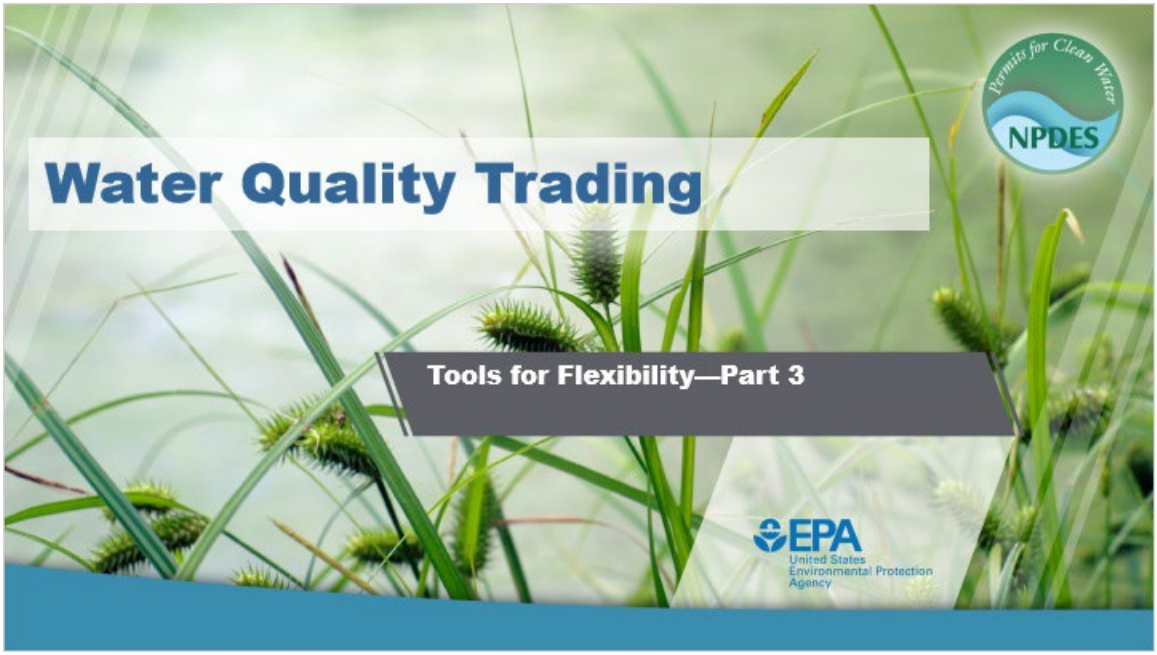
Water Quality Trading

1. Tools for Flexibility—Part 3: Water Quality Trading

1.1 Water Quality Trading



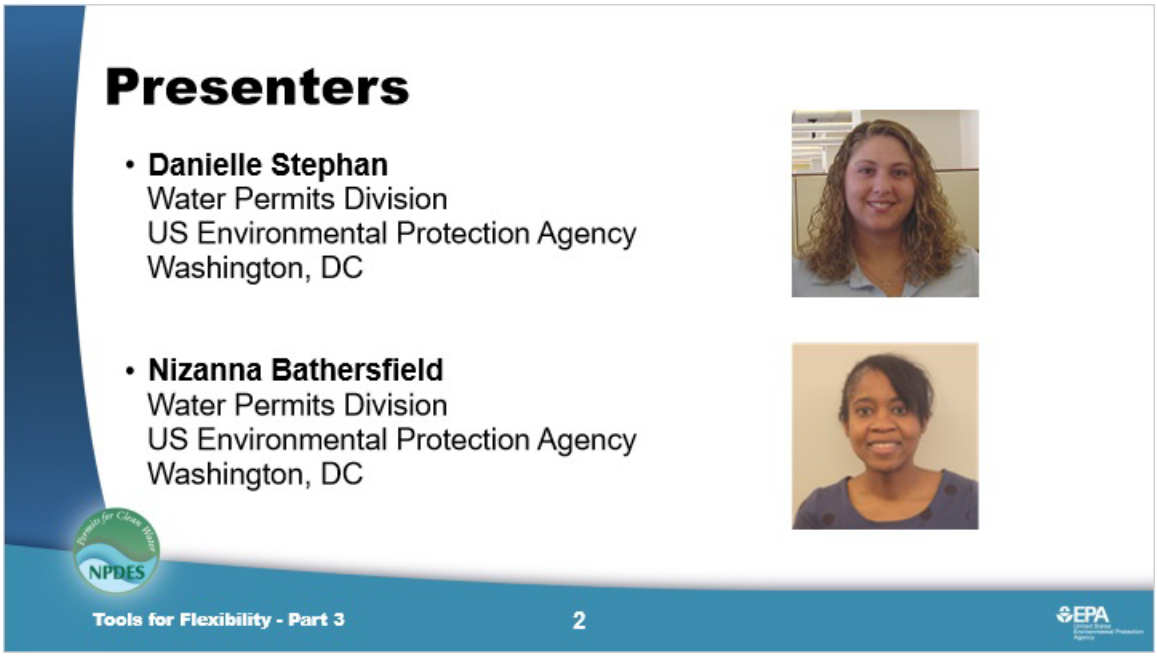
Notes:

Welcome to this presentation on water quality trading for nutrients.

This presentation is part of an online training series that addresses nutrient pollution in NPDES permits, sponsored by the Water Permits Division of the United States Environmental Protection Agency. This is the third and final part of the training, in which we consider tools for flexibility in the NPDES program when controlling nutrient pollution.

In this presentation, we will provide a basic understanding of water quality trading.

1.2 Presenters



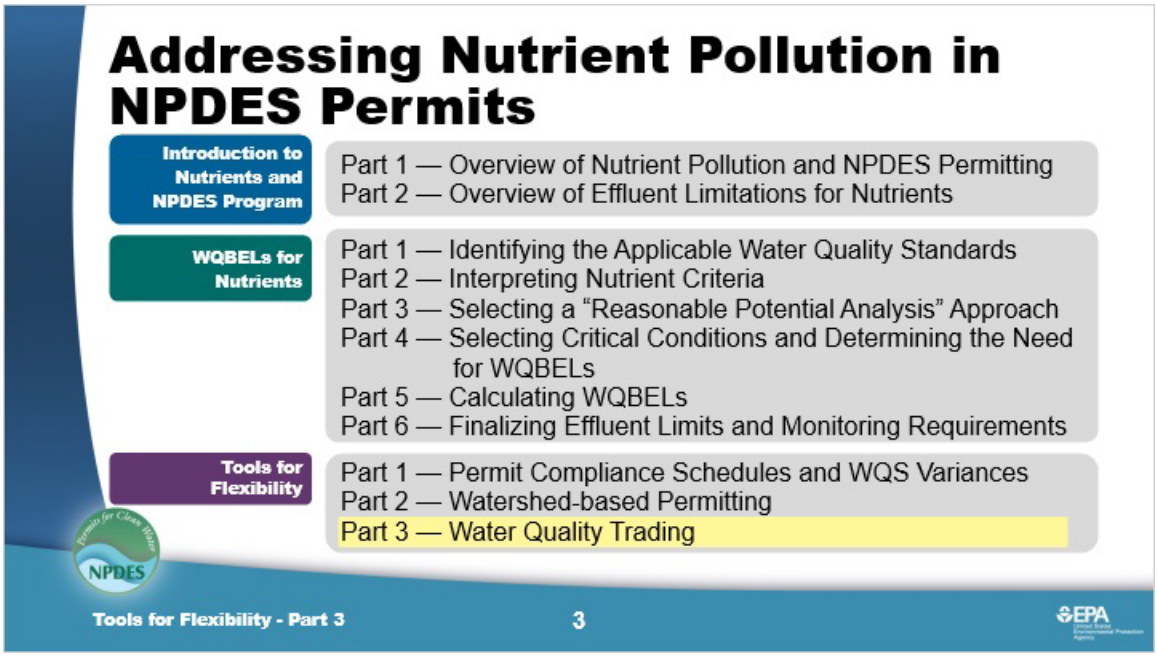
Notes:

Your speakers for this presentation will be me, Danielle Stephan, and Nizanna Bathersfield. We are both with the Water Permits Division of the U.S. Environmental Protection Agency, or EPA, in Washington, D.C.

Before we begin: please note that the materials used in this presentation have been reviewed by EPA staff for technical accuracy. However, the views of the speakers are their own, and do not necessarily reflect those of EPA. NPDES permitting is governed by the existing requirements of the Clean Water Act and EPA's NPDES implementing regulations. These statutory and regulatory provisions contain legally binding requirements. The information in this presentation is not binding. This presentation supplements, and does not modify, existing EPA policy, guidance, and training on NPDES permitting. EPA may change the contents of this presentation in the future.

Now, let's take a look at where we are in the overall training series.

1.3 Addressing Nutrient Pollution in NPDES Permits

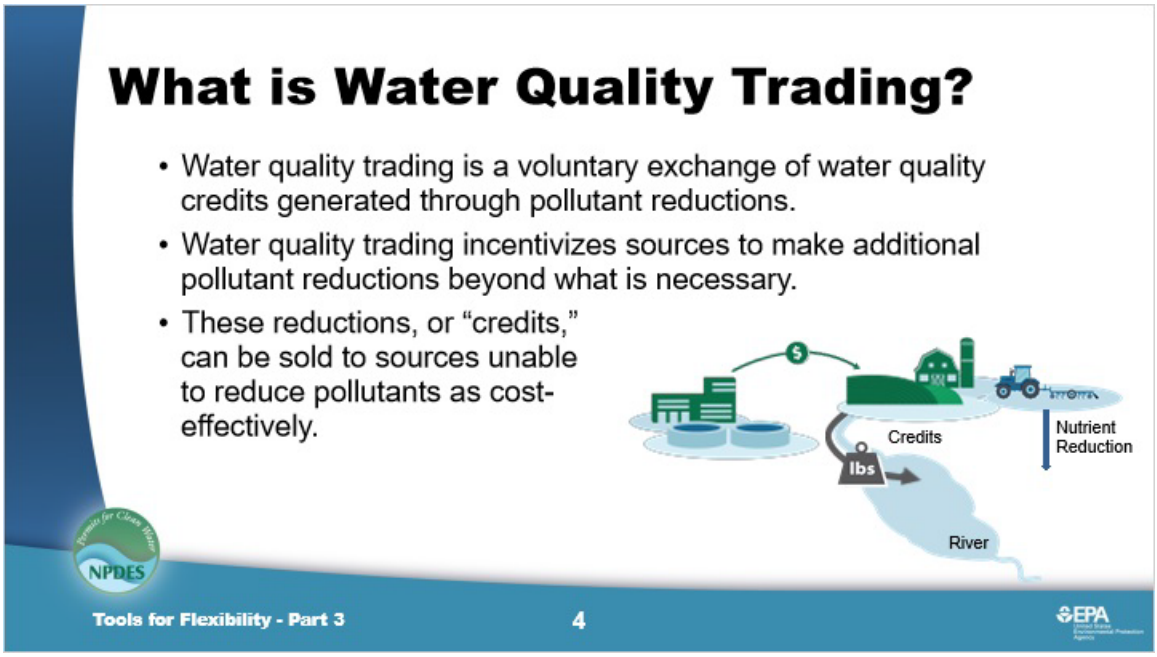


Notes:

This is the third and final section of our training on tools for flexibility for addressing nutrient pollution in NPDES permits.

In this part of the training, we'll discuss how water quality trading can be used to comply with nutrient limits.

1.4 What is Water Quality Trading?



Notes:

What is water quality trading?

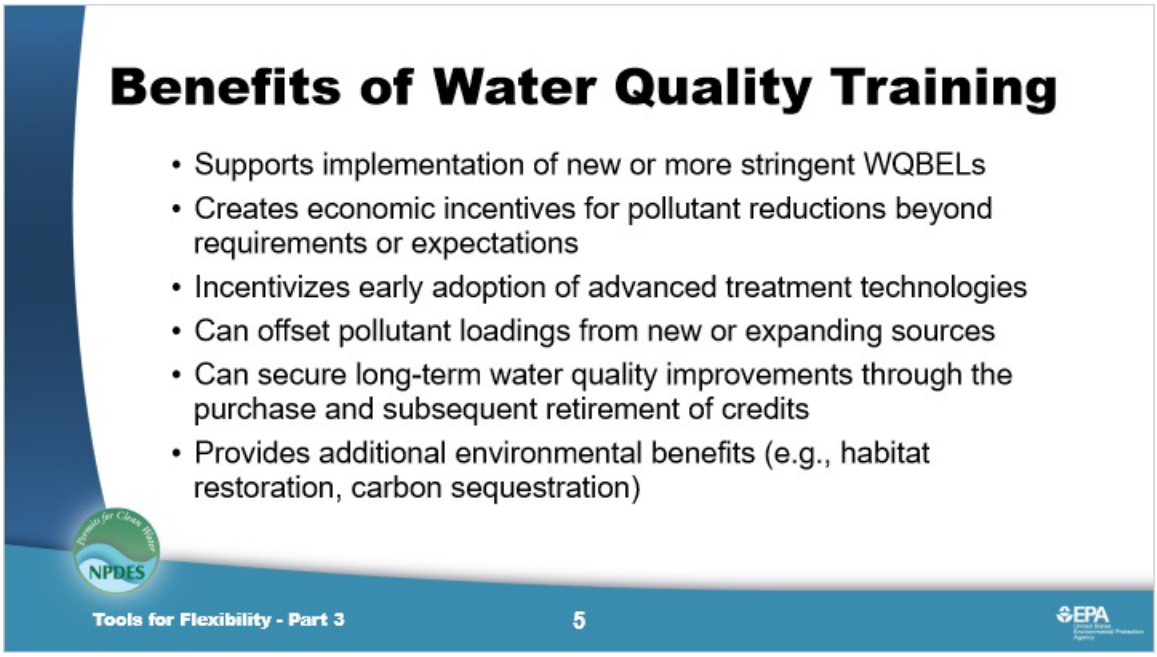
At its most basic level, water quality trading is a voluntary exchange of water quality credits that are generated through pollutant reductions. Point sources can use these credits to comply with water quality-based effluent limits. A key point to note is that participation in water quality trading is voluntary. While meeting an effluent limit is not optional, a state or other permitting authority might allow a permittee to use water quality trading to meet that limit. Water quality trading may not be appropriate for all pollutants, dischargers, or watersheds.

Water quality trading incentivizes sources to make additional pollutant reductions beyond what is necessary. This is because water quality trading works by allowing a point source discharger to purchase pollutant reductions from other sources that are controlling their discharges beyond what is expected in a permit requirement, total maximum daily load (or TMDL), or other requirement. These additional pollutant reductions are translated into credits, and the exchange of credits is called a trade. These reductions, or "credits," can be sold to sources unable to reduce pollutants as cost-effectively.

You can also think of trading as accounting for offsite pollutant removal. As seen on the image on the slide, instead of upgrading its onsite treatment, a facility can pay to have reductions for the same pollutant made at an offsite location, generally within the same watershed.

To understand why a discharger might be interested in water quality trading, let's take a look at some of the benefits of this approach.

1.5 Benefits of Water Quality Training



Notes:

Water quality trading can provide many economic and environmental benefits.

First, it supports implementation of new or more stringent water quality-based effluent limitations (or WQBELs) by providing a more cost-effective option to meet requirements.

Second, water quality trading can create economic incentives for sources to make additional pollutant reductions beyond what the source is required or expected to do. For a point source, these additional reductions could go beyond what is required in their NPDES permit. For nonpoint sources, these additional reductions could go beyond the expectations of an applicable TMDL or other watershed plan.

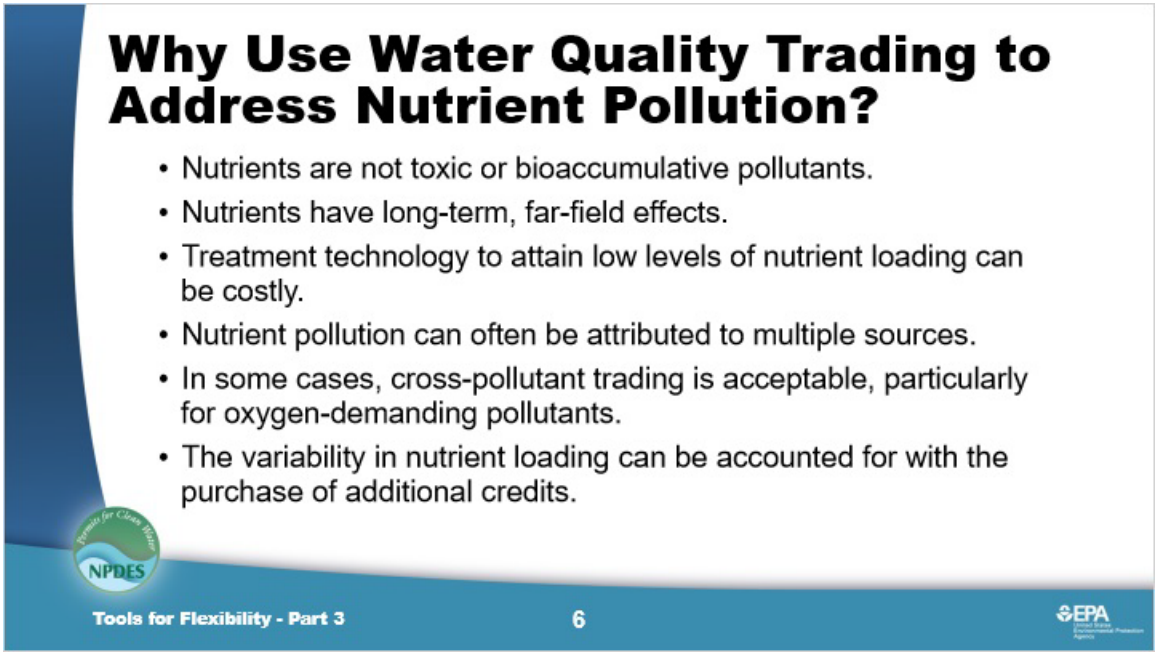
Third, water quality trading can provide incentives for early adoption of advanced treatment technologies. Advanced technologies that can reduce a pollutant below the level required by an effluent limit allow the permittee to sell those additional pollutant reductions as water quality trading credits. A permittee can also use water quality trading while they are installing advanced treatment technologies to meet final effluent limits in their NPDES permit.

Water quality trading can offset pollutant loadings from new or expanding sources in a watershed or water body. This is particularly useful in cases where a watershed or water body may not have any more capacity to accept additional pollutant loading and still meet the water quality standards, or where a TMDL does not have additional wasteload allocations available for a new or expanding facility.

Finally, water quality trading can provide environmental benefits that would not occur if conventional treatment technologies alone were used to reduce pollutant loading. For example, water quality trading can secure long-term water quality improvements through the purchase and subsequent retirement of credits. This accelerates water quality improvements by reducing pollutant loading to the water body.

Water quality trading credits generated through installation of best management practices (or BMPs) by nonpoint sources can also provide additional environmental benefits such as habitat restoration and habitat creation, and carbon emissions reduction and sequestration that would not otherwise occur.

1.6 Why Use Water Quality Trading to Address Nutrient Pollution?



Notes:

Water quality trading will not be appropriate for all pollutants, such as toxic or bioaccumulative pollutants. However, water quality trading can be a good approach for meeting WQBELs for nutrients and similar pollutants, as these tend to have long-term, far-field effects.

Nutrient pollution has been historically challenging to address for several reasons. One reason is cost. Using treatment technology to reduce nutrient loadings from discharges to the low levels that would be necessary to meet water quality standards may be costly.

Nutrient pollution can often be attributed to multiple sources, whose loadings vary geographically, seasonally, and in response to environmental factors. Where water quality problems stem from multiple sources, improvements may depend on a comprehensive approach to address nutrient pollution.

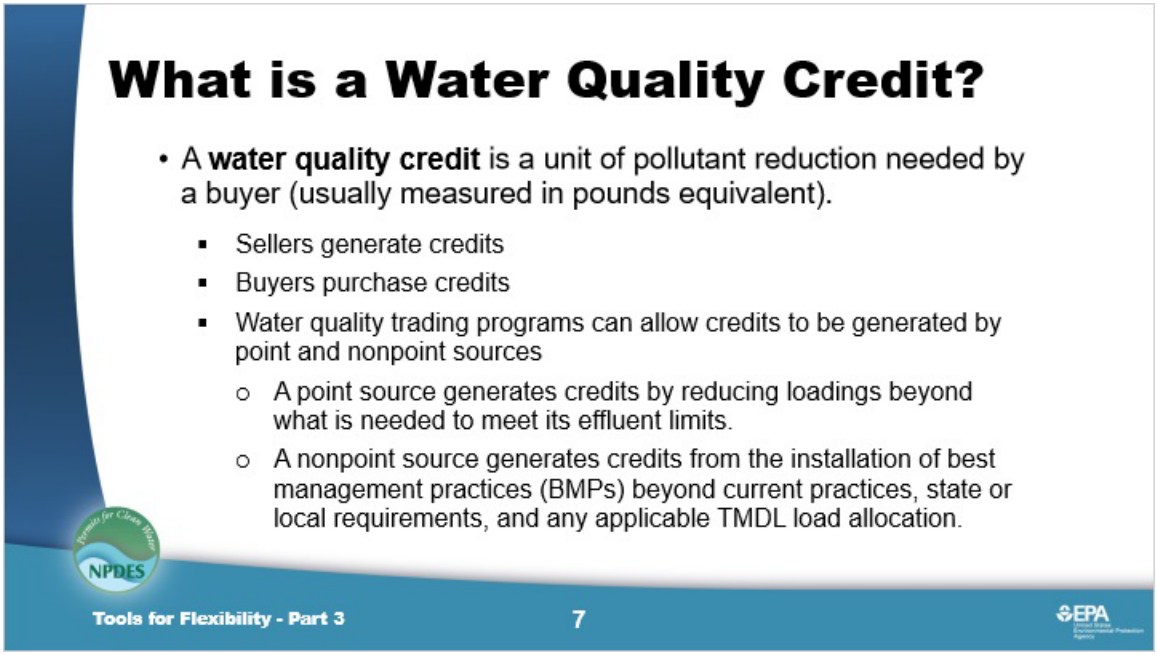
Nutrient pollution and resulting environmental impacts are a complex interaction of several nutrient compounds and other oxygen-demanding pollutants with the environment. Water quality trading can support cross-pollutant trading, which can account for this relationship between nutrient compounds and oxygen-demanding pollutants. For example, cross-pollutant trading can reduce upstream nutrient levels to offset a downstream biochemical oxygen demand or improve a depressed in-stream dissolved oxygen level.

A water quality trading approach can help alleviate the challenges of addressing nutrient pollution. The variability in nutrient loading can be accounted for with the purchase of additional credits, which will

incentivize trading. Further, the challenges inherent to nutrient pollution can create an ongoing demand for credits to purchase, which will support a robust credit market.

Now that we've talked about the benefits of water quality trading in the context of nutrients, let's take a look at some of the key terms and concepts of water quality trading.

1.7 What is a Water Quality Credit?



Notes:

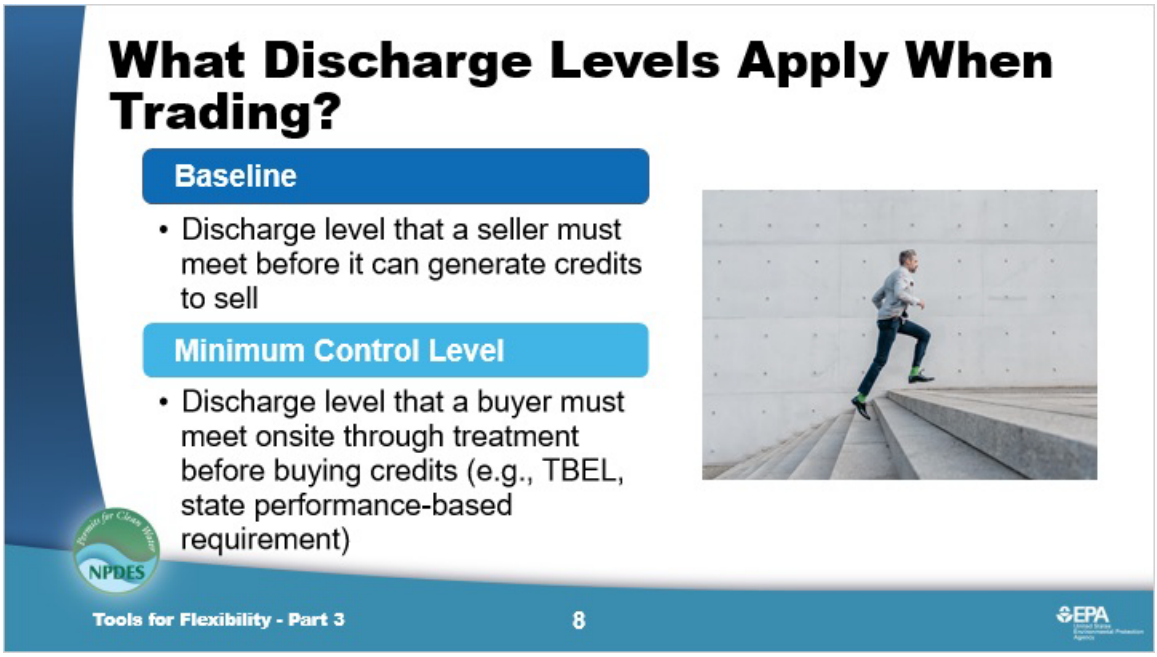
Let's discuss what we mean by the term "water quality credit."

A water quality credit is a unit of pollutant reduction needed by a buyer, usually measured in "pounds equivalent." Sellers generate credits when they make reductions beyond what is necessary to meet their Clean Water Act requirements or other expectations. Buyers then purchase and use these credits to help comply with WQBELs in their NPDES permits, or to meet state or local requirements or other expectations.

Some water quality trading programs allow credits to be generated by a point source or nonpoint source. Point sources generate credits by reducing loadings beyond their permit requirements, often by installing or using additional or enhanced treatment. Nonpoint sources can generate credits by installing BMPs. These nonpoint sources must achieve reductions beyond current practice, any local requirements, and any applicable load allocation in a TMDL.

This presentation will not cover the details of credit calculation, but we will talk about the structure of a trading program and how trades occur.

1.8 What Discharge Levels Apply When Trading?



Notes:

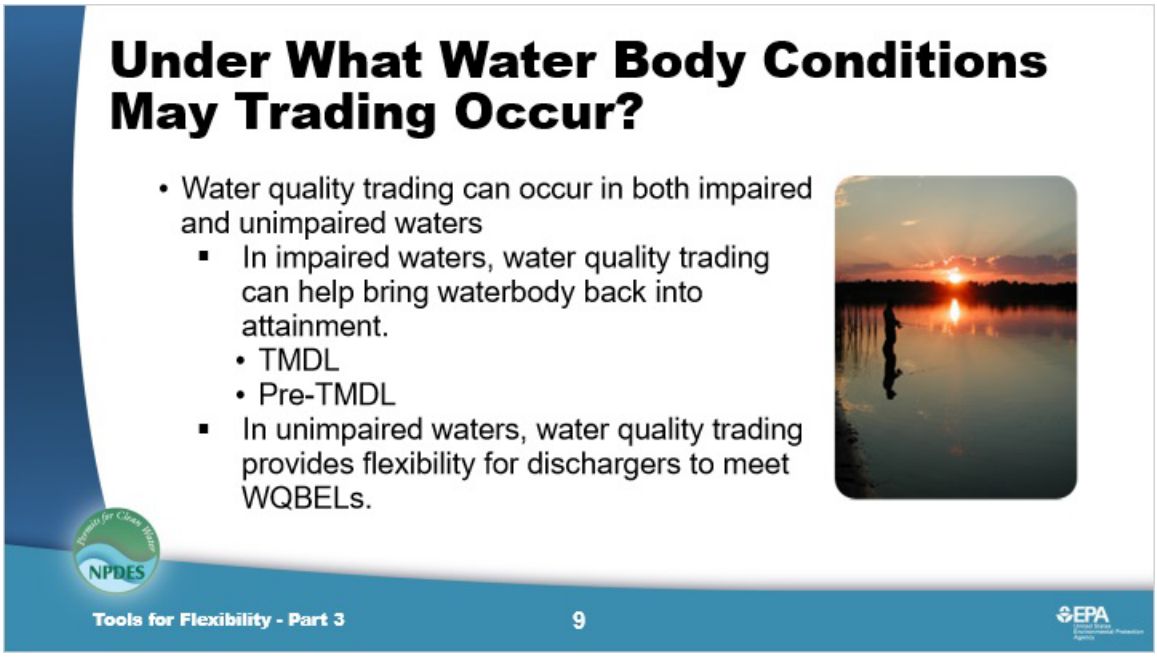
As a permit writer, it is important that you understand how water quality trading relates to the effluent limits in the credit buyer's permit. In order to trade, both a seller and a buyer must achieve certain pollutant reductions before they can begin trading. A seller must make pollutant reductions to reach the applicable **baseline,** and a buyer must make reductions to meet the **minimum control level.**

A baseline is a certain level of pollution reduction that a seller must meet before it can generate credits to sell. EPA's policy and guidance addresses baselines to ensure that trading supports maintenance or improvement of water quality.

For point source sellers, the baseline is the most stringent effluent limit in their NPDES permit for a pollutant, and could be either technology-based or water-quality based. For nonpoint source sellers, the baseline would be related to current practices, local requirements, or applicable TMDL expectations or load allocations. For example, if a nonpoint source is subject to a TMDL load allocation, then the source could be expected to meet or make progress toward meeting its portion of the load allocation before it is allowed to generate credits.

The minimum control level is the discharge level that a buyer must meet onsite before it can purchase the credits needed to meet its WQBEL. Generally, a point source discharger's minimum control level is an applicable technology-based effluent limit (or TBEL) or a state performance-based requirement for a publicly owned treatment works (or POTW). However, the permitting authority can also establish a more stringent minimum control level.

1.9 Under What Water Body Conditions May Trading Occur?



Notes:

Under what water body conditions may water quality trading occur? This is a common question, and the short answer is, pretty much any. Water quality trading can occur in both impaired and unimpaired waters.

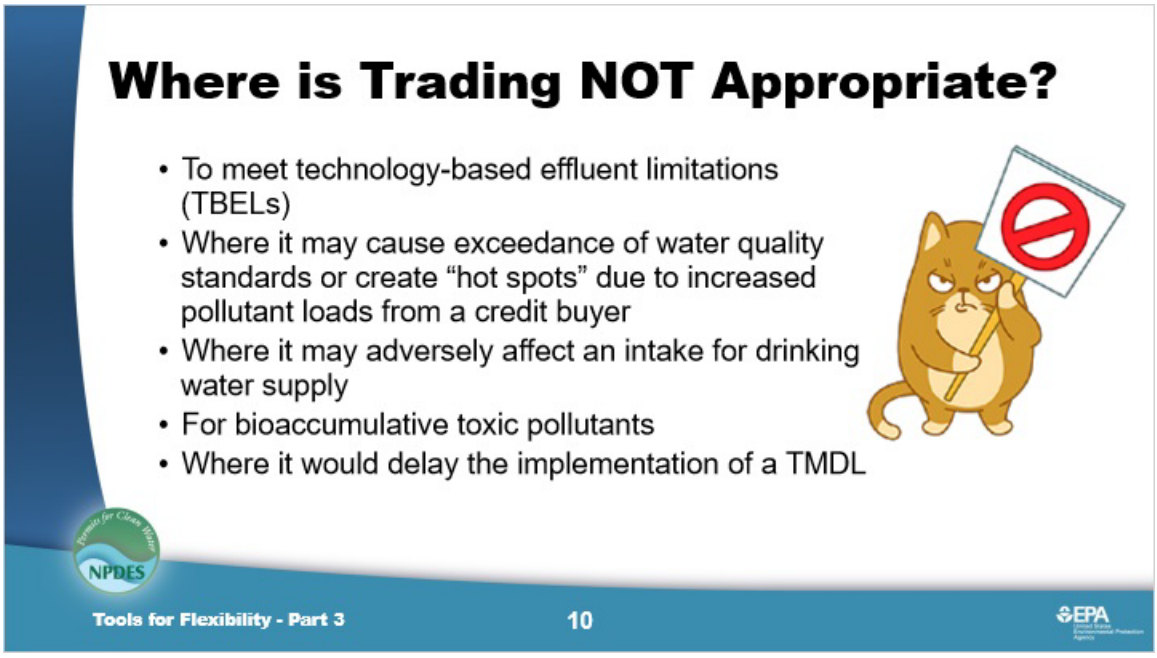
In impaired waters, water quality trading can be a way to help bring a water body into attainment. In impaired waters with an EPA-approved or -established TMDL, the TMDL would set a pollutant loading cap for the water body or watershed. A pollutant loading cap often serves as the driver for point sources to get involved in water quality trading. The TMDL would also break down the pollutant loading cap into wasteload allocations for point sources, load allocations for nonpoint sources and may include a margin of safety to account for uncertainty in predicting how well pollutant reductions will result in meeting water quality standards. A source could choose to use water quality trading to meet effluent limits based on its allocation. Any trade should be consistent with TMDL assumptions and requirements.

In impaired waters where a TMDL has not yet been established or approved, water quality trading may be used to make progress toward the attainment of, or to attain, water quality standards by reducing pollutant loads. A pre-TMDL trade must not cause or contribute to further impairments of the waterbody.

EPA's Water Quality Trading Toolkit for Permit Writers provides guidance on trading in both TMDL and pre-TMDL situations in impaired waters.

Water quality trading can also be used in unimpaired waters that are currently meeting water quality standards. Water quality trading provides flexibility to dischargers subject to a WQBEL for the pollutant being traded. Trading cannot cause a net increase of the pollutant being discharged into the water body, an exceedance of water quality standards, or a localized impairment or "hot spot."

1.10 Where is Trading NOT Appropriate?



Notes:

EPA's policy and guidance recommend boundaries to ensure water quality trading supports maintenance or improvement of water quality.

Water quality trading generally cannot be used to meet TBELs. TBELs are not based on water quality and must be met at the point of discharge. The only time EPA would support trading to meet TBELs is when federal regulations expressly authorize water quality trading. For example, the effluent guidelines for the iron and steel industry allow intra-plant trading between outfalls under certain circumstances.

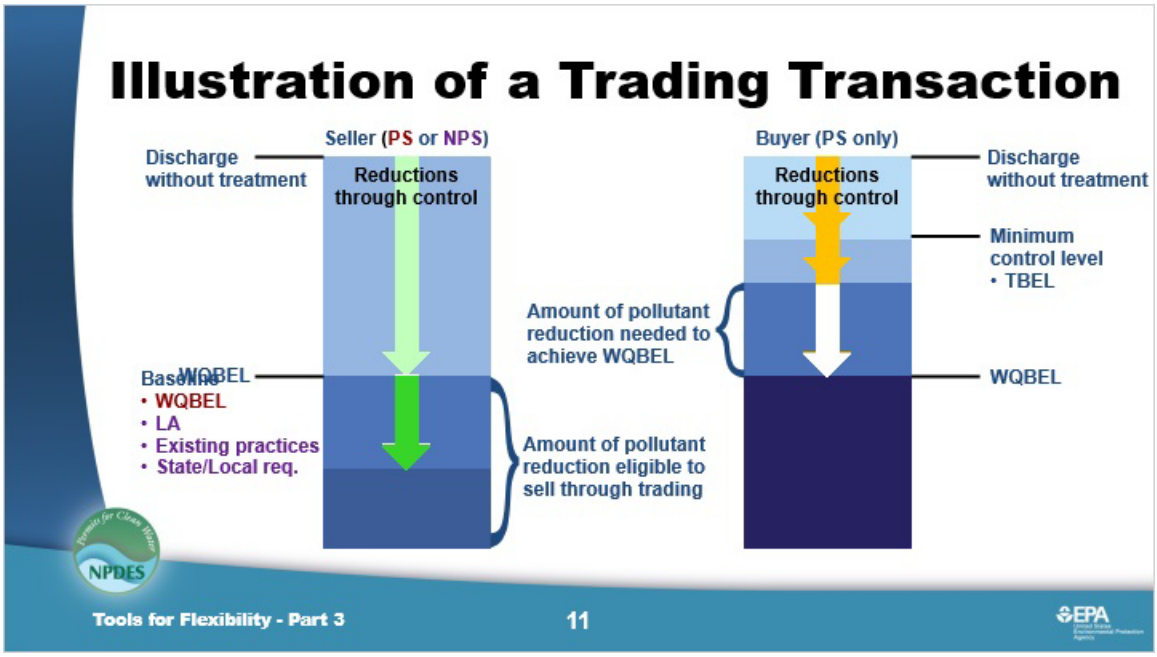
Water quality trading cannot be used in any scenario where it would cause exceedance of water quality standards or create "hot spots" or localized areas of exceedance due to increased pollutant loads from a credit buyer.

Water quality trading should not adversely affect water quality at an intake for drinking water supply.

EPA does not support water quality trading of persistent bioaccumulative toxic pollutants that exert acute effects over small areas and in relatively low concentrations.

Finally, water quality trading cannot delay the implementation of an EPA-approved or -established TMDL or cause the combined point and nonpoint source loadings to exceed a cap established by a TMDL.

1.11 Illustration of a Trading Transaction



Notes:

Let's see how this might look in practice. Here is an animated graphic that shows us how a water quality trading transaction works.

Let's consider two sources in the same watershed. For purposes of clarity, we will assume that one pound of reduction equals one credit, and that credit or reduction has the same water quality impact at both the buyer's and seller's location.

In a traditional scenario, both sources would make onsite reductions to meet their WQBELs or other targets.

In a water quality trading scenario, however, a point source or nonpoint source might be able to reduce beyond its baseline, as illustrated on the left. Another source, however, might not be able to meet its WQBEL with onsite treatment, as illustrated on the right. Water quality trading can benefit both of these sources.

A point source or nonpoint source that can achieve reductions beyond its baseline can become a seller, and a point source that is unable to meet the baseline could become a buyer, in a water quality trade.

Let's see how the trade works. First, the point source or nonpoint source seller can achieve its baseline and is able to achieve additional reductions beyond its baseline.

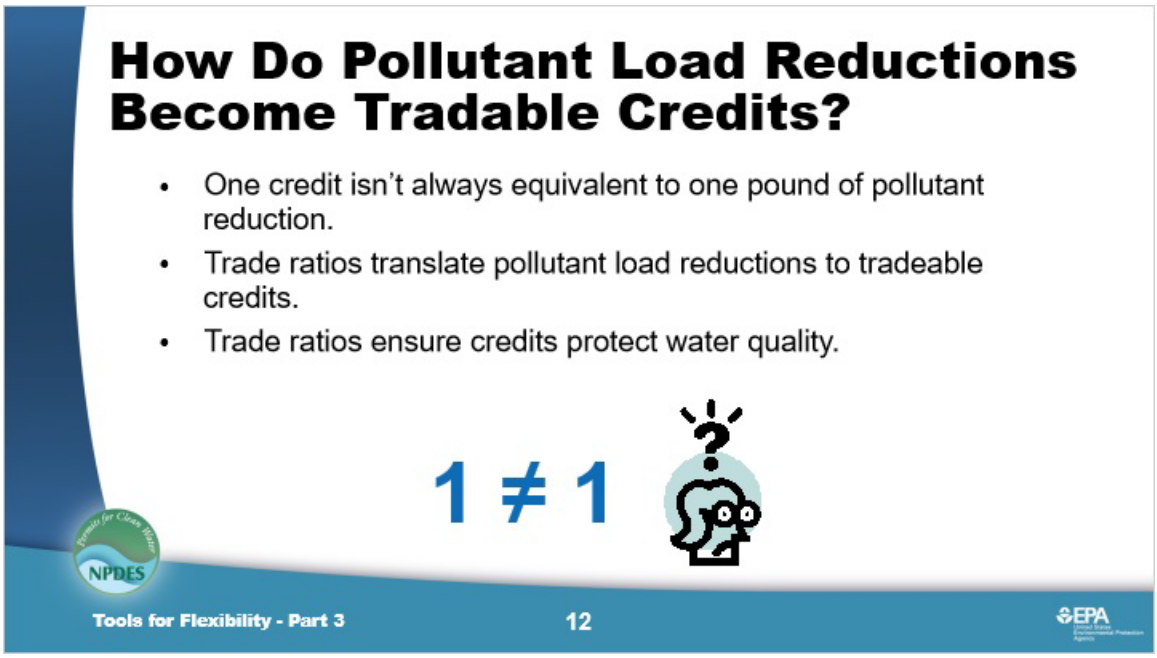
The point source buyer can meet its TBEL, which is its minimum control level, and, in this example, the buyer can even go beyond that minimum control level, but still falls short of meeting its WQBEL.

The point source buyer can purchase credits to meet its WQBEL. The seller generates credits by reducing

beyond the baseline. This is how many credits are available for sale. If there are enough for the buyer, the two entities can trade.

This example above is a simple representation of how water quality trading works. However, one pound of reduction doesn't necessarily translate to a one-pound tradable credit. This is because a pound of pollutant reduction at a seller's location might not be equivalent to a pound of pollutant reduction at a buyer's location. This can be due to a variety of factors, which we will address later in this presentation. So, how do pollutant load reductions, like these shown in the slide above, become tradable credits?

1.12 How Do Pollutant Load Reductions Become Tradable Credits?



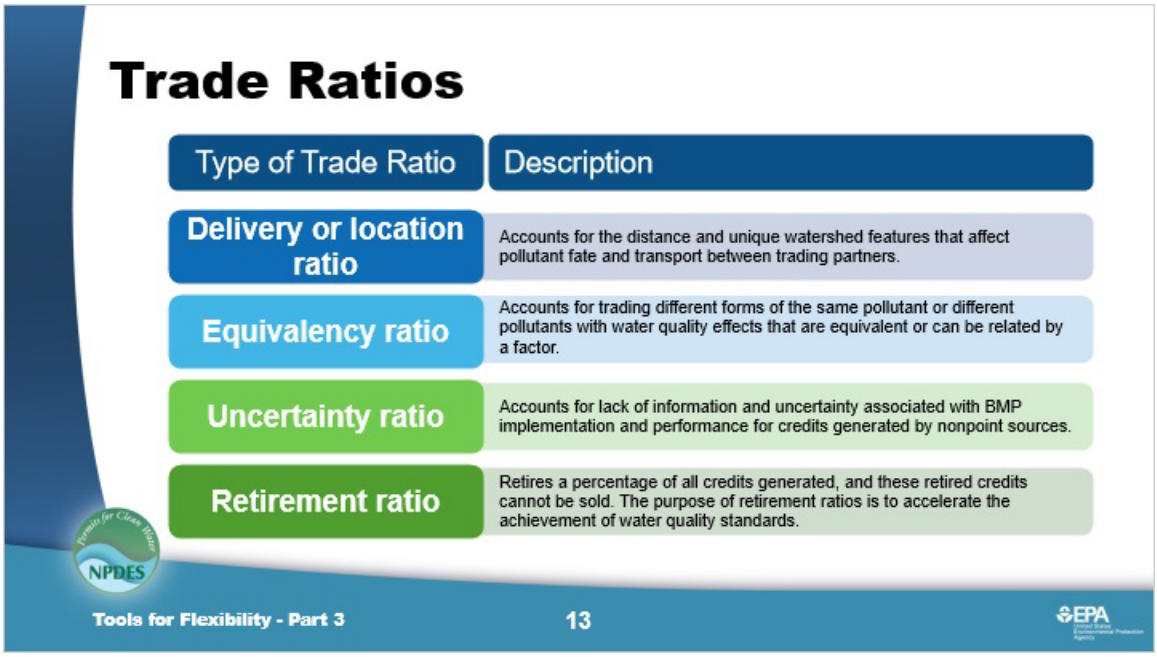
Notes:

In water quality trading, there is rarely a one-to-one correspondence between pounds reduced by the seller and pounds that can be purchased as credits.

To account for how a pound of pollutant reduction interacts within the watershed, we can apply one or more "trade ratios." A trade ratio translates a certain number of pounds of reduction into a certain number of pounds of tradeable credits.

A trade ratio helps ensure that the pollutant reductions represented by credits purchased are at least equivalent to those that the buyer would have generated. This provides assurance that water quality trading credits will protect, and may even improve water quality.

1.13 Trade Ratios



Notes:

Permitting authorities establish trade ratios for the specific circumstances in a watershed, including environmental conditions, pollutants to be traded, and programmatic goals. There are four basic categories of trade ratios: delivery or location ratios, equivalency ratios, uncertainty ratios, and retirement ratios. One or more trade ratios may apply to a particular trade, depending on the scenario.

Delivery and location ratios account for the distance and unique watershed features that will affect pollutant fate and transport between trading partners. This type of ratio addresses the fact that one pound of a pollutant discharged in the upper watershed may arrive as less than one pound in a lower part of the watershed.

Equivalency ratios adjust for trading different forms of the same pollutant. For nutrients, an equivalency ratio can be used to adjust for the relative biological availability of the nutrient parameter in the trading partners' discharge. For example, point source discharges tend to have higher proportions of biologically available phosphorus than nonpoint source discharges. An equivalency ratio can ensure that credits generated from nonpoint sources will have a similar water quality impact as phosphorus reductions from the point source. An equivalency ratio can also be used in cross-pollutant trading where different pollutants have water quality effects that are equivalent or can be related by a factor.

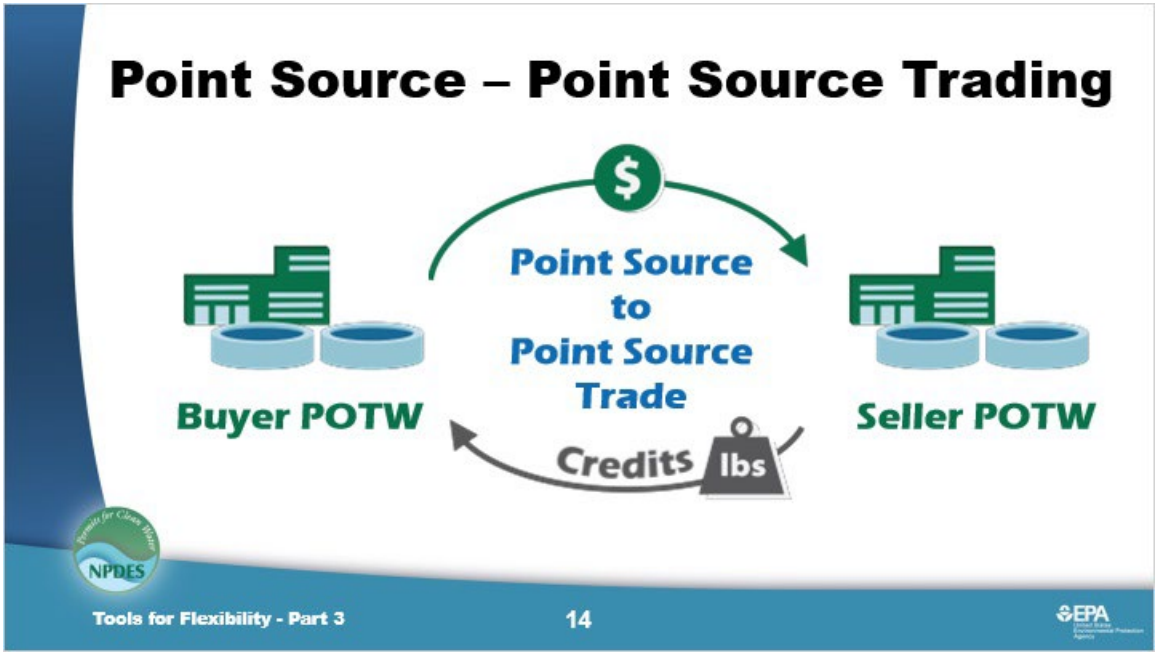
Uncertainty ratios are used to mitigate the uncertainty in trades between point sources and nonpoint sources. These ratios account for the lack of information and uncertainty associated with BMP implementation and performance for nonpoint sources.

The last category of trade ratio is the retirement ratio. Retirement ratios retire a percentage of all credits generated, and these retired credits cannot be sold. A retirement ratio represents a proportion of credits that must be purchased in addition to credits needed to meet limits. The purpose of

retirement ratios is to accelerate the achievement of water quality standards.

Now that we understand trading ratios and the relationships between trading partners, let's look at a few different types of water quality trading scenarios.

1.14 Point Source – Point Source Trading

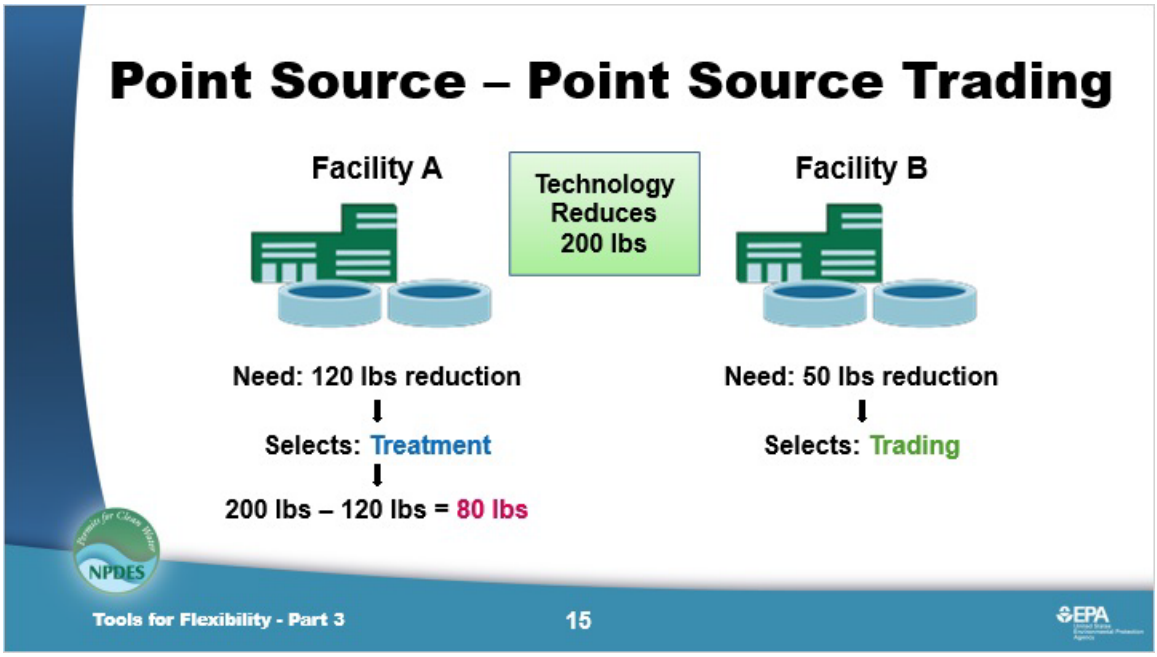


Notes:

The simplest water quality trading scenario is between two point sources. There is a single buyer and a single seller, each with an NPDES permit.

The buyer and the seller establish a trading agreement, under which the buyer pays the seller for water quality credits generated by the seller. Typically, each facility's NPDES permit spells out the terms of the trading agreement.

1.15 Point Source – Point Source Trading



Notes:

Here's an illustration of how two point sources might decide if they should trade. We'll assume a one-to-one trade ratio.

In this illustration, Facility A and Facility B are point sources in the same watershed. Facility A's permit includes limits that would require it to reduce the pollutant of concern by 120 pounds per day. Facility B needs to reduce the pollutant by 50 pounds per day to meet its permit requirements.

In this simplified scenario, Facility A determines it will be more cost effective to install the technology and reduce 200 pounds per day.

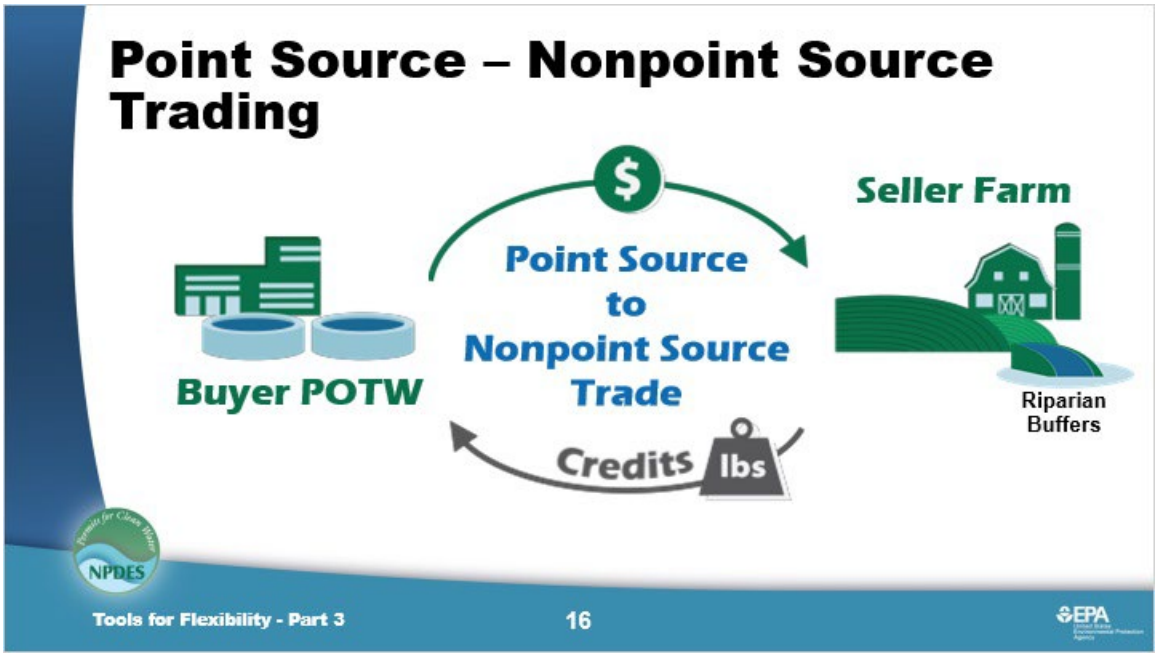
Facility A's permit requires it to reduce by 120 pounds per day. So, Facility A decides to install this technology to get these reductions. As a result, it reduces 80 more pounds a day than its permit requires.

Meanwhile, Facility B has determined it will be less costly to pay for those reductions elsewhere in the watershed than to install the technology. Facility B looks to Facility A's excess reductions as an alternative to additional onsite treatment and proposes a trade.

Since Facility A is reducing its loadings by an additional 80 pounds per day, while Facility B needs 50 pounds per day of credits, it looks like these two facilities might be able to trade, depending on the trade ratio.

Next, let's look at how point source to nonpoint source water quality trading would work.

1.16 Point Source – Nonpoint Source Trading



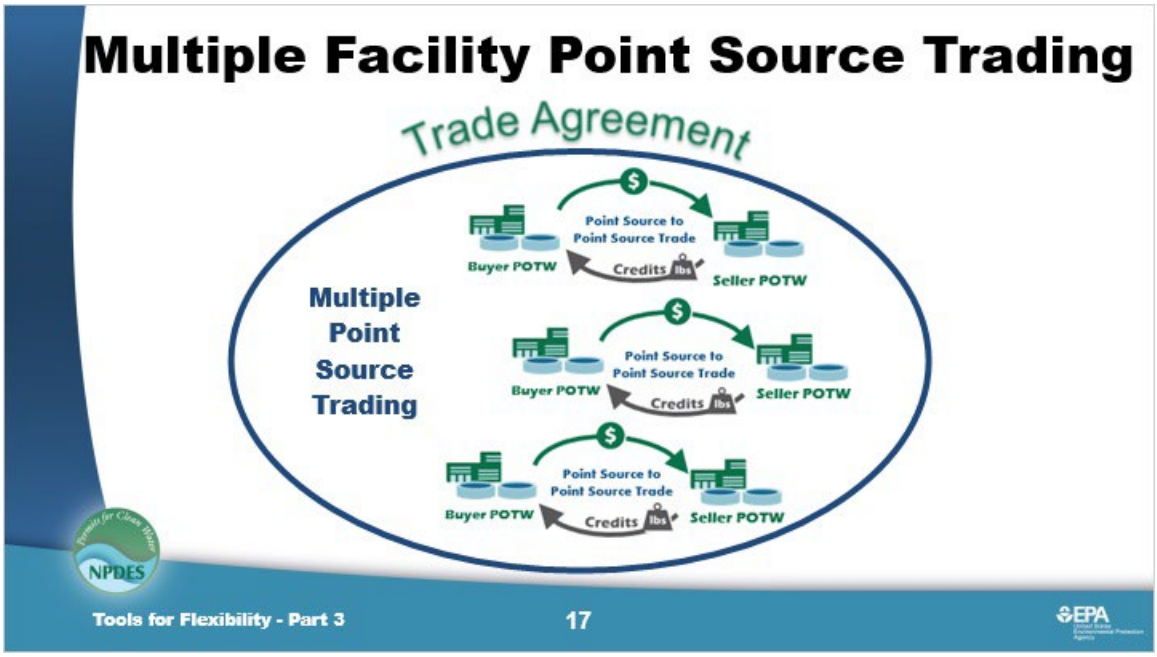
Notes:

This illustration depicts a simplified situation in which a POTW point source is trading with a single nonpoint source—in this case, a farm. In reality, a point source would likely need to have similar agreements with multiple nonpoint sources to find the credits it needs to purchase. As in our previous example, the point source buyer is exchanging money for excess pollutant reductions—this time by the nonpoint source seller, instead of a point source seller.

Nonpoint sources, such as farms, are different from point sources, such as POTWs, in two significant ways. First, the nonpoint source does not have an effluent limit in a permit that they need to meet. Its starting point, or baseline, for generating credits would be related to current practices, local requirements, and applicable TMDLs.

The second difference is that nonpoint sources use BMPs to reduce pollutant loads, rather than installing wastewater treatment technologies. Because pollutant reductions from nonpoint sources can be site-specific and are more difficult to assess than through monitoring end-of-pipe, as is done for point sources, a trade ratio would be used to address uncertainty around the farm's nutrient reductions.

1.17 Multiple Facility Point Source Trading



Notes:

So far, we've looked at examples of trades as relationships between two sources, but the reality can be much more complicated. Now that we understand how a trade works in a simple scenario, let's take a look at some of the other ways water quality trading may be structured.

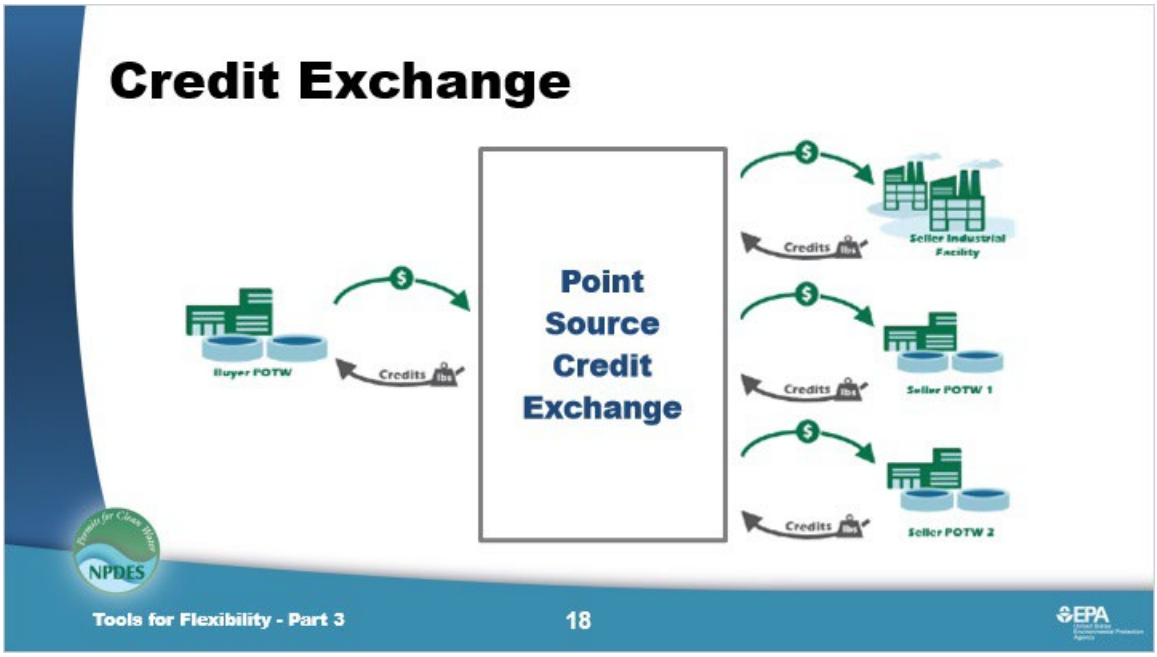
In this example, multiple buyers and sellers conduct trades under a single trade agreement.

The trade agreement might be documented in a variety of different places. There could be a state- or watershed-wide guidance or regulation that specifies conditions or requirements for water quality trading. The trade agreement could also be documented in the permit for each participant covered under the agreement, or there could be a single multi-source watershed-based permit.

Sometimes, participants in a multi-source trading agreement organize themselves under a trading umbrella, discharger association, or a similar organization that facilitates and oversees trading among its members.

The trade agreement specifies the ground rules for trades, reducing or eliminating the need for detailed negotiations between trading partners. A discharger association or similar organization can take on various functions related to trading and permit compliance, such as credit tracking and reporting.

1.18 Credit Exchange



Notes:

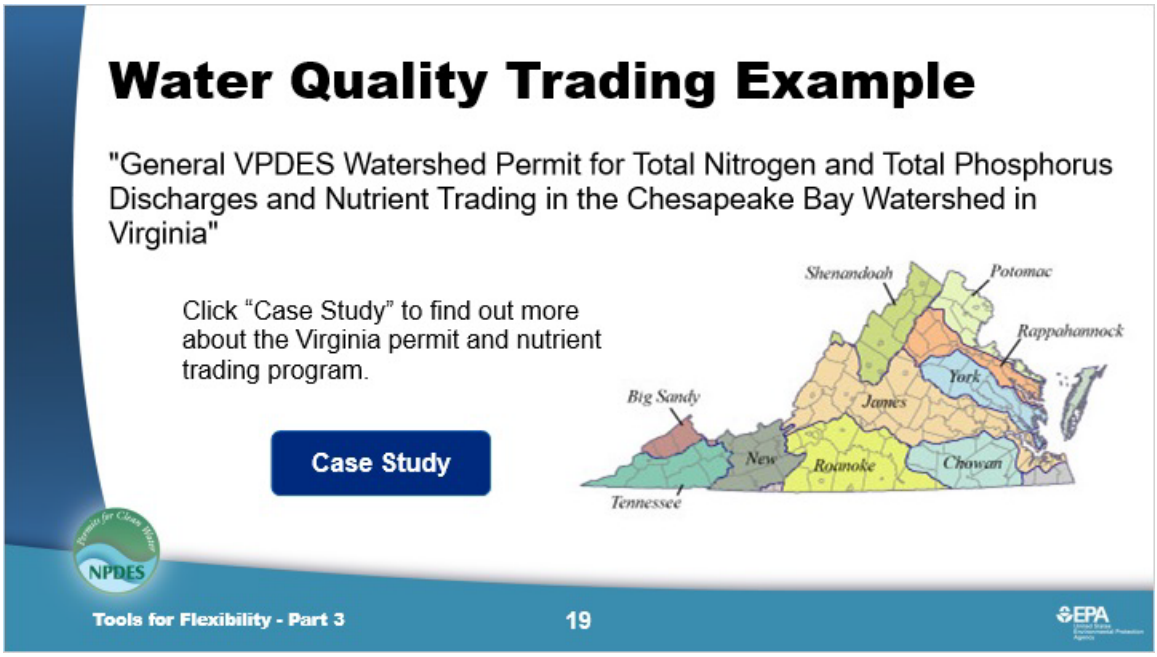
The final water quality trading arrangement we will consider is a central credit exchange administered by a third party. This could be a state agency, a conservation district, a local nonprofit, or even a for-profit credit bank or aggregator. The third party acts as the broker. It manages the trades and ensures that credits are available and valid.

This scenario is unique because it puts an additional actor between the buyer and the seller. While a credit exchange appears to have the potential to add complexity to water quality trading, it can actually simplify the process because buyers and sellers don't have to interact with each other. Third party brokers can engage with both buyers and sellers in ways that are understandable and familiar to each of them.

In a credit exchange, the credits are aggregated. Credits created by point sources and nonpoint sources participating in the exchange are sold to a central credit exchange. A buyer point source that needs credits to comply with their WQBEL purchases credits from the exchange rather than from a specific seller. The exchange ensures that the credits purchased and applied to effluent limits do not exceed the amount of credits generated.

A trade agreement specifies how credits may be generated and purchased and how trade ratios are calculated. Individual and group responsibilities for meeting effluent limits and any overall pollutant caps are specified in the applicable permits. The exchange ensures that applicable trading rules are followed for all transactions.

1.19 Water Quality Trading Example



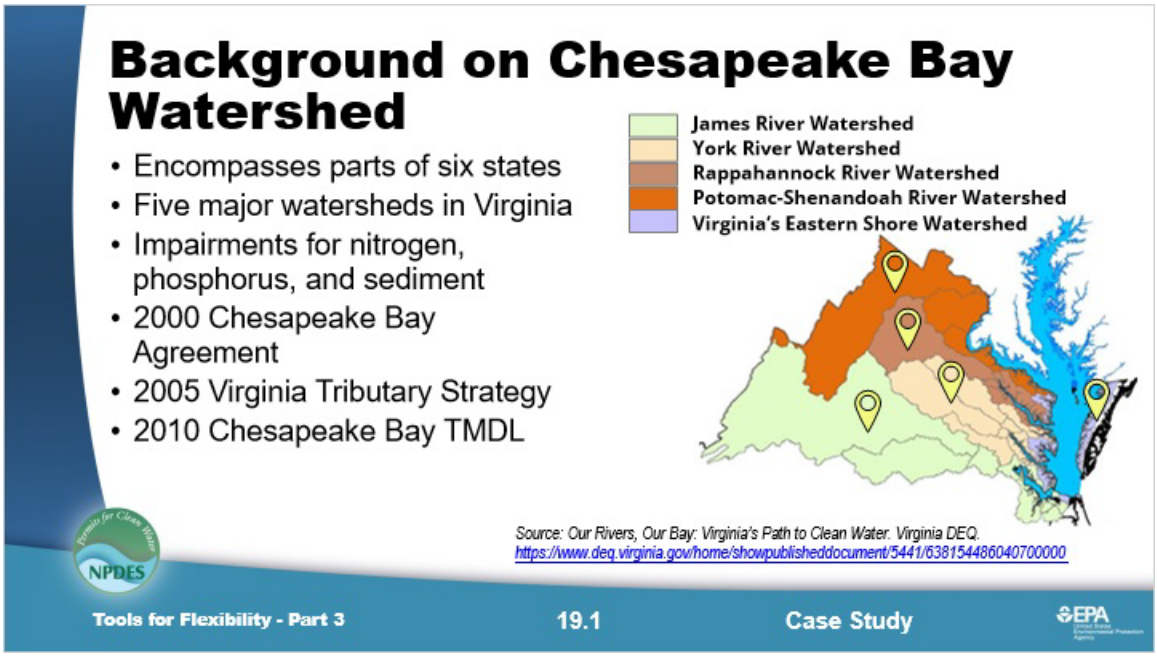
Notes:

Virginia has a watershed-based general permit for discharges of nutrients to the Virginia portions of the Chesapeake Bay and its tributaries that incorporates a nutrient trading program.

If you would like to view a case study about Virginia's nutrient trading program, click "Case Study" on the slide.

Otherwise, click "Next" to skip the case study.

1.19 Case Study: Background on Chesapeake Bay Watershed



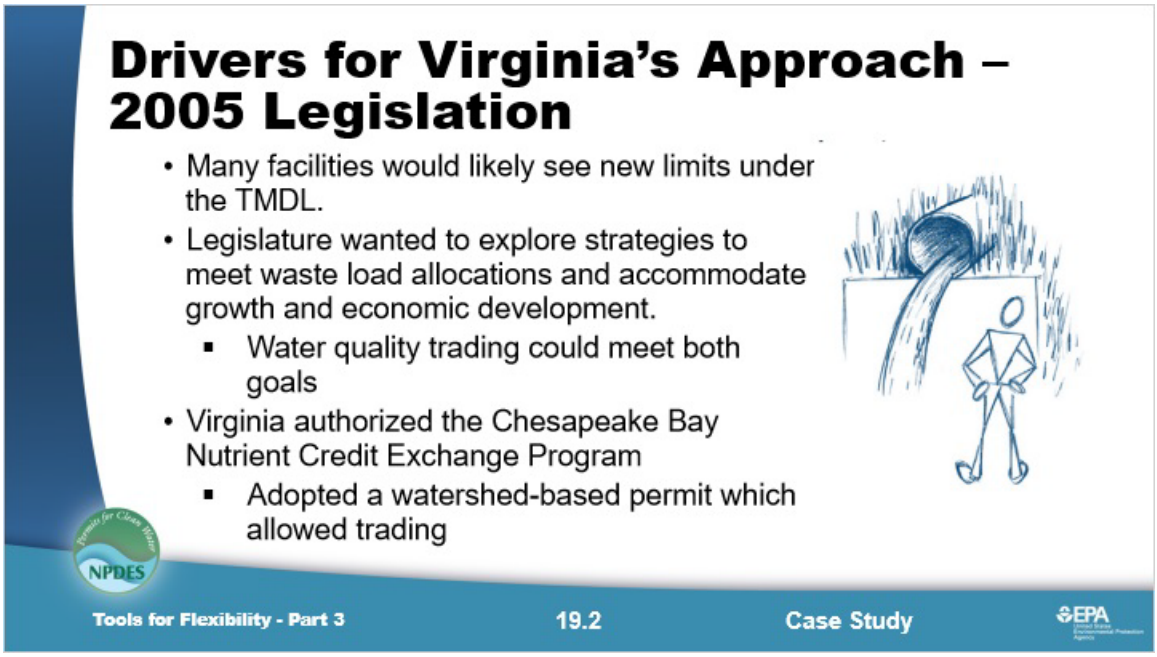
Notes:

If you viewed the case study on Virginia's Chesapeake Bay watershed-based general permit, recall that the Chesapeake Bay watershed encompasses parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia—as well as the entire District of Columbia. Five major watersheds in Virginia lie within the Chesapeake Bay watershed: the James, York, Rappahannock, Potomac/Shenandoah, and Virginia's Eastern Shore.

Nutrient pollution has been a significant water quality issue for the bay. Portions of the bay and its tributaries have been listed as impaired due to nitrogen, phosphorus, and sediment.

To address these impairments, the Commonwealth of Virginia signed the 2000 Chesapeake Bay Agreement, which established a goal to restore and protect water quality in the bay. That year, EPA and states in the watershed also began planning for a TMDL. In 2005, Virginia established nutrient reduction goals in its Tributary Strategy, the first step toward achieving the reductions called for in the agreement. Finally, EPA issued the Chesapeake Bay TMDL in 2010, requiring that all pollution control measures needed to fully restore the bay and its tidal tributaries be in place by 2025.

1.20 Case Study: Drivers for Virginia's Approach - 2005 Legislation



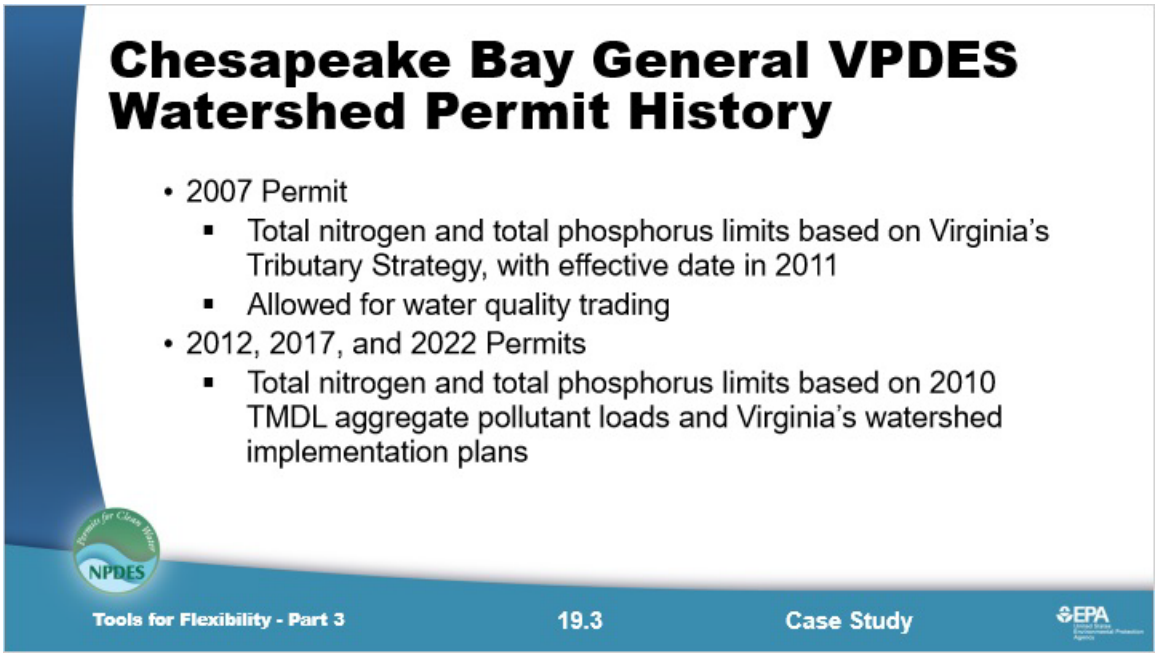
Notes:

Anticipating that the final TMDL would result in many point sources with new effluent limits for nitrogen and phosphorus, Virginia's legislature wanted to explore strategies to meet nutrient wasteload allocations in a timely and cost-effective manner while accommodating continued growth and economic development in the watershed. They identified water quality trading as a strategy that could meet both goals.

In March 2005, Virginia's governor signed legislation authorizing a Chesapeake Bay Watershed Nutrient Credit Exchange Program. This legislation also directed the Virginia Department of Environmental Quality (or DEQ) to issue a watershed general permit for significant point source discharges of nutrients to the Chesapeake Bay and its tributaries. One purpose of the watershed-based permit was to allow trading as an option for facilities to comply with limits based on the 2005 tributary strategy.

While the nutrient credit trading program helps point sources achieve their nutrient loading requirements, it also provides for market-based incentives to achieve nonpoint source reduction goals in the watershed.

1.21 Case Study: Chesapeake Bay General VPDES Watershed Permit History

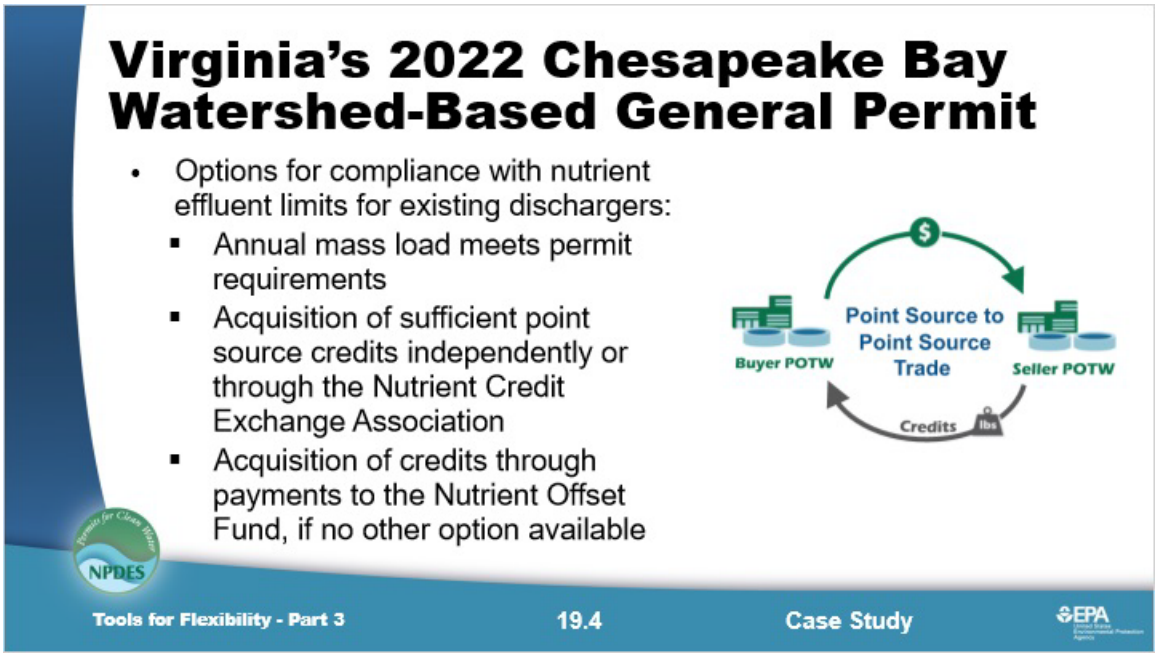


Notes:

Virginia's first "General Watershed Permit for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia" went into effect on January 1, 2007. The permit established effluent limits for total nitrogen and total phosphorus based on Virginia's 2005 Tributary Strategy, with compliance schedules requiring final compliance by 2011. The permit also allowed water quality trading as an alternative option for existing significant dischargers to meet their effluent limits. As mentioned previously, a Virginia Nutrient Credit Exchange Association had already been established in 2005 to coordinate and facilitate nutrient credit trading among its members.

Virginia reissued its General Watershed Permit in 2012, 2017, and again in 2022. Beginning with the 2012 permit, the General Watershed Permit includes nutrient effluent limits based on the 2010 TMDL and Virginia's watershed implementation plans.

1.22 Case Study: Virginia's 2022 Chesapeake Bay Watershed-Based General Permit



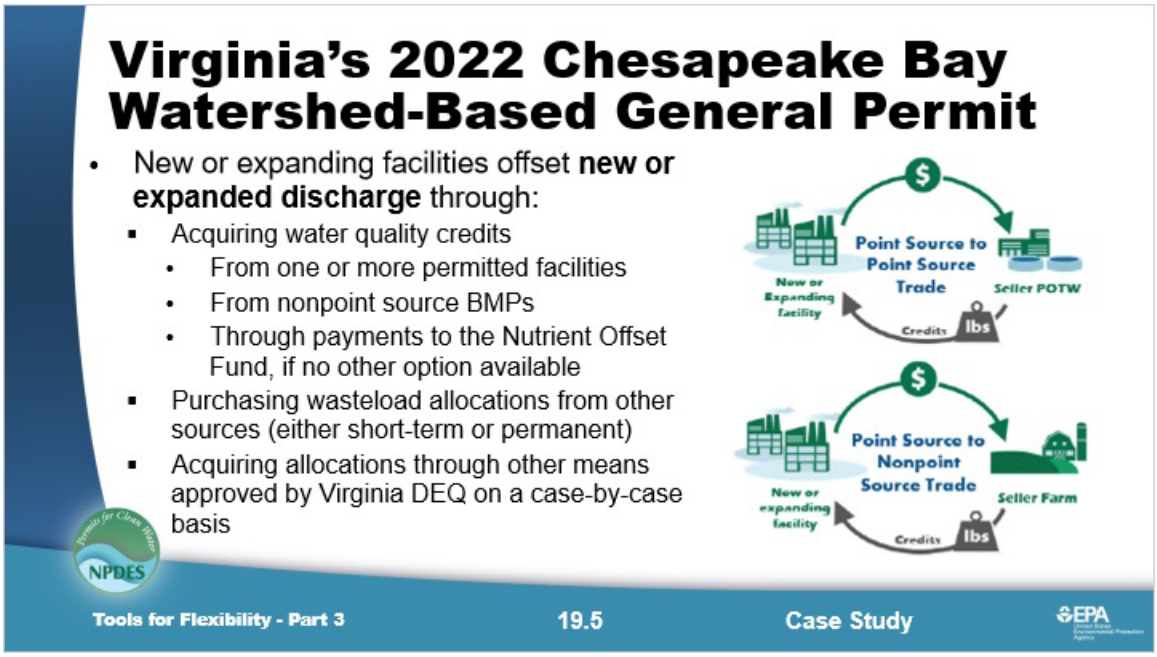
Notes:

If you viewed our case study on the watershed-based permit, you'll recall that a facility's compliance options depend on whether it is an existing discharger or a new or expanding discharger.

Under the general permit, existing dischargers have three ways to meet their total nitrogen and total phosphorus limits:

- They can install onsite treatment to achieve the annual mass loading limits in the permit;
- They can acquire water quality credits from other point sources directly or through the Nutrient Credit Exchange Association; or
- They can acquire water quality credits through payments to the state's Nutrient Offset Fund, if no other option is available.

1.23 Case Study: Virginia's 2022 Chesapeake Bay Watershed-Based General Permit



Notes:

Now let's look at the compliance options for new or expanding facilities under the Virginia watershed permit.

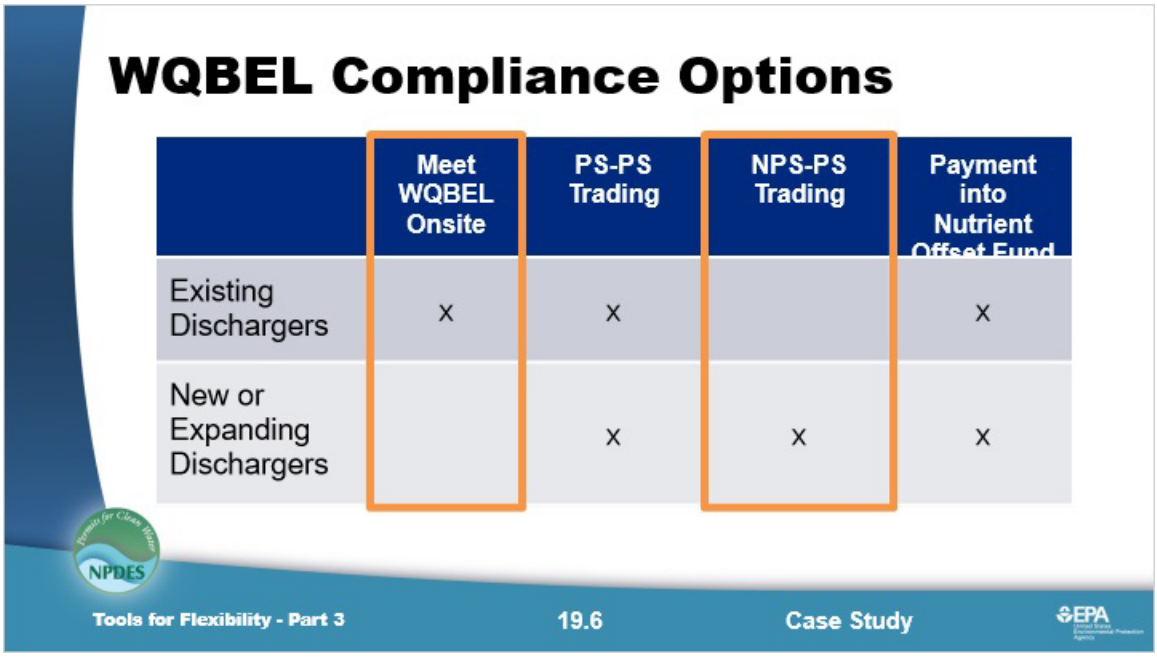
The TMDL does not provide wasteload allocations for new or expanding facilities. Instead, the facilities must acquire water quality credits to account for any mass load they discharge. They also must meet a minimum level of treatment.

Therefore, the watershed general permit provides the following options:

The new or expanding facility may acquire water quality credits from one or more permitted point sources, from nonpoint sources implementing BMPs, or through payments to the Nutrient Offset Fund, if no other option is available.

As an alternative to acquiring credits, a new or expanding discharger could acquire a portion of a wasteload allocation from another point source when approved by the DEQ. This can be permanent or on a short-term basis. The permit also allows new and expanding dischargers to acquire allocations through some other means approved by the DEQ on a case-by-case basis.

1.24 Case Study: WQBEL Compliance Options



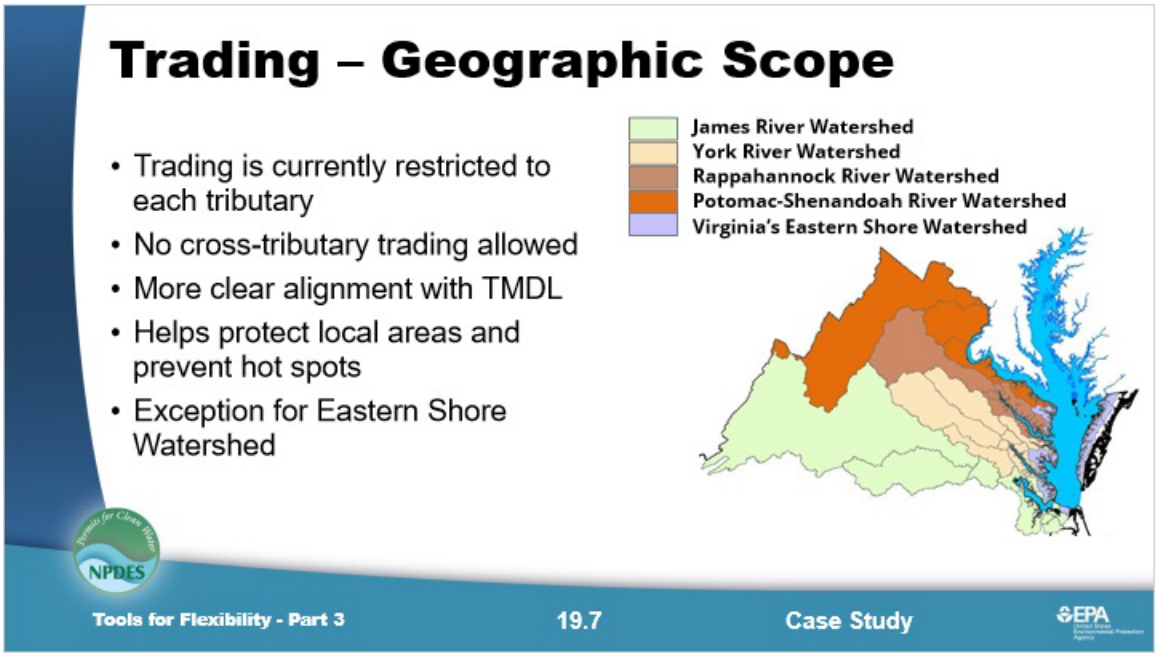
Notes:

The compliance options for existing versus new or expanding dischargers differ in two major ways.

The first difference is that an existing discharger already has a wasteload allocation under the TMDL and can simply meet its WQBELs through onsite treatment and control. A new or expanding discharger does not have this option, because there are no remaining allocations under the TMDL. A new or expanding discharger would have to provide onsite treatment and then purchase credits or a wasteload allocation from another source to cover its remaining nutrient load discharged.

The second difference is that only new or expanding dischargers can purchase credits from nonpoint sources. These credits must be certified by the State Water Control Board. They're subject to two trade ratios: a delivery ratio and a two-to-one uncertainty ratio.

1.25 Case Study: Trading - Geographic Scope

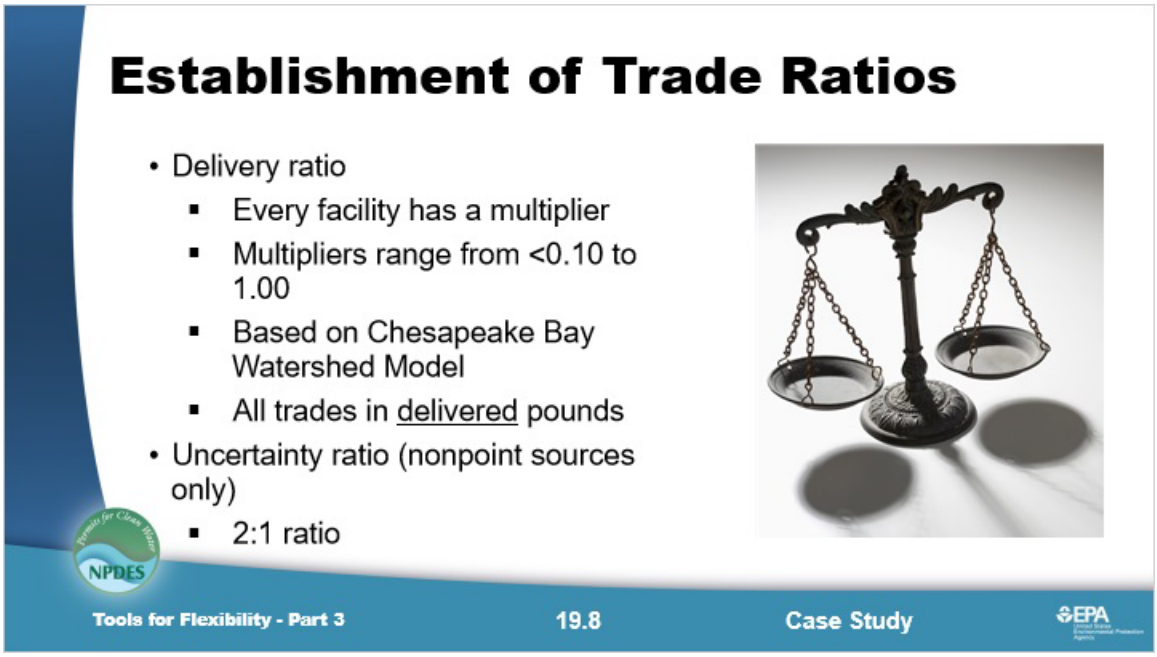


Notes:

Let's take a closer look at some important elements of Virginia's water quality trading program, starting with the geographic scope.

Most trades must take place within a tributary. In general, no cross-tributary trading is allowed, because the TMDL assigns allocations to each tributary. This approach helps keep the permit and trading program aligned with the TMDL and protects areas within local water bodies by preventing "hot spots" of localized nutrient pollution. However, there is an exception for the Eastern Shore Watershed, because it has a small trading market.

1.26 Case Study: Establishment of Trade Ratios



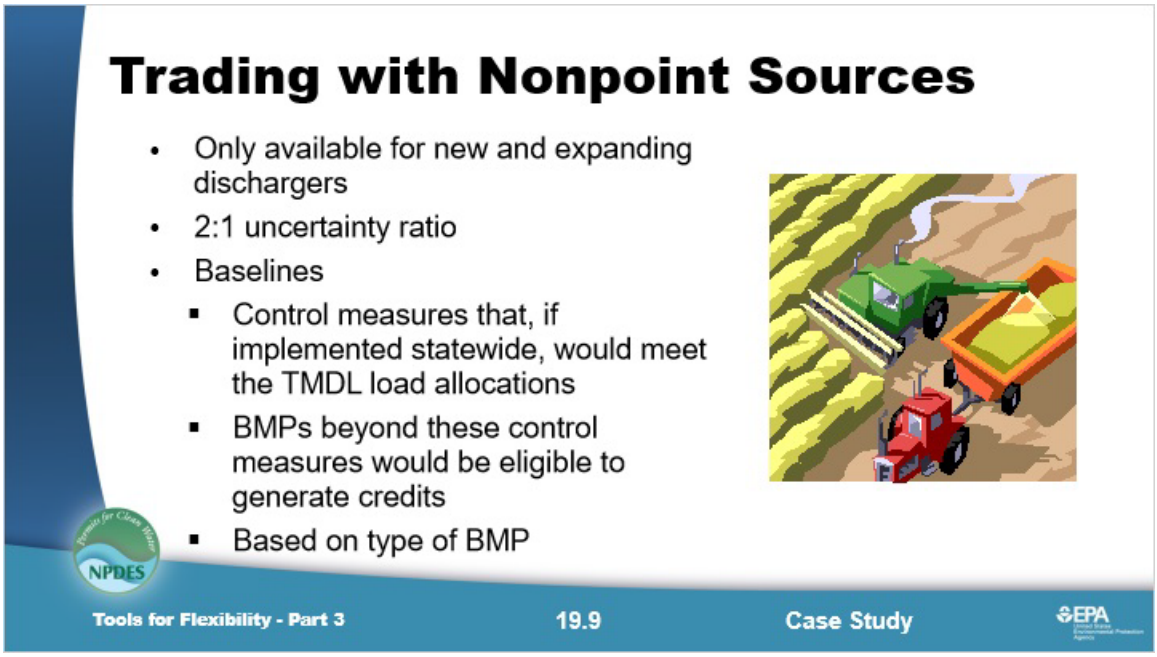
Notes:

The trade ratio is an important aspect of trading and water quality credit calculation. Two trade ratios used in calculating water quality credits in Virginia's program are the delivery ratio and the uncertainty ratio.

Every facility in Virginia has a multiplier that represents its delivery ratio. Remember that a delivery ratio accounts for the distance and pollutant fate and transport between the partners. These multipliers range from less than 0.10 to 1.00 and are based on the Chesapeake Bay Program Watershed Model. Application of delivery ratios ensures that all trades and credits are measured in pounds of nutrients delivered to the bay.

Virginia also applies an uncertainty ratio of two to one for trades with nonpoint source sellers. A nonpoint source seller would need to reduce nutrient discharges by two pounds to generate one pound of credit needed by a point source buyer.

1.27 Case Study: Trading with Nonpoint Sources



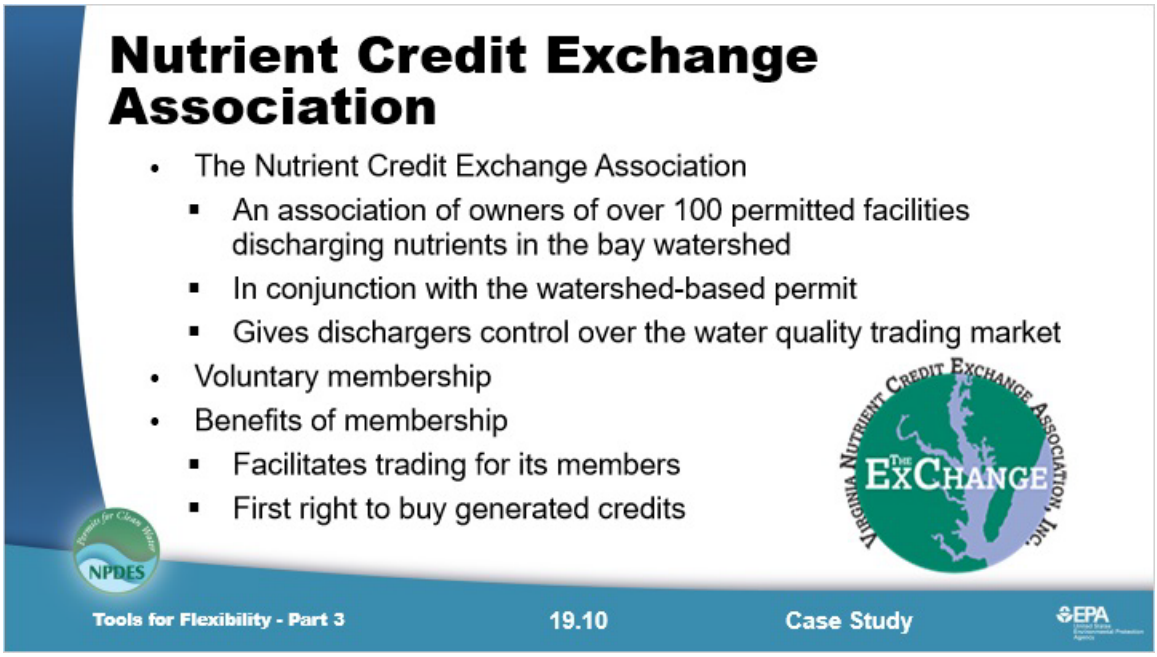
Notes:

We want to make a few other observations about trading with nonpoint sources under Virginia's program. Remember that trading with nonpoint sources is available only for new and expanding dischargers and is subject to the two-to-one uncertainty ratio.

Virginia has established a baseline for nonpoint sources wishing to trade. The baseline consists of control measures that, if implemented statewide, would meet the TMDL load allocations. This means that nonpoint sources must first implement certain BMPs as a baseline to be eligible to trade, and any reductions from BMPs beyond these baseline control measures are eligible to generate water quality credits. Virginia's administrative code specifies several categories of nonpoint source BMPs that can be used to meet the baseline.

An example of one of these categories is cropland, hayland, and pasture. Control measures that define baseline for this category include soil conservation, nutrient management plans, 35-foot riparian buffers, cover crops, and livestock exclusion from streams with a 35-foot buffer.

1.28 Case Study: Nutrient Credit Exchange Association

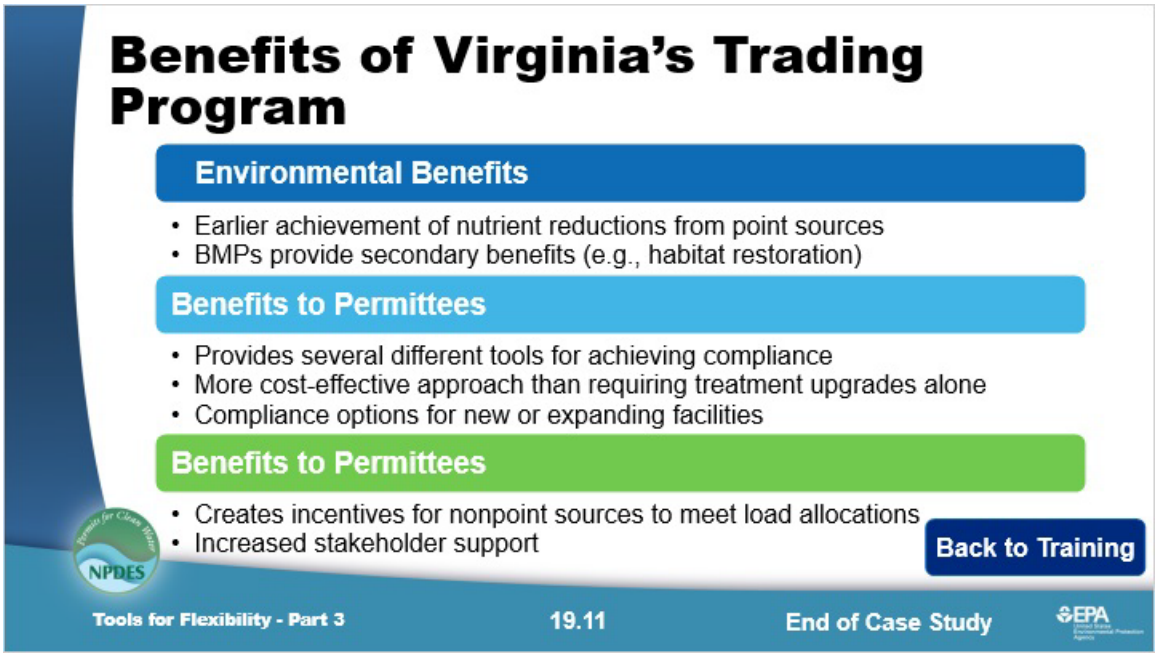


Notes:

Much of the ease of acquiring point source-generated credits can be attributed to Virginia's Nutrient Credit Exchange Association. The association consists of owners of over 100 industrial and municipal permitted facilities in Virginia discharging nutrients in the Chesapeake Bay watershed. The association operates in conjunction with the watershed-based permit and gives dischargers control over the water quality credit market.

Membership in the association is voluntary and offers a variety of benefits. The association facilitates trading for its members by buying all available member generated point source credits. Members of the association also get first right of purchase for credits.

1.29 Case Study: Benefits of Virginia's Trading Program



Notes:

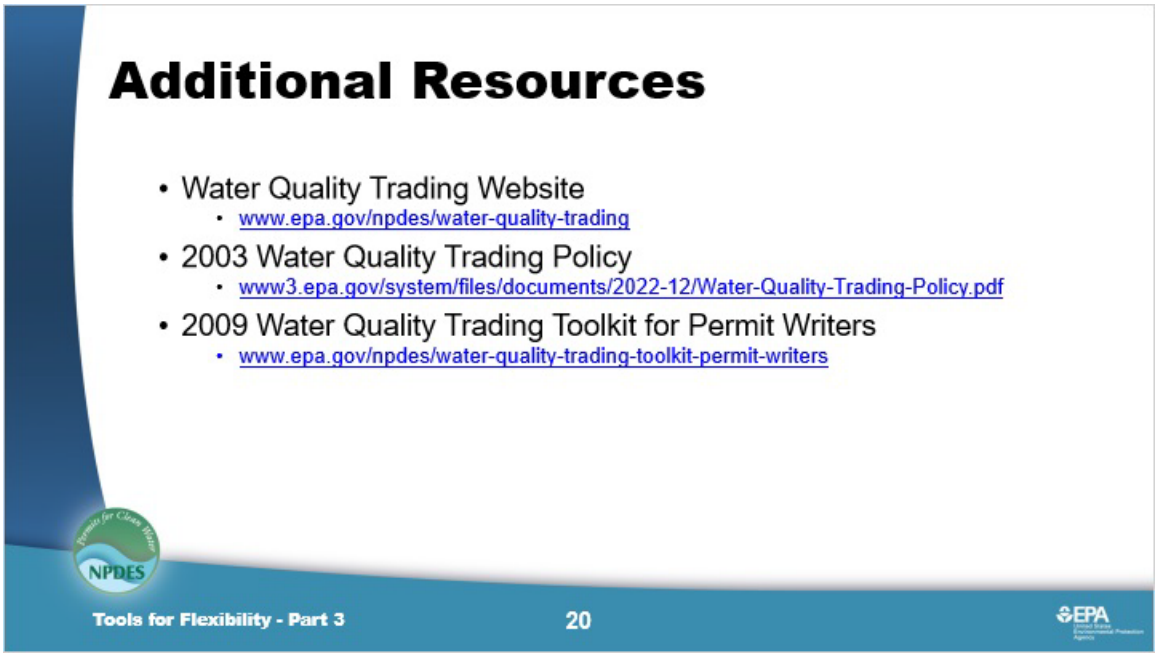
We'll conclude our case study by reviewing some of the benefits realized through the watershed-based permit and trading program in Virginia.

First, the program has environmental benefits. Virginia's trading program allowed earlier achievement of nutrient reductions from point sources than may have occurred through a more traditional permitting and compliance approach. In addition, BMPs installed to generate nutrient reduction credits may provide secondary environmental benefits.

Virginia's trading program also has benefits for permittees. The program provides several tools for achieving compliance and may be a more cost-effective approach than point source treatment upgrades alone. It also provides compliance options for new or expanding discharges without an allocation.

The trading program has benefits for Virginia DEQ as well. These include the creation of incentives for nonpoint sources to meet load allocations and increased stakeholder support.

1.30 Additional Resources



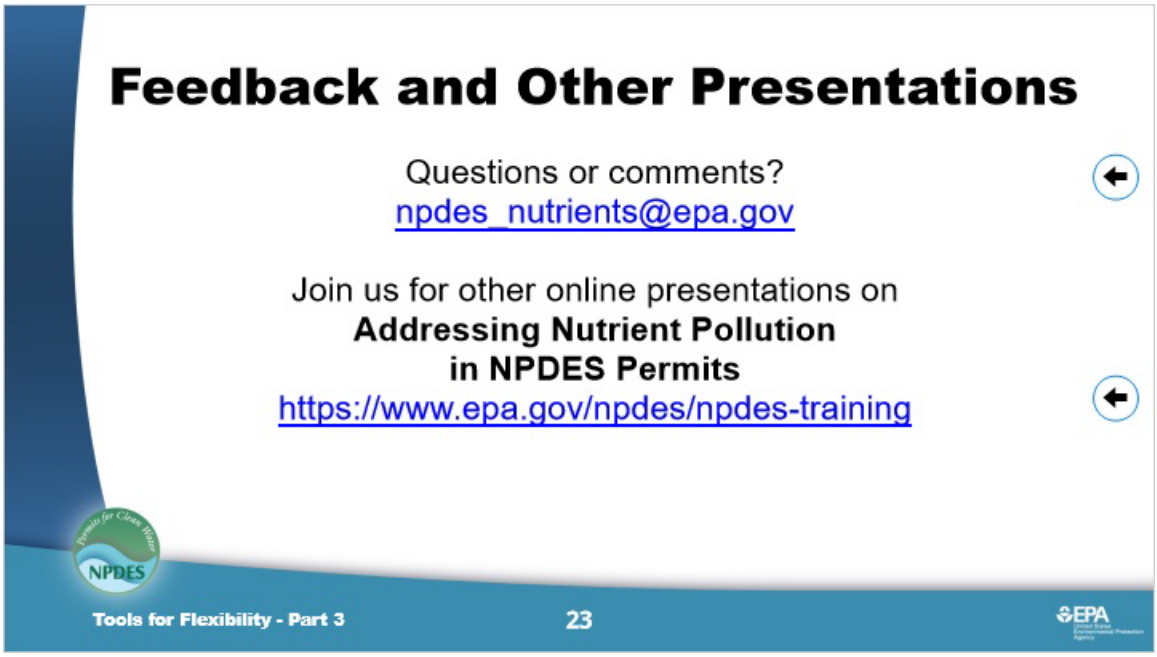
Notes:

For more information on water quality trading, including case studies from around the country and water quality trading resources, see EPA's water quality trading website at the link provided.

www.epa.gov/npdes/water-quality-trading

Other resources include EPA's guidance documents on water quality trading: the 2003 Water Quality Trading Policy and the 2009 Water Quality Trading Toolkit for Permit Writers. These resources provide permit writers and permitting authorities with more detailed guidance and tools for applying a water quality trading approach and incorporating water quality trading into existing permits and TMDLs.

1.31 Feedback and Other Presentations



Notes:

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