



Communicating Conowingo

A challenge for journalists



Reservoir filling to increase sediment, phosphorus loads

The amount of phosphorus entering the Chesapeake Bay from the Susquehanna River may double in the next two decades while the amount of sediment entering from the river triples, according to work by the U.S. Geological Survey.

The reason, according to USGS Hydrologist Lloyd Reed, is that the reservoirs behind the large hydroelectric dams on the lower Susquehanna — Conowingo, Safe Harbor and Holtwood — are nearly filled with sediment. When they are filled, sediments washing down the river will pass through the dams and into the Bay, degrading its water quality.

"We believe that two of the reservoirs — Safe Harbor and Holtwood — are filled, and the reservoir at Conowingo will be filled in the next 20 years," Reed said in a recent presentation to the Chesapeake Bay Commission.

According to USGS figures, about 3.3 million tons of sediment wash down the Susquehanna in an average year, of which about 2.4 million tons are trapped behind the dams while 900,000 tons washes into the Bay.

Also, the reservoirs trap about 4 million pounds of the 9.1 million pounds of phosphorus which wash down the river in an average year. The reservoirs trap little nitrogen — only 7 million of the 154 million pounds flushed down the river annually. The reason for the difference is that phosphorus tends to bind to sediments while nitrogen is more water-soluble.

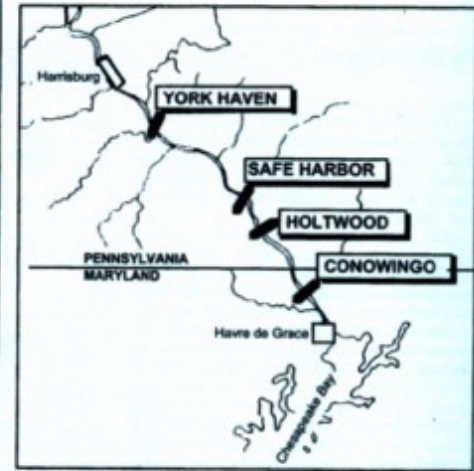
The Safe Harbor dam was built in 1931 and the reservoir behind it, which has a capacity of about 43 million tons of sediment, was filled by 1949, Reed said. Likewise, the Holtwood dam was built in 1910 and its reservoir, which has a capacity of about 14 million tons, was filled by 1920.

"Filled" does not mean that sediments are piled to the water surface, but rather that the amount of sediment deposited equals the amount washed out. The sediments pile up in the slow-moving parts of the reservoir, but are scoured away along the main channel where the water flows faster.

The reservoir behind the largest and southernmost dam,



The Conowingo Dam is the largest dam on the Susquehanna, but its reservoir will be filled with sediment in 20 years.



Hydroelectric dams on the Susquehanna River.

Conowingo, has about 155 million tons of sediment in it today, and can hold about 50 million tons more, Reed said.

As the reservoir fills, Reed said the amount of sediment and phosphorus passed onto the Bay would gradually increase. He noted that such an increase had not yet been detected.


Reed said there is little that can be done about the filling of the reservoirs.

Much of the sediment trapped behind the dams is coal residue from past upstream mining practices. Until 1972, 1 million tons of coal a year were dredged from the Safe Harbor reservoir and used at a coal-fired power plant adjacent to the Safe Harbor dam. However, Reed said such operations are probably no longer economical.

Reed said his projection of the reservoirs filling in the next two decades was based on average conditions and could change in the event of a major storm.

Over the next two decades, he said, it was possible there would be a major storm — perhaps similar to Hurricane Agnes — that would scour out large amounts of sediments from the reservoirs. (Agnes removed about 45 million tons, he said.)

But that isn't necessarily good news, he cautioned. Such a sudden, huge sediment and phosphorus load passed through the dams would have harmful effects on the Bay.



https://www.bayjournal.com/news/pollution/no-clear-solution-for-sediment-buildup-at-susquehanna-dams/article_bb59c3c5-beae-5509-82ea-d6053ae4cdbc.html

No clear solution for sediment buildup at Susquehanna dams

By Karl Blankenship

Jan 1, 2001

The sediment buildup behind Susquehanna River hydroelectric dams has been likened to a time-bomb — when their reservoirs are filled, huge amounts of dirt and nutrients will spill over, fouling Bay water quality.

But a recent symposium about the problem revealed some good news: Scientists believe the fuse on the time bomb may be longer than previously thought. Instead of being filled in less than 20 years, it may take an extra decade before the reservoirs reach capacity.

The bad news is that no one knows how to defuse the sediment bomb.

The two-day symposium looked at options ranging from dredging millions of tons of mud from behind the dams to stream corridor restoration to better land use practices that reduce erosion.

But no “silver bullet” solution emerged as participants raised questions as to whether any single solution — all of which have huge price tags — could solve the problem. In fact, a task force headed by the Susquehanna River Basin Commission and the Chesapeake Bay Commission, which studied the issue for 18 months, found more questions than answers and called for more research.

“This is a complex issue,” said Task Force Chair Tom Beauduy, Pennsylvania director of the Chesapeake Bay Commission, a panel that represents state legislatures. “It is one where we lack sufficient information to make comprehensive management decisions for the long term.”

Remaining questions are huge. No one knows exactly where all the sediment is coming from, how long it takes to move downstream or who would pay to keep the dirt out of the water and the Bay.

One thing is clear. Once the reservoirs reach their silt-trapping capacity, the amount of sediment pouring into the Upper Chesapeake will more than double while phosphorus inputs would rise more than 50 percent, ~~seriously~~ setting back Bay cleanup efforts.

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Partnership taking on trash in the Anacostia

Efforts to remove litter aimed at bringing people back to the river.

By LARA LUTZ

The plastic bottles and snack bags and mixed woody debris form a small but dense raft of litter that bobs gently at the edge of the Anacostia River in Washington, DC.

It's an unusually small mass of litter. Dry weather has brought temporary relief from the surge of trash that washes into the river with each rainfall.

And this particular jumble of litter is about to exit the ecosystem. It lies between the big tubular arms of a "trash trap" that catches litter in a grimy hug as it emerges from an outflow pipe at the river's shore.

Within days, staff from Groundwork Anacostia will be on hand to extract the trash the trap collects and report the type and quantity to the District of Columbia government.

But Anacostia Riverkeeper Mike Bolinder knows more trash is on its way.

The Anacostia runs through parts of Maryland and the District that are packed with people. And every day, people drop trash. The castoffs from a society



James Foster of the Anacostia Watershed Society eyes the approaching tide of trash that builds up along the Anacostia River. Photo / Dave Harp

TRASH CONTINUES ON PAGE 16

Conowingo Dam releasing pollutants at more frequent rate

≈ Pennsylvania, New York may have to adjust plans to meet TMDL goals.

By KARL BLANKENSHIP

Since the early 1990s, scientists have warned that the Conowingo Dam loomed as an ominous threat to the Chesapeake. When the reservoir behind the massive 100-foot dam filled, more sediment and nutrients would begin pouring down the Susquehanna River.

For nearly as long, dealing with the issue has been largely put off; the reservoir issue has always been considered a problem for the future.

But the future may be here, according to new research.

"It's not a decade out," said Bob Hirsh, a research hydrologist with the U.S. Geological Survey. "It's now."

To be sure, the giant dam, located near the Maryland-Pennsylvania border 10 miles upstream from the river's mouth, is still trapping much of what washes down the Bay's largest tributary. But it appears to be trapping less than it used to, particularly during

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6 MD counties unite to fight cleanup mandates, point finger at dam

≈ Local governments fear costly actions will be overwhelmed by Conowingo, but environmentalists say that their claim is misguided.

BY KARL BLANKENSHIP

Several Maryland counties, alarmed about the high cost of cleaning the Chesapeake, have formed a coalition to battle what they consider to be unfair state mandates in the legislature, and potentially in court.

Letters circulating among local governments charge that counties are facing huge costs to lessen local sources of pollution while state and federal agencies are not aggressively tackling major pollution problems — in particular the sediment built up behind the Conowingo Dam on the Susquehanna River — which the counties fear will overwhelm their local efforts.

Environmental groups and state and federal officials vigorously dispute the claims made in the letters. They contend that most cleanup actions required by counties are needed to clean up local waters — areas largely unaffected by the Susquehanna and the Conowingo.

Nonetheless, by mid-November, six rural counties — Allegany, Caroline, Carroll, Cecil, Dorchester and Frederick — had voted to chip in \$25,000 apiece to create the TMDL Coalition, which will use the Maryland law firm of Funk & Bolton to lobby the General Assembly to loosen some of the requirements placed on counties.

The Dorchester County Council, which has an annual county budget of \$56 million and faces estimated cleanup costs of \$87 million by 2025, engaged Funk & Bolton to try to enlist other counties into a coalition that could fight back against what the Dorchester council members see as overly costly mandates.

“The objective of the TMDL coalition is to pursue improvement to the water quality of the Chesapeake Bay in a prudent and fiscally responsible manner,” Dorchester County Council President Jay Newcomb said in a letter to Frederick County Council members.

“To achieve that objective, precious taxpayer funding must be directed toward reducing major sources of nutrient and sediment loading to the Bay before such funds are expended on lesser, more marginal sources of loading,” Newcomb did not return a call requesting an interview.

Funk & Bolton also sent out letters. Both the county’s and the law firm’s letters express concerns about the cost of cleanup actions; tougher controls on stormwater and wastewater treatment



A report earlier this year cautioned that phosphorus and sediment discharges from Conowingo will likely increase in the future as the sediment storage capacity of the reservoir behind the dam nears its capacity. Photo / Dave Harp

plants; septic systems; and other potential regulations. They contend that Maryland counties are being asked to do more than their counterparts in neighboring states, and question the cost-effectiveness and scientific underpinning for some of the actions they are expected to take.

Several other counties are considering joining the group, although some have declined to participate. “We are still waiting to see how many ultimately jump on board,” said Charles “Chip” MacLeod, an attorney with Funk & Bolton working on the issue. “For an initiative like this, there is strength in numbers.” And, he said, some counties may join once the coalition is formally established.

MacLeod said the intent of the coalition is primarily to lobby the General Assembly, although the Dorchester letter hints at a possible legal action as well, citing the importance in gathering information that would allow them to challenge the “factual and legal underpinning” for specific state mandates. At the least, the letter expresses hope that agencies “will be more thoughtful in how they seek to require counties to implement TMDL initiatives if they realize that Maryland local governments are scrutinizing the scientific and technical foundations underpinning (or not) such initiatives.”

A focal point of both letters is an argument that too little is being done to control pollution from the Susquehanna River, which provides most of the nutrients to the upper portion of the Bay, and to point

out that the situation may worsen. A report from the U.S. Geological Survey earlier this year cautioned that phosphorus and sediment discharges from the dam will likely increase as the sediment storage capacity of the reservoir behind Conowingo nears its capacity.

In an average year, the Susquehanna provides about half of the freshwater entering the Bay, along with two-fifths of the nitrogen and about a quarter of the phosphorus and sediment. Scientists estimated in the past that the 12-mile-long Conowingo reservoir traps about two-thirds of the sediment coming down the river, along with more than a third of the phosphorus.

Scientists have warned for two decades that the Conowingo reservoir was nearing its storage capacity, but the huge price tag of trying to remove sediment stored behind the dam — something that could cost tens of millions of dollars a year — has kept the problem from being addressed. The recent USGS report said the reservoir has reached a phase where phosphorus and sediment discharges appear to be increasing during large storms, a situation likely to become more pronounced over time.

The counties have seized on that as an example of states failing to tackle big challenges even as they require counties to undertake expensive actions that they contend would have minimal impact on the Bay.

“There’s an elephant in the room and we’re going after the flies,” MacLeod

said. “The big stuff always gets put off.”

But environmental groups and state and federal officials said it was misguided to blame water quality problems on the Conowingo Dam. While it’s true that flows and nutrients from the Susquehanna are largely responsible for poor water quality in much of the mainstem of the Chesapeake, they note that it has little impact on local rivers, and no impact above tidal zones of those tributaries — which also suffer from poor water quality.

“We think it perpetuates a really insidious myth that somehow the Susquehanna is responsible for everything,” said Tim Junkin, executive director of the Mid-shore Riverkeeper Conservancy. “We do a lot of water quality testing on the Eastern Shore, and the farther you go up any of our rivers to test, the worse the water quality becomes, even above the tidal zones. So clearly that pollution is not coming from the middle of the Bay or the Susquehanna. It is coming from our farms, our land.”

Rich Batiuk, associate director for science with the EPA’s Bay Program Office, said most tributaries would still suffer from poor water quality “even if we shut off every source of nutrients coming off the Susquehanna and sent pure distilled water down it. It is an important source, but it clearly is not the only one.”

Bob Summers, secretary of the Maryland Department of Environment, acknowledged that some of Maryland’s actions are more restrictive than neighboring states — discharge limits on wastewater treatment plants in Pennsylvania are not as restrictive as those in Maryland, for instance — but he said Maryland also stands to gain more from the cleanup effort.

“The argument that Maryland shouldn’t be leading the charge on the Bay cleanup to me doesn’t make a heck of a lot of sense,” Summers said. “Look at the map. We are the Bay, New York and Pennsylvania aren’t. So we’ve got to show the way here.”

He also said upstream states are making progress. While water quality monitoring shows that sediment and phosphorus loads below the Conowingo Dam may be ticking up during severe storms as the reservoir fills, they note that monitoring above the dam shows downward trends, suggesting that actions taken by Pennsylvania and New York are reducing pollution.

Summers also said the actions required in watershed implementation plans would be needed to clean up local waters regardless of the Chesapeake TMDL.

DAM CONTINUES ON PAGE 7

Study: Dredging Conowingo would have less impact than thought

≈ Removing sediment would be very costly and do little to improve water quality.

By **KARL BLANKENSHIP**

For years, the sediment building up behind Conowingo Dam has been referred to as a ticking bomb — one day in the future the reservoir behind the 100-foot dam would fill and huge amounts of sediment and nutrients would flow, unfettered, into the

Chesapeake Bay.

A recently released draft study suggests that day is now here. The reservoir is essentially filled, increasing the flow of sediment and nutrients from the Susquehanna River into the Bay, though the results may not be as devastating as what was once thought.

That added pollution — primarily the nutrients — would keep portions of the Upper Chesapeake from achieving cleanup goals, likely forcing states to

make additional nutrient reductions to make up the difference, according to the draft Lower Susquehanna River Watershed Assessment.

The study, which cost \$1.4 million and was led by the U.S. Army Corps of Engineers and the Maryland Department of the Environment, also concluded that dredging built-up sediment from behind the dam would have huge costs and provide little water quality improvement. Dredging, the report

summed up, “yields minimal, short-lived benefits at high costs.”

That runs counter to an argument put forth by some rural Maryland counties that have called dredging behind the dam, located just 10 miles upstream from the Chesapeake, an essential part of Bay cleanup efforts.

Historically, the dam’s 14-mile reservoir has trapped a portion of the

DAM CONTINUES ON PAGE 26

Bay region lags in preparing for rise in coastal flooding

≈ Many government entities more used to reacting to disasters instead of trying to prevent them.

This is the third in a series of articles — produced by the Bay Journal and Chesapeake Quarterly, the magazine of Maryland Sea Grant — which explores the impacts of, and policies related to, sea level rise around the Bay.

By **RONA KOPELL**

When Superstorm Sandy devastated the New Jersey shore and flooded

COME HIGH WATER

SEA LEVEL RISE & THE CHESAPEAKE BAY

by coastal flooding in the Chesapeake Bay region.

People in New Jersey and New York never expected the scale of damages from Sandy, and here in the Chesapeake Bay, a big storm could give us a similar nasty shock. Rising sea level is projected to increase

SEA LEVEL CONTINUES ON PAGE 20



Steeling itself for the long haul
 Workers use torches to blast through debris at the Bethlehem Steel plant in Sparrows Point. See “New owner all fired up to raise Sparrows Point from the ashes” on page 10. Photo / Dave Harp

Atlantic sturgeon back in Bay, or did they ever leave?

≈ ‘Fish that swam with the dinosaurs’ showing up in unexpected rivers and at unlikely times.

By **KARL BLANKENSHIP**

A couple of decades ago, a handful of scientists met to discuss the dismal state of the Atlantic sturgeon in the Chesapeake Bay. No researcher had seen a spawning sturgeon in years. Some doubted whether a remnant population of the Bay’s largest fish even remained. Finally, the scientists began to debate

what to do if someone actually caught a spawning female.

Some thought they should send her to a hatchery to preserve her unique Bay genetic makeup. Others thought they should tag and track her to see if she led to another sturgeon.

“We went back and forth about what we would do with the ‘last’ sturgeon,” recalled Dave Secor, a fisheries scientist with the University of Maryland Center for Environmental Science. “That discussion has changed.”

Thought nearly extinct in the Chesapeake

just two decades ago, sturgeon are turning up in surprising numbers and in surprising places. They’re also doing surprising things, like spawning in the fall — unlike any other anadromous fish on the East Coast.

Much of what was common knowledge 20 years ago is being cast aside as discoveries come at an increasingly rapid pace. “What we would have said a year ago about sturgeon, we wouldn’t say today,” said Chris Hager, a biologist

STURGEON CONTINUES ON PAGE 18

Conowingo no longer trapping sediment, nutrients from Susquehanna

≈ Study's findings mean more reductions will be needed to meet cleanup goals

By **KARL BLANKENSHIP & TIMOTHY B. WHEELER**

After 87 years, the ability of the 14-mile-long reservoir behind the Conowingo Dam to trap sediment and nutrients coming down the Susquehanna River has largely ceased, threatening the region's ability to meet Bay cleanup goals, a multi-year study concludes.

Offsetting that impact may require millions of pounds of additional nutrient reductions beyond what was anticipated when the Bay cleanup plan was released in 2010, according to the Lower Susquehanna River Watershed Assessment report, the final version of which was released March 10.

The \$1.4 million study, led by the Army Corps of Engineers and the Maryland Department of Natural Resources, comes at a time when the state-federal Bay Program partnership has embarked on a multi-year effort to assess and update cleanup goals by the end of next year — a task made harder by the Conowingo situation.

The report “puts more onus on all of us to recognize that Conowingo needs to be addressed, and with a sense of urgency,” Maryland Environment Secretary Ben Grumbles said. The contributions of nitrogen, phosphorus and sediment pollution from behind the dam and upriver are “important,” he said.

When running for office in 2014, Gov. Larry Hogan had charged that federal and state partners in the Bay restoration effort

MONITORING FROM PAGE 14

that affect water quality — from land use changes to pollution control efforts to climate change — to help explain often-



Because Conowingo's reservoir reaching its storage capacity was thought to be further in the future, the Bay cleanup plan did not anticipate its impact on water quality. Photo / Dave Harp

were neglecting the pollution threat posed by Conowingo, and he later expanded his criticism to accuse Pennsylvania and New York of not doing their share to help clean up the estuary. “This is going to continue to be one of the governor's priorities on the Chesapeake Bay,” Grumbles said.

For decades, the 100-foot-high dam had helped Bay cleanup efforts by trapping a portion of the sediment and nutrients coming down the Susquehanna River and keeping them from reaching the Chesapeake. While it has long been known that the dam's reservoir was reaching its storage capacity, that day was thought to be further in the future. As a result, the 2010 Bay cleanup plan did not anticipate the impact of the reservoir filling on Chesapeake water quality.

But the new report concludes that Conowingo and two upstream dams, Safe Harbor and Holtwood, “are no longer trapping sediment and the associated nutrients over the long term.” Instead, the dams delay a portion of the sediment and

will make attaining the 2025 cleanup goal more difficult.

Much of the public has focused on the impact of sediment from the dam. Extreme events like Tropical Storm Lee in 2011 can scour built-up sediment behind the dam, resulting in brown sediment-laden plumes stretching far down the Bay.

But the report said the greatest threat to Chesapeake water quality comes not from sediment scoured during large events, but rather from nutrients coming down the Susquehanna that are no longer being trapped. When they reach the Bay, those nutrients spur algae blooms that cloud the water and — when they die — rob it of oxygen needed by aquatic life and contribute to summertime dead zones.

Even if all currently planned nutrient control efforts are in place by the 2025 deadline, the report found that parts of the mid-Bay — the area with the most severe “dead zone” — would not meet water quality goals because of the dam's diminished nutrient-trapping capacity.

But trying to offset Pennsylvania's impact by reducing nutrient pollution from other rivers is equally problematic, because improvements elsewhere have less impact on the Mid Bay dead zone. Modeling estimates in the report suggest that meeting the water quality goals would require much greater reductions of 4.4 million pounds of nitrogen and 410,000 pounds of phosphorus if they had to come from the rest of the watershed.

Charles “Chip” MacLeod, an attorney who represents the Clean Chesapeake Coalition, a group of mostly rural Maryland counties, said the report affirms the coalition's long-held position that the issue of the Conowingo reservoir must be addressed to meet Bay goals. “This justifies a sense of urgency; as our efforts and expenditures in Maryland to improve Bay water quality are otherwise being inundated by upstream pollution,” he said.


But the report discounted the potential of dealing with the problem by dredging the reservoir, as some, including the coalition, have suggested. When it comes to dredging, the report said, “ecosystem benefits are minimal and short-lived, and the costs are high.” Dredging to roughly keep pace with what the dam historically trapped would cost between \$15 million and \$270 million annually, it said.

Exelon Corporation, which owns the hydroelectric facility, is funding \$3.5 million in additional studies to gain more detailed information about how sediment and nutrients from behind Conowingo are impacting the Bay. The results of those studies, which will inform the TMDL midpoint assessment, are expected later this year.

Exelon had applied in 2014 for a new 46-year license from the Federal Energy Regulatory Commission to generate power at Conowingo. Maryland environmental officials, concerned about the dam's impact on Bay water quality, signaled their



Conowingo is not the Bay's biggest threat

- ▶ About a 5% increase in nitrogen from the Susquehanna River
 - ▶ A slight small increase in non-attainment in a few segments if all other pollution reductions are achieved
- 



Conowingo's, Bay's mutual relationship finally ran its course

≈ Dam can no longer hold back nutrients and Bay is paying the price. Who should foot the bill?

Editor's note: This is part of a series of occasional articles examining issues related to the Chesapeake Bay Program's "Midpoint Assessment" of Bay cleanup efforts.

By **KARL BLANKENSHIP**

For decades, the Chesapeake Bay's biggest friend was the Conowingo Dam.

Even before scientists realized the Bay was sick from too much nitrogen and phosphorus, the 94-foot concrete wall on the Bay's largest tributary was holding back tens of millions of pounds of the nutrients that would have fueled even more greenish algae blooms.

The friendship was severely tested at times. Tropical Storm Agnes flushed huge amounts of stored sediment from behind the dam and into the Bay, smothering grass beds and oyster reefs, and causing general havoc. And migratory fish were none too happy that it became nearly impossible to swim up the Susquehanna River to spawn, despite huge investments in "fish elevators."

But without the dam, more nutrients and water-clouding sediment would have poured into the Bay for most of the past century. Algae blooms would have been more intense, and oxygen-starved dead zones would have been even larger.

Now, scientists say, the dam's reservoir is filled and in a state of "dynamic equilibrium" — what comes into the reservoir goes out.

The Bay's best friend has nothing more to give.

And now, state and federal policy makers must figure out who has to pick up the slack.

Should it be the upstream states, where the nutrients and sediment originate? Or, because the entire Bay benefitted from past reductions, should the whole region share the pain? Since the job ahead is going to be harder, should states get more time to offset the Conowingo effect?

It's one of the stickiest questions that decision makers face as they map out strategies to help the Bay — and its watershed — meet the 2025 cleanup deadline.

It's possible that an answer could be reached as soon as December. But — as several committees within the state-federal Bay Program partnership have failed to coalesce around a solution — it's also possible it won't be resolved until well into the next year.

"It's probably the decision that will be the most challenging to the partnership because it is potentially so divisive," said James Davis-Martin, Bay coordinator with the Virginia Department of Environmental Quality and chair of the Bay Program's Water Quality Goal Implementation Team. "It can set the



The Susquehanna River drains 43 percent of the Bay watershed. Most of its area is upstream of Conowingo Dam which once trapped 20 percent of the nitrogen and half of the phosphorus from the river. Photo / Dave Harp

us-against-them mentality in place."

No more 'free ride'

The Bay Program is in the midst of a "midpoint assessment" of the 2010 Chesapeake Bay Total Maximum Daily Load, which set nutrient and sediment caps for each state and river. The resulting pollution reductions were intended to reduce algal blooms, improve water clarity and enhance oxygen levels to sustain fish, crabs, oysters and other aquatic life.

States were to take all needed actions by 2025 to achieve those reductions — including planting cover crops, installing stream buffers and upgrading wastewater treatment plants. But the TMDL, or "pollution" diet, also called for a review in 2017, during which the states and the U.S. Environmental Protection Agency were to assess progress, weigh new information and make any needed course corrections by the end of that year.

Few issues have changed more than Conowingo since 2010.

When the TMDL was written, the EPA assumed that the dam's reservoir was trapping as much as 20 percent of the nitrogen and 50 percent of the phosphorus coming down the Bay's largest tributary as it had for decades — and that it would continue to do so through 2025.

But research shows that's no longer so. A review by the U.S. Geological Survey found that Conowingo has been trapping fewer and fewer nutrients since the 1990s, and sometime in the last few years reached the point where it essentially was no longer retaining nutrients and sediment.

"The free ride is over," said Robert Hirsch, a USGS research hydrologist whose work a few years ago was the first to show the dam was starting to leak more nutrients downstream. "What comes in basically goes out under the current situation."

Recent reports by the U.S. Army Corps of Engineers and the Bay Program's Scientific and Technical Advisory

Committee reached the same conclusion.

That lost trapping capacity has masked improvements made upstream. USGS monitoring shows that the amount of nitrogen and phosphorus in the lower Susquehanna River above the dam has decreased since the early 1990s. But because nutrients are no longer effectively being trapped in the reservoir, there has been little net change in the amount passing Conowingo and entering the Bay. In the last two decades, nitrogen levels measured below the dam have decreased slightly, while those for phosphorus have increased a bit.

The upshot is this: Because of the dam's diminished trapping capacity, the nutrient reductions called for in the Susquehanna watershed by the TMDL are no longer enough to meet dissolved oxygen goals in deep waters of the Upper Bay.

Who bears the burden?

Computer modeling done for the Corps estimated that to meet oxygen goals without Conowingo's help, areas upstream of the dam would need to keep an additional 2.4 million pounds of nitrogen and an extra 270,000 pounds of phosphorus annually from getting into the Susquehanna. Those would require 9 percent greater nitrogen and 38 percent greater phosphorus reductions from now to 2025.

In an appendix to the TMDL, the EPA said that if the Conowingo reservoir did fill prior to 2025, it would consider assigning steeper cuts to areas of Pennsylvania, Maryland and New York upstream of the dam to make up the difference.

But some question whether that is fair, or realistic. Pennsylvania — which would bear the brunt of any additional reductions — is already lagging far behind in its cleanup. It needs to ramp up the pace of nitrogen reductions five-fold beyond recent efforts just to meet current goals.

"They are already struggling to achieve the reductions that we have quantified for them," Davis-Martin said. "And the idea

that they would be able to absorb a bunch of previously unaccounted-for loads may not be a viable alternative."

And, some question whether all of the additional responsibility should be placed upstream of the dam, as the Bay has been a major beneficiary of past reductions.

"We have collectively reaped the benefits of the reservoir and its trapping capacity, and maybe there is a reasonable expectation that we share the consequence of that trapping capacity being lost," Davis-Martin said.

Beth McGee, senior water quality scientist with the Chesapeake Bay Foundation, said the debate about who bears the burden results from bad timing. The nutrients from Conowingo are considered "new" only because scientists didn't recognize that the reservoir was nearly filled when nutrient allocations were made under the TMDL in 2010.

Those allocations were made based on several principles, including that places with the greatest impact on the Bay bear the greatest cleanup burden, but also that as a matter of equity, everyone must share in the task.

If the dam's fading benefit had been recognized in 2010, McGee said, those additional nutrients would have been divided across the watershed using that formula.

"We would have factored in the new way Conowingo was behaving, and I don't think anyone would have debated it," she said.

Under that scenario, areas upstream of the dam would still have to undertake the greatest action — because they have the greatest impact — but some of the burden would be spread among other jurisdictions.

Efficiency vs. equity

But spreading the burden around comes at a price, literally.

Modeling estimates in the Corps' report suggest that meeting the water quality goals would require almost twice the reductions — 4.4 million pounds of nitrogen and 410,000 pounds of phosphorus — if spread using the allocation formula. That's mainly because the Susquehanna has a greater impact on dissolved oxygen levels in the Upper Bay than almost any other part of the watershed. Spreading the burden would likely increase the cleanup cost by millions, if not tens of millions, of dollars.


"It's a policy call," McGee said, adding that the whole region should "share the pain."

Those numbers could also increase. The computer models used to make those nutrient reduction estimates are being updated and improved with new research. Final estimates won't be available until late next spring. Officials don't expect

DAM CONTINUES ON PAGE 9



But the message is often blurred

- “the 800-pound gorilla”
 - “a loaded cannon”
 - “the largest threat”
- 

Offsetting nutrients passing Conowingo to cost \$53 million a year

Biggest obstacle is who will pay to reduce sediment behind dam

By Karl Blankenship

The cost to reduce the added nutrient pollution spilling over the Conowingo Dam now has a price tag: at least \$53 million a year.

That's the rough estimate contained in a draft strategy aimed at finding ways to offset the additional nutrients passing through the dam to the Chesapeake Bay, now that the dam's 14-mile long reservoir is filled with sediment.

The dam is located on the Susquehanna River in Maryland 10 miles upstream of the Bay. Most of the cleanup work proposed in the draft plan, released for comment Oct. 14, would take place upstream in Pennsylvania, primarily on farms.

The plan envisions attracting private investors to front the money needed to jumpstart the work but said that will only happen if the states and U.S. Environmental Protection Agency commit to paying them back — something that has not happened so far.

Beth McGee, director of science and agricultural policy at the Chesapeake Bay Foundation, said she liked much of the proposed strategy, but said its success depends on whether the state-federal Bay Program comes up with a way to pay for it. "It's only a plan," she said. "If it doesn't get implemented, we're no better off."

The dam, completed in 1929, actually helped to reduce Bay pollution for decades by trapping sediments and associated nutrients. It's long been known that the reservoir would eventually fill, allowing sediment and nutrients to flow more freely into the Chesapeake. When the latest Bay cleanup plan was drafted in 2010, though, that wasn't expected to occur until after the 2025 deadline that states are striving to meet.

But that has already happened, and computer models estimate an additional 6 million pounds of nitrogen and 260,000 pounds of phosphorus now reach the Bay in a typical year.

That's enough to keep the Chesapeake's 2025 clean water goals out of reach.

With states already struggling to meet their individual pollution reduction goals, the Bay Program in 2018 decided to have an outside group develop a separate plan to offset nutrient increases from the dam and come up with a way to finance it.



The Susquehanna River flows through the Conowingo Dam, 10 miles upstream from the Bay. A draft strategy for reducing an increased load of pollution from behind the dam is open for public comment until Dec. 21. (Staff photo)

Last year, the EPA awarded nearly \$600,000 to the Center for Watershed Protection, Chesapeake Conservancy and Chesapeake Bay Trust to tackle the job.

"It's a massive lift," said Bryan Seipp, a watershed planner with the Center for Watershed Protection, who led the team. "It took decades and decades for this material to build up behind the dam. Trying to solve a problem that took decades to create in a fraction of that time is a challenge."

The team examined nearly a dozen options, some of which included actions outside the Susquehanna watershed that would achieve the same benefits to the Bay, before settling on the recommended strategy. Most of the other options cost more — one came in at \$368 million a year.

The lowest cost strategy came in at \$49.5 million dollars annually but relied solely on reductions from agricultural lands in the Susquehanna basin. Seipp said that raised concerns that an overreliance on agriculture would result in taking too much farmland out of production.

The selected plan focuses entirely on the Susquehanna watershed — primarily in Pennsylvania. It also identifies places where nutrient control actions would be most effective and suggests more than a dozen on-the-ground pollution control practices that would be the most cost-effective to implement.

The plan still relies mostly on agriculture, but also seeks a sliver of nutrient reductions from developed lands.

The strategy cautioned, though, that its estimated costs are "likely low." They do not include, for example, the cost of providing technical support staff to work with landowners on runoff control practices.

The draft also opened the door to other alternatives, such as dredging built-up sediment from behind the dam. Maryland is planning a pilot study to determine whether that is feasible.

It also raises the possibility of extending the deadline for meeting Conowingo goals beyond 2025.

Seipp said there is no firm timeline to

issue a final strategy. That, he said, would hinge on public comments that may require plan revisions, as well as more clarity about funding.

A separate financing strategy will be released in December that is intended to identify ways to attract private money to support the plan.

That would spare cash-strapped states from having to pay up front and could speed implementation. But, the draft plan cautioned, "The only way that private investors will make money, at least in the near future, is if the public sector is compelled, for whatever reason, to pay them back for their investments."

Although states in the watershed chipped in funding to help develop the plan, there has been no commitment about who would ultimately pay for the actual work.

The team writing the financing strategy said in a Sept. 23 memo that it assumes the Bay states "will have the ultimate responsibility" for funding the plan. Without that commitment, it said, implementation "will be very limited in scale and impact."

Some state officials have hoped that other funding mechanisms will arise, such as philanthropic support that doesn't need to be paid back. But efforts to lure outside money have been elusive.

At the time that the Bay Program agreed to create the Conowingo plan, state and federal officials were hoping that a settlement between Maryland and Exelon — the utility that owns the dam — would generate tens of millions of dollars a year for the cleanup. The utility needs approval from the state before it can get a new federal license to operate the dam.

Earlier this year, though, the state and Exelon struck a deal that committed just \$19 million over the 50-lifespan of the license for that purpose. Some environmental groups and lawmakers have sought to block that agreement from being finalized.

"We still think that they should be held accountable for their downstream impacts, and we would love to see some of their dollars go upstream as opposed to what's currently in the settlement agreement," McGee said.

The draft Conowingo Watershed Implementation Plan is open for comment until Dec. 21. Comments should be submitted to CWIP@chesapeakebay.net. Read the plan at chesapeakebay.net/whogroup/conowingo_watershed_implementation_plan_steering_committee. ■

EPA declares 'no confidence' in Conowingo cleanup plan

Agency gives states 60 days to respond

By Karl Blankenship

Citing a lack of funding, the U.S. Environmental Protection Agency says it has "no confidence" in a pollution reduction plan written to offset the impact of the Conowingo Dam.

In a Jan. 24 letter to environmental officials in Chesapeake Bay watershed states, the agency said it would scrap what was supposed to be an innovative cleanup plan unless states come up with a way to pay for it within 60 days. The estimated cost of the plan is more than \$50 million a year.

If the plan is scrapped, the agency will replace the proposed cooperative regional approach to the vexing issue — addressing increased pollution flowing past the Susquehanna River dam — with a plan that instead requires each state to do more on its own. That approach would likely be even more costly.

"We must bring this effort to closure and ensure that we have an implementable path forward to address the pollutant loads from the Conowingo," Adam Ortiz, EPA administrator for the mid-Atlantic region, wrote in the letter.

At a legislative hearing in February, Maryland Environment Secretary Ben Grumbles said the Hogan Administration was proposing \$25 million in bond financing to help implement the plan, though it is unclear whether other Bay states — many of which have expressed reluctance — or the Maryland General Assembly would agree to do the same. "We'll put our money where our mouth is and hope others will match," Grumbles said.

Figuring out how to resolve the Conowingo issue has bedeviled policymakers for decades. Sediment and nutrients have been building up behind the 94-foot-high dam, located just 10 miles upstream from the Bay, since it was completed in 1928.

For many years, the dam kept huge amounts of those pollutants from reaching the Chesapeake. But studies since the early 1990s warned that the reservoir would eventually fill, at which point more nutrients and sediment would flow past the dam and into the Bay.

When the EPA and the states agreed on a new Bay cleanup plan in 2010, they thought the reservoir wouldn't fill until after 2025, when all pollution actions



Conowingo was built in 1928 to generate electricity, and it inadvertently acted as a trap for nutrient and sediment pollution flowing downstream to the Chesapeake Bay. Over the years, sediment buildup behind the dam has reduced its pollution-trapping capacity. (Dave Harp)

needed to restore Chesapeake water quality are supposed to be in place.

But after the EPA had assigned pollution reduction goals to each state, new research indicated the reservoir was already failing to trap pollutants and greater amounts were reaching the Bay.

With the states struggling to meet their own nutrient reduction goals, they agreed in 2018 to support the development of a separate cleanup strategy aimed at offsetting the Conowingo impact and finding a way to pay for it.

The EPA awarded a contract to several groups, led by the nonprofit Center for Watershed Protection, to write the strategy. They concluded that the most cost-effective approach was to focus on reducing nutrient and sediment loads in the Susquehanna basin, which is mostly in Pennsylvania. About 90% of the nutrient reductions would come from agriculture and most of the rest from developed lands.

The EPA agreed that actions outlined in the plan would achieve the goal of reducing nitrogen by 6 million pounds a year and phosphorus by 260,000 pounds. But the plan's main shortcoming, according to the EPA, is the lack of funding. The plan estimates it would cost \$53 million a year to implement, plus roughly \$13 million a year for additional technical and administrative support.

"Without a ... financing strategy in place and dedicated funding sources to support [the Conowingo plan], there is little

confidence that the plan will be implemented, and the Conowingo pollutant load will be reduced by 2025," the EPA review said.

When agreeing to create the Conowingo plan, the Bay states had hoped that Exelon Corp., which owned the troubled structure, would foot much of the bill as part of the new licensing agreement. But Maryland and Exelon negotiated an agreement that does not include significant financing for the plan. That means the states — which are ultimately responsible for meeting Bay cleanup goals — would have to come up with the money.

"Maryland's decision to not require Exelon to pay its fair share of the pollution reduction costs was a missed opportunity that leaves all the Bay jurisdictions liable for that funding," said Beth McGee, director of science and agricultural policy for the Chesapeake Bay Foundation. "Maryland, and the other Bay states, are now forced to step up to the plate and fund these measures."

Several environmental groups, led by Waterkeepers Chesapeake, have filed suit challenging the Federal Energy Regulatory Commission's approval of a new operating license for the dam, saying Maryland's agreement with the utility did not adequately protect the environment.

"What we have been saying for years has now been made clear by the EPA, [that] Maryland and other Bay state taxpayers are going to end up paying billions of dollars to clean up Conowingo Dam's mess because Maryland and FERC both failed to hold

Exelon accountable," said Betsy Nicholas, executive director of Waterkeepers Chesapeake. "This failure will be Governor Hogan's legacy."

In his letter, Ortiz urged states to "review and evaluate federal and state financing sources" that might be applied in the Conowingo plan. Most states have been getting influres of money from COVID relief and infrastructure funding bills, some of which could be applied to Bay cleanup efforts, including Conowingo.

If that doesn't happen, the EPA would redistribute responsibility for reducing an equivalent amount of pollution among the states in the watershed. That would still meet the overall Bay water quality goals, but it would do so by requiring places with less impact on the Chesapeake to do more.

The rationale is that all Bay states benefited when Conowingo was helping to improve Bay water quality by trapping nutrients and sediments. That, in turn, lessened the pollution reductions they were assigned in the 2010 cleanup plan, formally known as the Bay's total maximum daily load, or TMDL.

"[Had] the reservoir reached trapping capacity prior to the Bay TMDL being established," the EPA review stated, "the Bay jurisdictions would have had a greater lift to meet their respective Bay TMDL allocations." ■

Bay Journal associate editor Timothy B. Wheeler contributed to this report.



New plan finally in place for Conowingo pollution problems

Bay partners come to agreement, but strategy lacks full funding

By Karl Blankenship

It has taken more than four years, but leaders in the Chesapeake Bay restoration effort say they've found a path forward for dealing with the added pollution stemming from Conowingo Dam.

It's a solution that could soon ramp up pollution controls in the Susquehanna River basin, which drains the Bay's largest tributary.

And over time, it may involve seeding streams with mussels, dredging sediment from behind the 94-foot-high dam and cleaning up waterways hundreds of miles upstream damaged by acid mine drainage.

The plan is not fully funded and will not achieve its pollution reduction goals by the 2025 Bay cleanup deadline.

Still, the U.S. Environmental Protection Agency, which earlier threatened to scuttle the plan, signed off in July on the "phased approach" to address the problem created as the dam lost its capacity to trap sediment and nutrients flowing downstream.

Under that approach, some work will begin soon. But states in the Bay watershed — Pennsylvania, Maryland, Virginia, New York, West Virginia and Delaware — will have time to find more money and new solutions. The EPA will evaluate progress in 2026 and decide if the approach is working.

"It's a challenging issue, not all of our making, but it's up to us to figure it out," Adam Ortiz, administrator of the EPA's Mid-Atlantic region, told officials from Bay states at a recent meeting.

To that end, the Conowingo effort has already been "extraordinary," said Ann Swanson, executive director of the Chesapeake Bay Commission. This year, Maryland approved \$25 million to help implement nutrient control actions — much of it in Pennsylvania — to help partially offset the dam's impact.

It was the first time one Bay state approved spending significant money in another, which Swanson, who has led the legislative advisory commission for 34 years, called "a historic action that, at least in my career, I never saw before."

The money will come with strings attached, such as requiring that projects be completed and functioning before they would get money.

That's one example of how the Conowingo plan has given impetus for new ideas. These involved hope it ultimately serves as a testing ground for new thinking about the decades-old Bay cleanup effort.

"It does bring a level of priority to these types of innovative solutions," said Jill Whitcomb of the Pennsylvania Department of Environmental Protection and co-chair of a committee overseeing the Conowingo work. "I really am hopeful, and optimistic, that we're going to see a lot of good things coming out of this."

A problem, if not a "ticking time bomb"

The Conowingo Dam crosses the Susquehanna River in Maryland, just 10 miles upstream from the Bay. For decades, the dam helped protect Bay water quality by trapping a portion of the nutrients and sediment flowing downstream before they reached the Chesapeake.

It also loomed as a threat. Scientists realized that the reservoir behind the dam would one day fill with sediment, causing more of it to flow past the hydroelectric facility.

Many people called it a "ticking time bomb," destined to undercut the Bay's restoration — concerns fueled by dramatic satellite images of murky brown water extending from the river far into the Bay after major storms.

But recent studies have painted a more nuanced picture. To begin with, they emphasize that most of the sediment and nutrients washing into the Bay from the Susquehanna, even during large storms, originate from the watershed upstream of the dam, not the reservoir behind it.

And while major storms add to that by flushing sediment out of the reservoir, studies show that nutrients bound to the stored sediment are often in forms not easily used by algae. If flushed into the Bay, many are harmlessly buried rather than fueling the algae blooms that harm aquatic life.

Also, the reservoir isn't technically filled. It is in a state of "dynamic equilibrium." Less sediment is trapped behind the dam as it approaches its capacity, but large storms excavate some of the stored material, clearing space to accumulate more. The amount reaching the Bay varies from year to year.

When all of that is factored together, computer models estimate that under average conditions, the Bay's water quality is being impacted by an additional 6.25 million pounds of nutrients each year. Nitrogen accounts for 6 million of it and phosphorus the rest.

In all, that's only about 5% of the river's annual nutrient load to the Bay. But it's a slug of nutrients that the region must offset to restore the Chesapeake — and it wasn't factored into the 2025 cleanup goals.

Show us the money, EPA says

When state and federal partners in the Chesapeake Bay Program set the latest Bay goals in 2010, they thought the reservoir wouldn't be filled until after the 2025 cleanup deadline. So the Conowingo impact was not accounted for when the EPA assigned nutrient reduction goals to each of the Bay states.

Photo: Susquehanna River water gushes through the Conowingo hydroelectric dam in Maryland, about 10 miles from the river's mouth at Havre de Grace. For nearly a century, the dam helped trap sediment and nutrient pollution washing downstream, but research shows that the reservoir has reached its capacity. (Dave Hays)