CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

PENNSYLVANIA FACT SHEET

November 2013

Beyond the Chesapeake Bay—The Health of Pennsylvania's Rivers and Streams

Decades of sound investments have led to large-scale successes by Pennsylvania in the Chesapeake Bay cleanup effort. But, it's not just the Chesapeake Bay that suffers from pollution—so do thousands of miles of Pennsylvania's rivers and streams and hundreds of acres of lakes.

Although much focus has been on the Chesapeake Bay Clean Water Blueprint, many may not realize that there are thousands of stream miles and hundreds of acres of lakes in Pennsylvania that are considered "impaired" under the federal Clean Water Act that either have or will require what is known as a Total Maximum Daily Load (TMDL). When a waterbody is called "impaired," it does not meet scientifically established water quality criteria. Simply stated, a TMDL scientifically answers the question of "how much pollution is too much?" **The purpose of this fact sheet is to describe the major sources and causes of pollution to Pennsylvania's streams.**

What is Polluting Pennsylvania Waters?

According to the Pennsylvania Department of Environmental Protection's (DEP) most recent assessment[1], **more than 19,600 stream miles and nearly 67,990 acres of lakes in Pennsylvania are impaired**. This represents roughly 23% of all streams and approximately 42% of all lakes in the Commonwealth.

Top 3 Sources and Causes of River and Stream Impairment in PA

Sources		*Causes*	
	Miles		***Miles***
Agricultural Runoff	5,705	Siltation**	5,604
Abandoned Mine Drainage	5,596	Metals	3,908
Urban/suburban Runoff*	4,103	Nutrients	2,347

Source: 2012 Pennsylvania Integrated Water Quality Monitoring and Assessment Report
*Includes urban runoff/storm sewers, road runoff, and small residential runoff
** Siltation is commonly referred to as sediments

As the above table indicates, two of the three leading sources and causes of river and stream pollution in Pennsylvania are the same as those affecting the Chesapeake Bay. In each of these cases, like the Bay, a TMDL will need to be established and, eventually, implemented. In fact, according to DEP there are over 7,200 miles of streams that currently have TMDLs in Pennsylvania.[1]


Photo: Bill Portlock, CBF

Based on DEPs stream assessments, **sediment pollution is the leading cause of stream impairment in the Commonwealth.** Sediment, or siltation, is a term used to describe sand, silt and clay particles that can be transported with runoff from the land. It can also come from streambank erosion. It is largely influenced by how much, when, and where it rains, as well as the condition of the land the rain falls upon. Sediment is naturally found in healthy streams, but excessive amounts can result in poor water quality. When large amounts of sediment enter Pennsylvania streams, the water becomes turbid, or cloudy, thereby making it impossible for sunlight to reach subaquatic vegetation. This lack of sunlight, reduces the availability of oxygen, and impacts sensitive habitats for life, including fish and the things they feed on.

Another leading cause of stream impairment is a direct result of the coal mining legacy in many parts of the Commonwealth in the form of abandoned mine drainage**. This drainage is highly acidic and contains toxic metals which can significantly impact aquatic life within a stream**, thus, severally impacting recreational and economic value. Additionally, such streams are thought to have limited capacity to handle other forms of pollution which enter into them because they are effectively "dead" streams.[2,3]


Photo: Tim McCabe, USDA NRCS

Nutrients are cited as the third leading cause of stream degradation in Pennsylvania, impairing over 2,300 miles. As noted in our September 2013 fact sheet, *Chesapeake Bay Water Quality: A Primer on Pollutants of Concern*, nutrients that impact the Bay include nitrogen and phosphorus. The impacts of excessive nitrogen primarily affect salty waters like the Chesapeake Bay, not freshwater rivers and streams like those in Pennsylvania. And, **in Pennsylvania, the vast majority of streams listed as impaired for "nutrients" are phosphorus impaired streams**. As a result such streams have or will have phosphorus-based TMDLs. Commonly, such streams are co-impaired for phosphorus and sediment and subsequent TMDLs include both pollutants. However, under limited circumstances, there is some evidence that freshwater systems could benefit by controls on both nitrogen and phosphorus.[4]

What is a TMDL?

A TMDL is the maximum amount, or ceiling, of a pollutant that a segment of a stream, river, lake, or estuary can assimilate without causing a violation of scientifically-derived water quality standards designed to protect designated uses such as recreational use, fish consumption, aquatic life, human health, and others. The nation's largest and most famous TMDL is the Chesapeake Bay TMDL. TMDLs are a requirement of the federal Clean Water Act for waters deemed impaired due to pollutants. **Simply stated, a TMDL scientifically answers the question of "how much pollution is too much?"**


Photo: © Krista Schlyer/iLCP

TMDLs take a watershed-based approach in determining the pollutant load that can be allowed in a given waterbody. By taking such an approach, a TMDL considers all potential sources of pollutants, both point (e.g., sewage treatment plant discharge) and nonpoint sources (e.g., abandoned mine drainage and runoff from many agricultural fields, suburban lawns, roads and parking lots, and construction sites) and sets contribution limits from each identified source.

Impaired waterbody[7] is…

A waterbody (i.e., stream reaches, lakes, waterbody segments) with chronic or recurring monitored violations of the applicable numeric and/or narrative water quality criteria.

TMDLs are determined through a variety of methods based on waterbody type, pollutant of concern, and in some cases by comparing an unimpaired watershed with one slated for an impairment determination in order to help determine what the load caps should be, known as a reference watershed approach. In many cases, however, they are determined by employing various scientific models which determine the maximum amount of the pollutant in question and the needed reductions to achieve the designated water quality goals for a particular waterbody. All TMDLs also take into account a margin of safety, which reflects scientific variability and naturally occurring levels of pollutants. Meeting the limits set in the TMDL should result in the attainment of water quality standards.

Restoring the Chesapeake Bay starts with Pennsylvania Streams

The effort to "Save the Bay" starts with the small streams of Pennsylvania. **The benefits of better water quality, whether they be improved agricultural productivity, reduced flooding, improved sewer and water infrastructure, or downtown revitalization are investments for Pennsylvanians by Pennsylvanians.** To date, the Commonwealth has made sound investments in practices to help reduce pollution sources to local rivers and streams. These practices are also the same practices that can be found in Pennsylvania's phase 1 and 2 Chesapeake Bay plans, called Watershed Implementation Plans, and the associated 2-year Milestone commitments .[5,6] By galvanizing our efforts, and our funding, on conservation practices that count toward meeting the Commonwealth's obligations under the Chesapeake Bay Clean Water Blueprint, we are also helping to ensure clean water to local communities in the Bay watershed.

Citations

[1] Pennsylvania Department of Environmental Protection: Clean Water Act Section 305(b) Report and 303(d) List. 2012 Pennsylvania Integrated Water Quality Monitoring and Assessment Report. http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/integrated_water_quality_report_-_2012/1127203

[2] Baeseman JL, Smith RL, Silverstein J. 2006. Denitrification potential in stream sediments impacted by acid mine drainage: effects of pH, various electron donors, and iron. Microbial Ecology. 2006 Feb;51(2):232-41. Epub 2006 Feb 10.

[3] Stroud Water Research Center. Tioga County EPA grant to study effects of acid mine drainage. Press Release. August 25, 2006. http://www.stroudcenter.org/press/2006/20060825_amd.shtm

[4] USEPA Office of Water. Preventing Eutrophication: Scientific Support for Dual Nutrient Criteria. EPA -820-S-12-002. http://www2.epa.gov/sites/production/files/documents/nandpfactsheet.pdf

[5] USEPA Chesapeake Bay Program. Watershed Implementation Plans. http://www.chesapeakebay.net/about/programs/watershed

[6] USEPA Chesapeake Bay TMDL: How does it work? Ensuring results. http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/EnsuringResults.html

[7] USPEA Water: Total Maximum Daily Loads (303d). http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/glossary.cfm#i

CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

Founded in 1967, the Chesapeake Bay Foundation is a nonprofit 501(c)(3) conservation organization dedicated to saving a national treasure—the Chesapeake Bay and its rivers and streams. Its motto, Save the Bay, defines the organization's mission and commitment. With headquarters in Annapolis, MD, offices in Maryland, Virginia, Pennsylvania, and the District of Columbia, and 17 field centers, CBF works throughout the Chesapeake Bay's 64,000-square-mile watershed to build an informed citizenry, advocate pollution-reduction strategy, and enforce the law. CBF is supported by more than 200,000 active members and has a staff of 170 full-time employees. Approximately 80 percent of CBF's $23.6 million annual budget is privately raised.