



Potomac River Basin Character Statement

Beginning as a spring in Fairfax Stone, West Virginia, the Potomac carves its way not only eastward to the sea, but across the history of the making of a nation. The Fairfax Stone marks the northern corner of the 17th century British land grant awarded to Lord Fairfax. Captain John Smith explored the lower Potomac in 1608. George Washington, born, lived and buried along his beloved Potomac, chose its shore for the site of the new nation's capital. Washington chose the Potomac not only for its strategic military importance, but also for its potential as a gateway for westward expansion.

Although the Potomac River does not touch Commonwealth soil, its basin drains southern portions of the state, making it the fourth largest basin in Pennsylvania. The Potomac basin encompasses 14,670 square miles, draining portions of four states. Pennsylvania contains 11% of the Potomac basin, encompassing 1,570 square miles. Although 5.8 million people (as of 2005) live within the Potomac watershed, the land is still mainly rural in makeup, since three-quarters of the population lives in the Washington, D.C. metropolitan area.

Geology

The Potomac River cuts across five geologic provinces on its journey to the Chesapeake Bay. Headwater tributaries from five of these provinces contribute water from Pennsylvania to the Potomac River. Beginning high in the sandstone and shale hills of West Virginia on the Appalachian Plateau, the mighty Potomac starts the downhill journey to the bay. On the river's eastward journey across West Virginia, the Potomac twists and turns as it cuts through the long narrow ridges of the Ridge and Valley Province, including the Appalachian Mountains. Flowing out of the Appalachian Mountains, the river enters the Great Valley section of the Ridge and Valley Province, a wide sweeping valley underlain in limestone, providing an extremely fertile land for agricultural use. The Great Valley separates the Appalachian Mountains from the Blue Ridge Mountains Province.

The Potomac is joined by the Shenandoah River at Harpers Ferry, West Virginia, and proceeds through a gap in the Blue Ridge Mountains, entering the Piedmont Province. The Piedmont landscape consists of rolling hills underlain by red sedimentary stone and outcrop hills of hard igneous diabase. From the Piedmont, the Potomac enters the Atlantic Coastal Plain Province within the District of Columbia. This province is flat and sandy, as the geology in this area is the result of sand and gravel deposition by rivers sluggishly joining the Atlantic Ocean.

History

The Potomac has drawn human cultures to its shores for centuries. Many American Indian peoples enjoyed the bounties of the river, including the Pawtowmecks, from whom the river gets its name. The Potomac's name was derived from the Algonquin language and means "where something I brought." It seems the Pawtowmecks were the middlemen for northern and southern cultures to meet and trade.



The first Europeans to explore the Potomac River were led by Captain John Smith in 1608. John Smith's glowing reports of the river and its abundant resources led to rapid colonization. The Catholic followers of the Calvert family colonized the northern shores of the lower Potomac in what is now the state of Maryland. Other groups of English colonized the southern shores of the Potomac, founding the future state of Virginia. These two states would find themselves pitted against each other even before the Civil War in what was called the Oyster Wars, because the two states argued over fishing rights to the waters of the Potomac. The Oyster Wars resulted in the first constitutional convention for our growing nation.

Other battles have taken place along the shores and tributaries of the Potomac from the Revolution through the Civil War. The British invaded the Potomac region to destroy the nation's new capital in the War of 1812. Many skirmishes and battles took place on the soils of the Potomac basin, from John Brown's raid on Harpers Ferry and the first clash of North and South at Manassas, to the turning point engagements of Antietam and Gettysburg. Other modern fights have begun along the shores of the Potomac, such as the fight to conserve and clean up our natural resources. The conservation and preservation of historic sites and natural areas began with Mount Vernon in 1852, Gettysburg Battlefield in 1864, and Rock Creek Park in 1890. Greenways, now a common term and practice, grew out of the efforts of the small town of Greenbelt, Maryland. Even Rachel Carson penned her volley at the chemical industry, *Silent Spring*, along the banks of the Potomac. The Potomac is entering the new millennium on the upswing as people, industry, and government join to make the river and its tributaries the showcase for environmental, recreational, industrial, and community efforts that have turned this waterway back into the "Nation's River."

Problems and Solutions

Human use of the river has spanned the centuries, dating back 3,000 years to when American Indians camped and feasted on the shore, leaving middens of oyster shells acres broad and yards deep. The changes wrought since the arrival of European colonists, of course, have been more intense. Today the Potomac River is, culturally and geographically speaking, a river of contrasts from the coal miners of upstream West Virginia to the urban residents of the nation's capital and, along the lower Potomac, the watermen of Virginia's northern neck. With such a long and varied history of human use, it is not surprising that the Potomac as a whole has experienced episodes of serious ecological damage.

For example, in the upper reaches that flow through the rugged valleys of the Appalachians, the Potomac's North Branch is heavily polluted from coal mining operations that have contaminated the stream with sulfuric acid discharges. In the past, the pH of the North Branch at its confluence with the Savage River was approximately that of vinegar - conditions extremely difficult for aquatic life. However, progress is being made. The addition of lime to the waters of the Jennings-Randolph Reservoir helps buffer the Potomac from the continued addition of highly acidic mine-drainage streams. As a result, the pH of 5.5 that can be found at the river's entrance to the reservoir is brought to a much more neutral 6.5 pH downstream. This is due in part to the multi-port outlet structure of the Jennings-Randolph Reservoir which allows operators to mix water from different depths in order to control both temperature and pH. The diminishing demand for coal has also played a role in relieving the burden on the North Branch.



These results far surpass the expected benefits of the Jennings-Randolph Reservoir. It was assumed that the reservoir would not have a significant impact on the upper Potomac. Surprisingly, today Maryland operates a trout culture immediately below the outlet structure of the dam, where a considerable number of trout are raised in pens and wild trout are beginning to flourish. Had reservoir designers anticipated the improvement in North Branch water quality, additional features could have been included which would benefit the river even more. One example is that the dam lacks the ability to aerate the water as it is released. Without aeration, water released from the dam still contains a significant level of nitrogen, which has an adverse effect on aquatic life.

Sediment carried by tributaries creates other problems. According to the most recent available estimates, nearly one million tons of sediment washed into the tidewater Potomac during 1989. This amount can vary, however, depending on flow and averaged 1.7 million tons per year from 1978 through 1986. Approximately two-thirds of this sediment stems from erosion of agricultural land. The remainder is from construction sites and other sources in the Washington metro area. Storms and floods particularly aggravate the sediment problem. As a stream's velocity increases, its ability to carry suspended materials increases dramatically. During a flood event when the stream velocity doubles, its carrying capacity is squared. At Point of Rocks, Virginia, for example, about 70 percent of the Potomac's annual sediment load passes by during the ten days of the year when flows are highest.

Over time, the sediment from the Potomac and its tributaries can pile up at an astounding rate in downstream areas. Once bustling commercial ports, such as Bladensburg and Port Tobacco are now useless for navigation. Much of Washington, D.C.'s, tidal basin is built on sediment deposits, where once the river flowed freely. Unnaturally high rates of sedimentation have a distinctly negative effect on the river's aquatic life. Sediment covers important spawning and feeding areas for fish and shellfish and blocks the sunlight that submerged aquatic plants need to grow. Moreover, it often carries nutrients, such as nitrogen and phosphorus, which spur the growth of algae that can often deplete the river's oxygen content as they decompose. As it passes through the Washington, D.C. metropolitan area, the Potomac is subjected to yet another threat: coping with the wastes of the rapidly growing capital region, including billions of gallons of sewage treatment plant effluent.

Pre-1900 residents complained that the capital area was "a cowpen and a pigsty year round." By World War I, 320,000 people lived in the area, and there was no sewage treatment at all. The area's first wastewater treatment plant (WWTP), known as Blue Plains, was finally built in 1938. It became obsolete a few years later, thanks to the influx of another quarter million residents during World War II. In 1970, despite the expansion of Blue Plains and the construction of several other facilities downstream in Virginia and Maryland, the situation reached crisis proportions once again. Overflows of combined sewer and storm drains introduced more raw sewage into the Potomac than in 1932, when no treatment plants existed. How bad was it? According to one author, a floating fountain off of Washington's Hains Point that was dedicated to Lady Bird Johnson had to be shut off periodically during the 1960s for fear that high winds would "whip through its water plume and douse National Airport with cholera germs." The Potomac was also overloaded with nutrients, such as nitrogen and phosphorus, producing thick



mats of algae downstream of Mt. Vernon that choked more than 100,000 acres of the river during the summer months. With upgrading and installation of new state-of-the-art treatment facilities this phenomena has lessened.

Citizens of the Potomac basin can do a great deal to help make their river system a much cleaner and healthier environment for generations to come. Farmers can employ best management practices, such as no till cultivation, crop rotation, manure management and integrated pest management. Everyone can recycle used motor oil and should not put household toxins, such as oven cleaners and pharmaceuticals, down any drain. Suburban homeowners can restrict the use of fertilizers and pesticides on lawns and gardens, and can minimize erosion by keeping yards grassed and by using splash blocks or rain barrels at downspouts. Rural residents can make sure that septic systems are maintained in good order. Developers should make sure all development includes a storm water retention plan including effective anti-siltation devices to keep exposed soil from washing into streams during the construction.