SWG - State Caucus

Report on State Agency Contribution to SWAMPPS and the RSMP

January 6, 2015

Draft - for SWG feedback on target content and overall format to make this document as useful as possible to permittees and others

Summary

This report describes how Washington State agencies have contributed staff time and/or resources to the Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS) articulated by the Stormwater Work Group (SWG) in 2010 and the Regional Stormwater Monitoring Program (RSMP) leading up to and since its inception in 2014. The aim of this report is to show how each state agency's contributions have impacted the RSMP and contribute to the overall body of knowledge for understanding and managing stormwater impacts.

Washington State agencies and entities represented herein include:

- Department of Ecology (Ecology),
- Puget Sound Partnership (PSP),
- Department of Fish and Wildlife (WDFW),
- Department of Natural Resources (DNR),
- Department of Transportation (WDOT),
- Conservation Commission (WSCC),
- Department of Agriculture (WSDA), and
- Department of Health (WDOH).

Introduction and Background

In June of 2010, the Stormwater Work Group (SWG) released its 2010 Stormwater Monitoring and Assessment Strategy for the Puget Sound Region. This document called for a collaborative, comprehensive regional strategy for the Puget Sound basin to provide "an unbiased assessment of whether stormwater management actions are resulting in genuine progress towards regional conservation targets". To this end, the SWG proposed a *scientific framework* for regional stormwater-related monitoring and assessment (i.e. SWAMMPS, see below), as well as an *implementation plan* that lead to the establishment of a new Regional Stormwater Monitoring Program (RSMP) to conduct specific monitoring and assessment activities.

The SWG made 55 key recommendations for establishing a Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS). SWAMPPS was intended to provide vital information about "ecosystem status and trends (threats, drivers, state) and important effectiveness research within an adaptive management framework that is connected to policy makers". In addition it was intended to support research that more fully addressed "stormwater-related monitoring for other land uses, water bodies, and NPDES permits".

The RSMP was established as an integral part of the larger SWAMPPS effort: it was the intention that Washington State agencies (among others, including federal agencies, local governments, and other groups) would contribute to SWAMPPS, both through participation in the RSMP effort and through their own monitoring efforts. This document addresses the various roles of State agencies in the RSMP and details some of their other monitoring activities and programs that can be leveraged as part of SWAMPPS**.**

State Caucus member agency contributes to SWAMPPS and RSMP

ECOLOGY

Status and trends monitoring: estimated direct funding provided to other entities by Ecology to support/advance RSMP components prior to permittees' pay-in funding: ~$175K

Ecology has an integrated relationship with the RSMP in two distinct capacities: first as the RSMP administrator and as the host of several state-level monitoring programs that are being leveraged by the RSMP Status and Trends efforts. In both of these capacities, Ecology has received compensation from RSMP and has also volunteered staff time to assure consistency, and engagement between RSMP efforts and state programs. A great deal of Ecology's volunteered staff time was to prepare for the RSMP program. Ecology generated the probabilistic design site lists and draft QAPPs for each RSMP's Streams, Marine Nearshore Bacteria and Marine Nearshore Sediment components well in advance of RSMP funding by permittees.

Specific work on each RSMP component is listed below. This list includes funded and un-funded efforts:

Streams:

- Ecology staff (~0.5 FTE) wrote the draft and final QAPPs for this study. This work was largely completed prior to the RSMP pay-in funding beginning.
- Ecology funded (via GRSS) the second phase of the stream gaging analysis by USGS (USEPA funded the first phase of this analysis).
- The RSMP Coordinator has served as the project manager for this study. This work only became chargeable to RSMP S&T account after PRO-C approval in 2015.
- Ecology staff in the Environmental Assessment Program (EAP) contributed ~0.5 FTE working from 2009-2013 with the Stormwater Work Group to develop the monitoring design for RSMP.
- Manchester Environmental Laboratory is helping coordinate all of the analysis work as well as an inter-laboratory comparison. This work is RSMP-funded. MEL also contributed:
  - QAPP(s) development/review for both opt in and opt out cities and counties
  - Resolving issues with field crews
  - Coordinating with multiple contract laboratories
- Ecology trained RSMP field staff on stream sampling methods and protocols (funded by the RSMP).
- Ecology provided ~40 hours of technical consultation during the field season.

- The RSMP is leveraging Ecology's multi-million-dollar state-level Watershed Health monitoring program, particularly the reference and sentinel sites. Much work being done by Ecology's Environmental Assessment Program will be directly useful to RSMP, including developing a Western Washington benthic index which will be applied to RSMP data.

Marine nearshore sediment chemistry:

- Ecology EAP staff (~.25 FTE) wrote the draft QAPP for this study prior to the RSMP pay-in funding. Ecology Marine Sediment Monitoring Team staff analyzed existing data to inform RSMP design.
- Ecology's PSEMP Marine Sediment Monitoring stratum is adjacent to the 1 fathom linear sampling line that will characterized by the RSMP sediment sampling design. RSMP is leveraging Ecology's state-level marine sediment monitoring program.

Contaminants in mussels:

- Ecology funded an initial desktop survey of PS shorelines to determine whether this would be a feasible study. Ecology later funded (via GRSS) a shoreline gradient study as part of the WDFW pilot project.

Marine shoreline bacteria:

- Ecology staff wrote a draft QAPP for this study prior to the RSMP pay-in funding.
- The BEACH Program has provided technical assistance for bacteria issues.
- RSMP is funding the BEACH program manager to gather and conduct shoreline bacteria data analysis.

<u>Effectiveness studies</u>: estimated direct funding to support RSMP ~$300K

- The literature review and synthesis white papers were funded via Ecology GRSS to Pierce County and AWC prior to the RSMP pay-in funding.
- Ecology paid for the venue for the two workshops and lightning round facilitators to support the process of identifying the first round of studies.

<u>Source Identification Information Repository</u>: estimated direct funding to support RSMP ~$35K

- Ecology ensured that <u>scoping memo and literature review (next steps)</u> were completed via direct-award NEP funding in advance of launching the RSMP.
- Permit managers attempted to clarify cross-over between SIDIR and permit required IDDE reporting to minimize duplication of reporting. Ecology paid for development of the voluntary on-line form in advance of RSMP pay-in funding.

<u>Administration</u>: estimated direct funding to support RSMP ~$30K

- Ecology hired an RSMP Coordinator using permittees' funds. However, other start-up costs associated with launching the RSMP were not paid for out of the RSMP account.

Database Administration

- The Ecology-funded EIM database is used to store and manage habitat/ environmental data.
- Ecology and EAP IT provides the Watershed Health Monitoring Program Data Management System, which RSMP uses. The RSMP is a beneficiary of this effort in that:
    - Ecology manages the data stream
    - Ecology runs the Quality Assurance module
    - Ecology calculates the habitat metrics
    - Ecology returns the data and metrics to stakeholders from a web UI

- The WHM system includes electronic field forms that synch with the main system, editor, physical habitat tables, automatic metric calculation, web interface, and integration with EIM. RSMP is the beneficiary of these development costs (staff time). The RSMP Streams effort contributes about 16% of the data in the WHM system, on a five-year basis.

Ecology also conducts monitoring and research studies that contribute to overall understanding of stormwater impacts. Some examples of this work include: toxics loading studies, the state EMAP program, BEACH monitoring in coordination with WDOH, and contaminant transport modeling studies. Below are a few select studies that support our understanding of stormwater impacts and our efforts to address stormwater issues:

- Indian Creek Study: Above and below sample design to study the effects of stormwater on benthic organisms.
- Henderson Inlet Watershed Effectiveness Monitoring Study: Assessed biological impacts from stormwater outfall above and below several locations.
- Bertrand Creek Effectiveness Monitoring Study.
- Development of periphyton sampling methods to assess impacts from stormwater in stream.
- The Washington State BEACH Program monitors nearshore bacteria levels in Puget Sound on a weekly basis from Memorial Day through Labor Day. This bacterial monitoring data provides important information about bacterial inputs to Puget Sound's marine environment including stormwater bacterial inputs.
- The Washington State BEACH Program makes recommendation for bacterial source control to local jurisdictions when high levels of bacteria are found in the nearshore marine environment.

Puget Sound Partnership (PSP)

Regional Engagement and Participation:

- PSP staffs (Leska Fore) the Puget Sound Ecosystem Monitoring Program's Freshwater Work Group which combined with the Stormwater Work Group's subgroup on small streams. This group provides technical review and advice for small stream monitoring.
- PSP provides meeting facilitation for the Effectiveness Monitoring subgroup.
- PSP has participated in the PRO-C, Effectiveness Monitoring, Communications, and State Caucus subgroups.
- APWA Co-Chair (Bruce Wulkan) ensures updates from SWG as a standing item on agenda.
- PSP Communication Team advice on logo development and Fact Sheet design for communication of RSMP studies to non-technical audiences.

Status and Trends Monitoring:

- The Puget Sound Partnership reports the Water Quality Index and the B-IBI as Vital Signs to regional partners and the State Legislature; both are assessed as part of the RSMP. The Puget Sound Chinook Recovery teams and watersheds will also use information on the Water Quality Index as well as habitat condition measured by the RSMP to evaluate Chinook habitat for restoration planning.
- 10% FTE (Leska Fore) during 2016-2017 to develop Fact Sheets and other communication materials to interpret and summarize results from RSMP monitoring and analysis.

Effectiveness Monitoring:

- The Partnership will provide results of studies to decision makers to inform their selection of recovery actions to reduce pollution in stormwater. The Strategic Initiative Team for stormwater selects actions to be included in the Action Agenda, which is the regional Comprehensive Conservation and Management Plan required by EPA for estuaries of national significance.

Washington Department of Fish and Wildlife (WDFW)

Support of RSMP Status and Trends Monitoring:

- Mussel Stormwater Monitoring Feasibility Study, 2011 (~$25K):
    - WDFW conducted a desktop census evaluation of Puget Sound shorelines and a power analysis to determine the feasibility of using naturally occurring mussels

to measure differences in chemical contamination between urban growth area (UGA) and non-UGA shorelines. This work was funded by Ecology.

- 2015/16 RSMP Mussel Monitoring (~$475K; includes RSMP funding + Sponsors + WDFW match):
    - WDFW is managing, coordinating and executing the inaugural round of RSMP mussel monitoring at 40 randomly-selected, marine nearshore sites adjacent to Puget Sound's UGAs. Analysis will include an evaluation of the range and magnitude of chemical contamination in mussels, and recommendations for future status and trends monitoring. (~$270K from RSMP)
    - WDFW solicited additional interest and funding from groups outside the municipal stormwater permittees to increase the geographic range and size of the 2015/16 mussel monitoring. This has resulted in the inclusion of 25 additional sites, both in and outside of UGAs, in the 2015/16 RSMP Mussel Monitoring program. (~$50K from Sponsors + ~$105K WDFW match)
    - WDFW will analyze chemicals of emerging concern (CECs) in a subset of the mussel monitoring sites, to gather information on the occurrence and distribution of CECs that are not covered in the existing RSMP Mussel Monitoring program. (~$50K WDFW)
- WDFW will manage the 2017/18 RSMP Mussel Monitoring, to include solicitation of additional sites through sponsorship and WDFW match. (~$273K, estimated budget)

<u>Independent Contributions to Toxics Monitoring and Stormwater Research:</u>

General Research (~$1 M annually):

- WDFW's Toxics in Biota program has been tracking contaminant levels in Puget Sound fish since 1989. They monitor the geographic and temporal status and trends of a wide range of toxic chemicals in fish tissues, including those found in stormwater runoff, and their data are used to provide a guideline for evaluating fish health in the Puget Sound. Their studies are designed to evaluate and track the complex patterns of contamination across the Sound by using indicator species and life-stages that cover a broad range of feeding habits, movement patterns, and habitats. Their general research includes:
    - Biannual sampling of English sole to track contaminants from sediments
    - Biannual sampling of Pacific herring to track contaminants from the pelagic zone
    - Sampling of juvenile Chinook salmon to track contaminants in Puget Sound's lower river regions
    - Sampling of adult Chinook salmon to provide data for human health assessments
    - Focus and pilot studies to characterize contaminant exposure and the health of biota in specific geographic locations, to develop new metrics for fish health assessments, and to characterize.

- Data from WDFW's monitoring are used in the Puget Sound Partnership's *Toxics in Fish* vital sign, which contributes information about the state of Puget Sound fish as it relates to toxic contaminants present in stormwater and from other sources.

Nearshore Monitoring:

- WDFW supported the national Mussel Watch (MW) project by helping to sample mussels in 2009/10 and 2011/12 at established MW sites and by developing additional MW sites in the Puget Sound. Data from MW monitoring has been used by WDFW to assess and track nearshore contamination from stormwater and other pollution sources in the Puget Sound. (~$103K)
- 2012/13 Mussel Watch Pilot Expansion Project (MWPE) (~$308K):
    - WDFW conducted a large-scale pilot study, funded by the EPA's National Estuary Program, to evaluate the effectiveness of using transplanted mussels to evaluate nearshore contamination in all regions of the Puget Sound.
    - The methods developed and data gathered from the MWPE study was used as a model for the RSMP mussel monitoring.
    - The network of volunteers and partners developed during the MWPE study is being leveraged to provide a work force and funding for extra sites during the 2015/16 RSMP Mussel Monitoring (see below).

Washington State Department of Natural Resources (DNR)

Stormwater Work Group Participation:

- DNR has been a member of the SWG since its creation in 2007. Although staff representation has changed over the years, DNR has continued to stay engaged and active in the operations of the SWG.
- DNR staff also participates in the Communications Subgroup, SIDIR Subgroup, and Pooled Resources and Oversight Committee.
- As steward of more than 2.6 million acres of state-owned aquatic lands, DNR is responsible for ensuring commercial, recreational, and habitat uses can continue for future generations. DNR's involvement in the SWG provides an avenue to allow understanding of stormwater issues and how stormwater may affect natural resources managed by DNR.

RSMP Status and Trend Monitoring:

- Sediment Sampling – DNR will be working with USGS and King County to complete the Nearshore sediment sampling portion of the Regional Stormwater Monitoring Program. DNR will work with both agencies to finalize the QAPP and perform the field collection portion of the sampling.

Natural Resource monitoring and assessment:

- DNR requires a valid use authorization for all outfalls located on State-owned aquatic lands that require the avoidance or mitigation of impacts on natural resources. Under DNR authorizations, applications may have requirements that are more stringent in order to meeting the statutory obligation to protect the quality of State-owned aquatic land.
- To encourage ongoing sediment monitoring, DNR requests sediment sampling from proponents requesting certain types of easements or leases of State-owned aquatic lands. All data is requested to be entered into EIM.

Washington State Department of Transportation (WSDOT)

Stormwater Work Group Participation:

- Since the inception of the Stormwater Work Group (SWG), WSDOT has served as a committed state caucus representative and continues to commit staff resources to fully participate in and support the Stormwater Work Group and efforts to develop and implement a Regional Stormwater Monitoring Program (RSMP) for Puget Sound.
- WSDOT staff also participate in the SWG Effectiveness Studies, Roads and Highways, Work Plan, and Source Identification Subgroups.

Support for RSMP Status and Trends Monitoring:

- In partial fulfillment of WSDOT's NPDES Municipal Stormwater Permit monitoring requirements, WSDOT supports the RSMP Puget Sound status and trends monitoring program with an annual contribution of $27,000 as part of its NPDES permit pay-in obligation.
- In its 2019-2024 NPDES Municipal Stormwater Permit, WSDOT will support the developing Habitat Status and Trends Monitoring (HSTM) program in the Lower Columbia River with an estimated $8,800 annual contribution, as its status and trends pay-in obligation.

Contributions to identifying RSMP Effectiveness Studies:

- WSDOT participated on the Effectiveness Subgroup and in 2011, WSDOT librarians provided their services to conduct an extensive literature review of stormwater monitoring effectiveness studies as part of larger effort to develop 22 white papers related to effectiveness monitoring.
- WSDOT staff participated in two public workshops in 2014 to discuss, get input on, prioritize, and decide on effectiveness proposals to implement with RSMP funding.

Role in SWG Roads and Highways Subgroup:

- In 2013, WSDOT organized and facilitated a Roads and Highways Subgroup. The SWG directed this subgroup to:

  > "*Take a holistic approach to defining monitoring needs related to roads and highways across the full spectrum of urban to rural roads in Puget Sound, and to make specific recommendations as to how WSDOT's permit-required monitoring should address a subset of those needs. The big picture of monitoring needs should include status and trends monitoring, effectiveness studies, and source control.*"

- The Roads and Highways Subgroup consisted of a diverse group of representatives from State, Federal, and Local agencies, one university, and two non-governmental stakeholders with an interest in technical studies related to roads and highways in Washington State. This subgroup developed a prioritized list of recommendations on road and highway effectiveness, source identification, and status and trends studies and submitted them to the SWG.
- WSDOT is currently conducting two of the five priority highway BMP effectiveness studies recommended by the Roads and Highways Subgroup. Annual reports and QAPPs are available online from the WSDOT Stormwater Monitoring webpage. These studies are:
  - An evaluation of the stormwater treatment performance of modified vegetated filter strips, and
  - An evaluation of compost-amended biofiltration swales at road maintenance yards in eastern and western Washington.

WSDOT Stormwater Monitoring Studies that Support the RSMP Program:

- WSDOT collected highway runoff characterization data from four sites in western Washington and one site in eastern Washington. These data are summarized in the *WSDOT NPDES Municipal Stormwater Permit Final Highway Runoff Characterization Report (S7.B) Water Years 2012-2014*. This report and the highway runoff characterization study QAPP are available online from the WSDOT Stormwater Monitoring webpage.

- In September 2013, WSDOT completed a two-year stormwater runoff study of nine of the department's facilities across the state including one ferry terminal, two rest areas, and six maintenance facilities. Monitoring results are summarized in the *WSDOT NPDES Municipal Stormwater Permit Rest Areas, Maintenance Facilities, and Ferry Terminals Stormwater Monitoring Report (S7.D) Water Years 2012 and 2013*. This report and the facilities study QAPP are also available online from the WSDOT Stormwater Monitoring webpage.

Additional Stormwater Monitoring and Research:

- WSDOT staff participates in national stormwater research studies as panel members and contributors for the National Cooperative Highway Research Program (NCHRP). Panel members provide technical guidance, document review, and serve as champions for implementation of the research results. Past and present studies include:
    - NCHRP 25-31 "Guidelines for Evaluating and Selecting Modifications to Existing Roadway Drainage Infrastructure to Improve Water Quality in Ultra-Urban Areas" ($300K)
    - NCHRP 25-32 "Measuring and Removing Dissolved Metals from Stormwater in Highly Urbanized Areas" ($300K)
    - NCHRP 25-37 "A Watershed Approach to Mitigating Stormwater Impacts" ($600K)
    - NCHRP 25-41 "Guidance for Achieving Volume Reduction of Highway Runoff in Urban Areas" ($250K)
    - NCHRP 25-42 "Bridge Stormwater Runoff Analysis and Treatment Options" ($300K)
    - NCHRP 25-51 "Limitations of the Infiltration Approach to Stormwater Management in the Highway Environment" ($500K)
    - NCHRP 25-54 "Field Testing of BMPs Using Granulated Ferric Oxide Media to Remove Dissolved Metals in Roadway Stormwater Runoff" ($400K)

WSDOT has budgeted $2,275,600 in the 2015-17 biennium to implement its permit-required stormwater monitoring program. The department's stormwater monitoring team includes seven permanent staff.

Washington State Conservation Commission (WSCC)

Stormwater Work Group Participation:

- WSCC staff has participated in the Stormwater Work Group (SWG) since its formation, with a short hiatus due to staff turnover.

- WSCC staff provides a link between the SWG and the twelve Puget Sound conservation districts who work with the agricultural community to reduce non-point source pollution.
- Currently WSCC staff participate in the SWG with the aim of identifying ways in which the WSCC and the Puget Sound conservation districts can partner with local jurisdictions and NPDES permittees to reduce non-point source pollution from agricultural operations and rural lands.

Role in Agricultural Runoff Subgroup:

- In 2009, WSCC staff worked to form and staff the Agricultural Runoff Subgroup (ARS). The SWG tasked this subgroup to:

  > *"Review the small streams and near-shore status and trends monitoring parameter lists and consider adding agricultural pesticides and or other parameters for analysis at status and trends sites located outside Urban Growth Area (UGA) boundaries. Design a regional source identification and diagnostic monitoring strategy for agricultural issues. Design effectiveness studies for agricultural BMPs. Describe how the monitoring might be funded and conducted (implementation plan)."*

- Participants in the ARS have included conservation district staff, NGO representation, and local, state, and federal agency representatives. The ARS has worked to complete the tasks assigned and has provided recommendations to the SWG pertaining to pesticide monitoring, bacteria and nutrients from animal sources, cropland monitoring, and effectiveness monitoring. WSCC staff continues to work with the ARS to prioritize recommendations and craft an implementation plan.

Washington Department of Agriculture (WSDA)

Independent Contributions to Monitoring:

WSDA conducts regular ambient monitoring as well as targeted monitoring studies throughout the Puget Sound counties.

- Since 2003, our ambient monitoring program has grown in western Washington to include weekly sampling for 180 pesticides, total suspended solids (TSS), dissolved oxygen, pH, temperature, and conductivity at seven locations around Puget Sound (two in Whatcom, four in Skagit, and one in urban Seattle). The cost for our 27-week sample season in these counties is $200K annually.
- In 2015, WSDA partnered with MEL to assess sediment health in our ambient sampling locations throughout the state. This resulted in analysis of sediment samples at one

urban (Thornton Creek) and two agricultural (Bertrand Creek and upper Big Ditch) sites in King, Whatcom, and Skagit counties three times this year. Total investment: $5.5K

- WSDA is working in partnership with EPA and National Marine Fisheries Service to design and conduct targeted monitoring studies that evaluate the effectiveness of Best Management Practices (BMP's) in agricultural areas improving water quality.
    - In 2015, WSDA tested whether or not the addition of small riparian buffers (25ft or less) alongside streams reduced pesticide loading from farms during aerial pesticide applications. The study was conducted in Whatcom County and is being written for publication now. Total cost for the study (design, planning, field work, lab costs, data analysis) was $90K.

Support for RSMP monitoring:

- In 2015, WSDA partnered with the RSMP to conduct pesticide analysis on sediment from 85 of the monitored sites around Puget Sound. This covered an additional 100 pesticides not included elsewhere. The cost was $49,300.
- In 2015, WSDA worked with Ecology's Manchester Environmental Lab (MEL) to design a method to analyze for glyphosate (active ingredient in Roundup™). An additional 6 week sampling protocol was run at all sites statewide, adding an additional $6K in analysis in Puget Sound counties.

Washington State Department of Health (WDOH)

Independent Contributions to Monitoring:

WDOH conducts ongoing monitoring of lakes and marine beaches, and shellfish beds.

- WDOH partnering with and partially funded by Ecology, finalized and published a paper on bioaccumulation of microcystins in fish from Washington Lakes
- WDOH worked with Ecology's Water Quality Program to develop Water Quality Standards Narrative Criteria for lakes with Harmful Algal Blooms. to be added to the 303d list.
- WDOH analyzed nutrient data associated with Anderson Lake, Jefferson County
- WDOH worked with State Drinking Water Administrators to provide technical assistance for testing state drinking water sources for algal toxin toxicity levels.
- WDOH provided technical support for Washington State residents reporting health issues due to freshwater algal blooms.