

## The Conodoguinet and the Chesapeake Bay

The Chesapeake Bay is a body of water, and like a human body, its health depends on what goes in it. The Chesapeake is fed by ten major rivers and numerous smaller streams that flow out of Virginia, Maryland, Pennsylvania and Delaware. These rivers bring the nutrients and fresh water that, when mixed with the ocean salt water, make the Chesapeake Bay the most productive estuary in the United States.

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 and streams that feed the bay. Even those smaller streams that feed into major tributaries contribute significantly to the overall health of the Bay. This factsheet explains how the Conodoguinet Creek contributes to the Bay and outlines some ways to help you keep this creek-and the Bay - clean.

### THE BASIN

From sparkling, trout-inhabited Appalachian head waters on Kittatiny Mountain, Conodoguinet Creek flows 101 miles through the fertile Cumberland Valley of Pennsylvania, joining the mighty Susquehanna River near Harrisburg. As it meanders north- eastwardly across a broad plain between Blue Mountain on the north and South Mountain on the south, the Conodoguinet, an Indian word meaning "a long way with many bends," drains 500 square miles of diverse lands. Forested areas cover the upland basin, giving way to intense agriculture throughout the valley and rapidly expanding suburban areas downstream, where the Conodoguinet meanders toward the suburban west shore of Harrisburg in a series of elaborate bends and loops.

Early pioneers envisioned the waters of the Conodoguinet as an avenue of commerce linking the Susquehanna and Potomac rivers. Plans for a canal joining the headwaters of the Conodoguinet with the head waters of Conococheague Creek never materialized. However, the Conodoguinet was far from abandoned. Nearly a hundred mills lined its banks in the 19th century-a mill nearly every mile. Besides grain, cider, nails and wood, these mills refined diverse products such as sumac leaves that were made into tanning and dyeing materials. By 1909, only 13 of the mills remained and today, the industry is largely forgotten. Most of the basin still has a strong agricultural flavor, including numerous Amish farms and cozy villages and small towns. While farming is the most prominent land use in the valley, dramatic growth in recent years in the Carlisle-Camp Hill area has converted much agricultural land to residential and commercial uses, including sprawling truck terminals and often-unsightly strip development along major roads. Ironically, the early pioneer's vision of the Cumberland Valley as a major transportation corridor has come true -two interstate highways and the Pennsylvania turnpike now criss-cross the valley.

Today, the Conodoguinet Creek is most valued, not as an avenue of navigation but as a source of drinking water, a means of waste removal and recreation. The communities in the eastern part of the Cumberland Valley pump 8 million gallons per day from the river in order to meet residential, commercial and industrial water demand. Much of the water returns to the stream, but not before passing through six sewage treatment plants in the lower part of the basin, which remove some, but not all, of the Conodoguinet's pollution. Meanwhile, on a typical summer day,

one can also find avid canoeists and anglers within the river channel, enjoying the creek's ribbon of greenery, alive with herons, kingfishers and other streamside creatures. In winter, after prolonged periods of cold, the creek's shallow waters freeze over and ice skaters give the Conodoguinet an idyllic Currier-and Ives picture postcard beauty.

## **THE PROBLEMS**

In many ways, the almost pristine quality of the Conodoguinet is in jeopardy, and the ability to meet all of the competing, demands placed upon it is in doubt.

Population data from the municipalities and townships in the drainage basin indicate that the population in the watershed has increased from 55,323 in 1940 to 126,452 in 1980, an overall increase of 129 percent. The rate of increase has been rather steady, averaging more than 23 percent each decade.

Population growth is much more rapid in the semi-rural township areas than in the towns and boroughs; 15 of 20 townships in the drainage basin have had more than 100 percent growth between 1940 and 1980, while 8 of the 9 boroughs have experienced less than 100 percent growth, and three of these have actually had negative growth. The most rapidly growing areas are in the eastern or downstream portions of the watershed, with Hampden Township being the fastest growing area, with 1,168 percent growth over the 40-year period. As a whole, the drainage basin is experiencing much higher growth rates than the average for Pennsylvania or for the U.S.

As population grows, the demands on the creek intensify. Water supply is an increasingly important issue. Withdrawals from the river may already be having impacts on the ability of the stream to provide suitable habitat for fish, such as smallmouth bass and numerous panfish species during periods of low flow. Current proposals would increase the amount of water that could be taken from the creek. At the same time, the urbanization and paving of large areas of the watershed result in dramatic increases in stormwater runoff, leading to periodic high flows that erode streambanks and, in the long run, add silt to the already-shallow creek bottom.

The combined effect of heavy silt deposits and large withdrawals of water from the creek can have a dramatic effect on water quality, reducing the Conodoguinet's ability to dilute pollution. The lower reaches of the Conodoguinet are relied upon to handle increasing loads of treated sewage effluent from the six treatment plants, as well as other wastes including lawn clippings and debris carelessly discarded by homeowners along the stream.

As population continues to grow, increasing wasteloads are creating an abundance of nutrients, such as nitrogen and phosphorus, stimulating the growth of algae, which, in turn, robs the water of oxygen, stressing fish and other aquatic species.

While "point" sources-of pollution, such as sewage treatment plants, are easy to identify, equally crucial to the water quality of the Conodoguinet are the "non-point" sources of pollution, such as agricultural and residential lawn runoff, urban stormwater flows and increased erosion because of poor management of construction sites. These non-point sources are extremely difficult to pinpoint, measure and control but are currently the leading cause of the degradation of the

Chesapeake Bay.

The magnitude of agricultural runoff can be greatly increased by poor farm management practices that allow soils rich in nutrients from fertilizers and animal wastes to be washed into the creek, adding to nutrient and suspended solid levels. Nonpoint sources also send other pollutants such as pesticides, oil, metals and chemicals into the creek.

Also important is the fact that two-thirds of the Conodoguinet's flow is from groundwater sources, particularly in the southern half of the basin. Some citizens are concerned about potential contamination of the creek or groundwater from caches of PCB's, arsenic and chromium buried at contaminated sites within the watershed, although as yet no evidence exists to show that these chemicals have infiltrated water supplies.

### **THE REMEDIES**

The upper portions of the Conodoguinet remain relatively pristine and untouched by urbanization. The lower reaches, on the other hand, are more affected by point sources and problems associated with increased development.

If nutrient levels in the creek waters continue to rise, it may be necessary to seek tighter discharge controls at local sewage treatment plants. Currently, these plants must eliminate all but 2 mg/l of phosphorus from their effluents. Stricter limits can be achieved although it may result in higher sewer bills for local residents. A statewide ban on phosphate laundry detergents was recently passed by the Legislature and may also reduce phosphorous levels. New technologies to remove nitrogen, as well as phosphorus, at these plants may also be examined.

To reduce pollution from nonpoint sources, the state Bureau of Soil and Water Conservation has promoted voluntary Best Management Practices (BMPs) for farmers to adopt to reduce agricultural runoff. A study of non-point source pollution from agriculture in Cumberland County concludes that one million tons of soil are lost each year, and that if BMPs were implemented in the worst areas (which includes 9.5 percent of the farmland in the county), a 32 percent reduction in nitrogen and a 27 percent reduction in phosphorus loss would be achieved.

Some BMPs include sediment retention structures, grassed waterways, conservation tillage and nutrient management. Financial and technical assistance from county conservation districts and the Pennsylvania Chesapeake Bay Program is available to farmers who implement these practices, but increased funding and participation may be necessary to have a significant impact on the quality of the creek. A nutrient management bill, with some mandatory requirements, has been introduced in the state legislature.

To keep sediment from leaving, construction sites in the lower end of the creek, counties and local municipalities develop sediment and erosion control plans that can require the following: limits on the amount of time that bareground is exposed, silt fences and infiltration basins to control runoff and retention of natural vegetation, especially along streams. However, the degree to which these sediment and erosion control plans are effective depends greatly on the ability of local officials to inspect and enforce regulations and in the past adequate personnel and funding to do these tasks has been lacking.

Homeowners can also contribute by conserving water, using low or non-phosphate cleaners, and by limiting lawn fertilizer use and proper disposal of lawn, garden and household wastes. Getting involved in the local government process and expressing opinions to state lawmakers on environmental issues are also important ways of contributing.