

Strong Headwinds Face Water Quality Trading in the Chesapeake

By

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The Chesapeake Bay watershed covers 64,000 square miles in parts of Maryland, Virginia, Pennsylvania, Delaware, New York, West Virginia and the District of Columbia. When the six states and the District asked EPA to establish a multi-state Total Maximum Daily Load under the Clean Water Act in 2010 and assign each state its fair share, they took on the job of reducing discharges of nitrogen from all sources by 25%, phosphorus by 24% and sediment by 10%. The goal is to have all necessary measures in place to achieve this by 2025 to meet applicable water quality standards. With funding at the state and federal levels in short supply, a search was on for the most cost-effective ways to reduce these pollutants. The states with the biggest burdens, Pennsylvania, Virginia and Maryland, each turned to the emerging practice of water quality trading,

Trading enables a discharger for whom the cost per unit of pollution reduction is lower than for other dischargers to reduce its pollution below what the law requires and sell that extra reduction as a “credit” to another discharger for whom the cost per unit of pollutant reduction is greater. The result is that the seller makes money from the credit sale, and the buyer attains compliance at a lower cost than it would otherwise incur. Sounds simple, doesn’t it? In October the Government Accounting Office published the results of a nationwide survey in which it found that only 11 states have water quality trading programs, and the only significant use being made was in Pennsylvania, Virginia and Connecticut, even though EPA has been promoting it since 1996. (I discussed this in [“Water Quality: Wading into Trading”](#) posted Nov. 28, 2017).

To encourage the Bay states to adopt trading programs that will comply with the Clean Water Act and its implementing regulations, EPA published a series of

“Technical Memoranda” (TMs) addressing key elements of a trading program including “baseline” (the maximum amount of pollution allowed under any applicable law before a credit can be generated), protecting local water quality where a credit is used, credit calculation, and accounting for uncertainty. This is needed where a nonpoint source, like a farm, is generating credits by installation of best management practices (BMPs) and the pollution reduction benefits must be estimated using modeling. The TMs also address credit duration, certification by the agency, registration and tracking on a publicly posted registry, and verification that the BMPs on which the credits are based are being maintained. Finally, they address sampling and public participation. (See my blog post of Sept. 26, 2016 “[New Tools for Water Quality Trading](#)”). Credits can also be used to “offset” new or expanded discharges. The TMs are not regulations, but set forth EPA’s “expectations”.

Common Elements

Pennsylvania, Virginia and Maryland have adopted trading regulations which are intended to be consistent with the TMs. The principal elements include definitions, eligibility requirements, “baseline” requirements for credit generators, a trading framework describing how the program works, and procedures for calculation of credits and their certification, verification, registration and sale. When a credit is registered it is assigned an identification number and can be bought, used and tracked. In some instances, “aggregators” act as brokers buying and selling credits. Provisions for public participation and enforcement are also included, though they vary among the states.

Baseline for a point source discharger is its permit limitations, including technology-based requirements and water quality-based effluent limitations (WQBELs). This makes it easy to calculate and track the use of credits in a point source to point source trade. For nonpoint source dischargers, calculating baseline is more difficult because both compliance with pollutant load allocations and calculation of pollutant reductions resulting from BMPs are based on estimates. EPA’s Chesapeake Bay Program has estimated “effectiveness values” for several hundred BMPs in the

watershed. This provides valuable guidance, but does not account for the physical, hydrological, meteorological and other factors that will vary from site to site.

Using this type of information, Virginia and Pennsylvania currently set baseline for nonpoint sources by requiring certain BMPs to be implemented (a “practice-based” baseline). In Virginia these include nutrient management plans, cover crops, a soil conservation and erosion control plan, a 35’ vegetated buffer between any farming activity and any water body and, where applicable, fencing cattle out of streams. Pennsylvania’s are similar but not identical. Maryland, by contrast, developed a model-based “nutrient tracking tool” which enables the user to ascertain a site-specific baseline which considers not only the typical “effectiveness values” of the BMPs, but actual site-specific conditions.

Pollutant load allocations under the Bay TMDL are reallocated by each state to subwatersheds (like a river basin). A nonpoint source discharger’s baseline is its fair share of that reallocation. Maryland’s model can help determine what that is, what BMPs will be needed to meet it, and how many “credits” can be generated by implementation of additional BMPs. Because this “performance-based” approach provides a more accurate site-specific calculation than the “practice-based” approach, Pennsylvania is planning to switch to it soon. A further impetus is that in 2014 EPA objected to several permits which used BMP-based credits for compliance because it could not be shown that baseline had been achieved.

In all 3 states, when a credit is used for compliance, it becomes part of the buyer’s NPDES permit and is enforceable against the permittee. The buyer then enters a contract with the seller requiring the seller to maintain the credits, and typically providing remedies in case of a credit failure. In addition, Pennsylvania and Virginia allow a permittee to correct any noncompliance within a specified period after the end of a “compliance year” by buying credits that were in effect during that year – in effect a “true up.” Typically, credits are more expensive at this point than if they were bought in advance. To protect receiving water quality, in all 3 states a credit

must be used in the same river basin or subwatershed where it was generated (with a few controversial exceptions).

Pennsylvania

Pennsylvania has had a trading and offset program since 2010. It is reflected in a set of [regulations](#), 025 PA Code Sec. 96.8, and a “[Nutrient Trading Supplement](#)” to these regulations dated October 14, 2016,. Credits may be generated by point sources or non-point sources. Most trades have been point source to point source trades between waste water treatment facilities. Because they each have permits, calculating the amount of pollution reduction by the credit generator is far easier than the estimates that need to be made for a non-point source generator.

The most frequent non-point source trades have involved either shipment of manure to a destination outside of the watershed or manure destruction by “gasification” at a fledgling poultry waste-to-energy plant that is not yet operating in the black. For 2017, the Pennsylvania DEP reported 82 trades. Seventy-two involved point source generators. Seven involved manure shipments outside the watershed, one involved gasification and two involved BMPs installed at farms. Where BMPs are used, because of the inherent uncertainty in estimating the actual load reductions, an “uncertainty ratio” of 3 to 1 is required. That is, to sell a credit of 10 pounds per year of nitrogen reduction the generator must install BMPs estimated to achieve a reduction of 30 pounds. Virginia and Maryland use a 2:1 ratio with a few exceptions. This is at least one reason why farmers have been reluctant to engage in trading. Others are discussed below.

When a credit is sold there is a 10% set aside for the state “reserve fund“ for use in case of failed credits. Maryland also requires a 10% reserve and Virginia has a 5% “retirement ratio” – both applicable only where nonpoint source credits are involved. So far as I have been able to tell, Pennsylvania is the only state in the Bay watershed that has carried out an agriculture–based nonpoint source to point source trade.

Pennsylvania and Virginia have a 30 day public comment period on any credit once it is “certified” and before it sold.

Virginia

Virginia’s [nutrient trading statute](#), Article 4.02, Sec.62.1-44.19.12 et seq., authorizes a general permit for nitrogen and phosphorus discharges in the Chesapeake Bay watershed and creates a “Nutrient Credit Exchange Program” to facilitate trades. *See [implementing regulations](#)* at 9VAC25-820-10 *et seq.*, Both point source and nonpoint source trading is allowed, but so far, the only trading that has occurred involved credits generated by point sources or land conversion, notably farm land to forest (discussed below). A point source can create a credit either by installing new technology or implementing operating practices that enable it to operate with a lower discharge load than its permit requires. The terms of its permit and compliance plan are then modified to require it to keep its discharges at the lower level to ensure that the credits continue to be generated. More stringent limitations may be imposed on any discharger to ensure compliance with local water quality standards. Individual effluent sampling and reporting is required.

How does this work? Virginia has sub-allocated its statewide cap on annual nitrogen and phosphorus discharges under the Bay TMDL by major river basin. Discharges to that basin are limited so as to comply with that cap. With minor exceptions, all dischargers must submit a “compliance plan” to the Virginia DEQ demonstrating compliance with applicable effluent limitations. Trading may be used for compliance with WQBELs. Credits may be registered with the Nutrient Credit Exchange Association, a voluntary nonstock corporation which serves as a clearinghouse, selling credits for initial compliance or for a “true up” for any noncompliance that appears at the end of the “compliance year”. The Exchange aggregates all the individual compliance plans of its participants into a statewide annual compliance plan, posted on the DEQ web site, that shows for each basin which dischargers

expect to need credits and which expect to generate credits, so as to facilitate sales. Trades can also proceed directly between seller and buyer.

The DEQ website lists available credits, and shows prior credit generation and sales over the past few years. When credits are unavailable, a discharger may pay an amount into a “nutrient offset fund”, which is administered by the DEQ. Any new or expanded discharge must get an offset (or unused allocation) before commencing a discharge, and that must be included in a nutrient offset plan. The Exchange buys all credits that are listed with it, and because the number of credits available in recent years has exceeded the demand, the unsold credits have been retired, contributing to a net reduction in nitrogen and phosphorus discharges.

Point source to point source trading has been active in Virginia. In 2016 there were 18 trades for nitrogen and 20 for phosphorus. In 2015 there were 21 for nitrogen and 16 for phosphorus. The only nonpoint source credits traded have been land conversions. These credits are permanent and have been used to offset new or expanded discharges from stormwater management facilities. None have been generated by installation of BMPs on farms, although there are pending regulatory amendments designed to facilitate this and Virginia hopes that new and expanded point source dischargers will create a market for them.

Maryland

In Maryland the Department of Agriculture issued regulations in 2016 establishing procedures for farmers to develop, certify and register credits. [COMAR 15.20.12 et seq.](#) MDA then worked with the Department of the Environment (MDE) to develop the rest of the program for developing and trading credits and offsets generated by any type of nonpoint source. The Maryland program includes sediment as well as nitrogen and phosphorus. These [regulations](#) were finalized by MDE on July 6, 2018. COMAR 26.08.11.01 -.14, effective July 16, 2018. Point source to point source trades are allowed under a guidance document because they are so much simpler with respect to establishing baseline and quantifying pollution reduction amounts.

Maryland's regulations cover the use of BMPs to achieve baseline and generate credits, their quantification using the model-based "nutrient tracking tool" mentioned above, certification and registration, incorporation of the credits into the buyer's permit, and geographic regions within which trades may occur. An uncertainty ratio of 2:1 is required except, oddly, that where a stormwater point source is the buyer only a 1:1 ratio is required, which provides no safety factor for uncertainty at all. The regulations also provide for verification (including use of qualified third-party verifiers), reporting and enforcement.

Trading can be carried out within 3 large geographic regions, which are larger than subwatersheds and viewed by critics as too large to protect local water quality. However, the regulations also state that, "The use of a credit may not cause nor contribute to local water quality impairments or prevent the attainment of local water quality standards." To effectuate this, credits to be used in locally "impaired waters" must be generated in those waters. The regulation then says they should be generated upstream of the user but is unclear whether this is in addition or an alternative. The former would be more protective.

Must each trade result in a net reduction of pollution? Concerns have been expressed about the lack of clarity on this in all 3 states. EPA said it expects this, and while each set of regulations requires some kind of "reserve" or "retirement" ratio (5%-10%) discussed above, it is possible that these reserves may be used to replace failed credits rather than retired.

Perhaps the greatest concern is that trading programs, initially hailed as having huge potential to reduce pollution and relied on in each state's Watershed Implementation Plan, have not lived up to those hopes. There are several reasons for this. One is that farmers have been reluctant to sign up. Some are skeptical as to whether they will reap the promised benefits; others are concerned that if they implement the relatively inexpensive BMPs now, if the state later increases the

amount of pollution reductions needed to achieve water quality standards, the only way they will be able to comply is by using more expensive BMPs. Prospective buyers of nonpoint source credits worry about what happens if the BMP on which their credit is based fails, and they become immediately liable under their permit. In Pennsylvania and Virginia it is possible that such situations could be covered with point source credits purchased from the registered list during the “true up” period, but the availability of such reserves in Maryland is much less certain. Perhaps most important, the programs don’t provide a guaranteed market for a farmer who makes the investment in credit-generating BMPs.

The benefit of a guaranteed market is demonstrated by the Stormwater Reduction Credit Trading Program which is operating successfully in the District of Columbia. Those credits involve volumes of *stormwater* rather than of *pollutants*, and the former are easier to quantify. The Nature Conservancy and Prudential Insurance Company formed a special purpose entity, District Stormwater, LLC, which buys volume reduction credits, typically achieved by rain gardens, green roofs and other green infrastructure, and sells them to building owners who are required by law to minimize contaminated stormwater runoff. That program is thriving. See, [DC Code Ch.5, Title 21, Secs. 525-534](#).

While trading has fallen far short of expectations, it is not beyond rescue. A lot has been learned over the past 6 years, and more will be learned in the years ahead. As noted above, deficiencies in some of the regulations need to be fixed. Most importantly, however, dependable market incentives must be established before the creation and trading of agricultural nonpoint source credits, which offers the greatest potential for cost saving, will be able to contribute meaningfully to the Chesapeake Bay restoration.

Categories: Clean Water Act, EPA, Permitting, Regulation, States, Stormwater, Trading, Water Quality Standards

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