Regional Stormwater Monitoring Program (RSMP) Scope of Work (SOW)

Date: July 22, 2013

Purpose: The RSMP is the cumulative regional monitoring effort collectively funded by the Phase I and II Municipal Stormwater Permittees. The purpose of this SOW is to define and describe the RSMP activities and products that will be delivered to permittees and the public by Ecology and contractors from September 2013 through June 2019. The RSMP is divided into three main program components: S8.B Status and Trends, S8.C Effectiveness Studies, and S8.D Source Identification Information Repository.

The anticipated timeline and estimated maximum costs for each program component are presented in Tables 1-3 below. Because the RSMP is being jointly funded by all of the permittees who choose to participate, the final budgets for Tasks 0-3 will be known after all permittees have notified Ecology as to their decision to opt in or out of each component of the RSMP. Permittees are required to notify Ecology of their decisions by December 1, 2013. Check Ecology's RSMP website for updated information.

S8.B Status and Trends

Table 1. Tasks, Timeline and Estimated Costs* for RSMP Status and Trends Monitoring

Task	Implemented by	Anticipated Timeline	Estimated Maximum Costs
0. Program administration	Ecology	Begins in October 2013 with Phase I permittees decisions	$171,000 (about 5% of the total costs)
1. Puget lowland small streams monitoring and assessment	Contractors, including permittees	Ramp-up in 2014, conduct monitoring in 2015	$2,515,000
2.1 Marine nearshore sediment monitoring and assessment	Contractors, including permittees	Ramp-up in 2014, conduct monitoring in summer 2016	$220,000
2.2 Marine nearshore bacteria monitoring and assessment	Contractors, including permittees	Ramp-up in 2014, conduct monitoring October 2015 through September 2016	$67,000
2.3 Marine nearshore mussel contaminant monitoring and assessment	Contractors, including permittees	Ramp-up in 2014, conduct monitoring in winter 2015-2016	$619,000
TOTAL RSMP Status and Trends Monitoring Effort*			$3,592,000* over four years

* Final budget will be known in January 2014.

Task 0. Program Administration, Requests for Proposals, and Contracting

1. Develop a budget for status and trends monitoring based on collective decisions by permittees to opt in or out of the RSMP. The budget will be reviewed by the stakeholder oversight committee
2. Track costs associated with all RSMP fund-sharing program components
3. Participate in a project management oversight process
    a. Manage process to facilitate adaptive management to contracts, monitoring, databases and communication materials (websites, reports, etc)
    b. Inform and receive external stakeholder group recommendations
4. Facilitate an open process to determine who will conduct each of the tasks listed below for status and trends monitoring in small streams in Puget Lowlands and in urban marine nearshore areas of Puget Sound. Contractors may include permittees and/or other stakeholders.
5. Ensure contractors are qualified to conduct RSMP tasks according to approved Quality Assurance Project Plans (QAPPs)
6. Write, enter into, and manage agreements for data collection, management, analysis, and reporting
7. Provide project management oversight to ensure that quality data and products are produced, and data are entered into appropriate databases within the timeframes specified in the QAPPs
    a. Facilitate a process to inform permittees and stakeholders of project needs, schedule changes, or other unforeseen circumstances
    b. Coordinate interlaboratory comparison studies
8. Coordinate an annual review and reporting of results and information generated by the RSMP. In addition to the data interpretation tasks listed below:
    a. Summarize and distribute findings
    b. Cross-walk with information published by other key monitoring programs in western Washington
    c. Recommend new standard methods and protocols to be developed

Task 1. Status and Trends Monitoring in Small Streams in Puget Sound Lowlands

1. <u>Status and trends monitoring for small streams</u>
    a. Prepare to manage data
        i. Work out agreement with King County to store data in Puget Sound Stream Benthos database.
        ii. Create EIM account for water quality, sediment chemistry, and periphyton data
        iii. Confirm that data management tools are available to handle all RSMP data and that all data will be quality controlled, stored and accessible to the public
    b. Confirm sites and prepare for sampling in 2015. Up to 100 sites will be selected for sampling. The number of sites sampled will depend upon the final RSMP budget.

i. Use the site list in the Draft Quality Assurance Project Plan (QAPP). The QAPP is expected to be finalized in 2014. The lists of Master Sample Sites for Puget Lowland streams inside and outside the UGAs have been generated, sorted by county, and are available on Ecology's RSMP website.
ii. Confirm sites and prepare for sampling to begin by January 2015.
    1. For each site that is not accessible or is documented according to the QAPP as otherwise unsuitable, the next sequential site on the list of will be assessed for suitability. Proceed down the lists until required number of sites is found.
    2. Up to 100 sites will be assessed (up to 50 within the UGA, and up to 50 outside the UGA), plus up to 10 reference locations.
    3. The RSMP will not sample sites that are sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2.
    4. The RSMP will not re-sample sites that are monitored as part of Ecology's state EMAP program in 2013. The RSMP will use data collected for Ecology's 10 reference locations.
iii. Procure sample collection equipment necessary to produce data according to the QAPP.
iv. Procure accredited laboratories for analysis.
v. Procure staff for seasonal field work.

c. Prepare to manage small stream status and trends monitoring data
    i. Confirm that data management tools are available to handle all data and that all data will be quality controlled, stored and accessible to the public
    ii. Ensure data quality is evaluated and report all data to the required databases according to the QAPP

2. Conduct status and trends monitoring. Sampling protocols and procedures detailed in the Draft Quality Assurance Project Plan (QAPP) are from previously-approved QAPPs and may be adaptively managed:
    a. Collect and report monthly water quality index (WQI) and instantaneous flow monitoring at the RSMP sites for one year (January through December 2015).
        i. WQI Parameters: total phosphorus, total nitrogen, turbidity, total suspended solids, specific conductance, pH, chloride, fecal coliform, temperature, and dissolved oxygen.
        ii. Estimate streamflow following Ecology SOP #EAP024.
    b. Collect stream benthos and habitat monitoring data at the RSMP sites in summer 2015.
        i. Benthos parameters: aquatic macroinvertebrates and periphyton.
        ii. Water quality parameters: chlorophyll a, ammonia, nitrate-nitrite, total suspended solids, hardness, total phosphorus, total perchlorate nitrogen, chloride, and turbidity
        iii. Habitat monitoring: slope, bearing, habitat unit presence, wetted width, bankfull width, bar width, substrate size, substrate depth, shade, human

influence, riparian vegetation, large woody debris and grain size estimation.

iv. Sediment chemistry parameters
    1. Metals: copper, lead, arsenic, and zinc
    2. PAHs: naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, 2-chloronaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, anthracene, carbazole, phenanthrene, fluoranthene, pyrene, retene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(ghi)perylene, chrysene, benzo(b)fluoranthene, and benzo(a)anthracene

v. Additional sediment chemistry parameters subject to available funding:
    1. Pesticides: 2,4-D, triclopyr, diclobenil, diuron, carbaryl, chlorpyrifos, and imidacloprid
    2. Phthalates: Bis(2-ethylhexyl) phthalate, butyl benzyl phthalate, diethyl phthalate, dimethyl phthalate, di-n-butyl phthalate, and di-n-octyl phthalate
    3. PBDEs: 47, 49, 66, 71, 99, 100, 138, 153, 154, 183, 184, 191, 209
    4. PCBs: all 209 congeners
    5. Hormone disrupting chemicals: PPCPs (EPA Method 1694) and hormones and steroids (EPA Method 1698)

3. Ensure quality assurance and quality control (QA/QC), data reporting, and data analysis and interpretation are conducted according to the approved QAPP.
    a. Participate in interlaboratory comparison studies.
    b. Include results from sites sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2 in data analysis and interpretation.
4. Enter the results to EIM and/or other appropriate databases.
    a. Enter stream benthos data into King County's stream benthos database.
    b. Enter habitat data into Ecology Status & Trends: Riverine Ecology & Assessment Monitoring (STREAM) database.
5. Make recommendations for future status and trends monitoring.

Task 2. Status and Trends Monitoring in Marine Nearshore Areas of Puget Sound

1. Marine sediment chemistry monitoring and assessment
    a. Prepare to manage data.
        i. Create account and enter data into EIM for sediment chemistry data.
    b. Confirm sites and prepare for sampling in summer 2016.
        i. The draft QAPP for this monitoring is expected to be finalized in 2014.
        ii. Select and confirm marine nearshore sites
            1. Up to 40 sites will be selected for sampling. The list of randomly selected sites is being generated. A new nearshore GIS sampling frame is being developed for the 0 to 1 fathom (-1.8m) depth

zone of the nearshore that is adjacent to Urban Growth Areas (UGAs). The nearshore sediment sample site list will be available at Ecology's RSMP website in summer 2013.

2. The RSMP will not sample sites that are sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2.
3. For each nearshore sediment sample site that is not accessible or is documented according to the QAPP as otherwise unsuitable, the next sequential site on the list of alternates will be chosen and must be confirmed

iii. Procure necessary sampling equipment.
iv. Procure accredited laboratories for analysis.
v. Procure staff for seasonal field work.

c. Conduct marine nearshore sediment chemistry sampling during summer 2016 according to the approved QAPP.
   i. Marine sediment chemistry parameters:
      1. Grainsize and total organic carbon.
      2. Metal and metalloids: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, tin, and zinc.
      3. LPAHs: 1,6,7-trimethylnaphthalene, 1-methylnaphthalene, 1-methylphenanthrene, 2,6-dimethylnaphthalene, 2-methylnaphthalene, 2-methylphenanthrene, acenaphthene, acenaphthylene, anthracene, biphenyl, dibenzothiophene, fluorene, naphthalene, phenanthrene, and retene.
      4. HPAHs: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(e)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-c,d)pyrene, perylene, and pyrene.
   ii. Additional marine sediment chemistry parameters subject to available funding:
      1. Phthalates: bis(2-Ethylhexyl) phthalate, butylbenzylphthalate, diethylphthalate, dimethyl phthalate, di-n-butylphthalate, di-n-octyl phthalate.
      2. PBDEs: 47, 49, 66, 71, 99, 100, 138, 153, 154, 183, 184, 191, 209
      3. PCB Congeners: all 209 congeners
d. Ensure quality assurance and quality control (QA/QC), data reporting, and data analysis and interpretation are conducted according to the approved QAPP.
   i. Participate in interlaboratory comparison studies.
   ii. Include results from sites sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2 in data analysis and interpretation.
e. Enter the results to EIM.
f. Make recommendations for future status and trends monitoring.

2. Mussel contamination monitoring and assessment
    a. Prepare to manage data
        i. Create EIM account for mussel contamination data
        ii. Confirm that data management tools are available to handle all RSMP data and that all data will be quality controlled, stored and accessible to the public
    b. Prepare to conduct monitoring in winter 2015-2016.
        i. The QAPP for this monitoring is expected to be finalized in 2014 is expected to be based upon either NOAA Mussel Watch protocols or the Ecology-approved QAPP for WDFW's Mussel Watch Pilot Expansion Study.
        ii. Confirm sites. Up to 40 sites will be selected for sampling.
            1. The list of randomly selected sites in nearshore areas adjacent to Urban Growth Area boundaries is being generated according to the same protocols as the sediment chemistry sites (see 1.B.i above) but limited to the shoreline or to grid cells located along the 0 depth contour. The list of mussel and bacteria sampling sites, plus alternates, will be available at Ecology's RSMP website in summer 2013.
            2. The RSMP will not sample sites that are sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2.
            3. For each site that is not accessible or is documented according to the QAPP as otherwise unsuitable, the next sequential site on the list of alternates will be chosen and must be confirmed.
        iii. Develop sampling schedule to facilitate sampling, laboratories and troubleshoot logistics
        iv. Procure necessary sampling equipment
    c. Coordinate with WDFW, NOAA Mussel Watch and networks of volunteers
        i. Conduct volunteer trainings and facilitate communication
    d. Conduct mussel tissue sampling at RSMP sites during winter 2015-2016 according to the approved QAPP.
        i. Mussel habitat sampling parameters: water temperature, salinity, station location, distance between sub-stations at each site, tidal cycle, height above waterline.
        ii. Mussel biotic measures: %mortality, condition index, lipids, gonadal index and histopathology.
        iii. Mussel chemistry parameters:
            1. PAHs:
                a. LPAHs: naphthalene, fluorene, acenaphthylene, acenaphthene, anthracene, dibenzothiophene, phenanthrene, and retene
                b. HPAHs: dibenzoanthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene,

benzo[e]perylene, benzo[a]pyrene, benzo[z]pyrene, chrysene, fluoranthene, indeno-pyrene, perylene, and pyrene

c. Substituted PAHs: dibenzothiophenes(C1-,C2-,C3-), fluorenes((C1-,C2-,C3-), naphthalenes(C1-,C2-,C3-,C4-), phenanthrenes+anthracene(C1-,C2-,C3-,C4-), chrysenes (C1-,C2-,C3-,C4-), and fluoranthene/pyrene (C1-,C2-,C3-,C4-)

2. Chlorinated pesticides: 2,4'-DDD, 2,4'-DDE, 2,4'-DDT, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha-chlordane, trans-chlordane (gamma), trans-nonachlor, cis-nonachlor, nonachlor III, heptachlor, heptachlor epoxide, oxychlordane, alpha-hexachlorohexane, beta-hexachlorocyclohexane, delta-hexachlorocyclohexane, hexachlorobenzene, aldrin, dieldrin, mirex, and endosulfan I
3. Metals: arsenic, cadmium, copper, lead, mercury, and zinc
4. PBDEs: 28, 47, 49, 66, 85, 99, 100, 153, 154, 155, 183
5. PCB congeners:17, 18, 28, 31, 33, 44, 49, 52, 66, 70, 74, 82, 87, 95, 99, 101, 105, 110, 118, 128, 138, 149, 151, 153, 156, 158, 170, 171, 177, 180, 183, 187, 191, 194, 195, 199, 205, 206, 208, 209
6. Conventionals: total lipids, total solids, δ15 nitrogen, and δ13 carbon

e. Ensure quality assurance and quality control (QA/QC), data reporting, and data analysis and interpretation are conducted according to the approved QAPP
   i. Participate in interlaboratory comparison study
   ii. Include results from sites sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2 in data analysis and interpretation.
f. Enter the results to appropriate state and federal databases
   i. Mussel Watch at NOAA, and WDFW Toxics in Biota database
   ii. Chemistry data to EIM database

3. <u>Bacteria sampling and assessment</u>
   a. Prepare to manage data
      i. Create EIM account for bacteria data
   b. Prepare to conduct monthly monitoring beginning in October 2015. Up to 40 sites will be sampled.
      i. The QAPP for this monitoring is expected to be approved in 2014. It will be based upon former PSAMP and current BEACH monitoring program protocols.
         1. Sites identified and confirmed for mussel contamination monitoring will be sampled for bacteria, if suitable.
            a. Mussel sites that are not suitable for bacteria sampling due to holding time or other requirements will not be

sampled for bacteria. Additional bacteria sites will not be added

2. Develop sampling schedule to facilitate sampling, laboratories and troubleshoot logistics

ii. Develop contracts with local accredited laboratories (near sites)
iii. Procure and prepare necessary sampling equipment
iv. Procure volunteers and coordinate sampling
v. Conduct volunteer trainings

c. Conduct and coordinate monthly bacteria sampling during October 2015-September 2016 and according to the approved QAPP
   i. Parameters: fecal coliform by multiple tube fermentation (9221E)
d. Interpret and report the results as specified in the QAPP
e. Ensure quality assurance and quality control (QA/QC), data reporting, and data analysis and interpretation are conducted according to the approved QAPP
   i. Include results from sites sampled by permittees who opt to conduct individual monitoring according to Phase I permit condition S8.B.1.b or Phase II permit condition S8.B.2 in data analysis and interpretation
f. Enter the results to EIM and notify Ecology's BEACH Program of known water quality violations
g. Make recommendations for future status and trends monitoring

S8.C Effectiveness Studies

Table 2. Tasks, Timeline and Estimated Costs* for RSMP Effectiveness Studies

Task	Implemented by	Anticipated Timeline	Estimated Maximum Costs
0. Program administration	Ecology	Begins in December 2013 when permittees decide if they will participate; RFP process in 2014	$350,000 (about 5% of the total costs)
3. Effectiveness studies	Contractors, including permittees	Begin studies in August 2014 after first permittee payments submitted to Ecology	$7,000,000
TOTAL RSMP Effectiveness Studies Effort*			$7,350,000* over four years

* Final budget will be known in January 2014.

Task 0. Program Administration, Requests for Proposals, and Contracting

1. Develop a budget for effectiveness studies based on collective decisions by permittees to opt in or out of the RSMP. The budget will be reviewed by the stakeholder oversight committee.
2. Write, enter into, and manage agreements with contractors for data collection, management, analysis, and reporting
3. Track costs associated with all RSMP fund-sharing program components
4. Participate in a project management oversight process
    a. Manage process to facilitate adaptive management to contracts, monitoring, databases and communication materials (websites, reports, etc)
    b. Faciliated process to inform and receive external stakeholder group recommendations
5. Facilitate an open process to determine who will conduct each of the tasks listed below for effectiveness studies in Western Washington
6. Develop detailed scopes of work to ensure contractors are qualified to conduct RSMP tasks according to approved Quality Assurance Project Plans (QAPPs). Ensure robust scientific method and quality control procedures are included
    a. Identify opportunities to revise or develop Standard Operating Procedures (SOPs) that apply to multiple studies
7. Contract with successful applicants and provide project management oversight to ensure that quality data and other products are produced and entered into appropriate databases within the timeframes specified in the QAPPs
    a. Facilitate a process to inform permittees and external stakeholders of project needs, schedule changes, or other unforeseen circumstances
8. Coordinate an annual review and reporting of results and information generated by the RSMP or independent monitoring. In addition to the data interpretation tasks listed below:
    a. Summarize and distribute findings
    b. Cross-walk with information published by other key monitoring programs in western Washington
    c. Recommend new standard methods and protocols to be developed

Task 3. Effectiveness Studies

1. Conduct regionally relevant studies on topics that have been recommended through the external stakeholder process and using criteria pursuant to stakeholder group recommendations
    a. For each study, develop a QAPP that includes, as appropriate: site selection; sampling protocols; quality assurance and control procedures; laboratory analytical methods; data storage; data analysis; reporting methods; peer review requirements; and deadlines for publications
    b. Studies will be conducted from August 2014 through August 2018
        i. Some studies may not be completed by the expiration date of the permit; appropriate interim deliverables will be defined
2. Develop standard methods as needed across multiple studies
3. Enter quality-assured data into appropriate databases as required by the approved QAPPs
4. Make results and findings available to the public
5. Recommend future effectiveness studies

S8.D Source Identification Information Repository (SIDIR)

Table 2. Tasks, Timeline and Estimated Costs for SIDIR

Task	Implemented by	Anticipated Timeline	Estimated Maximum Costs
0. Program administration	Ecology	Begins in January 2014 with RFP process	$32,250 (about 5% of the total RSMP costs)
4. Source Identification Information Repository (SIDIR)	Contractors, including permittees	Begin in August 2014 after first permittee payments are submitted to Ecology	$645,000
TOTAL RSMP SIDIR effort			$677,250 over four years

Task 0. Program Administration, Requests for Proposals, and Contracting

1. Write, enter into, and manage agreements with contractors for subtasks listed in Task 4 below
2. Track costs associated with SIDIR program component
3. Participate in a project management oversight process
    a. Manage process to facilitate adaptive management to contracts, monitoring, databases and communication materials (websites, reports, etc)
    b. Faciliated process to inform and receive external stakeholder group recommendations
4. Facilitate an open process to determine who will conduct each of the tasks listed below for creating the SIDIR. Contractors may include permittees and/or other stakeholders
5. Develop detailed scopes of work to ensure contractors will conduct high quality work
6. Contract with successful applicants and provide project management oversight to ensure that quality products are produced and shared within the specified timeframes
    a. Facilitate a process to inform permittees and external stakeholders of project needs, schedule changes, or other unforeseen circumstances
7. Coordinate an independent annual review and reporting of results and information generated by the RSMP or independent monitoring. In addition to the data interpretation tasks listed below:
    a. Summarize and distribute findings
    b. Cross-walk with information published by other key monitoring programs in western Washington
    c. Recommend new standard methods and protocols to be developed

Task 4. Source Identification Information Repository (SIDIR)

1. Develop a *SIDIR Methods and Approaches* webpage or build on another platform as appropriate:
    a. Determine what tools for permittees and others are most needed to identify and remove illicit discharges from stormwater
    b. Identify existing standard operating procedures (SOPs) and protocols for source identification and diagnostic monitoring to include in the repository

   c. Prioritize new standard operating procedures (SOPs) and protocols for source identification and diagnostic monitoring to include in the repository
      i. Recommend GROSS grant or other funding for development of these tools
   d. Develp a QAPP library with data quality objectives and report templates
2. Develop a *SIDIR Results and Findings* database and analyze information from permittees:
   a. Determine data fields and specific information needed to support regional analyses
   b. Propose permittee reporting approaches to populate the database
      i. Develop a format that is easy to use and fulfills annual reporting requirements specified in the permits
   c. Design, develop, and populate the database
      i. Populate the database with information for 2014 that will be provided by permittees in their March 2015 Annual Reports
   d. Conduct the first regional analysis and report results before the end of 2016
3. Conduct further analyses with subsequent annual report data and report results in 2017 and 2018 and include with the third report