



Discussion Notes

Salmon Spawning Habitat Protection Rule Science Advisory Group (SAG)

1:15 – 4:15 p.m., Thursday, October 29, 2020, online meeting

Introductions¹

Ecology Watershed Mangement Section staff & their role

Susan Braley (Facilitator), Chad Brown (Unit Supervisor), Bryson Finch (Technical Rule Lead), Marla Koberstein (Moderator)

Public Advisory Group attendees & the organizations they represent²:

Joy Archuleta (USDA Forest Service), Jennifer Arthur (Seattle Public Utilities), Ashley Coble (NCASI), Joanna Crowe Curran (US Corps of Engineers), Chris Frissell (Salish Kootenai College), Lindsay Guzzo (EPA), Tim Hagan (Pierce County), Kirk Krueger (WDFW), Brian Mattax (WSP/Consultant), Ted Parker (Snohomish County), Rainy Rau (City of Vancouver)

Ecology Advisory Group attendees & the region/program they represent:

Jordan Bauer (ERO/Hydropower), Patrick Lizon (Nonpoint Source Pollution), Glenn Merritt (EAP Watershed Health Monitoring), Cleo Neculae (NWRO/TMDL), Cole Provence (CRO/TMDL), Keunyea Song (Stormwater Action Monitoring), Leanne Weiss (SWRO/TMDL), Angela Zeigenfuse (Water Quality Permits)

Meeting Goals³

- Introduce team members and establish SAG goals and objectives.
- Share background information on dissolved oxygen to aid in group discussions.
- Discuss considerations for a revised dissolved oxygen (DO) standard that protects early life stages of fish and takes into account natural variability of DO and feasibility of implementation.

SAG goals and objectives (Slides 8 - 9)

- Main goal of the SAG is to support development of DO and fine sediment standards to provide protection to salmon spawning habitat.
- Role of the SAG is advisory to Ecology rules staff as they move forward with this rule proposal.

¹ See [EZView page](#) for full bios of Advisory Group members.

² A list of acronyms is on page 5

³ See [October 29 meeting agenda](#).

Freshwater DO standard presentation & discussion (Finch)⁴

Dissolved oxygen: protective levels for early life stages of salmonids (Slides 12 - 15)

- Flow, substrate, temperature, DO are important aspects to salmonid spawning.
- One main point for today is current spread of DO protection in WA is 8-9.5 mg/L
 - Therefore intragravel DO would be 5-6.5 mg/L according to EPA.
- Currently there is no 24-hour diel monitoring of DO and no provisions for diel monitor and it raises concern. Several members noted that grab samples alone do not represent DO fluctuations.
- Major consideration needs to be made for early morning hour DO monitoring, such as:
 - Potentially build in buffer for DO criteria to account for day and night concentration fluctuations.
 - British Columbia criteria of 30-day Mean-Minimum for intragravels may be a potential to address this concern.
- Salmonid growth and survival may be the most sensitive aspects to DO concentrations and may be how EPA came up with 11 mg/L criteria for full protection.

Does the lit support 11 mg/L or is it over protective? (Slides 16 – 25)

- There may be some environmental variability that needs to be determined (sediments, temperature, groundwater influence, etc.).
- 11 mg/L seems high and may not be achievable given some habitats may not lend support to that level.
 - What is the potential DO level out there that can be naturally supported?
 - There may need to be more research to determine the appropriate DO depression in the intragravel DO.

Is there a concern with current WA DO levels? (Slides 28 – 30)

- Would there be an opportunity to change DO criteria based on changes to designated uses?
 - For example, if implementation studies take place and data cannot support achieving the DO criteria then would there be an opportunity to adjust the DO criteria?
 - This action is still being considered.
- Other states use a combination of percent saturation and different averaging periods and/or minimum DO concentrations to compensate for intragravel DO (IGDO) uncertainty due to the difficulty and lack of resources to monitor IGDO and define those values.
- Several members noted that salmonids are most fragile during these early life stage and using the highest level of protection should be considered especially given the uncertainty of the environmental conditions and variability.

⁴ The Discussion notes follow along with the [Powerpoint Presentation Slides](#).

- Further research is needed to identify if redds significantly change DO.

Preliminary options for DO criteria (Slides 31 – 34)

- New criteria of 11 mg/L alone will lead to many new 303d listings that may not in fact be impaired because the criteria can't naturally be met in many waters.
 - There would need to be contingencies included with a 11 mg/L criterion
- Review recent literature papers that may refine 3 mg/L suppression in intragravel sediments. The 3.0 mg/L may be based on old methods and may need refined.
- Present a repository and using best available science and studies to come up with change from water column and intragravel DO.

Apply a more restrictive seasonal fresh water DO criteria during spawning and rearing periods (Slides 35 – 41)

- Having a seasonal criteria may be impracticable given the criteria is general and would be difficult to get all environmental monitoring appropriate.
- Salmonids have been observed to spawn through the entire year and thus a seasonal timeline would not be worthwhile to try to establish.
- There are a wide range of temperatures which also apply to the seasonal aspects.
- Intragravel measurements are difficult to control and implement. Not feasible for all cases.
- An if/then clause could be established where if a water body doesn't meet 11 mg/L then an 8 mg/L intragravel criteria would take place.
- It was noted that the process of accumulation of fine sediment over incubation time in the redds decreases intragravel DO.
- Research on intragravel DO often requires permits from fisheries agencies in order to allow for substrate disruption of the spawning gravels. This further implies difficulty in being able to sample intragravel DO. It was also noted that the methodology of having piezometers in streams can vary due to many environmental conditions (i.e. substrate type).
- We need to have additional literature to suggest which percent saturation is most protective of salmonids and what is the fluctuation/range of the saturation in streams. How and why did states choose 90% or 95% saturation?
 - Colden Baxter et al. study looks at bull trout spawning in groundwater upwelling sites which were likely lower in DO and thus biological variability is important to consider. It is typically not feasible to find spawning locations that have optimal conditions for both DO and Temperature that would allow for the ideal protection of redds.
- SIDO-UK model by Sear may be relevant to the discussion. Focus on sediment oxygen demand could be useful.

Add a percent saturation component to the freshwater DO criteria (Slides 42 – 43)

- As part of rule development for DO, Ecology is considering the feasibility of including a percent saturation in the DO criterion (percent saturation can compensate for naturally high

temperatures). Using the percent saturation requirement would provide the ability to consider the degree of influence from nutrient and/or temperature impairments.

- If we could establish a relationship between percent saturation and IGDO it could be a useful metric.

Consider a combination of options for DO criteria (Slide 44)

- Several members suggested checking in with other states/tribes that have various combination criteria for DO in the water column, intragravel, and DO saturation (see Slide 15). How successful have the criteria been in protecting the intended use? How feasible is it to monitor and implement the criteria? What are the advantages and drawbacks of the different combinations?

Wrap up and next steps (Slide 47)

Due to time constraints, the discussion on DO criteria averaging periods will be addressed at the next meeting.

The next two meetings of the SAG will be November 19th (afternoon) and December 9th (afternoon).

Ecology will post reading assignments for the next meeting on the [EZview page](#), as well as discussion notes from the meeting.

Ecology Contacts

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More information

Meeting materials are stored on our [Salmon Spawning SAG EZ View page](#)

Follow the progress of this rule on Ecology's [Salmon spawning Habitat Protection Rulemaking](#) webpage

Get updates on this rulemaking by joining our [WQ Information listserv](#)

Acronyms

CRO – Central Regional Office

DO – Dissolved Oxygen

EAP – Environmental Assessment Program

EPA – Environmental Protection Agency

ERO – Eastern Regional Office

IGDO – Intragravel Dissolved Oxygen

NWRO – Northwest Regional Office

TMDL – Total Maximum Daily Load

SWRO – Southwest Regional Office

WDFW – Washington Department of Fish and Wildlife

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