The Monocacy and the Chesapeake Bay

The Chesapeake Bay is a body of water and, like a human body, its health depends on what goes into it. But, as everyone knows, the Chesapeake is not as healthy as it once was. The problems stem, in part, from the declining quality of the rivers that feed the Bay. This fact sheet explains how the Monocacy River contributes to the Bay.

THE RIVER

Henry Fleet, while visiting the Monocacy River valley during the 17th century, wrote of the area, "The place is without question, the most healthful and pleasant place...And for deer, buffaloes, bears, turkey the woods do swarm with them and the soil is exceedingly fertile..." Such remarks foretold the rich cultural heritage the river has enjoyed. Today, unfortunately, serious water quality problems threaten that heritage with ruin.

The Monocacy is the largest Maryland tributary to the Potomac River and forms near the Maryland and Pennsylvania border west of Harney, Maryland, at the confluence of Marsh and Rock creeks. From its origin, the river flows south to Double Pipe Creek, marking the border between Frederick and Carroll counties. Continuing south solely within Frederick County, it flows east of Frederick City and empties into the Potomac River near Dickerson, Maryland, some 58 miles from its source.

Throughout the 17th and 18th centuries, several Indian tribes periodically inhabited the Monocacy River valley. The Seneca Indians referred to the valley as "Cheneoowquoque", while the Shawnees called it "Monnockkesey," which translates to "river with many bends."

The Swiss explorer Franz Louis Michel, who traveled much of the watershed in 1702 looking for silver, left maps that provide an early glimpse of the Potomac River, the Monocacy River, and Sugarloaf Mountain, near what is now Urbana, Maryland. Chartier, a French trader, followed soon after and established an outpost at the mouth of the Monocacy. Hearing reports of abundant game and rich natural resources in the rolling woodlands of the Piedmont plateau, further European settlers followed.

Pioneers to the Monocacy valley were predominantly of English and German descent. Settlers quickly discovered the fertile soils under the chestnut, hickory, and oak canopy and began clearing land to farm. To this day, agriculture constitutes the economic mainstay of the Monocacy watershed. Interestingly, the river was not heavily navigated. Because the Monocacy flows north to south and not west to east like the majority of Piedmont waterways, it was inefficient for shipping goods to Baltimore or Washington.

The Monocacy River's most important role in history came during the Civil War. The Battle of the Monocacy, a small but crucial day long conflict, was fought on July 9, 1864. The center of the battle lay at Monocacy Junction, southeast of Frederick, Maryland, on the east bank of the Monocacy along what is now MD Route 355. In spite of repeated attempts by Union troops to burn all bridges over the river, the Confederates persisted and eventually crossed late in the day.

THE WATERSHED

The Monocacy watershed, a sub-basin of the Middle Potomac River basin, encompasses 774 square miles -- or 476,200 acres -- 75 percent of which is in the State of Maryland and the rest, in Pennsylvania. Roughly three-quarters of the land in the watershed has been cleared for agriculture and currently supports about 3,500 farms, averaging 150 acres each. The remaining land supports forests, the City of Frederick, and ever-growing residential neighborhoods.

Sediment continues to be a management problem for the basin. High levels of sediments suspended in surface waters periodically force the closure of drinking water supplies up river and the need for additional chemical treatment in drinking water from lower stretches and the Potomac.

FARMING AND THE RIVER

Agriculture practiced on highly erodible soils has the potential to degrade both surface and groundwater resources by contributing nutrients (such as nitrogen and phosphorus), agrichemicals, and sediment. Recognizing this, the Maryland Department of Agriculture has targeted the Monocacy watershed as a top water quality management priority. Improved water quality depends upon better farming operations, called Best Management Practices (BMPs), that address nutrient and agrichemical use and soil conservation.

Across the Monocacy watershed, crop land soil erosion ranges from two to 35 tons per acre (and more on intensively cultivated land) per year. This is in stark contrast to the T-value -- a measure of how much soil can be lost and still maintain productivity -- which is three tons per acre throughout the watershed. Better erosion control will not only help the river, but farmers, who currently lose an estimated three to seven percent in crop yield in certain areas of the watershed.

Of the 3,500 farms in the watershed, most are commercial operations such as dairy, poultry, hogs, and horses. Together, these livestock operations produce nearly 1,119,400 tons of manure annually containing the equivalent of 4,400 tons of nitrogen and 900 tons of phosphorus. This animal waste, along with processed water from milking parlors that produces additional nutrients, organic material, and pathogens, eventually fouls the odor, taste, and appearance of surface waters.

And fecal coliform, an indicator of disease-causing organisms, has been a persistent problem for a section of the river below the Frederick Sewage Treatment Plant. Failing septic systems also contribute to nutrient enrichment problems.

National studies have shown that the use of inorganic nitrogen fertilizers increased four-fold from 1960 to 1980. Nitrogen is of particular concern because it readily dissolves in water and in high concentrations can cause illness in infants. While precipitation, slope, soil type, and method and timing of application all significantly affect the amount of nitrogen leached below the root zone, models show that the quantity applied is the biggest determining factor.

Pesticides represent yet another problem for the river. Pesticide use has nearly tripled in the U.S. since 1964. The same factors that apply to nitrogen leaching -- namely climate, hydrology, and geology -- also influence the movement of pesticides to ground water. The problem is complicated by such properties as solubility, absorption rate, and persistence. Ironically, a national trend toward decreasing persistence has resulted in pesticides with increased solubility and, consequently, a

greater likelihood of leaching below the root zone.

RESTORATION EFFORTS

Created in 1949, the Interstate Monocacy Watershed Council was the first organizational attempt to restore the river. Two years later, the Maryland State Planning Commission released a report saying that although federal and state conservation efforts were under way, projects often lacked coordination and funding. The report recommended a dramatic increase in soil and water conservation, reforestation of large areas of the watershed, improvements in water quality, restoration of wildlife habitat, and careful development of recreational resources. Similar proposals are echoed today.

In 1968, the Maryland General Assembly passed the Scenic and Wild River Act (SWRA) to protect Maryland's river resources through an organized program of natural resource inventories and land use planning. After passage of the SWRA, officials identified the Monocacy River as a significant state resource and prime candidate for scenic designation. Approval came on April 30,1974 and a management plan with recommendations to conserve, preserve, and manage the Monocacy and its tributaries is now in place.

The SWRA also established the Monocacy Scenic River Local Citizens Advisory Board. Begun in 1976, the organization brings together citizens interested in all aspects of the river to assist county officials in decisions affecting its future. And the Monocacy Watershed Conservancy, which began as a volunteer trash pick-up project, is today a large organization that continues its clean-up efforts and seeks to purchase easements along the riverbanks.

In 1990, in an effort to increase understanding of the watershed hydrology and respond to severely impaired water quality, the U.S. Department of Agriculture awarded a grant to the University of Maryland and state conservation agencies to improve water quality through new, environmentally-safe technology working in harmony with productive agriculture. Demonstration sites were selected in three sub-basins -- Israel Creek, Piney/Alloway Creeks, and Linganore Creek -- chosen primarily for their ground and surface water problems, geology, and ongoing conservation programs. The challenge is to find tools that are innovative, yet practical -- reducing pollutants from both point and nonpoint (disparate) sources. Showing producers that each farm operation has an effect -- positive or negative -- on water quality throughout the watershed is key.

Federal and state cost-sharing for construction expenses helps relieve the financial burden on farmers, and additional incentives motivate them to continue using BMPs.

In 1991, 42 demonstration plots resulted in reduced soil erosion on over 3,500 acres by an average of six tons per acre per year. Nearly 5,600 tons of sediment were prevented from flowing into the three targeted streams. Project leaders, who hoped to enroll 2,000 acres in the integrated pest management program, had signed up 32 farmers representing a total of 4,302 acres by year end!

Monitoring, of course, plays an important role. An excellent program, run by the Maryland departments of Agriculture, Natural Resources, and the Environment, has been in operation in the Piney/Alloway Creeks sub-basin for several years. And, with assistance from the U.S. Geological Survey, a surface water monitoring program has just begun in the Israel and Linganore creeks sub-basins. But more coordinated

direction is needed. Such programs, while not expected to reveal significant improvements during the life of the demonstration project, will over time determine the success of long-term BMPs and improved farm management.

The success of the watershed demonstration project, as well as continued oversight by concerned citizens and governing officials, is critical to the rivers future. Only through coordinated and comprehensive resource management will the Monocacy be restored to its scenic vitality and a dependable source of drinking water.