

Maryland Scenic Rivers: **The SEVERN**



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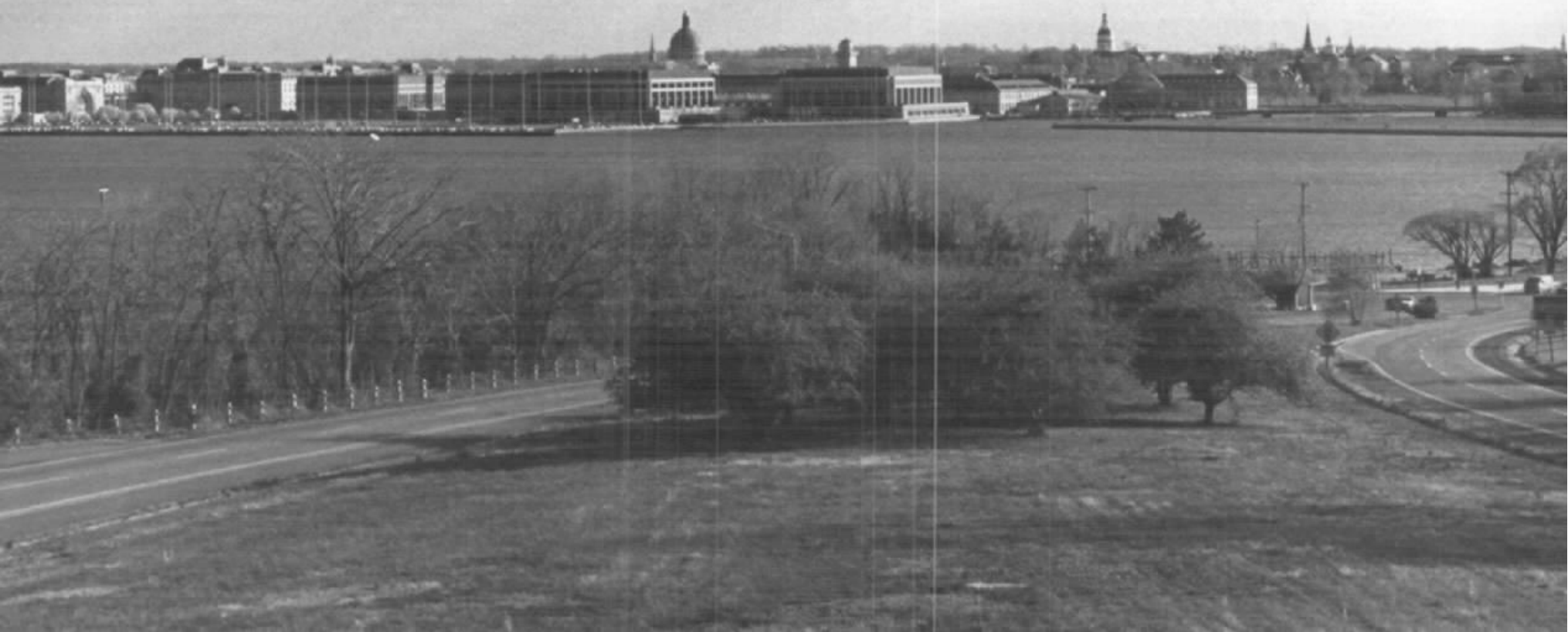
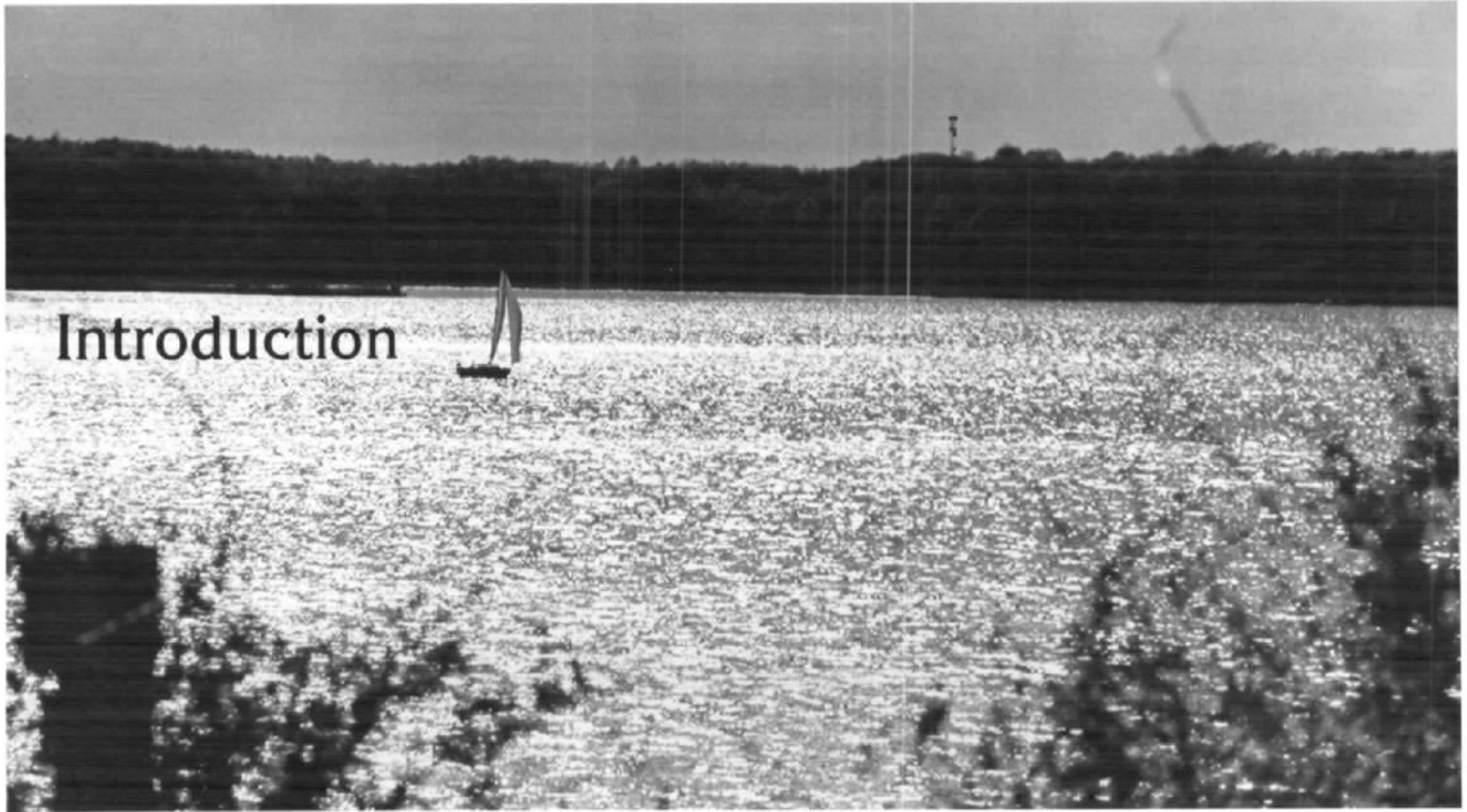


Table of Contents

	Page
Introduction	1
Summary of Recommendations	2
History	3
Natural Areas	17
Riverscapes	19
Watershed Features	29
Concerns and Recommendations	39
Growth and Development in the Severn River Watershed	40
Shoreline Protection	42
The Subdivision Review Process	44
Water Quality	45
The Impact of Public Sewers in the Watershed	47
Erosion	48
Stormwater Management	49
Incentives for Private Land Preservation	50
Providing Technical Assistance to Protect an Educational Resource	52
Identifying Important Natural Features	53
Protecting Historic Sites and Local Folklore	54
Recreation	54
Education and Appreciation	57
The Severn River District	59
Footnotes	60
Appendix	
A) Fauna	62
Flora	64
B) Government Aids to River Protection	67
C) Maryland Scenic and Wild Rivers Act	70
Bibliography	72

List of Maps

	Page
Map of Severn River Watershed, 1860	frontispiece
Upper Chesapeake Bay, 1608	3
Severn River, 1666	3
Severn River, 1670	4
Early Thoroughfares in Severn River Area, 1795	6
Annapolis Harbor, 1781	7
Historic Annapolis — original and present shorelines	9
Severn River Watershed, 1649-1900's	12-13
Severn River Watershed — Geologic Deposits	18
Severn Run and Natural Environment Area	20
The Severn River Estuary — Major Sections	22
Features of the Severn Estuary: Locations of	
Tidal Tributaries	24
Points and Promontories	27
Cliffs	28
Islands	28
Areas of Slopes over 15%	31
Ravines	33
Runs and Branches	34
Freshwater Ponds	37
Bogs	38



Introduction

The Severn is one of Maryland's greatest treasures, notable for fine scenery and a rich historic heritage. The river and the surrounding area are also host to varied recreational opportunities and include many ecologically important sites. In 1971 the General Assembly recognized these assets and designated the Severn as one of Maryland's Scenic Rivers.

In 1977 a citizens advisory board was appointed

by the Maryland Scenic and Wild Rivers Review Board. Working with the Scenic Rivers staff, the citizens advisory board has analyzed the full spectrum of river assets and concerns. This study is the result of that effort and is intended for use by everyone who is involved with the river. It documents the magnificence that was - and is - the Severn; it identifies the factors that threaten the integrity of this river; it discusses concerns and presents recommendations for saving both river and watershed.

The first major section of the study, *History*,

traces the role of the Severn in the development of the area from ancient times to the present. The *Natural Areas* section describes various scenes along the river in "Riverscapes" and prominent areas that form the watershed in "Watershed Features". *Concerns and Recommendations* provides guidelines to appropriate government agencies concerning the management of the river and watershed. This section also suggests ways in which private citizens and organizations can be more effective in protecting the Severn.

Summary of Recommendations

A Severn River District shall be established within Anne Arundel County, in concert with the Maryland Scenic and Wild Rivers Act, as amended in 1978.

Responsible administration of the Severn River District shall be vested in a Severn River Commission, a Severn River Advisory Board, or other viable body.

All environmental matters, in the broadest connotation, pertaining to the Severn River District shall be referred by all county and state agencies to the District administering body for its review, evaluation and recommendations to assure proper management, protection and utilization of the Severn River and its watershed.

Comprehensive environmental information shall be collected, stored, up-dated and effectively utilized in all watershed planning and development.

Plans for the watershed shall determine what type of land uses are most reasonably protective of natural values.

Public sewers shall be authorized only when all other

viable alternatives for waste disposal have been exhausted.

Conservation of natural features, green areas, forests and ecologically unique areas and historical sites shall be effected through public education, regulations, and incentive programs.

Development shall be controlled and managed by improved, effective, and enforced zoning and subdivision regulations.

Water quality shall be assured by effective regulation and enforcement of erosion control, stormwater management, industrial pollution control and sewage containment.

Recreational use of the watershed and of the river shall be in the balanced interests of the ecology, the public, the private landowners, communities and commercial enterprises.

The beauty and aesthetics of the Severn River and its watershed must be a continuing concern in all planning and development.

History

Indians

The discovery of a fluted projectile point near the head of the Severn indicates the presence of humans there as early as 10,000 years ago.¹ Those people, probably nomadic and dependent upon nature for their existence, undoubtedly found the river environment favorable, with its abundance of marine life and game animals of that post-ice-age era. Traces found in the Broadneck area dating to the period 7,000 to 5,000 years ago (late Archaic) include grooved axes, spearthrower weights, projectile points and toward the end of the period, shards of steatite (soapstone) vessels.



Section of John Smith's map *Virginia*, 1608, showing a drawing of a Susquehannock Indian and the earliest drawn record of the Severn.
Papenfuss/Coate: *The Hammond-Harwood House Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 1, p. 2.

The numerous ridges and terraces overlooking the Severn provided excellent sites for villages and camps. Investigations from 1956-1964 located seventy-two such sites, and six were examined in detail.² Studies have divided these sites into various phases. The Accokeek phase of 2,000 years ago was followed by the Selby Bay phase of 1,300 to 1,500 years ago, during which time trade extended from the Rappahannock to Martha's Vineyard.³ The Indians did not practice horticulture, but subsisted on wild plants, oysters, deer, raccoons, squirrels, box turtles and fish. The growing of corn and squash probably began not more than 1,000 years ago.⁴

During the Sullivan's Cove phase of 1,000 years ago, and the Round Bay phase of 700 years ago, oysters and small game were still an important food source.

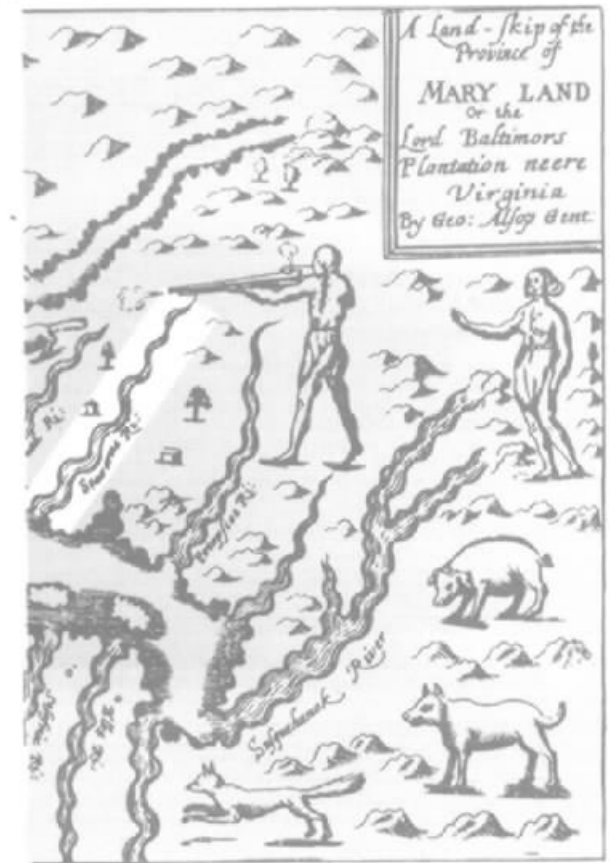
These early Indians were succeeded by Algonquian tribes from the Eastern Shore, who were in turn displaced by the belligerent Susquehannocks, an Iroquoian tribe from Pennsylvania. When Captain John Smith explored the Chesapeake Bay in 1608 he did not venture into the Severn, but he indicated that the Susquehannocks claimed the entire upper western shore as their hunting ground.⁵

The early European settlers were fortunate to sign

a treaty with the Susquehannocks in 1652. The Susquehannocks then moved northward where, in 1661, they began a period of warfare with the Cayugas and Senecas (the Susquehannocks were defeated after smallpox killed over half of their warriors in 1674).⁶ After the withdrawal of the Susquehannocks, other Indians—primarily Choptanks, Mattaponys, and Piscataways -- frequented the area briefly, but the Severn had become the white man's domain.

Section of 1666 map by George Alsop showing conceptual rendering of the "Seavorne" River.

Papenfuss/Coate: *The Hammond-Harwood House Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 7, p. 9.



Colonists

The first colonists to live in this area were Puritans from Nansemond, Virginia, on the banks of the James River. Unwilling to submit to Virginia Governor William Berkeley's demands for allegiance to the Church of England, they sought refuge in Maryland. Here, although Cecil, Lord Baltimore, was Catholic, he had determined to follow a course of religious toleration. Since more rapid settlement of Maryland was desired, Cecil's governor, Thomas Stone, invited the Puritans to settle on the western shore of the Chesapeake Bay, well north of the essentially Catholic St. Mary's settlement of 1634. In the fall of 1649 a few Puritan families sailed up the Bay to their new home.⁷



Detail of Augustine Herrman's map *Virginia and Maryland*, 1670, showing "Arundelton" and "Seavorn" River.

Papenfuss/Coale: *The Hammond-Harwood House Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 14a, p. 13.

The site chosen was a north-shore peninsula at the mouth of the Severn River. The settlers called the area Towne Neck. The ground was level and fertile and the settlers built a fort at the end of the point. This was necessary because the new settlement, called Providence, was within the area then controlled by the warlike Susquehannocks.

The names of the area and the river changed several times over the years, and there were many variations in spelling. Towne Neck was later called Greenberry Neck and is now known as Greenbury Point. The river was first called the Ann Arundell, but it was also called the Severn, after one of the major rivers in England. Since spelling was often a matter of personal choice, many variations have been used: Seavorne (1666), Seavorn (1670), Seavern (1689), Sebern (1703), Sivern (1781), Severan (1799), and Severon (1801). Severn, however, was the most common spelling.⁸

To the early colonists the forested lands along the river were a wilderness where deer, black bear, and mountain lion might be encountered. It appears that these woodlands were not an impenetrable thicket, but quite open and dominated by large, well-spaced trees. The shrub layer was likely low, partly as a result of burning by the Indians. Although a horse and wagon might be driven through such a woodland, and Indian trails existed, most travel was by water. This was not only easier but safer.

After a treaty was reached with the Susquehannocks in 1652, the Severn area and the upper Chesapeake were opened to hunting, fishing, trading, and further settlement. The treaty called for peace between Indians and colonists, and required that "upon any occasion of business with the English the Indians shall come by water and not by land."⁹

The Puritans were peaceful but militantly independent. They refused Governor Stone's demand to join a foray against the Nanticoke Indians on the Eastern Shore. This, and other differences led to an armed engagement with Stone's forces on March 24, 1655. Popularly referred to as the Battle of the Severn, the Puritans won handily at a site still undetermined but possibly near Horn Point.

Agriculture and the Development of a Seaport

By 1660 Providence had grown considerably. Agriculture had been expanded onto the broad plains of the Broadneck peninsula. Tobacco, a traditional Indian crop, was improved by strains brought from the West Indies. The fertile Collington soils along the Severn were ideal for its growth and tobacco cultivation soon dominated the local economy. This required that more land be surveyed, granted, and



Detail of Indian and tobacco barn from decorative title block, J.B. Homann's map, *Virginia, Maryland, et Carolina*, 1714.

Papenfuss/Coale: *The Hammond-Harwood House Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 25, p. 24.



Sailing ship from Augustine Herrman's map *Virginia and Maryland*, 1670.

Papenfuss/Coale: *The Hammond Harwood House: Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 14c, p. 14.



The William Paca House and Gardens, 1763

cleared. The timber was usually burned, only the steepest slopes, unsuitable for cultivation, being spared. The tobacco was packed in hogsheads -- large barrels which could hold about 500 pounds of the leaf.¹⁰ These were rolled to the river's edge and transported to sailing vessels bound for Europe.¹¹

Increasing trade promoted the development of a seaport. The best site was determined to be across the Severn and slightly upriver from Providence. The broad, rolling peninsula first surveyed by Thomas Todd in 1651 soon became a busy town. It was called Severn, Proctor's Landing, Townland at Proctor's, Anne Arundel Town, Arundelton, Port of Annapolis, and finally Annapolis. The town was nearly surrounded by water, and a wall was constructed from Acton's Cove on Spa Creek to Crocus Creek, which was a cove of Dorsey Creek (College Creek). The Annapolis port was well situated; it had a deep harbor and was sheltered by Greenberry Point and Horn Point, both much longer than today.

Sir Francis Nicholson, the third Royal Governor, recognized the advantages of the town's location. In 1694 he moved the seat of Maryland colonial government to Annapolis from St. Mary's. Nicholson zoned the town into sections according to different types of commercial and residential use. He also created a noteworthy street design. Two circles form the hubs of the system and are symbolic: one for the seat of government and one for the Anglican Church. Several streets converged on the center of

commerce, the waterfront. A ferry was established to cross the river, and shipyards and a customs house were soon built at the waterfront.

The growing wealth of merchants and planters combined with the influence of politicians to turn Annapolis into an elegant colonial city, with more cultural, political, and intellectual vitality than its size might otherwise have warranted. As the years passed, wealthier citizens built impressive homes and utilized the talents of the best local craftsmen of the colonial period, including William Buckland, architect; John Shaw, cabinetmaker; and William Faris, silversmith.

These great houses had extensive grounds, with gardens, yards, coach houses, stables, and handsome plantings -- often extending to the water. Perhaps the finest examples were Carrollton (1735), the Governor's House (1753), the Paca House (1763), Strawberry Hill (1766), the Brice House (1767), the Chase-Lloyd House (1769), and the Hammond-Harwood House (1774).¹²



Brice House, Annapolis, 1767



Belvoir

While Annapolis became a center of wealth and culture, plantations and small farms appeared in the outlying forests along the Severn. The houses generally were less ostentatious than those in Annapolis. Some, like Belvoir, built of native stone in 1690, were sturdy and are still standing. Most, however, were frame structures and do not remain. Exceptions include the Linsted House (1780) located on the north shore overlooking the river, and "Sevenside", an enlargement of Jacob Winchester's House (ca. 1849). Many fine structures were built along the General's Highway, including the Rising Sun Inn (1753), Brooksby's Point, Iglehart (1811), and Bunker Hill (1820).



Winchester

In the early years the colony was not self-sufficient, probably by design. Tobacco, pig iron, and other raw materials were shipped from Annapolis in return for manufactured goods from England. An overdependence on the tobacco crop was felt as early as 1702 when war in Europe interrupted world markets, causing tobacco prices to tumble. In 1704 an attempt was made to foster self-sufficiency by prohibiting the importation of grain, bread, and other necessities from Pennsylvania. But in 1709 food shortages were so severe that the ban was lifted.¹³ After 1714 tobacco prices rebounded, which further delayed the development of a diversified economy.¹⁴ Then, as tobacco and the erosion of topsoil exhausted much of the local soil, settlers began to move north and west to the more durable

soils of the Piedmont—to grow tobacco. The General's Highway, which had been an old Indian trail, became an overland route to Philadelphia in 1717 and until 1760 provided the best road from the tidewater area to Frederick and the Piedmont region.

Gradually, there was a shift away from Annapolis as an important port. With increased tobacco growing in Baltimore County and the upper parts of Anne Arundel and Prince George's Counties, the Patuxent and Patapsco Rivers became more convenient than the Severn for transportation. These fresh waters had the added advantage of being free of the teredo, or shipworm, that devastated wooden hulls in the Severn's brackish waters.¹⁵ Baltimore benefited from this situation because it was closer to the new

lands of the west, its port was larger, and it had abundant water power near the Fall Line. As Baltimore prospered in the late 1700's, Annapolis rapidly declined as an important port.

Once agriculture became more diversified in the mid-1700's, corn and wheat were grown extensively. Wheat exports, for example, increased from 83,000 bushels in 1749 to 473,000 bushels in 1774.¹⁶

With grain came a need for mills. Since waterpower was scarce on the lower Severn, windpower was used instead. In 1760 James Disney constructed a sturdy stone windmill at a site thereafter called Windmill Point. This landmark stood until torn down in 1808 for the construction of Fort Severn. Another windmill stood near today's Clay Street as late as 1844. In 1825 Daniel H. Wiggins constructed a windmill of novel design near the river, which attracted much attention (unfortunately, he neglected to provide a means of stopping the whirling device, and we may speculate on the outcome). Farther upstream, at Severn Run, waterpower was sufficient for saw- and gristmills.

Military Events

Throughout the colonies in the 1700's increasing tension with Britain led to violence. Just as Boston Harbor had its tea party, in 1774, the *Peggy Stewart*, a brig loaded with tea, was burned at Windmill Point. When the war started it was necessary to provide defenses for the Annapolis port, since it was strategically important. Rough forts and gun emplacements were built overlooking the harbor at Greenberry Point, Beaman's Hill, and Windmill Point. The port remained active throughout this period even though the British harassed shipping and attempted a blockade.

In September, 1780, 3,000 French troops under Rochambeau encamped near Belvoir (then Scott's Plantation) and reached Annapolis on the 18th. They encamped along Dorsey Creek near St. John's College, leaving some of their number buried near Powder House Hill before departing for Yorktown on five frigates and nine transports.¹⁷

Although commerce had shifted to Baltimore, Annapolis persisted as a center of culture and poli-



Early map of roads connecting the Severn River with Annapolis, Baltimore, and Washington, 1795, from Samuel Lewis's map, *The State of Maryland*. Papenfuss/Coale: *The Hammond-Harwood House Atlas of Historical Maps of Maryland, 1608-1908*, Fig. 51, p. 46.

tics. After the War the State House was briefly the capitol of the new nation and here Washington resigned his commission.

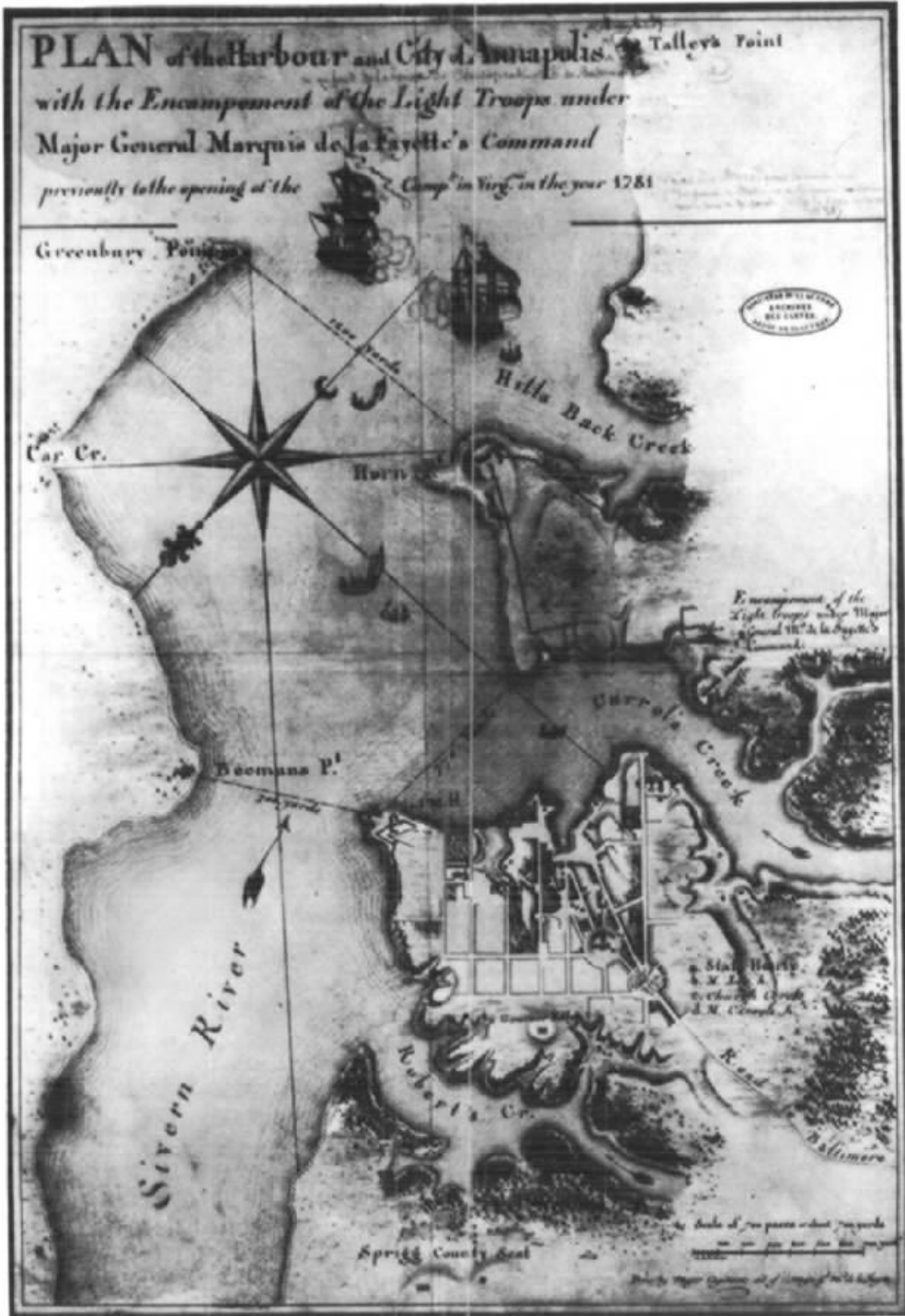
In 1808 renewed tension with Britain led to the building of forts to protect American ports. One of these was Fort Severn. It was built on a ten-acre site at Windmill Point and was more substantial than the earlier Revolutionary-era forts. It had a circular brick rampart and a ten-gun battery.¹⁸ Fort Madison, slightly larger, was built across the river at the same time. In all, at least seven sites on the Severn have been fortified, including "The Point" near the City Dock, Greenbury Point, Old Fort Horn, Old Fort Bieman, and Fort Nonsense. Fortunately, in the War of 1812, as in the Revolution, the British did not attack Annapolis.

In 1845 the Army transferred Fort Severn to the Navy for use as a training school for officers and once again large sailing vessels appeared in the broad harbor. In November, 1852 Commodore Perry's expedition to Japan sailed directly from the Severn.¹⁹ Another important feature of those days was the lighthouse on Greenberry Point. It stood from approximately 1846-1878, judging from maps of that era. However, the site was claimed by rapid erosion (since 1849 Greenberry Point has been reduced approximately 500 feet).

During the Civil War, Annapolis became an essential port for the movement of troops and supplies bound for Washington, and there were many war-related changes. Federal troops occupied the area throughout the War because the local population was sympathetic to the South. One Federal unit, the New York Volunteers, manned a lookout post on Mount Misery at Round Bay. In order to provide better protection to the port, the Army again took over Fort Severn. The Naval Academy, which had operated under that name since 1850, was moved to Newport, Rhode Island. The Annapolis and Elkridge Railroad tracks were extended down College Avenue to the water to make shipments more efficient.

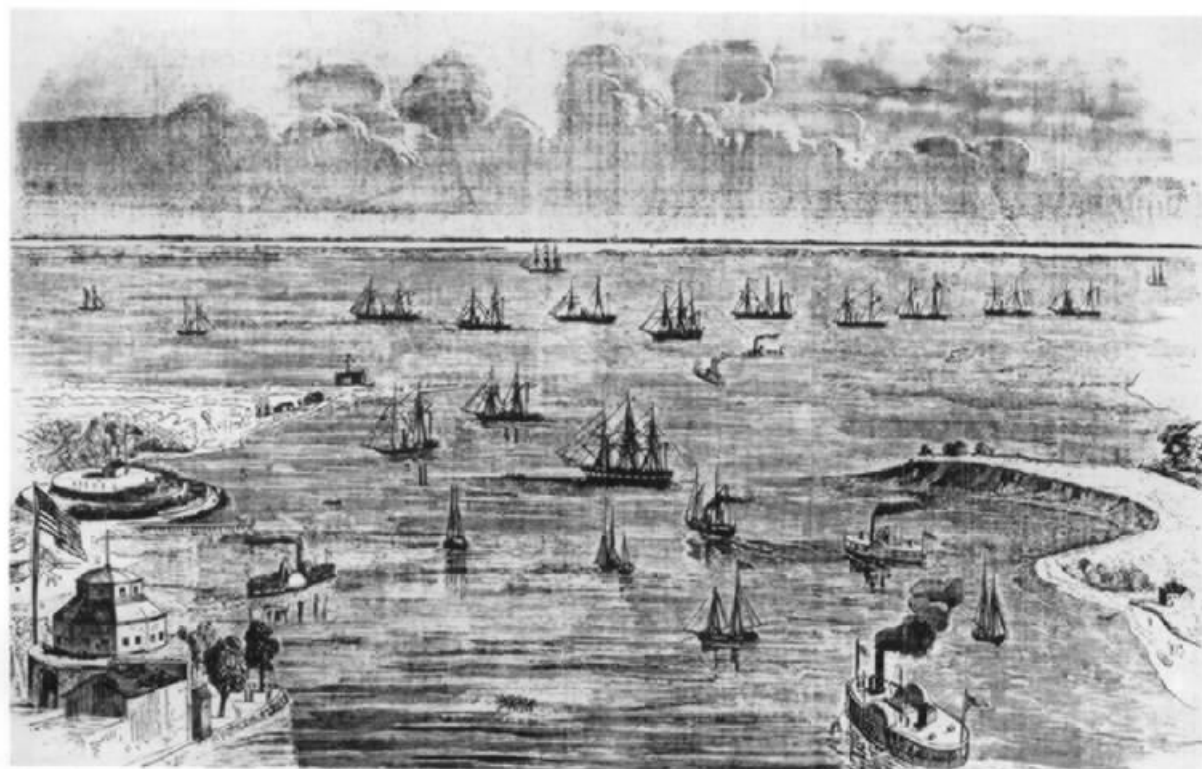
In October, 1861 a large naval expedition left the Severn to capture Port Royal, South Carolina. Shortly thereafter a military hospital was set up and wounded and repatriated soldiers began to arrive.

(continued on next page)



Major Pierre Capitaine. *Plan of the Harbour and City of Annapolis*, 1781.

Papenfuss/Coake. *The Hammond-Harwood House Atlas of Historical Maps of Maryland*, 1608-1908, Fig. 47, p. 42.



"The Great Naval Expedition Preparing for Departure from Annapolis, October, 1861" from *Harpers Weekly*, Nov. 6, 1861. Courtesy U.S. Naval Institute.

A processing center was located on Dorsey Creek at St. John's College. Paroled soldiers then were taken by train to Camp Richmond on the Saltworks Creek watershed or to Camp Parole just beyond. A Federal cemetery was laid out at the upper end of Dorsey Creek.

The Changing Shoreline

After the Civil War the Naval Academy was transferred back from Newport and a program of expansion began. Although much of the property acquired for the school was open land or small residences, some notable sites were included. The old Governor's Mansion of Colonial Governor Eden, with its extensive gardens leading to the tidal "Governor's Pond," was purchased about 1866 and torn

down in 1902. The Civil War military hospital, which had replaced Strawberry Hill, (the Sprigg family seat, which Washington visited and admired) was also removed. The hills along the Severn, where Wiggins built his windmill, were leveled. The shoreline was greatly altered and, from 1898 to 1906, extensive rebuilding was undertaken. Along the Severn, forty-two and one-half acres of land were filled in and the river's channel was dredged to a depth of thirty-one feet. This new depth allowed the Severn to admit larger vessels (in 1904 battleships and cruisers of the North Atlantic Squadron anchored in the river).

Over the years, the continuing expansion of the Academy has claimed much more of the estuary for new land. The once broad harbor is now a narrow section of the river. In addition, filling and bulkheading throughout the Annapolis area have eliminated nearly all the small coves and marshes seen on

earlier maps. Crocus Creek, Strawberry Creek, Swimming Pond, Deep Pond, and Governor's Pond have all disappeared, as have small coves at Brice Point and Little Carr Creek.

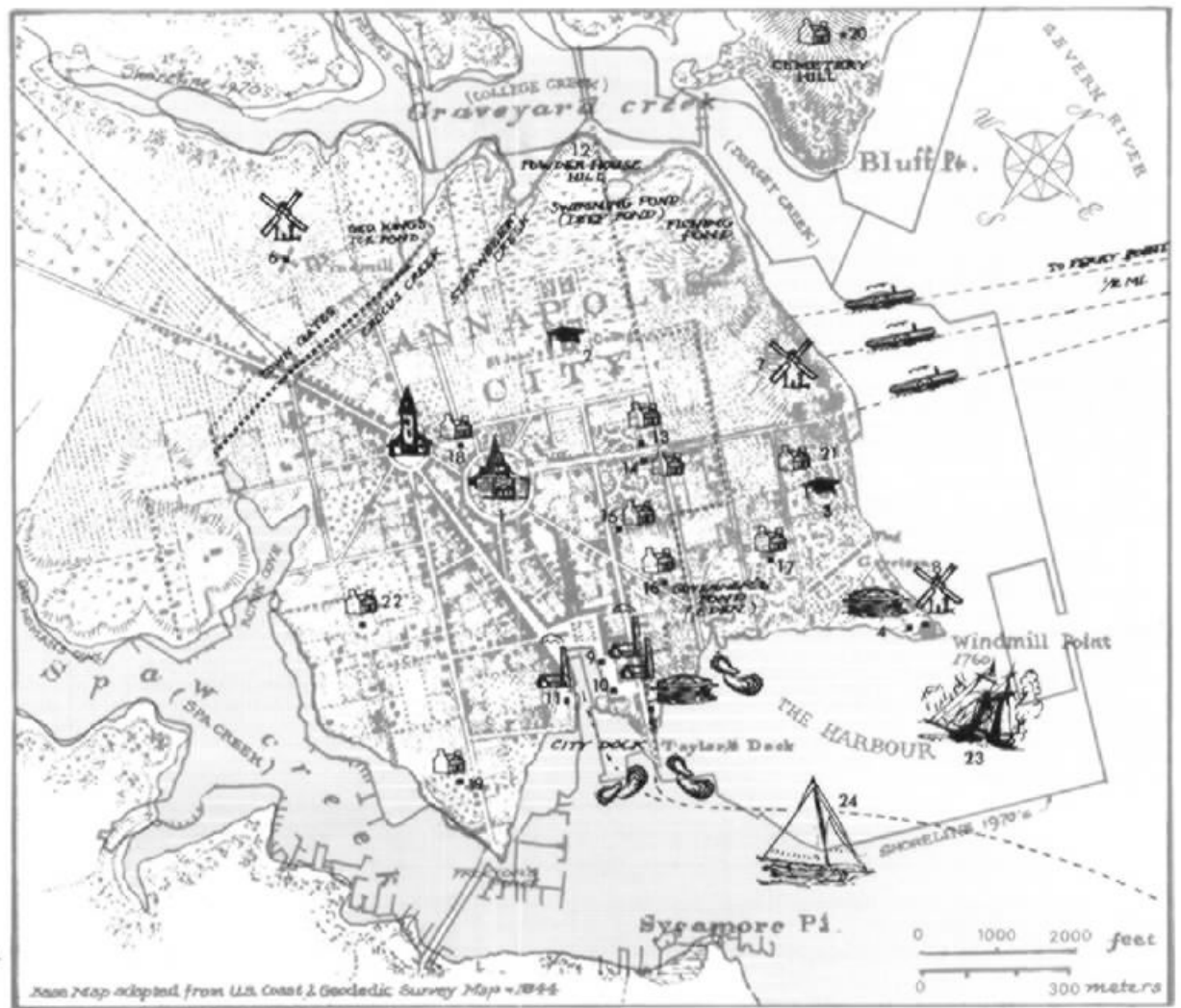
Early Changes in Transportation Patterns

After the Revolutionary War, Annapolis was somewhat isolated and no longer in the mainstream of commerce. Attempts were made to provide better access to the surrounding area. However, some of these were not successful: an 1823 proposal to build a bridge across the Severn failed; the Chesapeake and Ohio Canal, originally planned to enter the river, was redesigned; the Annapolis and Elkridge Railroad, although chartered along the south shore of the Severn to Annapolis in 1837 and completed in 1840, never reached Elkridge nor was it extended to the waterfront until the Civil War. While the railroad provided some help to local commerce, the link to the nation's capital was to prove more important, being a factor in the establishment of the Naval Academy in Annapolis.

The late 1800's saw other developments in transportation patterns along the river. The Severn Ferry, operating between Ferry Point and the foot of Maryland Avenue, was relocated to the foot of College Avenue about 1865 to make room for the expansion of the Naval Academy. By 1877 the ferry moved to Wagner Street, and to a similar site termed "Severn Street" by 1878.²⁰ Another river crossing, by a small ferry at Whitney's Landing, continued to operate until about 1930. The Drum Point Railroad, an ambitious plan to cross Severn Run at Dicus Mill via Jabez Branch, was under construction in 1887, but never completed.

Bridge building in the area included an 1868 bridge over Dorsey Creek and one over Spa Creek in 1870. The Spa Creek bridge was replaced in 1907. In 1886, the long awaited Severn River bridge was built from Meadow Point to Brice Point. All of these were made of timber and have since been replaced with masonry bridges in slightly different positions. Including railroad bridges, at least eighteen have been constructed over the Severn and its creeks.




While bridges had a localized effect on the horse-drawn traffic of the day, it was the construction of the Annapolis and Baltimore Short Line Railroad, down the north shore and across the timber trestle to Annapolis, that was to change the area forever. Chartered in 1880 and completed in 1887, the first effect was to speed access to other cities and thereby stimulate local industry. But a later effect was more lasting: the railroad brought the population of nearby urban centers to the once-secluded banks of the Severn.



Map References

1. State House, Capitol of U.S., November 26, 1783 to August 13, 1784. Maryland State Capitol since 1695.
2. St. Johns College, founded as King William's School, 1696
3. U.S. Naval Academy, military education, 1845
4. Fort Severn, 1808-1909
5. Battery Fortification, "the Point", 1812
6. Windmill, 1844
7. Daniel H. Wiggins' Windmill, 1825
8. James Disney's stone Windmill, 1760-1808
9. Hughes Steam Mill, 1834
10. Jones Steam Mill, 1834
11. Joseph M. Basil's Steam Saw, Grist and Planing Mill, 1890
12. French Troop Burial Ground, 1780
13. The Chase-Lloyd House, 1769
14. The Hammond-Harwood House, 1770-1774
15. The Wm. Paca House & Gardens, 1763
16. The Brice House, 1767
17. The Governor's House, 1753
18. The Governor's Mansion, 1870's — today
19. Charles Carroll's House, 1735
20. Strawberry Hill, 1766
21. Navy Superintendent's House
22. Ogle/Tasker Mansion & Gardens
23. The burning of the Peggy Stewart at Windmill Point, October, 1774
24. Late 18th Century ferries to Rock Hall, Kent Island, Oxford, Broad Creek, Baltimore

ANNAPOLIS
A Historical Map showing Selected Sites of Cultural or Commercial Significance beginning with Colonial Times

State House State Circle		St. Anne's Church Circle		Windmills	
Forts & Fortifications		Routes of the Severn Ferry		Saw & Planing Mills	
Oyster Loading Areas		Colonial Homes & Gardens		Current Shoreline and former water areas filled-in for development	
Institutions of higher learning					
National Historic Landmark Zone					



BIRD'S EYE VIEW OF THE
CAPITAL OF THE



CITY OF ANNAPOLIS,
STATE OF MARYLAND.

Edward Sachse, *Bird's Eye View of the City of Annapolis*, ca. 1858, showing a vista of the Severn River, Spa Creek (left), and College Creek (right).

Local Industries

While tobacco was the mainstay of early Maryland, other industries also existed along the Severn. These included shipbuilding, brickmaking, logging and milling, mining, fishing, truck farming and canning.

Shipbuilding: As early as 1651 Thomas Todd established a shipyard at "Todd's Harbor," now Annapolis. The Ship Carpenter's Lot, near the City Dock, was the center of local shipbuilding from 1719 through the Revolution. Shipbuilding continued around Annapolis but by 1936 only two yards remained.²¹ The industry today is limited to numerous marinas, located around Spa Creek and Back Creek, which moor, maintain and store recreational craft.

Brickmaking: In colonial days most of the brick used in this area was made locally, although some arrived as ballast in ships bearing lightweight manufactured goods from England.²² One brickyard of the mid-1700's was located on the Brice tract on lower Broadneck. The ruins of a kiln remain near Martin's Pond and may be the source of the name "Brickyard Point", a small promontory between Martin's Pond and Luce Creek.²³

A recent account of the 1774 construction of the wall between the Lloyd and Ogle properties in Annapolis states that it required "94,100 bricks bought of John Hammond, who undoubtedly made them of his good red Anne Arundel clay. They were brought by boat from the Hammond place at the head of the Severn River."²⁴ The Arundel clay above the head of the river may be well suited for brickmaking, but only at Forked Creek does this formation outcrop on the estuary. The Riverside Brick Company operated here before 1917.

Logging and Sawmilling: Logging was a necessary activity from the earliest days, although most of the original forest was not used productively. Instead, it was burned to make room for tobacco. Because the area lacked adequate water power, timbers were usually squared by broadaxe and then pit-sawed to the desired dimension. At Severn Run in the 1860's and 70's, the water powered mill of Cecil and Pumphrey (later J. Lowman's)

and the Dicus mill operated as saw- and gristmills. A stream on the Severn's north shore, above Round Bay, powered C. R. Sevier's sawmill in 1878.

Steam power was a great boost to sawmilling, allowing the sawing of large hardwoods. In 1834, Hughes' Steam Mill and Jones' Steam Mill operated near the City Dock, but whether they were sawmills or gristmills is uncertain. In 1860, Reisinger's Steam Saw operated between Brewer Creek and Clement's Creek, and an old sawmill existed near Three Mill Oak in 1878. By about 1890, Joseph M. Basil advertised his "Steam Saw, Grist and Planing Mill", located near the City Dock.²⁵

Logging heavy timber from rough terrain with horses and oxen took considerable ingenuity, and only the best material was cut. Some old timber stood until the 1950's, when bulldozers were used. Today the only sawmill remaining along the Severn is at Little Round Bay. This mill now gets a large proportion of its logs from sites being cleared for development.

Mining: Local sandstone was easily available and frequently used in construction in the region. The 1690 portion of Belvoir is built of this material. In Annapolis, colonial builders used some local stone, but in most cases a granitic stone called "Susquohannah stone" was brought from Havre de Grace, where it was convenient to tidewater and could be easily transported. Local quarry sites were located on the Severn's south shore near Indian Landing and across the river at Rock Point.

Sugary white sand suitable for glass making exists along the upper Severn in a rather narrow vein; Hopkins' 1878 map notes glass sand between Plum and Valentine Creeks. In 1885 the Annapolis Glass Works opened on Horn Point. Sand was dug from shoreline pits on both sides of the upper Severn and then transported by boat. Intricate tunnels were dug into the banks for these operations, especially in the Arden area. The abandoned tunnels were a local attraction until closed by authorities in the 1930's.

A number of small pit operations existed along the upper river in the early 1900's, including the Brenan Sand Company at Forked Creek and the Liberty Sand and Gravel Company at Stevens Creek. Operations at Forked Creek closed in 1938.

By 1976 only one pit was active, and this is now closed.

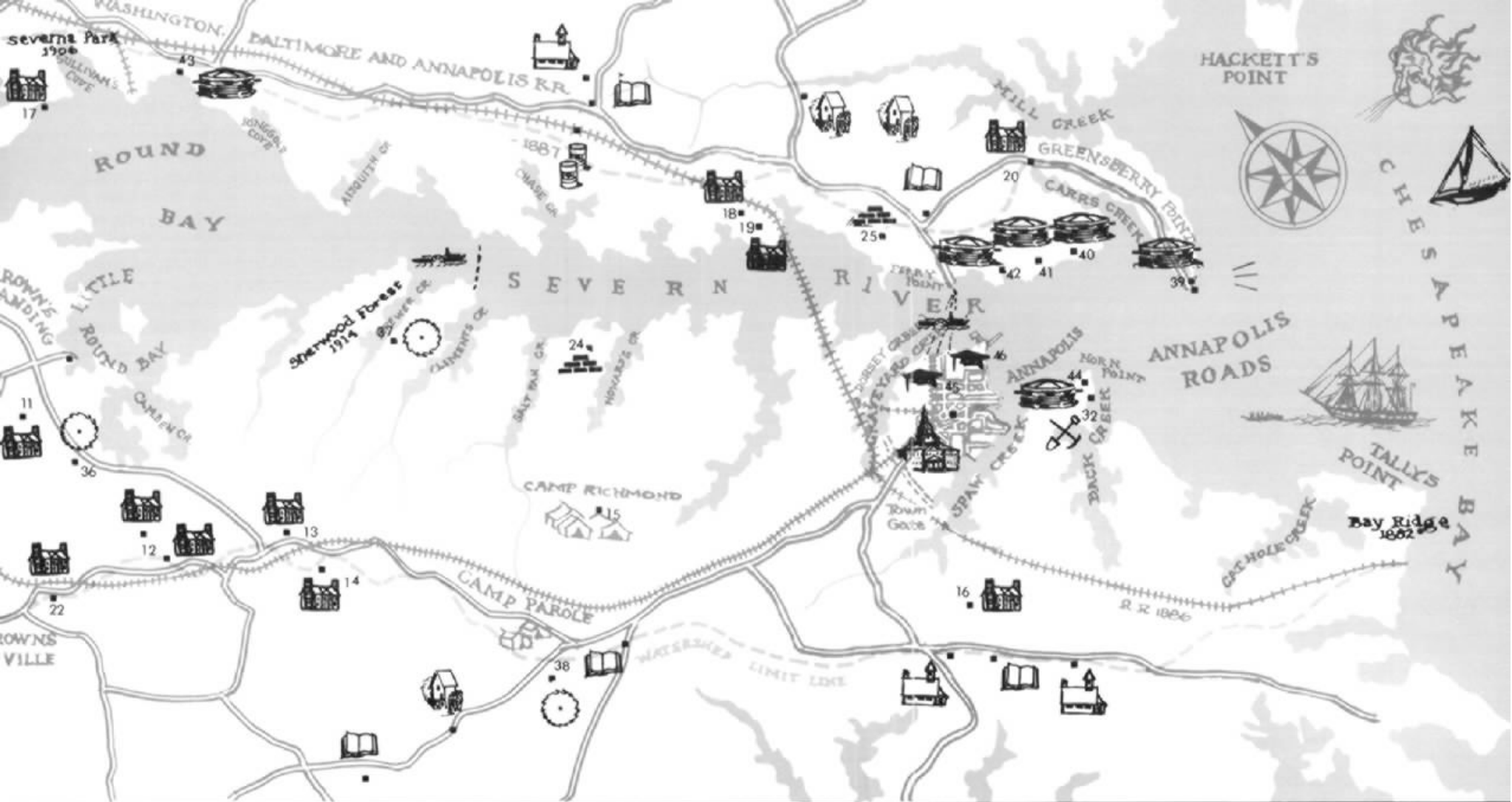
Fishing: Seafood has always been important for local use but was not an export in colonial days, since the salt obtainable from Britain was considered unsuitable for preparing fish. Oysters and crabs were viewed as inferior fare until after the Civil War, when oystering became an important local industry. In 1878 at least fourteen oyster houses operated in Annapolis. But after reaching peak harvests in 1885, Bay production declined to a low in 1904 as beds were depleted.²⁶

The harvesting of fish, crabs, oysters, and, more recently, soft shell clams is still important in the greater Annapolis area. Better road access and improvements in canning and refrigeration have greatly extended these markets. However, for some years the Severn has been closed to commercial finfishing above Horn and Greenbury Points, although pound nets have been set near Bay Ridge. Oyster bars still exist nearly to Round Bay but, at times, they have suffered from poor water quality and have been closed to harvesting. The mooring of oyster boats at the City Dock continues to hold the interest of tourists and is one of the last vestiges of the traditional local industries.

Truck Farming and Canning: From earliest days, the Severn River was a means of moving crops to market. Numerous wharfs and landings existed for this purpose, including Indian Landing at the head of navigation on the south shore, and at various locations along the north shore where no land route to Annapolis was available.

Even after the first bridges and railroad crossings were built, sailing craft and steamboats continued to load produce at these landings. Familiar crops were tomatoes, cantaloupes, watermelons, strawberries, peaches and apples. Canning operations included Charles Tate's tomato cannery, built along the Short Line Railroad at Arnold about 1904, and the George M. Murray Canning House on the upper watershed near Odenton.

The truck farming operations required an abundance of hard-to-obtain seasonal labor and went out of business by the 1920's. Today several small "pick-your-own" operations exist.



ANNAPOLIS, Capital of Maryland since 1695. Capital of U.S., November 26, 1783 to August 13, 1784. National Historic Landmark District



CHURCHES



SCHOOLS



CANNERIES



BLACKSMITHS



FERRY ROUTES



BRICKYARDS
 23 — Riverside Brick Co. (1917)
 24 — Colonial Brick Kiln
 25 — Brice's Colonial Brickyard



SAND, GRAVEL, STONE SITES
 26 — Liberty Sand & Gravel Co. (1912)
 27 — Brenan Sand Co. (1917)
 28 — Sand Caves
 29 — Stone Quarry
 30 — Glass Sand
 31 — Existing Sand Pit



WATERPOWERED MILLS
 33 — Pumfrey & Cecil's Grist & Sawmill (1860)
 34 — Jacob L. Dicus Grist & Sawmill (1860)
 35 — C. R. Sevier's Sawmill (1860)



STEAM MILLS
 36 — Operating Sawmill
 37 — Reisinger's Steam Saw (1860)
 38 — Old Steam Sawmill (1860)



FORTS & FORTIFICATIONS
 39 — Providence, 1658
 40 — Fort Madison, 1808-1900's
 41 — Old Fort Nonsense, 1844
 42 — Old Fort Biemen
 43 — Mt. Misery, Fortified Observation Post
 44 — Fort Horn, 1776-1812



INSTITUTIONS OF HIGHER LEARNING
 45 — St. Johns College, 1696
 46 — United States Naval Academy



Residential Development

For city dwellers of the last century, steamboat excursions provided an opportunity to escape the noise and congestion of the larger cities. Resorts along the Bay were popular and catered to the summer visitors. Bay Ridge, at the mouth of the Severn, was opened in 1882, and by 1886 could be reached by a railroad spur extending over Spa Creek.²⁷ About 1888, the Short Line Railroad opened a resort at Round Bay, with a spur line, stations, hotel, pavilion and bathhouse. The clear water and wooded scenery of the Severn were popular attractions and the operation continued until 1907. The Indian Landing Boat Club was founded about 1906 and continues as a popular recreational organization today.

The Severn River also attracted the very wealthy, who built fine mansions on the more imposing promontories overlooking the river. Uchlyn on Severn, the palatial estate of Edmund Pugh Baugh, a Philadelphia industrialist, was built on 550 acres near Aisquith Creek in 1906. Although of English Tudor and not French Renaissance architecture,

the furnishings, extensive gardens, sweeping view, associated farms, driveway and gatehouse were reminiscent of Vanderbilt's "Biltmore" at Asheville, North Carolina. This and other fine homes have added much to the Severn river scene.

These early residents appreciated the scenic and recreational advantages of the river and in 1911 organized the Severn River Association. This is now the oldest American volunteer group working for the preservation of a river and its watershed.²⁸

The building of residential communities along the river started, perhaps, with Wardour, or with Severna Park, first platted in 1906. Here the land was rather level and few houses had a view of the water. Like Odenton on the upper watershed, Severna Park was railroad-oriented and the houses were of traditional design. Starting in 1910 residential development at Round Bay generally followed a vacation resort theme. Houses were of various styles, some small and rustic, while others were more substantial.

In 1914 the community of Sherwood Forest was laid out on some of the highest and steepest terrain along the river. The waterfront, however, was sandy

and pleasant for bathing, thus combining the features of mountain and seashore resorts. Since Sherwood Forest was some distance from the railroad, commuting was not possible. The community therefore had its own waterworks, store, and post office. The roads were narrow and trees and slopes were little disturbed. The summer cottages were small and inconspicuous, perched on "stilts" on the steep hillsides overlooking the river. The retreat included a golf course and tennis courts. Strict covenants were drawn governing the use and sale of lots. This protected the natural wooded character of the community.

The Sherwood Forest theme was repeated at Pines-on-the-Severn in 1921. Other similar efforts included Epping Forest, Severn Heights, and Herald Harbor. Herald Harbor was unique in that lots were granted for newspaper subscriptions, "Herald" referring to a Washington newspaper of that name.

The Baltimore-Annapolis Boulevard, built in 1912, improved transportation and, during the 1920's the automobile made golf courses and country clubs easily accessible. The Annapolis Roads and Sherwood Golf Courses were quite popular, and smaller community courses existed at Severna Park, Pines-on-the-Severn, and within Sherwood Forest. A Naval Academy course was built near Shady Lake.

In a vacation area a certain primitiveness was accepted as part of the summer experience. Water was often obtained through a makeshift arrangement of spring water and exposed roadside pipes that were shut off before cold weather. Bottled water was drunk and chemical toilets were common. The old country stores never really adjusted to the influx of summer residents, therefore most shopping was done in Annapolis or Baltimore. Although a concrete bridge replaced the wooden span over the lower Severn in 1924, local roads were still unpaved and oxen were frequently needed to pull vehicles from mudholes. Travel across the upper river used the old ferry at Whitney's Landing, which operated until the 1930's. In many cases the best means of local transportation was by water.

The Depression essentially ended the vacation-cottage era along the river. Many of these small

structures changed hands, were winterized, and became year-round residences. This necessitated the installation of year-round roads, water, and other improvements. Often, adjoining lots were purchased to provide more space, but in general the scheme of narrow roads, small lots and steep slopes remained, providing a picturesque but impractical community layout.

There was little residential construction after the Depression. The old railroad along the south shore was abandoned and fields and orchards became woodland. The building of the Ritchie Highway in 1938 was to change all this and, after World War II, the residential communities of Linstead, Rugby Hall, and Ben Oaks were developed. With the building of the Revel Highway, the Chesapeake Bay Bridge, the John Hanson Highway, and the "new" Severn River Bridge in 1953, the pace of development increased, involving thousands of commuters. West Severna Park, Colchester, Hollywood, Fairwinds, Pointfield Landing and Glen Oban were soon added. Development was somewhat less extensive on the south shore, occurring at Lindamoor, Palisades, and Arden. In the 1970's the intensity of development in the Parole area necessitated improvements to General's Highway and the construction of Route 32. These changes made the south shore of the Severn more accessible, and development at Saefern was followed by The Downs and other communities, amounting to over a thousand acres in a few years.

As the countryside was stripped for development, other changes took place along the Severn. Boat mooring and a greater number of boats operating on the river encroached upon other recreational activities. Water quality was of concern. Public sewers were extended into Severna Park communities and promptly facilitated new and dense development. The Severn River Association was joined by the Greater Severna Park Council, the Lower Broadneck Federation of Community Associations, and the General's Highway Council of Civic Associations in seeking a better means to control future growth, and thus protect the river.

Narrow road typical of old communities; Old River Road, Pines-on-the-Severn.



Winchester on Severn marina; this dredged area was once a marsh.

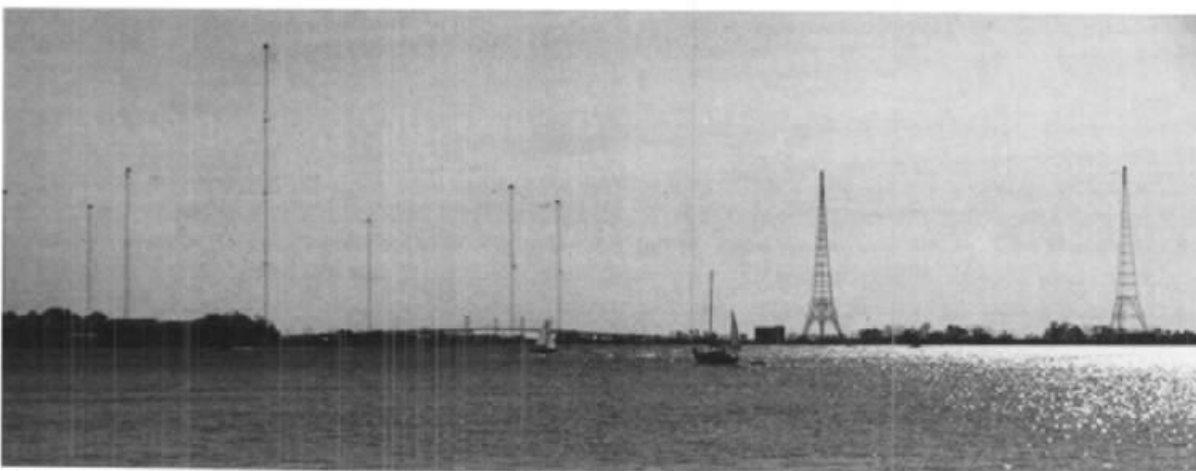


Public and Private Institutions along the Severn

Throughout the twentieth century Naval installations have dominated the area around the mouth of the Severn River. In 1911 the Greenbury Point Naval Air Station was begun, marking the start of naval aviation. The Station was closed in 1913 and replaced in 1917 by the Radio Transmitter Facility. A number of impressive radio towers with heights up to 1200 feet have since dominated the skyline. The David W. Taylor Naval Ship Research and Development Center and the Electromagnetic Compatibility Analysis Center are also located in the vicinity.

The quiet beauty of the Severn has long attracted religious and educational institutions. In 1852 the Redemptorist Fathers received the Carroll estate overlooking Spa Creek. Manresa, a Jesuit retreat house, was built in 1925, and adds much to the scenic quality of the river. St. Conrad's Friary, incorporating the Bartlett-Hayward mansion, overlooks the river at Winchester. Nearby, the Pine Lane Spiritual Center, a recently closed retreat, occupied the John Sherwood estate.

St. Helena Island, in Little Round Bay, was once the location of a camp for crippled children. Other camps in the area were Camp Linstead, a popular Boy Scout camp that operated from 1920 to 1941, Camp Wawanassa near Stevens Creek, operated by the Campfire Girls, and Camp Arlington Echo, once a children's church camp near Indian Landing that is now operated by Anne Arundel County. Also overlooking the river are the Severn School, established in 1914, and Wroxeter-on-Severn School, which operated from 1947 to 1980. St. John's College, on College Creek, was first established as King William's School in 1696, and has been a part of the Severn's history in every era. Like the Naval Academy, it adds to the intellectual vitality and scenic quality of the area.



*U.S. Navy Radio Transmitter Facility at Greenbury Point
Manresa →*



M: Dowell Hall (Bladen's Folly 1742)

St. Johns College, Annapolis



Conclusion

Many of the scenic and historic assets of the Severn remain today only because the economic growth of Annapolis faltered with the decline of its port two hundred years ago. Thus, new construction did not supplant the older landscape as quickly as in other colonial cities. Since the end of World War II, however, the desirability of the Severn River area has brought a resurgence of economic activity. This has increased the growth of tourism and the marina industry, and has led to the construction of many new communities, government buildings, condominiums and shopping centers. These changes are rapidly altering the shoreline and skyline, but more importantly, they are damaging the area's natural environment.

Geological Background

The geology of the Severn begins thirty to sixty million years ago in shallow seas and coastal estuaries.²⁹ The sands, silts, and clays laid down at that time now exist in distinct unconsolidated layers which slope and also thicken toward the southeast. Approximately one million years ago these geological deposits were uplifted. Although glaciers did not reach Maryland, sea levels were low during glacial periods and freshwater streams cut deep ravines and valleys in the sandy material. At the end of each glacial period the seas returned, flooding the valleys and cutting across the landscape. One such sea cut in from the north, leveling the Severna Park and Arden areas and leaving Broadneck as an island.³⁰ Today Broadneck is a peninsula and the Severn's original valley floor is as much as 135 feet below sea level, covered by more than 100 feet of silt.³¹ (Over the past two thousand years the sea level has risen approximately ten feet, and already one foot in this century.) Siltation of the estuary continues, from three sources: eroded material carried by freshwater streams, as at Severn Run; wave-induced shoreline erosion; and silty material carried into the lower river from the Chesapeake Bay by the tides.

Surface exposures of each ancient deposit extend in bands across the watershed and can be seen in cross section in the cliffs along the river. These deposits have evolved into the several soil types known in the region today and have made possible, due to their nature and disposition, appreciable aquifer recharge. The oldest and deepest deposit is the Potomac Group of sands and clays that dominates the Severn Run basin. The Magothy Formation, which outcrops across the upper estuary, is mostly fine to coarse quartz sand, including grades suitable for glass making and construction material. Where combined with compounds of iron, this material forms layers of ironstone, commonly called sandstone.

The Monmouth Formation is thinner, has poor permeability, and separates the Magothy from the massive overlying Aquia Formation. The Aquia sands, up to one hundred eighty feet thick, cover most of the lower watershed. They are quite firm; thus, slopes and cliff faces are steep and relatively stable. This material contains large amounts of glauconite and is noticeably green where unweath-

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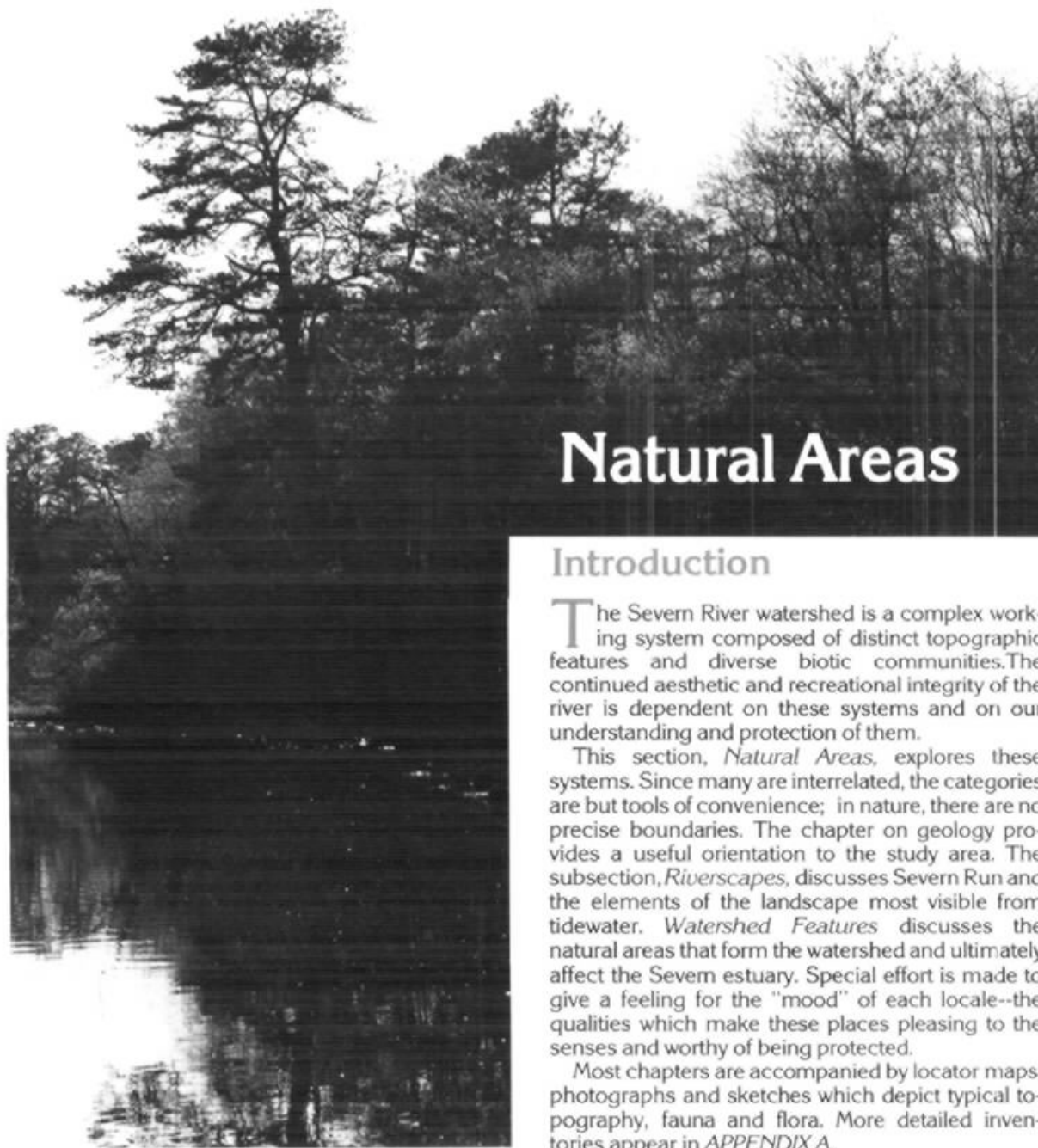
Natural Areas

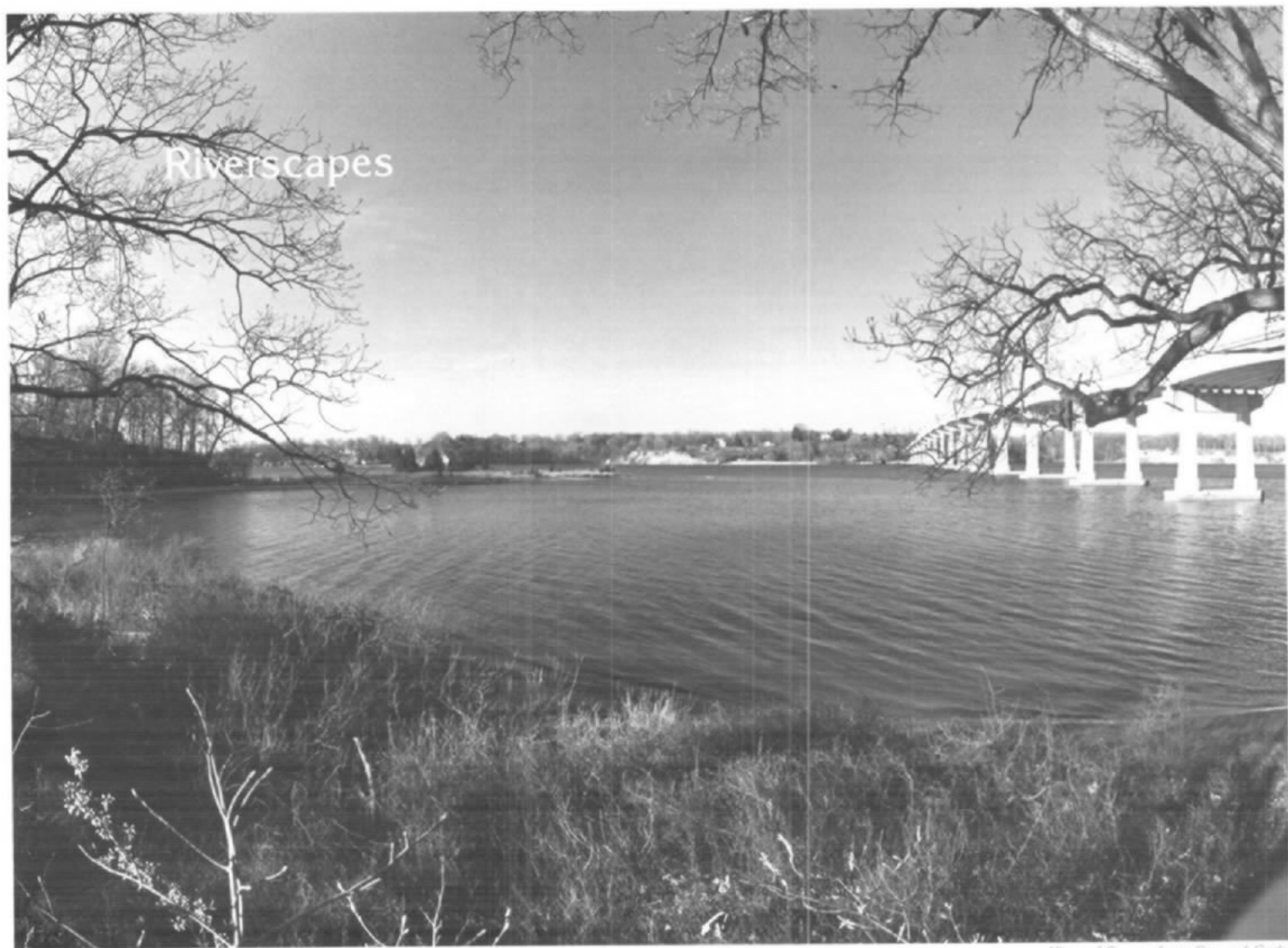
Introduction

The Severn River watershed is a complex working system composed of distinct topographic features and diverse biotic communities. The continued aesthetic and recreational integrity of the river is dependent on these systems and on our understanding and protection of them.

This section, *Natural Areas*, explores these systems. Since many are interrelated, the categories are but tools of convenience; in nature, there are no precise boundaries. The chapter on geology provides a useful orientation to the study area. The subsection, *Riverscapes*, discusses Severn Run and the elements of the landscape most visible from tidewater. *Watershed Features* discusses the natural areas that form the watershed and ultimately affect the Severn estuary. Special effort is made to give a feeling for the "mood" of each locale--the qualities which make these places pleasing to the senses and worthy of being protected.

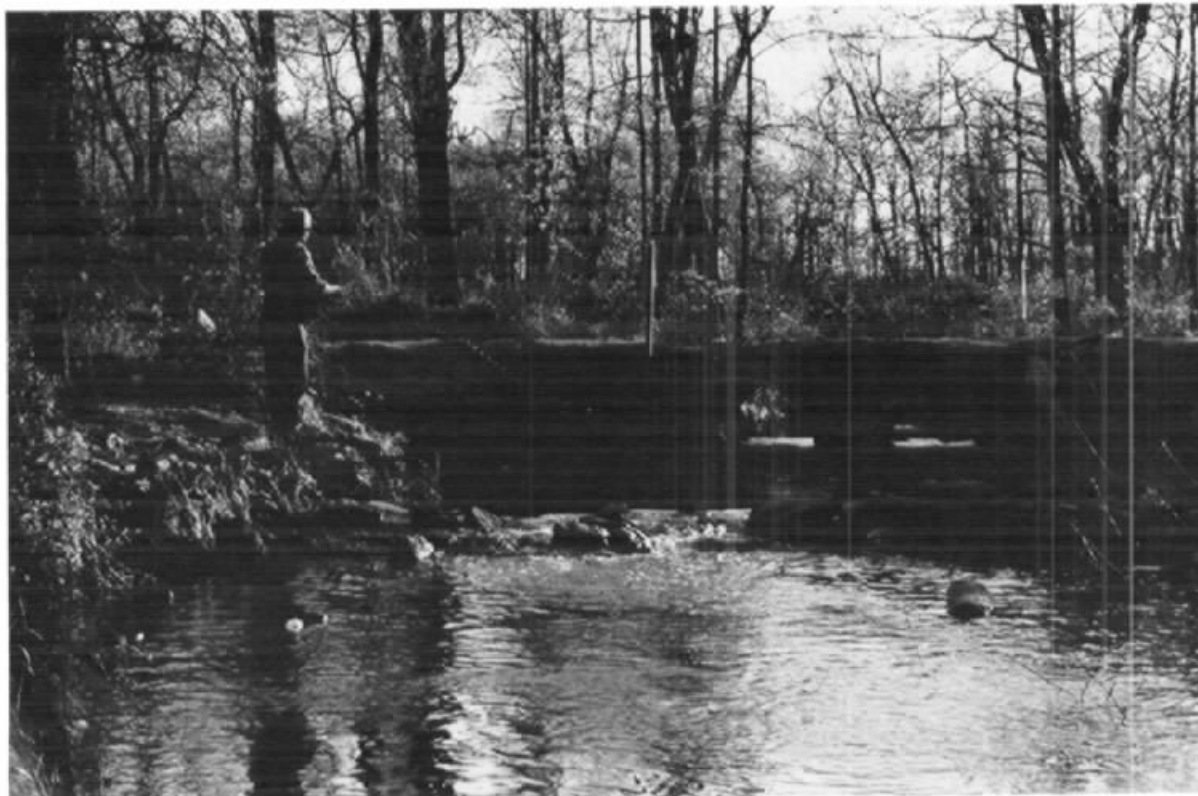
Most chapters are accompanied by locator maps, photographs and sketches which depict typical topography, fauna and flora. More detailed inventories appear in *APPENDIX A*.





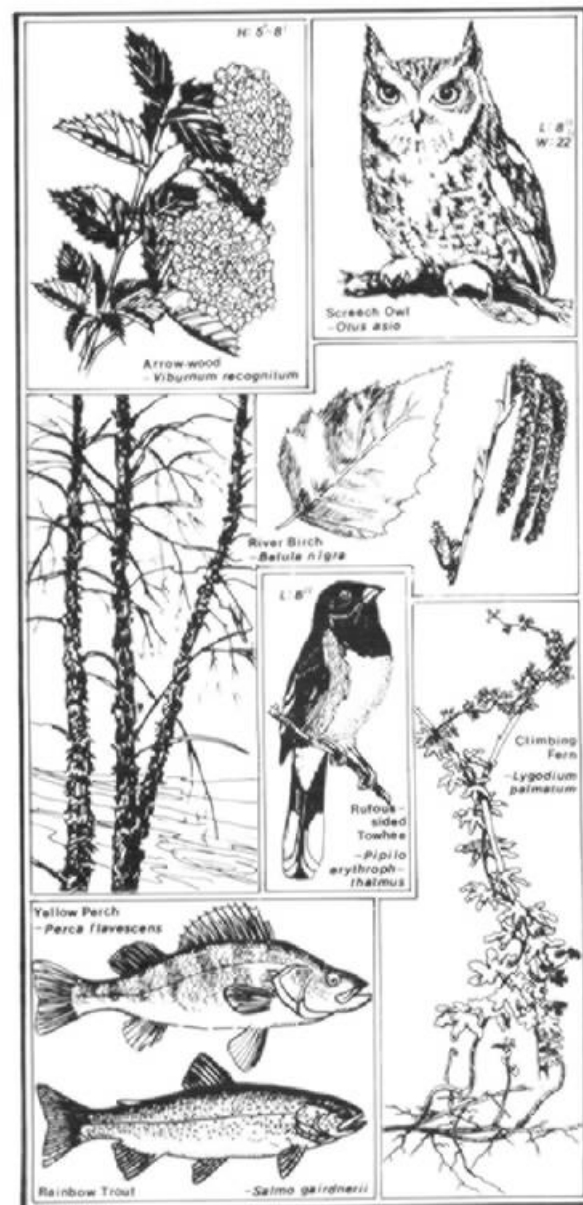
View of Severn from Cove of Cork

Severn Run at Burns Crossing Road

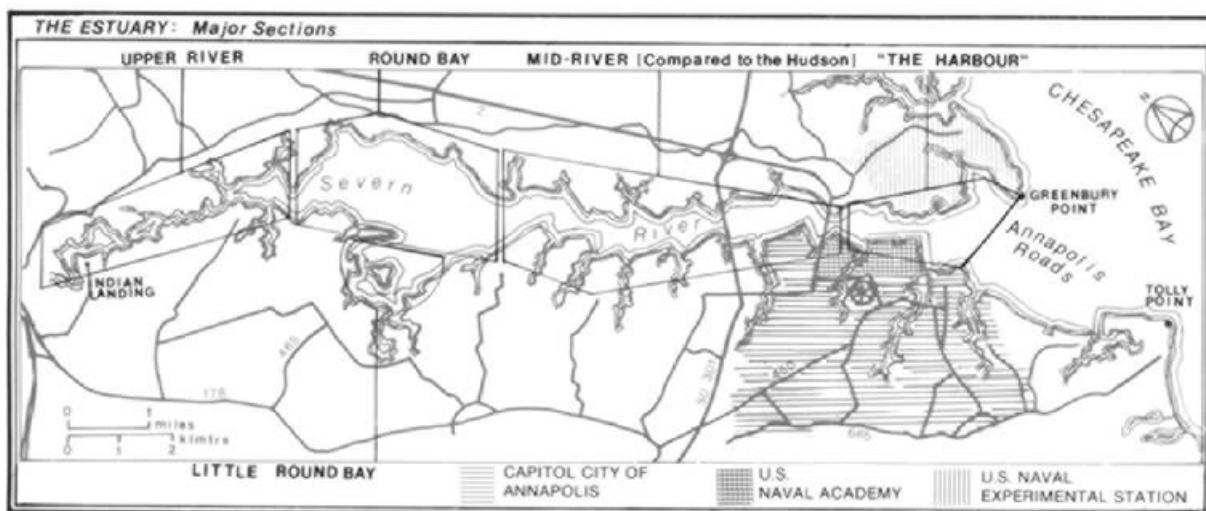


No major recreational facilities are contemplated. To date, approximately 1300 acres have been purchased. The Natural Environment Area is included in the 3000 acres of the headwaters area that has been designated by the State as an Area of Critical Concern. This designation means that all local and state agencies are to refrain from plans and activities that will degrade the Severn Run area's natural environment and water quality.

Despite these efforts Severn Run faces a serious environmental threat from development in the surrounding area. Of particular concern is the potential loss of soil and the resulting siltation of both Severn Run and the Severn River. Anne Arundel County's Severn Run Watershed Management Study (1981) indicates that over the next twenty years stormwater could erode sixteen million cubic feet of soil from the development sites and streambanks of the Severn Run area.³⁶



Flora and Fauna Typical of the Severn Run Area



The Severn Estuary

The mouth of the Severn River, where it meets the Chesapeake Bay, extends from Tolly Point to Greenbury Point. Along the southern side, from Tolly Point to Horn Point the Severn is greatly influenced by the Bay. Shorelines are low and the open waters can be rough. Some portions of the shoreline provide sandy beaches with opportunities

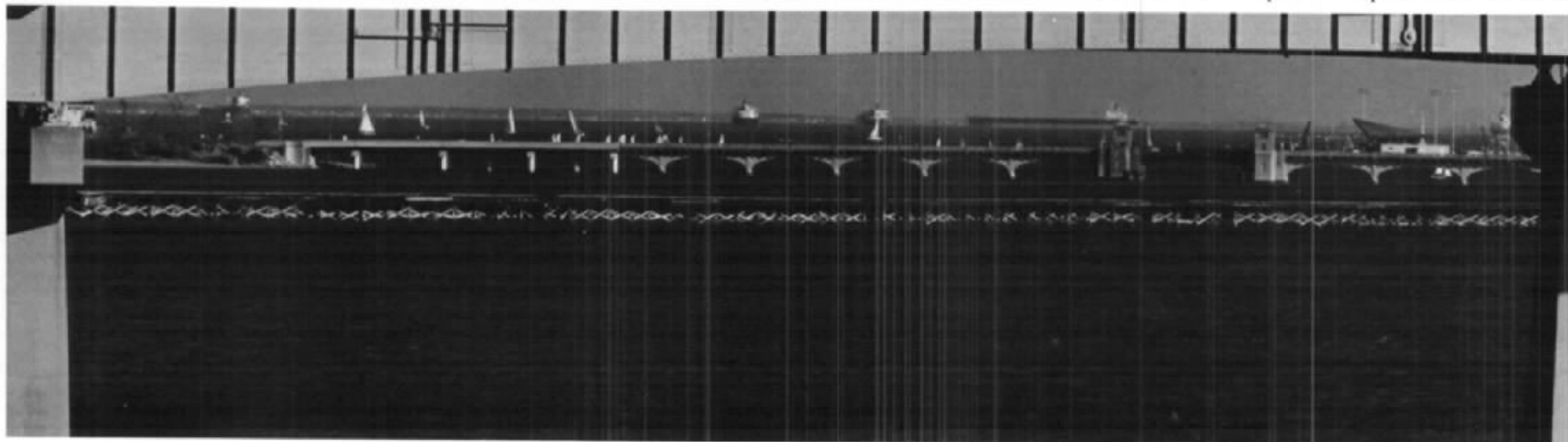
for recreation. Commercial fishing is permitted here, and there are extensive oyster beds. Bottom fishing over the oyster bars is good, with white perch and norfolk spot the usual catch. Blue crabs are numerous. Bird life includes gulls, herons, ospreys, grebes, swan and several species of dabbling and diving ducks. In the days of sailing ships this water area was called Annapolis Roads, where vessels

stood at anchor waiting to enter the port. Today, the vessels are racing sailboats which participate in regattas year-round.

Up river from Horn Point and Greenbury Point the setting changes; shorelines are higher and the river is more sheltered. The towers of the Naval Radio Transmitter Facility loom high above the north shore. The Naval Academy campus and the City of Annapolis, with domes, spires, high-rise buildings, and marinas dominate the south shore. In places, tidal currents are fairly strong and the river reaches depths of thirty to thirty-six feet. Boat traffic is heavy, with occasional congestion at the Route 450 bridge. Fishing regulations also change as we move upstream. Only hook and line may be used, eliminating commercial fishing. The tonging of oysters, possible up to Round Bay, has been prohibited at times, due to pollution.

Horn and Greenbury Points were once much longer; the river above them was called The Harbor. Over the years the Navy facilities in this area have expanded, making the water narrower. It is now extensively bulkheaded, and the shoreline is thoroughly urbanized.

Above Annapolis the river narrows only a little but the visual effect is increased by the high wooded banks and sandy cliffs. From early colonial days travelers have compared this part of the Severn to



Looking under Rt. 50 bridge at the Severn Harbor



Mid-river area off Clements Creek and Brewer Creek



View of Round Bay and St. Helena Island



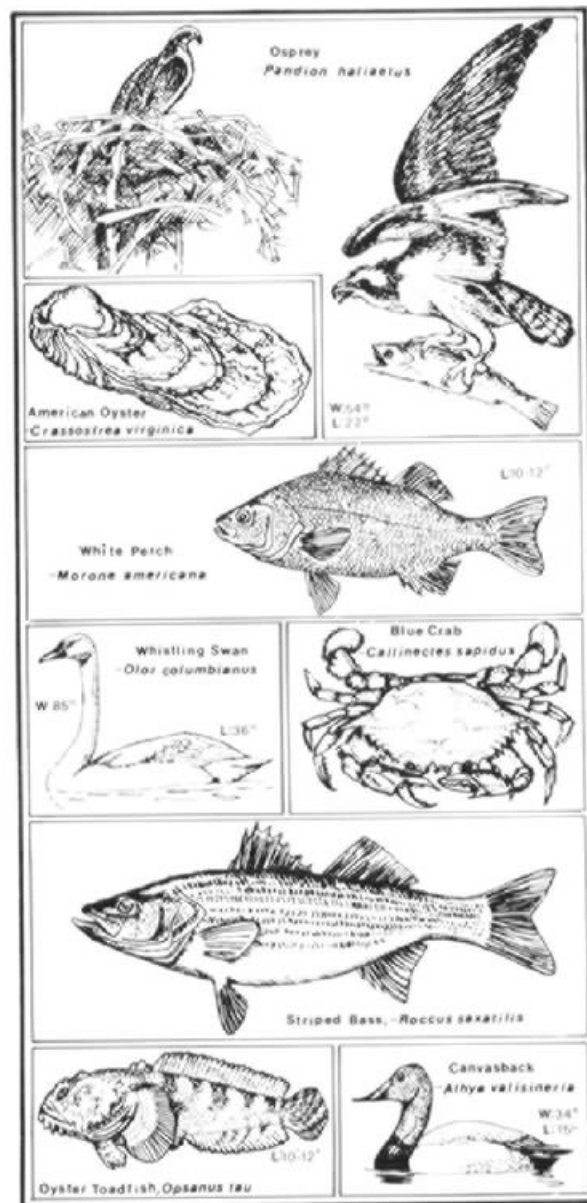
Upper river near Indian Landing

the scenery of the Hudson, though in miniature. For many, the Severn is the view seen from the Route 50 bridge.

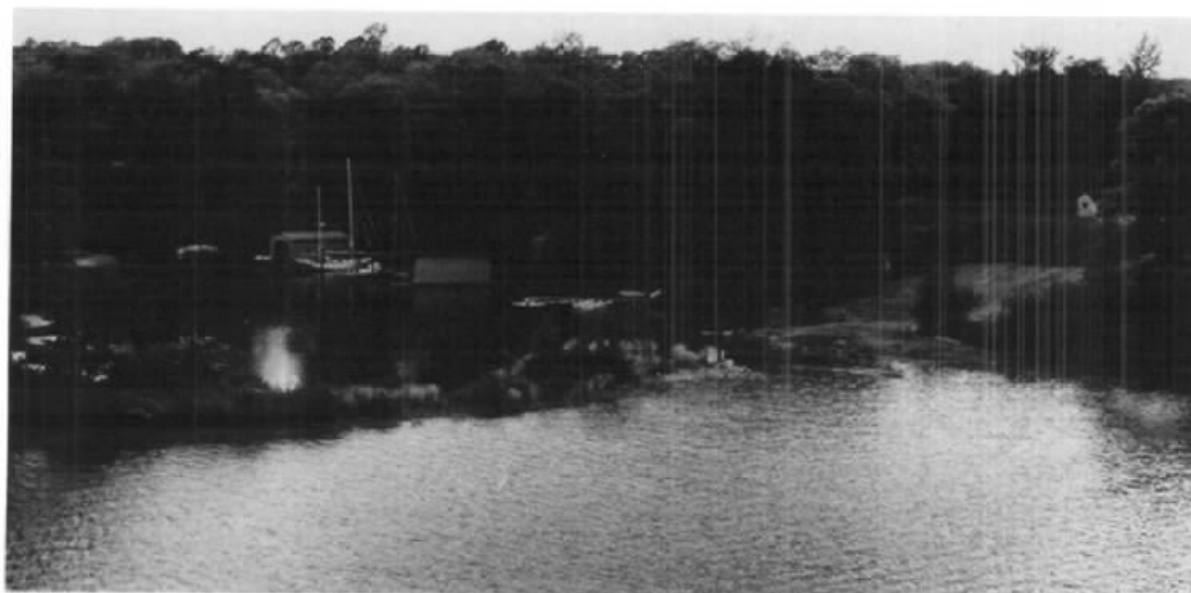
At Round Bay the Severn widens to nearly two miles and the shorelines are somewhat low again. Residential development predominates and recreational activity is intense. Above Round Bay the river narrows abruptly, with high banks, and becomes shallower. Here, the river is increasingly affected by the influence of Severn Run. Yellow perch spawn in the upper reaches. Shoreline wildlife include the

green heron, kingfisher, muskrats, and harmless water snakes.

Each autumn flocks of whistling swans come to the Severn to feed along the sandy shoreline. In summer, when water salinity nearly triples, various saltwater fish enter the river, principally striped bass, norfolk spot and needlefish--sometimes bluefish and sea trout. Croakers, once plentiful, have been extremely scarce for about thirty years. Summer also brings blue crabs to almost all parts of the river. And unfortunately, sea nettles.



Fauna Typical of the Severn Estuary



Cove of Cork

Tidal Tributaries

Names of the numerous side branches of the estuary -- usually called *creeks* -- names such as Dorsey, Chase and Ringgold, reflect, with few exceptions, ownership of adjoining early land grants. These "creeks" are irregular in shape, and some, having broad mouths and water depths up to fifteen or twenty feet, provide easy boat access and sheltered anchorages. The creeks along the south shore are longer due to the greater breadth of the watershed there. Coves are generally less sheltered, being rather round in outline, and opening broadly upon a large creek or the river itself.

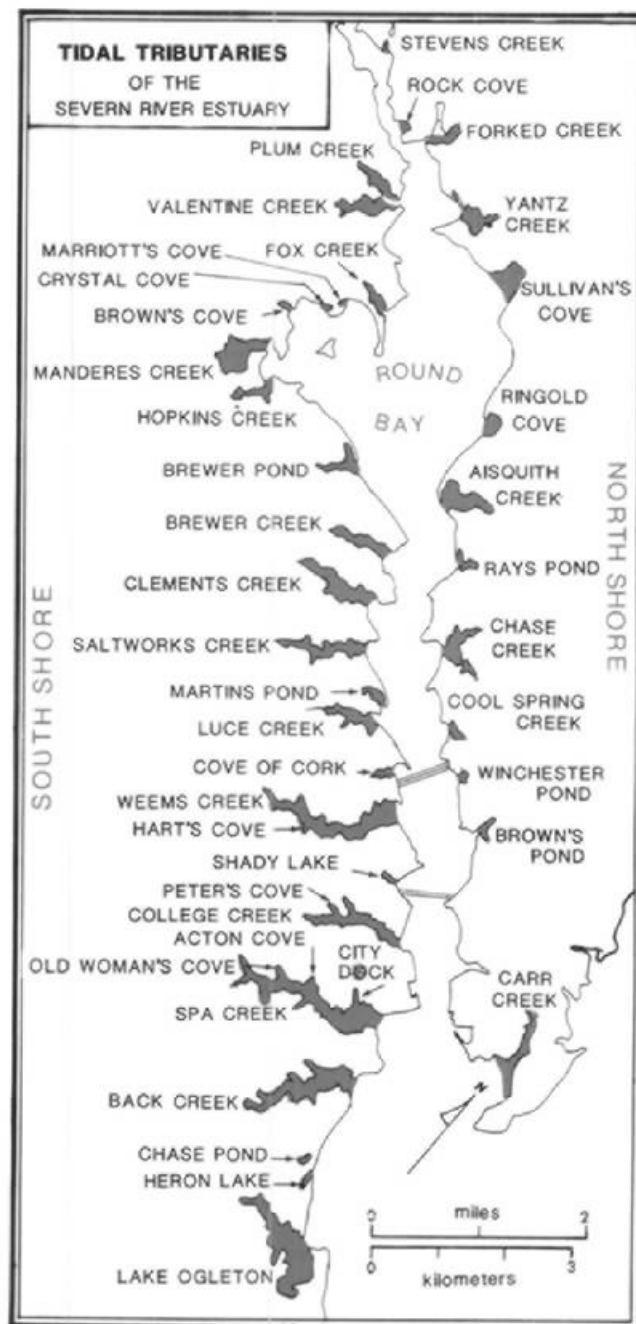
Sandbars have narrowed the mouths of some creeks. These bars are built up by wave action or eroded material from nearby cliffs. When the sandbars are large, only a small opening may remain. The enclosed waters are often termed ponds, or if larger, lakes. Although subject to some tidal influence, ponds often support freshwater plant and animal life.

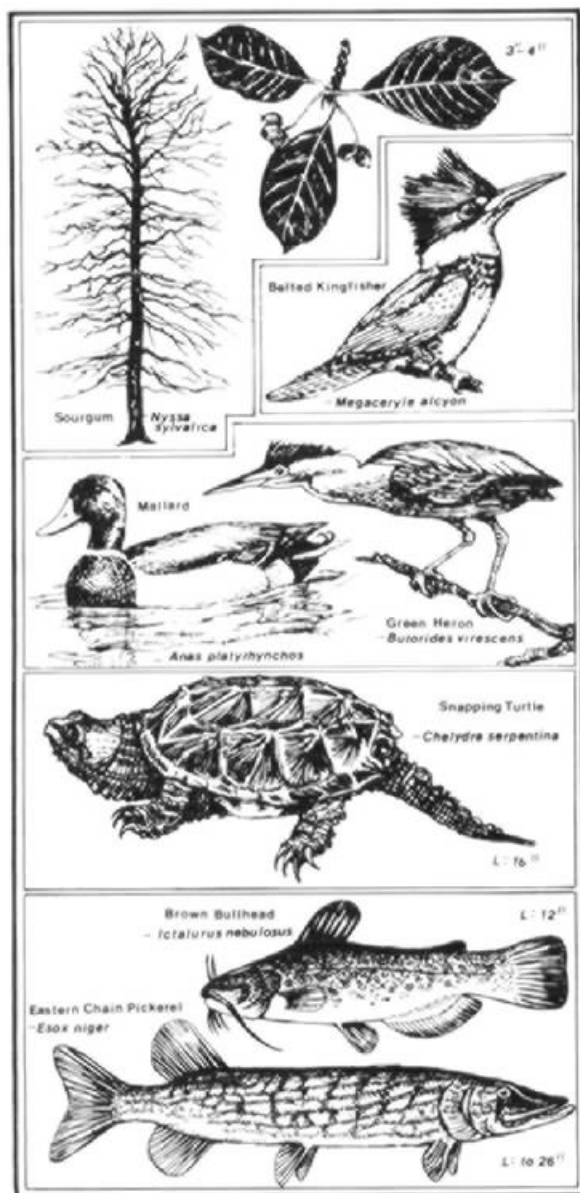
Many creeks are periodically muddied by watershed erosion, but the lack of water clarity is due mostly to the minute plant and animal life that flourishes in the brackish environment. As these forms

die in the winter the water then clears considerably.

Bottom sediments in the tidal tributaries consist of fine silt. The shallows are only somewhat sandy, there being minimal wave action to separate the finer particles from the soil eroded from the adjacent banks. Fish that spawn in these waters include the pumpkinseed sunfish, brown bullhead, and white perch. Other fish present include the eastern chain pickerel, yellow perch, American eel, and smaller species, especially herring and killifish. As salinity increases in the summer, various saltwater fish may enter the creeks, particularly striped bass, hog chokers and needlefish. Blue crabs enter to feed and shed in the quiet shallows. Crabs taken from these areas are usually heavier than those caught from the sandy bottom of the main estuary.

The recreational demand on the Severn's tidal tributaries is intense. Boat mooring often shoulders out swimming, fishing, crabbing, and similar pursuits. In addition, the shorelines of many creeks are being steadily bulkheaded, limiting the interactions of natural systems. Other effects of human activities on these productive waters include pollutants from malfunctioning sewage pumping stations, storm-water runoff, and the improper disposal of oil.





Flora and Fauna Typical of the Severn's Tidal Tributaries



Tidal marsh within the Sullivan's Cove Critical Area

Tidal Marshes

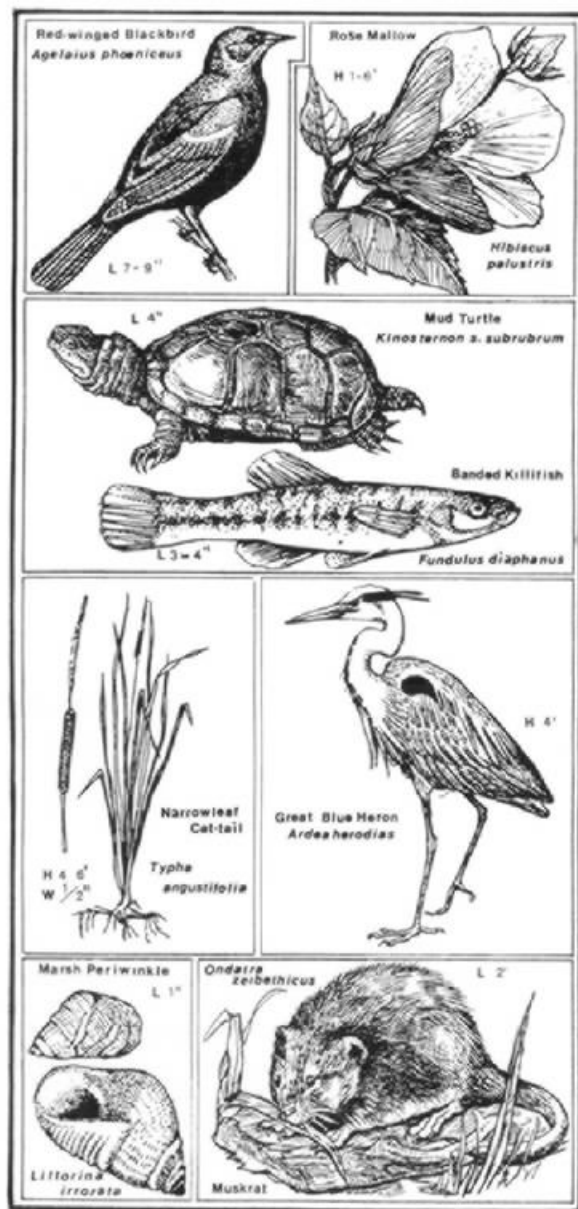
Marshes are areas of shallow water, thickly vegetated by characteristic herbs and grasses. No trees or shrubs occur. Approximately one hundred "brackish-water estuarine river marshes" have been inventoried along the Severn, totalling 118 acres. Rather small, these marshes range from one-quarter acre to fifteen acres. Many still smaller ones exist, though unlisted. The small marsh-like strips along sandy shorelines are popularly termed fringe marshes. Here, vegetation is of limited diversity. The saltmarsh cordgrass is typical, and protects the shoreline from wave-induced erosion.

Recently there has been more study and greater appreciation of marshes. Nutrients brought by the tides, and those from the watershed, are captured by the marshes, and promote vigorous plant growth. This growth ultimately dies and breaks down into small particles known as *detritus*. These particles support the tiny creatures of the marsh or are exported by tides, furnishing nourishment to the basic organisms of the estuarine system. The marsh provides habitat for many creatures, but most importantly it remains fundamental to the estuarine food chain.

Marshes at the heads of creeks and coves are laid on silty sediments and accumulated organic muck. Among the numerous plants are narrowleaf cattail, arrow arum, broad-leaved arrowhead, sedges and cordgrasses. Flowering plants include the blueflag, the rose mallow and the seashore mallow. Familiar marsh creatures include the muskrat, great blue heron, mud turtle, salt-marsh periwinkle, and numerous small fish, especially the banded killifish.

Some of the large marshes of the Severn are noteworthy. Bodenstein Marsh on Manderes Creek covers approximately eight acres and is held as an ecological sanctuary by the Anne Arundel County Chapter of the Maryland Ornithological Society. Sullivan's Cove Marsh near Round Bay is larger and includes several shallow tidal ponds, thus providing habitat for varied bird life. Numerous ducks and occasional egrets, night herons and ospreys are among the birds seen here. The marsh forms part of the State-designated Sullivan's Cove Critical Area. Anne Arundel County has purchased twelve acres of this site, including part of the marsh, in order to help preserve its important functions.

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Flora and Fauna Typical of the Severn's Tidal Marshes

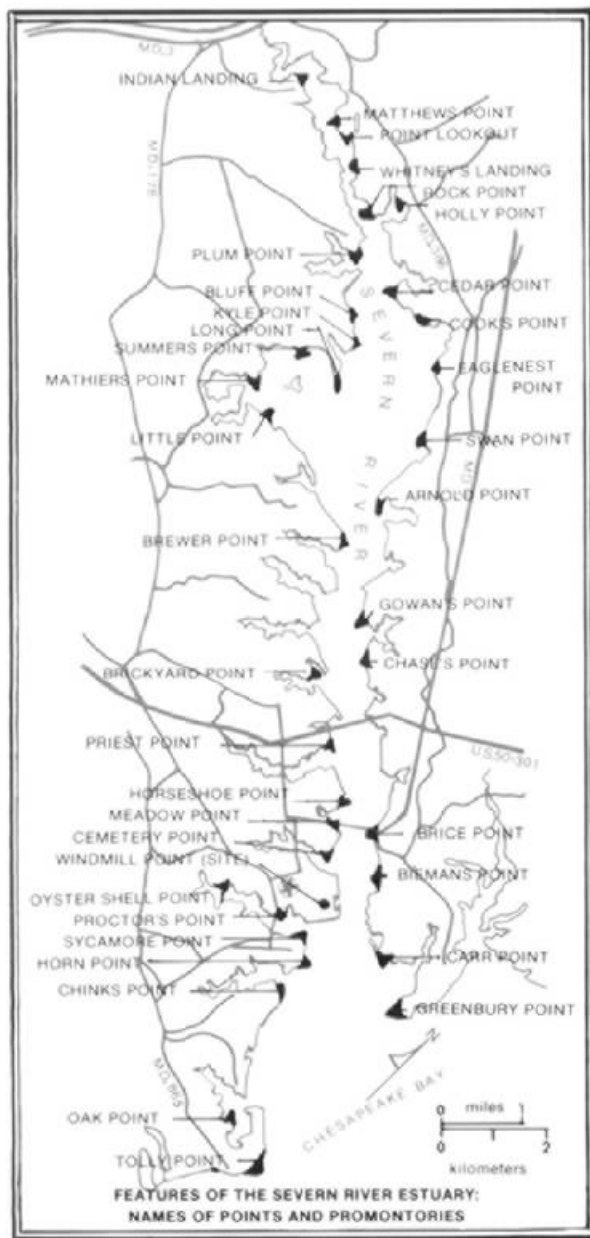
The *Maryland Wetlands Act* was passed in 1970 to help protect tidal wetlands in the face of demands for their use or alteration. But, serious threats to the local marshes still exist, primarily siltation from development on the adjoining upland areas. This siltation may increase marsh acreage, as, for example, from Severn Run. However, since it often consists of subsoil particles, the available nutrients may be low. In addition, a marsh that loses its adjoining swamps and wooded borders has lost much of the seclusion and habitat essential to its wildlife.

Sandbars and Beaches

Constant action of tides, currents and waves brings continuous changes to the Severn's shoreline. Due to rising sea levels, waves have access to banks and cliffs, undercutting them and allowing sandy particles to be borne along and deposited at the mouths of creeks and coves. Sandbars form and occasionally extend across the mouth of a creek, creating a secluded tidal pond. During past interglacial periods, when sea levels were higher, bars were formed that remain today as high sandy promontories and hillside terraces.



Winchester Pond

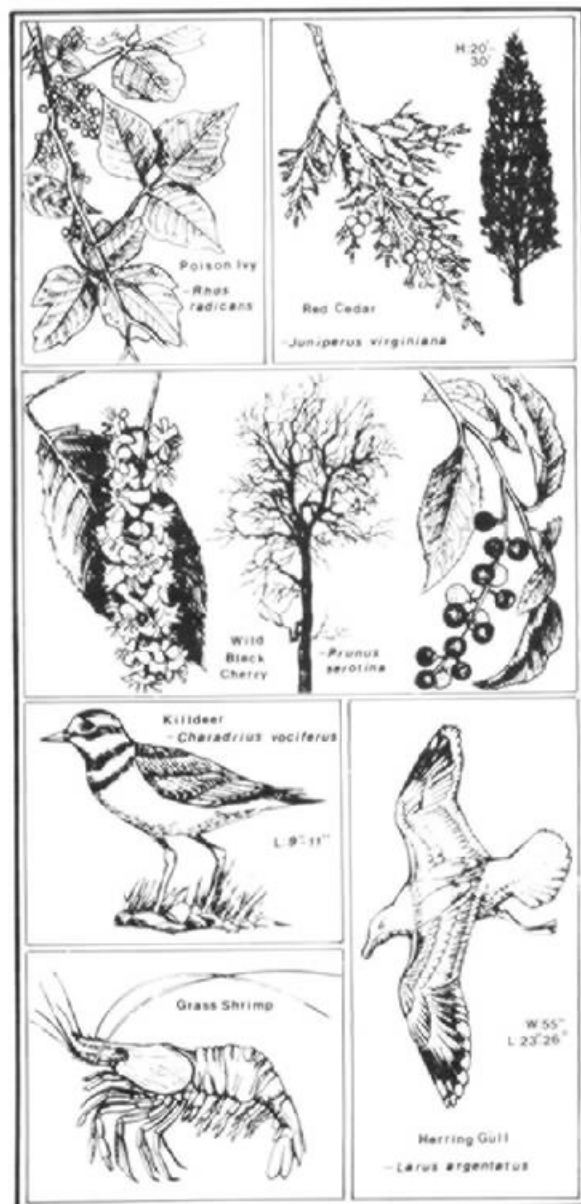


Although immense amounts of sand form these bars, the portions above water are usually small. Plants are quickly established here. Saltmarsh cordgrass, hightide bush, poison ivy, trumpet vine, wild black cherry, black locust, dwarf sumac, and persimmon are typical, and eastern redcedar often assumes dominant proportions. (Interestingly, all but the first two varieties are also seen along roadsides and old fields and clearings. In the days of the primeval forest these intolerant species were likely restricted to the few exposed, sunny areas like sandbars.) Birdlife is abundant along the sandbars; redwing blackbirds nest in the reeds and cedars, and gulls and shorebirds find food brought by the waves. Waves also bring in flotsam such as boards and miscellaneous debris which lodge in the vegetation.

Most of the Severn's beaches are narrow and private. The broader ones are protected by jetties, but sand is trucked in periodically to some recreational sites. The beaches along the sandbars are sometimes used by picnickers and swimmers. However, in general, these areas are left to nature. The tangled thickets beneath the bleaching cedars are not inviting, but lend a sense of windswept wildness to the beauty of the Severn.



Linstead on Severn



Flora and Fauna Typical of the Severn's Sandbars and Beaches

Cliffs

Near Winchester

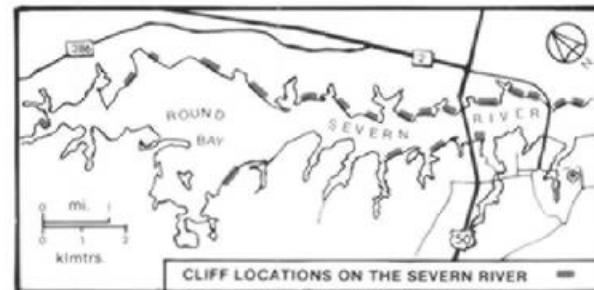


The cliffs along the Severn, sometimes called bluffs, reach heights over one hundred feet and are perhaps the river's most notable feature. The cliffs vary in color and contour depending on the nature

of their exposed geological deposits, primarily of the Magothy and Aquia Formations. Although these deposits are ancient, the cliffs themselves are relatively new, created largely as the result of rising sea levels following the last ice age. Cliffs along the lower sections of the river are often steeper, due to the greater cohesiveness of the Aquia material. The most prominent cliffs are along the northern shore, possibly as a result of prevailing wave movement.

Erosion of the cliffs can occur when frost and the drying action of the wind loosen material from the cliff faces. Rainfall, however, is the major erosive factor. It percolates into the earth behind the cliffs and loosens the soil, periodically causing massive sections of the cliff to fall into the river. This fallen material is quickly eroded by wave action and distributed along the shoreline by tidal currents.

In developed areas, homeowners have tried to stabilize cliffs by constructing bulkheads and sometimes covering lower slopes with timbers, old tires and rubble. Smaller cliffs have been regraded and planted, with bulkheads and riprap protecting the



shoreline. All such efforts are understandable but will greatly affect the aesthetic quality of the cliffs.

Their height and unstable nature makes the cliffs a hazardous place to venture. Vegetation may include Virginia pine, black locust, staghorn sumac, sassafras, chestnut oak and broomsedge. Kingfishers and bankswallows sometimes have nesting cavities in the cliff face. Gulls, vultures, and crows are also frequently in evidence.

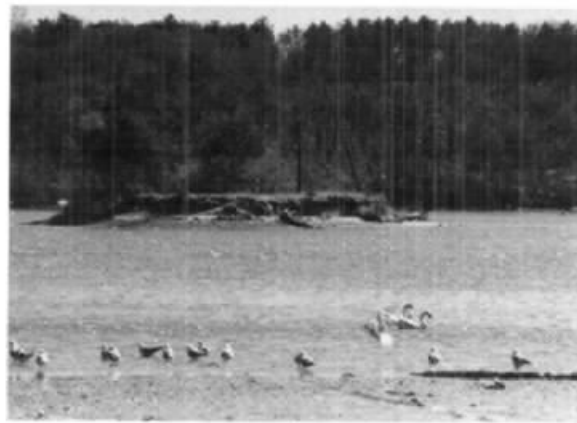
Islands

Although not numerous, islands are among the interesting features of the Severn. They capture our imagination and give the river a special dimension. The Severn's islands vary in size, but most are small wooded ridges that are not completely inundated.

Islands have caught the fancy of area residents since early times. An old account speaks of the attraction of sailing up the Severn "to Indian Landing, where three islands stand out boldly in the river." Today one island has a small house upon it and another is fast disappearing as waves erode its shoreline.

Hopkins Creek was long known as Sunken Island Creek, but the reason is unclear. (In nearby Manders Creek there is a tiny island fully covered with a dense stand of redcedars which does resemble a "sunken island.")

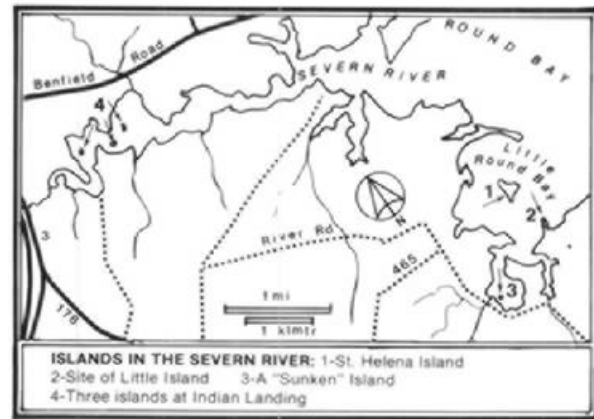
Often, shifting sandbars resemble islands. Little Point, on the south side of Little Round Bay, was known as Little Island in the 1840's. A similar site at Cove of Cork (visible from the Route 50 bridge) is



Small island off Ben Oaks

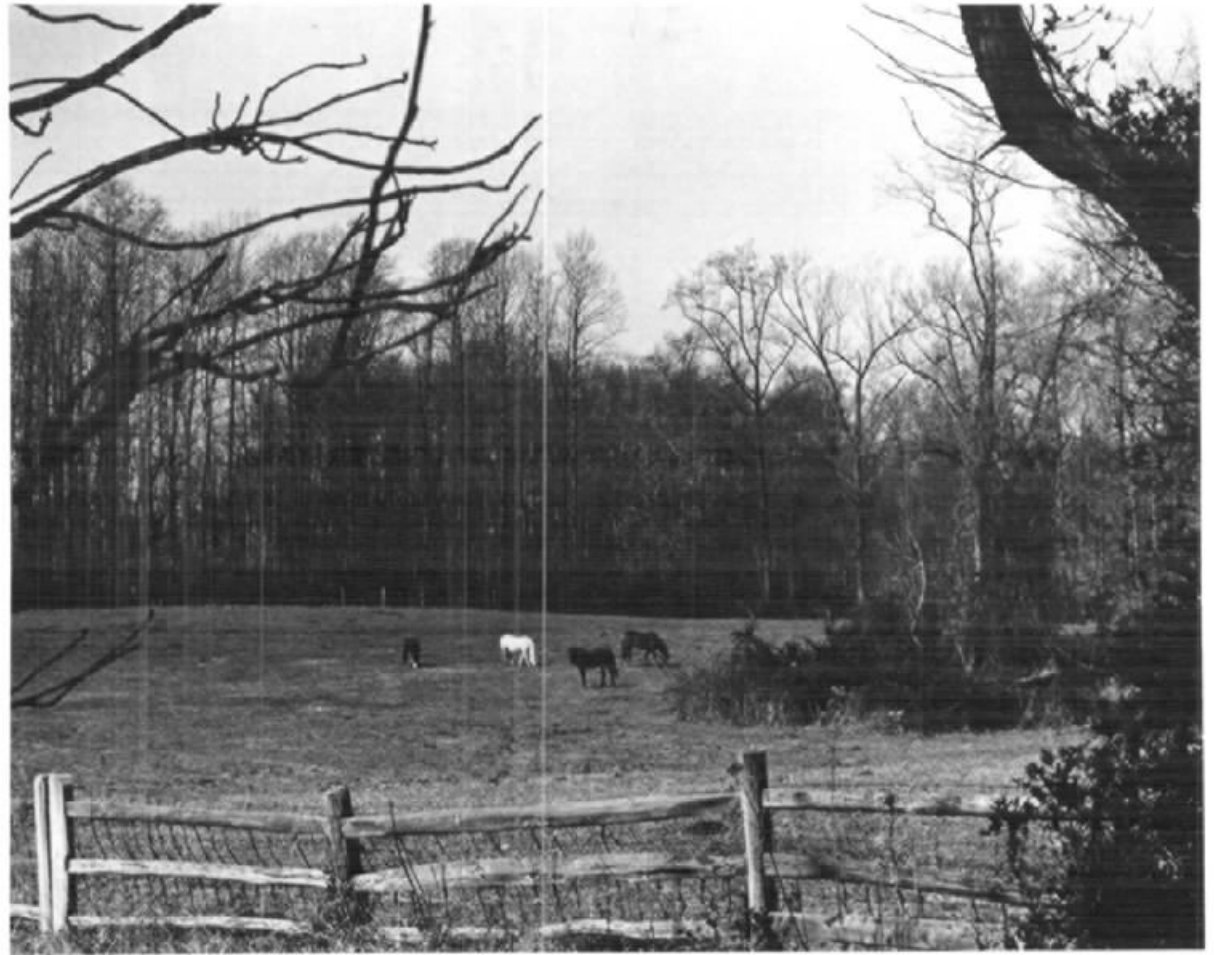
known locally as "the island."

St. Helena Island is the Severn's largest (about 15 acres) and best known. Shell heaps found here indicate that the island was inhabited by Indians from 700 to 2000 years ago. Its more recent history



includes stories of gamblers and bootleggers and midnight shipments of silver coins. At one time a camp for crippled children was located here. Today, except for a few private residences the island remains in its natural state.

Watershed Features



Pasture along Joyce Lane

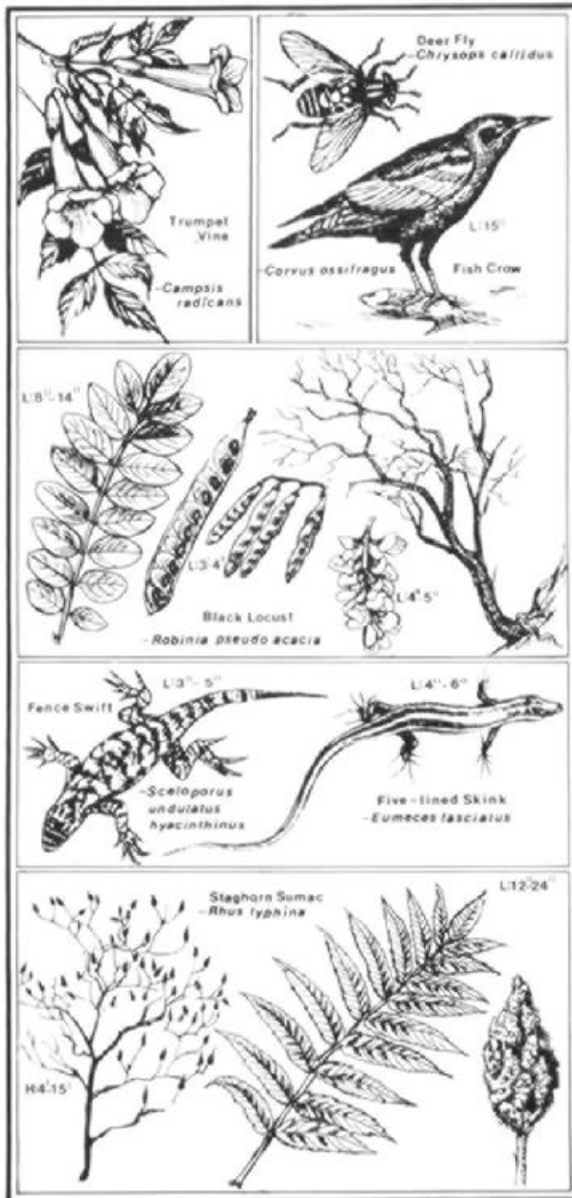
Uplands and Terraces

Nearly all of the natural areas along the Severn have, in some way, been altered by human activities. Nowhere is this more apparent than on the gentle upland terrain. In the early spate of tobacco growing and later, in more diversified agriculture, almost all of the ridges, terraces and plains were cleared. The topsoil was eroded and gradually the fields were

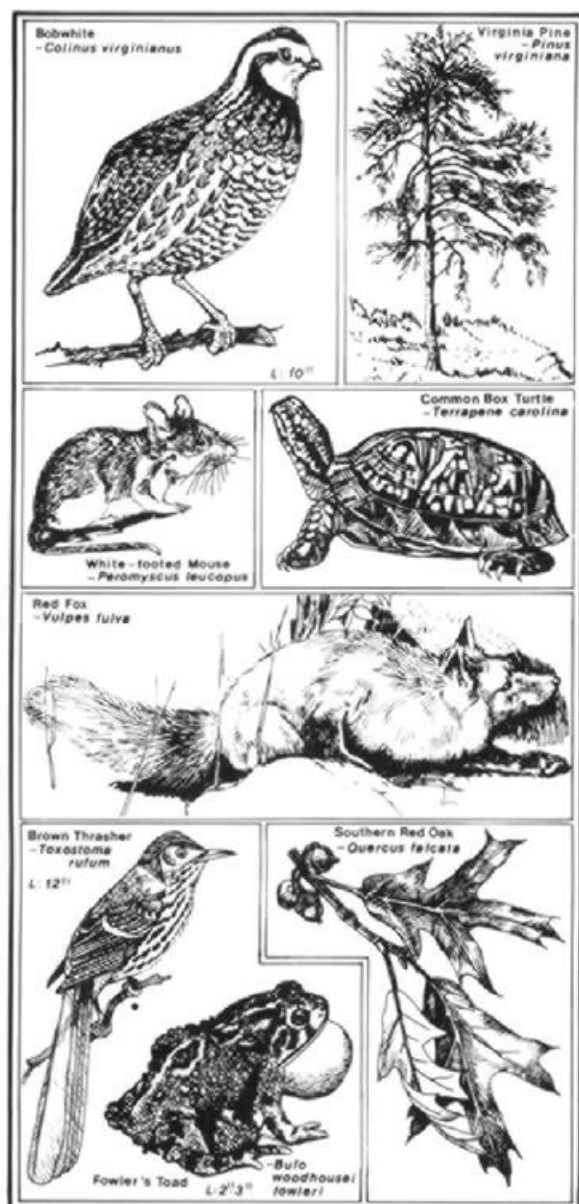
abandoned. Today, only a few farms remain, and most of these are in the Severn Run area.

The many differences among the upland areas are due to the numerous soil types developed from distinct geologic deposits, and to man's treatment of those soils. The resulting vegetation and accompanying wildlife vary accordingly. These differences may best be explained by geographic areas.

(continued on next page)



Flora and Fauna Typical of the Severn's Cliff Areas



Flora and Fauna Typical of the Severn's Uplands and Terraces

Severn Run Basin - Here, soils derived from the Potomac Group are mostly well drained. The forest is considered intermediate, being adapted to the moderately moist to somewhat dry conditions. Oaks, especially southern red oak, black oak and white oak predominate. Sweet gum and willow oak occur on wetter sites. Abandoned fields are quickly covered by Virginia pine which soon give way to hardwoods. Pitch pine is common and huckleberries dominate the shrub layer. Extensive areas remain thickly wooded and the danger of forest fires is often severe.

Round Bay Sandy Terraces - The loamy sands along the upper estuary support trees of intermediate forest type, especially southern red oak. Some sites are excessively drained and support only a dry type of forest growth, especially post oak and black-jack oak, with some black locust and Virginia pine. Suburban development has reduced much of these wooded areas.

Mid-River Ridges - The higher elevations in the mid-river area are capped by Monmouth and Collington soils derived from the Aquia and Calvert Formations. These fine sandy loams and silt loams are deep and rich; they retain moisture and are underlain by stiff subsoils. The mid-river forest is more like those of the Piedmont than the Coastal Plain. Southern red oak, sweet gum and willow oak are almost entirely absent. Instead, there may be handsome examples of white oak, tuliptree, mockernut, bitternut, northern red oak, sour gum and red maple. The understory includes pawpaw and dogwood. Shrubs are not abundant, but mayapple, Solomon's-seal, false Solomon's-seal and other wildflowers are common.

Examples of the true mid-river forest are rare because many sites were heavily eroded by past agricultural activity, and the remaining stiff, clayey soil reverted to a different forest growth. This old-field forest type consists of nearly pure stands of tuliptree. Throughout most of this area Japanese honeysuckle is abundant and suppresses most other species except spicebush and multiflora rose; the latter is increasingly becoming a nuisance.

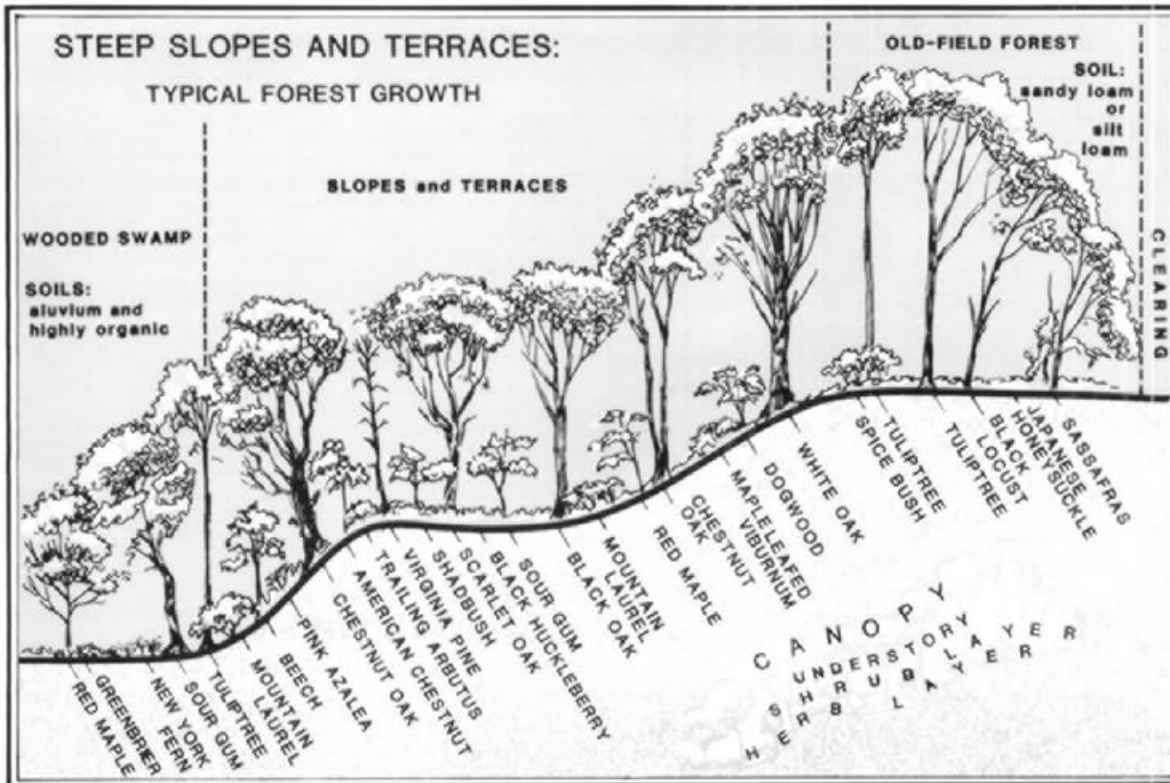
Quite different in vegetation are the hillside terraces, ridges and promontories occurring at intermediate elevations. Soils are sandy and well drained. Few traces remain of the immense American chestnuts once found here. Today scarlet oaks, sometimes of champion dimensions are dominant; a Chase Creek specimen measures thirty-three inches in diameter, and 103 feet high. A dense shrub layer of mountain laurel and huckleberries is common on these highly acidic soils. Spotted wintergreen and Indian pipe are familiar wildflowers; pink lady's-slipper, trailing arbutus and whorled pogonia are occasional finds.

Annapolis Neck Plain - This rather limited portion of the Severn watershed consists of moist, sandy soils characterized by an abundance of sweet gum and willow oak. Tuliptree, southern red oak and American holly are also numerous. Virginia pine attains large dimensions; both state and national champions have been found.

From colonial days, activities have been concentrated on areas of gentle terrain. This continues today, with new roads, shopping centers and sub-



divisions rapidly replacing old fields and woodlands. Such development has eliminated much of the wildlife oriented to the old-field and woodland habitat. As rabbits, quail, field mice and shrews decline, so do the foxes, owls, hawks, blacksnakes, and other interesting predators dependent upon them.

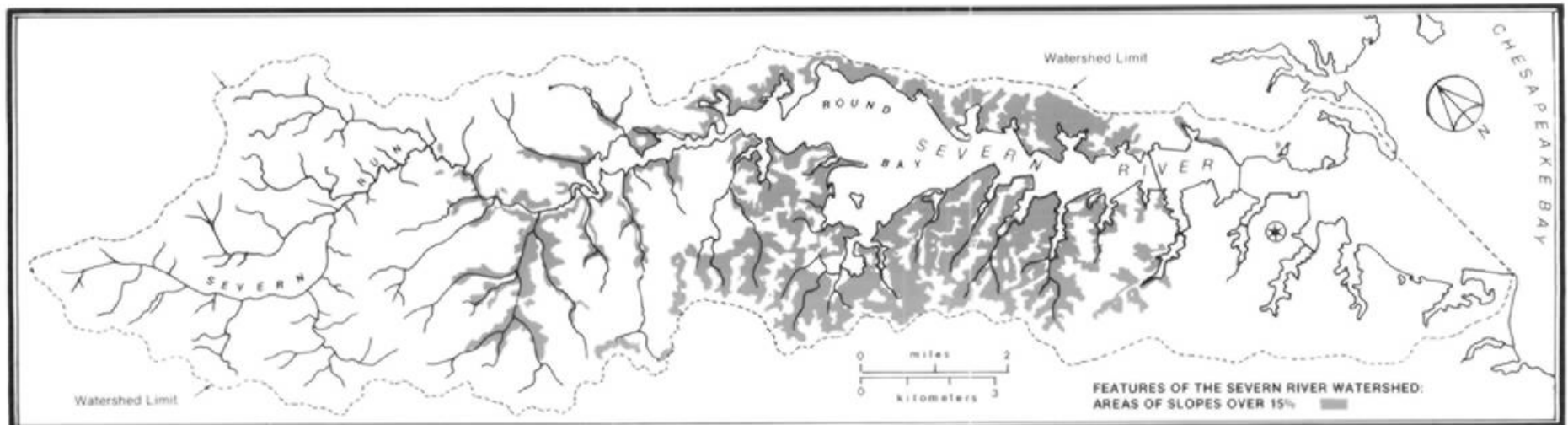


Steep Slopes

Steep slopes are a dominant feature along much of the Severn River. They present a landscape of private vistas, welcome breezes on a summer day, and hillsides of autumn color reflected in creeks and coves. An old account describes these qualities quite well: "The shores, sloping from the uplands to the river are varied by decided eminences attaining 155 feet elevation. Forty such little mountains can be seen sailing up the river."³⁷ A century ago some of these "eminences" bore names, including Miller's Hill, Brewer's Hill, Mount Pleasant, and Mount Misery (a Civil War lookout).³⁸ Today these names are not used but local communities continue the theme: Pendennis Mount, Robin Hood Hill, Hidden Hills, Severn Heights, Palisades, Briar Cliff.

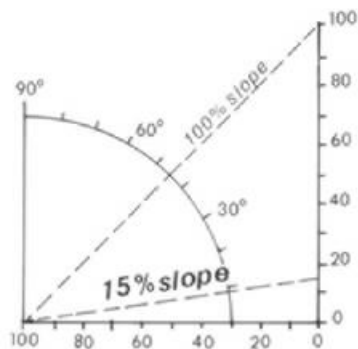
The natural vegetation of the Severn's slopes varies according to the exposure and soil moisture. On dry soils, northern slopes are usually dominated by chestnut oak. Small American chestnut, sour gum, red maple and shadbush form the understory. Mountain laurel, low blueberry, trailing arbutus, partridgeberry and mosses are characteristic. Sheep laurel, rare in Maryland, occurs at some sites and a stand of Canadian hemlock, rare on the Coastal Plain, exists near Cove of Cork. Dry southern

(continued on next page)



FEATURES OF THE SEVERN RIVER WATERSHED:
AREAS OF SLOPES OVER 15%

exposures are less varied. Trees may include chestnut oak, blackjack oak, post oak and Virginia pine. The topsoil may be loose and sandy, partially covered by dry leaves and bits of sandstone. Ground covers are sparse, but rattlesnake weed and wild phlox do occur.



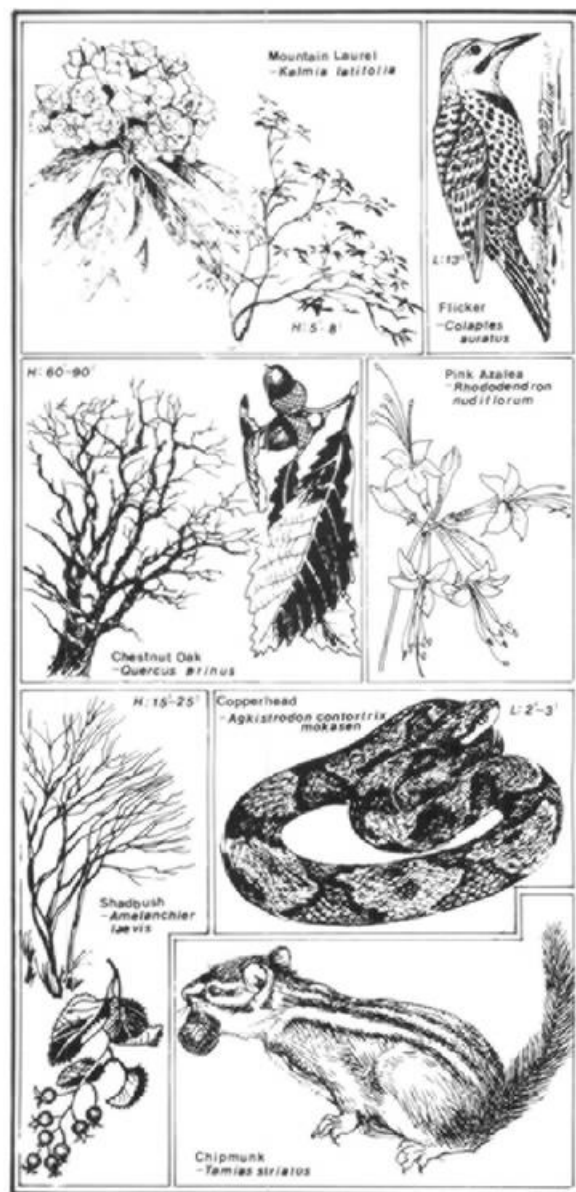
On moist soils, the north-facing slopes may include tuliptree, beech, northern red oak, wild hydrangea (uncommon on the Coastal Plain), Christmas fern and maidenhair fern. Putty-root, showy orchids and the crane-fly orchid are found at some sites. On southern slopes, moist soils support highly varied vegetation, often dominated by tuliptree, white oak and bitternut. Other woody plants may include redbud, dogwood, hackberry, black walnut and black haw. Unfortunately Japanese honeysuckle flourishes on these sites and overwhelms many species.

Of the many animals that frequent steep slopes, the chipmunk may be the most characteristic and popular. However, suburban development and the presence of free-running pets has drastically decreased the chipmunk population. Only at Sherwood Forest, where loose cats and dogs are prohibited, are chipmunks still common.

Over the centuries slopes have remained stable, largely due to the existence of specially adapted native plants. In developing areas where ground covers are disturbed, many years may be required for vegetation to become re-established. Therefore, homeowners often substitute non-native plants, with mixed results; the effect of Japanese honeysuckle on our landscape is well known. Other introduced plants may prove still worse. These include kudzu, wisteria, multiflora rose and English ivy. They have ruined many natural areas and should be used only where their containment is assured.

The best way to protect slopes is simply not to disturb them. The cutting of large trees "to open the view" may have negative scenic effects and may cause erosion by altering existing plant communities. Foot traffic is particularly damaging to ground covers, as is the dumping of leaves and debris.

The problem of development along steep slopes is acute. Sixty years ago summer cottages were often built on "stilts". Heavy equipment was rarely used, grading was minimal and impacts on slopes were minor, though cottages were located upon them. Today, houses are larger, with more extensive lot development. This is more damaging to the slopes, either directly or as the result of stormwater runoff from paved areas.



Flora and Fauna Typical of the Severn's Steep Slopes

Ravines

In a popular sense, a ravine is a lowland corridor dominated by steep wooded hillsides. The ravine bottom may be simply a narrow trough, or may include a floodplain, spring, stream or small swamp. In all cases the steep hillsides and forest growth create a cool, moist, shaded environment.

The ravine's orientation and resulting exposure create, with different soil types, an enormously varied ravine ecology. Where oaks dominate the surrounding forest, the ravine trough may be filled with an accumulation of leaves and humus, thus protecting this otherwise erodible area.

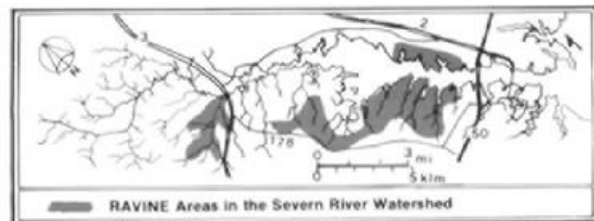
The soil of most ravines is deep and rich. This environment, with adequate moisture and intense competition for sunlight, produces trees of great height. On the Chase Creek watershed, tuliptree and northern red oak may reach heights of 130 to 140 feet with clear trunks four to five feet in diameter. Trees of the original forest were undoubtedly even more impressive, but ravines in the Severn River area have been logged repeatedly for their valuable timber. Occasionally, great hollow trees have been bypassed. Although fast disappearing, these giants, sometimes nine feet in diameter, are a memorable contact with the past.

The usual pattern of residential development has bypassed ravines and thus they become important storehouses of local ecological diversity. Here, one encounters many species of ferns, along with may-apple, jack-in-the-pulpit, Indian cucumberroot, white violet and bloodroot -- all familiar wildflowers. Some cool, rich ravines contain species rare or uncommon on the Coastal Plain, including maidenhair fern, narrowleaf spleenwort, silvery spleenwort,

hepatica, putty-root and wild hydrangea. The gray squirrel, raccoon and wood thrush are familiar creatures in these areas and occasionally the woodcock and the pileated woodpecker may still be seen.

Ravines may be damaged when suburban development spills onto their upper slopes. Soil disturbances, as well as visual impacts affect the ecology and the solitude of the ravine environment. Development also increases stormwater runoff, which frequently erodes fragile ravine troughs and smothers ravine floors under a deposit of eroded material. Logging in these areas also causes erosion and is now often limited to sites being cleared for development. The dumping of trash in ravines, which is a common practice, also greatly affects the beauty of these secluded areas.

Wooded ravines protect our watersheds, create buffers that separate communities, and provide a daily window on nature for nearby homeowners. But, it is from within the ravine that its beauty is most memorable. Homes on the surrounding hills are seldom visible, and one enters one of nature's private haunts.



GENERAL LOCATION OF THE PROMINENT RAVINES



Flora and Fauna Typical of the Severn's Ravine Areas

Runs and Branches

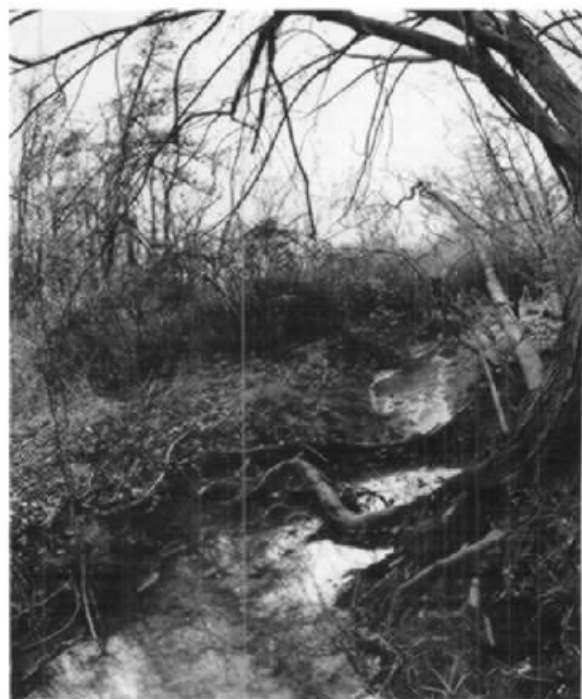
Well hidden in the deep ravines and verdant floodplains of the Severn are many small freshwater streams that enliven the landscape. They may issue as a spring from beneath the roots of an old beech tree or gather slowly amidst the spicebushes and jewelweed. Never called brooks, the usual term in the Severn River area is branch or, if larger, run.

On the south side of the Severn the watershed is fairly broad. Some of the branches may be nearly a mile long and most are named. On the north side the watershed drops off sharply, and the small streams seldom receive notice. An exception is the branch that passes through the Chartwell Golf Course and its two ponds.

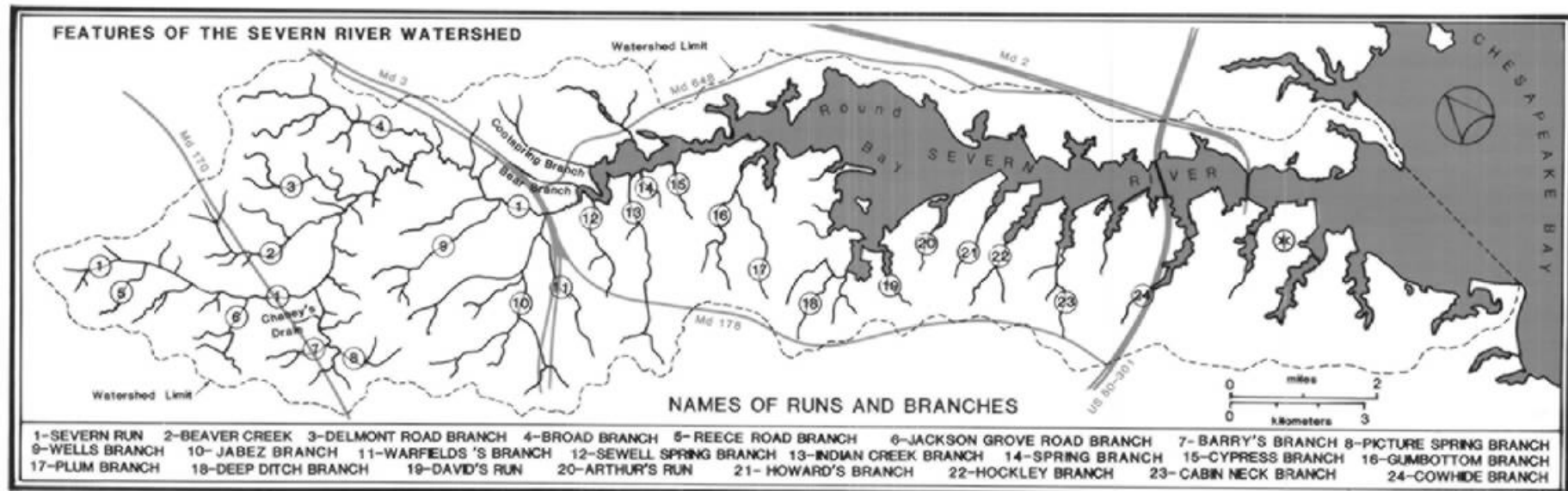
Few fish are found in the branches, though some may spawn in the lower portions of the larger ones, as near Little Round Bay. Tiny eels ascend the branches to reach ponds, often overcoming difficult obstacles to complete their journey from the ocean.

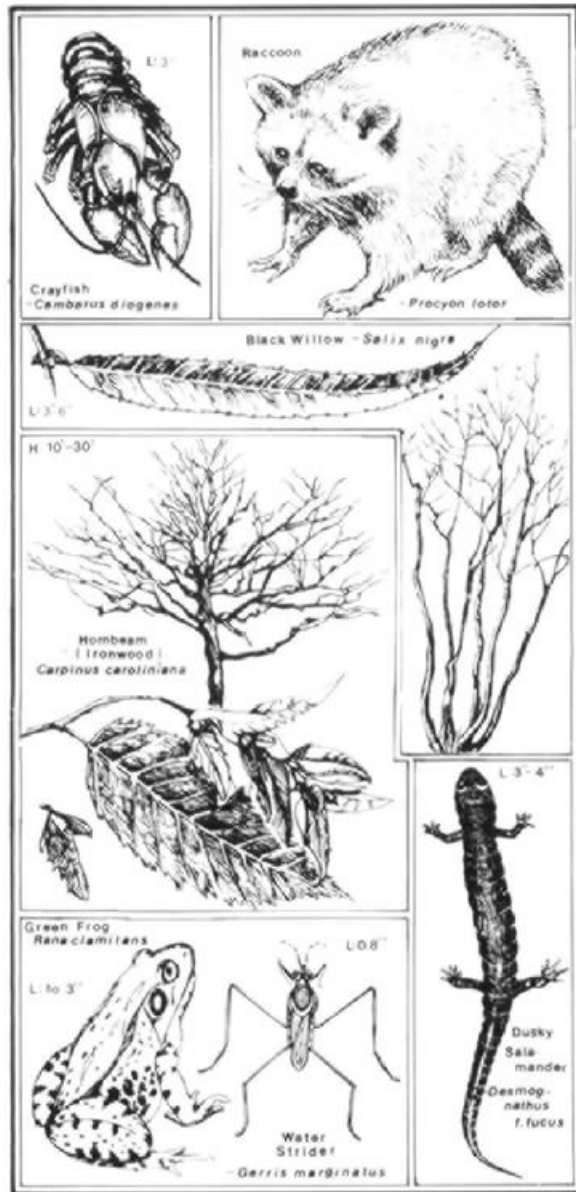
Other familiar residents are the green frog, crayfish and waterstriders. Numerous birds and other creatures come to the branch to drink.

Where the watersheds of these streams are small and undisturbed, the water is cool and clear and the flow is nearly uniform through the seasons. The banks are well vegetated and the stream bottoms consist of fine silt and sand, with old logs and accumulations of fallen leaves in places. Increasingly however, the streams have been affected by large volumes of stormwater runoff from developed and paved areas. This causes stream banks to erode and the bottom to become covered with assorted road gravel, broken concrete and glass fragments. The decreased absorptive capacity of developed areas lessens springwater flow, and the stream may consist of pools of oily rust-stained water, or the bottom may be covered by algae. A part of the continuing systems that unite all nature, the Severn's runs and branches provide an early warning when those systems are threatened.



Cowhide Branch of Weems Creek





Flora and Fauna Typical of the Severn's Runs and Branches

Floodplains

Floodplains are those portions of the land that adjoin watercourses and are periodically inundated. They are created when high levels of running water deposit loose soils and gravel that have been picked up from ravines and stream corridors. Floodplains are valuable in the Severn River area because they provide habitat for wildlife, serve as buffers between communities, and help protect water quality by collecting sediment from stormwater runoff.

The slope of a floodplain varies with the volumes of runoff and the types of soil collected. The upper floodplain is often composed of loose, sandy material which easily absorbs the normal volumes of runoff from nearby steep slopes and ravine troughs. The lower portion may consist of finer soil which supports dense plant growth. Here, stormwaters spread on the broader plain, velocities are reduced, and soil particles are deposited amid the vegetation.

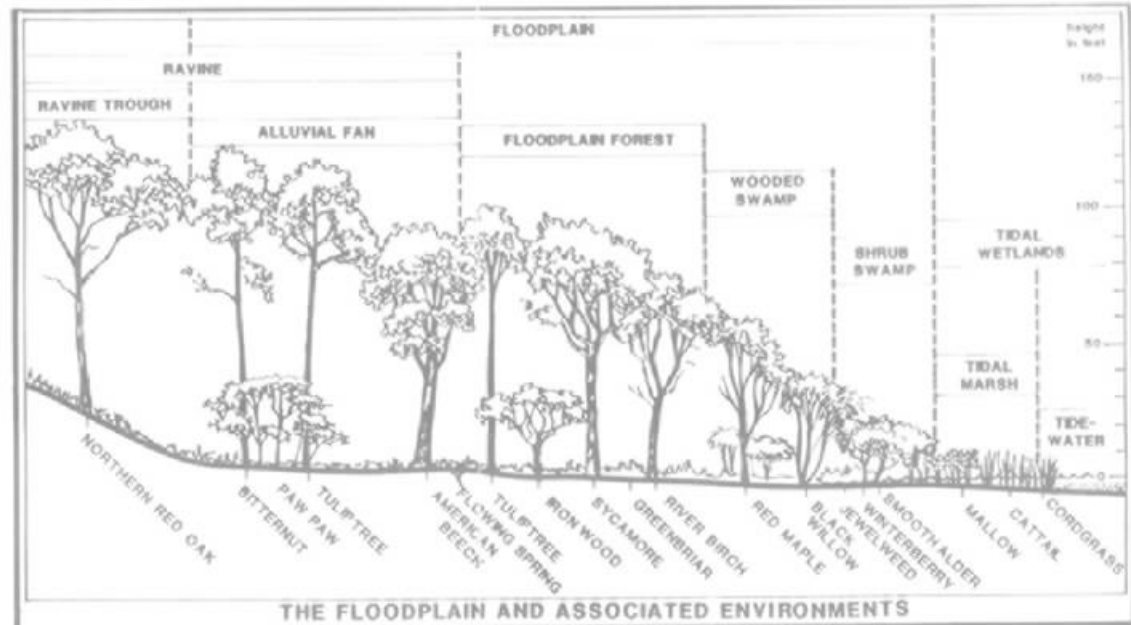
Plant growth in the floodplain follows a rather specific pattern. Most stream corridors on the Severn are too small to encompass the entire range of the well known species. Those floodplains with

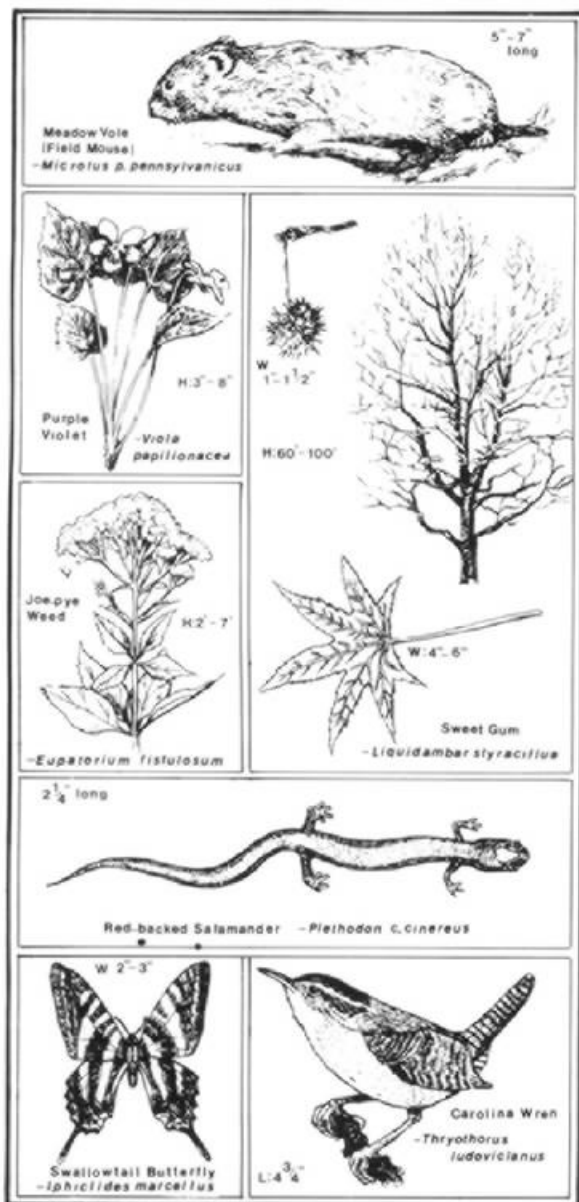
Floodplain of Severn Run Natural Environment Area



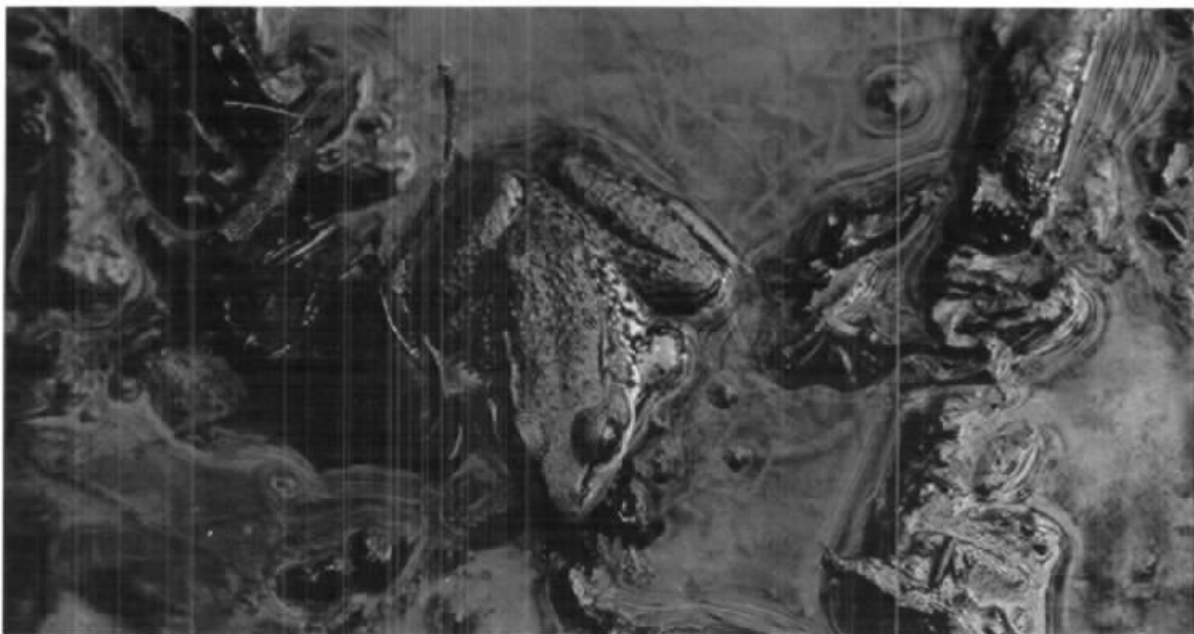
the most variety are found along Severn Run and the watershed of Little Round Bay. In these areas the lowland forest includes river birch, sycamore, red maple, sweet gum, pin oak and willow oak. The dense shrub layer includes clethra, arrowwood and greenbrier.

The existing floodplain equilibrium may be upset by development in the watershed. Increased stormwater volumes erode the sandy material from the upper floodplain, enlarge stream channels and cause accelerated deposition on fertile floodplain terrain. These effects are damaging in all instances, but this is not a new situation. In the agricultural days of the past, storms carried away vast amounts of topsoil from furrows and steep pastures. Today's situation differs in that storms bring not only topsoil, but also rough subsoil and pollutants from developing communities.





Flora and Fauna Typical of Floodplain Areas of the Severn River Watershed



Green frog

Swamps

Swamps are lowland areas supporting woody plants—plants adapted to highly organic soils that are nearly saturated with water. There may be pockets of standing water. Locally, there are two types of swampland, wooded and shrub, which frequently merge with rather indistinct boundaries.

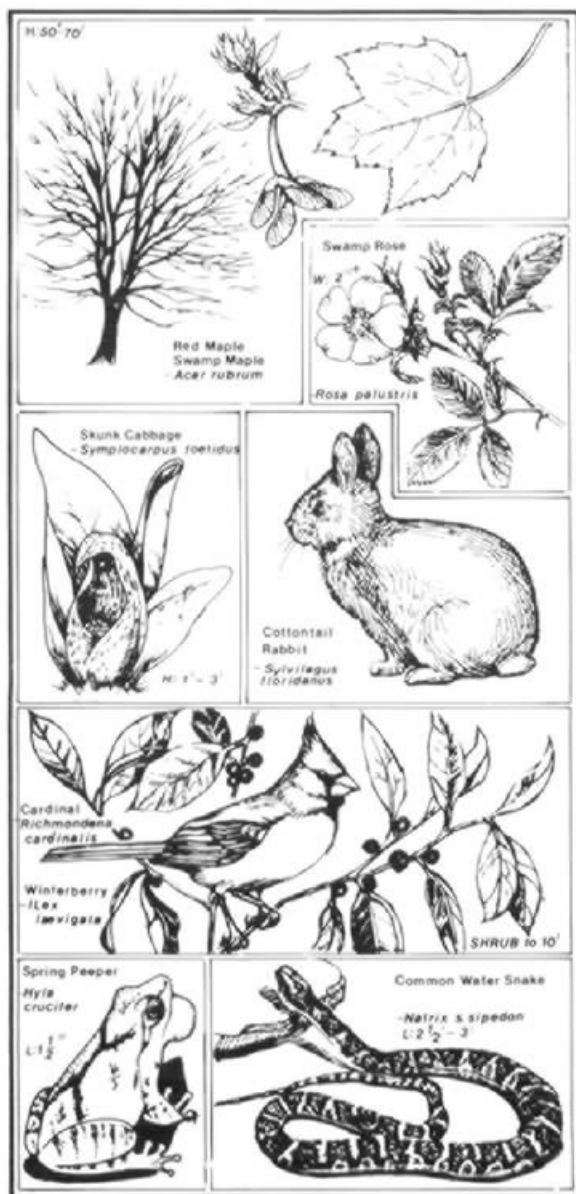
Wooded Swamps - These areas are usually dominated by red maple, black willow, sour gum, sweetbay magnolia and occasionally, pitch pine. Their spreading root mats create a stable surface over much of the swamp, and shrub growth is scattered and varied. Cinnamon fern and netvein chainfern occur, and familiar herbaceous plants include jewelweed, bur-reed, rattlebox and on the richest sites, skunk cabbage.

Shrub Swamps - These are characterized by conditions which do not permit the growth of red maple or other large trees. Such sites usually exist between wooded swamps and tidal marshes, or at the head of freshwater ponds and low-

land basins. Acidity is most likely a factor determining plant diversity. Sweetbay magnolia is the tallest species on acidic sites surrounded by silty soils. The dense shrub layer of these swamps contains many attractive species, including smooth winterberry, smooth alder swamp rose, black highbush blueberry, possumhaw viburnum, clethra, elderberry, swamp azalea, button bush and arrowwood.

Numerous species of birds find abundant food, shelter and nesting sites amid the thick vegetation of the swamp. Migrating birds, especially warblers abound here. Amphibians are numerous, the familiar sound of spring peepers marking the end of winter.

Although swamps are efficient nutrient store-houses and important ecological sanctuaries, they are not protected as natural areas to the same extent as are tidal marshes. While local subdivision regulations prohibit the plotting of lots in swamps, many of these areas are being ruined by the impacts of nearby development on wooded slopes and in transitional thickets.



Flora and Fauna Typical of Swampy Areas in the Severn Watershed

Freshwater Ponds

All freshwater ponds of the Severn watershed are man-made. A few of the smaller ones were created when the pits were dug for glass sand near the river's edge. However, most are impoundments created by the damming of lowland corridors leading to a tidal creek or cove. The dam sometimes carries a roadway but the ponds are otherwise bordered by steep, well wooded hillsides. Depending on their location in the lowlands, wooded swamps usually occur above or below the ponds.

In the sandy, upper portions of the watershed ponds are usually quite clear or slightly stained by the acidic nature of fallen leaves from the surrounding forest. The fragrant white water lily, bladderwort and watershield are the common aquatic plants. Eastern chain pickerel appears to dominate the fish species. Ponds in areas of fine-textured rich soil sometimes appear a little muddy, but support high fish populations, especially largemouth bass and bluegill sunfish. Common plants of the pond's edge include swamp loosestrife, broadleaved arrowhead, water pennywort, tearthumbs, and smartweeds.

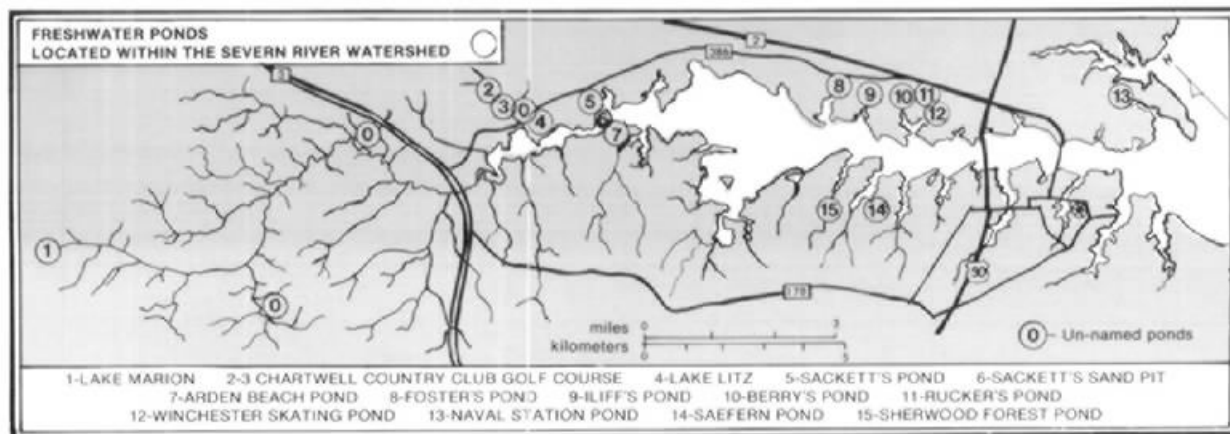
Most ponds are privately owned and privately stocked. Although they provide some recreational fishing and ice-skating opportunities, ponds are usually located in steep, fragile areas, and their real value is ecological. These ponds and the surround-

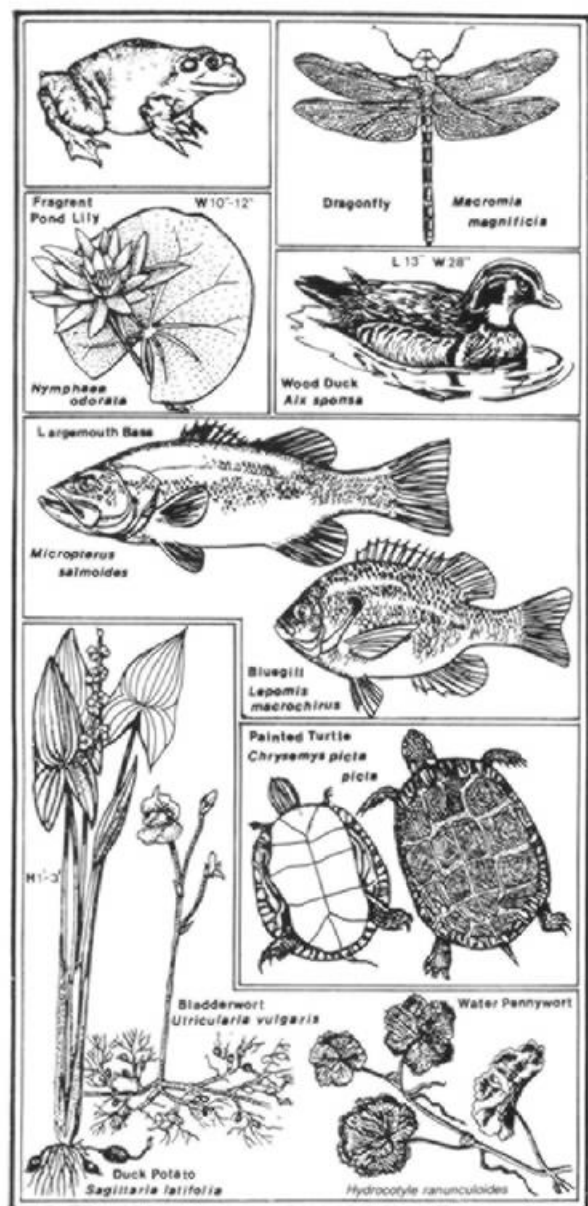
Freshwater pond, head of Chase Creek



ing swamps and woodlands provide the solitude necessary for shy creatures. The dense shrub border is ideal small-bird habitat. Creatures of the pond environment include the kingfisher, little green heron, wood duck, muskrat, painted turtle, snapping turtle, bullfrog and greenfrog.

The area's freshwater ponds are increasingly being affected by stormwater runoff that deposits soil eroded from ravines. This process is gradually filling in the ponds and damaging their ecology by increasing nutrients and turbidity.





Flora and Fauna Typical of Fresh Ponds in the Severn River Watershed

Bogs

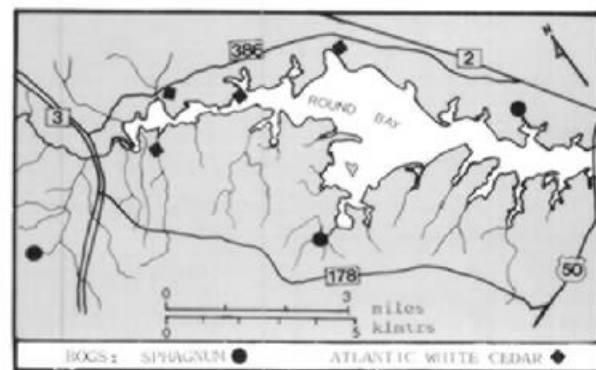
Bogs form in highly acidic areas of saturated soil and standing water, factors which limit the growth of all but a few highly specialized plants. Because decay is minimal, a layer of peat accumulates beneath the bog vegetation. Local bogs are considered to be of two types: sphagnum bogs and cedar bogs.

Sphagnum bogs - These are characterized by a thick surface mat of sphagnum moss, herbaceous plants and low shrubs. Local sites are usually very small and are shaded by surrounding woodland growth which limits plant diversity. Under such conditions plant growth may be limited to sphagnum moss and royal ferns. An exception is Round Bay Bog, where the forest growth was cleared away for an electric transmission line right-of-way. The resulting bog growth is vigorous and diverse. Re-establishment of the original forest growth is limited by the moisture-retentive capacity of the sphagnum mat.

Plant growth here also includes bog fern, Virginia chainfern, northeastern marshfern, rose pogonia orchid, maleberry and cranberry. The surrounding swamp and woodland are dominated by pin oak, willow oak, sweet gum and sour gum, with a dense shrub layer of swamp azalea, buttonbush, swamp magnolia and clethra. This cover is botanically interesting and forms a prime nesting area for birds. Round Bay Bog, like the Severn Run Tributaries, and Sullivan's Cove Marsh, has been designated as an Area of Critical State Concern.

Cedar Bogs - These sites are characterized by Atlantic white cedar which sometimes forms a dense, dark stand. Associated plants include sphagnum moss, swamp magnolia, sour gum, black highush blueberry, swamp leucothoe, and royal fern. The surrounding borders often contain pitch pine, smooth winterberry, clethra and red maple. These sites are of considerable botanical interest because Atlantic white cedar is quite uncommon on the western shore of Maryland. Several small stands exist at Sullivan's Cove.

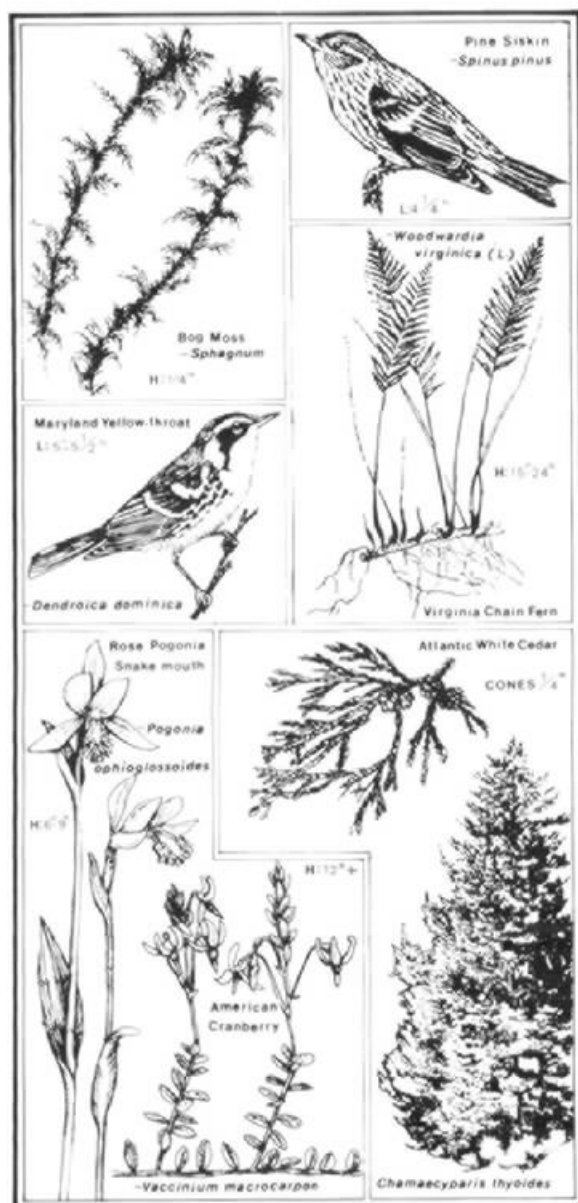
Bogs are fragile areas, requiring unusually careful protection. Maintenance of stable, moist conditions



White cedars in Sullivan's Cove



is a basic consideration. Any influx of sediment or reduction of acidity may lead to invasion by common woody plants. Protection of surrounding conditions also is essential to preservation of these unique sites.



Flora and Fauna Typical of Bog areas in the Severn River Watershed

Concerns and Recommendations



The fourteen sections that follow present concerns about the future of the watershed, and recommendations as to how its natural, scenic, and cultural heritage can be protected. The recommendations are directed toward residents of the area, organizations, and the federal, state, and local governments. Where appropriate, the recommendations are directed toward a specific level of government or a government agency. In many cases responsibilities cannot be easily separated, there-

fore, implementation must rely on the cooperation and dedication both of public and private interests.

The first section discusses the protection of the Severn River area within the context of local policies and plans. The next twelve sections discuss particular concerns, each section concluding with specific recommendations. The final section presents a proposal for the establishment of a special Severn River District, in order to provide better management of the watershed's resources.

Growth and Development in the Severn Watershed



Lake Marion outfall, Severn Run headwaters

The Severn watershed today is a complex functioning system in which we have obtained a precarious balance with nature. This balance is threatened however, by our use and overuse of the watershed's land and water resources. Unless we actively protect the Severn's outstanding scenery, water quality and important natural features, we risk exposing them to serious and possibly irreversible damage.

For over three hundred years the river's landscape has undergone a succession of major changes. It has been farmed, logged and mined; it has been altered for human habitation, commercial endeavors and recreation. Over the years such activities have wasted topsoils, destroyed wildlife habitat, eroded slopes, filled lowlands and streams with sediment and polluted the water. But, as agriculture declined, nature had a second chance. The fields reforested themselves, erosion slowed greatly, and some plant and animal species began to come back into their own. The topsoils and forests, however, had been extensively changed, and real recov-

ery may be slow. The original landscape, of course, cannot be regained; some native plant and animal species have disappeared and introduced species add competition. Extensive areas have been modified. In sum, we are fortunate that the Severn has retained and recovered so much of its natural beauty. It is a source of pride and enjoyment. Marylanders have come to realize that the Severn is no ordinary river, but a unique heritage. With care it can be preserved.

In recent years, however, the uses of land have intensified, not for agriculture, but for suburban development. Since the late 1940's dramatic population increases in the Baltimore-Washington metropolitan area have brought an influx of new residents into Anne Arundel County. Growth in the Severn River area, in particular, has accelerated, due in part to improved access routes, the availability of housing, and the attraction of the local waters and landscape.

The intensive development over the past thirty-

five years has placed great stresses on the watershed and the river. In combination with the area's steep terrain and erodible soils, this development has led to erosion, siltation, and significant declines in wildlife habitat and water quality. Thus, many results of land abuses seen during the agricultural exploitation of colonial days are again evident, although the sources have changed.

However, today's use and alteration of the watershed is more widespread and drastic. The major difference from earlier times — a critical difference — is that woodlands and other natural areas, once cleared and paved, cannot return to their original conditions. Obviously, it is vital that all land use decisions be made carefully.

Anne Arundel County and the City of Annapolis have the greatest responsibility in this regard. Since most of the watershed's remaining vacant land is in the county, Annapolis must be chiefly concerned with redevelopment and the influences of county growth. Anne Arundel County has been active in its

consideration of growth-related problems, and its efforts are particularly relevant to this document.

The County's long-range *General Development Plan* (1978) formally recognizes the importance of county shorelines, streams, wetlands, and other natural features.³⁹ It acknowledges that these features provide county residents with many scenic, recreational and significantly, financial benefits. One of the General Development Plan's major policies is to protect these natural assets. But another of its major policies seems to create a serious conflict regarding the Severn River area: the County intends to concentrate most of its future growth in the existing established areas, which include many portions of the Severn watershed. The expected benefits of this growth-concentration policy are significant. It could help the County preserve much of the open space and agricultural lands of the south-county area; reduce fuel consumption for commuters; and help control the cost of providing public services such as sewers, where those services are actually needed. This policy also could allow Anne Arundel County to accommodate a fair share of overall regional growth.

All of the factors encompassed in these policies are important. However, in a watershed like the Severn's which is undergoing rapid urbanization, the difficulty lies in making the policies relatively compatible. Certainly the area will see more development. And, continuing improvements in the development-regulatory process can reduce en-



Siltation in upper Severn; Severn Run Natural Environment Area in background

vironmental damages. Yet, it seems the primary reason for designating this particular watershed as a high growth area is its location between the expanding Baltimore and Washington, D.C. metropolitan regions. This is an unfortunate decision because this area, by virtue of its location, is suited to be a significant source of natural and scenic beauty, and of great educational value to a growing population. Full implementation of the County's development plans, under the existing county regulatory procedures, will degrade this important natural environment.

Instead, the uses of land in the Severn watershed should be based on inherent natural characteristics. To make such determinations effectively will require a greater understanding and appreciation of the watershed's natural systems, as well as planning that is specific to the area, and regulations that can be enforced.

Some recent environmentally-protective actions by Anne Arundel County are encouraging. For example, the County's *Severn Run Watershed Management Study* (1980) provides a useful analysis of threats to the Severn Run area.⁴⁰ If

implemented, the Study's recommendations will be most beneficial. The County's sector planning process, which is being used initially in the Annapolis Neck area, is another good approach in that it establishes a close citizen-government working relationship. However, for planning purposes, the Severn River watershed should be considered as a whole. A more thorough and coordinated planning approach is needed than is possible solely by combining various local plans. Therefore, Anne Arundel County and the City of Annapolis should designate the Severn River watershed as a special district, and employ special protective measures within it. The administration of this district should assure the meaningful participation of the many private citizens and civic organizations that are working for the river's protection.

The use of this type of planning and administrative mechanism has proven successful elsewhere, and is presented in greater detail in *Severn River District*, page 59.



Clements Creek area near Rt. 178

Shoreline Protection

The Severn's shoreline areas contain some of the watershed's most noted and valuable features. It is here that many of the natural, historic, and scenic qualities are most evident. The steep slopes and cliffs, secluded coves, marshes and woodlands, the marinas and excellent recreational opportunities, the Naval Academy and the Annapolis Historic District all combine to make the shoreline areas attractive and vital. But, these qualities also attract strong development pressures.

These pressures are evident in the widespread desire to obtain or create building sites near the shoreline -- and to reshape this varied terrain to allow for greater development. This is not always harmful to natural systems or aesthetic sensibilities. However, damaging alterations frequently occur. To alleviate these as much as possible, particular attention must be given to several factors. They are: the patterns of shoreline development; the preservation of wetlands; the proliferation of bulkheads and other shoreline structures; the importance of steep slopes and cliffs to the shoreline setting; and the protection of aquatic habitats.



Back Creek, Eastport

Patterns of Shoreline Development

Over the years a pattern of development has emerged in the Severn's shoreline areas. Generally, the steep terrain has kept development set back from the river. Many shoreline communities are separated from one another by coves, and are outlined by lowland green areas. Land values tend to be high along the shoreline because the demands for aesthetic qualities and recreational opportunities have made suitable development sites relatively scarce. Consequently, there is a strong economic incentive to seek high shoreline densities and add as many new building sites as possible.

There should be special measures in the Anne Arundel County and Annapolis development regulations to counter this trend. Building heights, building and marina densities, and other scenic and environmental impacts of development should be specifically adapted to the shoreline. The Annapolis Port Wardens evaluate these types of factors for the City of Annapolis, but they are an advisory body with no authority to halt or change the course of shoreline development.

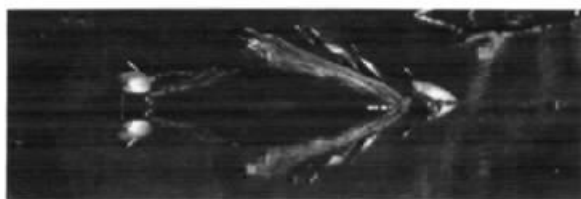
In general, large lots may be subdivided as a result of a denser zoning designation. Where lots are small, the separate sale of open areas used as sidelawns and gardens creates new homesites. In the county, the installation of public sewers may change the status of low-lying green areas. These sites, unsuitable for building purposes, often serve as community open spaces and buffers. Development of these open spaces can significantly alter the physical appearance and character of a neighborhood. Overall, filling in the Severn's shoreline communities in this manner is unfortunate, not only for the stability of established neighborhoods, but also for the river. It results in a loss of green areas, taxes the adaptive capabilities of aquatic habitats because of increased erosion and stormwater runoff, and reduces aesthetics and recreational opportunities.



Sullivan's Cove Marsh

Wetlands

Existing state law substantially protects tidal wetlands by controlling many types of direct alteration.⁴¹ Non-tidal wetlands and most other lowland natural areas are not protected to the same degree, although both the State and Anne Arundel County regulate development in the 100 year floodplain. However, the local zoning ordinances and subdivision regulations do not provide adequate protection to the wetland's buffer areas that are so important to ecological and scenic values. All lowland natural areas, therefore, can be vulnerable to the effects of nearby development.



Bulkheads and Other Shoreline Structures

Bulkheads are usually installed along the Severn to halt shoreline erosion, caused in part by wind-driven waves and rising sea levels. (Erosion can be accelerated by boat wakes, by the clearing of shoreline vegetation, and by changes in wave and tidal current patterns created by other bulkheads and shoreline structures.) Timber bulkheads are the most common choice to control erosion. Like all control measures they must be designed carefully to avoid causing greater ecological harm than caused by the erosion.

The disruption of the normal interaction between upland and estuarine ecosystems is possibly the most serious ecological impact of bulkhead installation. This interruption occurs because bulkheads create a physical barrier and eliminate the transitional and shallow-water vegetation that serve as habitat for fish, shellfish, and wildlife. Bulkheads also may increase wave recoil, causing scouring of the river bottom.

Other shoreline structures, including piers, boathouses, stairs, and marinas also affect the appearance and use of the shoreline. As the area's population continues to grow, the demand for recreational opportunities and for these types of structures will increase.

Steep-Slope Aesthetics

The stripping of trees and other vegetation from shoreline slopes to create wider vistas not only degrades the appearance of the slopes but can contribute to erosion. In areas where steep slopes or cliffs are rapidly eroding, attempts at stabilization can be needlessly unattractive, as in the use of tires instead of natural materials to hold the soil.

Aquatic Habitats

Although the environmental health of the Severn River is greatly dependent on the uses of land in the watershed, sometimes activities occurring directly in the river are also significant. Dredging is an example. It is a legitimate activity but it can be damaging, both directly and indirectly, to oyster beds, fish spawning areas and other bottom habitats. The effects of dredging include the siltation of adjacent habitat areas; an increase in water turbidity, which blocks out sunlight that is essential to aquatic life and hampers reproduction; and the possible release of pollutants buried under the sediments.

In their long range plans, Anne Arundel County

and the City of Annapolis have stated the need to ensure that the Severn's shoreline is not developed beyond its physical capabilities or in an unsightly manner. However, accomplishing this will require changes in the way shoreline use is controlled. Some of the existing local control measures are not finely tuned to the shoreline's particular requirements, and therefore, can offer only limited protection. There is, in fact, no formal shoreline plan, or an agreed-upon concept of the shoreline's future through which to apply these measures. Such a mechanism must be provided so that individual proposals can be evaluated within the larger contexts of shoreline preservation or enhancement.

RECOMMENDATIONS FOR SHORELINE PROTECTION

1. SHORELINE DEVELOPMENT PATTERNS

Establish strict shoreline-protective guidelines concerning the merits of zoning changes, subdivision requests and the installation of public sewers.

Employ a variety of techniques (zoning, tax incentives, easements, purchases, purchase with lease-back, and others) to preserve and protect significant ecological sites, such as the shorelines of certain small, secluded creeks.

2. WETLANDS

The Maryland Department of Natural Resources should work with Anne Arundel County and Annapolis to establish regulations to protect all lowland natural areas from the effects of direct or nearby development. This should include measures to provide for, and protect, buffer areas.

Remove man-made stream barriers that prevent a normal interaction between chains of lowland natural areas.

3. BULKHEADS AND OTHER SHORELINE STRUCTURES

The Maryland Department of Natural Resources should continue to provide residents with technical advice on the most appropriate design of shoreline stabilization, in order to minimize scenic and ecological damage.

A more comprehensive review of all proposed bulkheading should be made. Factors to be evaluated include possible changes in habitat, species distribution, interaction of ecosystems, littoral drift, benthic disturbance, and nearby shoreline erosion.

4. STEEP SLOPES

Special permits should be required for certain alterations to steep slopes or cliffs along the shoreline. Such alterations may include bulkheading, regrading, stabilizing, and clearing.

5. AQUATIC HABITATS

Dredging should continue to be regulated according to the season, extent, procedure, and ecological impact of the activity.

The Subdivision Review Process

Many Anne Arundel County development regulations lend some measure of protection to the watershed's natural features. However, the overall scope and effectiveness of these regulations is inadequate. They are often ambiguous and contradictory. Some are not enforced and, under certain circumstances, not enforceable. If development in the Severn River area is to continue without undue environmental harm, changes in certain procedures will be necessary.

An exhaustive analysis of development procedures and regulations is not attempted here. However, the following examples will help to illustrate some areas of concern.

Protection of Sensitive Natural Areas

There is an inherent inconsistency in "protective" regulations that apparently restrict development in many sensitive natural areas, and also permit damaging alterations to these same sites.

As an example, some development is allowed by the County in steep slope areas even though these sites are defined as being "characterized by increased runoff, erosion and sediment hazards". Development may not occur unless at least 30% of a building site is under 15% grade.⁴² Such a restriction would seem to protect many slopes from damaging development, but a conflicting provision allows these areas to be cut and filled, rendering them flat. The entire lot then becomes legally buildable.

Other natural areas in which development is prohibited also suffer from incomplete protection. An example of this situation is floodplain regulation. Floodplains, as defined in the County subdivision regulations, could include ravine floors, swamps, bogs, and some ponds. Thus, alterations to floodplains endanger many natural environments. County subdivision regulations state that "lots may not be platted within a natural or existing one hundred (100) year floodplain, tidal marsh or

swamp," but many other damaging activities are permitted, and frequently occur. These activities include the damming of lowlands for use as silt traps during grading operations, and the building of stormwater management ponds, road fills, storm drains, sewer lines, and sewage pumping stations. Fallen trees, and dead or dying vegetation, which could be beneficial to the floodplain environment, are required to be removed. In addition, floodplains may be converted into community recreation areas by clearing and grading. All such activities can result in the loss of scenic, ecological and functional benefits. And, they can be detrimental to overall watershed quality through increased runoff, siltation, and pollution.

Even tidal wetlands, protected from most development by the State Wetlands Act, are not entirely safe from the effects of development. Although proposed alterations to wetlands are subject to state review and a hearing and permit process, the adjoining swamps and transitional thickets are not protected by County regulations. This lack of legal protection for areas serving as natural buffers is a serious shortcoming in the protection of all natural areas. Buffers are an integral part of the functional and scenic integrity of lowland environments. The dense vegetation of buffers provides the seclusion and habitat essential for much of our wildlife, and protects the lowlands from siltation and other effects of nearby development. Where clearing or development is allowed to proceed to the edge of wetlands or other natural areas, they rapidly deteriorate and much of their value is lost.

On-Site Review

The landscape of the Severn River watershed is such that even relatively small alterations can have exaggerated consequences. However, the staff of the Anne Arundel County Office of Planning and Zoning is too small to permit an on-site review and analysis of each development proposal submitted.

An increase in staff would enable Planning and Zoning to conduct a pre-development inspection of each site, with subsequent verification of protective practices.

Cluster

Some regulations might seem beneficial in a general sense but can prove ineffective or harmful when applied to special situations along the Severn. The manner in which the cluster development technique is sometimes used serves as an example.

Developers frequently are able to build more houses on a site with extremely difficult terrain if they "cluster" the houses, leaving large open areas for recreational purposes. But, the steep terrain in many parts of the watershed can make this a questionable practice. The houses are crowded onto the tops of narrow ridges, leaving the steep slopes undeveloped. The need for heavy grading of the slopes is thus avoided. However, other considerations are important. The extra homesites on these ridges account for additional stormwater runoff that degrades the slopes and ravines. And the slopes, intended for recreation, actually provide few practical opportunities to the residents.

As can be seen by this example, the application of development regulations is a serious responsibility. It determines the form of future development in the watershed and the effects that it will have, both on residents and the environment. One of the most important functions of these regulations, therefore, should be to inform private citizens of the types of changes that they can expect. To accomplish this, regulations must be clear and concise. If it is necessary to provide for exceptions to certain regulations, the rationale should be stated clearly for full public understanding. There are many people in the watershed who are concerned that new development respect the Severn's natural features. Yet, these same people can be unfamiliar with important aspects of the development process. This strongly indicates the need for a better exchange of information.

RECOMMENDATIONS FOR THE SUBDIVISION REVIEW PROCESS

1. The scope and use of local development regulations should be evaluated concerning their effect on the natural environment. New regulations should be created to protect steep slopes and all lowland environments more effectively. Such protection should include the buffers that are important to the functioning of the lowlands and their scenic and ecological integrity. All regulations should be written carefully to ensure maximum enforceability.
2. The number of homesites permitted on each tract should be based on the maximum number of standard-sized lots that will fit on the property without substantive change in the natural terrain.
3. The subdivision review process should include a thorough on-site examination, inventory and evaluation of natural features of development sites. The potential impacts on the ecological and scenic qualities of nearby sites should be considered.
4. Areas designated as natural buffers should be inspected periodically, to ensure compliance with protective agreements, and to develop management plans appropriate to natural-area preservation. Community respect and watchfulness should be encouraged.
5. Buffers that have been damaged by development should be restored. All buffers should be protected through the use of easements and covenants, and by revegetation.
6. Intensive recreation sites should not be located on floodplains or other natural areas; rehabilitation of landfills and other gravely damaged terrain for recreational use is more appropriate.
7. Where the activities of public agencies have an impact on lowland areas, the agencies should establish adequate safeguards and assume full responsibility.

Water Quality

A foremost concern for the Severn River is the quality of its water, not only in the estuary but also in the many tributary streams and ponds. Water of good quality supports beneficial food chains and is safe for recreation. The relationship between river and land is vital to this role; the health of the river largely depends on the uses of the land. While there are many types of regulations affecting land use, there are numerous characteristics of water quality that indicate how these regulations are succeeding. These revealing characteristics include, among others, water temperature, turbidity, the levels of dissolved oxygen, acidity and heavy metals, and the presence of pathogens. Only a few of these general characteristics will be discussed here.

Turbidity

This unattractive "muddiness" and resultant siltation is damaging to aquatic ecosystems. Soil particles suspended in the water block out sunlight, inhibiting the growth of underwater plants and phytoplankton. Thus, turbidity reduces the shelter and food for aquatic life. Soil particles also can irritate the gills of fish, and increased siltation may smother oyster beds and other benthic communities. Turbid water is also dangerous because it obscures bottom characteristics from boaters and swimmers.

Turbidity is usually indicative of land development concerns in the watershed. The clearing, grading, and paving activities that accompany development lead to erosion and increased stormwater runoff. This runoff erodes additional soil from steep slopes, ravine troughs, and stream banks, and car-

ries it to the water. Turbidity is also produced at the shoreline, where storms and the wakes from motorboats undercut banks and agitate sediments, and when silty material is carried into the lower river from the Chesapeake by the tide.

Chemicals

Some chemicals pose a particularly severe threat to the Severn's water quality. However, many harmful types of chemicals are difficult to control because they escape from normal, appropriate land uses and legitimate activities. Sometimes, when these chemicals reach streams, ponds, and tidewater they prove injurious to aquatic life. They ultimately may affect our health and recreation.

Fertilizers, pesticides, and herbicides used on lawns and gardens are examples of common substances that can degrade water quality. Fertilizers can add excessive nutrients to stormwater runoff, promote algal blooms and excessive growth of other aquatic vegetation, and damage aquatic life. The eventual death and decomposition of this growth can lead to oxygen depletion, which may kill fish and other aquatic creatures.

The dumping of used motor oil and the leakage of oil and fuel from boats are other serious water quality concerns for the Severn. The State's Used Oil Recycling Program requires that used oil be disposed of only at designated collection facilities. However, this program must rely primarily on voluntary compliance, just as motorboat owners must be counted on to prevent leaks.

An increase in chemical-industrial activity in the Severn Run area carries an additional threat of pollution. While the direct release of toxic substances into the water is illegal, there is always the possibility of accidental toxic spills. In the past, it has been suspected that chemicals have been brought to the Severn Run area and dumped into the streams. In the Picture Spring Branch area some industries use groundwater to cool hot machinery. After its temperature is reduced, the water is discharged into the branch. Although it contains no chemicals, this water is being studied as a possible factor in the scarcity of insect larvae in sections of the branch.

(continued on next page)

Another important water quality concern is chlorine, which is used in sewage treatment. It enters the water when treated sewage effluent is discharged, and is toxic to marine life.

Sewage

The introduction of sewage into aquatic environments not only affects the physical attractiveness of those waters, but also the health and well-being of people and wildlife. Sewage related problems in the watershed involve overflows at sewage pumping stations, increasing boating activities, and failing septic systems.

At times, the bacterial contamination of the river has exceeded state standards. This is partially due to the periodic failure of sewage pumping stations. Pumping stations assist in the transport of sewage to the treatment plants. Failures often result in raw sewage being diverted directly into the water. Back Creek has been closed to swimming in recent years due to pumping station overflows.

Failing septic systems can add to bacterial contamination. Generally, septic systems have performed successfully where proper installation and maintenance prevail. Where problems exist, they often can be traced to poor construction, improper maintenance, the platting of lots too small to accommodate adequate drainage fields, or the location of houses on steep slopes (drainage is directed downhill instead of down into the ground).

Recreational boating contributes to water pollution through the improper discharge of wastes. This practice constitutes a relatively small portion of the Severn's overall water pollution. However, the concentration of boating activities near sensitive areas (wetlands, shellfish areas) increases the significance of discharges. Gradual changes toward stricter regulations are taking place, but there still are problems to be considered with the various marine sanitation devices. The holding tank option involves large size, probable odor and the cost and limited availability of pumpout facilities. These problems increase the likelihood of dumping wastes in or near the water. The other types of devices are of the flow-through variety, involving chemical treatment. These are

more complex than holding tanks, more prone to failure, and more expensive. In addition, chlorine and other toxic disinfecting chemicals are released into the water with the treated wastes.

There are two important points concerning the Severn's water quality that should be acknowledged by citizens, the State, and the local governments. First, there are existing methods of alleviating many of the water quality problems. These methods include strictly enforcing sediment controls and subdivision regulations, and properly maintaining sewage pumping stations. Second, water quality has not occupied a prominent position in planning, and will not unless detailed water quality information is avail-

able to decision makers.

At present there is no comprehensive water quality monitoring program for the entire watershed. The Maryland Department of Health and Mental Hygiene conducts the only continuous program for collecting water quality data on a watershed-wide basis. However, neither this program nor other studies have adequately assessed conditions in the entire Severn River area for the purposes of land use planning. More information is needed to indicate where regulations should be adjusted, and to provide a sound basis for Anne Arundel County and the City of Annapolis to judge the appropriateness of their plans for the watershed.

RECOMMENDATIONS FOR BETTER WATER QUALITY

- Promote the preservation of topsoils in new residential communities by strictly enforcing development regulations. This would help to slow runoff and reduce the need for fertilizers.
- Reduce the threat of chemicals to the Severn by:
 - restricting the heavy use of chlorine in sewage treatment; alternatives could include more thorough treatment by ozonation and ultraviolet light;
 - monitoring industrial areas to assure proper use and storage of toxic chemicals;
 - limiting the use of road salt and insect spray where possible because these substances ultimately reach the water;
 - limiting the use of chemicals in lawn and garden care, possibly by sponsoring educational efforts in cooperation with community associations and garden clubs;
 - providing more widespread promotion of Maryland's Used Oil Recycling Program.
- Reduce the threat to water quality from sewage by:
 - properly maintaining sewage pumping stations and treatment plants and providing auxiliary equipment for emergency situations;
 - prohibiting the construction of sewer lines in the Severn River and under the streambeds of its tributaries;
 - providing maintenance information and technical assistance to owners of septic systems;
 - providing more pumpout facilities for marine sanitation devices and encouraging boaters to use them.
- Annapolis and Anne Arundel County should implement the recommendations for marina construction and operation incorporated in the Anne Arundel County Boating and Marina Study (1980).⁴³
- Water quality sampling and monitoring programs should be expanded and better coordinated. Water quality information and trends should receive thorough consideration by Anne Arundel County and Annapolis in formulating their plans for the area.

The Impact of Public Sewers on the Watershed

The installation of public sewers is a complex issue in the Severn watershed. The primary purpose for sewers, as stated in the County's General Development Plan, is the protection of the public health.⁴⁴ Yet, it has not been firmly established that private septic systems are inadequate for sewage disposal, and therefore need to be replaced. While there are areas along the river where septic systems have malfunctioned, and continue to do so, in general these systems have operated satisfactorily due to the sandy nature of most local soils. Those homeowners who wished to try innovative handling systems have found it very difficult to obtain approval from the County Health Department. In addition, there are environmental concerns associated with sewer installation, and often prohibitive costs to the individual homeowner. It is understandable that the issue of sewers is controversial as well as complex.

Environmental Impacts

The environmental impacts of public sewers in the Severn watershed are potentially serious. There are concerns associated with 1) sewer installation, 2) sewer operation, and 3) the changes in land use brought about by the availability of sewers.

The digging of trenches for sewer installation can harm lawns and gardens. Where deep trenching interrupts existing soil and groundwater systems, large roadside and forest trees are destroyed. Sewage pumping stations and force mains, often located in lowlands, can seriously damage the ecological and aesthetic integrity of those fragile green areas. An extensive system of pumping facilities is necessitated by the steep terrain of the watershed, which limits the use of gravity in collecting sewage. The pumping stations have been beset by chronic operating problems, causing more than fifteen serious sewage overflows in the Severn watershed between 1975 and 1980.⁴⁵ Additional concerns involve the proposals to construct an underwater force main across the Severn from Rock Point to

Herald Harbor. In other parts of the county underwater lines have sometimes failed, resulting in leaks directly into the water.

Perhaps the most significant environmental concerns involve the changes in land use brought about by sewer availability. The presence of sewers, or even the inclusion of an area in County sewer plans, alters the circumstances that determine development levels. Sewers are often the primary basis for granting requests for higher zoning densities or per-

mitting smaller lot sizes (and therefore more houses per acre) than otherwise allowed. In established neighborhoods, like those along much of the Severn's shoreline, the installation of sewers permits development of previously unbuildable low-lying lots and green areas. This type of development eliminates these areas as natural buffers. It also increases stormwater runoff and other population impacts that damage adjoining natural areas and affect water quality.

RECOMMENDATIONS CONCERNING SEWER INSTALLATION AND ALTERNATIVES

1. Public sewers should be installed in the Severn watershed only to correct or prevent public health problems.
 - Sewer lines should be limited in size, to service only problem areas.
 - The density of development that would be permitted with sewer service should not be allowed prior to the actual availability of service.
 - Sewer lines should not be located under the Severn River due to the possibility of failure or leaks.
 - County sewer studies should consider the effects on local aquifers resulting from the export of water to the Bay via sewer lines. With less water being returned to the soil, the likelihood of lowering the water table and causing saltwater intrusion may be increased, especially in the Broadneck area.
2. The proper functioning of septic systems and their effects on the environment should be reflected in the subdivision plan and the approval of building permit applications. Some of the factors to be considered include appropriate soils, disturbance of fragile terrain and natural ground covers, and lot size that is sufficient for drainage fields.
3. Information and practical assistance should be readily provided to citizens and developers regarding the proper construction and maintenance of private septic systems. The possibility of low-interest repair loans should be explored.
4. In order to ease the effects on aquifers, drainfields or evapotranspiration systems should be considered in preference to drywells whenever possible.
5. Development of innovative public and private sewage disposal systems should be studied and encouraged.
6. Community associations should attempt to protect low-lying lots and green areas before sewers are installed. Their efforts could include encouraging owners of these sites to enter into protective covenants or conservation easements.

Erosion

Natural erosion is usually very slow, even slower than the formation of topsoil. Where undisturbed, the Severn's landscape is quite stable. There is an equilibrium between the erosive force of rainfall and running water, and the capacity of other factors to control or accommodate that force.

This stability can be upset, and erosion increased, by changes in any of four factors: water runoff volume, land contours, soil characteristics, and vegetation. Although fire, flood, hurricanes and other natural disasters can cause such changes, human alteration of the landscape is the primary cause of accelerated watershed erosion.

In undisturbed areas, normal, limited erosion can be viewed as ecologically beneficial since the resulting deposition of fertile soils extends and enriches lowland environments. However, when erosion of slopes and uplands is accelerated, the result may be ruinous. As an example, alterations to upland soils may increase stormwater runoff, eroding ravine troughs and scouring stream channels. The eroded material, much of it subsoils, may smother portions of floodplains and swamps. Where it is deposited in a marsh, it can reduce the production and export of organic matter basic to the estuarine food chains. Erosion is also responsible for large amounts of fine soil particles reaching tidewater, causing siltation and water turbidity.

Many erosion problems in the Severn watershed can be traced to careless or inappropriate use of land. The loss of topsoils from croplands, pastures, playgrounds, lawns and gardens is common. Stormwaters from these areas and paved surfaces often damage adjoining slopes and lowlands. Such erosion may go unnoticed but is serious because it is a continuing loss, amounting to tremendous volumes over a few decades.

The most dramatic erosion problems are caused by development. Land clearing, grading, excavating and other disturbances can cause watershed damage that is both sudden and massive. Damage may vary according to the inherent characteristics of the site, the extent of the alterations, and the manner in which they are carried out.

Construction practices used in new development often result in the stripping away of all topsoils, or the churning, spreading, and compaction of topsoils and subsoils. The loss of natural ground covers and the difficulty in establishing new ones result in the exposure and erosion of large, relatively infertile areas. Infiltration is therefore diminished, and stormwater runoff from these exposed areas is a serious condition that may continue for years after development.

Today's grading procedures usually concentrate on catching silt rather than preserving topsoils (by keeping them in place, or by stockpiling and restoring them). A common practice is to encircle development sites with extensive berms and silt traps.

While these devices are sometimes essential as extra safeguards, much of the site's fertile topsoil and vegetation is lost when they are used to the exclusion of other soil-protective measures.

Berms and silt traps often are placed in vegetated areas that could have remained undisturbed if other erosion-control measures had been used. Where silt traps are constructed in a ravine, swamp, floodplain or other lowland area, highly organic soils and beneficial vegetation can be ruined by introduced subsoils, prolonged submersion and compaction. These damaged sites ultimately may cause more widespread harm by contributing to increased runoff and erosion.

RECOMMENDATIONS FOR EROSION CONTROL

1. A comprehensive effort by private and public interests is needed to reduce watershed erosion. This effort should include:

providing greater understanding of the function, fragility, and proper management of natural areas;

continuing the State's erosion and sediment control program for developers;

reviewing existing zoning patterns to ensure that densities are appropriate to natural site limitations; factors that should be considered include topography, soils, and proximity to receiving waters.

2. Within their respective jurisdictions, the local, State, and Federal governments should implement and enforce strict regulations on the soil-disturbing activities of developers and other landowners, according to the following guidelines.

Minimize disturbance of natural vegetation and contours throughout the development period;

Keep topsoils intact and in place whenever possible, or carefully stockpile topsoils and restore natural soil characteristics, in order to facilitate revegetation and infiltration;

Avoid clearing and grading on steep slopes and areas adjacent to streams and wetlands;

Conduct grading activities in carefully timed and limited increments to minimize areas of exposed soil; keep disturbed areas heavily mulched; and prevent development of individual lot sites within new subdivisions until access roads are completely stabilized;

Design erosion and sedimentation control devices carefully, so that they are not more harmful to the environment than the influences they are designed to control; keep berms and silt traps out of lowlands and green areas;

Require all landowners, whether developers, individuals, or government agencies, to be fully responsible for protecting the quality of adjoining properties, and all waters and lowlands that are subject to the influences of the landowner's development or land alterations.

Stormwater Management

Due to the extremes of weather in the Severn River area, a certain amount of stormwater runoff is normal, even where the landscape is undisturbed. However, this runoff increases dramatically when the natural water-retaining vegetation is removed. Although runoff from compacted soil or lawns, for example, is greater than from undisturbed woodlands, the greatest and most damaging runoff comes from areas such as streets, parking lots, and rooftops, where stormwater picks up oil, salt, lead, and other debris. These impervious surfaces increase both the volume and the peak-flow velocity of runoff, resulting in widespread, possibly permanent damage to the river and many portions of the watershed.

The impacts of stormwater runoff include the gullyng of ravine troughs, the scouring of upper floodplains, the undercutting of stream banks, and the deposition of eroded material in ponds, swamps, and marshes. These conditions can continue for decades after completion of new developments, and frequently involve soil volumes far above those lost during clearing and grading.

While the physical destruction of natural contours and plant communities is the most obvious of these impacts, the loss or alteration of fertile topsoils has the most lasting effect. In most cases it has taken hundreds of years to build up these topsoils and when they are washed away, covered, or otherwise changed, revegetation is extremely difficult. Consequently, one area of severe runoff and erosion can affect an entire chain of lowland ecosystems, damaging their aesthetic qualities and their nourishing contribution to the estuarine food chains.

Too often in the Severn watershed the design of roads and stormwater outfalls demonstrates a lack of ecological or aesthetic understanding. Road-widening and the use of curbs or paved shoulders causes heavier and more concentrated runoff. Poorly designed outfalls can be both unsightly and prone to failure. When stormwater is discharged at a point above the floodplain it can cause gullyng up to that point. Massive gullyng can be caused by the

installation of stormdrains in ravine troughs. Here, the disturbed soil is quickly eroded by normal runoff and the pipes are undermined. When this happens the steep slopes of the ravine often cannot be stabilized.

Thus it can be seen that although a variety of stormwater management techniques are available,

each has certain drawbacks that must be carefully considered. In particularly fragile terrain there may be no entirely satisfactory means of handling stormwater volumes that result from even moderate urbanization. In these, and in all areas, the priority must be on reducing or diverting the amount of runoff. And in some areas, if effective stormwater management is not possible, perhaps the best course of action is to leave the land in its natural state.

RECOMMENDATIONS FOR STORMWATER MANAGEMENT

1. Avoid damage to natural areas when installing and repairing stormwater outfalls.

Regularly inspect all public-road outfalls for signs of damage to natural areas.

Where such damage occurs, immediately ensure that corrective measures are taken, and that they are protective of the area and the landowner's interest.

Where road alterations are necessary, make any corrective stormwater-outfall repairs prior to road work.

Wherever possible avoid the visible use of unattractive materials such as galvanized pipe and concrete boxes; limit the use of heavy construction equipment; select appropriate access and seasonal conditions.

Carefully evaluate all new stormwater-outfall proposals for their total impact on water quality and natural areas; develop alternatives where possible, such as extending pipes around a natural area rather than through it.

2. Decrease volumes of stormwater

from pavement: by considering the use of porous pavements for streets, parking lots, and similar uses; and by mini-

from lawns and recreation areas:

from rooftops:

mizing through careful design, the amount of pavement necessary;

by informing and encouraging property owners to limit cleared areas, conserve topsoils, mow higher, use contour planting; and making other provisions for highly compacted, heavy-use recreation areas;

by using rooftop storage, or, for residential areas, increased infiltration, possibly requiring roof drains to flow across vegetated areas prior to connection to drainage systems.

3. Carefully evaluate the use of stormwater control ponds, to avoid unnecessary destruction of lowland natural areas, or the increased erosive effect on streambeds associated with increased stream loads over a prolonged period. These ponds should not be installed where runoff can be reduced and the normal function of the floodplain maintained. If ponds are used, they should be inspected regularly to ensure proper operation.

Incentives for Private Land Preservation



Rucker's Pond, Chase Creek watershed

The privately-owned woodlands and other green areas of the Severn watershed are extremely valuable because they help protect its scenic and ecological qualities. These areas retain rainwater and thereby help replenish aquifers. They hold soil in place, reducing the amount of silt entering the water. They also provide outstanding scenery, serve as habitat for wildlife, and as buffers for lowland areas and between communities.

The development pressures on these lands increase as property values and property taxes continue to rise. In recent years some of the largest and ecologically significant sites along the river have been sold or subdivided. The results have been distressing, particularly concerning wildlife. Some of the watershed's once common wildlife species are rapidly disappearing. Only in the Sherwood Forest area, for example, are chipmunks found in numbers comparable to just a few decades ago.

Other species have not been sighted for many years. As the perimeters of bird sanctuaries and other wildlife habitats are increasingly exposed to developed areas, the seclusion that many of these creatures need is lost. They become vulnerable to construction equipment, free-running cats and dogs, and traffic.

There are several courses of action that can help preserve a viable complement of these lands. Some possibilities involve direct government or private control, such as through purchase of land or of its development rights. Other possibilities include a range of incentives that would encourage landowners to provide the same levels of protection, while keeping the lands in private ownership.

Purchasing land in the Severn watershed is an expensive and often time-consuming method of protection. For these reasons it is used very selectively, usually only when other means have been

exhausted. In a practical sense, if land is to be retained in its natural state, the impetus must come from private landowners.

While there are many people in the watershed who do not wish to sell or subdivide their woodlands and green areas, the potential profits available to them are a strong inducement to do so. This situation can be offset to some extent by tax incentives that are substantial and specifically tailored to the Severn watershed. Among the incentives currently available are conservation easements, Forest Conservation Management Agreements, and programs for the preservation of agricultural lands.

Conservation Easements

Through conservation easements landowners can gain tax benefits in exchange for donating the rights to develop portions of their properties. The Maryland Environmental Trust, an agency of the Department of Natural Resources, administers a conservation easement program, and other public and private entities also can receive these easements. The specific rights that are donated can vary from restricting the cutting of timber or vegetation to prohibiting buildings or other improvements. (Public access is not increased by conservation easements, unless the landowner wishes.) When these rights are donated, the value of the property decreases, at least initially. In order to compensate partially for this lost value, conservation easements provide for deductions from federal and state income, property, and inheritance taxes. A conservation easement also can reduce the local tax assessment by its effect on the value of the land. In addition, Anne Arundel County is eligible under State law to grant property-tax credits up to 100% for these donations.⁴⁶ However, the County has not enacted the necessary ordinance to permit these tax credits.

One of the major obstacles that discourages landowners from taking advantage of this tax benefit is the uncertainty over future development in their neighborhoods, especially on adjoining properties. (There are no added advantages, or incentives, to encourage adjoining, or groups of landowners to donate conservation easements). For example, if development rights were donated on one property,

the aesthetic or wildlife-habitat value of the easement would probably be decreased by development on an adjacent property. The primary purpose of the conservation easement, therefore, would be undermined. And, the donor of the easement could be assessed higher property taxes, to reflect the changed character of the area brought about by this new development.

Forest Conservation Management Agreements

Forest Conservation Management Agreements are administered by the Maryland Forest and Park Services. These agreements provide for tax benefits to owners of five or more contiguous acres of forest land. The landowners must agree to manage the forest land according to a plan prepared by a registered professional forester and approved by the Forest and Park Services. Property assessments are frozen at their current levels for that portion of the land covered by the agreement.

This program has limited applicability to the Severn River area because its emphasis is on the production of wood fiber. Most of the woodlands along the river are too small for efficient commercial logging. In many, the scenic and ecological priorities outweigh the commercial considerations. Varied understory trees, and so-called "weed trees," "defective trees," "overmature trees," "wolf trees," and dead or dying trees are often of major ecological importance. And, various "noncommercial" species may provide outstanding spring and autumn color to nearby residents.

Agricultural Preservation

Land that is in agricultural use can be eligible for two types of tax benefits. Easements can be donated or sold to the Maryland Agricultural Land Preservation Foundation, providing tax advantages similar to those offered under the Conservation Easement Program. Also, the Farmland Use Value Assessment Law provides that tax assessments for farmland shall not be based on neighboring, or nearby,

higher density development.

These various tax benefits cannot rival the financial returns available to landowners who sell or subdivide their properties. Therefore, the success of land preservation programs in the Severn watershed relies greatly on the landowner's concern for natural and scenic areas. However, many of the significant green areas and natural features in the watershed are not eligible for tax benefits. Parcels that have been platted for development are taxed by the local governments at full-market value, regardless of the actual use. In addition, there are no local

or state tax benefits that encourage preservation of other valuable natural features that make the Severn noteworthy, including its shoreline, cliffs, and steep, wooded slopes. These features are valuable to the Severn, but they also are vulnerable when developed. Strict building and siting regulations, and strict enforcement, would protect them from the worst impacts of development. In some cases, however, even the most carefully designed projects are inappropriate. This is where special tax advantages could be useful in offering resource-protective alternatives to development.

RECOMMENDATIONS FOR PRIVATE LAND PRESERVATION

1. Anne Arundel County should enact an ordinance (permitted by State law) allowing property tax credits up to 100% for land donated under a conservation easement.
2. Forest Conservation Management Agreements in the Severn watershed should emphasize the scenic and ecological importance of mature woodlands. Participation in the program could be increased by:
 - offering property tax credits instead of tax deferments as an incentive; this is a more substantial tax benefit and would better recognize the importance of keeping private woodlands out of development;
 - offering additional tax benefits to owners of adjoining properties;
 - broadening the eligibility requirements to include woodlands of less than five acres.
3. Anne Arundel County should provide tax incentives to landowners in the watershed to encourage protection of green areas, ponds, streams, and other natural features. The emphasis should be on property-tax credits (actual reductions of tax owed) rather than tax deferments.

Development controls should be flexible enough to permit eligibility for these benefits to be determined on a case by case basis. Preserving the ecological and scenic qualities of each property should be the priority. Small size should not mean automatic disqualification.

Continued eligibility should depend on the landowner adhering to a County-designed plan for the maintenance, protection or use of the property. Owners of adjoining properties should be encouraged to participate by offering them increased benefits.

4. The State and the local governments should continue to acquire significant ecological sites (or their development rights) if adequate protection cannot be guaranteed through tax-incentive programs or land-use controls.
5. The State and Anne Arundel County should consider establishing a land trust that would accept or purchase lands and maintain them in perpetuity as natural areas.

Providing Technical Assistance to Protect an Educational Resource

The Severn's varied landscape and ecology are not typical of Maryland's Coastal Plain. The diversity of plant and animal life found here and the wide range of natural systems present a valuable resource for educational and research purposes. They illustrate the changes that result from subtle variations in terrain, soil exposure, and other factors.

The Severn's proximity to large population centers makes this natural and educational resource widely accessible. Some local sites have been used for group field studies by the Smithsonian Institution and the University of Maryland. The demand for this type of instructional experience increases yearly as available study areas decrease throughout the Baltimore-Washington region. The Severn is ideal to meet this educational need.

Also important is the proximity of the area to the Severn's elected officials. In many ways, the Severn's water quality, and other natural-resource protection issues are indicative of similar state-wide concerns, and lessons learned here ultimately may benefit all of Maryland.

To ensure that the Severn's natural areas are protected far into the future requires that they be neither developed nor abused by excessive or carelessly conducted field study or through inappropriate use by the landowner. Since most of the Severn's green areas are privately owned, and will remain so, promoting proper management techniques is sometimes a delicate matter. While many owners realize the educational, scenic, and ecological value of their lands, others do not.

A means is needed to assist and encourage all landowners in the preservation of their lands. We must in effect "reach out" to them, providing insight and understanding, as well as assistance. It is important that two-way communication and trust are maintained because the future of the Severn's green areas depends on keeping the landowners both dedicated and informed.



RECOMMENDATIONS FOR PROVIDING TECHNICAL ASSISTANCE

1. Federal, State, and local governments should work together to make technical advice and assistance readily available to all landowners (individuals, organizations, communities, government agencies) to help them protect their natural areas. Special emphasis should be placed on the preservation of irreplaceable natural features. The effectiveness of an assistance program could be enhanced by:

developing programs that involve citizens in the solution of jointly-shared environmental problems;

informing civic and environmental organizations of the best land management practices, and encouraging their help in distributing information and locating landowners who would benefit from advice and technical assistance;

establishing a better exchange of practical information among landowners, organizations, and others; as an example, create

mailing lists of landowners who would respond to land-management ideas;

conducting workshops in communities to develop ecological awareness;

providing awards to, or otherwise recognizing, those who protect the Severn's natural qualities;

tailoring relevant agricultural preservation, forest management, erosion control and protective wildlife habitat programs to specific needs in the Severn watershed and actively offering these programs to landowners.

2. The provision of professional assistance should not place an obligation on private landowners.
3. Care must be taken to match educational or research efforts with appropriate study sites. Many areas are fragile and cannot be subjected to group studies, since they often contain relatively rare plants and wildlife.

Identifying Important Natural Features



Although only a small part of the Severn's watershed has been carefully studied, many noteworthy natural features have been discovered. These include sites of considerable scenic and ecological interest, state and national champion trees, and rare plants and animals. The checklists of flora and fauna included in the Appendix give some indication of the richness of this diverse and fertile environment.

Undoubtedly many more exceptional, possibly unique, features exist and await our discovery. Yet, many of these features may be lost before they can come to our attention. This situation is due in part to a lack of knowledge and appreciation on the part of citizens, and shortcomings in the development process.

Proposals for projects such as sewers and highways include environmental impact statements that are designed to assess the effect of each project on the ecology and natural features of the study area. However, these assessments sometimes are overly generalized and can reflect an over-reliance on findings from other study areas. Individual development proposals also show incomplete ecological data. When no one is required to determine what features actually lie in the path of development, well-intentioned protective regulations can be neither applied nor enforced.

To protect the beautiful and irreplaceable natural heritage of the Severn, we must take stock of its assets. We must not continue to ruin our green

areas without first determining the true makeup and significance of our varied landscape. Comprehensive knowledge of the natural characteristics of all lands in the watershed is essential to ensure that each site is properly protected or used. In this way hundreds of green areas can be singled out for complete and lasting protection years ahead of development pressure.

Some studies and inventory work have been conducted in the past, but the location or accuracy of such efforts is sometimes unknown. The *Upland Natural Areas Study*, the *Anne Arundel County Critical Areas Study*, and the *Maryland Natural Heritage Program* have evaluated only a few of the many significant sites in the watershed.⁴⁷ All such efforts may become outdated by alterations to the landscape unless sites are monitored and field studies are continued.

RECOMMENDATIONS FOR IDENTIFYING IMPORTANT NATURAL FEATURES

1. Create a special data center for the Severn watershed in which comprehensive information will be stored and processed for useful application. The center should be staffed by personnel adept in environmental subjects and the data should be kept current, well-indexed, and readily available. Accurate descriptions, inventories and status reports of the following must be maintained:
 - flora and fauna and viable sites for their preservation and study
 - ponds and watercourses
 - notable geologic sites
 - important wildlife and spawning areas
 - wetlands
 - other representative natural areas
2. Use the Maryland Natural Heritage Program to assist in gathering data through interviews with long-time residents, inquiries to organizations, and research of public records.
3. Foster new and continuing field studies by various agencies, organizations and knowledgeable citizens. This should be done with the cooperation of landowners. Require that a meaningful field study of ecological conditions precede all development and public projects.
4. Monitor natural areas on a regular basis to detect changes in their condition or features. Maintain good communication with concerned citizens who will note any activity, occurrence or proposal that could threaten the status of natural areas.

Protecting Historic Sites and Local Folklore

The desirability of an area depends on many factors, among them the interest and prestige attached to local lore, history, and tradition. The rich history of the Severn is an important heritage; it is also a tangible asset providing many benefits.

Unfortunately, local traditions and information on notable sites, often handed down from generation to generation, can be easily lost in a transient population. Damaging alterations to historic structures and even the misspelling of place names on new maps and documents diminish our understanding of the Severn's past. Also unfortunate is the destruction of Indian sites, and traces of old mills and other landmarks.

Considerable attention has been given to the protection of colonial homes within Annapolis in recent years, but interest in the outlying areas of the water-



Typical residential street in Annapolis Historic District

shed has been minimal. Important history is not limited to the Revolutionary Period; information about the establishment and early days of suburban communities also can be exceptionally interesting and worth collecting.

RECOMMENDATIONS FOR THE PROTECTION OF HISTORIC SITES AND LOCAL FOLKLORE

1. Develop a cooperative effort among individuals, communities, organizations, and government agencies, to pursue measures protective of local history and points of interest. This effort should involve varied approaches including the following:

- locating information on local history, including copies of useful texts and photographs; interviewing long-time residents to collect and record local lore and traditions;

- documenting the location and physical

- characteristics of historic sites and structures as a first step toward their protection or possible restoration;

- encouraging the creation of voluntary protective easements and covenants;

- encouraging the use of traditional place names and spelling on government documents whenever possible;

- assuring, as part of the development review process, adequate time for study, salvage, public acquisition or other methods of protecting historic features.

Recreation

The Severn River provides excellent recreational opportunities to residents of the area, to other Marylanders, and to visitors from surrounding states. Popular activities include boating, skiing, swimming, fishing and crabbing. The river and shoreline area also offer enjoyable settings for more passive activities such as picnicking and nature interpretation. However, the continuing development of shoreline areas has reduced the opportunities for more varied recreation. Increased boating on the river, and particularly in mooring areas, competes with other recreational pursuits. In addition, more powerful boats used for longer periods increase the problems of shoreline erosion, turbidity, noise and pollution.

The need to provide opportunities for a broad range of recreational interests is essential. New approaches are required to assure that a balance among all appropriate river uses is restored and maintained. Some of the chief recreation concerns are discussed below.

Mooring

Additional numbers of boats have prompted a need for considerable mooring space. This has led to increases in commercial and community marinas, private piers, and mooring buoys.

Commercial marinas are concentrated in Back and Spa Creeks. These facilities attract many boaters from outside areas and thus stimulate the local economy. They also provide much-needed water access for local residents. However, the spread of commercial marinas to other creeks or to sections of the main river could detract from scenic values and impede water traffic, thus reducing overall recreational enjoyment.

In a growing number of creeks and coves many recreational activities have been restricted by the presence of community marinas, private piers, and mooring buoys. Opportunities for shoreline and shallow-water activities such as crabbing, fishing,



Back Creek

canoeing, rowing, and swimming, have been reduced. The fact that a less-frequently used creek exists elsewhere on the river matters little to nearby residents; for them, excessive boat mooring has made many of the scenic and recreational features inaccessible. Whenever possible, a reasonable balance of appropriate water uses should be maintained in each creek.

Boating

Various types of boating activities have water requirements that are often in conflict. When the Severn River is considered as a whole there are

many areas where power-boating, skiing, sailing, canoeing and rowing do not infringe on each other. But, due to the popularity of boating (over 5000 registered boats on the Severn) and certain peculiarities of the river, conflicts do result.

Most of the larger power and sailboats are operated on the lower Severn River. This is because many of these boats are moored in the Annapolis area, where there is more water surface available. Another factor influencing boating densities is the restrictive nature of the bridges.

The Route 450 bridge is a drawbridge with relatively low clearance under the spans, and the remains of the old railroad bridge restrict passage. These bridges limit use of the upper river by

Annapolis-based boats, thus protecting the quiet, scenic, and more fragile portion of the river for those who want to venture upriver. Of course, congestion does occur at the bridges, sometimes raising concerns for personal safety. This is largely due to high speeds and reckless boat-handling.

Motorboating, and particularly, water-skiing, cause concern in many creeks and coves. Noise, disturbance of moored boats, and such dangers as piers and buoys make skiing unwise in the more developed creeks. Therefore, less congested creeks are often sought, where the water is usually calm and open.

However, other concerns are equally serious. The solitude of such creeks, valued by canoers, fishermen and nature enthusiasts is easily disturbed. And, boat wakes can cause greatly increased shoreline erosion and water turbidity in these often shallow, relatively undisturbed waters.

Recent studies have shown that boat wakes are more likely to contribute to erosion in shallow or narrow waterways than in the open water.⁴⁸ Speed limits of six knots-per-hour have been posted in several creeks, but these limits apply primarily on weekends, and, on a practical basis, enforcement by the State Marine Police is difficult. Compounding the erosion concern is the finding that, in some ways, establishing such speed limits is detrimental. Erosion-causing wakes occur with various combinations of boat speed, hull configuration and water depth. When boaters, especially those operating planing hulls, slow down to comply with the speed limits they often pass through these maximum wake-producing combinations.

The choice of boats has long been governed by a variety of economic, technological, social and prestige factors. As an example, rising fuel costs in recent years have caused an increasing shift to sailboats. And, canoeing and rowing, which diminished with the popularity of outboards, are increasing once again. Such small-boat use has many advantages since there is little noise, pollution, congestion, or need for mooring facilities. However, these smaller craft require more sheltered waters, protection from large or high-speed boats, and convenient access to the quiet areas appropriate for their use.



Other Recreational Pursuits

For swimmers, water quality is a chief concern. Sewage from boats and malfunctioning pumping stations pose a threat at any time. Many waterfront communities monitor water quality in bathing areas during summer months and some have constructed swimming pools for reasons of health, convenience and safety. Although water quality is generally good, swimmers must be careful of boats and bottom hazards because available swimming areas are increasingly used and misused.

Fisherman experience two main problems: reduced stocks, and fewer places to fish in solitude. A decline in aquatic plants, disturbance of shallow-water spawning areas, and reduction in marshland and natural shorelines may be partly responsible for a decline in fish populations. Watershed development and increasing population pressures on waterways are, of course, basic to the loss of solitude. For some, fishing on the river has lost its appeal, and the seclusion of some freshwater pond is sought. For others, congestion may be a way of

life and fishing from the Route 450 bridge and the railroad bridge is a favorite pastime.

The success of crabbing is dependent on complex factors involving the entire Chesapeake Bay. But other factors, such as waves generated by passing boats and shorelines rendered almost inaccessible by boat moorings, also greatly affect the enjoyment of crabbing.

Duck hunting once was a popular sport along the river. However, as the development of the shoreline continues there will be fewer places where shotguns might not endanger persons or property, or where the noise would not disturb residents.

Nature interpretation is of great enjoyment to many residents and visitors. Many people have at least a casual interest in nature and the sight of an interesting creature, attractive marsh flowers, or autumn foliage lends much to an outing on the Severn. Therefore, the continuing destruction of shoreline natural areas affects a great number of river enthusiasts.

Public Access to the Shoreline

The steep terrain along the Severn significantly limits access to the river, even by owners of waterfront properties. This has prevented intensive development and alteration of shorelines in many areas, thus protecting natural shoreline features. The pattern of residential and commercial ownership of the shoreline also limits direct access to the water by the non-shoreline-owning public. This factor is common to many waterways, especially in Anne Arundel County. Where access can be provided without causing harm to shoreline features, acquisition efforts should be pursued.

Access to any public area does not guarantee its indiscriminate use. Therefore, planning for future access points should consider those areas of the river where various activities are safe for the participants and do not cause undue stress on existing conditions. As an example, public access to the upper reaches of the river would logically be limited to canoes.

RECOMMENDATIONS FOR RECREATION

1. The location and design of all piers and marinas – commercial, community or private – should take into consideration the impact on scenic, ecological and recreational assets. All proposals for shoreline structures should be evaluated carefully in regard to these impacts.
2. Regulatory authorities should work together to improve mooring patterns.
3. Evaluate the location of speed-zone markers to avoid creating excessive boat wakes. Absolute restrictions should be considered in areas vulnerable to erosion from boat wakes.
4. Stress boating safety, possibly through required boater education courses.
5. Encourage the use of smaller boats; one possibility would be to provide new public access points limited to canoes and rowboats without motors.
6. Re-evaluate fish and wildlife regulations to reflect the special conditions along the Severn. As an example, minimum pickerel size might be set at eighteen inches. Maintain fishing privileges at the Route 450 bridge.
7. Pursue all possible measures to preserve natural shoreline habitat. Seek conservation agreements or acquire development rights along certain small, secluded creeks of ecological importance.
8. Continue to evaluate the available recreational opportunities of the Severn River, the need for additional opportunities, and the appropriateness of potential public and commercial access points.



Mayapples in Severn Run Natural Environment Area

Education and Appreciation

Most landowners in the area care about the Severn River and its natural environment, but many often do not realize the full effects of their actions. Particularly vulnerable to abuse or a lack of attention are the relatively small, green areas that are nearly surrounded by development. Permanent ecological harm to these sites is possible because many plants and animals, once eliminated, cannot become re-established.

There are also those people who do not care about the benefits provided by green areas. At some sites in the watershed the inroads of trespassers are frequent and destructive. Unfortunately, it is impossible to provide constant monitoring to all of these sites, and adequate fencing is expensive, sometimes unsightly, and hardly foolproof.

No program of natural-area protection, public or private, can succeed unless these green areas are respected by everyone. Greater knowledge and appreciation of the Severn's natural systems are needed. A broad program of environmental education could be extremely valuable in this regard, and the advantages would be twofold: land and water resources would be better protected, and our understanding and consequent enjoyment of them would

be increased.

An examination of familiar problems is basic to such an educational program. These problems include the dumping of refuse, disturbance of vegetation, and a lack of respect for private property rights and the natural environment.

Dumping

The dumping of used motor oil, trash, appliances, and other debris in natural areas is a widespread practice in the Severn watershed. In addition to the immediate ecological and aesthetic effects, an area once degraded in this manner likely will continue to be used as a dump. Nearby residents then may become less appreciative of the area. Sometimes bulldozing or even developing these blighted areas is advocated in order to remove the debris and end the practice.

This is not necessary. Where a cleanup operation is undertaken with care, patience, and diligence, many natural values can be salvaged, not further degraded. A good cleanup effort also reduces the likelihood of renewed abuse.

Disturbance of Vegetation

Around the home, pruning, thinning and removal of shrubs and trees is usually carefully considered. Such activity in natural areas is, unfortunately, often impulsive and short-sighted. Clearing vegetation to the shoreline to broaden water vistas is a familiar example. The result can be increased steep-slope erosion and a loss of shoreline scenery for others.

The elimination of native shrubs and other undergrowth is common in suburban wooded areas where lawns are the norm. This practice reduces buffer qualities and wildlife habitat, and also destroys spring and fall color features. Where new plant species are introduced they may spread into

natural areas, overwhelming native plant communities. Multiflora rose, English ivy, wisteria and kudzu are, perhaps, the most destructive, surpassing Japanese honeysuckle in their harmful effects.

Lack of Respect for Natural Areas

A lack of respect for private property and natural areas threatens to undermine all other protective

efforts. For example, steep slopes, fragile vegetation, and wet or easily compacted soils can be damaged by foot traffic or the use of motorbikes. The collection, disturbance and destruction of animals and small plants also is ruinous because of its selectivity. Acts of vandalism, such as the setting of fires and the mutilation of trees, are less frequent but can be serious obstacles to preservation. Ultimately, the success of natural-area preservation depends on a personal commitment by everyone.

Fiddlehead ferns in Severn Run Natural Environment Area



RECOMMENDATIONS FOR EDUCATION AND APPRECIATION

1. DUMPING

Encourage citizen interest and watchfulness as a means of detecting dumping activity.

Encourage cleanup campaigns by communities, organizations and government. Cleanup activities should minimize damage to natural vegetation and other features, and always should be conducted with landowner permission. Thickets, old logs, and other wildlife habitats should not be disturbed.

2. DISTURBANCE OF VEGETATION

Avoid extensive vista clearing, especially in community controlled areas. Possible measures include community or individual landowner covenants, and the granting of protective easements.

Distribute educational material, possibly through schools, libraries, civic associations, and garden clubs, to encourage greater respect for native vegetation.

Allow vacant land to revegetate with a normal succession of weeds, briars, and woody plants, and thus provide additional wildlife habitat.

Discourage the distribution and use of introduced plant species having harmful ecological side-effects; promote programs to eliminate certain of these species; provide advice on appropriate control measures to minimize damage to native ground covers.

3. PROMOTING RESPECT FOR GREEN AREAS

Provide instructive seminars and field trips for all government personnel involved in Severn River decisions, to maintain their understanding of the ecology of the area. Similar educational opportunities also could be provided to residents through local organizations.

Provide science instruction in the local schools, specifically designed to encourage young people to respect natural areas.

Supervise community and public green areas to minimize damage. Bogs and other fragile sites should be opened only for educational purposes, visitors always being under competent supervision.

Encourage newspapers and other local media to highlight citizens who help protect the Severn's natural environment.

The Severn River District

The recommendations contained in this study should prove useful in protecting the Severn River watershed. However, they are not offered as either a comprehensive river protection or land use plan. Coordinated planning must be accomplished by Anne Arundel County, the City of Annapolis, and their citizens, because they bear the greatest responsibilities for the watershed's future.

It is implied in many of these recommendations that their effectiveness will depend on close cooperation among government agencies, private citizens, and community and other organizations. The scope of the recommendations indicates that these varied interests face complicated, yet inter-related issues. Therefore, it is important to recognize that the most effective method of determining the Severn's future is to combine specific Severn

River watershed planning with the full participation of all interested parties.

Anne Arundel County and the City of Annapolis could accomplish this by jointly designating the Severn River watershed as a special district and assigning certain coordinative and administrative responsibilities to a special commission. This action would provide a framework for addressing urbanization-related issues in the watershed and help to assure that new development is compatible with the physical setting.

Examples of local jurisdictions establishing special river-protective districts and authorities can be found in many states, including Maryland. In Harford County, the County Council established the Deer Creek Scenic River District in order "to ensure the protection of private rights and the scenic river in a compatible and harmonious manner..." The County Council appointed an Advisory Board, in accordance with provisions of Maryland's Scenic and Wild Rivers Act, with the responsibility "to initiate and recommend policies and regulations to the County Council to enhance and protect the quality of Deer Creek".⁴⁹

In a more regulatory action, twenty communities along the Saco River in Maine formed the Saco River Corridor Commission. The Commission consists of one representative from each jurisdiction, who serve without compensation, and is assisted by a small staff. The Commission is responsible for basic land use decisions within the corridor. Development permits are issued based on criteria established by the Commission. Funding is provided primarily by the Maine Legislature and the three counties through which the Saco flows.⁵⁰

This Severn River study proposes that citizens and representatives of local organizations and government agencies be brought together in a protective effort for the benefit of the Severn River area, and function as part of the working system of local governments.

The following proposal presents a structure for a special commission that would work well in the Severn River watershed. The commission could consist of nine members, selected as follows:

2 citizens from the watershed, selected by a citizens advisory panel

2 citizens from the watershed, selected by the County Executive

1 citizen from Annapolis, selected by a citizens advisory panel

1 member of the Anne Arundel County Office of Planning and Zoning

1 member of the Annapolis Office of Planning and Zoning

1 member of the County Council, selected by the County Council

1 member of the General Assembly, from a Severn River District, selected by the Governor or the General Assembly in cooperation with a citizens advisory panel

(continued on next page)



The following suggests a range of possible regulatory, advisory, and educational functions that could be assigned to the commission.

- evaluating zoning, subdivision and other local development controls;
- revising these where necessary for protection of the Severn River watershed, or recommending revisions to local governments;
- developing guidelines, within the watershed, for the granting of zoning changes, subdivision approvals, sewer installation, and site designs; reviewing and recommending action on all such proposals;
- approving all new development projects in the Severn watershed;
- issuing permits for shoreline alterations, vegetation removal, large landscaping projects, cliff-erosion control measures, etc.;
- conducting or assisting in on-site reviews of development proposals;

- reviewing local, state, and federal agency plans that would affect the natural or scenic environment of the Severn watershed;
- organizing educational workshops, seminars or field trips for residents and government personnel interested in the protection of the Severn's natural features.

The commission would be supported by a staff whose duties would include conducting special studies; organizing citizen volunteers for clean-up campaigns; providing technical assistance to landowners; promoting Severn River protection to citizen groups and local officials; and promoting land preservation techniques.

The protection of the Severn's natural environment requires both strong and imaginative efforts. The creation of a Severn River District and an effective commission can protect the Severn by fostering better management, better communication, and greater cooperation between citizens and government.



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Appendix A

Fauna

The following checklists indicate that the Severn and its watershed have provided suitable habitats for many interesting and beneficial creatures. Some of these species are familiar, being seen frequently; the relative extent of their numbers is readily determined. Other animals are quite secretive, and their historic occurrence does not indicate their existence in viable numbers at present. Further study is needed to determine the present status of these species.

Mammals

1. OPOSSUM, *Didelphis marsupialis*
2. EASTERN MOLE, *Scalopus a. aquaticus*
3. STAR-NOSED MOLE, *Condylura c. cristata*
4. SHORT-TAILED SHREW, *Blarina brevicauda kirtlandi*
5. RACCOON, *Procyon l. lotor*
6. RED FOX, *Vulpes vulpes fulva*
7. EASTERN COTTONTAIL, *Sylvilagus floridanus mallurus*
8. RIVER OTTER, *Lutra canadensis lataxina*
9. WHITE-TAILED DEER, *Odocoileus virginianus borealis*
10. WOODCHUCK, *Marmota m. monax*
11. MUSKRAT, *Ondatra zibethicus macrodon*
12. GRAY SQUIRREL, *Sciurus carolinensis pennsylvanicus*
13. SOUTHERN FLYING SQUIRREL, *Glaucomys v. volans*
14. EASTERN CHIPMUNK, *Tamias striatus fisheri*
15. WHITE-FOOTED MOUSE, *Peromyscus leucopus noveboracensis*
16. MEADOW JUMPING MOUSE, *Zapus hudsonicus americanus*
17. MEADOW VOLE, *Microtus p. pennsylvanicus*
18. LEAST SHREW, *Cryptotis p. parva*
19. MASKED SHREW, *Sorex cinereus fontinalis*
20. PINE VOLE, *Pitymys pinetorum scalopsoides*
21. RED SQUIRREL, *Tamiasciurus hudsonicus loquax*
22. LONG-TAILED WEASEL, *Mustela frenata noveboracensis*
23. MINK, *Mustela vison mink*
24. GRAY FOX, *Urocyon c. cinereoargenteus*
25. RED BAT, *Lasiurus b. borealis*
26. LITTLE BROWN MYOTIS, *Myotis l. lucifugus*
27. KEEN'S MYOTIS, *Myotis keenii septentrionalis*
28. SILVER-HAIRED BAT, *Lasiorycteris noctivagans*
29. EASTERN PIPISTRELLE, *Pipistrellus s. subflavus*
30. BIG BROWN BAT, *Eptesicus f. fuscus*
31. HOARY BAT, *Lasiurus c. cinereus*
32. EVENING BAT, *Nycticeius h. humeralis*
33. STRIPED SKUNK, *Mephitis mephitis nigra*
34. BOBCAT, *Lynx r. rufus*

Mammals (continued)

35. FOX SQUIRREL, *Sciurus v. vulpinus*
36. BLACK BEAR, *Ursus americanus*
37. BEAVER, *Castor canadensis*
38. GRAY WOLF, *Canis lupus*
39. MOUNTAIN LION, *Felis concolor*

Study areas and sources: (Numbers refer to species listed above.)

- 1-17: Chase Creek watershed.
(W. H. Berry & C. B. Rucker - Personal sightings 1943-1980)
- 18-24: Additional sightings - vicinity of Epping Forest
(John C. Lingeback, Sr. - Personal communication 1981)
(John L. Paradiso, 1969, *Mammals of Maryland*)
- 25-32: Overall range includes Severn, local status unknown.
(Paradiso, 1969)
- 33: Irregular county distribution. Presence along Severn uncertain.
- 34: Maryland Endangered Species. Reported from Epping Forest area by Lingeback.
(Paradiso, 1969)
- 35: Severn probably within original range. Now absent.
- 36: Reported July 1753 on north side of Severn.
(Elihu S. Riley, 1887. "The Ancient City", p. 118.)
- 37-38: Absent since early Colonial times
- 39: Record of a "lion" killed before October 1675 near Crouches Creek, now probably Aisquith Creek.
(William B. Marye, "The Great Maryland Barrens", *Maryland Historical Magazine*, September, 1955, p. 247)

Birds

SPECIES BREEDING LOCALLY

- GREEN HERON, *Butorides v. virescens*
MALLARD, *Anas p. platyrhynchos*
BLACK DUCK, *Anas rubripes*
WOOD DUCK, *Aix sponsa*
OSPREY, *Pandion haliaetus carolinensis*
BOBWHITE QUAIL, *Colinus virginianus*
KILLDEER, *Charadrius v. vociferus*
SPOTTED SANDPIPER, *Actitis macularia*
MOURNING DOVE, *Zenaidura macroura*
YELLOW-BILLED CUCKOO, *Coccyzus a. americanus*
BLACK-BILLED CUCKOO, *Coccyzus erythrophthalmus*
BARN OWL, *Tyto alba pratincola*
SCREECH OWL, *Otus asio*

Bird Species Breeding Locally (continued)

- GREAT HORNED OWL, *Bubo virginianus*
CHIMNEY SWIFT, *Chaetura pelagica*
BELTED KINGFISHER, *Megaceryle a. alcyon*
YELLOW-SHAFTED FLICKER, *Colaptes auratus*
PILEATED WOODPECKER, *Hylatomus pileatus*
RED-BELLIED WOODPECKER, *Centurus carolinus*
HAIRY WOODPECKER, *Dendrocopos villosus*
DOWNY WOODPECKER, *Dendrocopus pubescens*
EASTERN KINGBIRD, *Tyrannus tyrannus*
CRESTED FLYCATCHER, *Myiarchus crinitus*
ACADIAN FLYCATCHER, *Empidonax virescens*
WOOD PEWEE, *Contopus virens*
BANK SWALLOW, *Riparia r. riparia*
ROUGH-WINGED SWALLOW, *Stelgidopteryx ruficollis serripennis*
BARN SWALLOW, *Hirundo rustica erythrogaster*
PURPLE MARTIN, *Progne s. subis*
BLUE JAY, *Cyanocitta cristata*
COMMON CROW, *Corvus brachyrhynchos*
FISH CROW, *Corvus ossifragus*
CAROLINA CHICKADEE, *Parus carolinensis*
TUFTED TITMOUSE, *Parus bicolor*
WHITE-BREASTED NUTHATCH, *Sitta carolinensis*
HOUSE WREN, *Troglodytes aedon*
CAROLINA WREN, *Thryothorus eudovicianus*
LONG-BILLED MARSH WREN, *Telmatorhynchus palustris*
MOCKINGBIRD, *Mimus p. polyglottos*
CATBIRD, *Dumetella carolinensis*
BROWN THRASHER, *Toxostoma r. rufum*
ROBIN, *Turdus migratorius*
WOOD THRUSH, *Hylocichla mustelina*
STARLING, *Sturnus v. vulgaris*
WHITE-EYED VIREO, *Vireo griseus*
YELLOW-THROATED VIREO, *Vireo flavifrons*
RED-EYED VIREO, *Vireo olivaceus*
PARULA WARBLER, *Parula americana*
PINE WARBLER, *Dendroica pinus*
OVENBIRD, *Seiurus aurocapillus*
KENTUCKY WARBLER, *Oporornis formosus*
YELLOWTHROAT, *Geothlypis trichas*
YELLOW-BREASTED CHAT, *Icteria virens*
HOODED WARBLER, *Wilsonia citrina*
AMERICAN REDSTART, *Setophaga ruticilla*
HOUSE SPARROW, *Passer d. domesticus*
RED-WINGED BLACKBIRD, *Agelaius phoeniceus*
ORCHARD ORIOLE, *Icterus spurius*
BALTIMORE ORIOLE, *Icterus galbula*
COMMON GRACKLE, *Quiscalus quiscula*
EASTERN COWBIRD, *Molothrus a. ater*
SCARLET TANAGER, *Piranga olivacea*
SUMMER TANAGER, *Piranga r. rubra*
CARDINAL, *Richmondia cardinalis*
INDIGO BUNTING, *Passerina cyanea*
AMERICAN GOLDFINCH, *Spinus t. tristis*
EASTERN TOWHEE, *Pipilo erythrophthalmus*
CHIPPING SPARROW, *Spizella p. passerina*
FIELD SPARROW, *Spizella p. pusilla*
SONG SPARROW, *Melospiza melodia*

SUMMER RESIDENTS

GREAT BLUE HERON, *Ardea herodias*
COMMON EGRET, *Casmerodius albus egretta*
SNOWY EGRET, *Leucophox t. thula*
TURKEY VULTURE, *Cathartes aura*
BLACK VULTURE, *Coragyps atratus*

WINTER RESIDENTS

WHISTLING SWAN, *Cygnus columbianus*
CANADA GOOSE, *Branta canadensis*
GADWALL, *Anas strepera*
AMERICAN WIDGEON, *Mareca americana*
CANVASBACK, *Aythya valisineria*
GREATER SCAUP DUCK, *Aythya marila nearctica*
LESSER SCAUP DUCK, *Aythya affinis*
COMMON GOLDENEYE, *Clauacionetta clangula americana*
BUFFLEHEAD, *Glaucionetta albeola*
OLDSQUAW, *Clangula hyemalis*
RUDDY DUCK, *Erimaturus jamaicensis rubida*
RED-TAILED HAWK, *Buteo jamaicensis*
RED-SHOULDERED HAWK, *Buteo lineatus*
AMERICAN COOT, *Fulica americana*
GREAT BLACK-BACKED GULL, *Larus marinus*
HERRING GULL, *Larus argentatus*
RING-BILLED GULL, *Larus delawarensis*
LAUGHING GULL, *Larus atricilla*
RED-BREASTED NUTHATCH, *Sitta canadensis*
BROWN CREEPER, *Certhia familiaris*
WINTER WREN, *Troglodytes troglodytes*
GOLDEN-CROWNED KINGLET, *Regulus s. satrapa*
CEDAR WAXWING, *Bombicilla cedrorum*
PURPLE FINCH, *Carpodacus p. purpureus*
EVENING GROSBEAK, *Hesperiphona vespertina*
PINE SISKIN, *Spinus p. pinus*
SLATE-COLORED JUNCO, *Junco hyemalis*
TREE-SPARROW, *Spizella a. arborea*
WHITE-THROATED SPARROW, *Zonotrichia albicollis*

MIGRANT BIRDS

COMMON LOON, *Gavia immer*
RED-THROATED LOON, *Gavia stellata*
HORNED GREBE, *Colymbus auritus*
PIED-BILLED GREBE, *Podilymbus p. podiceps*
DOUBLE-CRESTED CORMORANT, *Phalacrocorax auritus*
LITTLE BLUE HERON, *Florida c. coerulea*
BLACK-CROWNED NIGHT HERON, *Nycticorax nycticorax hoactli*
YELLOW-CROWNED NIGHT HERON, *Nyctanassa violacea*
AMERICAN BITTERN, *Botaurus lentiginosus*
BRANT, *Branta bernicla*
SNOW GOOSE, *Chen hyperborea*
PINTAIL, *Anas acuta taitzhoa*
GREEN-WINGED TEAL, *Anas carolinensis*
BLUE-WINGED TEAL, *Anas discors*
SHOVELLER, *Spatula clypeata*
REDHEAD, *Aythya americana*
RING-NECKED DUCK, *Aythya collaris*

Migrant Birds (continued)

HOODED MERGANSER, *Lophodytes cucullatus*
COMMON MERGANSER, *Mergus merganser americanus*
RED-BREASTED MERGANSER, *Mergus serrator*
GOSHAWK, *Accipiter gentilis atricapillus*
SHARP-SHINNED HAWK, *Accipiter striatus velox*
COOPER'S HAWK, *Accipiter cooperii*
BROAD-WINGED HAWK, *Buteo p. platypterus*
BALD EAGLE, *Haliaeetus leucocephalus*
MARSH HAWK, *Circus cyaneus hudsonius*
SPARROW HAWK, *Falco sparverius*
KING RAIL, *Rallus e. elegans*
VIRGINIA RAIL, *Rallus e. limicola*
SORA, *Porzana carolina*
COMMON GALLINULE, *Gallinula chloropus cachinnans*
SEMIPALMATED PLOVER, *Charadrius hiaticula semipalmatus*
WOODCOCK, *Philohela minor*
COMMON SNIPE, *Capella gallinago delicata*
WHIMBREL, *Numerius p. phaeopus*
SOLITARY SANDPIPER, *Tringa s. solitaria*
WILLET, *Catoptrophorus semipalmatus*
GREATER YELLOWLEGS, *Totanus melanoleucus*
LESSER YELLOWLEGS, *Totanus flavipes*

LEAST SANDPIPER, *Erolia minutilla*
SEMIPALMATED SANDPIPER, *Ereunetes pusillus*
SANDERLING, *Crocethia alba*
BONAPARTE'S GULL, *Larus philadelphia*
COMMON TERN, *Sterna h. hirundo*
ROYAL TERN, *Thalasseus m. maximus*
CASPIAN TERN, *Hydroprogne caspia*
CHUCK-WILL'S WIDOW, *Caprimulgus carolinensis*
WHIP-POOR-WILL, *Caprimulgus vociferus*
COMMON NIGHTHAWK, *Chordeiles minor*
RUBY-THROATED HUMMINGBIRD, *Archilochus colubris*
YELLOW-BELLIED SAPSUCKER, *Sphyrapicus v. varius*
EASTERN PHOEBE, *Sayornis phoebe*
YELLOW-BELLIED FLYCATCHER, *Empidonax flavinervis*
ALDER FLYCATCHER, *Empidonax t. traillii*
LEAST FLYCATCHER, *Empidonax minimus*
OLIVE-SIDED FLYCATCHER, *Nuttallornis borealis*
TREE SWALLOW, *Iridoprocne bicolor*
CLIFF SWALLOW, *Petrichelidon pyrrhonata albifrons*
HERMIT THRUSH, *Hylocichla guttata faxoni*
SWAINSON'S THRUSH, *Hylocichla ustulata swainsoni*
GRAY-CHEEKED THRUSH, *Hylocichla minima*
VEERY, *Hylocichla fuscescens*
BLUE-GRAY Gnatcatcher, *Poliophtila c. caerulea*
RUBY-CROWNED KINGLET, *Regulus c. calendula*
SOLITARY VIREO, *Vireo solitarius*
PHILADELPHIA VIREO, *Vireo philadelphicus*
BLACK AND WHITE WARBLER, *Mniotilta varia*
WORM-EATING WARBLER, *Helmitheros vermivorus*
GOLDEN-WINGED WARBLER, *Vermivora chrysoptera*
BLUE-WINGED WARBLER, *Vermivora pinus*
TENNESSEE WARBLER, *Vermivora peregrina*
NASHVILLE WARBLER, *Vermivora r. ruficapilla*
YELLOW WARBLER, *Dendroica petechia*
MAGNOLIA WARBLER, *Dendroica magnolia*

Migrant Birds (continued)

CAPE MAY WARBLER, *Dendroica tigrina*
BLACK-THROATED BLUE WARBLER, *Dendroica caerulescens*
MYRTLE WARBLER, *Dendroica c. coronata*
BLACK-THROATED GREEN WARBLER, *Dendroica virens*
CERULEAN WARBLER, *Dendroica cerulea*
BLACKBURNIAN WARBLER, *Dendroica fusca*
CHESTNUT-SIDED WARBLER, *Dendroica pensylvanica*
BAY-BREASTED WARBLER, *Dendroica castanea*
BLACKPOLL WARBLER, *Dendroica striata*
PRAIRIE WARBLER, *Dendroica discolor*
PALM WARBLER, *Dendroica palmarum*
NORTHERN WATERTHRUSH, *Seiurus noveboracensis*
LOUISIANA WATERTHRUSH, *Seiurus motacilla*
MOURNING WARBLER, *Oporornis philadelphia*
WILSON'S WARBLER, *Wilsonia p. pusilla*
CANADA WARBLER, *Wilsonia canadensis*
BOBOLINK, *Dolichonyx oryzivorus*
MEADOWLARK, *Sturnella magna*
RUSTY BLACKBIRD, *Euphagus carolinus*
ROSE-BREASTED GROSBEAK, *Pheucticus ludovicianus*
SEASIDE SPARROW, *Ammospiza maritima*
WHITE-CROWNED SPARROW, *Zonotrichia leucophrys*
FOX SPARROW, *Passerella l. iliaca*
LINCOLN'S SPARROW, *Melospiza l. lincolni*
SWAMP SPARROW, *Melospiza georgiana*

Study area: Sullivan Cove Marsh and environs.

Source: Dr. Eugene S. Morton (Personal communication)
Wayne Klockner (personal communication).

Reptiles

- SIX-LINED RACERUNNER, *Cnemidophorus s. sexlineatus*
- SPOTTED TURTLE, *Clemmys guttata*
- EASTERN HOGNOSE SNAKE, *Heterodon platyrhinos*
- EASTERN KINGSLAKE, *Lampropeltis g. getulus*
- EASTERN RIBBON SNAKE, *Thamnopsis s. sauritus*
- EASTERN WORM SNAKE, *Carphophis a. amoenus*
- NORTHERN RINGNECK SNAKE, *Diadophis punctatus edwardsii*
- KEELED GREEN SNAKE, *Ophedrys aestivus*
- BLACK RAT SNAKE, *Elaphe o. obsoleta*
- QUEEN SNAKE, *Natrix septemvittata*
- NORTHERN FENCE SWIFT, *Sceloporus undulatus hyacinthinus*
- FIVE-LINED SKINK, *Eumeces fasciatus*
- BROAD-HEADED SKINK, *Eumeces laticeps*
- EASTERN MUD TURTLE, *Kinosternum s. subrubrum*
- EASTERN PAINTED TURTLE, *Chrysemys p. picta*
- COMMON SNAPPING TURTLE, *Chelydra s. serpentina*
- EASTERN BOX TURTLE, *Terrapene c. carolina*
- COMMON WATER SNAKE, *Natrix s. sipedon*
- DEKAY'S SNAKE, *Storeria d. dekayi*

(continued on next page)

Reptiles (continued)

20. EASTERN GARTER SNAKE, *Thamnopsis s. sirtalis*
21. BLACK RACER, *Coluber c. constrictor*
22. VALERIA'S SNAKE, *Virginia v. valeriae*
23. CORN SNAKE, *Elaphe g. guttata*
24. NORTHERN COPPERHEAD, *Agkistrodon contortrix mokasen*
25. BROWN KINGSSNAKE, *Lampropeltis calligaster rhombomaculata*
26. COASTAL-PLAIN MILK SNAKE, *Lampropeltis triangulum temporalis*
27. NORTHERN SCARLET SNAKE, *Cemophora coccinea copei*

Study areas and sources:

(Numbers refer to species listed above.)

- 1-27: Apparently collected within watershed. See Harris, Herbert S., Jr. 1975. *Distributional Survey, (Amphibia/Reptilia): Maryland and the District of Columbia*. Bull. Md. Herp. Soc. 11(3), pp. 73-170.
- 1-18: Camp Linstead, Mansueti, Romeo. 1941. *A Descriptive Catalogue of the Amphibians and Reptiles Found in and around Baltimore City, Maryland within a Radius of Twenty Miles*. Proc. Nat. Hist. Soc. Md. No. 7.
- 6-24: Chase Creek watershed, Rucker, C.B. (Personal sightings 1946-1980).
- 27: Extremely rare in Maryland. Found (one) "near Arnold". Bull. Md. Herp. Soc. 9(3), pp. 88-89.



A rare plant unique to the Severn River watershed: cutleaf dwarf sumac, *Rhus copallina forma dissecta*.

Amphibians

1. EASTERN TIGER SALAMANDER, *Ambystoma t. tigrinum*
2. RED-BACKED SALAMANDER, *Plethodon c. cinereus*
3. NORTHERN RED SALAMANDER, *Pseudotriton r. ruber*
4. NORTHERN DUSKY SALAMANDER, *Desmognathus f. fuscus*
5. GREEN TREE FROG, *Hyla cinerea*
6. SPRING PEEPER, *Hyla c. crucifer*
7. GREEN FROG, *Rana clamitans melanota*
8. SOUTHERN LEOPARD FROG, *Rana u. utricularia*
9. PICKEREL FROG, *Rana palustris*
10. BULLFROG, *Rana catesbeiana*
11. EASTERN GRAY TREE FROG, *Hyla versicolor*
12. FOWLER'S TOAD, *Bufo woodhousei fowleri*
13. NORTHERN CRICKET FROG, *Acris c. crepitans*
14. WOOD FROG, *Rana s. sylvatica*
15. UPLAND CHORUS FROG, *Pseudoacris triseriata feriarum*
16. AMERICAN TOAD, *Bufo a. americanus*
17. EASTERN SPADEFOOT TOAD, *Scaphiopus h. holbrookii*
18. FOUR-TOED SALAMANDER, *Hemidactylum scutatum*

Study areas and sources:

(Numbers refer to species listed above.)

- 1 - 18: Apparently collected within watershed. See Harris, Herbert S., Jr., 1975. *Distributional Survey, (Amphibia/Reptilia): Maryland and the District of Columbia*. Bull. Md. Herp. Soc. 11 (3) pp. 73 - 170.
- 1: Maryland Endangered Species. A single specimen, Chase Creek watershed. See Bull. Md. Herp. Soc. 9 (3), p. 50.
- 2 - 12: Chase Creek watershed, Rucker, C.B. (Personal sightings 1946-1980).
- 10 - 13: Camp Linstead, Mansueti, Romeo. 1941. *A Descriptive Catalogue of the Amphibians and Reptiles Found in and around Baltimore City within a Radius of Twenty Miles*. Proc. Nat. Hist. Soc. Md., No. 7.

Fish

1. ATLANTIC CROAKER, *Micropogon undulatus*
2. NORFOLK SPOT, *Leiostomus xanthurus*
3. SPOTTED SEATROUT, *Cynoscion nebulosus*
4. BLUEFISH, *Pomatomus saltatrix*
5. OYSTER TOADFISH, *Opsanus tau*
6. SUMMER FLOUNDER, *Paralichthys dentatus*
7. HOGCHOKER, *Trinectes maculatus*
8. STRIPED BASS, *Morone saxatilis*
9. ATLANTIC SILVERSIDES, *Menidia menidia*
10. ATLANTIC NEEDLEFISH, *Strongylura marina*
11. BAY ANCHOVY, *Anchoa mitchilli*
12. GIZZARD SHAD, *Dorosoma cepedianum*
13. MENHADEN, *Brevoortia tyrannus*
14. BLUEBACK HERRING, *Alosa aestivalis*
15. ALEWIFE, *Alosa pseudoharengus*

Fish (continued)

16. AMERICAN EEL, *Anguilla rostrata*
17. WHITE PERCH, *Morone americana*
18. CARP, *Cyprinus carpio*
19. EASTERN CHAIN PICKEREL, *Esox niger*
20. PUMPKINSEED SUNFISH, *Lepomis gibbosus*
21. YELLOW PERCH, *Perca flavescens*
22. BROWN BULLHEAD, *Ictalurus nebulosus*
23. BANDED KILLIFISH, *Fundulus diaphanus*
24. MUD MINNOW, *Umbra pygmaea*
25. GOLDEN SHINER, *Notemigonus crysoleucas*
26. JOHNNY DARTER, *Etheostoma nigrum*
27. WHITE SUCKER, *Catostomus commersoni*
28. RED-BREAST SUNFISH, *Lepomis auritus*
29. BLUEGILL SUNFISH, *Lepomis macrochirus*
30. LARGEMOUTH BLACK BASS, *Micropterus salmoides*
31. CHANNEL CATFISH, *Ictalurus punctatus*
32. RAINBOW TROUT, *Salmo gairdnerii*

1 - 4: Migratory species

1 - 17: Familiar fish of the lower estuary

9 - 23: Common fish of creeks and coves

15 - 27 & 29: Fish of Severn Run (1965 DNR survey)

21 - 28: Fish of Severn Run (1973 DNR survey)

29 - 31: Species stocked in freshwater ponds

32: Stocked in Severn Run

Sources: Anne Arundel County. 1979. *Severn Run Watershed Management Study*. (draft), p.4 - 29. Lippsom, Alice (ed.). *The Chesapeake Bay in Maryland: An Atlas of Natural Resources*.

Flora

The Severn's watershed contains a broad range of natural environments, which permits the existence of many different plants. Some of these are considered rare or unusual. As an example, the cutleaf dwarf sumac is, apparently, a find new to science, and this unusual growth form may exist nowhere else.

As many of the sites are quite small, some species are found in limited numbers, and their status is precarious. The more sensitive species may require a specific microclimate, or an exacting soil condition, involving the association of specialized soil organisms. Such plants are often unable to compete in an altered environment; once disturbed, they may be lost permanently.

Although a rapidly increasing human population poses the greatest threat to this natural heritage, it

also provides the best reason for saving it. Properly protected and managed, a number of local natural areas could provide important aesthetic and educational benefits to residents of the area.

Further study is needed to locate the numerous sites worthy of protection. The investigator should secure the permission of the landowner before venturing onto private property for any purpose. To prevent collecting and vandalism, the exact location of rare plants should not be publicly divulged.

In the interest of space, many species have been omitted from the checklists, including naturalized plants and most species of field and roadside plants.

Ferns and Fern Allies

FIELD HORSETAIL, *Equisetum arvense*
 SHINING CLUBMOSS, *Lycopodium lucidulum*
 TREE CLUBMOSS, *Lycopodium obscurum*
 RUNNING PINE, *Lycopodium complanatum* var. *flabelliforme*
 CUTLEAF GRAPEFERN, *Botrychium dissectum*
 COMMON GRAPEFERN, *Botrychium dissectum* forma *obliquum*

RATTLESNAKE FERN, *Botrychium virginianum*
 ROYAL FERN, *Osmunda regalis* var. *spectabilis*
 CINNAMON FERN, *Osmunda cinnamomea*
 CLIMBING FERN, *Lygodium palmatum*
 SENSITIVE FERN, *Onoclea sensibilis*
 NORTHEASTERN MARSHFERN, *Dryopteris thelypteris* var. *pubescens*

BOG FERN, *Dryopteris simulata*
 NEW YORK FERN, *Dryopteris noveboracensis*
 BROAD BEECHFERN, *Dryopteris hexagonoptera*
 SPINULOSE WOODFERN, *Dryopteris spinulosa*
 CRESTED WOODFERN, *Dryopteris cristata*
 CLINTON'S FERN, *Dryopteris cristata* var. *clintoniana*
 CHRISTMAS FERN, *Polystichum acrostichoides*
 SERRATE CHRISTMAS FERN, *Polystichum acrostichoides* forma *inensum*

HAYSCENTED FERN, *Dennstaedtia punctilobula*
 NARROWLEAF SPLEENWORT, *Athyrium pycnocarpon*
 SILVERY SPLEENWORT, *Athyrium thelypteroides*
 LADY FERN, *Athyrium filix-femina*
 EBONY SPLEENWORT, *Asplenium platyneuron*
 VIRGINIA CHAINFERN, *Woodwardia virginica*
 NETVEIN CHAINFERN, *Woodwardia areolata*
 MAIDENHAIR FERN, *Adiantum pedatum*
 EASTERN BRACKEN, *Pteridium aquilinum* var. *latiusculum*

Study areas: Chase Creek watershed, Round Bay Bog, Severn Run Natural Environment Area.

Source: Rucker, C.B. 1980. Personal notes.

Trees

PITCH PINE, *Pinus rigida*
 SHORTLEAF PINE, *Pinus echinata*
 VIRGINIA PINE, *Pinus virginiana*
 EASTERN HEMLOCK, *Tsuga canadensis*
 EASTERN REDCEDAR, *Juniperus virginiana*
 ATLANTIC WHITE CEDAR, *Chamaecyparis thyoides*
 BLACK WILLOW, *Salix niger*
 BIGTOOTH ASPEN, *Populus grandidentata*
 BLACK WALNUT, *Juglans nigra*
 BITTERNUT HICKORY, *Carya cordiformis*
 MOCKERNUT HICKORY, *Carya tomentosa*
 PIGNUT, *Carya glabra*
 SAND HICKORY, *Carya pallida*
 AMERICAN HORNBEAM, *Carpinus caroliniana*
 RIVER BIRCH, *Betula niger*
 AMERICAN BEECH, *Fagus grandifolia*
 AMERICAN CHESTNUT, *Castanea dentata*
 ALLEGHENY CHINQUAPIN, *Castanea pumila*
 WHITE OAK, *Quercus alba*
 POST OAK, *Quercus stellata*
 SWAMP CHESTNUT OAK, *Quercus michauxii*
 CHESTNUT OAK, *Quercus prinus*
 NORTHERN RED OAK, *Quercus rubra*
 BLACK OAK, *Quercus velutina*
 PIN OAK, *Quercus palustris*
 SCARLET OAK, *Quercus coccinea*
 SOUTHERN RED OAK, *Quercus falcata*
 BLACKJACK OAK, *Quercus marilandica*
 WILLOW OAK, *Quercus phellos*
 SLIPPERY ELM, *Ulmus rubra*
 HACKBERRY, *Celtis occidentalis*
 RED MULBERRY, *Morus rubra*
 SWEETBAY MAGNOLIA, *Magnolia virginiana*
 TULIPTREE, *Liriodendron tulipifera*
 PAWPAW, *Asimina triloba*
 SASSAFRAS, *Sassafras albidum*
 SWEETGUM, *Liquidambar styraciflua*
 AMERICAN SYCAMORE, *Platanus occidentalis*
 DOWNY SERVICEBERRY, *Amelanchier arborea*
 WILD BLACK CHERRY, *Prunus serotina*
 EASTERN REDBUD, *Cercis canadensis*
 BLACK LOCUST, *Robinia pseudoacacia*
 AMERICAN HOLLY, *Ilex opaca*
 RED MAPLE, *Acer rubrum*
 BLACKGUM, *Nyssa sylvatica*
 HERCULES' CLUB, *Aralia spinosa*
 FLOWERING DOGWOOD, *Cornus florida*
 COMMON PERSIMMON, *Diospyros virginiana*
 WHITE ASH, *Fraxinus americana*
 GREEN ASH, *F. pennsylvanica* subintegerrima
 FRINGE-TREE, *Chionanthus virginicus*

Study areas: Chase Creek watershed, Sullivan's Cove Critical Area, Round Bay Bog, Severn Run Natural Environment Area (at Dicus Mill), Cove of Cork (hemlock grove).

Source: Rucker, C.B. 1980. Personal notes.

Shrubs

SILKY WILLOW, *Salix sericea*
 BAYBERRY, *Myrica pensylvanica*
 WAX-MYRTLE, *Myrica cerifera*
 SWEET FERN, *Comptonia peregrina*
 SMOOTH ALDER, *Alnus serulata*
 SPICEBUSH, *Lindera benzoin*
 WILD HYDRANGEA, *Hydrangea arborescens*
 WITCH HAZEL, *Hamamelis virginiana*
 RED CHOKEBERRY, *Pyrus arbutifolia*
 CANADIAN SERVICEBERRY, *Amelanchier canadensis*
 WILD BLACK RASPBERRY, *Rubus occidentalis*
 COMMON BLACKBERRY, *Rubus allegheniensis*
 SWAMP DEWBERRY, *Robus hispidus*
 SWAMP ROSE, *Rosa palustris*
 SMOOTH SUMAC, *Rosa glabra*
 DWARF SUMAC¹, *Rhus copallina*
 CUTLEAF DWARF SUMAC², *Rhus copallina* forma *dissecta*
 STAGHORN SUMAC¹, *Rhus typhina*
 POISON SUMAC¹, *Rhus vernix*
 INKBERRY, *Ilex glabra*
 SMOOTH WINTERBERRY, *Ilex laevigata*
 STRAWBERRY EUONYMUS, *Euonymus americanus*
 ST. ANDREWS CROSS, *Ascyrum hypericoides*
 SILKY DOGWOOD, *Cornus amomum*
 SWEET PEPPERBUSH, *Clethra alnifolia*
 PINK AZALEA, *Rhododendron nudiflorum*
 SWAMP AZALEA, *Rhododendron viscosum*
 MOUNTAIN LAUREL, *Kalmia latifolia*
 SHEEP LAUREL, *Kalmia angustifolia*
 MALEBERRY, *Lyonia ligustrina*
 FETTERBUSH, *Leucothoe racemosa*
 BLACK HUCKLEBERRY, *Gaylussacia baccata*
 DANGLEBERRY, *Gaylussacia frondosa*
 DEERBERRY, *Vaccinium stamineum*
 LOW BLUEBERRY, *Vaccinium vacillans*
 BLACK Highbush BLUEBERRY, *Vaccinium atrococcum*
 AMERICAN CRANBERRY, *Vaccinium macrocarpon*
 COMMON BUTTONBUSH¹, *Cephalanthus occidentalis*
 POSSUMHAW VIBURNUM, *Viburnum nudum*
 BLACK HAW¹, *Viburnum prunifolium*
 SMOOTH ARROWWOOD, *Viburnum recognitum*
 MAPLE-LEAVED VIBURNUM, *Viburnum acerifolium*
 COMMON ELDER, *Sambucus canadensis*
 HIGH-TIDE BUSH, *Baccharis halimifolia*
 LOW-TIDE BUSH, *Iva frutescens*

¹occasionally a small tree

²suggested nomenclature

Study areas: Chase Creek watershed, Sullivan Cove Marsh environs, Round Bay Bog, Severn Run Natural Environment Area.

Source: Rucker, C. B. 1980. Personal notes.

Woodland Wildflowers

JACK-IN-THE-PULPIT, *Arisaema triphyllum*
 FALSE SOLOMON'S SEAL, *Smilacina racemosa*
 SOLOMON'S SEAL, *Polygonatum biflorum*
 INDIAN CUCUMBER-ROOT, *Medeola virginica*
 PINK LADY'S SLIPPER, *Cypripedium acaule*
 SHOWY ORCHIS, *Orchis spectabilis*
 WHORLED POGONIA, *Isotria verticillata*
 PUTTYROOT, *Aplectrum hymale*
 CRANE-FLY ORCHIS, *Tipularia discolor*
 CLEARWEED, *Pilea pumila*
 VIRGINIA KNOTWEED, *Polygonum virginianum*
 WILD PINK, *Silene pennsylvanica*
 SPRING BEAUTY, *Claytonia virginica*
 KIDNEY-LEAVED CROWFOOT, *Ranunculus abortivus*
 RUE ANEMONE, *Anemone thalictroides*
 ROUND-LOBED HEPATICA, *Hepatica americana*
 MAYAPPLE, *Podophyllum peltatum*
 BLOODROOT, *Sanguinaria canadensis*
 TOOTHWORT, *Dentaria laciniata*
 ALUM-ROOT, *Heuchera americana*
 WHITE AVENS, *Geum canadense*
 NAKED-FLOWERED TICK-TREFOIL, *Desmodium nudiflorum*
 SWEET WHITE VIOLET, *Viola blanda*
 ENCHANTER'S NIGHTSHADE, *Circaea lutetiana*
 WILD SANSAPARILLA, *Aralia nudicaulis*
 WOOLLY SWEET CICELY, *Washingtonia claytoni*
 SPOTTED WINTERGREEN*, *Chimaphila maculata*
 INDIAN-PIPE, *Monotropa uniflora*
 WINTERGREEN*, *Gaultheria procumbens*
 TRAILING ARBUTUS*, *Epigaea repens*
 HORSE-BALM, *Collinsonia canadensis*
 PATRIDGEBERRY*, *Mitchella repens*
 BLUEJETS, *Houstonia caerulea*
 WHITE WILD LICORICE, *Galium circaezans*
 BLUE-STEMMED GOLDENROD, *Solidago caesia*
 RATTLESNAKE-WEED, *Hieracium venosum*

*Woody plants

Study area: Chase Creek watershed.

Source: Rucker, C.B. 1980. personal notes.

Vines

GLAUCOUS GREENBRIER, *Smilax glauca*
 COMMON GREENBRIER, *Smilax rotundifolia*
 CARRION-FLOWER, *Smilax herbacea*
 UPRIGHT SMILAX, *Smilax eckinata*
 WILD YAM-ROOT, *Dioscorea quaternata*
 MOONSEED, *Menispermum canadense*
 WILD BEAN, *Apios tuberosa*
 POISON IVY, *Rhus radicans*
 BITTERSWEET, *Celastrus scandens*

Vines (continued)

VIRGINIA CREEPER, *Parthenocissus quinquefolia*
 SUMMER GRAPE, *Vitis aestivalis*
 FOX GRAPE, *Vitis labrusca*
 WINTER GRAPE, *Vitis vulpina*
 TRUMPET-CREEPER, *Campsis radicans*
 ONE-SEEDED BUR-CUCUMBER, *Sicyos angulatus*

Study area: Chase Creek watershed.

Source: Rucker, C.B. 1980. Personal notes.

Herbaceous Plants of Lowlands, Ponds and Streams

1. RICE CUTGRASS, *Leersia oryzoides*
2. THREE-WAY SEDGE, *Dulichium arundinaceum*
3. WOOD-GRASS, *Scirpus rubricosus*
4. FRINGED SEDGE, *Carex crinita*
5. TUSsock SEDGE, *Carex stricta*
6. SALLOW SEDGE, *Carex lurida*
7. SKUNK CABBAGE, *Symplocarpus foetidus*
8. SMALL DUCKWEED, *Lemna minor*
9. COMMON RUSH, *Juncus effusus*
10. LIZARD'S TAIL, *Saururus cernuus*
11. FALSE NETTLE, *Boehmeria cylindrica*
12. ARROW-LEAVED TEARTHUMB, *Polygonum sagittatum*
13. TALL MEADOW RUE, *Thalictrum polygamum*
14. ST. JOHN'S WORT, *Hypericum spp.*
15. RATTLEBOX, *Ludwigia alternifolia*
16. MARSH PURSLANE, *Ludwigia palustris*
17. WATER PARSNIP, *Sium suave*
18. WATER HOREHOUND, *Lycopus spp.*
19. STIFF MARSH BEDSTRAW, *Galium tinctorium*
20. WHITE BONESET, *Eupatorium perfoliatum*
21. BROAD-LEAVED CATTAIL, *Typha latifolia*
22. BRANCHING BUR-REED, *Sparganium angrocladum*
23. BROAD-LEAVED ARROWHEAD, *Sagittaria latifolia*
24. HALBERD-LEAVED TEARTHUMB, *Polygonum arifolium*
25. THREADLEAF PONDWEED, *Potamogeton filiformis*
26. LEAFY PONDWEED, *Potamogeton foliosus*
27. VARIABLE PONDWEED, *Potamogeton gramineus*
28. GREATER DUCKWEED, *Spirodela polyrhiza*
29. MARSH SMARTWEED, *Polygonum coccineum*
30. DOTTED SMARTWEED, *Polygonum punctatum*
31. YELLOW POND LILY, *Nuphar advena*
32. WATER STARWORT, *Callitriche verna*
33. BLUE-EYED GRASS, *Sisyrinchium angustifolium*
34. BLUE FLAG, *Iris versicolor*
35. ROSE POGONIA, *Pogonia ophioglossoides*
36. FRAGRANT WHITE WATERLILY, *Nymphaea odorata*
37. WATER-SHIELD, *Brasenia schreberi*
38. SPATULATE-LEAVED SUNDEW, *Drosera intermedia*

Herbaceous Plants (continued)

39. SPOTTED JEWELWEED, *Impatiens capensis*
40. MARSH BLUE VIOLET, *Viola cucullata*
41. SWAMP LOOSESTRIFE, *Decodon verticillatus*
42. FLOATING MARSH-PENNYWORT, *Hydrocotyle ranunculoides*
43. WATER HEMLOCK, *Cicuta maculata*
44. DODDER, *Cuscuta spp.*
45. BLADDERWORT, *Utricularia spp.*
46. HOLLOW JOE-PYE WEED, *Eupatorium fistulosum*
47. BEGGAR-TICK, *Bidens spp.*

Sources:

- 1 - 24: Sipple, William S. 1978. *An Atlas of Vascular Plant Species: Distribution Maps for Tidewater Maryland.*
- 21 - 32: Anne Arundel County. 1979. *Severn Run Watershed Management Study (Draft)*
- 33 - 47: Rucker, C. B. 1980. Personal notes.

Plants of Tidal Marshes

NARROW-LEAVED CATTAIL, *Typha angustifolia*
 COMMON REED, *Phragmites communis*
 SALT MARSH CORDGRASS, *Spartina alternifolia*
 BIG CORDGRASS, *Spartina cynosuroides*
 SALTMEADOW CORDGRASS, *Spartina patens*
 SWITCHGRASS, *Panicum virgatum*
 WILD MILLET, *Echinochloa spp.*
 DWARF SPIKERUSH, *Eleocharis parvula*
 COMMON THREE-SQUARE, *Scirpus americanus*
 OLNEY THREE-SQUARE, *Scirpus olneyi*
 GREAT BULRUSH, *Scirpus validus creber*
 SALT MARSH BULRUSH, *Scirpus robustus*
 ARROW ARUM, *Peltandra virginica*
 DOTTED SMARTWEED, *Polygonum punctatum*
 SPREADING ORACHE, *Atriplex patula*
 SALT MARSH WATER-HEMP, *Amaranthus cannabinus*
 POKEWEEED, *Phytolacca americana*
 SEASHORE MALLOW, *Kosteletskya virginica*
 MARSH MALLOW, *Hibiscus palustris*
 ROSE MALLOW, *Hibiscus moscheutos*
 SALT MARSH LOOSESTRIFE, *Lythrum lineare*
 LILAEOPSIS, *Lilaeopsis chinensis*
 SWAMP MILKWEED, *Asclepias incarnata*
 DODDER, *Cuscuta spp.*
 CLIMBING HEMPWEED, *Mikania scandens*
 SEASIDE GOLDENROD, *Solidago sempervirens*
 PERENNIAL SALT MARSH ASTER, *Aster tenuifolius*
 SALT MARSH FLEABANE, *Pluchea purpurascens*

Study areas: Thirteen tidal marshes.

Source: Sipple, William S. 1978. *An Atlas of Vascular Plant Species: Distribution Maps for Tidewater Maryland.*

Appendix B — Government Aids to River Protection

Index to Selected Federal Authorities

DEPARTMENT OF THE ARMY, CORPS OF ENGINEERS

Aquatic Plant Control: To control obnoxious plants in rivers and allied waters. Technical and financial assistance is available to state and local governments.

Beach Erosion Control: To control all beach and shore erosion to public shores through projects not specifically authorized by Congress. Financial assistance is available to state and local governments.

Flood Control Projects: To reduce flood damages through projects not specifically authorized by Congress. Financial assistance is available to state and local governments.

Floodplain Management Services: To promote appropriate recognition of flood hazards in land and water use planning and development through the provision of needed information, technical services, and guidance to state and local governments.

Navigation Projects: To provide the most practical and economic means of filling the needs of general navigation. State and local governments can apply for financial assistance.

COMMERCE DEPARTMENT - NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Coastal Zone Management Program Administration: To assist states in developing and administering their CZM Programs.

Sea Grant: To support the establishment of major university centers for marine research, education, training, and advisory services, and also individual efforts in these same areas.

ENVIRONMENTAL PROTECTION AGENCY

Areawide Water Quality Planning: To encourage and facilitate the development and implementation of water quality management plans by areawide agencies.

Wastewater Treatment: To aid in local or state government planning, design and construction of wastewater treatment facilities.

GENERAL SERVICES ADMINISTRATION

Land Donation: To donate excess Federal Government property to be developed for the benefit of the area.

INTERIOR DEPARTMENT - NATIONAL PARK SERVICE

Historic Preservation: To expand and maintain the National Register of Historic Preservation, and to preserve maritime

heritage with significant river resources.

Wild and Scenic Rivers: To provide research and technical assistance to local and state governments for the protection of significant river resources.

Land and Water Conservation Fund: To acquire and develop outdoor recreation facilities.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Federal Insurance Administration: To provide flood insurance and technical assistance on flood control matters to state and local governments.

Index to Selected State Authorities

DEPARTMENT OF NATURAL RESOURCES

The Department is responsible for natural resources administration, management, research and development; for the development of coordinated policies for the conservation, enhancement, wise use, and perpetuation of the natural resources of the State; and the coordination and direction of comprehensive planning in the area of natural resources.

Assistance and Information

This office serves as a public interest center for the Department of Natural Resources. It is the principal office where the public obtains information about Maryland's natural resources activities.

Capital Programs Administration

Land Planning Services is responsible for planning related to the acquisition and development of public lands administered by the Department of Natural Resources. The work of this section is divided into four major activities, which are: park master planning; Scenic Rivers Program; acquisition mapping; and natural heritage - environmental review.

Program Open Space coordinates the purchase of Natural Resources lands, and the design and development of Natural Resources facilities. The program is funded through a transfer tax on all real estate transactions of Maryland. Program Open Space also obtains federal grants to assist funding land acquisition and development; administers state and federal grants to Maryland's subdivisions for local recreation and open space; and develops and maintains the Helen Avalynne Tawes Garden.



The Shore Erosion Control Program is responsible for providing financial and technical assistance to waterfront property owners with shore erosion problems on the Chesapeake Bay, its tributaries and in the Atlantic coastal region. Financial assistance through the Shore Erosion Control Construction Loan Fund is provided to qualified property owners. Under this program, interest-free loans are provided for a period up to 25 years. Technical assistance is available to property owners who do not qualify for financial assistance.

The Land and Property Management Program is responsible for all record keeping associated with Department-owned land.

Fisheries Administration

This is the principal unit within the Department with overall responsibility for both freshwater and marine fisheries. The management program activities are concerned with all aspects of preservation, enhancement, development, and the use of Maryland fishery resources—tidal and non-tidal, sport and commercial fish and shellfish species.

(continued on next page)

Government Aids to River Protection: Index to Selected State Authorities (continued)

Wildlife Administration

Responsibilities of the Wildlife Administration include regulating seasons, bag limits, and methods of taking game animals and fish; assisting other state agencies and private landowners in land management and wildlife planning; issuing permits and licenses for activities that directly affect wildlife; providing technical assistance for nuisance wildlife control; and managing areas for public wildlife enjoyment, including hunting, fishing, trapping, field trails, nature study and photography.

Maryland Forest and Park Services

Of the nearly 80,000 acres of public land managed by the Maryland Forest and Park Services, nearly 74,000 acres remain in natural state. The remaining 6,000 acres are improved for public recreational enjoyment. Park improvements include roads, parking lots, buildings, utilities, and those facilities which people associate with state parks, namely campgrounds, picnic areas, playgrounds, trails, and water-related facilities.

Forest-related responsibilities include land acquisition, timber sales, forest recreation, watershed management, forest protection and maintenance. Educational programs are also provided to elementary school students. Other programs involve fire preparedness, insect and disease protection, urban forest planting, roadside tree supervision, street tree inventories, tree expert licensing, and private-woodland owner assistance.

Natural Resources Police Force

The Natural Resources Police Force is responsible for enforcement of all laws and regulations to protect the natural resources of Maryland, the State Boat Act and the criminal laws of Maryland on both tidal and non-tidal waters.

The Field Enforcement Section enforces laws pertaining to the protection of all wildlife species. The Hunter Safety Program provides mandated classroom training and lectures on a statewide basis, to ensure firearms safety and good hunting practices.

Water Resources Administration

The Administration is responsible for the protection, management and enforcement of the water resources of the State. Through enforcement, permitting and planning activities, the Administration seeks to ensure the quality and quantity of the waters of the State for all legitimate uses.

In administering the Maryland Wetlands Act, the Wetlands Division is responsible for regulating activities in State and private wetlands. State wetlands are in tidal areas below the mean high water mark. Private wetlands are those above the high tide mark but subject to periodic tidal influence. Any dredging or filling in State or private wetlands also requires a federal permit from the U.S. Army Corps of Engineers.

The Watershed Management Division issues permits covering Small Ponds, Waterway Obstructions, Waterway Constructions, Erosion and Sediment Control, Maintenance and Repairs, and Surface Mining.

Other divisions have responsibility for coordinating the National Flood Insurance Program and providing flood management technical assistance to local subdivisions, dam safety, laboratory services and water supply.

Maryland Environmental Service

The MES provides water, wastewater and solid waste management services on a non-profit basis. Customers are local governments, private businesses and industries. The Service provides a full range of planning, design, finance, construction, operations and maintenance services.

Maryland Geological Survey

The Geological Survey conducts topographic, geologic, hydrologic, and geophysical studies, and prepares maps to meet specific needs. The Survey prepares reports on the extent and character of the geology, mineral, and water resources of the State, and supervises provisions relating to archeology. It engages in, sponsors, and coordinates archeological research, and encourages preservation of archeological resources in Maryland. Examples of its studies include water supply, water pollution, assuring continuing supply of mineral resources, the use of the Chesapeake Bay and Bay bottom, shore erosion and shore protection, and the preservation of archeological sites threatened by development.

Maryland Environmental Trust

The Trust's main activity is to encourage landowners of rare or unique natural areas, productive farmland, large open spaces, waterfront, or scenic areas, to donate conservation easements on their land to preclude development of their property. The Trust also works with local organizations to establish programs to conserve energy and materials, improve local environments, and increase citizen awareness of the need for voluntary stewardship of Maryland's natural resources. The Trust's policies and programs are defined and supervised by a volunteer board of trustees.

Tidewater Administration

The Boating and Fishing Liason offices are responsible for coordinating activities between the Department and other State agencies, the Coast Guard, National Weather Service, Corps of Engineers, University of Maryland Sea Grant Program, watermen, wholesalers, and many other government agencies and individuals. They also publish the Guide to Cruising Maryland Waters.

The Waterway Improvement Program mission is to develop, maintain, improve, and promote the recreational and commercial capabilities of Maryland's waterways. Responsibilities of the Program include the dredging and marking of channels and harbors, clearance of obstructions, and construction facilities to benefit the boating public. Some of the activities undertaken are ice-breaking during winter shellfish operations, hydrographic surveying and maintaining regulatory buoys.

Maryland's Coastal Zone Management Program was established to assure that federal, state and local governments work together under agreed upon policies in making decisions affecting use of coastal waters and the surrounding land. The Program's goal is to provide the method, organizational framework and legal strength to balance the many pressures on the

coastal zone, so that development, economic progress and preservation of valuable natural resources can be accomplished in a reasonable manner, without the over-exertion of one influence at the expense of the other. Essential to the management activities of the Program is the Coastal Resources Advisory Committee. The Committee functions as the permanent forum of citizens, special interest groups, academic institutions and local, state and federal agencies for providing guidance and recommendations to the Program.

The Tidal Fisheries Program administers fisheries laws and regulations and manages the use of fisheries resources. These varied activities are combined in management programs to enhance current fish stocks and ensure their future abundance.

The Shellfish Program is responsible for projects involving oyster propagation, blue crab management, clam management, and surveys of the Bay bottom. The major effort of the Tidewater Finfish Program is directed toward fishery resource monitoring. These activities document spawning success and recruitment of young fish into the various commercial and recreational fisheries. The studies are important in determining quantitative projections of Maryland's fishery harvests. They also add insight into the causes and effects of species abundance fluctuations.

Energy Administration

The Energy Administration's mission is to evaluate the production and conservation of energy while minimizing adverse environmental effects. This is accomplished by acquiring future power plant sites, determining the environmental impact of existing plants, increasing public and private awareness of the need for energy conservation, and maintaining balanced fuel allocation within the State in accordance with the needs of the consumer.

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Responsibilities of this department include air and noise regulations and overseeing county plans for water supply and sewage treatment systems. All counties must develop water and sewage plans which are consistent with county land use plans and State water quality standards.

Responsibilities transferred from the Department of Natural Resources in 1980 include: preparation of five-year plans for regional water supply management; licensing Master Well Drillers; issuing Water Appropriation and Use Permits for new structures that may require withdrawal of surface or underground waters; regulating discharges of water or waste or toxic materials into surface or groundwater; and issuing certificates for hauling hazardous substances.

DEPARTMENT OF STATE PLANNING

The Department of State Planning functions as an "advisory, consultative and coordinative" agency in planning matters. It prepares and updates a State development plan and a Comprehensive Outdoor Recreation Plan. In addition, it prepares the State's capital program and annual capital budget. This Department has many Clearinghouse functions, including review of all Federal and State grants, and review of any transfers of land within the State. It is also a storehouse for geographical

information on population growth, land use, public facilities and natural resources.

The State Land Use Act of 1974 gives this Department authority to participate in decisions concerning land use in Maryland, but does not convey any regulatory responsibilities or veto power to the Department. Critical Areas and an Intervention Program are two duties mandated by this act.

The Critical Areas Program is responsible for identifying and designating areas of critical concern to the State. Critical Areas are areas of importance, either for future use or development, to the citizens of the State. Critical Areas are divided into three general categories: areas suitable for preservation, conservation, and utilization.

Intervention Program: The Department of State Planning has the power to intervene in any Maryland administrative, judicial, or other proceedings concerning land use, development, or construction, which involve activity of more than just local impact.

DEPARTMENT OF ECONOMIC AND COMMUNITY DEVELOPMENT

The Maryland Historical Trust preserves and maintains historical, aesthetic, and cultural properties, buildings, and fixtures pertaining to Maryland's early history. The Trust has funding and can establish historical zoning districts for this purpose.

THE DEPARTMENT OF TRANSPORTATION

Within this Department, the State Highway Administration (SHA) is responsible for constructing the State's primary road system and extensive long-range highway planning. All SHA constructions still require grading and sediment control approval from the Water Resources Administration along with other permits for streambed alteration, bridge work or wetlands alterations.

THE DEPARTMENT OF AGRICULTURE

The Department of Agriculture is responsible for the supervision, direction, and control of the provisions of the agricultural laws, and all matters relating to fostering, protecting, and developing the agricultural interest of the State.

The Secretary of Agriculture has the authority to implement pesticide regulations, remove from sale any dangerous pesticide, license pesticide applicators, and establish standards for use, storage, and transfer of pesticides. The Department of Agriculture also participates in implementation of the Hazardous Substances Act and is represented on the Hazardous Substances Disposal Advisory Council.

The Agricultural Land Preservation Foundation was established to preserve agricultural land and woodland in order to provide sources of agricultural products within the State, control urban expansion, and protect agricultural land and woodland as open-space land. The Foundation can acquire agricultural land and easement donations.

The Soil Conservation Committee is responsible for the dissemination of funds and recommendations of policy to local Soil Conservation Districts.

Index to Selected Local Authorities

THE FOLLOWING LOCAL AUTHORITIES HAVE RESPONSIBILITIES WHICH AFFECT THE SEVERN RIVER WATERSHED:

ANNE ARUNDEL COUNTY

Office of Planning and Zoning: Responsibilities include development of long-range plans to guide the County's growth; implementation of the zoning ordinance and subdivision regulations; and special studies which cover watershed management, planning on a sector basis, water quality, historic sites, marinas, and others as needed.

Inspections and Permits: Responsible for sediment control from construction sites.

Health Department: Conducts water quality analysis from the Shoreline Survey, and monitors the sewage treatment plants.

Public Works: Responsible for stormwater management, solid waste management, the derelict boat program, and sewer and public facility planning.

Recreation and Parks: This department acquires land and develops recreation facilities.

Soil Conservation District: This is an independent political subdivision of the State responsible for the preservation of natural resources in the county. The District occupies the same boundaries as Anne Arundel County. It is managed by a five-member Board of Supervisors, four of whom are appointed by the State Soil Conservation Committee, and one by the County Government. Technical assistance is provided by the U.S. Department of Agriculture's Soil Conservation Service. The District approves plans for clearing, grading, and other activities disturbing soil. Other duties include designing long-range conservation programs for the County and participating in the non-point source pollution program (Section 208) of the *Federal Water Pollution Control Act*.

Environmental Affairs Commission: Appointed by the County Executive, this citizens commission is charged with studying matters of environmental concern to the county and recommending courses of action.

ANNAPOLIS

Office of Planning and Zoning: Implements the Zoning Ordinance and Building Code, conducts long-range studies, like the Comprehensive Policy Plan, and analyzes employment, population and commercial trends in the city and surrounding areas.

Public Works: Responsibilities involve maintenance of the city's public facilities, including sewers, water lines, stormdrains, and roads.

Recreation and Parks: Sponsors recreational programs and develops facilities for various recreation activities.

Much of the City's work is conducted by commissions. Some of these are composed of Aldermen and other citizens, others are made up entirely of citizens. The commissions assist and advise in the allocation of the City budget regarding their area of interest.

Commissions which have a particular interest or effect on the Severn are the Environmental Commission, the Planning and Zoning Commission, the Port Wardens, and the Recreation and Parks Commission.

Local groups and organizations with an interest in protecting the Severn:

American Forestry Association
Ann Arrundel | County Historical Society
Annapolis Neck Federation
Annapolis Waterfront Association
Anne Arundel County Bird Club
Archaeological Society of Maryland
Baltimore Environmental Center
Chesapeake Bay Foundation
Chesapeake Environmental Protection Association
Federated Garden Clubs of Maryland
General's Highway Council of Civic Associations
Greater Severna Park Council
Historic Annapolis, Inc.
Izaak Walton League of America
League of Women Voters of Maryland
Lower Broadneck Federation of Community Associations
Maryland Herpetological Society
Maryland Historical Society
Maryland Wildlife Federation
Natural History Society of Maryland
Nature Conservancy
Severn River Association
Sierra Club, Greater Baltimore Group
Trout Unlimited

Appendix C — Maryland Scenic and Wild Rivers Act

SCENIC AND WILD RIVERS ACT

As Amended

In the 1978 Session

Of the General Assembly

Article - Natural Resources

Section 8-401 Through 8-410

Annotated Code of Maryland

(1974 Volume and 1977 Supplement)

AMENDMENTS:

Chapter 70, Acts of 1976, Effective 7/1/76, (8-403(D), (E), (F); 8-408 (A))

Chapter 121, Acts of 1976, Effective 4/13/76, (8-409(B))

Chapter 962, Acts of 1977, Effective 7/1/78, (8-403(G))

Chapter 869, Acts of 1977, Effective 7/1/78, (8-403(D))

NOTE: This Act is published in this form and distributed as a public convenience and is not to be considered the official text. The official text may be found in the Annotated Code of Maryland as referred to above.

ARTICLE — NATURAL RESOURCES

SUBTITLE 4. SCENIC and WILD RIVERS REVIEW BOARD AND RELATED PROGRAM

8-401. Declaration of Policy

Many of the rivers of Maryland or portions of them and related adjacent land areas possess outstanding scenic, fish, wildlife, and other recreation values of present and potential benefit to the citizens of the State. The policy of the State is to protect the water quality of these rivers and fulfill vital conservation purposes by wise use of resources within this scenic and wild river system. Development of a scenic and wild rivers system is essential to fulfill these purposes.

8-402. Establishment and Administration of Scenic Rivers Program: Study of Deer Creek.

a. Establishment of Program; Rivers Included.

There is a Scenic and Wild Rivers Program. The following rivers, including their tributaries, are the initial components of the State scenic and wild rivers system: the Anacostia, Deer Creek, Monocacy, the Patuxent, Pocomoke, Potomac River in Montgomery and Frederick counties, Severn, Wicomico in Charles County, and Youghiogheny.

b. Administration of Program.

The Secretary shall administer the provisions of this subtitle. He shall formulate and implement a program to carry out the purposes of the Scenic and Wild Rivers Program for each designated river including any other river designated subsequently as part of the system. The Program shall provide for wise management of resources on the land and preservation of their scenic, agricultural, and wild qualities. Development is limited to activities such as fishing, hunting, hiking, horseback riding, natural and geological interpretation, scenic appreciation, and other programs by which the general public can appreciate and enjoy the value of these areas as scenic and wild rivers in a setting of natural solitude.

c. Study of Deer Creek

The Department, by July 1, 1976, shall prepare a study and plan for the use and development of the water and related land resources of Deer Creek in Harford County. The study and plan shall evaluate Deer Creek as a water, agricultural, and scenic resource, and evaluate its shoreline and related land in terms of zoning, parks, and recreational areas, public and private use. The study and plan shall be made in consultation and cooperation with every affected unit of Harford County. Upon completion, the Department shall file the study and plan with appropriate recommendations with the Harford County Planning Commission, the Harford County executive, and the Harford County Council for inclusion and implementation in the County's land use planning and zoning as the County deems appropriate.

d. Inventory and Study — Rivers Included in Subsection (a).

By July 1, 1976, the Department shall prepare and complete an inventory and study of the river stretches and related shorelines of those rivers included in subsection (a) of the scenic and wild river system, except Deer Creek in Harford County. The inventory and study shall evaluate the river and its shorelines as a water, agricultural, and scenic or wild resource. The inventory and plan shall be made in consultation with every affected governmental unit of any county where the affected river is located. Upon completion of any part of the inventory and study, the Department shall submit it with any appropriate recommendations to the governing body of every county where the affected river is located, for their approval and recommendations, and to the next regular session of the General Assembly.

e. Inventory and Study — Other Rivers

By July 1, 1978, the Department shall inventory and study every other river and related shoreline in the State and identify the rivers and their related shorelines or portions of them eligible for inclusion into the system as either a scenic or wild river. Upon completion of any part of the inventory and study, the Department shall submit it with any recommendations for addi-

tions to the scenic and wild rivers system to the governing body of every county where an affected river is located, for their approval and recommendations, and to the next regular session of the General Assembly. For the purposes of this inventory and study, (1) a scenic river means a free-flowing river whose related shorelines are predominately forested, agricultural, grassland, marshland, or swampland with a minimum of development for at least two miles of the river length, and (2) a wild river means a free-flowing river whose related shorelines are undeveloped, inaccessible except by trail, or predominately primitive in a natural state for at least four miles of the river length.

8-403. Scenic and Wild Rivers Review Board

a. Established; Composition; Compensations of Members; Chairman.

There is a Scenic and Wild Rivers Review Board. The Board consists of the secretaries of Natural Resources, State Planning and Agriculture. The members of the Board shall select the chairman. A member of the Board may not receive any compensation for his services but shall be reimbursed for necessary travel expenses and disbursements made in order to attend any meeting or perform any other official duty.

b. Duties.

The Board shall review the inventories, studies and recommendations of the Department.

c. Advisory Board — Appointment; Composition Generally.

The Board shall appoint, with the advice and consent of the appropriate local governing body a local scenic and wild river advisory board for each river included within the scenic and wild river system. Each local board shall consist of at least seven members who shall be selected as follows:

1. At least two shall be residents owning land contiguous to the scenic or wild river except for the Youghiogheny River where at least two must be residents owning land contiguous to that portion of the river designated by 8-408 (a) as a wild river;

2. At least two shall be residents of the county where the scenic or wild river flows and who do not own land contiguous to the scenic or wild river;

3. One shall be a representative of the local governing body in each county where the scenic or wild river flows;

4. Two members from the appropriate soil conservation district;

5. The members of each local advisory board shall select a chairman.

d. Advisory Board — Composition When River Flows Through More Than One County.

1. If a scenic or wild river flows through more than one county, the local advisory board shall consist of no more than the following members:

i. Two residents of each county through which the scenic or wild river flows who own land contiguous to the scenic or wild river;

ii. Two residents of each county through which the scenic or wild river flows who do not own land contiguous to the scenic or wild river;

iii. Two representatives of the local governing body of each county through which the scenic or wild river flows, and

iv. A representative of each soil conservation district through which the scenic or wild river flows.

2. The members of the local advisory board shall elect a chairman.

e. Advisory Board — Duties

The local advisory board shall review each designation of a scenic and wild river within its jurisdiction. In addition, the local advisory board shall review the studies and proposed programs formulated by the Department and any proposed rules relating to the recommendations for each river within its jurisdiction, and shall make recommendations to the Board and the appropriate local governing body.

f. Meetings; Reports; Recommendations.

The Board shall meet regularly and shall submit an annual report to the local legislative delegation of the General Assembly concerning the status of the Scenic and Wild River Program. The Board shall recommend for inclusion in the Scenic and Wild Rivers System, streams, portions of rivers, streams, and tributaries based on the inventory and studies of the Department and the recommendations of the appropriate local advisory boards.

g. Upon Completion of an Approved Management Plan.

The local governing body may establish a scenic river advisory board for each designated scenic or wild river within its jurisdiction. Each board, as constituted by the local authority may recommend such policies, laws, rules, and regulations, in furtherance of the aims of this subtitle to the appropriate local governing body. If a scenic or wild river flows through more than one county, the scenic river advisory board may consist of an equal number of members from each county.

8-404. Recommendations of Rivers, Streams, and Lands for Inclusion in Scenic and Wild Rivers System.

The Board may recommend for inclusion in the scenic and wild rivers system, rivers, streams, portions of rivers, streams, tributaries, and the related adjacent lands which fall within the following descriptions:

1. Trout streams and wetland areas the Department designates;

2. Spawning and propagation areas the Department outlines;

3. Streams and rivers with scenic and aesthetic value of statewide significance the Department outlines;

4. Existing or proposed public land adjacent to the rivers and streams in the State;

5. Sections of any river or stream where no development exists on either side of the river or stream for a distance of one-quarter mile from the mean high water line of the river or stream;

6. Sections of any river or stream where limited development exists but is compatible with the wise use of the resources;

7. Sections where encroachment is imminent and would lead to degradation of the river or stream, to some form of pollution, or adversely affect the intent of this subtitle; or

8. Sections of any river or stream important as food production areas, areas supporting migratory waterfowl, and spawning areas for shellfish.

8-405. Evaluation of Waterway Prior to Approval of Use or Development Plan.

Before specific plans for use and development of water and related land resources are approved, including constructing improvements, diversions, roadways, crossings, channelizations, locks, canals, or other uses which change the character of a river or waterway or destroy its scenic value, full consideration and evaluation of the river as a scenic and wild resource shall be given.

8-406. Approval Required for Construction, Operation, or Maintenance of Dams, etc.

A dam or other structure impeding the natural flow of a scenic and wild river may not be constructed, operated, or maintained in a scenic and wild river, and channelization may not be undertaken, unless the Secretary specifically approves.

8-407. Cooperation by State Units.

Every State unit shall recognize the intent of the Scenic and Wild Rivers Program and take whatever action is necessary to protect and enhance the scenic and wild qualities of the designated river. The Department shall utilize the scenic and wild rivers system and all related information to assist and cooperate with any other State and local unit which exercises jurisdiction and authority over land use planning and management.

8-408. Youghiogheny River — Designation as Wild River; Mining of Minerals.

a. Designation as a Wild River.

That segment of the Youghiogheny River between Millers Run and the southern corporate limits of Friendsville shall be designated a wild river.

b. Mining of Minerals.

Mining of any minerals by the strip or open pit method is prohibited in the scenic corridor of the segment provided in subsection (a). The provisions of this subsection do not apply to areas within the scenic corridor which previously have been mined and are not reclaimed. The scenic corridor shall be defined by rules and regulations adopted by the Department, but shall be confined to those adjacent land areas which are visible from the river or its contiguous shore.

8-409. Youghiogheny River — Rules and Regulations Governing Use and Development.

a. Development.

For the purpose of this section "development" means any structure, appurtenance, other addition, modification, or alteration constructed, placed or made on or to land or water.

b. Rules and Regulations.

In addition to the other regulatory authorities provided by this subtitle and due to the unique character of the Youghiogheny River the Department shall adopt rules and regulations after review by the local advisory board and the Scenic and Wild Rivers Review Board, by January 31, 1977, to regulate use and development in that segment of the Youghiogheny River designated S 8-408 (a) and adjacent land areas within the scenic corridor where development would affect the primitive qualities and characteristics of the Youghiogheny River.

8-410. Youghiogheny River — Use of Funds to Purchase Property; Restrictions on Use of Water or Land Areas.

a. Use of Funds to Purchase Property.

If the prohibitions of S 8-408 or of any rule or regulation the Department adopts for the Scenic and Wild Rivers Program would constitute a taking of a property right without just compensation in violation of the Constitution of the United States or the Constitution of Maryland, funds under Program Open Space may be used to purchase or otherwise pay for any property taken providing the acquisition has been previously approved by the General Assembly.

b. Restrictions on Use of Water or Land Areas

As to any water or land areas within that portion of the Youghiogheny River designated by S 8-408 (a) as a wild river, funds under the open space program may be used to purchase any restriction, whether drafted in the form of an easement, covenant, or condition, prohibiting or limiting the use of any of the water or land areas or any improvement or appurtenance thereto for any of the purposes listed in S 2-118 (b) of the Real Property Article. The restriction creates an incorporeal property interest in the water or land areas or the improvement or appurtenance thereto, so restricted, which is enforceable in both law and equity in the same manner as an easement or servitude with respect to the water or land areas or the improvement or appurtenance thereto, if the restriction is executed in compliance with the requirements of the Real Property Article for the execution of deeds of the Estates and Trusts Article for the execution of wills.

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