Identifying the Applicable Water Quality Standards

1. WQBELs for Nutrients-Part 1

1.1 Introduction: Identifying the Applicable Water Quality Standards

Notes:

Welcome to this presentation on water quality-based effluent limitations for nutrients in National Pollutant Discharge Elimination System, or NPDES, permits.

This presentation is part of an online training curriculum on addressing nutrient pollution in NPDES permits sponsored by the United States Environmental Protection Agency's Water Permits Division. It's the first of six parts of the training curriculum that consider water quality-based effluent limitations, or WQBELs, for nutrients.

This presentation covers the topic of identifying the applicable water quality standards that are the basis for WQBELs for nutrients. Specific issues covered in this presentation include the types of water quality criteria for nutrients typically found in water quality standards, interpreting narrative criteria to address nutrients, and considering the water quality standards of downstream water bodies.

In later presentations we will look more closely at how WQBELs are developed. If you would like more information on implementation of water quality standards in NPDES permits or on the water quality standards program, we recommend that you view EPA's NPDES Permit Writers' Online Training or visit the Water Quality Standards Academy website. Both websites can be found in the Resources tab.

Before we get started, let's introduce our speakers and take care of one housekeeping item.

1.2 Presenters

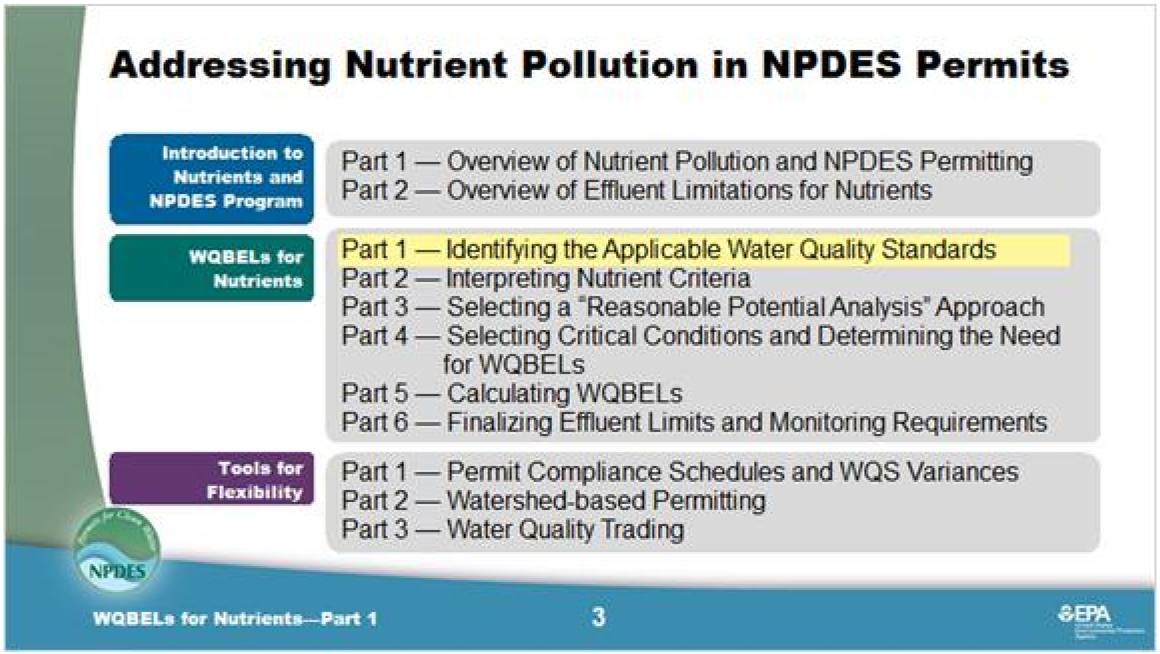
Notes:

Your speakers for this presentation are Amelia Letnes and Frank Sylvester, both with the Water Permits Division of the United States Environmental Protection Agency in Washington, DC.

Now with regard to that housekeeping item, I need to let you know that the materials used in this presentation have been reviewed by USEPA staff for technical accuracy; however, the views of the speakers are their own and do not necessarily reflect those of USEPA. NPDES permitting is governed by the existing requirements of the Clean Water Act and USEPA's NPDES implementing regulations. These statutory and regulatory provisions contain legally binding requirements. The information in this presentation is not binding. Furthermore, it supplements, and does not modify, existing USEPA policy, guidance, and training on NPDES permitting. USEPA may change the contents of this presentation in the future.

Let's get started with the presentation.

1.3 Addressing Nutrient Pollution in NPDES Permits



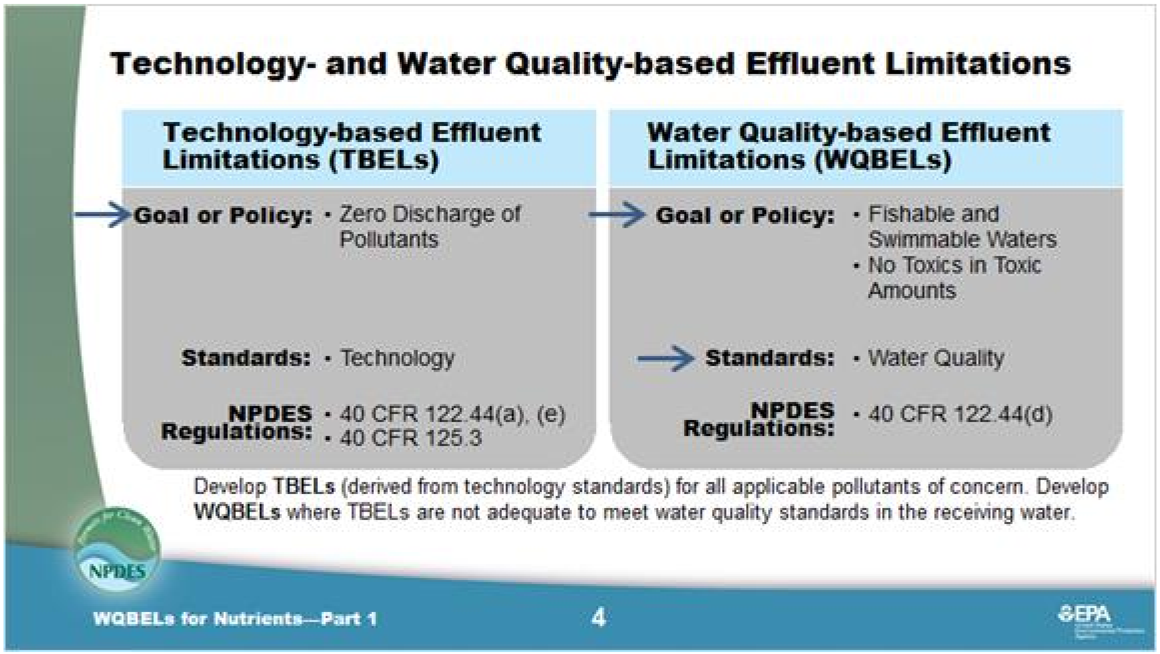
Notes:

This presentation is part one of the section of our training on water quality-based effluent limitations for nutrients.

As I mentioned, this presentation considers how we identify the applicable water quality standards that are the basis for WQBELs for nutrients in an NPDES permit. The remaining presentations in this section of the training will address topics ranging from interpretation of water quality criteria for nutrients to calculating effluent limitations.

Now, I'll turn it over to Frank.

1.4 Technology- and Water Quality-based Effluent Limitations



Notes:

Thanks, Danielle.

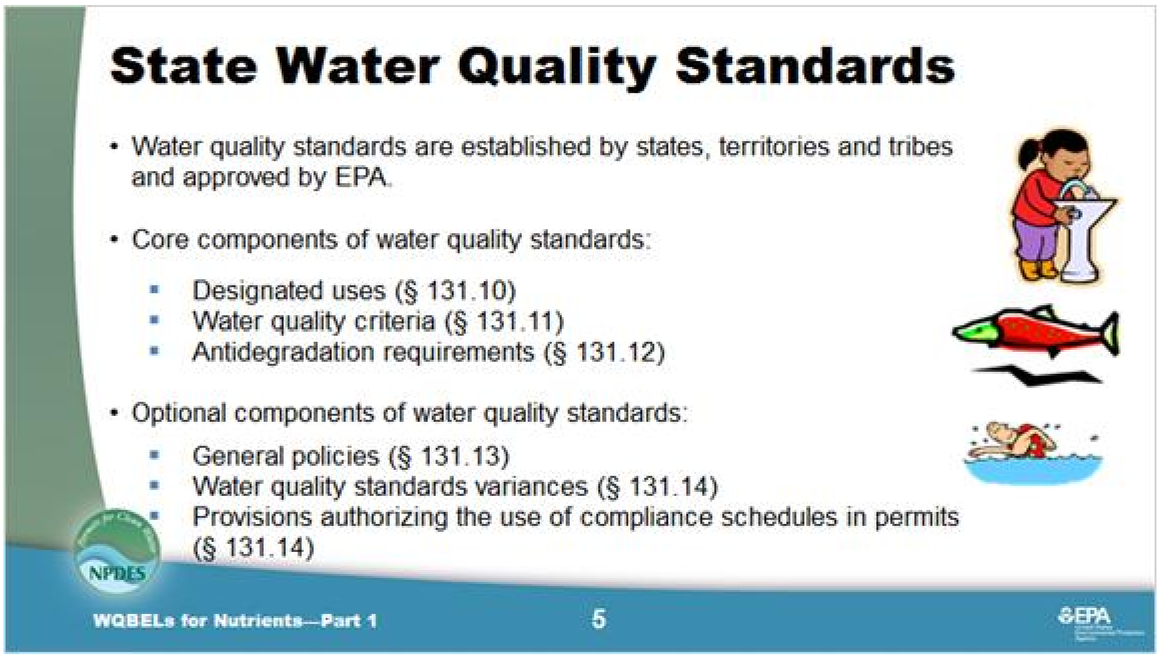
If you viewed the introductory presentations in this training series, you might remember that, when developing effluent limitations for an NPDES permit, a permit writer must consider limitations based on both the technology available to remove the pollutants from the discharge, or technology-based effluent limitations, and limitations that are derived from and comply with the applicable water quality standards for the receiving water, or water quality-based effluent limitations.

We also reviewed the Clean Water Act requirements for technology standards for various categories of point source discharges. Remember, these standards are derived from the goal of zero discharge of pollutants to navigable waters. Technology standards apply to a particular category of discharger no matter where that discharger is located.

Water quality-based effluent limitations are based on attaining and maintaining the applicable water quality standards for the receiving water body developed by a state, territory, or tribe (which we will refer to collectively as “states” for the remainder of this presentation). The Clean Water Act requirements for states to develop water quality standards are derived from the fishable/swimmable goal and “no toxics in toxic amounts” policy of the Clean Water Act. Water quality standards are site-specific, applying to a water body or segment of a water body, and are not dependent on the type of facility discharging to that water body.

The relationship between technology-based effluent limitations and water quality-based effluent limitations is straightforward: if technology-based effluent limitations are not adequate to protect water quality (as defined by the water quality standards that apply in the receiving water), then the permit writer must develop water quality-based effluent limitations.

1.5 State Water Quality Standards



Notes:

Before looking specifically at water quality standards that address nutrients, it is worth spending a moment reviewing the basic structure of the water quality standards program. Water quality standards are established by states and approved by USEPA. There are three required components and one optional component of water quality standards.

First, water quality standards must include beneficial uses designated for each water body or waterbody segment. Uses might include aquatic life protection and propagation, wildlife protection and propagation, recreation, various water supply uses, navigation, and others. These designated uses, as they are called in the regulations, establish the goals for the water body, whether or not those goals are currently being achieved.

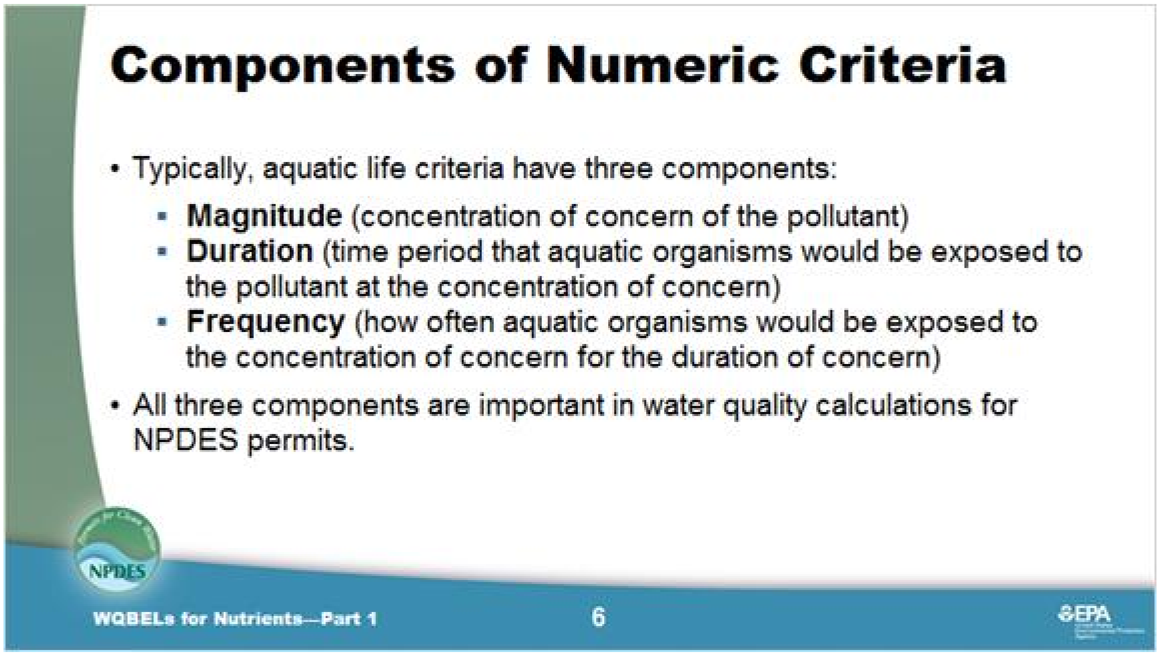
Second, water quality criteria help us determine whether the water is meeting its designated uses and help protect those uses. Criteria take the form of pollutant concentrations, water body conditions, such as those measured by bioassessments, or narrative statements representing a degree of water quality that supports a use. For nutrients, we might have numeric criteria for nitrogen or phosphorus, numeric criteria for response parameters, such as chlorophyll a and turbidity, or narrative criteria.

The third required component of water quality standards is antidegradation requirements designed to prevent unnecessary degradation of water quality. Each state with water quality standards has to adopt an antidegradation policy and identify a method of implementation for that policy.

Finally, the regulations give states discretion to include in their standards optional general policies addressing implementation concerns such as mixing zones, low flows, and water quality standards variances. We will begin talking more about these kinds of policies as they relate to nutrients later in this presentation and in other presentations that are part of this training. The regulations also give states the discretion to include in their standards optional provisions for water quality standards variances and provisions authorizing the use of compliance schedules in NPDES permits.

An important point to remember is that water quality standards apply to the water body, not directly to the discharge. As we consider the question of how a permit writer derives water quality-based effluent limitations for nutrients, which do apply to a point source discharge, we are going to focus on the water quality criteria component of the water quality standards.

1.6 Components of Numeric Criteria



Notes:

One other note before we move on is that it is very important to recognize that numeric water quality criteria designed for the protection of aquatic life typically consist of more than just a concentration value.

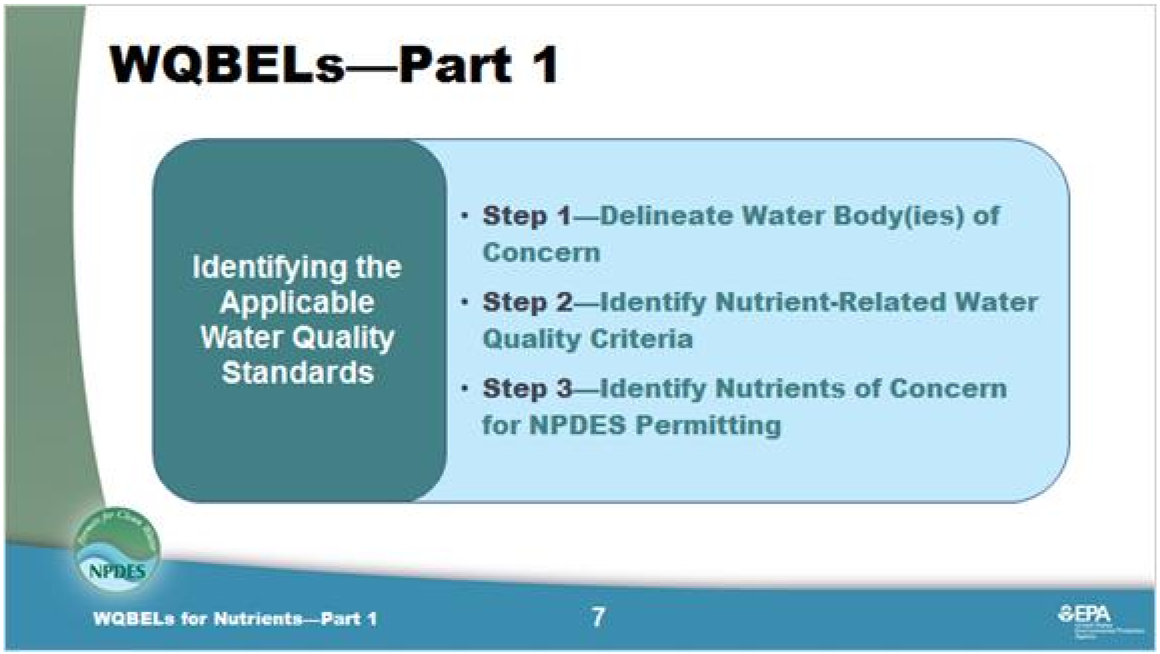
Most aquatic life criteria include three components:

- magnitude, which is the pollutant concentration or a restriction on how much of the pollutant can be present;
- duration, which is how long the aquatic organisms can be exposed to the pollutant at the specified concentration; and
- frequency, which is how often the aquatic organisms can be exposed to the concentration of concern at the specified duration.

All three components affect our water quality calculations in NPDES permitting.

And now, Amelia is going to explain how to determine which standards apply to your permit.

1.7 WQBELs—Part 1



Notes:

Thanks, Frank.

Now that we have covered those preliminary concerns, we are ready to consider specifically how we identify the water quality standards to apply when developing water quality-based effluent limitations for nutrients.

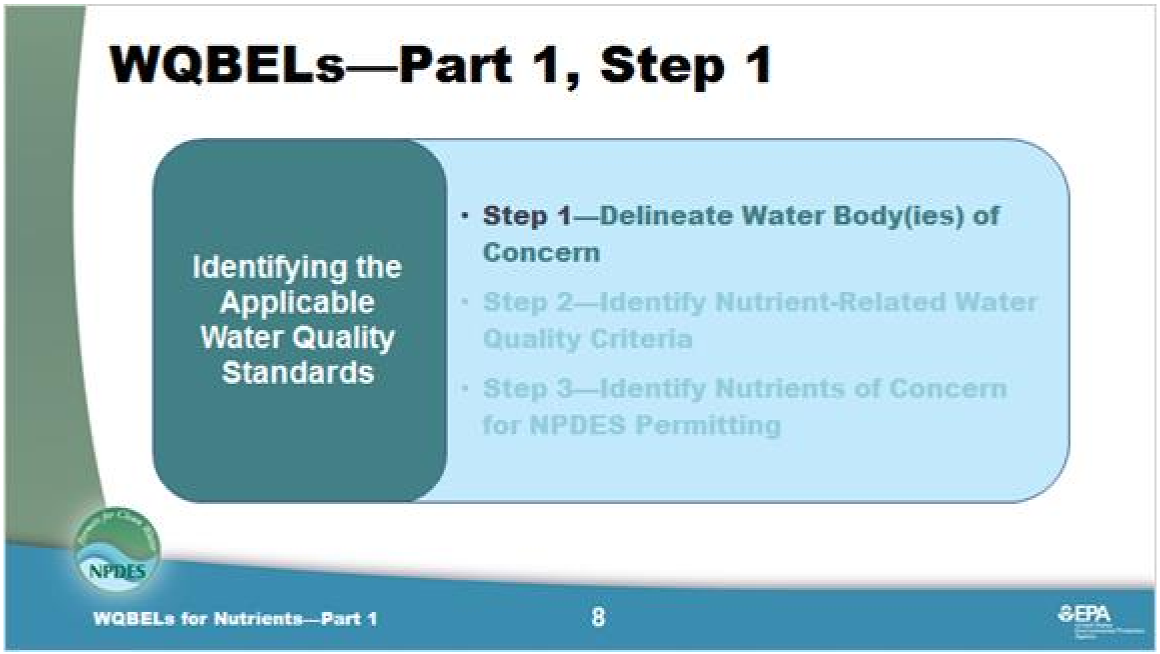
We are going to further divide this presentation into three steps:

Step 1. Delineate the water body or water bodies of concern,

Step 2. Identify the nutrient related water quality criteria that apply to the water body of concern, and

Step 3. Identify the nutrient or nutrients that we will need to address in the permit.

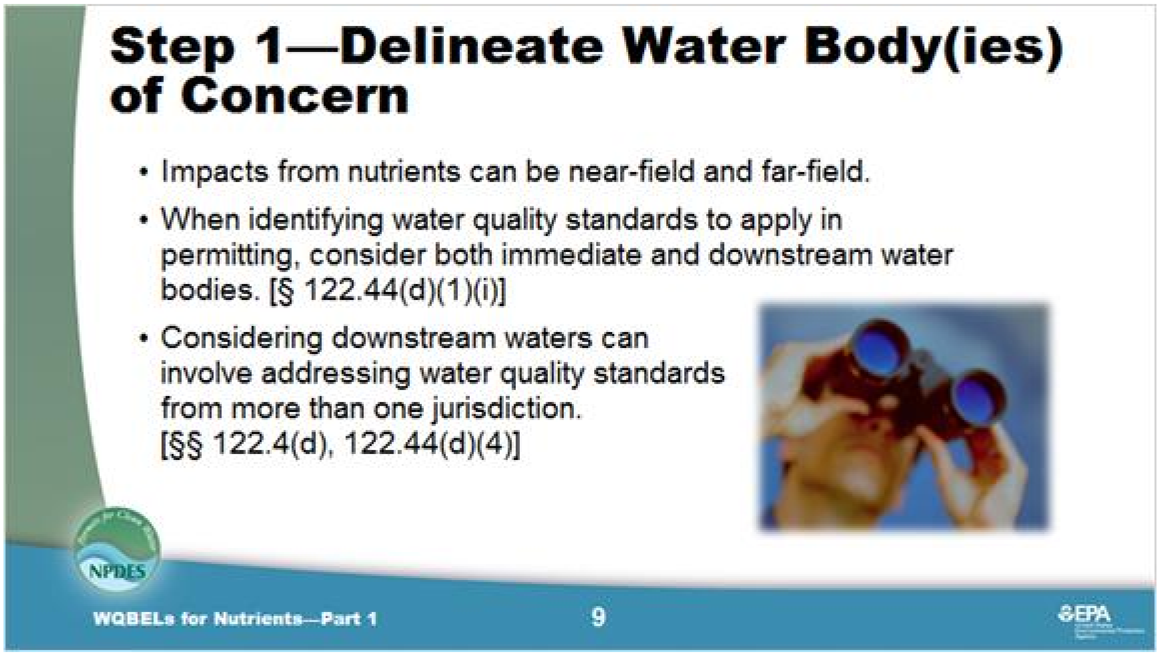
1.8 WQBELs—Part 1, Step 1



Notes:

So, our first task is to delineate the water body or water bodies of concern for our permit.

1.9 Step 1—Delineate Water Body(ies) of Concern



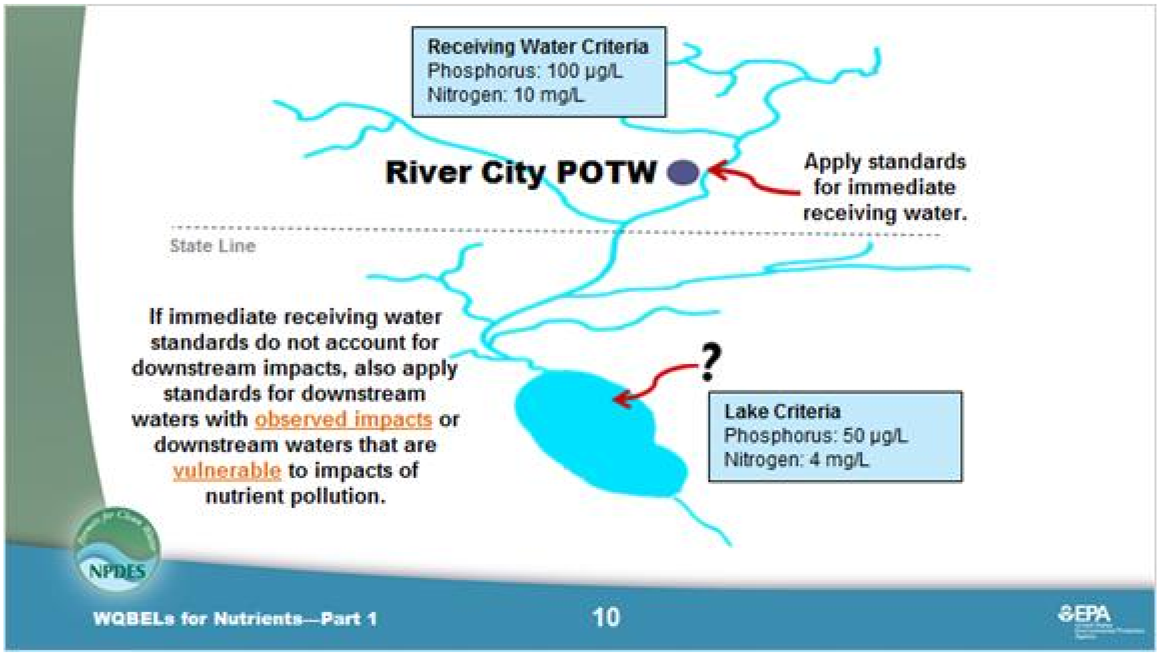
Notes:

NPDES Regulations require that effluent limitations control all pollutants or pollutant parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard. Because the effects of nutrients can be both near-field and far-field, implementing this regulation might mean that we need to consider both the immediate receiving water and downstream water bodies.

Considering downstream waters could also mean considering the water quality standards of another jurisdiction in permit development. For example, 40 CFR 122.4(d) states that no permit may be issued when the imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected states. In addition, if EPA is issuing the permit, 40 CFR 122.44(d)(4) states that the permit must include any conditions needed to conform to applicable water quality requirements under section 401(a)(2) of the Clean Water Act. Under this section of the Act, if the discharge could affect the waters of another state, that state has the opportunity to object to issuance of the permit and, if it determines that one of its water quality requirements will be violated, request a hearing.

Let’s take a look at a simple example that illustrates how considering downstream waters might affect a permit.

1.10 Example: Delineating Waterbodies of Concern



Notes:

Assume that we are writing a permit for the River City POTW.

When identifying the applicable water quality standards we should, of course, look at the standards for the immediate receiving water.

But what about downstream water bodies, such as this lake?

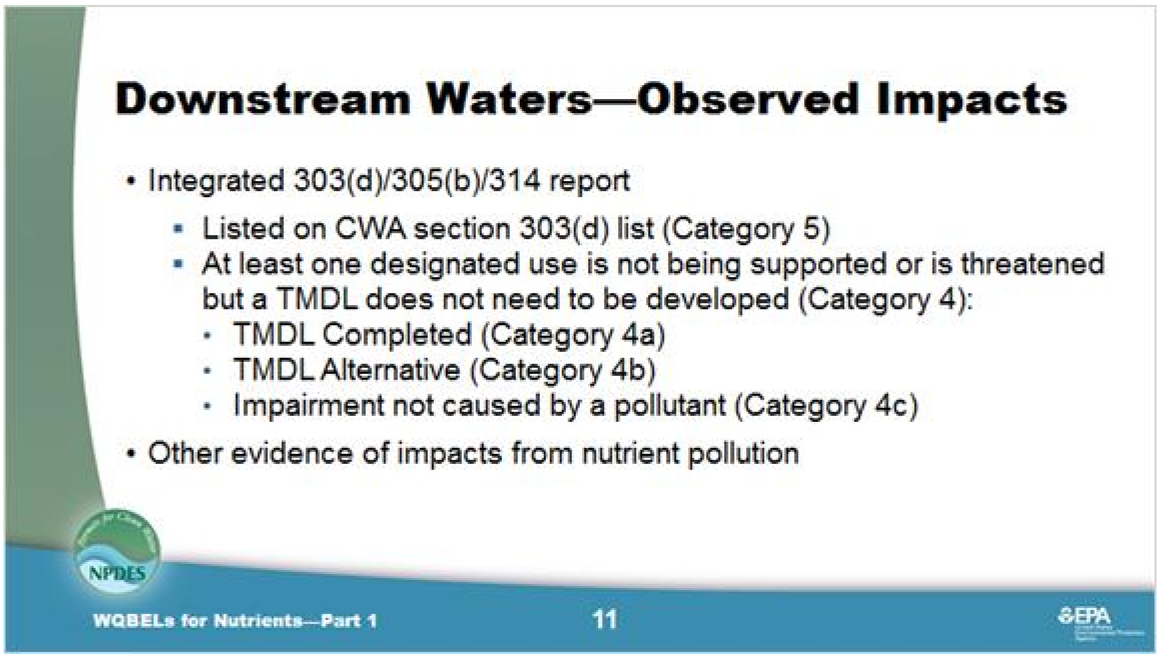
The standards for the lake could be different from the standards for the immediate receiving water. To further complicate the example, the downstream lake might be in a different state, which would require the permit writer to look at that state’s water quality standards.

Applying the regulations regarding downstream state water quality standards to this example raises some important questions. How do we know whether to consider the downstream lake standards when writing the permit for the River City POTW? How far downstream should we look when considering downstream water quality standards?

In general, if standards that apply to the receiving water do not explicitly account for the potential impacts on downstream water bodies, then we would also consider the standards for downstream waters with observed nutrient-related impacts or waters that we determine are most vulnerable to the impacts of nutrient pollution.

In the next several slides we are going to discuss how to identify which downstream water bodies might have observed impacts or be most vulnerable to the impacts of nutrient pollution.

1.11 Downstream Waters—Observed Impacts



Notes:

Let's first look at how we would identify a water body with observed nutrient-related impacts. This means that there already have been impacts such as algal blooms, low dissolved oxygen, or fish kills in that water body. Where might we find this information?

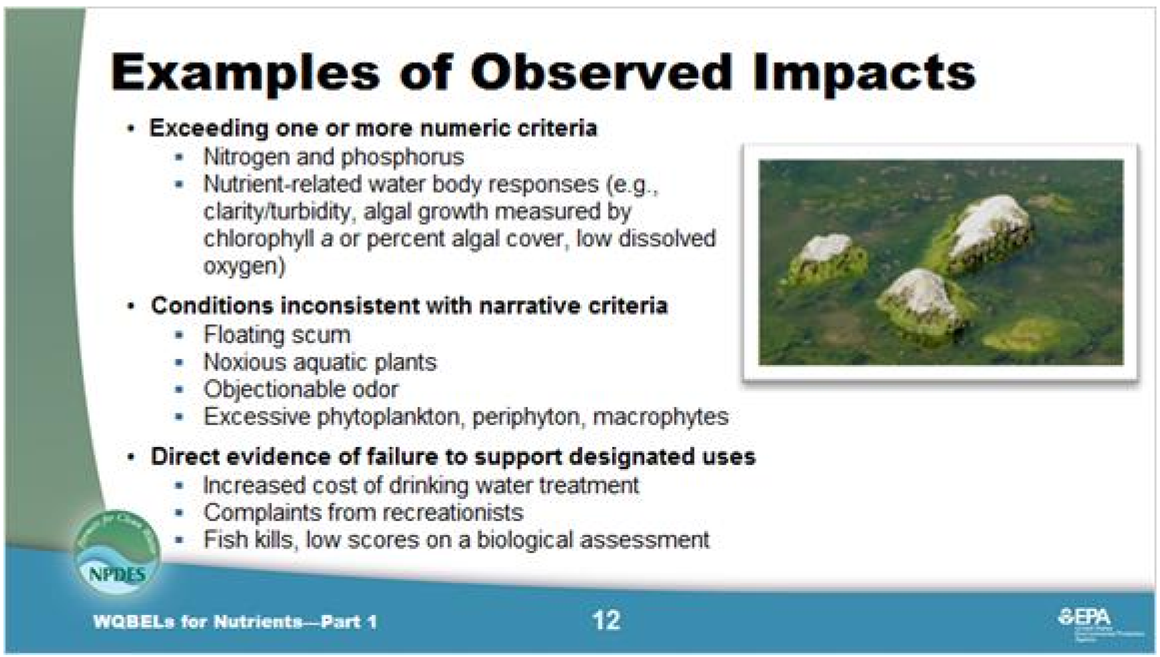
We could start by looking at the integrated Clean Water Act 303(d)/305(b)/314 report.

We would want to consider water bodies on the Clean Water Act 303(d) list of impaired waters, where nutrients, nitrogen, or phosphorus is identified as the cause of impairment. We also would want to consider water bodies listed because of a response to nutrient pollution such as low dissolved oxygen, impaired habitat, algal growth, or noxious aquatic plants.

Other waters we might want to look at from the integrated report are those where there is an impairment, but a total maximum daily load, or TMDL, has already been completed; a TMDL alternative that will achieve water quality standards is being implemented; or the impairment is not caused by a pollutant. Particularly in the case of a completed TMDL, facilities discharging that pollutant would have a wasteload allocation identified in the TMDL document.

Finally, we would consider those waters that might not be addressed in the integrated report, but for which available data provide other evidence of impacts from nutrient pollution.

1.12 Examples of Observed Impacts



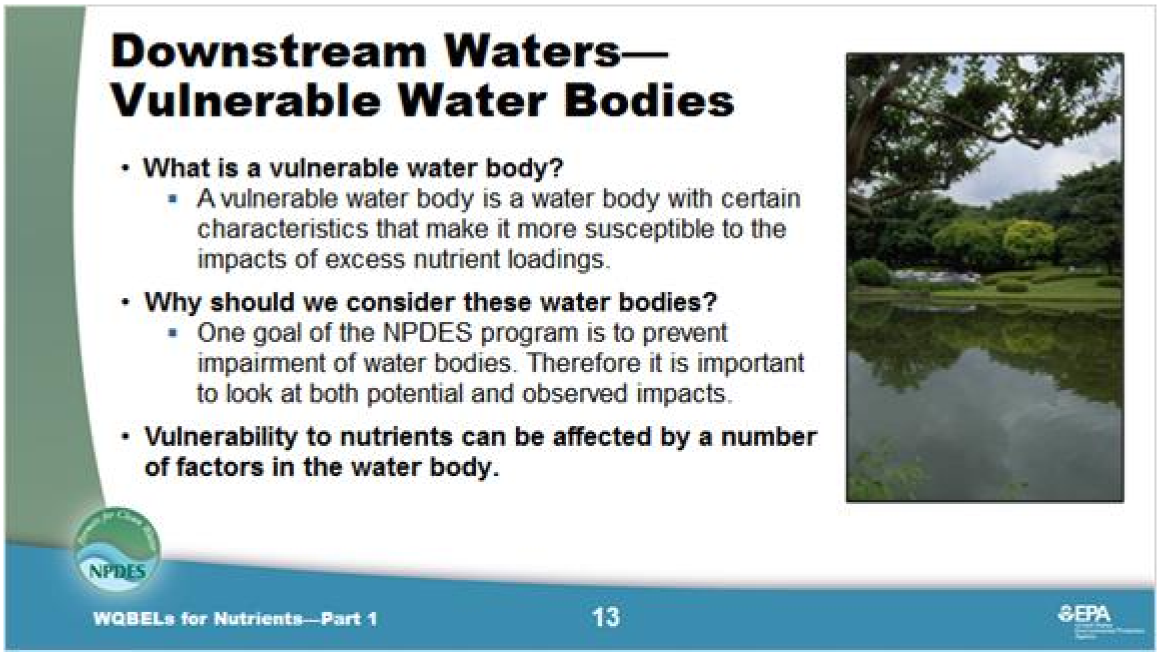
Notes:

Examples of observed impacts from nutrient pollution could include:

- Exceeding one or more numeric criteria for nitrogen, phosphorus, or response criteria such as clarity, turbidity, chlorophyll *a*, or dissolved oxygen,
- Conditions inconsistent with narrative criteria such as floating scum, noxious aquatic plants, and objectionable odor, or
- Direct evidence of failure to support designated uses such as increased costs for drinking water treatment, complaints from recreationists, and fish kills.

The important point to remember is that we do not need to wait for the water body to be listed on the 303(d) list or have a TMDL in order to consider its water quality standards when permitting. If there is evidence of observed impacts from nutrient pollution, we need to consider the water body and its standards in our permitting decisions.

1.13 Downstream Waters— Vulnerable Water Bodies



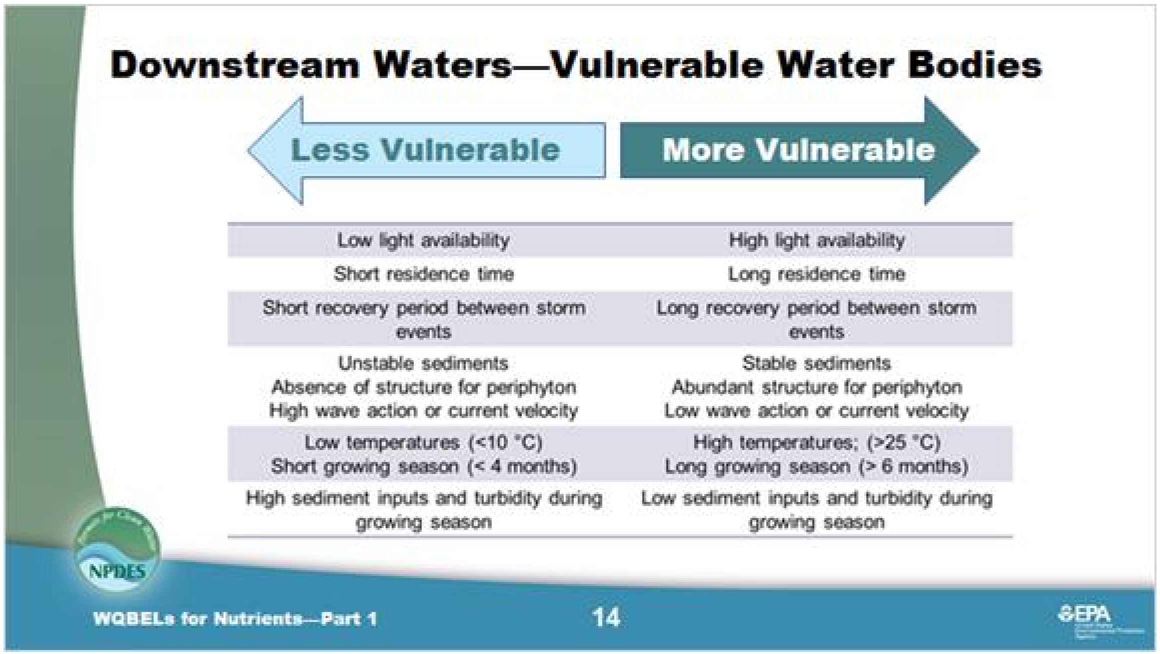
Notes:

In some cases, we might not have an assessment or data indicating that there are observed impacts from nutrient pollution on a downstream water body. In such cases, we would want to consider the water quality standards of the downstream water body most vulnerable to non-attainment of water quality standards as a result of nutrient-related impacts.

Vulnerable water bodies are water bodies with characteristics that make them more susceptible to impacts from excess nutrient loadings. It is important for us to consider these water bodies because an objective of the Clean Water Act is to prevent the impairment of water bodies. Therefore it is important to look at both observed and potential impacts from nutrient pollution.

Let’s look at some of the factors to consider when assessing the vulnerability of a water body to nutrient-related impacts.

1.14 Downstream Waters—Vulnerable Water Bodies



Notes:

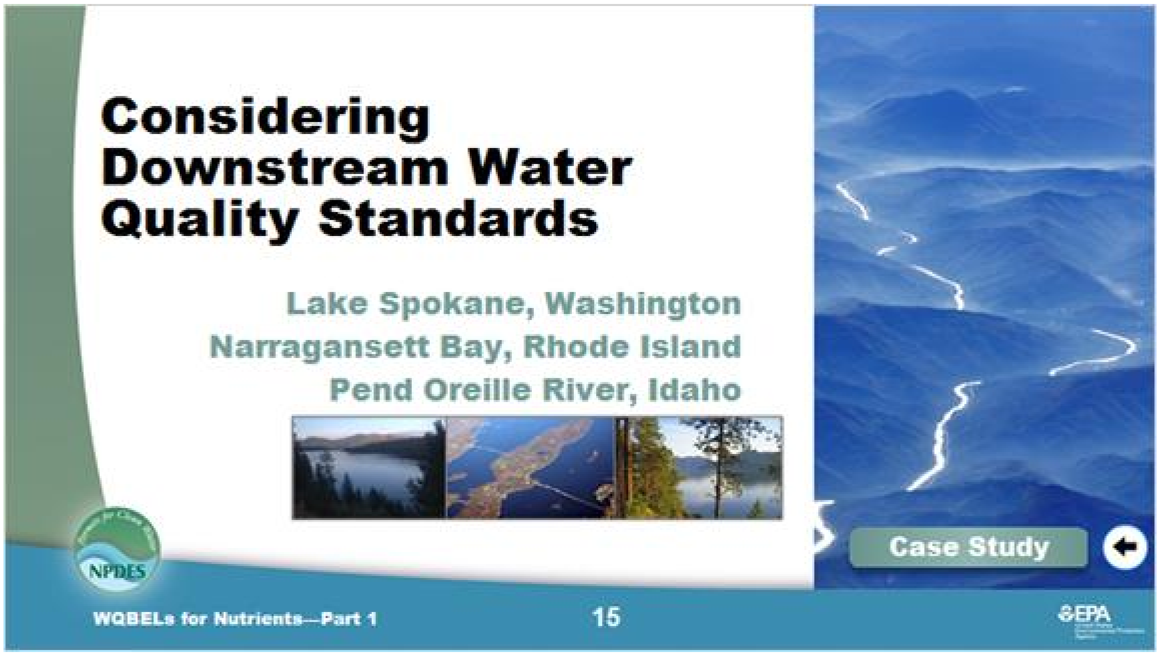
Here are several factors that could influence the vulnerability of a water body to the effects of nutrient pollution. These factors include, but aren't limited to, light availability, residence time, temperature, and turbidity.

It is up to the permitting authority to determine how to evaluate each factor when considering implementation of a downstream water body's standards.

For example, let's assume we are permitting a discharge to an upstream tributary of a lake. The downstream lake has high light availability, long residence time, warm water temperatures, and low non-algal turbidity. Thus, the lake would fall on the "More Vulnerable" side of this chart.

The permit writer would first need to determine whether water quality criteria for the immediate receiving water explicitly account for the water quality standards of the downstream lake. If not, the permit writer would consider what impact the water quality criteria for the downstream lake should have on effluent limitations in the permit. For example, how should the permit be written to address nutrient criteria for the lake if they are more stringent than the criteria for the immediate receiving water? Also, how should the permit writer determine the impact of the discharge on the downstream lake?

1.15 Considering Downstream Water Quality Standards



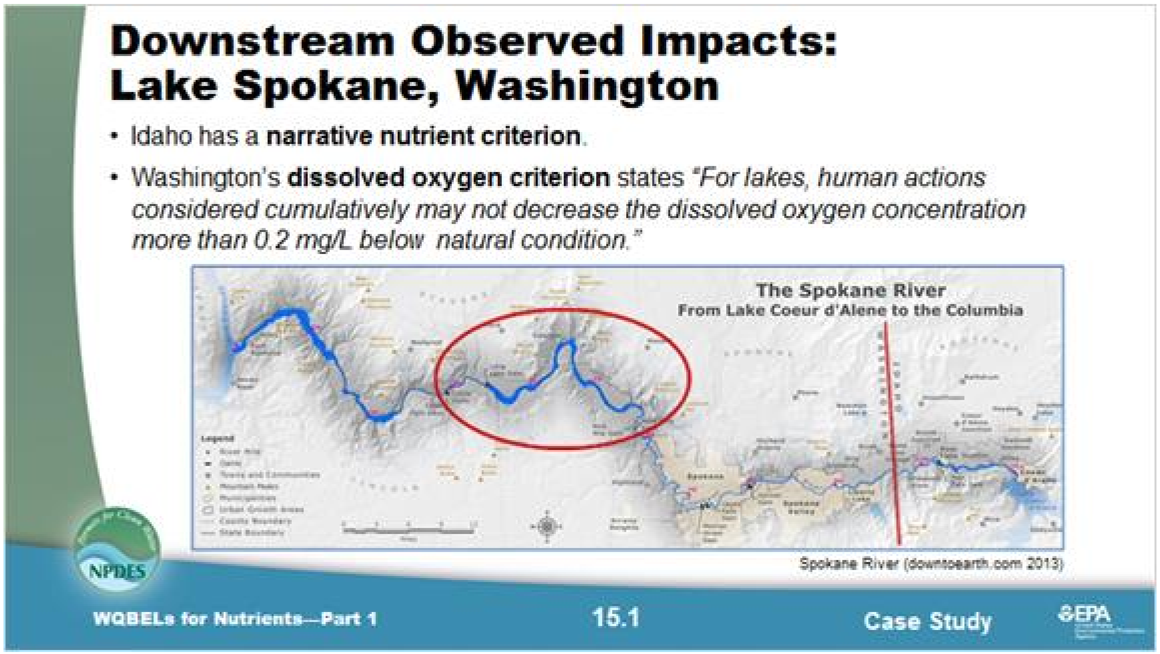
Notes:

USEPA Regions 1 and 10 have issued permits that have considered the water quality standards of downstream water bodies because of observed impacts in those water bodies or their vulnerability to impacts from nutrient pollution.

If you would like to view case studies showing how these two EPA Regions considered downstream water quality standards, click the “Case Studies” button on the slide.

Otherwise, click the “Next” button to skip the case studies.

1.16 Downstream Observed Impacts: Lake Spokane, Washington



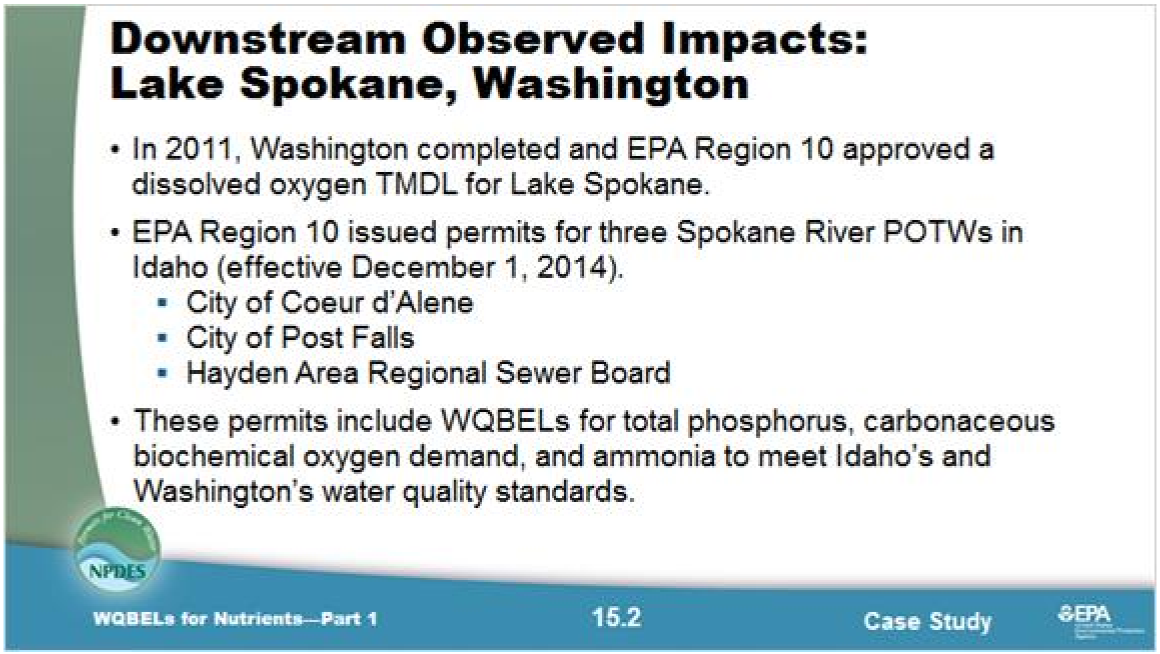
Notes:

The Spokane River drains the northern part of Lake Coeur d'Alene in the Idaho Panhandle and flows into Washington where it empties into the Columbia River at Franklin D. Roosevelt Lake, 111 miles downstream. Approximately halfway along the course of the Spokane River is Lake Spokane.

For the portion of the river in Idaho, the state's water quality standards have a narrative criterion that addresses excess nutrients. This narrative criterion requires that "Surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths that impair designated beneficial uses."

In Washington, the Spokane River and Lake Spokane have a long history of excess nutrients and low dissolved oxygen levels. The dissolved oxygen criteria in Washington's water quality standards include a requirement that "For lakes, human actions considered cumulatively may not decrease the dissolved oxygen concentration more than 0.2 mg/L below natural condition."

1.17 Downstream Observed Impacts: Lake Spokane, Washington



Notes:

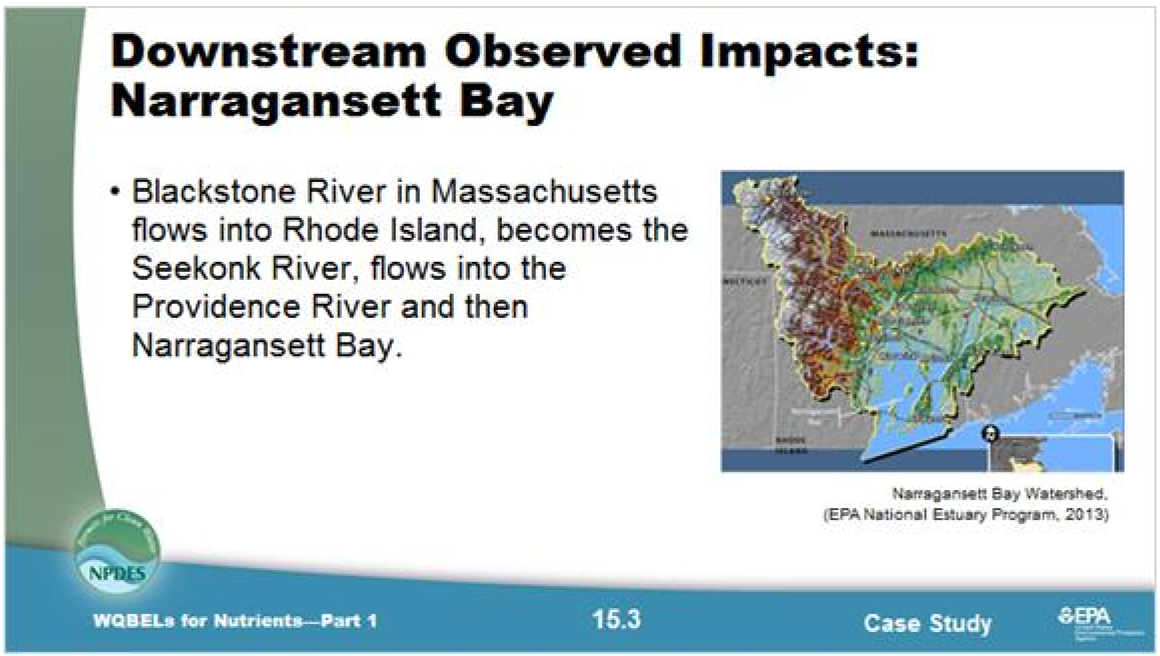
Dissolved oxygen conditions in Lake Spokane are poorer than the natural condition. Modeling of the river and lake system confirmed that dissolved oxygen is significantly depleted by anthropogenic pollution sources. Washington completed an approved total maximum daily load, or TMDL, for dissolved oxygen for Lake Spokane in 2010. The TMDL applies to the conditions and activities in Washington from the state line with Idaho to the Long Lake Dam, the dam that creates Lake Spokane, but also considers the contributions of upstream sources in Idaho.

In 2014, EPA Region 10 issued permits for three publicly-owned treatment works, or POTWs, discharging to the Spokane River in Idaho. These three permits include water quality-based effluent limitations for total phosphorus, carbonaceous biochemical oxygen demand, and ammonia. The limits in these permits were developed to allow the Spokane River and Lake Spokane to meet both Idaho and Washington's water quality standards, including the dissolved oxygen criteria in Lake Spokane. In this way, the permits for the three Idaho cities considered not only the water quality standards of the immediate receiving water, the Spokane River in Idaho, but also the downstream waters in another jurisdiction, the Spokane River and Lake Spokane in Washington.

We will consider additional features of these permits in the Case Study sections of other presentations in this series. If you would like more information on the 2011 dissolved oxygen TMDL or the NPDES permits for the three Idaho POTWs, click on the Resources tab for this presentation.

Amelia has an east coast example in Region 1 up next.

1.18 Downstream Observed Impacts: Narragansett Bay



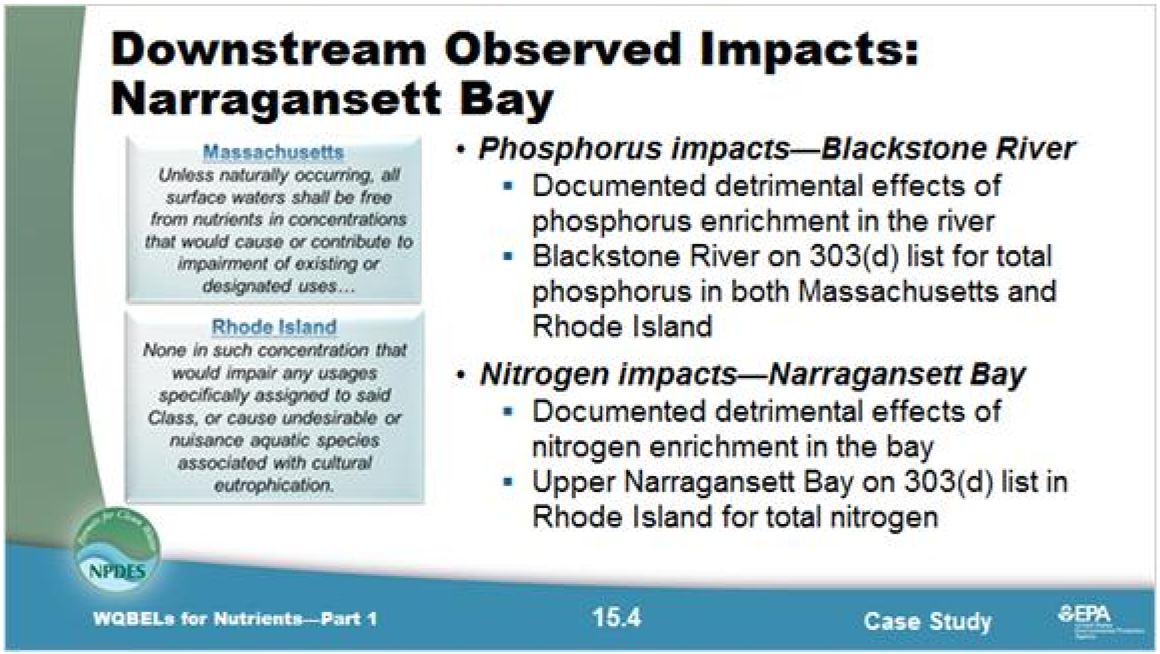
Notes:

Thanks Frank.

Here is another example of a permit that considers observed impacts on a downstream water body when addressing nutrients in discharges from an upstream point source.

In this example the discharge is to the Blackstone River in Massachusetts. The Blackstone becomes the Seekonk River, which flows into the Providence River which then empties into the Narragansett Bay in Rhode Island.

1.19 Downstream Observed Impacts: Narragansett Bay



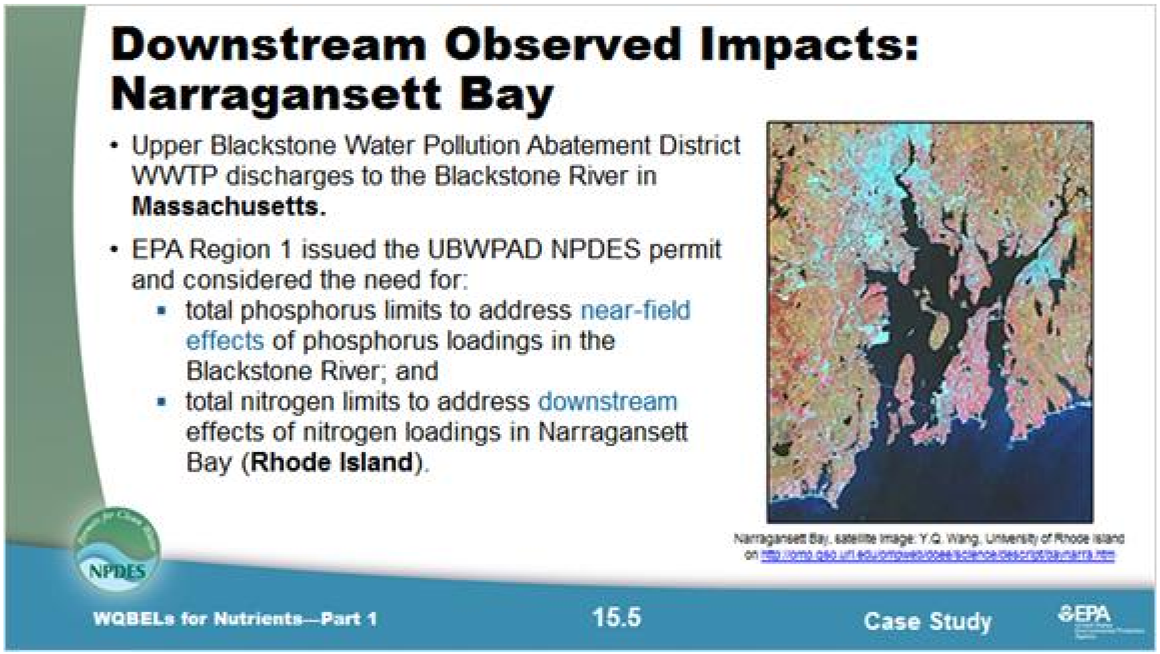
Notes:

Both Massachusetts and Rhode Island water quality standards must be met, but there are no numeric criteria for either the Blackstone River or the Narragansett Bay.

In the Blackstone River, there have been documented detrimental effects from phosphorus enrichment, including excessive periphyton and phytoplankton growth, supersaturated levels of dissolved oxygen, and pH violations. The river is included on both Massachusetts' and Rhode Island's Clean Water Act 303(d) lists because of impairment by total phosphorus.

In addition, there are available data and technical reports that clearly document the detrimental effects of nitrogen enrichment in Narragansett Bay. These effects include excessive phytoplankton growth, dissolved oxygen violations, and periodic fish kills. Rhode Island has listed the Upper Narragansett Bay on its 303(d) list because of impairment by total nitrogen.

1.20 Downstream Observed Impacts: Narragansett Bay



Notes:

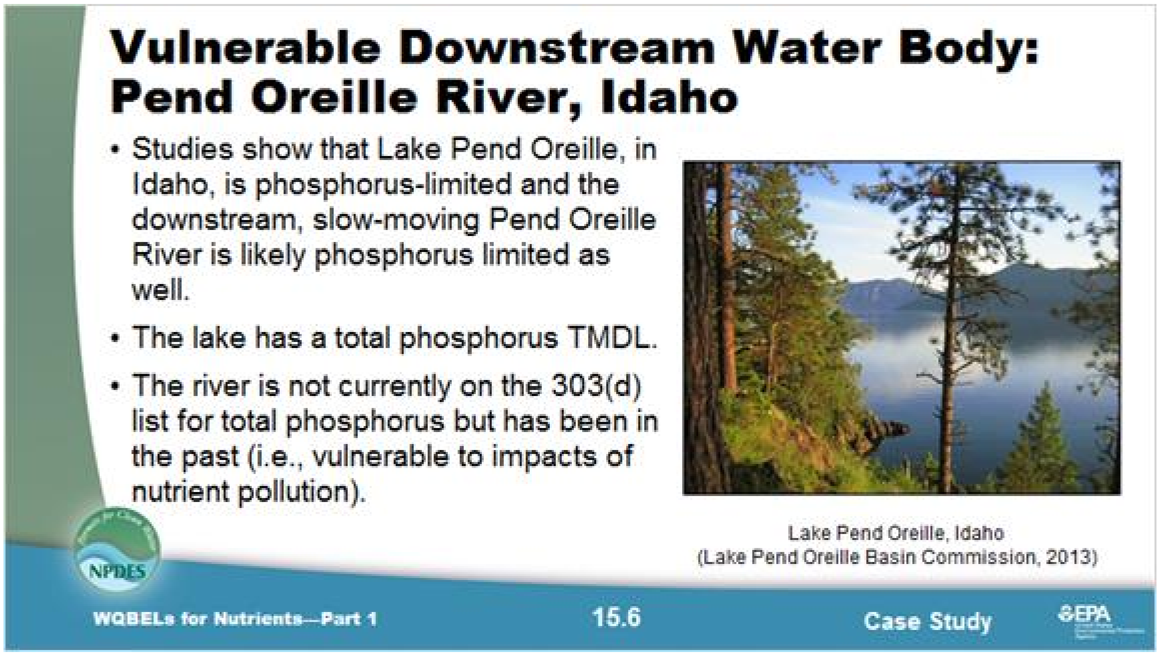
EPA Region 1 is the permitting authority for the state of Massachusetts, as the state has not yet been authorized to administer the NPDES program. EPA Region 1 issued an NPDES permit with effluent limitations for nutrients to the Upper Blackstone Water Pollution Abatement District Wastewater Treatment Plant in Millbury, Massachusetts. From now on, we'll just call the facility the Upper Blackstone Treatment Plant.

When writing the permit for the Upper Blackstone Treatment Plant, EPA Region 1 considered the need for effluent limits based on the water quality standards of both the immediate receiving water and downstream waters. Specifically, the Region considered the need for total phosphorus limits to protect the Blackstone River and total nitrogen limits to protect Narragansett Bay. In other words, because of the documented impacts on water quality, the Region considered the effects of the discharge from the Upper Blackstone Treatment Plant and far-field water bodies to meet their water quality standards.

We will talk more about EPA Region 1's analysis in the Case Study section of other presentations that are part of this series.

For now, Frank has another Region 10 example for you.

1.21 Vulnerable Downstream Water Body: Pend Oreille River, Idaho



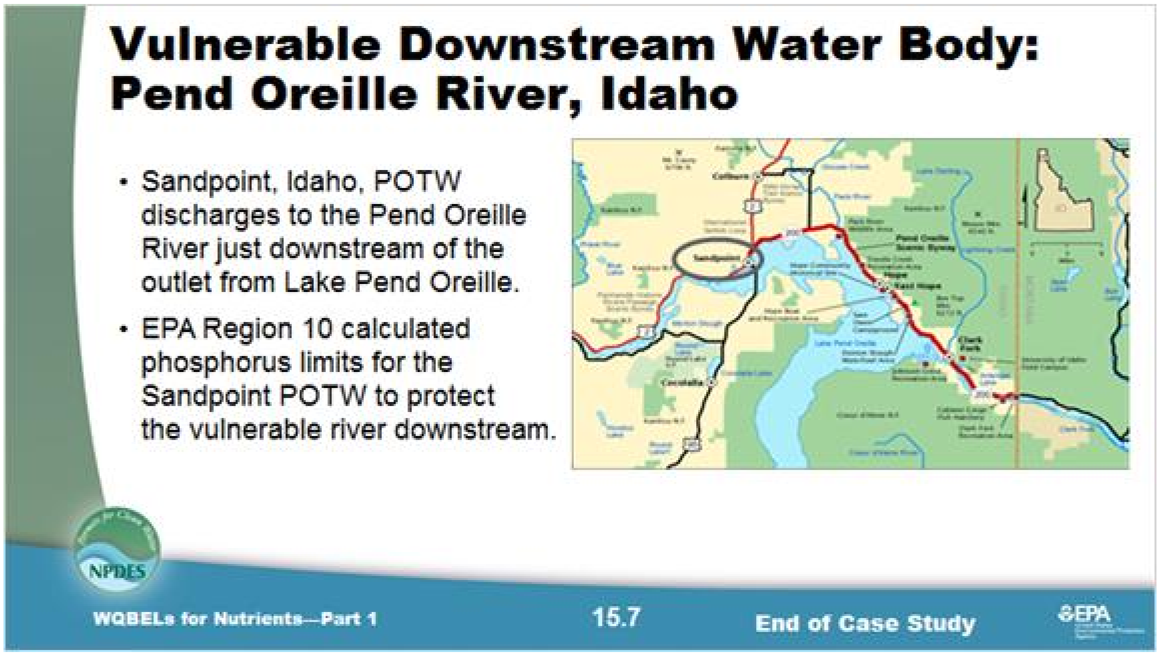
Notes:

Thanks, Amelia, and welcome back to Region 10, Idaho specifically.

Studies show that Lake Pend Oreille, which discharges to the Pend Oreille River, is phosphorus-limited. There is a gradual transition from lake to river, and the Pend Oreille River is likely phosphorus-limited too.

A total phosphorus TMDL was completed for the lake in 2002. The river is not currently listed on the 303(d) list because of total phosphorus, but has been in the past. This would indicate that the river is vulnerable to the impacts of nutrient pollution.

1.22 Vulnerable Downstream Water Body: Pend Oreille River, Idaho



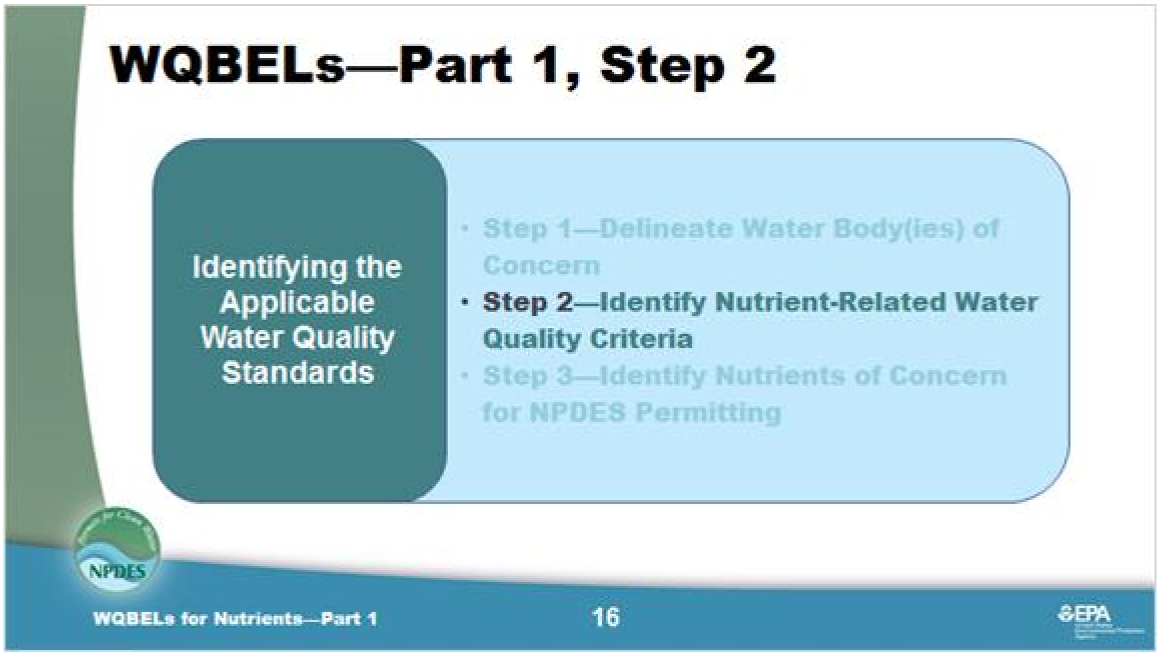
Notes:

The wastewater treatment plant for the City of Sandpoint, Idaho, discharges to the Pend Oreille River just downstream of Lake Pend Oreille.

USEPA Region 10 has issued a permit to the Sandpoint wastewater treatment plant that sets limits aimed at attainment of Idaho's narrative water quality criterion in the vulnerable, slow-moving river downstream. This criterion states that "surface waters of the state shall be free from excess nutrients that can cause visible slime growths or other nuisance aquatic growths impairing designated beneficial uses."

We are going to revisit this permit and provide more detail on how total phosphorus limitations for the City of Sandpoint's permit were calculated in other presentations on water quality-based permitting that are part of this training.

1.23 WQBELs—Part 1, Step 2

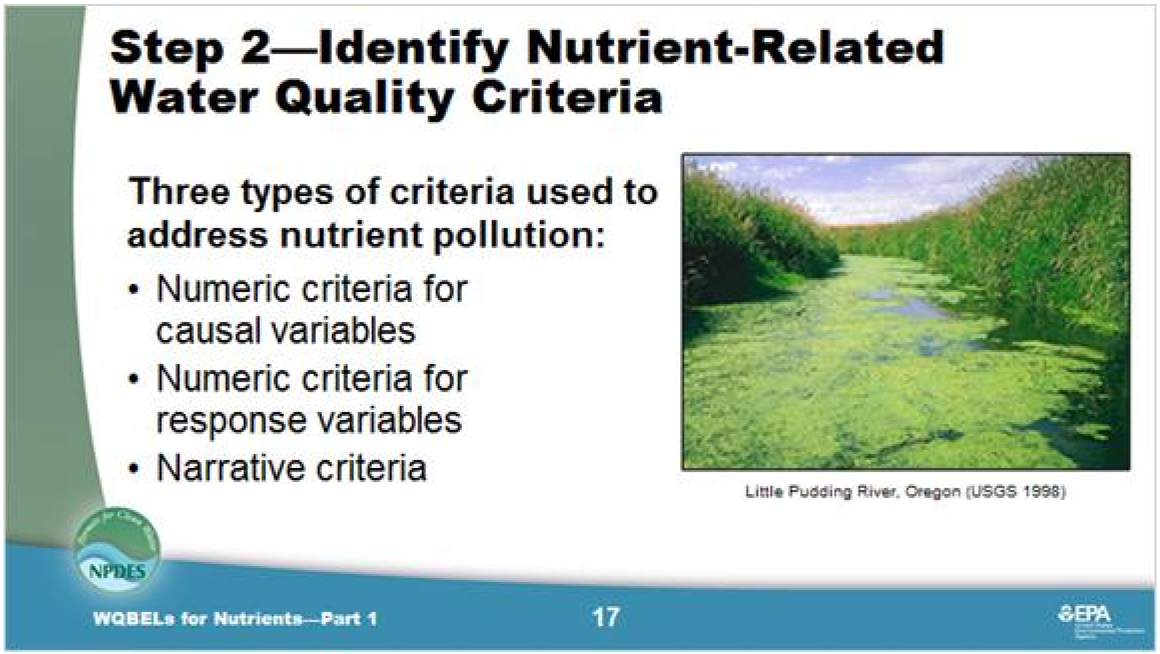


Notes:

Thus far, we have looked at the question of which water body or water bodies to consider in identifying the water quality standards we need to implement in an NPDES permit.

In Step 2, we will take a closer look at the types of water quality criteria for nutrients that we might find in those water quality standards.

1.24 Step 2—Identify Nutrient-Related Water Quality Criteria



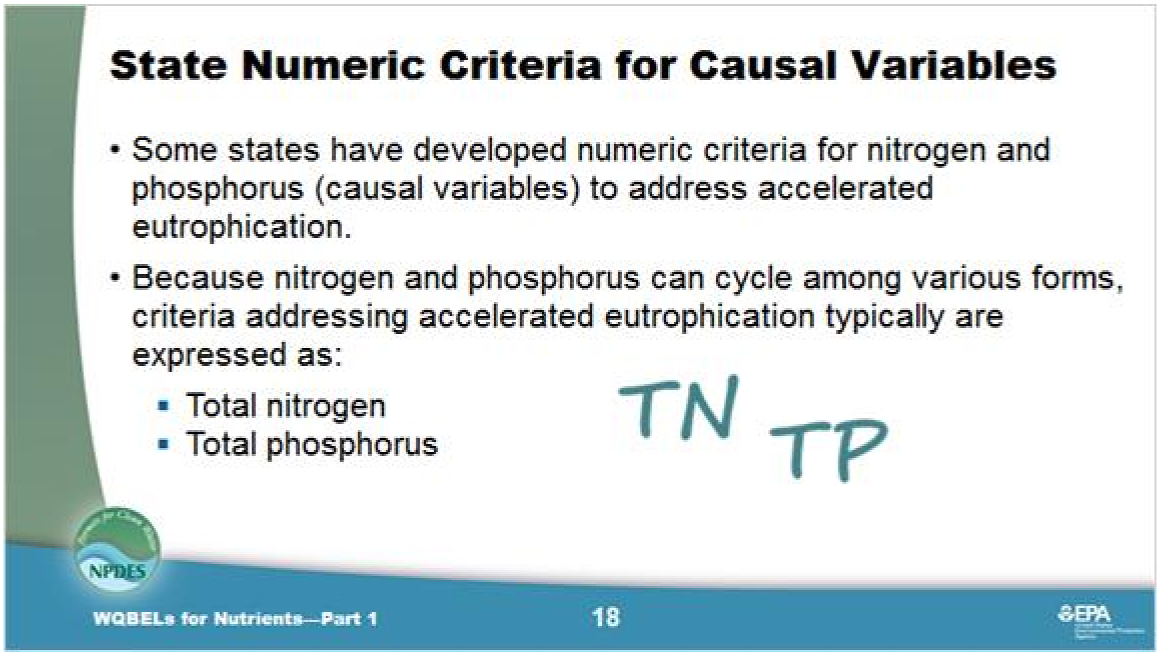
Notes:

Once we have delineated the water body or water bodies of concern, there are three types of water quality criteria in water quality standards that could be used to address nutrient pollution.

These three types of criteria are

- numeric criteria for causal variables, specifically total nitrogen and total phosphorus,
- numeric criteria for response variables, such as chlorophyll a and turbidity, and
- narrative criteria

1.25 State Numeric Criteria for Causal Variables



Notes:

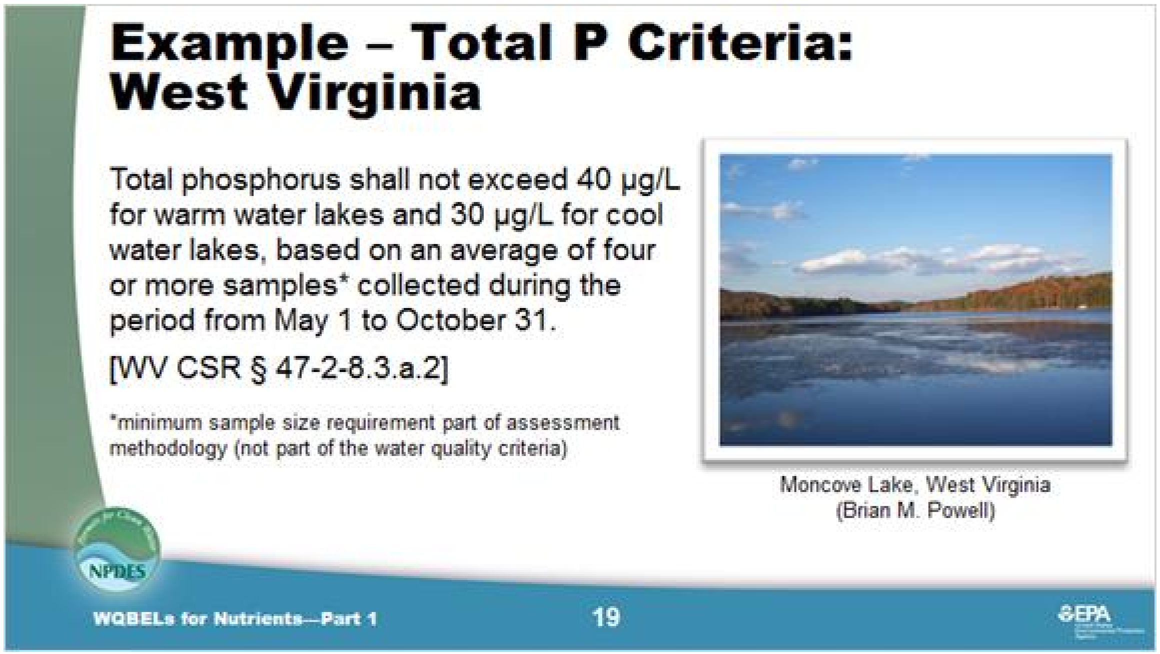
The most straightforward application of water quality standards in NPDES permits is when the standards include numeric criteria for causal variables, namely total nitrogen and total phosphorus, to address accelerated eutrophication.

Nitrogen and phosphorus in a water body can cycle among various forms. Thus, nitrogen and phosphorus pollution in water bodies generally is measured in terms of total nitrogen and total phosphorus when considering the impacts caused by the indirect effects of nutrient over-enrichment in surface waters. These effects might include intensive growth of algae leading to reduced sunlight penetrating the water, decreased amount of oxygen dissolved in the water, and unaesthetic or potentially toxic conditions that could impair water supply and recreational uses.

Keep in mind as well that some forms of nitrogen (such as un-ionized ammonia and nitrate) have direct toxic or human health effects. Generally, states already have numeric water quality criteria for these forms of nitrogen and have developed permitting procedures to address their direct impact on water quality and attainment of designated uses.

In this training, we are focusing on total nitrogen and accelerated eutrophication; therefore, we will not be discussing procedures for addressing ammonia and other forms of nutrients with direct toxic or human health effects.

1.26 Example – Total P Criteria: West Virginia



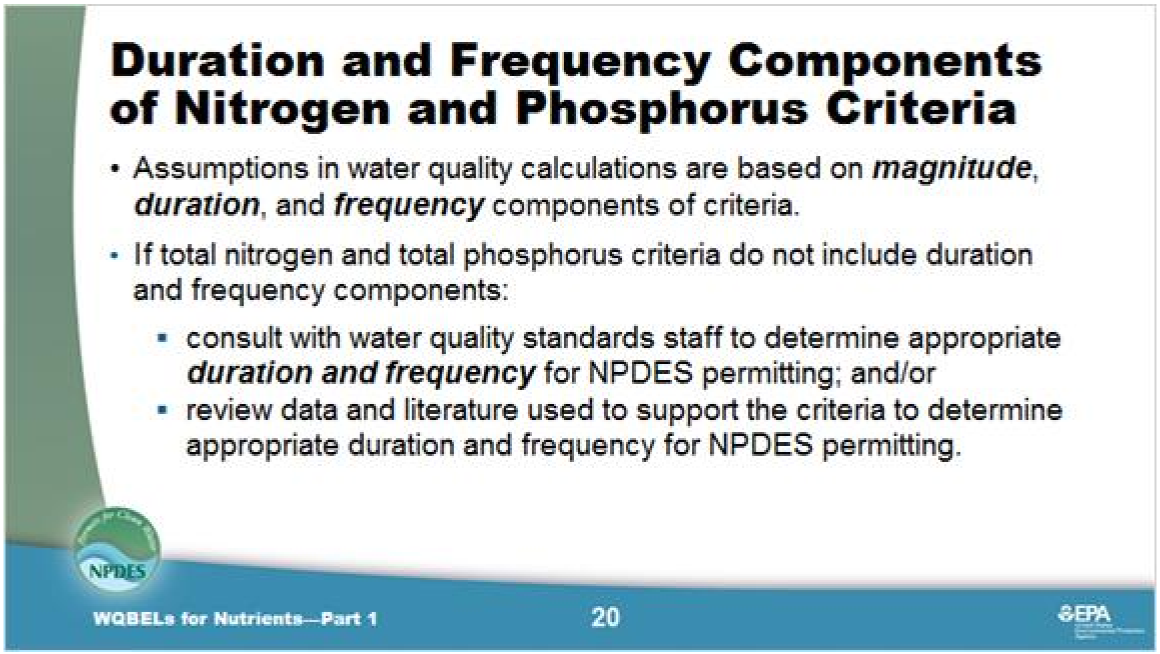
Notes:

West Virginia provides us with an example of criteria for total phosphorus that apply state-wide to certain types of water bodies, in this case, warm water and cool water lakes.

West Virginia's total phosphorus criteria are seasonal average criteria of 40 µg/L for warm water lakes and 30 µg/L for cool water lakes. An aspect of the seasonal average and annual average criteria that is not explicitly stated in the water quality standards is the acceptable frequency of excursion. Recall that most water quality criteria for protection of aquatic life have magnitude, duration, and frequency components. A permit writer would need to interpret the West Virginia criteria to determine an appropriate frequency component. One possible interpretation is that the acceptable frequency of excursion is zero. In other words, the seasonal or annual average concentration should never exceed the seasonal or annual average criterion.

As we will see in a few moments, West Virginia has additional nutrient-related statewide criteria for lakes.

1.27 Duration and Frequency Components of Nitrogen and Phosphorus Criteria



Notes:

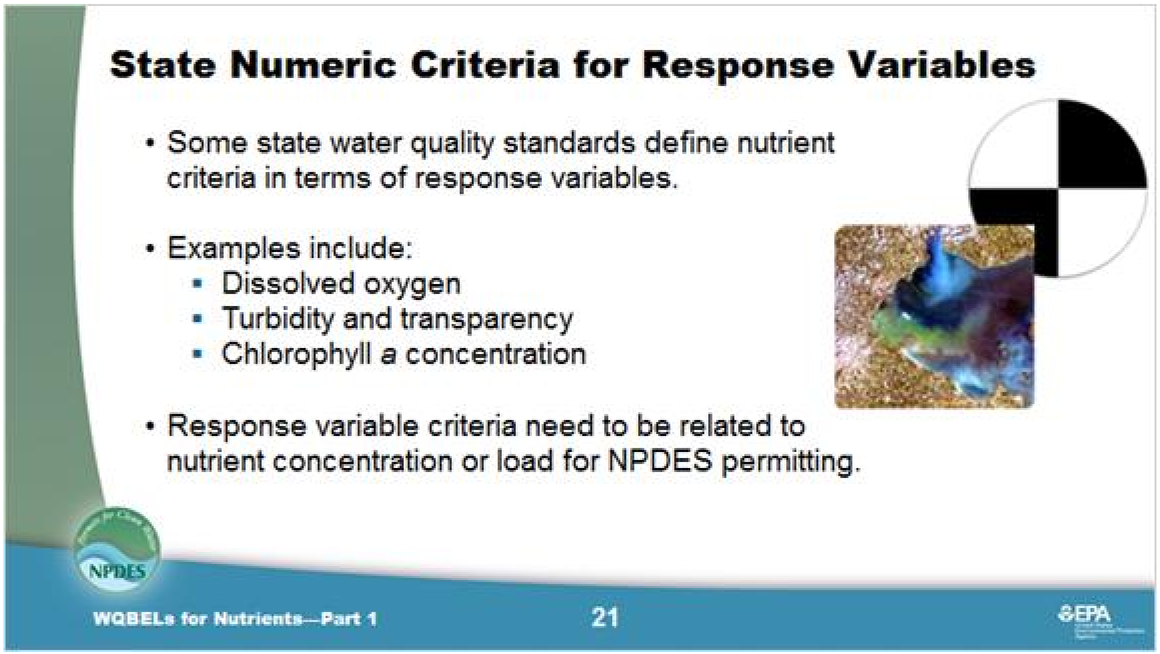
Again, most water quality criteria developed to protect aquatic life are not expressed as simply a concentration value. Typically, they include three components: magnitude, duration, and frequency.

If criteria for nitrogen and phosphorus include these components, then we are able to account for them in our water quality permitting calculations. We will see how duration and frequency impact these calculations in later presentations.

As we have seen, nutrient criteria do not always include all three components. If nutrient criteria do not include explicit duration and frequency components, permit writers will need to consult water quality standards staff or review the data and literature underlying development of the criteria to determine the appropriate duration and frequency to use in water quality-based permitting calculations.

Now, I'll turn it over to Amelia to discuss numeric criteria for response variables.

1.28 State Numeric Criteria for Response Variables

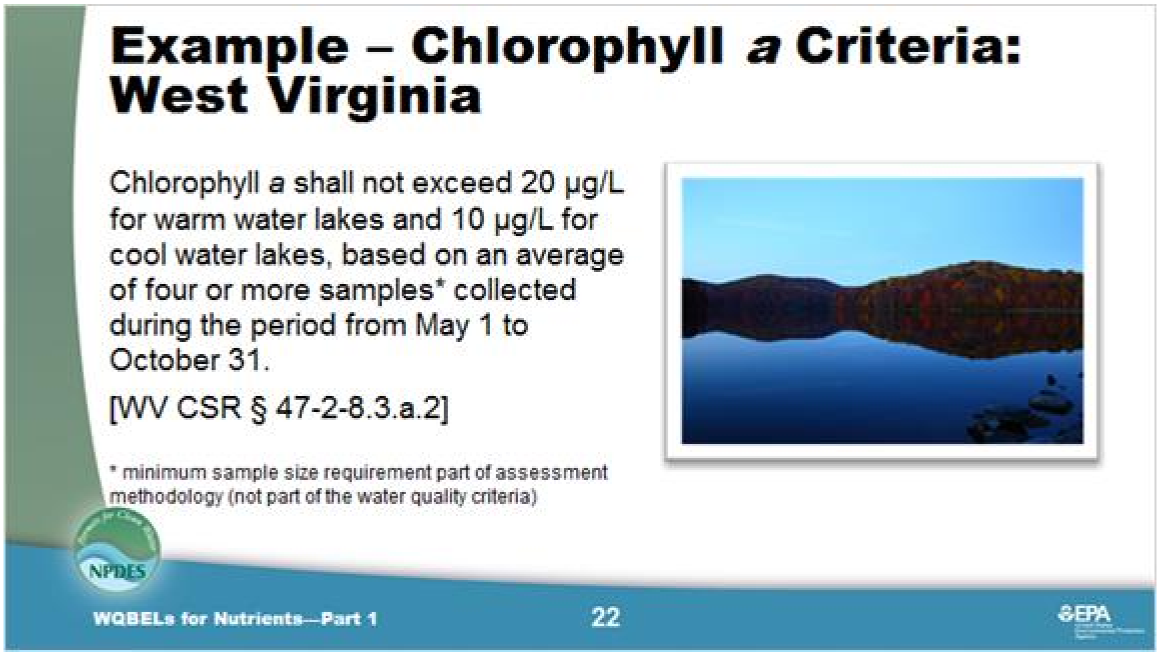


Notes:

Some water quality standards include numeric criteria for response variables rather than, or in addition to, numeric criteria for nitrogen and phosphorus. Response variable criteria more directly reflect underlying water quality concerns associated with nutrient pollution. For example, they might address dissolved oxygen concentration, turbidity, or chlorophyll *a* concentration. However, we will have to take a few additional steps to implement response variable criteria in NPDES permitting.

Permit writers need a mechanism or procedure for relating response variables to a nutrient load or concentration that can be used in calculating effluent limitations. For example, if the response variable criterion for a lake is a growing season mean chlorophyll a concentration of 10 µg/L, developing effluent limitations for nutrients requires determining target ambient nutrient concentrations or loads that ensure that the mean chlorophyll a concentration criterion is maintained. The nutrient concentration or loads could then be used to calculate effluent limitations.

1.29 Example – Chlorophyll a Criteria: West Virginia

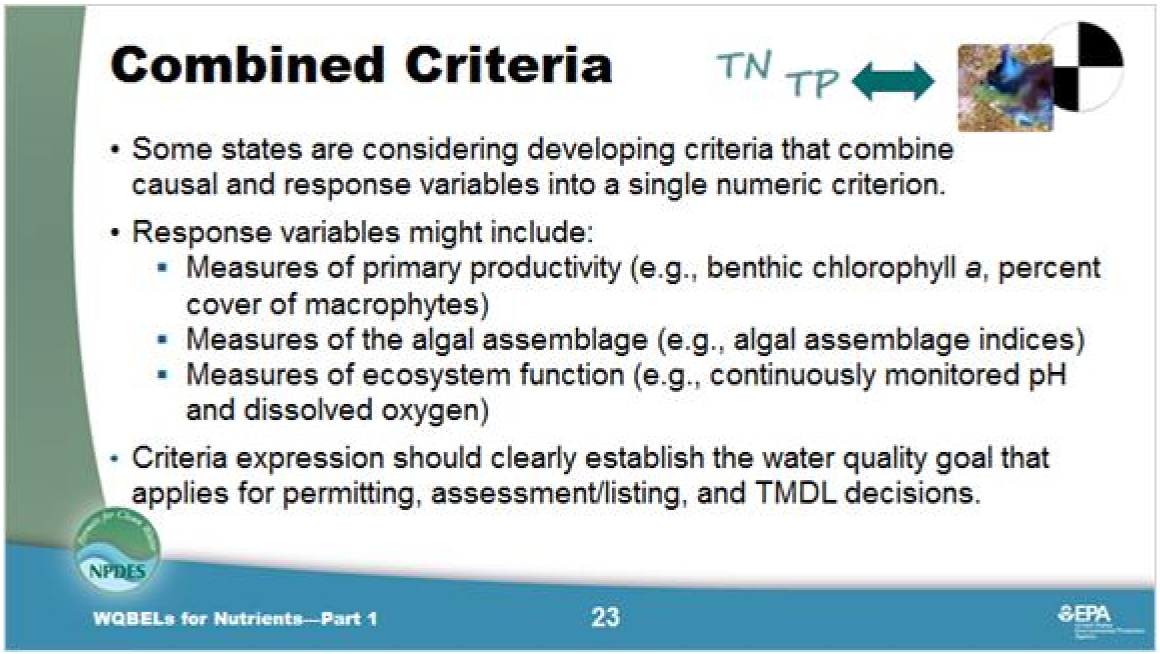


Notes:

Here is the other half of West Virginia's numeric nutrient criteria for lakes. This portion provides us with an example of response variable criteria.

These seasonal average chlorophyll a criteria of 20 µg/ L for warm water lakes and 10 µg/L for cool water lakes are in the same section of West Virginia's water quality standards regulations as the total phosphorus criteria we saw earlier. Notice too that, once again, there is no explicit frequency component to these criteria. Just as with West Virginia's total phosphorus criteria for lakes, we might assume the frequency is zero.

1.30 Combined Criteria



Notes:

We have seen examples of numeric criteria for causal variables and numeric criteria for response variables. Generally, these criteria are independent and are evaluated separately.

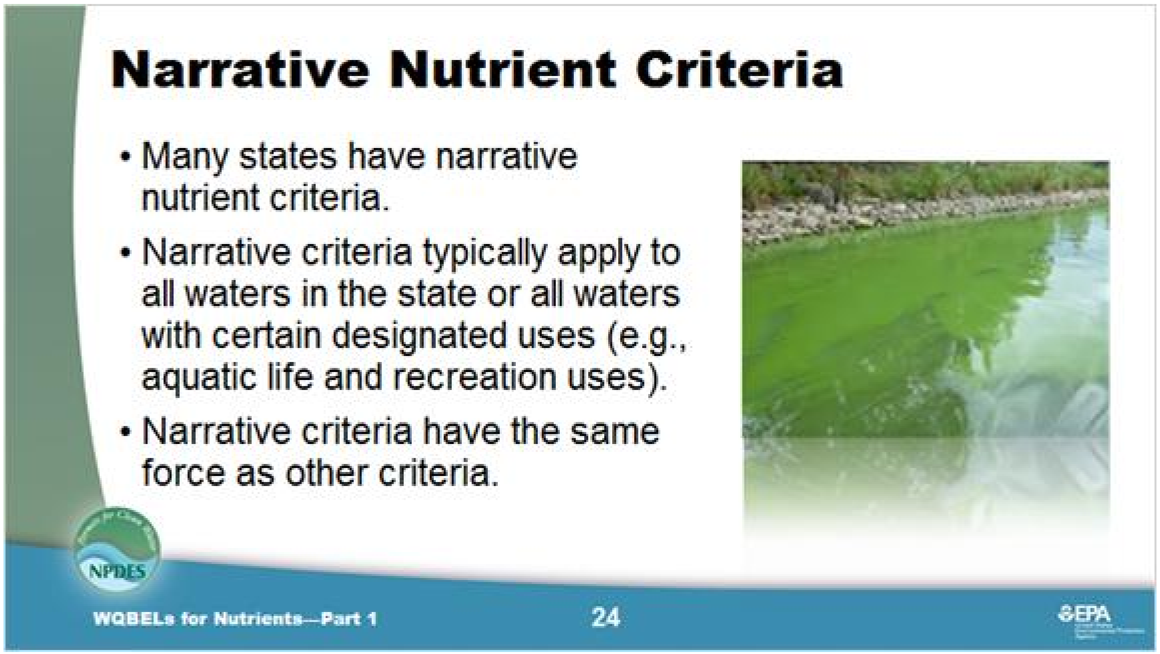
Some states, however, are considering developing combined criteria. A “combined criterion” is a single criterion that has both causal and response components. So, a single criterion would have components addressing total phosphorus or total nitrogen (or both) and components addressing response variables that measure primary productivity, algal assemblage, or ecosystem function.

The important thing to remember about combined criteria is that the process for implementing the criteria should be clear. A combined criterion needs to be explicit about the specific goal or goals that apply for permitting, water quality assessments, listing decisions, and development of TMDLs. For NPDES permitting, this means that the combined criterion or its implementation policies and procedures should specifically state the numeric target that applies for purposes of calculating water quality-based effluent limitations.

If you would like more information on combined criteria, see a fact sheet entitled, “Guiding Principles for Combined Criteria” on the Resources tab.

Now that we have discussed the types of numeric criteria you might encounter, Frank is going to discuss how to use narrative nutrient criteria in permitting.

1.31 Narrative Nutrient Criteria



Notes:

Thanks, Amelia.

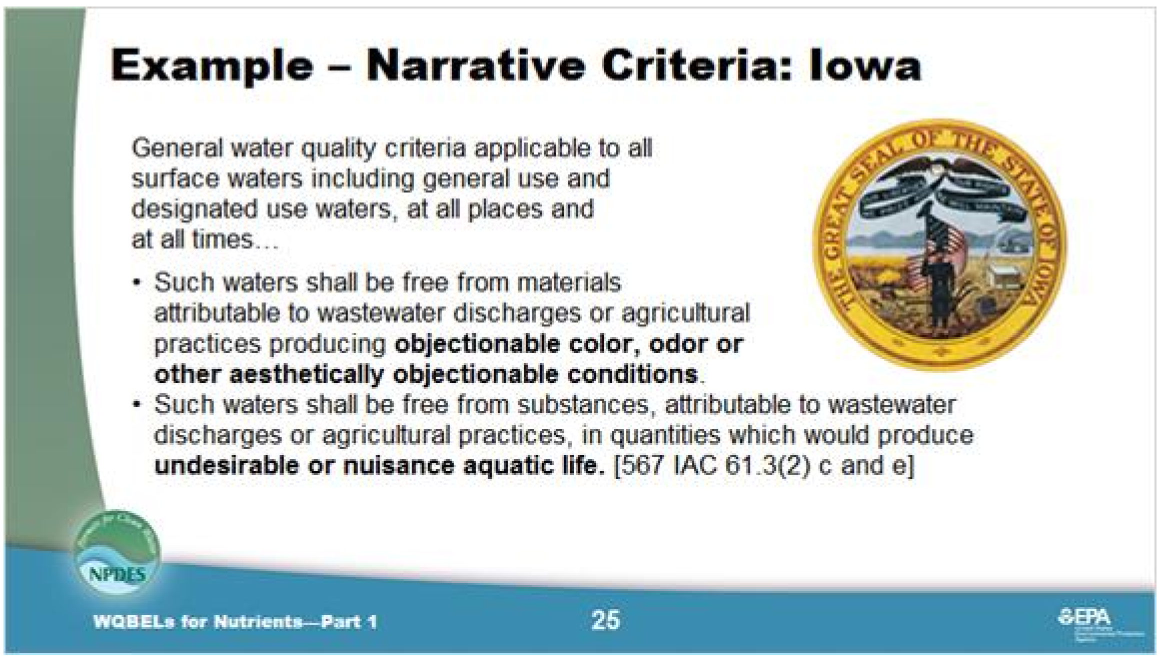
That brings us to our final type of criteria-narrative criteria. A number of states have not yet established numeric total nitrogen and total phosphorus criteria or response variable criteria. These states rely on narrative criteria as the basis for controlling nutrient pollution. States that do have numeric criteria applicable to specific water bodies or types of water bodies might also have narrative criteria that apply to all water bodies in the state.

Narrative criteria are descriptions of conditions necessary for the water body to attain its designated uses and could be expressed as prohibitions (for example, “discharges must not cause…”) or statements that waters shall be free from certain substances or conditions. State nutrient-related narrative criteria often are specifically aimed at preventing growth of nuisance algae.

40 CFR 122.44(d)(1)(i) makes it clear that narrative water quality criteria have the same force of law as other water quality criteria when it requires that NPDES permits include effluent limitations necessary to attain and maintain all applicable water quality criteria, including narrative criteria.

Let's look at some examples of narrative water quality criteria that are at varying levels of specificity, but all of which could be used as the basis for addressing nutrient pollution in NPDES permits.

1.32 Example – Narrative Criteria: Iowa



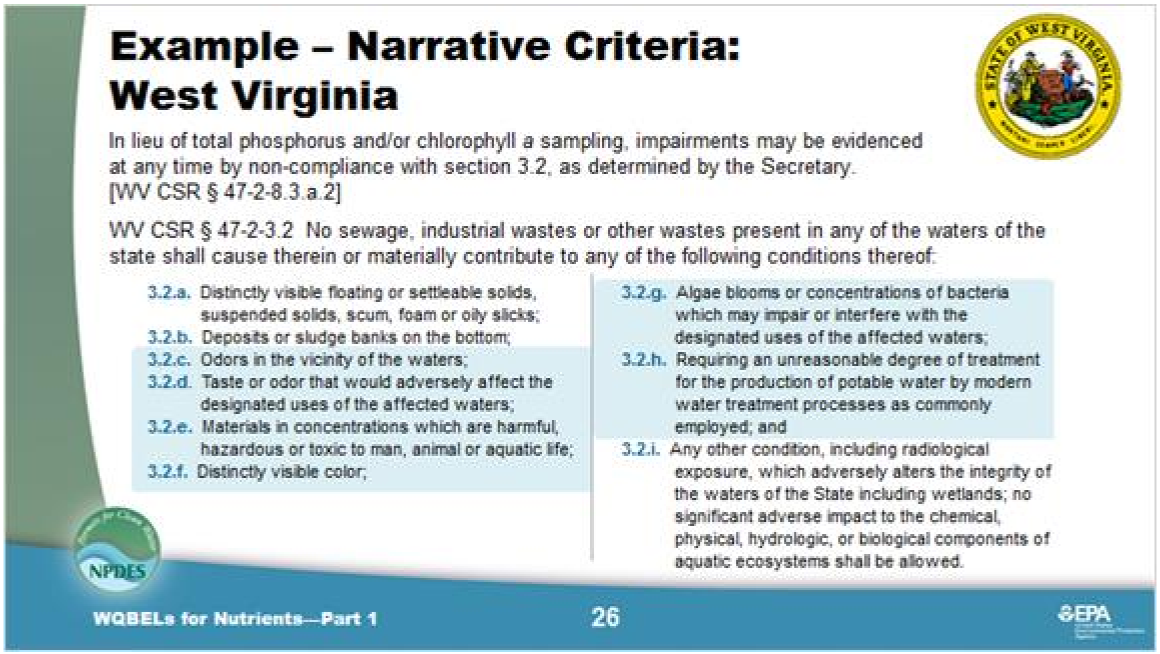
Notes:

Iowa's narrative criteria do not specifically mention nutrients.

They could be applied to nutrients, however, because objectionable color, odor or other aesthetically objectionable conditions, and undesirable or nuisance aquatic life are consequences of nutrient pollution.

When using narrative criteria in NPDES permitting calculations for total nitrogen and total phosphorus, we are going to need to interpret all three criteria components: magnitude, duration, and frequency. We will address some options for interpreting narrative criteria in later presentations.

1.33 Example – Narrative Criteria: West Virginia



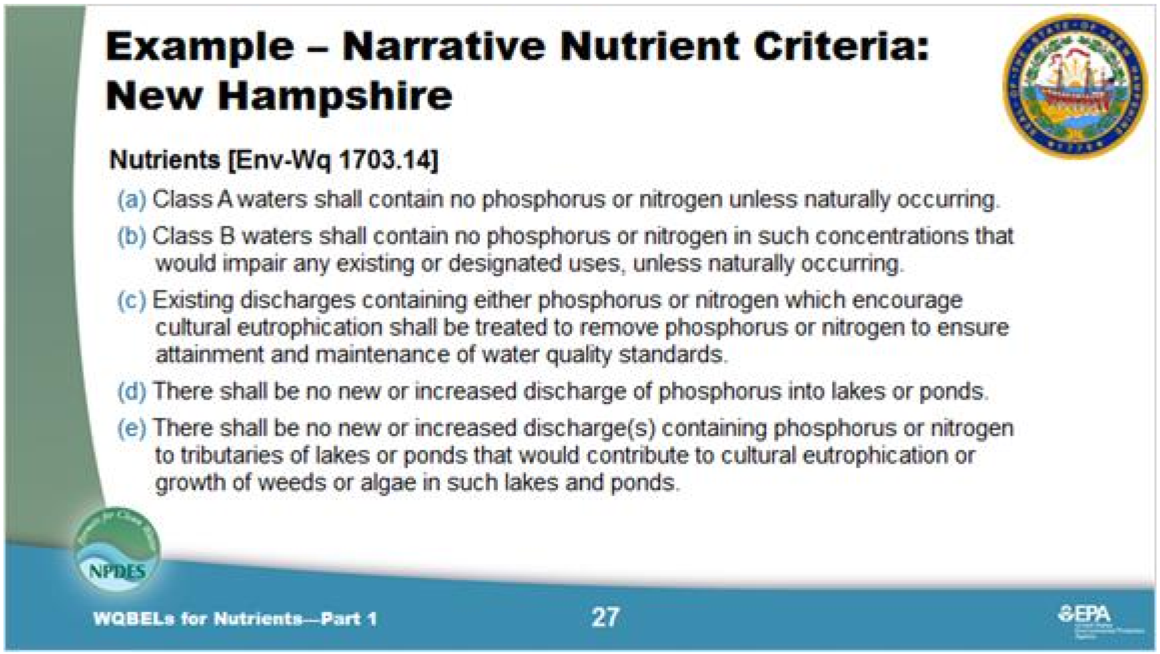
Notes:

Next, let’s take a look at West Virginia’s water quality standards one more time.

In the same section of the water quality regulations that includes West Virginia’s total phosphorus and chlorophyll a numeric criteria for lakes, there is the statement that, in lieu of total phosphorus and/or chlorophyll a sampling, impairments to a water body may be evidenced at any time based on the presence of conditions listed in the state’s narrative criteria.

Many of the criteria, listed on this slide, are known impacts of nutrient pollution.

1.34 Example – Narrative Nutrient Criteria: New Hampshire



Notes:

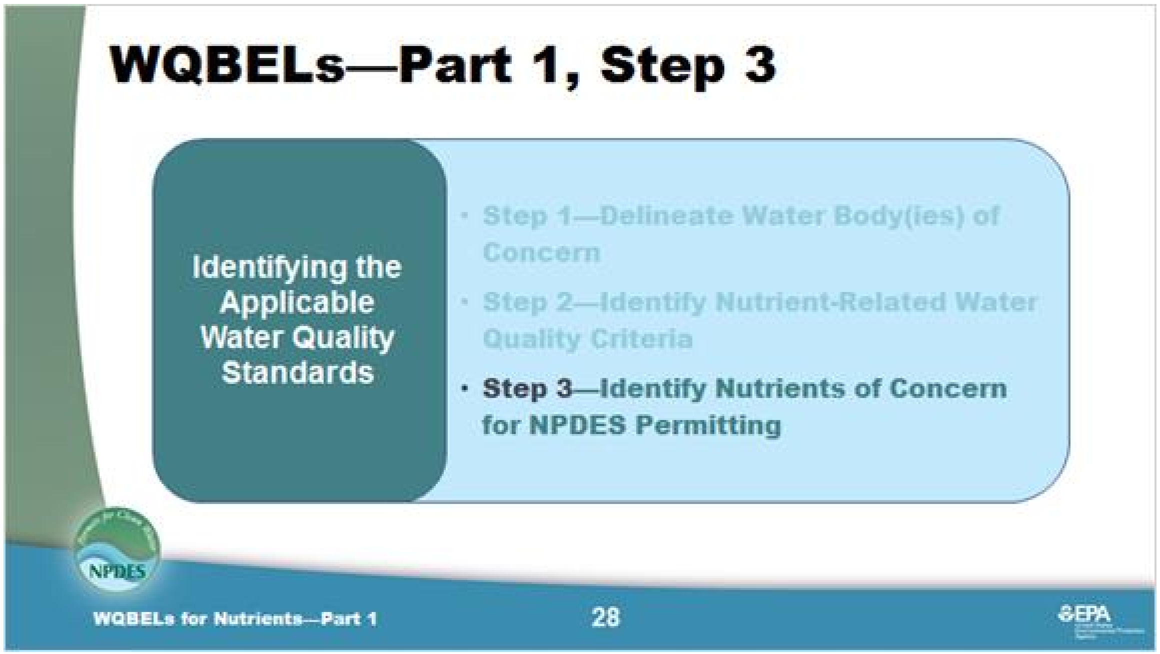
Our last narrative nutrient criterion example is from New Hampshire.

New Hampshire's narrative criterion gives permit writers clear direction regarding appropriate nutrient loadings without numeric criteria.

The standard addresses acceptable levels of nutrient loadings based on factors such as the water body type and whether the discharge is new or existing.

I'll now hand it over to Amelia.

1.35 WQBELs—Part 1, Step 3

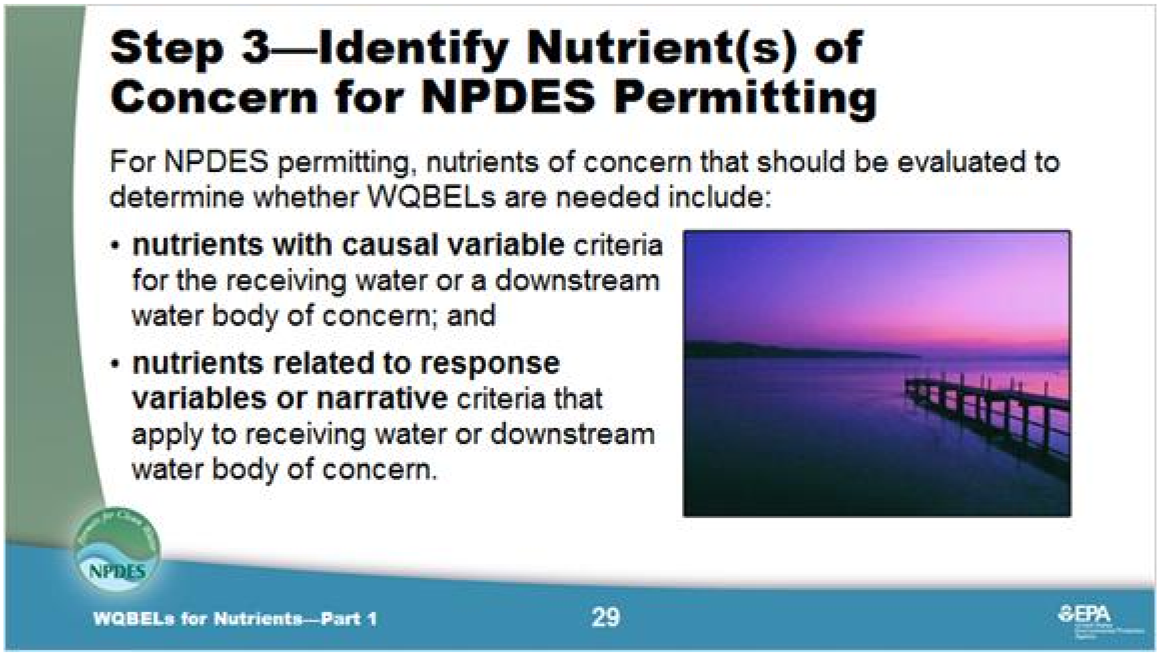


Notes:

Thanks Frank, and on to our final step in identifying the applicable water quality standards.

After identifying the nutrient-related water quality criteria for the receiving water and any downstream water bodies of concern, we are ready to move on to Step 3, specifically determining which nutrients we might need to address in the permit.

1.36 Step 3—Identify Nutrient(s) of Concern for NPDES Permitting

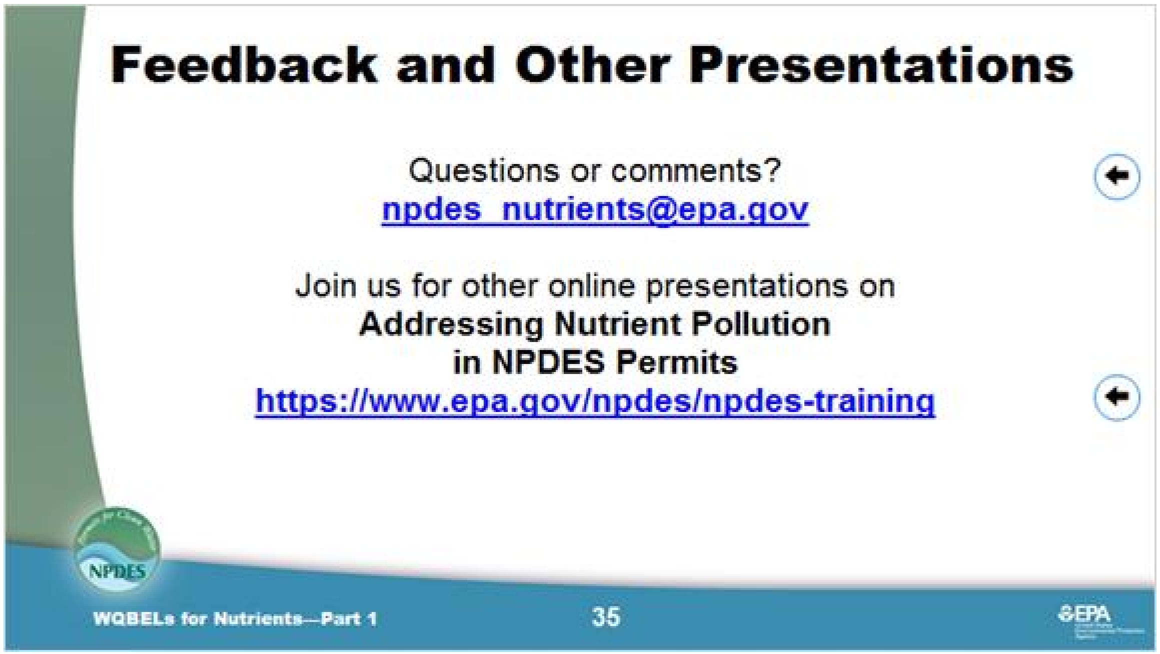


Notes:

Determining whether to develop effluent limitations and other permit conditions for phosphorus, nitrogen, or both nutrients depends on the applicable water quality criteria and, possibly, the conditions present in the receiving water and downstream water bodies of concern. If the water quality standards that apply to the receiving water or a downstream water body of concern include numeric criteria for a specific nutrient, then we should, at a minimum, further analyze the need for water quality-based effluent limitations for that nutrient.

If, however, the receiving water and downstream water bodies of concern have only criteria for response variables or narrative criteria, we will need to determine which nutrients are related to attainment of those criteria and, therefore, are potential candidates for water quality-based effluent limitations in the permit.

1.47 Feedback and Other Presentations



Notes:

Congratulations on completing the quiz and this presentation!

If you have questions or comments on this presentation or any part of this training curriculum, you can email npdes_nutrients@epa.gov.

Remember, you will find all NPDES online training presentations, under the "Training" section of USEPA's NPDES website.

Thanks again for joining us!