

Table 2: Short Descriptions of Proposals for RMP Special Studies in 2019

Workgroup	Study Name	Budget	Summary	Deliverables
Emerging Contaminants	Emerging Contaminants Strategy	\$75,000	Annual update of CEC Strategy, including tracking new information, updating the Tiered Framework and Multi-Year Plan, developing a toxicology strategy, and developing conceptual models. Increasing needs for stakeholder support, coordination of pro bono studies, and development and use of CEC transport model.	Update RMP CEC Strategy document; Present updated strategy at SC
Emerging Contaminants	CECs in Urban Stormwater	\$178,000	Monitoring during the first, pilot year of a multi-year study on CECs in stormwater is being completed now. The study is designed to provide critical stormwater data needs for four contaminant classes: 1) a new, targeted list of CECs specific to stormwater; 2) per- and polyfluoroalkyl substances (PFASs); 3) organophosphate ester (OPE) plastic additives/flame retardants; and 4) ethoxylated surfactants. A fifth contaminant class, bisphenols, was recommended for inclusion by the Emerging Contaminants Workgroup (ECWG) based on detections of bisphenol (BP) A and S in open Bay samples collected in summer 2017.	Sample collection; sample analysis; data review to inform year 3
Emerging Contaminants	Bisphenols in effluent and sediment	\$48,000	This study will measure bisphenols in wastewater effluent and archived margins sediment. In addition, sunscreens in wastewater effluent could be added on to this study. Bisphenol A was found throughout the Bay in a 2017 study and the Emerging Contaminants workgroup elevated bisphenol A to a CEC of moderate concern in April 2019. This study is broken down into three tiered design options of increasing scale based on available project funding. Option 1 would only include a screening of bisphenols in effluent. Option 2 would leverage sample collection costs and would include analysis of both bisphenols and sunscreens in wastewater effluent. Option 3 would include bisphenols and sunscreen in effluent as well as analysis of bisphenols in archived sediment samples.	Sample collection; sample analysis; data QA/QC; technical report
Emerging Contaminants	Sunscreens in Bay Area Wastewater Effluent	\$40,000	The sunscreens component of this project is included in the proposal for the bisphenols data collection above.	Sample collection; sample analysis; data QA/QC; technical report
Emerging Contaminants	Characterization of Pharmaceutical Contamination in Lower South Bay Water, Margin Sediment, and Wastewater	\$100,000	Pharmaceutical contamination is widely detected in the Bay, and the most recent Bay study indicates key pharmaceutical contaminants may approach levels of concern for wildlife. This study will monitor South Bay and Lower South Bay water (and effluent if there is sufficient project funding) for pharmaceutical contamination, providing data essential to a current evaluation of the potential risks of approximately 150 pharmaceutical contaminants to inform the RMP's Tiered CEC Risk and Management Framework.	Sample collection; sample analysis; data QA/QC; technical report
Microplastics	Microplastic Strategy	\$15,000	In early 2019, SFEI will complete a major two-year project on microplastic monitoring, modeling, and policy guidance, which was funded by the Gordon and Betty Moore Foundation with generous matches from the RMP and others. To continue to provide strategic support on this issue to the San Francisco Bay Regional Water Board and other RMP stakeholders, strategy funding is recommended for 2020. Core tasks include tracking new information regarding microplastic occurrence and toxicity; responding to requests for information from the Water Board and other stakeholders; and, in collaboration with the Workgroup, identifying any essential data gaps for San Francisco Bay that could be filled by the RMP or others. Strategy funding also allows for important leveraging activities such as the coordination of pro bono analyses by partners.	Update RMP Microplastic Strategy
Microplastics	Conceptual model for microplastic pathways from stormwater	\$30,000	In the fall of 2019, SFEI will complete a three-year project to characterize microparticles and microplastics in San Francisco Bay, funded by the Gordon and Betty Moore Foundation and others. A key element of this project was to characterize microplastics in stormwater. The findings suggest that the stormwater pathway contributes more than 200 times the number of microparticles than the wastewater pathway. Given this significant contribution, the Microplastics Workgroup recommends the development of a stormwater conceptual model for microplastics. This proposal is to fund that conceptual model development over a two-year time frame.	Begin development of a conceptual model

Microplastics	Microplastic in San Francisco Bay Sport Fish	\$78,400	Sport fish are an important food source to humans and Bay wildlife and are integrators of contaminants present in Bay water, sediment, and prey fish. In summer 2019, as part of RMP Status and Trends monitoring, sport fish will be collected and analyzed for a suite of contaminants. In 2018, the Steering Committee approved funding to collect and archive sport fish for microplastic analysis. This proposal is to fund the analysis of the archived samples for microplastic.	Analyze samples; manuscript
Nutrients	High Frequency Moored Sensor Network: data analysis, interpretation, and maintenance	\$355,000	High frequency water quality data will be collected through a network of in situ moored sensors in Lower South Bay and South Bay. Instruments measure multiple parameters, including specific conductance (or salinity), temperature, depth, dissolved oxygen, turbidity, chlorophyll-a, fDOM, and phycocyanin. Two key aims for the mooring network were to allow for more comprehensive condition assessment, and to foster data collection that will allow us to better characterize and quantify ecosystem response to SFB's high nutrient loads, including by aiding the calibration of numerical models. Funding will be used for mooring maintenance, data management (including QA/QC), and data interpretation.	
Nutrients	Ship-based Monitoring for Nutrient-Related Parameters with USGS	\$165,000	Discrete samples and in-situ sensor-based measurements will be collected during USGS cruises in San Francisco Bay aboard the R/V Peterson on ~12 full-bay cruises and an additional ~12 South Bay cruises (Figure 1), with a SFEI staffer participating as a field technician during cruises. The overall program continues USGS' long-term water quality studies in San Francisco Bay, and is jointly funded by USGS, the RMP, and the NMS. Data from the program play critical roles in nearly all of NMS' activities, including condition assessment, hydrodynamic and biogeochemical model calibration and validation, and improved understanding of nutrient behavior and nutrient-related effects within SFB.	
PCBs	PCB Strategy Coordination and Technical Support	\$10,000	The goal of RMP PCB Strategy work over the next few years is to inform the review and possible revision of the PCB TMDL and the reissuance of the Municipal Regional Permit for Stormwater (MRP), both of which are tentatively scheduled to occur in 2020.	Update PCB Multi-year plan (June 2019)
PCBs	Priority Margin Unit Stormwater PCB Monitoring	\$91,000	The objective of this study is to assess the loading and spatial distribution of PCBs in the Steinberger Slough/Redwood Creek (SS/RC) Priority Margin Unit (PMU) to address information gaps in the conceptual model for this area (Davis et al., 2017). Passive sampling device (PSD) measurements will complement sediment measurements to evaluate the spatial pattern of PCB concentrations in the surface and subsurface sediment. The study would provide information on current spatial patterns in PCB availability (which may provide insights on present patterns of loading) and long-term trends in loading from the tributaries to SS/RC.	Field sampling; technical report
Sediment	Sediment workgroup support and planning	\$10,000	Coordinate workgroup activities and update the multi-year plan	Workgroup strategy and coordination; update the multi-year plan
Sediment	Update of Erosion and Deposition in San Francisco Bay	\$77,000	In 2014 and 2015 the Ocean Protection Council (OPC) contracted for bathymetric surveys of large portions of San Francisco Bay. This data bathymetric surveys of large portions of San Francisco Bay. This data along with recent NOAA, USGS, and California State University Monterey Bay surveys can now be combined to create a revised bathymetric bathymetric Digital Elevation Model (DEM) of the whole of San Francisco Bay (South Bay, Central Bay, San Pablo Bay, and Suisun Bay). Analysis of these surveys and comparison with the USGS DEMs of earlier surveys will provide an update on the quantities and patterns of erosion and accretion in the Bay over the past 25 to 35 years. Such information can be used to assess how the Bay has responded to changes in sediment supply from the Delta and tributaries and provide managers with data for making decisions on a variety of issues including exposure of legacy contaminated sediment and strategies for beneficial dredge disposal.	Final Report

Sediment	Golden Gate Sediment Flux Modeling Study	\$45,000	This study proposes to simulate the sediment flux across the February 2017 high flow period, validate the model-predicted sediment flux using the one tidal cycle of flux observations collected by the USGS, and then compute the total predicted sediment flux through the Golden Gate over a 3-month period	Technical report
Sediment	Sediment bioaccumulation threshold review for PCBs	\$22,500	This study will review all the PCB bioaccumulation test results from San Francisco Bay to assess the performance of current bioaccumulation testing trigger thresholds. The results of this review may be used to support reassessing these thresholds. The recommendations from this study will save dredgers and regulators time and money by improving the efficiency and consistency of dredging project evaluations.	Meeting with stakeholders, analyze PCB data from DMMO database, technical report
Sediment	Integrated monitoring and modeling strategy	\$26,000	In 2017 and 2018, the Workgroup received funds to develop a sediment monitoring strategy to guide efforts for collecting data to fill key sediment knowledge gaps. During the May 2019 Workgroup Meeting, the members discussed the importance of having a strategy that included sediment modeling as well as monitoring. Developing an integrated sediment monitoring/modeling strategy will require additional workshops with regional sediment scientists beyond what has already been funded for strategy development, and inclusion of modeling elements in the strategy document. This request is for supplemental funds to cover additional workshops and inclusion of sediment modeling into the strategy.	Workshop with experts; integrated monitoring/modeling strategy
Sediment	Sediment bioaccumulation model update	\$25,500	This study will review and recommend a standard set of values for bioaccumulation modeling. This information would ensure that bioaccumulation modeling evaluations use the best available science and are consistent within the region. The recommendations from this study will save dredgers and regulators time and money by improving the efficiency and consistency of dredging project evaluations.	Meeting with stakeholders, analyze PCB data from DMMO database, technical report
Selenium	Selenium Strategy Coordination & Technical Support	\$10,000	These funds will support SFEI coordination and technical support for workgroup activities and continuing development of the Selenium Strategy.	Update Selenium Multi-Year Plan
Selenium	Selenium in North Bay clams and water	\$73,160	Following the development of the North Bay Selenium TMDL, the San Francisco Bay Water Board asked the Selenium Workgroup to develop a long-term monitoring design for North Bay. Concurrent clam (<i>Potamocorbula amurensis</i>) and water samples will be collected from two USGS long-term clam monitoring stations in Suisun Bay in July-September 2019 and December 2019-February 2020. These two sampling periods precede (1) the fall sturgeon muscle plug study and (2) the sturgeon pre-spawning period, when reproductive females are particularly sensitive to selenium toxicity. Clam concentrations collected during these preceding months will (1) inform the linkage between dietary selenium patterns and observed sturgeon tissue selenium concentrations, and (2) provide information about selenium exposure patterns that can inform expectations of sturgeon selenium concentrations during the sensitive pre-spawning period when sturgeon will not be sampled directly.	Collect and analyze water and clam samples
Sources Pathways and Loading	Workgroup coordination and strategy	\$40,000	The goal of the STLS Program over the next few years is to continue to provide information to RMP Stakeholders and the public that directly supports the identification and management of PCBs and Hg sources, concentrations, loads, and the determination of trends in relation to management efforts and beneficial uses in San Francisco Bay. This task is to support the Small Tributaries POC stormwater concentration and loading program through monthly communication with BASMAA program and Water Board representatives, including regular check in phone calls, planning for and development of meeting agendas and materials, preparation of meeting summaries, and monitoring the agenda of and attendance at key external meetings.	Coordination meetings (8x per year)

Sources Pathways and Loading	POC watershed reconnaissance stormwater sampling	\$110,000	To support a weight-of-evidence approach for the identification and management of PCB and mercury (Hg) sources, stormwater samples will be collected to assess concentrations and particle ratios in stormwater in the areas that have a disproportionately larger area of older urban and industrial land use. Manual sampling will also provide opportunities for CEC piggybacking. The proposal is primarily a field study. The level of effort will be tailored to the amount of budget available. There is no phasing proposed.	Select sampling sites; assess tidal conditions needed for a range of sites; collect & ship wet season samples; wet season sampling organization; SAP for POC monitoring; Lab analysis, QA, and data management; interpretation & reporting
Sources Pathways and Loading	Regional model development to support management decisions	\$100,000	Following the approval of the MIP, this proposal is for funding in 2020 to implement the second task of the multi-year plan - developing a regional model for hydrology. Model development will follow the procedures outlined in the MIP. The hydrology model, once established, will be used as a basis for modeling sediment, POCs, and CECs in subsequent years.	Collect model input and calibration data; model setup; calibration; reporting
Sources Pathways and Loading	Advanced Data Analysis, Phase III	\$50,000	This project proposes to analyze additional available data (likely all the remaining sites) using enhanced ranking and congener fingerprinting methods. The outcome of this project will be a completed application of these new methodologies to existing stormwater datasets to help prioritize areas for enhanced management or further sampling.	Technical report
Sources Pathways and Loading	Stormwater monitoring and trends monitoring to support the model	\$56,000	This project proposes to provide funding for one wet season of sampling for PCBs and Hg at three sampling locations in line with trends modeling needs. The outcome of this study will be quality assured data on PCBs and Hg for one, two or three field locations provided to the public via the online RMP CD3 tool and a short technical report. This study would also provide a platform for coordinated sample collection by other workgroups in future years.	Field sampling, data QA/QC