

Status & Trend Scientists Team Meeting Notes

Thursday, September 25, 2025, 1:30 - 3:00 pm

Group Purpose: To bring together regional scientific expertise to guide long-term monitoring programs and support collective learning about improved stormwater management.

Meeting objective: Make progress on finalizing our study questions and get ready for the November SWG meeting

Background Materials

- Revised Draft Study Questions
- Stormwater Work Group (SWG) at a glance

Meeting Notes

Refining SAM Receiving Water Study Questions

1. Proposed Schedules for Trend Reports
 - a. **First report is prepared by the end of 2027 and ahead of the start of the 2029 MS4 Permit Reissuance process. Subsequent reports will be every five years (end of 2032 and 2037, etc).**
2. **The revised draft trend study questions were posted on the agenda.** These questions aim to understand if regional conditions in receiving water quality and biota are improving in concert with broad implementation of required stormwater management practices.
3. Puget Sound – Trend Report prepared every 5 years
 - a. How have concentrations of key parameters (nutrients, metals, organic contaminants) changed over time?
 - i. For each impervious surface strata?
 - ii. For other landscape factors such as traffic intensity, land use type, tree canopy? **WDFW used the National Land Cover Data Set in a mussel analysis before. WSDA has specific land use data for crops, we also map crop land that has changed to non-crop. It's statewide and surveyed every 3 years. There is a state govt supplied data for land cover, that Pierce County used. It has 1.5 m resolution, with very good granularity, including canopy cover height. It's possibly called [HRCd](#). Recommend using traffic intensity data as categorical data because calculation of individual roads in a basin could be time consuming.**
 - iii. Mussel data only: For nearshore geologic processes such as [drift patterns](#), deposition rates, water circulation patterns? **For Ecology's Nutrient Reduction Project, they [modeled flushing rates from several basins and inlets](#). Those data might be useful depending on whether the sites and model years align. UWT, WDFW, and PNNL compared mussel data to hydrodynamic model simulations in this paper: [Explicit quantification of residence and flushing times in the Salish Sea using a sub-basin scale shoreline resolving model - ScienceDirect](#). This analysis could serve as an example method, but we'd need different model data.**
 - b. Have concentrations of key parameters changed at individual sites over time?

- i. Notes: This is a future question that will be answerable after repeated site visits. It probably would be incorporated in the 2037 synthesis report.
 - c. How have indicators of stream health (e.g., B-IBI, periphyton biomass, habitat metrics) changed over time?
 - i. For each impervious surface strata?
 - ii. For other landscape factors such as traffic intensity, land use type, tree canopy?
 - d. Are summer maximum and average stream temperatures increasing or decreasing?
 - e. Is there evidence of changing hydrologic patterns (e.g., baseflow decline, flashiness) over time?
 - f. What percentage of stream and nearshore length are improving or worsening in Puget Sound over time?
 - g. **Risk Assessment: Identifying Natural and Human Stressors**
 - i. **These study questions need to be added to the analysis. We have a start, but need to refine them. Suggestion to reach out to Tim Clark who assisted with stressor analysis for King County and Chad Larson who works on this for Ecology.**
 - ii. **Relative risk/Attributable risk analysis – Abigail shared a relative risk assessment done for the Yakima River Basin which could be a model for us. [Integrating Metapopulation Dynamics into a Bayesian Network Relative Risk Model: Assessing Risk of Pesticides to Chinook Salmon \(Oncorhynchus tshawytscha\) in an Ecological Context - Mitchell - 2021 - Integrated Environmental Assessment and Management - Wiley Online Library](#)**
 - iii. **Boosted Regression Trees – this was done in SAM’s 2015 Puget Streams Report. [Stormwater Action Monitoring Status and Trends Study of Puget Lowland Ecoregion Streams: Evaluation of the First Year \(2015\) of Monitoring Data - King County](#)**
 - iv. **EPA’s CADDIS tool – another possibility, but has it’s limitations and might not meet our study objectives. [Causal Analysis/Diagnosis Decision Information System \(CADDIS\) | US EPA](#)**
 - v. **Consider something like the very policy/management oriented causal model for risk to ecological endpoints that King County developed. [Water Quality Benefits Evaluation \(WQBE\) Toolkit - King County, Washington](#)**
- 4. Lower Columbia – Trend Report prepared every 5 years
 - a. How have concentrations of key parameters (nutrients, metals, organic contaminants) changed over time?
 - i. For each impervious surface strata?
 - ii. For other landscape factors such as traffic intensity, land use type, tree canopy?
 - b. Have concentrations of key parameters changed at individual sites over time?
 - c. How have indicators of stream health (e.g., B-IBI, habitat metrics) changed over time?
 - i. For each impervious surface strata?

- ii. For other landscape factors such as traffic intensity, land use type, tree canopy?
- d. Are summer maximum and average stream temperatures increasing or decreasing?
- e. Is there evidence of changing hydrologic patterns (e.g., baseflow decline, flashiness) over time?
 - i. For each impervious surface strata?
- f. Possible case study: How does WQ change with age of stormwater infrastructure in Cougar Creek?
- 5. Considerations for additions to the monitoring program
 - a. How could passive sampling support the monitoring we're already doing?
 - i. **USGS put out some passive samplers for 6PPDQ last fall at about 16 sites and they are hoping they caught a good first flush. When they get that data back they will share it.**
 - b. What additional parameters would be recommended to add to or delete from the program? CECs, conductivity? **Maybe add non-targeted HRMS analysis? Create a dataset that could be mined in the future as new CECs are discovered? Strongly recommend conductivity sensors in each stream location. There are ways to characterize the stormwater signal using hydrograph separation. Conductivity data can also help answer the fundamental question of how catchments hold and release solutes and pollutants.**

Preparing for November SWG Meeting

1. **The SWG chairs are looking for the subgroup to update SWG on the long term receiving water monitoring activities and our preparations for the upcoming trend analysis. We do not need to seek approval for contracting the analysis, as this was covered in the 2018-19 discussions about monitoring design. PRO-C, the SAM oversight sub committee of SWG will review the contract to ensure appropriate scope, scale, and budget.**
2. For discussion: What do we prepare? **Focus on the stormwater signals and making connection with permit. Emphasize regional dataset, with many possibilities for partnership (give examples from WDFW-Port of Tacoma and USGS partner projects). Definitely be certain to tie the presentation to regulatory compliance and interests in the permit, not necessarily science questions.**

Next Meeting

- **Possible presentation from King County on estimating stormwater control measures for a trend analysis**
- Preliminary data exploration – quick visualization of time series, box plots, cumulative distribution function plots
- Finalize presentation to Stormwater Work Group

Stormwater Work Group (SWG) at a Glance

	Description
Mission & Purpose	Protect water quality and stream habitat with a sustainable, cooperative stormwater monitoring & assessment framework.
What SWG Does	• Provide a forum for stormwater-related monitoring and assessment • Directs the Stormwater Action Monitoring (SAM) program — a regional monitoring effort funded by municipal stormwater permittees.
Membership Structure	• Invited representatives from local, state, and federal governments, environmental and business organizations, public ports, Tribes, and agriculture. • Has several subgroups, e.g. Status & Trends; Effectiveness & Source ID Study Solicitation; 6PPDQ, Oversight. • Caucuses provide input and advocate for interests. • Voting representatives with defined roles.
Geographic & Organizational Scope	• Covers all of Washington State as of 2024. • Part of Puget Sound Ecosystem Monitoring Program (PSEMP).
Key Documents & Resources	• SWG Membership • SWG Charter & Bylaws • SWG Work Plan • Past meeting materials, agendas, summary notes • Intro video for SWG and SAM program
Current Priorities	• Oversight of pooled resources to implement regional monitoring. • Exploring stormwater management needs and research questions (e.g. 6PPD-quinone). • Developing & selecting new effectiveness and source identification studies. • Tracking & updating work plan.
What Subgroups Do	Examples: • Status & Trends – tracking long-term changes in receiving waters • SAM Study Selection Subgroup – process for selecting new effectiveness and source identification studies • SWG 6PPDQ – sharing 6PPDQ stormwater research findings
Decision & Feedback Pathways	• Subgroups develop draft recommendations or study proposals. • SWG reviews and votes on proposals and recommendations. • Input from subgroups & caucuses is expected in advance of SWG meetings.
Why It Matters	• Ensures stormwater monitoring and assessment efforts are aligned and scientifically solid. • Helps municipalities and permittees to make better management decisions based on credible data.