PRESIDENT'S MESSAGE

By Al Tucker

The Patuxent River

As a former member of the Patuxent River Commission, I don't recall the Commission ever discussing why the Patuxent River is important to Maryland. Discussions revolved around water quality, tourism, sewerage overflows and the management of the stormwater caused by development. The latter caused friction and dissension between the political members and the citizen commissioners. Priority was placed on economic development in the watershed over its negative impacts on the River's ecosystems. The River spans seven counties, each having a different set of economic priorities. In general, development's impact on the River is an afterthought. One county's use of the River's resources is often in conflict with others'. The metro Washington counties use the Upper Patuxent for drinking water, while sewer outfalls dominate the Middle Patuxent. The Lower Patuxent suffers degradation from the lack of natural replenishment. This description is, of course, an oversimplification, since the root cause is more development, i.e., ever more population growth, and it "drains" even more of the River's dwindling resources. In short, the River's role in our environment has not been examined wholistically.

So why is the Patuxent River important to us? As I delved into this rhetorical question, I found I didn't really have a good answer. So, I tried to start by answering the question, what is the function of a river?

A riverine system encompasses many different but interdependent biogeochemical cycles. Surprisingly, the first and maybe the most fundamental is the creation and transport of soil. As water falls on land it erodes rocks that form the soils. In the river, the soil particles – composed of gravel, sand, silt, and clay – become sediment. Yes, sediment! The fine particles – silt and clay – tend to remain suspended in water for days or longer. Forests and meadows are the first line of defense for capturing the fine particles, while the more granular particles are transported downstream to form the riverbeds. The granular sediments help maintain water clarity and support aquatic life while filtering water that recharges aquifers. Finally, the transported sediments reach the mouth and usually form a series of wetlands often referred to as the "delta". There it mitigates the extreme storm events of the sea and/or river surges and is further nourished by nutrients and biota it carries along. Like all physical systems, the river attempts to find a lower energy state. It does this by meandering across its floodplain. Meander lengthens the river and, as a result, slows the flows, creating wetlands at oxbows and turns. The river prepares itself for storm surges, where the wetlands absorb the energy and capture the suspended sediments. These cyclic processes have continued for eons, but in recent geologic time, humans have exploited some of a river's natural resources, mostly for food or energy.

In the industrial era, humans have dammed rivers to extract energy, to divert water for irrigation, to create canals for transportation, and more. These activities not only interrupt the river's natural cycles but also its basic ecological functions.

The exploitation of the Patuxent River began inadvertently as the colonists cleared the forests for agriculture. Clearing forests for agriculture removed the first line of defense, that of holding back highly erodible soils. The run-off from exposed soils filled many of its watershed tributaries with silt. Now the threat has shifted from agriculture to development. As development introduces impervious surface, water runoff gains energy that scours tributaries and deposits silt and clay into the main stem of the river. The occluding effect of silt defeats the purpose of the "good sediment" that supports aquatic life.

For the Patuxent, more development causes another concomitant impact. The dams at its headwaters divert hundreds of millions of gallons of water to supply drinking water to the metro Washington area. This diversion robs the Middle Patuxent of much of its natural function of building wetlands, which we now know are the bulwark against storm surges. The Washington Suburban Sanitary Commission (WSSC) mixes this supply with water from the Potomac. Hence the water that reaches the Patuxent sewer plants may or may not have originated in the Patuxent. This unnaturally "clean water" is now devoid of its natural constituents.

As a consequence, the Lower Patuxent, which is an estuary, does not have adequate ecological feedback systems to counteract the impacts of upstream degradation. An interesting study[1] assessed the outcomes of various best management practices (BMP) within the whole watershed in dealing with growth and climate change. Several scenarios were assessed as to whether these BMPs could meet the current target for the pollution levels of the Total Maximum Daily Load (TMDL). For example, one scenario assumed an average precipitation increase of 1.8%, a low population growth, and development restricted to infill. Best management practices would require an additional 1985 acres of wetlands and wet ponds. If the increased precipitation was 3.7%, the population growth follows its current trend, and the development is still restricted to infill, an additional 80,892 acres of urban filtering would be required.

The results of this study are disheartening. It is hard to see the political will to implement these minimal restrictions on growth even in the light of small changes of precipitation. But even more discouraging is where we would find the land to implement these practices. We have ruined the River's natural feedback loops that would naturally create more wetlands. We have diverted its water that would maintain the aquatic systems that naturally purify its water.

Many river systems have been restored by removing dams. These rivers in general had dams for mills or were used for downstream flood control. Their removal was successful because their primary watersheds were mostly undisturbed. However, the Patuxent's watershed has been inexorably changed. There is no hope of returning it to its natural function. We may clear the sediment, we may reduce the nutrient flows, but we will not be able to restore the Patuxent River's ability to provide us with a safety net against climate change and the impacts of future development.

A natural river would be important to us since it can respond to natural changes. But we have undercut the Patuxent River's natural ability to heal itself, so we are resigned to limiting the damage we are causing.

1 J. Fischbach et.al., "Managing Water Quality in the Face of Uncertainty", http://www.rand.org/t/RR720, (2015)