

Round 3

SAM Study Selection Workshop

September 16, 2020: 9am – 12 pm

Virtual Workshop – Hosted by SWG, Ecology, & Association of WA Cities



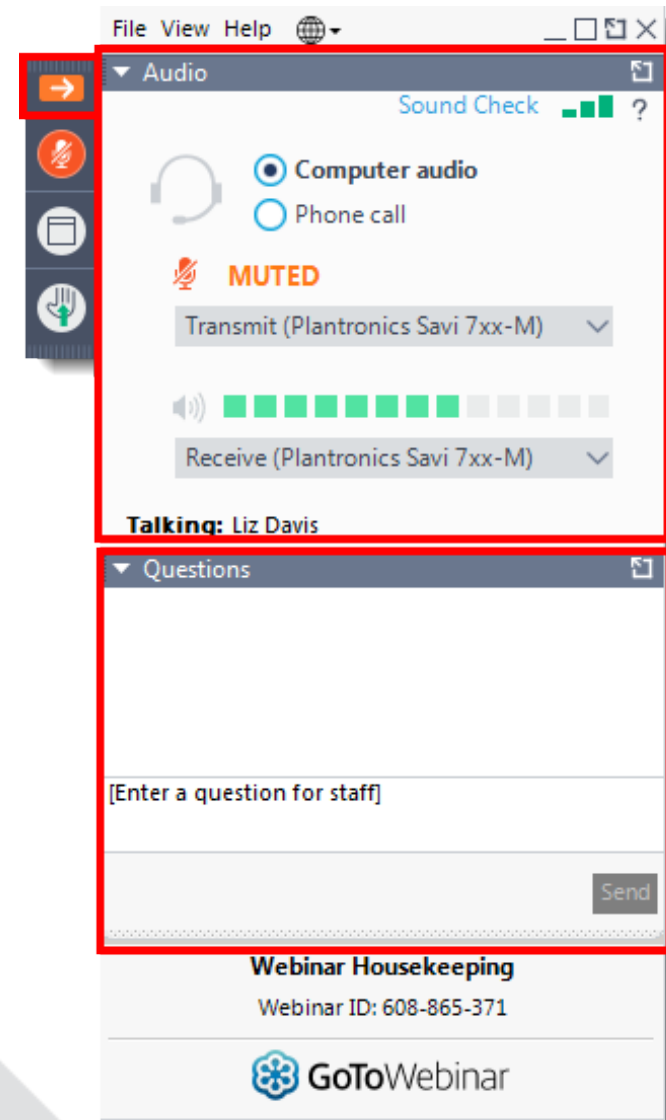
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Round 3

SAM Study Selection Workshop

September 16, 2020: 9am – 12 pm



www.ecology.wa.gov/SAM



9:00 AM – 9:05 AM	Welcome to SAM Round 3 Study Selection Workshop - Dana DeLeon, SWG Chair
9:05 AM – 9:20 AM	Introduction and Workshop Goals - Brandi Lubliner, SAM Coordinator
Literature/Synthesis	Source Control, Source ID, and IDDE
9:20 AM – 9:35 AM	Developing and Refining Source Control Inspection Programs for Businesses (FP5). Washington Stormwater Center (<u>Laurie Larson-Pugh</u>) with City of Olympia (Susan McCleary), King County (Cynthia Hickey), City of Redmond (Tally Young, Ken Waldo), and City of Tacoma (Kurt Fremont)
9:35 AM – 9:50 AM	Mobile Business, Stormwater Source Control, and Multi-Jurisdiction Coordination (FP6). King County (<u>Todd Hunsdorfer</u>) with Aspect Consulting (<u>James Packman</u>)
9:50 AM – 10:05 AM	Break
Literature/Synthesis	LID, Structural BMPs, Retrofits, O&M
10:05 AM – 10:20 AM	Stormwater BMPs Maintenance Conditions Evaluation (FP7). City of Bellevue (<u>Don McQuilliams</u>) with Aspect Consulting (James Packman)
10:20 AM – 10:35 AM	Effect of Particle Size Distribution on Stormwater Characterization and BMP effectiveness (FP1). Washington Stormwater Center (<u>Nigel Pickering</u>) with Osborn Consulting (Aimee Navickis-Brasch)
10:35 AM – 10:50 AM	Replacement and Lifecycle Costs of Permeable Pavements compared with Standard Impervious Pavements (FP4). Washington Stormwater Center (Joseph Cook & Ani Jayakaran)
Literature/Synthesis	Education and Outreach
10:50 AM - 11:05 AM	Addressing Challenges Through Behavior Change and Incentives, and Permittee Guidance for Evaluating the Effectiveness (FP2). Washington Stormwater Center (<u>Joseph Cook</u>) with Osborn Consulting (Aimee Navickis-Brasch)
11:05 AM – 11:20 AM	Break
Sampling Studies	LID, Structural BMPs, Retrofits, O&M
11:20 AM - 11:35 AM	Ditch Maintenance & Retrofits for Improved Stormwater Management (FP3). Washington Stormwater Center (<u>Ani Jayakaran</u>) with Herrera Environmental, Inc. (<u>Dylan Ahearn</u>) and City of Tacoma (Angela Gallardo)
11:35 AM - 11:50 AM	Evaluation of the Long-term Bioretention Soil Infiltration Rate related to Vegetation, Maintenance, Soil Media and Geotechnical Site Parameters (FP8). Associated Earth Sciences, Inc. (<u>Jennifer Saltonstall</u>), with Raedeke Associates, Inc. (Bill Taylor, Anne Cline), Clear Creek Solutions (Doug Beyerlein), and City of Olympia (Eric Christensen)
11:50 AM-12:00 PM	Next Steps and Looking Ahead - Brandi Lubliner, SAM Coordinator

2013-present SAM study solicitation and selection

2008-2012

2013-2014

May 2016 -
Feb 2017

April - June
2017

April - June
2020

November
2020

Solicit
study
topics &
questions

Round 1:
First 10
studies
Selected
and started

Round 2:
Solicit
study ideas
&
proposals

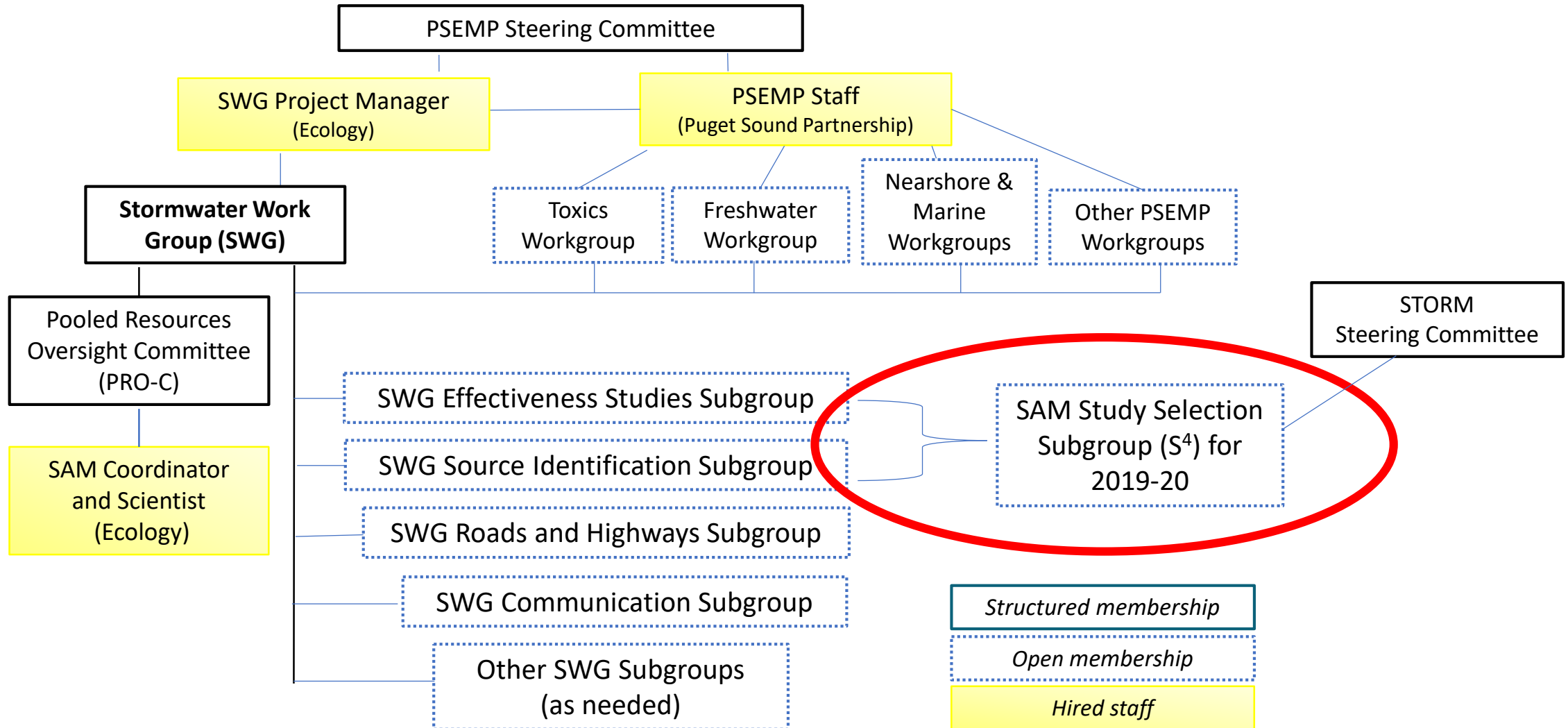
Round 2
Workshop:
permittee
voting and 8
studies
approved

Round 3
Workshop:
proposed
projects,
followed by
permittee
voting

SWG decide
on Round 3
funded
projects and
timeline



**We are
here**



Round 3 SAM Study Selection Process

Topic Priorities

2019

- *SAM Priorities workshop in February
- *SWG formed new subgroup: S⁴ (SAM Study Selection Subgroup)
- *In November SWG approved the final list for Ecology to use for Round 3

Proposal Reviews

2020

- *Solicitations began in January
- *S⁴ feedback on 16 Letters of Interest
- *S⁴ and Ecology Technical review of 9 Full Proposals
- *Formation of study teams

Study Selection

2020

- *8 Final proposal presentations at public workshop (**today**)
- *Caucus discussions (today) and Permittee voting (soon)
- *SWG recommends which projects to fund and when to start (November 18)



Budget & Timeline

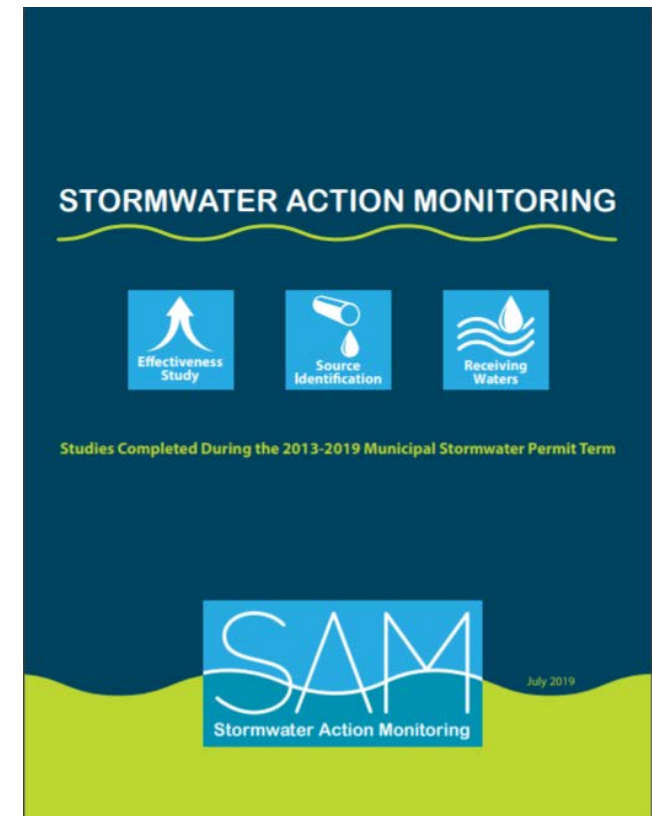
- **Budget for Effectiveness Studies and Source ID projects**
 - Total costs of all Round 3 proposed ideas (~2.2M) would use 2 of the 5 years of funding this permit term (2019-2024) provided by permittees for SAM Effectiveness Studies and Source ID projects (one combined account)
 - Redmond's paired watershed study is a long term project still getting funds thru 2024
 - All of prior permit term (2013-2018) funds for Effectives studies were obligated to the Round 1 and Round 2 projects
- **SAM study timelines are not tied to funding timeframes**
 - New projects timing depends on study objectives, funding, and capacity at Ecology to manage the contracts
 - 2-3 projects can get started right away

How is SAM useful to Permittees?

- SAM studies produce and share findings that are **transferable** to other jurisdictions in the region
 - Inform councils, legislature, permits and manuals
 - Specific approaches to adaptively manage stormwater to protect lakes, rivers, local streams, and Puget Sound
- All jurisdictions can be **involved** by offering sites or technical expertise
 - Permittees participate on projects' technical advisory committees and review draft deliverables

SAM: Stormwater Action Monitoring

- SAM's communication strategy is to share findings regionally and use findings to improve stormwater management practices locally
 - **Study Reports** on stormwater science questions and management needs
 - **Fact Sheets** for all completed studies
 - written for stormwater managers, public works and agency managers, city & county elected officials
 - **Annual Reports** from Ecology as the SAM administrator
 - **SAM Booklet** 5-year synopsis of completed studies
 - **Videos** 2-5 minute accessible explanations



Today's Workshop Goals

- Hear about each of the 8 study proposals
 - Project goal or study design and intended findings
 - Timing – is this flexible or tied to other considerations?
 - Other projects findings, retrofit activities, sampling season
- Make connections, learn how to become involved
 - Ask thoughtful relevant questions to the study/project
 - Share interest, concerns, & considerations
- Presenters hope to hear from you separately about joining their technical advisory committees

FP5: Developing and Refining Source Control Inspection Programs for Businesses

Washington Stormwater Center: Laurie Larson

City of Olympia: Susan McCleary, City of Tacoma: Kurt Fremont

King County: Cynthia Hickey, and

City of Redmond: Tally Young & Ken Waldo

September 16, 2020





Purpose/Need of this Project

- SAM Priority #24: *Develop a source control program guidance manual and trainings to help Phase II permittees*
- Implementation of S5.C.8- Source Control for Existing Development

What problem will the project address

- Most Phase II jurisdictions don't have existing source control programs and have limited resources to developed from scratch
- Regional consistency is difficult to achieve without standard guidance
- Smaller jurisdictions have limited resources to train inspection staff

Approach to answer the problems

- Survey and interview Phase I and Phase II permittees with established source control programs
- Collect program documents including codes, procedures, checklists, forms, etc.
- Produce guidance manual with Best Practices
- Develop and implement training for business inspections



Expected Deliverables

- Regional Source Control Guidance Manual
- Adaptable Templates
- List of Online Resources
- Inspection Training Sessions (4)
- Inspection Training Video

How the Deliverables will be used by permittees

- Utilize deliverables to efficiently develop Phase II source control programs
- Create more consistent regional programs
- Meet permit obligations
- Training for staff
- Resources for existing programs
- Information for budget and staffing decisions

Timeline and budget

- Estimated project cost is \$278,945
 - In-kind TBD
 - Consultant selection using RFP
- Timeline is estimated at 2 years to complete the project
- Start Jan. 2020 to meet permit 2022-2023 deadlines



Contact Information

Project Lead:

- Washington Stormwater Center: Laurie Larson laurie.Larson-pugh@wsu.edu

Technical Advisory Team (TAC)

- City of Olympia: Jeremy Graham
- City of Vancouver: Nikki Guillot
- City of Lacey: Emily Watts
- City of Wenatchee: Kelsey Grover
- We are looking for additional TAC members to represent Phase II jurisdictions

FP6: Mobile Businesses, Stormwater Source Control, and Multi-Jurisdiction Coordination

Todd Hunsdorfer, King County Natural Resources and Parks

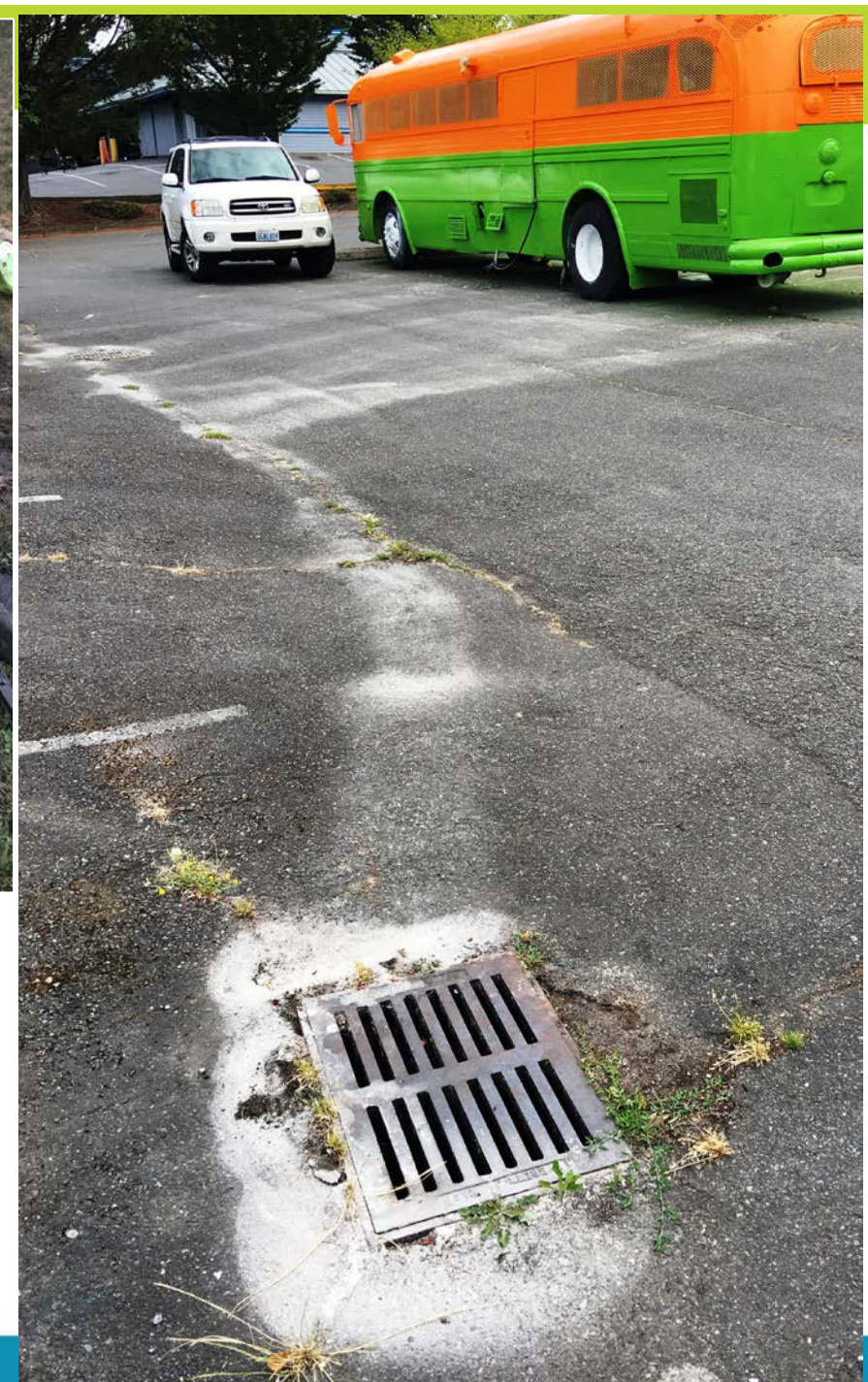
James Packman, Aspect Consulting

September 16, 2020



King County





Purpose/Need of this study

- Mobile businesses have a unique set of challenges for stormwater managers for source control
 - Mobility across jurisdictions boundaries coordination: opportunity for coordination, efficiency, consistency = better source control
 - Business licensing inconsistent for mobile businesses: opportunity to develop improved process for identifying mobile businesses and increasing licensure
- Genesis: jurisdictions' experiences trying to identify, track, contact, and include mobile businesses in source control efforts
 - Examples: City of Kent, hood vent cleaners; King County, food trucks
- Priority Topic Questions (summarized):
 17. What...approaches would...support local government oversight of mobile businesses?
 - 17.1 How can business licensure process...support proper waste handling?
 - 17.2 What are barriers to proper handling of waste?
 23. Evaluate IDDE data...to identify mobile and other multi-jurisdictional business' violations [and] support coordinated and effective multi-jurisdiction enforcement.

Questions the study will answer and approach

1. How can we identify mobile businesses to be included in the inventory of businesses required to meet permit section S5.C.8.b.ii? “businesses...that are pollutant generating.”

Answer: use a combination of business licensing data, proprietary geographic business data (e.g. from ESRI or Google), and crowd-sourced business review data (e.g. Yelp); develop a data capture, ranking, and sorting process.

2. What techniques and recommended best practices can be identified for stormwater managers to coordinate across jurisdictions to identify, track, communicate with, inspect, and enforce mobile businesses for source control?

Answer: develop a best practices guidance document based on TAC and jurisdiction input; test the document and other support resources in a Pilot Study in south King County.

Questions the study will answer and approach (continued)

3. What can we learn to improve source control response to mobile businesses based on IDDE incidences that involved mobile businesses as reported by municipal jurisdictions in 2020?

Answer: review annual report IDDE data from 2020 (first submittal using new reporting format); focus on incidences related to mobile businesses.

Project will include:

- Survey of municipal permittees to capture current practices regarding mobile businesses
- Data request of Ecology to provide the 2020 municipal IDDE data records from the WQWebIDDE system after annual reporting is complete in 2021.

Expected results and outcomes

- Better knowledge about mobile businesses: how many; where and how they operate; associated wastes; IDDE and source control compliance barriers.
- Improved business listing generation process for permittees to implement S5.C.8.ii.b.
- A best practices guidance document to support cross-jurisdiction coordination to track and manage source control issues for mobile businesses.
- A voluntary pilot project among jurisdictions in south King County to test out and refine the business listing procedure and best practices guidance for cross-jurisdiction coordination.

How the results will be used by permittees

- Permittees can use the results from this project in several ways:
 - Develop or update their businesses lists.
 - Improve their source control program efficiency with mobile businesses by coordinating across jurisdictions using best practices.
 - Understand some of the unique challenges for the variety of mobile businesses that have the potential to discharge waste to the MS4.
 - Have a data-driven and pilot study-tested project on which to base programmatic decisions for mobile businesses mobile business source control.



Timeline and budget

- Estimated project cost: \$229,000
- Estimated project timeline: 22 months
- Time-sensitivity:
 - Business inventories due by August 2022
 - Business inspection programs start by January 2023
- Recommended to begin as soon as possible in 2021 to support permittees with meeting the August 2022 business inventory deadline. The business listing process technical memo would be ready 11 months after the project begins.



Contact Information

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James Packman, Aspect Consulting
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Seeking more TAC members!

- Current TAC interest: King County, Cities of Kent, Covington, Maple Valley, Enumclaw, Sammamish.
- Additional members sought from south King County jurisdictions
- Department of Revenue representative



King County



Break until 10:05 am

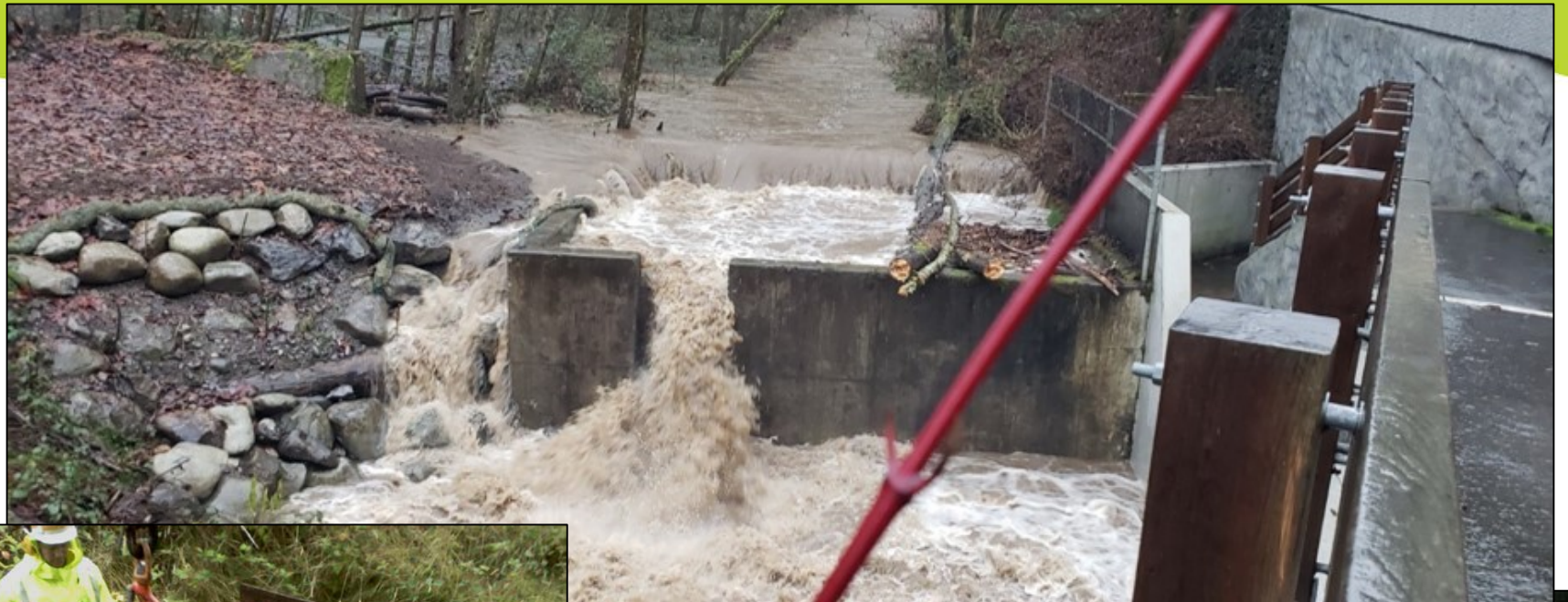
FP7: Stormwater BMPs Maintenance Conditions Evaluation

Don McQuilliams, City of Bellevue
James Packman, Aspect Consulting

September 16, 2020



SAM





Purpose/Need of this study

- Purpose

- To evaluate maintenance thresholds in SWWMM for four types of BMPs: vaults, ponds, tanks, and trenches.
- To provide framework for permittees to evaluate O&M data to potentially reduce maintenance frequency of some BMPs per permit guidance while maintaining water quality.

- Genesis of Project

- Permittee experience with too frequent maintenance on some BMPs and need to reduce O&M costs
- Need for demonstration of water quality benefits or impacts from alternative maintenance frequencies

- Priority Topic Questions

7. What is known about the water quality benefits of the maintenance thresholds that are required in the SWMMWW for vaults, ponds, and trenches?

7.1. Can we more cost-effectively clean vaults, ponds, infiltration trenches, and catch basins

7.2. When is it more effective to replace/retrofit versus provide significant maintenance to a facility?

13. Quantify the habitat and other benefits and reduced O&M provided by mature vegetation in stormwater ponds. Are we still getting the pollutant removal? What are the tradeoffs?

16. Informed by a white paper, do a controlled field study to evaluate maintenance thresholds required in the SWMMWW

Questions the study will answer and approach

1. What are the O&M inspection and maintenance practices and their costs used by western Washington municipal permittees?

Answer: Survey permittees to collect basic information about their O&M programs, costs, and data available with specific emphasis on the four types of BMPs being evaluated.

2. What data are available on O&M practices and their effects on water quality?

Answer: Search published databases for O&M-related data: including Int'l Stormwater BMP Database; Nat'l Pollutant Removal Performance Database; and Nat'l Stormwater Quality Database.

Questions the study will answer and approach (continued)

3. How were some of the maintenance conditions established in the BMP Maintenance Tables of the SMMWW?

Answer: Interview Ecology staff (current and retired) who were or are involved in determining the maintenance conditions for vaults, ponds, trenches, and tanks.

4. What can be learned from O&M data and records already collected by western Washington municipal permittees?

Answer: Perform a pilot data analysis study with data from a few volunteer jurisdictions to evaluate facility inspection and maintenance type, frequency and triggering conditions, land use, and water quality if available.

Surveys and Data Requests:

- Participation in pilot study data analysis will be by a few volunteer TAC jurisdictions.
- No data request will be made of all permittees

Expected results and outcomes

- **Technical memorandum** with information on western Washington municipal stormwater O&M practices in use and costs.
- **Technical memorandum** on the origins and basis of maintenance conditions for selected BMPs in the SMMWW BMP Maintenance Tables.
- **Technical memorandum** on published data based on stormwater facility O&M activities.
- **Technical memorandum** on the pilot analysis of permittee O&M data and records.
- **White paper** with recommendations for how permittees can make informed decisions about stormwater facility inspection and maintenance frequency.

How the results will be used by permittees

- Learn about maintenance schedules and practices in use in western Washington.
- Make data-driven decisions about stormwater facility inspection and maintenance based on published international and local data and BMP-specific conditions.
- Perform a follow-up controlled field study to evaluate alternative maintenance frequencies for selected BMPs.
- Consider updates to the BMP Maintenance Tables in the SMMWW.

Timeline and budget

- Estimated project cost: \$187,000
- Estimated project timeline: 22 months
- No permit-related time-sensitivity
- Schedule could be up to 24 months depending on start date relative to holidays and annual reporting period.



Contact Information

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James Packman, Aspect Consulting
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- Seeking more TAC members!
 - Have expressed interest: Cities of Bellevue, Kirkland, Sammamish, Redmond, and Newcastle
 - Additional representation sought, especially from Phase Is, non-Puget Sound Phase IIs, and Ecology

FP1: Effect of Particle Size Distribution on Stormwater Characterization and BMP Effectiveness

Washington Stormwater Center (Nigel Pickering)

Osborn Consulting (Aimee Navickis-Brasch)

September 16, 2020



Purpose/Need of this study

- Purpose
 - This synthesis study will document the importance of particle size distribution (PSD) for pollutant load and BMP effectiveness, providing a white paper and specific guidance for permittees
- SAM Priority Addressed
 - Low Impact Development (LID), Structural BMPs, Retrofits, Operation and Maintenance (O&M) – *Topics for White Papers*
 - #6. Which BMPs are most effective under typical pollutant loadings/sediment particle size ranges?

Questions the study will answer

- What is the importance of PSD for pollutant loads?
- How does PSD affect post-construction BMP effectiveness?
- When is pre-treatment needed based on PSD?
- When is the receiving water body likely to be impacted by PSD?
- How should PSD be measured for accurate and repeatable results?

Approach to answer study question

- Project Team: Two senior researchers, one assistant researcher, and one graduate student
- Project Duration: 12 months for data review, report, white paper, and guidance document
- Systematic review of available literature, databases, and regional reports to investigate:
 - Influence of PSD on stormwater characteristics from various sources
 - BMP effectiveness as a function of PSD
 - Impacts of PSD on receiving water bodies
 - Appropriate methods for measuring PSD

Approach to answer study question (cont.)

- Data Analysis
 - Data sources rated for quality
 - Data analysis and statistics
 - Tables
 - Graphics
 - Correlations/regressions
 - Conclusions
- Reporting
 - White paper – synthesis of findings
 - Guidance document for permittees

Expected results

- Improved pollutant load estimates
- Improved receiving water impact estimates
- Improved understanding of BMPs for PSD effectiveness
- Improved PSD measurements
- White paper and guidance document

How the results will be used by permittees

- Improved pollutant loads – prioritize drainage areas
- Improved impact estimates– prioritize receiving waters
- Improved BMP effectiveness – better performance and less cost
- Improved measurement – more accurate results
- Improved guidance – assist with making informed decisions
- Improved understanding of why/when PSD is important

Timeline and budget

- Estimated project cost is \$116,270
- Timeline is estimated at one year to complete the project
- Project has no sampling component
- Project is not time sensitive



TAC Members

- TAC Members Confirmed:
 - City of Tacoma
 - WSDOT
 - Ecology
- Additional TAC members (1-2) will be invited:
 - Phase II

Contact Information

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THANK YOU!!

QUESTIONS?

FP4: Replacement and Lifecycle Costs of Permeable Pavements compared with Standard Impervious Pavements

Washington Stormwater Center (Joe Cook and Ani Jayakaran)

September 16, 2020



Purpose/Need of this study

- Topic 3: Quantify the benefit of replacing traditional pavement with permeable pavement. What are the lifecycle costs of permeable pavement?

Question the study will answer

- Topic 3: Quantify the benefit of replacing traditional pavement with permeable pavement. **What are the lifecycle costs of permeable pavement?**

Approach to answer the study question

- Survey Puget Sound jurisdictions with experience installing permeable pavements; snowball sample. Expected ~5-10. Ask for data on construction costs and maintenance costs (see last slide for draft questions)
- Review academic and case study literature nationally and internationally

Expected results

- White paper describing
 - results (de-identified) of Puget Sound survey,
 - summary table of other case study and academic articles,
 - Possible regression/meta-analysis for lifecycle costs

How the results will be used by permittees

- Permittees will have higher quality information on the likely costs of pursuing permeable pavements in their jurisdictions.



Timeline and budget

- (Revised) estimated project cost is ~\$45,000
- Timeline is estimated at 9 months to complete the project



Contact Information

- Joe Cook (joe.cook@wsu.edu)
- Ani Jayakaran (anand.jayakaran@wsu.edu)

Draft survey questions

1. Total construction costs

- Total square footage of project, design parameters (e.g. pavement type, soil type, design traffic load, depth of aggregate and sand, etc.)
- If traditional pavement, what are the costs of additional stormwater management incurred – kerb/gutter, ROW purchase, stormwater detention, catch basins, etc.
- Year of construction
- Can costs be disaggregated by a) design, b) excavation c) materials (sand, asphalt, etc), and d) labor ?
- if multiple bids were received to do the work, would it be possible to share the (anonymized) total bid amounts of all bids received, to help us understand the spread of bids.

2. Expected design life of the pavement

3. Maintenance protocols used or expected to be used.

- What activity and what frequency? (e.g. streetsweeping, patching potholes)
- Is this activity done by jurisdiction personnel or outsourced? If outsourced, what are the contours of the maintenance contract (total cost, duration, expectations, etc).
- What is the personnel requirement (e.g. person-hours of staff)? What general salary level (including benefits) would be appropriate for that person?
- Do the protocols for permeable pavement need specialized equipment? If so, does your jurisdiction own that equipment? What was the purchase price? How many miles of permeable pavement is this equipment currently serving? If not owned, can this equipment be leased, and at what cost?
- Do the protocols for either need any sort of chemicals or supplies? If so, what are the costs?
- Are there any additional testing requirements (e.g. perc tests) needed for permeable pavements that would not be required for traditional?

FP2: Addressing Challenges Through Behavior Change and Incentives, and Permittee Guidance for Evaluating the Effectiveness

Washington Stormwater Center (Joe Cook, Ani Jayakaran, Laurie Larson-Pugh)
Osborn Consulting (Aimee Navickis-Brasch)

September 16, 2020



Purpose/Need of this study

- **SAM Effectiveness Study & Source Identification Project Round 3 Request for Proposals; E&O Topics for White Papers:**
 1. What types of stormwater problems are appropriate for meaningful behavior change efforts?
 2. For stormwater issues that are effectively influenced by behavior change efforts, what are the most effective behavior change tools?
- **Compliance support for S5.C.11 (Phase I) and S5.C.2 (Phase II):**
 - Provide guidance for effectiveness evaluation and reporting results

Approach to answer study questions

- **Which stormwater problems?**

- *Key informant interviews, web-based survey of Phase I and II jurisdictions*

- **Which behavior change tools are effective?**

- *Literature review of E&O programs inside and outside Puget Sound and WA; evaluate research quality.*

- **Matching problems and behavior change tools.**

- *Decision support tool and web-based database of E&O programs (like bmpdatabase.org)*

- **How to evaluate effectiveness of chosen E&O programs?**

- *Interviews, literature review, and pilot testing to develop tools and templates for permittees that meet requirements of S5.C.11 and S5.C.2*

Expected results

- **White paper** summarizing nationwide evidence on effectiveness of various E&O programs
- **Decision support tool and website** documenting E&O programs, evaluations, and related studies
- **Templates** that provide guidance for evaluating effectiveness and reporting results; *develop and validate with TAC*
- **Training manual** that provides *just in time* guidance for applying tools developed during study

How the results will be used by permittees

- **Whitepaper**
 - Reference to understand work complete
- **Decision Support Tool and Website**
 - E&O Resources: access information that can inform decision making
- **Effectiveness Templates**
 - Streamline effectiveness evaluation and reporting
- **Training Manual**
 - Just in time training available when needed

Timeline and budget

- Estimated project cost is **\$260,053**
- Timeline is estimated at **1.25 years** to complete the project
- **E&O time sensitive** permit deadlines
 - July 1, 2020 - Evaluate Effectiveness of Behavior Change
 - February 1, 2021 – Develop E&O Campaign
 - Develop strategy & schedule including **evaluation plan**
 - April 1, 2021 – Implement Strategy



Technical Advisory Committee

- Confirmed TAC Members
 - Clark County
 - Snohomish County
 - Kitsap County
 - Thurston County
 - STORM
 - City of Shoreline
 - City of Wenatchee
- Add 3-5 more TAC Members
- Quarterly meetings

Contact Information



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Laurie Larson-Pugh:
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(253)445-4593

Break until 11:20 am

FP3: Ditch retrofits for improved stormwater management

A. Jayakaran and M. Neff – WSU

D. Ahearn – Herrera Environmental Consultants

A. Gallardo – City of Tacoma

September 16, 2020



Purpose/Need of this study

- Ditches are an under-exploited potential to mitigate stormwater quality.
- Installing ditches that require the least maintenance over time is critical.
 - *Priority topic 14: Compare cleaned/uncleaned ditches to assess effectiveness of ditch cleaning at removing legacy pollutants. Include evaluation of likely release of pollutants.*
 - *Priority topic 15: Evaluate effectiveness of ditch enhancement techniques at removing pollutants.*

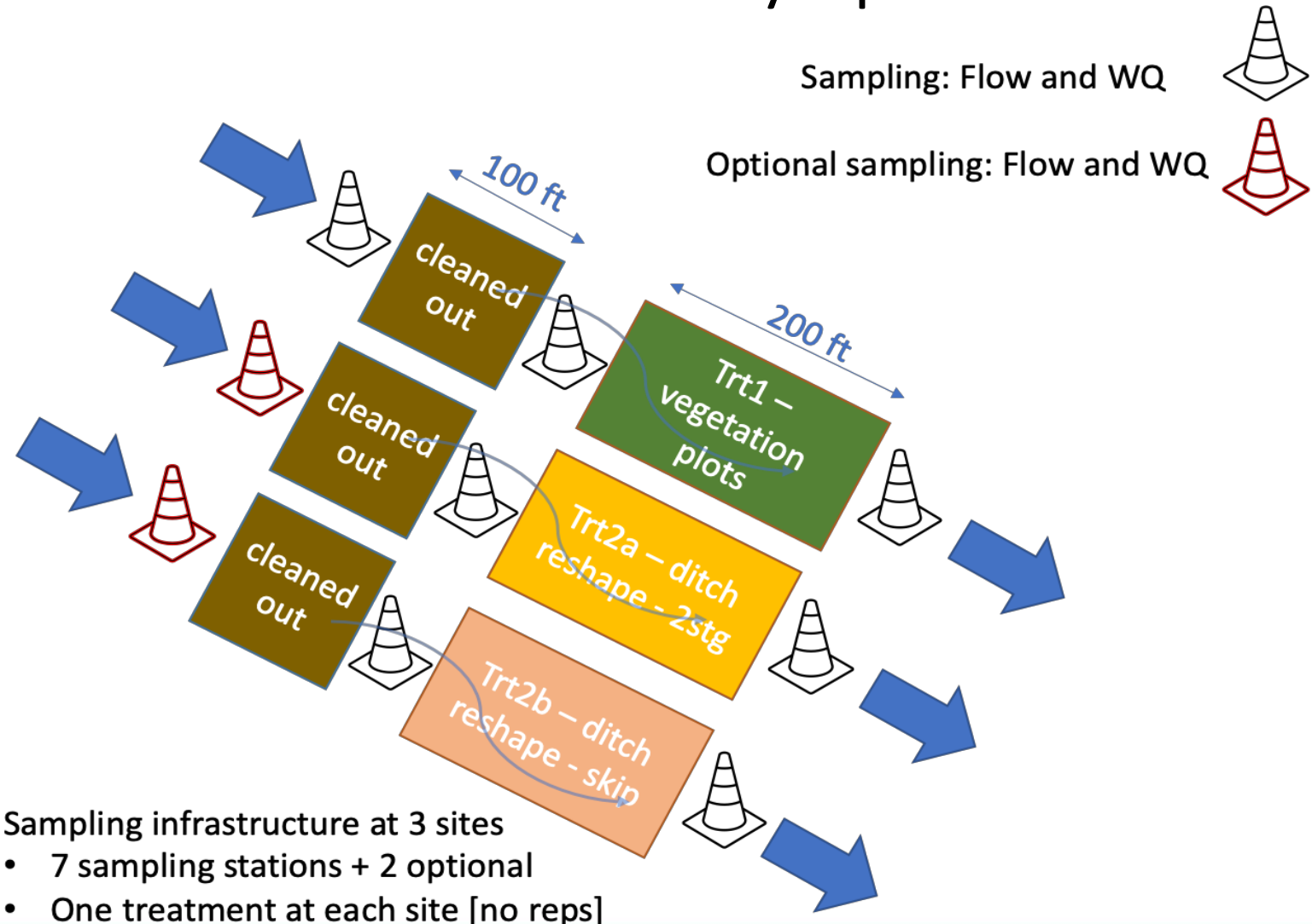
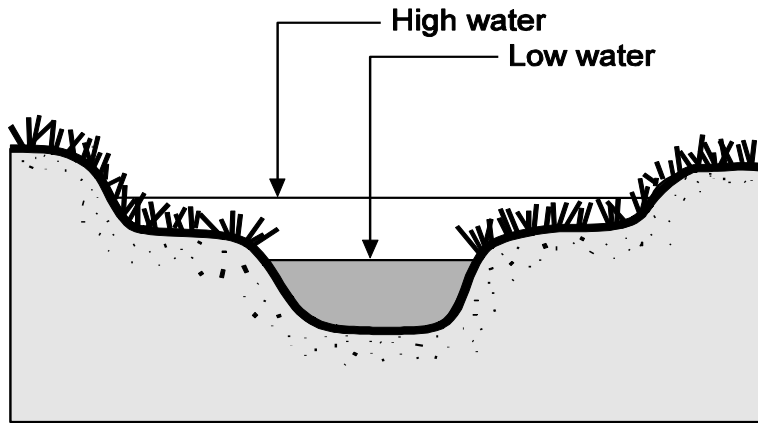
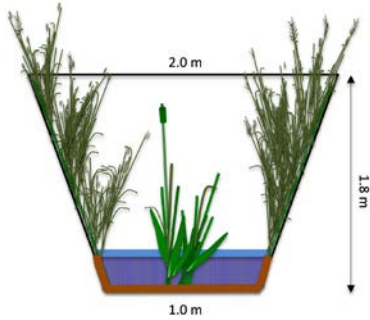


Questions the study will answer

- Can alternative ditch forms - two-stage, and skip-ditch - provide for more stable and ditches with better water quality?
- Will a more ditch-specific planting palette provide for better ditch management?



Approach to answer the study question



Sampling infrastructure at 3 sites

- 7 sampling stations + 2 optional
- One treatment at each site [no reps]

Expected results

- Pollutant removal rates by enhanced ditches.
- Effort associated with enhanced maintenance
- Seed mix for roadside ditches in W Wa

How the results will be used by permittees

- Permittees will know:
 - How well two-stage and skip ditch systems perform – maintenance and water quality.
 - What plants are best suited for ditch environments in western WA.
 - Sediment and contaminant release when ditches are ‘cleaned out’.
 - How much water quality benefit can be reaped from actions in just the roadway prism.

Timeline and budget

- Estimated project cost is \$481,454
- Timeline is estimated at 3 years to complete the project
- We have to do earthwork in the summer, and plant in early fall. Ideally – summer 2021 and fall 2021.



Contact Information

- Ani Jayakaran – anand.jayakaran@wsu.edu
- Current TAC commits:
 - Doug Navetski – King County
 - Shanti Colwell – City of Seattle
 - Nic Graves – Kitsap County
 - Others contacted...

FP8: Evaluation of the Long-Term Bioretention Soil Infiltration Rate Related to Vegetation, Maintenance, Soil media and Geotechnical Site Parameters

City of Olympia, Eric Christiansen, P.E.

PI: Bill Taylor, Tayler Aquatic Science

Prime: Jennifer Saltonstall, Associated Earth Sciences, Inc.

Team: Anne Cline, Raedeke Associates, Inc. and Doug Beyerlein, Clear Creek Solutions, Inc.

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Purpose/Need of this study

- Anecdotal uncertainty exists among jurisdiction staff about bioretention longevity due to clogging and compaction and cost of maintenance
- Does clogging and compaction reduce bioretention lifespan?
- What factors contribute to longevity or reduced infiltration?
- Question 16. Informed by a white paper, do a controlled field study to evaluate maintenance thresholds required in the SWMMWW.
- Question 11. Gather data about eligible SSC project types to inform future requirements and/or implementation

Question the study will answer

- This study is about bioretention facility lifespan
- Point-in-time checkup on 50 older (10 years or older) bioretention facilities
- “Do older facilities still work?” i.e., do they exhibit sufficient infiltration?
- Measure infiltration rates, maintenance practices, and influencing design factors

Approach to answer the study question

- Directly measure **infiltration rates** of 50 bioretention facilities and associated contributing factors (vegetation, **maintenance**, drainage area and ratios, etc.)
- Conduct a concise telephone survey with each facility owner to identify the extent and frequency of maintenance
- Permittee interaction is only to assist in finding older sites – 15 sites already identified with over 60 individual cells

Expected results

- Outcome 1: are older facilities still working?
- Outcome 2: identify design factors and maintenance practices supporting long-term infiltration
- Outcome 3: site conditions that correlate to continued infiltration
- As a result of these findings – we will suggest important design features to agency reviewers and the design manual

How the results will be used by permittees

- **For confidence!** Enhance permittees' design and maintenance support for longevity in region-wide use of bioretention
- **Also: reduced capital and maintenance costs, and greater assurance in attaining receiving water goals!**
- Results from maintenance practices and design factors will directly inform guidance in the SWMMWW

Timeline and budget

- Estimated project labor cost is \$9,200 per study site – or \$615,000 with reporting and contingencies (could select fewer than 50 cells)
- Timeline: ~1 year to complete
- The project should start in **winter** to achieve site selection and then be ready to conduct the vegetation assessment in **late spring**

Contact Information

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- *TAC Participation: one benefit gained from our previous bioretention projects is a data base of participating jurisdictions with staff interested to join a TAC.*

Next Steps - Permittee Voting and SWG

- Following the workshop, a survey link will be sent to all permittees for voting on the Round 3 proposals
 - Each jurisdiction is allowed a single vote for their top three choices
- Stormwater Work Group (SWG) determines which projects to fund
 - Also which will begin first based partly on the results of the voting and further considering study timeframes
- Ecology will begin contracting after SWG final recommendations are made in November

How can you be involved – beyond voting

- Join a technical advisory committee (TAC)
 - This is the best way to ensure relevance to multiple stormwater audiences
 - **We need you to volunteer**; typical workload is limited to reviewing draft versions of major deliverables
- Participate in the Stormwater Work Group (SWG)
 - Meetings are open to public, caucuses designate representatives “at the table”
 - Attend the caucus meetings: SWG has 4 currently active caucuses (local gov’t, state, federal, environmental) and seeks more participation from business groups and tribes
- Follow active projects and share study findings/communication materials with your colleagues
- Sign up for the SAM listservs

www.ecology.wa.gov/SAM

ABOUT



www.ecology.wa.gov/SAM

Thank you!

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