Planning for RSMP Small Stream Data Analysis

Charge to the new subcommittee and notes from November 12, 2014 Stormwater Work Group (SWG) discussion of the October 31, 2014 recommendations from the Freshwater Workgroup (FWG)

Background: 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. 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.

Desired outcomes: 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 SWG convened a special subcommittee to scope the QAPP addendum writing. The subcommittee will have a conference call on December 9, 2014 and meet on January 12, 2015. The subcommittee will:

1. Identify the final set of questions, understanding that:
    a. we need to be gathering the data necessary to answer each question, and
    b. we need to produce recommendations for the next round of RSMP (trends) sampling
2. Determine who is interested and wants to participate in writing the QAPP addendum and then assign roles and responsibilities
3. Write a scope of work, schedule, and budget for writing the QAPP addendum in the first half of 2015

The SWG discussed the following FWG recommendations. Note that Recommendations #1 and #7-9 are considered outside the scope of the subcommittee for the purposes of guiding the QAPP addendum; main focus is on #6.

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.

Discussion: What is feasible for answering important questions about flow? We may need a separate interpretation of stage and flow. We know of nearby gages for the preliminary set of RSMP sites and USGS NAWQA program is investigating doing continuous flow at a handful of sites, most likely to target smaller streams where a gap in the gaging network was identified in the prior analyses.

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.

Discussion: There is lots of existing data like the RSMP will collect. Who would fund an analysis to inform status and trends at a PS level? EPA Corvallis is looking for work relevant to locals. Include targeted locally-driven sites with random sites in analysis. How do they compare? Are there enough targeted sites at the same level of detail as the RSMP?

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.

Discussion: Tie this in with the data analysis and with Recommendation #4 below. May also need to look at as-builts and infrastructure. Talk to local jurisdictions.

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.

Discussion: Which coverages give us the best data? What mix of sources? Write a white paper on this.

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.

Discussion: Goes with Recommendation #2 above.

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?

Discussion: Multiple people will be involved in the analysis. We have some methods ready. Many correlations are already well known/understood. These data are for one point in time: status assessment. How can we best make use of the data and what are the most important data for future RSMP data collection for trends analyses? In addition to the questions posed above, consider two new questions: What are the loadings? How do results of random and targeted sites

compare? We're unlikely to have recommendations to stormwater managers without trends. Stream monitoring is telling us more than a stormwater story: how to parse that out. Consider metrics developed for paired urban watershed retrofit study Redmond is doing.

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.
Discussion: Salmon groups are looking at habitat/WQ and asking questions. Get the groups synchronized.

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.
Discussion: Do we need another group doing this? Will we see a signal in copper in water or sediment? Might be a good baseline for comparison backward and forward. Also keep this in mind as we move forward with the effectiveness study of business inspections and drawing in Local Source Control programs. Make recommendations to Ecology.

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.
Discussion: Go ahead and save the filters. Maybe a grad student would do this.