

Sewage and Wastewater Plants in the Chesapeake Bay Watershed

21 Sewage Plants Violated Permit Limits in 2016; PA and VA Used Trading to Allow Pollution



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THE ENVIRONMENTAL INTEGRITY PROJECT

The Environmental Integrity Project (<http://www.environmentalintegrity.org>) is a nonpartisan, nonprofit organization established in March of 2002 by former EPA enforcement attorneys to advocate for effective enforcement of environmental laws. EIP has three goals: 1) to provide objective analyses of how the failure to enforce or implement environmental laws increases pollution and affects public health; 2) to hold federal and state agencies, as well as individual corporations, accountable for failing to enforce or comply with environmental laws; and 3) to help local communities obtain the protection of environmental laws.

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PHOTO CREDITS

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Executive Summary

Across the Chesapeake Bay watershed, 21 sewage treatment plants violated their permit limits last year by releasing excessive amounts of nitrogen or phosphorus pollution that fuel algal blooms and low-oxygen “dead zones” in waterways, according to an Environmental Integrity Project examination of federal and state records.¹ The plants in violation included 12 municipal sewage facilities in Maryland that treat more than half of the state’s wastewater, with the most pollution coming from the state’s largest two facilities: Baltimore’s Back River and Patapsco wastewater treatment plants. In West Virginia, six wastewater plants violated their permit limits in 2016; in Pennsylvania, two did; and in New York, one. In both Virginia and Pennsylvania, pollution credit trading systems allowed many plants that were over their limits to buy their way out of violations. The credit swaps in these Wall-Street style schemes reduce transparency and accountability and contribute to local pollution “hot spots” – for example, in Virginia’s Shenandoah Valley, where the waters are overloaded with phosphorus and algal blooms.²

Plant Upgrades:

Modernizing sewage treatment plants has proven over the last half century to be the most successful method of improving local water quality and the Chesapeake Bay. But the regional states have not invested equally in upgrading wastewater plants. Maryland has done more than many states – especially Pennsylvania, New York and Delaware – to upgrade its sewage



Maryland’s second largest sewage treatment plant, the Patapsco WWTP in Baltimore, discharged more than four times the permitted limit of nitrogen pollution into a Chesapeake Bay tributary in 2016 and twice permitted levels in 2017. A \$250 million upgrade was scheduled to be complete in 2014 but has suffered repeated delays.

treatment to state-of-the-art levels. But compliance with the law and permit limits remains a major problem in Maryland, and several wastewater treatment plant upgrade projects have fallen behind schedule for the bay cleanup plan (also called EPA’s bay pollution “diet” or Total Maximum Daily Load, TMDL). These include Maryland’s second largest sewage plant, the Patapsco Wastewater Treatment Plant south of Baltimore, which released 3.7

million pounds of nitrogen pollution last year – four times its permit limit. The problems continued into 2017, with the Patapsco plant by August already discharging more than twice as much nitrogen as permitted for the whole year, records show.

The state's largest, Baltimore's Back River Wastewater Treatment Plant, discharged 3.6 million pounds of nitrogen last year into a bay tributary, 29 percent more than its 2016 permit limit. Planned sewage plant upgrade projects in Salisbury and Frederick are also behind schedule, leading to more violations of permitted levels of pollution in 2016 and 2017, according to federal and state records. All of Maryland's large sewage plants were supposed to have completed enhanced upgrade projects by 2017, to help meet the targets of the bay cleanup.³ Maryland officials report that – despite the delays – the Patapsco plant's upgrades should be finished within a year, and the Back River plant's upgrades are now complete and should be fully tested and online by January 1, 2018. When these final large projects are finished, the state will have achieved its bay cleanup goals for sewage plants.⁴

West Virginia, like Maryland, also had some wastewater treatment plants in violation of their permit limits in 2016, with six facilities discharging excessive amounts of either nitrogen or phosphorus pollution. The largest of West Virginia's violators last year was the Berkeley County Opequon/Hedgesville sewage treatment plant, which released 70,912 pounds of nitrogen pollution, almost three times the legal limit, into Eagle Creek and Opequon Creek.

In New York state, one wastewater discharger, the Greene Composting Facility, discharged more phosphorus than permitted last year. Similar data were not available for Delaware.⁵

Pollution Trading: In Virginia, no municipal sewage treatment plant broke the law for discharging excessive amounts of pollution last year, according to the Virginia Department of Environmental Quality.⁶ But that was not because sewage plants in Virginia were necessarily cleaner or better run than those in Maryland, West Virginia, New York or other states. The difference was that Virginia, like Pennsylvania, uses a system of pollution trading. The system allows facilities that want to dump excess pollution into waterways do so, while avoiding legal jeopardy, if their operators send money (through the purchase of pollution credits) to other sewage plants, industrial facilities or farms that reduce their pollution below levels allowed by the EPA bay cleanup plan. According to the Virginia Department of Environmental Quality, 13 sewage plants in 2016 discharged a total of 321,275 pounds of nitrogen into the Chesapeake Bay in excess of the limits for their individual plants, and 14 plants discharged 26,696 pounds of phosphorus over their limits.⁷ But these were not violations or illegal discharges, because state law permitted them to buy credits from the Virginia Nutrient Credit Exchange Association and other sellers.

Maryland is considering regulations to encourage a similar pollution trading scheme. But the problem with such systems is that they undermine accountability and can lead to pollution "hot spots" in local streams. In Virginia, for example, because of trading, the Strasburg Sewage Treatment Plant released 2,942 pounds of phosphorus, more than three times its permitted limit, into the North Fork of the Shenandoah, which also has excessive levels of the nutrient. And the Front Royal Wastewater Treatment Plant dumped 9,146 pounds of phosphorus, more than twice its limit, into the Shenandoah. The nonprofit

Shenandoah and Potomac Riverkeeper organizations filed a lawsuit on May 30 in federal court, alleging that Virginia had failed to update water quality standards to protect the North and South Fork of the Shenandoah from algae blooms caused by nutrient pollution.⁸ A trading system designed to help the overall bay can hurt smaller, local waterways like the Shenandoah.

Pennsylvania also engages in pollution trading, using a problem-riddled system that makes transparency nearly impossible. The commonwealth's wastewater plants frequently buy credits to allow them to discharge more pollution into waterways than normally permitted. But then the plant operators often fail to report this information to an online enforcement database that allows the public and regulators to tell who is following the rules, according to the Pennsylvania Department of Environmental Protection (DEP).⁹ In 2016, nine wastewater plants in the state appeared to have discharged more nitrogen and phosphorus pollution than permitted, when EIP looked at the public database. But many of these plants purchased credits without also reporting the impact of the purchases on their net pollution load into the enforcement database— making accounting difficult and the system opaque. In reality, only two PA wastewater plants – not nine -- were in violation last year because they failed to buy enough pollution credits to bring them back into compliance, according to an inquiry by DEP that was prompted by EIP's questions. The two in violation last year were the Newport Borough sewage plant (which did not buy enough pollution credits to compensate for its excess nitrogen and phosphorus discharges) and the Mahanoy City plant (which didn't buy enough phosphorus credits), according to DEP.

Recommendations: This report, which was compiled from a review of state and federal records and interviews with officials across the Chesapeake Bay watershed, analyzes data from municipal and industrial wastewater dischargers in 2016 and provides recommendations on how the bay states could better manage this water pollution. The recommendations are:

1. The bay region states should more consistently fine wastewater treatment plants and other polluters that violate their permit limits.
2. Pollution trading systems, like those of Virginia and Pennsylvania, should be avoided in Maryland and other states not already employing them because they can lead to reduced accountability and increased local pollution “hot spots.”
3. States that do allow facilities to engage in pollution trading should require the plants to accurately and promptly report, to public databases, credits purchases and their impact.
4. EPA should press bay region states to upgrade more of their large municipal wastewater treatment plants with state-of-the art technology. This is especially true in Pennsylvania, New York and Delaware, which have not upgraded their sewage plants to the same enhanced level as many in Maryland, Virginia and the District of Columbia.

Progress Toward Modernizing Sewage Treatment Plants

In many ways, Maryland has been a regional leader in investing public money to reduce pollution from sewage treatment plants. On May 26, 2004, Governor Robert Ehrlich signed into law the Chesapeake Bay Restoration Fund (also called the “flush tax” law). This law imposed a fee of \$2.50 per month on most households to fund the modernization of the state’s 67 largest municipally-owned sewage treatment plants to state-of-the-art levels, called “enhanced nutrient removal” or ENR. (This means the systems are designed to discharge less than 3 mg/liter nitrogen and .3 mg/liter dissolved phosphorus). The goal was to dramatically reduce the amount of nitrogen and phosphorus pollution feeding algal blooms and low oxygen “dead zones” in the bay.¹⁰

According to the Maryland Department of the Environment (MDE), 53 of the 67 sewage plant upgrade projects have been completed, eliminating 6.3 million pounds of nitrogen and 500,000 pounds of phosphorus annually.¹¹ Eleven more projects are under construction or in testing phases, including the state’s largest, Baltimore’s Back River Wastewater Treatment Plant, which the state predicts should be fully tested and online by the end of the year, and Baltimore’s Patapsco Wastewater Treatment Plant, which is expected to be finished in mid 2018. Three more projects have not yet started and are still in the design or planning stages.¹² These remaining 14 incomplete projects are so large that the state is looking to them to achieve about half of Maryland’s planned reductions of nitrogen and phosphorus from sewage plants. Maryland officials expect the state will achieve another five million pounds of nitrogen pollution reductions and 403,598 pounds of phosphorus reductions when these final projects are finally completed.¹³

Virginia and other bay region states have also invested in modernizing sewage plants, but the levels of effort among the states have not been the same. While Maryland has paid about \$1.25 billion to upgrade 79 percent of its large municipal sewage plants to enhanced (ENR) levels, Virginia has invested about \$800 million to improve about 44 percent (40 of 90) of its large municipal sewage plants to similar standards.¹⁴ In Pennsylvania, most plants have been upgraded to a lower level. Only 4 percent (7 of 189) of the large- to medium-sized municipal sewage treatment plants in the bay watershed of Pennsylvania have enhanced pollution control systems, according to EPA data.¹⁵ Washington DC’s one sewage plant – Blue Plains, bay’s region’s largest – has been upgraded to an enhanced level. In West Virginia, about half (6 out of 13) of wastewater plants have been modernized to this standard. In New York and Delaware, it’s zero percent (none out of 26 in New York and zero out of 3 in Delaware).

Overall, across the Chesapeake watershed since 1985, the states and District of Columbia have invested more than \$7 billion to upgrade sewage treatment plants, reducing their overall nitrogen pollution into the bay by 57 percent and phosphorus by 75 percent, according to EPA.¹⁶ More cleanup progress has been made in this pollution sector than any other. Wastewater was the source of only 16 percent of the nitrogen pollution in the bay in 2015, down from 28 percent in 1985. That’s far less than the 45 percent of nitrogen pollution in the bay from farm fields, a relatively constant figure over the last three decades; and slightly less than the 17 percent of the nitrogen pollution from suburban and urban runoff in

2015, which is up from 11 percent in 1985, according to EPA.¹⁷ Phosphorus pollution in the bay has experienced similar trends for the wastewater sector.

In terms of bay cleanup plans for the year 2025, the Maryland Department of the Environment reports that the state is one million pounds short of achieving its nitrogen pollution reduction goals from the sewage and wastewater sector and has already achieved its goal for phosphorus pollution from this sector.¹⁸ Once the Back River and Patapsco plant upgrade in Baltimore are fully tested and operational, the state’s overall TMDL goals from this sector will be more than achieved, according to MDE.

Examination of 2016 Pollution Data from Wastewater Plants

Just because the sewage and wastewater sector, as a whole, has made progress over the last four decades does not mean that all plants are meeting their permit limits or that upgrade projects have kept pace with the goals of the Chesapeake Bay cleanup plan. To examine these issues, the Environmental Integrity Project (EIP) reviewed Discharge Monitoring Report data from 487 significant municipal and industrial waste dischargers in EPA’s Enforcement and Compliance History Online (ECHO) database and Virginia’s 2016 published nutrient loads. (For more on methodology, see Appendix A). As part of the Bay cleanup plan, each sewage plant is given a target (called a “Waste Load Allocation”) that they are supposed to meet by 2025 to restore the estuary to health. Table 1 (below) shows the number of plants that were not meeting their targets as of 2016, according to our analysis. It should be noted that a plant’s bay cleanup goal for 2025 is not always the same as its annual permit limit for 2016 (or sometimes interim pollution limits set by consent decrees).¹⁹ Twice as many plants across the bay watershed exceeding their long-term bay cleanup goals last year as violated their permit limits.

Table 1: Number of Plants Exceeding Bay Cleanup Goals for 2025

State	Number of Significant Dischargers	Number of Facilities Exceeding Nitrogen Pollution Goals	Number of Facilities Exceeding Phosphorus Pollution Goals
MD	84	10	9
DC	1	0	0
VA	140	18	18
PA	212	9	10
NY	30	1	7
DE	4	*	*
WV	16	4	6
Total	487	42	50

Note: This chart reflects pollution discharges in 2016. “Bay Cleanup Goals” here refers to Waste Load Allocations under the Chesapeake Bay Total Maximum Daily Load (TMDL), which are targets for pollution reductions by 2025. Not all states have agreed to the same goals for their plants, with Pennsylvania and New York, for example, generally setting more modest targets for their sewage plants and upgrading them to lower levels than Maryland or Virginia.²⁰

** Loads for the Delaware facilities could not be calculated because data was not available in EPA’s ECHO database. See Appendix A.*

Wastewater Plants in Maryland

EIP reviewed discharge monitoring data for 84 significant municipal and industrial wastewater dischargers in Maryland, and identified 12 different wastewater plants that discharged nitrogen or phosphorus pollution in excess of their annual permit limits in 2016. Eight wastewater plants discharged nitrogen in excess of their limits last year; and nine plants released too much phosphorus. The same plants sometimes appear on both lists, so the total number in violation is only 12, not counting duplications.

By volume, the plant that released the most pollution – by far -- was Baltimore’s Patapsco sewage treatment facility, which also had the worst permit exceedances, as gauged by percentage over permit limits for nitrogen and phosphorus.

Several of Maryland’s sewage plants have entered into legal agreements with MDE while they upgrade their facilities. According to these legal agreements, facilities have been given the green light to discharge up to twice as much nitrogen and phosphorus as their permits allow before MDE can start assessing penalties. These temporary legal limits are called interim performance standards. Three plants—Patapsco WWTP, Salisbury WWTP, and Frederick City WWTP—exceeded even these relaxed performance standards for nitrogen pollution last year, and Patapsco also exceeded its interim standard for phosphorus. In 2017, all three of these plants exceeded their annual permit limits for nitrogen pollution months before the year ended.

Tables 2 and 3 show the large wastewater plants in Maryland that still need to reduce pollution, how much nitrogen and phosphorus they discharged in 2016, and how those discharges compared to their annual permit limits for that year.

Table 2. Maryland Sewage Plants Exceeding Permit Limits for Nitrogen, 2016

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Permit Limit (lbs)	Percent Over Limit	Main Receiving Waterway
Patapsco WWTP* (Baltimore)	3,704,300	889,300	317%	Patapsco River
Back River WWTP (Baltimore)	3,618,282	2,799,655	29%	Back River
Westminster WWTP (Westminster)	71,619	60,911	18%	Upper Little Pipe Creek
Salisbury WWTP* (Salisbury)	416,651	103,549	302%	Wicomico River
Frederick City WWTP* (Frederick)	199,962	97,458	105%	Monocacy River
Chesapeake Beach WWTP* (Chesapeake Beach, MD)	25,542	18,273	40%	Herring Bay
Cox Creek WRF*	277,643	182,734	52%	Patapsco River

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Permit Limit (lbs)	Percent Over Limit	Main Receiving Waterway
(Curtis Bay, MD)				
Marlay-Taylor WWTP* (Lexington Park, MD)	84,816	73,093	16%	Saint Jerome Creek

* Indicates facilities that had interim performance standards, as set by consent decrees or agreements, in addition to permit limits, in 2016. The following were the the interim performance standards for nitrogen last year: Patapsco WWTP (1,778,600 lbs), Salisbury WWTP (372,600 lbs), Frederick City WWTP (194,916 lbs), Chesapeake Beach WWTP (36,546 lbs), Cox Creek WRF (365,468 lbs), Marlay-Taylor WWTP (146,186 lbs).

Table 3. Maryland Sewage Plants Exceeding Permit Limits for Phosphorus, 2016

Facility (Location)	Phosphorus Pollution Discharged (2016, lbs)	Permit Limit (lbs)	Percent Over Limit	Main Receiving Waterway
Fruitland WWTP (Fruitland)	1,070	731	46%	Wicomico River
Patapsco WWTP* (Baltimore)	170,100	66,700	155%	Curtis Creek
Salisbury WWTP (Salisbury)	9,467	7,766	22%	Wicomico River
Naval Support Facility Indian Head WWTP (Indian Head)	461	457	1%	Potomac River
Taneytown WWTP* (Tanyetown)	1,040	1,005	3%	Piney Creek
Frederick City WWTP* (Frederick)	13,860	7,309	90%	Monocacy River
Cox Creek WRF* (Curtis Bay)	22,996	13,705	68%	Patapsco River
Marlay-Taylor WWTP* (Lexington Park)	7,236	5,482	32%	Saint Jerome Creek
Northeast River Advanced WWTP* (Charlestown)	1,915	1,777	8%	Northeast River

* Indicates facilities that had interim performance standards, as set by consent decrees or agreements last year. The following were the interim performance standards for phosphorus in 2016: Patapsco WWTP (133,400 lbs), Taneytown WWTP (2,010 lbs), Frederick City WWTP (14,618 lbs), Cox Creek WRF (27,410 lbs), Marlay-Taylor WWTP (10,964 lbs), Northeast River Advanced WWTP (3,554 lbs).

Officials at the Maryland Department of the Environment said in an email on October 30, 2017, that the agency is evaluating the pollution exceedances outlined in this report and “expects to issue stipulated penalties for ENR violations” as specified by the law and court consent orders.²¹

“In general, project delays are due to the complexity of the upgrades, as Maryland is upgrading its wastewater treatment plants to the limit of technology while ensuring the continued operation of these facilities during construction,” said Jay Apperson, Deputy Director of the Office of Communications at the agency. “MDE continues to encourage facilities to complete the ENR upgrade as soon as possible by setting specific compliance schedules, entering into consent orders and assessing stipulated penalties.”

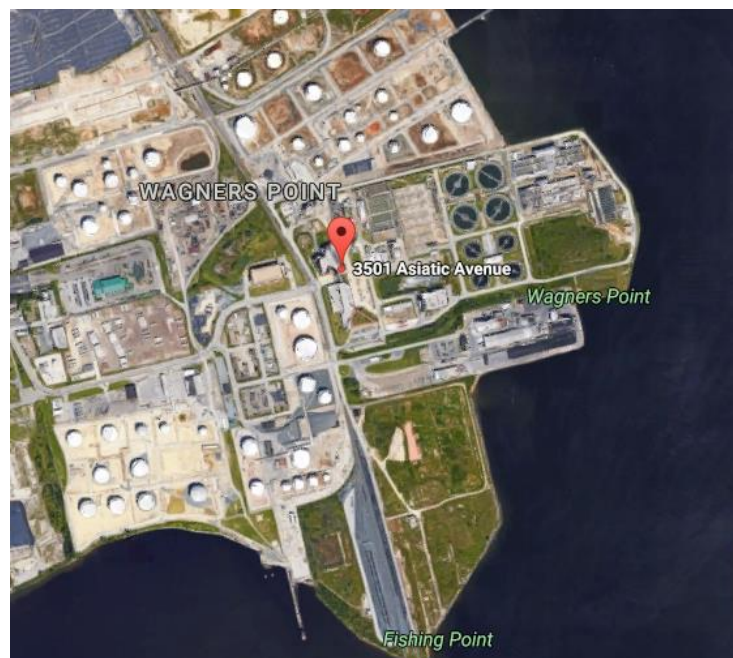
Ben Grumbles, Maryland Secretary of the Environment, said in a written statement: “Maryland is a national leader on environmental protection and clean water infrastructure. Our commitment to the Chesapeake Bay is stronger than ever and so is our willingness to work with communities as technical, engineering and financial challenges arise. We’ll continue to push hard for getting results, meeting deadlines and enforcing compliance.”²²

Patapsco Wastewater Treatment Plant

Owned by Baltimore in the Wagner’s Point area of the far southern city near Curtis Bay, the Patapsco Wastewater Treatment Plant is the second largest in Maryland, with a capacity to treat 88 million gallons of wastewater a day. The Patapsco sewage plant discharged 3.7 million pounds of nitrogen pollution into the Patapsco River in 2016, which was four times its permit limit, and more than double the interim limit of 1.8 million pound as established by a court consent order. The plant also discharged 170,100 pounds of phosphorus in 2016, which was more than double its permit limit and 28 percent above its more relaxed interim limit, according to EPA data.

The violations continued in 2017, with the plant discharging more than 2.2 million pounds of nitrogen pollution as of August, which was more than double its permitted limit for the entire calendar year, according to federal and state records. The plant by August had also released 41 percent more phosphorus than is permitted in the whole year.

Inspection reports on file with MDE show numerous violations at the 77-year-old plant, stretching back years. The problems include sewage overflows; illegal bacteria and phosphorus discharges into the Patapsco River; globs of foul-smelling fat and grease being released into the waterway because skimmers on treatment



The Patapsco Wastewater Treatment Plant at 3501 Asiatic Avenue in the Wagner's Point area of Baltimore discharged 3.7 million pounds of nitrogen pollution into the Patapsco River in 2016, more than four times its permit limit.

tanks failed (a recurring problem); a lack of proper certification for plant operators; and quality control problems with the city's water testing labs, state records indicate.²³

An MDE inspection report from February 23, 2016, documents the following: "15 effluent violations for total nitrogen for June to December 2015 and 13 total phosphorus violations for the same period. There were 2 violations for enterococcus (bacteria) for the year 2015 as well."

The state permit for the Patapsco plant required the city to modernize it to state-of-the-art levels by June 30, 2014, so that the facility could comply with tighter permit limits by January 1, 2015, according to an August 12, 2014, inspection report by MDE. "The facility has failed to comply with meeting the construction deadline," the MDE report said. As a result, the city and state entered into a consent agreement with a revised deadline of Dec. 31, 2016 for a plant upgrade. But then the city missed that revised deadline. Part of the reason for the repeated and costly delays in the \$250 million project was a court battle between contractors over "defective pipe system designs" and allegedly poor planning for the project, according to court records.²⁴

MDE fined the city for some of the problems at the plant, but the penalties were light: \$5,000 in January 2015, and then another \$20,000 in May 2016, according to state and EPA records.²⁵

Jeffrey Raymond, spokesman for the Baltimore Department of Public Works, provided an update on the project's status in an email on October 19, 2017: "The (upgrade) ENR work at Patapsco Wastewater Treatment Plant will be completed by the summer of 2018, more than three years after the original target date. Construction and contractor issues on this very complex project led to delays, but the City of Baltimore is confident we will end up with a facility ... built to the highest standards. It is expected to remove about 2.7 million pounds of nitrogen from effluent annually."²⁶

MDE said it expects the upgraded treatment system at the Patapsco plant to be in operation by the end of 2018.²⁷

Back River Wastewater Treatment Plant

The Back River Wastewater Treatment Plant, located east of Baltimore at 8201 Eastern Ave. in Dundalk, is the largest in Maryland, with the capacity to treat 180 million gallons of wastewater a day from Baltimore city and county. The plant discharged 3.6 million pounds of nitrogen into Back River in 2016, which was 29 percent over its permit limit and 65 percent over the goal for eight years from now under the Chesapeake Bay cleanup plan.

MDE inspection records for the plant show a history of sewage overflows, including 2.4 million gallons on August 14, 2011, and of 50,000 gallons on June 11, 2013. A March 2014 inspection report found 15 violations at the facility, including for excessive phosphorus pollution and releases of suspended solids. MDE penalized the city \$800 for violations at the plant in May 2012 and another \$20,000 in June 2016.



Maryland's largest sewage plant, the Back River wastewater facility, discharged 29 percent more nitrogen water pollution than permitted in 2016. Baltimore officials said in October 2017 they completed a \$263 million upgrade to the plant which should be fully tested and online by December 31, 2017.

Baltimore faced a deadline of December 31, 2016, for finishing a \$263 million enhanced upgrade of Back River to eliminate 2.2 million pounds of nitrogen water pollution per year. But the city missed that deadline.

Jeffrey Raymond, the spokesman for the Baltimore Department of Public Works, wrote in an email on October 25, 2017 that the upgrade project should be online by Dec. 31. "The system went operational last month, but is still in a testing period. We expect to accept the system by the end of the year," Raymond said. The construction "came in a year later than anticipated due to 'constructability' issues," He said, explaining the issues this way: "Some of the items of work in the contract included rehabilitation of the existing facilities. Since it is not possible to take the entire facility out of service, the contractor was only allowed to work on small sections at a time. That resulted in additional time required."

Salisbury Wastewater Treatment Plant

The Salisbury Wastewater Treatment Plant, in Wicomico County on the Eastern Shore, has the capacity to treat about seven million gallons of wastewater a day (including about a million gallons daily from a local Perdue Farms poultry processing plant).

The Salisbury plant has a long history of violations, including in 2016, when the plant discharged 416,651 pounds of nitrogen pollution into a tributary to the Wicomico River, according to EPA data. That was four times its permit limit and also higher than a more relaxed interim limit set by the state. The facility also discharged 9,467 pounds of phosphorus last year, which was 22 percent above its permit legal limit.

In 2017, the Salisbury plant also violated its permit limits. From January through September of this year, it discharged more than three times the total amount of nitrogen that it is allowed to release in a full year, according to state and federal records.

A review of MDE inspection records for the plant show an extensive list of problems stretching back years, including a plant superintendent not certified to supervise the facility in 2016. In addition, a June 26, 2017, letter from MDE to the city of Salisbury described 15 sewage overflows from the plant from May 2013 to December 2016. The letter also detailed 63 permit limit violations for excessive releases of nitrogen, copper and chlorine. The plant on September 29, 2016, released 177,880 gallons of sewage into the Wicomico River during a rainfall. More than 76,000 gallons overflowed on June 30, 2016, due to a construction error, according to state records.²⁸

Between 2005 and 2010, Salisbury spent more than \$80 million on a major upgrade and rebuilding of the plant. But the improvements did not work as advertised to reduce nitrogen pollution, triggering a lawsuit and protracted legal battle between the city and the contractors. Meanwhile, pollution kept flowing into the Wicomico River, inspiring the state to slap \$333,750 in fines on Salisbury from 2012 through 2017, according to EPA records.

“It was a failed design,” said Salisbury Mayor Jacob Day of the upgrade to the sewage treatment plant.²⁹ “I don’t mean to disparage them (the contractor), but to think that anyone could design something like that and for it to not even come close to meeting the standards is very shocking,” Day said.

The city is now building yet another new version of the sewage plant to replace the failed upgrade. Local officials expects it to be completed by May of 2018, Day said. That would be about five months later than the December 2017 completion date that state officials expected.³⁰ Day said he was optimistic that the city will successfully finish the project, despite the rocky road: “We are excited to finally have a facility that we can be proud of, in terms of its footprint and its impact on the Wicomico River,” Day said.



The Salisbury Wastewater Treatment Plant has a long history of water pollution violations, including in 2016 for discharging four times more nitrogen than the permitted limit and in 2017 for releasing at least three times too much. An upgrade to the plant is behind schedule.

Frederick Wastewater Treatment Plant

The Frederick City Wastewater Treatment Plant is a 31-year-old sewage facility at 850 New Design Rd. in north-central Maryland that can treat about eight million gallons of wastewater a day. In 2016, the plant discharged 199,962 pounds of nitrogen into the Monocacy River, which was more than double the plant’s permitted limit and also more than allowed under interim standards set by the state.

The violations continued in 2017, with the plant releasing from January through September 130,249 pounds of nitrogen, which was a third more than permitted for the entire year. MDE inspection records show repeated failure of the plant to meet pollution limits in recent years. Frederick signed a consent decree with the state that required upgrades to the plant by July 31, 2011, to bring it to state-of-the-art pollution control standards. In theory, the upgrades should remove 97,364 pounds per year of nitrogen pollution into the Monocacy River, and 41,396 pounds per year of phosphorus.

But the city has repeatedly failed to meet the construction deadline. The state fined the city \$1,600 for the plant's problems in April 2015. The facility remained "out of compliance" as of May 31, 2017, according to state records.³¹

Stona Cosner, Superintendent of the Frederick sewage plant, said a planned \$45 million upgrade project to bring the facility back into compliance with the law has been delayed for a number of reasons.³² First, there was an extended back-and-forth between the city, county and state about how large to build the new sewage plant, with greater capacity meaning higher costs for ratepayers – which the city wanted to avoid, Cosner said. In the end, the city settled on a smaller, less expensive plant. "We just wanted to do it right," Cosner said.



The Monocacy River, a popular spot for fishing and kayaking, received 199,962 pounds of nitrogen pollution in 2016 from the Frederick City sewage treatment plant, which was more than permitted by law.

The sewage plant is being built on top of a former trash landfill. When construction workers dug into it, they encountered sinkholes and irregular terrain that delayed the process and required extra stabilization efforts, Cosner said. A lawsuit by a neighboring landowner also slowed the upgrade project.³³

The 2016 nitrogen pollution violation at the plant happened because the plant's managers had to deactivate one of the treatment reactors during construction, which reduced the plant's capacity, Cosner said. At the same time, heavy rains hit in March 2016, which overwhelmed the sewage system. The upgrade project is now about a year behind schedule.³⁴ "The contractor is now asking for an extension – and it's highly likely that this project will run to July 2018," Cosner said.

Westminster Wastewater Treatment Plant

The Westminster Wastewater Treatment Plant, located northwest of Baltimore, has the capacity to treat five million gallons of sewage a day. The facility discharged 71,619 pounds of nitrogen pollution into the Upper Little Pipe Creek in 2016, which was 18 percent over its permit limit.

MDE inspection reports from March 28, 2017, and November 9, 2016, describe the Westminster plant as being “noncompliant” with its permit conditions. The state fined the plant \$2,000 in February 2013 and another \$7,200 in January 2015.

The city of Westminster had been scheduled to start an enhanced upgrade project at the sewage plant by December 1, 2010, to be completed by April 1, 2012. “Due to unforeseen delays, the facility was not able to start the actual construction,” an MDE inspection report said. After the state found the facility to be in violation of its permit, MDE signed a consent decree with the city on November 12, 2011, with a new schedule that would have construction start on March 1, 2016, to be completed by September 1, 2019.

Westminster Mayor Joe Dominic said in an email on October 27, 2017, that the city is also behind in this new schedule, with construction on the \$40 million project not expected to start until the spring or summer of 2018, with completion likely in 2021.³⁵ The old plant has violated its permit limits every year since 2013, Mayor Dominic said, because the state calibrated the pollution limits to match an upgrade project that has still not yet happened. The delays have been caused in part because of personnel changes in the wastewater division, shifts in local priorities, and “financing decisions related to other large projects,” Dominic said.



The Westminster Wastewater Treatment Plant has violated its permit limits every year since 2013 because a planned \$40 million upgrade project has been repeatedly delayed, with completion now expected in 2021.

Wastewater and Pollution Trading in Virginia

Virginia allows wastewater treatment plants in the Chesapeake Bay watershed to engage in pollution trading as part of its 2005 Chesapeake Bay Watershed Nutrient Credit Exchange Program and its General Permit for nutrient trading.³⁶ Plants can legally exceed their permit

limits for discharging nitrogen or phosphorous pollution if they buy credits from other facilities or farms to meet their bay cleanup goals.

Under Virginia's nutrient trading program, each facility (or group of commonly owned facilities) can trade credits that are based on "*delivered* load." Delivered load means the amount of nitrogen or phosphorus pollution that reaches the Chesapeake Bay, and it may be less than the total amount discharged at the facility because not all discharged nitrogen and phosphorus travels all the way to the bay. Facilities close to the bay, for example the Eastern Shore's Tangier Island Wastewater Treatment Plant, will have delivered loads that are identical to actual load (the actual amount of pollution discharged). Facilities further inland will have delivered loads that are lower than actual loads (adjusted by a percentage formula, based on their distance from the bay). For example, the Virginia Department of Environmental Quality estimates that only 61 percent of the nitrogen discharges from the Shenandoah Valley's Front Royal Sewage Treatment Plant reach the bay, and so its delivered load (to the bay) is 61 percent lower than its actual load (to the local Shenandoah River).

Trades must generally be between sewage plants or farms that discharge to the same tributaries. However, some of the tributary-based trading areas are very large – with the Potomac River basin, for example, encompassing the entire Shenandoah River system, as well as all the streams that flow into the Potomac on the distant Northern Neck. This means that trades within a region could cause a worsening in water quality in a local stream, which may already be impaired or threatened by other pollution sources, such as farm runoff, while any benefits of the exchange could be far away. The situation for the Eastern Shore is even worse, because sources in this area are authorized to purchase credits from the Potomac and Rappahannock tributaries, which are on the western side of the bay. This means that the excess pollution load will be on the Eastern Shore, while the benefits of trading (in the form of cleaner water) will occur on the other side of the bay.

The following is an example of the pollution "hot spots" that can happen under this pollution trading system. Last year, a pollution credit swap allowed the Strasburg Sewage Treatment Plant in the Shenandoah Valley to release 2,942 pounds of phosphorus last year, more than three times its permitted limit, into the North Fork of the Shenandoah, which already has excessive levels of phosphorus and suffers from algal blooms. The Front Royal Wastewater Treatment Plant released 9,146 pounds of phosphorus, more than twice its limit, into the Shenandoah.

A third wastewater plant in the Shenandoah Valley near Harrisonburg, the Massanutten Sewage Treatment Plant, last year used trading to discharge 5,188 pounds of phosphorus pollution, almost three times its permitted limit, into the South Fork of the Shenandoah River. But, a nonprofit clean water organization, the Shenandoah Riverkeeper, filed a legal challenge to the plant's permit in state court, and won a victory. The Virginia Department of Environmental Quality in May 2017 issued a new permit that prohibited the facility from pollution trading and established numeric limits to plant's nitrogen and phosphorous pollution, as well as a timeline for the owners to upgrade their plant.³⁷ In 2016, 18 wastewater dischargers in Virginia exceeded their permit limits for nitrogen. Nineteen exceeded their permit limits for phosphorus. But all of them purchased enough pollution

credits to stay in compliance with their permits, according to the Virginia Department of Environmental Quality.³⁸

Table 4. Virginia Facilities Exceeding Permit Limits for Nitrogen, 2016

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Nitrogen Pollution Delivered to Chesapeake Bay (lbs)	Permit Limit* (lbs)	Percent Over Limit	Main Receiving Waterway
Lake Monticello STP (Palmyra, VA)	73,833	49,468	12,182	306%	Rivanna River
Urbanna WWTP (Urbanna, VA)	2,954	2,954	1,218	143%	Rappahannock River
Strasburg STP (Strasburg, VA)	26,880	11,558	5,134	125%	North Fork Shenandoah
Shore Memorial Hospital (Nassawadox, VA)	2,659	2,659	1,218	118%	Nassawadox Creek
Front Royal STP (Front Royal, VA)	95,216	58,082	29,725	95%	Shenandoah River
Grief Packaging Inc. (Amherst, VA)	126,488	82,217	47,610	73%	James River
Covington STP (Covington, VA)	87,821	18,442	11,512	60%	Jackson River
Tangier Island WWTP (Tangier, VA)	1,883	1,883	1,218	55%	Chesapeake Bay
So. Central Wastewater Authority WWTF (Petersburg, VA)	480,597	480,597	350,239	37%	Appomattox River
Fredericksburg WWTF (Fredericksburg, VA)	74,127	74,127	54,820	35%	Rappahannock River
Buena Vista STP (Buena Vista, VA)	53,901	30,185	23,024	31%	Maury River
WestRock CP LLC- West Point (West Point, VA)	339,016	339,016	259,177	31%	Pamunkey River
Montross- Westmoreland WWTP (Montross, VA)	2,043	1,512	1,172	29%	Rappahannock River
Town of Broadway WWTF (Timberville, VA)	35,260	6,699	5,601	20%	North Fork Shenandoah River
E.I. Dupont-Spruance (Richmond, VA)	227,597	227,597	207,080	10%	James River
GP Big Island LLC (Big Island, VA)	132,527	79,516	73,493	8%	James River
Camp Red Arrow WWTF	81	40	38	5%	Mountain Run

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Nitrogen Pollution Delivered to Chesapeake Bay (lbs)	Permit Limit* (lbs)	Percent Over Limit	Main Receiving Waterway
(Culpeper, VA)					
Reedville S.D. WWTP (Reedville, VA)	2,538	2,538	2,436	4%	Lower Chesapeake Bay

* Based on the amount delivered to the Chesapeake Bay

Table 5. Virginia Plants that Exceeded their Permit Limits for Phosphorus, 2016

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Phosphorus Pollution Delivered to Chesapeake Bay (lbs)	Permit Limit * (lbs)	Percent Over Limit	Main Receiving Waterway
Dominion-Chesterfield (Chester, VA)	2,454	2,454	210	1069%	James River
Urbanna WWTP (Urbanna, VA)	652	626	87	620%	Rappahannock River
Lake Monticello STP (Palmyra, VA)	6,832	4,509	1,000	351%	Rivanna River
Massanutten PSC STP (McGaheysville, VA)	5,188	2,750	727	278%	South Fork Shenandoah
Strasburg STP (Strasburg, VA)	2,942	1,731	474	265%	North Fork Shenandoah
Tangier Island WWTP (Tangier, VA)	288	276	87	217%	Chesapeake Bay
Reedville S.D. WWTP (Reedville)	523	513	179	187%	Lower Chesapeake Bay
Buena Vista STP (Buena Vista, VA)	9,338	6,163	2,261	173%	Maury River
Front Royal STP (Front Royal, VA)	9,146	4,939	1,974	150%	Shenandoah River
Oakland Park STP and Hopyard Farms WWTF (King George, VA)	1,070	1,069	576**	86%	Rappahannock River
Shore Memorial Hospital (Nassawadox, VA)	141	135	87	55%	Nassawadox Creek
E.I. Dupon-Spruance (Richmond, VA)	12,017	1,2017	7,816	54%	James River
Montross-Westmoreland WWTP (Montross, VA)	156	144	109	32%	Rappahannock River

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Phosphorus Pollution Delivered to Chesapeake Bay (lbs)	Permit Limit * (lbs)	Percent Over Limit	Main Receiving Waterway
Fredericksburg WWTF (Fredericksburg, VA)	5,154	5,154	4,112	25%	Rappahannock River
WestRock CP LLC- West Point (West Point, VA)	58,635	58,635	56,038	5%	Pamunkey River
VA Poultry Growers Cooperative- Hinton (Hinton, VA)	1,419	752	727	3%	South Fork Shenandoah River
Hopewell RWTF (Hopewell, VA)	77,584	77,584	76,139	2%	James River
Stoney Creek S.D. STP (Basye, VA)	672	356	354	1%	Stoney Creek

* Based on to the amount delivered to the Chesapeake Bay

** Aggregate limit

Many facilities with common ownership that discharge to the same watersheds in Virginia do not have individual, enforceable permit limits. Instead, they share an aggregate enforceable limit based on their collective delivered loads to the Chesapeake Bay. These aggregate limits allow a municipality or county government to essentially “trade” with itself before having to purchase credits from someone else to remain in compliance. This kind of a system can jeopardize local water quality.

For example, the Augusta County Service Authority owns eight sewage treatment plants that discharge to tributaries of the Shenandoah River. These plants, together, are not allowed to deliver more than 21,383 pounds of nitrogen and 10,012 pounds of phosphorus to the bay each year. Neither limit was exceeded in 2016. But, each individual plant also has an individual, unenforceable limit on its actual discharges to local waterways. Two of the eight sewage treatment plants—Weyer’s Cave and Mt. Sidney—exceeded their individual local limits for nitrogen in 2016, while six discharged less than their individual local limits. No pollution credit purchases were required to offset the loads from the two plants that discharged in excess of their local limits. Instead, Virginia’s nutrient trading and permit system allowed the Augusta County Service Authority to *generate* 11,687 nitrogen credits that it could then sell, even though two of its eight plants exceeded local limits.

In total, ten facilities exceeded their local limits for nitrogen and nine plants exceeded local limits for phosphorus (Tables 6 and 7). None of these plants needed to purchase pollution credits to remain in compliance because their discharges were regulated as part of an aggregate total.

Table 6. Facilities that Discharged Nitrogen in Excess of their Local Limits but did not Need to Buy Pollution Credits, 2016

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Local Limit* (lbs)	Percent over local limit	Main Receiving Waterway
Weyers Cave STP (Weyers Cave, VA)	16,076	6,091	164%	North River
Okland Park STP (King George, VA)	3,738	1,706	119%	Rappahannock River
West Point STP (West Point, VA)	22,795	10,964	108%	Mattaponi River
Chesapeake-Elizabeth STP (Virginia Beach, VA)	1,690,980	1,100,000	54%	Lower Chesapeake Bay
Purkins Corner WWTP (King George, VA)	1,573	1,096	44%	Potomac River
FMC WWTF (Fredericksburg, VA)	57,947	48,737	19%	Rappahannock River
Virginia Initiative STP (Norfolk City, VA)	837,575	750,000	12%	Elizabeth River
Ashland WWTP (Ashland, VA)	38,581	36,547	6%	South Anna River
Boat Harbor STP (Newport News, VA)	773,188	740,000	4%	Hampton Roads Channel
Mt. Sidney STP (Mt. Sidney, VA)	8,756	8,543	2%	Middle River

* Local limits apply to the amount of pollution discharged to local waterways, but they are not permit limits.

Table 7. Facilities that Discharged Phosphorus in Excess of their Local Limits but did not Need to Buy Pollution Credits, 2016

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Local Limit* (lbs)	Percent Over Local Limit	Main Receiving Waterway
West Point STP (West Point, VA)	3,991	731	446%	Mattaponi River
Weyers Cave STP (Weyers Cave, VA)	1,927	457	322%	North River
Purkins Corner WWTP (King George, VA)	234	110	113%	Potomac River
Ashland WWTP (Ashland, VA)	4,039	2,436	66%	South Anna River
Chesapeake-Elizabeth STP (Virginia Beach, VA)	82,298	51,110	61%	Lower Chesapeake Bay
Doswell WWTP (Doswell, VA)	1,610	1,218	32%	North Anna River

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Local Limit * (lbs)	Percent Over Local Limit	Main Receiving Waterway
Fairview Beach STP (King George, VA)	236	183	29%	Potomac River
Nansemond STP (Suffolk, VA)	73,120	63,887	14%	Hampton Roads
Virginia Initiative STP (Norfolk City, VA)	96,972	85,183	14%	Elizabeth River

* Local limits apply to the amount of pollution discharged to local waterways, but they are not permit limits.

Pennsylvania: Pollution Trading Reduces Transparency

Like Virginia, Pennsylvania allows pollution trading, with regulations in place since 2010. Plants that exceed their individual permit limits can do so legally by buying pollution credits. The annual pollution discharge amounts (pollution “loads”) shown in the charts below are *net* loads, which represent pollution totals that have been mathematically reduced to account for nutrient trades and offsets. The actual pollution releases (gross loads) are higher when trading occurs. For the wastewater facilities that do not trade or rely on offsets, the net and gross loads would be the same. However, the data reported in the EPA online enforcement database show that facilities sometimes fail to account for trading in their discharge monitoring reports, with the result that reported gross and net annual discharges are the same. This makes it difficult to determine if facilities are in compliance with their discharge permits and reduces transparency.

In an email on November 9, 2017, Deborah Klenotic, the Deputy Communications Director for the Pennsylvania Department of Environmental Protection, explained the problem this way: “The reason why credits purchased aren’t always accurately represented in the EPA database is that not all facilities went in and updated their data in the database to reflect the credits they purchased. Once they purchase credits, they need to go back in the system to update their load data, which some haven’t done or done accurately.”

In a planning document that Pennsylvania officials submitted to EPA that year, state officials were candid in admitting that they hoped their pollution trading system would be a mechanism by which sewage plants could avoid modernizing, by simply paying to pollute. “Buying the credits may help the plants avoid upgrades entirely, or allow them to do less expensive upgrades,” Governor Tom Corbett, wrote in a Pennsylvania bay watershed plan in 2012.³⁹

Table 8. Pennsylvania Wastewater Facilities Exceeding Nitrogen Limits, 2016

Facility (Location)	Total Nitrogen Pollution Discharged (lbs)	Nitrogen Credits Bought	Nitrogen Pollution After Credits (lbs)	Permit Limit (lbs)	Percent Over Limit	Waterway
Keystone Protein Co. (Fredericksburg, PA)	56,824		56,824	19,786	187%	Lower Little Swatara Creek
Newport Boro STP (Newport, PA)	19,181	9,962	19,181	7,306	163%	Juniata River
Farmer's Pride, Inc. (Fredericksburg, PA)	30,558		30,558	16,438	86%	Lower Little Swatara Creek
Saint Thomas TWP Mun. Auth. (St. Thomas, PA)	12,556	3,765	12,556	7,306	72%	Back Creek
Tri-Boro Mun Auth (Susquehanna, PA)	12,742	1,900	12,742	9,132	40%	Susquehanna River
Hastings Muni Authority (Hastings, PA)	12,952		12,952	10,959	18%	Brubaker Run
Porter-Tower Joint Mun. Auth. (Tower City, PA)	8,791	995	8,791	7,854	12%	Upper Wiconisco Creek
Middleburg Boro WWTP (Middleburg, PA)	9,550	1,270	8,514	8,219	4%	Penns Creek
Papetti's Hygrade Egg Products, Inc. (aka Michaels Foods Egg Products) (Klingerstown, PA)	50,326	50,000	8,246	8,104	2%	Pine Creek

Note: Based on DMR data available on ECHO as of Fall 2017. Some of the numbers of these two charts do not add up because the plant operators failed to enter pollution credit trading information correctly, according to the Pennsylvania Department of Environmental Protection. This is an example of how pollution trading systems can undermine transparency and accountability.

Table 9. Pennsylvania Wastewater Plants Exceeding Phosphorus Limits, 2016

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Phosphorus Credits Bought	Phosphorus Pollution After Credits (lbs)	Permit Limit (lbs)	% Over Limit	Waterway
Newport Boro STP (Newport, PA)	2,118	110	2,118	974	117%	Juniata River
Chestnut Ridge Area JMA WTF (New Paris, PA)	3,082	595	3,082	1,717	79%	Dunning Creek
Tri-Boro Mun Auth (Susquehanna, PA)	1,874	310	1,874	1,218	54%	Susquehanna River
Glendale Valley Municipal Authority (Flinton, PA)	1,576	535	1,576	1,041	51%	Upper Clearfield Creek
Hanover Foods Corp. (Hanover, PA)	1,361		1,361	979	39%	Oil Creek
Mahanoy City Mun. Sewer Auth. (Mahanoy City, PA)	4,491		4,491	3,361	34%	Upper Mahanoy Creek
Papetti's Hygrade Egg Products, Inc. (aka Michaels Foods Egg Products) (Klingerstown, PA)	6,207	5,000	679	532	28%	Pine Creek
Brown Township Sewage Treatment Plant (Reedsville, PA)	1,714	179	1,714	1,461	17%	Lower Kishacoquillas Creek
Springfield Township Hollow Cr. STP (York, PA)	1,968	200	1,968	1,704	15%	East Branch Codorus Creek

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Phosphorus Credits Bought	Phosphorus Pollution After Credits (lbs)	Permit Limit (lbs)	% Over Limit	Waterway
Middleburg Boro WWTP (Middleburg, PA)	1,275	70	1,114	1,096	2%	Penns Creek

Note: Based on DMR data available on ECHO as of Fall 2017. Some of the numbers of these two charts do not add up because the plant operators failed to enter pollution credit trading information correctly, according to the Pennsylvania Department of Environmental Protection. This is an example of how pollution trading systems can undermine transparency and accountability.

New York Wastewater Plants

Only one wastewater facility in New York’s share of the bay watershed exceeded its annual permit limit for phosphorus last year, and none exceeded its permit limits for nitrogen. New York does not have a pollution trading program, per se. But the state does allow wastewater facilities to “offset” their own excess nitrogen discharges for if they discharge less phosphorus pollution. One facility, Bath Wastewater Treatment Plant in Bath, NY, discharged 64,038 pounds of nitrogen to the Cohocton River with a permitted annual limit of 61,000 pounds. However, the facility was able to mathematically offset its nitrogen discharge to 57,133 pounds by discharging less phosphorus, bringing it into compliance with its permit limit. But, this facility still has to reduce its nitrogen discharges significantly if it is to meet its 29,941-pound 2025 bay cleanup goal.

New York also uses what is called a “bubble permit,” which means there is an aggregate total for all significant nitrogen dischargers⁴⁰ in the Chesapeake Bay watershed. The aggregate nitrogen limit is based on a delivered annual load. The aggregate load limit for 2016 covered 25 facilities and allowed up to 993,954 pounds of nitrogen to be delivered to the bay. New York did not exceed this limit last year.

One facility violated its permit limit for phosphorus in 2016, Greene Composting Facility in Greene, NY. This facility discharged 1,593 pounds of phosphorus to the Chenango River, exceeding its 1,020 pound limit by 56 percent.

West Virginia Wastewater Plants

West Virginia, like Maryland, does not use pollution trading for the regulation of its wastewater treatment plants. Three wastewater plants in Virginia’s portion of the Chesapeake Bay watershed exceeded their permit limits for nitrogen in 2016, and six facilities exceeded their limits for phosphorus pollution, according to EPA data (six total, as some exceeded limits for both pollutants.)

The facilities listed in tables 10 and 11 below have all entered into legal agreements with West Virginia Department of Environmental Protection (WVDEP) concerning violations of their nitrogen and phosphorus permit limits. For example, the Petersburg Wastewater Treatment Plant entered into a consent order with WVDEP on June 15, 2016, that required the city to undergo a \$7.2 million upgrade its sewage plant,⁴¹ but it did not waive compliance deadlines with the facility’s annual permit limits for total nitrogen or total phosphorus.⁴² The upgrades are expected to be complete by early 2018.

The City of Keyser also entered into a consent order with WVDEP, back in 2011, which required it to make upgrades to its wastewater treatment plant and comply with permit limits by the end of 2015.⁴³ The city failed to meet that deadline, however, and committed to a new deadline of July 1, 2017 for compliance with its nitrogen and phosphorus limits. As of October 31, 2017, the plant’s upgrades were nearly complete, according to a WVDEP inspection report, and nitrogen and phosphorus levels had already been significantly reduced even though key parts of the upgrade had not been completed.

Berkely County Public Service Sewer District operates four major sewage plants that are covered by a single wastewater discharge permit: Opequon Hedgesville, North Area, Inwood, and Baker Heights. The District entered into a consent order with WVDEP in August of 2011 (order No. 7363), which required major upgrades to its facilities and extended the compliance deadline to meet annual nitrogen and phosphorus limits to December 31, 2015. According to a WVDEP inspection report dated August 2, 2017, upgrades at the District’s facilities were “substantially complete as of May 1, 2017.” The District’s Opequon Hedgesville and Baker Heights were expected to be in compliance with their nitrogen and phosphorus limits by November 2017, according to a July 5, 2017 letter from the District to WVDEP. The other two plants, North Area and Inwood, experienced some issues during the startup of their upgrades, and as a result, they may exceed their permit limits for nitrogen and phosphorus in 2017, but would be in compliance next year.

Table 10. West Virginia Sewage Plants Exceeding Nitrogen Limits, 2016

Facility (Location)	Nitrogen Pollution Discharged (lbs)	Permit Limit (lbs)	Percent over Limit	Waterway
Berkeley County PSSD- Opequon/ Hedgesville Plant (Martinsburg, WV)	70,912	24,353	191%	Opequon Creek
City of Keyser (Keyser, WV)	66,690	36,547*	82%	North Branch Potomac River
Berkeley County PSSD- Inwood Plant (Martinsburg, WV)	36,918	22,831	62%	Opequon Creek
Petersburg WWTP (Petersburg, WV)	23,342	20,557	14%	South Potomac River

*Compliance with permit limits were extended beyond 2016 through consent orders, according to state records.

Table 11. West Virginia Sewage Plants Exceeding Phosphorus Limits, 2016

Facility (Location)	Phosphorus Pollution Discharged (lbs)	Permit Limit (lbs)	Percent Over Limit	Waterway
Berkeley County PSSD- Baker Heights Plant (Martinsburg, WV)	16,668	2,740	508%	Opequon Creek
Berkeley County PSSD- Inwood Plant (Martinsburg, WV)	9,058	2,283	297%	Opequon Creek
City of Keyser (Keyser, WV)	7,499	3,655*	105%	North Branch Potomac River
Berkeley County PSSD- North End WWTP (Martinsburg, WV)	2,461	1,522	62%	Opequon Creek
Berkeley County PSSD- Opequon/Hedgesville Plant (Martinsburg, WV)	3,680	2,435	51%	Opequon Creek
Petersburg WWTP (Petersburg, WV)	2,531	2,056	23%	South Potomac River

*Compliance with permit limits were extended beyond 2016 through consent orders, according to state records.

Washington, DC

Only one facility in DC is considered a significant discharger: Blue Plains, the largest wastewater treatment plant in the Chesapeake Bay region and one of the largest and most advanced plants in the U.S. The plant treats wastewater from DC, MD, and VA and is allowed to trade nutrient credits in Virginia’s trading program. According to its discharge monitoring data, Blue Plains did not discharge more nitrogen or phosphorus than its permit allowed in 2016, and it is already meeting its bay cleanup goals for 2025.

Delaware

Loads for all but one of the four Delaware significant wastewater dischargers could not be calculated using DMR data available in EPA’s ECHO database. One facility reported no discharge all year, and data for two others were not available through ECHO. The one facility that did report discharges was missing data from two months of the year, so loads are likely underestimates. The 10-month load from that facility did not exceed the annual limit, based on the limited data available.

Conclusion and Recommendations

In some ways, sewage treatment plant upgrades have been a poster child of success in the Chesapeake Bay cleanup effort. The billions of dollars invested have led to measurable pollution reductions and noticeable improvements in water quality – for example, in the Potomac River, downstream from the District of Columbia’s state-of-the-art Blue Plains plant. Other types of pollution, such as from suburban and urban runoff and the agricultural industry, have been more problematic, both because they are governed by weaker regulations and because runoff is harder to measure.

Despite the overall progress with managing wastewater, however, some significant problems remain and demand regulatory vigilance. These include individual sewage plants that violate their legal limits and modernization projects that are years behind schedule. The fact that Maryland’s two largest sewage treatment plants – Baltimore’s Back River and Patapsco – have been significantly tardy in their upgrades means that the state needs to keep a close eye on the city’s management of these projects, because they are critical to improving water quality in the state. Other problem-plagued upgrade projects in Maryland, including in Salisbury and Frederick, deserve increased state oversight. And plants violating their limits in West Virginia, Pennsylvania and New York also require more rigorous enforcement.

Across the bay watershed, the following steps would also help with the management of sewage and industrial wastewater:

1. To provide a clear financial incentive for environmental improvements, the bay region states should more consistently penalize wastewater treatment plants and other polluters that violate their permit limits.
2. To avoid a decline in accountability and a possible increase in local pollution “hot spots,” Maryland and other states not actively engaging in pollution trading schemes should avoid them and instead rely on strong enforcement of individual Clean Water Act permits for sewage and wastewater treatment plants. Pollution trading should not serve as an accounting gimmick to allow municipalities or industries avoid their responsibilities to reduce their pollution.
3. States that do allow facilities to engage in pollution trading should require the plants to accurately and promptly report, to public databases, credits purchases and their impact.
4. Because the investment of states in sewage plant upgrades has been uneven, EPA should push states such as Pennsylvania and New York to do more to modernize their wastewater facilities to the state-of-the-art (Enhanced Nutrient Removal) levels increasingly found in Maryland, the District of Columbia and in parts of Virginia.

Precisely because sewage plant upgrades are such a proven method of improving the health of local waterways, all states and communities should feel pressure to invest in pollution reduction technology that has a clear and verifiable track record of success. The

Chesapeake Bay, which defines the culture, history and ecology of our region, deserves nothing less.

Appendix A: Methodology

The Environmental Integrity Project reviewed the discharge monitoring report (DMR) data from EPA’s Enforcement and Compliance History Online (ECHO) database and Virginia’s 2016 Published Nutrient Loads for 487 “significant” municipal and industrial wastewater dischargers in the Chesapeake Bay watershed.⁴⁴ These facilities meet certain flow or annual discharge criteria defined by bay states (Table A1) and are listed in each state’s Phase II Watershed Implementation Plans (WIPs).⁴⁵

Table A1. State definitions of “significant” municipal and industrial dischargers

State	Municipal wastewater facilities (million gallons per day)	Industrial wastewater facilities (estimated loads, lbs/yr)
DE	Design flow \geq 0.4	\geq 3,800 Total phosphorus
DC	Blue Plains WWTP	or
MD	Design flow \geq 0.5	\geq 27,000 Total nitrogen
NY	Design flow \geq 0.4	
PA	Design flow \geq 0.4	
VA	Design flow \geq 0.5 above the fall line/tidal line Design flow \geq 0.1 below the fall/tidal line Design flow \geq 0.04 for expanded flow	
WV	Design flow \geq 0.4	

Source: Bay TMDL, section 9, table 4-4. https://www.epa.gov/sites/production/files/2014-12/documents/cbay_final_tmdl_section_4_final_0.pdf p. 4-7.

Our nutrient loading analysis is based on DMR and loading data reported by wastewater dischargers to state environmental agencies and EPA as of March and 2016. When available, we relied on total annual loads reported by facilities on their DMRs. We also relied on net loads, which account for trading and offsets, when comparing loading rates to permit limits where applicable. If total annual loads were unavailable, we aggregated monthly or quarterly mass loadings to calculate annual loads. When no mass loadings were available, we calculated loads using concentration and flow data reported by the facility. If we discovered obvious reporting errors in the DMR data, we reported these to EPA and state agencies through EPA’s ECHO error reporting system. We did not calculate loads if insufficient data were available in ECHO.

For all states except Pennsylvania, annual loads represent the amount discharged from January through December of 2016. In Pennsylvania, the annual load represents the amount discharged between October 2015 and September 2016, Pennsylvania’s compliance year.

Permit limits, except those for facilities in Virginia, were listed in each facility’s wastewater discharge permit, which we obtained from state online databases in Spring 2016.⁴⁶ The local and delivered bay limits for Virginia facilities were listed in Virginia’s 2016 Nutrient Loading Analysis.

Notes

¹ This report relies on discharge monitoring report data available through the Environmental Protection Agency's Enforcement and Compliance History Online (ECHO) database as of Spring and Fall 2017, state records obtained through public information requests and online databases, and telephone interviews and correspondences with state agency officials and wastewater treatment plant managers.

² Many segments of the Shenandoah River and its tributaries have high levels of phosphorus, although they have not been designated as "impaired" under the federal Clean Water Act by the Virginia Department of Environmental Quality.

³ Maryland Department of the Environment, "Bay Restoration Fund Advisory Committee Annual Status Report, 2015," January 2015. Link:

<http://mde.maryland.gov/programs/Water/BayRestorationFund/Documents/2015%20BRF%20Report%20-%20Final.pdf>

⁴ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.

⁵ Loads for all but one of the 4 Delaware significant wastewater dischargers could not be calculated for 2016 using DMR data available in the EPA ECHO database. One facility reported no discharge all year, and data for two others were not available through ECHO. The one facility that did report discharges was missing data from 2 months of the year, so loads are likely underestimates. The 10-month load from that facility did not exceed the annual WLA, based on the limited data available.

⁶ Interview on October 27, 2017, with Allan Brockenbrough, Manager of the Office of VPDES Permits for the Virginia Department of Environmental Quality.

⁷ Virginia Department of Environmental Quality, "2016 Nutrient Trades Report," link:

<http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/2016NutrientTradesReportDraft06232017.pdf?ver=2017-06-30-122203-300>

⁸ William H. Funk, "Algae blooms sprout lawsuit over polluted Virginia river," Bay Journal, June 1, 2017.

Link: http://www.bayjournal.com/article/algae_blooms_sprout_lawsuit_over_polluted_virginia_river

⁹ November 9, 2017, email from Deborah Klenotic, Deputy Communications Director, Pennsylvania.

¹⁰ Maryland Department of the Environment, "Bay Restoration Fund," web page, link:

<http://mde.maryland.gov/programs/Water/BayRestorationFund/Pages/index.aspx>

¹¹ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.

¹² Maryland Department of the Environment, "Bay Restoration Fund Targeted Wastewater Treatment Plants," September 2017. Link:

<http://mde.maryland.gov/programs/Water/BayRestorationFund/Documents/9-BRF-WWTP%20Update%20for%20BayStat.pdf>

¹³ *Ibid.*

¹⁴ Data sheet on Virginia wastewater treatment plant upgrades provided on October 27, 2017, by Allan Brockenbrough, Manager of the Office of VPDES Permits for the Virginia Department of Environmental Quality. Virginia doesn't use the term "ENR" or Enhanced Nutrient Removal for its sewage plants, but these figures reflect plants designed to discharge 3 or 4 mg/liter nitrogen. MDE update on Bay Restoration Fund sewage treatment plant upgrades, September 2017.

<http://mde.maryland.gov/programs/Water/BayRestorationFund/Documents/9-BRF-WWTP%20Update%20for%20BayStat.pdf>

¹⁵ Pennsylvania sewage plants that are upgraded are generally improved to a lower standard than ENR called Biological Nutrient Removal or BNR, according to the Pennsylvania Department of Environmental Protection, Data on wastewater treatment plant upgrades provided by EPA Chesapeake Bay Program via email on May 1, 2015.

¹⁶ EPA, "Chesapeake Bay Progress: Wastewater Pollution Reduction Leads the Way," June 2016. Link:

https://www.epa.gov/sites/production/files/2016-06/documents/wastewater_progress_report_06142016.pdf

¹⁷ *Ibid.*

¹⁸ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.

- ¹⁹ Permits referred to here are National Pollutant Discharge Elimination System (or NPDES) permits. Legal limits are either NPDES permit limits or interim performance standards established by court consent decrees.
- ²⁰ Limited to facilities in MD, PA, NY, WV, DE, and DC that were listed in 2012 Phase II WIPs and those with DMR data available in ECHO as of March 2017. VA facilities are limited to those that were included in VDEQ's 2016 Nutrient Load Analysis.
- ²¹ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.
- ²² *Ibid.*
- ²³ MDE inspection reports for Patapso WWTP obtained through a Maryland Public Information Act request.
- ²⁴ Court of Special Appeals of Maryland, BALFOUR BEATTY INFRASTRUCTURE, INC. v. RUMMEL KLEPPER & KAHL, LLP, decided January 28, 2016. Link: <http://caselaw.findlaw.com/md-court-of-special-appeals/1724523.html>
- ²⁵ EPA ECHO online database.
- ²⁶ Email from Jeffrey Raymond, Chief of the Division of Communications and Community Affairs at Baltimore City Department of Public Works, on October 25, 2017.
- ²⁷ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.
- ²⁸ MDE inspection records obtained through a Maryland Public Information Act request.
- ²⁹ Interview with Salisbury Mayor Jacob Day on October 26, 2017.
- ³⁰ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.
- ³¹ *Ibid.*
- ³² Interview on October 24, 2017 with Stona Cosner, Superintendent of the Frederick WWTP.
- ³³ Email from Jay Apperson, Deputy Director, Office of Communications, Maryland Department of the Environment on October 30, 2017.
- ³⁴ *Ibid.*
- ³⁵ Email from Westminster Mayor Joe Dominic on October 27, 2017.
- ³⁶ Va. Admin. Code 25-820-10.
- ³⁷ Potomac Riverkeeper, "Shenandoah Riverkeeper Halts Nutrient Trading at the Massanutten Sewage Treatment Plant," link: <http://www.potomacriverkeepernetwork.org/srk-halts-nutrient-trading-massanutten-sewage-treatment-plant/>
- ³⁸ Virginia Department of Environmental Quality, 2016 Nutrient Trades Report <http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/2016NutrientTradesReportDraft06232017.pdf?ver=2017-06-30-122203-300>
- ³⁹ Pennsylvania Chesapeake Watershed Implementation Plan Phase II, March 30, 2012. Link: http://www.dep.state.pa.us/river/iwo/chesbay/docs/refmaterials/PACHesapeakeWIPPhase2_3-30-12.pdf
- ⁴⁰ By 2017, 29 facilities in New York were included in the bubble permit, with an aggregate load of 1,086,461 lbs delivered N. (one facility is left out—the Binghamton-Johnson City treatment plant, due to an order of consent and attainment.) (See phase II WIP).
- ⁴¹ West Virginia Infrastructure & Jobs Development Council, Petersburg Sewer System Improvements, Project Number 2012S-1334, available at <http://www.wvinfrastructure.com/projects/projectDetails.php?projectID=2012S-1334>
- ⁴² Consent Order Issued Under the Water Pollution Control Act, West Virginia Code Chapter 22, Article 11, Order No. 8511 Issued to the City of Petersburg, April 6, 2016.
- ⁴³ Consent Order Issued Under the Water Pollution Control Act, West Virginia Code, Chapter 22, Article 11, Order 7400, issued to the City of Keyser, December 21, 2011.
- ⁴⁴ Virginia Department of Environmental Quality, 2016 Nutrient Load Analysis, March 2017, available at http://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/Watershed%20GP/2016_Published_Loads_Draft_4_4_2017.pdf, accessed 4/4/2017
- ⁴⁵ Maryland Phase II WIP Appendix F- Final Target Loads for Significant Facilities, available at http://www.mde.state.md.us/programs/water/TMDL/TMDLImplementation/Documents/FINAL_PhaseI_Report_Docs/Final_Documents/PhaseII/Appendix_F_Major_Facility_Final_Targets_100512.pdf; Pennsylvania Department of Environmental Protection, Phase 2 Watershed Implementation Plan Wastewater Supplement, Revised September 6, 2017, Available at: http://files.dep.state.pa.us/Water/Wastewater%20Management/EDMRPortalFiles/Phase_2_WIP_Supplement.pdf. New York State Department of Environmental Conservation, Final Phase II Watershed

Implementation Plan for New York Susquehanna and Chemung River Basins and Chesapeake Bay Total Maximum Daily Load, January 7, 2013, available at http://www.dec.ny.gov/docs/water_pdf/finalphaseiiwip.pdf; West Virginia Phase 2 Watershed Implementation Plan, appendices A1 and B1, available at <http://www.wvchESApeakebay.us/WIP/WIP.cfm>.
⁴⁶ Maryland Department of the Environment, Wastewater Permits Interactive Search Portal, available at <http://mes-mde.mde.state.md.us/WastewaterPermitPortal/>; New York State Department of Environmental Conservation State Pollutant Discharge Elimination System Individual and Multi-Sector General Permits, available at <https://www.dropbox.com/sh/hz3spt98h4d88ue/AADmNLCYxcpZQFeWUNAxGMi9a?dl=0>; West Virginia discharge permits were accessed through a password-protected public information request database maintained by West Virginia Department of Environmental Protection; Pennsylvania Department of Environmental Protection Wastewater Reports, Individual NPDES permit documents, available at <http://www.dep.pa.gov/Business/Water/CleanWater/Pages/Wastewater-Reports.aspx>.



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