Welcome to the Public Hearing: Salmon Spawning Habitat Protection Rule 173-201A WAC Water Quality Standards

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Thanks for joining us today

Melissa Gildersleeve  Chad Brown  Bryson Finch  Kalman Bugica

Jessica Huybregts  Lucienne Banning  Susan Braley
Today’s Agenda

1. **Presentation on the rule proposal**
   --Revisions to fresh water criteria for dissolved oxygen
   --New criteria for fine sediment

2. **Informal Question and answer session**

3. **Formal Public Hearing** to receive verbal public comments on the proposed rule
Timeline of Rulemaking Proposal
Salmon Spawning Habitat Protection Rule

- **Filed CR-101**
  - Dec. 2019
  - Announced start of rulemaking process.
  - Gathered information to develop rule

- **Science Advisory Group Meetings**
  - Oct. 2020–July 2021
  - Held 5 Advisory Group meetings
  - Sept. 2021
  - Held public webinar on preliminary decisions

- **Filed CR-102 & Public Hearings**
  - Oct. 18–Dec. 16, 2021
  - Public Review period
  - December 8 & 9
  - Public Hearings

- **Finalize Rule**
  - Winter 2022
  - Respond to comments

- **File CR-103**
  - March 2022
  - Decision on rule adoption
Scope and Purpose of Rulemaking

• Revisions to Surface Water Quality Standards (WAC 173-201A-200)

• Scope
  • Revisions to the freshwater dissolved oxygen criteria
  • Development of a new fine sediment criterion

• Purpose
  • Improve rules that protect aquatic life habitat
  • Ensure sufficient DO levels in spawning gravels
  • Account for environmental factors that influence dissolved oxygen
  • Develop methods to ensure the physical condition of streambeds are protective of aquatic life and salmonid reproduction
Freshwater
Dissolved oxygen
Background

• **What is Dissolved Oxygen (DO)?**
  • Measure of the amount of oxygen dissolved in water

• **Sources**
  • Transfer of oxygen from the atmosphere
  • Photosynthesis

• **Importance**
  • Essential for aquatic life growth, survival, and reproduction

• **Reductions in DO levels**
  • Nutrients, temperature, and respiration
Salmon eggs and larvae need oxygen to breathe

Water flows through gravel and carries oxygen to the redd

Dissolved oxygen (DO) moves between the water column and gravel bed.

Redds have lower DO levels than water column.

Why Revise Freshwater DO Criteria?

• Federal concerns that WA freshwater DO criteria is not fully protective of incubating salmonid embryos
  • Addressed some concerns in 2009 (Publication 09-03-039)

• EPA’s recommendation for full protection: **11.0 mg/L**
  • WA standards for salmonid spawning: **8.0 – 9.5 mg/L**

• Need to account for impact of naturally warm water temperatures and elevation on dissolved oxygen
### EPA Recommendations for Dissolved Oxygen

#### Embryo and Larval Stages of Salmonids

<table>
<thead>
<tr>
<th>Level of Protection</th>
<th>Water Column DO Recommendation* (mg/L)</th>
<th>Intragravel DO Recommendation (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No production impairment</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Slight production impairment</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Moderate production impairment</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Severe production impairment</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Limit to avoid acute mortality</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

*These are water column concentrations recommended to achieve the required intragravel dissolved oxygen concentrations. A 3 mg/L difference is assumed between the water column and gravels.
## Washington’s Dissolved Oxygen Criteria

<table>
<thead>
<tr>
<th>Use Category</th>
<th>DO (mg/L) (1-Day Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Char Spawning and Rearing</td>
<td>9.5*</td>
</tr>
<tr>
<td>Core Summer Salmonid Habitat</td>
<td>9.5*</td>
</tr>
<tr>
<td>Salmonid Spawning, Rearing, and Migration</td>
<td>8.0*</td>
</tr>
<tr>
<td>Salmonid Rearing and Migration</td>
<td>6.5</td>
</tr>
<tr>
<td>Non-anadromous Interior Redband Trout</td>
<td>8.0*</td>
</tr>
<tr>
<td>Indigenous Warm Water Species</td>
<td>6.5</td>
</tr>
</tbody>
</table>

*Salmonid spawning protective levels: 8.0 – 9.5 mg/L
# Proposed Freshwater DO Criteria

<table>
<thead>
<tr>
<th>Aquatic Life Use Category</th>
<th>Water column DO concentration (1-day minimum)</th>
<th>Intragravel DO concentration (1-day minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Char Spawning and Rearing</td>
<td>10.0 mg/L or 90% oxygen saturation OR 8.0 mg/L</td>
<td></td>
</tr>
<tr>
<td>Core Summer Salmonid Habitat</td>
<td>10.0 mg/L or 90% oxygen saturation OR 8.0 mg/L</td>
<td></td>
</tr>
<tr>
<td>Salmonid Spawning, Rearing, and Migration</td>
<td>10.0 mg/L or 90% oxygen saturation OR 8.0 mg/L</td>
<td></td>
</tr>
<tr>
<td>Salmonid Rearing and Migration Only</td>
<td>6.5 mg/L or 90% oxygen saturation OR Not applicable</td>
<td></td>
</tr>
<tr>
<td>Non-anadromous Interior Redband Trout</td>
<td>10.0 mg/L or 90% oxygen saturation OR 8.0 mg/L</td>
<td></td>
</tr>
<tr>
<td>Indigenous Warm Water Species</td>
<td>6.5 mg/L or 90% oxygen saturation OR Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
Basis for Proposed Decisions

• Intragravel DO level of 8.0 mg/L is fully protective of early life stages of salmonids

• We determined a maximum **2 mg/L** DO depression value

  \[ 8 \text{ mg/L intragravel DO} + 2 \text{ mg/L} \text{ DO depression} = 10 \text{ mg/L water column protection level} \]

• Oxygen saturation accounts for naturally higher temperatures during summer months and barometric pressures impact on dissolved oxygen levels
  
  • Many reference sites considered pristine (21%) and minimally disturbed (52%) do not meet 95% during the year
Implementation
Freshwater DO Criteria: Implementation

Permitting
- Anticipating limited impacts to how permit limits are written
- Possible additional monitoring tools (e.g. % DO saturation)

Total Maximum Daily Loads (TMDLs)
- **Existing:** do not anticipate any changes to EPA approved DO TMDLs
- **New:** may need to incorporate additional measures into effectiveness monitoring

Water Quality Assessment:
- Potential refinement to DO impairments (nutrients vs. temperature)
- New methods for freshwater dissolved oxygen

Non-point program
- Adds additional tools to characterize the discharge of pollution
Fine Sediment Criteria
What is Fine Sediment?

• Defined
  • Particles less than 2 mm (fines and sands)

• Sources
  • Erosion, runoff, flooding, land development, in-water activities, and natural stream hydrology

• Importance
  • Excess fine sediment impacts:
    • Loss of aquatic life habitat
    • Poor water quality
    • Reduced oxygen
    • Reduced embryo hatching success/emergence
    • Behavioral changes
    • Reduced growth, survival, and reproduction
Fine sediment is not suitable spawning habitat

Fine sediment settles over redds and in between gravel, blocking the flow of water and oxygen.

Sediment covers eggs and reduces hatching success

Water Column

Gravel substrate

Why a Fine Sediment Criterion?

1. Fine sediment is the Nation’s #1 pollutant (according to EPA)
2. Better protect salmonid spawning and aquatic life habitat
3. Meet obligations in a 2018 US District Court Stipulated Order of Dismissal
4. Current narrative criteria does not specifically address fine sediment
Fine Sediment Criterion

• Proposed narrative fine sediment criterion:

“Water bodies shall not contain fine sediment (<2 mm) from anthropogenic sources at levels that cause adverse effects on aquatic life, their reproduction, or habitat. When reference sites are used, sediment conditions shall be compared to sites that represent least disturbed conditions of a neighboring or similar water body.”
Basis for Narrative Fine Sediment Criterion

• A single measurement cannot adequately characterize fine sediment

• Limited science on relationships between measures used to characterize fine sediment and biological endpoints
  • Weight of evidence approach is important

• Sediment dynamics are complex
  • Important to evaluate multiple environmental compartments to understand sediment dynamics
  • Physical, chemical, and biological makeup of a stream
## Fine Sediment Assessment Measures

<table>
<thead>
<tr>
<th>Environmental Compartment</th>
<th>Measure</th>
<th>Primary or Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical (water column)</td>
<td>Suspended Solids</td>
<td>Optional</td>
</tr>
<tr>
<td>Physical (streambed)</td>
<td>Percent Substrate</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Relative Bed Stability</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Subsurface Fines</td>
<td>Optional* (if measuring intragravel dissolved oxygen)</td>
</tr>
<tr>
<td>Chemical (gravels)</td>
<td>Intragravel Dissolved Oxygen</td>
<td>Optional* (if measuring subsurface fines)</td>
</tr>
<tr>
<td>Biological (benthic life)</td>
<td>Fine Sediment Biotic Index</td>
<td>Primary</td>
</tr>
</tbody>
</table>
Identifying Anthropogenic Sources

1. Fine sediment must be from anthropogenic sources
   • An assessment of human disturbance and riparian habitat as well as additional watershed information will be needed
   • Naturally occurring sources of sediments will not result in an impairment listing (e.g. glacial-fed streams with high sediment loads)
Fine Sediment Measures: Water Column

2. **Suspended solids concentration** - OPTIONAL

- Suspended solids is optional due to high temporal variability, dependence on flow, and limited relationship with fine sediment in substrate

- Suspended solids measure captures both fines and sands and has shown to be reliable

- Provides information on the transport of fine sediment and sediment dynamics in a water body
Fine Sediment Measures: Streambed

3. **Percent surface substrate** - PRIMARY
   - **Relative bed stability** - PRIMARY
   - **Percent subsurface sediment** - OPTIONAL if measuring IGDO

- Percent substrate and subsurface fines represent site-specific sediment conditions
  - Direct measurement of sediment quality
- Relative bed stability provides a catchment level assessment of sediment movement
  - Measure of streambed stability
Fine Sediment Measures: Water Chemistry

4. **Intragravel dissolved oxygen level** – OPTIONAL if measuring subsurface fines

- Direct measurement of dissolved oxygen levels for sediment dwelling aquatic life
- Accounts for several factors (substrate size, permeability, sediment oxygen demand, water flow, groundwater influences, etc..) that can influence dissolved oxygen
Fine Sediment Measures: Biological

5. **Fine sediment sensitivity index** - PRIMARY

- Biological index that evaluates the presence or absence of fine sediment sensitive species
- Relates sediment quality with a biological response
Implementation
Fine Sediment Implementation

• Permitting
  Unimpaired waters
  • No changes anticipated for dischargers

  Impaired waters
  • Permittees with limits for total suspended solids may become more stringent
  • Possibly more monitoring and new methods for dischargers

• Total Maximum Daily Loads
  • Existing: don’t anticipate changes to EPA approved TMDLs
  • New: additional monitoring in evaluating sediment

• Water Quality Assessment:
  • Add a fine sediment listing methodology within 18 months of finalized rule

• Non-point
  • Another tool to examine the discharge of pollution and better assess fine sediment pollution
Rulemaking Process and Next Steps
Next Steps

- Public comment period: Oct 18 – Dec 16
- Respond to comments
- Modify rule and documents as necessary
- Rule adoption target: March 2022

Future work
- Develop methods in the water quality assessment (Policy 1-11) for fine sediment impairments and hold public review
- Finalize methodology within 18 months after rule adoption – implement in next Water Quality Assessment
Informal Q&A Session

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Questions on what was presented?

Susan Braley

swqs@ecy.wa.gov
Formal Public Hearing
Public Hearing
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If you would like to provide comment at this hearing, please use the raise your hand feature to identify yourself.

Other ways to provide your comments, due December 16, 2021:

**Online:**  [https://wq.ecology.commentinput.com/?id=RFGDN](https://wq.ecology.commentinput.com/?id=RFGDN)

**By mail:**  Department of Ecology  
Water Quality Program  
Susan Braley  
PO BOX 47600  
Olympia, WA 98504-7600
Thank You!

Questions on rule process?
Send to:
Susan Braley at
swqs@ecy.wa.gov