Cure for Patuxent cleanup requires heavy doses of high tech, perseverance

- By Tom Horton on November 07, 2013

Walter Boynton has lived most of his life around the Chesapeake. The paper he wrote with seven other scientists found that water quality improved during dry years when less pollution entered the Patuxent, which improved oxygen levels and led to nitrogen stored in sediments being released harmlessly into the atmosphere. This improved oxygen levels even more, which led to even more nitrogen being released. (Dave Harp)

For centuries, artists, writers, scientists, politicians—even lawyers—have drawn inspiration from the Patuxent River, the Bay's seventh biggest tributary.

Its tidal marshes are portrayed unforgettably in Gilbert Klingel's classic 1951 book, "The Bay." Its culture is immortalized in the lyrics of singers such as the late Tom Wisner and the Norris brothers, David and Joe.

The river's "crystal" waters in the 1830s moved novelist James Hungerford to make Clearwater River the setting of his novel, "The Old Plantation."

The river's murky waters by the early 1970s led Bernie Fowler, a Calvert county commissioner and state senator, to begin his famous annual wade-in — looking to see his toes as he did in his youth— in his advocacy for cleaner water.

The Patuxent was the subject of an unprecedented lawsuit that by 1981 forced Maryland and the EPA to recognize nitrogen as a major pollutant, setting the stage for the Chesapeake cleanup.

Despite all of this tribute for a tributary; perhaps the most important work for the river's future will be "Nutrient Budgets and Management Actions in the Patuxent River Estuary, Maryland (2008)," a paper you might have missed it if you don't get Estuaries and Coasts, the journal of the Coastal and Estuarine Research Federation.

The paper's eight scientist authors were led by Walter Boynton, a professor with the University of Maryland Center for Environmental Science who has lived most of his adult life around the Patuxent. They represent collectively a couple of centuries of studying the Chesapeake and how it works.

I use their little masterwork on nutrient budgets every year with environmental studies students at Salisbury University because what Boynton and crew say is vital for restoring most Bay rivers, and the Bay.

Nutrient budgets are simple in concept. They account for everywhere nutrients (nitrogen and phosphorus in the Bay's case) come from and where they go: down pathways that can be bad (like murking up the water and exhausting aquatic oxygen) or good (like gassing off nitrogen into the air or burying phosphorus deep in the bottom sediments). A good budget is the first step to managing for a healthy balance of nutrients critical to healthy rivers.

But in reality, few places anywhere else in the world have budgets of this quality. Most waters haven't had major laboratories like the University of Maryland's located on them for close to a century, haven't had the extensive ecosystem measurements that ground the Patuxent work.

The Patuxent paper examined 13 years of data, covering a period before and after large and expensive upgrades of sewage treatment plants; a period long enough to capture the huge variation in polluted runoff from farms and developments from dry (less pollution) to wet years.

The budget documented that high-tech upgrades to sewage plants dramatically drove down sewage pollution. But it also showed that wetter weather, which results in greater nutrient runoff from the land, after the upgrades actually made water quality a little worse.

Wetlands along the river are skimpy, about 12 square miles in a 937-square-mile watershed; yet they take out around 700,000 pounds of polluting nutrients annually, an unexpectedly large contribution.

But the biggest way the river absorbs nutrients is in its bottom sediments. It's likely, the scientists write, that when the Patuxent was more alive with seafood and aquatic plants, more nutrients were absorbed by living tissue than in "dead" sediments. A more stable environment would have been the result, with nutrients less likely to be quickly recycled from sediments to fuel excesses of floating algae.

Hope lies in the paper's finding that the bottom sediments aren't some inexhaustible reservoir of nutrients that would haunt the river even if we cut new pollution big time.

Indeed, water quality improved quickly when dry years reduced new pollution; and as oxygen improved, the sediments released their nitrogen harmlessly back to the atmosphere, which improved oxygen more, which released more nitrogen…"a sort of vicious cycle in reverse," Boynton said.

The paper tells us we can encourage that cycle if we:

- Not only apply high technology to what comes from pipes; but also get a handle on land runoff and fallout from dirty air (which already shows signs of improving);
- Protect wetlands, which pull way more than their weight in pollution removal;
- Understand the river's problems are largely independent of the Bay's and don't wring our hands waiting on cleanup elsewhere to restore local waters;
- Persevere— evidence shows the system responds rapidly to pollution reductions.

The latest cleanup plans for the Patuxent recognize the paper's findings. But achieving what's needed will require all technology can offer, plus unprecedented reductions in runoff from farming and development. This paper's not easy reading, but it'll tell you volumes about how this estuary works, why it's still unhealthy and how it could recover.

About Tom Horton

Tom Horton covered the Bay for 33 years for The Sun in Baltimore, and is author of six books about the Chesapeake. He is a freelance writer, splitting his time between Baltimore and Maryland's Eastern Shore.

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