Overview of Effluent Limitations for Nutrients

1. Introduction Part 2: Overview of Effluent Limitations for Nutrients

1.1 Overview of Effluent Limitations for Nutrients

Notes:

Welcome to this presentation on addressing nutrient pollution in National Pollutant Discharge Elimination System, or NPDES, permits.

This is the second of two presentations providing an introduction to nutrients and the NPDES program. This presentation provides an overview of the types of effluent limitations for nutrients that we might find in an NPDES permit. This training is sponsored by the United States Environmental Protection Agency's Water Permits Division.

Before we get to the presentation, let's introduce our speakers and take care of a housekeeping item.

1.2 Presenters

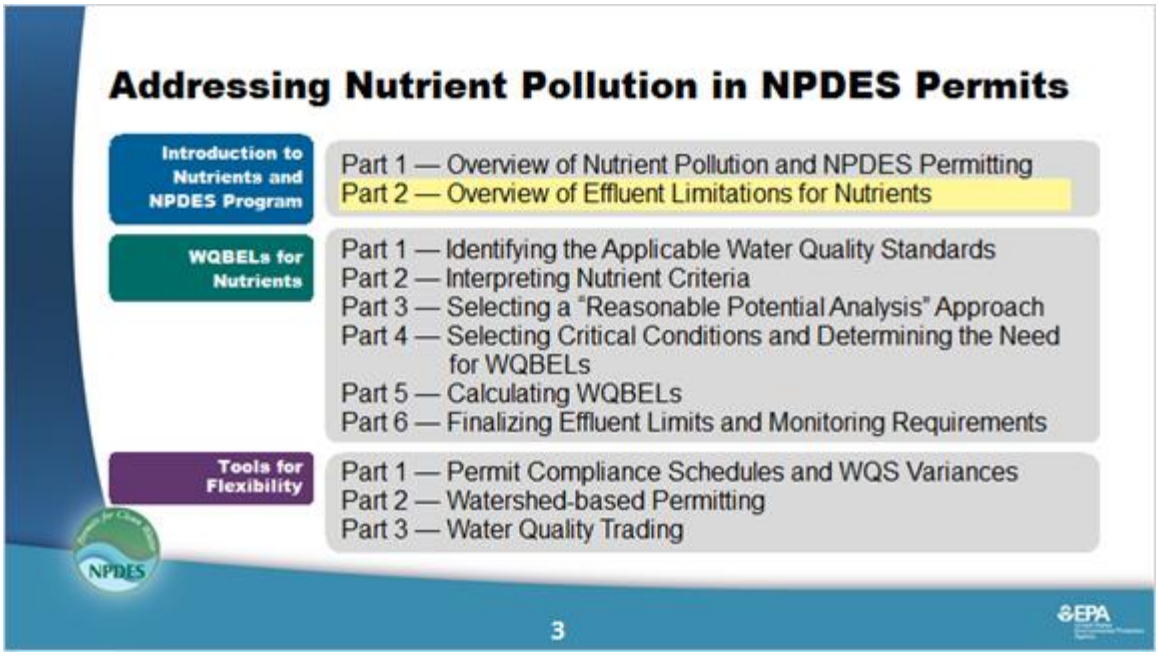
Notes:

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 turn it over to Amelia to start the presentation.

1.3 Addressing Nutrient Pollution in NPDES Permits

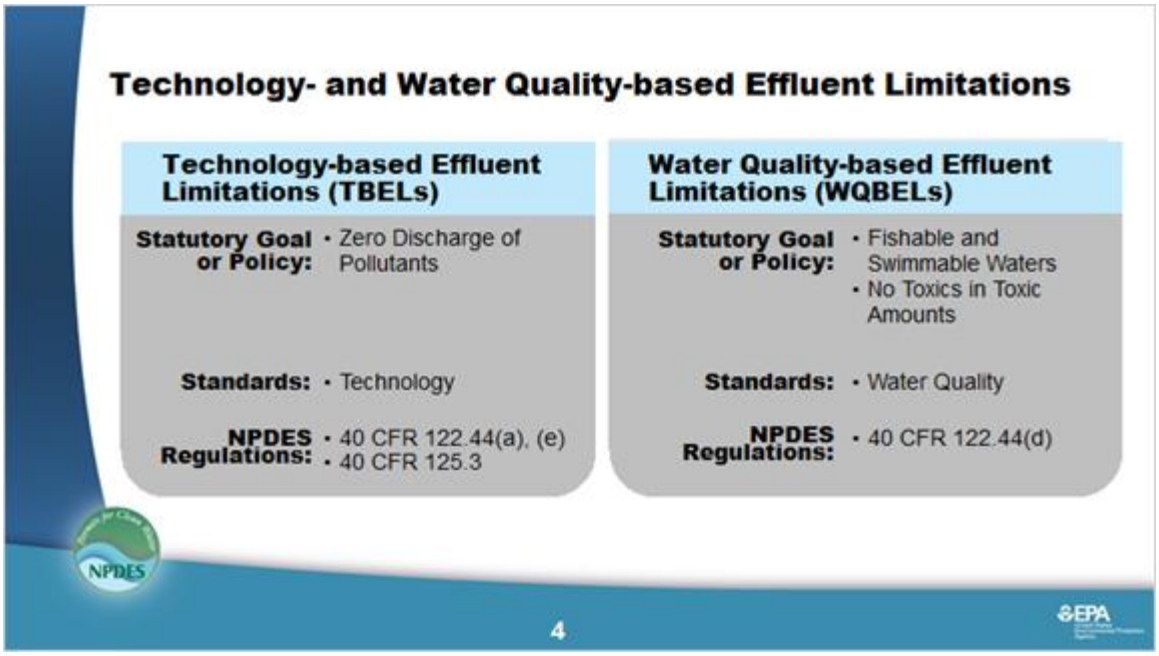


Notes:

This presentation is Part 2 of the introductory section of our training on nutrients and NPDES permits. Part 1 provided an overview of nutrient pollution and the NPDES program and, as mentioned, this part provides an overview of effluent limitations for nutrients in NPDES permits.

In the remaining sections of the training we will take a much more detailed look at the process for developing water quality-based effluent limitations for nutrients and at some tools for flexibility in permits and the permitting process.

1.4 Technology and Water Quality-based Effluent Limitations



Notes:

Let's start by considering the statutory and regulatory framework for establishing technology-based effluent limits in an NPDES permit.

Section 101(a) of the Clean Water Act states that the Act's objective is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." To achieve this objective, the Clean Water Act sets several national goals and policies.

One national goal is that the discharge of pollutants to navigable waters be eliminated by 1985.

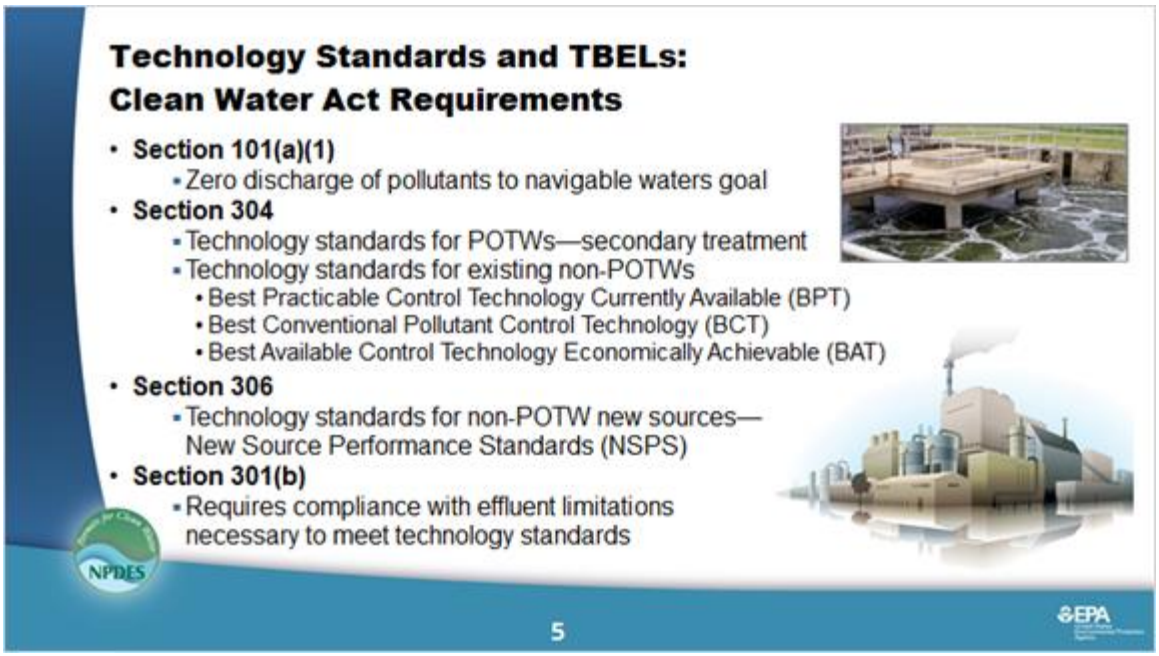
This goal underlies the Clean Water Act's requirements for developing technology standards for point source discharges. To meet the requirements of the Act, EPA has developed technology standards for publicly-owned treatment works, or POTWs, and for various categories of non-POTW facilities, generally industrial facilities. These standards correspond to the application of an identified technology to control pollutants, but do not require dischargers to install the identified technology. Rather, they require the facility to meet a performance standard based on what could be achieved with application of the technology.

The NPDES regulations at Title 40 of the Code of Federal Regulations, or CFR, Parts 122.44 and 125.3 require that permits include effluent limitations that implement these standards. We call

these limits “technology-based effluent limitations” or “TBELs.”

Let’s take a look at the Clean Water Act’s technology standards.

1.5 Technology Standards and TBELs: Clean Water Act Requirements



Notes:

To move toward attainment of the “zero discharge of pollutants” goal, the Clean Water Act establishes technology-based performance standards for various types of dischargers.

We need to distinguish between direct and indirect dischargers and new and existing sources in order to know which standards apply to a particular facility. In this training we’ll address only direct dischargers because these discharges are covered directly by an NPDES permit.

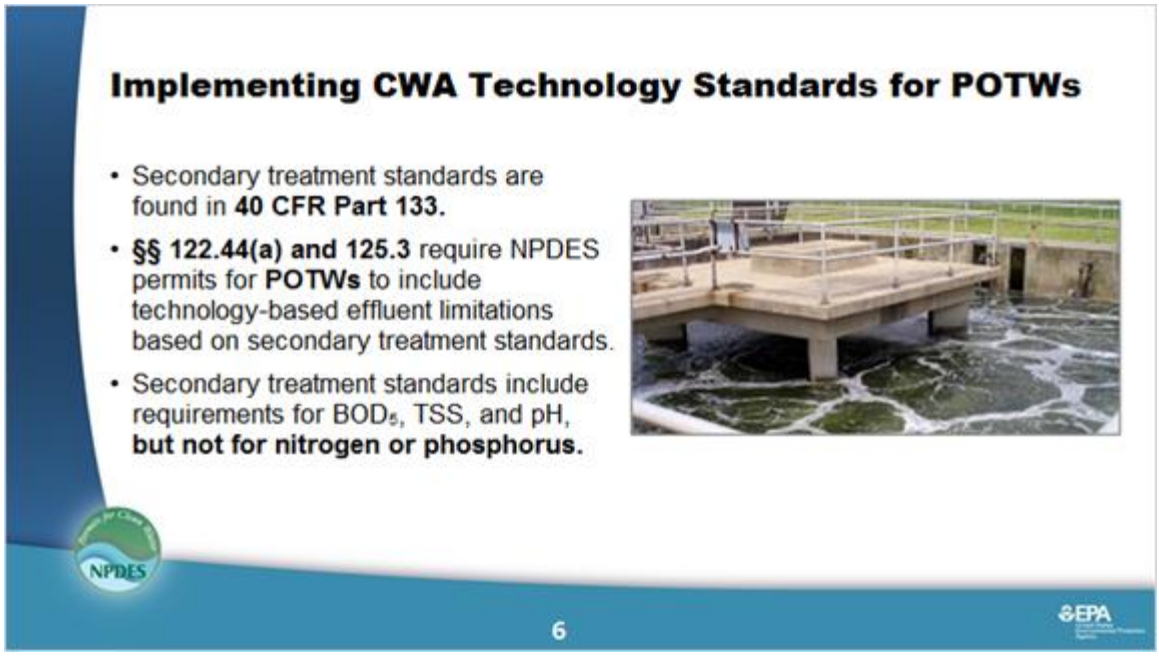
The technology-based performance requirements for direct dischargers are in Clean Water Act sections 304 and 306.

- The standards for POTWs are secondary treatment standards.
- The standards for existing non-POTWs are Best Practicable Control Technology Currently Available, Best Conventional Pollutant Control Technology, and Best Available Control Technology.

- The standards for new source non-POTWs are New Source Performance Standards.

Clean Water Act section 301(b) requires permits to include effluent limitations necessary to meet these technology standards.

1.6 Implementing CWA Technology Standards for POTWs



Notes:

As noted, the technology standards for POTWs are secondary treatment standards.

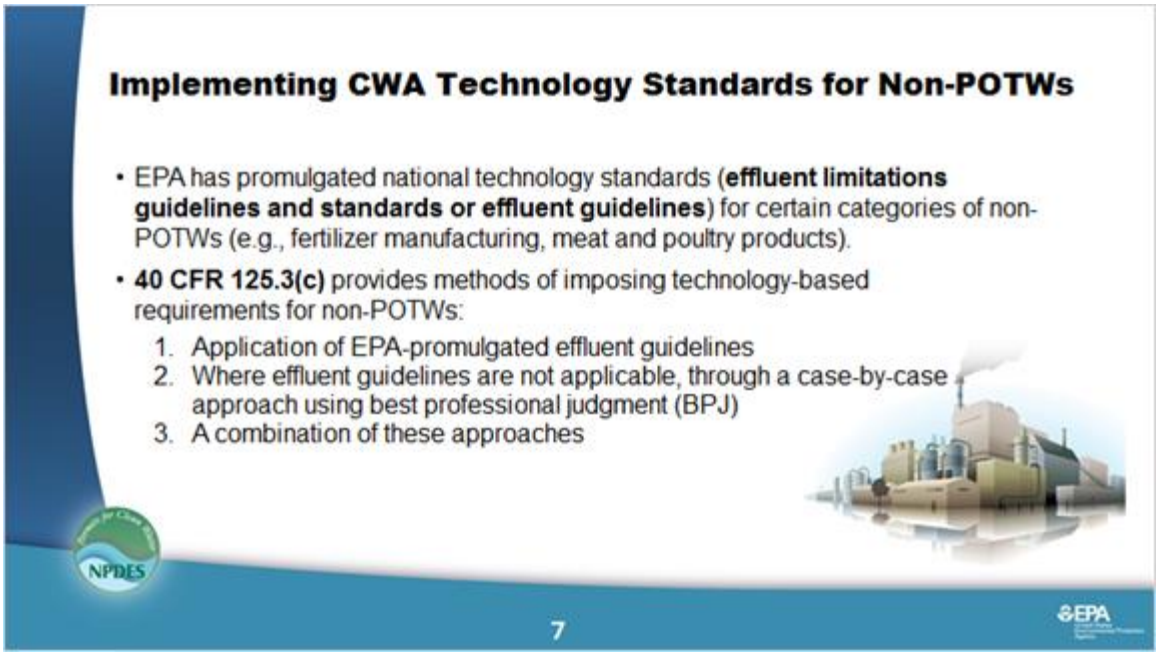
In response to the requirements of the Clean Water Act, EPA promulgated the secondary treatment standards in 40 CFR Part 133. Recall that 40 CFR 122.44(a) and 125.3 require NPDES permits for POTWs to include technology-based effluent limitations based on secondary treatment standards.

Secondary treatment standards include concentration requirements for five-day biochemical oxygen demand, or BOD, and total suspended solids, or TSS, percent removal requirements for BOD and TSS, and a required pH range.

Notice that secondary treatment standards **do not** include requirements for nutrients. Because there are no national technology-based standards for POTWs for nitrogen or phosphorus, NPDES permits for POTWs do not contain technology-based effluent limitations for nutrients

based on any Clean Water Act technology standards. Any effluent limitations for nutrients in NPDES permits for POTWs would be based on water quality standards or, in some cases, state performance standards.

1.7 Implementing CWA Technology Standards for Non-POTWs



Notes:

That's right, Amelia.

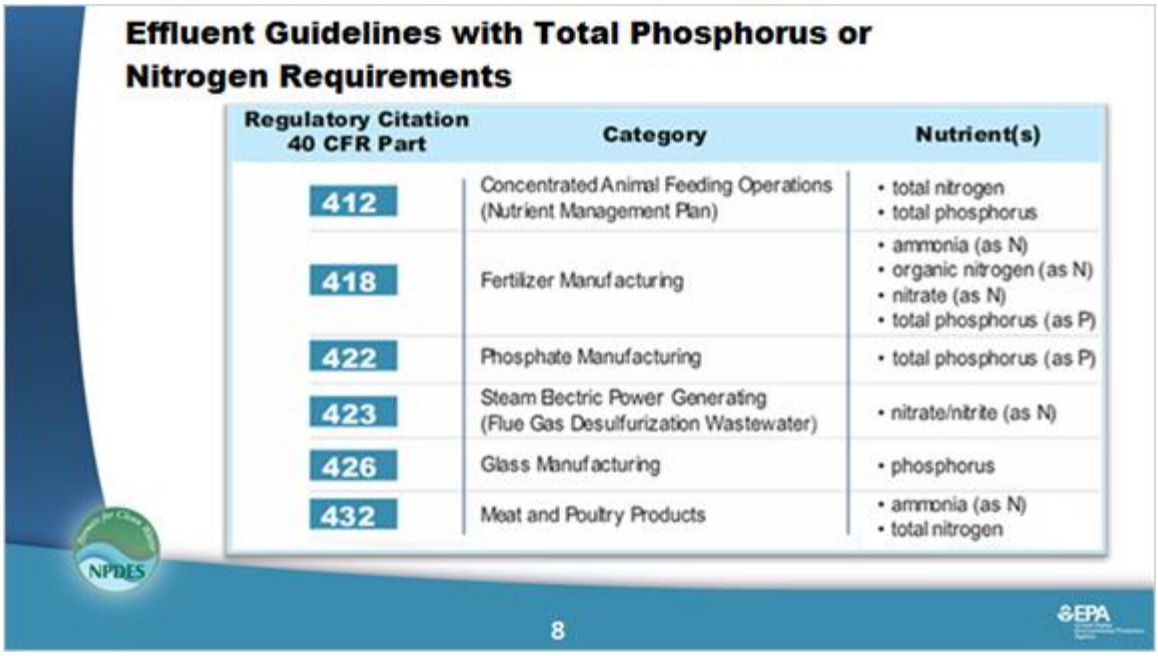
We can find technology standards for some non-POTWs in what are called "effluent limitations guidelines and standards" or "effluent guidelines" for short. Effluent guidelines are regulations promulgated by EPA that establish national technology-based standards of performance for various categories of non-POTWs. As you might imagine, however, EPA has not promulgated effluent guidelines for every category of facilities in the country.

Consequently, 40 CFR 125.3(c) describes three methods of imposing technology-based requirements for non-POTWs:

1. First, application of EPA-promulgated effluent guidelines where they exist.
2. Second, where there is no applicable effluent guideline, through a case-by-case approach, determining the appropriate technology standards for an individual facility using best professional judgment, or BPJ.

3. And third, where effluent guidelines might apply to only certain parts of a facility or certain pollutants discharged by a facility, through a combination of these approaches.

1.8 Effluent Guidelines with Total Phosphorus or Nitrogen Requirements

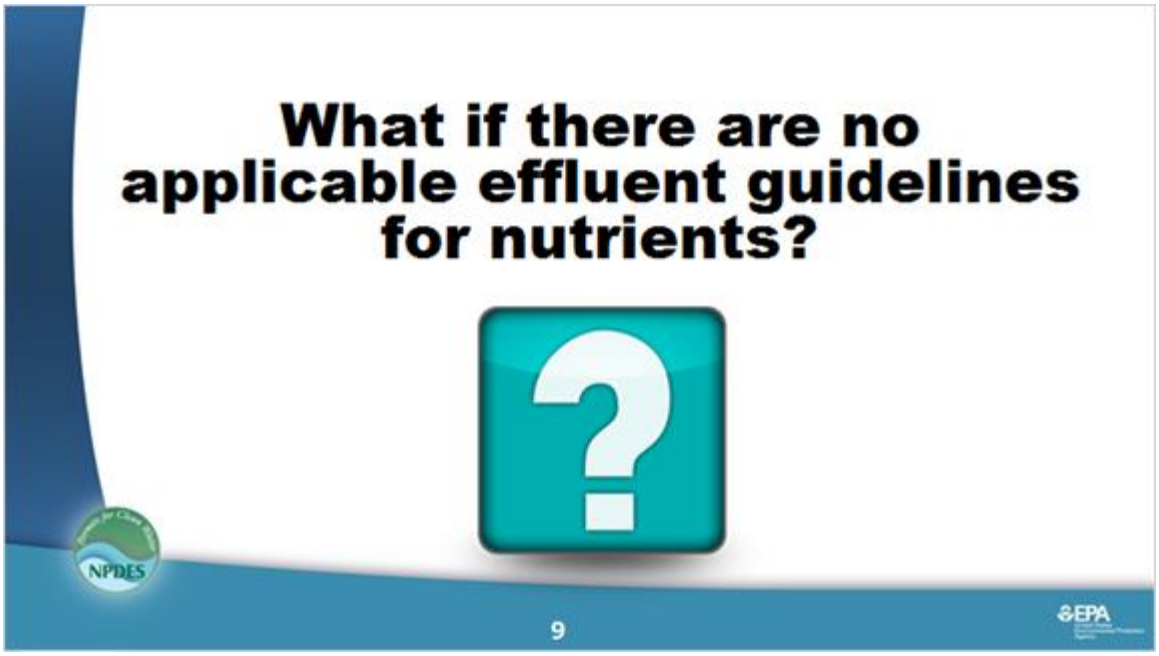


Notes:

Now, let's focus in on nutrients.

EPA has promulgated effluent guidelines for nearly 60 industrial categories. This slide shows the categories that include the requirements for total phosphorus, total nitrogen, or other forms of nitrogen. We have not included categories where the only requirements for any form of phosphorus or nitrogen are requirements for ammonia. As you can see, the list of categories with technology standards for nutrients is rather short.

1.9 What if there are no applicable effluent guidelines for nutrients?

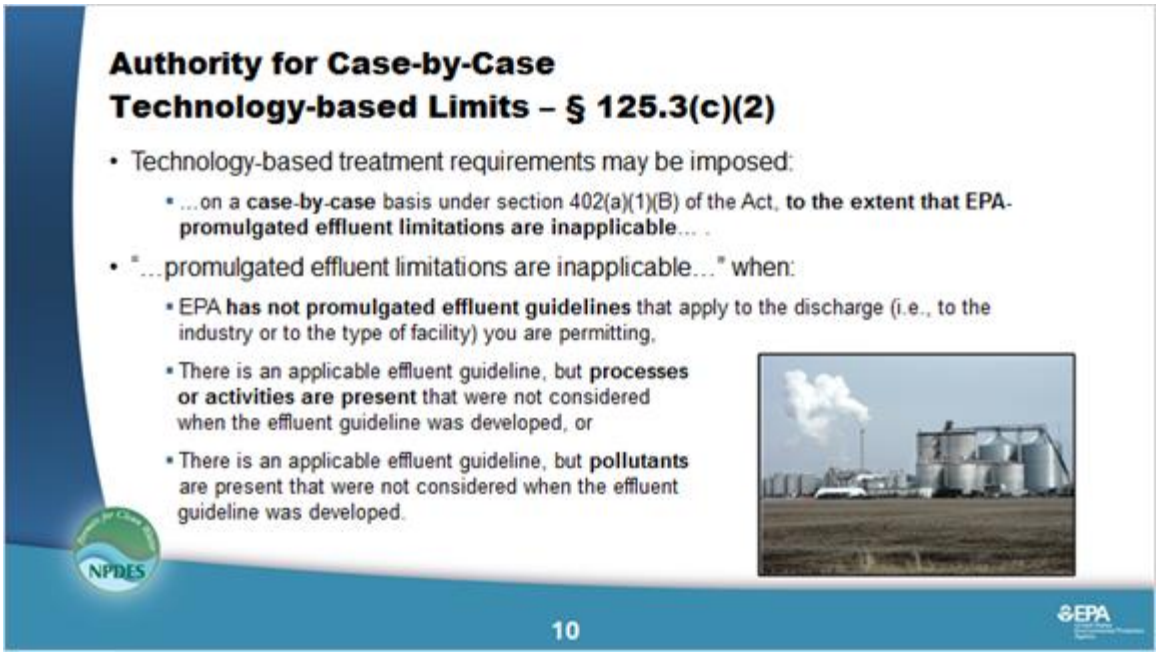


Notes:

But remember, if we are permitting the effluent from a non-POTW and phosphorus or nitrogen is present, but there are no effluent guidelines requirements that address nutrients, we could still develop technology-based limits for nutrients on a case-by-case basis.

Let's see how.

1.10 Authority for Case-by-Case Technology-based Limits – § 125.3(c)(2)



Notes:

The Clean Water Act and the NPDES regulations include provisions for developing case-by-case technology-based effluent limitations in situations where EPA's promulgated effluent guidelines are inapplicable.

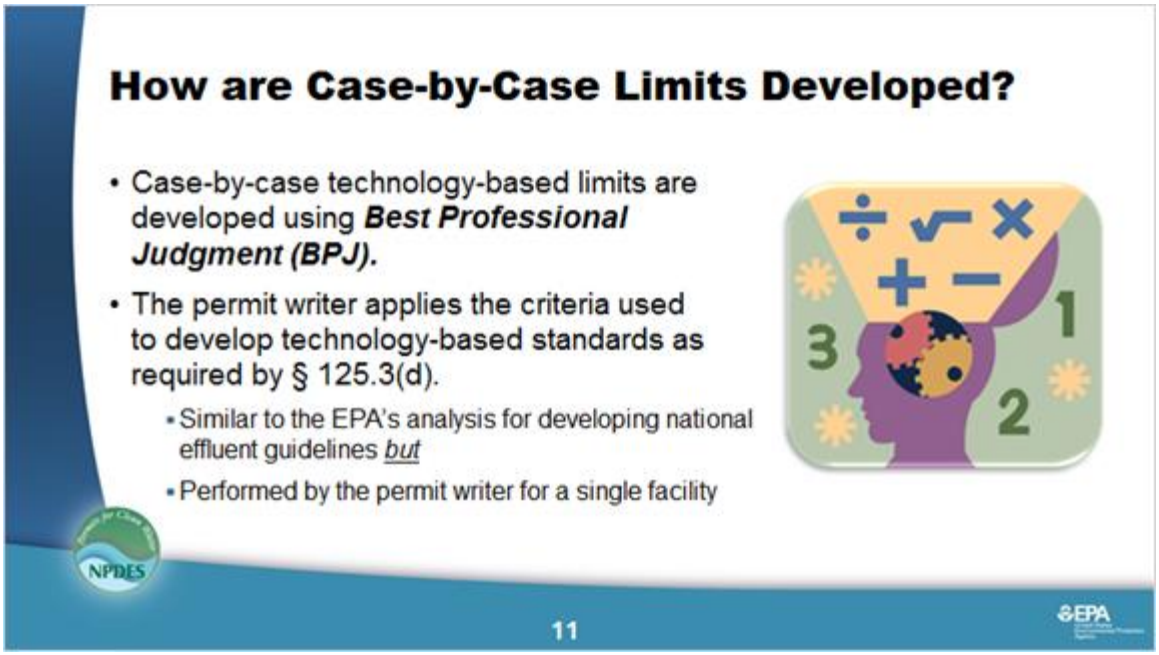
When are effluent guidelines inapplicable?

- When EPA has not promulgated effluent guidelines for the point source category or subcategory;
- When EPA did not consider the specific process or activity being regulated; or
- When EPA did not consider the specific pollutant of concern.

In any of these three situations, we can determine technology-based limits on a case-by-case basis.

We should note here that if EPA evaluated a particular process, activity, or pollutant when promulgating an effluent guideline but specifically determined that it would not include requirements for it in the effluent guidelines, under the federal regulations a permit writer cannot set more stringent technology-based requirements for that process, activity, or pollutant using a case-by-case approach.

1.11 How are Case-by-Case Limits Developed?



Notes:

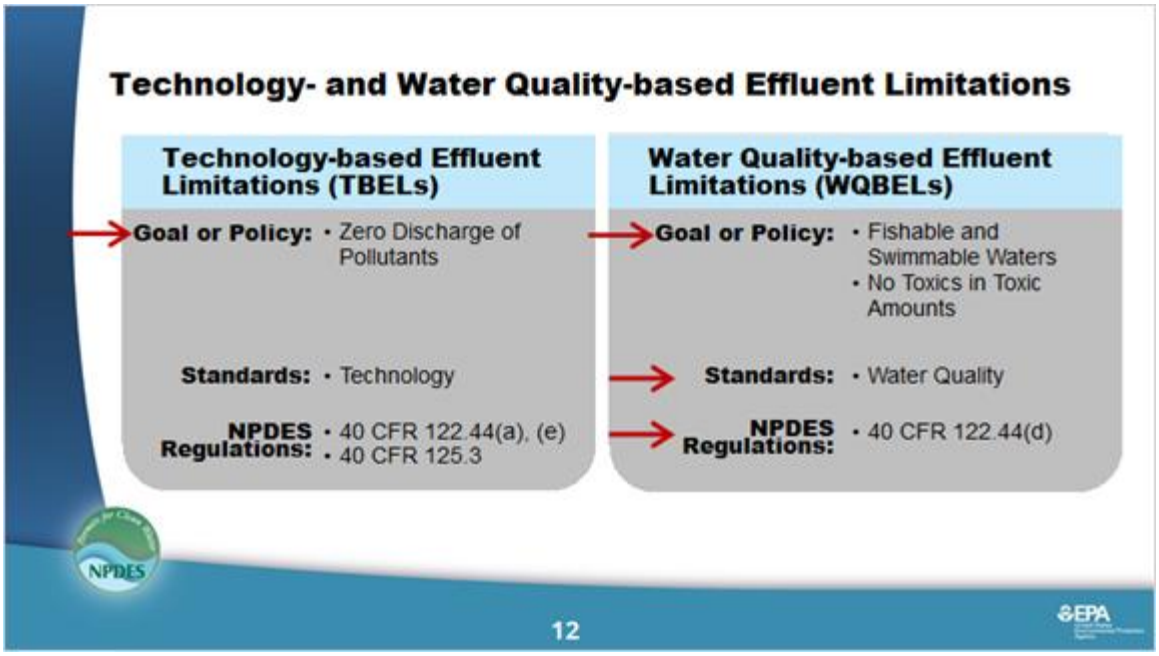
How are case-by-case limits developed? As we mentioned, case-by-case TBELs are developed using the permit writers' best professional judgment, or BPJ.

The regulations require that, in setting case-by-case limitations, permit writers must consider several specific factors established in 40 CFR 125.3(d) to select a model treatment technology and derive limitations on the basis of the expected performance of that treatment technology.

These factors are the same factors EPA considers when developing effluent guidelines for an entire industry category, but, for case-by-case limitations, they are applied to the individual facility. Section 5.2.3 of the *NPDES Permit Writers' Manual* provides more detail on considerations for determining performance standards on a case-by-case basis.

Because of the limited number of technology standards for nutrients, most effluent limitations for nutrients in NPDES permits are derived based on water quality standards. So, let's turn to a discussion of water quality-based effluent limitations.

1.12 NPDES Permits Implement CWA Standards



Notes:

Here is the same table we saw earlier in this presentation with a summary of the statutory and regulatory framework for establishing effluent limitations in an NPDES permit.

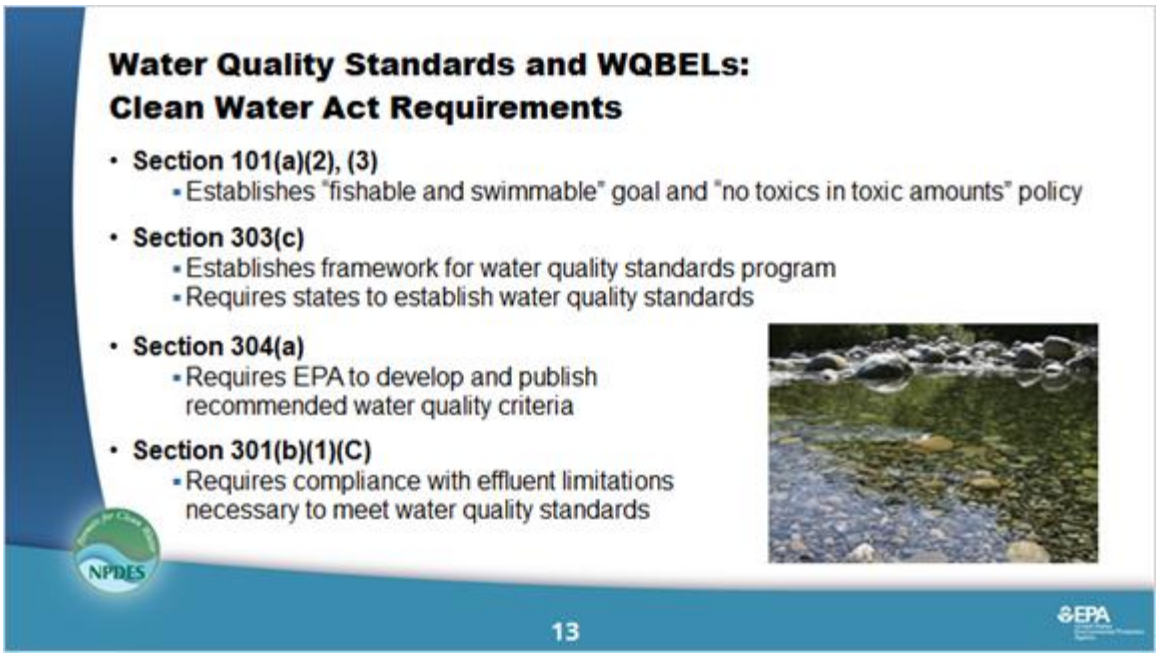
Up to this point, we have been discussing the national goal to eliminate the discharge of pollutants to navigable waters, which underlies the requirements for developing technology standards for point source discharges.

On the right-hand side of the table, we have another major goal and policy of the Clean Water Act. In addition to eliminating the discharge of pollutants to navigable waters, the Act sets an interim goal of achieving, wherever attainable, a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water. It also includes a national policy that prohibits the discharge of toxic pollutants in toxic amounts.

To meet this “fishable and swimmable” waters goal and “no toxics in toxic amounts” policy, the Act requires states to develop water quality standards for waters of the United States within their jurisdiction and the NPDES regulations at 40 CFR 122.44(d) require that permits include effluent limitations that are derived from and comply with water quality standards.

Let’s take a closer look at the Clean Water Act’s framework for water quality standards.

1.13 Water Quality Standards and WQBELs: Clean Water Act Requirements



Notes:

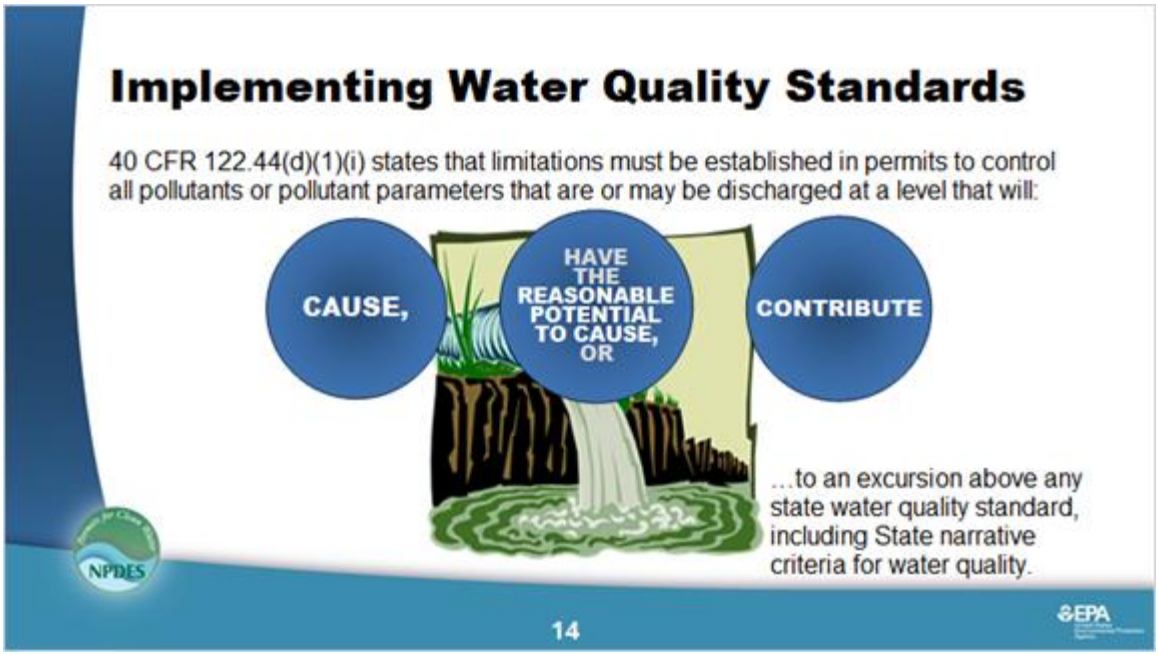
Sections 101(a)(2) and (3) establish the “fishable and swimmable” goal and the “no toxics in toxic amounts” policy that we just discussed.

Section 303(c) of the Clean Water Act establishes the statutory framework and requirements for the water quality standards program and requires that the states establish water quality standards.

Section 304(a) requires EPA to develop and publish water quality criteria to protect aquatic life, wildlife, and human health. States can use these national criteria in their water quality standards or develop their own.

Finally, section 301(b)(1)(C) requires effluent limits in NPDES permits that are necessary to implement water quality standards. We refer to these limits based on section 301(b)(1)(C) as water quality-based effluent limitations or WQBELs.

1.14 Implementing Water Quality Standards



Notes:

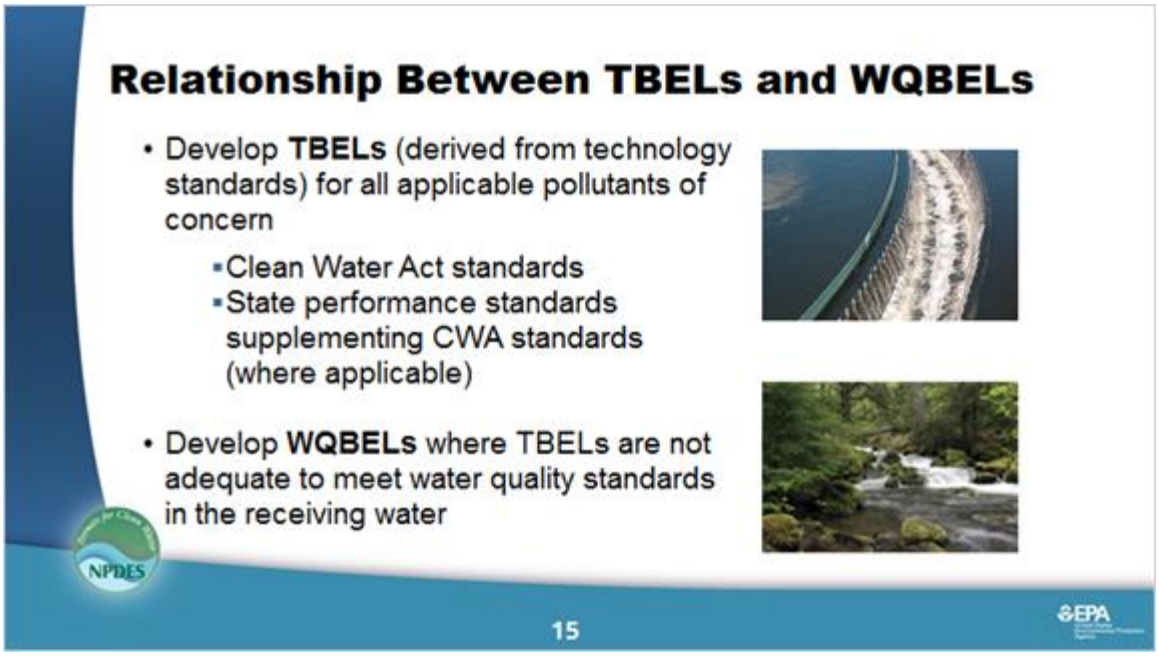
When are water quality-based effluent limitations necessary? How does a permit writer determine when water quality-based effluent limitations are needed in a permit? EPA has answered these questions in the federal regulations that govern the NPDES program.

EPA's regulations state: "Limitations must be established in permits to 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 of the wording of this regulation, EPA, and many authorized NPDES states, refer to the process that a permit writer would use to determine whether water quality-based effluent limits are needed as the "reasonable potential analysis."

The six presentations that make up the section of this training on WQBELs for nutrients provide more detailed information on issues to consider when conducting a reasonable potential analysis for nutrients and when calculating water quality-based effluent limitations for nutrients.

1.15 Relationship Between TBELs and WQBELs



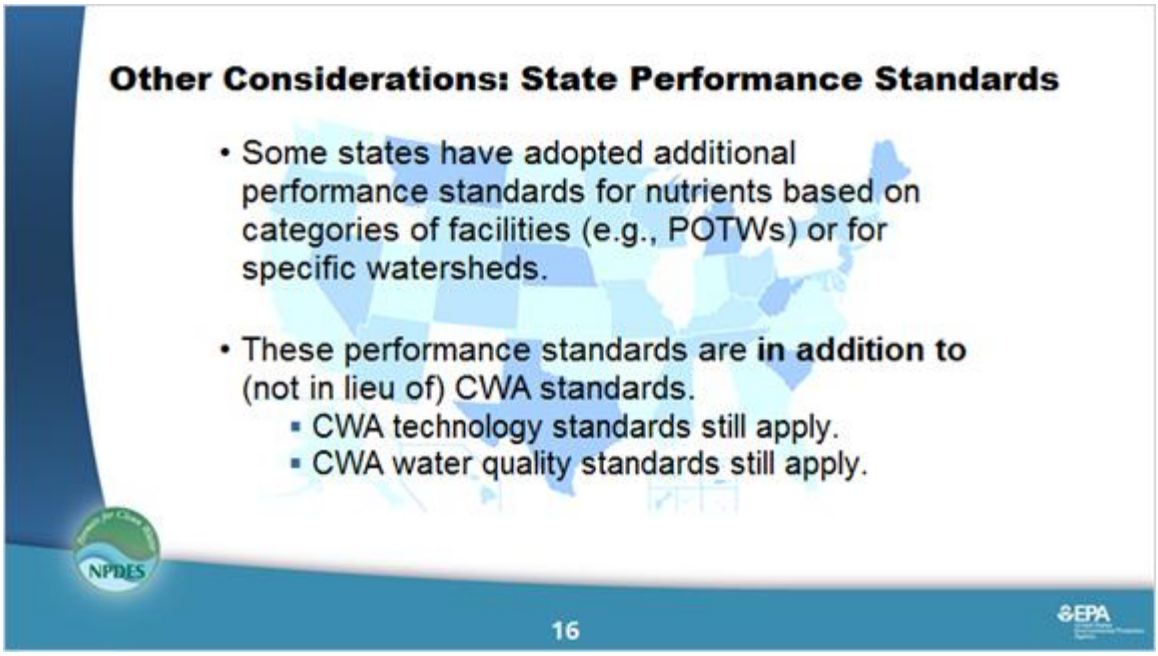
Notes:

Now that we have discussed the basis for technology-based and water quality-based effluent limitations, let's look at the relationship between them.

First, a permit writer develops technology-based effluent limitations derived from applicable Clean Water Act technology standards.

Where technology-based effluent limitations are not adequate to ensure that water quality standards are attained in the receiving water, the permit writer must develop water quality-based effluent limitations that derive from and comply with applicable water quality standards.

1.16 Other Considerations: State Performance Standards



Notes:

But wait! There's more!

We have considered Clean Water Act technology standards and water quality standards as well as effluent limitations based on these standards. Before we close out this presentation, let's consider another type of standard that, in some states, might be the basis for effluent limits for nutrients.

States have the ability to develop requirements in addition to or that go beyond the Clean Water Act standards. Some states have adopted performance standards for nutrients that apply to certain categories or classes of facilities, for example POTWs, or that apply to facilities in specific watersheds, such as for facilities discharging to water bodies that are tributaries to a lake.

These state performance standards for nutrients are similar to and supplement the minimum technology-based requirements of the Clean Water Act. They often are associated with protection of specific water bodies or types of water bodies; yet, they are separate from the state's water quality standards. Implementing state performance standards is in addition to implementing Clean Water Act technology standards and water quality standards and does not take the place of implementing the Clean Water Act standards. Implementation of state

performance standards is based on state law and policy.

1.17 Wisconsin Example

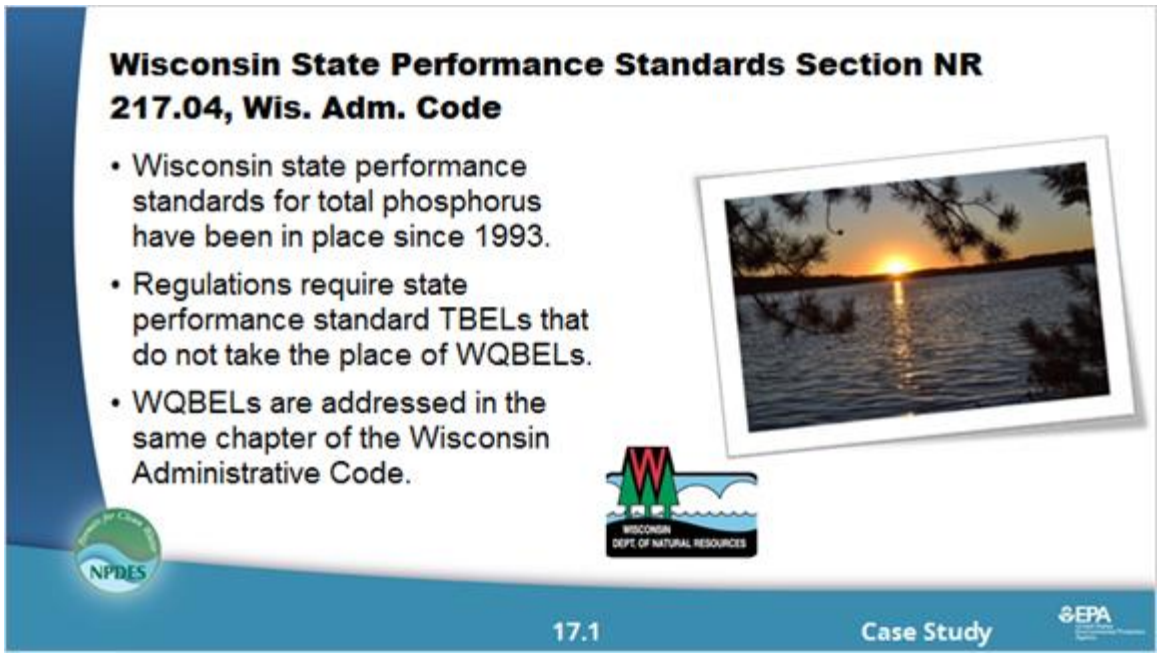
Notes:

This training does not provide guidance on developing or implementing state performance standards; however, we have provided an example of the performance standards for phosphorus established by Wisconsin Department of Natural Resources.

If you would like to view a case study about these standards, continue to the next slide.

Otherwise, skip to Slide 22.

1.18 Wisconsin State Performance Standards Section NR 217.04, Wis. Adm. Code



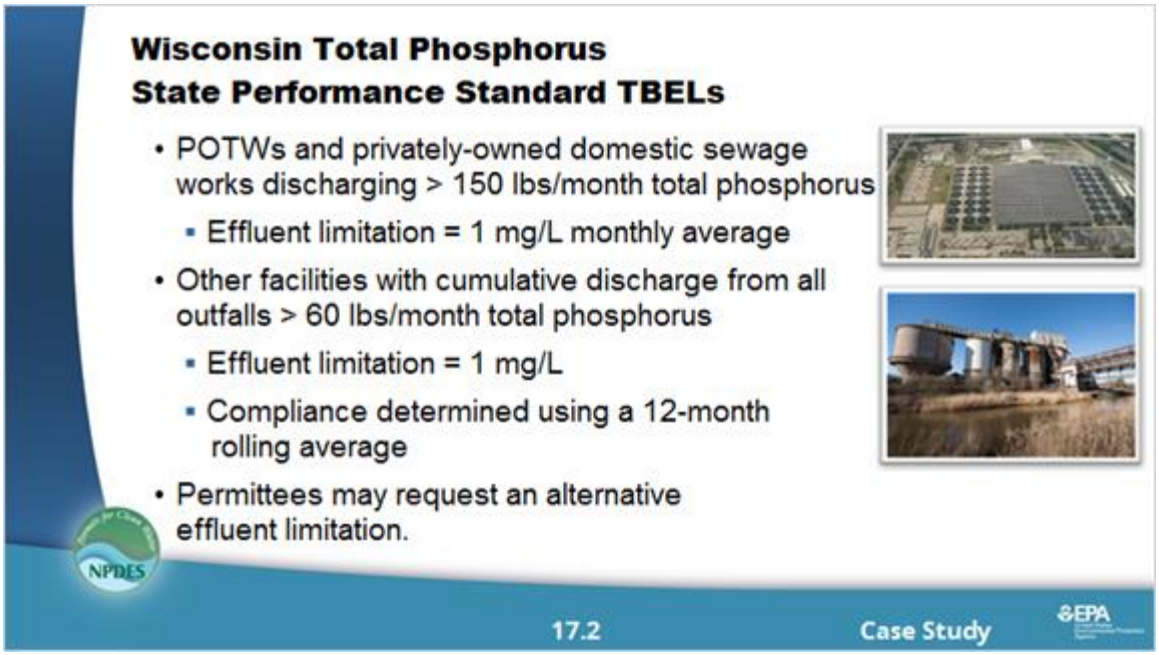
Notes:

In 1993, Wisconsin developed performance standards for total phosphorus that serve as the basis for setting state technology-based effluent limits under Wisconsin law. Unlike the TBELs we have been discussing thus far in the presentation, these TBELs are not based on Clean Water Act technology standards but on independent state authority.

These state TBELs were an initial step that Wisconsin took to address nutrient pollution. They do not replace water quality-based effluent limits where such limits are needed.

In fact, water quality-based effluent limitations are addressed in the same chapter of the Wisconsin Administrative Code where the state performance standards are found.

1.19 Wisconsin Total Phosphorus State Performance Standard TBELs



Notes:

Wisconsin's performance standards for POTWs and privately-owned domestic sewage works are slightly different from the standards for other types of facilities.

For POTWs and privately-owned sewage works, the total phosphorus performance standard is 1 mg/L as a monthly average for facilities discharging more than 150 pounds per month of total phosphorus. The monthly average is applied as a calendar month average.

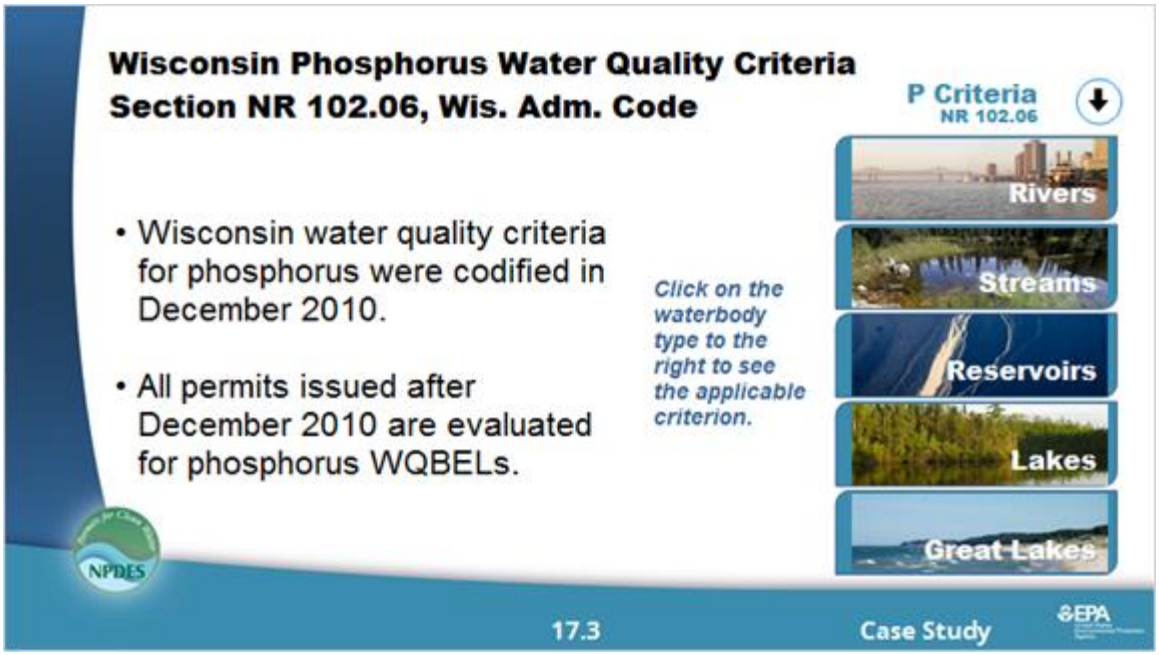
For other facilities, the standard is 1 mg/L with compliance measured using a 12-month rolling average rather than a calendar month average. This standard applies where the cumulative discharge of total phosphorus from all outfalls exceeds 60 pounds per month.

The regulations provide an opportunity for permittees to request and demonstrate the need for an alternative effluent limitation in certain cases. These cases include where:

- The 1 mg/L limit is not practically achievable;
- Operation of specific technologies achieve an equivalent performance;
- Addition of phosphorus is necessary to assure efficient operation and compliance with other effluent limitations; or
- Achieving the performance standard would not result in environmentally significant

improvement and progress toward water quality standards attainment.

1.20 Wisconsin Phosphorus Water Quality Criteria



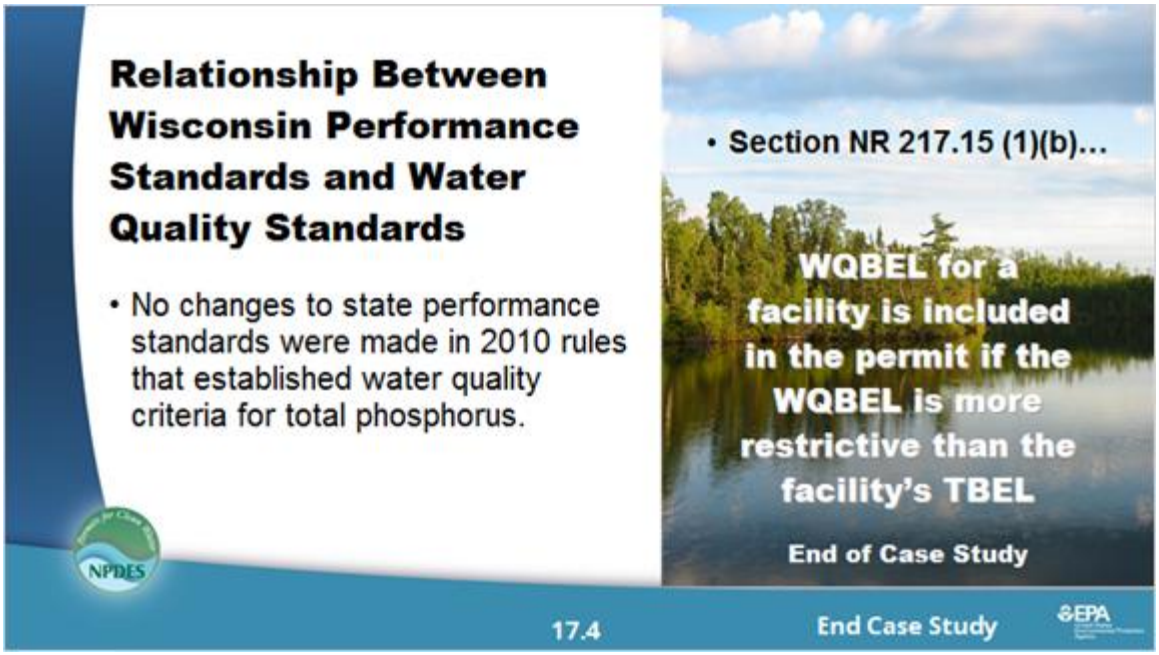
Notes:

In December 2010, Wisconsin also established numeric water quality criteria for total phosphorus.

At the same time, the state promulgated regulations addressing how to determine the need for water quality-based effluent limitations for total phosphorus and how to calculate such limits.

To implement these regulations, any permit issued by the Wisconsin Department of Natural Resources after December 2010 required an evaluation of the need for water quality-based effluent limits for phosphorus.

1.21 Relationship Between Wisconsin Performance Standards and Water Quality Standards



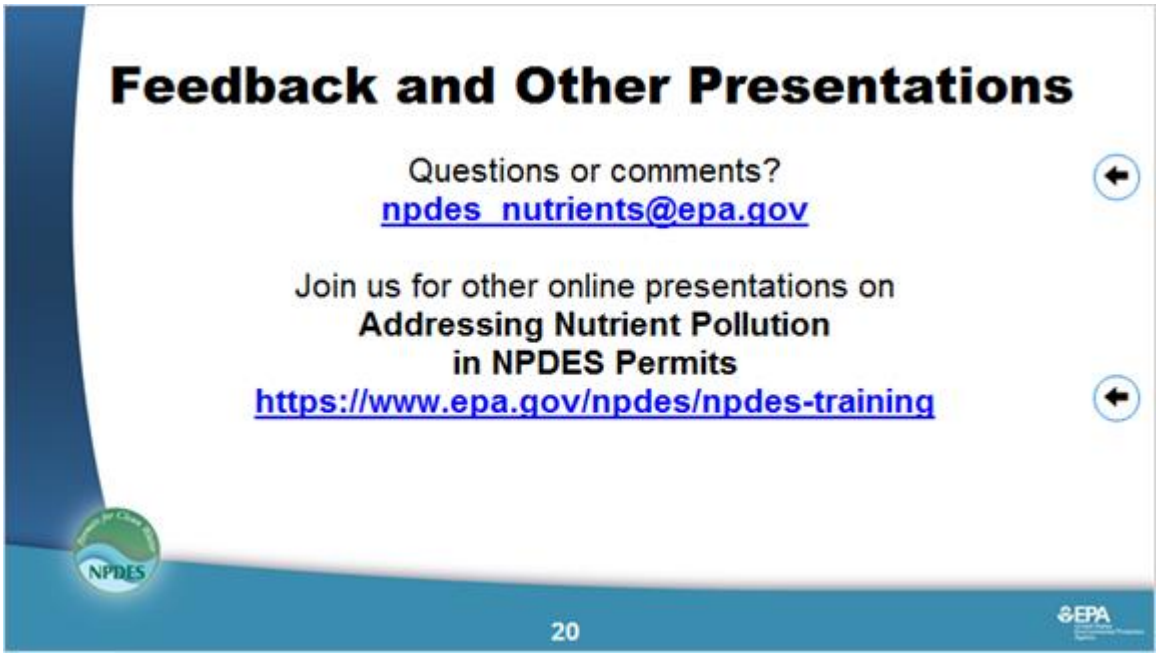
Notes:

When Wisconsin adopted water quality criteria for phosphorus in 2010, the state left the phosphorus performance standards in place with no changes.

Again, the regulations governing effluent limits for total phosphorus specifically state, "If a permittee has a technology-based phosphorus limitation in a permit that is less restrictive than a water quality-based effluent limitation for phosphorus…then the department shall include the water quality-based effluent limitation in the permit."

In this way, the state's total phosphorus performance standards supplement, but do not replace, implementation of Clean Water Act requirements in Wisconsin's NPDES permits.

1.30 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!