

Stormwater Action Monitoring

2017 Annual Report

May 2018



This is the third annual report from the Washington State Department of Ecology (Ecology) on implementation of Stormwater Action Monitoring (SAM), a collaborative program funded by more than 90 Western Washington cities and counties, the ports of Seattle and Tacoma, and the Washington State Department of Transportation (WSDOT). Ecology manages SAM's revenues, expenditures, agreements, and communication of findings.

About SAM

Stormwater Action Monitoring (SAM) is the new name of the regional stormwater monitoring program (RSMP) for municipal stormwater permits.

The goal of SAM is to improve stormwater management, reduce pollution, improve water quality, and reduce flooding. We do this by measuring stormwater impacts on the environment and evaluating the effectiveness of stormwater management techniques.

All jurisdictions large and small can benefit from SAM projects that are designed to produce regionally transferable findings. All permittees can implement SAM findings to protect local lakes, rivers, streams, and Puget Sound.



Highlights

SAM has strategic monitoring categories to answer stormwater management questions.

Status and trends monitoring

Are conditions in receiving waters getting better or worse?

In 2017, all SAM receiving water studies were in data analysis and writing phases. Final reports for bacteria and the first round of mussel monitoring were completed. The second round of mussels were deployed in December. The streams and nearshore sediment reports will be published in early 2018.

Effectiveness studies

How well are required or innovative stormwater management practices working?

Eight SAM effectiveness studies will continue monitoring and/or analysis into 2018, and one study was completed. Five new studies will begin in 2018.

Source identification projects

What are the common sources of illicit discharges and best ways to reduce them?

The completed SAM source identification project compiled and analyzed permittees' data for their 2014 Illicit Discharge Detection and Elimination (IDDE) incidents. Three new projects will begin in 2018.

Communication

What are we learning from SAM projects and how should we use the information?

The first SAM symposium was held in June. A new SAM website was launched with new communication products (project fact sheets, newsletters, and "About SAM" video), individual project pages, final reports, and more.



Program Management



Stormwater Work Group

The Stormwater Work Group (SWG) of the Puget Sound Ecosystem Monitoring Program (PSEMP) is a coalition of representatives of local, state, and federal governments, environmental and business organizations, public ports, tribes, and agriculture.

The SWG formed in 2008 to develop a strategic, coordinated and integrated approach to understanding the stormwater problem in western Washington.

The SWG welcomes participation on the work group's subcommittees and caucuses.

What is the connection between SAM and the SWG?

The SWG sets priorities and makes recommendations to support SAM implementation and other stormwater related monitoring. All SAM projects are selected and approved by the SWG.

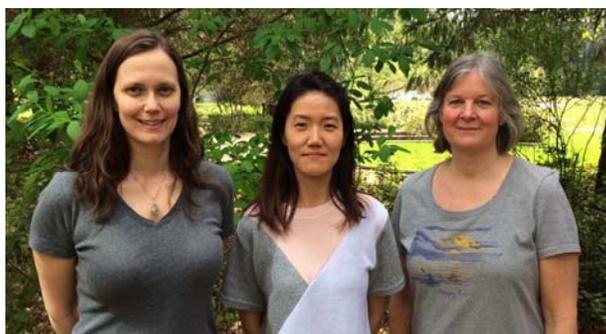
Permittees and state and federal agencies provide funding and leadership on SAM projects. Ecology serves as the administrative entity that manages SAM funds and executes SAM contracts. The Pooled Resources Oversight Committee (PRO-C), a subgroup of the SWG, oversees Ecology's administration of SAM and approves all SAM spending. The PRO-C reviews and approves projects' scopes of work and budgets.

Both the SWG and PRO-C are formal committees. The members represent stakeholder groups. All meetings are open to the public. Agendas are posted on the SWG website: <https://sites.google.com/site/pugetsoundstormwaterworkgroup/>.

Oversight

In 2017, Ecology published four quarterly reports and the 2016 Annual Report on implementation of SAM.

The PRO-C approved 8 contract scopes of work and several amendments, bringing the total number of agreements to 37 for SAM projects from program launch in 2014 through the end of 2017. This number will increase in 2018 as the SWG-approved second round effectiveness studies and source identification projects are brought under contract. The SWG continues to approve projects for SAM to fund and in 2018 will start to identify study topics and questions for a third round of effectiveness studies and new source identification projects. Receiving water study design and approach will also be refined during this time.



Brandi Lubliner, SAM Coordinator; Keunyea Song, SAM Scientist; and Karen Dinicola, SWG Project Manager

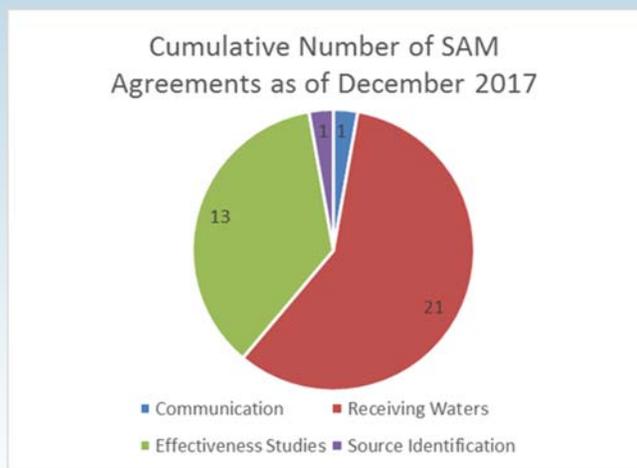
Staff

Ecology is committed to the success of SAM and continues to staff the SWG.

In 2017, the SWG agreed to fund another FTE at Ecology to assist the SAM Coordinator in managing the SAM program and overseeing contracted studies. Ecology hired the SAM Scientist mid-year. The SAM Coordinator and SAM Scientist work with project leads to develop detailed scopes of work for contracting. They review deliverables, approve project invoices, manage cash flow for the three SAM accounts and maintain transparency to permittees and SWG stakeholders.

Contracts and Agreements

Ecology added or extended five agreements and closed five agreements in 2017. Ecology also unencumbered more than \$57,000 in unspent funds from completed and closed agreements with our Environmental Assessment Program for work related to SAM receiving water status assessments.



Budget

Ecology invoiced participants, managed permittees' annual funding contributions toward SAM, and managed payment receipts in [PARIS](#).

A total of \$1,811,975 was spent in 2017 on projects and SAM management. The PRO-C sent a budget summary to SWG reporting that SAM was on track to spend 97% of the total SAM project budgets for 2013-2018, which are approximately: \$3.5 million for status and trends monitoring in Puget Sound; \$6.5 million for effectiveness studies; and \$600,000 for source identification.

Administration costs are estimated to be \$250,000 annually. Ecology is committed to the success of SAM and has contributed over \$750,000 since 2010 to launch and manage the program.



SAM Symposium — June 2017

SAM held its first findings symposium. All SAM studies were showcased for the 108 people in attendance. Each of the 14 study leads highlighted goals, project status, and preliminary monitoring results. Future symposia will highlight completed studies.

SAM staff conducted outreach at conferences and meetings in 2017 including the Washington State Hydrogeology Symposium, the AWC Conference, and Baker to Bay. SAM projects were also featured in several presentations at MuniCon and StormCon.

AWC developed a communication strategy for SAM's target audiences: stormwater managers, public works directors, agency managers, and city/county elected officials. In early 2017, AWC conducted a survey evaluating these audiences' knowledge of SAM.

Communications

New Website

ecology.wa.gov/SAM

Ecology overhauled its website and launched new SAM webpages. Changes were intended to improve search success and accessibility. Ecology asks for patience into 2018 as both old and new content are added to the new website.

Many new SAM communication products were created by the Association of Washington Cities (AWC) this year. On the website, look for:

- ◆ A video introducing SAM
- ◆ Six fact sheets for stormwater managers about SAM and findings of completed studies
- ◆ Newsletters, quarterly reports, and prior annual reports on SAM activities
- ◆ "Pool Party" article interview with City of Battle Ground in *CityVision Magazine* (Sept/Oct 2017).

Status & Trends

Receiving Waters in Puget Sound

SAM is monitoring and assessing the impacts of stormwater runoff in urban and urbanizing areas in the Puget Sound nearshore and small stream environments. In 2017, two of four initial receiving water projects were completed, and one project began a second round of monitoring. Final reports for Puget Sound nearshore sediment and Puget lowland small streams SAM monitoring projects are anticipated in early 2018.

In 2018, the SAM status and trends study leads will convene to discuss the complete set of findings and scientific recommendations for receiving water status and trends monitoring. The scientists will make recommendations to the SWG for a modified design approach and priorities for future monitoring that will be most meaningful for stormwater management.



Puget lowland streams

Throughout 2017, scientists from King County, USGS, Ecology, and Puget Sound Partnership continued to discuss and analyze this large data set from 2015.

Early findings about stream conditions around Puget Sound were presented to the PSEMP Freshwater Work Group and the SWG for feedback on the analysis approach. The final report and recommendations for SAM stream monitoring are anticipated in early 2018.

Shoreline bacteria

The Beach Environmental Assessment Communication and Health (BEACH) manager compiled existing fecal indicator bacteria data from the Puget Sound shoreline. The [SAM shoreline bacteria final report](#) came out in early 2017.

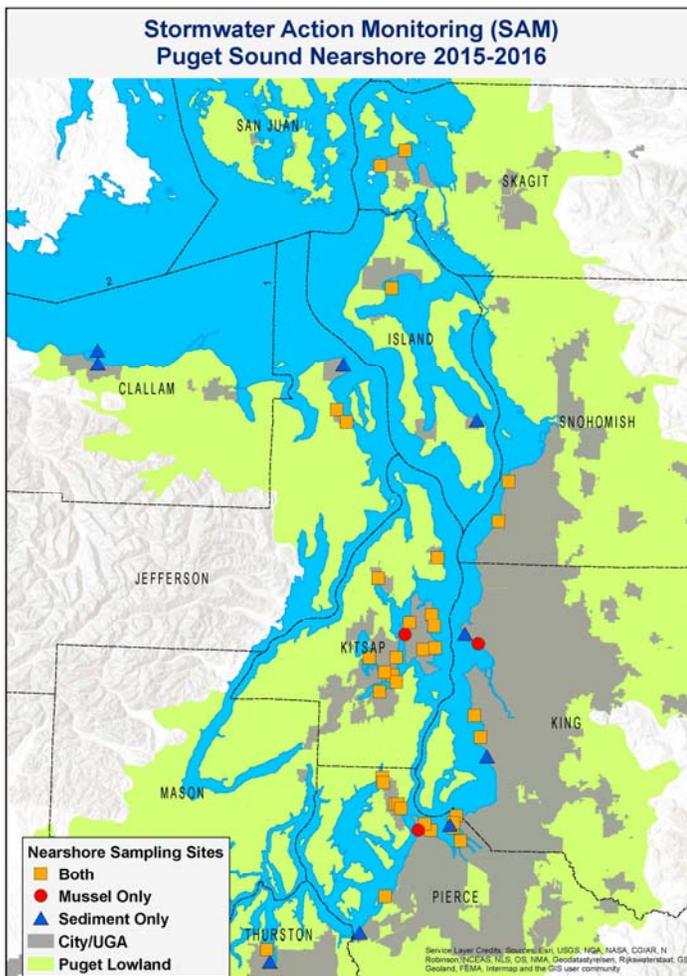
Data from 27 entities with different sampling goals showed diverse results, which were expected. Ambient monitoring programs tend to have lower bacteria levels. Programs that focus on monitoring storm events or source identification tend to have higher bacteria levels. Recommendations to SWG for consideration of a future SAM bacteria sampling effort are to consider leveraging the BEACH programs most urban sites and focusing future SAM bacteria monitoring on effectiveness studies.



Status & Trends

Nearshore sediment

In late 2017, USGS submitted a draft report on the SAM nearshore sediment monitoring data from 2016. The final report, fact sheet, and technical memo are anticipated in early 2018.



Mussel contaminant monitoring

Washington Department of Fish & Wildlife (WDFW) published the [SAM nearshore mussel monitoring final report](#) on the first round 2015-2016 sampling, updated the Quality Assurance Project Plan, and deployed mussels for a second round of monitoring in 2017-2018. WDFW staff presented findings at SWG and PSEMP Toxics Workgroup meetings.

SAM staff wrote a [nearshore mussels technical memo](#) with additional spatial analyses.

A major finding from the first round was that toxic organic contaminants like total PAHs, PBDEs, PCBs, and DDT were correlated to urbanization as measured by impervious surface cover. For metals there was only a weak spatial pattern related to urban development, for zinc.

WDFW deployed mussel cages for the second round of monitoring in December at most of the same 40 randomly selected sites along the Puget Sound urban shoreline.



Effectiveness Studies

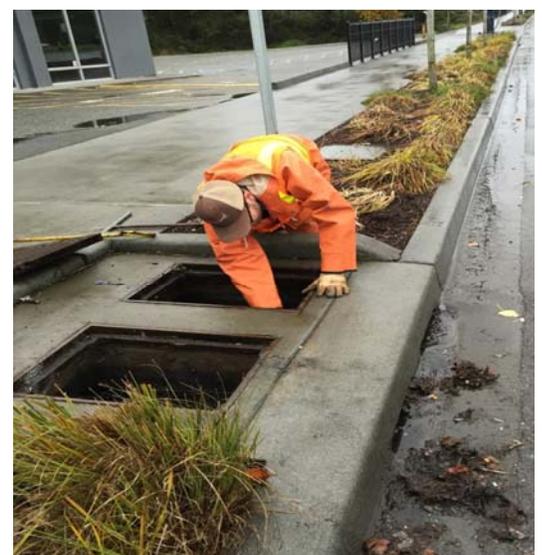
SAM is measuring the effectiveness of BMPs and management actions to reduce stormwater runoff destructive flow and transport of pollutants to receiving waters. All of the first round studies were contracted by the end of 2017. The scopes of work, amendments, and deliverables are posted to each project's page on the SAM website. Fact sheets accompany each completed study's final report.

Low Impact Development (LID)

- ◆ **Bioretention hydrologic performance:** the City of Bellingham finished monitoring at ten bioretention sites across western Washington. Analysis is underway and the final report is expected in 2018.
- ◆ **Rain garden and bioretention assessment protocol:** the City of Puyallup is developing a second iteration of the protocol including training materials and a social science survey. The final report is expected in 2018.



- ◆ **Bioretention amendment with fungi and plants:** U.S. Fish and Wildlife Service and Washington State University are monitoring bioretention mesocosms with fungal amendments at the WSDOT Ship Canal test location. The final report is expected in 2018.
- ◆ **Bioretention reduction of PCBs:** King County's study of treatment and sequestration of polychlorinated biphenyls by bioretention soils is using the same mesocosms as the fungi amendment study. The final report is expected in 2018.



Retrofits

King County completed the [Monitoring Stormwater Retrofits in the Echo Lake Drainage Basin](#) final report. They summarized the stormwater treatment effectiveness of bioretention planters, a Filterra device, and detention tanks. The planters reduced flows and concentrations of most contaminants, but runoff was not always able to enter the planters when inlets were clogged with debris. This study provides new information on treatment of common stormwater organic contaminants and the benefits of retrofits in space-constrained highway corridors.

Retrofits

- ◆ **Watershed scale retrofit and restoration:** the City of Redmond is actively monitoring at seven sites. This watershed-level study will continue for several more years. A new SAM fact sheet describes the 'getting started' phase of this study.
- ◆ **Regional stormwater facility retrofit in Federal Way:** King County completed monitoring of the retrofitted detention pond and bioretention cells that make up the regional treatment facility near the Hylebos Creek headwaters. The final report is expected in late 2018.

Operation and Maintenance

- ◆ **Catch basin cleaning effectiveness:** King County compiled and started analyzing western Washington city, county, and port municipality data gathered by survey in 2017. The final report is expected in 2018.

Source Control

The City of Lakewood completed the [Business Source Control Effectiveness Study final report](#). They summarized Phase I and II permittees' records on the types of businesses, frequencies of inspections, and source control BMPs employed. The study recommended all businesses in the auto/boat, food/retail, and land usage categories be inspected to assess risk. High risk businesses should be inspected annually or every other year. Businesses where issues are identified should be revisited every other month until the problem is resolved. Inspection frequencies of existing programs could be adjusted based on the study findings.

Second Solicitation Round for Effectiveness Studies

The SAM Coordinator, SWG effectiveness subgroup, and Ecology's stormwater engineers reviewed and scored ten full proposals. Eight moved on to the SAM Effectiveness Studies workshop attended by more than 60 stakeholders. Permittees voted to rank the proposals and provided feedback.

The SWG approved five new studies in June. Two more projects were directed to address concerns in their proposals by forming technical advisory committees. One project was encouraged to reapply with more regional partners in a future round of funding.

By the end of 2017, SAM staff had three detailed scopes of work ready for contracting.



Source Identification

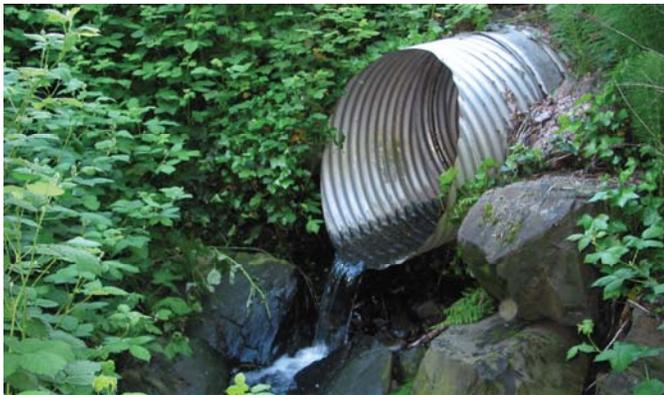
SAM source identification projects identify common problems and propose regional actions on source control to prevent transport of pollutants in stormwater.

The City of Lakewood and published the [Illicit Discharge Detection and Elimination \(IDDE\) final report](#). Permittees' IDDE program investigations and incident responses for 2014 were compiled and analyzed. The regional dataset provided objectivity to understand and address the most common IDDE problems encountered by municipal stormwater permittees. The study found a relatively large number of incidents related to vehicle spills and accidents and confirmed the importance of timely reporting. An expanded and improved list of standard data fields and entry options was developed through this project to provide consistent and useable data while not increasing the time needed for data entry by permittees.

More source identification projects coming in 2018

In 2017, the SWG approved three project proposals recommended by the SWG Source Identification Subgroup. Scopes of work will be finalized in 2018 and project pages will be available on the SAM website. The approved new projects are:

- ◆ **Regional Spill Hotline Feasibility Analysis:** King County will lead a public process to gather ideas and influential factors for implementing a spill hotline that could be used for regional or statewide reporting of stormwater problems and spills, and referral to appropriate response entities.
- ◆ **Updates to the Illicit Control and Illicit Detection Manual:** King County will lead a public process to gather needs and techniques, update the field screening manual, and provide trainings.
- ◆ **Risk-based small business source control:** Seattle Public Utilities will lead a study to evaluate their risk-based outreach approach to source control at small businesses.



Third Solicitation Round Coming in 2019

In 2018, the SWG will begin a year-long process to identify new priority questions and topics for more SAM effectiveness studies and source identification projects. The process will gather ideas and feedback from permittees and others in advance of soliciting proposals for SAM funding.

Bookmark SAM's new website

ecology.wa.gov/SAM

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Special accommodations

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SAM is funded by:

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