

The Potomac and the Chesapeake Bay

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

History

From high in the Alleghenies of West Virginia, where the Fairfax Stone marks "the first fountain of the Potowmack," to Pt. Lookout on the Chesapeake Bay, the Potomac River sweeps nearly 400 miles across the Atlantic Piedmont and plain to form the fourth largest watershed on the East Coast - and one of the nation's most bountiful and historic.

Captain John Smith explored here in 1608 and found fish "lying so thicke with their heads above water, (that) for want of nets, we attempted to catch them with a frying pan." In the mid - 18th century, oyster wars were fought between the colonies of Maryland and Virginia over the river's abundant bivalve crop - a dispute that ultimately led to the convening of the first constitutional convention. In this century, the river's shad and herring fisheries produce prodigious harvests.

Spectacular scenery is also abundant along the Potomac. As it joins the Shenandoah River at Harper's Ferry, the river carves a canyon that Thomas Jefferson called "one of the most stupendous scenes in nature." Downstream at Great Falls, the river dramatically plunges to sea level, pounding through the hard rocks of the Piedmont and settling out into a slow moving waterway - or estuary - that meanders lazily past the nation's capital and on to the Chesapeake Bay. In this stretch of the river, it can take as long as 40 days for a drop of water to move 15 miles from Three Sisters Island at Georgetown to Indian Head. Beyond Indian Head, the Potomac becomes progressively saltier and gradually broadens, so that at the river's mouth, it spans fully ten miles from shore to shore.

The river is also rich in history. In 1632, two ships - the Ark and the Dove - landed at what is now St. Mary's City on the lower Potomac and established the colony of Maryland. Less than a decade later, colonization of the Northern Virginia shore followed. The ancestors of some of our most prominent families - the Lees and the Washingtons - came to settle along the river's banks. Tobacco became to the Potomac what gold later would be to California. Thriving ports were eventually established as far upriver as Georgetown and Alexandria.

The nation's capital was carved out of a Potomac swamp in 1800, burned by the British in 1812 and resurrected. Two of the decisive battles of the Civil War - Antietam and Manassas - were fought within a cannon's roar of the river.

In more recent times, the effects of more than a century of steady growth in population, especially in the Washington D.C. area, have wrought tremendous changes in the way the river is used - and abused - by the public.

Problems on the Potomac

Human use of the river has spanned the centuries, dating back 3,000 years to when 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, geographically and culturally 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.

In its upper reaches, for example, as it flows 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. The Mt. Storm Reservoir in West Virginia, which feeds the North Branch through Stony River, now adds lime to its water, which helps buffer the Potomac from the continued addition of highly acidic mine-drainage streams. As a consequence, at its entrance into the Jennings - Randolph Reservoir, upstream of the Savage River, the North Branch's waters have an approximate pH of 5.5. Water released downstream from the Reservoir now has a pH of approximately 6.5. 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 where 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 from 1978 through 1986. Approximately two-thirds of this sediment stems from erosion of agricultural land and the rest from construction sites and other sources in the Washington metro area. Storms and floods particularly aggravate the sediment problem: at Point of Rocks, 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. Moreover, unnaturally high rates of sedimentation have a distinctly negative effect on the river's living creatures. Sediment covers important spawning and feeding areas for fish and shellfish and blocks the sunlight that is needed by submerged aquatic plants to grow. Moreover, it often carries with it nutrients, such as nitrogen and phosphorus, that spur the growth of algae which, in turn, can often deplete the river's oxygen content.

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.

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, and 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 proportion 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 fears 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.

Solutions

Citizens of the Potomac basin can do a great deal to make their river a better place:

- Farmers can employ best management practices, such as no till cultivation, crop rotation, and manure management.
- Urban dwellers can recycle used motor oil and avoid putting household toxics, such as oven cleaners, down the drain.
- Suburban homeowners can restrict the use of fertilizers and pesticides on lawns and gardens and can minimize erosion by keeping yards grassed and using splash blocks at downspouts.
- Rural residents can make sure that septic systems are maintained in good order.
- Developers can install effective anti - siltation devices to keep exposed soil from washing into streams during construction.