Phosphorus Site-Specific Criteria

WDNR Water Quality Standards Rules

Kristi Minahan, WDNR Water Quality Standards, kristi.minahan@wisconsin.gov
Tyler Linton, Great Lakes Environmental, tlinton@glec.com
Overview

- WDNR is authorized to establish SSC for P under NR 102.06; our goal is to make a standard process

- Main concepts
- Six standard categories eligible for SSC
- Factors to consider for less-stringent SSC
- Application process

- Example
SSC for Phosphorus

- Use SSC if the statewide phosphorus criteria are over- or under-protective
- SSC are based on protecting the waterbody and its downstream waters
  - Protect Aquatic Life & Recreation Uses
  - Demonstrate using biological metrics
    - Streams: fish, aquatic insects, benthic algae (diatoms)
    - Lakes: algal blooms, chlorophyll a concentrations, aquatic plants
• SSC is a water quality standard, not a permit compliance option
• Similar to a TMDL, an SSC helps inform the permitting process, but is not a permitting tool

**SSC is:**

- Selected to be the appropriate P criterion for a waterbody
- Based on science
- Protective of designated uses
- Set to ensure downstream waters are not affected

**SSC is not:**

- Based on economics
- A change to the permitting system
- A compliance option

Compliance options:
- Adaptive Management
- Water Quality Trading
- Alternative Effluent Limits
- Upgrades

Other permitting tools:
- Compliance Schedules
- Variances
### Six standard SSC categories

- Alternative methods also allowed

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<th>More-Stringent</th>
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<td>1. Attains P but biological metrics are not attained</td>
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<td>2. Reservoirs with TMDL/modeling</td>
<td>2. Impoundments with TMDL/modeling</td>
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<td>3. High natural background P concentration</td>
<td>3. Outstanding or Exceptional Resource Waters (OERW)</td>
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### Cases typically not eligible

- Phosphorus is high & biology is not attained = Impaired
- Phosphorus & biology are both good = Not Impaired
1. Less-stringent

- P exceeds statewide criterion
- All biological metrics are attained
  - Both instream & downstream waters

→ Set SSC at the current ambient P conc.

1. More-stringent

- P attains statewide criterion
- One or more biological metrics are NOT attained

→ May need more stringent SSC
  - SSC value may be based on sediment cores (lakes) or reference sites
Reservoirs & Impounded Flowing Waters with TMDL modeling analysis

2. Less-stringent: Reservoir
- Slower flowing, more lake-like
- Gets lake criteria (15-40 ug/L P)
  ➔ May be lower than needed
    • Base SSC on modeling what P conc. is needed to achieve chlorophyll targets

2. More-stringent: Impounded Flowing Water
- Faster flowing, more river-like
- Gets stream/river criteria (75 or 100 ug/L P)
  ➔ May be too high
    • Base SSC on modeling what P conc. is needed to achieve chlorophyll targets
3. Less-stringent: High Natural Background P

- P exceeds statewide criterion
- Natural background levels of P are higher than criterion
  ➔ Set SSC at natural background levels
  - Use studies, reference sites, sediment cores (lakes)

3. More-stringent: Outstanding or Exceptional Resource Water

- P attains statewide criterion
- Attains biological metrics
  ➔ An SSC may be set to be protective of current conditions
  - Set SSC based on current ambient P conc.
For less-stringent SSC, also consider...

Downstream Protection

- Make sure most sensitive downstream water is protected
  - Lake
  - Impaired water
- If impairment is farther downstream (not directly adjacent), determine if there is reasonable potential for SSC segment to contribute to impairment
Would a less-stringent SSC be beneficial for a permittee?

• Timing
  ▫ Does antibacksliding apply?
  ▫ Is there already an approved TMDL wasteload allocation?
    → If Yes for either, SSC may not be beneficial

• SSC & TMDLs
  ▫ If TMDL is in early stages of development:
    • Water quality modeling may be used to support SSC selection
    • SSC must be approved by DNR/EPA before being used in TMDL
    • May be possible to include two sets of allocations
  ▫ TMDL already approved by EPA before SSC approved:
    • SSC would not be incorporated into permits until/unless the TMDL was modified to reflect the SSC
Would a less-stringent SSC be beneficial for a permittee?

• Will SSC prevent the need for a major facility upgrade?
  ▫ SSC is used in permit calculations in NR 217

• Possibly “Yes”, if:
  ▫ The ratio of stream flow to effluent flow (Qs:Qe) is greater than 2:1
  ▫ There is enough assimilative capacity
Application & Decision Process

1. Submit Preliminary SSC Action Plan
   - Compile existing data; meet with DNR

2. Monitoring & Modeling
   - Need 2 years of data

3. Finalize SSC Proposal
   - Review complete dataset; verify eligibility; select SSC

4. Review & Approval Determination
   - Public comment; DNR & EPA approval determinations
Recap: Development of SSC for P

• Statewide P water quality criteria are meant to be appropriately protective in most cases

• Tied directly to ability to demonstrate support of a waterbody’s Phosphorus Response Criteria (PRC) and Biocriteria

• Biological Metrics Specific to Waterbody Type
  • **Streams:**
    • PRC: benthic algal biomass and benthic diatom taxa
    • Biocriteria: aquatic insects (macroinvertebrates) and fish
Objectives

• Show basic steps for determining **preliminary** feasibility of P SSC for a waterbody segment

• Identify tools (e.g., Water Condition Viewer) and resources available to assist with process

• Provide case study example
  • Highlight and discuss data and additional information needs/gaps
Data Instruments and Tools

• Water Condition Viewer –
  • On-line map of assessment data

• Surface Water Integrated Monitoring System (SWIMS) –
  • Raw data

• Downloadable spreadsheets of assessment results –
  • e.g., 2016 cycle = previous 5 yrs of data, i.e., (2010...2014)
Water Condition Viewer

- New HTML5 Platform
- Stackable information layers
- Easy access to monitoring data
- Requires use for efficiency
Case Study: Deer Tail Creek

- Rusk County (near Ladysmith; NE of Chippewa Falls)
DT Creek – TP Data & Impairment

Listed in 2012 for TP-
Long-term growing season median = 103 µg/L

SWIMS (553131): 2016 Listing Table indicates sufficient samples from 2007-2008
DT Creek – Fish & Macros

- No TP
- Fish (Attains)
- Macros (Attains)
- No diatom
- Limited biological sites close to Point Source

TP Data - Much Farther Downstream
DT Creek – Natural Community

- Default NC–Predicted Coldwater above Hwy 8
- Verified NC–Good quality Warmwater

Fish Station 130199 (July 2002): Indicated that the verified NC should be Warm waterbody type
DT Creek - Condition Summary

Fish: Apply Warm Stream Fish IBI: Score = 100
• Attains (Excellent)

Bugs: Apply Macroinvertebrate IBI: Score = 5.5 – 7.3
• Attaining (Good)
→ Attaining all Biocriteria

Phosphorus
• Median TP = 103 µg/L (based on distant downstream station)
• Clearly Exceeds criterion of 75 µg/L
• All of Deer Tail Creek is currently listed as Impaired due to TP, but preliminary data suggests could be a good candidate for SSC
  • Need more TP and biological data near site

Phosphorus Response Criteria (PRC)
• No benthic algal biomass or diatom samples currently available

Key Question: Would SSC be protective of downstream Uses?
Protection of Downstream Uses

Chippewa R.: 1st downstream waterbody with different P criterion (100 µg/L) – DUs would likely be protected

Area with high Natural Background P – e.g., Mud Creek
Undeveloped watershed with high background TP in soils and groundwater
Some Key Things to Remember

• Waterbodies get SSC, not dischargers

• SSC for P set at existing concentrations if PRC and biocriteria are being met, and so long as downstream DUs are protected

• Verification of Natural Community is important – could result in poorer score if correct NC is not used

• Work with DNR staff up front and throughout the process