



Priorities and Approaches for RSMP Small Stream Data Analysis

October 31, 2014

The *2010 Stormwater Monitoring and Assessment Strategy for Puget Sound* (2010 Strategy) articulates hypotheses and questions to guide streams status and trends monitoring. The strategy articulates that the information collected will integrate influences from various land uses, geologic and geomorphic conditions, and other factors outside the control of stormwater managers. In 2015 the Regional Stormwater Monitoring Program (RSMP, a subset of the *2010 Strategy*) is monitoring small streams in the Puget Lowlands for: monthly water quality grab samples (instantaneous flow, conventional parameters, bacteria, nutrients, PAHs, and metals); B-IBI, habitat, and periphyton at each site; and a single sediment chemistry sample at each site for metals, PAHs, PCBs, and common roadside use pesticides. Decisions regarding RSMP priorities and implementation are made by the PSEMP Stormwater Work Group (SWG) in recommendations to the Washington Department of Ecology (Ecology).

The PSEMP Freshwater Workgroup (FWG) has discussed needs and questions for guiding analysis and reporting of RSMP data and the status and trends monitoring questions posed in the *2010 Strategy* and parsing out stormwater management influences on instream conditions. RSMP data collection is beginning in January 2015. An addendum to the QAPP will be written to guide the analysis and reporting by detailing the approaches and methods for answering the priority questions. The FWG considered:

1. Are these the right questions?
2. Do we have the capacity/are we gathering the data necessary to answer each of these questions?
3. Which of these questions can be answered now, in advance of RSMP data collection?
4. Who is interested and wants to participate in analysis and reporting?

The FWG makes the following recommendations to the SWG:

Recommendation #1: During all monthly water quality sampling visits, collect stage data at all RSMP sites not located near a stream gage to help fill in gaps in the streamflow gauging network. The importance of getting more flow information cannot be overstated. Monthly stage is only marginally better than monthly discharge measurements to evaluate whether stormwater management is succeeding to reduce flashiness.

1. Collect continuous flow or continuous stage opportunistically at as many sites as possible (i.e., using pressure transducers). Use the monthly instantaneous data to calibrate and interpret the continuous data.

Recommendation #2: Before or during sample collection, explore ways to learn from existing data from other programs to inform recommendations for the next round of RSMP sampling. Specifically:

1. Gather and QA/QC as much existing data as possible to prepare for analyses.
2. Conduct power analyses of existing data to inform priority metrics and understand expected variability; which measures are changing over time, which metrics are too variable to measure change, and summary measures by land use and other key geographic categories.
3. Conduct an analysis of existing data to describe current conditions based on data collected by other programs, particularly Ecology's last two rounds of sampling in Puget Sound.
4. Propose an integrative and thoughtful approach to evaluating RSMP data along with data collected by other programs of both similar and different designs, including NAWQA, EMAP/NRS, and locally-driven monitoring.

Recommendation #3: While data collection is underway, delineate the drainage basin areas of the RSMP sites added during site confirmation in 2014. Do this following the same protocols that were followed for the original list of 100 sites. Determine whether any corrections or adjustments are necessary based on findings during the 2014 field visits. Coordinate with PSEMP Land Cover Workgroup to do this.



Recommendation #4: While data collection is underway, develop a list of target information for spatial analysis in each RSMP drainage basin (land cover, land uses, road crossings, existing stormwater infrastructure, outfalls, adjacent land use, etc.) needed to support the analyses to parse out stormwater management influences versus other factors influencing the streams. Gather this information during the first half of 2015 so that analysis can begin as soon as possible. Coordinate with PSEMP Land Cover Workgroup to do this.

1. Select an appropriate approach for consistently defining land uses in the drainage basin contributing to each RSMP site.

Recommendation #5: Define the statistical approach for evaluating the RSMP data together with comparable data sets including Ecology's ambient and sentinel sites, EMAP data from prior years, and jurisdiction-specific ("opt-out" permittee) data to be collected during the 2015 water year.

Recommendation #6: Request proposals from interested parties to work on developing the RSMP QAPP addendum detailing data analysis and interpretation. Ask them to be creative about using RSMP and other existing data to inform the region by answering these questions:

1. What percentage of Puget Lowland streams support their designated beneficial uses? How do these percentages compare inside and outside Urban Growth Area (UGA) boundaries? How do these percentages compare by different land uses and other spatial data?
 - a. How can we best use data from 2009 and 2013 (and 2015?) to answer this question?
 - b. What data should be collected in the next RSMP sampling (2020?) to assess the change in percentage from the status defined in 2015?
2. Conduct standard analyses of all of the RSMP data and report percentages meeting standards or in various classifications, as appropriate. How do these percentages compare inside and outside Urban Growth Area (UGA) boundaries? How do these percentages compare by different land uses?
3. What data should be collected, at what interval, to show statistically significant trends over time? To evaluate whether biological conditions remains stable or improves despite new development or whether biological conditions at sites developed under new standards are closer to biological condition than sites developed under old standards? To measure improvements in areas with more restoration or management actions?
 - a. Use the results of Recommendation #2 above to support these recommendations.
4. How do B-IBI scores correlate to the makeup of the periphyton community? To the nutrients and metals concentrations in water? To metals and toxics concentrations in sediment? What is the best set of metrics to continue to collect? Can we establish a P-IBI for Puget Sound?
 - a. Use the results of Recommendation #2 above to support these recommendations.
5. What recommendations to stormwater program managers will we be able to make based on our collective findings, i.e., regarding specific pollutants, habitat conditions, biota, or land uses -?
 - a. What specific sites warrant follow-up action or further investigation?
 - b. Are there types/patterns of management actions that appear to be protecting instream conditions?

Recommendation #7: Reach out to watersheds working on salmon recovery; the Salmon Recovery Council and the LIOs are likely interested in asking questions and hearing answers.

Recommendation #8: In the next round of RSMP Effectiveness Studies, request proposals from interested parties to work on making further recommendations regarding the best set of metrics for determining whether regional source control initiatives and infrastructure improvements are working over time, i.e., "Don't Drip and Drive" and the brake pad copper phase-out. A probabilistic sampling approach is unlikely to be the best way to answer these questions.

Recommendation #9: After all of the above recommendations are underway, find out what is needed to sample micro plastics. Preserve the filters from the September or October (first flush) dissolved metals sample collection processing for future counts of plastic particles.