

Discussion Notes

Salmon Spawning Habitat Protection Rule Science Advisory Group (SAG)

1:15 – 4:15 p.m., Wednesday, December 9, 2020, online meeting

Introduction of Meeting participants¹ (Braley)

Ecology Watershed Management 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), Seth Book (Skokomish Tribe), 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), Leanne Weiss (SWRO/TMDL), Angela Zeigenfuse (Water Quality Permits)

Discuss individual physical, biological, and chemical-based parameters used to characterize fine sediment (Finch)

Water column measures

- Suspended particles (<2mm) and reduced light penetration is characteristic of high turbid waters with decreased fish growth and predatory deficiency.
- Total suspended solids (TSS) are a combination of both inorganic and organic materials.
- TSS was originally considered a wastewater measurement method for organics while suspended sediment concentration (SSC) has been considered a more reliable natural-water measurement (Gray et al. 2000).
 - SSC incorporates the whole sample while TSS uses a subsample.
 - TSS is more functional because of existing background database and trends. Also, one member observed that a specific fraction less than 500µm is more favorable for TSS than SSC.
- The methodology for measuring TSS needs to be discussed with Ecology as well as determining what is the best fraction to consider.

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

² A list of acronyms is on page 5

- Cause and effect analysis using TSS for permitting purposes and background data appears to be the most favorable, although TSS is not a complete measure for identifying the impacts for fine sediment on egg incubation.
- Based on member comments, turbidity and TSS may be used depending on site accessibility and sample frequency considerations.

Streambed Measures

- Embeddedness measures have a high level of variability due to observer evaluations that can differ significantly over time.
- Relative bed stability may be one of the more useful measures but is fairly involved due to multiple parameters that go into the measure.
 - Parameters in the Ecology database exist to support this metric.
- Multiple streambed metrics may be useful to consider. Fine sediment and embeddedness are commonly used within many state assessment tools.
- Armored ratio is a grain-size metric that compares surface and subsurface substrates.
 - Describes relationship of bed load transport rates over time.
- Surface fine measurements underestimate the total impact of fine sediment in the stream bed. Subsurface sediment fines also play a role and should be considered.
 - A combination of pebble counts for surface armor layer measurements and core samples adjacent to redds or nearby (to avoid redd disruption) has been used to identify a full substrate profile that is specific to salmonid spawning.
- Choosing the appropriate streambed measure/metric may provide multiple insights into stream health. A combination of streambed parameters may be necessary to adequately characterize fine sediment.
- One member expressed concerns with how measures will be implemented in TMDLs, permits, and beneficial uses.
- It was noted that WDFW and Ecology recently updated their toe-width method for rapid assessment which provides a quick and cost-effective estimate of preferred spawning and rearing stream flows for fish. This method provides site-specific spawning information.

Chemical Metrics

- Intragravel dissolved oxygen measurement for evaluating fine sediment was discussed in previous meetings.

Biological Metrics

- Benthic macroinvertebrates are used to define streambed health, but ultimately the benthic community may be affected by multiple pollutants.
- These biological metrics should be accompanied by other indices/measures.
- Characterizing the benthic community can be used as an indicator to define the health of a stream and can be an indicator of substrate suitability.

- No rigorous work has been done to show the correlation between the benthic community and egg incubation/fry survival.
- In-stream hydraulics may be one of the most important parameters to influence benthic communities and especially IBI scores.
- Using reach-wide samples for comparisons of substrate and macroinvertebrates is more favorable than site specific samples and should be emphasized.

Channel Characteristics

- Not diagnostic on their own but should be used as secondary measures.

Review Ecology's existing data and monitoring methods that collect data related to fine sediment (Finch)

- Ecology's watershed monitoring program has some existing infrastructure that may be used as a starting point for characterizing fine sediment.
- Fine sediment sensitivity index is always calculated for biological monitoring.
- There has been no attempt to validate biological metrics with salmonid egg/fry emergence and survival.
- We need to understand the effects of catchment vs reach-wide sampling.
- Concerns were noted that the Ecology-based methods are set up to track long term monitoring (e.g. projects) while it is difficult to identify shorter-term differences observed over a given time period or year.
- Existing data provides context for how spatial and temporal changes occur, but if assessment does not occur on a yearly basis than the dataset misses out on temporal variations.

Conclusion: Fine Sediment (Finch)

- A lines of evidence approach may be necessary for fine sediment since a single indicator may not substantiate a fine sediment impairment.
- Concern expressed that monitoring of fine sediment needs to narrow down to reaches that may be specific to salmonid habitat and fry/egg emergence and survival.
- It was noted that organic matter material may be a significant component on the gravel/oxygen exchange in the interstitial substrate area.
- Sampling design and sample size are important elements for collecting data that can be used to characterize a stream. Rigorous methods that are repeatable are a necessary component to an evaluation method that accounts for spatial and temporal variability.

Final Thoughts (Finch)

- A seasonal criteria approach to dissolved oxygen would be very site specific and likely not feasible to undertake for this rulemaking.
- Diurnal fluctuation is important as it emphasizes the interstitial changes and, more so, focuses on the full protection of salmonid egg emergence and fry survival.

Next Steps (Braley)

- Ecology staff will use information/suggestions/feedback gained from these Advisory group meetings to begin to develop preliminary rule language concepts for dissolved oxygen and fine sediment to protect salmon spawning.
- Ecology will be sending out a doodle poll soon to schedule a final meeting of the Advisory group in early February to share initial concepts for preliminary rule language and get feedback from advisory group members.
- Later in Spring 2021, we anticipate holding a public webinar to share preliminary draft rule language with the broader public, ahead of starting the formal CR 102 rulemaking public review.

Ecology contacts

Project Technical Lead

Bryson Finch

360-999-9610

bryson.finch@ecy.wa.gov

Rulemaking Lead

Marla Koberstein

360-628-6376

marla.koberstein@ecy.wa.gov

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

CR – Code Reviser

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

TSS – Total Suspended Solids

SWRO – Southwest Regional Office

WDFW – Washington Department of Fish and Wildlife