DAY 2 AGENDA - April 17th

Including the Joint Meeting of Emerging Contaminants & Sources, Pathways, and Loadings Workgroups
(10 AM to 12 PM)

Remote Access
https://us06web.zoom.us/j/87106175469

Meeting ID: 871 0617 5469

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1	**Summary of Yesterday and Goals for Today** The goals for today's meeting: ● Brief recap of yesterday's ECWG discussions and outcomes ● Overview of PFAS Sources to Solutions project (USEPA Water Quality Improvement Fund) and implications for RMP PFAS science ● MORNING: Discuss ongoing stormwater CECs projects; this is a joint meeting of ECWG & SPLWG ● AFTERNOON: Recommend which ECWG special study proposals should be funded in 2025 and provide advice to enhance those proposals; ECWG meeting	9:00 Amy Kleckner
2	**Information: PFAS Sources to Solutions Project (USEPA Water Quality Improvement Fund)** The workgroup will receive an overview of a new USEPA-funded project, PFAS Sources to Solutions, a timely and innovative effort to address the urgent public health and environmental issue of PFAS in San Francisco Bay. Project partners include the RMP, local wastewater and stormwater agencies, academic scientists, and DTSC's Safer Consumer Products Program, among others. Over the 4-year project period, the project team will work with partners and stakeholders throughout the Bay Area to (1) monitor PFAS in the Bay and pathways and estimate PFAS loads to the Bay from municipal wastewater and urban stormwater runoff; (2) develop high-quality information on PFAS-containing products to inform regulatory action to support the reduction of urban PFAS sources; and (3) communicate widely with both experts and non-experts on PFAS sources, how to reduce PFAS pollution, and key information gaps to guide future efforts to identify and address urban PFAS sources. The RMP's PFAS Synthesis and Strategy special study, launching this year, will feed directly into the work for this new project. Desired Outcome: Informed Workgroup	9:15 Kelly Moran, Ezra Miller, Diana Lin
	Short Break	9:45

3	**Introductions and Goals for the Joint Meeting** The goals for this meeting: ● Provide updates on recent and ongoing stormwater CECs monitoring & modeling activities ● Discuss straw proposal for stormwater CECs monitoring design Meeting materials: Guidelines for Inclusive Conversations, page 5 2023 ECWG Meeting Summary, pages 6-18	10:00 Amy Kleckner
4	**Information: Stormwater CECs Projects Update** This agenda item will cover: ● Overview of the process to develop the RMP Stormwater CECs integrated modeling and monitoring approach and the projects feeding into its development (10 minutes) ● SFEI Mayfly remote stormwater sampler pilot season, design improvements, and other sampler options (20 minutes) ● Modeling CECs stormwater loads - literature review & recommendations (10 minutes) ● Updates & key insights from other projects (5 minutes) ● Q&A and discussion Meeting materials: RMP Stormwater CECs Update, pages 19-25; see also background and approach sections of Stormwater CECs '25 proposal, pages 26 - 39 Desired Outcome: Informed Workgroup	10:10 Kelly Moran, Kayli Paterson, Don Yee, Pedro Avellaneda
5	**Discussion: Stormwater CECs Integrated Modeling & Monitoring Approach: Straw proposal for stormwater CECs monitoring design** This agenda item will cover: ● Key background informing straw proposal development ● Straw proposal for monitoring design ● Workgroup discussion Desired Outcome: Feedback on straw proposal monitoring design	11:10 Kelly Moran
6	**Next steps** This agenda item will cover: ● Upcoming schedule	11:55 Kelly Moran
	Lunch	12:00

7	**Summary of Proposed ECWG Special Studies for 2025** The ECWG science lead will present the proposed special studies. Clarifying questions may be posed; however, the workgroup is encouraged to hold substantive comments for the next agenda item. 2025 RMP ECWG Special Study Proposals include: ● Stormwater CECs Monitoring & Modeling 2025 - $300,000 ● Plastic Additives in Bay Water and Archived Sediment - Two options, $172,940, $235,200 ● Quaternary Ammonium Compounds (QACs) in Bay Water and Stormwater - Two options, $106,000, $164,000 ● Synthetic Dyes in Bay Sediment, Water, Wastewater, and Urban Stormwater Runoff - $170,600 ● NTA of Bay Fish (year 2) - $76,000 ● Nontarget and Target Analysis of Fibers and Urban Stormwater - $136,000 ● Stormwater In Vitro Toxicity Screening - $26,000 Tier Two Proposals describe projects that could be funded if additional resources become available: ● Stormwater CECs Monitoring & Modeling 2025 (additional priorities) - $150,000 ● PFAS NMR Analysis in Wastewater, Stormwater, and Bay Matrices - $385,000 ● Tire Wear Emissions and Washoff Estimates Journal Paper - $15,000 ● Tire Rubber Marker Analysis - $105,000 ● PFAS Analysis Add-on to Stormwater Depth Monitoring Pilot - $55,000 ● Analysis of PFAS Wet Deposition Pathway - $251,000 - $440,000 Special Study Proposals for other workgroups that are relevant to ECWG include: ● Fixed station watershed monitoring network (multiple workgroups)	12:30 Rebecca Sutton, Alicia Gilbreath, Diana Lin, Don Yee, Ezra Miller, Kayli Paterson, Kelly Moran, Miguel Méndez, Pedro Avellaneda
8	**Discussion of Recommended Studies for 2025 - General Q&A, Prioritization** The workgroup will discuss and ask questions about the proposals presented. The goal is to gather feedback on the merits of each proposal and how they can be improved. The workgroup will then consider the studies as a group, ask questions of the Principal Investigators, and begin the process of prioritization by stakeholders.	1:15 Amy Kleckner
9	**Closed Session - Decision: Recommendations for 2025 Special Studies Funding** RMP Special Studies are identified and funded through a three-step process. Workgroups recommend studies for funding to the Technical Review Committee (TRC). The TRC weighs input from all the workgroups and then recommends a slate of studies to the Steering Committee (SC). The SC makes the final funding decision. For this agenda item, the ECWG is expected to decide (by consensus) on a prioritized list of studies to recommend to the TRC. To avoid an actual or perceived conflict of interest, the Principal Investigators for proposed special studies are expected to leave the meeting during this agenda item. Desired Outcome: Recommendations from the ECWG to the TRC regarding which special studies should be funded in 2025 and their order of priority.	2:10 Eric Dunlavey
10	**Report Out on Recommendations**	2:50 Eric Dunlavey

RMP REGIONAL MONITORING PROGRAM FOR WATER QUALITY IN SAN FRANCISCO BAY

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RMP Joint Emerging Contaminants and Sources, Pathways and Loadings Workgroup Meeting

Agenda Package Table of Contents

Bay RMP Stakeholder and Workgroup Meetings

Guidelines for Inclusive Conversations

This document is intended as a guideline for engagement at Bay RMP Technical Review Committee, Steering Committee, and Workgroup meetings. This is a living document. If you have input on what could be added, please email Amy Kleckner (amyk@sfei.org).

Zoom Etiquette

- Rename yourself - consider adding your name, organization, preferred pronouns and whose native land you are on.
- "Raise your hand" virtually if you wish to speak.
- In the case of a land acknowledgement, take the time to determine whose native land you are on at the time of your meeting (https://native-land.ca/). People may be invited to share the name in the chat.

Meeting Agreements[1]

- TRY IT ON: Be willing to "try on" new ideas, or ways of doing things that might not be what you prefer or are familiar with.
- PRACTICE SELF FOCUS: Attend to and speak about your own experiences and responses. Do not speak for a whole group or express assumptions about the experience of others. Work on examining your default assumptions about another person's identity or lived experience.
- UNDERSTAND THE DIFFERENCE BETWEEN INTENT AND IMPACT: Try to understand and acknowledge impact. Denying the impact of something said by focusing on intent is often more destructive than the initial interaction.
- PRACTICE "BOTH / AND": When speaking, substitute "and" for "but." When used to connect two phrases in a sentence, the word "but" essentially dismisses the first phrase altogether. Using "and" acknowledges multiple realities and promotes inclusion.
- REFRAIN FROM BLAMING OR SHAMING SELF & OTHERS: Practice giving skillful feedback.
- MOVE UP / MOVE BACK: Encourage full participation by all present. Take note of who is speaking and who is not. If you tend to speak often, consider "moving back" and vice versa.
- PRACTICE MINDFUL LISTENING: Try to avoid planning what you'll say as you listen to others. Be willing to be surprised, to learn something new. Listen with your whole self.
- RIGHT TO PASS: You can say "I pass" if you don't wish to speak.
- AVOID JARGON: Try to avoid using jargon and/or acronyms.
- IT'S OK TO DISAGREE: Not everyone will be in agreement all of the time, and that's ok!

[1] Adapted from Visions, Inc. Guidelines for Productive Work Sessions found at: https://www.emergingsf.org/wp-content/uploads/2017/08/EBMC_AgreemntsMulticulturalInteractions15.09.13-copy.pdf.

Joint Meeting of Emerging Contaminants Workgroup & Sources, Pathways, and Loadings Workgroup

April 20, 2023
San Francisco Estuary Institute

Meeting Summary

Science Advisors *(ECWG shaded in blue; SPLWG shaded in grey)*	**Affiliation**	**Present**
Bill Arnold	University of Minnesota	Yes
Miriam Diamond	University of Toronto	Yes
Lee Ferguson	Duke University	Yes
Derek Muir	Environment and Climate Change Canada	Yes
Heather Stapleton	Duke University	Yes
Dan Villeneuve	U.S. Environmental Protection Agency	Yes
Robert Budd	CA Department of Pesticide Regulation	Yes
Jon Butcher	Tetra Tech	Yes
Steven Corsi	US Geological Survey	Yes
Tom Jobes	Independent Consultant	Yes

Attendees

Adam Wong (SFEI)
Alicia Gilbreath (SFEI)
Amy Kleckner (SFEI)
Anne Balis (City of San Jose)
Anne Cooper Doherty (DTSC)
Autumn Ross (SFPUC)
Ben Priest (CIL)
Blake Brown (CCCSD)
Bonnie de Berry (EOA)
Bushra Khan (UC Davis MPSL)
Craig Jones (Integral)
Daniel Lee (Geosyntec)
David Peterson (SFEI)
Diana Lin (SFEI)
Don Yee (SFEI)
Ed Kolodziej (U of Washington)
Elana Varner (DPR)
Emily Corwin (FSSD/Solano Stormwater

Alliance)
Eric Dunlavey (City of SJ)
Erica Kalve (SWRCB)
Ezra Miller (SFEI)
Gaurav Mittal (SFBRWQCB)
Hope Taylor (Sacramento County Water Resources Dept)
Ian Wren (SF Baykeeper)
Jay Davis (SFEI)
Jaylyn Babitch (City of San Jose)
Jennifer Doughtery (SFEI)
Jennifer Teerlink (DPR)
June-Soo Park (DTSC)
Kayli Peterson (U of Charleston)
Kelly Moran (SFEI)
Lester McKee (SFEI)
Lisa Austin (Geosyntec)
Lisa Welsh (Geosyntec)
Maggie Monahan (SFBRWQCB)
Manoela de Orte (SWRCB)
Martin Trinh (SFEI)
Mary Cousins (BACWA)
Maya McInerney (SFBRWQCB)
Meltem Musa (OEHHA)
Million Woudneh (SGS AXYS)
Miguel Mendez (SFEI)
OIMA staff (SWRCB)
Paul Salop (Applied Marine Sciences)
Pedro Avellaneda (SFEI)
Rachel Scholes (Univ. British Columbia)
Rebecca Sutton (SFEI)
Reid Bogert (C/CAG)
Richard Grace (SGS AXYS)
Rob Carson (Marin Countywide Stormwater)
Robert Budd (CDPR)
Sarabeth George (SCWRB)
Setenay Frucht (SWRCB)
Sami Harper (SFBRWQCB)
Simona Balan (DTSC)
Simret Yigzaw (City of San Jose)
Steven Corsi (USGS)
Tan Zi (SFEI)
Terry Grim (independent)
Tom Mumley (SFBRWQCB)
Violet Renick (Orange County Sanitation)
Xueyuan (Helen) Yu (Central Valley RWQCB)?
Xin Xu (EBMUD)

10. Information: Summary of Day 1 and Goals for Day 2

Amy Kleckner began the day by reviewing meeting tips for live and remote attendees, highlighting important Zoom features, and allowing time for an abbreviated roll call of the day's attendees. Amy then briefly recapped the events of Day 1 of the ECWG meeting, which led into the agenda and goals for Day 2. The first half of Day 2 was a combined meeting of the SPLWG and ECWG, centering the collaboration across the groups, and the second half focused on the prioritization of special study proposals from ECWG.

11. Information: Stormwater CECs Screening Study Preliminary Findings

Rebecca Sutton reviewed preliminary findings from the multi-year screening study of a diverse set of CECs in SF Bay urban stormwater. This study has been a 4-year effort in sample and data collection to understand the occurrence of a broad range of CECs in urban stormwater and overall help fill data gaps for this important pathway of contaminants to the Bay. Rebecca noted that a total of 25 sites were selected based on general site selection criteria including a minimum drainage area of 1 km^2, leveraged legacy contaminant monitoring, and relative urban land use, with 21 sites being highly urban (>80% urban land use) and 4 less urban sites (<20% urban land usage). Sampling occurred when storms were forecast to have a minimum of 1.3 cm of rainfall within 6 hours, with some samples taken from the first event in the season. Five contaminant classes (PFAS, organophosphate esters (OPEs),bisphenols, ethoxylated surfactants, and tire & roadway contaminants) and over 240 individual compounds were analyzed via multiple academic and commercial analytical partners.

Rebecca continued by highlighting the preliminary results of PFAS, organophosphate esters, and 6PPDQ in urban stormwater. A high priority set of contaminants at both the state and federal level, PFAS are used in a plethora of consumer and industrial products and are known to be persistent, bioaccumulative, and highly toxic. PFAS were widely detected; PFOS and PFOA, two of the most well studied PFAS contaminants, along with another PFAS, PFHxA,showed the highest concentrations among those detected. She noted concentrations of PFAS in urban stormwater are comparable to those appearing in municipal wastewater, another important pathway to the Bay. She continued with discussion of OPEs, mobile and toxic chemicals used as flame retardants and plastic ingredients. Several OPEs were detected in stormwater with two OPEs (TBOEP and TCIPP) at the highest concentrations. Also observed in stormwater were two OPEs previously detected at levels exceeding toxicity thresholds in Bay water, TDCIPP and TPhP. There was some variation in the detection of OPEs across sites, with specific OPEs in the thousands of ng/L. Isopropylated and tert-butylated triphenylphosphate esters (ITPs & TBPPs), novel OPEs recently identified in commercial flame retardant mixtures, were also detected in many sites. Rebecca then talked about 6PPDQ, a contaminant derived from a common tire antiozonant ingredient (6PPD), now known to be acutely toxic to multiple fish species at low levels, and under potential regulation through the CA Department of Toxic Substances Safer Consumer Products Program (for vehicle tires containing 6PPD). Levels in the Bay may be of concern, especially with several surpassing a suggested interim PNEC of 10 ng/L for rainbow trout (an important species relevant to the Bay).

Rebecca briefly reviewed the problems with several of the “reference” sites, spotlighting the detection of many CECs in these sites. Though the current process examined watersheds with <20% urban area overall, in some cases sampling sites were located near specific urban land uses (e.g., highways) that are clearly impacting these sites. Future site selection will include more robust analysis to ensure the suitability of sites as less-urban or reference sites.

Overall, these results showed many CECs are present in stormwater, with variations within and between chemical classes. There is a continued need for data and conceptual models to inform future monitoring strategies, particularly as it pertains to supporting urban runoffmodeling. Rebecca ended by summarizing the ongoing efforts in analyzing the stormwater dataset including examination of the influence of storm size, watershed and landscape features, comparison to Bay wet season data, and assessment of variability. A manuscript and summary for managers are expected to be completed by Fall 2023.

Several meeting participants asked questions and discussed this study, with Miriam Diamond recommending the creation of a foundational stormwater model across all contaminant classes that can then be crafted to emphasize different inputs for each class. Many participants emphasized the need for improved spatial analysis and understanding of the connection of sources to sampled sites. Lee Ferguson highlighted the potential for consideration of the ratio of transformation products and the freshness of the stormwater samples. Miriam Diamond and Bill Arnold noted potential complicating factors to this analysis including antecedent dry days and the limited understanding of photodegradation. Tom Jobes mentioned the importance of understanding sources and their relative contribution to best target monitoring and modeling efforts. Jon Butcher added the potential for fugacity modeling including roadway factors among

other chemical and physical properties could be useful. Tom Mumley noted a need for understanding the loadings of these contaminants into the Bay for better comparison across pathways. Derek Muir recommended consideration of rainfall sampling to understand background contamination levels. Dan Villeneuve added that comparison of data from baseline events in the dry season to large loads of stormwater could be useful. Dan also inquired if the Bay RMP considered ecological impacts of pathways and watersheds, which Tom Mumley noted was outside of the scope of current Bay RMP design focused on Bay water.

12. Discussion: Stormwater CECs Groundwork - Management Level Review

Kelly Moran presented a management level review of the important groundwork needed to best develop and establish the stormwater CECs approach centered on integrated modeling and monitoring. She noted a subgroup of RMP stakeholders and science advisors, including a mix of experts in CECs and watershed monitoring and modeling, known as the Stormwater CECs Stakeholder Science Advisor Team (SST), are providing guidance on the development of the overall approach. Kelly continued by discussing the relevant management context and actions related to stormwater in the Bay. At present, there are no immediate regulatory drivers for stormwater (CECs) monitoring and management, though that could change in the near future. There is a general regulatory goal of protection of the Bay's beneficial uses. Kelly highlighted PFAS as a contaminant class that has garnered increasing regulatory and stakeholder interest in the past few years. Currently, there are several relevant actions for emerging contaminants across regional, state, and federal agencies including California State and Regional Water Board efforts on CECs, the DTSC Safer Consumer Products Program, the Municipal Regional Stormwater Permit (MRP), and voluntary early management interventions by local agencies. Notably, there is potential for PFAS in the Bay to be added to the §303(d) list of impaired waters in a future Clean Water Act §305(b) Integrated Report. . There are currently no CECs on the 303d listing, but any inclusion would merit reexamination and likely elevation under the RMP tiered risk-based framework. Richard noted that microplastics are on the "watchlist" for the Bay and pesticides are not included here since we are working with DPR on related monitoring projects.

Kelly then reviewed the current budget planning guidance for stormwater CECs modeling and monitoring provided by the SST, which recommended a planning budget of $400k/year for the next three years. This budget includes $300k from the RMP per year (which includes $100k from BAMSC for CECs monitoring) as well as $100k from an EPA Water Quality Improvement Fund Grant. As a note, costs related to remote samplers will be funded separately (e.g., as a separate special study).

Kelly summarized the near term priority management guidance developed in consultations with the SST, which includes three near-term priority topics: loads, changes, and sources of CECs. The SST recommended that the stormwater CECs monitoring design also address two additional considerations. First, it should support addressing the RMP's overarching Management Questions through linkage to the ECWG Management Questions and wet season

elements of the Bay Status and Trends monitoring design. Second, it should provide the ability to determine if previously unmonitored CECs are present in local watershed runoff.

With general agreement on the summarized management guidance from participants, Kelly went through the specific suggested near-term priority stormwater CECs management questions for any comments or recommendations. The management question regarding load estimates (*How does the local watershed runoff load to San Francisco Bay compare to loads from other pathways?)* was the first examined, with Miriam Diamond noting its importance and the need to examine temporal variability, particularly through calibration with S&T redesign (with monitoring in dry and wet seasons). Lee Ferguson commented on current sampling design, specifically if selected sites provide enough coverage to accurately estimate/understand contaminant loads to the Bay, and what criteria would tell us that we have enough information for estimates. Tom Mumley similarly remarked on the scope of analysis for load estimates, with Kelly noting these are important needs to identify and continue to think about further within the context of the finalized question.

The next management question presented focuses on change of concentrations/trends (*a. Are presence or concentration in local watershed runoff changing over time? b. Are presence, concentration, or load expected to change in the future?*) following a “trends light concept” where datasets would provide multi-year insights without a requirement for statistically significant trends. This question groups past, current, and future concentrations together, which after some discussion the group agreed was appropriate. Richard Looker commented on the connection between this question and discussion of a similar approach to trends analysis related to the S&T redesign, with potential for a special study to incorporate relevant Bay data, watershed, and source data into a more comprehensive approach.

The third management question reviewed centered on sources (*a. What are the likely sources? b. What land features correlate with presence, concentration, and load in runoff?*), with focus on true sources including products and contaminated sites with consideration of all pathways between source and stormwater runoff. Lee Ferguson inquired about the land features under consideration and inclusion of specific chemicals related to industries. Tan Zi noted many land features, such as land use, land cover, road density, and population, would be included, with Kelly Moran highlighting the availability of data that could provide further analysis and connection to sources as determined per contaminant class. All participants reached a unanimous consensus on moving forward with the current management questions.

13. Information: Stormwater Groundwork Project Update

Kelly Moran kicked off the update on the stormwater CECs groundwork project, beginning with an overview of the three groundwork project elements and their relationships to the five other stormwater CECs-related projects currently underway. The overall stormwater CECs approach aims to integrate modeling and monitoring together to help inform management actions. This is a holistic process meant to examine all aspects of both monitoring and modeling, with the current groundwork project providing critical pieces in the group of related projects that together form the basis for the RMP develop the best monitoring approach possible for

stormwater CECs. Kelly introduced the project updates, first an update by Tan Zi on the stormwater CECs loads modeling exploration project and groundwork project stormwater CECs data analysis task, an update from Alicia Gilbreath on the groundwork project stormwater sampling locations database development task, and an update from Don Yee on the groundwork project task to develop a remote stormwater sampler.

Tan Zi continued by updating the group on the progress related to stormwater CECs loads modeling exploration and obtaining insights on monitoring design through stormwater CECs data analysis. The outcomes of these efforts will feed into, the development of a stormwater CECs modeling plan, the next step that is planned for early fall.. An examination of the literature revealed few relevant studies and no existing stormwater CECs modeling template ready to adapt to the Bay Area. Tan continued by reviewing some models used by others for CECs load estimation, beginning with a statistical/regression model, LOADEST, used to evaluate single watershed downstream from a known CEC (PFAS) production facility. This particular model is hard to adapt to the Bay area due to the complexity of the region's watersheds. A second approach uses a simplified process/relation to correlate chemical load relations to land, storm, and other features and extrapolates these to the whole region to estimate loads. The third model is more advanced, with consideration of the different fate and transport processes occurring within the watershed. Previously, this advanced approach has been applied to single watershed with identified discharges and a large monitoring network of a variety of matrices within the watershed. The second approach appears most viable for the RMP's near-term stormwater CECs watershed modeling needs. There remain further knowledge and data gaps to help bridge with findings. The model exploration outcome and recommended approach are expected in a report this summer.

Tan then presented a preliminary stormwater data analysis for OPEs and bisphenols. The goal of this effort is to inform development of design recommendations for CECs stormwater monitoring and to identify factors that may be useful in load modeling. There are variations of total chemical concentrations across the individual chemicals in the two noted classes, with OPEs concentration variation generally nearly an order of magnitude higher than bisphenols. There were clear spatial variations of total sum of bisphenols, with several sites showing levels well above the average/median concentration, and some sites showing differences based on the storm event. bisphenols A, F, and S (BPA, BPF, BPS) appear to be major contributors of bisphenols concentrations, while OPEs have a more diverse fingerprint across sites. In addition, consideration of partitioning behavior could be important for certain chemical classes, with sites showing variance in partitioning for bisphenols. Moving forward, watershed and storm characteristics will be examined to elucidate any relationships from the stormater CEC screening project data and to develop recommendations for the stormwater CECs monitoring and modeling approach.

Alicia Gilbreath reviewed the progress of the sampling locations database, which she is setting up with the help of David Peterson. They identified an initial candidate list of 225 locations in the Bay Area with flow gauges (in collaboration with the RWB). From these, 70 sites with flow gauges were identified for site reconnaissance to understand feasibility of monitoring based on

location within key areas of interest, estimated urban area >33%, and no tidal influences. So far, Alicia (and the stormwater team) have visited 19 sites with the rest to be completed this summer. Alicia notes the importance of this work as valuable for all RMP stormwater monitoring (not just CECs) and to support the first region in the world to establish an ongoing regional stormwater monitoring program.

Don Yee then presented on the development of a remote sampler, highlighting the current challenges facing stormwater monitoring including staffing difficulties, hazardous conditions, and imperfect prediction of rain events as well as several other issues. Commerical autosamplers (e.g., ISCO) are available, though they are bulky, expensive, require proprietary parts, and are limited in programming flexibility. Based on an initial autosampler model from USEPA, Don created an SFEI variant fit to meet our specific needs for stormwater monitoring. With the prototype complete, several mounting configurations were considered and tested, including fixed mountings and a semi-fixed pendant mounting using a PVC pipe and 50 lb weight plate to provide suitable collection and stability during a storm. Future work to examine the feasibility of using this sampler for CECs will focus on blank testing the remote sampler for four CECs classes, refining the tidal site adjustment to best determine set-up times, and adding remote programming to change capabilities. Several participants were excited about the progress with Richard Looker wondering about the cost. Don roughly estimated that it would be roughly $6k of total cost per sampler, including about $1500 in raw parts. Compared to an ISCO sampler, Don noted the cost was above $3k though it is actually upwards of $6k as a base cost and not any additional add-on features.

14. Summary of Proposed ECWG Special Studies for 2024

Rebecca Sutton gave an overview of all proposed special studies, highlighting the motivation and approach for each study, as well as associated budgets and deliverables. Meeting participants were allowed a few clarifying questions after the presentation of each proposal, though it was noted that more time would be available for discussion in the next agenda item. The focus of discussion was on seven high-priority proposals, one of which is already expected to be funded through RMP S&T, with a brief review of two special study proposals relevant to ECWG from other RMP workgroups: SPLWG and PCBWG.

The proposal for Stormwater CECs Monitoring and Modeling in 2024 is a placeholder for completing and implementing the novel integrated monitoring and modeling plan in the upcoming wet season (2023/24). This project continues the work of the Stormwater CECs Stakeholder-Science Advisor Team (SST) and will be developed together with the Stormwater CECs Approach. The proposal also requests early release of funds for this project to begin in this summer (2023).

Next, the PFAS Synthesis & Strategy proposal highlights an important updated review of the current state of the science of PFAS in the Bay, the development of a conceptual model framework for sources to the Bay, and an updated strategy for RMP monitoring of PFAS. This proposal would include a concise literature review to inform interpretation of current PFAS data and help further identify priority information gaps to best inform future monitoring. Several

members had questions about the scope of the project, specifically on the definition of PFAS to be used in the project, and whether sub-categories such as pharmaceuticals and pesticides will be included. Kelly Moran noted this project would use elementary concepts to first develop a conceptual model as a base of understanding PFAS in the Bay. Tom Mumley indicated that if this project could potentially be spread over two years due to on-going projects, that would be important to include.

PFAS and non-targeted analysis of marine mammal tissues, the second of a two-year study, was showcased next. This study aims to inform S&T study design by determining if it is appropriate to add routine monitoring of marine mammal tissues while monitoring PFAS, a contaminant of high priority. In addition, improved analytical methods, particularly for non-targeted analysis, are likely to provide new insights into the presence of CECs in marine mammal tissues. The first year of this study has been funded as a part of S&T efforts.

The next proposal discussed would expand on current S&T efforts to monitor PFAS with additional analysis using the total oxidizable precursors (TOP) assay in Bay water and sediment. The use of the TOP assay provides a means to indirectly quantify presence of a broader suite of PFAS precursors that break down to detectable compounds, providing a greater scope of PFAS present beyond a targeted method alone. The study could be spread across both wet and dry seasons, with three different funding levels available, and would require early release of funds to begin in summer 2023. A few meeting participants asked for clarification on the TOP sites, which will be correlated with S&T sites for targeted PFAS analysis. Others also asked about archiving samples, which Rebecca Sutton noted is also an option.

The next study was the third and final year in a multi-year monitoring effort to examine tire contaminants in Bay water during the wet season. A small number of samples have indicated the presence of the tire contaminant 6PPD-quinone and others in Bay water, with further results needed to classify these contaminants under the tiered risk-based framework. In addition, these findings can help evaluate the pilot wet season monitoring effort.

A proposal to examine OPEs, bisphenols, and other plastic additives in wastewater effluent was introduced to build our understanding of the fate and transport of these contaminants in the Bay. Limited previous findings of OPEs and bisphenols in wastewater, stormwater, and ambient Bay water merit further review to assess the importance of the effluent pathway while expanding analysis to additional classes of plastic additives potentially reaching the Bay. This study is presented in two tiers based on interest to examine only OPEs, which are expected to be of High Concern under the revised tiered risk-based framework, and the full suite of contaminant classes.

The final project presented was the first year of a two-year study on non-targeted analysis (NTA) of SF Bay fish. This study would leverage 2024 S&T sport fish monitoring to collect samples for NTA. This type of analysis will provide a means to identify unanticipated contaminants, including unknown PFAS and halogenated hydrophobic (bioaccumulative) compounds, that may merit follow-up targeted monitoring, and would provide the means to compare San Francisco Bay fish

contaminant profiles to those of fish in the Great Lakes, where this type of study has already occurred. Derek Muir noted that the analytical lab partner uses advanced analytical equipment, which may be able to detect additional contaminants like chlorinated paraffins. Heather Stapleton inquired if the sportfish study would be more human or ecologically focused, with Rebecca noting the study is on consumable fish tissues (e.g., fillets) and is meant to inform human and ecological health.

15. Discussion of Recommended Studies for 2023 - General Q&A, Prioritization

Amy Kleckner introduced the item by reviewing the process for prioritization and recommendation of special study proposals. She also noted the overall planning budget for the special studies to prioritize for the TRC and overall scope of the budget within the RMP. Meeting attendees asked any remaining questions while proposal PIs were still in attendance.

Stormwater CECs Monitoring and Modeling
Tom Mumley mentioned the stormwater proposal has many gaps remaining in what will be done and inquired what optimum use is needed now. Kelly Moran clarified the importance of building a strong foundation for the program in concert with what is occurring in the stormwater CECs approach. Bill Arnold inquired if there is flexibility in the analytes included in the study, which Kelly noted is possible, depending on funding levels.

PFAS Synthesis & Strategy
Several attendees continued discussion of the best time to begin this project, with several noting the current value of the synthesis and development of a plan to continue updating the document. Rebecca Sutton noted this is an ideal time to start as a wide variety of our work is now centered around PFAS and it is critical to best inform our continued projects. She continued by noting this would help provide information on important data gaps and considers the document to be “living,” transforming as more data is available. Kelly Moran also noted the possibility to do a WQIF proposal for PFAS in the Bay to add more funds to this effort.

PFAS and Non-Targeted Analysis of Marine Mammal Tissues
Several attendees asked about year 1 results. Rebecca Sutton explained that no tissue analysis has happened yet, as harbor seal pup season is in the spring and we are waiting for more samples to be collected before sending them to the labs.

PFAS in Bay Water & Sediment using the TOP Assay
Several meeting attendees asked about the extraction method and its relation to sediment. Diana Lin described the solid phase extraction method, which Lee Fergson noted could be undercounting PFAS. He also mentioned consideration of the direct-TOP method to directly oxidize the sediment and get a full understanding of PFAS present. Tom Mumley inquired about the current importance beyond intellectual interest, which Derek Muir noted is important to consider as PFAS precursors have been observed in sediment and could be degrading to relevant contaminants. Lee Ferguson also noted it could be important to consider the high loadings from wastewater and if they are degrading or partitioning to sediments. Miriam

Diamond noted consideration of doing wet and dry season monitoring for wastewater sampling to understand if there is a difference in seasonality.

Tire Contaminants in Bay Water (Year 3/3)
Some participants asked whether the dry season should be monitored as well as the wet season (only wet season was proposed). Kelly Moran explained that tire-related chemicals were non-detected or very low concentrations in the dry season of year 1, which is why only wet season monitoring is being conducted this year and has been proposed for year 3. Whether a third year of the project is necessary was also brought up; while we have two years of data, the S&T wet season pilot is for three years and a third year's data would be helpful toward informing our understanding of these chemicals and to support inclusion of tire contaminants in Bay modeling.

OPEs, Bisphenols, and Other Plastic Additives in Wastewater
Several experts, led by Derek Muir, indicated a high interest in the option to gather data on the broader list of plastic ingredients, rather than focusing exclusively on OPEs.

Non-targeted Analysis of San Francisco Bay Fish (Year 1/2)
Stakeholders indicated an initial interest in reducing the requested budget, pondering whether this might impact the overall study design, and whether a portion of the budget for the first year could be covered via S&T. Tom Mumley indicated that S&T should fund collection of extra fish tissue to archive.

16. Closed Session - Decision: Recommendations for 2023 Special Studies Funding

Study Name	Budget	Modified Budget	Priority	Comments
Stormwater Contaminants of Emerging Concern (CECs) Monitoring and Modeling 2024	$300,000 (RMP) $100,000 (WQIF)		1	Leveraging additional funding and in year 3
PFAS Synthesis & Strategy	$107,000		4	When is the right time to do this? We may want to wait for more data Eventual consensus that sooner is better Maybe a lit review is necessary first, others say not as critical Could produce technical manucript Clarify scope of PFAS to include
PFAS and Nontargeted Analysis of Marine Mammal Tissues Year 2	$126,500			

PFAS in Bay Water & Sediment using the TOP Assay	$27,200 (Wet Season; Water only) $67,200 (Dry & Wet Seasons; Water only) $97,700 (Dry & Wet Seasons; Water & Sed)	$67,200 (Dry & Wet Seasons; Water only)	5	Qualms about methods for sediment TOP, Advocates for Middle Option- Will be interesting from a PFAS standpoint Interested in potential presence of precursors Think about Eurofins for analysis - Becky says Eurofins much more expensive
Tire and Roadway Contaminants in Wet Season Bay Water Year 3	$50,000		2	
OPEs, Bisphenols, and Other Plastic Additives in Wastewater	$48,400 (OPEs only) $95,400 (OPEs, Bisphenols, and Other Plastic Additives)	$95,400 (OPEs, Bisphenols, and Other Plastic Additives	3	
Non-targeted Analysis of San Francisco Bay Fish Year 1	$48,000 ($110,000 for both years)	$23,000 ($85,000 for both years)	6	Some advisors advocate to deprioritize, but others believe this study is complementary, program could stop after one year Cover sample collection ($25K) under the S&T fish monitoring budget (so it doesn't need to be included here) Could do lite version even if not preferred Could fund analysis of archived samples in subsequent years

17. Report out on Recommendations

After the closed door session, proposal authors were invited back to the meeting to hear the final prioritization decisions. Eric Dunlavey summarized the discussed suggestions and recommendations. The proposals for OPEs and plastic additives was of high interest due to its broad scope of analytes and prioritized. The PFAS Synthesis and Strategy was the next highest priority due to its need, though questions remained about the most appropriate time, clarification of overall scope, and potential development of a manuscript. The proposal on TOP PFAS in Bay water and sediment was next with exclusion of the sediment due to questions of the current analytical method and potential for analysis by another lab. The proposal on NTA in fish was last, with advisors noting a need to collect archived fish and fund analysis in future years.

Adjourn

About the RMP

RMP ORIGIN AND PURPOSE

In 1992 the San Francisco Bay Regional Water Board passed Resolution No. 92-043 directing the Executive Officer to send a letter to regulated dischargers requiring them to implement a regional multi-media pollutant monitoring program for water quality (RMP) in San Francisco Bay. The Water Board's regulatory authority to require such a program comes from California Water Code Sections 13267, 13383, 13268 and 13385. The Water Board offered to suspend some effluent and local receiving water monitoring requirements for individual discharges to provide cost savings to implement baseline portions of the RMP, although they recognized that additional resources would be necessary. The Resolution also included a provision that the requirement for a RMP be included in discharger permits. The RMP began in 1993, and over ensuing years has been a successful and effective partnership of regulatory agencies and the regulated community.

The goal of the RMP is to collect data and communicate information about water quality in San Francisco Bay in support of management decisions.

This goal is achieved through a cooperative effort of a wide range of regulators, dischargers, scientists, and environmental advocates. This collaboration has fostered the development of a multifaceted, sophisticated, and efficient program that has demonstrated the capacity for considerable adaptation in response to changing management priorities and advances in scientific understanding.

RMP PLANNING

This collaboration and adaptation is achieved through the participation of stakeholders and scientists in frequent committee and workgroup meetings (see Organizational Chart, next page).

The annual planning cycle begins with a workshop in October in which the Steering Committee articulates general priorities among the information needs on water quality topics of concern. In the second quarter of the following year the workgroups and strategy teams forward recommendations for study plans to the Technical Review Committee (TRC). At their June meeting, the TRC combines all of this input into a study plan for the following year that is submitted to the Steering Committee. The Steering Committee then considers this recommendation and makes the final decision on the annual workplan.

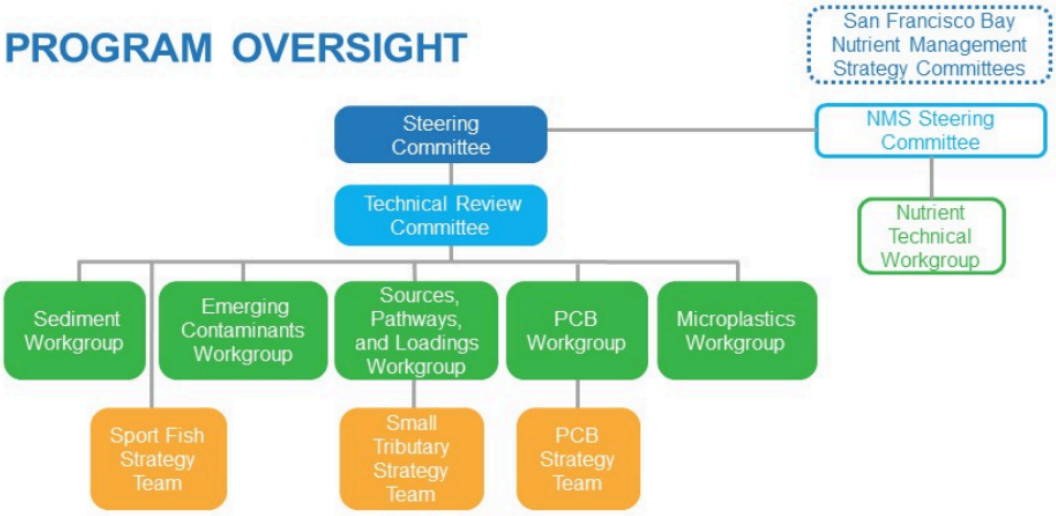
In order to fulfill the overarching goal of the RMP, the Program has to be forward-thinking and anticipate what decisions are on the horizon, so that when their time comes, the scientific knowledge needed to inform the decisions is at hand. Consequently, each of the workgroups and teams develops five-year plans for studies to address the highest priority management questions for their subject area. Collectively, the efforts of all these groups represent a substantial body of deliberation and planning.

PURPOSE OF THIS DOCUMENT

The purpose of this document is to summarize the key discussion points and outcomes of a workgroup meeting.

Governance Structure for the
Regional Monitoring Program for Water Quality in San Francisco Bay

Figure 1. Collaboration and adaptation in the RMP is achieved through the engagement of stakeholders and scientists in frequent committee and workgroup meetings.



The Steering Committee consists of representatives from discharger groups (wastewater, stormwater, dredging, industrial) and regulatory agencies (Regional Water Board and U.S. Army Corps of Engineers). The Steering Committee determines the overall budget and allocation of program funds, tracks progress, and provides direction to the Program from a manager's perspective.

Workgroups report to the TRC and address the main technical subject areas covered by the RMP. The Nutrient Technical Workgroup was established as part of the committee structure of a separate effort—the Nutrient Management Strategy—and makes recommendations to the RMP committees on the use of the RMP funds that support nutrient studies. The workgroups consist of regional scientists and regulators and invited scientists recognized as authorities in the field. The workgroups directly guide planning and implementation of special studies.

Oversight of the technical content and quality of the RMP is provided by the **Technical Review Committee** (TRC), which provides recommendations to the Steering Committee.

RMP strategy teams constitute one more layer of planning activity. These stakeholder groups meet as needed to develop long-term RMP study plans for addressing high priority topics.

RMP Stormwater CECs Update
Background information for April 17, 2024 ECWG/SPLWG Joint Meeting

The RMP is developing an approach to monitoring emerging contaminants entering the Bay from the region's small tributaries ("Stormwater CECs Approach"). The Stormwater CECs Stakeholder Science Advisor Team (SST) is guiding its development.

This background document contains updates on the status of the various projects composing the work to develop the Stormwater CECs Approach. Three items are attached for reference: (1) near-term priority monitoring questions and guidance for program design (approved spring 2023), (2) management drivers for RMP stormwater CEC monitoring (2023), and (3) a roster of SST members.

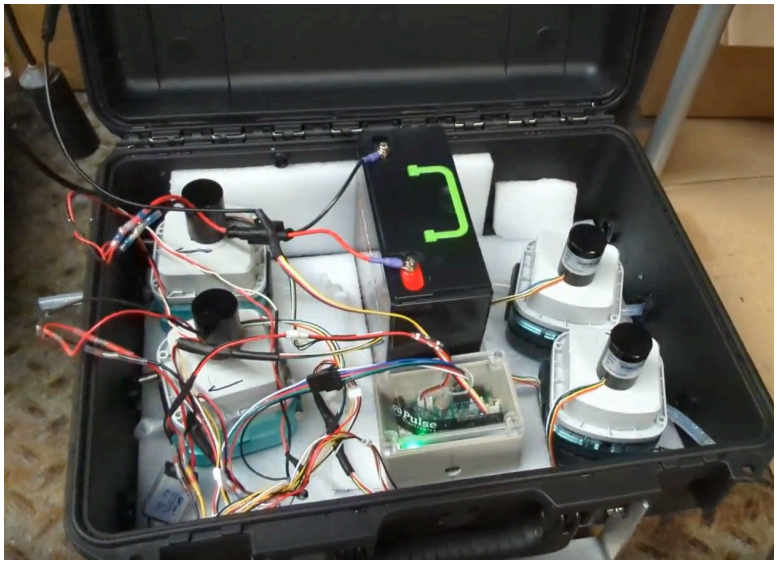
Project Status Update
The RMP Stormwater CECs Approach builds on multiple RMP projects currently underway and recently completed. The status of these projects and key insights for the Stormwater CECs Approach coming out of these projects are summarized in the attached Table 1.

In September 2023, we reviewed the project status and SFEI Mayfly blank testing data with the SST. This resulted in a revised project workflow for 2024, which added work on the SFEI Mayfly remote sampler to address contamination and to make operational improvements, and involved beginning a pilot monitoring effort focusing on use of the Mayfly in the 2023/2024 wet season. The remote sampler update below summarizes the reasons for these workflow changes.

Remote Sampler Update
A key proposed element of the Stormwater CECs Approach is the use of remote samplers. Using remote samplers reduces labor required for sample collection and provides the opportunity to collect more samples from a storm event than is practical with manual sampling.

We initially evaluated two remote samplers for potential use in our stormwater CECs monitoring: an SFEI adaptation of a low cost EPA/USGS microsampler ("SFEI Mayfly" demonstrated at the spring 2023 ECWG/SPLWG joint meeting) and a standard ISCO sampler. Operationally, the SFEI Mayfly is preferred due to its relatively low cost and ease of deployment.

To evaluate the potential for sample contamination from operating these samplers, in spring 2023, we conducted parallel blank tests of both samplers and the flexible cubitainer that is the preferred sample collection container for the Mayfly. These tests involved four chemical analyte groups, which were selected based on chemicals with "moderate" or "high" concern ranking in the RMP's tiered risk-based framework for emerging contaminants, prior RMP CECs monitoring, as well as analytical laboratory capabilities. These were per- and poly-fluoroalkyl substances (PFAS), organophosphate esters (OPEs), bisphenols, and tire/road contaminants [Kolodziej/University of Washington list]).



SFEI Mayfly interior view

Example of Mayfly deployments using a pendant or torpedo mount. The HYDROS conductivity, depth, and temperature sensor are protected by the pendant (white PVC tubing) from large debris. The excess sensor cord is coiled and attached to the top of the pelican case (black coil). Sampling tubing (small white tubing) is run down the side of the pendant or chain and secured with zip ties. Sample containers are hung from the front of the pelican case using a flexible cargo net that allows the cubitainer room to fill. A chain is used to secure all the pieces of the sampler to a secure location.

Excluding sample collection containers, results were similar for both samplers. They indicated no detectable sampler contamination with PFAS or any of the Tire/Road chemicals. Bisphenol A (BPA) and three OPEs (TEP, TCIPP, and TBOEP) were detected at concentrations well above reporting limits. The soft tubing required for both the SFEI Mayfly's and ISCO's peristaltic pumps was identified as a potential source of contamination.

For the cubitainers, results were acceptable (65-120%) recoveries for PFAS and Tire/Road chemicals other than 6PPD-quinone. However, for BPA and several of the tested OPEs we found blank contamination, too low or high recoveries, or both, indicating that sampling for these chemicals will require a less convenient rigid container (e.g., glass).

In September, we reviewed the operational and blank testing results with the SST, which recommended that we continue with the SFEI Mayfly and begin pilot deployments to increase experience with the sampler, while in parallel seeking other options to address the identified contamination.

Remote sampler improvements 2023/2024
This fall and winter, we have examined sampler improvements with potential to eliminate contamination. We identified several soft tubing alternatives; Heather Stapleton's laboratory recently completed pro-bono testing of these alternatives and we are examining the data. We also identified two commercially available large autosamplers using a vacuum-based sample collection system that eliminates the soft tubing entirely. These were blank tested in February, with results anticipated before summer. We will provide an update on these activities at the April 17 meeting.

Remote sampler pilot deployments 2023/2024
This fall, we further refined the SFEI Mayfly design, did extensive in-house testing, and initiated pilot deployments. We successfully collected our first samples for PFAS analysis in January 2024. We subsequently constructed 5 fully operational samplers and continued pilot deployments, which were limited to just a few sets of deployments due to the unexpected difficulty in obtaining permits for their temporary deployment at creek sampling locations. We will provide an update on these activities and lessons learned at the April 17 meeting.

Preliminary Stormwater CECs Monitoring Design
In February 2024, building on lessons learned from the pilot monitoring, preliminary data analysis of the Stormwater CECs screening study data, and the recommendations of the Stormwater CECs Loads Modeling Exploration project report, we developed a straw proposal for the stormwater CECs monitoring design. This straw proposal was reviewed with various SST members in a series of meetings in March. A revised version of the proposal will be presented for review and discussion at the April 17 meeting.

Stormwater CECs Approach Design - Near-Term Priority Monitoring Questions
April 2023

The RMP Stormwater CECs Approach will address the RMP's existing Emerging Contaminants Work Group (ECWG) management questions. To guide the design of the initial phase of the Approach, we sought direction from Stormwater CECs Stakeholder Science Advisor Team (SST) composed of RMP stakeholders and science advisors from the ECWG and the Sources, Pathways, and Loadings Work Group (SPLWG).

The SST recommended that the initial Stormwater CECs Approach design prioritize the following near-term questions, which may be applied to a specific chemical (e.g., PFOS) or a chemical family (e.g., PFAS).

1. Load. How does the local watershed runoff load to San Francisco Bay compare to loads from other pathways?
    - *This entails order of magnitude load estimates and is interpreted in the context of Bay management questions (which guide the RMP efforts to consider chemical fate, organism exposures, and exposure timing in the Bay)*

2. Changes. (a) Are presence or concentration in local watershed runoff changing over time? (b) Are presence, concentration, or load expected to change in the future?
    - *This is a "trends light" concept, which would provide insights on a multi-year time scale while not requiring datasets robust enough to identify statistically significant trends*

3. Sources. (a) What are the likely sources? (b) What land features correlate with presence, concentration, and load in runoff?
    - *"Sources" = true sources, such as products and contaminated sites and includes consideration of all pathways between source and stormwater runoff, including air deposition and groundwater transport*

These questions may be addressed by a combination of monitoring, modeling, and information from publicly available resources (e.g., product presence and management measure changes).

Additionally, the SST recommended that the Stormwater CECs Approach design:

- Support addressing the RMP's overarching Management Questions through linkage to the ECWG Management Questions and wet season elements of the Bay Status and Trends monitoring design.
- Provide the ability to determine if previously unmonitored CECs are present in local watershed runoff

Management Drivers - Stormwater CECs (April 2023)

Context

- No immediate regulatory driver - yet
- General goal: protection of Bay beneficial uses
- Strong interest in PFAS

Current management drivers

- Regional Water Board Action Plans for emerging contaminants
- *Future Clean Water Act §305(b) Integrated Reports*
- DTSC Safer Consumer Products Program
- State Water Board CEC Program
- Implementation of and future provisions of the Municipal Regional Stormwater Permit (MRP)
- Early management interventions

RMP Stormwater CECs Stakeholder Science Advisor Team (SST) Roster

- RMP science advisors - Miriam Diamond (U of Toronto), Derek Muir (Environment & Climate Change Canada), Rob Budd (DPR), Steve Corsi (USGS), Jon Butcher (TetraTech), Heather Stapleton (Duke)
- SF Bay Regional Water Board - Tom Mumley, Richard Looker, Maggie Monahan
- Bay Area Stormwater Management Agencies (BAMSC) - Chris Sommers, Lisa Austin
- Bay Area Municipal Wastewater Treatment Plants (BACWA) - Karin North, Eric Dunlavey
- State Safer Consumer Products Program (DTSC) - Anne Cooper Doherty
- State Water Board Surface Water Ambient Monitoring Program - Tessa Fojut
- US EPA Region 9 - Luisa Valiela

Table 1. Status of related projects

Project	Status	Key insights for development of stormwater CECs monitoring approach
Stormwater CECs Screening Study	Manuscript submitted (Peter, K. T., Gilbreath, A., Gonzalez, M., Tian, Z., Wong, A., Yee, D., et al. (submitted). "Storms Mobilize Organophosphate Esters, Bisphenols, PFASs, and Vehicle-derived Contaminants to San Francisco Bay Watersheds.") Management summary in preparation	CECs frequently detected in San Francisco Bay Area urban runoff, in some cases at concentrations similar to or exceeding those measured in municipal wastewater effluent Concentrations in samples from 25 regional watersheds were highly variable, with individual chemical concentrations spanning from one to more than three orders of magnitude
Stormwater CECs Load Modeling Exploration	Report finalized (Avellaneda, P., and Zi, T. 2024. *Modeling Stormwater Loads of Contaminants of Emerging Concern: Literature Review and Recommendations*. SFEI Contribution No. 1131. San Francisco Estuary Institute, Richmond, CA. https://www.sfei.org/documents/modeling-stormwater-loads-contaminants-emerging-concern-literature-review-and)	Conceptual models are a starting point for both monitoring design and modeling Data-driven methods should be used to investigate the relationship between CEC concentrations in stormwater runoff and various factors (e.g., land use/landscape features, rainfall characteristics, and discharge rates) Load estimates can be based on extrapolating these relationships to the entire Bay Area - initially with the RMP's Regional Watershed Spreadsheet Model (potentially used in combination with the surface runoff output of the RMP's Watershed Dynamic Model)
Integrated Watershed Monitoring & Modeling Strategy	Draft report to be distributed soon	Coupling stormwater monitoring and modeling provides a more efficient approach for addressing management questions Monitoring design should build from management questions and conceptual models, and take into account planned data analysis methods, and computational modeling data needs RMP stormwater monitoring designs and modeling programs should aim to serve multiple workgroup data needs

Stormwater CECs Data Analysis	Nearing completion. Analysis reflected in Peter et al. (submitted). Information to support stormwater CEC screening study management summary and Stormwater CEC approach report in preparation	Preliminary data analysis of a subset of the stormwater CEC screening study data did not identify any obvious relationships with watershed land use, other than a potential linkage between a few chemicals and imperviousness that has yet to be fully examined. The available data set is relatively small for this type of analysis and was biased towards industrial land uses.
Stormwater sampling locations database	Nearly complete internal resource	Dozens of monitoring locations are available in San Francisco Bay Area watersheds, including many at existing flow gauges Most flow gauges are upstream of the region's most intensely developed urban areas and industrial areas Not all sites are feasible for remote sampling
Remote sampler development and improvement	SFEI Mayfly sampler developed Blank testing conducted Pilot deployments initiated Additional work underway	(See text for a summary of the key findings)
Remote sampler purchase	Five SFEI Mayfly samplers constructed Funds available for purchase/construction of both additional Mayfly samplers and any of the large autosamplers under consideration	Remote samplers can be part of the RMP's future stormwater sampling program

Special Study Proposal: Stormwater Contaminants of Emerging Concern (CECs) Monitoring and Modeling 2025

Summary: This project will continue implementing the RMP stormwater CECs integrated monitoring and modeling program in water year 2025 (October 2024-September 2025). It builds on prior stormwater CECs RMP projects that have identified priority near-term management questions, identified the modeling and data analysis approach to address these management questions, developed and piloted the SFEI Mayfly remote sampler, and are currently framing out the RMP stormwater CECs monitoring design. These projects are collecting data and supporting the overall stormwater CECs monitoring program framework development through the RMP "Stormwater CECs Approach" project that is slated for completion in late 2024. This program is being guided by a Stormwater CECs Stakeholder-Science Advisor Team (SST). The SST includes representatives from the Steering Committee and Technical Review Committee, as well as science advisors and stakeholders.

This project is designed to mesh with two RMP-related grant projects funded by EPA's San Francisco Bay Water Quality Improvement Fund (WQIF): Destination Clean Bay and PFAS Sources to Solutions. This project is supported by a separate, approved 2024 RMP project for purchasing and/or building remote samplers capable of collecting stormwater during storm events ("remote sampler purchase project"). This proposal includes a range of costs to prove the option to expand its scope should additional funds become available to the RMP from the EPA Program Office.

We request early release of funds to initiate implementation of this project in summer 2024 to ensure we can be prepared for the fall start of the wet season.

Estimated Cost:	$300,000 (base RMP funding) - $450,000 (including Tier 2 funding)
Oversight Group:	ECWG and SPLWG, Stormwater CECs Stakeholder-Science Advisor Team
Proposed by:	Kelly Moran, Alicia Gilbreath, Pedro Avellaneda, Don Yee, Rebecca Sutton
Time Sensitive:	Yes

PROPOSED DELIVERABLES AND TIMELINE

Deliverable	Due Date
Task 1. Project management and coordination with non-RMP funding sources	Fall 2024-Fall 2025
Task 2. Stakeholder and science advisor engagement —Informal stakeholder and advisor meetings —One SST meeting —Three RMP presentations (ECWG/SPLWG, TRC and SC)	 Fall 2024-Fall 2025 Summer-Fall 2025 Spring 2025
Task 3. CEC modeling and data analysis —Inform monitoring design	 Summer 2025

—Draft Technical Report —Final Technical Report	October 31, 2025 December 12, 2025
Task 4. Stormwater CECs work integrated scientific systems development and cross-task and cross-project team coordination	Fall 2024-Summer 2025
Task 5. Stormwater CECs monitoring —ECWG and SPLWG presentations —Presentation to and discussion with the SST —Data uploaded to CEDEN	 Spring 2025 Summer-Fall 2025 December 2025
Task 6. Remote Sampler continued improvement —ECWG and SPLWG updates —Updated sampler design summary	 Spring 2025 December 2025
Task 7. Initiate site selection and permitting for water year 2026	Summer 2025

Background

CECs are a diverse group of substances with different sources, chemical properties, and fate. A multi-year RMP stormwater CECs monitoring project identified the presence of CECs in urban stormwater runoff (Peter et al., submitted; Tian et al., 2021). Available data from this and other RMP CECs sampling are relatively limited, but provide a strong weight of evidence that stormwater is a major pathway for many CECs to enter San Francisco Bay. Importantly, prior to water year 2024, RMP CECs monitoring, which has focused on understanding the potential for CECs to occur in stormwater, has not been designed to address other management questions, such as estimating loads of CECs discharged to the Bay.

The RMP is developing a stormwater CECs monitoring approach that addresses both Emerging Contaminant Workgroup (ECWG) and Sources, Pathways, and Loadings Workgroup (SPLWG) management questions. A cornerstone of the new stormwater CECs monitoring approach is the integration of monitoring and modeling designs to maximize the value of each sampling event. A second key element of the stormwater CECs monitoring approach is the use of remote samplers to reduce sample collection costs and increase the number of samples that can be collected during each storm event. Through the deployment of remote samplers, more data can be obtained in a more diverse array of locations as compared to manual sampling.

The near-term focus is on developing a modeling and monitoring approach to answer three near-term priority management questions:

1. Load. How does the local watershed runoff load to San Francisco Bay compare to loads from other pathways?

   This entails order-of-magnitude load estimates and is interpreted in the context of Bay management questions, which guide the RMP efforts to consider chemical fate, organism exposures, and exposure timing in the Bay.

2. Changes. (a) Are presence or concentration in local watershed runoff changing over time? (b) Are presence, concentration, or load expected to change in the future?

   This is a “trends light” concept, which would provide insights on a multi-year time scale while not requiring datasets robust enough to identify statistically significant trends.

3. Sources. (a) What are the likely sources? (b) What land features correlate with presence, concentration, and load in runoff?

   “Sources” is defined as true sources, such as products and contaminated sites and includes consideration of all pathways between source and stormwater runoff, including air deposition and groundwater transport.

This project depends on work in progress on multiple projects currently underway including the 2023 Stormwater CECs Approach project (anticipated completion in 2024) and the Stormwater CECs Modeling & Monitoring 2024 project (remote sampler improvements; CEC modeling plan; pilot stormwater CECs monitoring). Consequently, some elements of the necessary work remain in flux and will be refined in consultation with the SST as the project proceeds.

This project is being integrated with two RMP-related grant projects. The recently initiated “Destination Clean Bay” project is a multi-faceted Bay monitoring and modeling project funded by EPA’s SF Bay Water Quality Improvement Fund (WQIF) 2022. It will use the monitoring data generated by this project to support watershed and Bay model development. The EPA WQIF 2023 “PFAS Sources to Solutions” project is expected to start in summer 2024. It integrates stormwater, wastewater, and Bay monitoring, conceptual modeling, stormwater and wastewater preliminary loads modeling, data analysis, and commercial product PFAS testing toward the goal of informing management action, including prioritizing PFAS-containing products for potential regulatory action under California’s Safer Consumer Products Program.

Study Objectives and Applicable RMP Management Questions

Table 1. Study objectives and questions relevant to the RMP ECWG management questions.

Management Question	Study Objective	Example Information Application
1) Which CECs have the potential to adversely impact beneficial uses in San Francisco Bay?	N/A	N/A
2) What are the sources, pathways, loadings, and processes leading to the presence of individual CECs or groups of CECs in the Bay?	Implement CECs integrated monitoring and modeling and move from piloting to full use of remote samplers.	Implementing monitoring projects to address near-term priority stormwater CECs management questions, such as to determine whether stormwater pathway loads of various CEC families are large or small relative to other pathways flowing into the Bay.
3) What are the physical, chemical, and biological processes that may affect the transport and fate of individual CECs or groups of CECs in the Bay?	N/A	N/A
4) Have levels of individual CECs or groups of CECs changed over time in the Bay or pathways? What are potential drivers contributing to change?	Conduct monitoring capable of informing general understanding of changes in CECs presence in the stormwater pathway.	Understanding the changes in presence of CECs in the stormwater pathway.
5) Are the concentrations of individual CECs or groups of CECs predicted to increase or decrease in the future?	N/A	N/A
6) What are the effects of management actions?	N/A	N/A

Approach

In water year 2025, we propose to complete piloting and preparations for full implementation of the new Stormwater CECs Monitoring and Modeling Approach. The

Approach will involve use of remote samplers and will integrate monitoring and modeling designs.

During water year 2024, we have been refining the design of the SFEI Mayfly remote sampler and pilot testing it in house and at various stormwater monitoring locations. Through these pilot tests and deployments we have been refining processes for remote sampler programming, mounting options, and efficient installation and retrieval. The pilots have clarified the types of locations feasible for the Mayfly. Due to unanticipated challenges with obtaining stormwater sampling location permits, this year's piloting was less robust than we had planned. During the upcoming wet season, we anticipate expanded pilot work and preparing to transition from pilot-scale to full implementation of the SFEI Mayfly monitoring.

Blank testing of the SFEI Mayfly and a larger, more traditional remote sampler (ISCO) revealed contamination of samples by a few bisphenol and organophosphate ester (OPE) chemicals (SGS AXYS tested for OPEs, bisphenols, and PFAS - see Yee et al. 2024 for analyte lists; the Kolodziej laboratory tested for other stormwater CECs including 6PPD-quinone - see vehicle/tire-related suite from Hou et al., 2019). Negligible PFAS contamination was identified. Both samplers showed similar contamination, suggesting the soft tubing required for their peristaltic pumps as the likely contamination source. While the contamination was limited to a few chemicals, some of these chemicals are risk drivers for the Bay (bisphenol A, and the OPEs TCIPP and TBOEP). Consequently, the SST recommended that the RMP continue with the SFEI Mayfly, starting with PFAS, while in parallel exploring alternative approaches that might avoid contamination.

We completed additional research on soft tubing options, which identified several potential options that Dr. Heather Stapleton (Duke University) is testing for OPE content (no laboratory was identified to conduct a full suite of bisphenols content measurements on tubing samples). We also identified two commercially available, larger (ISCO-comparable) samplers (Manning, Aquamatic) that use vacuum for sample collection instead of peristaltic pumps, thus eliminating contact with soft tubing. We blank-tested both options (analyzing PFAS targeted and TOP, OPEs, bisphenols, and tire/road related chemicals) and are currently awaiting results. We plan to review all of these testing results with the SST to inform sampler design and sampler selection for the upcoming water year.

This proposal does not include costs for activities funded by the related grants. Destination Clean Bay grant funds will pay for laboratory analysis, data management and CEDEN data uploads for stormwater monitoring for non-PFAS chemicals (OPEs, bisphenols, and tire/road chemicals), laboratory analysis for any sampler blank testing, as well as for a portion of SFEI labor.

PFAS Sources to Solutions funds will pay for PFAS conceptual model development (which will support this project's modeling work), laboratory analysis for PFAS in

stormwater samples (targeted and TOP), stormwater PFAS data management and data uploads to CEDEN, and travel to share findings at a stormwater or monitoring conference such as the California Stormwater Quality Association (CASQA) Conference in fall 2025.

Task 1: Project management and coordination with non-RMP funding sources
This project will be funded by a minimum of three funding sources (RMP and two EPA WQIF grants), with a potential for funding by an additional source (EPA Program Office 2024). This task will provide SFEI staff with the capacity to coordinate the project's financial and scientific management across three funding sources and the various requirements associated with each funding source.

If additional funding becomes available, additional Task 1 funding will be required to meet the additional funding source requirements, to expand the budget controls, and to help the project team ensure work is properly tracked for each funder.

Task 2: Stakeholder and science advisor engagement
We will convene a meeting of the SST to support model development and to refine the program based on anticipated phased implementation of the monitoring design. We anticipate holding one SST meeting in addition to extensive informal individual and small group engagement with stakeholders and advisors. We will provide a project update at spring 2025 RMP workgroup meeting(s) and plan to share findings at a stormwater or monitoring conference such as the California Stormwater Quality Association (CASQA) Conference in fall 2025.

If additional funding becomes available, this task would be expanded to start the process for selecting a small group of fixed stormwater monitoring locations to support addressing near-term priority CECs management questions and other RMP and stakeholder data needs. This would entail engaging stakeholders and science advisors across RMP workgroups to obtain input toward developing a multi-benefit long-term design and staff time to develop and refine a list of proposed sites.

Task 3: Stormwater CEC modeling and data analysis
This task will implement the first phase recommendations of the 2024 RMP Stormwater CECs Modeling Work Plan task, which is to be completed in late 2024. The CECs modeling work plan will address the “Loads” and “Sources” near-term priority management questions noted above.

The work on this task will be coordinated with the PFAS conceptual model being developed under the PFAS Sources to Solutions grant. Due to the opportunity provided by the PFAS grant, we anticipate that the first implementation for stormwater CECs load modeling will be for PFAS. Specifically, the grant anticipates that SFEI will prepare a technical report “Urban PFAS Loads Estimates” in 2028. The grant also includes substantial work toward identifying PFAS sources, i.e., specific categories of PFAS products most likely to contribute PFAS to San Francisco Bay. The grant workplan

includes product research, product PFAS content measurements, the conceptual model identifying pathways between products and San Francisco Bay, and laboratory and data management costs associated with RMP stormwater sampling. SFEI plans to build off the conceptual model and the combined RMP and municipal stormwater PFAS dataset anticipated to be available by 2027 (potentially >100 samples) to use data-driven methods to explore potential linkages between monitoring data and products (most likely by exploring land use/land feature correlations).

To address the loads management question, the 2024 CECs modeling workplan will lay out the first steps to implement the recommendations of the recently completed RMP report *Modeling Stormwater Loads of Contaminants of Emerging Concern: Literature Review and Recommendations* (Avellaneda & Zi, 2024). This report recommended that we use a hybrid data-driven and spatially distributed approach for regional stormwater load estimation and recommended that initial load estimates be made using the RMP's Regional Watershed Spreadsheet Model (RWSM).

We expect the modeling workplan will include updating and adapting the RWSM to support CECs load estimates. Modeling and data analysis for CECs will require extensive work to develop underlying datasets. In response to regional challenges updating Bay Area land use data and the desire to explore land features other than land use, this task would include evaluation of other available datasets, including artificial intelligence enhanced data. Additionally, we anticipate exploring consideration of climatic factors in the data statistical analysis. All of this work would be coordinated with the parallel PFAS conceptual model development.

If additional funds become available, we would expand work on development of underlying datasets. These datasets could include, for example, geospatial information on land features such as directly connected impervious areas, roofing areas identified as a source of PFAS, and solar panel areas. This geospatial information will be used to update the RWSM.

In addition, this task will include providing modeling expertise and preliminary PFAS data analysis to support stormwater sampling location selection for water year 2026 (October 2025 - September 2026). The preliminary data analysis will provide an opportunity to use the information from PFAS product research and the grant-funded PFAS conceptual model to consider how we will address the "sources" management question, specifically "what land features correlate with presence, concentration, and load in runoff?" As only a limited dataset will be available in 2025, such work will not be a focus of 2025 activities, but this early work will inform recommendations for next steps.

To support these novel model development activities, if additional funding becomes available, this task's budget would be expanded to include funding for an expert consultant with expertise on conceptual and stormwater modeling of chemicals in urban outdoor environments to support the SFEI modeling team.

The results of this task will be documented in a report with recommendations for the next phase of this work, which we anticipate conducting in 2026.

Task 4: Stormwater CECs Work Integrated Scientific Systems Development and Cross-Task and Cross-Project Team Coordination

This task includes project team meetings to keep this multi-faceted project on track, to develop operating systems supporting the long-term implementation of integrated stormwater CECs modeling and monitoring (e.g., workflows and shared team physical and digital resources), and to ensure consistency and coordination among the interlinked elements of this and related stormwater and Bay CECs monitoring and modeling projects. We anticipate (almost) biweekly high-level meetings with staff from the emerging contaminants, stormwater monitoring, stormwater modeling, project leadership, and RMP science leadership teams and occasional (every 2-3 months) meetings with a larger group of key scientific staff to work through scientific issues on specific project elements.

Task 5: Stormwater CECs Monitoring

The CECs monitoring approach for water year 2025 entails three elements, using three different sample collection methods: the SFEI Mayfly portable remote sampler; a larger full-sized remote sampler; and manual sampling. The budget range for this task reflects fewer samples at the lower end of the range and more samples (up to the maximum in each category) at the upper end of the range.

The first element entails expanded pilot work and preparing to transition from pilot deployment to water year 2026 full implementation of remote SFEI Mayfly samplers for monitoring PFAS (only). Remaining pilot deployments of the remote samplers will provide necessary real-world experience with larger-scale remote sampler monitoring, starting with smaller deployments (e.g., 2-4 samplers per event) and moving to larger deployments (e.g., up to 8 samplers per event, with a potential stretch goal of 12). The SFEI Mayfly uses soft-sided “cubitainer” samplers. Two containers will be collected by each sampler during each event, one each anticipated to be analyzed by SGS AXYS for PFAS target and total oxidizable precursor [TOP] analysis (see Yee et al. 2024 for analyte lists; lab selection pending completion of grant-related requirements). We anticipate a total of 20 sets of samples (PFAS target and TOP) from 4 or more events.

If additional funding becomes available, we will be able to try for 24 sets of samples (i.e., four additional remote sampler deployments with one PFAS target and one PFAS TOP analysis from each deployment).

The second element, piloting a full-sized sampler to test out the approach for future permanent, fixed location deployments, will involve temporary installation of a large multi-container automated remote sampler (e.g., ISCO peristaltic pump or Manning or Aquamatic vacuum pump), for up to two storm events. The multi-bottle capacity of the samplers will allow collection of samples to be analyzed by SGS AXYS for OPEs,

bisphenols, and PFAS target and TOP (see Yee et al. 2024 for analyte lists), by the Kolodziej laboratory for other stormwater CECs including 6PPD-quinone (vehicle/tire-related suite from Hou et al., 2019), and by SFEI staff for suspended sediment concentration (SSC). For all analytes, QA samples will include one field blank, one duplicate sample, and one matrix spike sample.

If additional funding becomes available, we will be able to pilot the sampler during a third storm event, collecting samples for the same analytes listed above.

Both elements one and two will involve training additional staff in remote sampler preparation, programming, deployment, and retrieval methods.

The third element will entail limited manual sampling for multiple contaminants at locations that are infeasible for SFEI Mayfly installation and/or locations that are candidates for future permanent fixed sampling locations. We anticipate two sampling locations, one storm event at each site, 1 to 2 locations per storm event, plus one duplicate and one field blank. Samples collected will be analyzed by SGS AXYS for OPEs, bisphenols, and PFAS target and TOP (see Yee et al. 2024 for analyte lists), by the Kolodziej laboratory for other stormwater CECs including 6PPD-quinone (vehicle/tire-related suite from Hou et al. 2019), and by SFEI staff for suspended sediment concentration (SSC). For all analytes, QA samples will include one field blank and one duplicate sample (we propose to rely on the matrix spike described above).

If additional funding becomes available, we will be able to expand manual sampling to four additional locations, one storm event at each site, collecting samples for the same analytes listed above.

Prior to the initiation of this project, in Summer 2024, we will start identifying sampling locations in consultation with stakeholders and acquire permits to place the remote samplers and work at the selected sites. We anticipate this pre-project work will be funded by the Destination Clean Bay grant. This site selection process will give special focus on sites likely to be candidates for a potential future fixed-station monitoring network.

Additional tasks to implement stormwater monitoring are pre-season storm preparation, staff training, pre-storm remote sampler setup (e.g., programming, tubing installation, battery charging), and cleaning equipment.

After each event, remote sampler installation and performance will be evaluated to inform procedures for subsequent installations. Lessons learned about the installation and use of remote samplers will be incorporated into the Stormwater CECs Approach report, future sampling designs, and (as appropriate) into the sampler refinement work (Task 6).

The Destination Clean Bay and PFAS Sources to Solutions grants will fund QA/QC evaluation of the data and, after QA/QC evaluation, data upload to the California Environmental Data Exchange Network (CEDEN). QA/QC findings will be evaluated in detail to inform future stormwater CECs monitoring design and laboratory analysis. Data interpretation will be limited, focused on evaluating outcomes and informing future monitoring design. We do not anticipate a full report on this year's data, as the Stormwater CECs Approach will establish a multi-year reporting and data interpretation process. PFAS monitoring data will be summarized and included in a 2028 report under the PFAS Sources to Solutions grant.

The study team will evaluate the outcome of the monitoring experience, which will inform future Stormwater CECs monitoring design. Update presentations will be given to the ECWG and SPLWG and results will be reviewed with the SST.

Task 6: Remote Sampler Continued Improvement

This task has two potential elements: SFEI Mayfly improvements and potentially work to prepare for use of vacuum samplers.

SFEI Mayfly improvement tasks may entail blank testing of any promising peristaltic pump soft tubing alternatives, physical modifications of the design based on additional deployment experience, the high priority task of continued exploration of options to add telemetry capabilities for post-installation control of the remote sampler operations, which would simplify programming, provide better ability to respond to changing weather forecast when using the remote samplers, and reduce deployment costs.

If the blank test results for vacuum samplers are promising, this task would include materials and activities to support in-office operational testing (e.g., for pump head height and programming) and their pilot deployment under the task above (e.g., construction of parts to support necessary collection containers, implementing telemetry controls).

If additional sampler blank QA-testing is needed, it will be conducted following procedures similar to those used for the spring 2023 and spring 2024 field blank testing of the current SFEI Mayfly design and the vacuum samplers, i.e., pumping laboratory water through the sampler at a remote location selected to minimize potential environmental contamination (e.g., from ambient air). Field blank samples will be analyzed by SGS AXYS for OPEs, bisphenols, and (if appropriate for the design) PFAS (see Yee et al. 2024 for analyte lists). Field blanks will also be analyzed for other stormwater CECs including 6PPD-quinone (vehicle/tire-related suite from Hou et al. 2019). Data QA review and interpretation will include evaluating samplers for potential contamination and examining pilot data in the context of available stormwater CECs monitoring data. Blank testing analytical costs would be funded by the Destination Clean Bay grant.

If additional funds are available, this task would be expanded to include work toward developing telemetry controls for the full-sized samplers envisioned for installation at fixed stormwater monitoring locations and exploration of a vacuum-based alternative design for the SFEI Mayfly.

Presentations on progress will be given to the ECWG and SPLWG. The scientific team will evaluate the outcome of the sampler improvement effort with the SST to inform the stormwater CECs monitoring design as well as the plan for purchasing and building additional remote samplers under the remote sampler purchase project. If the SFEI Mayfly design is modified, a revised summary of the revised sampler design, with photos, will be prepared.

Task 7. Initiate site selection and permitting for water year 2026.
This task is proposed only if additional funds are available. Efforts to pilot the SFEI Mayfly remote sampler were limited by the long timelines necessary to obtain permits for its temporary installation at sampling locations. Based on this experience, we anticipate the need to start site selection and permitting each year in June to ensure we are prepared for the upcoming wet season. Under this task, in June 2025, we will start identifying sampling locations in consultation with stakeholders and begin acquiring permits/permission to place remote samplers and collect samples at the selected sites. The budget assumes that this task provides seed funding for an early start; storm season preparations will be included in the Stormwater CECs water year 2026 budget.

Budget

The Project budget will include Labor, subcontracted expert advisor services, and direct costs. The budget lists costs to be covered by the DCB ($100,000) and PFAS Source to Solutions ($251,000 - $260,000) grants, but these amounts are not included in the totals which represent only the RMP funding request.

Table 2. Budget

Labor	**2025 - Base (hours)**	**Base + Tier 2 (hours)**	**Tier 2 activities**
Task 1. Project management and coordination with non-RMP funding sources	$20,000 (95)	$30,000 (140)	Increased management complexity with more funding sources
Task 2. Stakeholder and science advisor engagement	$45,000 (215)	$65,000 (310)	Initiate site selection for permanent network
Task 3. Stormwater CEC modeling and data analysis	$55,000 (320)	$70,000 (400)	Increased work on underlying data sets to support modeling and

			data analysis
Task 4. Stormwater CECs work integrated scientific systems development and cross-task team coordination	$35,000 (180)	$35,000 (180)	n/a
Task 5. Stormwater Monitoring Base program max. # of sets of samples: --24 Remote (PFAS target and TOP) --2 Manual & 2 large autosampler (PFAS target and TOP, OPEs, bisphenols, Kolodziej lab tire/road chemicals) --5 QA samples (all analytes)	$145,000 (850)	$199,750 (1,100)	Additional samples (4 remote sets; 4 manual sets; 1 large autosampler set)
Data technical services --PFAS target and TOP (PFAS grant) --OPEs, bisphenols, Kolodziej lab tire/vehicle chemicals (DCB)	$20,000 (120) $31,500 (190)	$20,000 (120) $31,500 (190)	Limited additional work for additional samples
Task 6. Remote sampler continued improvement	$30,000 (150)	$40,000 (200)	More resources to develop telemetry for large samplers; try design for mayfly vacuum sampler
Task 7. Initiate site selection and permitting for water year 2026	$0	$5,000 (30)	Start site selection/ permitting in June
Develop PFAS conceptual model (PFAS grant)	$200,000 (1,100)	$200,000 (1,100)	n/a
Subcontracts			
<u>Laboratory</u> PFAS targeted + TOP (PFAS grant) OPEs, Bisphenols, Kolodziej lab tire/vehicle chemicals (DCB)	$27,521 $15,201	$36,062 $23,646	Additional samples
Consultant to support stormwater CEC modeling	$0	$20,000	Added staff-like senior expert to support modeling work
Direct Costs			
Sampling Travel	$800	$1,300	Additional samples
Conference travel (PFAS grant)	$3,250	$3,250	n/a
Equipment, supplies, shipping	$15,120	$18,932	Additional samples

Permit fees	$7,200	$9,900	Additional samples
Total RMP funding request	**$300,000**	**$450,000**	Additional Tier 2 RMP funding

Budget Justification

SFEI Labor
Labor hours for SFEI staff to complete all project elements.

Data Technical Services
Standard RMP data management procedures will be used. Data for stormwater samples will be uploaded to CEDEN. These costs are anticipated to be funded by the Destination Clean Bay and PFAS Sources to Solutions grants.

Laboratory Costs
Laboratory costs are anticipated to be funded by the Destination Clean Bay and PFAS Sources to Solutions grants.

Other Direct Costs
Other direct costs are anticipated to include travel, shipping, potentially sampler testing related equipment, and other miscellaneous sampling-related equipment.

Permit fees for temporary installation of remote samplers are a new cost identified from the SFEI Mayfly pilot monitoring in water year 2024. The budget assumes permit fees averaging $600 per site are required for 50% of remote and large autosampler sampling events. (Manual sampling has typically required minor or no permit fees.)

Sampling travel includes sampling-associated driving costs. Conference travel is for a project-related presentation at a professional conference, such as the California Stormwater Quality Association (CASQA) conference.

We anticipate purchasing and building the remote samplers and any ISCO or vacuum samplers to be used for this project under the approved RMP 2024 Remote Sampler Purchase project.

Early Funds Release Request
If this project is approved, we request early release of funds for use in 2024 to support parallel projects and to initiate monitoring during the wet season.

Reporting

Reporting for Task 2 will include the SST and RMP presentations. Task 3 will include a technical report (draft and final). Reporting for both Task 5 and 6 will include update

presentations to the ECWG and SPLWG, as well as presentations to and discussions with the SST. For Task 5, stormwater monitoring data will be uploaded to CEDEN. For Task 6, a summary (draft and final) of the final sampler design, with photos, will be prepared

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