Source Water Protection Plan

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Friendsville Source Water Protection Plan

1 INTRODUCTION

In 1974 the Safe Drinking Water Act was passed by Congress with the purpose of protecting public drinking water quality. It has been amended since then to expand its protection to surface sources of public drinking water. The Environmental Protection Agency (EPA) has been charged with overseeing this Source endeavor, and in Maryland the primacy agent for the EPA is the Maryland Department of the Environment (MDE). MDE has performed source water assessments for each public water supply in the state of Maryland, as federally mandated.

The Friendsville source water assessment, "Source Water Assessment for the Town of Friendsville", completed in November, 2004, now more than 10 years old, is a building block for the creation of a source water protection plan. It describes where the water originates, whether in the ground or from surface bodies of water. The source of the water is delineated, meaning boundaries are created that describe the area around a water source in which any contaminant present could ultimately reach the water source. If a system obtains its water from a surface body, such as a reservoir or river, then the watershed that contributes to the surface water is included in the delineation. An inventory of potential contamination sources is created for this delineated area. The water source is evaluated to determine if it is vulnerable to any of the identified potential contaminants. Recommendations and/or suggestions are made to keep the drinking water safe, but these are not federally mandated; they are only suggestions.

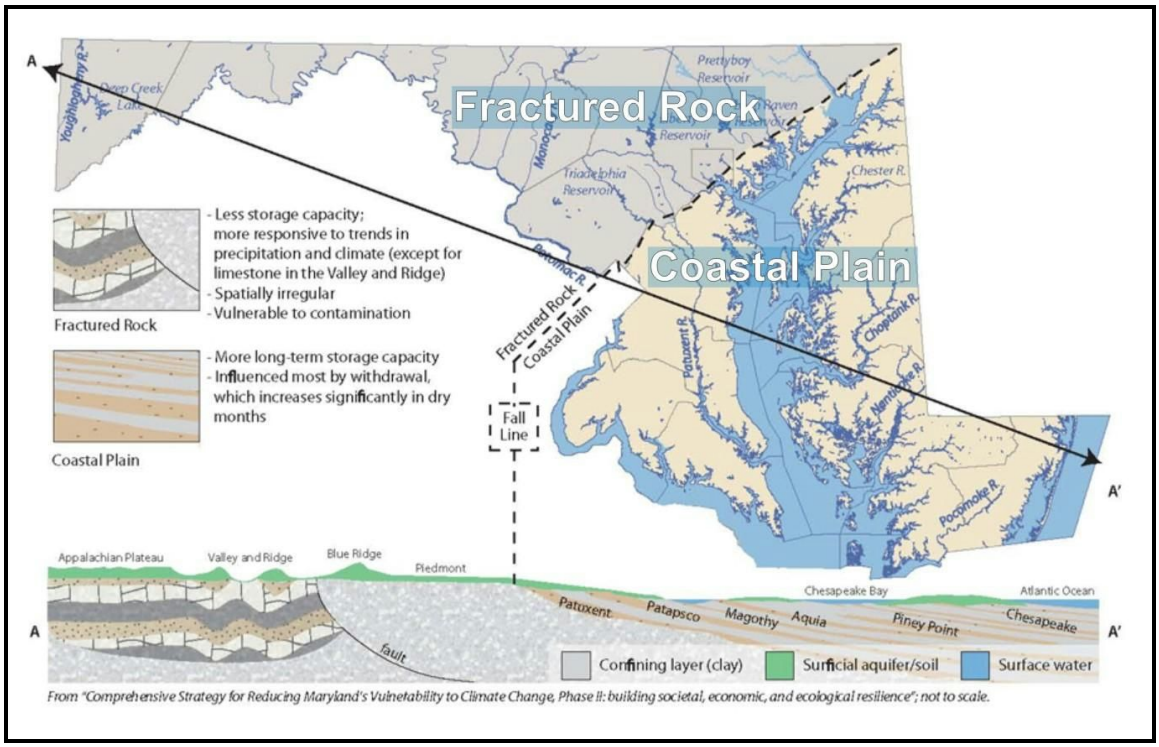
2 PURPOSE

The purpose of this Source Water Protection Plan is to build on the MDE Source Water Assessment to create a plan that will protect the drinking water for Friendsville. Information in this document was obtained from multiple sources which are listed in the Reference section. The Plan has been created by a committee consisting of members of the town of Friendsville, Maryland Rural Water Association, the Garrett County Department of Planning and Land Management, the Garrett County Department of Public Works and the Youghiogheny River Watershed Association. The committee is responsible for prioritization, implementation and periodic review of the plan. This Source Water Protection Plan should become a living document that will guide the community for years to come in protecting the quantity and quality of their drinking water.

3 WATER SOURCE

Friendsville obtains its drinking water from the Youghiogheny River, not from ground water sources. By drawing its water directly from the Youghiogheny River, the Town avoids issues associated with obtaining its water from ground sources, however the Town is more vulnerable to contamination from run off, drought, and upstream changes resulting from development and agriculture.

Garrett County and Friendsville are located in the Appalachian Plateau which is characterized by fractured rock. As noted in the diagram, this type of geology and hydrology is vulnerable to contamination issues that may take longer to detect and correct if damage occurs.

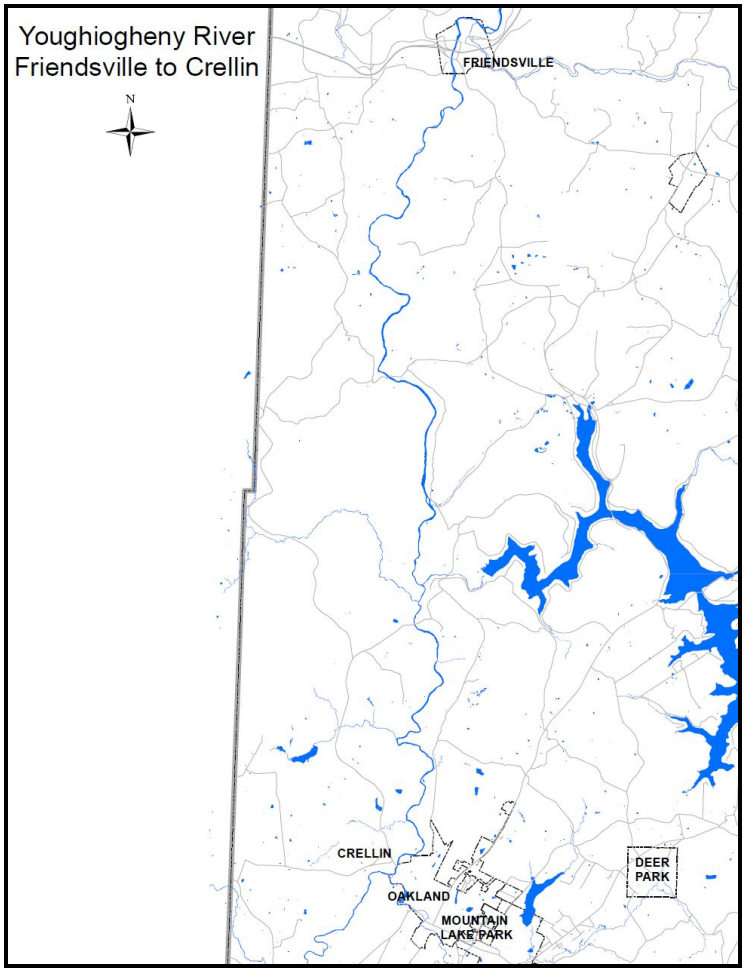


While there is the potential for Friendsville to convert from drawing its water from the Youghiogheny River, there are no plans for the foreseeable future to make such a conversion because of the cost associated with such a conversion. Therefore, this source water protection plan focuses on maintaining a reliable, contamination-free source by drawing Friendsville's water supply directly from the Youghiogheny River.

This river is unique in that it flows northward, from West Virginia to Pennsylvania. It eventually drains into the Mississippi River, making it the only major water body in Maryland that does not

flow into the Chesapeake Bay. The water intake is located downstream from the Interstate 68 overpasses and the Maple Avenue bridge which leads into town.

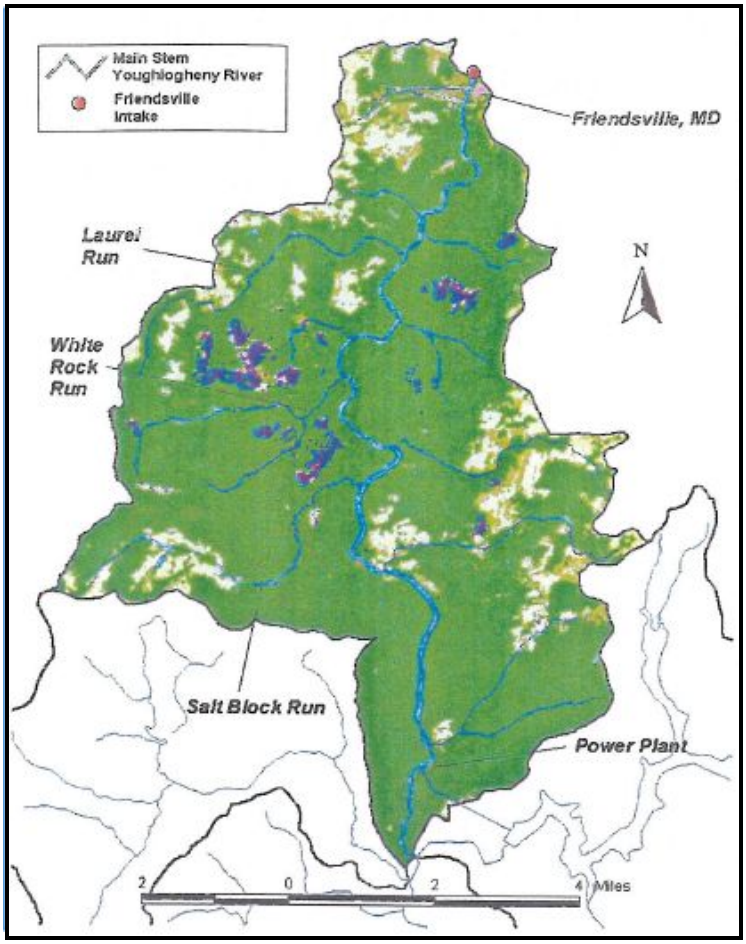
4 Watershed Characterization



This watershed is characterized by soil that is predominantly Group C in hydrologic property; that is, it allows increased runoff during wet periods, and has poor water transmission qualities due to the higher percentage of clay. Group B soils, which contain more loam and therefore absorb water better, is only found in small areas in this watershed. The terrain is mountainous, with sharp slopes along the Youghiogheny River in the northern potion; the River itself drops sharply between Oakland and Friendsville, creating the world famous rapids. South of Oakland, the slopes are more gradual. This corresponds to a slower streamflow. Average precipitation in Garrett County has remained around 47 inches per year for 2000-2012; in the West Virginia portion of the watershed, annual precipitation averages 51 inches per year. The delineation of a surface water source, by EPA definition, includes the entire watershed upstream of the public water system's intake structure. This results in the Friendsville source water protection area extending from West Virginia to the town itself. MDE calculated the intake watershed for Friendsville at 296 square miles. A detailed assessment of the topography can be found in the 2004 Source Water Assessment completed by MDE. The state of Maryland classifies the Youghiogheny River as use III-P. This means the River south of the Maryland-Pennsylvania line is designated as able to support natural trout propagation, as well as suitable for public water recreation and drinking water use. Depending upon the agency assessing the Youghiogheny, there are four to ten sub-watersheds.

For sake of continuity and identification of localized concerns, this plan will refer to the seven sub-watersheds discussed in the original MDE Source Water Assessment (see Appendix A). Land use and water quality for each sub-watershed will be contrasted between the original 2004 assessment (which utilized 1990 data) and 2010 data. An additional parameter for evaluating stream health is the Benthic Index of Biotic Integrity. This parameter evaluates the presence of invertebrate organisms in waterways. The diversity and abundance of these organisms relates directly to habitat – both physical and chemical. An environment full of healthy benthic organisms provides a healthy fish habitat. How does this relate to the quality of drinking water? Stream health is affected by substances that pollute; they can create an environment that is uninhabitable. If a body of water is unable to support its designated uses (such as hatching and growing fish, recreational use, or public drinking use), then the causative pollutant is identified and a limit is placed on how much of this pollutant should exist in the water. These limitations, known as TMDLs, are placed on pollutants that end up in the water from runoff, discharge or seepage. They can also occur naturally from decomposition or leaching.

THE YOUGHIOGHENY SUB-WATERSHED (060301)



THE **YOUGHIOGHENY SUB-WATERSHED (060301)** extends from the Friendsville water intake south to the Deep Creek area. It includes the Route 68 overpasses, the Maple Street bridge into town, and the Route 42 overpass south of Route 68. The town's wastewater treatment plant discharges downstream of the intake. Private septics and groundwater wells serve homes outside the town boundaries, which are potential sources of contamination if the well or septic infrastructure experiences a loss of integrity. The 2015 county Master Plan anticipates extending sewer service to this area. Much of

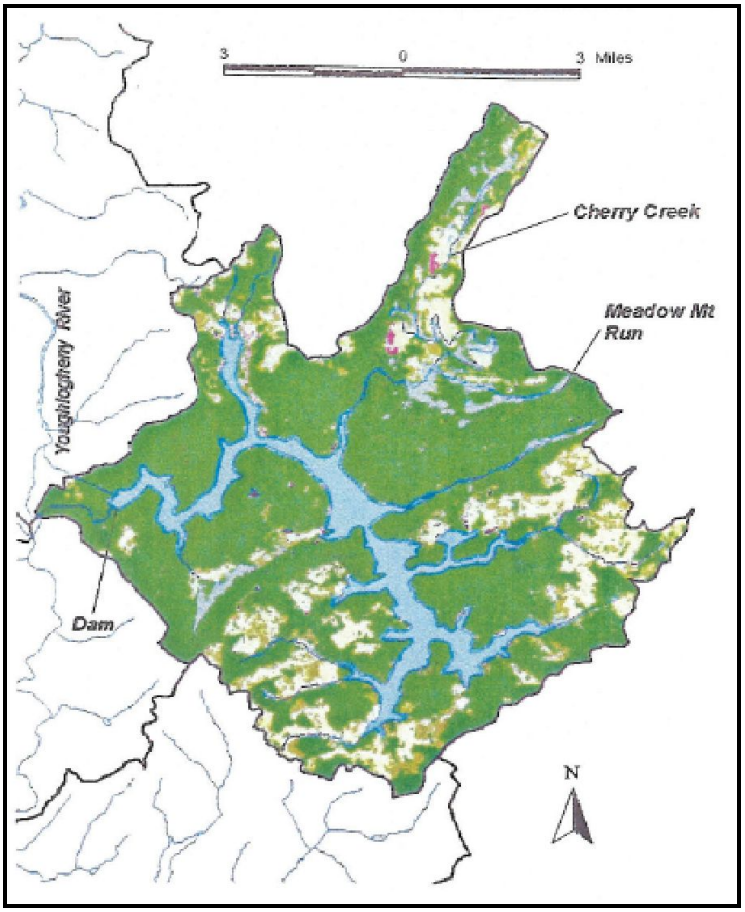
this sub-watershed is forested, and a portion is also protected by state regulation as a Maryland Wild River and Scenic River area. The portion of the River upstream of town is known world-wide for its white water sports. The rapids are dependent on scheduled releases from the hydroelectric dam at Deep Creek. It is notable that in the last 14 years, residential land use has increased over 2000%. Agricultural land use has undergone a major shift; land in crops has decreased 65%; land in pasture has increased 120%, signaling a reversal in use. Forested land continues to contribute the majority of land use and has not changed significantly. Of concern is the 58% decrease in wetland acreage. The steep terrain adjacent to much of the River in this sub-watershed does not lend itself well to wetland or agricultural use, as the soil tends to be erodible and does not absorb water well. Non-coal surface mines include Superior Sand on White Rock Sang Run Road (sand), Sang Run Quarry and Mill (limestone), Deep Creek Quarry (crushed stone) at Hoyes Run, and Hoyes Quarry and Plant (flagstone). Several mining sites in the sub-watershed have contributed to acid mine drainage, especially on Laurel Run and Salt Block Run. According to the Maryland Bureau of Mines Coal Permit Section, the only active coal mine is located south of Laurel Run on the Maryland/West Virginia state line. Though the Marcellus Shale industry is currently under a moratorium in Maryland, there are some active Marcellus Shale leases north of Deep Creek Lake and some small leases appear to be active in this sub-watershed as of March 2015. The only industrial discharge source is the Deep Creek Hydroelectric Station. There is one wastewater discharge location in this sub-watershed, a campground that discharges to an unnamed tributary of White Rock Run. There are no water quality monitoring sites near this campground wastewater discharge. The primary source of water quality data has been obtained from the USGS monitoring site just upstream from the intake, as there is a DNR monitoring station close by that has the most extensive data collection in the sub-watershed. Benthic Index sampling is a parameter of monitoring not seen in the original assessment and is included in this assessment.

THE MUDDY CREEK SUB-WATERSHED (060106)

THE  **MUDDY CREEK SUB-WATERSHED** (060106) lies southwest of the Youghiogheny sub-watershed, with Maryland and West Virginia splitting the sub-watershed roughly in half. Most of this segment is also forested, with a slight

increase in the amount of forested land since the last assessment. There has been no significant change in residential land use. This sub-watershed is known for the Cranesville (Pine) Swamp on the Maryland/West Virginia line. Unfortunately, this wetland area has decreased 88%. Seventy-five percent of the wetland is now managed by state nature conservancy, with the rest being privately owned. It has been the site of reforestation programs, but has suffered from an infestation of the hemlock wooly adelgid. There has been a slight increase in hay/pasture land use, but cropland has decreased 73%. A subdivision named Youghiogheny Mountain Resort straddles Muddy Creek and Piney Run; the original assessment lists this property as 1000 acres with 100 undeveloped septic lot permits, in a "state of disrepair". Recent research indicates the resort is not improved with public roads, and development has been minimal. Swallow Falls State Park is located along Muddy Creek; the Muddy Creek Falls are the state's highest free-flowing falls, at 60 feet. There are no municipal wastewater treatment plants or industrial discharges, as the Swallow Falls park wastewater plant is located in the Herrington Run sub-watershed. According to a map of active Marcellus leases dated 2007-2012, there are active leases in this sub-watershed; they are not evident on the updated March 2015 map.

THE DEEP CREEK SUB-WATERSHED



THE DEEP CREEK SUB-WATERSHED (060202) is southeast of the Youghiogheny sub-watershed. It is known for the state's largest fresh water lake, Deep Creek Lake and its surrounding resort. A Deep Creek Watershed Management Plan has recently been completed. Development of the land surrounding the lake has contributed to an increase of 69% in residential land use. Cropland, once responsible for almost 16% of the land use, is now only 0.2% of the total sub-watershed land. Pasture use has increased 44%, and forested land has slightly

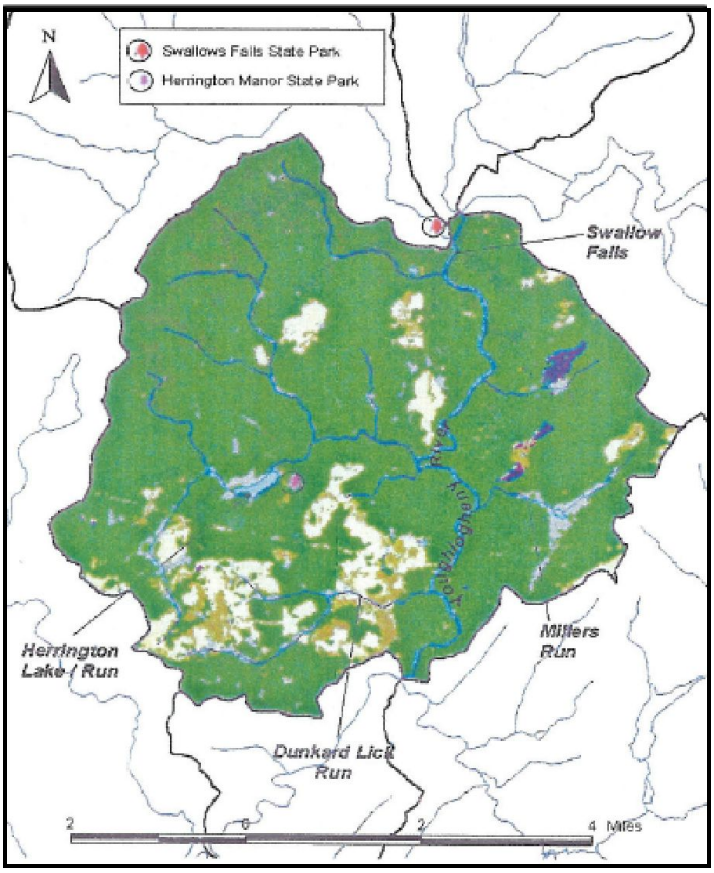
increased. Soil in this region is predominantly erodible but there is a small area near the confluence of Deep Creek Lake and the Youghiogheny River that is more loamy and able to absorb runoff. The amount of land designated as wetland has decreased 85%, which is concerning. The Department of Natural Resources manages the lake area, and some land is owned by the Nature Conservancy. Forested areas here are also infested with the hemlock woolly adelgid. The Brookfield Renewable Energy Partners is the parent company which owns and operates the Deep Creek Dam at the northern end of the lake. There has been ongoing dialogue between the Deep Creek residents and Friendsville about periodic dam releases. The releases affect lake levels, which in turn affect watercraft use and docking capabilities for residents. Downstream, the releases affect not only whitewater activities (a source of revenue) but also by increasing turbidity at the Friendsville water intake. Water releases are permitted via an appropriations permit held by MDE. This permit is regularly reviewed using a public process that involves opportunity for all stakeholders to comment. MDE makes every effort to balance the needs of the various stakeholders. The Deep Creek wastewater treatment plant is located at 764 Mayhew Inn Road and discharges to Deep Creek approximately one half-mile downstream of the Deep Creek Dam. The Deep Creek Wastewater Treatment Plant receives and treats sanitary wastewater from the Deep Creek Lake Sewer Service Area, which encompasses most of the area around the west, north and east sides of Deep Creek Lake. Originally built in 1984, the Deep Creek Lake Wastewater Treatment Plant underwent a significant upgrade in 2006-2007. Sanitary sewer overflows are published online, and in 2014 the county issued an update on the wastewater treatment plant that stated that current failing septic systems contributed more septic leakage than the wastewater treatment plant experienced. According to a map of active Marcellus gas leases, there are active leases west of the northern tip of Deep Creek Lake as of March 2015.

THE SNOWY CREEK SUB-WATERSHED (060103)

THE SNOWY CREEK SUB-WATERSHED (060103) lies south of Muddy Creek. Much of it lies in West Virginia, where the state primacy agency confirmed in 1996 acid mine drainage affected some of the tributaries to the Youghiogheny River. Land use statistics in West Virginia show 68% of the sub-watershed is forested, and 19% is in plantings/cultivation. This portion of the Youghiogheny watershed is mountainous, with an average elevation of 2714 feet above

sea level. Surface geology in the West Virginia portion is predominantly shale and sandstone, with a small percentage of alluvium and limestone. Two public water supply facilities are located in West Virginia: Terra Alta, and Alpine Lake. Both of the facilities obtain their water from groundwater sources. In Garrett County, there has been a slight increase in pasture, and cropland has decreased by over 50%. The amount of land that is forested has not changed significantly. Wetland areas have decreased from 2.6% to 1.7%. In Maryland, MDE has listed Snowy Creek as impaired for low pH. West Virginia DEP has designated their portion of the Youghiogheny River as impaired and requiring a TMDL for low pH, selected metals and fecal coliform in the Snowy Creek subwatershed. There is a history of several surface coal mines in this area, which indicates a need for further assessment. One such coal tipple site on the Snowy Creek benefitted from a project designed by West Virginia University graduates. The site now has a boardwalk through the wetland; the acid mine drainage is being treated, and nearby schoolchildren are participating in activities to further the rehabilitation. There are several mine sites in this sub-watershed, including a known mine gob and some confirmed mine drainage in the Laurel Run area. There are active Marcellus gas leases in the southern portion of this sub-watershed as of March 2015. There are three NPDES facilities: Grimm Lumber in Terra Alta, a West Virginia Department of Transportation substation, and the Terra Alta waterworks plant. None have any reported violations.

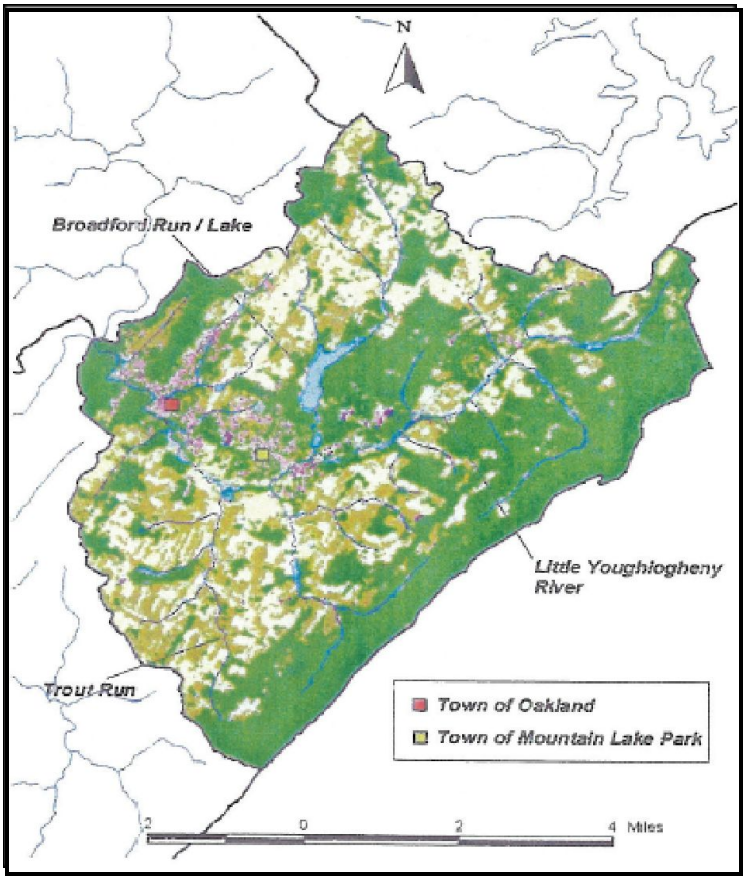
THE HERRINGTON RUN SUB-WATERSHED (060107)



THE HERRINGTON RUN SUB- WATERSHED (060107) is located centrally in the Friendsville watershed. The Youghiogheny is designated a Wild River from Millers Run to Friendsville. As in 1997, it remains the sub-watershed with the highest percentage of forested land. One third of the land is state-owned, including the Garrett State Forest, Swallow Falls State Park, and Herrington Manor State Park. The Youghiogheny Wild River corridor is also managed by the state. The 1997 assessment listed this sub-watershed as having no residential land; as of 2011, 4.6% is now residential. Crop land has decreased by half, while pasture and forested land remain essentially unchanged. Wetland areas

have decreased by two thirds. There are two industrial discharge facilities permitted in this sub-watershed: Round Glade Landfill and the Garrett County Solid Waste and Recycling Facility. The Round Glade Landfill is located on the site of an old coal mine, and although it is no longer in operation, the landfill site contains leachate which is pumped to the Deep Creek Wastewater Treatment Facility; storm water mine drainage runoff remains an issue. The county solid waste and recycling facility was also built on an old mine site; its leachate is pumped to the Deep Creek Wastewater Treatment Plant, and there are two storm water management ponds that receive runoff from the facility. There are three surface coal permits located in this sub-watershed, south of Deep Creek and north of Broadford Lake on the east side of the Youghiogheny River; none are active per the Maryland Bureau of Mines.

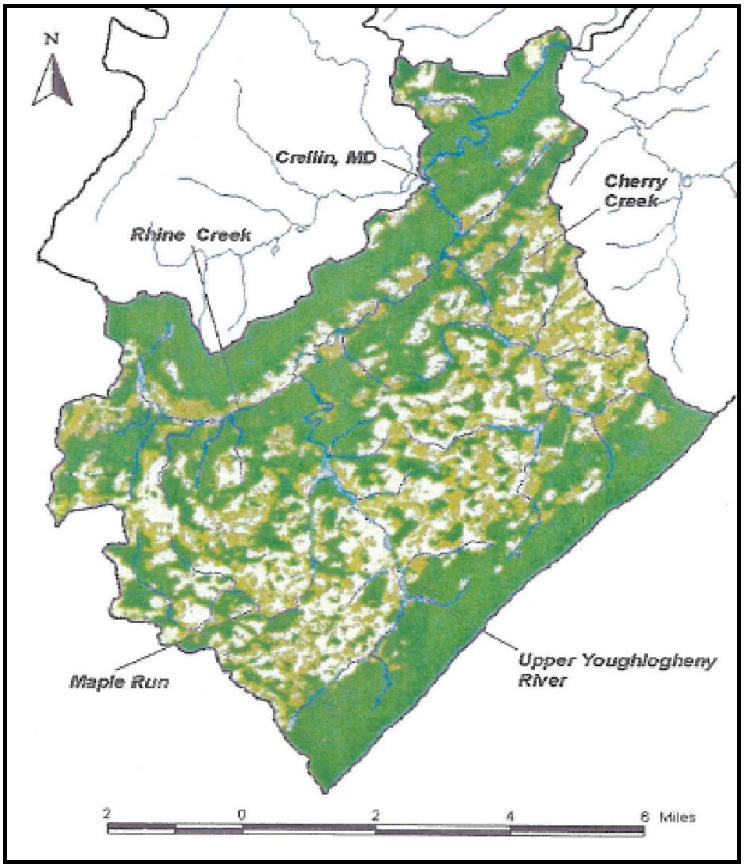
THE LITTLE YOUGHIOGHENY SUB-WATERSHED (060104)



THE LITTLE YOUGHIOGHENY SUB-WATERSHED (060104) lies east of Herrington Run. Containing the towns of Oakland, Mountain Lake Park and Loch Lynn Heights, it is the most developed sub-watershed. In fact, residential area has increased from 2.7% to 14.6% of the sub-watershed. Pasture land has increased 130%, but inversely, cropland has decreased from 96% in the area. Wetland areas have decreased from 2.2% to 1.6% of the sub-watershed. Trout Run and Broadford Lake are both tributaries of the Little Youghiogheny. The town of Oakland obtains the majority of their drinking water from Broadford Lake. There are several NPDES permitted facilities in the sub-watershed including Trout Run Wastewater Treatment Plant, Oakland Wastewater Treatment Plant, Peters Fuel Company, Fairfax Stone, Wood Products Inc., and the Deer Park Spring Water Company (which no longer obtains its spring water from this location). There were several active Marcellus gas leases in this sub-watershed in the years 2007-2012, but the

March 2015 map shows no active leases. There are three active natural gas wells south of Oakland near Loch Lyn Heights.

THE UPPER YOUGHIOGHENY SUB-WATERSHED



THE UPPER YOUGHIOGHENY SUB-WATERSHED is the final sub-watershed. This land area is more rolling, lending a quieter pace to river flow. Recent Land Use maps have divided this region into three smaller sub-watersheds, but they will be grouped together for this plan in order to maintain continuity. Almost half of this sub-watershed is in West Virginia. It is a welcome surprise to find the wetland area has increased from 1.7% to 2.3%; forested land has also increased slightly. Cropland has decreased by two thirds, but pasture land has increased slightly from 15% to 19%. Residential land use has increased 68%, signaling increased development. The most recent Garrett County Comprehensive Plan (2008) does not indicate extensive development in this region, mainly due to the extensive agricultural land use, some of which is in land preservation/ agricultural easement. The only significant NPDES is the Crellin waste water treatment plant.

There are active Marcellus Gas leases around Kempton as of March 2015, and there are also some active natural gas production wells near Redhouse.

5 Potential Sources of Contamination

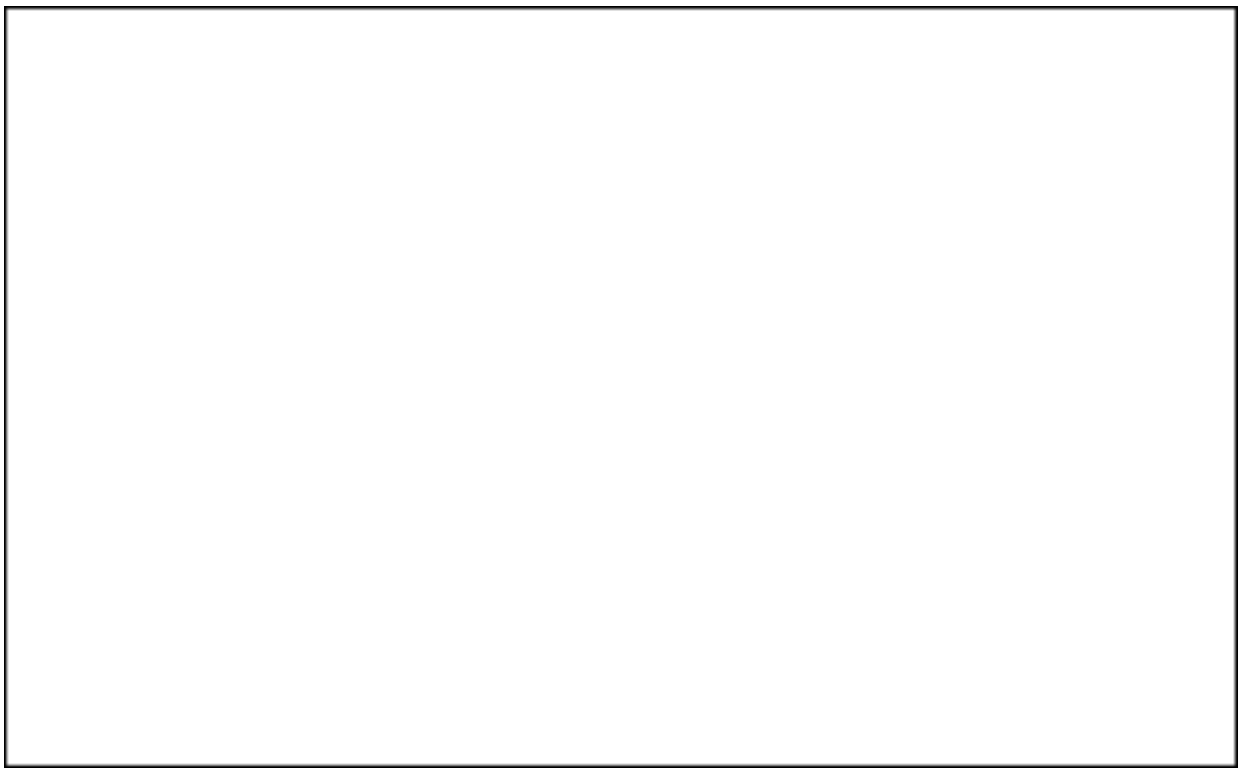
Sources of contamination can be divided into two categories: point and non-point. Point sources of contamination originate in a single identifiable source, such as sewage treatment discharge or a leaking underground storage tank. Non-point contamination sources consist of any source that cannot be traced to a single point. This includes runoff from agricultural and residential chemical use, animal waste, bacteria from faulty septic systems, or oil and chemical runoff from industrial or residential use. An inventory of potential contamination sources for the delineated source water area should be periodically updated as land use and aging infrastructure may change the environment.

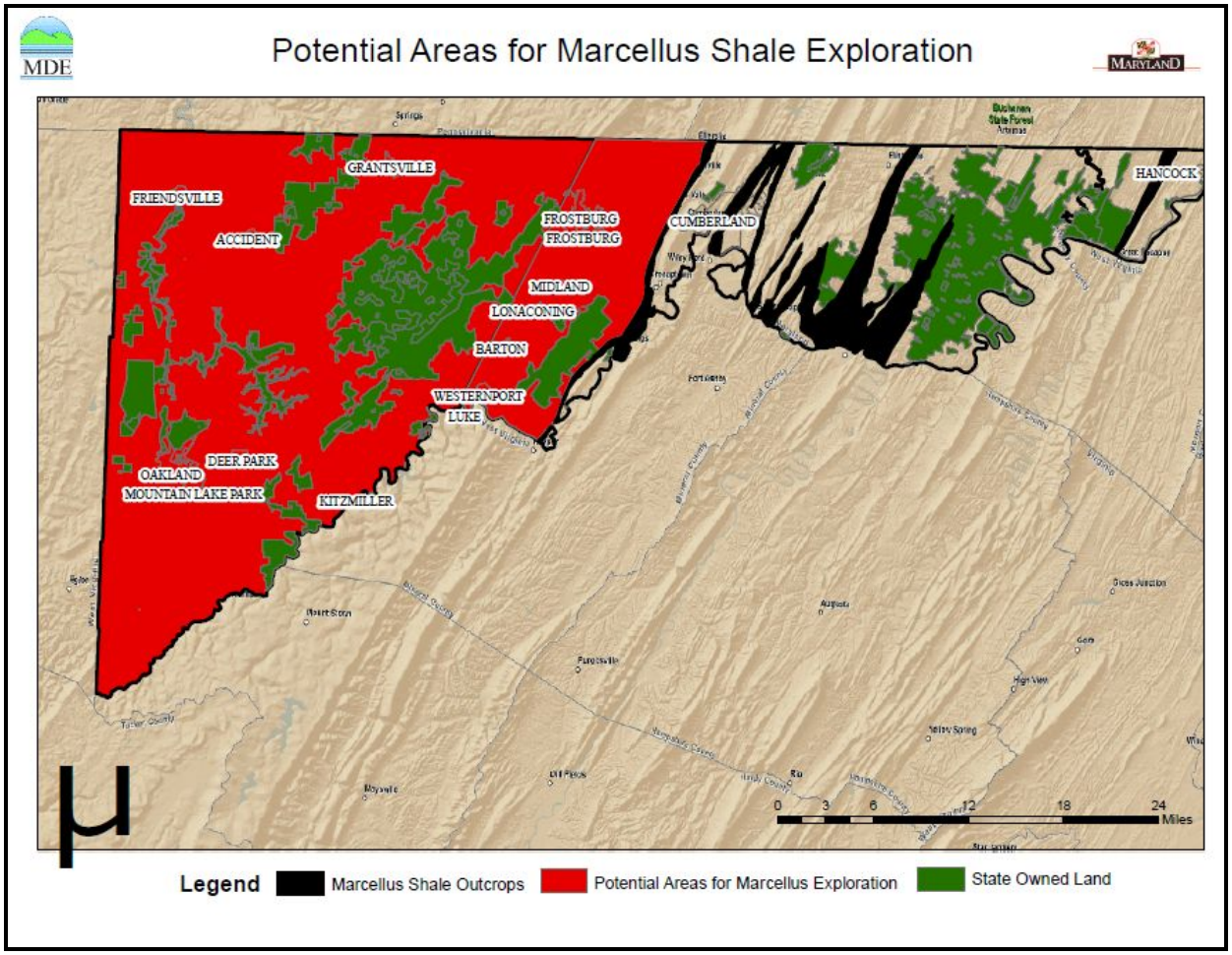
5.1 Point Sources of Contamination

Wastewater treatment plants have the potential to affect surface water quality as they discharge treated effluent into a waterway. They can be a source of harmful bacteria, viruses and protozoa. All systems that discharge into the Chesapeake Bay system are required to have enhanced nutrient removal systems or practices; this is not required for systems in the Youghiogheny River watershed. There are, however, restrictions on discharge due to waterway classification, meaning they are designated as suitable for certain uses and must be protected. Seasonal temperature and flow determine how much each system is allowed to discharge. When significant precipitation occurs, many systems are unable to handle the rapid increase in flow, which can result in discharges of incompletely treated wastewater. There are four public wastewater treatment plants between Friendsville and the West Virginia state line. They are required to monitor for pH, temperature, total suspended solids, nitrogen, coliform bacteria, dissolved oxygen levels and biochemical oxygen demand. Industrial discharges can come from landfills, factories, and businesses. Their discharge can include onsite stormwater runoff, boiler or cooler water, and vehicle wash water. This discharge can contain chemicals, and the temperature of the discharge can also affect water quality. There are four industrial discharge facilities in the town's Maryland watershed. The Deep Creek Generating Station has two discharges to the watershed. One discharges noncontact cooling water and powerhouse floor drainage; the other discharges stormwater from the transformer and switching area. Both are monitored due to their (small) potential for release of oil products, which have never been detected in the monitoring samples. The Herrington and Swallow Falls discharge waste water from the water treatment systems. The Broadford Lake water treatment plant discharges disinfection waste water.

In West Virginia, there are only two municipalities with public sewer and water in the watershed. According to the Region III EPA evaluation of the Youghiogheny River Watershed in West Virginia, there are no active mining permits, although past mining activities have contributed to water quality impairment. There are two non-mining discharge permits; one is for industrial stormwater discharge, which may contain metals; the other is for a water treatment plant backwash discharge, which may also contain metals.

One new potential point source of contamination should be included in this assessment. Nonconventional drilling and extraction of gas, or hydro fracturing ("fracking") has been in existence in West Virginia and Pennsylvania. Maryland has a moratorium on fracking until 2017.





Regulations are currently under development by MDE (November 2015), and are expected to be in place by late 2016. Maryland is in a position to acquire a solid database of their resources prior to any drilling activity, unlike neighboring West Virginia and Pennsylvania. To this end, the Maryland Department of Natural Resources, Maryland Geological Survey and the United States Geological Survey are developing a program to monitor baseline groundwater and surface water resources in the Appalachian Plateau. Monitoring wells and surface water monitors are being placed, including a pair of wells next to a stream gage on Buffalo Run, approximately two miles northwest of Friendsville. This site is downstream of the town, but provides valuable data on the state of the Youghiogheny. Potential contamination from fracking activities includes well communication between hydro fracturing wells and drinking water wells if there is insufficient casing on the gas well. This can result in allowing methane and other gases and fluids to travel from the new well up toward shallow groundwater via existing semi-vertical fractures or via existing oil and gas wells. Large quantities of water are required to hydro fracture the gas well, and the resulting wastewater is high in salts, proprietary chemicals, organic pollutants and naturally occurring radioactive material. **This wastewater has the potential to contaminate both ground and surface water, including from leaching from inadequately constructed barriers, spills, or improper disposal.** Lastly, a significant threat of

surface water contamination exists from transportation incidents involving hazardous materials. Interstate I-68 has two overpasses just upstream from the town intake, and the steep terrain would increase the speed and likelihood of river contamination.

5.2 Non-Point Sources of Pollution

The Friendsville source watershed remains heavily forested, which aids in water quality, especially in riparian areas. The overall decrease in wetland acreage is regrettable, as these areas help filter runoff before it reaches surface waters. After a trend away from livestock production between 1997 and 2002, the shift in land use over the last ten years suggests less crop planting, which could reduce the amount of fertilizer use and erosion. The significant increase in pasture use could signal an increase in livestock production; the University of Maryland Extension states that Garrett County's agriculture is based on livestock and dairy production. The county ranks 3rd in beef cattle, 4th in dairy cattle, and 7th in sheep production among Maryland counties, which would support the shift in pasture use. Increased livestock production could negatively impact surface water quality if livestock are allowed to graze and stand in streams. The Maryland Department of Agriculture's (MDA) revised nutrient management regulations became effective October 15, 2012. The new regulations modify how a farm's nutrient management plan is developed and implemented and changes the way organic nutrient sources and other materials are managed. Among other items the regulations recommend that a 10 to 35 foot "no fertilizer zone" must be used along surface waters and streams. While this regulation does not mandate fencing be placed to ensure animals do not graze within this zone, it does allow soil conservation district staff to evaluate each site to determine whether alternative BMPs such as watering facilities, livestock crossings, pasture management techniques or vegetative exclusion will work equally well in protecting water quality while offering farmers more manageable or cost-effective solutions. The deadline for implementing stream protection measures in Maryland was January 1, 2014.Pastureland use has not changed significantly in West Virginia. Acreage placed in conservation has increased dramatically in West Virginia, while Maryland has seen a relatively small increase.

The steep terrain bordering the Youghiogheny along much of its path increases the risk of stormwater runoff, especially during significant precipitation events. Increased snowfall results in increased application of de-icing material on roadways, adding chloride as well as automotive chemicals and oils to run-off when snow melting occurs. Increased urban development, with its associated impervious surfaces can also affect the amount of runoff that enters streams. Garrett County as a whole has increased its developed land by 11% and land that is barren or extractive in use has increased 19%. Both of these trends contribute to runoff. The two I-68 overpasses upstream from the town intake have direct storm drainage onto the concrete abutments. This runoff continues to a shallow concrete ditch along Water Street (see Appendix C). Potential contamination includes oil, metals and sediment. If fracking should commence,

there is a potential for surface water contamination from erosion during well construction, runoff from vehicle and machine fluids. The greatest non-point source of contamination is still related to mining activity. The 2004 Source Water Assessment for Friendsville could not locate any active mining sites, Maryland Coal Permits Section of MDE has one active mining site on the Maryland/West Virginia line south of Crellin. Maryland's Abandoned Mine Inventory has numerous sites throughout the watershed with confirmed mine drainage at Laurel Run, Buffalo Run, between White Rock and Salt Block Run, between White Rock Church and the Youghiogheny River. There is a documented mine gob at Kendall, upstream of Friendsville.

6 WATER QUALITY

Maryland requires assessment of certain compounds in community surface water sources. This list continues to evolve, which results in additional testing. In addition, load limits for certain substances have been established for specific waterways. These limits are based on water quality parameters and are labeled as TMDLs, or Total Maximum Daily Load of polluting substances. Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (at Title 40 of the *Code of Federal Regulations* [CFR] Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not supporting their designated uses even after pollutant sources have implemented technology-based controls. A TMDL establishes the maximum allowable load (mass per unit of time) of a pollutant that a waterbody is able to assimilate and still support its designated use(s). In 1996 the Youghiogheny River was listed as impaired due to excessive nutrient levels; this listing was removed in 2002 after evaluation showed no nutrient impairment. TMDLs for sediment levels, biological stressors and low pH are currently in effect in multiple stream segments of the watershed.

Total suspended solids (TSS) is the parameter which measures the amount of particles that are suspended in water. They are important because they can serve as carriers of bacterial pathogens and toxins. High levels of TSS can impede sunlight penetration and lead to decreased photosynthesis and increased water temperature. Heavy precipitation can run off into water bodies, increasing sediment and silt suspension in the streams, carrying pesticides, bacteria and transportation byproducts such as oil and road salt. The Youghiogheny River has been listed as sediment impaired since 1996, from the Maryland State line north to Friendsville. The Little Youghiogheny is also sediment impaired. Sediment has been identified as a significant biological stressor on streams in the western sub-watersheds.

Low pH, or an acidic level in a water body has multiple causes and effects. It can result from acid mine drainage, acid rain, or runoff from decomposing plant matter. Low pH can have detrimental biological and chemical effects. Fish are more susceptible to infection in acidic waters; they can lose the ability to reproduce, and ultimately leave the area. Moss that is able to exist in acidic environments may take over water segments, leading to eutrophication and

algae blooms. Chemically, the more acidic a water body is, the more toxic any metals can become, further damaging fish population and water health. MDE published a report in 2014 determined acidity was a major biological stressor on the western sub-watershed streams.

Comparison of water quality parameters from the 2004 assessment and those of the last 10 years show an overall improvement in water quality, both in West Virginia and Maryland. The biological health of the watershed has improved since 1994; as of 2009, the number of streams with good benthic scores doubled. The next round of sampling was scheduled for 2014.

The Youghiogheny watershed has seen a slight improvement in pH values, sulfate, TSS, turbidity and phosphorus. Compared to 1997-1998 data, the turbidity has decreased and pH has increased at the monitoring station closest to the intake. There continue to be extreme variations which are related to flow and temperature. Several tributaries continue to be affected by acid mine drainage: Trap Run (acid mine drainage, where the pH has risen to 6.1 as of 2003), Laurel Run (acid mine drainage and acid deposition; pH levels in 1995-1996 averaged 4.67), White Rock Run (average pH 5.71 in 2009). Salt Block Run has displayed fair to poor benthic health in 2012 stream monitoring, and a one-time measurement in 2011 revealed a pH of 6.9. The Muddy Creek sub-watershed has had good benthic scores for the last three years. It was listed as impaired due to low pH from acid mine drainage and acidic decomposition in 2007, but pH levels have risen from 7.02 in 2002 to 7.54 in 2009. There has been no monitoring for E.coli or any coliforms at the Youghiogheny River in Maryland since 2000. There has not been any evaluation for viruses or protozoa, either. Water quality monitoring at the Friendsville water treatment plant is obtained from finished, not raw water. The water treatment plant is mandated to treat with filtration, to treat for any bacterial contaminants. Benthic monitoring is occurring at the same site as the water quality monitoring upstream from the intake, but data is not currently available. Hoyes Run has experienced a loss of flow near Deep Creek, apparently due to a change in hydraulic gradient that caused the water to flow towards the Deep Creek Quarry. This waterway used to be a trout habitat. The Deep Creek Quarry has had pH and sediment violations in the past from its outfall pipes. Mining maps of the West Virginia portion show active underground mining continues near Turner-Douglass on Little Laurel Run, with a very small portion reclaimed or released. Water quality monitoring near this mine site reveals an average pH of 6.44 during 2005-2006. Water quality monitoring of the North Branch of Snowy Creek showed acceptable pH levels, averaging 6.95 during 1995-1996 and 6.95 in 2005-2006. Fecal coliform levels are elevated in the West Virginia Snowy Creek sub-watershed. Comparison to the original water quality assessment cannot be made accurately, as there was only a one-time reading at each site in 1996 (See Appendix B). The latest average readings for the acidity-impaired tributaries are improved, however; pH in the South Branch of Snowy Creek averaged 6.75 in 2005-2006.

7 VULNERABILITY ASSESSMENT

Table -1. Vulnerability Assessment

Run-off	Roadways: de-icing, motor vehicle accidents, precipitation Improper residential disposal	Sodium, chloride Petroleum Cyanide, sediment Copper/other metals Sulfates Unknown hazardous materials	Low to Moderate	High
Run-off **Failing septics** **Sanitary sewer overflows**	Fertilizer – agricultural and residential Animal waste Residential septic systems WWTP	Nutrients, coliforms, bacteria/ protozoa Glyphosate	Low to Moderate	Low
Acid mine seeps **Accidental spill** **Frack well communication**	Underground mines Hydro fracture drilling Strip mines	Sulfide Metals Cyanide, Benzene Bromides Methane Radioisotopes	Moderate To High	High

Based on the vulnerability assessment, the water supply of the community of Friendsville is susceptible to contamination from several sources. The steep slopes of the Youghiogheny River near the intake present a situation where materials can easily be transported into the water. The risk of potential contamination is moderate based on the numerous tributaries upstream which can transport contaminants from releases and spills. Three overpasses exist just upstream of the intake; two of them carry interstate traffic which transport hazardous materials. An accidental spill could reach the intake relatively quickly. Road salt, fuel byproducts and general litter run directly off of the bridges from drainpipes and scuppers with no filtration or diversion. Contamination from rail accidents is possible in the southern portion of the watershed, from West Virginia through Oakland, but the distance from the intake is far enough to decrease the risk. Transportation-related contamination is a low to moderate probability, high risk event. Land use concerns regarding water contamination include erosion and runoff from mines, agricultural and residential nutrient overuse, and loss of riparian buffers or wetlands in the watershed. Based on water quality monitoring, the community's water source is vulnerable to bacteria, protozoa, viruses and volatile organic contaminants from a hazardous spill. The water source is also vulnerable to potential contamination from metals, methane and radioisotopes, should hydro fracturing occur in the watershed. This risk escalates in the immediate sub-watershed.

8 Source Water Protection Action Plan

As noted in the original assessment, most of the delineated watershed is not within or under the control of the Town of Friendsville. However, partnerships can increase the reach and

effectiveness of strategies. Monitoring for identified contaminants (and new ones) can take place within the immediate area of the intake. Municipal strategies that strengthen source water protection policy can be developed. Public awareness and outreach increase the scope of community participation and impact. Specific recommendations are outlined:

8.1 Formation of a Source Water Protection Committee

The Friendsville Source Water Protection Committee has been formed as of June 2015. Members of this committee may (and should) change over time to reflect representation of the community, Maryland and West Virginia EPA primacy agencies, the Youghiogheny River Watershed Association, Garrett County Soil Conservation District, Farm Service Agency, Department of Planning & Land Management and the Department of Public Works, Maryland State Highway Administration, the Department of Natural Resources of West Virginia and Maryland, and Preston County West Virginia officials. Goals of this committee are to: increase citizen involvement in watershed protection, protect the quantity and quality of the town water source, and maintain awareness of potential contamination. Current Committee members are listed in Appendix D.

ACTION STEP:

1. The Town of Friendsville should appoint the Source Water Protection Committee concurrent with adoption of this Plan. This Committee should meet at least twice a year to formally monitor any changes that may have taken place upstream, and report any recommendations to the Friendsville Mayor and Town Council.

8.2 Public Awareness and Outreach

Consumer Confidence Reports should be made available to residents in multiple venues, such as the local paper, the Town Hall or the Town Library. Copies should also be available through the Maryland Department of the Environment. Road signs should be erected on Interstate 68 and town bridges to facilitate notification of potentially damaging spills. Signs can also be placed at put-ins and take-outs on the River which help keep recreational users aware of the need to protect this source of drinking water from contamination. Storm drains within the town limits can be stenciled to remind the public to avoid clogging the drains with lawn clippings, leaves or litter. Public areas can benefit from pet waste stations. Stream monitoring activities should be publicized, and community participation should be encouraged. Other community activities include a medication take-back event, student and resident clean-up parties.

ACTION STEP:

1. The Friendsville Mayor and Town Council should erect “water protection area” signs at appropriate locations along I-68, Rt. 42, at the intersection of Rt.291 and 42, and other locations to reinforce to the public and the travelling public the importance of protecting and reporting contamination incidents. These signs should be placed both

within and outside of the area of responsibility of Friendsville for public education and awareness.

2. Residents should be educated and encouraged to implement stormwater best management practices on their properties, including rain barrels, rain gardens and other effective measures.

8.3 Monitoring

Town residents, the Youghiogheny River Watershed Association, the Department of Natural Resources and the Maryland Department of the Environment should work together to establish stream monitoring in the Youghiogheny sub-watershed. Once appropriate parameters are identified, volunteers can be trained. A database can be established which will enable the timely detection of potential contaminants and detection of any trends in water quality. Possible parameters include bacteria (total coliforms), *Cryptosporidium*, protozoa (*Giardia*), salts, glyphosate and sulfate.

ACTION STEP:

1. The Friendsville Mayor and Town Council should immediately formally request the assistance of the Youghiogheny River Watershed Association to assist with establishing this monitoring program for implementation Spring 2016.

8.4 Erosion, Sediment and Runoff Control

Public awareness of the impact of misapplied fertilizer can help decrease resident nutrient runoff. Handouts that explain how and when to use fertilizer are available. The Garrett County Soil Conservation District, County Extension Service, and watershed members can often assist in implementing environmental site design practices such as rain barrels, rain gardens and bio-retention basins to control and treat runoff. A joint project with transportation agencies to evaluate bridge runoff could help divert and slow runoff from scuppers and drains. Agricultural and residential partnerships could be created to examine nutrient trading options. This would be facilitated by the Garrett County Soil Conservation District and the Garrett County Department of Planning & Land Management. Stream banks should be evaluated for riparian buffer development in the immediate areas.

ACTION STEP:

1. The Friendsville Mayor and Town Council should formally engage the Garrett County Soil Conservation Service, the Garrett County Department of Planning & Land Management, and the Garrett County Department of Public Utilities to develop a process to ensure timely notification of planned major developments and/or activities within the watershed that may impact stream water quality. that ensures protection of Friendsville's water supply as part of the permitting review and approval process.

8.5 Land Use Policies

Land use policies can strengthen the protection of the source water. This would include limiting use of fertilizer within a determined distance from the waterway.

ACTION STEP:

1. A pet waste ordinance could be put into effect.
2. Land preservation and protection programs, such as those offered through the Maryland Environmental Trust, the Maryland Agricultural Land Preservation Foundation and others, should be encouraged and promoted.
3. When county land use and regulatory ordinances are updated, those parties interested in the protection of Friendsville's source water should be engaged in the process.
4. The Mayor and Town Council should make recommendations to the Planning Commission and the Garrett County Commissioners concerning protection of Friendsville's water supply. These recommendations should be considered for inclusion in the final adopted revisions to the Garrett County Comprehensive Plan.

8.6 Marcellus Gas Development

The Town of Friendsville is uniquely vulnerable to potential negative effects of Marcellus gas development because of terrain, downslope, and water supply. It is not likely that Garrett County will adopt county-wide zoning regulations in the foreseeable future that would afford Friendsville needed protections from a robust set of local ordinances and regulations. It appears that the major activity of protection of Friendsville's water supply will be found in the yet-to-be-established Maryland Department of Environment regulations concerning Marcellus development.

ACTION STEP:

1. The Friendsville Mayor and Town Council should immediately express its concern about the potential negative impacts of Marcellus gas development to Governor Hogan and the Department of Environment.
2. Additionally, the Mayor and Town Council should conduct a comprehensive review of MDE Marcellus regulations when those regulations are proposed for public comment and communicate any concerns and suggested changes to MDE to help assure protection of its water supply.
3. Prior to Marcellus gas development, the Mayor and Town Council should pursue collection of baseline water quality data, through continuous electronic monitoring and reporting/recording, upstream of its current water supply intake: 1) conduct a full scale baseline study on the quality of groundwater and surface water. Water samples should be measured for dissolved gasses that include methane, ethane, propane, noble gas (He, Ne, Ar, etc.); and 2. inorganic chemistry including major elements in water (Ca, Mg, Na, K, Cl, SO4, HCO3, NO3, Br) and trace elements (B, Li, Ba, Sr, Pb, Cd, Cr, Al, V, Mn, Fe, Co, Ni, Cu, Zn, As, Se, Mo, U) and 3. organics (BETX), and 94) isotope tracers: stable isotopes (d18O, d2H, d13C-DIC), dissolved ions isotopes (boron, strontium).

4. Baseline studies should be conducted before any Marcellus drilling operations begin, and data should be evaluated by qualified experts for characterization of the chemistry of groundwater and surface water in the Friendsville area.
5. During and following hydraulic fracturing operations an intensive water quality monitoring should be conducted using all of the parameters utilized for the baseline study. Any changes in the water chemistry and quality, including levels within and beyond drinking water (MCL) or ecological (CCC) standards would require delay/stop of operations and examination of the water chemistry data by independent and external reviewers. Evaluation of the data should be conducted based on the best science available for research dedicated for studying the impact of hydraulic fracturing on water resources. Funding for water quality baseline and impact assessments need to be allocated as conditioned for operations.

8.7 Contingency Planning

Finally, no source water plan is complete without addressing contingency planning. This plan should address the following concerns: short term water interruption; long term water interruption; and emergency response to contamination incidents. The town of Friendsville relies solely on the Youghiogheny River for its drinking water. In order to maintain services in an emergency, the town must determine how much storage capacity they have – in other words, how long can they provide water before depleting their stored supply? Potential threats to water supply need to be inventoried. The emphasis is on all-hazards preparedness, rather than specific situations. A plan then evolves from this information, and is supplemented by support from the county Department of Emergency Management and the county Department of Public Works, as they are responsible for operating the facility. This plan is a separate document that supplements the Source Water Protection Plan, and should be reviewed and updated at least biannually. The following is an example of what this contingency plan would contain.

Potential Threats to Water Supply
Flood
Hazardous spill
Deliberate release of hazardous material
Vandalism/malicious destruction of property
Power interruption

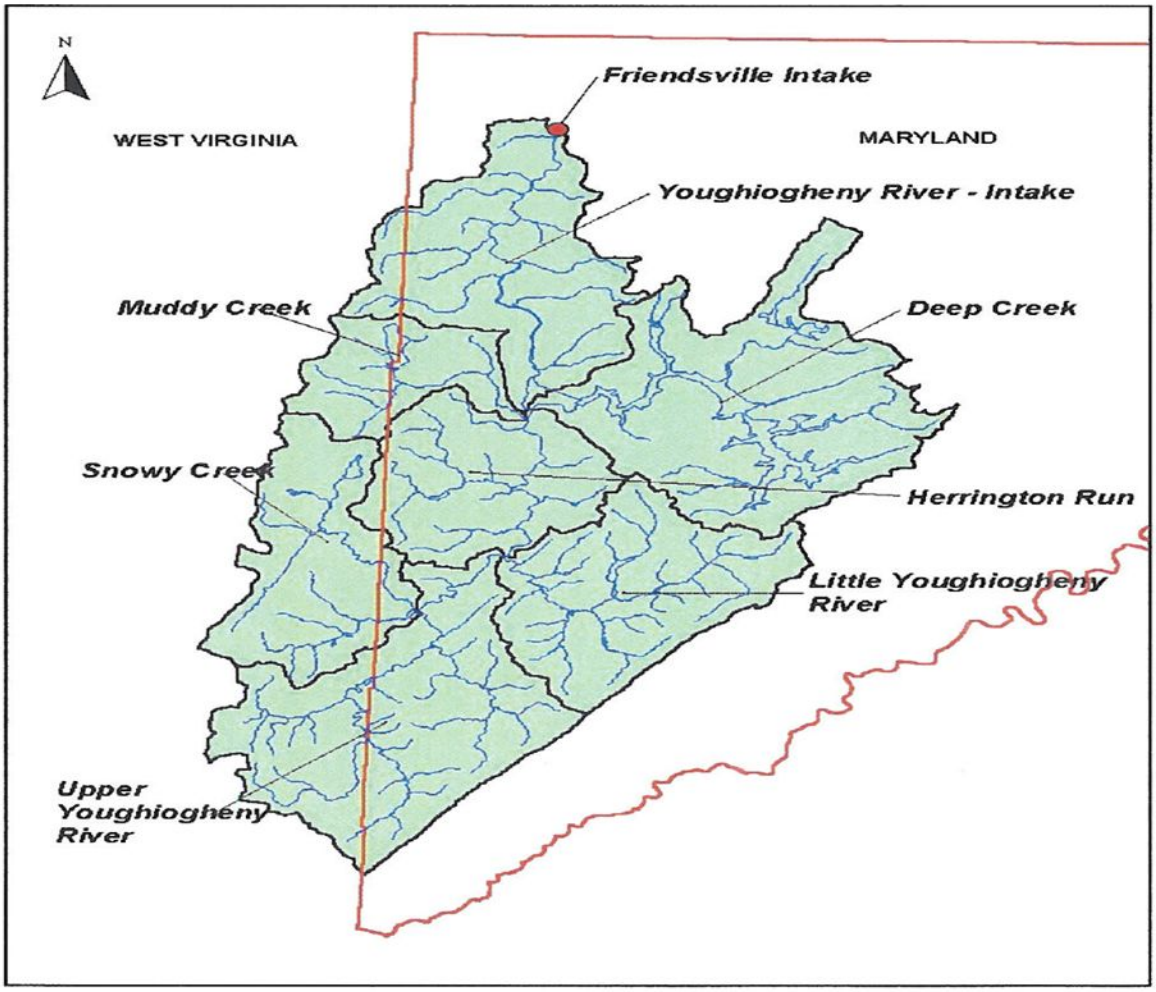
Countermeasures
Prior notification of potential flooding event
Sandbags
Notification system of contamination event upstream
Fenced perimeter of facility
Camera surveillance
Back-up generators – possible source Maryland National Guard
Notification system for residents
Fuel supply for generators

Alternate water supply – short term and long term
Coordination with county emergency management, hazmat team, MDE, health department
Contact list: labs, repair contractors, equipment vendors, health department, MDE, power utility
Place utility on priority customer list with power utility for restoration of power

In the case of long term interruption of water supply, there may be a need to develop a new water source. Possible options include drawing from Bear Creek, well exploration or investigation into re-establishing access to springs that once supplied the Town with drinking water. The first two options have been discussed with the Water Supply Program of MDE. They believe Bear Creek is an option for the town, but also feel a 6-8" test well would be a possibility.

9 APPENDIXES

Appendix A.



Appendix B.

West Virginia Fecal Coliform Levels 2005-2011			
Station	**Location**	**Maximum**	**Average**
MY	Upper Youghiogheny	164	164
MY-02	Snowy Creek	1750	348
MY-02-A	N Branch Snowy Creek	750	168
MY-02A1	Wardwell Run	12000	902
MY-02-B	S Branch Snowy Creek	2900	506
MY-02-B1	Pine Run	270	63
MY-04	Rhine Creek	5000	351
MY-05	Maple Run	6200	1309

Appendix C.

Appendix D.

Friendsville Source Water Protection Committee

Jesse Whittemore	Friendsville Town Council
Ginny Siemer	Maryland Rural Water Association
James Stanton	Youghiogheny River Watershed Association
Deborah Carpenter	Garrett County Department of Planning and Land Management
Patrick Hudnall	Garrett County Department of Public Works

July 2015

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