Dorsey Hotel Road is planned, which would increase water demand by 46,000 gpd.

North Branch Potomac River Watershed

Bloomington

The source water for the community of Bloomington is the Savage River. The capacity of the water treatment plant is approximately 43,000 gpd, and current demand in Bloomington is 38,000 gpd. The permitted maximum daily withdrawal from the Savage River is 58,000 gpd. At this time, there are no planned system upgrades or expansions to the service area. Any

new system expansion would require increased withdrawals from the Savage River and capacity upgrades to the water treatment plant, including increased treatment requirements for surface water sources.

Gorman

Water for the community of Gorman is drawn from groundwater wells in the Greenbrier and Mauch Chunk formations. Demand is 35,000 gpd, while system capacity is approximately 40,000 gpd (this includes a water supply line installed by the Mettiki corporation). There are plans to expand the service area to Table Rock Road and a portion of Fairview Church Road, which will require additional water sources and an amended appropriation permit to increase the maximum daily withdrawal. The County has requested that MDE expand the Gorman system's water appropriations permit to 50,000 gpd.

Kitzmiller/Shallmar

Water for the Town of Kitzmiller and nearby area of Shallmar is drawn from groundwater wells in the Allegheny and Pottsville formations, and an impoundment on Wolf Den Run. The water treatment plant has a rated capacity of 86,000 gpd, with a maximum permitted withdrawal of 63,000 gpd, and demand of 20,000 gpd. An additional well is being planned to replace the Wolf Den Run impoundment, which is subject to siltation. After completion of the second well, the impoundment would be retained as a redundant water supply in case of well failure. There are no plans for service area expansion.

Deep Creek Watershed

McHenry

The McHenry system serves areas around the northern end of Deep Creek Lake. Water for the McHenry system is drawn from groundwater wells in the Greenbrier formation, with a maximum permitted withdrawal of 150,000 gpd. Demand in the McHenry system in 2007 was also approximately 150,000 gpd, meaning that the system could not support any additional demand.

The County is planning a significant expansion of the McHenry system, with additional wells, treatment and storage facilities, and service area expansions onto Mosser Road, Gravelly Run Road, Deep Creek Drive, Shingle Camp Road, Stockslager Road and Sandy Beach Road (see Map 4.6). The expanded McHenry water system would have a total capacity of approximately 1.0 MGD.

5.2.2 Private Water Systems

All residents in portions of Garrett County outside of public water systems (approximately 14,000 homes, or 76% of all homes in the County), obtain their water from private wells or springs. Since 1945, approximately 12,000 wells have been drilled in Garrett County for individual residences.[2] These wells draw their water from a variety of water-bearing formations—typically the nearest available formation—in the County, with no single formation being prevalent.[3] Although water quality from wells and springs systems is generally good, these systems are vulnerable to pollution from septic systems and other sources. This is especially true in cases where wells and/or septic systems predate current health regulations related to parcel size and system design.

[2] Source: Western Maryland Resource Conservation and Development Council. 2006. Garrett County, MD Water Well Inventory. Wells drilled prior to 1945 were not inventoried.

[3] Individual wells are generally drilled into the nearest underlying water bearing formation, generally characterized by the 1968 Geologic Map of Maryland, developed by the Maryland Geologic Survey (http://www.mgs.md.gov/esic/geo/gar.html).

5.2.3 Commercial and Agricultural Use

Overall Commercial Water Use

All of the County's major business and industrial parks, as well as most of its major commercial areas (see Map 11.1 in Chapter 11, the Economic Development Element) receive public water from one of the systems described in section 5.2.1. Since 1945, 571 wells have been drilled in Garrett County for industrial and commercial use.[4]

The Thayerville area in the Deep Creek watershed is the largest business/commercial area without public water. As described in Chapter 4, the Deep Creek Lake Influence Area Master Plan, the County has conducted initial engineering studies, and is in the process of locating an appropriate water source to serve Thayerville. Once source water is found, the County intends to designate a water service area.

Specialized Commercial Water Uses

The Wisp Resort draws water from Deep Creek Lake—and stores that water at the top of Marsh Mountain—for snowmaking activities during the winter ski season. Most of this water eventually returns to the Lake as snowmelt. Adventure Sports Center International (ASCI) also withdraws lake water to fill and replenish its recirculating whitewater course.

The Oakland Country Club golf course irrigates extensively during the summer months, using on-site ponds fed by Bradley Run, a tributary of the Little Youghiogheny River.

Agricultural Water Uses

Natural rainfall is generally adequate to support agriculture in Garrett County. Some farmers use individual groundwater wells (approximately 288 have been drilled in Garrett County since 1945[5]), on-property streams or springs, or reclaimed stormwater collected in farm ponds to provide water for livestock, or for limited irrigation purposes. However, large-scale irrigation for agricultural purposes is not generally present in Garrett County, and does not comprise a significant use of ground or surface water.

5.2.4 Identification of Issues – Drinking Water

With the residential growth projections shown in Chapter 2 (which were reviewed by the towns in 2006, early in the comprehensive plan process) and the non-residential growth assumptions in Chapter 11, the public water systems in Accident, Mountain Lake Park/Loch Lynn Heights, Grantsville, and Bloomington will approach or slightly exceed their available capacity (see Table 5.2). The McHenry water system, described in detail in Section 4.7.1. will be adequate to serve projected demand (approximately 1 MGD, as listed in Table 5.2).

Unmet Future Demand in Public Water Systems

To serve projected growth, the County and the municipalities will need to obtain additional water supplies, and will, in many cases, need to upgrade and expand treatment facilities and water distribution systems, as described below. Potential new supplies for unmet demand are described in Sections 5.2.5 and 5.2.6. In all cases, water conservation measures (installation of water-conserving fixtures, limiting excess outdoor water use, etc.) can help to avoid potential shortfalls.

- Based on growth projections, the Town of Accident has adequate water supplies to accommodate future growth. However, the Town is evaluating an expansion of its wastewater treatment system to accommodate up to 90,000 gpd. Should wastewater

[4] See footnote 2. This also includes state and federal government wells.

[5] Ibid.

demand rise to 90,000 gpd, the Town would need to obtain an additional 20,000 gpd of water to ensure proper flushing of the expanded wastewater system.

- There are more than 2,800 acres of Future Growth Area (FGA) surrounding Oakland, Mountain Lake Park, and Loch Lynn Heights, currently containing approximately 350 residences and several businesses. All three towns have indicated interest in annexing at least some of this land, and these areas (which contain approximately 338 existing residences) would likely receive public water upon annexation into a town. Accordingly, the data in Table 5.2 include the water demand that existing development in these Future Growth Areas would generate. That demand is divided approximately evenly between the Oakland and Mountain Lake Park/Loch Lynn Heights systems.

  In aggregate, the two systems appear to be able to serve existing development in the FGAs. However, full development of the undeveloped portions of the FGAs would likely require additional water supplies. In addition, upgrades may be needed for the Mountain Lake Park/Loch Lynn Heights system to address poor water quality.

- The Grantsville water system will need an additional 40,000 gpd of water to serve future growth (primarily due to the Pea Vine Road extension).

- The Bloomington water system is nearing capacity. As the water treatment plant is replaced, the system's permitted and physical capacity should also be increased.

Water Quality Concerns

(In addition to the concerns listed in Table 5.1.)

- The community of Finzel, located atop Little Savage Mountain in the northeast corner of the County, depends entirely on wells in the Hampshire and Pocono formations for its water supplies. The quality of ground water in this region is poor, with high concentrations of iron and other minerals, necessitating residents to install water conditioners in order to use well water
- Development of Garrett County's potential natural gas resources (see Chapter 11) could have impacts on water supply and water quality. Natural gas mining techniques can involve considerable water consumption, and can produce wastewater that must be treated before being discharged.

5.2.5 Potential New Groundwater Supplies

More than half of the water used in Garrett County is drawn from groundwater wells.[6] Except in extreme drought conditions, such as those experienced during the spring and summer of 1991 (the worst on record), these groundwater resources, combined with surface water sources, have been adequate to meet demand.

However, information on the capacity of the County's groundwater resources—particularly groundwater's capacity to serve continued growth, and stresses upon those groundwater resources—is outdated. The last full study of the County's groundwater resources was a 1980 U.S. Geological Survey (USGS) groundwater study.[7] Since then, the number of residents and seasonal housing units in the County has increased rapidly (housing units grew by 33 percent between 1990 and 2005 alone).

[6] Source: 1993. A Second Closer Look at Garrett County. This was the most recent information available about Countywide water use patterns.

[7] 1980. USGS. *Basic Data Report 11, Garrett County Water-Well Records, Chemical-Quality Data, Ground-Water Use, Coal Test-Hole Data, and Surface Water Data.*

Based on MDE's water balance methodology (described in the Plan Appendix), the water-bearing formations that serve Garrett County recharge at the rate of more than 200 million gallons per day.[8] At the broad scale, and lacking specific data to the contrary, this volume is adequate to serve projected growth in rural areas of Garrett County through 2030. In addition, MDE's own calculations show that "an analysis of stream base flow information indicates that the quantity of recharge per acre [in Garrett County] is sufficient to support the density of one home per three acres or a greater density."[9]

However, the caveats to this finding are important. Garrett County's water-bearing formations serve the broader region beyond the County itself (notably, the City of Frostburg owns wells in the Savage River watershed). In addition, geological and seasonal variations mean that groundwater resources may not be uniformly available in every location in the County.

A frequently expressed concern is the impact of new development (and its wells) on existing groundwater wells serving individual homes and businesses. Neither the County Health Department, nor MDE are aware of "situations in Garrett County where water use at a subdivision on individual wells [is] impacting other users."[10] However, this situation could potentially arise in cases where the existing well is older and shallower. In such a situation, new wells could reduce flows to existing wells in the immediate vicinity, forcing existing well owners to drill new, deeper wells.

These older, shallower wells are often more vulnerable to direct transmission of septic effluent and contamination from the surface (via underground storage tanks, landfill leachate, mining and construction, petroleum and pesticide spills, and nutrients and bacteria from feedlots) than deeper commercial or public supply wells. In the past, salt runoff from highway deicing and salt storage facilities in the County have affected some homeowners.[11] While significant new wells (such as those serving public water systems) require a groundwater appropriations permit from MDE's Water Management Administration,[12] wells for individual businesses and homes (even those in small subdivisions) require no such state permit.

Finally, it is also important to remember that groundwater and surface water resources are linked. While groundwater withdrawn through wells is typically returned to the ground or surface via septic systems and absorption of runoff from outdoor water uses (such as watering lawns), large withdrawals can potentially impact nearby surface water bodies. In developing expanded public water systems, consideration should be given to potential impacts on nearby bodies of water and private wells outside of the service area.

To improve available data on groundwater availability, Garrett County, Allegany County, MD, and Mineral County, WV have begun to plan a detailed regional study of groundwater resources. Future updates to the Comprehensive Plan should explicitly incorporate the planned regional water resources study into decisions about growth and development—particularly if the groundwater study reveals limitations on groundwater capacity.

[8] Source: *Models and Guidelines 26*, the official state guidance for preparing the Water Resources element (see http://www.mdp.state.md.us/mgs/pdf/mg26.pdf). See also the Water Resources section of the Comprehensive Plan Appendix. This calculation reflects only the nearest water-bearing formation. In most locations, two or more water-bearing formations could reasonably be tapped.

[9] MDE. Letter dated June 20, 2007. See Water Resources section of the Plan Appendix.

[10] See footnote 9.

[11] Source: DNR, Comments on Preliminary Draft of 2008 Comprehensive Plan

[12] Source: http://www.mde.state.md.us/Permits/WaterManagementPermits/index.asp. Typically, new wells drawing more than 10,000 gpd and residential subdivisions with more than ten lots require a MDE permit.

5.2.6 Potential New Surface Water Supplies

The County's surface water resources include major rivers and a number of surface water impoundments, many of which are already used as public water sources. This section describes the characteristics and limitations of those bodies of water.

Deep Creek Lake

Deep Creek Lake is Maryland's largest and highest inland body of water, and is owned by the Maryland Department of Natural Resources (DNR). The lake is not used as a source of drinking water, although this possibility has been discussed in the past. While Deep Creek Lake's size makes it an attractive potential source of drinking water, this opportunity must be balanced against other concerns.

Using Deep Creek Lake as a source of drinking water could lead to a drawdown (drop in water elevation) that could adversely impact recreational uses of the Lake—a major component of the County's tourism economy. Such drawdown could also impact hydroelectric generation at the Deep Creek Lake Dam.

In addition, the Maryland Department of the Environment (MDE) currently lists the lake as being impaired due to the presence of bacteria, mercury, and nutrients. MDE has completed a Total Maximum Daily Load, or TMDLs (see Section 5.3.3), for mercury, and will prepare a TMDL for the other impairments. There are also concerns about petroleum pollution from the motorized watercraft that use the Lake. As a result, lake water would likely require specialized (and potentially costly) treatment before being suitable for public consumption.

As part of this Comprehensive Plan, the County commissioned an Assessment of Water Quality Impacts from Potential Land Development, Deep Creek Lake (the *Water Quality Study*, May 2007), which used existing water quality data to evaluate the impacts of projected development and the Development Capacity Analysis on the Lake's water quality. The overall findings of that study are described in Chapter 4, the Deep Creek Lake Influence Area Master Plan.[13] The Maryland Department of Natural Resources began more detailed monitoring and study of the Lake's water quality in 2007.

Savage River Reservoir

The Savage River Reservoir is used for flood-control purposes, and is also a source of water for Westernport in Allegany County, as well as a small number of customers in Garrett County connected to Westernport's water transmission line. The reservoir has a usable capacity of 20,000 acre-feet.[14] As with Deep Creek Lake, Savage River Reservoir is a recreational, economic, and scenic resource for Garrett County. These considerations should be addressed in any future proposal to withdraw additional drinking water from the reservoir.

Youghiogheny River Reservoir

The 16-mile long Youghiogheny River Reservoir, formed by the damming of the Youghiogheny River in Southern Pennsylvania, extends south into the county for a distance of approximately three miles. The reservoir is primarily used for flood control and recreational purposes has a usable capacity of 254,000 acre-feet, the vast majority of which is in Pennsylvania. The reservoir's water level is lowered dramatically during the summer and fall months to provide storage for downstream flood control. As a result, the Maryland portion of the Lake is frequently dry or heavily silted, and is not well suited as a water supply.

[13] The full document is included in the Comprehensive Plan Appendix.

[14] Usable capacity is the volume that could be withdrawn each year while still maintaining minimum lake or reservoir volume, as determined by the agency responsible for managing the body of water. One acre-foot is equivalent to approximately 326,000 gallons per year (Source: NOAA, http://www.srh.noaa.gov/wgrfc/convert.html).

Broadford Lake

Broadford Lake was created by the Natural Resources Conservation Service (NRCS) for flood control, recreation, and municipal water supply for the Town of Oakland. It has usable capacity of 2,337 acre feet. The town of Oakland owns and operates the facility as the secondary source of water. Some capacity may be available to serve future growth.

Piney Run Reservoir

The Piney Run Reservoir in the northeastern corner of Garrett County (just west of Finzel) is owned and operated by the Town of Frostburg (in Allegany County), exclusively as the town's municipal water supply. The reservoir impounds 400 million gallons of water. Garrett County may wish to work with Frostburg to explore the possibility of using the reservoir as a public water source for existing residents and businesses in Finzel, alleviating groundwater quality problems. One difficulty of such an agreement is that Frostburg's water treatment plant is adjacent to the city, and not at the source. Pumping treated water from Frostburg back to Finzel would be quite difficult and expensive. To use water from the Piney Run Reservoir, the County would likely need to build a separate water treatment facility for the Finzel area.

Jennings Randolph Lake

Jennings Randolph Lake, along the North Branch Potomac River east of Kitzmiller, was built by the U.S. Army Corp of Engineers (ACOE), for flood control and water storage purposes to regulate flow in the Potomac River. The lake has also helped to improve water quality in the North Branch Potomac below the dam related to acid mine drainage. This structure at spillway level has a usable capacity of 130,900 acre-feet.

Barton Reservoir

The Town of Barton (in Allegany County) owns a reservoir on Butcher Run in Garrett County. The Barton Reservoir allows a sufficient storage capability to withdraw up to 100,000 gallons of water a day. It is not known whether excess capacity is available for use in Garrett County, but the reservoir's distance from existing public water systems makes it an unlikely candidate for such use.

Rivers, Streams and Other Sources

The Towns of Friendsville and Oakland both withdraw water from the Youghiogheny River, while the Town of Bloomington withdraws its drinking water from the Savage River. Beyond those sources, Garrett County's rivers and streams are not generally used as sources of drinking water. Significant seasonal variations in water level, and degraded water quality in some streams due to acid mine drainage (see Chapter 10) tend to discourage the use of these bodies of water. That fact notwithstanding, treatment of surface water from mines can be feasible in some situations, and should not be eliminated as an option for providing drinking water.

Finally, the link between stormwater and drinking water should be considered. Stormwater management facilities (ranging from stormwater ponds to cisterns on individual homes) could be designed and sited in ways that allow collected stormwater to be treated and reused as process water or even drinking water.

5.2.7 Source Water Protection

In 2004, MDE conducted a series of Source Water Assessments (SWA) for the public water systems in Garrett County. Each SWA characterizes the extent of and threats to the public water system, and lists a number of actions necessary to protect source water in those systems. The major common recommendations of the SWAs are:

- Creation of a Source Water Protection Team (for each water system)

- Better education of residents and business owners about source water issues and concerns
- Continued adherence to groundwater monitoring requirements
- Communication with County land use officials about future planning and land use

The 2007 Garrett County Source Water Protection Plan (SWPP) used the findings of the SWAs as the basis for delineation of Source Water Protection Areas for public water systems in Accident, Crellin, Gorman, Grantsville, Kitzmiller, and McHenry.[15] The SWPP delineates 1,738 acres containing 22 wells and springs serving public systems for future source water protection.

The SWPP's major recommendations are similar to those in the SWAs, and include:

- Establishment of a Source Water Protection Committee (already accomplished).
- Establishment of a public education program. Such a program would include signage (including emergency contact information in the case of a contamination event), and distribution of printed materials related to source water protection.
- Coordination with the County departments of Planning and Public Utilities to ensure that growth and development activities incorporate source water protection considerations.
- Continued monitoring of source water, as required by MDE.

Further actions to protect source water could include reduction or prohibition of development in delineated source water protection areas, and the establishment of buffers around the edges of source water protection areas. In particular, the County's existing Sensitive Areas Ordinance could be updated to include Source Water Protection Areas (as mapped by the SWPP and its future updates) as a type of Sensitive Area, with appropriate development and buffering regulations. The SWPP, including maps and descriptions of source water protection areas, is included in the Comprehensive Plan Appendix.

5.3 Wastewater Assessment

This section describes existing and projected future demand for public wastewater service in Garrett County.

5.3.1 Existing Conditions

Approximately 6,700 dwelling units in Garrett County (37 percent of the County total) are connected to public sewer systems. Map 5.2 shows existing major public sewer service areas. Table 5.3 summarizes the discharge points, treatment technology, and general needs of the County's public wastewater systems. Table 5.4 shows wastewater treatment capacity, existing wastewater flows, projected future flows, and the projected wastewater capacity surpluses and deficits for each of the County's public wastewater systems. capacity and demand for public water systems. Those water systems are described in detail below.

Youghiogheny River Watershed

Crellin

Wastewater for Crellin and the nearby community of Hutton to the northwest is treated using a recirculation tank, sand filter, and UV radiation disinfection. Effluent is discharged into the Youghiogheny River near the MD 39 bridge. The permitted capacity for the Crellin WWTP is 27,000 gpd, compared to existing Average Daily Flow (ADF) of 14,000 gpd. No system upgrades or service area expansions are currently planned.

[15] These are the public systems operated by the County—or with County assistance, as is the case in Accident. Other public water systems in Garrett County are operated by municipalities.

Map 5.2 Sewer Service Areas in Garrett County

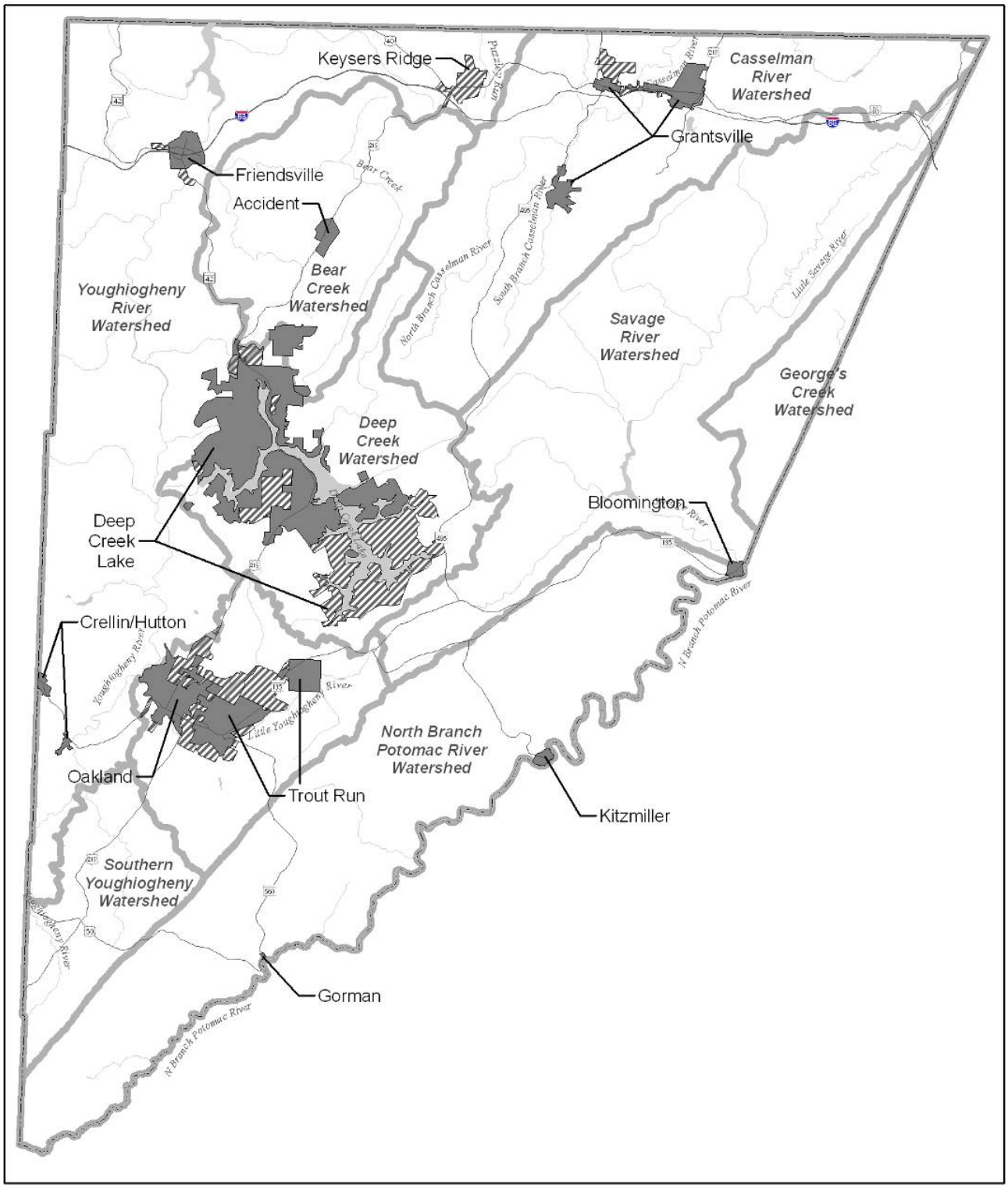


Table 5.3: Public Wastewater Treatment Plant (WWTP) Characteristics

Wastewater Treatment Plant	Discharge Location	Treatment Technology	Planned/Potential WWTP Upgrades or Expansions	Planned/Potential Service Area Extensions
Youghiogheny River				
Crellin/Hutton	Youghiogheny River, south of MD Route 39 bridge.	Septic Tank, Recirculating Sand Filter	None	None
Friendsville	Youghiogheny River in Friendsville	Activated Sludge	Rehabilitation of main sewer lines to eliminate Inflow and Infiltration (I/I)[2]	None
Oakland	Youghiogheny River, downstream of Little Youghiogheny River	Aerated lagoons	None	Planned extension to annexed areas north of town on US 219.
Bear Creek				
Accident	Bear Creek South Branch tributary in Accident.	Activated sludge	Rehabilitation of main sewer lines to eliminate I/I. Planned upgrade to 90,000 gpd.	None
Little Youghiogheny River				
Trout Run[1]	Little Youghiogheny River south of Mountain Lake Park	Aerated lagoons	Rehabilitation of sewer lines and interceptors to eliminate I/I.	None
Casselman River				
Grantsville	Casselman River, north of the Casselman River Bridge	Submerged Biological Contactor (BNR)	None	Planned extension MD 669 to Pea Vine Road and Dorsey Hotel Road
North Branch Potomac River				
Bloomington	NB Potomac River in Bloomington	Activated sludge	None	Possible extension to failing septic areas along MD 135.
Gorman	NB Potomac River just east of Gorman	Septic Tank, Recirculating Sand Filter	None	Possible extension to Althouse Hill Road area (south of Gorman)
Kitzmiller	NB Potomac River, north of Kitzmiller	Activated sludge	None	Possible extensions to Jennings Randolph Lake.
Deep Creek				
Deep Creek Lake	Deep Creek Stream, west of Deep Creek Dam	Oxidation Ditch (BNR)	Eventual expansion to 3.9 MGD. Upgrade to ENR considered.	Planned extension to properties at the southern end of Deep Creek Lake (see Chapter 4).

1: Treats wastewater from the Towns of Deer Park, Loch Lynn Heights, and Mountain Lake Park

2: Inflow is water from storm events entering the system through roof drains, sump pumps, foundation drains, and similar sources. Infiltration is groundwater entering the system through leaking pipes, manholes, and other elements. I/I takes up sewer capacity that should be reserved only for wastewater, effectively limiting the system's overall capacity.

Table 5.4: Wastewater Flow and Treatment Capacity

		Crellin/Hutton	**Friendsville** (Future demand assumes I/I problems resolved)	**Oakland** (Includes expansion to Lowe's site and surrounding areas	**Accident** (Future demand assumes I/I problems resolved)	**Trout Run**	**Grantsville** (Includes Chestnut Ridge, Jennings, Pea Vine Road extension)	**Bloomington** (Excludes extension along MD 135)	**Gorman** (Includes extension to Althouse Hill Rd)	**Kitzmiller** (Excludes extension to Jennings Randolph Lake)	**Deep Creek Lake**
Existing Treatment Capacity[3]	gpd[1]	27,000	125,000	900,000	50,000	900,000	600,000	50,000	8,500	40,000	2,200,000
	ERU[2]	103	476	3,429	190	3,429	2,286	190	32	152	8,381
Average Daily Flow (ADF), 2007	gpd	14,000	123,000	490,000	160,000	701,000	440,000	36,000	5,000	18,000	1,170,488
	ERU	53	469	1,867	610	2,670	1,676	137	19	69	4,459
Net Available Capacity, 2007	gpd	13,000	2,000	410,000	(110,000)	199,000	160,000	14,000	4,000	22,000	1,029,513
	ERU	50	8	1,562	(419)	758	610	53	15	84	3,922
Projected New Residential Demand, 2030[4]	gpd	8,762	6,563	109,988	6,563	109,988	41,266	4,819	5,070	6,563	1,094,822
	ERU	33	25	419	25	419	157	18	19	25	4,171
Projected New Non-residential Demand, 2030[5]	gpd	-	1,000	57,390	3,338	13,260	18,950	-	-	-	106,050
	ERU	-	4	219	13	51	72	-	-	-	404
Total projected demand	gpd	22,762	90,563	657,378	69,900	824,248	500,216	40,819	9,070	24,563	2,371,359
	ERU	87	345	2,504	266	1,906	1,906	156	35	94	9,034
Future Treatment Capacity[6]	gpd	27,000	125,000	900,000	90,000	900,000	600,000	50,000	8,500	40,000	2,200,000
	ERU	103	476	3,429	343	3,429	2,286	190	32	152	8,381
Net Available Projected Capacity, 2030	**gpd**	**4,238**	**34,438**	**242,623**	**20,100**	**75,753**	**99,784**	**9,181**	**(570)**	**15,438**	**(171,359)**
	ERU	**16**	**131**	**924**	**77**	**289**	**380**	**35**	**(3)**	**59**	**(653)**

Source: Garrett County Department of Public Utilities and ERM

1: gpd = gallons per day

2: ERU = An Equivalent Residential Unit (ERU) is 262.5 gallons per day (gpd). See note in table 5.2.

3: Indicates the more restrictive of either MDE's wastewater discharge permit limits, or the system's design capacity.

4: For towns: reflects projected housing units added by 2030, from Table 2.3, plus any specific system expansions listed in Table 5.3. See Water Resources section of the Plan Appendix for detailed methodology for unincorporated areas.

5: Future non-residential demand based on Table 11.5. See Water Resources section of the Plan Appendix for detailed methodology.

6: Incorporates all ongoing or planned capacity upgrades.

Friendsville

Wastewater for the Town of Friendsville is treated via the extended aeration variant of the activated sludge process, followed by disinfection, before being discharged into the Youghiogheny River in Friendsville. The permitted capacity for the Friendsville WWTP is 125,000 gpd. Existing ADF to the Friendsville WWTP is 123,000 gpd, although flows as high as 1 million gallons per day (MGD) have been reported during wet weather events, due largely to the presence of Inflow and Infiltration (I/I).[16]

An I/I reduction program for the main sewers is being planned. In 2008, the County was awarded $100,000 from the Maryland Department of Housing and Community Development's Community Development Block Grant program to replace aging sewer lines and address I/I. The County is working to obtain additional funding for I/I repairs. A service area expansion along MD 42 west of the Town will serve the Future Growth Area identified in Map 3.5. However, this and other future expansions will be severely restricted until the Town completes its I/I reduction program.

Keyser's Ridge

As of early 2008, there were no active tenants in the Keysers Ridge Business Park, with the first tenant (American Woodmark) expected to begin construction in 2008-9. Wastewater from this tenant and any other tenants is expected to be treated by on-site septic systems for the foreseeable future. Development of a Keysers Ridge WWTP, which would treat wastewater from the Business Park and surrounding areas, is a long term goal that is dependent on occupancy at the business park.

Once constructed (although there are no active plans to do so), the Keysers Ridge WWTP could potentially discharge treated effluent into a tributary of Puzzley Run near the Pennsylvania state line via an existing permitted discharge point. Given the fact that Puzzley Run is a Tier II stream (see Section 5.3.3), extreme care will have to be taken when designing the plant, and alternative disposal options (wastewater reuse, more advanced treatment technologies not yet available) should be considered when such a facility is built.

The treatment technology, and size of the future Keysers Ridge WWTP and collection system has yet to be determined,[17] but will be sized to serve existing and potential future demand in the Keyser's Ridge Business Park, and in the commercial area surrounding the I-68/US-219 interchange.

Oakland

The Town of Oakland operates its own wastewater system and WWTP, which uses a series of aerated lagoons and discharges into the Youghiogheny River, just downstream of its confluence with the Little Youghiogheny River.[18] The design and permitted capacity of the Oakland WWTP is 900,000 gpd, compared to ADF of 490,000 gpd. The Oakland system also serves the Wood Products, Inc. site southeast of Oakland. The Town is planning to extend sewer service north on Garrett Highway to accommodate the planned Lowe's store and nearby businesses and residences. This extension would require approximately 50,000 gpd of treatment capacity.

[16] Source: Garrett County DPU

[17] For the purposes of evaluating current and future nitrogen loads in the Youghiogheny River watershed, specifically in Section 5.3.3, the future Keysers Ridge system is assumed to have a capacity of 100,000 gpd, using Biological Nutrient Removal (BNR) technology.

[18] Thus, while the Town sits in the Little Youghiogheny River watershed, its wastewater is discharged into the Youghiogheny River. Accordingly, the Oakland sewer system is described as part of the Youghiogheny River watershed.

Bear Creek Watershed

Accident

The Town of Accident operates its own wastewater system and WWTP, with operator supervisory service from the Garrett County Department of Public Utilities. Wastewater for Accident (including the Central Garrett Industrial Park) is treated using the extended aeration variant of the activated sludge process followed by chlorine disinfection. Effluent is discharged into a tributary of the South Branch of Bear Creek, at the southern end of the Town.

The permitted capacity for the Accident WWTP is 50,000 gpd, compared to ADF of 160,000 gpd. This imbalance between ADF and permitted capacity led the Maryland Department of the Environment (MDE) to issue a consent order in 2000, mandating that the town rehabilitate its system to reduce I/I. That rehabilitation is underway, and is believed to be caused largely by improper connection of roof drains and sump pumps to the sewage collection system from individual homes.[19]

The town is also planning to expand the treatment capacity of the plant to 90,000 gpd, largely to support full buildout of the Central Garrett Industrial Park. However, until the Town brings flows to within the parameters of the existing design and permitted capacity of the plant, expansions to the system are restricted. At present, no service area expansions are planned.

Little Youghiogheny River Watershed

Trout Run

The Trout Run WWTP serves the towns of Mountain Lake Park, Loch Lynn Heights, and Deer Park, as well as the Shady Acres and Weber Road areas. The County owns and operates the WWTP and the sewer collection lines for Deer Park, while the towns of Mountain Lake Park and Loch Lynn Heights own and maintain the sewer collection lines within their respective jurisdictions. The Trout Run WWTP also serves Southern Garrett Industrial Park, the Southern Garrett Business and Technology Park, the former Bausch and Lomb property, and the new Roads Department facility (all on MD Route 135, east of Mountain Lake Park). The Trout Run WWTP uses an aerated lagoon, and discharges into the Little Youghiogheny River. These discharges are restricted through the use of a Hydrographic Controlled Release (HCR) when flows in the receiving stream are below a prescribed level.

The permitted capacity of the Trout Run WWTP is 900,000 gpd, compared to ADF of 701,000 gpd. Severe I/I is present in the Trout Run collection system, and the County and towns are cooperatively implementing an I/I reduction program currently underway in Mountain Lake Park, Loch Lynn Heights, and on the main interceptor line that feeds the plant. Repair of this I/I is complicated by split ownership of the sewer collection lines.

Casselman River Watershed

Grantsville

Wastewater from the Town of Grantsville, Chestnut Ridge, Jennings, and the Goodwill Mennonite Home is treated at the Grantsville WWTP using the Rotating Biological Contactor (RBC) variant of the Biological Nutrient Removal (BNR) process, prior to discharging into the Casselman River. Sludge from the WWTP is treated in an aerobic digester and the stabilized liquid sludge is spread on nearby farm fields for which sludge application permits have been obtained. The design and permitted capacity for the Grantsville WWTP is 600,000 gpd, compared to ADF of approximately 440,000 gpd.

[19] Source: Garrett County DPU.

A service expansion along Route 669 to Pea Vine Road and Dorsey Hotel Road is currently planned, requiring a treatment capacity of 24,000 gpd (92 ERUs).

North Branch Potomac River Watershed

Bloomington

Wastewater for Bloomington is treated by an activated sludge process prior to discharging into the North Branch Potomac River. The Bloomington WWTP has a permitted capacity of 50,000 gpd, compared to ADF of 36,000 gpd. The County is considering expanding the system to serve failing septic areas along Route 135, west of Bloomington, but such expansion would likely require increased permitted capacity.

Gorman

Wastewater for Gorman and nearby communities consists of individual septic tanks at residences and businesses, a recirculating tank and sand filter, and an ultra violet radiation disinfection unit. The treated effluent is discharged into the North Branch Potomac River. The Gorman WWTP has a permitted capacity of 8,500 gpd, compared to ADF of 5,000 gpd. There are no planned system upgrades, although the County is considering expanding the service area to the Althouse Hill Road area to address failing septic systems. This expansion would require approximately 4,500 gpd of treatment capacity, leaving plant essentially at capacity.

Kitzmiller

Wastewater from Kitzmiller is treated via activated sludge and discharged into the North Branch Potomac River. The permitted capacity for Kitzmiller's WWTP is 40,000 gpd, (with a design capacity of 50,000 gpd), compared to ADF of 18,000 gpd.

Deep Creek Lake Watershed

Deep Creek Lake

The wastewater collection, conveyance and treatment system serving the Deep Creek Lake area is the largest in the County. Map 4.4 (in Chapter 4, the Deep Creek Lake Influence Area Master Plan) provides a detailed delineation of the existing and planned service area for the Deep Creek Lake WWTP. Wastewater from this service area is treated using the oxidation ditch variant of the BNR process before discharging into Deep Creek, below the Deep Creek Lake dam and approximately one-half mile from its confluence with the Youghiogheny River. Current permitted capacity for the Deep Creek Lake WWTP is 2.2 MGD, compared to ADF of approximately 1.17 MGD.

Marginal and failing septic systems in Turkey Neck, Sky Valley, Green Glade and Hazelhurst at the south end of Deep Creek Lake are included in the Deep Creek Lake WWTP's future sewer service area. As shown in Table 5.4, extension of the sewer service area to existing residences and businesses in these locations, combined with projected new development in the service area would generate ADF of nearly 2.4 MGD by the year 2030, creating the need to expand the plant to accommodate approximately 170,000 gpd of additional flow.

The Deep Creek Lake WWTP was laid out for a potential mirrored (duplicate) expansion on the north side of the plant property. Ultimately, the site could accommodate a total of 3.9 MGD of treatment capacity, enough treatment capacity to accommodate projected growth through the year 2030, plus approximately 5,800 additional ERU of capacity. Expansion—perhaps to the full 3.9 MGD capacity—will likely be necessary by 2030 (see Table 5.4). Any additional demand beyond this would not be able to be treated at the current site.

In addition to the treatment plant, numerous collection and conveyance system upgrades will be required to transport wastewater flows to the treatment plant. The most significant is the Western Conveyance system, currently under design and expected to be operational by the end of 2008, that will take flows from the proposed portions of the Wisp Resort and redirect flows from the McHenry area directly to the WWTP. Other areas of potential conveyance system expansion include the failing septic areas of Green Glade, Turkey Neck, and Hazelhurst, at the southern end of the lake. These systems were typically installed prior to current health regulations, and fail due to small lots and underlying soils and geology that are not suitable for septic systems.

Should a future upgrade to Enhanced Nutrient Removal (ENR) technology[20] be necessary or desirable, the WWTP site has adequate space to add ENR infrastructure. However, there is not adequate land at the site to increase the system's overall capacity beyond 3.9 MGD, regardless of treatment technology.

Wastewater from Deep Creek Lake State Park is currently treated on site and disposed via spray irrigation during spring, summer, and early autumn, and at the Deep Creek Lake WWTP during the remainder of the year (when spray irrigation is not possible). The state and County are in the process of eliminating the spray irrigation system in favor of year-round treatment of state park wastewater at the Deep Creek Lake WWTP.

5.3.2 Identification of Issues – Public Sewer Systems

Public Wastewater Systems

As shown on Table 5.4, most of the County's public sewer systems will be able to accommodate projected residential and nonresidential growth through the year 2030, while still having some additional capacity to accommodate long-term growth beyond 2030. Systems that will require expansions or other modifications are as follows:

- The Gorman system will be at capacity after expansion to serve failing septic systems along Althouse Hill Road, and the County may wish to pursue expanded system capacity and increased discharge limits to provide a margin of safety.

- The Crellin/Hutton system could approach 85 percent capacity, based on development projections for the unincorporated portions of the Youghiogheny River watershed. If development in these villages exceeds projections, the County may wish to pursue expanded system capacity and increased discharge limits.

- As discussed in this chapter and in Chapter 4, the Deep Creek Lake system will likely need to be expanded prior to 2030, and would likely be expanded to the full 3.9 MGD site capacity. This would allow the plant to accommodate considerable growth beyond 2030. Assuming continued use of BNR technology, expansion of the Deep Creek Lake WWTP will likely require increased discharge limits for both discharge volume and nutrient loads, and additional collection infrastructure beyond what already exists.

- The County has been cited for violations of discharge restrictions at the Trout Run WWTP during prolonged low flow conditions in the Little Youghiogheny River. In these cases, existing storage capacity was inadequate to hold the accumulated sewage flows without discharging. The system's I/I deficiencies contribute to this problem.

[20] ENR is the best available wastewater treatment technology, resulting in loading as low as 3 mg of Nitrogen and 0.3 mg of Phosphorus per liter of effluent, compared to 8 and 2 mg/L, respectively for BNR.

Other Wastewater Needs

The village of Finzel uses septic systems, and is already experiencing poor drinking water quality due to iron and minerals, as described above. The Finzel area is in the same watershed as the Piney Run Reservoir—the City of Frostburg's water supply—and also sits near Finzel Swamp, a sensitive natural area that is the source of the Savage River. While there is no current evidence of failing septic systems in this area, a Finzel sewer system may eventually be needed to protect water quality and sensitive habitat.

5.3.3 Point Source Discharge Limits

This section describes the key limits on point source discharges of nitrogen and phosphorus (more generally referred to as "nutrients") as they apply to the County's WWTPs.

Point Source Caps

To address nutrient loads from point sources such as WWTPs, the state has established Chesapeake Bay Tributary Strategy point source caps. These caps are numerical limits on the amount of nitrogen and phosphorus that WWTPs can discharge to the Bay and its tributaries (loading and caps are expressed as pounds per year of nitrogen and phosphorus). The Bloomington, Gorman, and Kitzmiller WWTPs, all of which discharge to the North Branch Potomac River or its tributaries, and are the only WWTPs in Garrett County that discharge to the Chesapeake Bay basin, and are therefore the only County facilities subject to point source caps. For all three WWTPs, the nutrient cap is equivalent to the maximum existing capacity of the wastewater treatment system.

Expansion of treatment capacity is possible at these facilities, but due to nutrient caps, must be accompanied by improved treatment technology. In theory, upgrading these WWTPs to Biological Nutrient Removal (BNR) standards (which would reduce nitrogen loads by more than half, compared to existing discharges—see Section 5.3.4 below) would permit those facilities to treat a larger volume of wastewater without violating nutrient load caps. However, BNR technology is quite expensive, and has only been implemented for large WWTPs, such as Deep Creek Lake and Grantsville. Thus, the existing capacities of the Bloomington, Gorman, and Kitzmiller WWTPs are likely to be the long-term limit of available sewage treatment capacity.

TMDL

Another measure of "assimilative capacity" is the Total Maximum Daily Load (TMDL) concept. A TMDL is the maximum amount of pollutant (in this case, nutrients) that a water body, such as a river or a lake, can receive without causing a water quality impairment. In essence it quantifies an upper threshold on pollutants or stressors. The TMDL accounts for all sources of the given pollutant; for example, for nutrients the sources could be point sources such as WWTPs, or nonpoint sources such as stormwater or agricultural runoff. A TMDL typically establishes separate caps for point source and nonpoint source discharges of the impairing pollutant.

The Deep Creek watershed is not subject to point source caps described above, but is "impaired" due to nutrients—that is, the amount of nitrogen and phosphorus generated in this watershed is higher than permitted. MDE has identified the need to develop a TMDL for nutrients in the Deep Creek watershed, but has not yet completed it.

The Little Youghiogheny River watershed was originally listed as being impaired for nutrients. However, MDE's investigation revealed that the actual problem in the Little Youghiogheny is

excess Biochemical Oxygen Demand (BOD), a separate type of impairment.[21] The resultant TMDL for BOD does not specifically limit nutrient loads.

Several of Garrett County's waterways are also impaired by other contaminants, such as bacteria, biological contaminants, metals, and sediments (notably in the Youghiogheny River watershed). In most cases, TMDLs have been completed to address these impairments.

Antidegradation

Maryland's antidegradation policy significantly limits new discharge permits that would degrade water quality. Discharged wastes that exceed a waterbody's assimilative capacity violate this policy and will result in listing a water body as being impaired—possibly requiring determination of a TMDL. Of particular concern are Tier II (high quality) waters, as defined by MDE.[22] Garrett County's Tier II waters are shown in Figure 5.1. In most cases, Tier II waters in Garrett County are in areas where development is already limited by state land ownership or agricultural land preservation.

The primary exception is Puzzley Run, which would be the receiving body for the proposed WWTP serving the Keysers Ridge area. The County plans to use an existing, privately held discharge point on this stream. The Keysers Ridge WWTP would likely have to use BNR or higher treatment technology to avoid degradation of water quality in Puzzley Run.

Other Discharge Limits

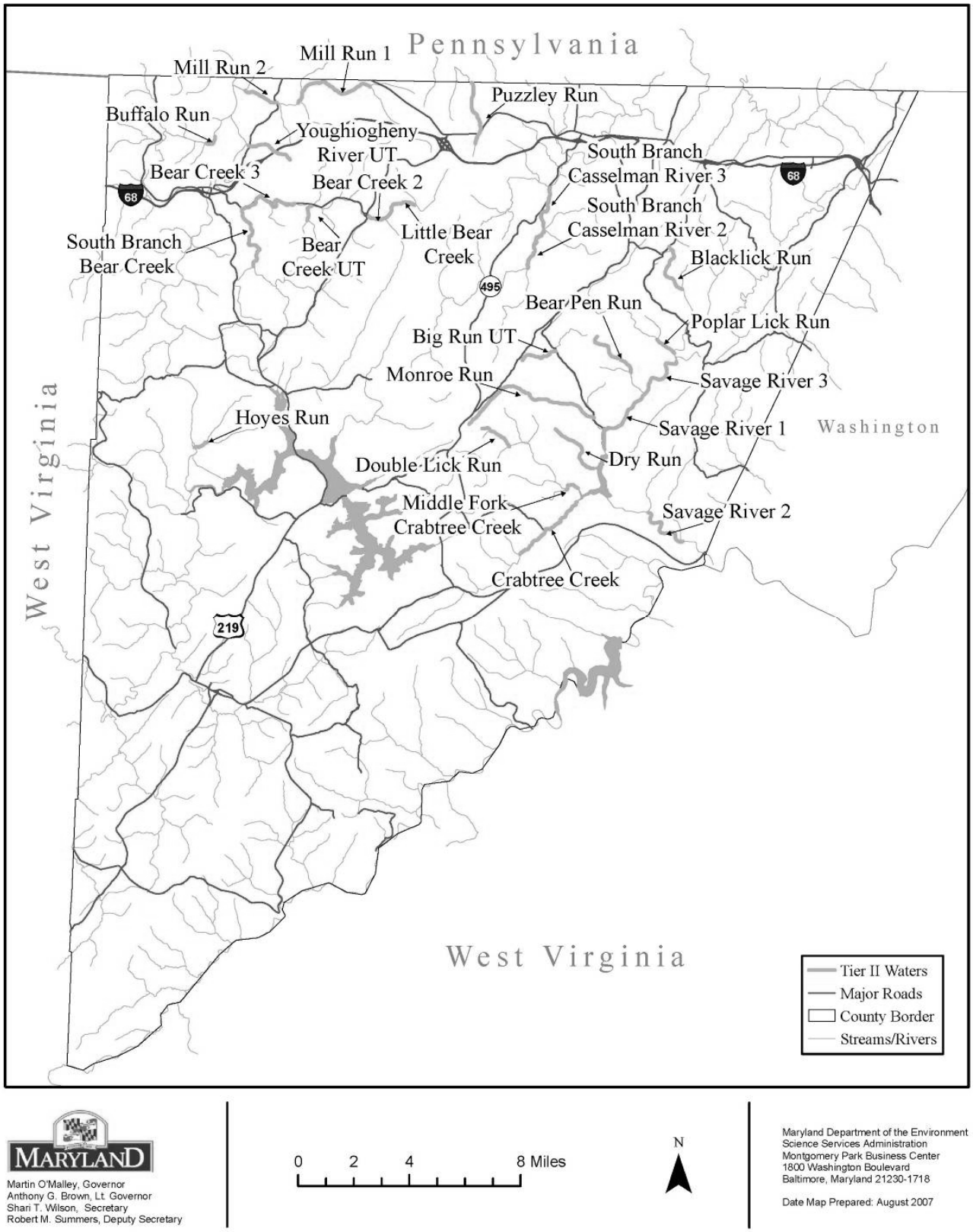
Aside from the cases described above, there are few numeric or policy limits on WWTP discharges in Garrett County. Most major WWTPs discharge to the Youghiogheny River basin (which drains to the Ohio and Mississippi Rivers), and are not governed by the Tributary Strategy requirements or TMDLs (except in the case of Deep Creek Lake, which will eventually be assigned a TMDL).

In preparing the Comprehensive Plan, the County consulted with MDE regarding other discharge limits. Any forthcoming MDE guidance regarding this subject will be incorporated into future Comprehensive Plan updates. Regardless, the County's overall approach will be to pursue land use and water resources policies that limit adverse impacts on water quality from both point and nonpoint sources.

[21] Source: MDE. 2001. Total Maximum Daily Loads [TMDL] of Carbonaceous Biochemical Oxygen Demand (CBOD) and Nitrogenous Biochemical Oxygen Demand (NBOD) for the Little Youghiogheny River

[22] See MDE's website for more information on the antidegradation policy: http://www.mde.state.md.us/ResearchCenter/Data/waterQualityStandards/Antidegradation/index.asp

Figure 5.1: Tier II Waters



5.3.4 Alternative Wastewater Disposal Options

BNR Upgrades

The need to protect and improve water quality in Maryland is not limited to the Chesapeake Bay. Treatment capacity at the County's WWTPs could eventually be limited, and it is important to understand how WWTP technology can be used to reduce overall nutrient loads in the Youghiogheny River and its tributaries.

The Deep Creek Lake and Grantsville WWTPs are already at BNR technology, and it is assumed that the future Keysers Ridge WWTP will be constructed using BNR technology. Table 5.5 shows the amount, or "load" of nitrogen and phosphorus that could be reduced if all other WWTPs in the County were upgraded to BNR standards.

Upgrade of the Grantsville and Deep Creek Lake WWTPs to Enhanced Nutrient Removal (ENR) technology could further reduce nutrient loads by as much as 35,000 lbs per year of nitrogen and 15,000 lbs per year of phosphorus by 2030. In the case of Grantsville, such upgrades could allow for further expansion of WWTP capacity.

Although the Trout Run WWTP is projected to have available capacity in 2030, its size, discharge limitations, and projected growth in the Little Youghiogheny watershed suggest the need to upgrade the plant's treatment technology. However, as described in Section 5.3.1, the Trout Run collection system experiences significant I/I. After completion of the ongoing I/I reduction program, DPU will be better able to determine whether expansion is necessary.

Should expansion become necessary, the Town of Mountain Lake Park has purchased land adjacent to the WWTP, and the County and Town have discussed use of this land for expansion of the WWTP. If combined with upgrade to BNR expansion of the Trout Run facility could be achieved without increasing overall nutrient discharge the Little Youghiogheny River.

However, discharges at the Trout Run WWTP are tied to flow rates in the Little Youghiogheny River. Because the Little Youghiogheny's flow can be quite low during dry months (typically the summer), significant capacity increases may not be possible, or may require more effluent storage (during the dry season) than could be achieved at the site.

Other Wastewater Disposal Alternatives

A number of other opportunities exist to protect and improve water quality while still accommodating projected growth and development. This section summarizes key concepts that the County may wish to consider.

Continue System Repairs. Considerable capacity is taken up by I/I at the Trout Run and Friendsville WWTP. Although these systems are not projected to approach their permitted treatment capacities, resolving these problems will give the system additional flexibility, and may prevent further discharge violations during low-flow conditions on Trout Run. Similar benefits could be realized at the town-run Accident WWTP, where new development will be constrained until I/I problems are fixed.

Spray Irrigation. Spray irrigation refers to the application of treated wastewater effluent directly to the soil, allowing pollutants to be absorbed before the effluent reaches receiving streams. In Garrett County, shallow soils, heavy annual rainfall, and hilly topography giving rise to minor watercourses over short distance intervals limit the acceptability of spray irrigation as a primary wastewater disposal technique, and have limited the use of this technique.

Table 5.5: Point Source Nutrient Loads

Watershed	System	Existing Demand	Existing Nutrient loading (lbs/year)		Projected Demand, 2030	Nutrient Discharges, before BNR upgrade, 2030[2] (lbs/year)		Nutrient Discharges, 2030, after BNR upgrade[3] (lbs/day)		Potential Nutrient Reduction (lbs/year), after BNR upgrade	
		MGD	TN[1]	TP	MGD	TN	TP	TN	TP	TN	TP
Youghiogheny River	Crellin	0.01	768	256	0.02	1,248	416	555	139	**693**	**277**
	Friendsville	0.12	6,744	2,248	0.09	4,965	1,655	2,207	552	**2,759**	**1,103**
	Oakland[4]	0.49	26,866	8,955	0.66	36,359	12,120	16,160	4,040	**20,200**	**8,080**
	Total	*0.63*	*34,378*	*11,459*	*0.78*	*42,573*	*14,191*	*18,921*	*4,730*	***23,652***	***9,461***
Bear Creek	Accident	0.16	8,773	2,924	0.07	3,833	1,278	1,703	426	**2,129**	**852**
Little Youghiogheny River	Trout Run	0.70	38,435	12,812	0.82	44,877	14,959	19,945	4,986	**24,932**	**9,973**
North Branch Potomac River	Bloomington	0.04	1,974	658	0.04	2,238	746	995	249	**1,243**	**497**
	Gorman	0.00	219	73	0.01	497	166	221	55	**276**	**111**
	Kitzmiller	0.02	987	329	0.02	1,347	449	599	150	**748**	**299**
	Total	*0*	*3,180*	*1,060*	*0*	*4,082*	*1,361*	*1,814*	*454*	***2,268***	***907***

1: TN = Nitrogen; TP = Phosphorus
2: Assumes that loads prior to BNR upgrade are 18 mg Nitrogen and 6 mg Phosphorus per liter of effluent. Source: MDE.
3: Assumes that loads after BNR upgrade are 8 mg Nitrogen and 2 mg Phosphorus per liter of effluent. Source: MDE
4: Although Oakland sits in the Little Youghiogheny River watershed, its discharge is to the main stem of the Youghiogheny River.

Deep Creek Lake State Park has the only existing spray irrigation facility in Garrett County. As described above, the state and County are working to eliminate the spray irrigation system, in favor of year-round treatment at the Deep Creek Lake WWTP.

Capacity Credits. The County may be able to obtain credit (and therefore permission to expand treatment capacity) from MDE for connecting septic systems to public sewer systems. Septic systems generally discharge higher nitrogen loads per household than public systems. Similarly, the County may also be able to receive credit for funding septic denitrification improvements for existing homes or businesses.

Nutrient Trading. In a trading system, a WWTP from one part of the County could agree to forego a certain amount of development, and then send or "trade" that excess treatment capacity to another WWTP in need of capacity. Any such trading system would need to conform to regulations and guidelines developed by MDE in 2008.[23] This might be a viable option for the larger systems in the County that are within the same basin, such as the Upper Potomac River basin (which includes the Savage River, North Branch Potomac, and George's Creek watersheds in Garrett County) or the Youghiogheny River basin.

5.4 Programmatic Assessment of Nonpoint Source Policies

In addition to point source nutrient discharges, a majority of Garrett County's primary water courses are influenced by nonpoint source nutrient loading, consisting of agricultural runoff,, sediment from development, and stormwater runoff from the roads, streets, and highways. Other nonpoint pollution comes from bacteriological contamination (primarily caused by inadequate treatment and disposal of sanitary wastewater and agricultural runoff) and toxic chemical intrusion (primarily caused by surface and deep mining activity which occurred prior to implementation and enforcement of regulatory controls; the modern day use of fertilizers, herbicides and insecticides are also contributing factors). This section characterizes County policies and regulations that address nonpoint source pollution.

Maryland Stormwater Design Manual

The 2000 Maryland Stormwater Design Manual, Volumes I & II is incorporated by reference into the Garrett County Stormwater Ordinance, and serves as the official guide for stormwater principles, methods, and practices. In addition, the County encourages innovative stormwater management techniques such as tree conservation areas, buffer strips, rain gardens, vegetated swales, and dry wells to reduce the quantity of runoff from urban and rural development sites.

In 2007, the General Assembly passed the Maryland Stormwater Management Act, which mandates substantial revision of the Stormwater Design Manual. The most notable provision of the Stormwater Management Act of 2007 is the requirement that new development use Environmentally Sensitive Design (ESD) techniques, which are intended to "maintain pre-development runoff characteristics" on the site.[24] MDE expects to have the revised manual and accompanying regulations adopted by the end of 2008. This Comprehensive Plan recommends that the County revise its Stormwater Management Ordinance to incorporate the forthcoming revision of the Maryland Stormwater Design Manual and other enhanced stormwater management policies (recommended by MDE, pursuant to the Stormwater Management Act of 2007).

Other Nonpoint Source Management Techniques

In addition to updating the Stormwater Management Ordinance, the following actions can help manage stormwater.

[23] Information available at: http://www.mde.state.md.us/Water/nutrientcap.asp

[24] Source: MDE. http://www.mde.state.md.us/assets/document/act%20-%20a%20state%20perspective.pdf

Sedimentation and Erosion. As described in Chapter 7, the Sensitive Areas Element, sedimentation and other impacts resulting from construction activity, and increased stormwater flows to streams and rivers from development are also a potential threat to water quality. The County feels that its ordinances are (and will be, after adoption of the revised state Stormwater Manual) adequate to manage these impacts. However, the County strongly supports increased state inspection to ensure implementation of erosion and sediment controls.

Open Section Roads. Outside of towns and populated areas where pedestrian facilities are a priority, new roads in the County should continue to be developed with open sections, to better disperse stormwater.

Land Use Regulations. The expansion of the RR and AR land classifications, and the new standards for development in these areas (see Section 3.4.2) will help to reduce nonpoint source pollution. The new development standards specifically call for the preservation of contiguous forest and agricultural resources and sensitive areas. Such resources can act as buffers help to reduce the flow of nutrients and pollutants to streams.

Other elements of the Land Use Plan, such as the concentration of development in and around towns and other areas with public sewer systems will reduce nonpoint source pollution from septic systems.

Septic Denitrification. Requiring the use of septic denitrification systems in new construction, and encouraging denitrification retrofits for existing septic systems can further reduce nonpoint source pollution.

Stormwater Retrofits. As described in Section 7.3.1, stormwater retrofits can help to reduce nonpoint source pollution. Due to the expense of installing large-scale retrofits, such improvements should be targeted to environmentally sensitive areas.

5.5 Total Nutrient Loads and Assimilative Capacity

Nutrient loading from WWTPs, stormwater, and other "non-point sources" are the primary contributors to degraded water quality, particularly in the Chesapeake Bay and its tributaries. As a result of state policies designed to help protect and restore the Bay, the Comprehensive Plan must take into account the "assimilative capacity" of a receiving body of water—the amount of nutrients that the stream can receive while still maintaining acceptable water quality. While only a portion of Garrett County is in the Chesapeake Bay Watershed (the remainder is in the Mississippi River basin), nutrient pollution can degrade water quality in any receiving body; protecting and improving water quality in Maryland is a Countywide goal. Accordingly, this section describes the ability of the County's water bodies to assimilate point and nonpoint source nutrient loads from existing and projected development.

Nonpoint Source Loading

In developing the Comprehensive Plan, two future land use scenarios were considered:[25]

Scenario 1: Continuation of existing land use policies (1995 Comprehensive Plan). This scenario would retain the existing amount of all land classifications, notably a large amount of Rural and Lake Residential land (one unit per acre).

Scenario 2: Considerable expansion of the RR and AR designations (with accompanying reduction of area designated R and LR), with mandatory clustering of

[25] Four land use scenarios for the Deep Creek Lake Influence Area were also evaluated primarily for their impact on development capacity—but not for water and water quality impacts. These are described in Chapter 4 and the accompanying appendix material. Of these four scenarios, one corresponds to Scenario 1, as described in this section, while the other scenarios all generally correspond to Scenario 2.

development in AR and RR areas. Within the Deep Creek Lake Influence Area, all RD land and significant amounts of LR land are reclassified as AR or RR. The remaining LR land is split into LR1 (one unit per acre, on sewer) and LR2 (one unit per two acres, no sewer) districts (see description in Chapters 3 and 4).

In developing the Water Resources Element, a third scenario was developed:

Scenario 3: The same as Scenario 2, except that all new development uses septic denitrification systems. More than two thirds of development in Garrett County uses well and septic systems, rather than public water and sewer. However, very few residences and businesses in the County use septic denitrification technology, which reduces nitrogen from septic discharges. This scenario would not change the land use pattern, compared to Scenario 2, but would result in lower nitrogen discharges.

The nonpoint source nutrient loads for these three land use scenarios were evaluated using methodology developed by the Maryland Department of the Environment, as modified by the County to reflect conditions specific to Garrett County. More detail on the nonpoint source evaluation methodology is presented in the Water Resources section of the Comprehensive Plan Appendix.

Combined Loading

The projected point source, nonpoint source, and total nutrient loads for each land use scenario are shown in Table 5.6. Nonpoint source pollution from residential and non-residential septic tanks is an input into the state's nonpoint source model, and is therefore included in the nonpoint source component of Table 5.6. The point source data assume that the Accident, Friendsville, Oakland, and Trout Run WWTPs would be upgraded to BNR by 2030. Although no specific BNR plans exist for these facilities, such upgrades are reasonably foreseeable due to impending TMDLs, antidegradation policies, and other considerations related to existing and future development.

All three scenarios would result in increased nitrogen and phosphorus loads, due to the accommodation of more than 6,000 new dwelling units and more than 750 ERU of commercial and industrial development. The point source nutrient loads were held constant across all three scenarios, reflecting the Plan's assumptions about the amount of new development that would occur within existing or future public sewer service areas.

Thus, nonpoint source pollution (including septic systems) was the only variable amongst the three scenarios. The increased nonpoint loading (compared to existing conditions) is largely due to the conversion of forest and agriculture land to residential, commercial, and other development types which typically have higher nutrient loading rates. All three scenarios would convert approximately 20,000 acres of forest and 5,000 acres of agricultural land (for additional information, please see the Water Resources section of the Comprehensive Plan Appendix).

Scenarios 2 and 3, both of which incorporate changes to the County's land use pattern, would have smaller increases in nitrogen and substantially smaller increases in phosphorus loading than Scenario 1. This pattern applies Countywide, and for each of the County's watersheds.

Table 5.6: Total Nutrient Loading, By Land Use Scenario[1]

Annual Loading (lbs/year)		Existing Conditions[2]		Scenario 1		Scenario 2		Scenario 3	
		TN	TP	TN	TP	TN	TP	TN	TP
Watershed									
Youghiogheny River	Nonpoint Source	87,537	4,333	156,010	8,313	143,368	7,421	135,198	7,421
	Point Source	34,378	11,459	19,474	4,973	19,474	4,973	19,474	4,973
	Total	*121,915*	*15,792*	*175,484*	*13,286*	*162,842*	*12,393*	*154,672*	*12,393*
Bear Creek	Nonpoint Source	29,989	1,421	45,141	2,475	42,959	2,321	41,367	2,321
	Point Source	8,773	2,924	1,703	426	1,703	426	1,703	426
	Total	*38,761*	*4,345*	*46,844*	*2,901*	*44,662*	*2,747*	*43,071*	*2,747*
Southern Youghiogheny River	Nonpoint Source	9,994	430	13,101	638	12,392	588	12,186	588
	Point Source	-	-	-	-	-	-	-	-
	Total	*9,994*	*430*	*13,101*	*638*	*12,392*	*588*	*12,186*	*588*
Little Youghiogheny River	Nonpoint Source	57,323	3,066	64,660	3,963	60,782	3,689	60,088	3,689
	Point Source	38,435	12,812	20,086	5,021	20,086	5,021	20,086	5,021
	Total	*95,758*	*15,877*	*84,746*	*8,984*	*80,868*	*8,710*	*80,174*	*8,710*
Casselman River	Nonpoint Source	51,686	2,301	86,628	4,588	78,802	4,036	76,307	4,036
	Point Source	10,722	2,681	12,190	3,047	12,190	3,047	12,190	3,047
	Total	*62,408*	*4,982*	*98,817*	*7,636*	*90,992*	*7,083*	*88,496*	*7,083*
Savage River	Nonpoint Source	32,440	1,472	50,631	2,635	46,578	2,349	45,428	2,349
	Point Source	-	-	-	-	-	-	-	-
	Total	*32,440*	*1,472*	*50,631*	*2,635*	*46,578*	*2,349*	*45,428*	*2,349*
George's Creek	Nonpoint Source	8,052	479	8,610	517	8,448	505	8,413	505
	Point Source	-	-	-	-	-	-	-	-
	Total	*8,052*	*479*	*8,610*	*517*	*8,448*	*505*	*8,413*	*505*
North Branch Potomac River	Nonpoint Source	58,974	3,420	70,609	4,235	67,076	3,986	66,475	3,986
	Point Source	3,180	1,060	4,082	1,361	4,082	1,361	4,082	1,361
	Total	*62,154*	*4,480*	*74,691*	*5,596*	*71,158*	*5,346*	*70,557*	*5,346*
Deep Creek	Nonpoint Source	89,059	4,630	149,437	9,292	111,684	6,627	107,240	6,627
	Point Source	28,523	7,131	57,787	14,447	57,787	14,447	57,787	14,447
	Total	*117,582*	*11,760*	*207,224*	*23,739*	*169,471*	*21,074*	*165,027*	*21,074*
Total Point Source		425,054	21,552	644,827	36,656	572,089	31,522	552,702	31,522
Total Nonpoint Source		124,011	38,067	115,322	29,275	115,322	29,275	115,322	29,275
Grand Total		**549,065**	**59,618**	**760,148**	**65,930**	**687,411**	**60,796**	**668,024**	**60,796**
Change from Existing Conditions		**n/a**	**n/a**	**211,083**	**6,312**	**138,346**	**1,178**	**118,959**	**1,178**

1: The nonpoint source component of this table was generated by using a modified version of the state's default nonpoint source model. For more details on modifications to the state's model, please see the Water Resources portion of the Comprehensive Plan Appendix.

2: Existing nutrient loads reflect the Countywide land use pattern at the end of 2005.

Impervious Surface

Impervious surfaces are primarily human-made surfaces, such as roads, rooftops, and sidewalks, which do not allow rainwater to enter the ground. The amount of impervious surface in a watershed is a key indicator of water quality. Water quality in streams tends to decline as watersheds approach 10 percent impervious coverage, and drops sharply when the watershed approaches 25 percent impervious coverage. Table 5.7 summarizes existing and potential impervious coverage by watershed.

Table 5.7: Impervious Coverage

	Existing	Scenario 1	Scenario 2/3
Youghiogheny River	1.3%	2.4%	2.2%
Bear Creek	1.6%	2.6%	2.5%
Southern Youghiogheny	0.7%	1.0%	1.0%
Little Youghiogheny	4.7%	5.7%	5.5%
Casselman River	1.1%	2.3%	2.1%
Savage River	0.4%	0.8%	0.7%
Georges Creek	0.2%	0.3%	0.3%
North Branch Potomac	0.7%	1.0%	0.9%
Deep Creek	3.6%	6.5%	4.9%
Total	**1.4%**	**2.4**	**2.1**

Countywide, less than two percent of all land is impervious. Even in Garrett County's most developed watersheds, impervious surface coverage is low: under four percent and five percent in the Deep Creek and Little Youghiogheny River watersheds, respectively. Under all scenarios, countywide impervious coverage would increase above two percent. Individual watersheds would have higher impervious coverages under Scenario 1, particularly the Deep Creek watershed, which would rise above six percent impervious coverage.

Choice of Land Use Plan

Land use and water quality are closely linked. Lacking specific measures of assimilative capacity, such as completed TMDLs for nutrients, it is not possible to determine whether or by how much the nutrient loads from future development would exceed that capacity. Because Garrett County is projected to remain largely undeveloped, it is unlikely that assimilative capacity will be exceeded in most watersheds (the exception being Deep Creek, which is already impaired due to nutrients). However, other environmental impacts from development, such as air pollution or pollution from road sand and salt, could alter the analysis in this section. A comprehensive analysis of such impacts is difficult.

Given these uncertainties, and the goal of protecting and restoring water quality, the County's choice of future land use plan should minimize additional nutrient loads. Based on point and nonpoint source considerations, such as potential increases in nitrogen and phosphorus discharges, and changes in impervious surface, the land use pattern described for Scenarios 2 and 3 (shown in Map 3.4) would have less impact on water quality than Scenario 1, and is therefore the preferred land use scenario. The land use plans for each watershed, described in Section 3.5, reflect this preferred scenario.

Any steps that the County can take to further reduce nonpoint source nitrogen and phosphorus discharges by encouraging septic denitrification technologies and improved agricultural management practices (to reduce nutrients in agricultural runoff) will help to further improve water quality. To this end, the County should take advantage of funding opportunities from both the Chesapeake Bay Program and the Mississippi River & Gulf of Mexico Hypoxia Task Force, coordinated by the US Environmental Protection Agency (US EPA). Garrett County is Maryland's headwaters representative for the latter organization, which addresses water quality concerns in the Gulf of Mexico.

5.6 Policies and Actions

1. Use data from the planned regional water resources study (Garrett, Allegany, and Mineral Counties) in future Comprehensive Plan updates to guide growth and development decisions.

2. Work with appropriate federal, state, and local authorities as necessary to identify additional sources of water necessary to serve projected demands. In particular, work with the Town of Frostburg to evaluate the possibility of drawing water from Piney Run Reservoir to serve the Finzel community.

3. Amend the Sensitive Areas Ordinance to limit development in—and establish buffers around—Source Water Protection Areas, as defined in the Source Water Protection Plan.

4. Review the County's building and land development codes to ensure that water conserving fixtures and appliances are required for all new development and retrofits outside of public water systems.

5. Consider requiring all new development outside of existing or planned public sewer service areas to use septic denitrification systems.

6. Explore incentives to encourage property owners to:

    - Install water conserving fixtures and appliances.
    - Install septic denitrification units on existing septic systems.

7. Continue to resolve I/I problems in the Friendsville and Trout Run sewer systems.

8. Consider upgrading the Trout Run WWTP to BNR (or ENR) technology.

9. Continue to work with MDE to determine whether the County can receive nutrient credits for providing sewer service to properties with septic systems (especially failing systems).

10. As part of the next Comprehensive Plan update, re-run the nonpoint source loading analysis, incorporating up-to-date land use and any changes to the state's default model.

11. Consider adopting a nutrient trading program that conforms to MDE regulations and guidelines.

12. Continue to support land preservation activities such as MALPF and Rural Legacy, and specifically encourage such activities (including the purchase of land by private conservation organizations) on land that drains to Tier II waters in the County, and in watersheds where impervious coverage approaches or exceeds 10 percent.

13. Consider stormwater management retrofits targeted to areas where runoff impacts sensitive environmental features (see policy 7 in Chapter 7, the Sensitive Areas Element).

14. Work with MDE to monitor natural gas development activities to ensure the safety of the ground and surface water supplies.

15. Amend the Stormwater Management Ordinance, the Deep Creek Lake Watershed Zoning Ordinance, and the stormwater provisions of the Subdivision Ordinance as follows:

    - Adopt the Maryland Stormwater Design Manual, as revised by MDE to reflect provisions of the Stormwater Management Act of 2007 (anticipated to be completed by 2008), as the County's governing stormwater regulations for new development.
    - Adopt future MDE guidelines and recommendations for using Environmentally Sensitive Design (ESD) in new development.

16. Monitor the activities of and opportunities presented by US EPA's Mississippi River Basin and Gulf of Mexico Hypoxia Task Force.