Congressional Research Service
Informing the legislative debate since 1914

IN FOCUS

Updated July 8, 2016

Restoring Chesapeake Bay's Water Quality: Where It Stands

Since 2009, the Chesapeake Bay jurisdictions (New York, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and the District of Columbia) have made progress in reducing pollutants that impair the quality of Bay waters. However, further reductions are needed in order to reach water quality goals established for the Bay by 2025. Basinwide, nitrogen loadings to Bay waters will need to be reduced an additional 20.4% from levels measured in 2015, phosphorus loadings will need to be reduced an additional 5.8%, and sediment loadings will need to be reduced an additional 8.6% by 2025.

Background

Despite several decades of activity by governments, the private sector, and the general public, efforts to improve and protect the Chesapeake Bay watershed have been insufficient to meet restoration goals. Although some specific indicators of Bay health have improved slightly or remained steady recently (such as blue crab populations and underwater bay grasses), others remain at low levels of improvement, especially water quality. Scientists conclude that overall, the Bay and its tributaries remain in poor health, with polluted water, reduced populations of fish and shellfish, and continued degradation of habitat and resources. The primary pollutants causing impairments are excess nutrients (nitrogen and phosphorus) and sediment discharged from multiple urban, suburban, and rural sources around the Bay. Agriculture is the principal source of these pollutants. Reducing pollution is critical to restoring the watershed, because clean water is the foundation for healthy fisheries, habitats, and communities across the region.

In May 2009, President Obama issued an executive order that declared the Bay watershed a "national treasure" and charged the federal government with developing a new strategy for protecting and restoring the Chesapeake region. A central feature of the strategy was development of a Total Maximum Daily Load (TMDL) for Chesapeake Bay by the Environmental Protection Agency (EPA). A TMDL is a pollution budget, containing a scientific calculation of how much pollutant loadings need to be reduced to achieve state-established water quality standards. (For background, see CRS Report R42752, *Clean Water Act and Pollutant Total Maximum Daily Loads (TMDLs)*.)

The Chesapeake Bay TMDL is the largest single TMDL developed to date. It addresses all segments of the 64,000-square-mile Bay watershed, including tidal tributaries. Nitrogen and phosphorus are considered the main contributors to poor water quality because, in excess amounts, they spur algae blooms, which block sunlight critical to underwater grasses that support crabs, fish, and waterfowl. When the algae die, they sink to the bottom and decompose in a process that depletes the water of oxygen, creating so-called dead zones, which are harmful to aquatic life. Sediment also depletes water of oxygen. To implement the TMDL, the Bay jurisdictions created state-specific plans called Watershed Implementation Plans, or WIPs. The WIPs provide detailed plans of specific pollutant reductions required of sectors such as agriculture and wastewater treatment. The WIPs track progress toward achieving two goals established in the TMDL—an interim goal of having 60% of cleanup practices and policies needed to attain water quality standards in place by 2017 and 100% of practices and policies in place by 2025. Each jurisdiction also established interim, two-year cleanup goals called milestones. The two-year milestones and progress reports are intended to be critical tools for holding the states and the federal government publicly accountable. WIPs provide states with flexibility to determine the mix of specific controls they deem appropriate to meet the overall reduction goals. The TMDL also embodies an adaptive management framework that allows states to modify their strategies to achieve reductions in the most efficient way.

The Chesapeake Bay TMDL has been controversial with a number of groups over concerns about implementation costs and fear that it will hamper economic growth. Challenges to the TMDL were brought by agricultural and home builder groups, who argued that EPA had exceeded its authority and impinged on the responsibilities of states to manage water quality. Federal courts rejected the challenges and upheld the TMDL.

2016 Evaluations of Progress

In June 2016, EPA provided evaluations of the jurisdictions' progress towards meeting their sector-specific 2014-2015 milestones and progress toward the 2017 and 2025 goals. EPA compared 2015 measured loads with 2009 levels, the year before the TMDL began. (EPA's evaluations are available at https://www.epa.gov/chesapeake-bay-tmdl/epa-oversight-watershed-implementation-plans-wips-and-milestones-chesapeake-bay.) For each jurisdiction, EPA evaluated these sectors: agriculture, urban/suburban stormwater, wastewater and combined sewer overflows (CSOs), onsite septic systems, and forestry.

In 2015, for the Chesapeake Bay basin as a whole, phosphorus loading was down 20%, nitrogen loading was down 7%, and sediment loading was down 7%, compared with 2009. However, reductions of specific pollutants in individual jurisdictions varied widely (see **Figure 1**). Collectively, the Bay jurisdictions are on track to meet the watershed-wide 2017 targets for phosphorus and sediment, but not nitrogen. While the goal is to achieve 60% of the load reduction by 2017, nitrogen is currently projected to be at only 46% of the 2017 targeted reduction. Looking toward the 2025 goal, EPA made the following assessments.

- The District of Columbia has essentially achieved the 2025 goals for nutrient and sediment reduction, but will need to place emphasis on the urban/suburban stormwater sector to stay on track.
- Delaware and Maryland are on track to meet the 2025 goals for phosphorus and sediment, but both need to make progress to limit nitrogen discharges, especially from the agriculture and stormwater sectors.
- West Virginia has essentially achieved the 2025 goals for sediment, but needs to make progress to limit nitrogen and phosphorus discharges by all sectors.
- Pennsylvania and New York need to significantly increase the level of effort to reduce loads of all three pollutants in order to meet the 2025 goals.
- Virginia is on track but needs to make progress to limit loadings of all three of the pollutants by 2025.

Figure 1. Chesapeake Bay Pollution Reduction Progress Toward 2025 Goals (By Jurisdiction)

(Million pounds/year)

	2009 Baseline	2015 Milestone	2017 Target	2025 Goal	% Reduction Needed 2015-2025
Jurisdiction	Nitrogen	Nitrogen	Nitrogen	Nitrogen	
DC	2.88	1.50	2.57	2.37	---
DE	4.47	4.03	3.82	3.39	15.9%
MD	51.95	48.09	45.48	41.17	14.4%
NY	10.72	10.97	9.60	8.85	19.3%
PA	116.64	112.91	94.05	79.00	30.0%
VA	68.13	58.76	58.80	52.59	10.5%
WV	5.47	5.45	5.20	5.02	7.9%
Total	**260.26**	**241.71**	**219.52**	**192.39**	20.4%
Jurisdiction	Phosphorus	Phosphorus	Phosphorus	Phosphorus	
DC	0.071	0.060	0.100	0.120	---
DE	0.345	0.270	0.304	0.277	---
MD	3.301	2.800	3.010	2.810	---
NY	0.956	0.770	0.768	0.642	16.6%
PA	4.984	4.260	4.136	3.571	16.2%
VA	8.672	6.520	7.310	6.402	1.8%
WV	0.899	0.670	0.741	0.635	5.2%
Total	**19.23**	**15.35**	**16.37**	**14.46**	5.8%
Jurisdiction	Sediment	Sediment	Sediment	Sediment	
DC	17	16	17	17	---
DE	99	78	99	100	---
MD	1,395	1,247	1,368	1,350	---
NY	332	327	315	305	6.9%
PA	2,644	2,459	2,225	1,945	20.9%
VA	3,743	3,574	3,448	3,251	9.0%
WV	445	335	402	373	---
Total	**8,675**	**8,035**	**7,875**	**7,341**	8.6%

Source: Calculations by CRS, from Chesapeake Bay Program, http://chesapeakeprogress.com/Data_2015_Reducing_Pollution_04-15-2016.xlxs.

EPA also evaluated progress by sectors in the watershed. In 2015, compared with 2009, agricultural sources reduced discharges of nutrients and sediment. Urban/suburban stormwater runoff loadings of nitrogen and sediment increased slightly, compared with 2009, while phosphorus loading declined. Discharges of all three pollutants from wastewater treatment and combined sewer overflow sources declined. Onsite septic system discharges of nitrogen increased slightly, and loading of all pollutants from forestry sources declined slightly.

In its 2016 evaluations, EPA found that the wastewater sector of Bay jurisdictions is on track to achieve the 2017 nitrogen load targets, but the agriculture, stormwater, and onsite septic sectors are off-target for meeting nitrogen reductions. For phosphorus, all sectors except urban/suburban stormwater achieved the 2017 targets. For sediment, the wastewater sector of the Bay jurisdictions achieved the 2017 targets, but the agriculture and urban/suburban stormwater sectors are off-target. Looking toward 2025, EPA made the following assessments.

- Agricultural sources and urban/suburban stormwater runoff sources need to make significant progress in reducing discharges of nitrogen, phosphorus, and sediment. Urban runoff is one sector that has shown increases in loadings—especially nitrogen—since 2009.
- Wastewater treatment and CSO sources of sediment discharges have essentially achieved the 2025 goals, but need to make progress to limit nitrogen and phosphorus.
- Onsite septic systems, a source of nitrogen discharges, need to make progress to achieve the 2025 goals.
- Forestry sources are on track to achieve the 2025 goals for all pollutants.

EPA works with and maintains oversight of the Chesapeake Bay jurisdictions to help them achieve pollution reduction goals on schedule. If a jurisdiction's progress is insufficient, EPA may take federal actions to get them back on track, such as using Clean Water Act authority to expand permit coverage to unregulated sources, increase federal enforcement and compliance, or redirect EPA grants.

Challenges

EPA and other stakeholders acknowledge that, despite progress on the Bay's cleanup efforts, challenges remain.

- Sectors and jurisdictions that are close to or have essentially attained the 2017 and 2025 goals will need to stay on track to maintain their progress, even as economic development and population growth occur.
- States will need to improve and accelerate implementation of priority best management practices (BMPs) in the agriculture and urban/suburban stormwater sectors, if they are to meet their future commitments.
- Perhaps the key challenge is providing adequate funding for wastewater infrastructure upgrades and improvements in several jurisdictions and BMP implementation throughout the Chesapeake Bay region.

Claudia Copeland, Specialist in Resources and Environmental Policy

IF10283

Disclaimer