

## 2017 Special Studies Proposals

Workgroup	Proposal Name	Principal Investigator	Funding Request	Notes	Page Number in Agenda Package
Emerging Contaminants	Emerging Contaminants Strategy	Rebecca Sutton (SFEI)	\$50,000	Ranked #1 out of 6 funding priorities	38-43
Emerging Contaminants	Imidacloprid in Ambient Bay Water	Rebecca Sutton (SFEI)	\$40,110	Ranked #2 out of 6 funding priorities	44-50
Emerging Contaminants	Perfluorinated and Polyfluorinated Compounds in San Francisco Bay: Synthesis and Strategy	Meg Sedlak and Adam Wong (SFEI)	\$56,300	Ranked #3 out of 6 funding priorities	51-59
Emerging Contaminants	Phosphate Flame Retardants in Ambient Bay Water	Rebecca Sutton (SFEI)	\$47,125	Ranked #4 out of 6 funding priorities	60-67
Emerging Contaminants	Bisphenol Compounds in Ambient Bay Water	Jennifer Sun and Rebecca Sutton (SFEI)	\$50,000	Ranked #5 out of 6 funding priorities	68-76
Emerging Contaminants	Triclosan in Small Fish	Rebecca Sutton (SFEI)	\$41,300	Ranked #6 out of 6 funding priorities	77-83
Exposure and Effects	Estrogen receptor <i>in vitro</i> assay linkage studies	Nancy Denslow (University of Florida)	\$45,000	Ranked #1 out of 3 funding priorities	84-89
Exposure and Effects	Strategy for Benthos and Sediment Toxicity Monitoring by the RMP	Philip Trowbridge (SFEI)	\$10,000	Ranked #2 out of 3 funding priorities	90
Exposure & Effects	Strategy for Monitoring Water Temperature, Salinity, and Acidification due to Climate Change in San Francisco Bay	Philip Trowbridge (SFEI)	\$30,000	Ranked #3 out of 3 funding priorities	91-92
Nutrients	Ship-based sampling and sample analysis	David Senn (SFEI)	\$153,000	Project will be managed by the Nutrient Management Strategy	93-94
Nutrients	Open-Bay and slough moored sensors: data analysis, interpretation and maintenance	David Senn (SFEI)	\$342,000	Project will be managed by the Nutrient Management Strategy	95-96
Dioxin	Dioxin Synthesis Report	Don Yee (SFEI)	\$40,000		97-99
PCBs	PCB Strategy Coordination and Technical Support	Jay Davis (SFEI)	\$10,000		100-101
PCBs	Priority Margin Unit Conceptual Model Development	Jay Davis (SFEI)	\$60,000		102-107
Selenium	Selenium Strategy Support	Jay Davis (SFEI)	\$10,000	Ranked #1 out of 3 funding priorities	108
Selenium	2017 Sturgeon Derby Monitoring	Jay Davis (SFEI)	\$42,000	Ranked #2 out of 3 funding priorities	109-115
Selenium	2016-2017 Selenium Monitoring Workshop	Jay Davis (SFEI)	\$20,000	Ranked #3 out of 3 funding priorities	116
Sources, Pathways and Loadings	Small Tributaries POC Loading Program Management	Lester McKee, Alicia Gilbreath, Jennifer Hunt (SFEI)	\$30,000		117-118
Sources, Pathways and Loadings	Small Tributaries Loading POC Watershed Characterization Reconnaissance Monitoring	Lester McKee et al. (SFEI)	\$200,000		119-121
Sources, Pathways and Loadings	Small Tributaries Loading Regional Watershed Spreadsheet Model	Jing Wu, Lester McKee, Alicia Gilbreath (SFEI)	\$40,000		122-125
Sources, Pathways and Loadings	Small Tributaries Loading POC Trends Strategy and Trends Monitoring	Lester McKee, Alicia Gilbreath, Jennifer Hunt (SFEI)	\$200,000	Alternative Option: \$150,000	126-129
<b>Total</b>			<b>\$1,516,835</b>		
<b>Expected Funding</b>			<b>\$1,073,000</b>		

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Emerging Contaminants	Emerging Contaminants Strategy	Rebecca Sutton (SFEI)	\$50,000	Increasing interest in emerging contaminants issues by the San Francisco Bay Regional Water Board, RMP stakeholders, and the general public is reflected in headline news as well as policy actions at local, state, and federal levels. The amount of effort needed to manage the RMP Emerging Contaminants Strategy has increased significantly in recent years. Core deliverables have been tracking new information regarding contaminant occurrence and toxicity and updating the RMP's Tiered Risk and Management Action Framework. New requests for information include assisting the Water Board with emerging contaminants action plans. Coordination of pro bono analyses by partners, such as BACWA and universities, is another rapidly expanding component of strategy implementation. A Bay-specific contaminant transport model will also be revised to incorporate better information on pathways, in response to a need for improved modeling capabilities identified by stakeholders and experts. Finally, an exploration of quantitative passive sampling capabilities has been identified as another near-term strategic goal. For these reasons, this proposal requests an increase in funding for managing the RMP Emerging Contaminants Strategy.	Ranked #1 out of 6 funding priorities	38-43
Emerging Contaminants	Imidacloprid in Ambient Bay Water	Rebecca Sutton (SFEI)	\$40,110	Imidacloprid is a widely used neonicotinoid insecticide. Recent RMP-funded monitoring of 24-hour composite samples of influent and effluent from eight Bay wastewater treatment plants (WWTPs) found levels in discharged effluent that exceed an established aquatic toxicity threshold. Imidacloprid has been intermittently detected in Bay Area creeks at levels above this threshold. The proposed study would screen ambient water samples from San Francisco Bay to determine whether levels of imidacloprid, common imidacloprid degradates, and other neonicotinoid pesticides approved for use in California exceed aquatic toxicity thresholds. Findings are essential to appropriate classification of imidacloprid and other neonicotinoids within the RMP's tiered risk framework for contaminants of emerging concern (CECs), and may influence ongoing efforts within the California Department of Pesticide Regulation aimed at reducing environmental contamination and ecological impacts of current use pesticides.	Ranked #2 out of 6 funding priorities	44-50

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Emerging Contaminants	Perfluorinated and Polyfluorinated Compounds in San Francisco Bay: Synthesis and Strategy	Meg Sedlak and Adam Wong (SFEI)	\$56,300	A comprehensive review of PFAS monitoring and toxicity data is needed to determine whether PFOS is the only member of the family of merit regular surveillance. The RMP current monitors for 13 perfluorinated chemicals including perfluorooctanoic acid (PFOA) and perfluorooctane sulfonamide (PFOSA). The purpose of this study is to synthesize the PFAS monitoring to date, to evaluate the classification of these compounds according to the RMP CEC tiers, and to develop a strategy for monitoring PFASs.	Ranked #3 out of 6 funding priorities	51-59
Emerging Contaminants	Phosphate Flame Retardants in Ambient Bay Water	Rebecca Sutton (SFEI)	\$47,125	California's past implementation of unique flammability standards has resulted in decades of flame retardant additives in consumer goods. RMP-funded monitoring of ambient Bay water in 2013 revealed the presence of numerous phosphate flame retardants. Some South Bay samples exhibited levels of one particular flame retardant, triphenyl phosphate (TPhP), which approached an established marine aquatic toxicity threshold. New furniture testing data also reveal key flame retardants in current use that have yet to be monitored. The proposed study would screen ambient water samples from San Francisco Bay to determine whether levels of TPhP or other widely used phosphate flame retardants commonly exceed aquatic toxicity thresholds. Findings are necessary to determine whether these chemicals have been appropriately classified as "possible concerns" (Tier I) within the RMP's Tiered Risk Framework for contaminants of emerging concern (CECs), and may influence ongoing efforts within state agencies aimed at reducing environmental contamination and ecological impacts of flame retardants.	Ranked #4 out of 6 funding priorities	60-67
Emerging Contaminants	Bisphenol Compounds in Ambient Bay Water	Jennifer Sun and Rebecca Sutton (SFEI)	\$50,000	Bisphenols are a class of widely used endocrine-disrupting compounds, commonly found in polycarbonate plastics and epoxy resins and frequently detected in many environmental matrices. Bisphenol A (BPA) is a high-production volume compound, and use volumes of several BPA alternatives have increased in recent years. This study would screen ambient water samples from San Francisco Bay for 16 bisphenol compounds. The results of this initial screening will inform the classification of bisphenols within the RMP's tiered risk framework for contaminants of emerging concern (CECs).	Ranked #5 out of 6 funding priorities	68-76

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Emerging Contaminants	Triclosan in Small Fish	Rebecca Sutton (SFEI)	\$41,300	The RMP classification of the widely used antibacterial ingredient triclosan as an emerging contaminant of low concern (Tier II) for San Francisco Bay is based on a relatively small amount of data. A recent study of a West Coast estuary suggests monitoring in small fish may be a more sensitive indicator of impact; these data are lacking for San Francisco Bay. Characterization of triclosan in whole fish composites of juvenile salmon from the Puget Sound indicates levels of potential concern, despite low concentrations in estuary waters. Food web transfer is suspected of leading to the higher concentrations observed in small fish. The proposed study would screen small Bay fish for triclosan and its metabolite, methyl triclosan, to determine whether levels may pose concerns. These data are essential to appropriately classify triclosan within the RMP's tiered risk framework for contaminants of emerging concern (CECs), and may influence ongoing efforts among stakeholders and local and state agencies aimed at reducing environmental contamination and ecological impacts of this antibacterial agent.	Ranked #6 out of 6 funding priorities	77-83
Exposure and Effects	Estrogen receptor <i>in vitro</i> assay linkage studies	Nancy Denslow (University of Florida)	\$45,000	The RMP has funded a study to develop quantitative linkages between <i>in vitro</i> bioanalytical assays and higher order <i>in vivo</i> endpoints that point to population level effects in estuarine fish. The objective of this effort is to develop a cost-effective, high throughput tool that will assist in the identification of chemicals of emerging concern that are adversely affecting biota. The current proposal would support addressing two objectives: (1) repeating the <i>in vivo</i> portion of the previous linkage study with together concentrations around the likely EC-50 for <i>in vivo</i> responses, which will help narrow the comparison between <i>in vitro</i> and <i>in vivo</i> endpoints, and (2) testing water and sediment from six locations in San Francisco Bay for estrogenic equivalencies as a pilot test for this bioanalytical tool.	Ranked #1 out of 3 funding priorities	84-89

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Exposure and Effects	Strategy for Benthos and Sediment Toxicity Monitoring by the RMP	Philip Trowbridge (SFEI)	\$10,000	Monitoring for benthic invertebrates and sediment toxicity has been part of the RMP Status & Trends Program for decades. From 2009-2016, a number of special studies have been completed on benthic assessment tools and the causes of moderate sediment toxicity in the Bay. No additional studies are planned. In 2018, the RMP is scheduled to collect the next round of benthic invertebrate and sediment toxicity data. This study will support the development of a short strategy document outlining what has been learned over the past 7 years of special studies and how the RMP should proceed in the future with benthic monitoring.	Ranked #2 out of 3 funding priorities	90
Exposure & Effects	Strategy for Monitoring Water Temperature, Salinity, and Acidification due to Climate Change in San Francisco Bay	Philip Trowbridge (SFEI)	\$30,000	Due to climate change, the temperature, salinity, and acidity in San Francisco Bay is changing. Although these changes are largely out of control of local managers, it is important to anticipate the changes, document changes that occur, and understand the effect that changes could have on habitat quantity and quality for species of management interest. This study would support the development of a strategy for monitoring and assessment of climate change stressors in the Bay, including holding a workshop on ocean acidification and the developing a long-term monitoring design for water temperature, salinity, and acidification due to climate change in the Bay.	Ranked #3 out of 3 funding priorities	91-92
Nutrients	Ship-based sampling and sample analysis	David Senn (SFEI)	\$153,000	Ship-based samples will be collected and analyzed for a range of nutrient-related parameters. This data is essential for basic condition assessment, model calibration, and improved understanding of nutrient behavior and nutrient-related effects in the Bay. Ship-based discrete samples will be collected by USGS aboard the R/V Peterson on ~12 full-bay cruises and an additional ~12 South Bay cruises.	Project will be managed by the Nutrient Management Strategy	93-94

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Nutrients	Open-Bay and slough moored sensors: data analysis, interpretation and maintenance	David Senn (SFEI)	\$342,000	Most data on dissolved oxygen concentrations over the past 20+ years have been collected in deep subtidal habitats. Considerably less data is available for shallow margin habitats in San Francisco Bay, including sloughs, creeks, tidal wetlands, and former salt ponds undergoing restoration. It is hypothesized that lower dissolved oxygen waters are being advected from margin habitats, including the extensive network of sloughs and creeks in Lower South Bay, causing dissolved oxygen to dip near or below 5 mg/L at locations in the South and Lower South Bay. In 2015, a network of moored sensors were installed in the margin areas of Lower South Bay to test this hypothesis. This funding will support year 3 of moored sensor monitoring at open bay stations, the completion of moored sensor deployment in the sloughs and creeks of Lower South Bay, sensor network maintenance, and data management.	Project will be managed by the Nutrient Management Strategy	95-96
Dioxin	Dioxin Synthesis Report	Don Yee (SFEI)	\$40,000	Additional data on dioxin concentrations and loads have been collected in various media since the last dioxin synthesis in 2004. This effort would formally report and interpret this new information and evaluate the needs or potential for additional data collection or management action for dioxins. This effort is needed in 2017 to resolve the 303(d) impairment listings and in support of NPDES permitting strategy. In addition, the dioxin dataset generated under the RMP Dioxin Strategy was primarily generated in 2009-2012 and is getting dated - synthesis and interpretation of these data now will avoid any real or perceived consequence of using a dated dataset and a need to resample.		97-99
PCBs	PCB Strategy Coordination and Technical Support	Jay Davis (SFEI)	\$10,000	The objective of this task is to provide coordination and technical support for continuing development of the PCB strategy. Funds for this task would enable SFEI to continue to consult with the PCB Workgroup and Small Tributary Loadings Strategy Team regarding plans for the next iteration of the PCB TMDL and RMP activities that can inform the TMDL. Funds would also support small-scale synthesis of information that is needed to support these discussions. The plan will include a multi-year schedule of budgets and deliverables aimed at providing a technical foundation for the next iteration of the TMDL.		100-101

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PCBs	Priority Margin Unit Conceptual Model Development	Jay Davis (SFEI)	\$60,000	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. Conceptual model development for a set of four representative priority margin units will provide a foundation for establishing an effective and efficient monitoring plan to track responses to load reductions and also help guide planning of management actions. The Emeryville Crescent was the first PMU to be studied in 2015-2016. The San Leandro Bay PMU is second (2016-2017). The third PMU will either be Santa Fe Channel/Parr Channel in Richmond Harbor, or Steinberger Slough in San Carlos. A report on this third PMU will be completed in 2017.		102-107
Selenium	Selenium Strategy Support	Jay Davis (SFEI)	\$10,000	In April 2014 the RMP formed a Selenium Strategy Team to evaluate information needs that can be addressed by the Program in the next several years. The charge given to the Team by the RMP Steering Committee was to focus on low-cost, near-term monitoring elements that could provide information that provides high value in support of policy development and decision-making. A TMDL for the North Bay has been developed and approved by the Regional Water Board and the State Water Board, and is awaiting approval by USEPA. Development of a TMDL for the South Bay will be considered after the North Bay TMDL is completed. The need for greater investment in studies in support of managing selenium in the Bay is currently being considered by the Workgroup.	Ranked #1 out of 3 funding priorities	108
Selenium	2017 Sturgeon Derby Monitoring	Jay Davis (SFEI)	\$42,000	In March 2016, the State Water Resources Control Board approved a Selenium TMDL for North San Francisco Bay, which established a white sturgeon muscle tissue target of 11.3 ug/g dry weight as the basis for evaluating impairment. In 2015 and 2016, the RMP funded a study in collaboration with USFWS and Stantec, Inc. to collect tissue samples from angler-harvested female sturgeon collected as part of the annual Sturgeon Derby held out of Bay Point. The objective of this study was to establish relationships between selenium concentrations measured in non-lethally collected tissues (muscle plugs, fin rays) and those that are more closely tied to, or predictive of, adverse impacts in white sturgeon due to selenium (ovaries, otoliths). This study proposes a continuation of this sampling in 2017.	Ranked #2 out of 3 funding priorities	109-115

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Selenium	2016-2017 Selenium Monitoring Workshop	Jay Davis (SFEI)	\$20,000	At their May 2016 meeting, the Selenium Workgroup, at the request of the Water Board, discussed the need to develop a technical consensus on a robust suite of trend indicators of selenium impairment in the North Bay. The goal is to identify leading indicators of change to allow prompt management response to signs of increasing impairment. Of particular concern are the possible impacts of changes in hydrology in the Delta or changes in selenium loads to Bay-Delta tributaries in the Central Valley. A technical workshop on this topic will be convened this summer. This funding request is a placeholder that will allow for followup activities stemming from the workshop. The funds could be used for additional planning or to augment existing monitoring to address high priority information needs.	Ranked #3 out of 3 funding priorities	116
Sources, Pathways and Loadings	Small Tributaries POC Loading Program Management	Lester McKee, Alicia Gilbreath, Jennifer Hunt (SFEI)	\$30,000	The goal of the Small Tributaries Loadings Strategy (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. To support the Small Tributaries POC stormwater concentration and loading program, the outcome of this task will be to maintain monthly communication with BASMAA program and Water Board representatives. This will be completed through 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.		117-118
Sources, Pathways and Loadings	Small Tributaries Loading POC Watershed Characterization Reconnaissance Monitoring	Lester McKee et al. (SFEI)	\$200,000	To support a weight-of evidence approach for the identification and management of PCBs and Hg sources, the outcome of this proposal will be further knowledge about concentrations and particle ratios in stormwater in areas that have a historically and disproportionately larger area of older urban and industrial land use.		119-121



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Sources, Pathways and Loadings	Small Tributaries Loading Regional Watershed Spreadsheet Model	Jing Wu, Lester McKee, Alicia Gilbreath (SFEI)	\$40,000	To support improved estimates of regional scale watershed loads, the outcome of this proposal will be a GIS map of watershed scale loads for the region estimated from the RWSM that will be calibrated or verified with a minimum of 60 sites now characterized for of PCBs and Hg concentrations. The information generated from this model, including updated land use specific yields, will also be useful for assisting BASMAA program staff at smaller scales with their proposed effectiveness evaluation methods for stormwater BMPs.		122-125
Sources, Pathways and Loadings	Small Tributaries Loading POC Trends Strategy and Trends Monitoring	Lester McKee, Alicia Gilbreath, Jennifer Hunt (SFEI)	\$200,000	To support stormwater concentration and loading trends evaluation, the outcomes of this proposal will be provision of an improved dataset (more samples targeted at improving the description of source, release, and transport processes at selected tributary monitoring sites) following the monitoring design laid out at the conclusion of the 2016 Trends Strategy workplan, data evaluation to prepare refine the monitoring plan for subsequent winter seasons (i.e., 2018 and 2019), and further evaluation of data and information to continue the dialogue on the ultimate design of a long-term monitoring program for trends.	Alternative Option: \$150,000	126-129
<b>Total</b>			<b>\$1,516,835</b>			
<b>Expected Funding</b>			<b>\$1,073,000</b>			