SWG 6PPD Subgroup Meeting Notes

December 13th, 2023

1:00pm – 2:30pm PST

90 participants

Welcome

Eli Mackiewicz, SWG 6PPD Subgroup Co-Chair

Eli gave an overview of the agenda. Eli also described the purpose of this space, which is to share emerging information about how to effectively manage 6PPD and 6PPD-quinone in stormwater. Eli wants these meetings to be useful to participants and welcomes any ideas about what should be included in future meeting agendas, such as research presentations from subject matter experts. If you have an idea for what you would like to learn about in a future meeting, please contact Eli at emackiewicz@cob.org.

Updates from the Washington State Department of Ecology (ECY)

Madison Rose Bristol, SWG Interim Coordinator

6PPD Funding Opportunities: Ecology has over $3 million available for new 6PPD BMP effectiveness studies through 3 funding opportunities – 6PPD Interagency Agreements (IAAs), 6PPD Request for Proposals (RFP), and the Stormwater Strategic Initiative (SIL) RFP. ECY will be publishing outreach materials in early 2024 describing these three 6PPD funding opportunities, which will be shared on this webpage.

Ecology is seeking proposals for IAAs to partner with public organizations – such as Tribal Nations, government agencies, and public universities – to research 6PPD BMP effectiveness. Additionally, Ecology will be publishing a RFP for BMP effectiveness research in early 2024. This RFP is open to all applicant types; however, since the IAA process is non-competitive, it is recommended that public organizations pursue this over applying to the RFP. The National Estuary Program SIL will also be publishing an RFP in early 2024 to research contaminants of emerging concern, toxic hot spots, and BMP effectiveness. Please reach out to Madison at madison.bristol@ecy.wa.gov if you have questions.

New 6PPD Staff: Madison shared that ECY has hired one new staff member to assist with 6PPD stormwater planning. Shelby Giltner joined ECY in November 2023 and will serve as an environmental engineer.

Updates from Stormwater Work Group Study Selection

Madison Rose Bristol, SWG Interim Coordinator

At the last SWG general meeting on November 15, 2023, SWG members voted to approve several Stormwater Action Monitoring (SAM) proposals for funding. 6PPD-quinone is a parameter for three of these studies, including: a street sweeping effectiveness study in Seattle (Full Proposal (FP) 2), testing the effectiveness of High Performance Bioretention Soil Mix (HPBSM) at a full-scale facility in Bellingham (FP 3), and monitoring for contaminants of emerging concern throughout Western Washington (FP 8). Ecology offered to partially fund all three of these proposals and to fully fund and manage an additional proposal: a synthesis of street sweeping research and practices (FP 1). For a summary of these funding decisions, see this document

Group Discussion

Eli Mackiewicz, SWG 6PPD Subgroup Co-Chair

During every SWG 6PPD Subgroup meeting, Eli creates space for participants to share and discuss research updates or relevant work. Three notable subjects were addressed in this meeting:

New Publication: "Tire additives: Evaluation of joint toxicity, design of new derivatives and mechanism analysis of free radical oxidation" describes new research that investigates the toxicity of 6PPD alternatives in tires. Toxicity testing is important because 6PPD should be replaced by an environmentally friendly, less toxic alternative.

WSDOT Retrofit Prioritization Map: The Washington State Department of Transportation (WSDOT) has published the WSDOT Stormwater Retrofit Prioritization WORKING DRAFT Web Map. They are actively seeking feedback on this GIS planning tool through this survey, with a focus on data layer inputs, weighting, scoring, and overall output. The stormwater retrofit prioritization considers three main categories: salmon recovery and ecosystem health, reducing pollution, and addressing health disparities. One component of the prioritization considers specific recommended priority locations provided by Tribal Governments, municipalities, and interested parties and can be accessed through this survey .

This GIS map also includes elevated structures, which are high potential sites for retrofits and using bioremediation to manage 6PPD-q. WSDOT is available to meet upon request with those interested in talking more about this draft tool. Contact Tatiana Dreisbach at tatiana.dreisbach@wsdot.wa.gov. Learn more from WSDOT's Stormwater Retrofit Toolbox.

Research Topics of Interest to SWG 6PPD Subgroup Members: Eli asked subgroup members what kinds of research topics they would like to hear about at future meetings. The following research topics were suggested: whether or how beaver dams help decrease downstream 6PPD-q concentrations, the role that retention time plays in reducing 6PPD-q toxicity, and an

assessment like that for total maximum daily load (TMDL) to determine the total mass loading reductions needed to reduce 6PPD-q concentrations below amounts that cause acute coho mortality.

Presentation: Presentation Slides

Curtis Hinman on behalf of King County

Curtis gave a mid-project update from King County's "Testing Removal of 6PPD-q and Coho Salmon Lethality by High Performance Bioretention Media Blends" project, which is funded by ECY. The presentation and discussion addressed these topics:

Study Design: This study is a column array, and they are using a media lab at Western Washington University in Bellingham. They are testing ECY's compost-based bioretention soil media (BSM) and high performance bioretention soil media (HPBSM), and each blend is replicated 3 times. The blends include:

1. Treatment 1, which is a BSM with a ratio of 60% sand, 40% compost layer. This mix alone is not appropriate to install within a quarter mile of sensitive waters and salmon-bearing streams since it can create copper, bacteria, phosphorus, and other nutrient issues. This is why the following 3 HPBSM could be helpful for 6PPD-q.
2. Treatment 2, an 18-inch HPBSM primary layer consisting of 70% sand, 20% coconut coir, and 10% biochar.
3. Treatment 3, consisting of the Treatment 2 HPBSM primary layer plus a 12-inch polishing layer comprised of 90% sand, 7% activated alumina, and 3% iron aggregate.
4. Treatment 4, consisting of the Treatment 3 HPBSM plus a 2-inch compost layer, which has the added benefit of very robust plant growth.

They are running very contaminated stormwater from the I-5 Ship Canal Test Facility through these soil mixes and evaluating the influent and effluent concentrations of 6PPD-q, total suspended solids (TSS), conductivity, pH, and additional parameters. For this study, they are also testing acute mortality directly with juvenile coho salmon for Treatments 1, 2, and 4. Treatment 3 is not being tested due to funding constraints.

Preliminary Results: So far, they have been able to conduct 2 out of 3 experiments and have had promising results. While the influent concentrations for 6PPD-q were between 0.23 - 0.79 ug/L, all four BSM were able to reduce 6PPD-q levels in the effluent to below the LC50 for coho salmon (0.04 - 0.10 ug/L) - aka the concentration at which half of the test population experiences acute mortality. For all 3 treatments tested, coho survival significantly increased from only 5% survival in the influent to 100% survival in the effluent. In previous research, they have monitored these BSMs over 2 years for metals, phosphorus, nitrogen, hydrocarbons (motor oil, diesel, PAH), and bacteria with no reduction in water quality treatment effectiveness.

Implications: This study will help ECY further develop HPBSM guidance for 6PPD-q and additional contaminants. ECY published guidance on HPBSM in 2021, and will be updating the stormwater management manuals with new guidance during this permit reissuance cycle. At this time, HPBSM is more expensive than BSM, but HPBSM is helpful for use in situations where copper, nutrients, and bacteria are an issue. Otherwise, using the 60:40 mix is still encouraged.

Wrap Up

Eli Mackiewicz, SWG 6PPD Subgroup Co-Chair

Future Meetings: The next SWG 6PPD Subgroup meeting is scheduled for **March 13, 2024 from 1-3pm**. To receive an invite to this meeting, subscribe to this listserv. Eli also noted that he would like to host an in-person meeting for Summer 2024 – outside of the rainy season. After some discussion, it seemed like Bellingham and Mukilteo would be willing to host. If it was hosted in Bellingham, Curtis would be willing to give a lab tour. A hybrid option for the meeting is available in Mukilteo.

Closing Thoughts: Eli closed with a series of questions and participants also contributed questions. Receiving an update on laboratory standards should be addressed in a subgroup meeting in 2024. The applicability of laboratory standards to field work is a very intriguing question. If you found a dead coho, what killed it? Does anyone out there know if urban runoff mortality syndrome (URMS) has a particular post-mortem signature? For adult or juvenile coho mortality? There is also a need for sampling 6PPD-q in water, sediment, and tissues. ECY is close to developing a water methodology and is moving forward on developing methods for sediments and tissues. Eli hopes that this subgroup continues to be a space to share important questions such as these.

View the SWG 6PPD Subgroup Website

We regularly update the SWG 6PPD Subgroup website with information about upcoming meetings, past meeting materials, and important SWG documents.

Contact Us

The SWG 6PPD Subgroup is organized by a dedicated team of stormwater staff. Please reach out to the following individuals if you have questions about the subgroup or the SWG:

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