



Water quality standards

What they are, how they work, and why they matter

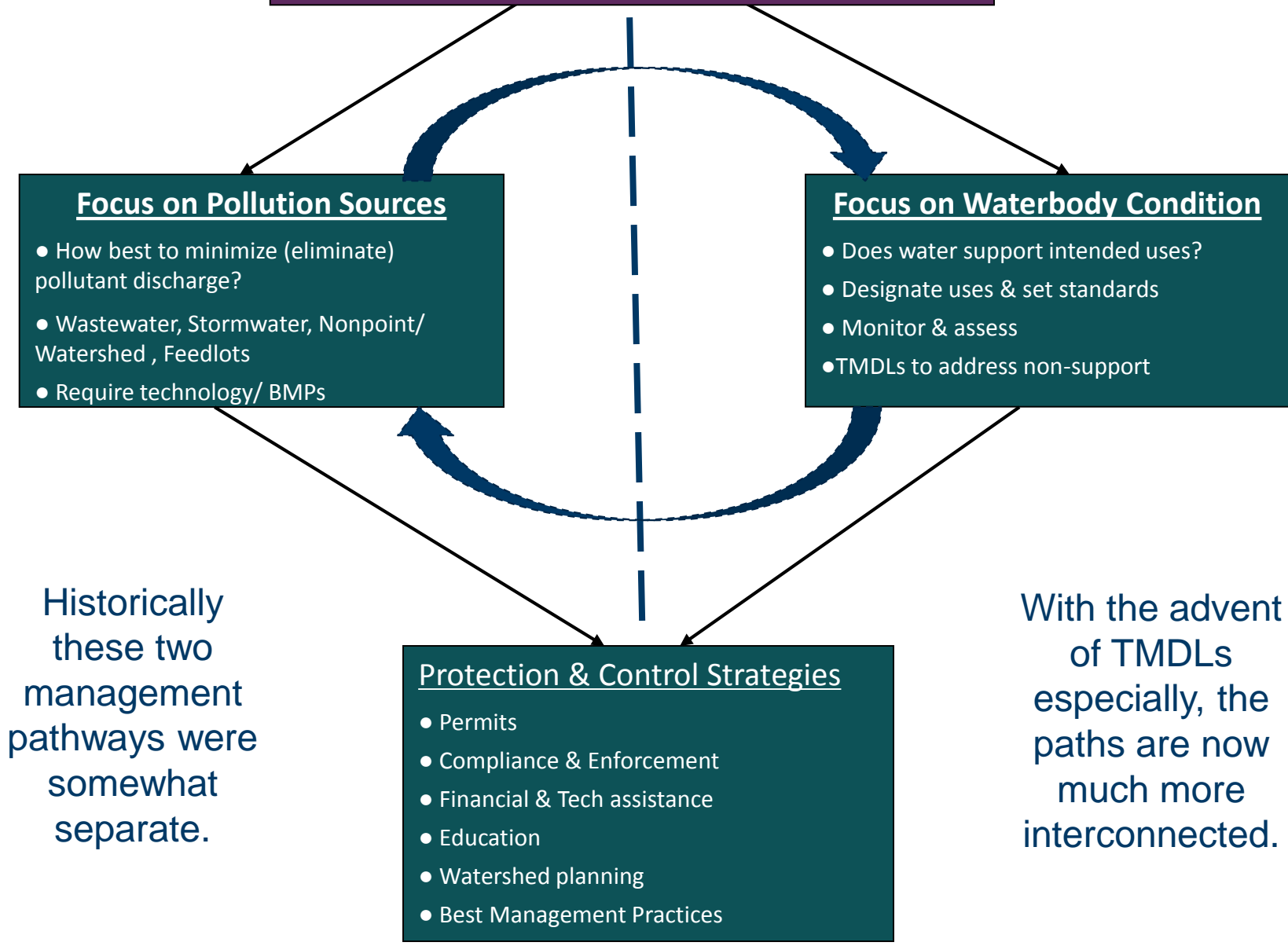
What we'll cover

1. Statutory framework
2. What is a water quality standard?
3. How are standards developed?
4. How are standards used?
5. MN water quality standards: past and future



Federal Clean Water Act

Two pathways to clean water:



Focus on Pollution Sources

- How best to minimize (eliminate) pollutant discharge?
- Wastewater, Stormwater, Nonpoint/ Watershed , Feedlots
- Require technology/ BMPs

Focus on Waterbody Condition

- Does water support intended uses?
- Designate uses & set standards
- Monitor & assess
- TMDLs to address non-support

Protection & Control Strategies

- Permits
- Compliance & Enforcement
- Financial & Tech assistance
- Education
- Watershed planning
- Best Management Practices

Historically these two management pathways were somewhat separate.

With the advent of TMDLs especially, the paths are now much more interconnected.

Federal law and regulations

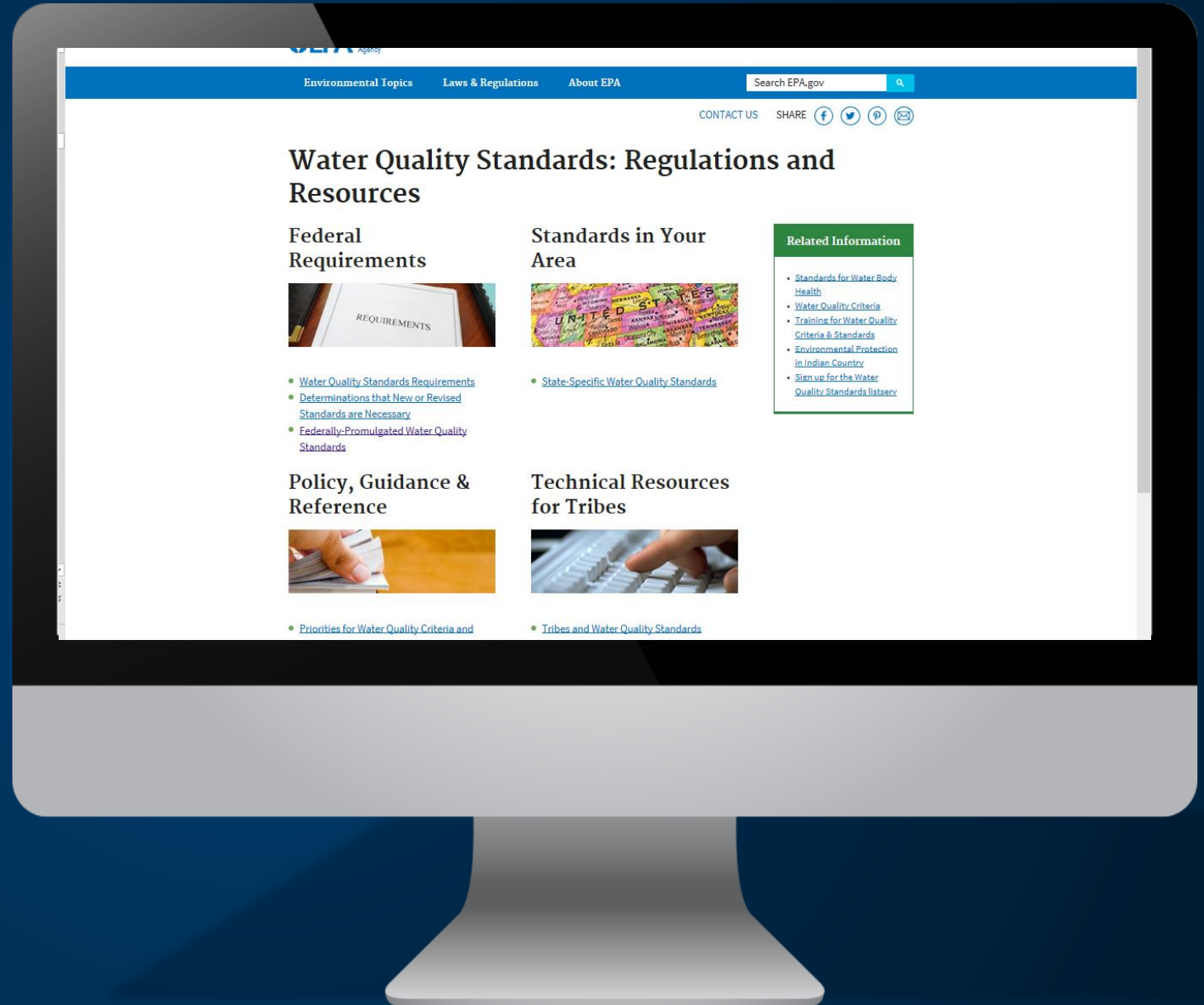
Federal Clean Water Act (CWA) provides the framework, oversight, and guidance

- Section 303(c) requires states to adopt and EPA to review and approve or disapprove
- Section 304(a) requires EPA to develop criteria for ambient water quality that accurately reflect the latest scientific knowledge on the impacts of pollutants on human health and the environment.
- EPA's water quality standards regulation: 40 CFR Part 131



Federal role in practice


- Federal Environmental Protection Agency (EPA) develops recommended criteria and guidance...



...but these documents are not enforceable standards.

Adopting standards is up to the state. Unless a state fails to act, and then it's up to EPA.

“These criteria are not rules, nor do they automatically become part of a state’s water quality standards. States may adopt the criteria that EPA publishes, modify EPA’s criteria to reflect site-specific conditions, or adopt different criteria based on other scientifically-defensible methods.”

 United States Environmental Protection Agency

Office of Water
EPA 820-F-15-001
June 2015

Human Health Ambient Water Quality Criteria: 2015 Update

Summary

EPA published final updated ambient water quality criteria for the protection of human health for 94 chemical pollutants. These updated recommendations reflect the latest scientific information and EPA policies, including updated body weight, drinking water consumption rate, fish consumption rate, bioaccumulation factors, health toxicity values, and relative source contributions. EPA accepted written scientific views from the public from May to August 2014 on the draft updated human health criteria and has published responses to those comments. EPA water quality criteria serve as recommendations to states and tribes authorized to establish water quality standards under the Clean Water Act.

Background

Ambient water quality criteria developed by EPA under Clean Water Act section 304(a) represent specific levels of chemicals or conditions in a water body that are not expected to cause adverse effects to human health. EPA is required to develop and publish water quality criteria that reflect the latest scientific knowledge. These criteria are not rules, nor do they automatically become part of a state’s water quality standards. States may adopt the criteria that EPA publishes, modify EPA’s criteria to reflect site-specific conditions, or adopt different criteria based on other scientifically-defensible methods. EPA must, however, approve any new water quality standards adopted by a state before they can be used for Clean Water Act purposes.

In this 2015 update, EPA revised 94 of the existing human health criteria to reflect the latest scientific information, including updated exposure factors (body weight, drinking water consumption rates, fish consumption rate), bioaccumulation factors, and toxicity factors (reference dose, cancer slope factor). The criteria have also been updated to follow the current EPA methodology for deriving human health criteria (USEPA 2000). EPA also developed chemical-specific science documents for each of the 94 chemical pollutants. The science documents detail the latest scientific information supporting the updated final human health criteria, particularly the updated toxicity and exposure input values. Specific updates are described below.

Due to outstanding technical issues, EPA did not update human health criteria for the following chemical pollutants at this time: antimony, arsenic, asbestos, barium, beryllium, cadmium, chromium (III or VI), copper, manganese, methylmercury, nickel, nitrates, nitrosamines, N-nitrosodibutylamine, N-nitrosodiethylamine, N-nitrosopyrrolidine, N-nitrosodimethylamine, N-nitrosodi-n-propylamine, N-nitrosodiphenylamine, polychlorinated biphenyls (PCBs), selenium, thallium, zinc, or 2,3,7,8-TCDD (dioxin).

It is important for states and authorized tribes to consider any new or updated section 304(a) criteria as part of their triennial review to ensure that state or tribal water quality standards reflect current science and protect applicable designated uses. EPA recently proposed revisions to its water quality

- To fulfill Section 304(a) obligations, EPA develops criteria and guidance
 - Criteria = numeric thresholds
 - Guidance = considerations/procedures for developing a standard
 - Both require state-specific adjustments
 - Translating guidance into standards is more work for states. It's also becoming more common.
- Other federal actions on standards
 - Approval/disapproval of state standard
 - Federal funding
 - Permit program delegation
 - Permit program oversight

State role under Clean Water Act

- Review, revise, and adopt water quality standards and submit them to EPA
- Review at least every three years, with public input
- Additional requirements for Great Lakes states



Minnesota statutes and rules

- Minnesota Statutes Chapter 115 charges MPCA:

- “to establish and alter such reasonable pollution standards for any waters of the state in relation to the public use to which they are or may be put as it shall deem necessary for the purposes of this chapter ...”
- Section 115.44 further addresses classification of waters and “standards of purity and quality”

- Minnesota’s water quality standards are housed in two chapters of MN Rules:

- Chapter 7050
- Chapter 7052
- Implementation procedures in Chapter 7053



Questions about framework?

What is a water quality standard?

- Intersection of science and policy
- Addresses:
 - What and who are we protecting?
 - What conditions are protective?
 - How do we maintain high water quality?



Who or what is protected?



Public value

Federal CWA:

- Fishable/swimmable wherever attainable
- Use and value for public water supplies, fish and wildlife, navigation, agriculture and industry, navigation

Minnesota Statutes 115.44:

- “...best usage in the interest of the public...”



Beneficial uses assigned in Minnesota Rules:

1. Drinking water
2. Aquatic life and recreation
3. Industrial use and cooling
4. Agricultural and wildlife use
5. Aesthetics and navigation
6. Other uses
7. Limited resource value

Beneficial uses

- Waters have multiple uses, and therefore multiple standards
- Can be specifically identified, or “default”
- Monitoring helps refine beneficial uses

Buffalo Creek: JD 15 to S Fk Crow R (Stream)

Stream identification number: **07010205-501**

| Description | Overall condition | Biology | Recreation use |
|-------------|-------------------|---------|----------------|
| | CAUTION | CAUTION | CAUTION |

Not always suitable for swimming and wading due to high bacteria levels caused by the presence of human or animal waste in the water. May not support a thriving community of fish and other aquatic organisms, as indicated by fish population assessments and insufficient dissolved oxygen and macroinvertebrate population assessments

Details:

| | |
|-----------------|--|
| Major Watershed | South Fork Crow River |
| County | Carver, McLeod, Renville, Sibley |
| Length | 52.15 miles |
| Next Segment | 07010205-508 |
| Ecoregion | North Central Hardwood Forests Western Corn Belt Plains |
| Protected for | a healthy warm water aquatic community; industrial cooling and materials transport use without a high level of treatment |

What conditions are protective?

- Standards identify conditions needed to protect the beneficial use
- Generally statewide or region-specific
- Descriptive (narrative) or numeric
 - Typically start with narrative standard, then adopt a number when science is better understood
- Standard applies in the waterbody



Examples of narrative standards

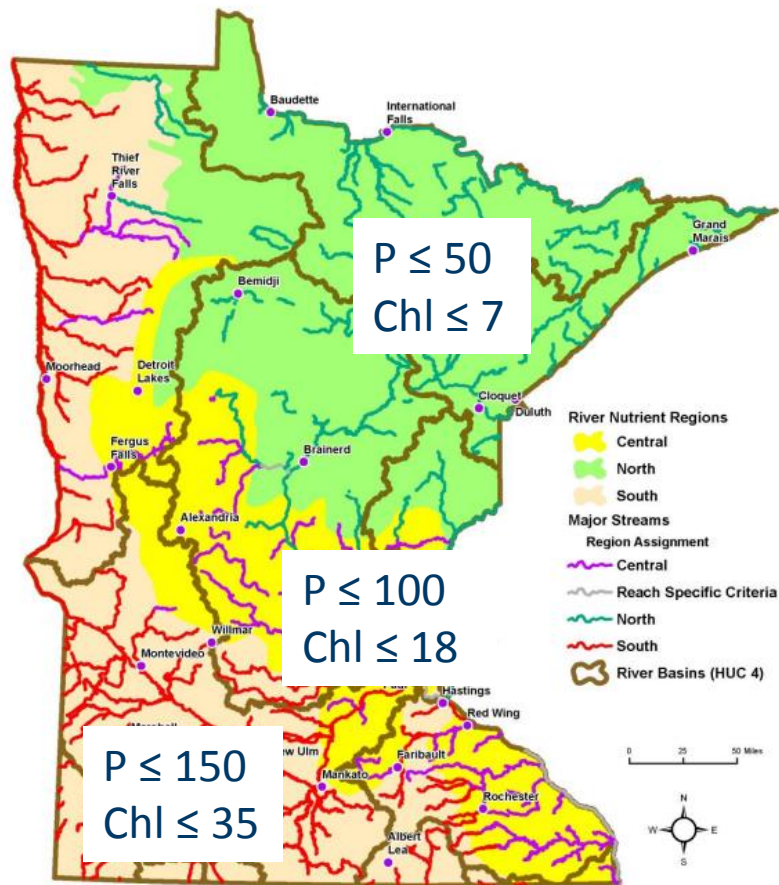
| Standard language | Protects |
|--|---|
| “...no material increase in undesirable slime growths or aquatic plants, including algae...” | Aesthetics, swimming – precursor to numeric nutrient standards |
| “...the normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered...” | Aquatic life, particularly fish and macroinvertebrates – precursor to numeric biological standards (IBIs) |

Standards can vary by beneficial use...

| Beneficial Use | Same Standard for all Waters | Same Pollutant, Different Standard | Same Pollutant, not all Uses |
|------------------------------|---|------------------------------------|------------------------------|
| | Narrative Standard | pH standard (min/max) | Chloride standard (mg/L) |
| 1: Drinking water | “No sewage, industrial waste, or other wastes shall be discharged from either point or nonpoint sources into any waters of the state so as to cause any nuisance conditions...” | 6.5 / 8.5 | 250 |
| 2: Aquatic life & recreation | | 6.5 / 8.5 or 9.0 | 230 |
| 3: Industrial and cooling | | 6.5 / 8.5 or 6.0 / 9.0 | 50, 100 or 250 |
| 4: Agriculture & wildlife | | 6.0 / 8.5 or 6.0 / 9.0 | No standard |
| 5: Aesthetics & navigation | | 6.0 / 9.0 | No standard |
| 6: Other | | No standard | No standard |
| 7: Limited uses | | 6.0 / 9.0 | No standard |

...and by region or water body type

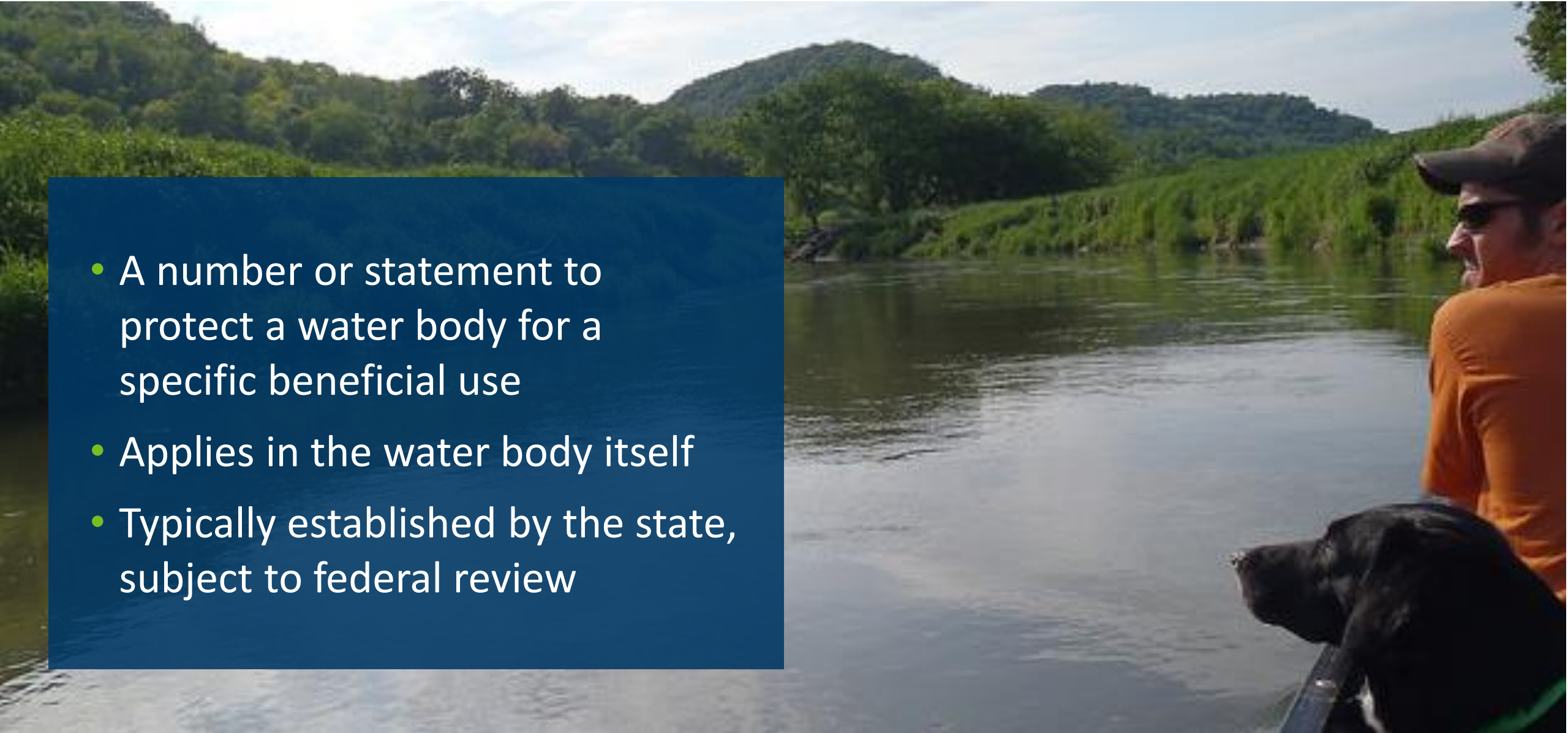
River Nutrient Regions in Minnesota



| North Central Hardwood Forest Lake Types | Phosphorus Standard ($\mu\text{g/L}$) | Chlorophyll-a Standard ($\mu\text{g/L}$) |
|--|---|--|
| Lake trout lakes | 12 | 3 |
| Trout lakes (except lake trout lakes) | 20 | 6 |
| Lakes/reservoirs | 40 | 14 |
| Shallow lakes | 60 | 20 |

What is a water quality standard?

- A number or statement to protect a water body for a specific beneficial use
- Applies in the water body itself
- Typically established by the state, subject to federal review





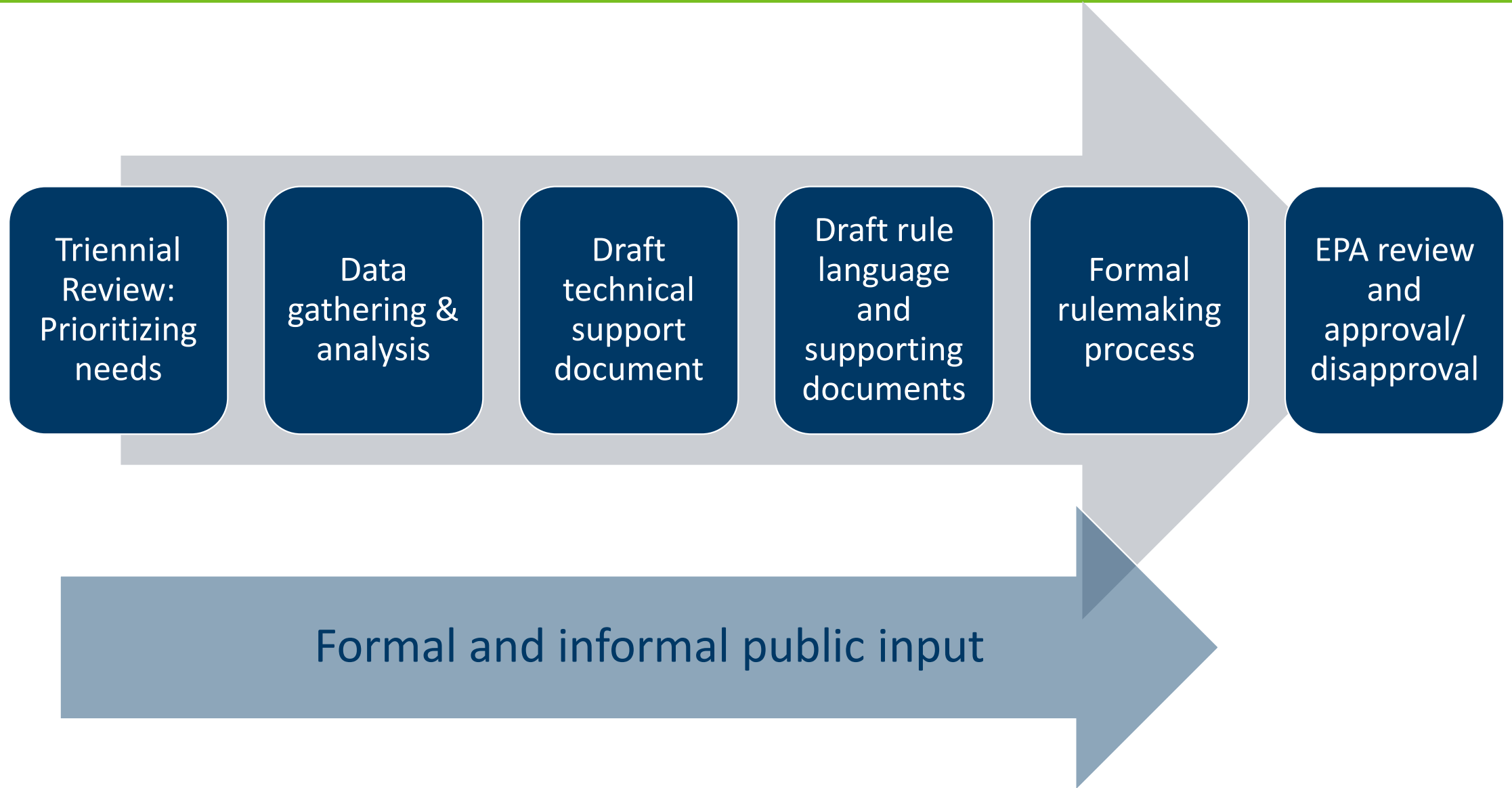
Questions about what is a standard?

Standards development

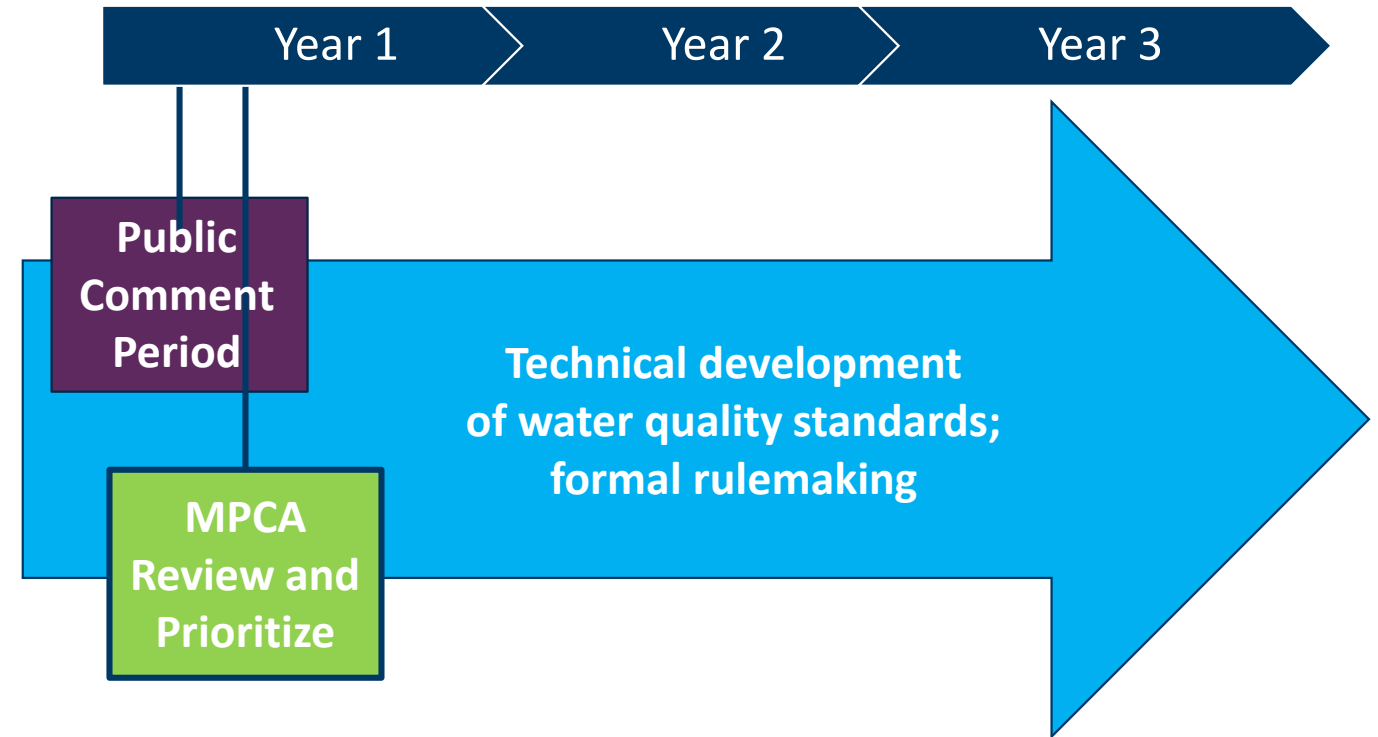


- Prioritize needs
- Identify conditions that protect beneficial uses, adopt them in rule
- Use best available science
- Public involvement is essential

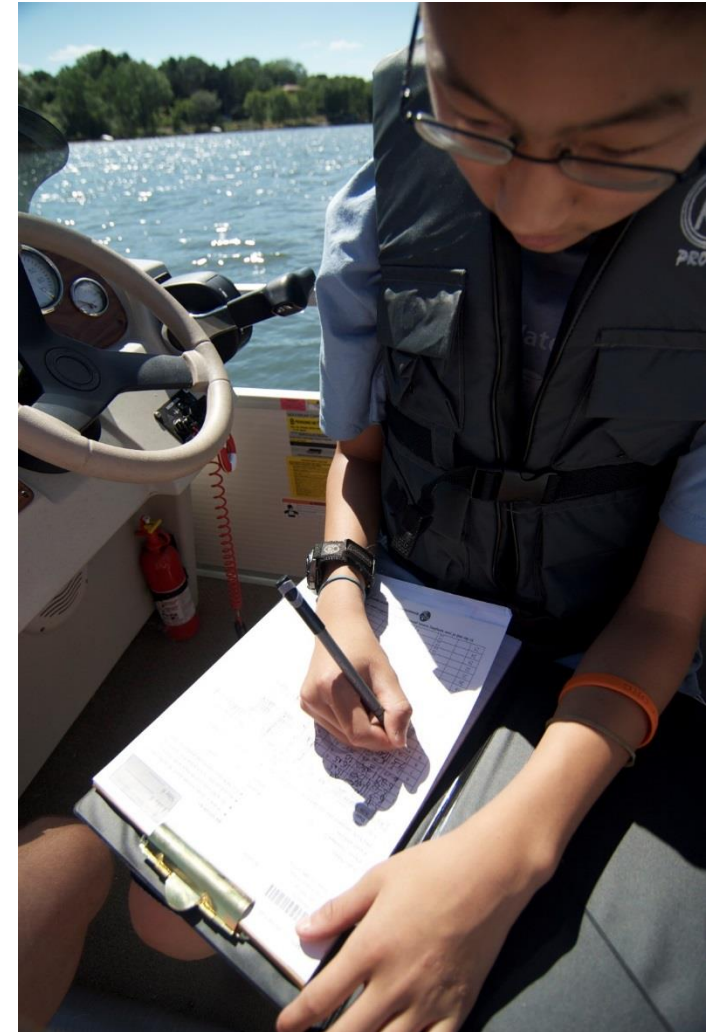
Standards development process



- Public comment and priority-setting for Minnesota's water quality standards needs
- Federal CWA requirement, every three years
- Results in priorities and general work plan for development and rulemaking
 - Updated annually
- Next review is this fall/winter

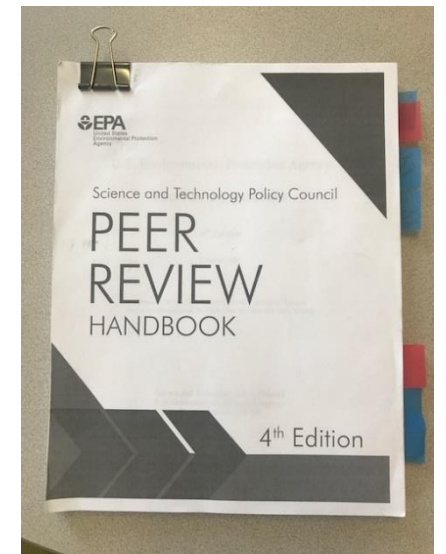


- Scientific basis for the proposed standard
- May involve:
 - Reviewing and refining an EPA criteria document
 - Compiling the scientific literature about a pollutant
 - Collecting Minnesota-specific data
 - Undertaking one or more studies
- Can take anywhere from months to decades
- Peer-reviewed science is critical



Draft technical support document (TSD)

- Describes, in detail, the scientific basis for the proposal
- Best practice: release a draft TSD for public input that documents the analysis, peer-reviewed science
 - Now a standard practice going forward
- Draft TSDs will also undergo independent peer review
 - MPCA always relies on peer-reviewed science
 - This new practice is intended to help enhance transparency and allow for more meaningful input



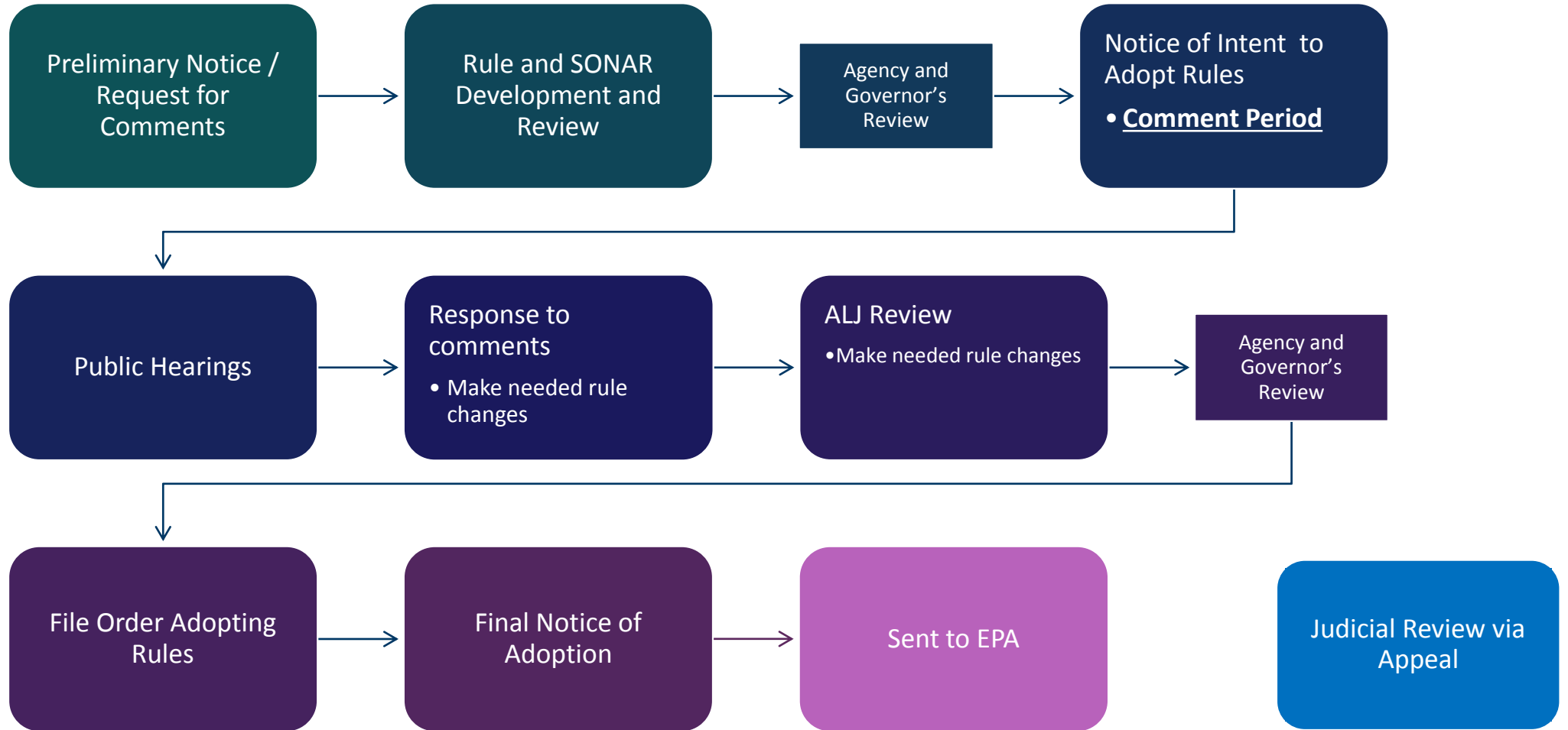
Develop rule language and SONAR

- Statement of Need and Reasonableness: State Administrative Procedures Act
 - Need for and reasonableness of the proposal
 - Public participation and stakeholder involvement
 - Regulatory analysis
 - Who bears the costs, who will benefit
 - Alternatives analysis
 - Costs/consequences of adopting and not adopting the rule
 - Options for mitigating costs

Under the Federal CWA, cost analysis is not a determinant in establishing a water quality standard. Such information is critical when implementing standards.

Formal rulemaking process

Formal rulemaking process



Role of the Administrative Law Judge

- Preside over public hearings
- Ensure Administrative Procedures Act is followed
- Determine if the proposed rules are:
 - Necessary and reasonable,
 - Within the agency's authority, and
 - If any modifications after public notice are within the original scope announced
- Reasonable = there is a rational basis for the proposed rule, which the agency has explained based on evidence in the record



40 CFR 131.6 requires states submit:

- Methods used and analyses conducted to support WQS revisions
- Certification that the WQS were duly adopted under state law
- General information to aid EPA in determining the adequacy of the scientific basis of the WQS



Questions about standards development?

How are standards used?



Measures/benchmarks

- Communication
- Monitoring and assessment



Implementation

- Permit requirements
- Antidegradation review
- TMDLs

Water quality standards ≠ permit requirements

- Standards identify the goal in the water body based on beneficial use and environmental science
- Permits specify facility requirements including costs, timeline and feasibility considerations

1.

Water quality standards: setting the goal



A water quality standard is not the same thing as a permit requirement.



2.

Permits: making it happen

An implementation of strategies to reach the clean water goal



Targeting sources



Flexible timelines



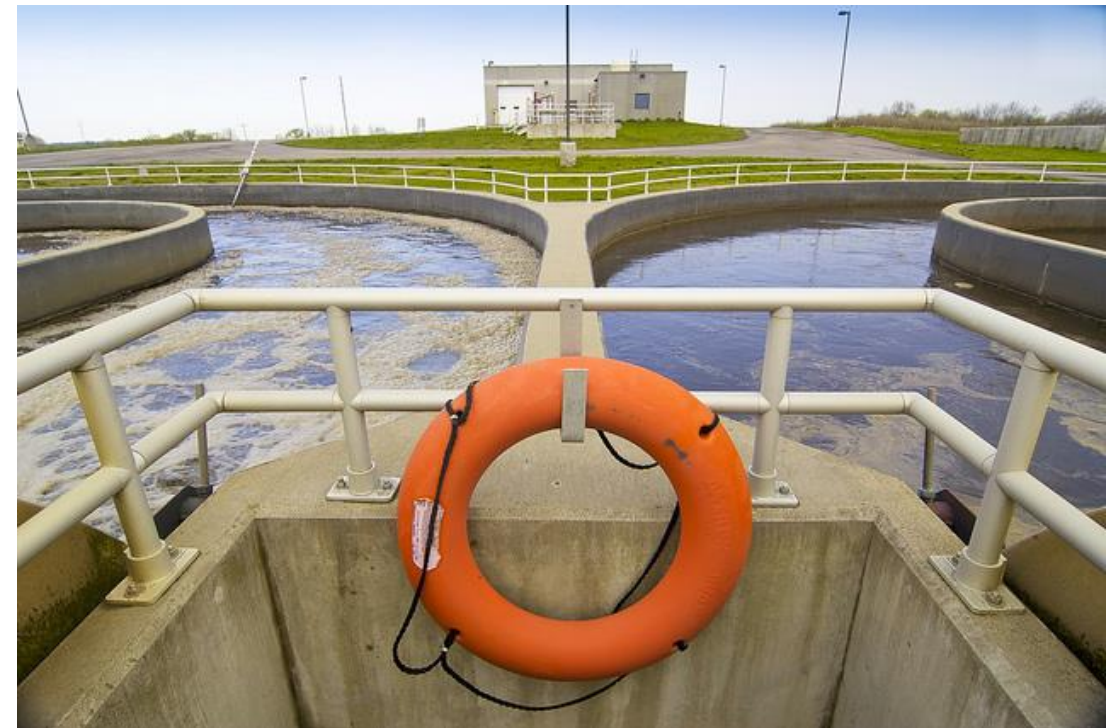
Financial assistance



Variances

From standards to permits

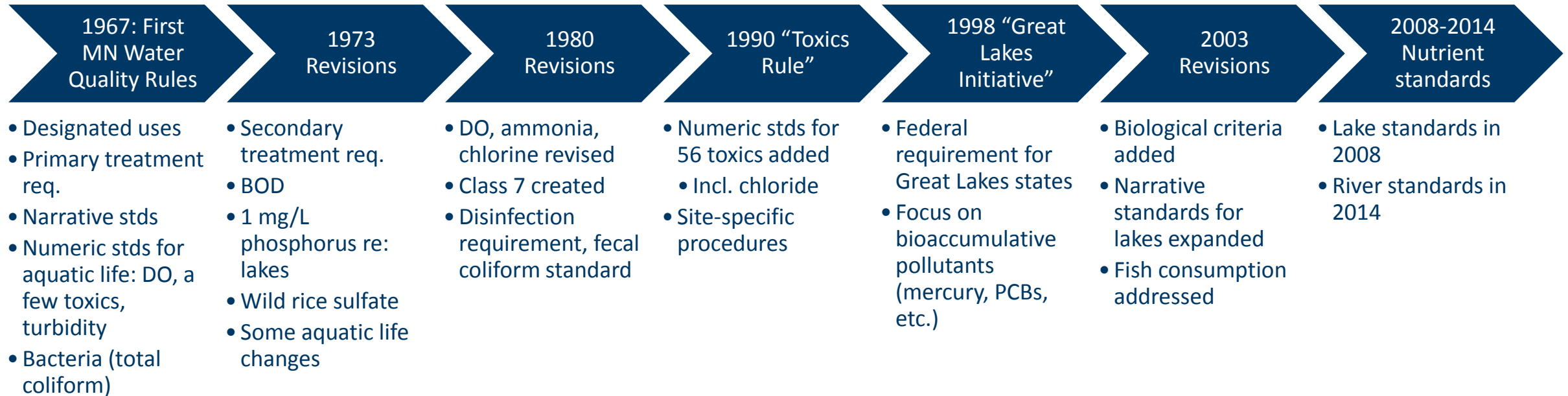
- Not all facilities have the potential to affect a standard in the receiving water
- “Effluent limit review” is the process for figuring out if permit limits are needed to protect a receiving water
- Reviews require receiving water data and facility data
 - Data collection is prioritized
- Permits have limits for only a fraction of water quality standards





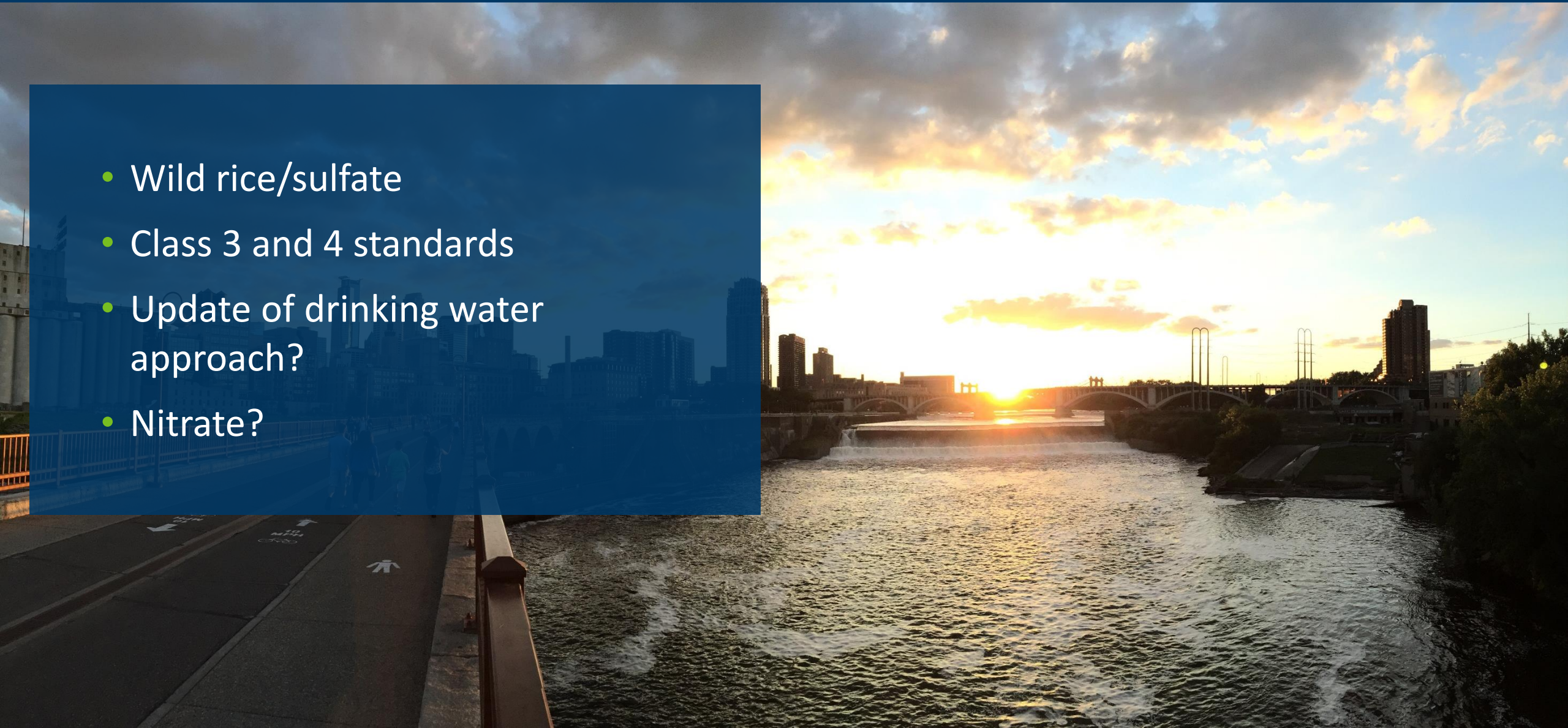
Questions about how standards are used?

Minnesota water quality standards milestones



On the horizon

- Wild rice/sulfate
- Class 3 and 4 standards
- Update of drinking water approach?
- Nitrate?



In summary

- Water quality standards set the goals for our lakes, streams, wetlands and drinking water
 - Uses/values for Minnesotans
- Rely on best available science
- Public involvement is critical
- Once we have the goal, we can wrestle with when, how and by which route(s) to get there



Thank you! Questions?

Shannon Lotthammer

shannon.lotthammer@state.mn.us

651-757-2537

<https://www.pca.state.mn.us/water/water-quality-standards>