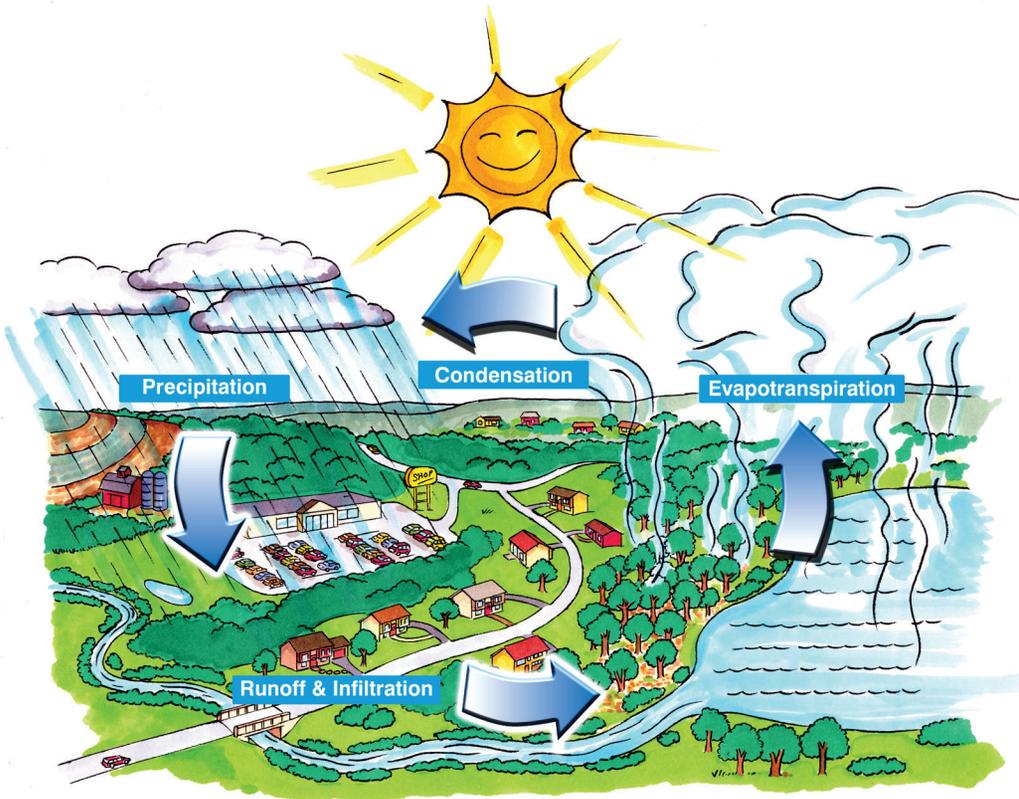


# Chapter 3. WESTMORELAND COUNTY WATER RESOURCES

## NATURAL WATER CYCLE

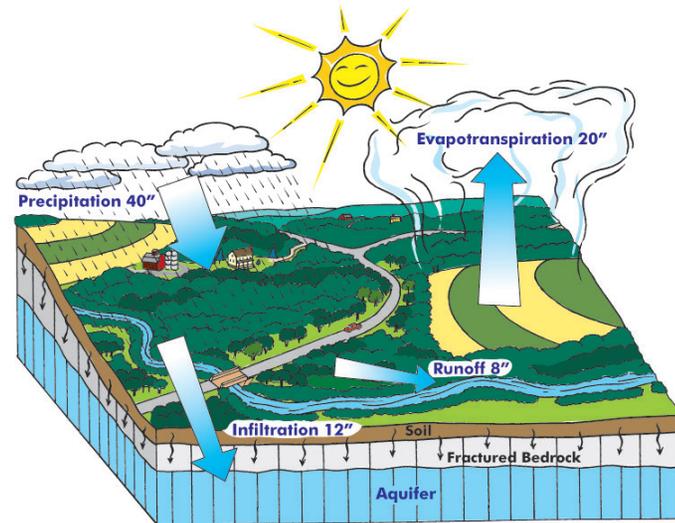
Our water resources are all tied together as part of the natural hydrologic or water cycle which begins when the rain falls. During the natural water cycle, some of the rain soaks into the ground to replenish our groundwater, some of it runs off the land to become the base flow in our streams and water bodies, and the rest sustains the vegetation and rises through the roots and leaves by evapotranspiration, to become rain again and complete the cycle.



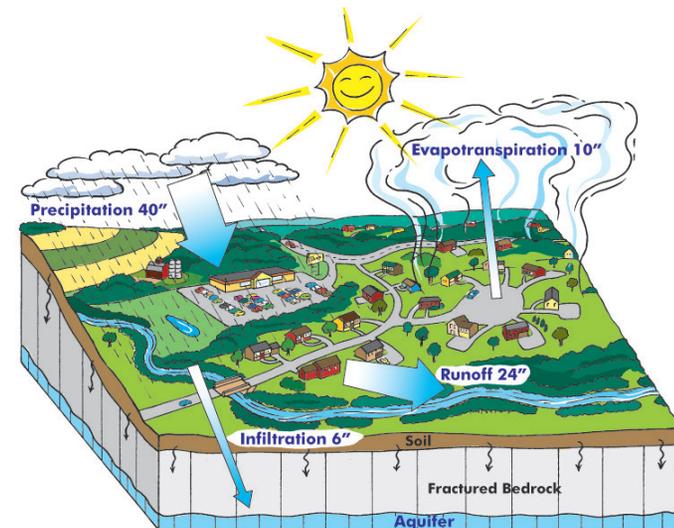
The natural water cycle

## WATER CYCLE AND DEVELOPMENT

The natural water cycle is affected by land development and changes in land use. Developed areas of our county can generate two to three times more stormwater runoff than undeveloped natural areas. In a rural or undeveloped condition half of the 40 inches of rain we receive



Natural water cycle before development



The natural water cycle changes significantly with land development.

Illustrations by Mark Jackson

is evapotranspired back into the air by the natural vegetation to complete the natural water cycle. Around 12 inches soaks into the ground through infiltration to replenish the natural water table and about 8 inches naturally runs off the land to become base flow in our waterways and waterbodies.

In a developed condition, where impervious areas like roofs, roads, and parking lots have been constructed covering the land, vegetation has been removed reducing evapotranspiration, and soils have been compacted reducing infiltration capacity, the natural infiltration rate can drop by 50% and the runoff rate can increase by 300%. The impacts that human activity and development have on the land create erosive flows in our waterways, encourage erosion and sedimentation, disrupt the natural water cycle, and impact the water resources that we depend on for a healthy environment.

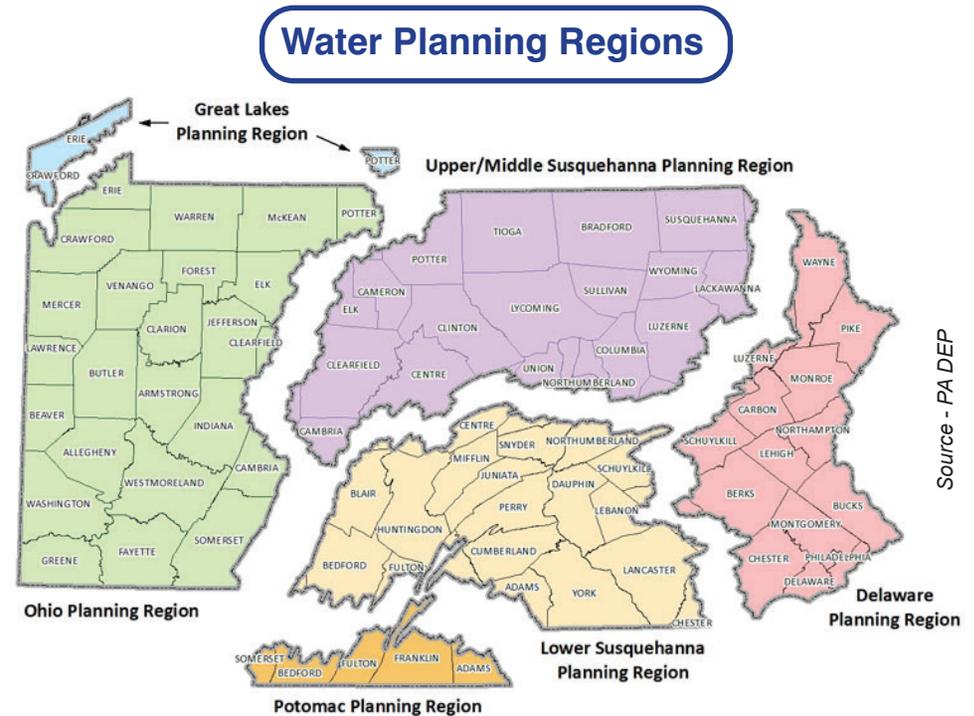
Excess stormwater runoff is one of the key natural resource issues in our county, contributing to flooding, erosion, pollution, and property damage. Infiltration is also affected by land development and can be severely reduced by pavement, roofs, and soil compaction. Less infiltration means lower groundwater levels and less recharge of the base flow of streams. Water consumed in personal daily activities, manufacturing, and agriculture also can affect the balance of water in the county. The key to management of our water resources is to manage new and existing land development to closely replicate the natural water cycle to sustain this valuable resource.

## WATER BALANCE AND ALLOCATION

People rely on water resources for our drinking water supply, wastewater management, manufacturing, energy production, agriculture and food processing, as well as recreation and tourism. Those same resources must also be available for use by aquatic and riparian plants and animals. The potential for conflict among competing uses can be great. There also is uncertainty over how climate change will affect annual precipitation amounts and whether that may cause water shortages on a more frequent basis.

Although Westmoreland County does not have an official water budget, it is a worthwhile concept to consider for adoption in the future. A water budget accounts for the water inputs, outputs, and changes to the flow of water in a watershed. Some of these components are natural processes (precipitation, evapotranspiration, groundwater flow) and

some are created by humans (water withdrawals, interbasin transfers). By knowing where, when, and how much water flows in and out of the system, planners can determine how much water is left for other uses and where potential shortages may exist. (<https://water.usgs.gov/water-census/water-budgets.html>).



While the Pennsylvania Water Resources Planning Act 220 of 2002 uses watershed boundaries to evaluate water demands and needs, land development is still managed at a political level (townships, boroughs, cities, counties). These political subdivisions do not have the power to regulate water withdrawals or allocate water resources, which may result in conflicts. However, the State Water Plan makes its information available to municipalities to help make informed land use decisions (<https://extension.psu.edu/access-and-allocation-of-water-in-pennsylvania>), and has been included in the IWRP online decision making flowchart explained in Chapter 6: Action Plan.

Water resource use in Pennsylvania is governed by common law, which means that it is based on court rulings and legal precedent. This means that it can be changed or modified by any future court case. It also views surface water, diffuse surface water (runoff, snow

melt, floodwaters, seeps), and groundwater differently with separate and different rules ([http://files.dep.state.pa.us/Water/BSDW/Water-Allocation/water\\_law\\_review\\_022806.pdf](http://files.dep.state.pa.us/Water/BSDW/Water-Allocation/water_law_review_022806.pdf)).

While Act 220 recognizes the connection among surface, diffuse surface, and groundwater and provides guidelines for future allocation of that water, it is not known how it might affect future common-law interpretation (<https://extension.psu.edu/access-and-allocation-of-water-in-pennsylvania>).

## WATER RESOURCES

Our water resources include all water from precipitation to groundwater, and from streams and lakes to rivers and wetlands.

### PRECIPITATION

**Precipitation** is any product of the condensation of water vapor in the air that falls to the ground, including drizzle, rain, sleet, snow and hail. Westmoreland County receives on average about 40 inches of precipitation annually, increasing about five inches across the county from west to east.

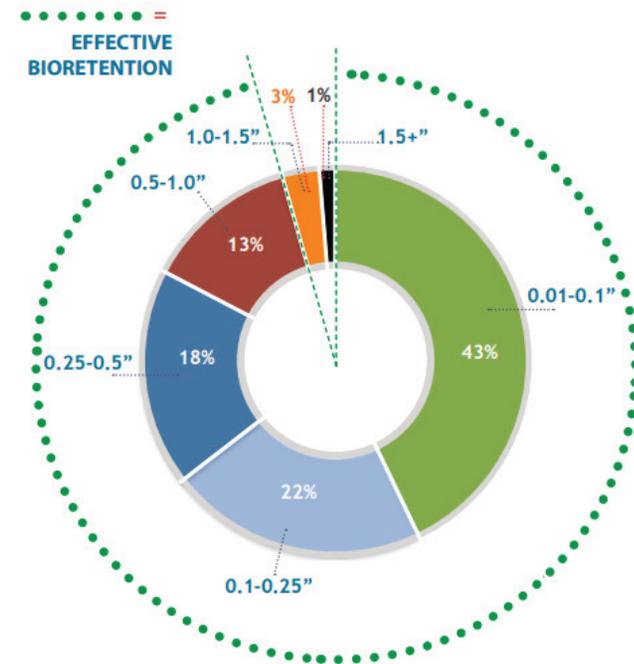
**Why is this important?** On average, the continental U.S. gets about 30 inches per year, so we are wetter than many areas. This means we have enough water for commercial, industrial, agricultural, and personal use—but we sometimes have too much water, which leads to flooding.



Photo by Stephen Simpson

Road flooding near Champion, PA

## Rainstorm Intensity



| Precipitation Ranges (inches) | Average # Days per Year | Percent of RAIN Days per Year | Percent of Annual Precipitation |
|-------------------------------|-------------------------|-------------------------------|---------------------------------|
| 0.01 - 0.1                    | 61                      | 43%                           | 7%                              |
| 0.1 - 0.25                    | 31                      | 22%                           | 13%                             |
| 0.25 - 0.50                   | 26                      | 18%                           | 24%                             |
| 0.50 - 1.0                    | 18                      | 13%                           | 31%                             |
| 1.0 - 1.5                     | 5                       | 3%                            | 13%                             |
| 1.50+                         | 2                       | 1%                            | 12%                             |
|                               | <b>143</b>              | <b>100%</b>                   | <b>100%</b>                     |

This graphic illustrates that the vast majority of precipitation we receive during a single rain event in southwestern Pennsylvania is well below 1 inch. In fact, 83% of all annual precipitation is ½ inch per day or less.

## WATERWAYS AND WATERBODIES

**A waterway or water body** is any body of water like a lake, pond, channel, or natural or man-made conveyance of surface water. It can be a run, stream, creek, or river that has defined bed and banks, whether natural or artificial, with a flow that is continuous or recurring.

There are approximately 2,000 miles of waterways in Westmoreland County and 8.5 square miles of water surface. Several lakes and dams in the county are under federal, state, or county control but many are privately owned. Class A wild trout streams account for 37 miles of waterways. **Impaired waters**, those classified by the state as having

some form of pollutant (often Abandoned Mine Drainage (AMD) but sometimes other pollutants), are 677 miles or 33% of the total stream miles in the county.

– *from the PA Fish and Boat Commission and the PA Water Plan*

**Why is this important?** Our water bodies, streams, and wetlands must be clean to be sustainable resources for all those who depend on and enjoy them.



Photo by Mark Jackson

*Fishing the Youghiogheny River near Smithton, PA*



Photo by Mark Jackson

*Bridgeport Dam County Park*



## WETLANDS

**Wetlands** are areas where water covers the soil or remains at or near the surface for an extended period of time throughout the year. These areas provide a hydrologic link between land and water resources, whether surface or groundwater. Wetlands differ from each other in topography, climate, hydrology, water chemistry and vegetation and they provide unique habitat to many species of plants and animals. Wetlands also serve as natural filters to surface and groundwater supplies. As water flows through a wetland, contaminants like nitrates, phosphates, and sediment particles are captured and removed by nearby vegetation, thereby eliminating them from the water.

“The county has approximately 2,200 acres of wetlands, which equates to about 0.5% of the total land area, yet they are valuable wildlife habitat and home to many endangered species. Most of the designated wetlands are located in the northeastern portion of the county, branching off of Loyalhanna Creek and in the southern portion, branching off of Jacobs Creek. The Sewickley Creek Wetlands, located in the center of the county, are used as an education space with an observation deck and trails for visitors to learn about wetlands habitat.”

– *Reimagining Our Westmoreland*



Photo by Kathy Hamilton

*PennDOT's Jacobs Creek wetland bank in Mount Pleasant PA*

## GROUNDWATER

**Groundwater** is the water present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. Groundwater supplies are affected by the geology of the region depending on the concentration of fractures and cracks in the bedrock. Coal fields, which are typically cracked and fractured, also have an effect on groundwater allowing for better transportation of groundwater through its conduits. Past and present mining practices however, have impacted and diverted groundwater movement.

The geology of Westmoreland County is such that there is no one single water table, but many local water tables and at varying elevations. Westmoreland County consists mostly of interbedded sedimentary rock with some sandstone along the ridges. Layers of coal are also typically found underground, along with natural gas.

**Why is this important?** Wells drilled for water use in our geologic regime often have low yields and produce water high in iron, sulfur, and other minerals. This limits growth in areas where there is no access to city water.



Photo by Kathy Hamilton

*Well casing*



Photo by Stephen Simpson

*Heron on Loyalhanna Creek*

## WATERSHEDS

A **watershed** is a drainage basin or area of land where precipitation collects and drains off into a common outlet, such as into a waterway, or other body of water. The drainage basin includes all the surface water from rain runoff, snowmelt, and nearby streams that runs downslope towards the shared outlet, as well as the groundwater underneath the Earth's surface.

Westmoreland County has 10 major watersheds. Sewickley Creek and Loyalhanna Creek are the only two located solely within the county. The Kiskiminetas and Conemaugh River basins are shared with Cambria, Indiana and Armstrong counties; Indian Creek with Somerset and Fayette counties; Jacobs Creek and Youghiogheny River with Fayette; Monongehela with Fayette and Washington; and Turtle Creek, Pucketa Creek-Plum Creek-and the Allegheny River with Allegheny County. For a detailed look into these watersheds refer to Chapter 5. Issues and Challenges.

Many watersheds in Westmoreland County have watershed associations which provide stewardship for the waterways, **habitats, and ecosystems**

within their watershed. These watershed associations have created watershed and river conservation plans and are very active in education and restoration programs and projects in their watersheds. Our watershed associations include:

- Kiski-Conemaugh Watershed Association
- Pucketa-Chartiers Watershed Association
- Loyalhanna Watershed Association
- Mountain Watershed Association (Indian Creek)
- Sewickley Creek Watershed Association
- Jacobs Creek Watershed Association
- Turtle Creek Watershed Association

For a full list of watershed plans, refer to the Appendix.

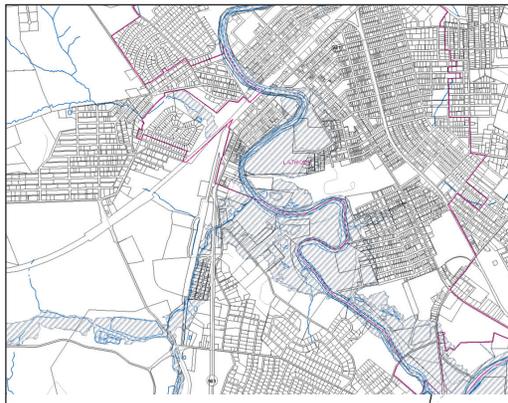
### Legend

Westmoreland Municipalities

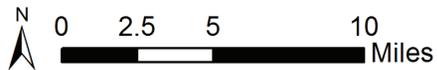
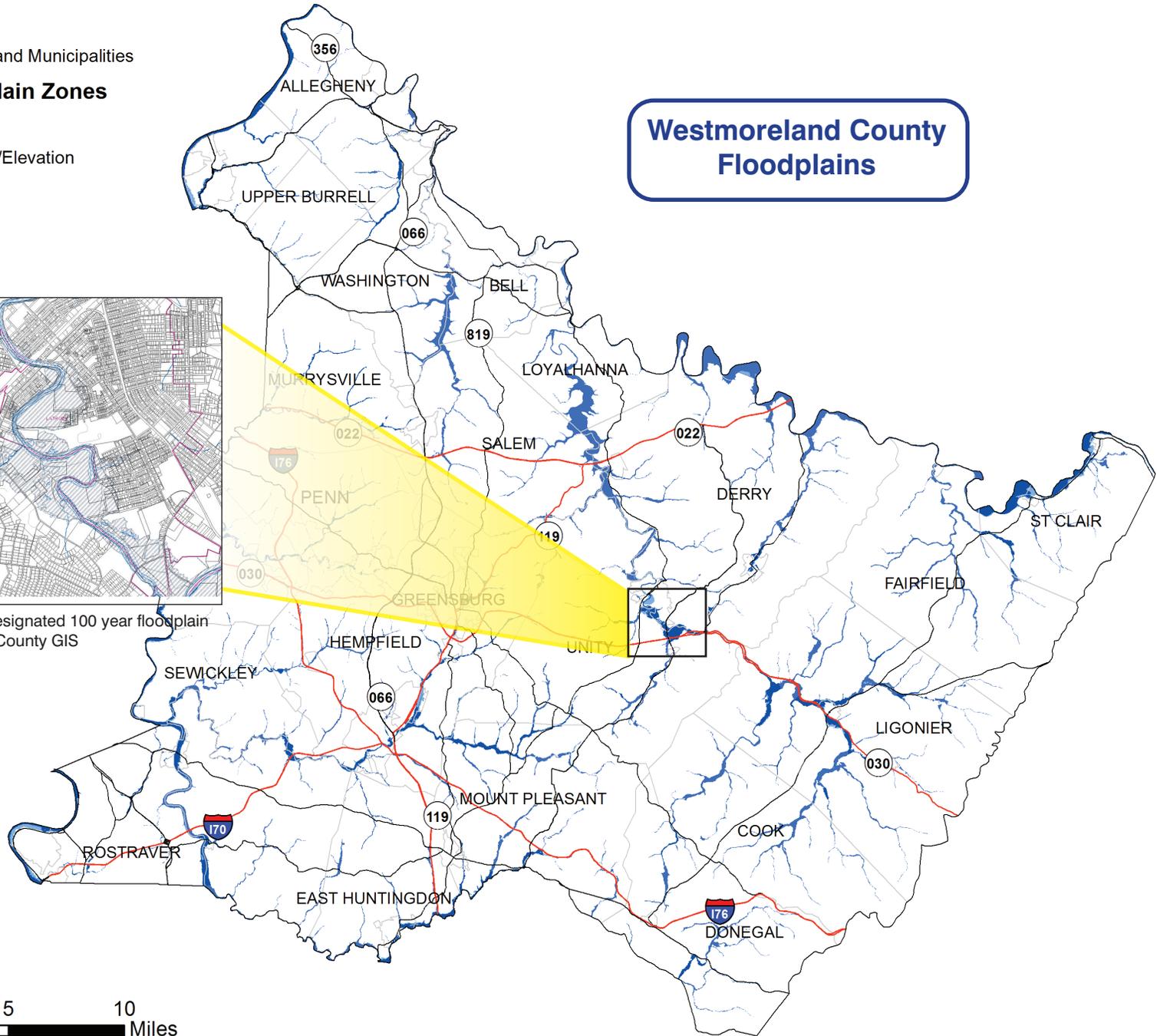
### FEMA Floodplain Zones

- 100 Year
- 100 Year w/Elevation
- 500 Year

## Westmoreland County Floodplains



City of Latrobe FEMA designated 100 year floodplain  
Image - Westmoreland County GIS



Source - Westmoreland County

## FLOODPLAINS

**Floodplains** are the relatively flat areas adjacent to streams and water bodies that become inundated with water when the banks or channel capacity is exceeded during heavy rain events. When flooding occurs naturally, floodwaters carry nutrient rich sediments that can be deposited on floodplains to encourage a fertile environment for vegetation and habitat for wildlife.

Many of the waterways in Westmoreland County have floodplains identified and delineated by the Federal Emergency Management Agency (FEMA). Years of development have encroached on many of the natural floodplains and have affected those living within the designated floodplain. Even without this designation, many county residents experience roadway flooding, property flooding, and flood damage in low lying areas and along waterways where there is development and inadequate infrastructure.

**Why is this important?** Floodplains are beneficial by controlling floodwaters, allowing sediment to deposit on the floodplain and breaking down pollutants. Future development ought to be located outside of floodplains. Existing homes and businesses in floodplains would benefit from flood control measures, whether on-site or on a watershed-wide basis.

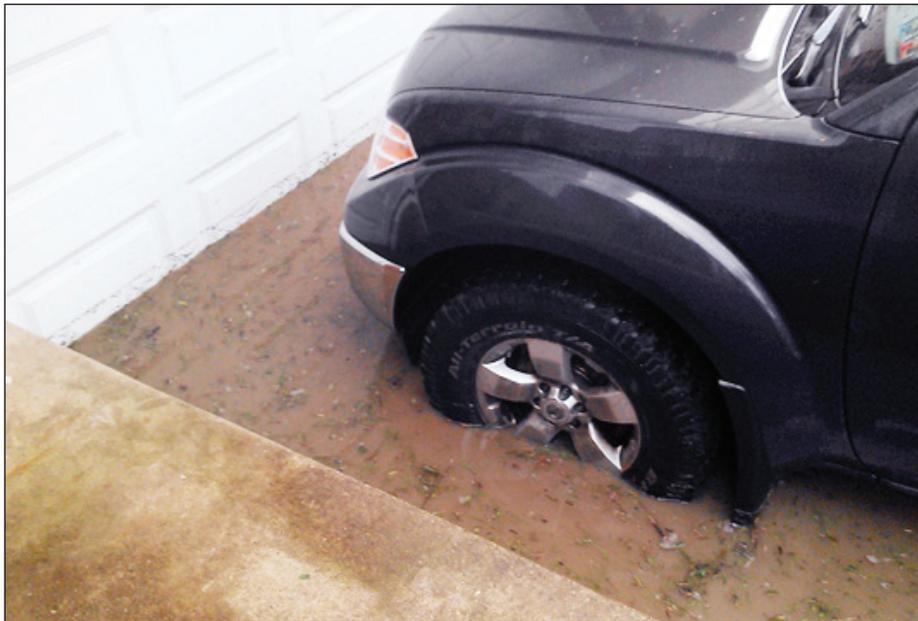


Photo by Kathy Hamilton

*Flash flood at a home in Salem Township*

## REGULATIONS

Water is regulated on the federal, state, and local level. The primary federal law governing stormwater runoff is the **Clean Water Act of 1972** - 33 U.S.C. §1251 et seq. (1972)

**The Clean Water Act (CWA)** regulates the discharge of pollutants into US waters, and sets the quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972, becoming the “Clean Water Act.”

The CWA made it unlawful to discharge any pollutant from a point source (a pipe or man-made ditch, for example) into navigable waters of the United States, unless a permit was obtained. The NPDES permit program, created by the CWA, at first regulated industrial point source pollution. Over time EPA expanded it to regulate other sources of pollution, including stormwater discharges from three potential pollutant sources: municipal separate storm sewer systems (MS4), construction activities, and industrial activities. The NPDES permit program provides two levels of control: technology-based limits and water quality-based limits (if technology-based limits are not sufficient to control pollution of the water body).

Under the CWA, EPA authorizes the NPDES permit program to state governments, enabling them to perform many of the permitting, administrative, and enforcement aspects of the NPDES program.

**Pennsylvania’s Clean Streams Law**, originally enacted in 1937, is our state’s basis for water regulations. The law preceded Pennsylvania’s Stormwater Management Act (better known as Act 167), Chapter 102 (Erosion and Sediment Control Requirements), and NPDES Permit Program for Stormwater Discharges Associated with Construction Activities, Chapter 105 (stream encroachment requirements), and the MS4 Program for municipalities with separate storm sewer systems. These programs are amongst the Commonwealth’s methods for meeting the runoff-related requirements of the federal CWA.

Passed in 1978, the **Floodplain Management Act 166** provides for the regulation of land use and water use for flood control purposes. Also passed in 1978, the **Stormwater Management Act 167** mandates that every Pennsylvania county must study stormwater issues and create a stormwater management plan based on watersheds. This IWRP was created to meet those mandates. In September 2002, in an attempt to

integrate its various stormwater management programs (including MS4 Permits, NPDES Construction Permits, and Act 167) and promote a comprehensive watershed approach to stormwater management, PA DEP finalized a Comprehensive Stormwater Management Policy, DEP Policy No. 392-0300-002.

The **Dam Safety and Encroachments Act 325** of 1978 provides for the regulation of dams and reservoirs, water obstructions and encroachments in order to protect the health safety and welfare of people and property.

**Chapter 102 'Erosion and Sediment Control'** of the PA Code Title 25 requires persons proposing or conducting earth disturbance activities to develop, implement and maintain best management practices (BMPs) to minimize the potential for accelerated erosion and sedimentation and to manage post construction stormwater. The BMPs shall

be undertaken to protect, maintain, reclaim, and restore water quality and the existing and designated uses of waters of the Commonwealth. For most earth disturbances greater than 1 acre, a NPDES permit is required and measures must be taken to manage the increase in stormwater runoff with a Post Construction Stormwater Management (PCSM) plan.

The PA DEP issued the latest version of the Erosion and Sedimentation Pollution Control Manual in March 2012 to help guide the implementation of controls for earth disturbance.

The **NPDES** permit applies to most earth disturbance activities that disturb greater than or equal to 1 acre of earth disturbance. This permit does not apply to agricultural plowing and tilling, animal heavy use areas, timber harvesting activities, road maintenance activities, and oil and gas activities. The major components of an NPDES Permit



Photo by Chris Droste

*Erosion control barriers prevent sediment-laden water from leaving construction sites under Chapter 102.*

Application include: Erosion and Sediment (E&S) Control Plan, Pennsylvania Natural Heritage Program (PNHP) Search, Post Construction Stormwater Management (PCSM) Plan for all storms equal to or less than the two year/24-hour event, Thermal Impact Analysis, and Anti-degradation Analysis to ensure the development does not increase the post-development total runoff volume.

The **PA Stormwater Best Management Practices Manual** (Manual) was released in December 2006 to assist with the implementation of PA DEP's 2002 Stormwater Management Policy. The stated goal of the Manual is "to protect, maintain, and improve the Commonwealth's water resources, while allowing for the continued growth and development of Pennsylvania." The Manual describes a stormwater management approach to land development that:

- Emphasizes reducing the impacts of development activities through planning and development techniques that avoid potential impacts to watershed resources; and
- Minimizes and mitigates any unavoidable impacts through the use of both structural and non-structural best management practices

The manual is used to complete the NPDES and PCSM permit applications.

**Chapter 105 'Dam Safety and Waterway Management'** of the PA Code Title 25 regulates structures and activities under Section 302 of the Pennsylvania Flood Plain Management Act.

The purposes of this chapter are to:

- Provide for the comprehensive regulation and supervision of dams, reservoirs, water obstructions and encroachments in the Commonwealth in order to protect the health, safety, welfare and property of the people
- Assure proper planning, design, construction, maintenance, monitoring and supervision of dams and reservoirs, including preventive measures necessary to provide an adequate margin of safety
- Assure proper planning, design, construction, maintenance and monitoring of water obstructions and encroachments, in order to prevent unreasonable interference with water flow and to protect navigation
- Protect the natural resources, environmental rights and values secured by the Pennsylvania Constitution and conserve and protect the water quality, natural regime and carrying capacity of water courses

**A PA DEP Chapter 105 Dam Safety Permit** may be needed for ponds having an embankment height of greater than 15 feet (measured on the upstream side); a drainage area greater than 100 acres; and a storage volume greater than 50 acre-feet. If construction of a pond impacts wetlands or streams, a **Water Obstruction and Encroachment Permit** may be needed.



Photos by Rob Cronauer

*Before and after photos of a Bank Rehabilitation General Permit project along Mill Creek*

**A PA DEP Chapter 105 General Permit (GP)** for stream encroachments may be required if the project impacts streams, water bodies and/or wetlands. Some permits are required for projects with a contributory drainage area greater than 100 acres. Projects with a contributory drainage area greater than 1 square mile may instead require a Joint Permit issued by PA DEP.

General Permits that are available related to land development include:

- Fish Enhancement Structures
- Private Recreational Docks
- Bank Rehabilitation, Protection, and Gravel Bar Removal, (limit 500 linear feet)
- Intake and Outfall Structures
- Utility Line Stream Crossings
- Agricultural Crossings and Ramps
- Minor Road Crossings (limit 1 square mile of drainage)
- Temporary Road Crossings



Photo by Mark Jackson

*Westmoreland Conservation District Watershed Program Manager Rob Cronauer checks developing trees which are part of a stream buffer at Hutter's Dairy Farm near Kecksburg. A cattle stream crossing is in the background.*

- Agricultural Activities
- Abandoned Mine Reclamation
- Maintenance, Repair, Rehab or Replacement of Water Obstructions and Encroachments

## MS4 COMMUNITIES

In Westmoreland County, 35 of our 65 communities are classified as Municipal Separate Storm Sewer System (MS4) communities, which means they are part of an urban area; have a certain population density; and have storm sewer systems separate from sanitary. MS4 communities are required by the State to address **six minimum control measures** for improving stormwater quality:

- Public education and outreach
- Public participation
- Illicit discharge detection and elimination
- Erosion and sedimentation control
- Post-construction stormwater management in new and re-development
- Good housekeeping for pollution prevention in municipal facilities

MS4 communities are also required to create a **Pollution Reduction Plan (PRP)** to implement control measures for pollutant reduction in storm sewer discharges. The goal of the PRP is to implement Best Management Practices to reduce pollution entering waters from a municipal storm sewer system. The PRP must contain the following elements:

- Public Participation
- Map of all sewersheds (an area draining to a particular MS4 out fall)
- Identity of Pollutants of Concern (often in Westmoreland County, sediment, nutrients, and metals) in each sewershed
- Existing loading of Pollutants of Concern in each sewershed
- Selection of BMP's to achieve the necessary reduction of Pollutants of Concern (typically, a ten percent reduction in the pollutant level during the five year permit period)

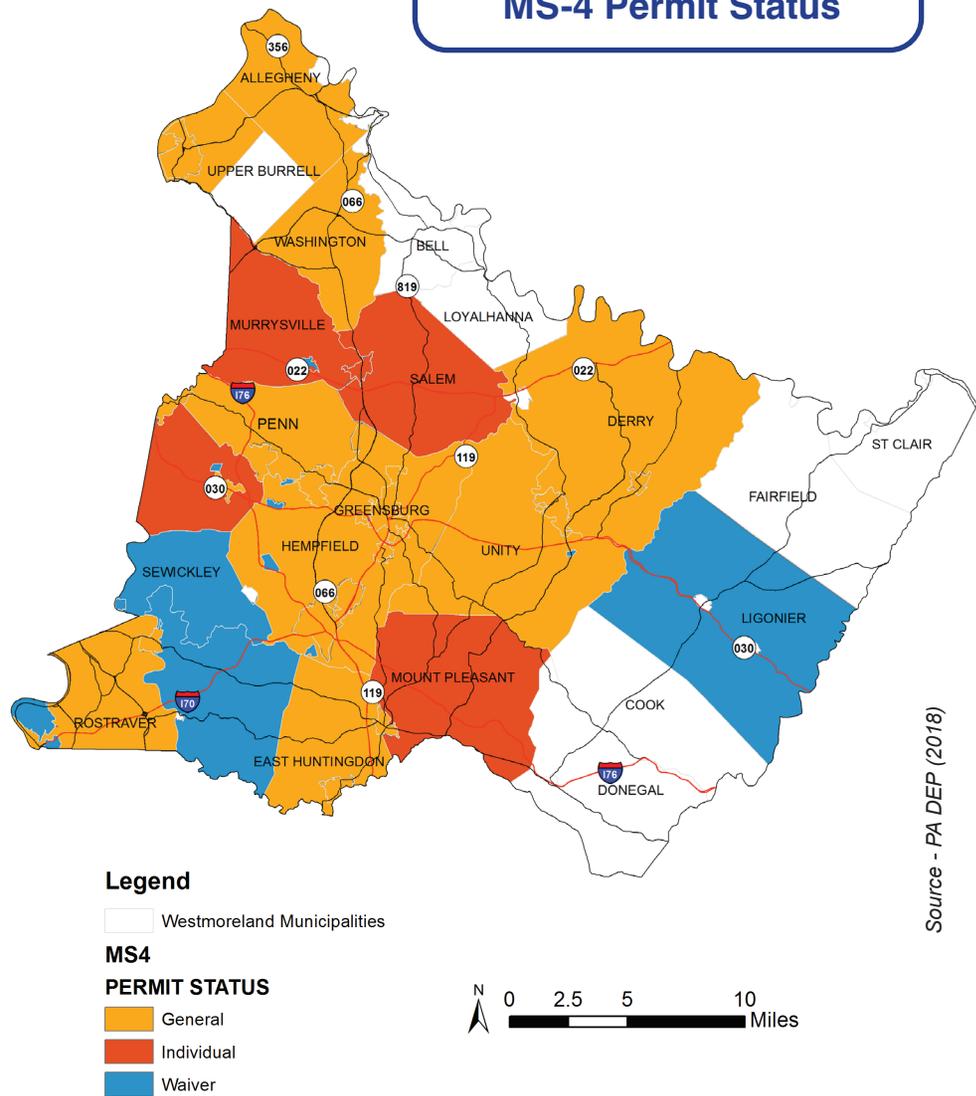
- Identification of funding mechanisms to implement and maintain the BMP's
- Identification of responsibility for implementing and maintaining the BMP's

PA DEP has technical guidelines and a standard Protocol available for municipalities as they perform these various steps. Beyond the PRP, a MS4 municipality may be located in a watershed with a total maximum daily load (TMDL) of certain pollutants set by the PA DEP to address impairments of water bodies. These municipalities may be required to develop a specific plan for addressing that TMDL. Links to more information on these items may be found in the IWRP Appendix.

Many municipalities across the county have their own stormwater management regulations, but some have none. The IWRP provides guidance to municipalities on managing water resources and on partnering with other municipalities that share watersheds and stormwater issues. It also recommends a model stormwater ordinance to help those municipalities guide development and address issues related to stormwater management, especially those communities without a current stormwater management ordinance. The county's **Model Stormwater Management Ordinance** is located in the Appendix.

The **Westmoreland Conservation District** is mandated by PA DEP to administer, monitor and provide technical assistance for the programs developed by the state to meet the CWA, the PA Clean Streams Law, Act 167, Chapter 102 including the NPDES permit program, and Chapter 105. The District also provides technical assistance to municipalities with their MS4 requirements. Most individual municipalities across the county have developed their own regulations for land development and stormwater management or they are covered by the county's Subdivision and Land Development Ordinance (SALDO).

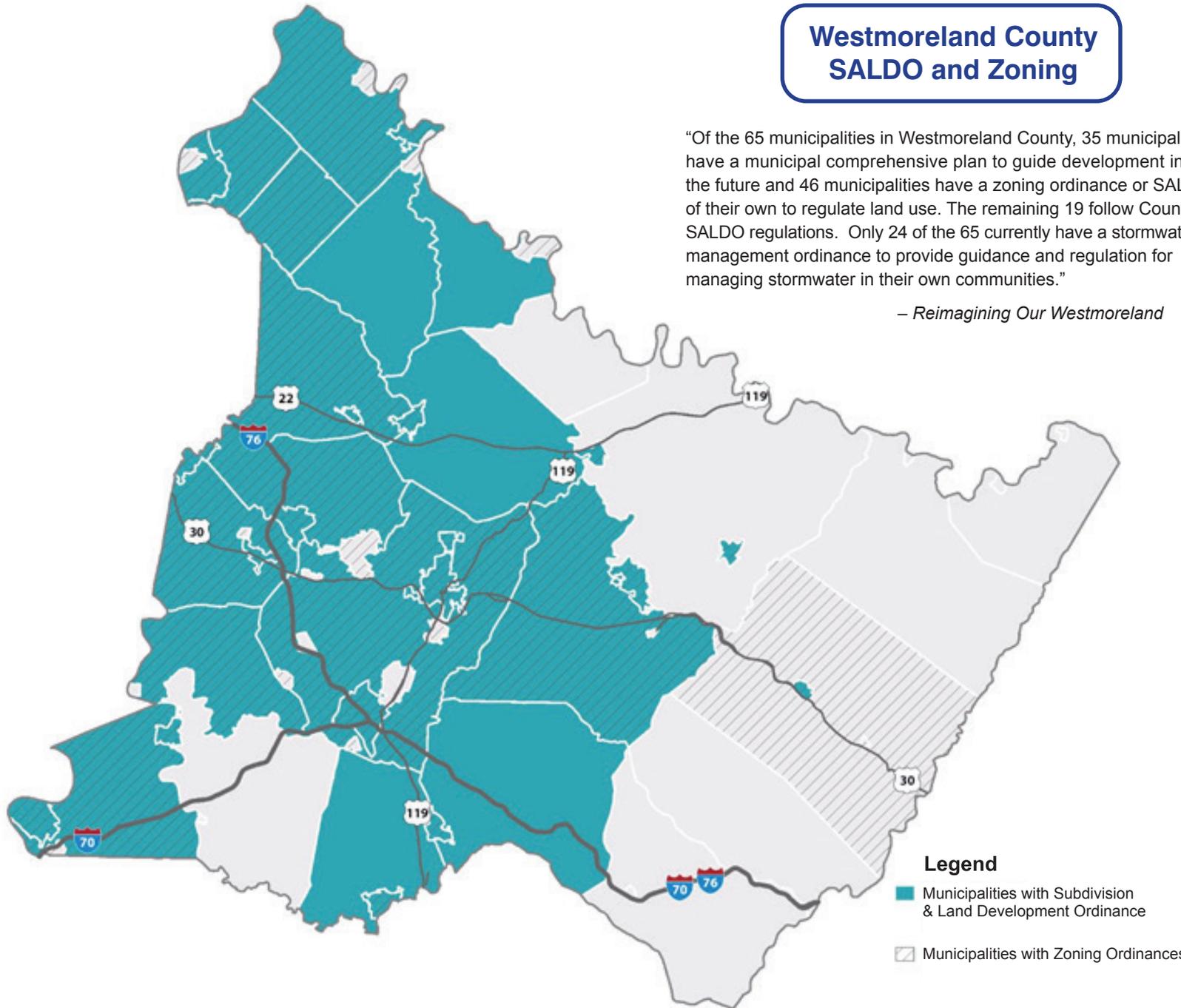
## Westmoreland County MS-4 Permit Status



## Westmoreland County SALDO and Zoning

“Of the 65 municipalities in Westmoreland County, 35 municipalities have a municipal comprehensive plan to guide development into the future and 46 municipalities have a zoning ordinance or SALDO of their own to regulate land use. The remaining 19 follow County SALDO regulations. Only 24 of the 65 currently have a stormwater management ordinance to provide guidance and regulation for managing stormwater in their own communities.”

– *Reimagining Our Westmoreland*



Source - Westmoreland County Planning (2018)