If a man fails to honor the rivers,
he shall not gain the life from them.

Anonymous

WATER QUALITY

Streams and rivers are located at the low point on the landscape and receive runoff from activities and uses that occur on the land. All land development and uses—past and present—impact water quality, aquatic life, as well as the surrounding ecological environment. Inadequate riparian buffers, unsound land use practices, insufficient stormwater management, and poor natural resource stewardship all contribute to stream bank erosion, sedimentation and degradation of water quality, affecting the quality of all life in a watershed, from the smallest macroinvertebrate to the largest mammals---including humans. A few examples of land uses that can degrade water quality include:

1. Livestock with unfettered access to streams and rivers. Livestock can trample banks and cause excess erosion and bacteriological and nutrient pollution in our waterways.

2. Cultivation adjacent to waterways. Cultivation, without sufficient vegetative buffers, can deliver excess sediment and nutrients directly into our streams and rivers.

3. Impervious areas, such as roof-tops, roads, parking lots, and compacted turf grass. Impervious surfaces concentrate and accelerate water that runs-off these areas after storm events and may exacerbate flooding as well as adding pollutants, such as sediment, oils, and chemicals to our waterways. Atmospheric deposition of pollutants also enters waterways.

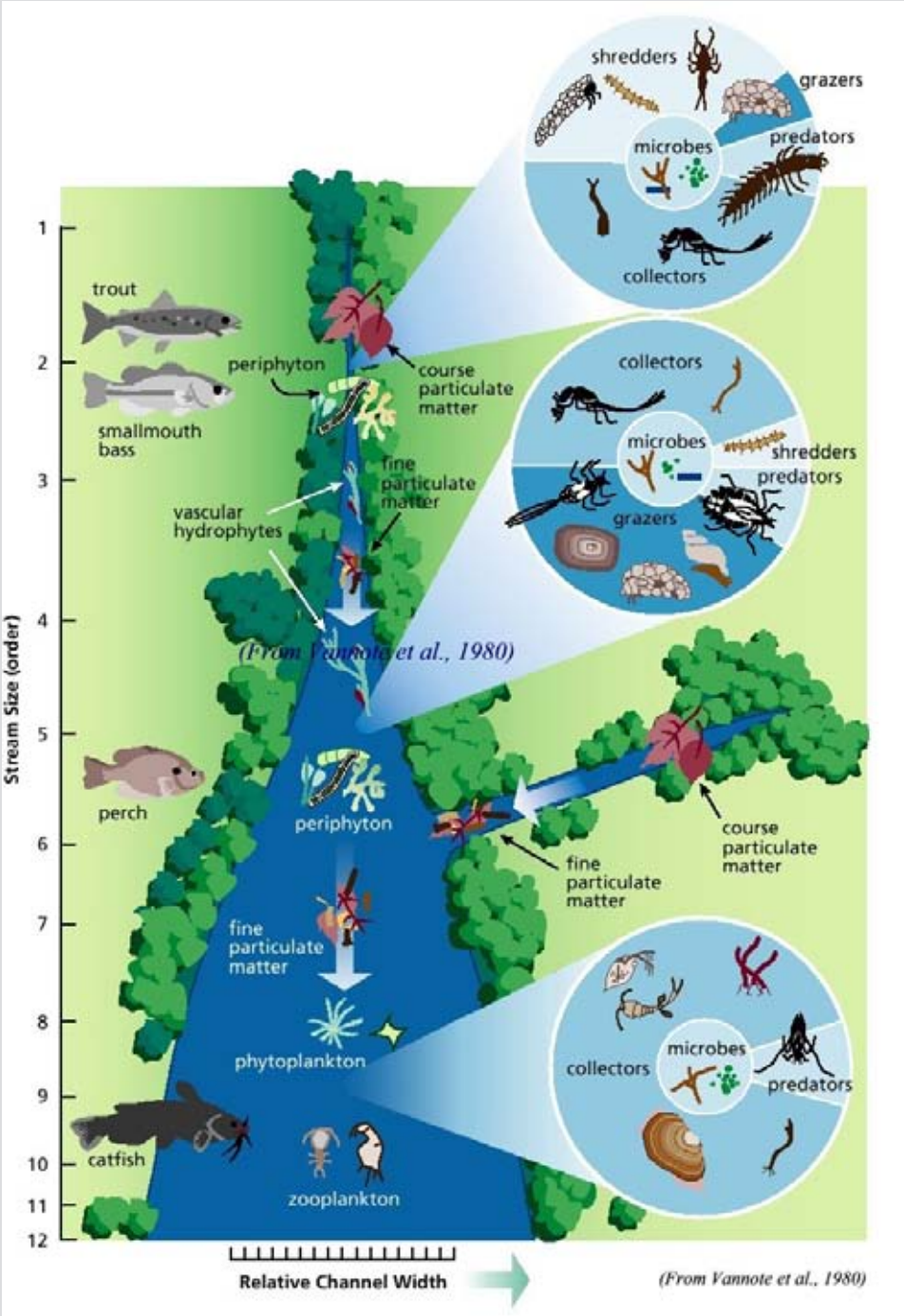
The Monocacy River's water comes from all the tributary streams present throughout its watershed that eventually flow into the mainstem of the River and from groundwater sources. Some of the Monocacy's tributaries are large, fifth-order (or higher) streams that have miles of smaller streams that flow, converge, and grow into larger streams that eventually empty into the Monocacy River. Some tributaries that flow directly into the Monocacy River are relatively small, first or second order streams draining just a few hundred acres or less. The landscape throughout the Monocacy River Watershed varies greatly; some areas have high concentrations of forested land, agricultural land, or human development. The variety and extent of these land uses--- and their management-- in the Monocacy River Watershed directly impact water quality in the streams and eventually the Monocacy River.

River Continuum Concept

Another concept to aid further understanding the complex and dynamic nature and hierarchy of our aquatic systems—from small streams to the Monocacy River--- is the 'River Continuum Concept' (Vanote et al., 1980). Streams grow and change in many ways from the beginning trickles in headwater streams to becoming large rivers. Picture the coalescing network of capallaries, veins, and arteries in our bodies; it's similar to the streams on our landscape.

Headwater streams are cooled by groundwater springs and generally have steeper gradients with riffles—rocks---in the stream and (in healthy systems) plenty of overhanging trees and vegetation. These streamside trees provide shade (to keep water cool for fish and stream insects) plus provide leaves, twigs, seeds, and grass stems that are consumed by the 'shredders'—stream insects (benthic macroinvertebrates) such as the larval forms of stoneflys and craneflys, plus crayfish. As streams converge and flow together, the stream gets wider, has fewer riffles, and receives more sunlight that promotes the growth of aquatic plants. The biological community of the stream also changes due to the change in the food inputs—there is less coarse material (leaves, twigs, seeds) in the stream and more fine particulate matter in the stream thanks to the shredders upstream. The feeding groups known as scrapers, grazers, filters and collectors (larval caddisflys, mayflys, and blackflys) are prevalent in the medium-sized streams.

Finally, in rivers---like the Monocacy—temperatures become higher as more sunlight reaches the water. The leaves, twigs, and seeds (terrestrial organic matter) are minor components of the river, compared to the volume of water. Dissolved organic material is prevalent in the water. Drifting phytoplankton and zooplankton in the river contribute to the food base as does organic material from the adjacent floodplain during flooding events. Fish species in the Monocacy are omnivores and plankton feeders such as carp, catfish, and bass.



Three (3) main pollutants of concern within our waterways—including the Monocacy River—are total suspended solids (sediment), phosphorus, and nitrogen. Sediment pollution in waterways occurs when land is disturbed by clearing natural vegetation near water, grading to 'level' the land, cultivation, or grazing. The exposed soil runs off the land and can enter streams and rivers. Phosphorus and nitrogen are nutrients that are natural parts of aquatic ecosystems. They both support algae growth and aquatic plants, which provide food and habitat for fish and other aquatic organisms. However, excessive phosphorus and nitrogen, usually from a wide range of human activities, in the water causes eutrophication, which: 1) causes a rapid growth in algae; 2) significantly harms water quality, aquatic food resources, and habitats by blocking sunlight needed for submerged aquatic vegetation to photosynthesize; and 3) reduces oxygen levels in water caused by the die-off and decomposition of algae. Some algal blooms are harmful to humans because they produce elevated toxins that can make people sick if they come into contact with polluted water, consume tainted fish or shellfish, or drink contaminated water. As polluted runoff enters streams and creeks from various land uses within the Monocacy basin, the potential for eutrophication increases. Sources of phosphorus and nitrogen include:

- agriculture (e.g., animal manure, excess fertilizer, soil disturbance);
- stormwater (e.g., impervious areas such as roads carry pollutants during storms);
- wastewater (e.g., ineffective septic systems and sewer systems discharge pollutants);
- fossil fuels (e.g., electric power generation, transportation); and
- residential activities (e.g., fertilizers, pet waste)

There are many solutions to preventing pollution from entering our waterways, one of which is a separation or buffer between all land development and activities (e.g., development, agriculture). A robust and healthy vegetative buffer along streams and rivers is key to reducing sediment, nitrogen and phosphorus from entering surface waters, as is agricultural (and residential) nutrient management, sediment and erosion control, and stormwater management. In addition to nutrient uptake, a sufficiently-wide forested buffer along streams and rivers provides valuable wildlife habitat, flood control and bank stabilization.

There is distinction between Monocacy River water quality impacts from land uses in the watershed, which are widely dispersed, numerous, and cumulative, and from direct water quality impacts from land uses in the River's surrounding environmental corridor. For example, run-off from land development or cultivated fields adjacent to the River have high potential to deliver sediment and nutrients directly to the mainstem of the Monocacy River. Structures, impervious surfaces, and lack of natural vegetation in the River's corridor degrade the scenic qualities of the Monocacy River, short-circuit nutrient cycling and flood attenuation, and eliminate wildlife habitat.

Nitrogen Cycle

Most of the nitrogen in aquatic systems—streams, rivers, lakes, ponds—is present as gas (N2), ammonia (NH4), nitrate (NO3), and nitrite (NO2). Nitrogen can 'transform' or cycle through various forms— gas, soluble (dissolvable), and particulate. Nitrate is normally the most common form of nitrogen in streams, river, and lakes. The concentration and rate of supply of nitrate is intimately connected with land use practices in the watershed. Nitrate moves easily through soil (unlike phosphorus) and is quickly lost from the land, if not taken up by plants, and enters surface and ground waters. Nitrogen derived from fertilizers, waste from animal husbandary , and wastewater treatment plant discharges are the primary sources of nitrate in streams, rivers, and lakes. Wetlands and riparian vegetation contain the environments that enable natural biologic and chemical transformation or treatment of nitrogen into much less harmful substances.

Emerging Contaminants

Sometimes chemicals that had not previously been detected (or were previously found in far lesser amounts) are discovered in the water supply. These chemicals are known as 'contaminants of emerging concern' or simply 'emerging contaminants.' Emerging contaminants are important because of the risk they pose to human health, aquatic life, and the environment is not yet fully understood. Pharmaceuticals, personal care products, and endocrine disrupting compounds (dioxins, polychlorinated biphenyls, pesticides) are examples of emerging contaminants. They commonly enter the environment from municipal, agricultural, and industrial wastewater sources and pathways. These newly recognized contaminants represent a shift in traditional thinking as many are produced industrially yet are dispersed to the environment from domestic, commercial, and industrial uses.

Watershed-wide water quality impacts are varied and occur over a huge land area, impacting hundreds of miles of streams in the Monocacy's watershed and the Monocacy River directly. The Monocacy River is the end-point for all the streams in the watershed that drain the land and collect pollutants along the way. Run-off and discharge of pollutants from all land uses and sectors is regulated, to varying degrees, by federal, state, and local laws. Following is a summary of the federal, state, and local regulatory framework for surface water protection, as well as local watershed evaluations, protection efforts, and restoration programs.

Federal And State Oversight

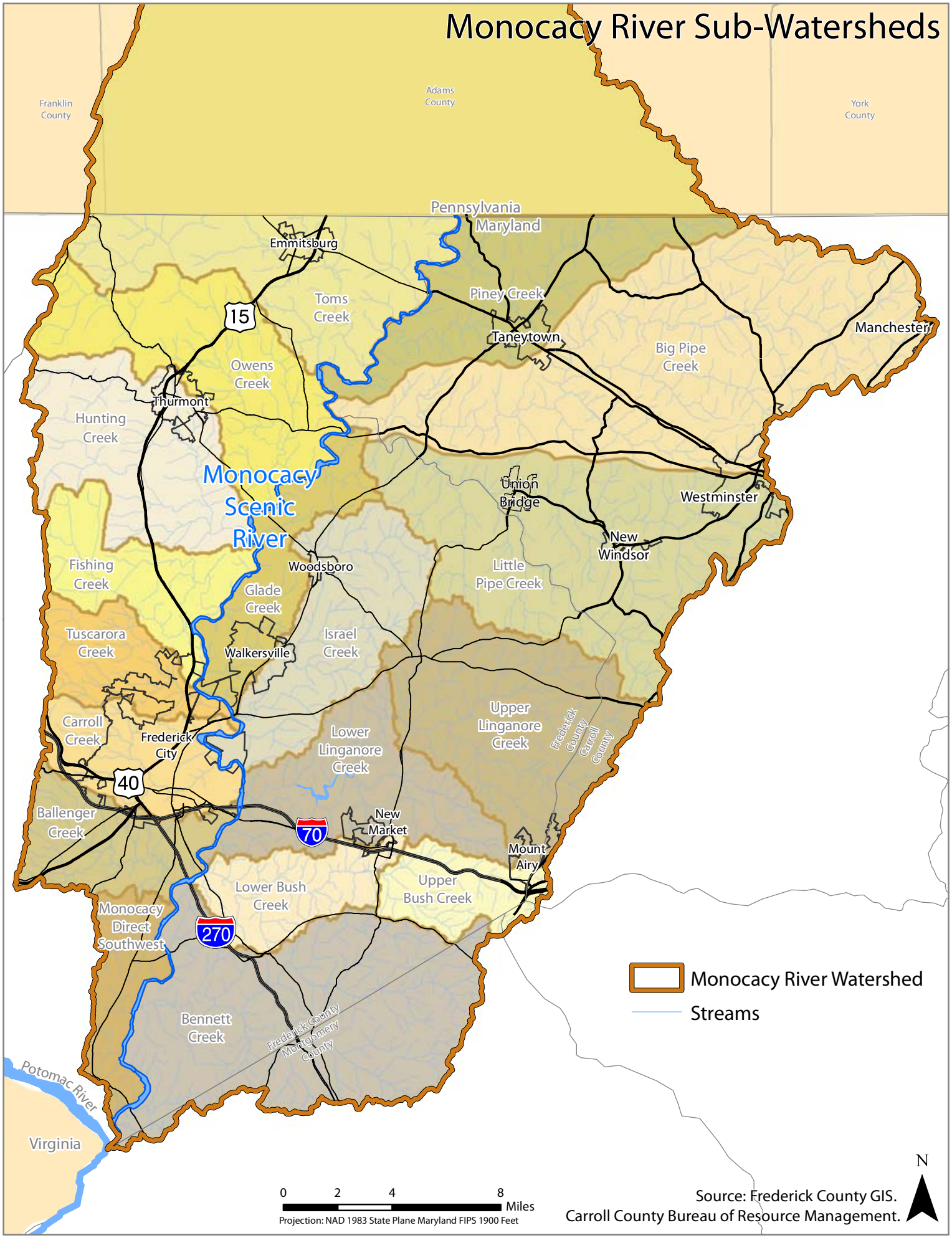
The Federal Clean Water Act requires states to develop water quality standards to protect and improve surface waters and wetlands. Maryland water quality standards have been adopted per the Federal Clean Water Act to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Individual standards are based on a particular waterbody use, function, goal, or 'designated use,' such as supporting trout populations or protecting public water supplies. Criteria to achieve these designated uses include specific threshold levels of dissolved oxygen, bacteria, temperature, toxics, and turbidity (clarity) in waterways. The Clean Water Act also requires Maryland to monitor and identify water that does currently meet the standards for its designated use. A listing of these waterbodies can be found the Maryland Department of the Environment's (MDE) Integrated Report on Surface Water Quality:

http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/pages/2014IR.aspx

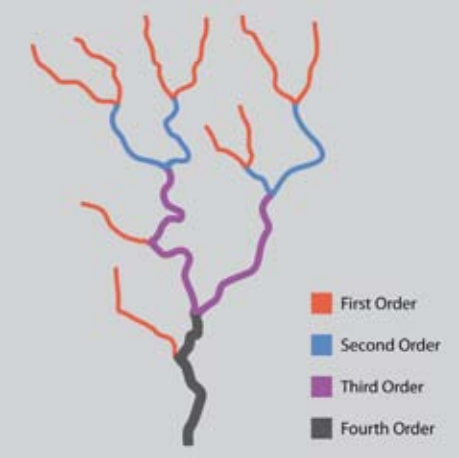
Maryland's designated water uses are identified in the Code of Maryland Regulations (COMAR) 26.08.02.08. The designated use of a waterbody refers to its anticipated use and any protections necessary to sustain aquatic life. A listing of Maryland's designated water uses and their specific application to waterbodies in the Monocacy River Watershed can be found in the Appendix under 'Maryland Designated Water Uses.'

The State of Maryland has determined, through water monitoring and computer modeling, that most waterways in the Monocacy River Watershed do not meet water quality standards. Thus, the MDE has issued formal notices of water quality impairment, called Total Maximum Daily Loads (TMDL) for the watersheds and waterways listed in the table below.

A TMDL establishes the maximum amount of an impairing substance or stressor that a waterbody can receive and still meet water quality standards. TMDLs calculate pollution contributions from the entire watershed and then allocate reduction requirements to the various contributing sources of pollution. These allocations are divided among counties and towns and then further divided by sources, including agriculture, wastewater, and stormwater. For more information: http://www.mde.state.md.us


Monocacy River Sub-Watersheds
Franklin County
Adams County
York County
Pennsylvania
Maryland
Emmitsburg
Toms Creek
Piney Creek
Taneytown
Manchester
Big Pipe Creek
Owens Creek
Thurmont
Hunting Creek
Monocacy Scenic River
Union Bridge
Westminster
New Windsor
Fishing Creek
Woodsboro
Little Pipe Creek
Glade Creek
Tuscarora Creek
Israel Creek
Walkersville
Carroll Creek
Frederick City
Lower Linganore Creek
Upper Linganore Creek
Frederick County
Carroll County
Ballenger Creek
New Market
Mount Airy
Lower Bush Creek
Upper Bush Creek
Monocacy Direct Southwest
Bennett Creek
Frederick County
Montgomery County
Potomac River
Virginia
15
40
70
270
Monocacy River Watershed
Streams
0 2 4 8 Miles
Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet
Source: Frederick County GIS.
Carroll County Bureau of Resource Management.
N

Impairment and Watershed or Waterway	Date Issued by MDE
Sediment on Double Pipe Creek	February 20, 2009
Sediment in Upper Monocacy River Watershed	December 3, 2009
Sediment in Lower Monocacy River Watershed	March 17, 2009
Sediment in Lake Linganore	May 13, 2003
Fecal Bacteria on Double Pipe Creek	December 3, 2009
Fecal Bacteria in Upper Monocacy River Watershed	December 3, 2009
Fecal Bacteria in Lower Monocacy River Watershed	December 3, 2009
Phosphorus on Double Pipe Creek	April 26, 2013
Phosphorus in Upper Monocacy River Watershed	May 7, 2013
Phosphorus in Lower Monocacy River Watershed	May 22, 2013
Phosphorus in Lake Linganore	May 13, 2003



Stream Order

The Monocacy River And The Chesapeake Bay

The Monocacy River Watershed is not unique in its impairments; there are over 300 TMDLs in Maryland. In fact, due to the numerous water quality issues in Maryland (and nearby states) and their ultimate impacts on the Chesapeake Bay, the US Environmental Protection Agency (EPA) issued a TMDL for the entire Chesapeake Bay Watershed in 2010. After decades of voluntary efforts to fully restore the health, productivity, and resiliency of the Chesapeake Bay, the US EPA established pollution load limits to restrict three major pollutants fouling the Bay's water: nitrogen and phosphorus (nutrients) and sediment (soil) from agriculture, land development, and wastewater treatment plants. These loading limits, which set clear goals for reducing excess pollution, are science-based estimates of the amount of each substance the Chesapeake Bay and its tributaries—like the Monocacy River-- can receive and still meet standards for clean, healthy water. The goals, or pollution reduction targets, require the seven jurisdictions in the Chesapeake Bay watershed (Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York and the District of Columbia) to reduce their nutrient and sediment loadings to the Bay until these protective limits are met, within a specific time frame (MD Department of the Environment).

The seven (7) Bay jurisdictions created individual Watershed Implementation Plans (WIPs), or restoration blueprints, that detail specific actions from each activity or sector—agriculture, land development, and wastewater treatment—the States will take to meet their pollution reduction goals by 2025. The blueprints guide local and state Bay restoration efforts through the next decade and beyond.

The local WIP reports vary in length and detail, but generally include the following information:

- Overview of local WIP team process, description of team membership, and summary of Phase II WIP efforts
- Local area narrative strategies to achieve nutrient and sediment reductions
- Local area 2012-2013 milestones
- Description of local area tracking and reporting methods
- Optional description of local watershed planning frameworks
- Optional documentation of technical discrepancies, recommended future steps to address concerns.

For further detail or to download a one of the seven local WIP reports, see http://www.mde.state.md.us/programs/water/tmdl/tmdlimplementation/pages/wipphaseiicountydocuments.aspx

In addition to reaffirming commitments to restore the Bay's waters by achieving the nutrient and sediment reduction targets in the Chesapeake Bay TMDL, the Chesapeake Bay Watershed Agreement, signed by the Bay jurisdictions, addresses both climate change and toxic contamination as challenges whose solutions will ultimately increase the resiliency of the Bay and ensure that the Bay and its rivers are free from the effects of toxic substances on living resources and human health.

Watershed Study, Monitoring, And Restoration

The following Section provides brief descriptions of work that has been or is being done in assessing the health of the Monocacy River Watershed.

Interstate Commission on the Potomac River Basin (ICPRB)

The ICPRB is an agency of the Potomac River Basin that performs studies and provides a sound science base that assists states with protecting water quality and related resources of the basin. The ICPRB promotes watershed-based comprehensive water resources planning.

Middle Potomac Watershed Assessment
From 2009 to 2012, ICPRB worked with the Nature Conservancy and the U.S. Army Corps of Engineers to develop the assessment, which examined the hydrology of the non-tidal Potomac (except for the North Branch) and how hydrologic changes from changes in use and climate could affect the ecology of the region's streams. The Monocacy watershed (both in MD and PA) was identified as one of the watersheds most at risk of degradation through changes in stream flow. The major culprits include increasing urban areas/impervious surfaces, increased water demand, and the karst geology in the region.

The Middle Potomac Watershed Assessment produced several products to increase understanding of the region's hydrology and to provide tools for planning sustainable water use, including:

- A basin-wide database of biological and water quality data;
- A more-refined hydrologic model;
- Future water use projections;
- Assessments of current hydrologic alteration based on water demand and climate change;
- Development of environmental flow recommendations for the mainstem Potomac;
- Creation of hydrologic alteration-ecological response relationships to aid in development of environmental flow recommendations for tributary streams

To view the complete report, see the following website: http://www.potomacriver.org/wp-content/uploads/2015/01/MPRWA_FINAL_April_2013.pdf

Frederick and Carroll Counties

Significant study and analysis of the condition of waterways and the landscape within the Monocacy River Watershed in both Carroll and Frederick County have been made since the 1990 Monocacy Plan was issued. A large portion of these have been mandated by the Federal Clean Water Act and subsequent Chesapeake Bay Clean Up initiatives.

Frederick County secured funding from the US EPA to prepare Watershed Restoration Action Strategies (WRAS) for both the Lower and Upper Monocacy River Watersheds (completed in 2004 and 2005, respectively) to address the Monocacy River Watershed's impairments as listed in MDE's Integrated Report. The WRAS included a Stream Corridor Assessment, a field survey to evaluate and assess the overall instream and riparian habitat condition of selected stream corridors in the watershed; a GIS Watershed Characterization; and water quality monitoring at selected points in the watershed. Both the Upper and Lower Monocacy WRAS included measurable environmental goals, stakeholder involvement, and monitoring to address the water quality impairments within the watershed. The WRAS included initiatives such as restoring unbuffered waterways, protecting critical forested headwater areas and wetlands, implementing best management practices in urban and agricultural areas for nutrient reduction benefits, as well as developing pilot projects and other programs to address the negative human-induced impacts to water quality and habitat.

The WRAS reports can be found here: http://www.watershed-alliance.com/

Stream Monitoring

Frederick County has a stream survey program to assess the status of County streams in terms of water quality, biological condition, and habitat. The survey employs a statistical design, using a random sampling approach to draw inferences about stream condition in each of the County's 20 watersheds and the entire County. The County Stream Survey was designed to answer key questions about the condition of the County's watersheds and streams and, in particular, the stressors affecting those streams. Since 2008, data have been collected on water quality, instream and riparian habitat, and biological communities at each of the stream sites. This information was then used to make an assessment of stream conditions Countywide. Please see the following website: http://www.frederickcountymd.gov/518/Watershed-Management

Carroll County's current monitoring strategy is focused primarily around stormwater retrofit locations where reductions in loadings can be documented from the before-and-after study approach. This comprehensive monitoring program is intended to validate the overall effectiveness

Innovative BMP Monitoring

Carroll County's innovative monitoring project will evaluate the pollutant removal efficiency of an enhanced sand filter design developed by the County to improve the removal of nutrients from stormwater runoff. This project, located within the Monocacy River Watershed, will focus on the mass removal of phosphorus and will compare the pollutant removal capability of a traditional sand filter versus an enhanced sand filter using iron fillings as an added media. In theory the iron additive within the aerobic layer of the sand filter should bond with the oxygen present and with the phosphorus in stormwater, forming an iron-orthophosphate nodule that precipitates out into the sand, increasing the removal of dissolved phosphorus and therefore, total phosphorus from stormwater runoff.

Sampling will include the data collection from the influent and effluent side of the sand filter for the same storm events in order to determine: mass removal of dissolved phosphorus , total phosphorus, total nitrogen, as well as determine the difference in total suspended solids between the standard sand filter design and the enhanced sand filter design.

The results of this study will provide support to adopt the Carroll County-designed enhanced filter as an approved Best Management Practice by the Maryland Department of the Environment and the Chesapeake Bay Program.

of BMPs and document the efficiency of any innovations made to BMPs. Three of the County's monitoring locations are located within the Monocacy River Watershed. Bi-weekly monitoring by the County's Bureau of Resource Management involves the collection of chemical grab samples with corresponding discharge measurements in order to calculate nutrient and sediment loadings to waterways. Additional monitoring includes spring macroinvertebrate collection.

Carroll County has conducted stream corridor assessments within the Monocacy River Watershed to identify and rank impairments within the watershed to assist in prioritizing locations for restoration implementation. The assessments are based on Maryland Department of Natural Resources protocols and collect data on eroded stream banks, channel alterations, exposed utility pipes, drainage pipe outfalls, fish barriers (debris jams), inadequate streamside buffers, trash dumps, and grading activities that are either in or near the stream. Carroll County's monitoring and assessment information can be found at: http://www.ccgovernment.carr.org/ccg/resmgmt/

Stormwater Management

Various other watershed water quality improvements---stream restoration, stormwater management system upgrades, environmental education initiatives, and watershed evaluations/assessments—are included in both Frederick County and Carroll County's National Pollutant Discharge Elimination System (NPDES) permit—aka 'stormwater permit.' The Clean Water Act authorizes the EPA, and states that are delegated the authority by the EPA, to regulate point sources that discharge pollutants into waters of the United States through the NPDES permit program.

"Point sources" are generated from a variety of municipal and industrial operations, including treated wastewater, process water, cooling water, and stormwater runoff from drainage systems. The NPDES storm water program, in place since 1990, regulates discharges from municipal separate storm sewer systems (MS4s), construction activities, industrial activities, and those designated by EPA due to water quality impacts. MS4 jurisdictions, such as Frederick and Carroll Counties are required to track, monitor, and report on activities related to stormwater discharge. In general, the permit requires the management and administration of the following categories:

- Source identification for pollutants in stormwater runoff countywide.
- Maintain a stormwater management program for development activities.
- Maintain an erosion and sediment control program for construction activities.
- Maintain an illicit discharge detection and elimination program that includes inspection and enforcement.
- Address problems associated with litter and floatables in waterways that adversely affect water quality.

- Maintain a property management and maintenance program for county-owned operations.
- Implement a public education and outreach program.
- Conduct stormwater restoration.

For further details on the MS4 NPDES permits in Frederick and Carroll Counties, see the following websites:

Frederick County: http://www.frederickcountymd.gov/518/watershed-management

Carroll County: http://ccgovernment.carr.org/ccg/resmgmt/

Maryland Department of Natural Resources

The Monitoring and Non-tidal Assessment Service of the Maryland Department of Natural Resources monitors the Monocacy River monthly at four locations. "Core-Trend" data is gathered from the following locations:

- Bridgeport (Site No. 0528)
- Biggs Ford Road (Site No. 0269)
- MD 144 (Site No. 0155)
- MD 28, Dickerson Road (Site No. 0020)

In addition to benthic macroinvertebrate collection, the following chemical parameters are analyzed monthly by the DNR from the 4 Core-Trend Stations:

Water Chemistry Parameters	Measurement Units
Total Organic Carbon	milligrams per liter (mg/L)
Total Suspended Solids	mg/L
Total Kjeldahl nitrogen	mg/L
Total phosphorus	mg/L
Turbidity	Nephelometric Turbidity Units (NTUs)
Total alkalinity	mg/L
Sulfate	mg/L
Ammonium	mg/L
Nitrate + Nitrite	mg/L
Nitrite	mg/L
Nitrate	mg/L
Phosphate	mg/L
Water Temperature	Celsius
Conductivity	micromhos (umhos/cm)
Total Dissolved Solids	parts per million (ppm)
Dissolved Oxygen	mg/L
pH	

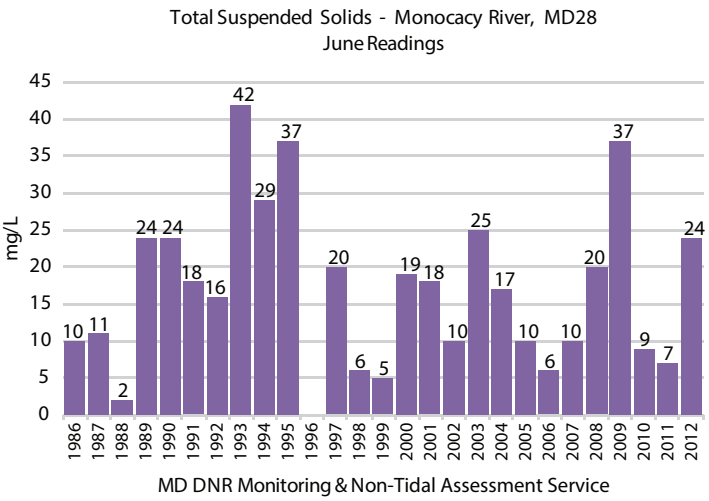
For more information about Maryland DNR's core trend program, visit http://dnr2.maryland.gov/streams/pages/ctsites.aspx

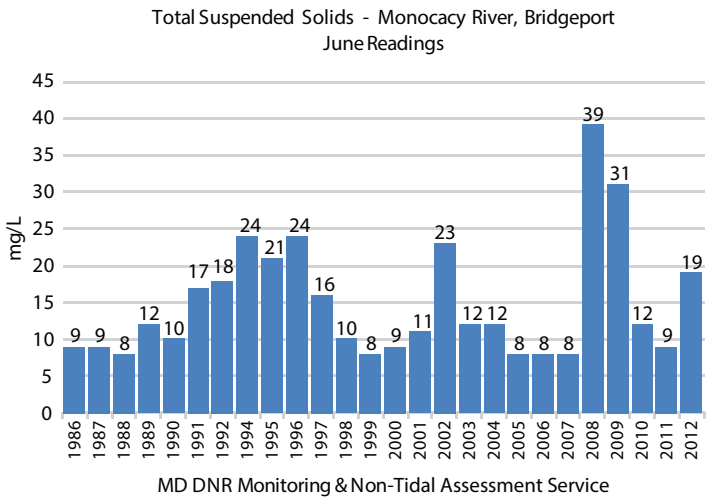
Water Quality--Concentrations

Below are 2 graphs comparing Total Suspended Solids (TSS) values from the Bridgeport monitoring site with the MD Rt. 28 site, which is over 50 miles down-river from Bridgeport and after the Monocacy River receives flow from its tributaries in Frederick and Carroll Counties. These readings reflect concentrations of sediment on one particular day each month, in each year from 1986—2012 at 2 sites on the Monocacy River. Several

factors including river ecology, land use, and fluvial dynamics may explain the variability in the readings between these 2 sites.

Concentration simply measures the amount of a substance or material in a specific volume of water—in this Monocacy River example, milligrams per liter (mg/L). Concentration is often a useful parameter to assess water quality because it has biological significance to organisms of concern. (15) For example, concentration data is used to indicate levels of pollutants and other substances that can be toxic or harmful to fish and other aquatic organisms.





Water Quality—Loadings

Pollutant loading is also a useful measure of water quality but, unlike concentration data, measures the amount of a substance or pollutant carried in a stream past a particular point for a given time period, (e.g, kilograms per day, kg/day or pounds per year, lbs/yr). Stream or river flow or discharge data (e.g., cubic feet per second, ft3/sec) is key to calculating loading rates. The allocation of pollutant loading by source (e.g., agriculture, stormwater) is the foundation of the Federal TMDL process used nationwide to regulate water quality issues arising from nonpoint sources of pollution, as described elsewhere in this chapter.

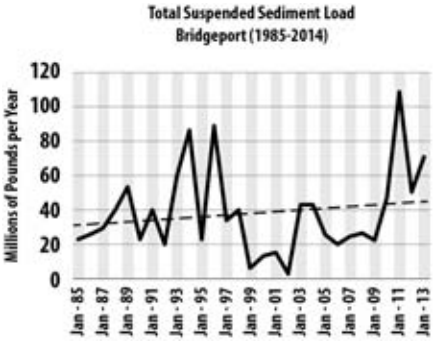
Chesapeake Bay Nontidal Network

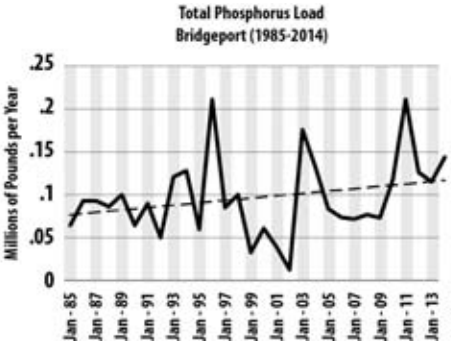
The Chesapeake Bay Nontidal Water Quality Monitoring Network is a partnership implemented among the States in the watershed, the US EPA, the USGS, and the Susquehanna River Basin Commission. A network of monitoring stations has been established and is sampled using standardized protocols and quality-assurance procedures designed to measure pollutant loads and changes in pollutant loads over time.

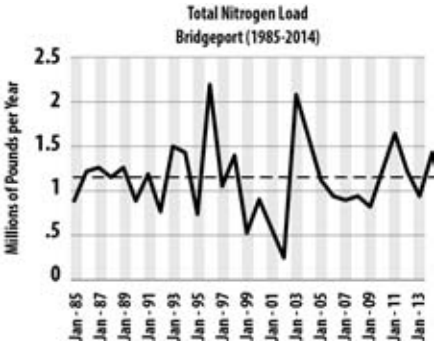
The monitoring sites within the network track changes in nitrogen phosphorus, and suspended solids in the Chesapeake Bay Watershed to determine loads and trends through discharge measurements, water quality sampling, and statistical analysis. One of the nontidal monitoring network sites is located on the Monocacy River at Bridgeport.

The Bridgeport has been part of the nontidal monitoring network since 1985, and the water quality information collected at this location has and will continue to play a crucial role in both the

development and progress of local and Chesapeake Bay TMDLs. The following graphs show long term trends from the Chesapeake Bay Nontidal Network for total nitrogen, total phosphorus and suspended sediment at the Bridgeport monitoring location.







Recommendations

9-1) Frederick County, Carroll County, and all NPDES Phase I and Phase II municipalities should continue to implement their programs to address required nutrient and sediment reductions to meet Chesapeake Bay and local TMDL's

9-2) The River Board needs to engage more frequently with NPDES stormwater staff in Frederick County, Carroll County, Adams County, PA, and the Phase II municipalities in the Watershed to stay current about Monocacy River Watershed water quality issues

9-3) Lobby for an increase to Maryland's Used Tire Clean Up and Recycling Fund to generate additional resources for the clean-up, removal, processing, and reuse of tires dumped in our environment. Subsidize and support expansion of the Maryland Farm Bureau's and Maryland Environmental Service's 'Farm tire drop-off day' (see River Board's involvement with tire removal from the River in Chapter 2)

9-4) Promote and fund additional hazardous and toxic material 'drop-off' days at the Reich's Ford Road Landfill and the Northern and Hood Mill Landfills to encourage proper disposal of hazardous materials and reduce illegal dumping which pollute ground and surface waters, including the Monocacy River