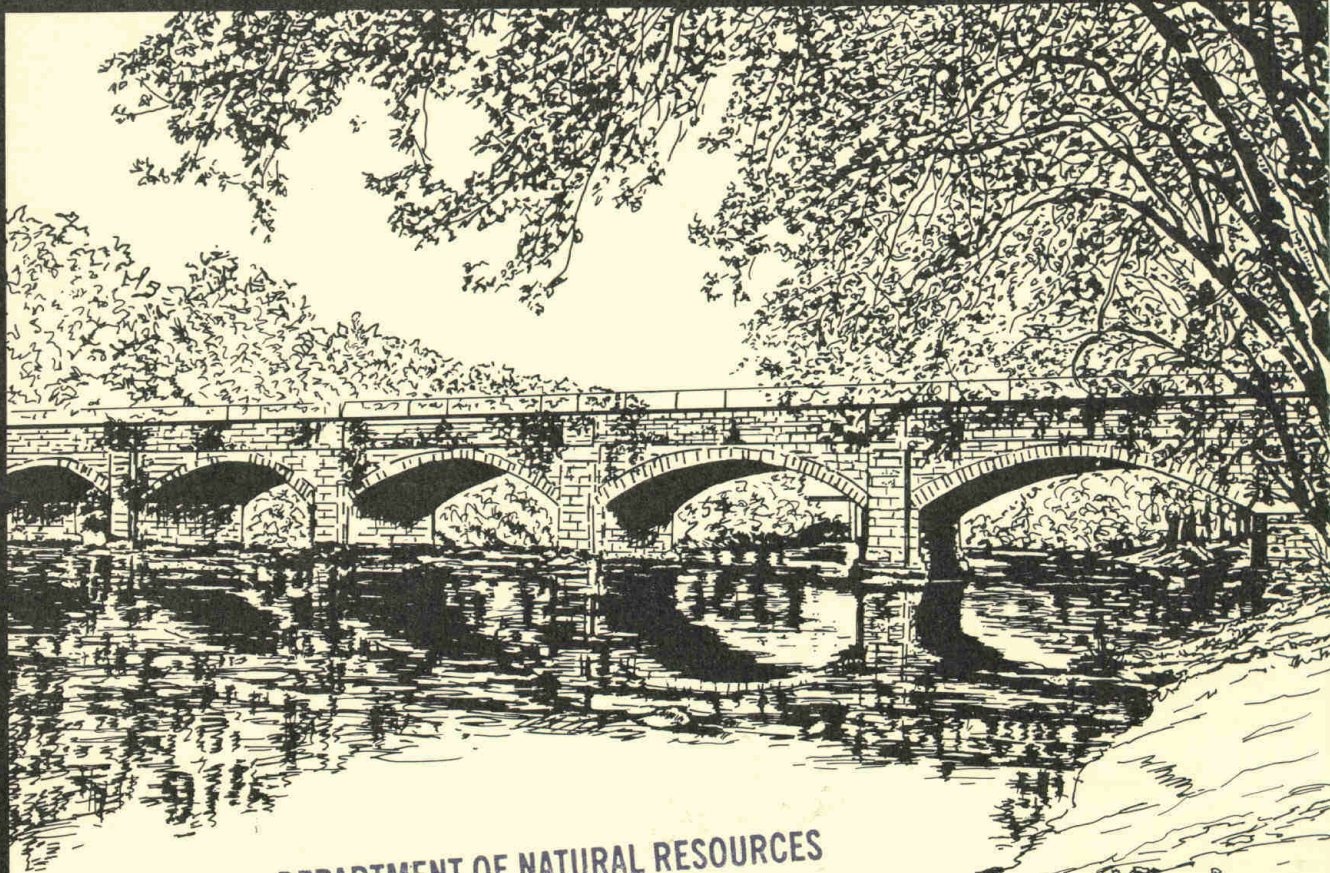


# Maryland Scenic Rivers: The Monocacy



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*It is the marriage of the soul with  
Nature that makes the intellect  
fruitful, and gives birth to  
imagination.*

*-Henry David Thoreau*

## ACKNOWLEDGEMENTS

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Dedication, experience, and a respect and concern for the environment describe the efforts of the Monocacy Scenic River Citizens Advisory Board. They spent many hours reviewing the study and plan draft, deliberating issues and making final recommendations. We also extend our gratitude and thanks to those people who previously served on the board.

In addition to the board members, there were many citizens and local government officials who have contributed directly or indirectly to this document. The collective efforts of these people will help to ensure that future generations may enjoy and benefit from the resources of the Monocacy River.

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# MONOCACY SCENIC RIVER

## STUDY AND MANAGEMENT PLAN

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*Sixes Bridge*



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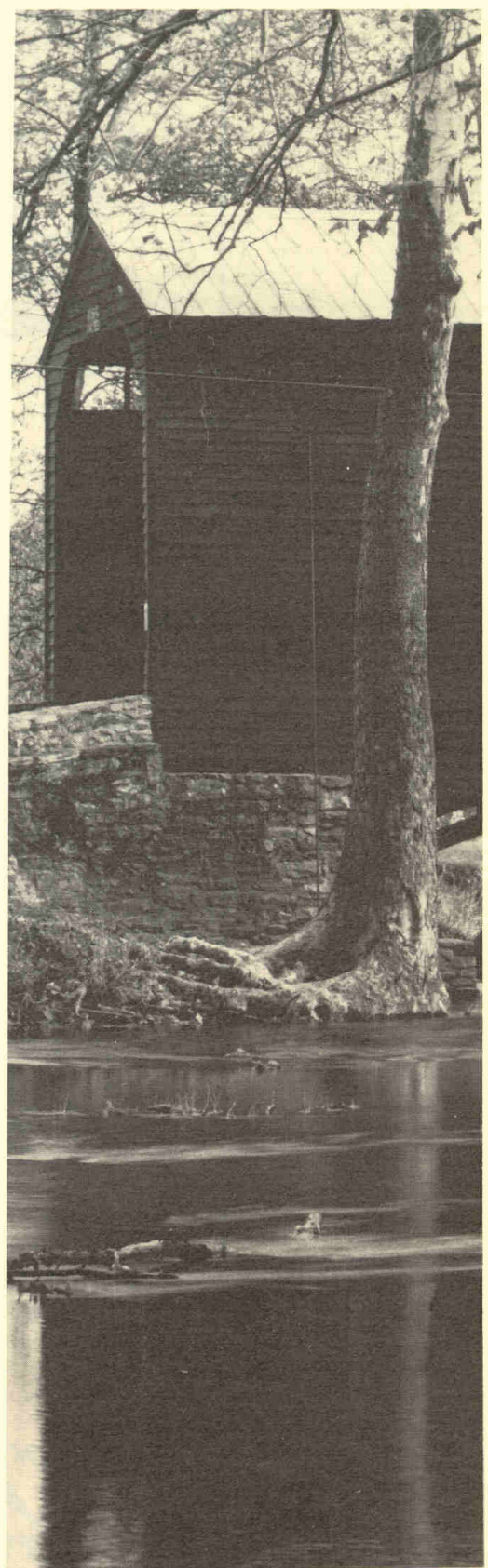
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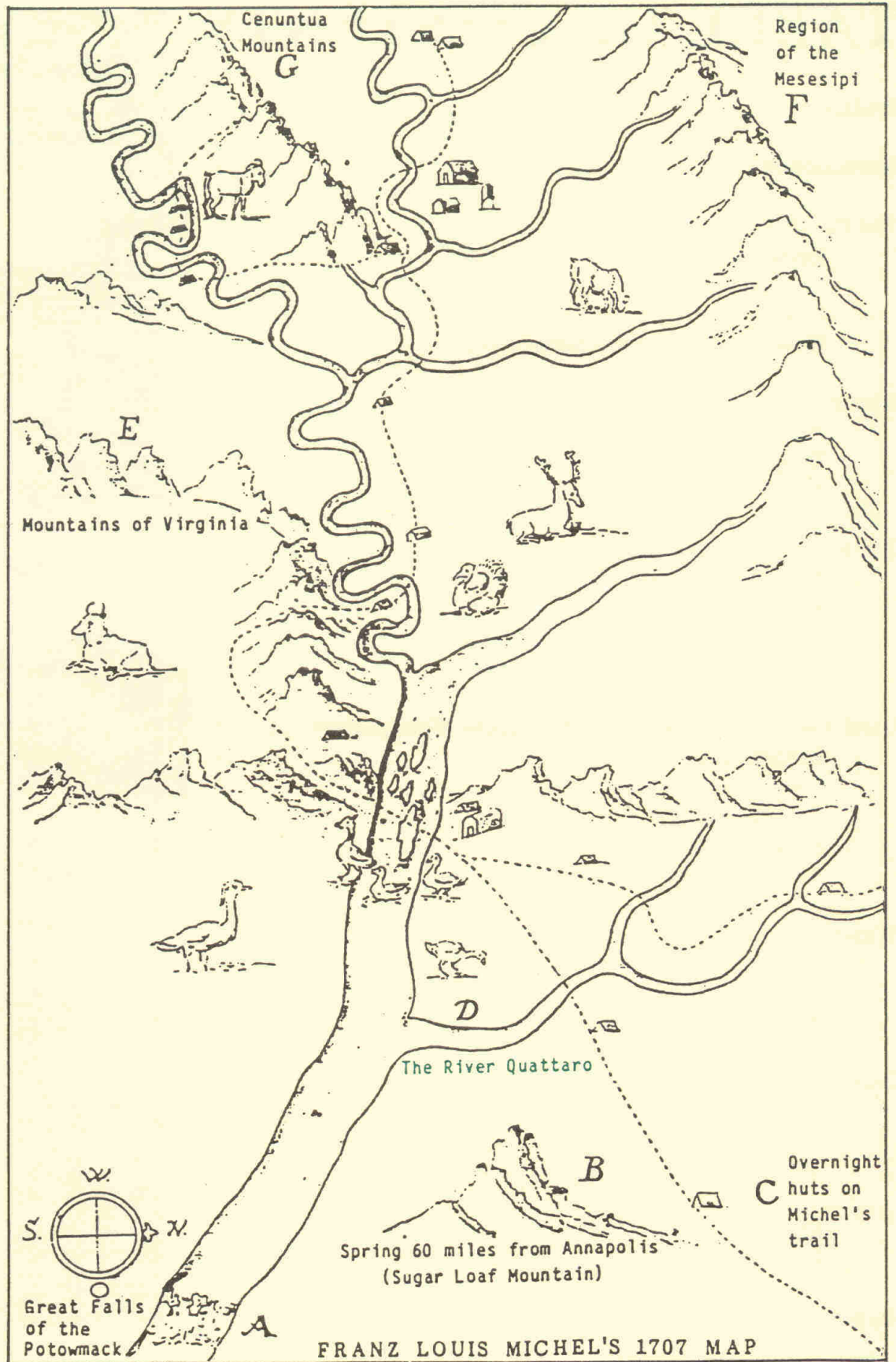
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*Thurmont - Covered Bridge*







# Preface

The Monocacy River and its tributaries are a valuable and rich resource that provide water for domestic consumption, fish and wildlife habitat, effluent disposal, recreation and many other uses. *The Monocacy River Study and Management Plan* is a coordinated effort that directly addresses riverine resources and related issues and makes recommendations for the protection and conservation of those resources.

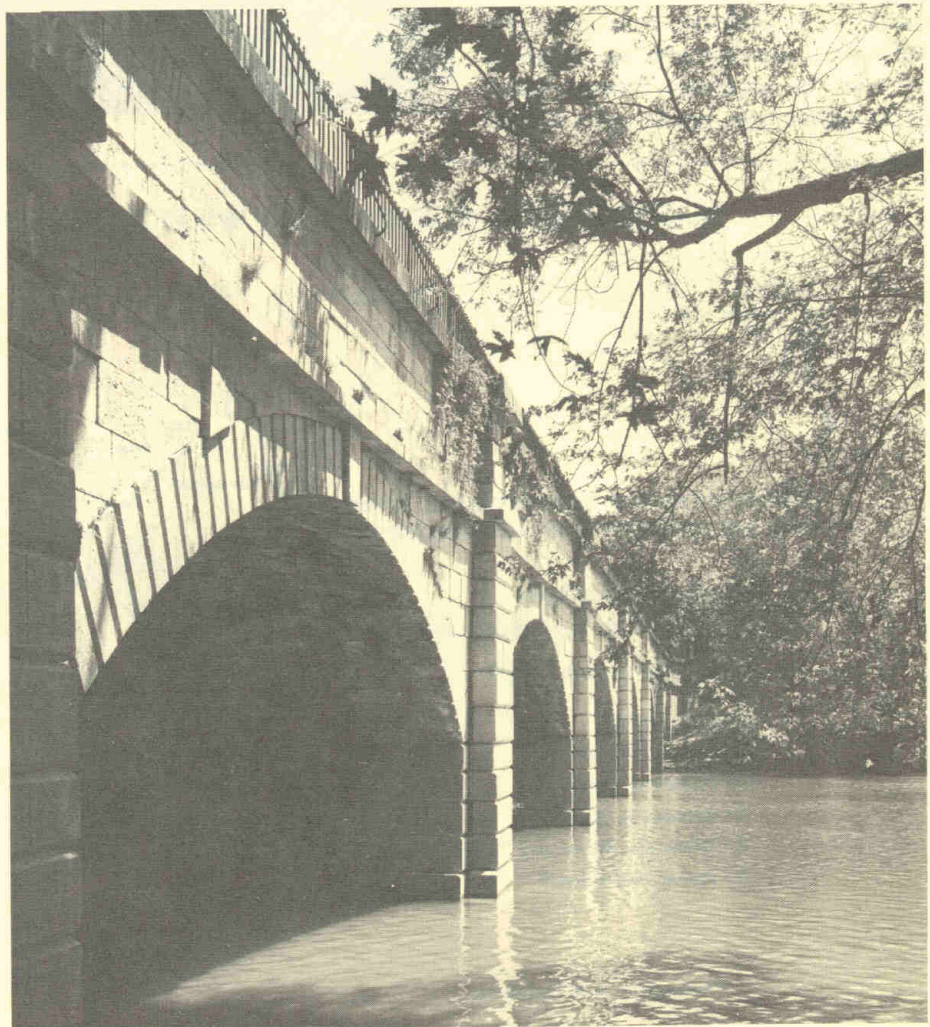
The purpose of this report is based on the Maryland Scenic and Wild Rivers Act of 1968 as amended, which called for the protection of Maryland's river resources through an organized program of inventories and land use planning.<sup>51</sup> *The Monocacy River Study and Management Plan* provides a river assessment and recommendations for conserving, preserving and managing the Monocacy River, its tributaries and related resources. The objectives of this plan are to:

Part I, chapters 1-5, is the river study. Numerous reports on subjects ranging from biological diversity to land use have been used as source material. The chapters include: **The Physical Environment, History and Cultural Resources, The Ecological Environment, Land Use and Water Resources Management and Water Quality.** Part II, chapter 6, discusses **Issues and Recommendations.**

The recommendations in the last chapter have been suggested by the Monocacy Scenic River Advisory Board and citizens who have attended the public board meetings. The study and plan is not intended as a conclusive solution to address all of the issues related to the Monocacy River, nor is it a regulatory document. Instead it serves as a guideline and reference for the local and state governments to use in order to conserve and protect the river. The study and plan will require future revisions to address newly evolving conservation issues.

## OBJECTIVES

- Improve water quality.
- Help maintain and restore the ecological health and productivity of the river.
- Encourage land use compatibility and attention to environmentally sensitive areas to maximize conservation and use of riparian resources.
- Identify and facilitate appropriate uses and alternative protective measures of significant scenic and ecological areas, historic and archeological sites, and other valued resources.
- Provide resource information about the Monocacy watershed for local, state and federal governments, elected officials and the citizens of Carroll and Frederick counties.
- Develop multi-jurisdictional cooperation and coordination for the management and protection of the river corridor.
- Increase public awareness about important river resource values through public relations and environmental education.



*Monocacy Aqueduct*



# Introduction

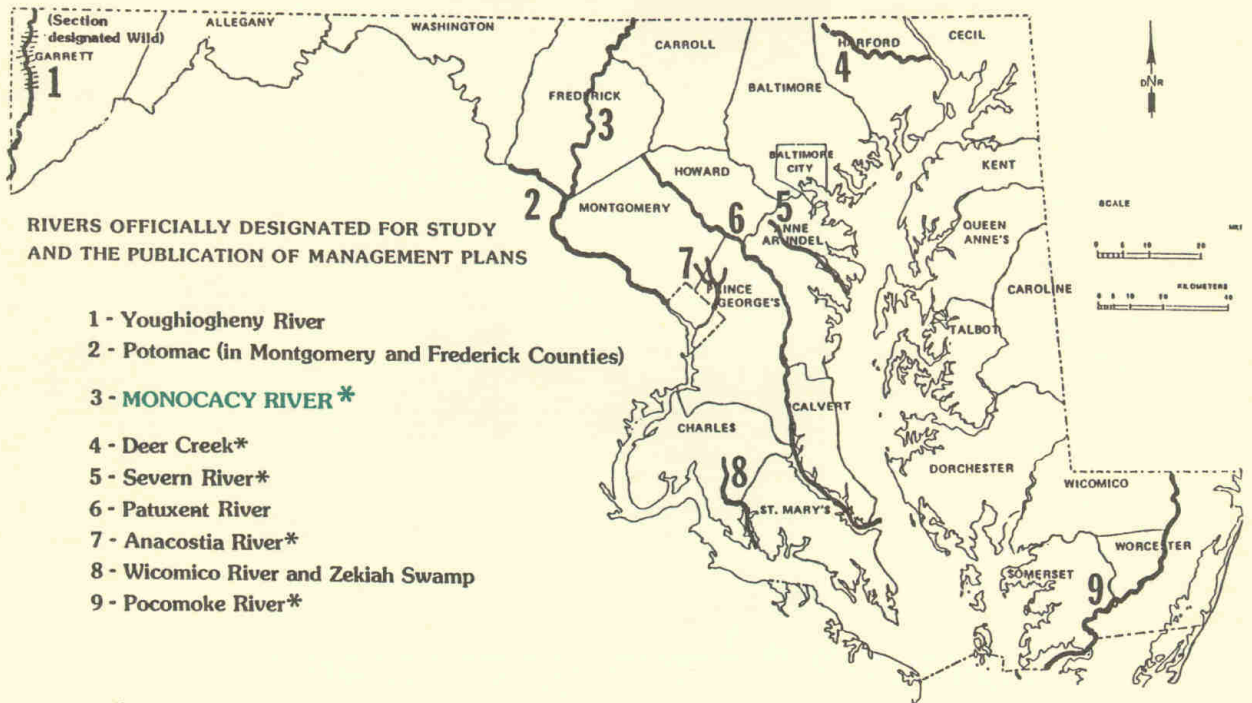
Located in central Maryland, the Monocacy River is the largest Maryland tributary of the Potomac River. Nature has provided the Monocacy watershed with ample rainfall, fertile soils and a temperate climate suitable for nurturing abundant natural resources. These natural resources are the foundation of a prosperous agricultural system and a rapidly growing urban population.

The problems of the watershed involve overuse of its limited resources. The cities of Frederick, Westminster and Gettysburg place a heavy water supply demand and sewage disposal burden on the river's resources. Agriculture has developed in some areas beyond the long term capabilities of the soil to sustain it. In addition, residential and commercial development has at times occurred in unsuitable areas. These issues are not new, but are unresolved.



*Upper Monocacy*

## MARYLAND'S SCENIC AND WILD RIVERS PROGRAM





## Scenic Rivers Planning History

The first organized attempt to restore the Monocacy resulted in the creation of the Interstate Monocacy Watershed Council in 1949. After studying the problems of the watershed, the Maryland State Planning Commission released Publication Number 70: *A Program for the Monocacy Watershed*, in 1951.<sup>46</sup> The report recognized that some federal and state conservation efforts were underway to restore the watershed's resources, but these efforts were not coordinated and were usually inadequately funded. The report's major recommendations were to dramatically increase soil and water conservation efforts and to reforest extensive areas of the watershed. Water quality needed to be improved, local wildlife habitat needed restoration and recreational resources required careful development. This simple message, although 40 years old, is as true today as it was then.

After the Maryland Scenic and Wild Rivers Act of 1968 was adopted, the first inventory, *Scenic Rivers in Maryland*, was released by the Maryland Department of State Planning in 1970.<sup>43</sup> The Monocacy River was identified as a significant state resource, worthy of immediate study, and as a prime candidate for State Scenic River designation. On April 30, 1974, the Monocacy River was added to the Maryland scenic river system.

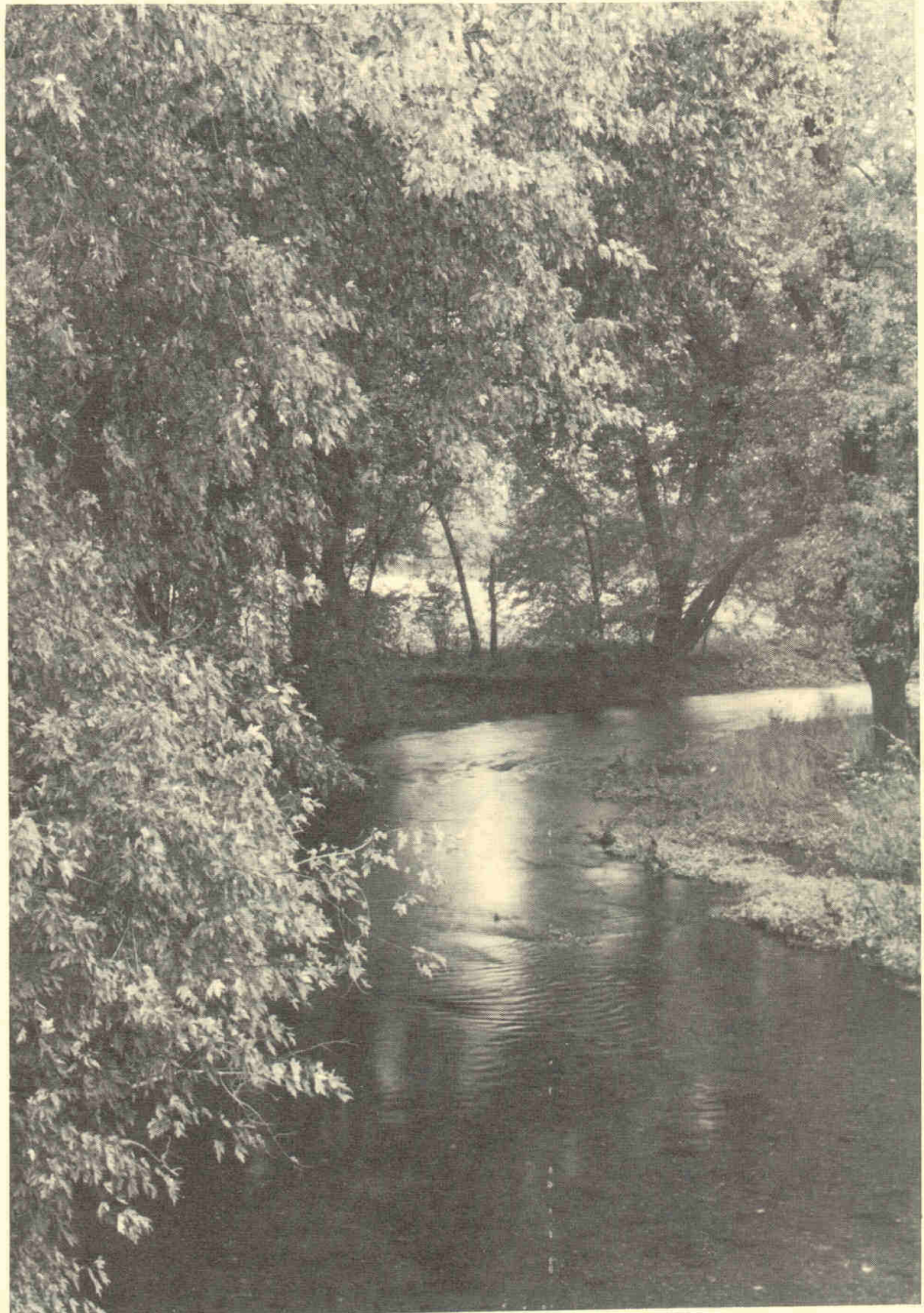
The scenic river planning process was initiated in 1976 when the Carroll and Frederick County Commissioners were contacted to assist with the organization of the Monocacy Scenic River Citizens Advisory Board. The advisory board met for the first time in 1978 and participated in a recreational use study conducted by the University of Maryland.

In 1982, the National Park Service published *The National Rivers Inventory* which identified American rivers that were eligible for National Scenic River

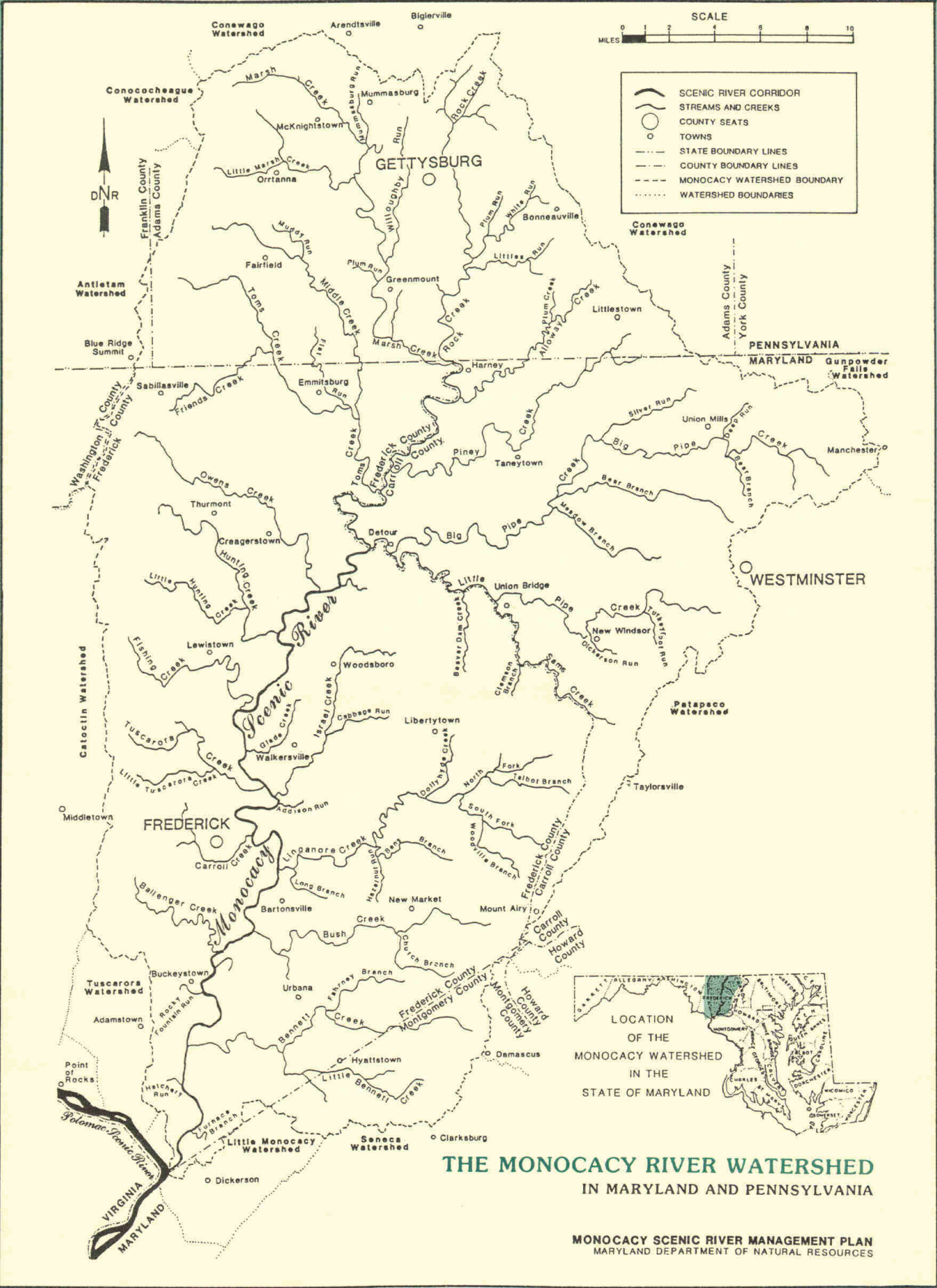
designation. Fifty-two miles of the Monocacy from Bridgeport to the Potomac, were identified as eligible for National Scenic River designation. The river was described as possessing significant natural and recreational resources as well as outstanding native American archeological resources.<sup>68</sup>

More recently, the Monocacy Scenic River Citizens Advisory Board was active in developing this study and plan in cooperation with the Carroll and Frederick County governments and other applicable jurisdictions and government agencies.

*View From Sixes Bridge*







**THE MONOCACY RIVER WATERSHED  
IN MARYLAND AND PENNSYLVANIA**

**MONOCACY SCENIC RIVER MANAGEMENT PLAN**  
MARYLAND DEPARTMENT OF NATURAL RESOURCES

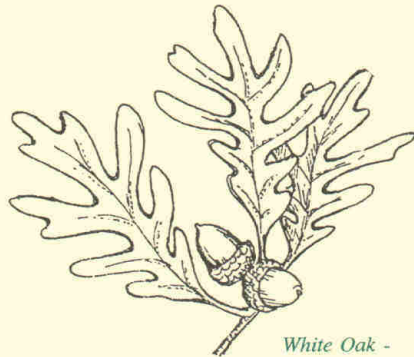


# The Physical Environment

## Geography, Topography and Climate

The Monocacy River, situated approximately midway in the State of Maryland, bisects the more mountainous counties to the west from the hills and broad valleys of the eastern Piedmont and Coastal Plain. Beginning at the confluence of Marsh and Rock Creeks near the Pennsylvania and Maryland border, the Monocacy slowly meanders 58.2 miles in a southerly direction to the Potomac River. The watershed is approximately 973.6 square miles within the 14,640 square mile Potomac River basin. Fifteen percent of the Monocacy River basin lies in the Blue Ridge Mountains; the remainder is in the Piedmont Province. Over 75% of the surrounding region is used either for agriculture, commercial or residential development.<sup>20</sup>

Topography is an expression of the relative positions and elevations of land regions. The Frederick Valley is nestled between the Catoctin Mountains to the west, and the lower Parris Ridge to the east. A relatively flat plain extends west from the river to the Catoctin Mountains, where the basin reaches a height of up to 1,600 feet.<sup>20</sup> The river valley's topography indicates little steep terrain near the Monocacy and its tributaries. Exceptions occur on the western mountains and on certain ridges and bluffs adjacent to the river. These land elevations and the degree of slope have influenced land use in the watershed. The region's relatively flat topography has made it easily accessible for development and agriculture in some areas next to the river and tributaries, further contributing to the river's water quality problems.



White Oak -  
*Quercus alba*

The humid, temperate, continental climate of the watershed is also partially influenced by its topography. Annual precipitation is just over 40 inches, while the average annual temperature is 54 degrees Fahrenheit. Winters can be more severe at higher elevations in the northwestern part of the river basin. In the Frederick Valley, a milder average temperature and adequate average rainfall is highly conducive for agriculture.<sup>24</sup>

## Geological History

Topography and other physical characteristics of the Monocacy River basin were created by the actions of geological upheavals, wind, water, temperature fluctuations and gravity. The Monocacy River watershed is located in the Piedmont and Blue Ridge Provinces. The rock formation that influences the river basin's geological history is intensely metamorphosed, or highly compact and crystalline, and is largely due to high temperature and pressure conditions that occurred over geological time.

Three rock types are found in the western division: the Frederick Valley Region, the Triassic Upland Region and the Piedmont Upland Region. The lower part of the basin, the Frederick Valley Region, is characterized by easily erodible sedimentary rocks that have deep soils, shallow banked streams and gently rolling topography. As a result of volcanic activity during many past millennia, the more heavily rolling Piedmont Upland Region contains more metamorphic material. In the river's upper watershed, the Triassic Upland Region has harder rock materials overlaying the softer limestones. This latter geological phenomenon has created some shallow, highly erodible soils.<sup>24</sup>



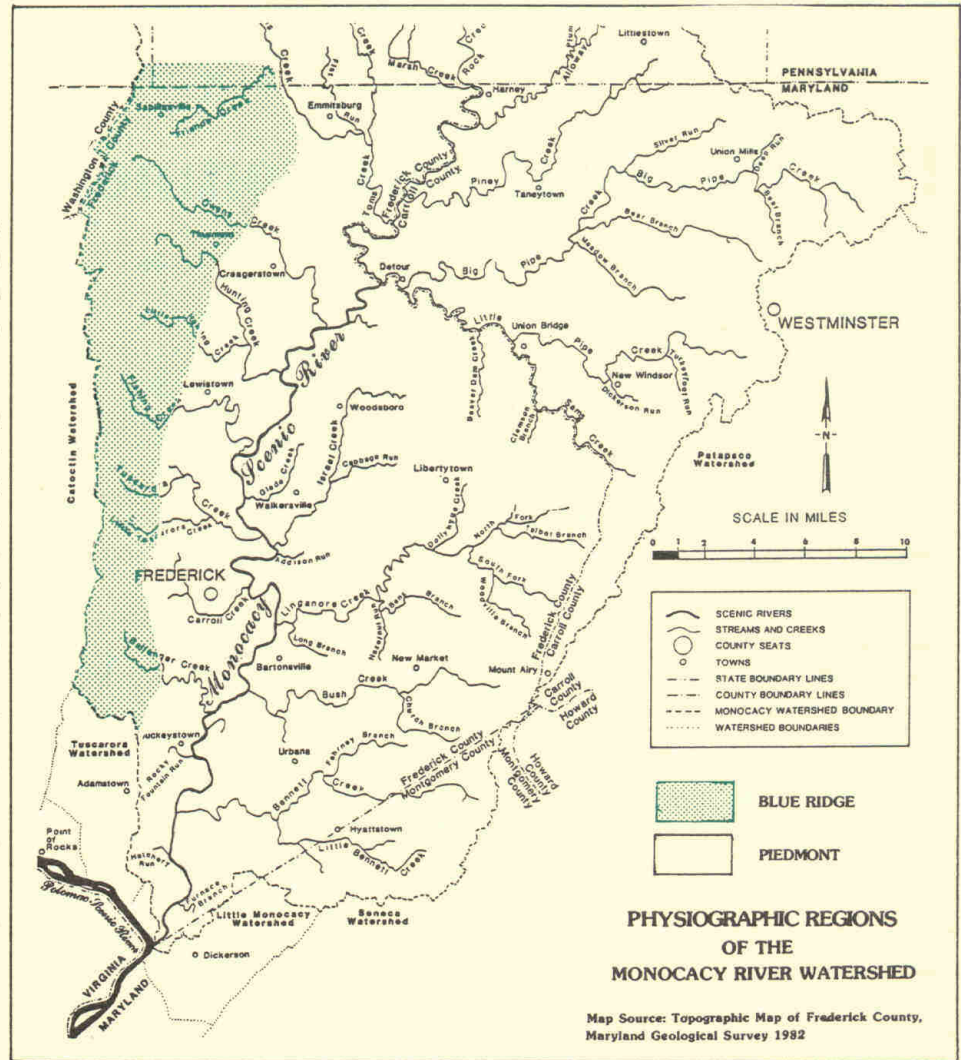
Springdale Farm, once part of Carroll estate, Carrollton Manor. Purchased by Charles Simmons, owner of Michael's Mill.



## Soils

The soils found within the Monocacy watershed are derived from different rock formations. Soil formation is the result of parent material, climate, plant and animal life, topography and interactions over time. The parent material is still the most important factor in soil classification; consequently soils are subdivided by geological parent material. During periods of rainfall, some shallow, erodible soils are washed into the Monocacy River and its tributaries. One end result is sedimentation and nutrient loading into the surface water. When erodible soils on slopes are disturbed for urban development or agriculture, the potential for erosion substantially increases.

The major soil groups common in the watershed include: Mountain Soils, Colluvial Soils, Limestone Valley Soils, Piedmont Plateau Soils and Soils of River Terraces and Flood Plains.<sup>60, 61</sup> (See Appendix, Soils in the Monocacy Watershed.)



## Hydrology - Ground and Surface

Hydrology deals with the properties, circulation and distribution of water. The environmental impacts on ground and surface water are closely interdependent. Over long periods of time, rainwater is partially absorbed by soil and porous rocks and slowly released from the ground water table. Aquifers in the watershed partially contribute to the discharge (flow) capacity and water quality of the Monocacy River. If a source of groundwater is contaminated by pollution, there is a possibility that the contaminants will eventually reach a stream.<sup>42</sup>

The surface water system of the Monocacy River basin is extensive. Over 75% of the watershed is in Maryland, while the remainder is in Pennsylvania. Approximately 1,700

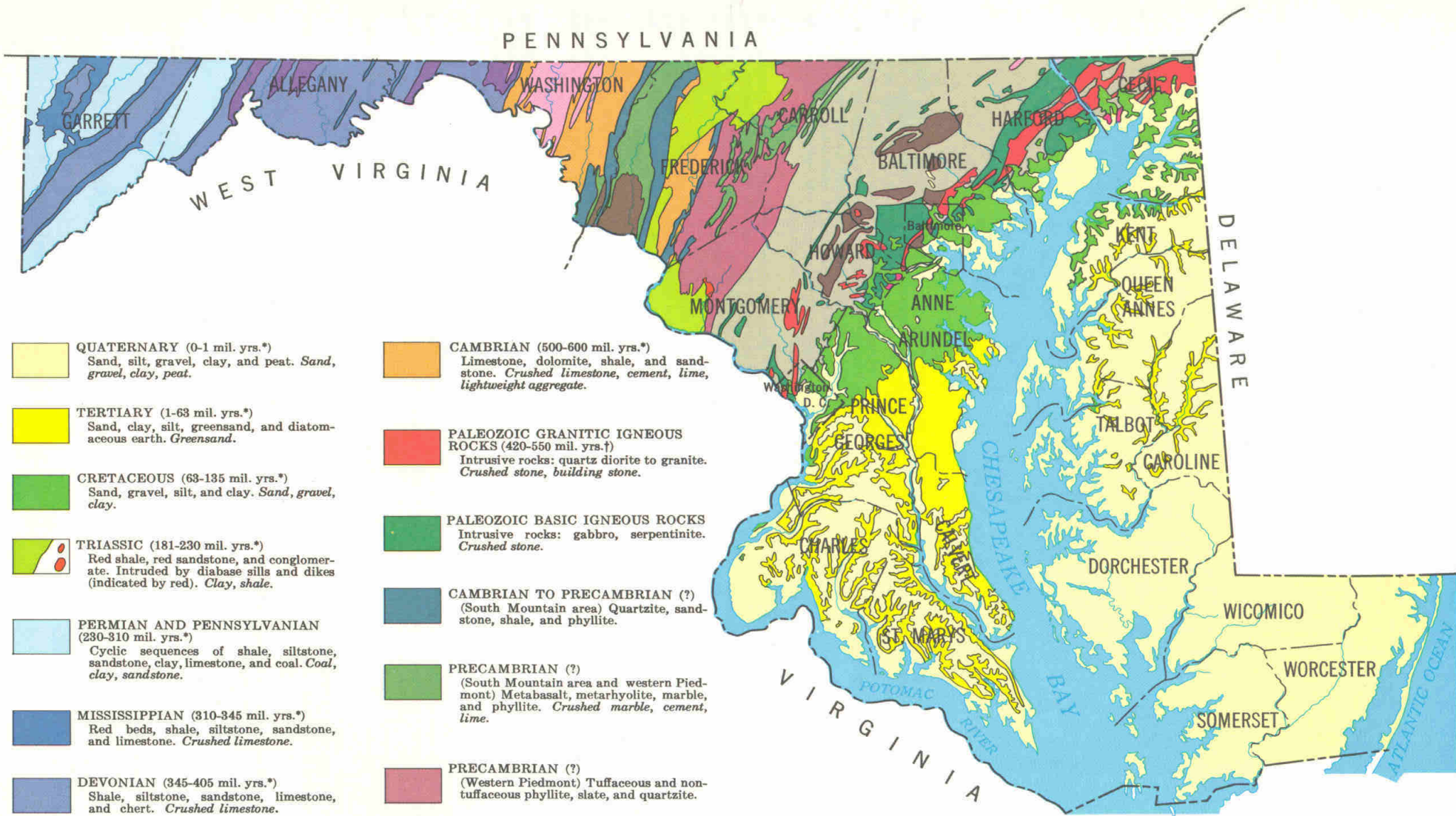
minor streams feed into the larger 23 tributaries of the Monocacy River.<sup>54</sup> Tributaries that discharge significant amounts of water include: Rock; Marsh; Middle; Tom's; Double Pipe; Linganore; Bennett; Alloway; Piney; Hunting; Tuscarora; Israel; Carroll; Bush; Owens; Fishing; Glade; Addison and Ballenger Creeks; Rocky Fountain and Hatchery Runs; and Furnace Branch.<sup>29</sup>

The Monocacy is well known as a flat, slow moving river, subject to periods of high turbidity and rapidly changing water levels during heavy rainfall. Analyzing the surface water flow can reveal some useful conclusions regarding the hydrology of the Monocacy and its tributaries. For example, low flow conditions are mild on Fishing Creek even though it is a

high gradient mountain stream which could be subject to rapid runoff and extreme low flows. The City of Frederick has helped to maximize the utility of the stream by managing the Fishing Creek watershed as a model forested watershed. On the other hand, low flow conditions in the upper Monocacy drainage above the Bridgeport gage and on Owens Creek are extremely severe. Owens Creek is similar to Fishing Creek in terrain, but receives far less protection and management.<sup>42</sup>

There is also a relationship between land use, surface water flow and water quality. The magnitude and cost of development is often based on the low flow characteristics of the available water source. They determine the availability of water for





- QUATERNARY (0-1 mil. yrs.\*)**  
Sand, silt, gravel, clay, and peat. *Sand, gravel, clay, peat.*
- TERTIARY (1-63 mil. yrs.\*)**  
Sand, clay, silt, greensand, and diatomaceous earth. *Greensand.*
- CRETACEOUS (63-135 mil. yrs.\*)**  
Sand, gravel, silt, and clay. *Sand, gravel, clay.*
- TRIASSIC (181-230 mil. yrs.\*)**  
Red shale, red sandstone, and conglomerate. Intruded by diabase sills and dikes (indicated by red). *Clay, shale.*
- PERMIAN AND PENNSYLVANIAN (230-310 mil. yrs.\*)**  
Cyclic sequences of shale, siltstone, sandstone, clay, limestone, and coal. *Coal, clay, sandstone.*
- MISSISSIPPIAN (310-345 mil. yrs.\*)**  
Red beds, shale, siltstone, sandstone, and limestone. *Crushed limestone.*
- DEVONIAN (345-405 mil. yrs.\*)**  
Shale, siltstone, sandstone, limestone, and chert. *Crushed limestone.*
- SILURIAN (405-425 mil. yrs.\*)**  
Shale, mudstone, sandstone, and limestone. *Glass sand, crushed limestone.*
- ORDOVICIAN (425-500 mil. yrs.\*)**  
Limestone, dolomite, shale, siltstone, and red beds. Slate and conglomerate in northern Harford County. *Crushed limestone, cement, clay, lime.*

- CAMBRIAN (500-600 mil. yrs.\*)**  
Limestone, dolomite, shale, and sandstone. *Crushed limestone, cement, lime, lightweight aggregate.*
- PALEOZOIC GRANITIC IGNEOUS ROCKS (420-550 mil. yrs.†)**  
Intrusive rocks: quartz diorite to granite. *Crushed stone, building stone.*
- PALEOZOIC BASIC IGNEOUS ROCKS**  
Intrusive rocks: gabbro, serpentinite. *Crushed stone.*
- CAMBRIAN TO PRECAMBRIAN (?)**  
(South Mountain area) Quartzite, sandstone, shale, and phyllite.
- PRECAMBRIAN (?)**  
(South Mountain area and western Piedmont) Metabasalt, metarhyolite, marble, and phyllite. *Crushed marble, cement, lime.*
- PRECAMBRIAN (?)**  
(Western Piedmont) Tuffaceous and non-tuffaceous phyllite, slate, and quartzite.
- PRECAMBRIAN (?)**  
(Eastern Piedmont) Schist, metagraywacke, quartzite, marble, and metavolcanic rocks. *Crushed stone, crushed marble, building stone.*
- PRECAMBRIAN BASEMENT COMPLEX (1100 mil yrs.†)**  
Gneiss, migmatite, and augen gneiss.

MARYLAND GEOLOGICAL SURVEY  
Kenneth N. Weaver, Director

## GENERALIZED GEOLOGIC MAP OF MARYLAND†

1967



1 inch equals 25 miles

Most important mineral products in italics.

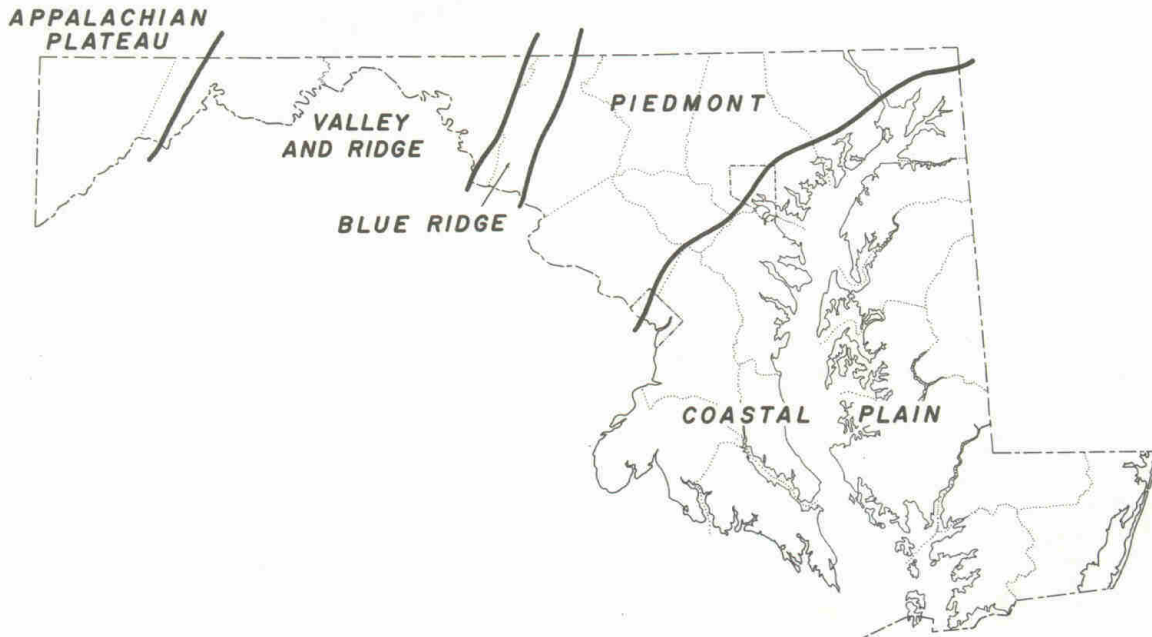
\* Age ranges from Kulp, J. L., 1961, Geologic time scale: Science, v. 133, no. 3459, p. 1105-1114.

† Radiometric dates made on Maryland rocks.

† A detailed Geologic Map of Maryland, 1968 at a scale of 1 inch equals 4 miles, is also available.



# A BRIEF DESCRIPTION OF THE GEOLOGY OF MARYLAND



Maryland is part of three distinct physiographic regions: (1) the Coastal Plain Province, (2) the Piedmont Province, and (3) the Blue Ridge, Valley and Ridge, and Appalachian Plateau Provinces. These extend in belts of varying width along the eastern edge of the North American continent from Newfoundland to the Gulf of Mexico.

The Coastal Plain Province is underlain by a wedge of unconsolidated sediments including gravel, sand, silt, and clay, which overlaps the rocks of the eastern Piedmont along an irregular line of contact known as the Fall Zone. Eastward, this wedge of sediments thickens to more than 8,000 feet at the Atlantic coast line. Beyond this line is the Continental Shelf, the submerged continuation of the Coastal Plain, which extends eastward for at least another 75 miles where the sediments attain a maximum thickness of about 40,000 feet.

The sediments of the Coastal Plain dip eastward at a low angle, generally less than one degree, and range in age from Triassic to Quaternary. The younger formations crop out successively to the southeast across Southern Maryland and the Eastern Shore. A thin layer of Quaternary gravel and sand covers the older formations throughout much of the area.

Mineral resources of the Coastal Plain are chiefly sand and gravel, and are used as aggregate materials by the construction industry. Clay for brick and other ceramic uses is also important. Small deposits of iron ore are of historical interest. Plentiful supplies of ground water are available from a number of aquifers throughout much of the region.

The Piedmont Province is composed of hard, crystalline igneous and metamorphic rocks and extends from the inner edge of the Coastal Plain westward to Catoctin Mountain, the eastern boundary of the Blue Ridge Province. Bedrock in the eastern part of the Piedmont consists of schist, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks of probable volcanic origin. In several places these rocks have been intruded by granitic plutons and pegmatites. Deep drilling has revealed that similar metamorphic and igneous rocks underlie the sedimentary rocks of the Coastal Plain. Several domal uplifts of Precambrian gneiss mantled with quartzite, marble, and schist are present in Baltimore County and in parts of adjacent counties. Differential erosion of these contrasting rock types has produced a distinctive topography in this part of the Piedmont.

The rocks of the western part of the Piedmont are diverse and include phyllite, slate, marble, and moderately to slightly metamorphosed volcanic rocks. In central Frederick County the relatively flat Frederick Valley is developed on Cambrian and Ordovician limestone and dolomite. Gently undulating plains underlain by unmetamorphosed bedrock of Triassic red shale, siltstone, and sandstone occur in three areas in the western Piedmont.

The Piedmont Province contains a variety of mineral resources. Formerly, building stone, slate, and small deposits of non-metallic minerals, base-metal sulfides, gold, chromite, and iron ore were mined. Currently, crushed stone is important for aggregate, cement, and lime. Small to moderate supplies of ground water are available throughout the region, but favorable geological conditions locally may provide larger amounts.

Unlike the Coastal Plain and Piedmont Provinces, the Blue Ridge, Valley and Ridge, and Appalachian Plateau Provinces are underlain mainly by folded and faulted sedimentary rocks. The rocks of the Blue Ridge Province in western Frederick County are exposed in a large anticlinal fold whose limbs are represented by Catoctin Mountain and South Mountain. These two ridges are formed by Lower Cambrian quartzite, a rock which is very resistant to the attack of weathering and erosion. A broad valley floored by Precambrian gneiss and volcanic rock lies in the core of the anticline between the two ridges.

The Valley and Ridge Province between South Mountain in Washington County and Dans Mountain in western Allegany County contains strongly folded and faulted sedimentary rocks. In the eastern part of the region, a wide, open valley called the Great Valley, or in Maryland, the Hagerstown Valley, is formed on Cambrian and Ordovician limestone and dolomite. West of Powell Mountain, a more rugged terrain has developed upon shale and sandstone bedrock which ranges in age from Silurian to Mississippian. Some of the valleys in this region are underlain by Silurian and Devonian limestones.

For many years the limestone formations have been used as local sources of agricultural lime and building stone. Modern uses include crushed stone for aggregate and cement. A pure, white sandstone in the western region of the province is suitable for glass manufacturing.

The Appalachian Plateau Province includes that part of Allegany County west of Dans Mountain and all of Garrett County, the westernmost county in Maryland. The bedrock of this region consists principally of gently folded shale, siltstone, and sandstone. Folding has produced elongated arches across the region which expose Devonian rocks at the surface. Most of the natural gas fields in Maryland are associated with these anticlinal folds in the Appalachian Plateau. In the intervening synclinal basins, coal-bearing strata of Pennsylvanian and Permian ages are preserved.

The sedimentary rocks of the Blue Ridge, Valley and Ridge, and Appalachian Plateau Provinces yield small to moderate supplies of ground water. Under favorable conditions large amounts may occur.

Jonathan Edwards, Jr.  
*Geologist*

1981

STATE OF MARYLAND  
DEPARTMENT OF NATURAL RESOURCES

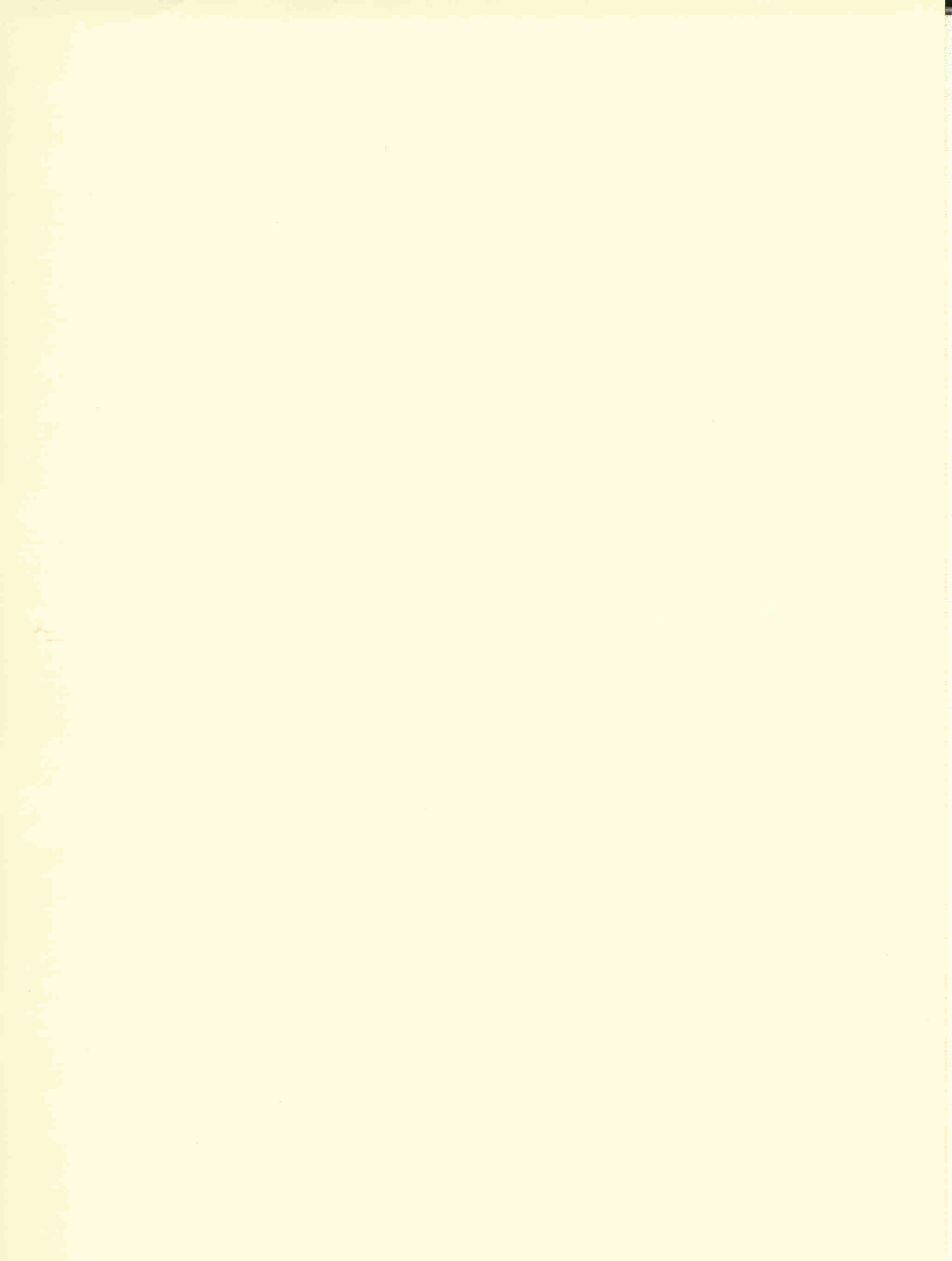
*Prepared by the*  
MARYLAND GEOLOGICAL SURVEY

Baltimore, Maryland 21218













*Contour stripcropping, Carroll county farm.*

consumption and effluent disposal, plans for development and other issues.<sup>29</sup> Non-permeable surfaces like roads and parking lots that are associated with development shed water more quickly than natural ground surfaces. This creates the potential to significantly change surface water levels. Pollutants which were once partially absorbed by vegetation and soils are also often washed directly into the surface water during periods of rainfall.

Encroachment on flood plain has also affected hydrology. Structures that were previously built near the river and tributary corridors have increased the problem of flood control and nonpoint sources of pollution.<sup>29</sup> Farming in flood plains, erodible soils and a rapidly growing suburban population have also contributed to numerous flash floods in the Monocacy watershed, and have been identified as a significant problem by the USDA's Soil Conservation Service.<sup>57</sup>

## Summary

- The Monocacy River is the largest Maryland tributary of the Potomac.
- The environmental impacts on ground and surface water are interdependent. Groundwater partially contributes to the discharge (flow) capacity and water quality of the Monocacy River.
- The frequency and kinds of nonpoint pollution entering the Monocacy River and its tributaries are partially determined by the extent of erodible soils, degree and location of slope (topography) and types of land use.
- The river basin's relatively flat topography has made it easily accessible for development and agriculture, especially in or near some stream corridors and flood plain. Alteration of these sensitive physiographic features through flood plain development has had a substantial, adverse environmental impact on the Monocacy's water quality and has also contributed to flash floods.
- Some of the soil erosion problems in the watershed are caused by overuse of certain soil types and their susceptibility to erosion.



# History and Cultural Resources

## Introduction

Archeological and historic resources are irreplaceable components of local heritage, and once destroyed, can not be replaced. In 1981, a nationwide river study conducted by the National Park Service identified the Monocacy River as an outstanding archeological resource of national significance. The Maryland Scenic and Wild Rivers Act's "Declaration of Policy" makes specific reference to the importance of recognizing the outstanding "historic values" of a designated scenic river and its adjacent lands.<sup>51</sup>

The preservation of historic and archeological resources contributes to the quality of people's lives in many ways. It increases a community's knowledge about its heritage, provides people with a sense of place and conserves natural and cultural resources. It also promotes community pride and improves and maintains the visual quality of the landscape. Preservation also provides an attraction for tourism and local commercial activities.

The Monocacy River Valley is an area rich in cultural history. Early Indians caught fish in the Potomac and Monocacy Rivers and hunted for an abundance of wild game. Early European settlers were also attracted to the Monocacy region for the same reasons. By the time Frederick and Carroll Counties were chartered, farming had become the local economic mainstay.



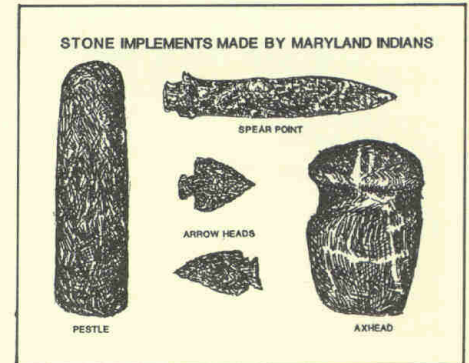
Early historical uses of land and water resources have shaped land use and development patterns that are still prevalent today. Farming still plays an important role in both counties, but there is now growth in the commercial, industrial and residential sectors. Frederick County especially has evolved into a bedroom community tied to Washington, D.C., and Baltimore. Towns such as Westminster in Carroll County are also experiencing rapid residential development.

## Archeological Summary

The Monocacy River Valley's outstanding archeological treasures are primarily attributed to the numerous early Indian tribes who inhabited the area. Below is a brief chronology of the archeological and historic periods of the region:

### *Paleo-Indian Period (10,000 - 7,500 B.C.)*

Almost 10,000-12,000 years ago, the Monocacy River Valley most likely had a deciduous forest along the river. The uplands were probably boreal forest and open areas, which were indicative of a colder climate. Though limited Paleo archeological evidence has been located in the watershed, several points or implements from the period have been discovered. During the early Paleo Indian Period, the Indians were most likely nomadic. As this period drew to a close, the Indians seemed to have stayed closer to the river to camp, hunt and fish.



### *Archaic Period (7,500 - 2,000 B.C.)*

There are numerous Archaic sites in the Monocacy area. As this period experienced a climatic warming trend, vegetation may have changed to pine and hemlock in mountainous regions, and a mix of conifer and deciduous forests in the river valley. The warming trend continued, creating changes in the vegetative cover. The Late Archaic Period showed a possible pattern of early tribal migration moving away from the river to the lower foothills and tributaries.

### *Woodland Period (2,000 B.C. - A.D.1650)*

The early Indians' use of resources did not significantly change during the Early Woodland Period. The Late Woodland Period (1000-1650 A.D.), is perhaps the best documented of the American Indian periods. It was during this time that many of the tribes had names that are still recognized today.<sup>16</sup> The major change during the Late Woodland Period was the presence of permanent or semi-permanent villages or settlements in the valley. Although wild game was plentiful, there was an increasing reliance on the use of domesticated plants such as maize or corn.



### Colonial Settlement (A.D. 1650 - A.D.1750)

The remains of houses, a glassworks, lime kilns, grain mills and an ore pit are small indicators of many more sites from the period of colonial settlement that remain undiscovered. Documented sites that range from the 18th to the 20th centuries are somewhat representative of farming and the early industries that thrived in the area.

(Excerpt from Maryland Geological Survey, Maureen Kavanagh, 1982)

### Early European Exploration and Settlement

Henry Fleet's 17th century description of the upper waters of the Potomac River testified to a rich landscape, teeming with native species of animals and plant life: "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..."<sup>16</sup> The first recorded attempt to penetrate the Monocacy watershed was by several missionaries, who established an outpost on the Monocacy River.<sup>16</sup>

During the 17th and 18th centuries, several Indian tribes periodically inhabited the region. The Seneca Indians called the Monocacy River Valley Cheneowquoque". The Shawnees called the river and adjacent land "Monnockesey," while early European explorers called it "Quattaro;" the derivation of the last name is unknown. Eventually the name evolved to Monocacy. During the early 18th century and for some time after, "Monocacy" not only referred to the river but to the surrounding valley and a local village.<sup>59</sup>

In 1702, a Swiss explorer, Franz Louis Michel, visited the Monocacy River Valley while searching for silver. Five years later, Michel drew a map that clearly depicted the Potomac River, the River Quattaro (Monocacy) and Sugarloaf Mountain. During his 1707 exploration, Michel travelled through



*Amelung's Glass Works, Base of Sugarloaf Mt.*

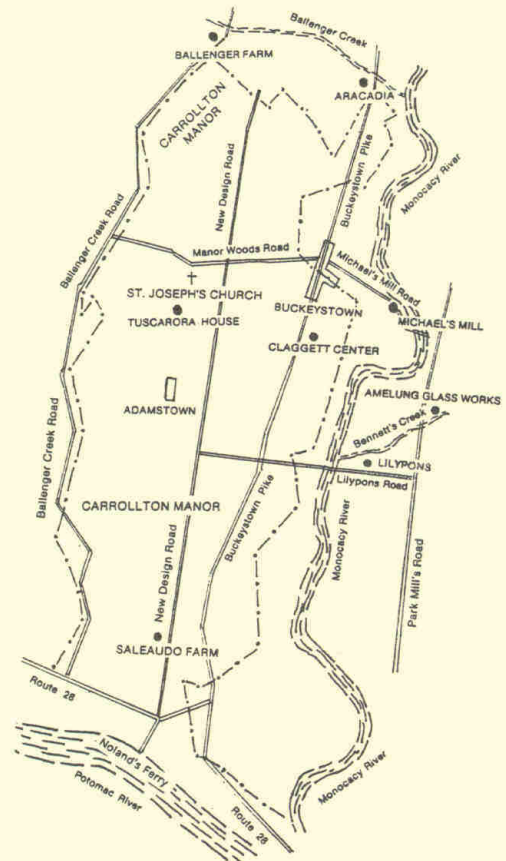
the southeastern part of the Monocacy watershed, and then may have travelled up the western side of the Monocacy to Hunting Creek.<sup>59</sup>

Michel's interest in further exploration of the region was financed by Baron Christoph von Graffenried, who, after unsuccessfully settling in North Carolina, moved north to resettle in what is now southern Frederick County. After climbing Sugarloaf Mountain, Graffenried recorded, "I believe there is hardly any place in the world more beautiful and better situated than this of the Potomac and Canavest."<sup>59</sup>

Traders typically followed explorers, and Chartier, a French trader, established himself near the mouth of the Monocacy. The natural environment, as seen by the Indians, quickly changed as the pace of colonial settlement escalated. Distinct settlement patterns developed in the northern and southern parts of the Monocacy River basin. Early English land patents consisted of large holdings in the south. As Germans migrated from Pennsylvania down through what is now Carroll and Frederick Counties, smaller farms became the more predominant rural feature in the north.<sup>59</sup>

More settlers continued to arrive in this region, and by 1748, Frederick County was formed from Prince George's County, and Fredericktown was designated as the county seat. Present day Carroll County continued to be part of Frederick County during this period.

\* "Canavest" was an area west of the Monocacy River.



*Illustration and map - courtesy of Nancy W. Bodmer, Buckeystown and other Historical Sites.*

Originally, the Carroll County land area was located in what was then Baltimore and Prince George's Counties. The northern part of Carroll County was rapidly settled. In-migration around the upper reaches of the Monocacy watershed included the Germans and Scottish-Irish from the north and the English, who came from other parts of Maryland and Frederick. James Carroll received a sizable land patent in the New Windsor area in 1727. Other notable land patents included Taneytown, the first town, and the town of Westminster, formerly known as Winchester. Quakers settled in the Union Bridge area in what was once known as Pipe Creek Settlement. The Union Bridge Quakers were active in the movement to abolish slavery, and in 1826, an anti-slavery society was formed at the Pipe Creek Meeting House.<sup>71</sup>



By the early 19th century, growth in the area that was to become Carroll County justified its separation from Baltimore and Frederick Counties. Numerous petitions were made to create a new county seat, but they were unsuccessful. An increase in population, long trips to other government seats, and under-representation in the General Assembly finally provided the political momentum for Carroll County to be established in 1837. The bill stated that the boundaries for the new county "...are contained within the bounds and limits following...beginning at the Pennsylvania line, where Rock Creek crosses said line, thence with the course of said creek until it merges in the Monocacy River...to the point where Double Pipe Creek empties into the Monocacy..."<sup>71</sup>

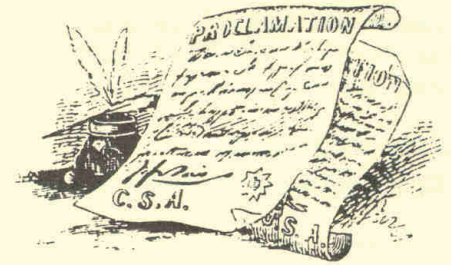
### *The Civil War*

The start of the Civil War saw the citizens of Frederick and Carroll Counties divided on the issue of secession from the Union and the question of slavery and the rights of free blacks. Despite the local formation of Union companies, the federal government exerted pressure to ensure that Maryland did not secede from the Union.<sup>59</sup>

During the war, both counties experienced numerous confrontations between Union and Confederate troops. In 1864, The Battle of the Monocacy occurred. Opposing troops were led by Confederate General Jubal Early, and Union General Lew Wallace. General Early was heading to an undefended Washington, D.C. Wallace, who learned

of Early's movements, marched to the Monocacy and fought the battle to delay Early's planned invasion of the capital.

The one day delay Wallace managed to secure gave Grant enough time to return forces from Petersburg and defend the nation's capital. After the Battle of Monocacy, the Union made a concerted effort to control southern sympathizers in the area.<sup>65</sup>



AQUEDUCT OF THE CHESAPEAKE AND OHIO CANAL, AT THE MOUTH OF THE MONOCACY—PRESENT POSITION OF GENERAL EARLY'S ARMY.



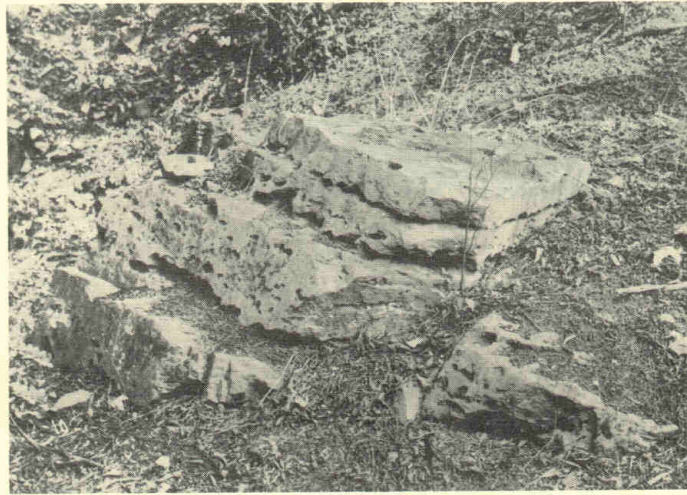
*Location of covered bridge burned by Federal Troops.*



*Bank of River where hand-to-hand battle was fought.*



*FIRST MARYLAND REGIMENT*

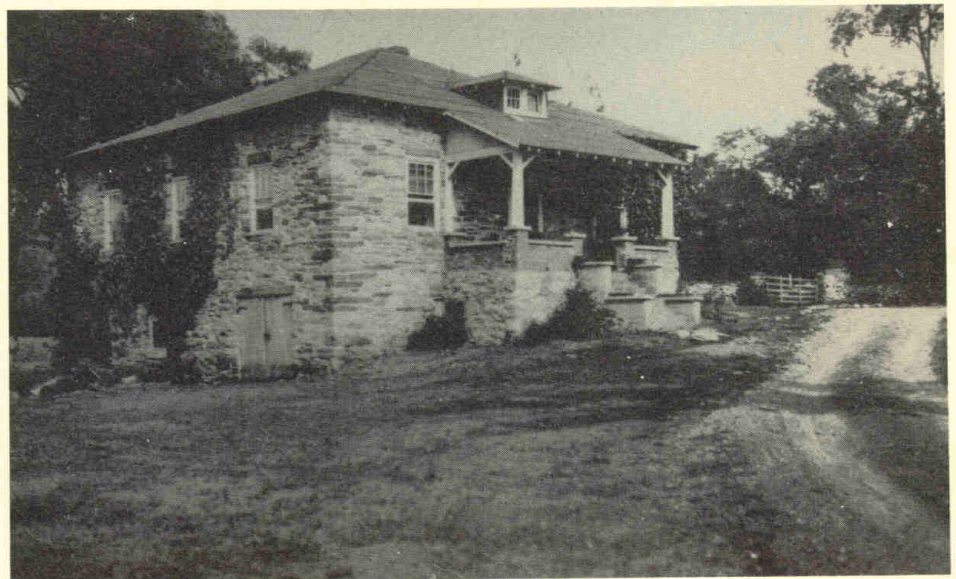


*Stones on river bank, showing effect of rifle bullets.*

### *Entering the 20th Century*

After the Civil War, both Frederick and Carroll Counties recovered fairly quickly. This was partially because Maryland did not experience the more severe reconstruction efforts that were enacted elsewhere in the south.<sup>16</sup>

Commerce and industry continued to grow during the late 19th and 20th centuries, but both were primarily dependent on the farming community. World War II helped to spur continued industrial development, and by the 1950's, both counties were experiencing rapid growth and economic diversification. Growth has continued at even a faster rate during the past two decades.



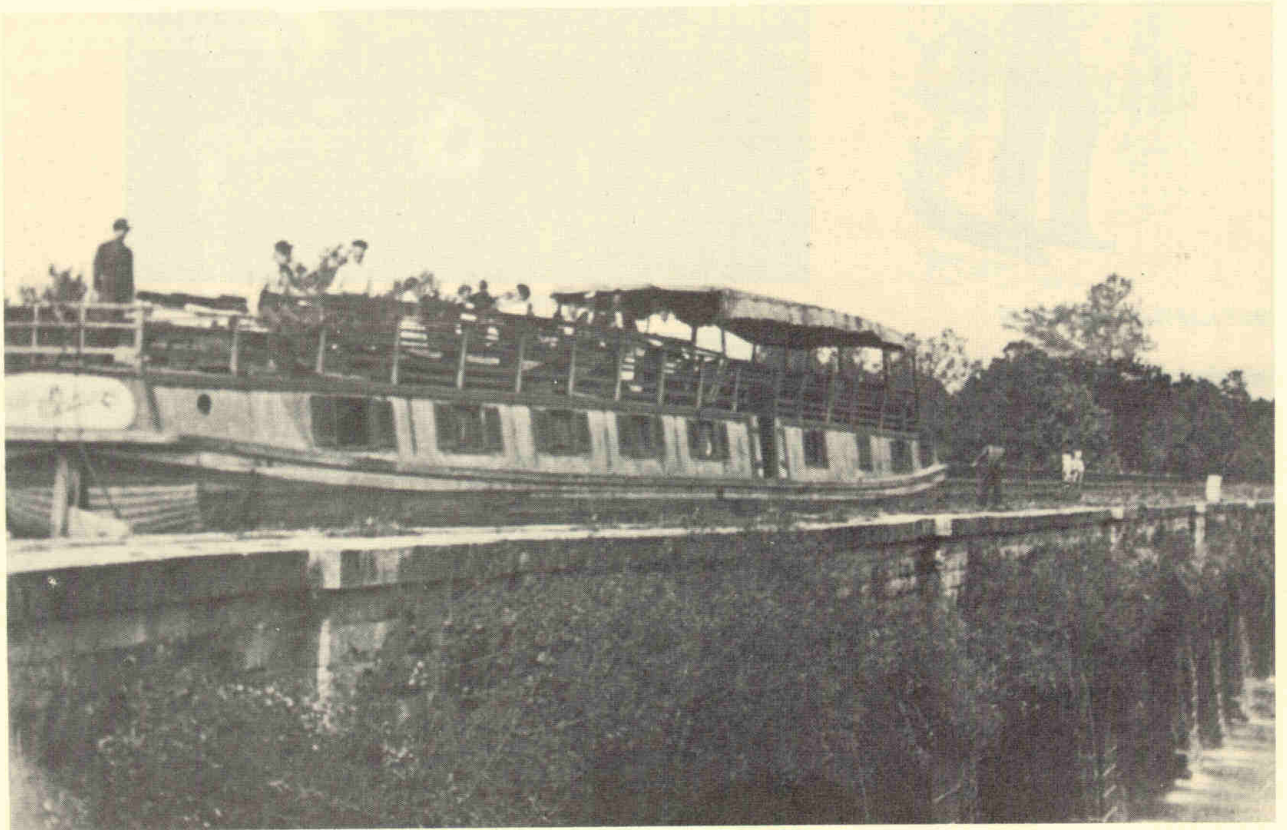
*Stone bungalow - Used as Field Hospital by Federals.*



*Confederate soldiers on Patrick St., Frederick City, Sept. 12, 1862*



*Crossing the Monocacy - 1864  
Courtesy of Indiana State University Library*



*"Queen City", a passenger excursion boat, C & O Canal Aqueduct over Monocacy - Sept. 25, 1904*



## Significant Historic and Archeological Sites

Increasing growth is threatening historical and archeological resources in Carroll and Frederick Counties. Beginning in the 1960's, Frederick County surveyed over 3,300 historic sites. The inventory was updated in the early 1970's, and future ones are planned. In Carroll County, historic sites were surveyed during 1970 and 1971. Below are highlights of some archeological and historic sites located in the Monocacy's stream corridors (See maps, Archeological and Historic Sites.)

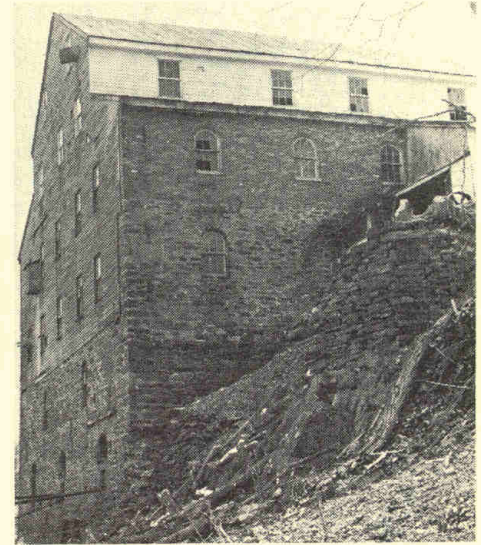
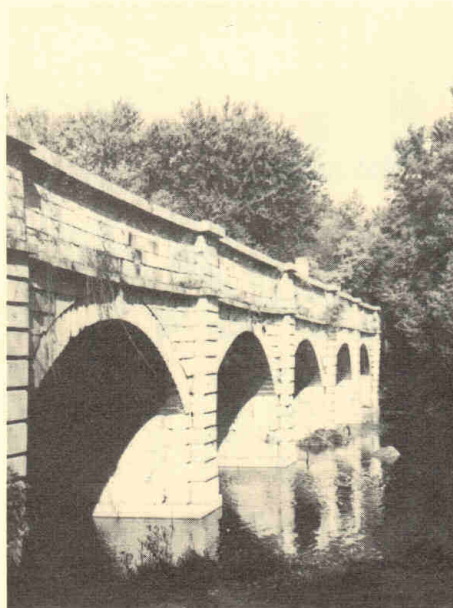
- *Archeological Sites:* Based on an archeological survey of the Monocacy River, any area within 200 yards on either side of the river has a high potential for archeological sites. Furnace Branch has six prehistoric sites. For purposes of protection, specific locations of the archeological sites are not indicated on the map.
- *The Monocacy National Battlefield* is protected and managed by the National Park Service. It is a significant historic, scenic and cultural resource adjacent to the Monocacy River.
- The 5,000-acre *Sugarloaf Mountain* Historic District has numerous significant historic and archeological sites. (See map, Public Lands) Early industrial activities included glass making and lime and iron production. The mountain was designated a Natural Landmark by the United States Department of the Interior in 1969.
- *The Monocacy Aqueduct*, constructed from 1829-1863, is on the National Register. It crosses the Monocacy River and is considered to be one of the best examples of aqueduct engineering along the entire length of the C&O Canal.



*Miller's house, Michael's Mill Road*

- *The Baltimore and Ohio Railroad Viaduct* (1870) was rebuilt in 1900; the viaduct is located about one half mile upriver from the Monocacy Aqueduct.
- By the late 18th century, there were over 870 grist mills in the Monocacy Valley. *Michael's Mill* was built in 1739 and operated until the 1950's. The mill is still standing. Another significant mill site on the river corridor is *Greenfield Mills* which operated from the 1830's to the turn of the century.<sup>20</sup>

*Monocacy Aqueduct  
Courtesy of C&O Canal National Historical Park*



*North and West Sides of Michael's Mill*

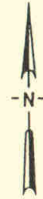
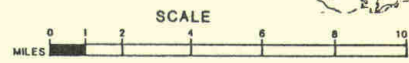
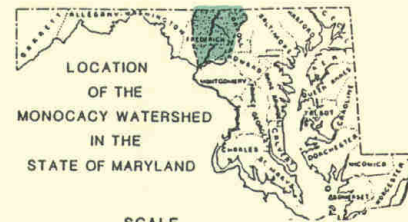
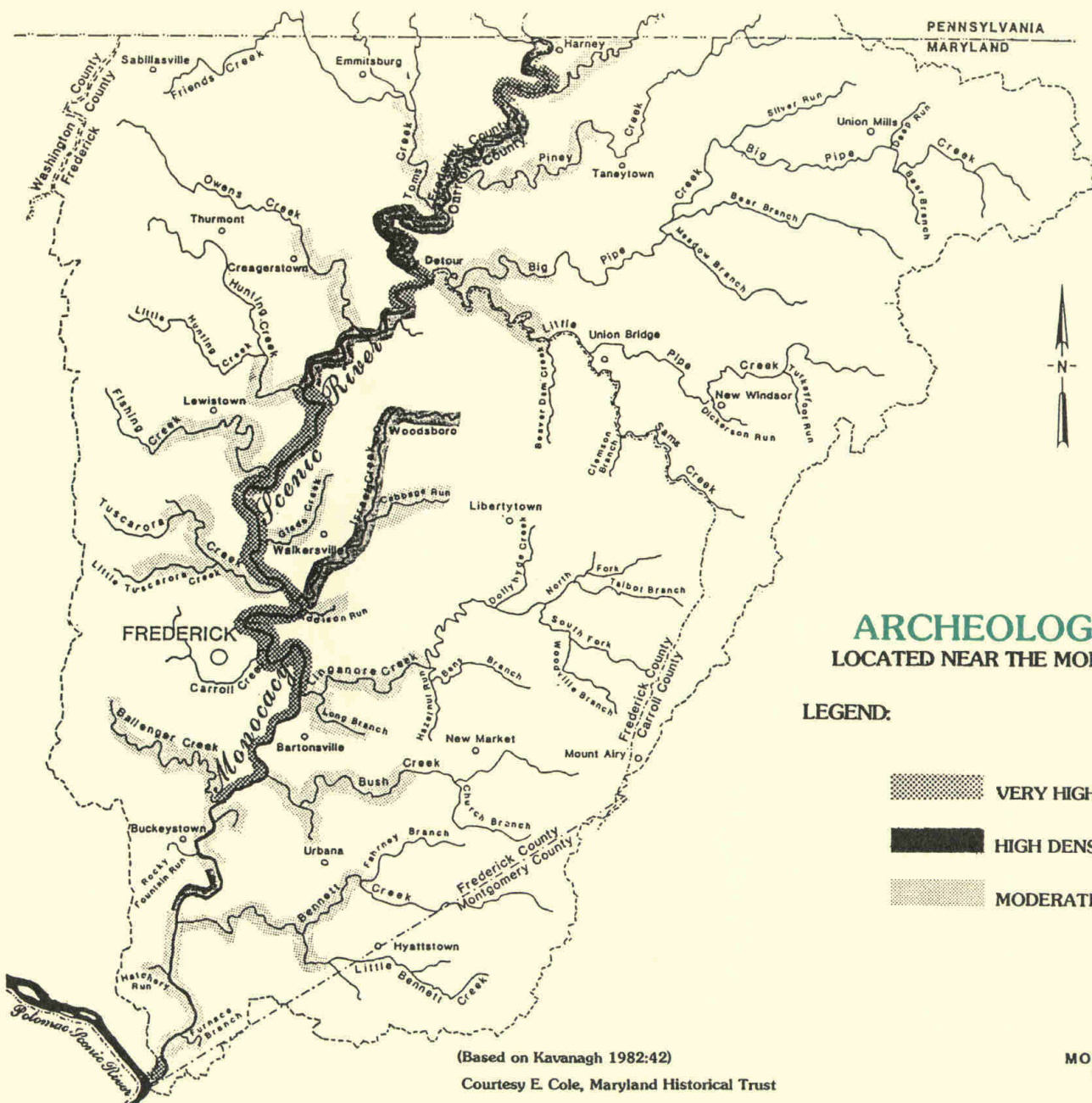


*Sugarloaf Mountain*

### SUMMARY

- The National Park Service has identified the Monocacy River as an outstanding archeological resource of national significance. Based on an archeological survey of the Monocacy River Valley, any area within 200 yards of the river has a high potential for archeological sites.
- There are eight bridges and twenty seven structures and buildings on the Maryland and National Historic Register that are located in the proximity of the Monocacy River and its tributaries.
- The resources in the Monocacy River basin have influenced the historical settlement of the region.





- SCENIC RIVER CORRIDOR
- STREAMS AND CREEKS
- COUNTY SEATS
- TOWNS
- STATE BOUNDARY LINES
- COUNTY BOUNDARY LINES
- MONOCACY WATERSHED BOUNDARY

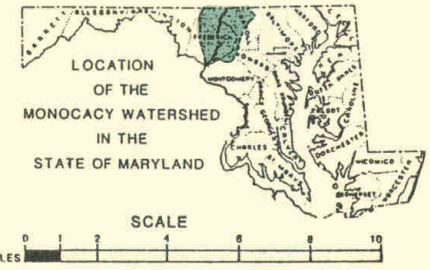
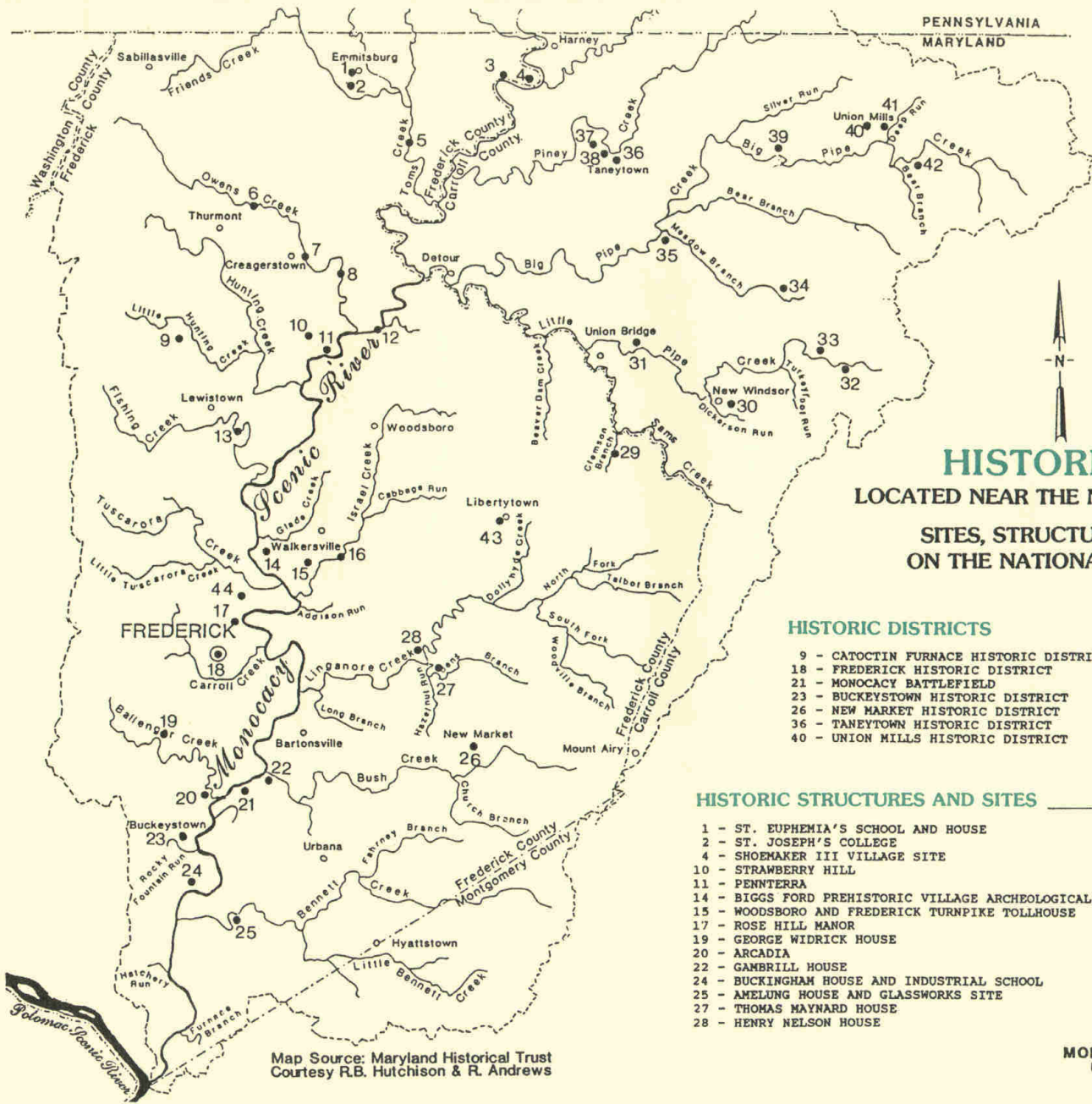
## ARCHEOLOGICAL RESOURCES LOCATED NEAR THE MONOCACY RIVER AND BRANCHES

**LEGEND:**

- VERY HIGH DENSITY of Archeological Sites
- HIGH DENSITY of Archeological Sites
- MODERATE DENSITY of Archeological Sites

(Based on Kavanagh 1982:42)  
Courtesy E. Cole, Maryland Historical Trust

**MONOCACY SCENIC RIVER MANAGEMENT PLAN**  
MARYLAND DEPARTMENT OF NATURAL RESOURCES  
SCENIC AND WILD RIVERS PROGRAM



## HISTORIC RESOURCES

### LOCATED NEAR THE MONOCACY RIVER & BRANCHES

#### SITES, STRUCTURES, AND DISTRICTS LISTED ON THE NATIONAL AND MARYLAND REGISTER

#### HISTORIC DISTRICTS

- 9 - CATOCTIN FURNACE HISTORIC DISTRICT
- 18 - FREDERICK HISTORIC DISTRICT
- 21 - MONOCACY BATTLEFIELD
- 23 - BUCKEYSTOWN HISTORIC DISTRICT
- 26 - NEW MARKET HISTORIC DISTRICT
- 36 - TANEYTOWN HISTORIC DISTRICT
- 40 - UNION MILLS HISTORIC DISTRICT

#### BRIDGES

- 3 - BULLFROG ROAD BRIDGE
- 5 - FOUR POINTS BRIDGE
- 6 - RODDY ROAD BRIDGE
- 7 - LOYS STATION COVERED BRIDGE
- 8 - OLD HILL ROAD BRIDGE
- 12 - LE GORE BRIDGE
- 13 - UTICA COVERED BRIDGE
- 16 - CRUM ROAD BRIDGE

#### HISTORIC STRUCTURES AND SITES

- 1 - ST. EUPHEMIA'S SCHOOL AND HOUSE
- 2 - ST. JOSEPH'S COLLEGE
- 4 - SHOEMAKER III VILLAGE SITE
- 10 - STRAWBERRY HILL
- 11 - PENNTERRA
- 14 - BIGGS FORD PREHISTORIC VILLAGE ARCHEOLOGICAL SITE
- 15 - WOODSBORO AND FREDERICK TURNPIKE TOLLHOUSE
- 17 - ROSE HILL MANOR
- 19 - GEORGE WIDRICK HOUSE
- 20 - ARCADIA
- 22 - GAMBRILL HOUSE
- 24 - BUCKINGHAM HOUSE AND INDUSTRIAL SCHOOL
- 25 - AMELUNG HOUSE AND GLASSWORKS SITE
- 27 - THOMAS MAYNARD HOUSE
- 28 - HENRY NELSON HOUSE
- 29 - HOPEWELL
- 30 - AVALON
- 31 - WILSON'S INHERITANCE
- 32 - FRIENDSHIP VALLEY FARM
- 33 - AVONDALE
- 34 - MEADOWBROOK FARM
- 35 - TREVANION
- 37 - LUDWICK RUDISEL TANNERY HOUSE
- 38 - ANTRIM
- 39 - CHRISTOPHER ERB HOUSE
- 41 - SOLOMON ARTER HOUSE
- 42 - WHITTAKER CHAMBERS FARM
- 43 - ABRAHAM JONES HOUSE
- 44 - SPRING BANK FARM

Map Source: Maryland Historical Trust  
 Courtesy R.B. Hutchison & R. Andrews

MONOCACY SCENIC RIVER MANAGEMENT PLAN  
 MARYLAND DEPARTMENT OF NATURAL RESOURCES  
 SCENIC AND WILD RIVERS PROGRAM



# The Ecological Environment



## Introduction

During the first one hundred years of settlement, intensive land development and the consumption of other natural resources in the Monocacy watershed had altered the region's ecological character. Prior to European arrival, the Monocacy River Valley supported a rich and diverse variety of forest vegetation, wetlands and wildlife.

The limestone regions had substantial forests that included yellow poplar, beech, ash, red oak and basswood. Silver maple, cottonwood, sycamore, ash, elm and box elder were abundant in flood plain forests. In the mountainous, western region of the river basin, pine-oak-hickory forests were common, while the mountain hollows supported hemlock and mixed hardwoods.<sup>20</sup> The American chestnut, once common in the Monocacy River Valley, was later eliminated by blight, which further contributed to change in forest cover. These woodlands, open grasslands, and wetlands supported a diversity of wildlife, including large herbivores such as elk and bison.<sup>1</sup>

By the late 18th century, the Monocacy watershed's natural environment was indelibly altered. Thousands of acres of forests had been cleared for agriculture and prime hardwoods were harvested and processed into charcoal. These centuries of human-caused impact on forest, wetland and other types of habitat have forced the decline or disappearance of many plant and animal species in the Monocacy Valley as well as the rest of the state. For example during the first half of the 20th century, Peregrine falcons nested in Frederick County. They are now on the federal endangered species list. The disappearance of Peregrine falcons from Maryland was a result of the early use of persistent pesticides such as DDT.

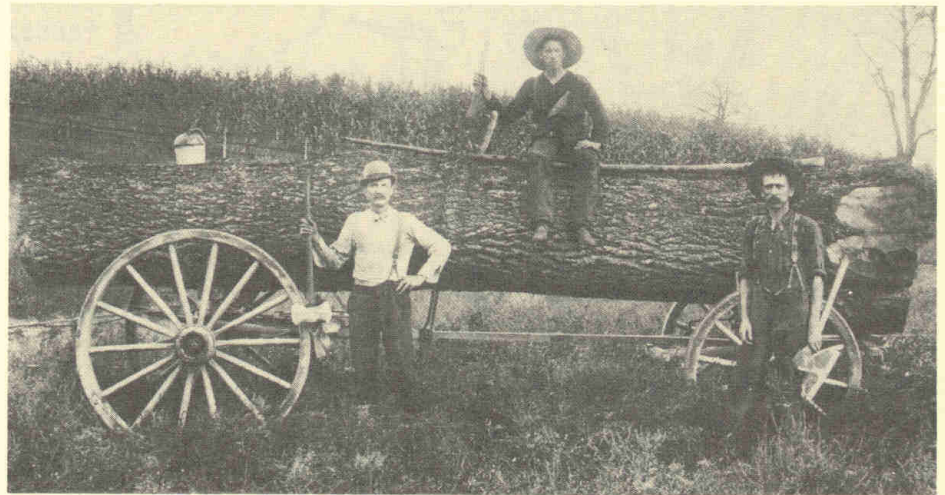
Although efforts to return the falcon to Maryland have been some-



*Least bittern at nest in cattails*



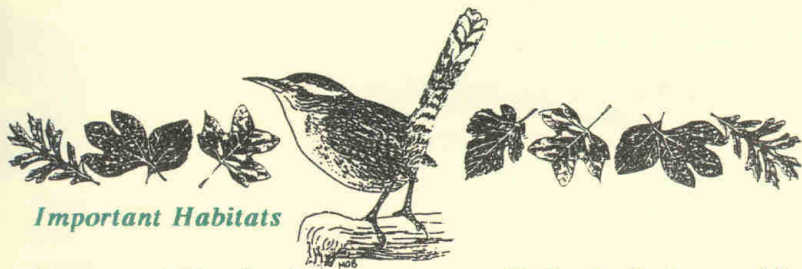
what successful, the Peregrine still has not returned to nest in Frederick County. Bewick's wren, which also formerly bred in the county, has declined dramatically in the eastern states. The last known Maryland pair was reported in 1983. The Loggerhead shrike, a predatory bird about the size of a robin, formerly bred in Maryland from the mountains to the Eastern Shore. Today, only a few pairs remain in Frederick County and the state.<sup>1</sup>



*Frederick County, Maryland, Courtesy of Maryland State Archives*







### Important Habitats

#### Forests and Woodlands

Forests and woodland areas serve several important functions in the riparian environment. Forested areas have extensive root systems and canopies that help to reduce the amount of nonpoint pollution entering the Monocacy River. In addition, forests serve as noise and visual barriers, reduce water temperature by providing shade for the aquatic environment and provide wildlife habitat.

The Monocacy watershed has one of the lowest rates of forest cover in Maryland. Fortunately, there has been a limited net loss of forest during the last fifteen years because most of the remaining forested lands are limited to mountainous areas (steep slopes), limestone ridges and stream valley corridors. Approximately 85% of existing forests are privately owned, while the remainder are managed by the local, state and federal governments. Significant forested tracts are located in the Monocacy Natural Resources Management Area, Sugarloaf Mountain, and public and private lands associated with the Catoctin Mountains.<sup>50</sup>

In a few remnant areas in Frederick County, rare plants of the forests still persist. Such plants include mountain skullcap, prairie rockcress, goldenseal and white trout-lily. Unfortunately, a variety of weeds introduced from Europe and Asia have taken over many of the area's rich forest fragments and have choked out the native flora. Aggressive weeds include Japanese honeysuckle, tree-of-heaven, multiflora rose, garlic mustard and ground ivy. Human related activities that have opened forest canopies have encouraged these weeds at the expense of native flora.<sup>1</sup>

#### Wetlands--Springs and Seepage Areas

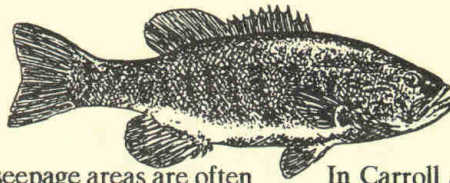
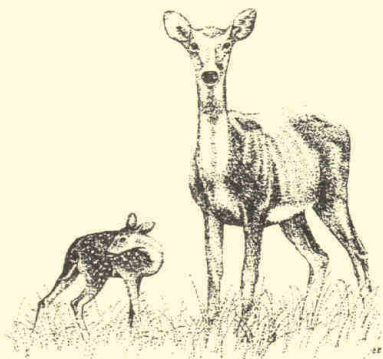
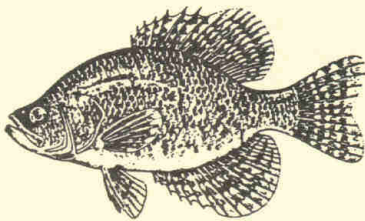
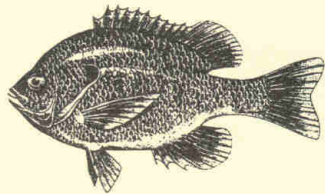
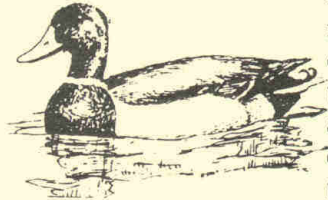
Hydric soils, vegetation and hydrology are some of the resources analyzed to classify wetlands. Wetlands have several major functions. They serve as habitat and breeding grounds for wildlife, and the dense and complex vegetation absorb and filter nonpoint pollution runoff. Wetlands also reduce flooding and recharge groundwater supply.<sup>32</sup>

Riverine, lacustrine and palustrine are the most common wetland types in the Monocacy watershed. The riverine includes the Monocacy River and its tributaries. Lake Linganore, a reservoir located southeast of the City of Frederick, is a good example of a lacustrine system. The lacustrine system consists of large open bodies of water such as lakes, ponds and reservoirs that are usually the result of a dammed river channel. Palustrine forested wetlands refer to wooded flood plain, swamps and associated emergent vegetation. Most of the Monocacy's stream valley corridors include this major type of wetland.<sup>32</sup>

One interesting aspect of the watershed is its abundance of springs and seepage areas which often are classified as a wetland type. With the exception of Fountain Rock Spring which produces over a thousand gallons of water per minute, springs and seepage areas are usually small, but differ primarily in their degree of permanence and nature of flow. Springs flow throughout the year, while seepage areas are typically dry during the summer and fall and always exhibit a seeping flow with no defined single point of discharge. However, springs and seepage areas do have the same important, cooling effect on the streams that they enter.<sup>47</sup>







Springs and seepage areas are often highly restrictive to the special species that dwell within them. These resurgences of cool groundwater impart many stream reaches with year-round cool water conditions that make possible the survival of such stenothermic species as brook trout and pearl dace--fish that can only survive in a narrow range of temperature conditions. The pearl dace (*Semotilus margarita*) is typically a cold water species that reaches its greatest abundance in the larger springs of Frederick County. This species seldom ranges far from spring runs and is among the first to disappear as spring flow is disrupted or pollutants are introduced. The pearl dace is very characteristic of a spring pool or run having an abundant growth of watercress (*Nasturtium officinale*).

Other species typically found in these cress beds are amphipods (*Gammarus minus*) and isopods (*Caecidotea communis* and *Lirceus brachyurus*). These interesting invertebrates frequently occur in enormous numbers, and play a vital role in aquatic foodchains. Other invertebrates, chiefly larval insects, occur in great numbers among bottom sediments of spring runs, particularly in rocky riffles, where they are preyed upon by larger invertebrates and fishes. At this point little is known about the aquatic insects of the Monocacy watershed, but there is the potential for many rare and uncommon species to inhabit them.<sup>47</sup>

Wetland habitats in the mountainous part of the watershed in Frederick County also support a variety of rare plant species. These wetlands are often fed by cool, nutrient-rich subsurface seepage that provides a habitat type preferred by many northern plants, such as nodding trillium and Pennsylvania saxifrage. Plants such as gold thread, glade spurge, large purple fringed orchid, tubercule orchid, and queen-of-the-prairie, are among the rare species of the mountain wetlands.<sup>1</sup>

In Carroll and Frederick Counties, wetlands comprise a relatively small percentage of the total land area, and are usually found in the riparian environment. Frederick County has taken measures to address proposed development that involves wetlands by adopting a recent amendment to the zoning ordinance. The ordinance requires a 25-foot buffer between development and all wetlands.<sup>23</sup> Carroll County requires all necessary state and federal permits for alteration of wetlands.

## Fish and Wildlife

Stream valley corridors are important to fish and wildlife for several reasons. They provide vital sources of food, and habitat for breeding and serve as migratory routes for some animals. As development continues in the watershed, the Monocacy's stream valleys will play an even more critical role in the survival of plants and animals.

Removal of forest cover in the watershed has disrupted the ecological balance between natural habitat and living resources. Agriculture and development have changed the natural patterns of plant succession. Wildlife habitats, now restricted to farmland, isolated woodlots, stream corridors and certain protected public lands, limit the diversity and reproductive capacity of plant and animal species that remain.

Information gleaned from fish and wildlife surveys is partially indicative of the Monocacy's ecological health. A river that has poor to fair water quality may only support a marginal number of different species. Some species, such as catfish and carp, can better survive in polluted waters, further disrupting the ecological balance. The Monocacy River has the potential to support a greater diversity of fish and wildlife populations as efforts continue to improve its water quality.



### Fish

In 1986, a report and research project conducted by the Maryland Department of Natural Resources' Tidewater Administration summarized the status of fish populations in the Monocacy River.

The upper, middle and lower Monocacy support varying numbers and levels of fish species. Largemouth bass are the most abundant sportfish in the upper Monocacy, especially above Starner's Dam. Other sportfish in this region include smallmouth bass and black and white crappie. In the middle Monocacy, from Big Pipe Creek to Carroll Creek, smallmouth bass are the most abundant sport fish. Other fairly common fish species include largemouth bass, black crappie, bluegill, pumpkinseed and green sunfish. Smallmouth bass are also the most common sportfish in the lower Monocacy. However, in 1983, quality sized smallmouth were not collected, and largemouth bass and black crappie were fairly scarce. Eels, channel catfish and yellow and brown bullheads are common fish species found along the entire length of the river.<sup>11</sup>

Suspended sediment in the Monocacy River is the most limiting factor to many aquatic species. Fish populations are stressed by high turbidity and there is a direct impact on habitat reduction. In the upper and middle Monocacy, the proportion and quality of largemouth and smallmouth bass is good, but in the lower part of the river, the numbers decrease.<sup>11</sup>

Furnace Branch, Glade Branch and Bear Branch are three streams in the eastern watershed that support brown and brook trout. Other trout streams located in the western watershed are: Friends, Ballenger, Owens, Hunting, Tuscarora and Fishing Creeks.<sup>20</sup> (See Appendix, Fish Species.)

### Amphibians and Reptiles

The riparian environment and its associated flood plain and wetlands provide a vital, moist habitat for

amphibians. Amphibian species diversity and composition may be affected by flood conditions. High water can disperse species to different regions, and during low-flow conditions, amphibians are often restricted to one area.<sup>20</sup>

Many different species of reptiles live in the Monocacy River Valley. Snakes and lizards may be found in stream valley bottoms as well as upland areas. Turtle habitats include streams, wetlands forests and other moist areas. (See Appendix, Amphibians and Reptiles.)

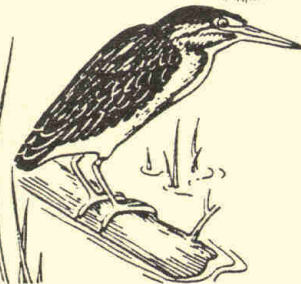
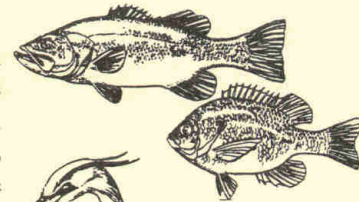
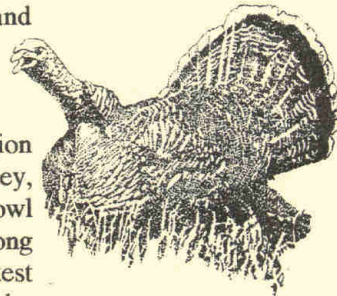
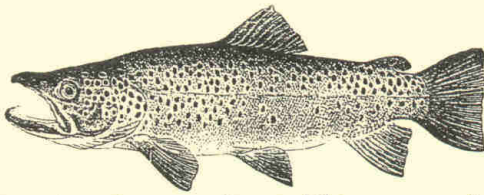
### Waterfowl and Other Birds

Avian species found in the region include waterfowl, birds of prey, gamebirds and songbirds. Waterfowl habitat includes vegetated areas along stream corridors. One of the greatest concentrations of waterfowl may be observed from Michael's Mill Dam through the Monocacy Natural Resources Management Area to the river's confluence with the Potomac. This region also has numerous pockets of wetlands and channels which provide an expanded habitat favorable for waterfowl.<sup>20</sup>

Mallards, blue and green wing teal, mergansers, black duck and pintail are bottomland ducks that have been sighted in the watershed. Mallards and wood ducks breed locally. More transient ducks include the American widgeon, ring neck duck and ruddy duck. Canada geese are occasional year round residents.

A graceful wading bird that inhabits the lower Monocacy is the Great blue heron. Its smaller cousin, the Green heron, may also be observed wading in shallow areas. The Solitary sandpiper and Spotted sandpiper are temporary visitors.

Fish, amphibians, reptiles and small mammals in the river corridor provide a varied food source for predatory birds. Permanent predatory birds include the Red shouldered, Redtailed,





## The Monocacy River Corridor: Summary of Flora, Fauna, Land Use & Impact



Bald Eagle

Raccoon -  
*Procyon l. lotor*

Sharp shinned, and Cooper's hawks, and the Osprey. Temporary residents include the Broad wing and Sharp shinned Hawk. The Kestrel, a member of the Falcon Family is common. Golden and Bald eagles have been reported, but none recently. Three types of owls have been sighted in the watershed. They are the Screech, Great Horned and Barred owls.

Quail, pheasant and wild turkey are present in the watershed, however turkey are more common in counties west of Frederick.<sup>20</sup>

### Mammals

Official inventories or formal surveys of mammals in the Monocacy region have not been recently conducted. Examples of recorded game species in the river basin include: fox, grey squirrel, deer, woodchuck, raccoon and rabbit. Muskrat and beaver are just a few of the other mammals that have been observed.

Below is a summary of existing vegetation and some land use characteristics from the headwaters of the Monocacy River to its confluence with the Potomac. A summary of these sections is also included in the River Corridor Overlay in Chapter 6.

### Marsh Creek to Bridgeport (Distance 4.7 miles)

From the confluence of Marsh and Rock Creeks to Harney Road, the river is shallow. Nesting wood duck, kingfisher and a variety of other birds inhabit this scenic area. Starners Dam, which is an old mill site, is a scenic and historic point of interest. Triassic shale cliffs support flora such as stonecrop (*Sedum acre*) and columbine (*Aquilegia canadensis*.) On some of the cliffs, ferns such as the hairy lipfern (*Cheilanthes lanosa*) and the maidenhair spleenwort (*Asplenium trichomanes*) are present. The river's shoreline and flood plain have a dominant vegetative type composed of a stand of mature silver maple (*Acer saccharinum*), box elder (*Acer negundo*) and sycamore (*Platanus occidentalis*) association. A Scarlet oak (*Quercus coccinea*) and chestnut oak (*Quercus prinus*) association with hemlock stands (*Tsuga canadensis*) is present on adjacent ridges. Old fields, planted in scotch (*Pinus sylvestris*) and white pine (*Pinus strobus*), are located south of Bullfrog Bridge.

The predominant land use adjacent to the river corridor is agriculture. There is a small residential community at Starners Dam. The forest buffer is inadequate, with successional vegetation less than 50 feet in width occurring on less than half of the border.\* The forested portions are highly dissected. The soil drainage is poor, further contributing to erosion problems.<sup>24</sup>

\* The Maryland Department of Natural Resources has established that a 50 foot minimum of forested buffer is an acceptable standard on a nearly level slope; additional buffer width for steeper slopes is based on additional factors.

### Bridgeport to Sixes Bridge (Distance 6.0 miles)

This scenic section of the river is bordered by shale outcrops and some forested areas. Silver maple, sycamore, white ash and red oak are common along the river bottom. Ferns and mosses can be observed growing on the shale outcrops, and above them, white, red, and chestnut oak predominate. Dense shrub layers provide valuable habitat for wildlife. Muskrat, woodchuck, mink, beaver and river otters have been reported.

Agriculture along the river banks is still the predominant land use and severely impacts water quality. Forested buffers are inadequate and overall soil drainage is poor.<sup>24</sup>

### Sixes Bridge to LeGore Bridge (Distance 8.2 miles)

Flood plain and narrow strips of upland woodlands serve as valuable buffers and wildlife habitat.

Predominant species in the river corridor and islands are silver maple, sycamore and slippery elm (*Ulmus pubescens*). Steeper slopes include dense shrub/herbaceous layers. Predominant species on ridges are oaks, hickories and white ash (*Fraxinum alba*).

A few dwellings may be observed in this part of the corridor, but agriculture is still the major land use. Some farms are no longer actively operated and therefore old fields are becoming more common. Forested buffers are marginal, with strips over 50 feet occurring on approximately half of the border. One exception is LeGore Bridge. It is a scenic and historic point of interest, and is surrounded by a significant forested area. One problem that detracts from this beautiful scenic area is the prolific dumping of trash.

Soil drainage ranges from poor to well-drained.<sup>24</sup>

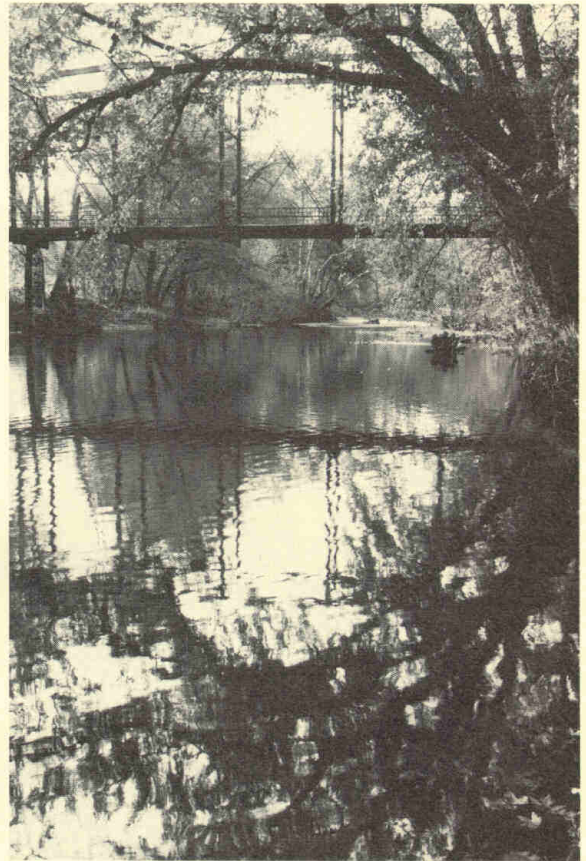




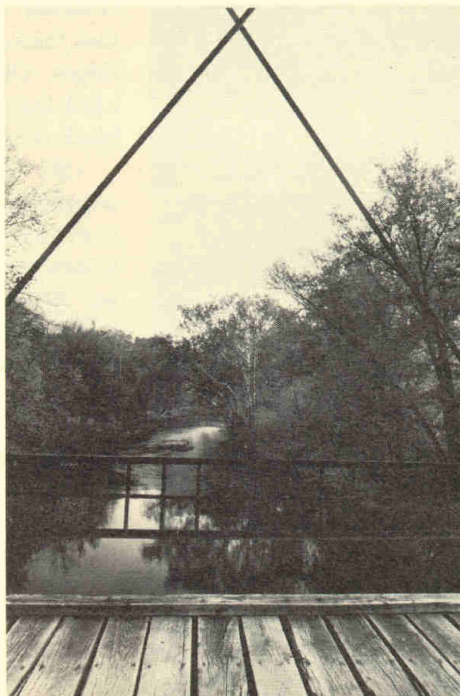
*Starners Dam*

*"Put on the river like a fleeing coat, a garment of motion, tremendous, immortal."*

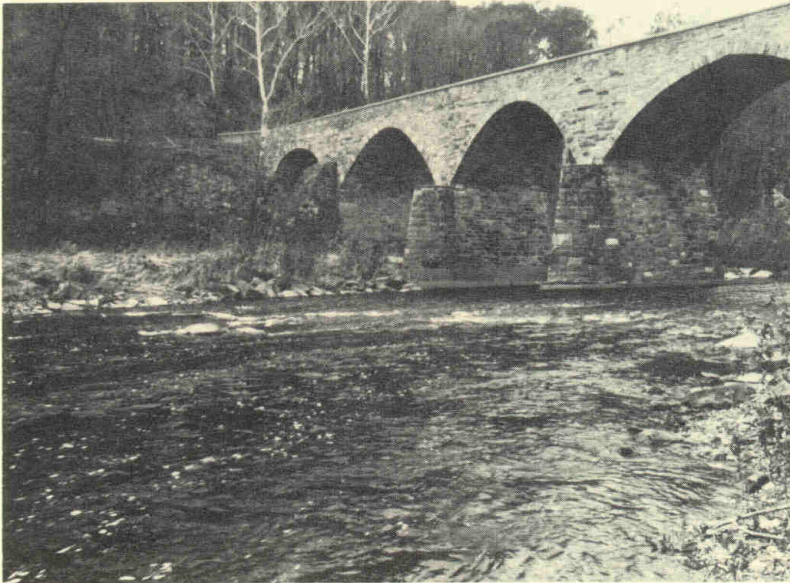
James Dickey



*Sixes Bridge  
View From Sixes Bridge*







LeGore Bridge

View from LeGore Bridge



*LeGore Bridge to Links Bridge  
(Distance 6.7 miles)*

This region supports the sycamore and river birch (*Betula nigra*) association. Large silver maples are also present. Box elder (*Acer negundo*) and spice bush (*Lindera benzoin*) are present in dense shrub layers near the river's shoreline. Rocky slopes and ridges have pockets of wooded areas that include an oak/hickory association and other mixed hardwoods. The confluence of Owens and Hunting Creeks occurs in the section, creating a noticeable increase in water flow. The river bottom is intermittently rocky.

Agriculture and old fields are the predominant land use near the river. Successional vegetation of 50 feet in width or greater is observable for almost two thirds of the corridor. Major access to the river is provided by Craegerstown Community Park.<sup>24</sup>

*Links Bridge to Route 26 Bridge  
(Distance 7.8 miles)*

High vegetative diversity is characteristic of this section. White ash (*Fraxinus alba*), sycamore and silver maple are the most common tree species. The herbaceous layer has jewelweed (*Impatiens biflora*) and stinging nettle (*Urtica dioica*). Oak/hickory hardwoods are located on ridges. Other mixed hardwoods include black locust (*Robinia pseudoacacis*) and black cherry (*Prunus serotina*).<sup>24</sup>

Old fields and agriculture are common on the northern section. As the river approaches Route 26, isolated homes and a new residential community are observable from the river. The Walkersville community is rapidly growing, and there are plans to widen the Route 26 bridge to accommodate future growth. Adequate forested buffers occur on approximately half of the corridor.



*Route 26 to 270 (Distance 7.4 miles)*

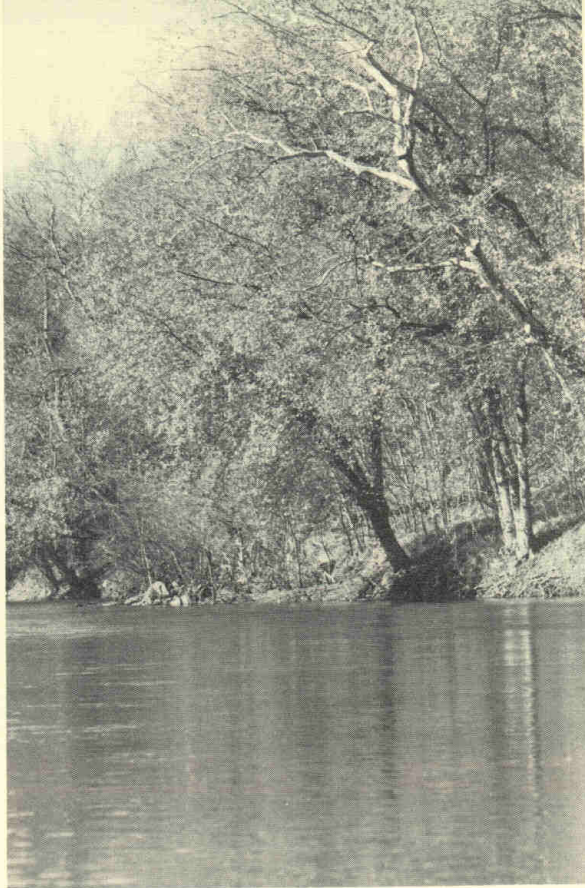
The region has underlying Frederick limestone with sections of Grove limestone; the limestones provide habitat for several types of ferns. The river corridor has a silver maple/sycamore/American elm association. Black locust occurs in dense layers in the upland areas. A red oak/chestnut oak association is also present.<sup>24</sup>

Urban and suburban development encroaching on old fields is the predominant land use pattern and provides a major impact along the river. Two sewage treatment plants and a municipal airport are located on or near the river corridor. Trash is a problem along the river banks. Forested buffers vary from inadequate to nonexistent due to past land uses. There are some remaining forested buffers on the east side of the river; however, development is planned on those land parcels.

Monocacy Pine Cliff Park and the Monocacy National Battlefield are public lands that provide access to the river in this section.

*Route 270 to Bennett Creek (Distance 10 miles)*

Two vegetative types are predominant. The woodlands adjacent to the river's shoreline contain silver maple, sycamore and tulip poplar (*Liriodendron tulipifera*) with dense shrub layers. To the east, a high ridge supports chestnut and red oaks and provides a scenic backdrop for the river. The ridge follows the Antietam formation and Frederick limestone interface. Its highest point is approximately 300 feet above the river with cliffs providing vistas of the Frederick Valley and Catoctin Ridge. East of Buckeystown, the ridgeline breaks and then continues. Most of the ridges are forested.<sup>24</sup>



*Monocacy Pine Cliff Park Area*



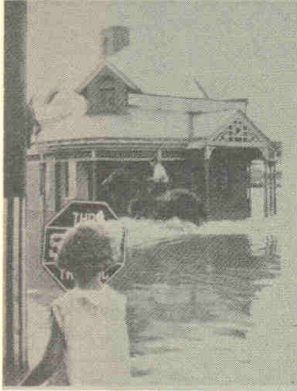
*Michaels Mill area*

*"If there is magic on this planet, it must be contained in water."*

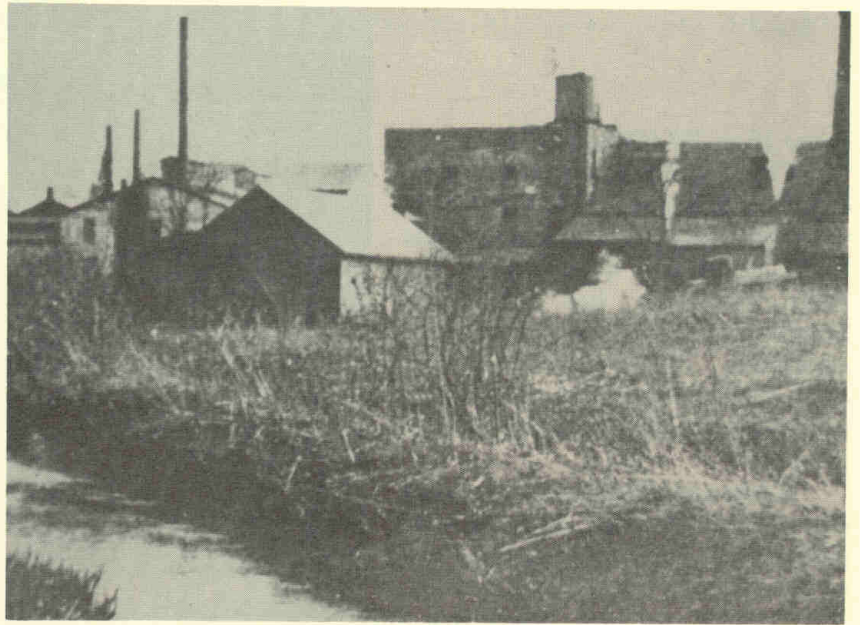
Loren Eisley



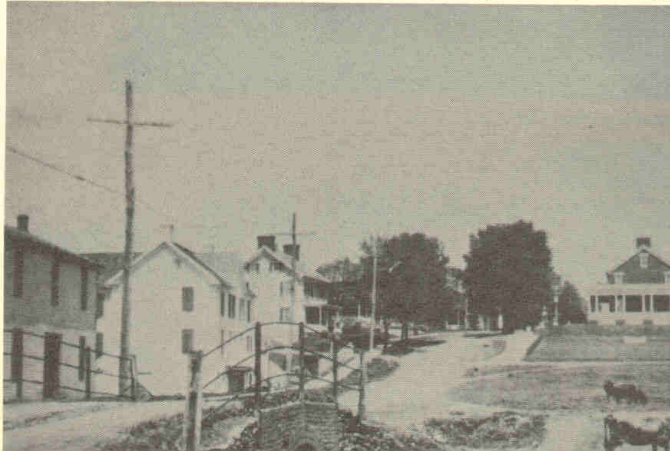
*Rowena Pfeifer Hildebrand, 1933.*



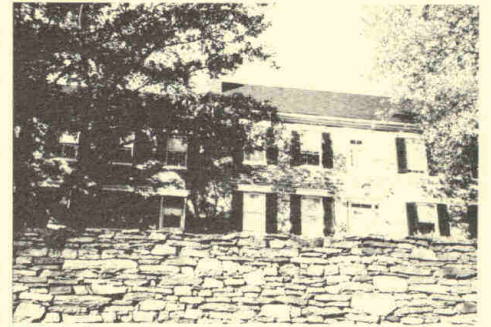
*Water floods the square corner.*



*West view of village industry showing ice plant and cannery, circa, 1930.*



*Northend of town - circa, 1905. Bridge over Rocky Fountain, granary far left. Cows stand where tannery was located.*



*Miller's house, Michael's mill Road, built from stone quarried from nearby hillside.*



*Home of Johann Frederick Amelung, Founder of Amelung Glass Works. (Still standing).*



*August, 1933 flood. Walter Specht in canoe.*



*Circa, 1885, looking north. Three white frame tannery buildings on right.*



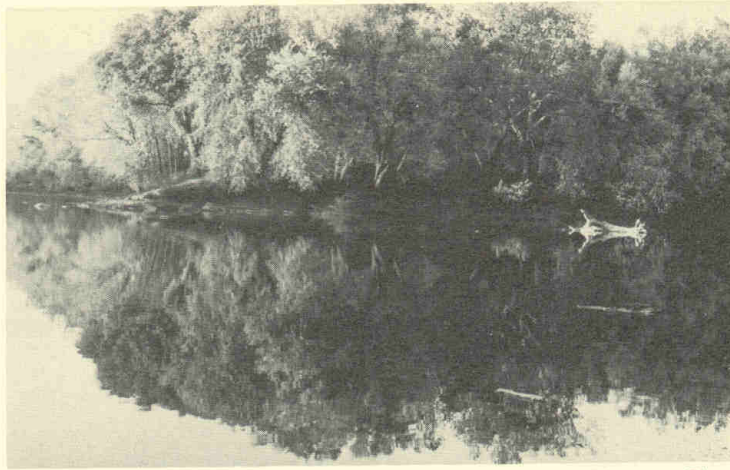
Small residential developments and light industry are rapidly replacing older farm fields adjacent to the corridor. Forested buffers over 50 feet in width occur on between half and two thirds of the border. Ballenger Sewage Treatment Plant is also in this section. Buckeystown Park provides access to the river, and nearby, is the historic Michaels Mill.

### *Lilypons Road to the Confluence with the Potomac River (Distance 6.2 miles)*

Vegetative diversity provides excellent habitat for wildlife. Higher elevations adjacent to the river support some large Beech (*Fagus grandifolia*). There are also chestnut oak, white oak and scarlet oak (*Quercus coccinea*). The flood plain supports species such as silver maple, white ash and sycamore. Herbaceous layers along the shoreline are dense.<sup>24</sup>

Public lands and scattered residences are observable from the river. The Monocacy Natural Resources Management Area (MNRMA) is well buffered except for pockets of leased agricultural land on the west side of the river. However, forested buffers are generally inadequate on this section. Public access is provided by the MNRMA, a state boat ramp and the C&O Canal National Park.

This river section does have several scenic, panoramic views. Greenfield Rapids is the only natural significant drop in elevation and is a scenic and historic point of interest. However, this stretch is also marred by trash along the river banks. The C&O Canal National Historical Park is located at the confluence of the Monocacy and Potomac Rivers, and is a nationally recognized historic resource.



*Confluence of Monocacy and Potomac Rivers*

## Summary

- Stream corridors and wetland areas in the Monocacy River basin are vital to the survival of fish and wildlife.
- Forests and other types of vegetative buffers are critical to reducing nonpoint pollution runoff, serving as noise and visual buffers and moderating flood events.
- The Maryland Department of Natural Resources has indicated that the watershed has the one of the lowest rates of forest cover in Maryland, approximately 27%.
- The palustrine forested wetlands, which are directly associated with the river and its tributaries, also help to absorb and filter out pollutants and reduce erosion and flooding.
- Suspended sediment is the most limiting factor to many fish species.
- The environmental impact of intensive land use has forced the decline or disappearance of many plant and animal species in the Monocacy River Valley. Identified rare, threatened and endangered species on Maryland's Heritage List are primarily limited to wetland and forest habitats in the mountainous or stream corridor regions in the watershed.







*Frederick County-Boys fishing from tumbledown bridge*



*Monocacy Aqueduct - Courtesy of C&O Canal National Historical Park*



# Land Use Planning and Water Resources Management

## Introduction

The future of the Monocacy River and its tributaries will be determined by proper land use planning and water resources management. Frederick and Carroll Counties have developed comprehensive, master and land preservation plans to deal with increasing economic development and community growth. The Comprehensive Plan for Frederick County and Carroll County's Master Plan are planning tools that provide direction for accommodating desirable growth while maintaining the quality of life. The plans address many concerns, including transportation, schools, parks and open space, different types of development and agriculture. An understanding of existing local land use and water resources management plans and related state and federal programs is an important component of the river study. Continued coordination of local and state planning efforts can increase the effectiveness of environmental planning.

Closely related to land use planning, water resources management takes into account many factors, including the current water quality of the Monocacy, projected water demands based on population growth, surface water hydrology and the assimilative capacity of the river. Assimilative capacity is an important concept related to the Monocacy River's aquatic health. It is a projection of the maximum amount of total point and nonpoint effluent discharges that the Monocacy River can absorb before causing undesirable environmental conditions.<sup>39</sup>

As population has increased, the importance of reliable water resources has led to occasional controversy over the development and use of the Monocacy River for water supply. The Monocacy and its tributaries have served as important sources of potable water to compensate for portions of the

basin that are incapable of yielding sufficient quantities of ground water to support large industrial and municipal water users. Some of the main factors governing the use of the surface waters are natural flows and Maryland water law. (See Chapter 1, hydrology and Appendix, Government Programs.)

## Frederick County

### *Planning History, The Comprehensive Plan, Zoning, and Land Use*

Frederick County is the largest county in Maryland. Centrally located in the state, its 664.8 square miles is bordered by the Potomac River, the Commonwealth of Pennsylvania, and Washington, Montgomery and Carroll Counties. Recent and rapid population growth has placed increased demands on the area's natural resources. During the last eight years, the population has increased by 24% to 142,566 residents. By the year 2000, the population growth may reach 159,200 as a result of immigration from other counties in Maryland.<sup>39</sup>

The Frederick County Comprehensive Plan is reviewed every five years, most recently in 1989. Periodic reviews ascertain the status of the county's growth and the plan's ability to meet the needs of an expanding population. The current review process assesses the growth of designated sections of Frederick County and outlines plans for comprehensive rezoning five years into the future.<sup>39</sup>

Frederick County has three major planning goals. They are to conserve the natural environment; preserve an environment compatible with a desirable quality of living; and promote a balanced, diversified economy. The first two goals are directly related to the Monocacy River. The objectives derived

from the goal to conserve the natural environment are to: protect air and water; to promote agricultural preservation; and to encourage wise use of resources and environmental compatibility.<sup>39</sup>

The Comprehensive Plan encourages conservation by restricting the density of development in environmentally sensitive areas. It calls for growth to occur in and around established towns and growth centers. Approximately 45% of the projected growth will take place in Frederick city and 38% will occur in smaller towns.<sup>39</sup> Significantly impacted urban areas in the watershed are, and will continue to be, the Walkersville\Woodsboro communities (Monocacy River, Glade and Israel Creeks); the City of Frederick and suburbs (Monocacy River, Carroll, Ballenger, Tuscarora and Linganore Creeks); Thurmont (Owens, Hunting\ Little Hunting Creeks); and Emmitsburg (Tom's Creek).

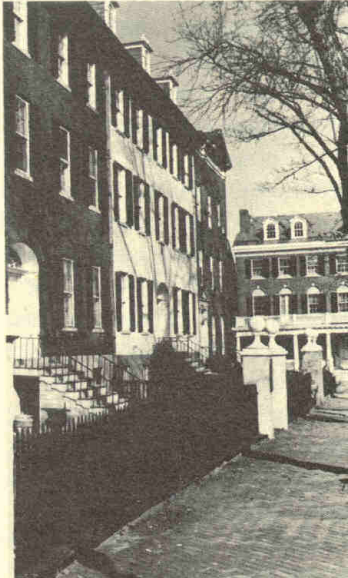
Environmentally sensitive stream corridors are protected by the county's conservation zone. Twenty one percent of Frederick County is zoned as "conservation", and because conservation zones often include steep slopes, wetlands or flood plain, enforcement of existing regulations and best management practices are encouraged. The conservation zone around the Monocacy River also has a flood plain overlay district\* that prohibits construction. The flood plain is defined either by soil type or by the

\*Annual flood plain has a potential to flood every year and is defined by soil type. The one hundred year flood plain is defined by the Federal Emergency Management Agency (FEMA). County zoning requires that development must have a set-back of twenty five feet beyond the designated one hundred year flood plain. Historic flood plain includes areas which have documented floods beyond the one hundred year floodplain.



occurrence of significant storm events. County flood plain regulations have not been seriously challenged. A Board of Appeals can grant exceptions, but very few requests are approved.<sup>39</sup>

The Comprehensive Plan includes several other classifications. Even though these classifications do not necessarily occur adjacent to the Monocacy or its tributaries, their designated land use can affect stream corridors and water quality. These classifications include: agriculture/rural; low density residential (scattered throughout the county and also in incorporated towns); medium and high density residential (immediately north and south of Frederick City and in incorporated towns); commercial (throughout the county, Frederick City and in incorporated towns); and office/industrial (Frederick city and in incorporated towns).<sup>39</sup>



*Court Square homes in downtown Frederick face historic City Hall.*



*Winchester Hall, downtown Frederick - Seat of Frederick County's government.*



*Carroll Creek - Rose Hill Manor House, 1907 Frederick County*

### *Water Supply Resource Development and Use*

Due to an increasing local demand for water, Frederick County has given a priority to water resources management. The City of Frederick relies exclusively on surface water from the Monocacy River and the Linganore Creek and Fishing Creek Reservoirs to meet this water demand. Expanding the Linganore Plant or the Monocacy intake has been considered to meet the city's future needs. In both cases, however, available water supply is limited. The Maryland Department of Natural Resources' Water Resources Administration has indicated that Linganore Creek is an unlikely source of additional water, especially during periods of low flow, even though there are flowby requirements from Linganore Dam to protect the downstream watershed. This provides some limited protection to the city's intake but does not guarantee its total existing withdrawal or future additional supply.<sup>42</sup> Flows in the Monocacy River are inadequate to consistently support an increase in withdrawals by the city.

During the 1966 drought, the river was nearly dry at the city's intake.

Considering the limitations of these two water resources, a proposal to increase the county's Potomac River allocation has been discussed. Both the Water Resources Administration and Frederick County agree that the Potomac River is the best alternative water supply.<sup>42</sup>

Reservoirs are a remote alternative for supplying water in Frederick County. The Soil Conservation Service has identified thirty-two potential dam sites in the county. None has been developed due to prohibitive construction costs, landowner opposition, and, considering the availability of Potomac River water, the lack of a demonstrated need.<sup>39</sup>

Several municipal systems in the Monocacy basin make use of more than one water source in order to obtain a sufficient and reliable supply. Thurmont and Emmitsburg use surface water from reservoirs as well as ground water. Walkersville relies on wells but has a reservoir in case of an emergency, and Woodsboro has a well system.<sup>39</sup>

### *Sewage Treatment*

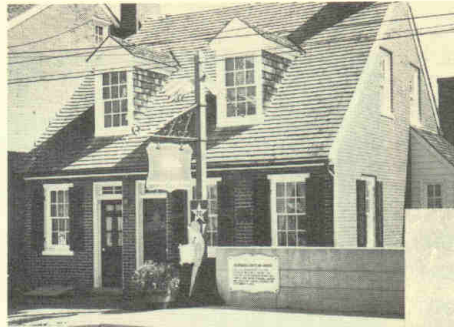
Inadequately treated sewage is becoming a more important issue in Frederick County. Parcels of suitable land for septic systems are becoming more scarce, and requests for public systems are increasing. The capacities of local sewage treatment plants have been increased to accommodate projected growth in areas served by public water and sewer systems. Major point discharges into the Monocacy River are the Frederick City Sewage Treatment Plant, and treatment plants at Ballenger and Fort Detrick. Historically, the river has had some periods of low flow, but it will still be capable of meeting the projected requirements at these plants.<sup>39</sup>

When Frederick City's Sewage Treatment Plant and the Ballenger Creek Plant are running at full discharge, the section of the Monocacy between the city's plant and Bennett

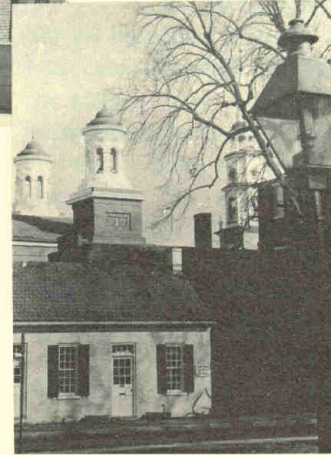


Creek will reach its assimilative capacity. This means that future effluent discharges into the tributaries of the Monocacy will be prohibited. To allow for continued growth, the chosen alternative is to pipe Frederick City's overflow to the Ballenger Creek Sewage Treatment Plant. As both plants reach full capacity, a discharge line will transmit treated effluent into the Potomac River.<sup>39</sup>

Land application is another method to dispose of treated effluent, but high cost can make it prohibitive. Emmitsburg has an innovative system that uses a reasonable amount of land for application. Land application must be carefully monitored to prevent nonpoint runoff into streams. The majority of farmers are not considering land application for agriculture because they are concerned that more stringent regulations in the future may affect their ability to sell dairy products or crops. For the same reasons, land disposal of sludge has become increasingly difficult.<sup>39</sup>



*The Barbara Fruehie House Museum -*



*Building that once housed the law offices of Roger Brook Taney stands in front of three of Frederick's famous spires.*



*Frederick County - Old Jug Bridge*



*Frederick County - Catactin Furnace, Bridge over Hunting Creek*

## Summary

- Rapid population growth in Frederick County will place extensive and different demands on land and water resources. There has been a 24% increase in Frederick County's population during the last eight years. An increase of 11% is projected by the year 2000.
- Frederick County's three major planning goals include: conservation of the natural environment; preservation of a quality living environment; and promotion of a balanced diversified economy.
- In summary, 66% of Frederick County's land is used for agriculture, 15.5% is woodland and 5% is parks and open space.
- Most of the growth in Frederick County is planned to occur near incorporated towns. Anticipated growth will have an impact on parts of the Monocacy River, and Glade, Israel, Carroll, Ballenger, Tuscarora, Linganore, Hunting and Tom's Creeks.
- Frederick County is making extensive efforts to review and update its guidelines for the conservation zone.
- Water quality and quantity are important issues for Frederick County because of anticipated population growth and land use patterns.
- With some exceptions, Frederick County has adequate ground and surface water resources to meet demands. The future construction of dams for reservoirs is unlikely and expensive. The Potomac River is a more viable and cost effective source for water.
- The assimilative capacity of the Monocacy River is limited. The assimilative capacity between the Frederick City Sewage Treatment Plant and Bennett Creek will be completely subscribed when both the Frederick City and Ballenger Creek sewage treatment plants are running at full capacity.



## Carroll County

### *Planning History, the County Master Plan, Zoning and Land Use*

Carroll County is bordered by the Commonwealth of Pennsylvania, and Frederick, Howard, and Baltimore Counties. It encompasses approximately 456 square miles.<sup>4</sup> Carroll County's population, like that of Frederick County is increasing faster than anticipated. In 1980, the county's population was slightly less than 97,000. Almost ten years later, it has reached an estimated 122,220.<sup>38</sup>

The goal of Carroll County's Master Plan is to promote orderly growth and preserve its rural heritage and agricultural lands by directing the majority of development to existing municipalities. Originally adopted in 1964, the plan was reaffirmed and strengthened with the adoption of major amendments to the agricultural zone in 1978. Since that time, the county has become more involved in promoting agribusiness. Concentrating growth in and around incorporated towns such as Westminster will help to ensure the preservation of existing farmland and prevent urban sprawl. The land in these areas of higher density encompasses most of the land designated for business, residential and industrial land use.<sup>38</sup>

Another component of the Master Plan is the Parks and Land Preservation Plan. Adopted in 1987, it outlines planning for open space and natural and recreational areas and again emphasizes the importance of preserving agricultural land.

Carroll County has zoned approximately 48,000 acres of land in the **conservation district**. Its primary purpose is to protect water quality. Stream valleys, steep slopes, critical soils and priority natural resource areas are often included in the conservation district. Residential development is limited to three acre lots, and a 100 foot buffer measured from the center line of



*Piney Creek - Carroll, County*

streams has been implemented to protect wildlife areas and reduce runoff.<sup>38</sup>

### *Water Supply Resource Development and Use*

In 1972, Carroll County conducted studies to determine possible sites for reservoir development. The importance of future reservoirs in Carroll County was confirmed by a study done by R.E. Wright & Associates in 1982. The study examined existing ground water supplies for the towns and environs and evaluated maximum supplies available for each community. The results indicated that some towns will not have an adequate water supply to meet future demands. As a follow-up, Carroll County was authorized in 1988 by the Maryland General Assembly to develop a water resources management program to protect county ground and surface water resources through land use or other ordinances, regulations, resolutions or policies which do not duplicate or conflict with state regulatory programs. The county was also authorized to appoint a Carroll County Water Resources Commission.<sup>38</sup>

Several towns in Carroll County are facing the pressures of urbanization with limited water supply resources. Supplementing ground water with surface water through the development of new reservoirs is one solution to the

problem. To alleviate its dependence on groundwater, the county has acquired three reservoir sites, one in the Monocacy basin at Union Mills and two in the Patapsco Basin. Anticipating the development of these facilities, the county has taken measures to comply with legal requirements and to establish environmental safeguards for the land surrounding the reservoirs. The adjacent land at the proposed Union Mills site will also be developed into a park. Pending project approval, the reservoir would supply water to Hampstead, Manchester and Westminster.<sup>38</sup>

Before state approvals are granted for these reservoirs, Carroll County must address a variety of environmental and resource management issues. The county must demonstrate that there is no other feasible alternative to the development of reservoirs.

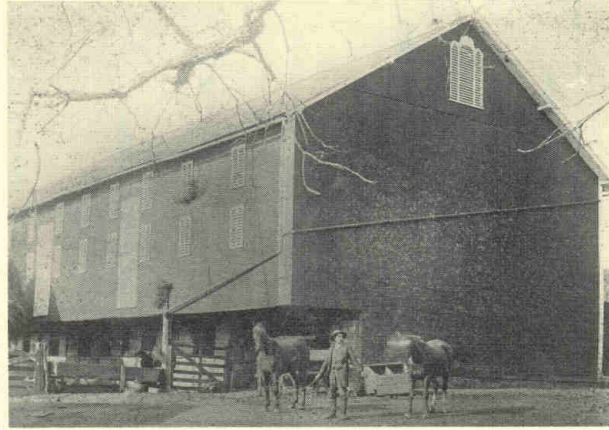
### *Sewage Treatment Plants*

Carroll County has three major sewage treatment plants in the Monocacy watershed. They are at Union Bridge (Little Pipe Creek), Taneytown (Piney Run) and Westminster (Little Pipe Creek). Treatment capacity may be expanded to accommodate anticipated growth in the Taneytown area. (For additional information see "Water Quality.")

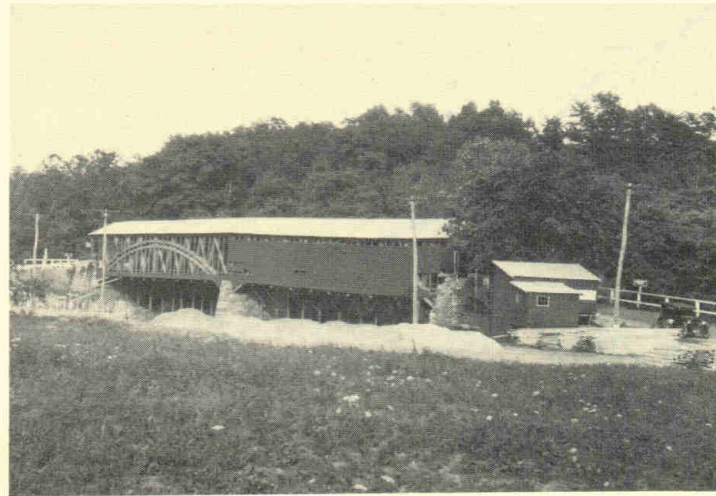


### Summary

- Carroll County's population, like that of Frederick County, is increasing faster than anticipated, thereby placing increasing demands on future land and water resources.
- Carroll County's major planning goal is to promote orderly growth and preserve its rural heritage and agricultural lands by directing the majority of development to existing municipalities.
- Most of Carroll County's lands in the Monocacy watershed are to be retained for agriculture. Agribusiness is important to the economy of Carroll County.
- The primary objective of Carroll County's conservation district is to protect water quality.
- Some towns in Carroll County will not have adequate ground water supplies.



*Carroll County - Old farm , barn west of Engler's House, 1895*

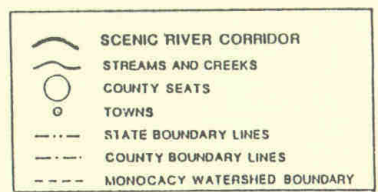
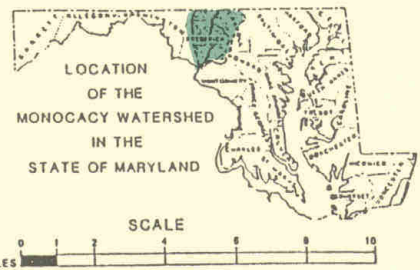


*Carroll County - covered bridge between Emmitsburg and Westminster.*



*A mill, New Market, Carroll County*





- A - EMMITSBURG WATERSHED
- B - MIDDLE/ELEMENTARY SCHOOL
- C - CATOCTIN MOUNTAIN PARK
- D - CUNNINGHAM FALLS STATE PARK
- E --CITY OF FREDERICK MUNICIPAL FOREST
- F - MEYER ROAD RECREATION AREA
- G - MT. TABOR PARK
- H - WOODSBORO COMMUNITY PARK
- I - FOUNTAIN HOOK COMMUNITY PARK
- J - WALKERSVILLE WATERSHED
- K - MONOCACY RIVER PARK
- L - BAKER PARK
- M - HUSKY PARK N -
- N - MONOCACY PINE CLIFF PARK
- O - URBANA LAKE FISH MANAGEMENT AREA
- P - MONOCACY NATURAL RESOURCES MANAGEMENT AREA
- Q - LITTLE BENNETT REGIONAL PARK
- R - KEMPTOWN PARK

- \*\* FISH HATCHERIES/PONDS
- ★ ★ MONOCACY NATIONAL BATTLEFIELD

## PUBLIC LANDS IN THE MONOCACY RIVER WATERSHED

MONOCACY SCENIC RIVER MANAGEMENT PLAN  
MARYLAND DEPARTMENT OF NATURAL RESOURCES  
SCENIC AND WILD RIVERS PROGRAM



## Public Lands, Open Space and Recreation

As the population in the Monocacy watershed continues to grow, selective protection or designation of open space and public lands will help to conserve the river. Functioning as natural buffers, designated open space areas and public lands help to protect wildlife habitats, improve water quality and provide opportunities for outdoor recreation. Public lands outside of critical stream corridors may be used for logging and agriculture.

The diverse benefits offered by open space illustrate the concept of "Greenways." A "Greenway" is a linear natural area such as the Monocacy River and its tributaries. Although greenways may serve other purposes, their primary values are to conserve natural resources, provide open space and encourage appropriate types of land use in environmentally sensitive areas.<sup>58</sup>

There are several local, state and federal public lands in the Monocacy River basin. Pine Cliff Park, Frederick's first regional park, is on the Monocacy River. Craegerstown and Buckeystown Parks are also on the river. The City of Frederick has developed Carroll Creek Park, and is planning to develop a linear park along the Monocacy. The city has also recently constructed a municipal golf course near the Monocacy River. Boat access areas along the Monocacy are maintained by the National Park Service, the Department of Natural Resources and Frederick County.

The federal government has acquired easements for the Monocacy Battlefield National Park and plans to acquire more land around the river. If federal funds are available, the Park Service will install a visitor center at the national battlefield. Such measures will increase the public's awareness of the Monocacy and make it more accessible. The National Park Service also operates the C&O Canal National Historic Park at the confluence of the Monocacy and Potomac Rivers. Near the C&O Canal

is the State of Maryland's 2,000 acre Monocacy Natural Resource Management Area. On the southeastern side of the Monocacy near the Natural Resource Management Area is Sugarloaf Mountain, a privately operated 5,000 acre historic district protected from development. To the west, is Catoctin Mountain National Park, Cunningham Falls State Park and the City of Frederick's Watershed Management Area. (See map, Public Lands.) Several major tributaries, including Hunting and Fishing Creeks, flow through these protected lands.

The recreational and scenic attractions in parts of the Monocacy River are marred by poor water quality, trash, tires and abandoned automobiles. Nevertheless local citizens enjoy the many beautiful areas and the opportunities for recreation that the Monocacy River offers. A slow moving river, the Monocacy provides boating and fishing enthusiasts with vistas of farmland, wooded ridges and the urban area around the City of Frederick. Canoers may run the entire length of the river in four sections. A guide book, *Delaware and Maryland Canoe Trails*, gives details.<sup>15</sup> Although numerous bridges cross the river via state right-of-ways, people still trespass occasionally on private lands.

According to Carroll County's Master Plan, the importance of farmland preservation in the Monocacy watershed preempts an immediate need for designated open space, such as stream valley parks.<sup>38</sup> In addition to agricultural land preservation, the *Carroll County Parks and Land Preservation Plan, 1986-1987*, emphasizes a "respect for the county's natural and historic access by preserving it for public enjoyment and edification." There are almost 9,000 acres of open space and recreational facilities in the county. Another 1,197 acres have been acquired at the Union Mills reservoir site.<sup>4</sup>



Recreation on the Upper Monocacy Cunningham Falls pathway through the woods.

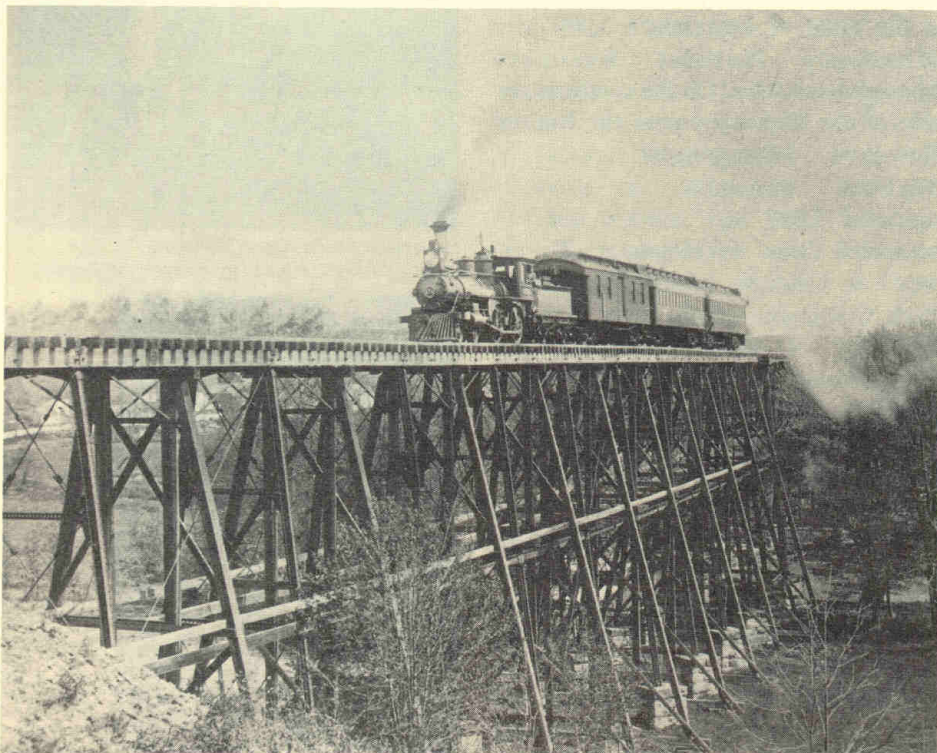


## Summary

- There are several local, state and federal public lands in the Monocacy River basin. Existing and planned public lands that border the Monocacy River include: Pine Cliff; Craegerstown and Buckeystown Parks; a municipal golf course; a linear park along the river in the City of Frederick; the Monocacy Battlefield National Park; the C&O Canal National Historic Park and the Monocacy Natural Resource Management Area.
- The Monocacy River is not used to its full potential for recreation such as fishing and boating because of diminished water quality. Poor water quality and trash also detract the river's scenic and recreational amenities.



## Adams County, Pennsylvania: Summary of Land Use and Water Resources



*Little Pipe Creek, PA.- Railroad train crossing Monocacy*

The Monocacy's headwaters begin in Adams County, Pennsylvania. Land use and water resources management in this part of the upper watershed does affect the river's water quality and quantity.

Approximately 70% of the Toms Creek watershed is forested, 20% is farmland and 10% is residential. The town of Fairfield has a sewage treatment plant.

Land use in the Marsh Creek vicinity is 53% forested, 43% agricultural, 2.5% municipal, and 1.5% parkland. Little Marsh Creek is a major tributary to Marsh Creek. The City of Gettysburg has a diversion structure and water treatment plant located in the Marsh Creek watershed.

In the Rock Creek region, approximately 36% of the land is forested, 54% is farmland, 5% combination residential and 5% public lands. (Gettysburg National Park) The Gettysburg Sewage Treatment Plant discharges treated effluent into Rock Creek. The plant has been recently retro-fitted, and water quality has improved.

The Piney/Alloway Creek watershed is 70% farmland, 24% forested and 6% municipal. The Borough of Littlestown discharges treated effluent into Alloway Creek.

*Mason Dixon Farm, PA.*





# Water Quality

## Introduction

One reason the Monocacy River was designated a Maryland Scenic River was to improve its water quality. Past and present land and water use in the watershed have significantly impacted the river's water quality, aquatic life and the surrounding ecological environment.

Surface water quality directly influences or limits the types of human activity that rely on the Monocacy's natural resources. A river that does not have a healthy riparian environment may limit, for example, the availability of clean water for consumption, reduce alternatives for recreational use, or result in increased plant treatment costs for water purification. Therefore there is a close relationship between water quality and the human demands that are placed on the river.<sup>73</sup>

## Water Quality Problems

Three major water quality problems are associated with the Monocacy River. They are nutrient enrichment, sedimentation and contamination by pathogenic organisms.

Nutrient enrichment in the Monocacy River is caused mostly by nonpoint sources; nitrogen and phosphorus from agricultural land use are the main contributors. The effects of nonpoint source pollution are also more difficult to monitor than point sources. Peak levels of nonpoint nutrient loading usually occur during some form of precipitation. As rainwater falls on agricultural lands, it combines with sources of nitrogen and phosphorus, and eventually some of the pollutants enter a tributary or the river itself. If erodible soils are present, the problem is compounded.<sup>73</sup>

The majority of nutrient enrichment from point sources is derived from four major discharge plants that include three in Frederick and one in Westminster. Most of the

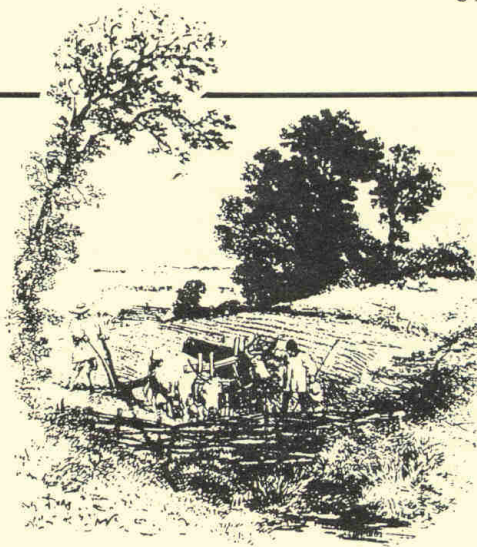
other plants are small, each discharging less than one million gallons per day.

Compared to most of the upper Potomac River, the Monocacy is more enriched in nutrients due to extensive agriculture and higher human and animal populations. High nutrient levels in the Monocacy river system increase the growth of blue-green algae, a plant that thrives in a nutrient enriched environment. As the algae dies and decays, the decaying matter decreases the availability of oxygen in the river.<sup>73</sup>

Sedimentation is the movement of solids such as soil, minerals and sand in water, and it is the most serious problem of the Monocacy River. On a per acre basis, the Monocacy watershed contributes sediment at more than twice the rate for all other land draining into the Potomac upriver from Point of Rocks.<sup>73</sup> The Monocacy also has numerous bends that may trap sediment over a period of time. This physiographic phenomenon possibly allows for a great deal of sediment to be stored in the river system.<sup>57</sup>

Suspended sediment makes the water cloudy or murky, and decreases the amount of sunlight necessary for desirable aquatic life to survive. It also contributes to reduced dissolved oxygen levels in the river, again adversely affecting certain forms of aquatic life.<sup>73</sup> Valued fish such as smallmouth bass, for example, have difficulty surviving in a murky environment because this is not their natural habitat. A muddy river also loses its aesthetic and scenic value.

The last water quality problem, pathogenic contamination, is directly associated with public health. Water quality standards that include this criterion measure the existence of fecal coliform bacteria in the river and its tributaries. Fecal coliform bacteria usually indicate pollution from animal waste or untreated sewage. Coliform counts tend to be more prevalent in



parts of the Monocacy or its tributaries where there is intensive livestock farming or near point sources such as sewage treatment plants.<sup>73</sup>

Numerous other pollutants enter the Monocacy River. They mostly come from nonpoint sources, especially during rainfall. They include pesticides, herbicides and other toxins. Pesticide and herbicide use are often associated with farming. However the growing home-urban environment also contributes to surface water quality problems. Oil and auto related chemicals from parking lots are just a few of the other contaminants that enter the Monocacy River. There are not any ongoing water quality studies that address the growing impact of urban based contaminants that enter the Monocacy and its tributaries. As Frederick County and the City of Frederick continue to develop land near stream corridors, there will be an increase in these sources of water pollution.

## Water Quality Summary

The *Maryland Water Quality Inventory*, prepared biennially by the Maryland Department of the Environment, routinely monitors water quality at four CORE stations located on the Monocacy River and six Trend stations in the sub-basin. Fish tissue samples are also collected at these stations:





**Lower Monocacy River, Segment 024**

Water quality in the lower Monocacy ranges from fair to good. A high suspended sediment load from upriver sources, construction and agricultural runoff are the most serious problems. Low dissolved oxygen conditions, especially during low-flow summer months in the river below Frederick, stress aquatic life. Elevated bacterial levels also occur throughout much of this segment. However, there have not been any conclusive tests that have identified the sources for these elevated levels.

Temperature also affects aquatic life. During the warmer summer months, extreme temperatures have been recorded in Rocky Fountain Run and Linganore Creek. A decrease in forest cover is one reason for this problem. Despite being classified as a Class III stream, (natural trout stream), Carroll Creek has a high turbidity rate at certain seasons and cannot support a natural trout population.

**Upper Monocacy River, Segment 03**

Water quality ranges from fair to good. A high suspended sediment load from agricultural runoff is the most severe water quality problem. Intensive use of livestock has also elevated the bacterial level.

**Double Pipe Creek, Segment 04**

Double Pipe Creek is a major tributary of the Monocacy River. High suspended sediments and coliform levels are the most severe problems. Intensive farming in the Double Pipe Creek area has also increased nitrogen and phosphorus runoff.<sup>28\*</sup>

**Summary**

- Sedimentation derived from nonpoint sources is the major contributor to the Monocacy River's water quality problems. This is followed by nutrient enrichment from agricultural fertilizers.
- In the lower Monocacy, total nitrogen levels are significantly



increasing. Increases in fecal coliform levels have been measured directly below the City of Frederick.

efforts to reduce erosion and nonpoint runoff in this sub-watershed.

**Adams County, PA**

- The upper river segment has not shown any significant changes in nitrogen, phosphorus, sedimentation or coliform levels during the past ten years. However, there was a measurable trend in lower oxygen levels monitored at the station below Frederick. Decreasing levels of oxygen above this station have also been recorded, but at this time they are not significant.
- In Double Pipe Creek, there has been a small increase in nitrogen levels. Suspended solids (sedimentation) appear to be significantly decreasing. This may be due in part to the Soil Conservation Services' increased

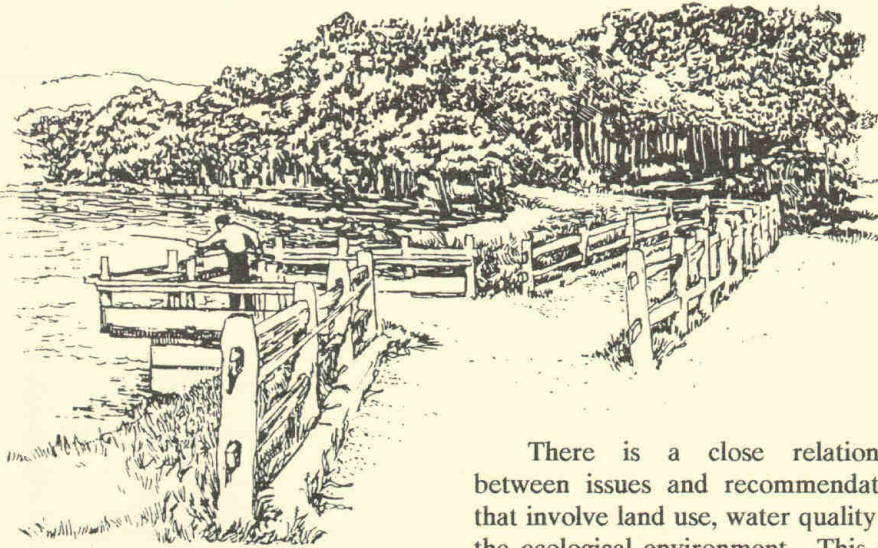
Two major tributaries help form the headwaters of the Monocacy River. Located in Pennsylvania, they are Rock and Marsh Creeks. The City of Gettysburg obtains its water from Marsh Creek. The water quality of this stream is good. Mayflies, indicators of fair/good water quality, are living in the water.

In the southern part of Adams County, most of the land in the Marsh and Rock creek sub-watersheds is used for farming. There has been an increase in the phosphorus level in Rock Creek, which was measured at a water quality monitoring station near the Maryland and Pennsylvania border.

\* Data recorded at the stations vary depending on water flow, rainfall, time of year and several other conditions. Conclusions are based on average trends.

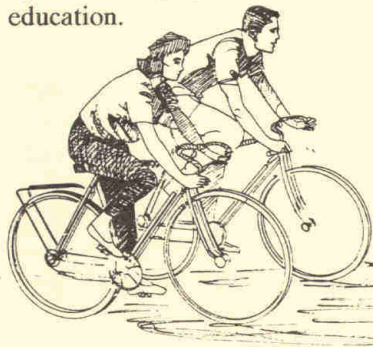


# Issues and Recommendations



## Introduction

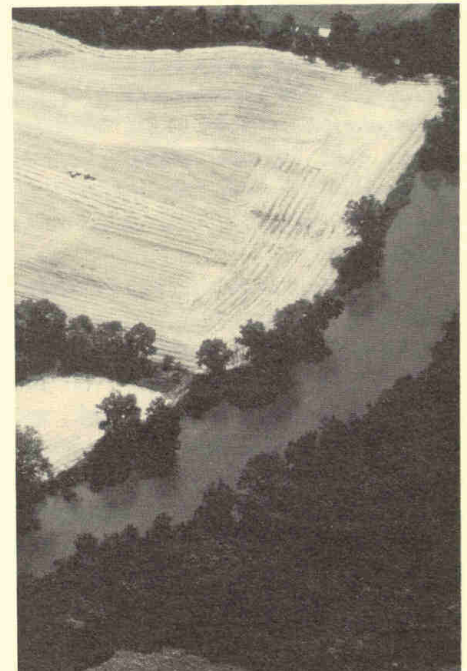
The following section presents issues and recommendations that are directed to the citizens of Carroll and Frederick Counties and local and state governments. Issues can be defined as: "those matters whose solutions are of public concern and which involve some difference of opinion about how they should be resolved...understanding issues is a challenging task because it involves not only a knowledge of the resources, but of the local community and economy as well..."<sup>49</sup> The recommendations provide guidelines for resolving these issues by: encouraging environmentally sensitive land use and planning efforts; initiating additional studies; facilitating inter-agency cooperation to conserve and protect riparian resources; and promoting community involvement by increasing public awareness and education.



There is a close relationship between issues and recommendations that involve land use, water quality and the ecological environment. This may be illustrated by discussing water quality, which is a major issue for the Monocacy River. For example, when a proposed land use next to the river is reviewed during a rezoning hearing, related issues may include the environmental impact to water quality and protection of natural habitat. A possible recommendation that may address these concerns is to designate open space that serves as a buffer between the proposed land use and the river's shoreline. The buffer helps to retain the existing forest cover, reduce nonpoint pollution runoff that is associated with developed lands, protects fish and wildlife habitat, and offers potential recreational access to the river. Implementing a river management plan may reap numerous benefits to a community, including:

- Improved water quality.
- Protection of the natural environment, including improved fish and wildlife habitats.
- Increased recreation and open space, such as: urban walkways and bike paths; community parks; and fishing and boating.
- Other: historic preservation; flood storage and prevention; health protection: quality of life and the economic environment.<sup>49</sup>

The issues and recommendations in this report have been made by the Monocacy River Citizens Advisory Board. They are based on a review of the study information, public meetings, and presentations by guest speakers who have diverse professional disciplines. For each topic of discussion, the issues and objectives have been identified. Identifying objectives provide a method to clearly express a plan of direction to address each issue. Finally, recommendations that address the issues and objectives are discussed. The issues, objectives and recommendations have been topically categorized as follows: land use compatibility and attention to environmentally sensitive areas; inspection, enforcement and disposal of solid and hazardous waste; agriculture; the ecological environment; open space parks and recreation; historic and cultural resources; public awareness and education; interstate resolutions; additional studies; and plan implementation.





## ISSUE #1, LAND USE COMPATIBILITY AND ATTENTION TO ENVIRONMENTALLY SENSITIVE AREAS

Growth in Carroll and Frederick counties will place new and different demands on land and water resources. A growing urban and suburban environment has the potential to contribute more sources of point and nonpoint pollution entering the Monocacy Watershed.

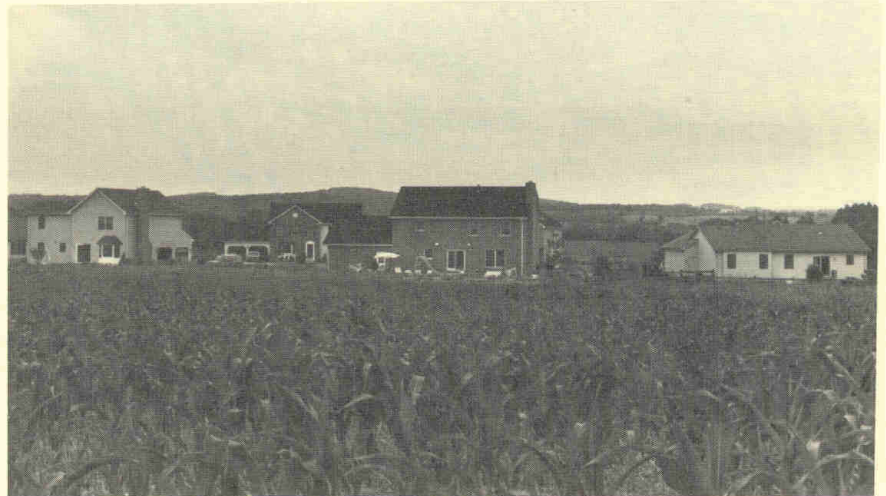
### MAJOR OBJECTIVES

- To improve water quality by encouraging compatibility between active land uses and the natural environment, and directing attention to environmentally sensitive areas.
- To identify and facilitate appropriate uses and/or protection of significant scenic and ecological areas, historic and archeological sites and other valued resources.
- To continue to develop multi-jurisdictional cooperation and coordination with respect to river corridor management and protection.
- To help restore and maintain the ecological health and productivity of the river.

### RECOMMENDATION #1

It is recommended that both counties continue to pursue environmentally sensitive land planning alternatives with a special emphasis on the protection of stream corridors in the Monocacy watershed. This includes efforts that involve county zoning, implementing a river corridor overlay, project coordination and stormwater management.

Zoning ordinances and numerous environmental laws are some of the measures that promote wise management and protection of the river's resources. Sound land use practices may also include: designing structures to minimize environmental and visual impact in a designated conservation zone; introducing innovative construction methods to reduce forest disturbance and tree removal; and incorporating newly available environmental technology into stormwater management.



*A thriving cornfield and community co-exist side by side in Walkersville.*

### 1a. County Zoning

-Carroll and Frederick Counties should continue to maintain and protect their existing designated conservation zones adjacent to the Monocacy River and tributaries with the emphasis on maintaining and improving water quality.

-Based on an analysis of proposed land use, soil type, slope, and other criteria, Frederick County should consider increasing its setback requirement beyond 25 feet from designated flood plains.

-Based on resource analysis, Carroll County should also consider a specified setback distance for proposed development that may occur in the proximity of flood plains. The county is encouraged to continue to implement, where appropriate, the recently passed ordinance that permits clustering in the conservation zone, with environmentally sensitive areas designated as open space.

-Both counties should consider exploring alternatives that provide developers with incentives and information on development options to lessen environmental impact on the river. Incentives should also encourage project

sponsors to voluntarily incorporate setback distances from flood plains along the river. Voluntary setback distances above and beyond designated flood plains would allow for increased buffer protection in the river corridor. Possible options could include considerations such as TDRs (transferable development rights), clustering, maintenance of flood plain as open space (which Carroll County has recently adopted), and a county property tax reduction to developers who retain forested land. (See "density credits under The Ecological Environment-Forest Cover.")

-Frederick County should identify (map) all flood plain next to Monocacy River tributaries and include such information in the comprehensive plan.

-In areas that abut designated conservation zones, both counties should give special attention to zoning and development requests that may adversely impact water quality and other riparian resources. This includes development such as proposed land fills, junkyards, hazardous material storage facilities and industries that produce hazardous or toxic waste.



### 1b. River Corridor Overlay

-Both counties should consider using the river corridor overlay for the Monocacy River to provide additional resource information for local planning efforts. (See map.) The purpose of the overlay is to help focus and direct attention to environmentally sensitive stream corridors and promote land use alternatives that encourage conservation and protection of riparian resources. The Monocacy River, its tributaries and their immediate shoreland are often referred to as stream valley corridors. Land use near or in stream valley corridors can substantially impact surface water quality. Therefore, stream valley corridors are environmentally critical areas that require special conservation and protection measures. The use of an overlay would help address this issue.

-The overlay's objectives are to: re-emphasize the importance of water quality protection; help identify valuable wooded buffers as well as areas in need of reforestation; identify predominant land use within one mile of either side of the river's shoreline and identify

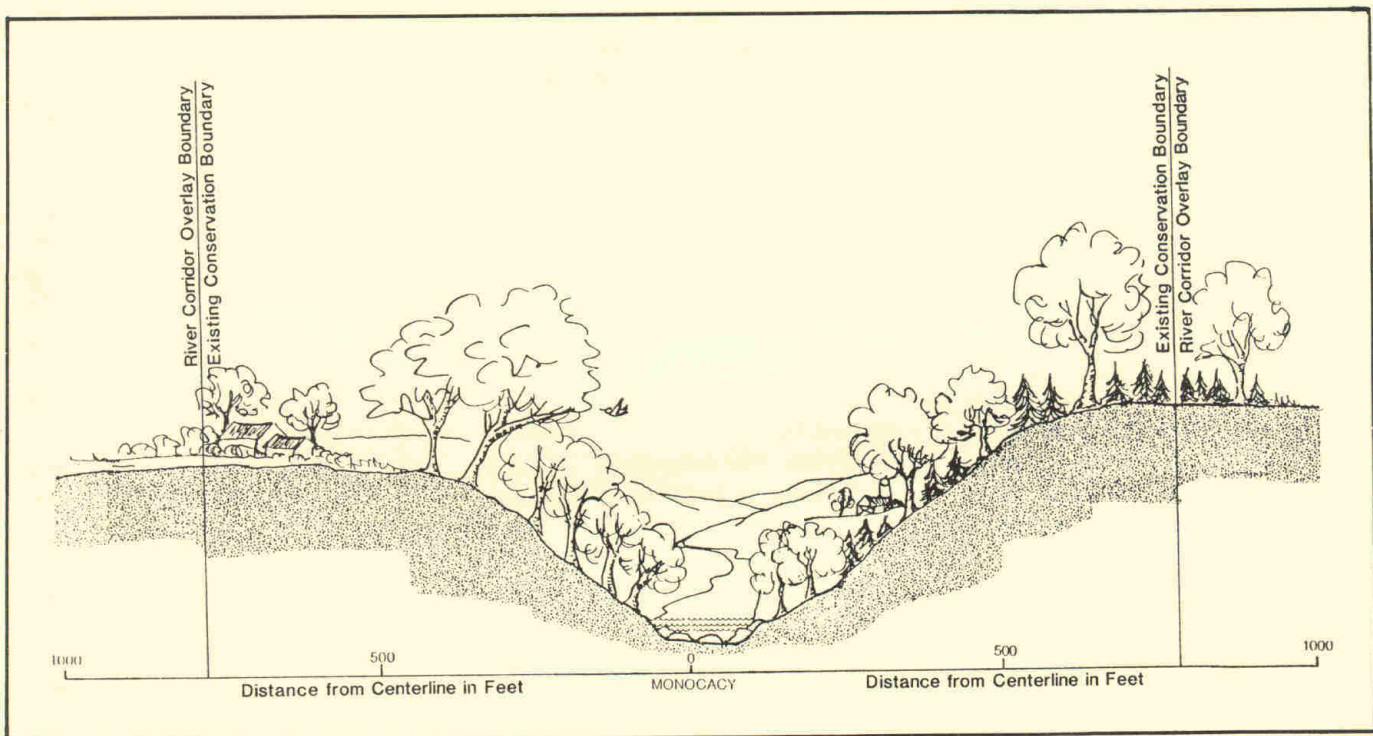


Mumma Ford

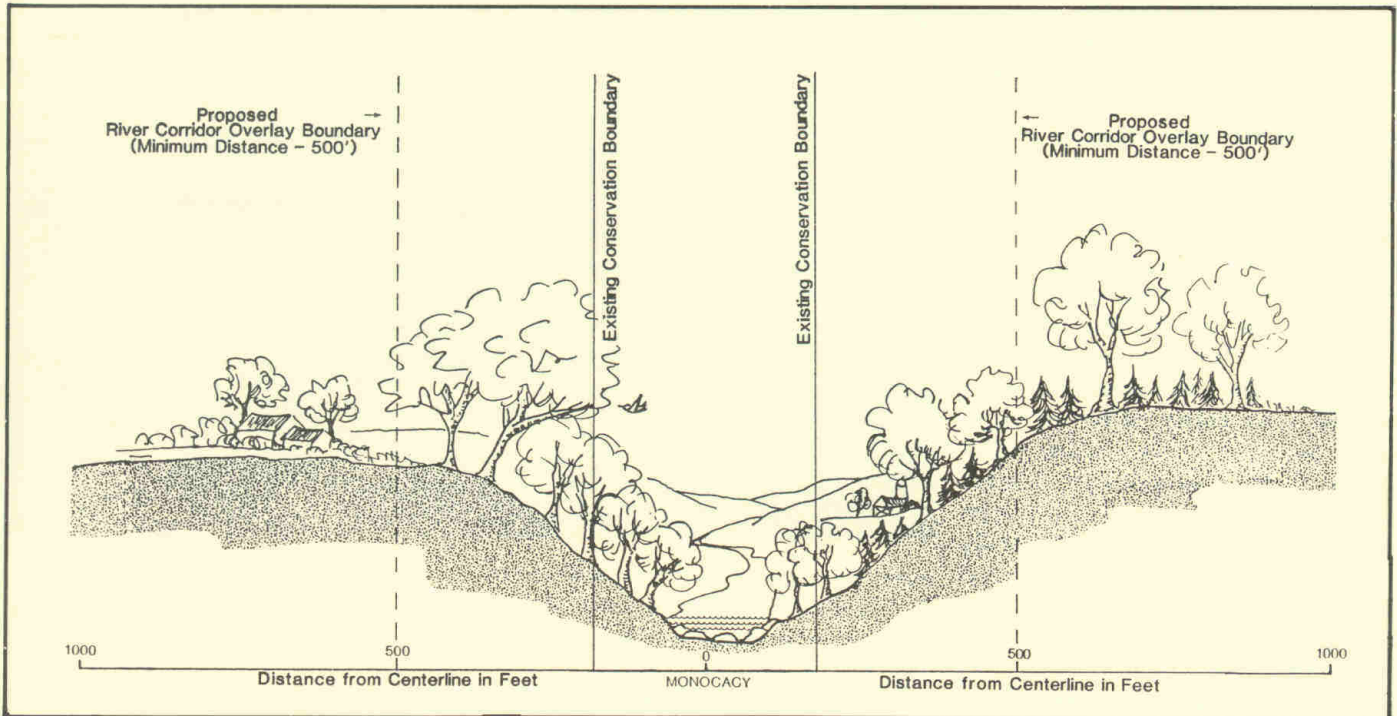
resources that are not considered part of the counties' conservation zone criteria. These resources, outlined by The Scenic and Wild Rivers Act, include: habitat; fisheries; rare, threatened and endangered species; scenic and natural areas; ecological/ hydrological features; historic and archeological sites; and lands suitable for future open space and recreational opportunities. (See legislation, Preface.) The river corridor

overlay would not function as a regulatory measure. The proposed boundary for the overlay is as follows:

1. The boundary is the same as Carroll and Frederick Counties' conservation zone for existing distances of 500 feet or greater, as measured from either side of the river's centerline.







2. In some areas along the river, the existing conservation zone boundaries are less than 500 feet when measured from either side of the river's centerline. In these instances, the overlay boundary would extend to 500 feet measured from either side of the river's centerline. This distance is necessary to conserve river-related resources and certain land features. Criteria for selecting the 500 foot minimum distance is based on: the presence and location of some steep terrain such as cliffs and ridges next to the river's shoreline; protecting water quality; projected incidence and location of archeological sites; presence, location and probability of non-tidal wetlands and species identified on the Heritage List; possible considerations for future open space designation; and a minimum visual-distance that takes into account the river's scenic and aesthetic character.
3. The river corridor overlay also has four extended boundaries. The extended boundaries include critical areas that are not protected by the existing conservation zones and are also located outside of the rest of the river corridor overlay's 500 foot minimum distance as measured from either side of the river's centerline. An example is where certain species on the Heritage List and steep forested slopes are present outside of the existing conservation boundary and the 500-foot minimum distance as established for the rest of the overlay's boundary. In this example, the extended boundary is located approximately 1000 feet as measured from the river's centerline. The extended boundaries include the following: Map Section 3: LeGore Bridge vicinity & ridge located north of LeGore Bridge. Map Section 7: wooded ridge on east side of river, north of Michael's Mill. Map Section 8: wooded ridge on east side of river, south of Lilypons Bridge. The extended boundaries are recommended because they contain critical woodlands that are located on steep slopes in the river corridor.
- Identifying and updating the resource information in the overlay will be a continual process. Resource information should include: forested areas; soils; slope; species on the Heritage List; water quality trends; fisheries and wildlife; and archeological and historic sites. The overlay's map data should be eventually stored in a computerized mapping system. This would allow the counties and the state to share data base information. The overlay data base should include not only identified riparian resources, but also property lines with detailed land features; lands suitable for voluntary conservation, historic preservation, and agricultural preservation easements; land owners who have donated



conservation, historic preservation and agricultural easements; and land owners who are participating in various land conservation programs.

-In the future and contingent on resources and staff availability, cartographic services to further develop the river corridor overlay will be provided by Greenways and Resources Planning, Maryland Department of Natural Resources. Project development will be coordinated with Carroll and Frederick Counties, as well as with other state agencies, and as agreed upon by the Maryland Department of Natural Resources and both counties. As a long range goal, the counties should consider developing similar overlays for major tributaries of the Monocacy.

**1c. Project Coordination**

-During the initial design phases of projects, government agencies should actively continue to pursue

environmentally sensitive land use strategies with project sponsors. For example, project coordinators should explore future design alternatives for proposed bridge crossings with project applicants. Coordination has the potential to reduce wetland and forest disturbance, incorporate engineering design with mitigative measures, and suggest methods of reforestation that will reduce nonpoint runoff into the river.

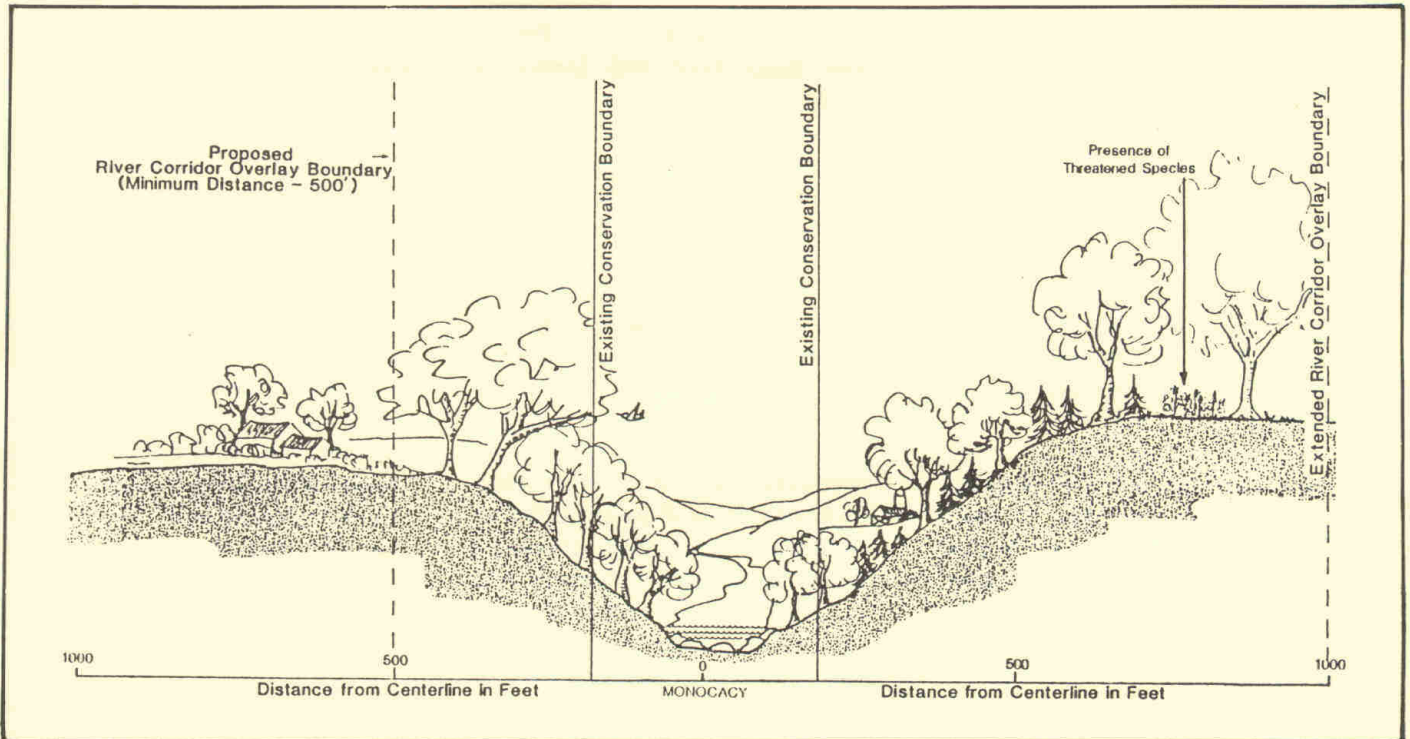
**1d. Stormwater Management**

-Both counties should consider establishing a special escrow account for funds provided by project sponsors for future stormwater pond (wetpond) maintenance; this would help support the counties' existing stormwater maintenance programs. (Maintenance agreement periods may be determined best by each county, but similar escrow accounts cover maintenance between five to ten years.) When stormwater ponds are not maintained, excess sedimentation contributes to point

sources of pollution and is a safety hazard.

-In order to reduce environmental impact, the counties should continue with long range plans to properly locate future stormwater ponds, especially if they must occur in or adjacent to environmentally sensitive stream corridors. The installation of future stormwater ponds in stream corridor areas should be avoided.

-Stormwater ponds should also be designed with provisions for convenient cyclical maintenance such as: providing areas for drying sediment in stormwater pond areas, designing slopes that can be easily mowed, and allowing for rescue considerations. Up-to-date technology and aesthetics to blend in with the surrounding environment should be incorporated into ponds and maintenance facilities. The state and the counties need to constantly update and research methodologies for stormwater management and other sediment and erosion control programs.



\* All distances are measured on a horizontal straight line using 7.5 minute quadrangle maps; they are not calculated from ground measurements.



## ISSUE #2, ENFORCEMENT OF ENVIRONMENTAL LAWS, SOLID WASTE DISPOSAL AND RESTORATION OF DEGRADED ENVIRONMENTAL CONDITIONS

There is an increasing demand for more land and water resources. Adequate enforcement of existing environmental laws is crucial to conserve those resources and reduce environmental impact, produce a better living environment for county residents and reduce costs of environmental clean-up. Related to environmental enforcement is the issue of environmental clean-up. Currently there are not any designated county or state environmental clean-up funds or contingency plans to remove abandoned autos, tires and similar types of pollutants discarded into the Monocacy River and its tributaries. The issue of recycling is also becoming more important. The availability of suitable landfill sites is decreasing and the cost of developing and maintaining them is increasing.

### MAJOR OBJECTIVES

- To improve water quality by enforcing existing environmental laws as specified by local, state and federal legislation.
- To help restore and maintain the ecological health and productivity of the river through the use of existing programs.
- To increase public awareness about important river resource values through public relations and environmental education.

### RECOMMENDATION #2

It is recommended that both counties and the state consider the following:

- 2a. Increase the number of inspectors at the local and state level for sediment and erosion control permit evaluations.
- 2b. Increase the number of inspectors employed to enforce other environmental violations. This includes investigating violations such as the illegal dumping of solid waste and hazardous materials into the Monocacy River.
- 2c. Require sewage treatment plants in the Monocacy watershed to meet all discharge requirements. Water quality monitoring, treatment plant inspections and enforcement of state and federal regulations should be implemented where necessary. \*
- 2d. Improve coordination between local and state governments to cleanup solid waste such as tires

and abandoned autos. Methods of local and state coordination and designated funding for solid waste clean-up projects could be established by designating a special citizen, county and state task force, or by incorporating this project into the "Adopt the Monocacy River" program. (See also, Appendix, Area-Wide Watershed Assistance Programs.)

- 2e. Continue to pursue alternatives to encourage citizens to discard materials in legally permitted landfills. The problem of illegal dumping on public and private property such as at LeGore Bridge, and Biggs Ford and Monocacy Bottom roads is increasing. One consideration is to increase the number of amnesty days at county landfills to accept these materials free of charge, and increase the number of times county trucks pick up discarded materials at residences through the bulk pick-up program.
- 2f. Both counties should continue developing and implementing comprehensive, voluntary recycling programs, as well as strategies to more effectively manage hazardous and toxic waste. Returning and recycling discards to productive use can reduce disposal costs, save energy and conserve and protect natural resources. The issue of where to dispose of our garbage is a growing problem in many other local communities. In some

jurisdictions, it has become a crisis. Other successful county pay-as-you-go recycling programs rely on active marketing and advertising campaigns that educate the public about the alternatives and benefits of recycling. Often the local jurisdiction makes the information readily available in a comprehensive, informational brochure. Numerous waste management alternatives are available, depending on local need, and available funding. For example, some local governments subcontract their entire recycling programs to a private operator. Another option is for the counties to establish county operated, "drop-off centers" for citizens to recycle materials. The centers commonly have transfer boxes that segregate glass bottles, aluminum cans, newspapers, hazardous waste such as motor oil and car batteries, and scrap metals. Proceeds from the sale of the recycled materials help to cover the costs of operating the drop-off centers. Similar programs are made even more effective by coordinating strategies with local waste management companies that accept additional recyclable materials from the public.





- 2g. Create greater public awareness specifically about the current availability of legal sites for discarding hazardous and toxic materials such as automotive lubricants, herbicides and pesticides. Both counties should also consider increasing the number of sites that can receive hazardous and toxic waste.



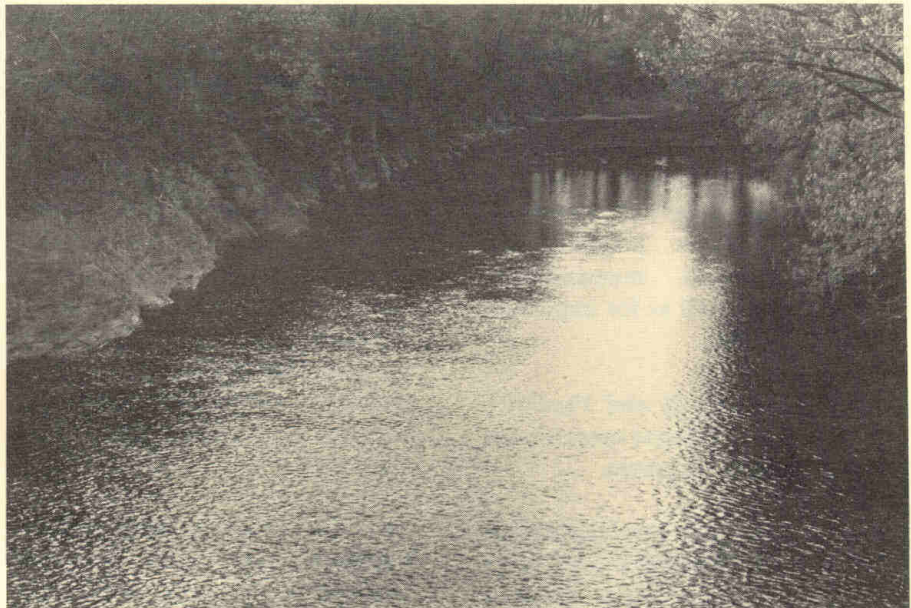
- 2h. Provide important phone numbers and access to report infractions against environmental laws that involve nontidal wetlands, sediment and erosion control, and illegal dumping. The current lack of access can be partially remedied by printing important phone numbers in the front of local phone books and exploring other similar measures to increase public accessibility to local and state environmental enforcement agencies.

- 2i. Continue the efforts by local, state and federal governments to rigidly monitor and enforce laws that deal with sludge application in critical areas. This includes routine inspection of trucks that transport sludge, timing and method of field application, and prohibiting application in areas that are in the proximity of stream corridors based on factors such as weather conditions, soil type, slope, and extent and effectiveness of existing vegetative buffers.

*\*Note-*Since the completion of this report in draft form, the Monocacy Sewage Treatment Plant has been expanded.



*LeGore Area*



*Lilypons Area*



## ISSUE #3, AGRICULTURE

**Agriculture, a vital part of the economic, scenic and rural character of both counties, is a contributor of significant nonpoint source pollution entering the watershed; this includes sedimentation, nitrogen and phosphorous, and coliform bacteria.**

*Frederick County*

### MAJOR OBJECTIVES

- To develop multi-jurisdictional cooperation and coordination to improve water quality.
- To encourage best management practices that maximize conservation and wise use of riparian resources.

### RECOMMENDATION #3

Excellent agricultural programs exist in both counties. These programs were created to assist area farmers and reduce the effects of nonpoint sources of pollution. However, as with many programs that rely on local, state and federal funding, future agricultural subsidies may decrease. Voluntary farmer participation and compliance with the various cost-share programs can be strengthened by considering the following:

- 3a. Through a concerted lobbying effort on a county, state and federal level, obtain additional agricultural cost-share program funding. This money should be used to encourage buffer strips in stream corridors, pesticide and animal waste management programs, as well as for improving wildlife habitat.
- 3b. Encourage Carroll and Frederick Counties to contribute more money for cost-share programs.
- 3c. Continue to have the Department of Natural Resources and other applicable government agencies assist the Soil Conservation Service and districts with grant proposals for cost-share money. As grant monies become more competitive, justification and quantification for



fund requests will become more important. Justification may be strengthened by emphasizing and describing the need to improve water quality in the Monocacy watershed.

- 3d. Send agricultural agents out to farmers to enlist them in various programs, rather than solely relying on regional offices to increase the rate of farmer participation. Additional staffing and funding to provide adequate and experienced technical assistance should be explored if program workloads are increased.
- 3e. Develop localized informational brochures on farm program availability, rather than distributing area-wide brochures. Existing generic brochures are not often applicable to the local farming community and therefore do not contribute to program participation.

3f. Develop informational and outreach programs on related farming issues that not only reach local farmers, but the rest of the community as well.

3g. Develop monetary incentives for preserving prime agricultural land which are commensurate with today's real estate values, thus allowing farmers to continue farming.

3h. Consider farmland that is located in the watershed's designated flood plain as having a higher priority for farmland district formation and easement purchases.

3i. Provide the river corridor overlay information to the Soil Conservation Service. The overlay information would help to identify problem areas on agricultural lands that could benefit from special voluntary agricultural cost-share programs.



## ISSUE #4, THE ECOLOGICAL ENVIRONMENT--FOREST COVER

The Monocacy Watershed has one of the lowest rates of forest cover in the State of Maryland. The values of adequate forest cover are numerous. Forest cover adjacent to stream corridors prevents runoff from nonpoint sources of pollution, promotes wildlife habitat and bio-diversity and prevents thermal pollution.

### MAJOR OBJECTIVES

- To help restore and maintain the ecological health and productivity of the river.
- To improve water quality by identifying land areas in need of reforestation.
- To identify and facilitate appropriate uses and protection of significant ecological, forested areas located in the watershed.
- To continue to develop multi-jurisdictional cooperation with respect to forest management.

### RECOMMENDATION #4

Consider the following measures to protect water quality by minimizing the loss of forest cover during development:

- 4a. Encourage both counties to explore alternatives to prohibit and/or minimize vegetative disturbance caused by development in stream valley corridors for a specified distance. The Maryland Department of Natural Resources has established a minimum buffer of 50 feet on nearly level ground, with an increase in buffer width calculated from the percentage grade on steeper slopes. Protection of existing forest cover in the river corridor could also be encouraged by allowing project sponsors density credits for land left undisturbed. (See 1a, Zoning.)

-Loss of forest cover may also be mitigated by requiring replacement of forested land on-site. This could also take the form of reestablishing a certain portion of woodland or forest for any proposed development. This recommendation emphasizes environmentally sensitive planning at a conceptual

level to optimize use of resources. If on-site mitigation is not possible, the counties should create a fund to purchase land and plant material for reforestation projects. Local funding efforts could then be matched against available state funds. (See Zoning.)

- 4b. Protect, designate and segregate areas where tree cover is to be retained and/or replanted in planned development. Soil compaction, unnecessary changes in grade that may affect moisture regime, and mechanical injury to trunk and roots associated with construction, will reduce the chances of vegetative survival.

- 4c. Due to limited resources and funding, state and local governments need to continue identifying and prioritizing critical stream corridor areas in need of reforestation. Data should include such factors as identification of steep slopes, erodible soils and insufficient vegetative cover under acceptable BMP standards. This information should also be incorporated into the computerized mapping system as a data category. (See "River Corridor Overlay.")

- 4d. Encourage the use of locally mixed native species such as red maple in the Monocacy River Basin Forestry Project, with an emphasis on replanting these hardwoods in critical buffer areas. Native species should be determined by project foresters by using the river corridor overlay's identified tree associations as well as by on-site surveys.

- 4e. Expand the resources of the Monocacy River Basin Forestry Project. Additional personnel would provide technical assistance for new cost-share programs and increase seedling production capacity at state nurseries. This would increase the program's capability to reforest critical stream corridor areas.

- 4f. Logging operations need to apply special care as to the location, use and stabilization of logging roads, skid trails and loading areas. This especially applies to logging projects on public and private lands adjacent to the Monocacy River and tributaries. Improper logging practices may adversely impact habitat, soils and water quality.

- 4g. Provide continuing education in forestry practices for landowners who initiate forestry activities. The state should continue sponsoring locally advertised courses to encourage landowners with forested lands to develop an approved forest management plan with assistance provided by the Forest and Park Service. Additional education provided to landowners would help decrease erosion and unnecessary loss of wildlife habitat. There is also a need to increase the level of information, technical and educational services. An increase in personnel could help strengthen existing forestry programs.





## ISSUE #5, THE ECOLOGICAL ENVIRONMENT: FISH, WILDLIFE AND OTHER HABITATS

The Monocacy's stream valley corridors provide vital and irreplaceable habitat for fish and wildlife.

### MAJOR OBJECTIVES

- To help restore and maintain the ecological health and productivity of the river.
- To improve water quality.
- To identify the appropriate protection of significant ecological areas.
- To develop multi-jurisdictional coordination with respect to river corridor management and protection.
- To increase public awareness about important river resource values through public relations and environmental education.

### RECOMMENDATION #5

Protect fish, wildlife and other habitat in the watershed by considering the following alternatives:



Red-tailed Hawk  
-*Buteo*  
*jamaicensis*

5a. Use the proposed river corridor overlay to identify sensitive ecological areas and Heritage species and determine best possible methods to encourage land use compatibility. The overlay should identify designated wetlands, forest cover by acreage (see forests), species on the Heritage List, and aquatic features of the riparian environment. The counties should consider protecting ecologically significant areas when developing or revising land use plans and policies.

5b. Conserve resources while allowing land to remain in private ownership. Natural land areas next to the Monocacy and tributaries may be protected by soliciting landowners for voluntary conservation easements. Efforts should be coordinated with the Maryland Environmental Trust, Greenways and Resources Planning and other applicable state and county agencies. Some of the easement criteria for selecting landowners in the Monocacy watershed should include:

- Lands that contain habitat with species listed on the Natural Heritage List.
- Lands that contain wooded areas that serve as valuable forested buffers.
- Sections of the river and tributary corridors that have high recorded counts of sportfish and wildlife. (See the Ecological Environment).
- Designated wetlands of Special State Concern.
- Lands that contain sections of stream valley corridors that have steep slopes (10% or greater) and bluffs.



Muskrat -  
*Ondatra zibethicus*

5c. Consult the Natural Heritage Program to maximize habitat and species protection. Contingent on species and habitat, below is a summary of recommendations pertaining to identified rare, threatened and endangered species in the Monocacy region:

- Incorporate habitat and population protection measures into a management plan for species residing on National Park Service lands.
- Incorporate local, state and federal planning measures that retain springs and seepage areas that contain species on the Heritage List.
- Add species populations that are found on private lands to the Maryland Natural Areas Registry. If those lands become available for sale, consider proposing land acquisition by non-profit organizations such as the Nature Conservancy.



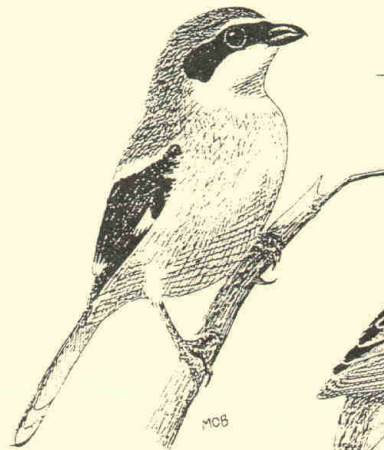


- Establish habitat and population monitoring programs; continue survey efforts to discover additional populations.
- Determine optimal stage of habitat succession for species' establishment and maintenance.
- Coordinate conservation and protection measures with other regulatory agencies and nonprofit organizations that are involved with habitat protection.
- Maintain an updated list of non-profit organizations as potential grant sources for land acquisition.
- Continue survey efforts to rediscover historic population and to discover new populations.
- Determine beneficial management practices to enhance habitat.
- Decrease the impact of foot traffic and prevent unnatural canopy openings on public lands.

**Current and Historic Rare, Threatened and Endangered Species of Frederick and Carroll Counties, Maryland**

Courtesy of Maryland Natural Heritage Program.  
Illustrations by Michael O'Brien.

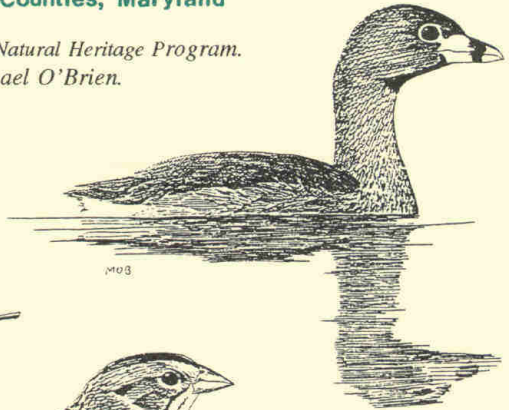
- 5d. Retain den trees in vegetative buffer zones and snags (underwater stumps etc.) for game/migratory birds and mammals.
- 5e. Install wood duck nests in the river corridor in observed nesting wood duck areas. Observed nesting areas include the upper and lower Monocacy (River Corridor Overlay, Sections I, II, VII and VIII). Installation could be done by service oriented groups such as the Boy and Girl Scouts of America.
- 5f. Maintain and provide nesting cover for ground birds and mammals. This may be accomplished by encouraging land owners to participate in state sponsored habitat improvement programs. Replanting native shrubs that provide a wildlife food source should also be encouraged. (See "Forestry.")
- 5g. Reduce mowing during ground nesting seasons to protect wildlife.



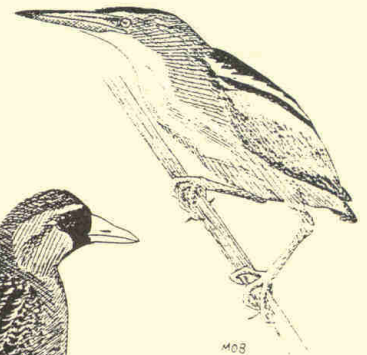
Loggerhead shrike- *Lanus ludovicianus*



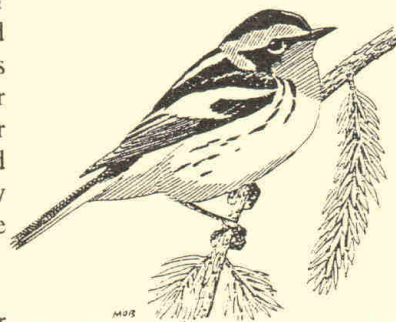
Henslow's sparrow- *Ammodramus henstowii*



Pied-billed grebe- *Podilymbus podiceps*



Least bittern- *Ixobrychus exilis*



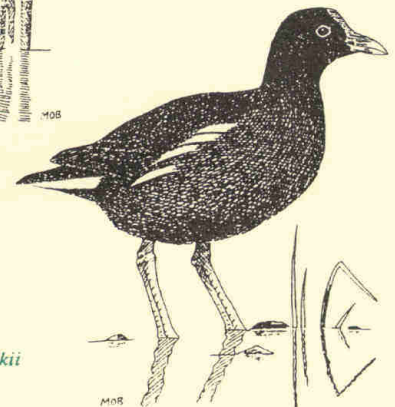
Blackburnian warbler- *Dendroica fusca*



Sora- *Porzana carolina*



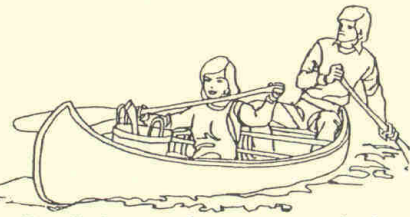
Bewick's wren- *Thryomanes bewickii*



Common moorhen- *Galinula chloropus*



## ISSUE #6, OPEN SPACE, PARKS AND RECREATION



As Frederick County continues to grow, the correlation between a quality living environment and planning for adequate open space, parks and recreation opportunities is becoming more important. This issue is especially pertinent to designated growth areas immediately north of the City of Frederick and south to the river's confluence with the Potomac.

The majority of the Monocacy region in Carroll County remains predominately agricultural. With the exception of some rural towns located near tributaries, planning for park and recreational opportunities along the river is not an immediate need, but this could be subject to change in the future.

### MAJOR OBJECTIVES

- To identify and facilitate appropriate methods to designate open space as an outdoor recreational resource.
- To improve water quality by reducing sources of nonpoint pollution by retaining lands in open space.
- To encourage environmentally sensitive land use and water resources management to maximize conservation of riparian resources.

### RECOMMENDATION #6

The following should be considered:

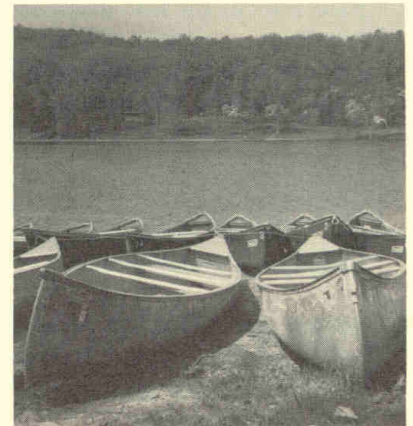
6a. Continue developing stream valley parks that may serve as vital greenways in urban and residential areas in Frederick County. The impact of public use and access to these environmentally sensitive areas should be carefully considered before land is designated and when a park master plan is developed. Stream valley parks are a source of open space and recreation. They also provide buffers to enhance water quality and promote wildlife habitat. Upon consultation with the Frederick County Parks and Recreation Commission, it is recommended that the following streams be considered for special conservation and protective measures: Furnace Branch; Rocky Fountain Run; and Tuscarora, Ballenger, Bennett, Glade, Bush, Toms, Carroll, Owens, Fishing, Friends, and Hunting Creeks. It is also

recommended that the county pursue its goal to develop Glade, Ballenger, Linganore and Tuscarora Creeks into stream valley parks. The county should also consider coordinating its future open space and stream valley park plans with the City of Frederick, which has designated Carroll Creek as a stream valley park and is committed to developing a Monocacy River linear park. Funding sources that provide money for land acquisition and capital improvements should be explored.

6b. The concept of protecting the rights of private land ownership along the river is very important. However, the Monocacy River is a state waterway (Annotated Code of Maryland, §08 05-01). As land becomes available for sale, the counties should consider the option to purchase suitable property that may provide public access points to the river. Both counties should direct attention to lands that may become available for sale next to existing bridge crossings. Proper site design, location and maintenance will be critical to reduce environmental impact to the river due to public use (See Zoning resource analysis).

Frederick County should install a modified, small boat ramp facility at Buckeystown Park and improve the existing one at Craegerstown Park. Future locations and

suitability for other potential boat access sites should also be explored along the entire length of the Monocacy River.



*Hunting Creek Lake, south of Buckeystown.*

- 6c. Carroll County should continue to take into account changes in development patterns and how they may affect future available open space in the Monocacy watershed. Open space should be designated in stream corridor areas when development occurs.
- 6d. Explore other sources of recreational funding to maximize use of resources. Federal and state funding that assists local governments to acquire and maintain open space is decreasing. Frederick County should consider a grant program to supplement existing sources of funding.
- 6e. Consider improving the entrance and parking area of the Monocacy Natural Resources Management Area.



## ISSUE #7, HISTORIC AND CULTURAL RESOURCES

The National Park Service has identified the Monocacy River as an outstanding archeological resource of national importance. The river and tributary corridors also contain many historically significant structures that are part of the heritage of Carroll and Frederick Counties.

### MAJOR OBJECTIVES

- To identify and recommend appropriate uses and protective measures of significant archeological and cultural resources.
- To increase public awareness and education about local cultural history and its relationship to the natural environment.

### RECOMMENDATION, #7

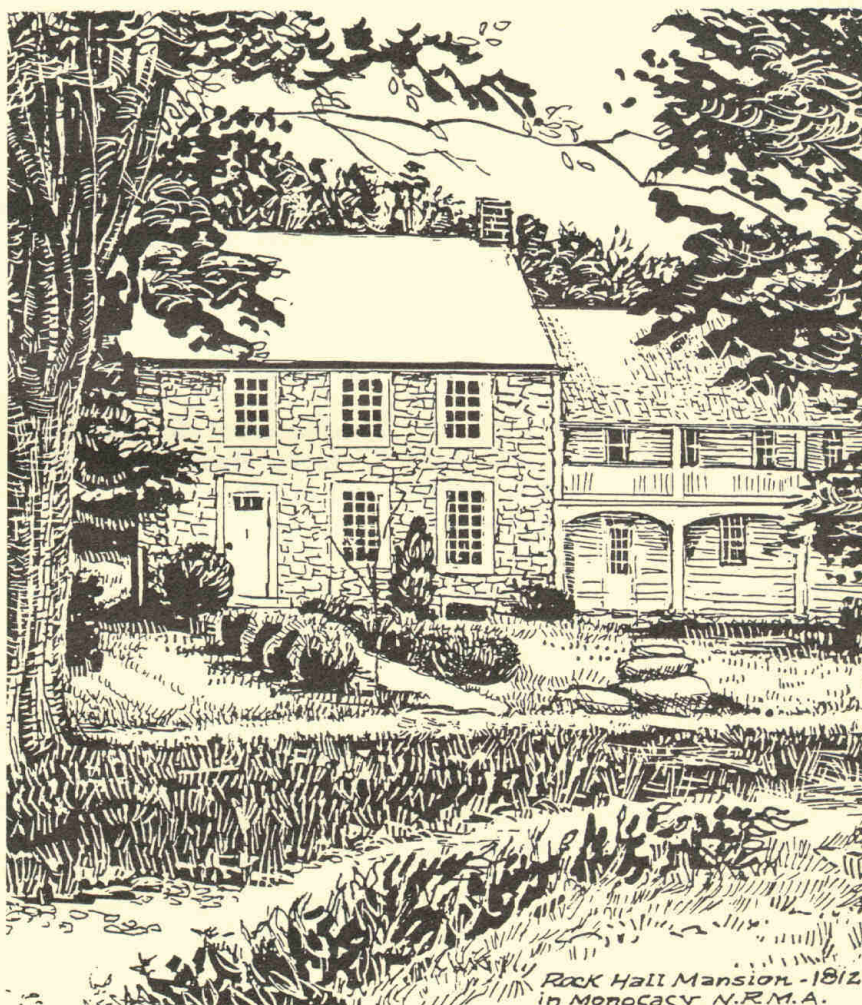
- 7a. The State of Maryland's Historical Trust needs to actively approach Carroll and Frederick county property owners for voluntary historic preservation easements if their lands contain significant archeological or historic sites. Efforts need to be coordinated with the local planning departments and historical societies.
- 7b. Carroll and Frederick Counties should continue to coordinate preservation planning with the Maryland Historical Trust, especially for proposed development that may impact historic and archeological sites. This includes consideration to protect irreplaceable sites of archeological and historic significance, and the encouragement of land uses that may protect them.
- 7c. Coordinate the National Park Service's plans for the Monocacy National Battlefield with the local county governments, the Department of Natural Resources and the Maryland Historical Trust. Coordination should address open space and recreational opportunities, future protection of a national historic property, public

access to the Monocacy River, and how proposed development may benefit from an important, archeological and historic resource.

- 7d. When a significant historic site becomes available for sale, the counties should consider purchasing the site for the purposes of historic preservation and education.

Alternatives could include involvement and coordination with the local historical societies to implement fundraising efforts that promote historic preservation.

- 7e. Future county and state sponsored studies are needed to locate and identify cultural resources that are located in stream corridors.



Rock Hall Mansion - 1812  
in Monocacy N.R.M.A.



## ISSUE #8, PUBLIC AWARENESS AND EDUCATION

Several of the issues related to the Monocacy River are due to a lack of public awareness and education. The extent to which public awareness and education are promoted will partially determine the effectiveness of plan implementation.

### MAJOR OBJECTIVES

- To increase public awareness about important river resource values through public relations and environmental and cultural education.

### RECOMMENDATION #8

There needs to be a continued emphasis at the local and state government levels to generate greater public awareness and education about the Monocacy River's resources.

- 8a. Local educational monies are needed to create greater public awareness about the importance of land and water conservation practices. For example, this could be in the form of county sponsored adult education classes.
- 8b. Local schools and colleges should continue to develop and incorporate studies of the Monocacy's resources into their curricula. Examples include Carroll County's Westminster High School, which offers an ecology course on local natural resources, and the Hashawha Environmental Center, which sponsored its first Monocacy Watershed Studies Program for middle-school children.
- 8c. Request the Maryland State Highway Administration to post new signs on bridge crossings that state "Monocacy Scenic River."
- 8d. Establish an "Adopt the Monocacy River" program. Sponsored by the local governments, the proposed Monocacy River Citizens Advisory Board and the Department of Natural Resources' "Adopt a Stream" program and Greenways

and Resources Planning, the on-going project would encourage local citizens to "adopt" designated sections of the Monocacy River and tributaries, routinely clean up trouble spots and assist with local and state conservation programs.

8e. The state should readily provide speakers to make presentations to civic groups, schools and business organizations about the Monocacy's resources.

8f. Carroll and Frederick Counties and the state should continue to conduct special programs that educate and promote the resource values of the Monocacy River; this includes canoe and field trips, and other types of interpretive programs. The local and state governments should also co-sponsor a program to educate the public about the rich natural and cultural history of the Monocacy River Valley. The program should be educational and meaningful to all age groups and families. Presentations, participatory activities, field trips, and other events could interpret the watershed's diverse resources and relate their importance to the local citizenry.



8g. Frederick County should consider establishing an Environmental Education Center which would serve the general public and local schools.

8h. Frederick County should also consider establishing a Cultural Interpretive Center. Its purpose would be to promote historic and archeological preservation and education. Alternatives for land and facilities could possibly include the state-sponsored installation of an interpretive facility on state lands. Operational money, staff and site development would be the responsibility of the county. The proposed Cultural Interpretive Center could also be combined with the environmental education facility.





## ISSUE #9, INTERSTATE RESOLUTIONS

Rivers do not always fall within a single governmental jurisdiction and the Monocacy is no exception. The Monocacy River's headwaters begin in rural Pennsylvania around the City of Gettysburg. Land and water use decisions made by those local governments and the Commonwealth of Pennsylvania have a substantial impact on the Monocacy River's water quality.

### MAJOR OBJECTIVES

- To improve water quality by encouraging land use compatibility for tributaries of the Monocacy River.
- To develop multi-jurisdictional cooperation and coordination with respect to river corridor management and protection.

### RECOMMENDATION #9

Prepare and sign an interstate resolution for the Monocacy River. The resolution should be between the Maryland Department of Natural Resources and the Pennsylvania Rivers and Wetlands Division, Department of Environmental Resources. The resolution would provide a foundation to establish citizen and professional forums on river conservation and planning and to jointly address those land planning and water quality issues directly related to the interstate Monocacy Watershed.

Contingent on the agreement between Carroll and Frederick Counties and the Maryland Department of Natural Resources, interstate coordination could also be improved by inviting Adams County to appoint a representative to the proposed Monocacy Scenic River Advisory Board. (See Recommendation #11, Implementation.)



Upper Monocacy





## ISSUE #10, ADDITIONAL STUDIES

Well informed decisions about land and water resources management are dependent on adequate information. Some resource information about the Monocacy River is inadequate or outdated.

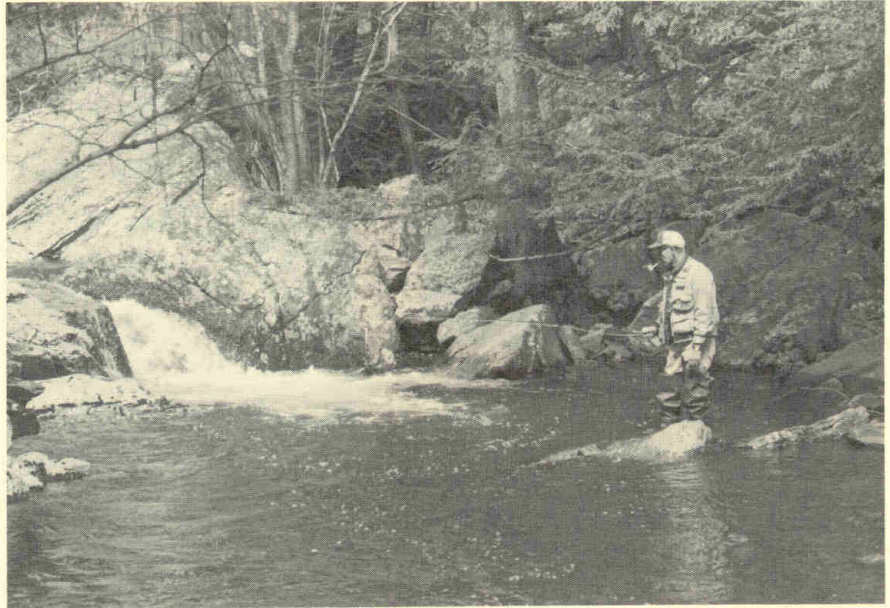
### MAJOR OBJECTIVES

- To improve water quality by evaluating the environmental impact of various types of land uses.
- To encourage land use and water resources management that will maximize conservation and the wise use of riparian resources.

In an era of high demand on natural resources, water quality monitoring is vital to optimize effective use of limited resources. It helps to: monitor the river for protecting human health and safety, including activities such as water contact recreation; determine and evaluate the environmental impact from types of land use that occur along the river; and encourage planning efforts which promote environmentally sensitive land use in stream corridor areas. There is a need to implement the following studies and tests to help identify the impact of land use on water quality:

10a. The state should continue to monitor and maintain existing water sampling stations on the Monocacy River and support detailed water quality assessment programs, such as the Piney\Alloway targeted watershed monitoring project. It should also plan for future, adequate funding to support these types of water quality programs, and, in addition, test results should be made readily available to the public. Carroll and Frederick County's Health Departments should consider monitoring fecal coliform counts in strategic locations in the Monocacy River and tributaries.

- Develop inexpensive biomonitoring water sampling



*Trout fishing at Hunting Creek, Thurmont.*

programs at the local level to monitor and identify areas that may have water quality problems and educate the public as to the nature of the problems. This could also be encouraged as a local high school or university project. Under county supervision, volunteers could also use water sampling kits that are easy to use, portable, and provide another method to identify possible water quality problems. This should be coordinated with other regional agencies such as the Metropolitan Washington Council of Governments, Interstate Commission of the Potomac River Basin, Maryland Department of the Environment and Alliance for the Chesapeake Bay.

10b. The counties should recommend that the state continue with studies of the ecological environment. Areas of study should include: fish and wildlife; unique habitat; rare, endangered and threatened species; and possible

impact of pesticide\ herbicide application on habitat and animal populations.

10c. Frederick County should develop an open space and recreational needs assessment and stream valley park plan for Glade, Ballenger, Tuscarora and Linganore Creeks. The assessment and plan should include the following: identification of areas suitable for open space and/or linear park designation; recommended boundaries based on environmental criteria and projected citizen use and demand; projected capital and operational costs; alternative sources of funding; and planning strategies for project implementation.

10d. As part of the "Adopt a River" program, volunteers and professional staff need to walk the entire length on both sides of the Monocacy River to identify additional land use problems.



## ISSUE #11, IMPLEMENTATION OF THE MONOCACY PLAN

**Implementation of the Monocacy River Plan will depend on local support and citizen involvement.**

### MAJOR OBJECTIVES

- To increase public awareness about important river resource values through public relations and environmental education.
- To continue to identify, facilitate and implement appropriate uses and/or protection of significant scenic and ecological areas, historic and archeological sites and other valued resources.
- To continue to encourage land use compatibility in environmentally sensitive stream corridors and conserve riparian-related natural resources.

### RECOMMENDATION, #11

**11a.** A permanent bi-county Monocacy River Citizens Advisory Board should be established by the Carroll and Frederick County governments. (Pursuant to §8-403 of the Maryland and Scenic and Wild Rivers Act.) The purpose and composition of the proposed board would be as follows:

-The name or designation for the appointees should still be referred to as "board" in order to avoid confusion with existing county "commissions."

-The board would serve in a review and advisory capacity only and should meet on a regular basis, such as monthly or bi-monthly; specific board functions and roles would be specified in a bi-county resolution as directed by the county commissioners and agreed upon by the State of Maryland, Department of Natural Resources (See Draft Resolution in Appendix).

-The bi-county resolution should stipulate that the Monocacy

Advisory Board use the plan and river corridor overlay as guidelines to provide advice to the county governments on land use planning and resource management. The board should also submit an annual report to the county commissioners.

-The board would serve as an advocate for the Monocacy River and its resources by continuing to identify issues and making recommendations to the public, and local, state and federal officials.

-The board would serve as an information exchange and discussion forum concerning the Monocacy's resources.

-Under the direction and approval of Carroll and Frederick Counties, the board would submit grant proposals to non-profit organizations and state and federal agencies that may provide additional conservation program assistance for the Monocacy watershed. The board should also work closely with the Maryland Environmental Trust and provide information and recommendations that encourage the implementation of local conservation easements.

-State and county planners (Carroll and Frederick) should attend the meetings as ex-officio, non-voting members. They would provide technical assistance and coordinate board actions with county and state objectives. The state should provide adequate funding for a planner from Greenways and Resources Planning to offer such assistance. It is an option and

recommendation to include the City of Frederick in the board membership; a city planner could also serve as staff support in an ex-officio, advisory capacity. It is also recommended that one representative from Adams County be invited to serve on the board.

-Citizen representation on the board would be determined by the county commissioners in cooperation with the Maryland Department of Natural Resources.

**11b.** Based on the recommendations of the proposed Monocacy Scenic River Advisory Board, the counties should consider developing an implementation program for this study and plan. In cooperation with the State of Maryland, assignment and prioritization of project responsibilities should also be recommended by the board to Carroll and Frederick counties.

**11c.** As a long term goal, establish a Monocacy River Land Trust, a private organization which would encourage the conservation and protection of lands that contain significant ecological, historic, archeological or recreational resources. A land trust usually conserves land by easements, or purchases property outright when it becomes available for sale. Effective use of a local land trust could be strengthened through coordination with the Maryland Environmental Trust and the proposed Monocacy Citizens Advisory Board. The Monocacy Land Trust should also prepare and submit grant proposals to appropriate agencies.



# River Corridor Overlay: Introduction and Interpretation of Map

The following maps contain a proposed river corridor overlay which extends from the Pennsylvania and Maryland line to the Monocacy's confluence with the Potomac River. The purpose of the overlay is to help focus and direct attention to environmentally sensitive stream corridors and promote land use alternatives that encourage conservation and protection of those riparian resources. Due to map scale, the delineated overlay boundaries are approximate. Distances for the overlay boundaries vary between 500 and 1000 feet measured from either side of the river's centerline. (Additional information on the proposed overlay boundaries is contained under Recommendation 1, the River Corridor Overlay.)

In addition to the river corridor overlay functioning as a reference for local and state governments, the proposed Monocacy River Citizens Advisory Board should use the overlay as a guideline to provide advice to the county governments on land use planning. Other terms used in the map are defined below:

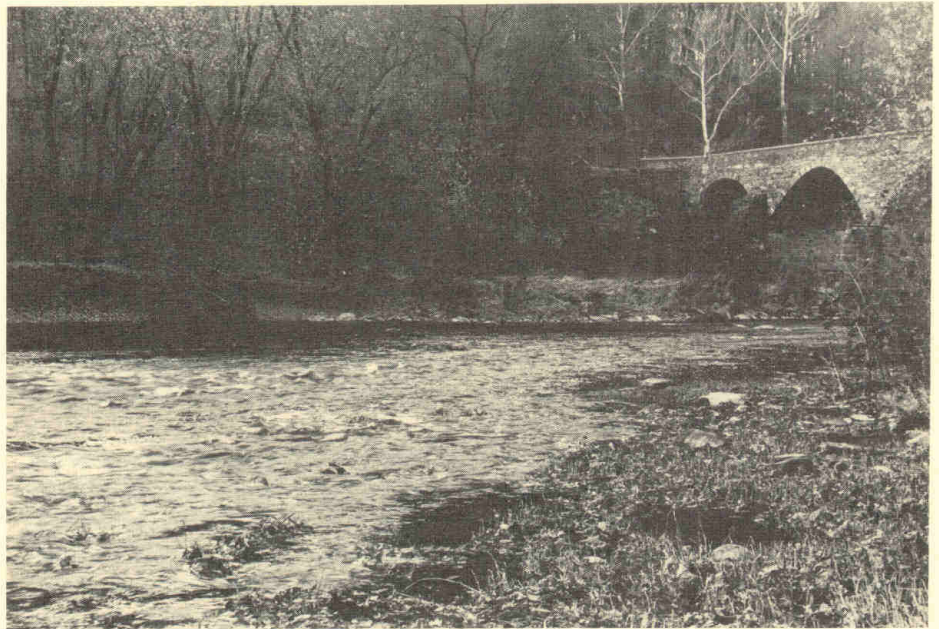
1. **Section**--one of eight river sections which are discussed under the chapter, "The Ecological Environment." The following are identified in each section of the river: regional, predominant land use; water class/quality; the extent and description of forested buffers; habitat suitability; fisheries; rare, endangered and threatened species; natural areas; geologic/hydrologic features; historic sites/areas; existing and projected archeological sites and public lands.

*Region I--Upper Corridor-Agricultural/Rural (Starner's Dam to Biggs Ford Bridge/North of Walkersville, Map Sections 1-5)*

In the upper Monocacy, from the Pennsylvania border to just south of LeGore Bridge, the river's adjacent lands are mostly agricultural, with windrows and small wooded areas dividing fields. There is a long range

possibility that scattered residential communities could be developed on older fields that are no longer actively farmed. In the northern part of the watershed, agricultural preservation is an important goal for both Carroll and Frederick counties. Nonpoint pollution from agricultural sources is a significant problem in the upper watershed.

2. **Region**--an area reflecting a predominant land use within each designated map section. Three regions exhibiting different types of land use and features have been identified within approximately two miles of the Monocacy River corridor. Regional identification helps to show that the Monocacy River Basin does not have homogeneous land management and water quality problems, and emphasizes that different areas of the river require specialized planning and management efforts. Land use patterns and their resultant impact on the river's resources are always subject to change.



*LeGore Bridge*



*Region II--Middle Corridor-Suburban/Urban (Biggs Ford Bridge below I-270., Sections 5-6)*

The vicinity of Walkersville and the City of Frederick is an urban and economic hub for the emerging growth on land surrounding the Monocacy River. There are plans for future development on many of the older fields next to the river in this section. The city has recently annexed land north and south of Route 26. Hard pavement, more densely populated areas with commercial and industrial buildings, sewage treatment plants and stormwater systems are predominant land use features that will continue to be developed. Possible point sources of pollution and highly environmentally stressed areas along the river's shoreline are present in this region.

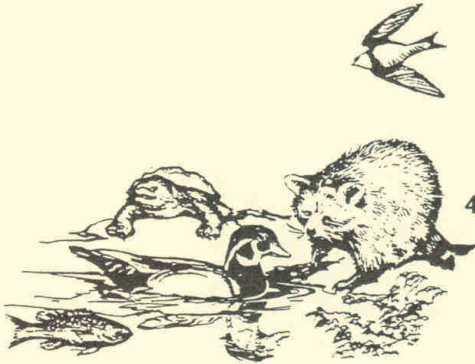
*Region III--Lower Corridor-Isolated Suburban Development and Public Lands (South of I-270 to Confluence, Sections 7-8)*

The lower Monocacy, south of I-270 to its confluence with the Potomac River, features some pockets of active agricultural lands and existing and newly emerging residential development. A combination of natural ground surfaces, agricultural lands and some impervious pavement is characteristic of the area. Additional rezoning applications for residential land use may occur. Therefore, there is a significant opportunity to examine land use management alternatives that may mitigate potential damage to the natural environment, improve water quality and provide for a quality environment for people to live in. The large tracts of public lands offer significant areas of protected habitat for existing and future outdoor recreational use and natural resource management and protection.



*Monocacy Valley from Parrs Ridge, I 270.*





### Water Quality Classification Systems

Intended use is the basis for classifying water quality in the State of Maryland. In 1974, the Water Resources Administration prepared a surface water classification system according to the most critical use it must be protected:

- Class I:** Protected for contact recreation, for fish and other aquatic life, and for wildlife (such protection is sufficiently stringent to protect for use as a water supply.)
- Class II:** Protected for shellfish harvesting.
- Class III:** Protected as natural trout waters.
- Class IV:** Protected as recreational trout waters (waters capable of holding adult trout for put-and-take fishing.)

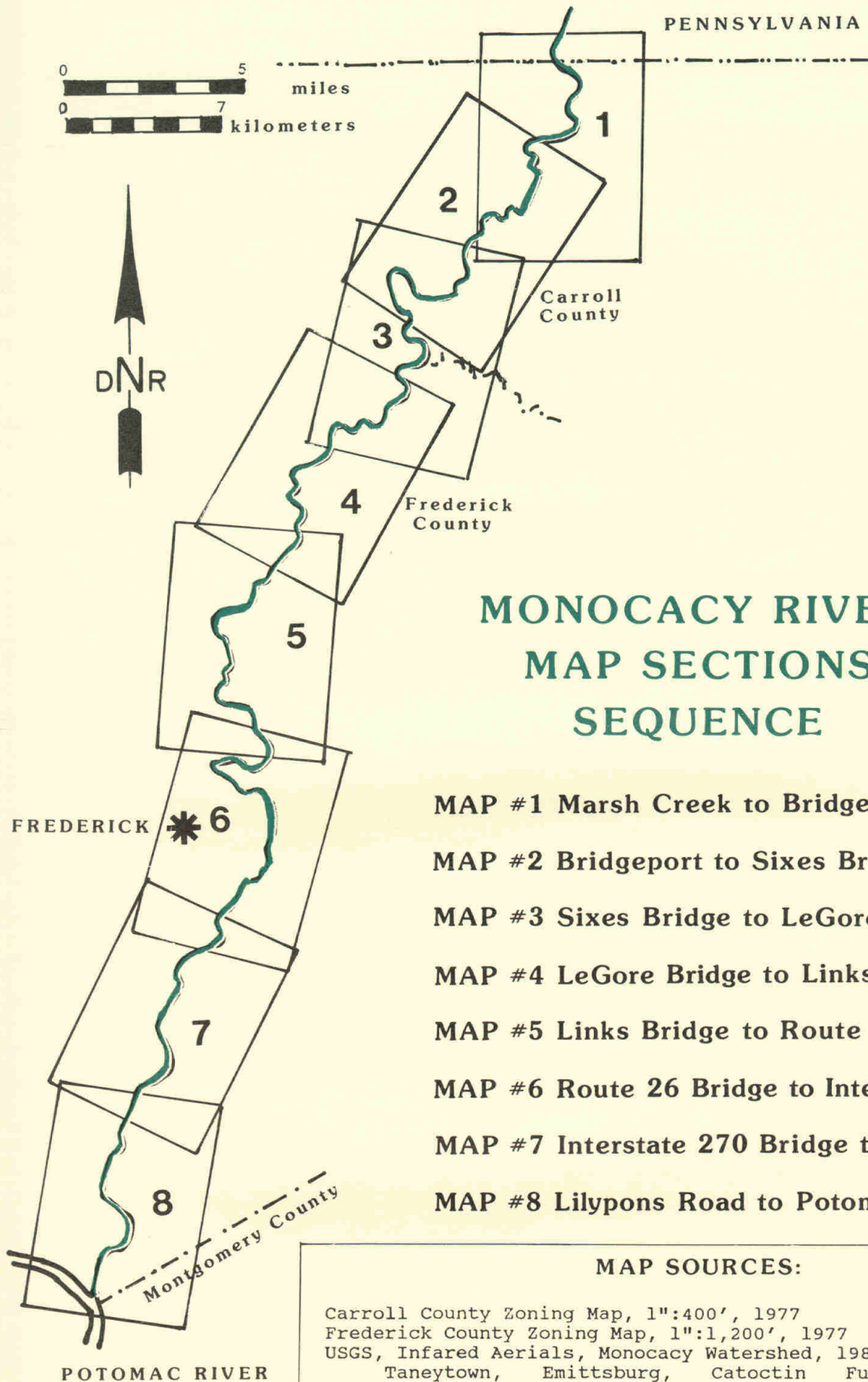
Below is a summary of the Monocacy Watershed's classification:

- Class I** Mainstem of river below Route 40
- Class II** None
- Class III** Tuscarora Creek & tributaries  
Carroll Creek & tributaries (above Rte. 15)  
Rocky Fountain Run & tributaries  
Fishing Creek & tributaries  
Hunting Creek & tributaries Owens Creek & tributaries  
Friends Creek & tributaries  
Little Bennett Creek (above Rte. 355)  
Furnace Branch
- Class IV** Monocacy River & tributaries except those designated as Class III, above Rte. 40



3. **Water Class and Quality**--terms used respectively by the Maryland Department of Natural Resources and Maryland Department of the Environment as discussed under the chapter, "Water Quality."
4. **Extent and Description of Vegetative Buffer**--refers to the predominant tree associations in the river corridor and highlights their general adequacy as effective buffers. In some areas next to the Monocacy, there is no natural vegetation, or the width of established vegetation along the shoreline is inadequate. The Maryland Department of Natural Resources has indicated that a vegetative buffer width of 50 feet for a nearly level slope is the minimum distance to effectively control nonpoint pollution. As slope increases, a greater width of forest cover or buffer is required. Additional studies are needed to determine more specific buffer widths in the watershed's stream corridors. The forest buffer designations can help to prioritize reforestation efforts and are as follows:
  - Very High Priority--Less than half or 50% buffered.
  - High Priority--half or 50% adequately buffered.
  - Moderate Priority--2/3 or 66% adequately buffered.
5. **Suitability for Wildlife Habitat**--is rated on a scale of low, moderate and high. The ratings are not empirical and give general indications for habitat suitability within the river corridor overlay; they are based on available forest cover, water quality, impact of existing developed land adjacent to the river and limited wildlife counts. (See "The Ecological Environment.")
6. **Fisheries**--A study provided by the Tidewater Administration's Fisheries Division. It identifies some of the more common fish species in each section of the river. (See "Fisheries, The Ecological Environment.")
7. **Rare, Endangered and Threatened Species**--indicates the presence of species listed on Maryland's Heritage List. The locations of such species are not publicly available so as to ensure their protection.
8. **Natural Areas**--is an inclusive term which refers to land areas that are generally undisturbed by development, accessible primarily by foot, and have extensive forest cover and wildlife habitat. Natural areas along the Monocacy River are limited to within the river corridor itself (flood plain and shoreline), public lands in the lower sections of the river, and some important but smaller forested ridges.
9. **Geologic and Hydrologic Features**--highlights any unique or unusual land or surface water feature found in each section.
10. **Historic Sites and Areas**--sites and historic districts identified on the National Register and historic sites that have local historical significance.
11. **Existing and Projected Archeological Sites**--indicates the presence or probability of archeological sites located in the river corridor overlay. The probability for archeological sites was determined by the Maryland Historical Trust and rated as Low, Moderate, High and Very High.
12. **Public Lands**--lands that are owned by local, state or the federal government.





## MONOCACY RIVER MAP SECTIONS SEQUENCE

- MAP #1 Marsh Creek to Bridgeport
- MAP #2 Bridgeport to Sixes Bridge
- MAP #3 Sixes Bridge to LeGore Bridge
- MAP #4 LeGore Bridge to Links Bridge
- MAP #5 Links Bridge to Route 26 Bridge
- MAP #6 Route 26 Bridge to Interstate 270 Bridge
- MAP #7 Interstate 270 Bridge to Bennett Creek
- MAP #8 Lilypons Road to Potomac River

### MAP SOURCES:

Carroll County Zoning Map, 1":400', 1977  
 Frederick County Zoning Map, 1":1,200', 1977  
 USGS, Infrared Aerials, Monocacy Watershed, 1985  
 Taneytown, Emmitsburg, Catoctin Furnace, Woodsboro,  
 Walkersville, Frederick, Buckeystown, Poolesville  
 USGS, Topographical Quadrangles, 7.5 Series, Monocacy Watershed,  
 photorevised, 1985



MONOCACY RIVER STUDY  
**MAP SECTION 1**  
Marsh Creek to Bridgeport, 4.7 miles

**REGION 1:** Agricultural/Rural-Farms, Old Fields, Starner's Dam Community

**WATER CLASS/QUALITY:** Class IV, Fair/Good; high suspended sediment loads, elevated coliform counts during low flow

**EXTENT AND DESCRIPTION OF VEGETATIVE BUFFER:** Very High Priority--Less than half; silver maple/box elder/sycamore.

**SUITABILITY FOR WILDLIFE HABITAT:** High (around Marsh Creek) Moderate (closer to Bridgeport)-high diversity of water bird species such as wood duck, mallards & kingfishers.

**FISHERIES:** Large mouth bass/small mouth bass-game fish; eels, catfish/eels more common species

**RARE, ENDANGERED & THREATENED SPECIES:** None determined

**NATURAL AREAS:** Natural areas mostly limited to flood plain and immediate river shoreline due to extensive farming.

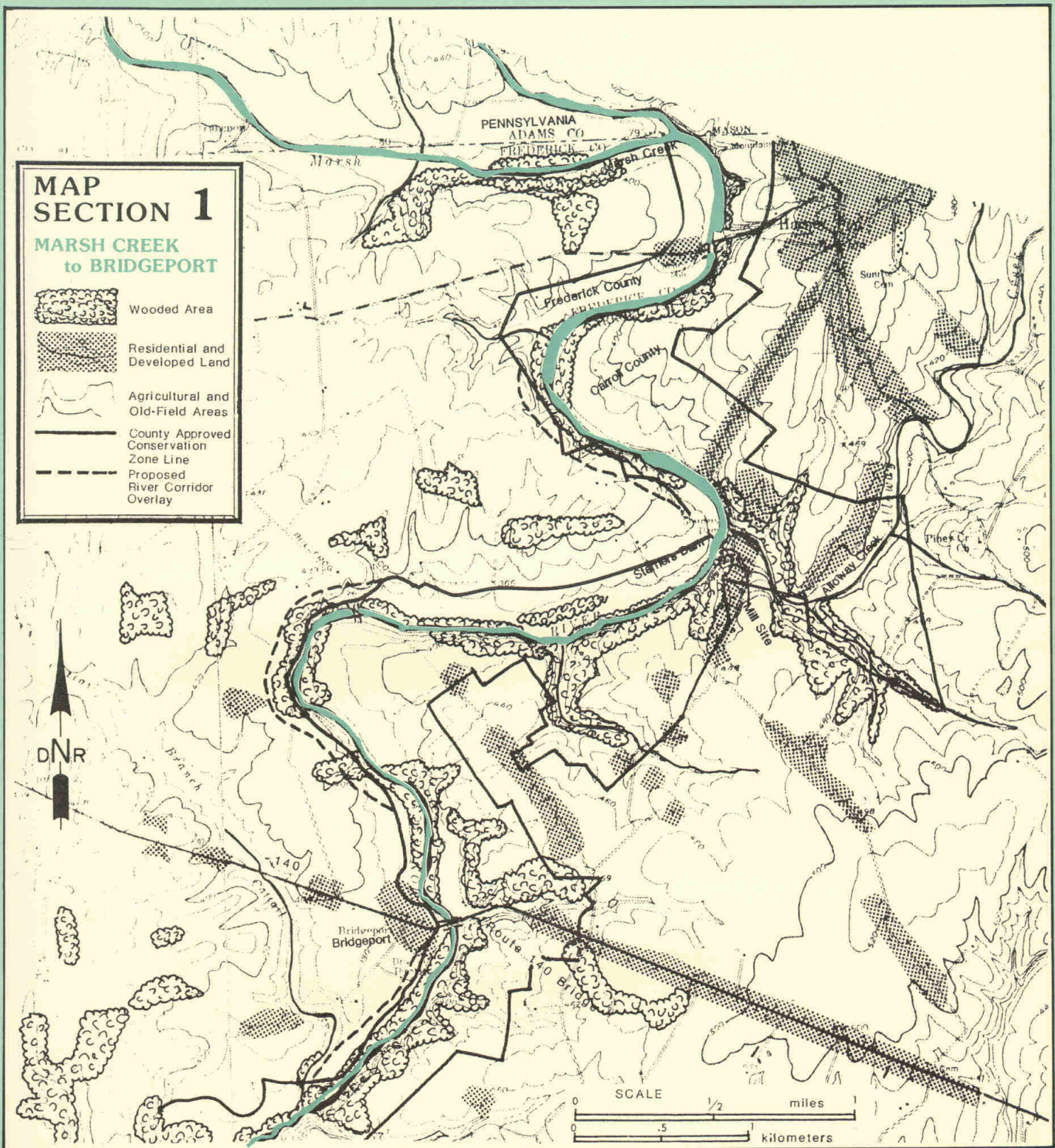
**GEOLOGIC/HYDROLOGIC FEATURES:** Land/topography is gently rolling; presence of some small, Triassic shale cliffs

**HISTORIC SITES/AREAS:** Starner's Dam/mill site & Community, Bull Frog Road Bridge, Harney Bridge, Bridgeport

**EXISTING/PROJECTED ARCHEOLOGICAL SITES:** Very High Probability for other sites; Shoemaker 111 Village Site--National Register, Nairs Mill

**PUBLIC LANDS:** None







MONOCACY RIVER STUDY  
**MAP SECTION 2**  
Bridgeport to Sixes Bridge, 6.0 miles

**REGION 1:** Agricultural/Rural-Farmland

**WATER CLASS/QUALITY:** Class IV, Fair/Good; high suspended sediment loads; high bacteria counts during low flow months

**EXTENT AND DESCRIPTION OF VEGETATIVE BUFFER:** Very High Priority--Less than half; silver maple/sycamore/white ash in floodplain; mixed hardwood on ridges.

**SUITABILITY FOR WILDLIFE HABITAT:** Good/Moderate-river otters have been reported though not verified.

**FISHERIES:** Smallmouth and largemouth bass most common sportfish, black, crappie/bluegill common panfish; catfish/eels common.

**RARE, ENDANGERED &/OR THREATENED SPECIES:** None Determined

**NATURAL AREAS:** Natural areas mostly limited to floodplain and immediate river shoreline due to extensive farming.

**GEOLOGIC/HYDROLOGIC FEATURES:** Land/topography gently rolling; some shale outcrops and intermittent ridges adjacent to river.

**HISTORIC SITES/AREAS:** Keysville Rd. Bridge, Sixes Bridge

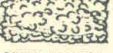


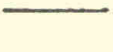

**EXISTING/PROJECTED ARCHEOLOGICAL SITES:** High

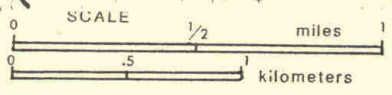
**PUBLIC LANDS:** None



# MAP SECTION 2

## BRIDGEPORT to SIXES BRIDGE

-  Wooded Area
-  Residential and Developed Land
-  Agricultural and Old-Field Areas
-  County Approved Conservation Zone Line
-  Proposed River Corridor Overlay



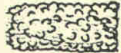


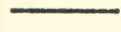



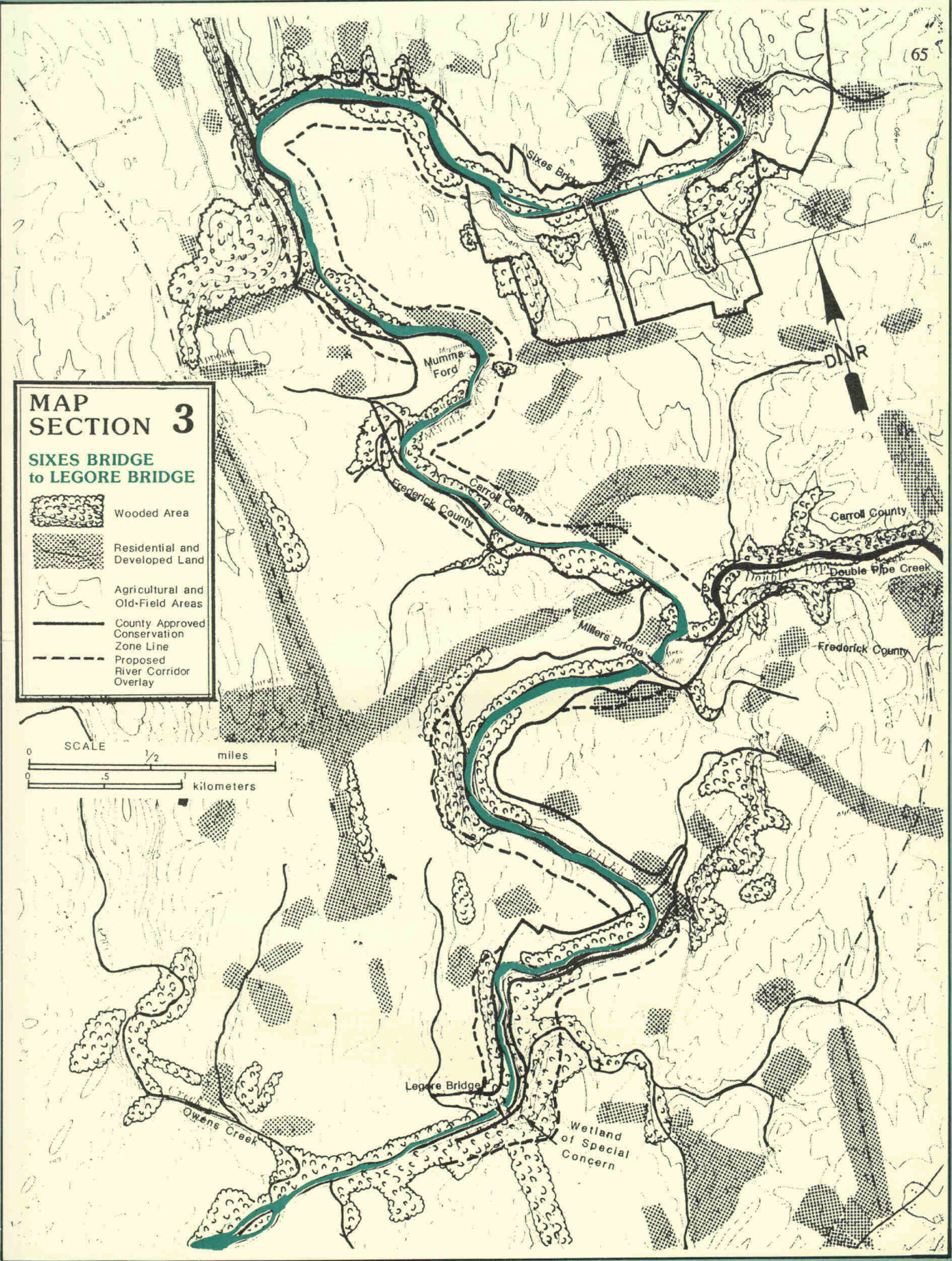
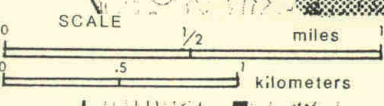




# MAP SECTION 3

## SIXES BRIDGE to LEGORE BRIDGE

-  Wooded Area
-  Residential and Developed Land
-  Agricultural and Old-Field Areas
-  County Approved Conservation Zone Line
-  Proposed River Corridor Overlay





MONOCACY RIVER STUDY  
**MAP SECTION 4**

**LeGore Bridge to Links Bridge, 6.7 miles**

**REGION 1:** Agricultural/Rural-Farmland

**WATER CLASS/QUALITY:** IV, Fair/Good; observed degradation in water quality at confluence of Hunting and Owens Creeks-increase in sedimentation and algal growth.

**EXTENT AND DESCRIPTION OF VEGETATIVE BUFFER:** Moderate Priority--  
Approximately 2/3; sycamore/silver maple; mixed hardwoods on ridges.

**SUITABILITY FOR WILDLIFE HABITAT:** High

**FISHERIES:** Small mouth bass most common game fish; panfish-black crappie, bluegill and pumpkinseed; eels and catfish common

**RARE, ENDANGERED & THREATENED SPECIES:** See Section 111

**NATURAL AREAS:** Six sections of woodlands on ridges offer significant wildlife habitat around LeGore Bridge vicinity.

**GEOLOGIC/HYDROLOGIC FEATURES:** High incidence of steep slopes/ridges and shale cliffs on river; this section also has numerous sets of riffles or slight drops in elevation.


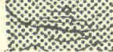



**HISTORIC SITES/AREAS:** See Section 111- LeGore Bridge; Penterra Manor

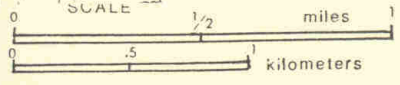
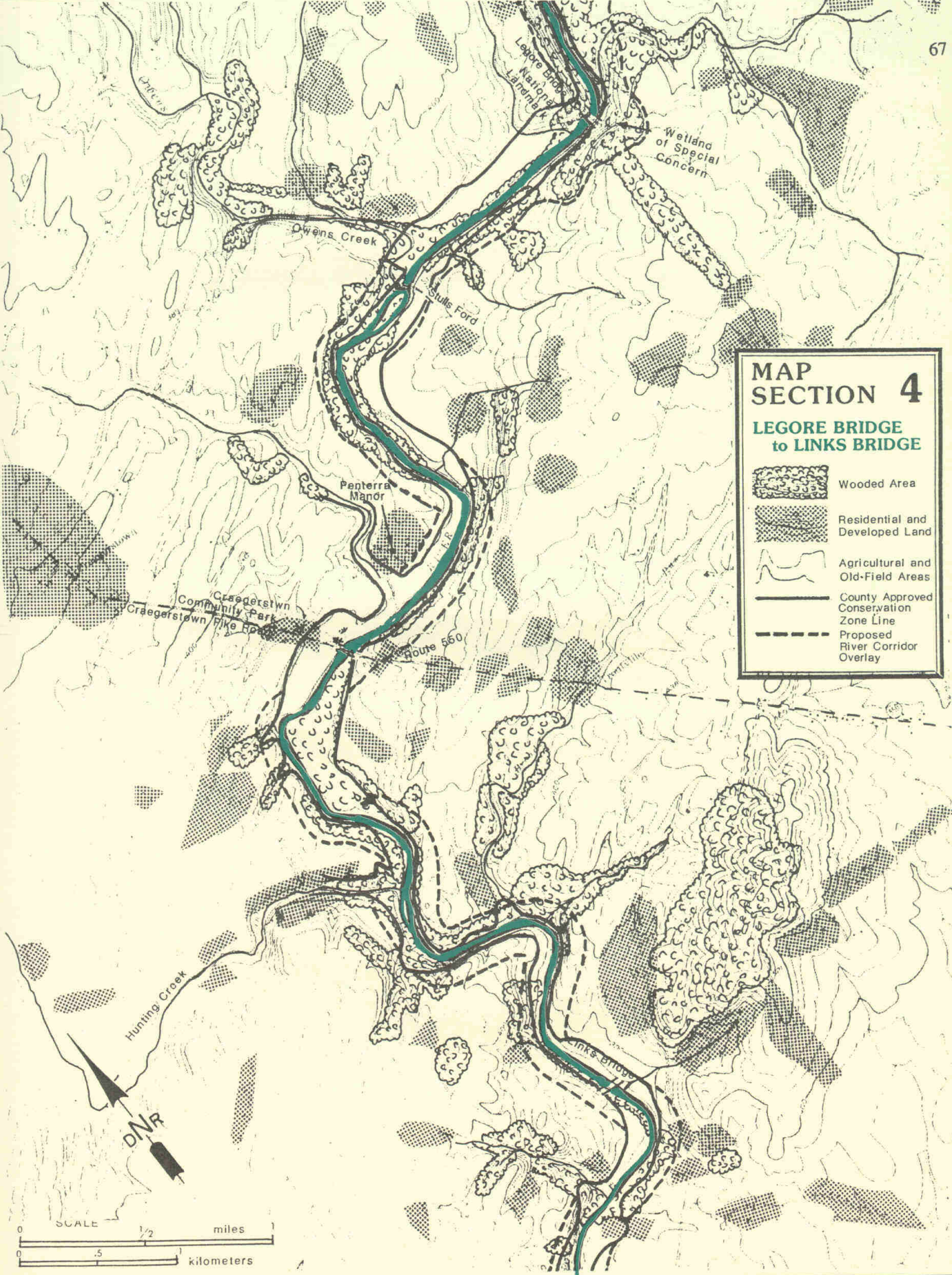
**EXISTING/PROJECTED ARCHEOLOGICAL SITES:** High and Very High (in two areas of the river section)

**PUBLIC LANDS:** Craegerstown Community Park



**MAP SECTION 4**  
**LEGORE BRIDGE to LINKS BRIDGE**

-  Wooded Area
-  Residential and Developed Land
-  Agricultural and Old-Field Areas
-  County Approved Conservation Zone Line
-  Proposed River Corridor Overlay





MONOCACY RIVER STUDY  
**MAP SECTION 5**

Links Bridge to Route 26 Bridge, 7.8 miles

**REGION 1 AND 2:** Rural on upper section-numerous fields that are not actively farmed; Existing/projected residential and mixed land use on lower section within next five years-Walkersville and the City of Frederick will continue to grow rapidly next to the river from Biggs Ford to the Route 26 Bridge.

**WATER CLASS/QUALITY:** Class IV, Fair/Good; observed increase in sedimentation, algal growth and trash/solid waste as river approaches Route 26.

**EXTENT AND DESCRIPTION OF VEGETATION BUFFER:** High Priority--white ash/silver maple/sycamore; mixed hardwoods on ridges.

**SUITABILITY FOR WILDLIFE HABITAT:** High; High/Moderate as river approaches Route 26

**FISHERIES:** Small mouth bass-common game fish; panfish; eels and catfish common

**RARE, ENDANGERED & THREATENED SPECIES:** None Determined

**NATURAL AREAS:** Two ridges offer some significant woodlands on west side of river. Farmland/old fields limits rest of natural corridor to existing floodplain.

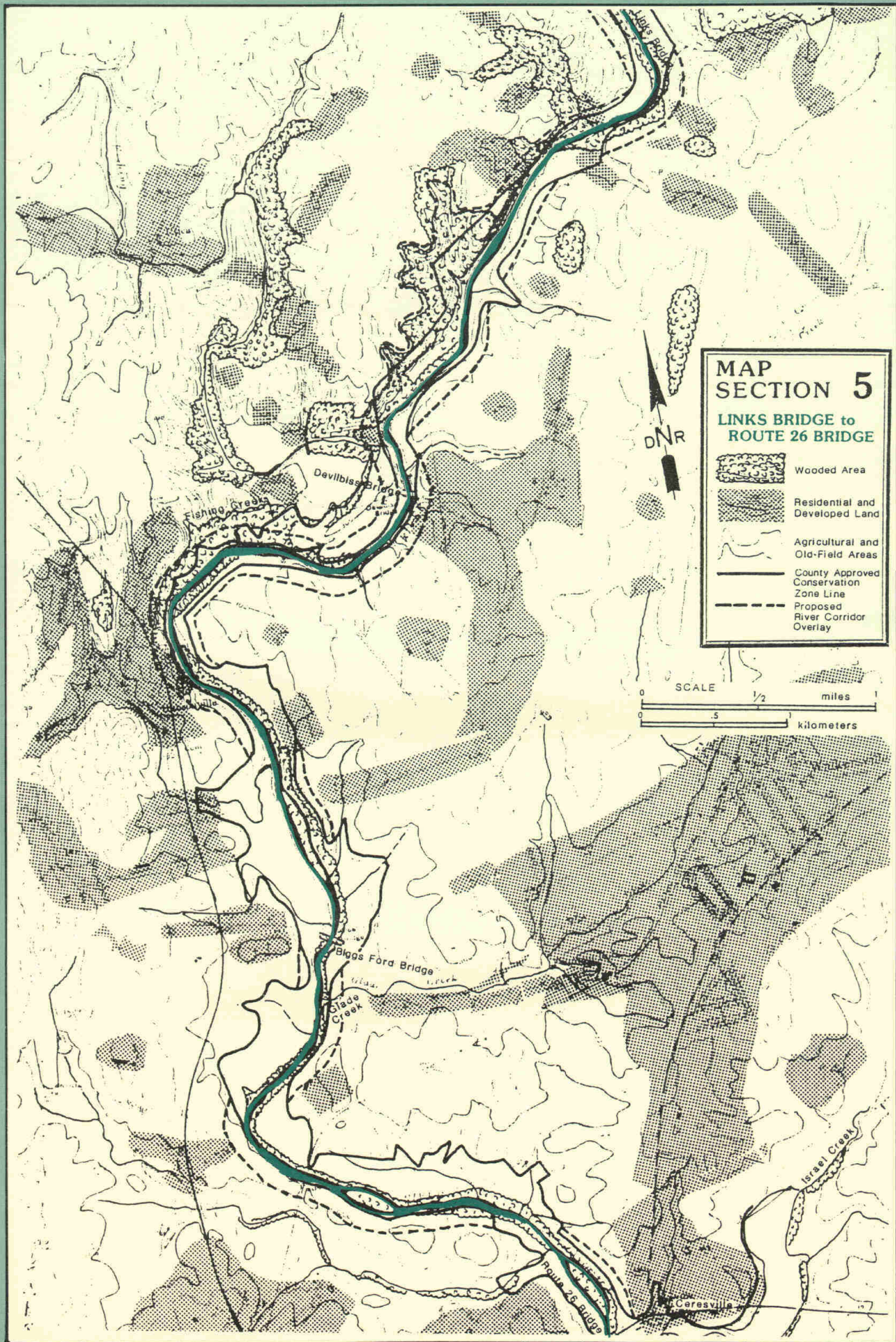
**GEOLOGIC/HYDROLOGIC FEATURES:** Some small cliffs directly below Links Bridge; riffles during first few miles, land/topography gently rolling; river slows as it approaches the Route 26 Bridge.

**HISTORIC SITES/AREAS:** Devilbiss Bridge, several sites in Utica

**EXISTING/PROJECTED ARCHEOLOGICAL SITES:** Very high; Biggs Ford Site

**PUBLIC LANDS:** none







MONOCACY RIVER STUDY  
**MAP SECTION 6**  
Route 26-Interstate 270, 7.4 Miles

**REGION 2:** Residential/Urban-projected residential development to increase around Walkersville & City of Frederick; south of Route 26 to Interstate 270 existing and proposed development is commercial, industrial and residential.

**WATER CLASS/QUALITY:** Class IV, below Route 40/Interstate 270-Class 1; low dissolved oxygen levels below the City of Frederick and elevated bacterial counts, especially during low flow summer months.

**EXTENT AND DESCRIPTION OF VEGETATIVE BUFFER:** Very High Priority--Less than half; silver maple/sycamore; mixed hardwoods.

**SUITABILITY FOR WILDLIFE HABITAT:** Moderate/Low

**FISHERIES:** Small mouth bass most common game fish; panfish-black crappie, bluegill and pumpkinseed; eels and catfish become more numerous as river reaches confluence; high sedimentation in lower section is most limiting factor to fish populations.

**RARE, ENDANGERED & THREATENED SPECIES:** None Determined

**NATURAL AREAS:** Natural areas limited to narrow, wooded strips of floodplain along river; remaining sizeable tracts of old field and woodland in Frederick City vicinity will be developed within five years; significant forest area at confluence of Linganore Creek and Monocacy; two limited woodlands on east side of river, one mile north of Interstate 270.

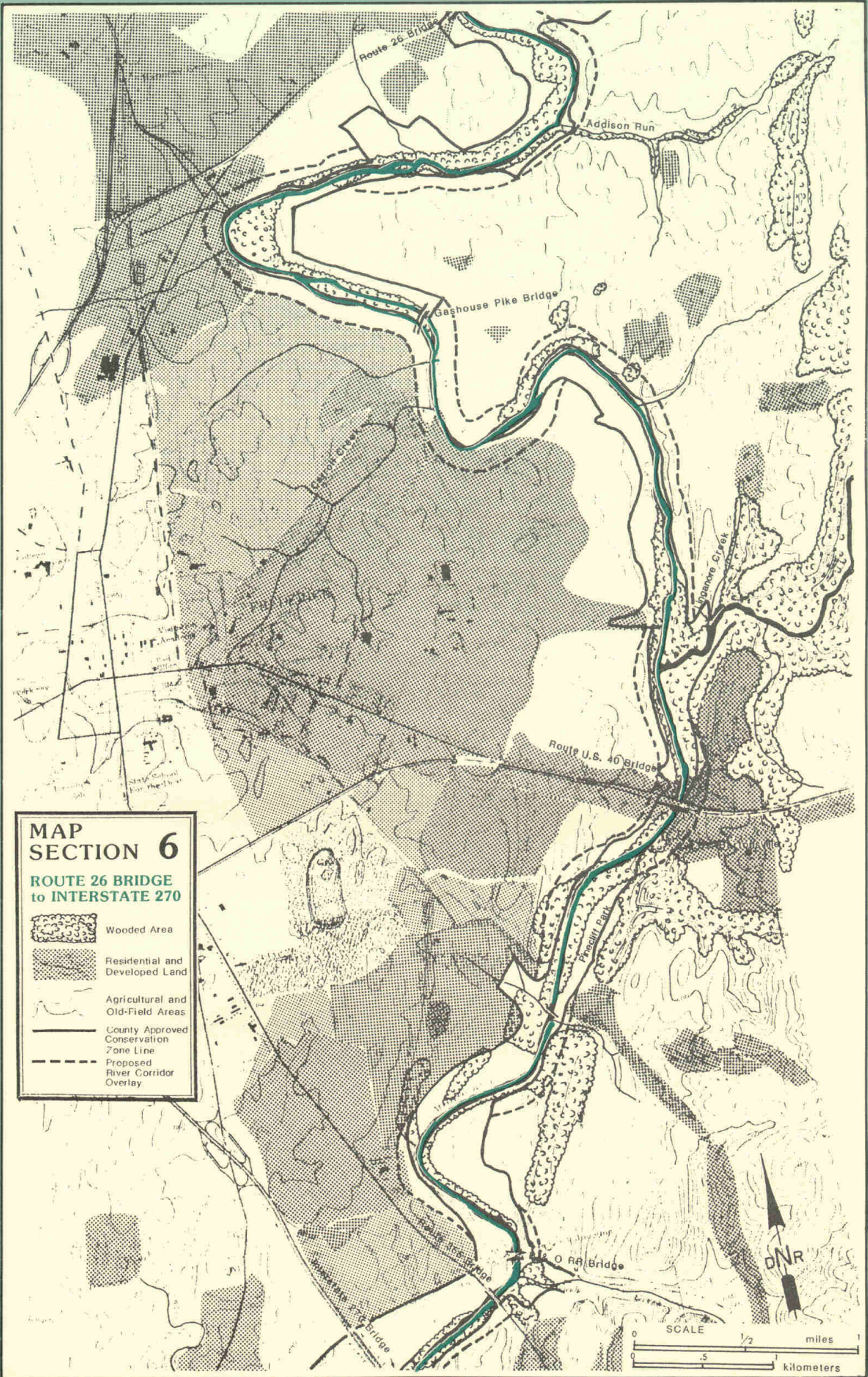
**GEOLOGIC/HYDROLOGIC FEATURES:** The river becomes wider and slow moving below the Route 26 Bridge and is characterized by several, large bends.

**HISTORIC SITES/AREAS:** Rose Hill Manor; Gambrill House; Monocacy National Battlefield

**EXISTING/PROJECTED ARCHEOLOGICAL SITES:** Very High Probability; Rosenstock-National Register.

**PUBLIC LANDS:** The City of Frederick's Carroll Creek Park; the City is also proposing a public golf course and Monocacy River Park below the Route 26 Bridge; Pine Cliff Park-Frederick County

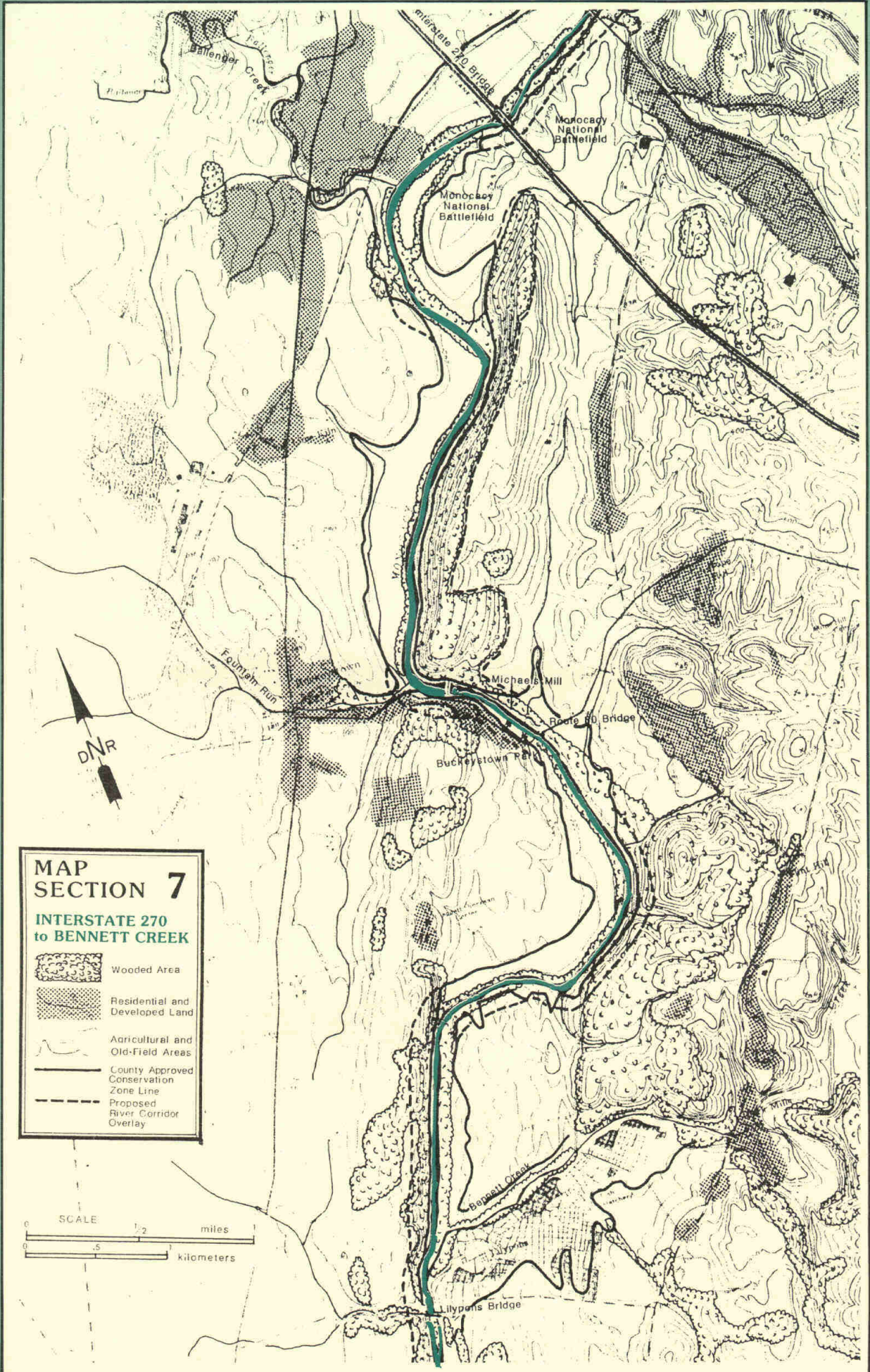






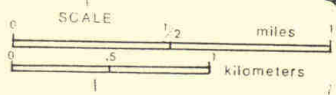






**MAP SECTION 7**  
**INTERSTATE 270 to BENNETT CREEK**

	Wooded Area
	Residential and Developed Land
	Agricultural and Old-Field Areas
	County Approved Conservation Zone Line
	Proposed River Corridor Overlay










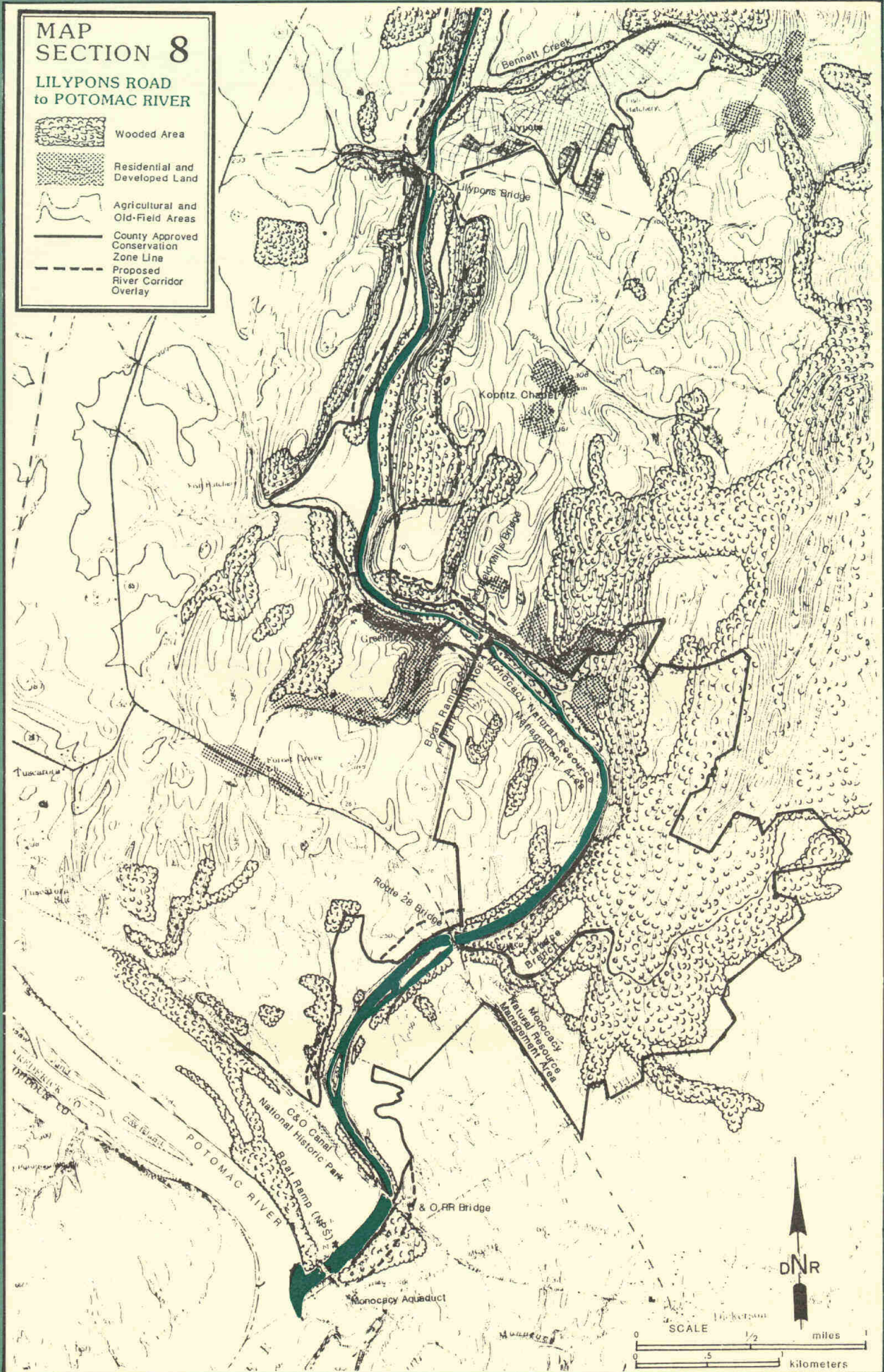




# MAP SECTION 8

## LILYPONS ROAD TO POTOMAC RIVER

-  Wooded Area
-  Residential and Developed Land
-  Agricultural and Old-Field Areas
-  County Approved Conservation Zone Line
-  Proposed River Corridor Overlay







*Locust Run - Crissford Road (near Lilpons)*



# Appendix

## *Agriculture and Special Water Quality Projects in the Monocacy Watershed*

The Monocacy watershed is the subject of a number of cooperative State, federal and local efforts to improve the management and control of water pollution. Through extensive inter-agency cooperation, the watershed is in the forefront of river basins subject to agricultural nonpoint source pollution control efforts. The entire Monocacy watershed is listed as a "priority watershed" by the Department of Agriculture. The United States Department of Agriculture, Maryland Department of Agriculture and the local soil conservation districts provide numerous voluntary cost-share programs, management plans and technical assistance to area farmers. These programs not only make farm operations more efficient and effective, but also encourage land conservation and improve water quality. Every farmer who participates in the ASCS's Agricultural Conservation Program (ACP) is required to have a conservation plan for his or her farm. Farmers who wish to remain eligible for the USDA program benefits, must have a conservation plan and be actively implementing the plan for highly erodible cropland by January 1, 1990; the plans must be fully implemented by January 1, 1995.<sup>39</sup>

Three recently approved regional programs include the "Monocacy Watershed--Water Quality Demonstration Project," the "Piney/Alloway Special Water Quality Project" and one in the Linganore sub-basin. The State of Maryland has targeted the Piney\Alloway watersheds for a special inter-agency effort to restore water quality and monitor improvements in water quality and benefits to living resources. The highly successful "Double Pipe Creek\ "Rural Clean Water Program" was implemented several years ago, and the Maryland Department of the Environment is presently continuing to monitor and document the extent of improvements in the area's water quality. In addition to these regional programs, Frederick County's PL-566 agricultural cost-share program is similar to those available in Carroll County.<sup>37</sup>

In order to evaluate the water quality benefits of all of the nonpoint source pollution control activities in the Monocacy, the Maryland Department of the Environment is working cooperatively with the Interstate Commission on the Potomac River Basin to develop a state-of-the-art computer model of the watershed. When completed, the model will provide water quality managers with a tool to evaluate the relative water quality benefits of different types of nonpoint source pollution control efforts and their cumulative benefits relative to control of point source discharges.

### *Agricultural Preservation*

Another land use aspect of agriculture is preservation of existing prime farm land. Much of the Monocacy River's scenic, ecological and rural character is attributed to family owned farms that date back for several generations. A large percentage of farmland borders the Monocacy and its tributaries. As land prices continue to escalate, agricultural preservation is becoming more difficult. When relatively low easement values are compared to anticipated growth opportunities, agricultural preservation is often an unattractive business alternative to many local farmers.<sup>39</sup>

The problems of farmland preservation are recognized by the local, state and federal governments. The Maryland Agricultural Preservation Program which is administered by the Agricultural Land Preservation Foundation, is part of the Maryland Department of Agriculture. An Agricultural Land Preservation District may be established by a county level board. This preserves the land for agricultural use for at least five years. Once the district has been formed, an agricultural easement may be sold to the foundation through a competitive bid procedure.<sup>53</sup>

In Frederick County, the preservation of select lands for continued agricultural production is encouraged by identifying prime soil areas and implementing the Agricultural Preservation Program. The average size of farms in Frederick County permit an individual to form a state agricultural district, rather than several neighboring farmers forming one large block. The prime agricultural soils and consequently two thirds of the agricultural districts are located in the watershed. A total of 14,000 acres is in agricultural preservation districts, and 6,800 acres are in easements.<sup>39</sup>

The majority of Carroll County is in the agricultural district and more than 60% of the land is used for agriculture. The county's goal is facilitated by allowing land owners to voluntarily place their land in an agricultural preservation district by promising not to develop the land for five years. Easements which limit development rights on the property may then be purchased by the state. Currently, easements on 14,000 acres have been acquired. Carroll County is also working with the towns to promote the program.<sup>38</sup>



**MAJOR SOIL GROUPS IN CARROLL AND FREDERICK COUNTIES,  
MONOCACY WATERSHED \***

<i>SOIL GROUP/ASSOCIATION</i>	<i>LOCATION</i>	<i>CHARACTERISTICS</i>
<p align="center"><b>Mountain Soils</b></p> <p>Edgemont - Dekalb</p>	Sugarloaf Mountain; Catoctin Mountain; tributaries such as Fishing and Hunting Creeks; parts of Bennett Creek	Shallow; often highly eroded; not suitable for extensive development, logging of farming; suitable for forests
<p align="center"><b>Limestone Soils</b></p> <p>Duffield - Hagerstown</p>	<p>Buckeystown; north through City of Frederick</p> <p>Walkersville -- large percentage of soil group found in Frederick Valley</p>	Mostly productive, easy to manage; good for agriculture -- well drained and fertile; some assoc. can be rocky; one assoc. prone to erosion.
<p align="center"><b>Other Valley Soils</b></p> <p>Penn - Readington - Croton</p>	Present on several tributaries in the lower watershed; continues northward at intervals to actually include river corridor near MD/PA border.	Shallow, developed, mostly over red shales/sandstones; not fertile and subject to severe erosion.
<p align="center"><b>Piedmont</b></p> <p>Cardiff</p> <p>Manor Glenelg</p>	<p>Narrow strip, SE quadrant of watershed</p> <p>Kempton, Walkersville; north of Libertytown; common in other parts of watershed.</p>	Sometimes subject to erosion and overuse.
<p align="center"><b>River Terrace &amp; Floodplain</b></p> <p>Waynesboro - Captina - Huntington</p> <p>Elk - Captina - Huntington</p>	Floodplain and river terraces	Highly erodible
<p align="center"><b>Penn-Klinesville-Abbottstown Association</b></p>	Monocacy River Area; some tributaries.	Penn soils fairly deep, well-drained -- present on farmland; Klinesville often shallow & severely eroded -- located over shale/sandstone
<p align="center"><b>Mt. Airy - Glenelg Association</b></p>	Scattered throughout upper watershed such as around Westminster.	Rolling to very steep soils.

\* (U. S. Department of Agriculture, 1960 & 1969, Ref.# 60 and 61)



## AMPHIBIANS OCCURRING WITHIN MONOCACY WATERSHED

### Jefferson salamander (*Ambystoma jeffersonianum*)

Rare in forested areas, usually at higher elevations. Moves into temporary ponds to breed in early spring.

**Spotted salamander** (*Ambystoma maculatum*)  
Common in forested areas along floodplain. Moves into temporary ponds to breed in early spring.

**Marbled salamander** (*Ambystoma opacum*)  
Common in forested areas along floodplain. Moves to sites of temporary ponds to breed in fall.

**Northern dusky salamander** (*Desmognathus fuscus*)  
Common in springs and small streams throughout watershed.

**Two-lined salamander** (*Eurycea bislineata*)  
Common in springs and small streams throughout watershed.

**Long-tailed salamander** (*Eurycea longicauda*)  
Uncommon in springs and small streams, and along banks of river.

**Spring salamander** (*Gyrinophilus porphyriticus*)  
Uncommon in springs and small streams, mostly in western half of watershed.

### Red-spotted newt (*Notophthalmus viridescens*)

Common in farm ponds, pools along floodplain, and backwater areas of river.

**Red-backed salamander** (*Plethodon cinereus*)  
Common in forested and undeveloped areas throughout watershed. Terrestrial.

**Slimy salamander** (*Plethodon glutinosus*)  
Uncommon in forested areas throughout watershed. Terrestrial.

**Red salamander** (*Pseudotriton ruber*)  
Uncommon in springs and small streams throughout watershed.

**Cricket frog** (*Acris crepitans*)  
Uncommon in ponds, swamps and backwaters along river.

**American toad** (*Bufo americanus*)  
Common throughout watershed.

**Fowler's toad** (*Bufo w. fowleri*)  
Uncommon throughout watershed.

**Gray treefrog** (*Hyla versicolor*)  
Uncommon in forested areas of watershed. Breeds in ponds and swamps during summer.

**Spring peeper** (*Pseudacris crucifer*)  
Common throughout watershed. Breeds in ponds and swamps during spring and summer.

**Upland chorus frog** (*Pseudacris feriarum*)  
Uncommon in forested areas of watershed. Breeds in swamps during spring.

**Bullfrog** (*Rana catesbeiana*)  
Common in ponds, swamps, and along river throughout watershed.

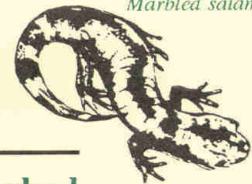
**Green frog** (*Rana clamitans*)  
Common in ponds, swamps, and along river throughout watershed.

**Northern leopard frog** (*Rana pipiens*)  
Uncommon in ponds, along streams and floodplains.

**Pickerel frog** (*Rana palustris*)  
Uncommon in ponds and along streams.

**Wood frog** (*Rana sylvatica*)  
Common in forested areas of watershed. Comes to ponds and swamps to breed in spring.

**Spadefoot toad** (*Scaphiopus holbrookii*)  
Rare and possibly extirpated within watershed. Burrowing species that breeds in temporary pools in summer.



Marbled salamander -

## Reptiles Occurring Within Monocacy Watershed

**Copperhead** (*Agkistrodon contortrix*)  
Uncommon throughout watershed. Congregates in rocky areas during spring and fall.

**Worm snake** (*Carphophis amoenus*)  
Uncommon, under rocks and logs throughout watershed.

**Black racer** (*Coluber constrictor*)  
Common throughout watershed.

**Timber rattlesnake** (*Crotalus horridus*)  
Uncommon and local, primarily in rocky areas at higher elevations.

**Ringneck snake** (*Diadophis punctatus*)  
Common throughout watershed.

**Black rat snake** (*Elaphe obsoleta*)  
Common throughout watershed.

**Hognose snake** (*Heterodon platirhinos*)  
Uncommon throughout watershed.

**Milk snake** (*Lampropeltis triangulum*)  
Common throughout watershed.

**Water snake** (*Nerodia sipedon*)  
Common around water bodies throughout watershed.

**Smooth green snake** (*Opheodrys vernalis*)  
Uncommon in western half of watershed.

**Queen snake** (*Regina septemvittata*)  
Uncommon along streams throughout watershed.

**Brown snake** (*Storeria dekayi*)  
Uncommon throughout watershed.

**Red-bellied snake** (*Storeria occipitomaculata*)  
Uncommon throughout watershed.

**Ribbon snake** (*Thamnophis sauritus*)  
Uncommon along streams and floodplains throughout watershed.

**Garter snake** (*Thamnophis sirtalis*)  
Common throughout watershed.

**Smooth earth snake** (*Virginia valeriae*)  
Uncommon, lower elevations throughout watershed.

**Snapping turtle** (*Chelydra serpentina*)  
Common in ponds, swamps, and in river throughout watershed.

**Spotted turtle** (*Clemmys guttata*)  
Uncommon along streams and in swamps throughout watershed.

**Wood turtle** (*Clemmys insculpta*)  
Common in forested areas throughout watershed.

**Painted turtle** (*Chrysemys picta*)

Common in ponds, swamps, and in river throughout watershed.

**Mud turtle** (*Kinosternon subrubrum*)  
Uncommon in lower portion of river.

**Red-bellied turtle** (*Pseudemys rubriventris*)  
Uncommon in the river and its larger tributaries.

**Stinkpot turtle** (*Sternotherus odoratus*)  
Common in river and occasionally in ponds and swamps throughout watershed.

**Box turtle** (*Terrapene carolina*)  
Common throughout watershed.

**Red-eared turtle** (*Trachemys scripta*)  
Uncommon in ponds, swamps, and lower portion of river.

**Five-lined skink** (*Eumeces fasciatus*)  
Rare and local.

**Fence lizard** (*Sceloporus undulatus*)  
Uncommon in undeveloped areas throughout watershed.

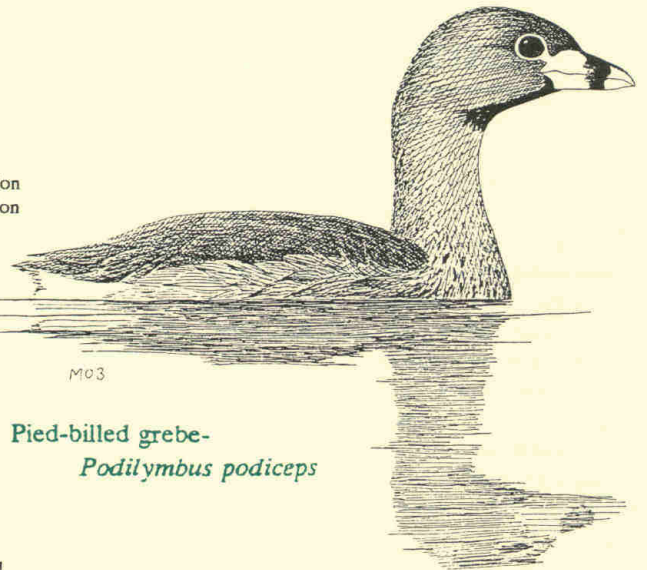


Current and Historic Rare, Threatened and Endangered Species  
Frederick County, Maryland

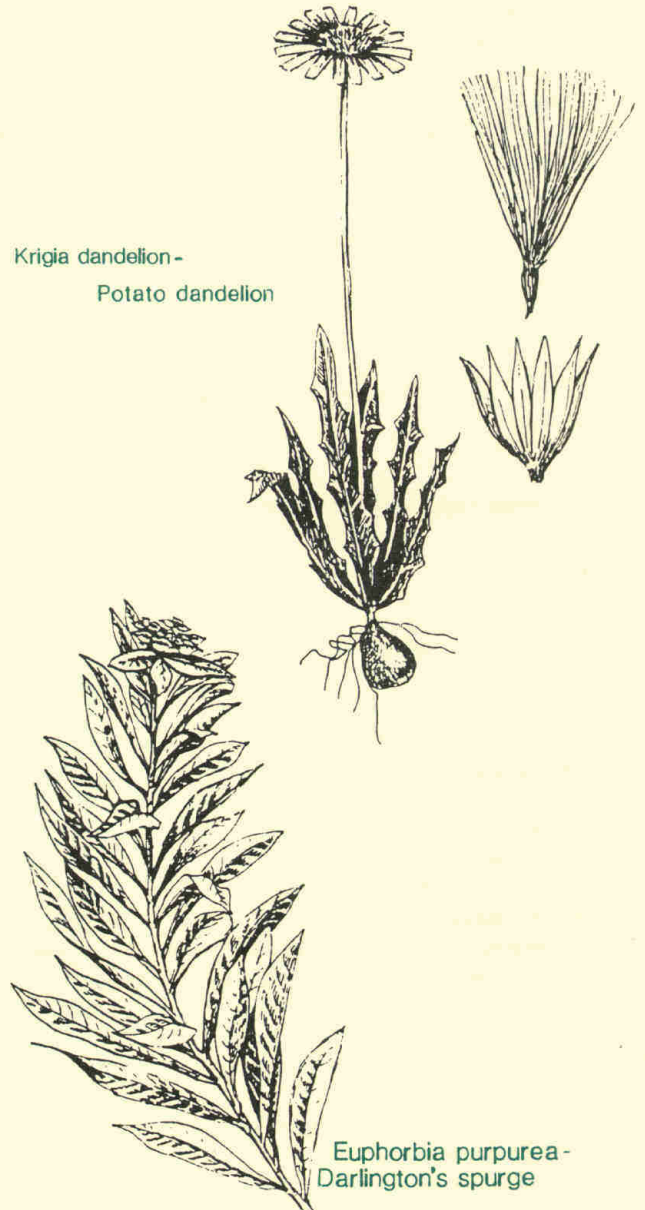
SCIENTIFIC NAME	COMMON NAME	STATE STATUS
<b>Animals</b>		
<i>Alasmidonta varicosa</i>	Brook floater	Extirpated
<i>Dendroica fusca</i>	Blackburnian warbler	Threatened
<i>Eulimnadia ventricosa</i>	A conchostracan phyllopod	Highly Rare
<i>Gallinula chloropus</i>	Common moorhen	In Need of Conservation
<i>Ixobrychus exilis</i>	Least bittern	In Need of Conservation
<i>Lanius ludovicianus</i>	Loggerhead shrike	Endangered
<i>Lasmigona subviridis</i>	Green floater	Endangered
<i>Podilymbus podiceps</i>	Pied-billed grebe	Rare
<i>Porzana carolina</i>	Sora	Highly Rare
<i>Satyrium edwardsii</i>	Edward's hairstreak	Endangered
<i>Stygobromus pizzinii</i>	Pizzini's cave amphipod	Highly Rare

**Plants**

<i>Adlumia fungosa</i>	Climbing fumitory	Threatened
<i>Agastache scrophularifolia</i>	Purple giant hyssop	Threatened
<i>Agrimonia microcarpa</i>	Small-fruited agrimony	Endangered
<i>Amelanchier obovalis</i>	Coastal juneberry	Endangered
<i>Amelanchier spicata</i>	Running juneberry	Threatened
<i>Anemone riparia</i>	Large white anemone	Status Uncertain
<i>Asplenium bradleyi</i>	Bradley's spleenwort	Endangered Extirpated
<i>Asplenium pinnatifidum</i>	Lobed spleenwort	Endangered
<i>Aster radula</i>	Rough-leaved aster	Endangered
<i>Azolla caroliniana</i>	Mosquito fern	Endangered Extirpated
<i>Bromus ciliatus</i>	Fringed brome	Endangered Extirpated
<i>Cacalia suaveolens</i>	Sweet-scented indian-plantain	Endangered
<i>Calopogon tuberosus</i>	Grass-pink	Endangered
<i>Carex aestivalis</i>		Endangered
<i>Carex conjuncta</i>	Soft fox sedge	Endangered Extirpated
<i>Carex emoryi</i>	Emory's sedge	Highly Rare
<i>Carex foenea</i>		Endangered Extirpated
<i>Carex leavenworthii</i>	Leavenworth's sedge	Endangered Extirpated
<i>Carex rugosperma</i>		Rare
<i>Carex striatula</i>	Lined sedge	Endangered Extirpated
<i>Castilleja coccinea</i>	Indian paintbrush	Endangered
<i>Chelone obliqua</i>	Red turtlehead	Threatened
<i>Coeloglossum viride</i>	Long-bracted orchis	Endangered
<i>Coptis trifolia</i>	Goldthread	Endangered
<i>Corallorhiza wisteriana</i>	Wister's coralroot	Endangered
<i>Cornus rugosa</i>	Round-leaved dogwood	Endangered
<i>Cystopteris tennesseensis</i>	Tennessee bladder-fern	Highly Rare
<i>Dirca palustris</i>	Leatherwood	Endangered
<i>Dryopteris campyloptera</i>	Mountain wood-fern	Endangered
<i>Epilobium leptophyllum</i>	Linear-leaved willowherb	Highly Rare
<i>Equisetum sylvaticum</i>	Wood horsetail	Endangered
<i>Erythronium albidum</i>	White trout lily	Threatened
<i>Eupatorium maculatum</i>	Spotted Joe-pye-weed	Endangered Extirpated
<i>Euphorbia purpurea</i>	Darlington's spurge	Endangered
<i>Filipendula rubra</i>	Queen-of-the-prairie	Endangered
<i>Gentiana andrewsii</i>	Fringe-tip closed gentian	Threatened
<i>Geranium robertianum</i>	Herb-robert	Endangered
<i>Glyceria acutiflora</i>	Sharp-scaled mannagrass	Endangered Extirpated
<i>Helianthus hirsutus</i>	Hirsute sunflower	Status Uncertain
<i>Helianthus microcephalus</i>	Small-headed sunflower	Endangered
<i>Houstonia tenuifolia</i>	Slender-leaved bluets	Highly Rare
<i>Hydrastis canadensis</i>	Goldenseal	Threatened
<i>Krigia dandelion</i>	Potato dandelion	Endangered
<i>Lycopodium inundatum</i>	Bog clubmoss	Rare
<i>Lythrum alatum</i>	Winged loosestrife	Endangered
<i>Melanthium latifolium</i>	Broad-leaved bunchflower	Endangered Extirpated
<i>Mimuartia glabra</i>	Mountain sandwort	Endangered
<i>Nymphoides cordata</i>	Floating-heart	Endangered
<i>Oryzopsis racemosa</i>	Black-fruited mountainrice	Threatened
<i>Platanthera flava</i>	Pale green orchid	Threatened
<i>Platanthera grandiflora</i>	Large purple fringed orchid	Threatened
<i>Platanthera peramoena</i>	Purple fringeless orchid	Threatened
<i>Platanthera psycodes</i>	Small purple fringed orchid	Endangered Extirpated
<i>Pycnanthemum pycnanthemoides</i>	S. mountain mint	Endangered Extirpated
<i>Pycnanthemum torrei</i>	Torrey's mountain-mint	Endangered
<i>Quercus macrocarpa</i>	Mossy-cup oak	Highly Rare
<i>Quercus shumardii</i>	Shumard's red oak	Highly Rare
<i>Rhododendron calendulaceum</i>	Flame azalea	Highly Rare
<i>Rumex altissimus</i>	Tall dock	Endangered



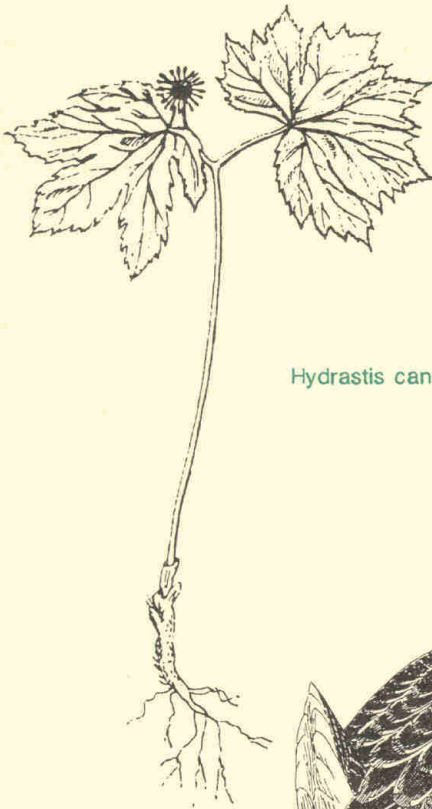
Pied-billed grebe-  
*Podilymbus podiceps*



Krigia dandelion -  
Potato dandelion

Euphorbia purpurea -  
Darlington's spurge





*Hydrastis canadensis* -  
Goldenseal



*Sora - Porzana carolina*



*Platanthera flava*-  
Pale Green orchis

<i>Smilacina stellata</i>	Star-flowered false Solomon's-seal	Endangered
<i>Solidago rigida</i>	Hard-leaved goldenrod	Endangered Extirpated
<i>Spiranthes ochroleuca</i>	Yellow nodding lady's tresses	Endangered
<i>Stenanthium gramineum</i>	Featherbells	Threatened
<i>Thalictrum dasycarpum</i>	Purple meadowrue	Status Uncertain
<i>Triostecum angustifolium</i>	Narrow-leaved horse-gentian	Endangered
<i>Vernonia gigantea</i>	Giant ironweed	Status Uncertain
<i>Viola incognita</i>	Large-leaved white violet	Highly Rare
<i>Zanthoxylum americanum</i>	Northern prickly-ash	Endangered

**Current and Historic Rare, Threatened and Endangered Species  
Carroll County, Maryland**

SCIENTIFIC NAME	COMMON NAME	STATE STATUS
<b>Animals</b>		
<i>Ammodramus henslowii</i>	Henslow's sparrow	In Need of Conservation
<i>Regulus satrapa</i>	Golden-crowned kinglet	Rare
<i>Speyeria idalia</i>	Regal fritillary	Endangered
<b>Plants</b>		
<i>Asclepias rubra</i>	Red milkweed	Endangered
<i>Carex buxbaumii</i>	Buxbaum's sedge	Endangered
<i>Carex conjuncta</i>	Soft fox sedge	Endangered Extirpated
<i>Carex conoidea</i>	Field sedge	Endangered
<i>Carex lanuginosa</i>	Woolly sedge	Threatened
<i>Carex meadii</i>	Mead's sedge	Highly Rare
<i>Castilleja coccinea</i>	Indian paintbrush	Endangered
<i>Elatine minima</i>	Small waterwort	Endangered
<i>Euphorbia purpurea</i>	Darlington's spurge	Endangered
<i>Fraxinus profunda</i>	Pumpkin ash	Endangered Extirpated
<i>Geum aleppicum</i>	Yellow avens	Endangered
<i>Krigia dandelion</i>	Potato dandelion	Endangered
<i>Lonicera canadensis</i>	Canada honeysuckle	Endangered
<i>Lythrum alatum</i>	Winged loosestrife	Endangered
<i>Mateuccia struthiopteris</i>	Ostrich fern	Rare
<i>Pycnanthemum verticillatum</i>	Whorled mountain-mint	Endangered
<i>Sanguisorba canadensis</i>	Canada burnet	Threatened
<i>Scirpus smithii</i>	Smith's clubrush	Endangered Extirpated
<i>Scleria reticularis</i>	Reticulated nutrush	Rare
<i>Sphenopholis pennsylvanica</i>	Swamp-oats	Threatened
<i>Talinum teretifolium</i>	Fameflower	Threatened

**EXPLANATION OF STATE STATUS CATEGORIES**

The State Status is determined by the Maryland Department of Natural Resources. The first four categories are those included in the Department's Threatened and Endangered Species list. Legal protection is provided only to species designated under one of these four categories. The remaining five categories are unofficial designations as determined by the Department's Natural Heritage Program.

**Endangered Extirpated** - a species that was once a viable component of the flora or fauna of the State, but for which no naturally occurring populations are known to exist in the State.

**Endangered** - a species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.

**Threatened** - a species of flora or fauna which appears likely, within the foreseeable future, to become endangered in the State.

**In Need of Conservation** - an animal species whose population is limited or declining in the State such that it may become threatened in the foreseeable future if current trends or conditions persist.

*Illustrations 80a and 81b, Michael O'Brien. Illustrations 80b, 80c, 81a, 81c, Josephine Thoms.*

**Extirpated** - a species that is known historically from the State, but has not been verified for an extended period, usually 40 years, and apparently is extirpated; or any species whose only known populations have been destroyed.

**Historical** - a species that is known historically from the State, but has not been verified for an extended period, usually 15 years.

**Highly Rare** - a species which typically has five or fewer current, naturally occurring, viable populations remaining in the State.

**Rare** - a species which typically has between five and twenty current, naturally occurring, viable populations remaining in the State.

**Status Uncertain** - an uncommon species considered to be of concern in the State, but with an uncertain status due to inadequate data to determine rarity, question of taxonomic classification, the possibility that reports of Maryland populations are based on misidentified specimens, or the possibility that the species is not native and naturally occurring in the State.



## A SAMPLE RESOLUTION

### Entitled

A RESOLUTION concerning:     The Monocacy Scenic River Citizens Advisory Board.

FOR the purpose of establishing a permanent Monocacy River Citizens Advisory Board.

WHEREAS, in 1974, the General Assembly of the State of Maryland recognized that the Monocacy River is notable for its rich natural resources, cultural heritage, for its many ecologically important sites, and for varied recreational opportunities, and consequently designated the Monocacy River as one of Maryland's "Scenic Rivers"; and

WHEREAS, the policy established for the State's Scenic Rivers is to preserve and protect the natural values for these rivers, enhance the water quality, and fulfill vital conservation purposes by the wise use of resources within the surrounding environment; and

WHEREAS, in 1990, the Monocacy River Advisory Board in conjunction with the Scenic Rivers Program of the Maryland Department of Natural Resources completed a study of the Monocacy entitled *The Monocacy River, Study and Management Plan*; and

WHEREAS, the study proposes several recommendations as to how the Monocacy's natural, scenic, and cultural heritage may be conserved and protected; and

WHEREAS, as in 1991, the Commissioners of Frederick and Carroll Counties adopted the Study and Plan which established the policy of protecting and enhancing the resource values of the Monocacy River; and

WHEREAS, Frederick County and Carroll County have within their boundaries approximately fifty-eight miles of shore line along the Monocacy River and over twenty major tributaries, which constitute an environmental resource of inestimable value to county residents and visitors to the area; and

WHEREAS, in 1984, the General Assembly created the Chesapeake Bay Critical Area Protection Program to protect the natural habitats and water quality of the Chesapeake Bay and its tributaries, which include the Monocacy River; and

WHEREAS, section 8-403(g) of the Natural Resources Article of the Maryland Annotated Code as amended provides that a political subdivision may establish a scenic river advisory board to further the aims of the Scenic and Wild Rivers Act; and

WHEREAS, the formation of an advisory body to provide counsel and advice on the stewardship of the Monocacy River Watershed in accord with the Act, the studies, and the plans, is a goal which is mutually desirable to Frederick County, Carroll County and the State of Maryland.

NOW, THEREFORE, BE IT RESOLVED BY FREDERICK COUNTY AND CARROLL COUNTY that a Monocacy River Citizens Advisory Board be and it is hereby established. For the purposes of defining the jurisdiction of the Board, the boundaries of the Monocacy River shall include the entire watershed, in consonance with both *The Monocacy Scenic River, Study and Management Plan*.

AND BE IT FURTHER RESOLVED BY THE COMMISSIONERS OF FREDERICK AND CARROLL COUNTIES that the purpose and membership of the Board shall be as follows:

**A.     THE BOARD SHALL PROVIDE COUNSEL AND ADVICE TO FREDERICK AND CARROLL COUNTIES, AND THE STATE OF MARYLAND. THE DUTIES OF THE BOARD SHALL BE:**

1.     To adopt policies, procedures and bylaws governing the conduct of business and the attendance requirement of its membership.



2. To recommend policies that encourage land use compatibility, enhance water quality, direct attention to environmentally sensitive areas and suggest alternatives to protect the natural, cultural and scenic resources in the Monocacy River Valley.
3. To review studies, policies, and rules formulated by federal, state and local government agencies that concern the Monocacy River watershed with special attention directed to the river and its stream corridors, and to comment on such proposals as appropriate. The Board's role in each county planning review process is specified in an operational letter of agreement addressed by the county commissioners to the Board.
4. To review and make recommendations concerning the implementation of *The Monocacy Scenic River, Study and Management Plan* and to help fulfill the other objectives as outlined in the in the document.
5. To review and make recommendations on federal, state, county and local programs, regulations, and public and private projects, including land use and development proposals, which the Board believes may have an impact on the Monocacy River watershed.
6. To prepare an annual written report outlining the activities, goals and accomplishments of the Board. This report shall be submitted to both Frederick and Carroll County Commissioners at the end of each fiscal year.

**B. MEMBERSHIP-VOTING**

1. The membership of the Board shall consist of five voting members selected by the Carroll County Commissioners, and five voting members selected by the Frederick County Commissioners. (It is recommended that the representative categories should include any of the following: contiguous land owners on the Monocacy River; the Farm Bureau; business such as a chamber of commerce representative; special interest groups; and a general category.)
2. The ten voting members shall appoint a chair and establish a written set of bylaws.
3. Members shall serve for a term of four years from the date of appointment; in order to ensure continuity, the membership will have staggered terms. The initial term of the voting members shall be four years.
4. A majority of the voting members shall constitute a quorum.
5. Members shall serve without compensation.
6. If a vacancy occurs, the new appointment shall be made in the manner described herein for the position vacated and for the balance of the unexpired term of the preceding member.

**C. Ex-Officio Membership--Non-Voting**

1. Upon invitation, one ex-officio member from Adams County, Pennsylvania will serve on the Board.

**D. Ex-Officio Membership--Nonvoting and/or Staff**

1. The Frederick and Carroll County Commissioners shall appoint one staff member respectively from their Planning Departments to serve as ex-officio members. The City of Frederick will have one government representative to also serve on the board as an ex-officio member.
2. The County Commissioners shall invite the Secretary of the Department of Natural Resources to appoint a Scenic Rivers Program representative to serve as an ex-officio contingent upon agreement by the commissioners and the Department of Natural Resources.

- E.** Subject to the appropriation of funds, the counties and the State shall provide professional and technical staff assistance to the Board in performance of its duties.



# GLOSSARY

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## **algae**

A group of mostly microscopic plants found in sunlit waters. They are eaten by fish and small aquatic animals and, like all green plants, they produce oxygen during the day and consume oxygen at night.

## **algal bloom**

A proliferation of living algae on the surface of lakes, streams or ponds, stimulated by nutrient enrichment. They are usually undesirable because of their appearance, the tastes and odors they impart to the waters, and the dramatic effects they often have on other aquatic life.

## **assimilative capacity**

The amount of pollutants that a stream may receive without violating any water quality standards.

## **benthic organisms**

Organisms living in or on bottom substrates in aquatic habitats.

## **best management practices (BMPs)**

The most environmentally, socially and economically appropriate in-stream or land treatment measure which can be applied to control a nonpoint source water quality problem.

## **bioassay**

Laboratory tests used to determine the response of organisms to specified conditions relating to the natural environment (e.g., water quality).

## **biomonitoring**

The use of living organisms to monitor water quality. By observing changes in the numbers and types of biological species, polluted conditions can be identified. Biomonitoring can provide an additional insight into water quality. Chemical sampling is highly dependent on the particular hour, season and weather when the sample was obtained. Species whose presence indicate polluted conditions, such as the oligochaete worms, are called "indicator species."

## **boreal**

Of or pertaining to the northern zone of plant life and associated with a colder climate.

## **buffer zone**

An area situated between two areas which are in possible conflict. The objective of the buffer zone is to reduce the possibility of adverse impacts from land use on water quality.

## **channel erosion**

The widening, deepening, and headward cutting of small channels and waterways, due to erosion caused by moderate to large floods.

## **cluster zoning**

A means to permit the transfer of density, in conjunction with the approval of a subdivision plat, from a preset standard by grouping or concentrating the building units on a reduced area of land. If for example, approximately 30 acres is zoned for conservation, at one house per 3 acres, cluster development would permit the total of 10 dwellings to be grouped on less land, leaving additional land for open space designation next to a waterway like the Monocacy or its tributaries.

## **discharge**

In Maryland, "the addition, introduction, leaking, spilling, or emitting any pollutant to waters of the State or the placing of any pollutant in a location where it is likely to pollute."

## **dissolved oxygen**

Gaseous oxygen which becomes soluble and is absorbed by water.

## **effluent**

The substance of a discharge. The discharge may be untreated, partially treated, or completely treated.

## **emergent plants**

Aquatic plants that are rooted in the sediment but whose leaves are at or above the water surface. These wetland plants often have high habitat value for wildlife and waterfowl, and can aid in pollutant uptake.

## **enrichment**

The addition of nitrogen, phosphorus, carbon compounds or other nutrients into a waterway, greatly increasing the growth potential for algae and other aquatic plants. Most frequently, enrichment results from the inflow of sewage effluent or agricultural runoff.

## **erosion**

The removal of land surface materials by wind or water. Erosion occurs naturally from weather or runoff but is often intensified by man's land clearing practices.

## **eutrophication**

The natural aging process which occurs in lakes and leads to their eventual extinction. Cultural eutrophication is the accelerated fertilization of impoundments, streams, and lakes arising from pollution associated with population growth, industrial development, and

intensified agriculture.

## **fecal coliform bacteria**

Minute living organisms associated with human or animal feces that are used as an indirect indicator of other disease causing bacteria.

## **flood frequency**

The frequency with which the maximum flood may be expected to occur at a site in any average interval of years. Frequency analysis defines the "n-year flood" as being the flood that will, over a long period of time, be equaled or exceeded on the average once every "n" years.

## **flood plain**

For a given flood event, that area of land adjoining a continuous watercourse which has been covered temporarily by water.

## **ground water**

Water in the porous rocks and soils of the earth's crust; a large proportion of the total supply of fresh water.

## **hazardous substance**

Chemical substances or compounds which may be for example, toxic to humans and animals.

## **hydrology**

A study of the properties, circulation and/or distribution of water.

## **impervious area**

Impermeable surfaces, such as pavement or rooftops, which prevent the infiltration of water into the soil.

## **low flow**

Typically the average flow for a week during a given ten year period having the least water volume. Used for calculating discharge permit limits.

## **nonpoint source pollutants**

Pollutants that are usually come from developed or undeveloped land surfaces often during some form of precipitation.

## **nutrient**

Elements including nitrogen but particularly phosphorus, which stimulate algal growth and other plant growth so as to change the trophic condition of a lake.

## **overlay**

The use of map overlays in planning is an approach that evaluates the features of a resource such as a river. Different features in



the overlay may include an assessment of erodible soils; steep slope; flood plain and endangered species.

**pathogenic organism**

Any microorganism or virus that can cause disease.

**pesticides**

An agent used to control pests. This includes insecticides for use against harmful insects; herbicides for weed control, fungicides for control of plant disease etc....

**point source**

A pollutant reaching a receiving water by a pipe or man-made conveyance from a discrete source.

**pollutant**

Any gas, liquid, or solid or form of energy whose nature, location, or quantity produces undesirable environmental effects. Some general categories of pollutants are: oxygen demanding wastes, pathogens, nutrients, sediment, heat, radioactivity and many chemicals.

**riparian**

A relatively narrow strip of land that borders a stream or river; often coincides with the maximum water surface elevation of the 100 year storm.

**riparian vegetation**

Vegetative growth along the banks of a stream.

**sediment**

Eroded soil particles which are transported by wind or water and settle to the bottom of a stream or lake.

**sludge**

The solid residuals of any industrial or sewage treatment process.

**soil association**

A landscape that has a distinctive proportional pattern of soils. They can be used to indicate the suitability of an area for certain land uses, but will not serve for detailed analyses because soils within an association may differ from each other significantly.

**streamflow**

Water flowing in a natural channel above ground.

**thermal pollution**

Degradation of water quality by the introduction of a heated effluent.

**topography**

The configuration of a surface, including its

relief or relative elevations, and the position of its natural and manmade features.

**transfer development rights (TDRS)**

Permits all or part of the density potential established in a zoning ordinance of one tract of land to be transferred to a noncontiguous parcel or even to land owned by someone else. The development rights become a separate article of property, which can be sold to a landowner whose property is better suited to greater densities of development. After selling the development rights, a landowner still retains title and all other rights to the land. These other rights permit farming, forestry, some recreational uses, and other non-intensive uses such as stream corridor conservation, open space preservation etc...TDRS can be individually designed to meet a County's specific needs.

**turbid**

A condition of water due to fine visible material suspension, which may not be of sufficient size to be seen as individual particles by the naked eye but which prevents the passage of light through the water.

**urban runoff**

Storm water from city streets and gutters. Usually it contains a great deal of litter and organic and bacterial wastes. In the past, urban runoff has largely gone untreated, but recently it has been recognized as a significant pollutant that needs retention and treatment.

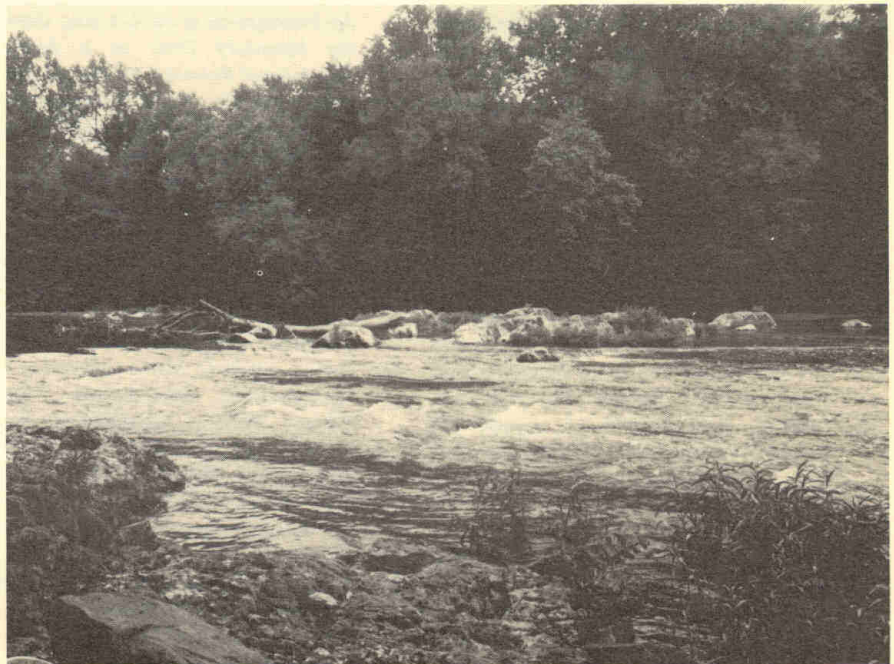
**water quality BMP**

A BMP specifically designed for pollutant removal.

**water table**

The upper surface or top of the saturated portion of the soil or bedrock layer; indicates the uppermost extent of groundwater.

\* Definitions taken from the New York State Department of Environmental Conservation, 1986, and Metropolitan Washington Council of Governments, 1987.



*Michaels Mill area*

*"....Nature never did betray  
The heart that loved her; 'tis her privilege,  
Through all the years of this our life, to lead  
From joy to joy;...."*

*William Wordsworth*



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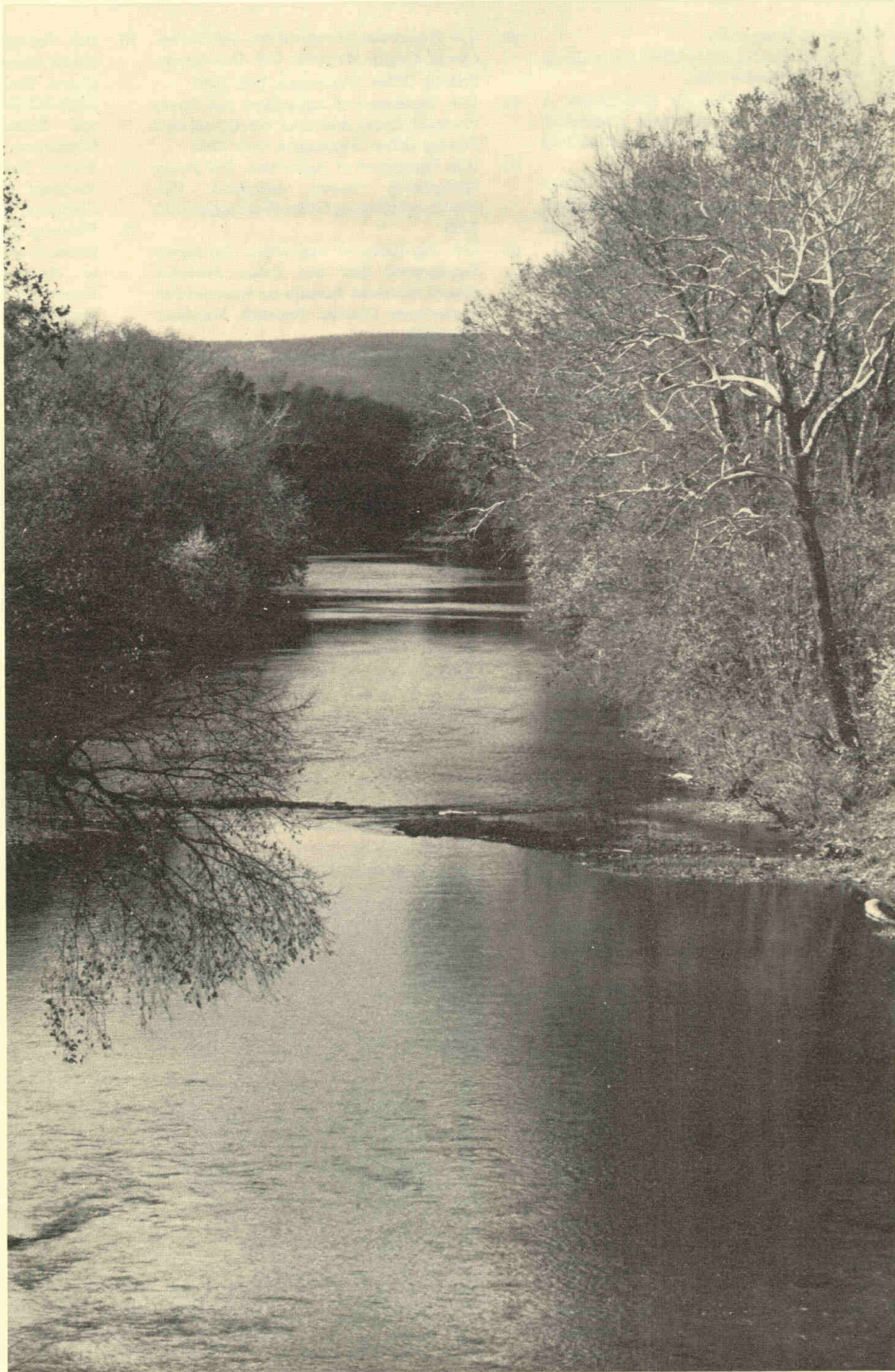
#### MAPS

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#### Thurmont - Covered Bridge

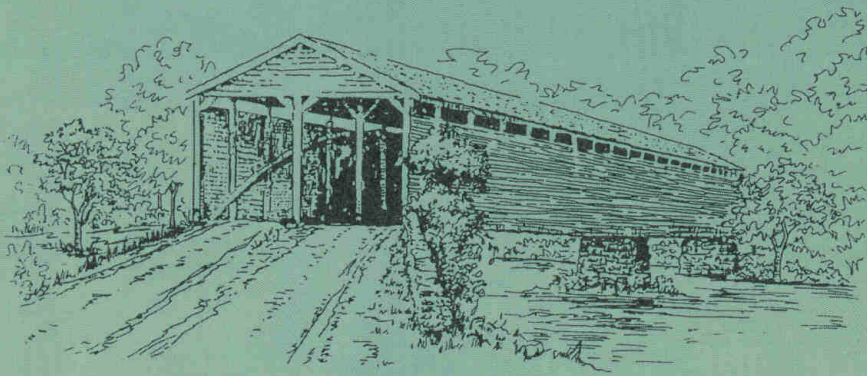






*Sugarloaf Mountain Area*





"It's ancient roof resounds the hoof  
As water roars beneath it  
Through storm and strife it clings  
to life  
And only time can cleave it"

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