**RMP**
**REGIONAL MONITORING**
**PROGRAM FOR WATER QUALITY**
**IN SAN FRANCISCO BAY**

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Regional Monitoring Program for Water Quality
in San Francisco Bay

# 2023 Detailed Workplan and Budget

*Final October 2022*

**SFEI** | **AQUATIC SCIENCE CENTER**

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## Summary

In 2023, the Regional Monitoring Program for Water Quality in San Francisco Bay (RMP) is entering its 32nd year of collecting data and communicating information to support water quality management decisions. This Detailed Workplan and Budget describes the activities that will be completed in 2023, the proposed funding levels, and the deliverables for each task.

The *planned* revenue from RMP fees for 2023 is $4,035k, with additional supplemental fees of $329k from municipal wastewater and $100k from municipal stormwater bringing the total revenue to $4,656k. The *expected* revenue is $4,456k as shown in Table 1 and Figures 1-2, which is reduced by $200k to account for the lower volume of dredged sediment being disposed of in the Bay, per the Long-Term Management Strategy (LTMS) plan. The $200k figure is a placeholder and the dredger contribution will be updated when we receive the final in-Bay dredge disposal volumes for calendar year 2022 (typically in March of the following year). The majority of the expenses in 2023 (69%) will be for Status and Trends monitoring and special studies (Tasks 6-7). The cost for running the RMP (Tasks 1-5) is $60k higher in 2023 than 2022 and funding allocations have been shifted slightly within each subtask.
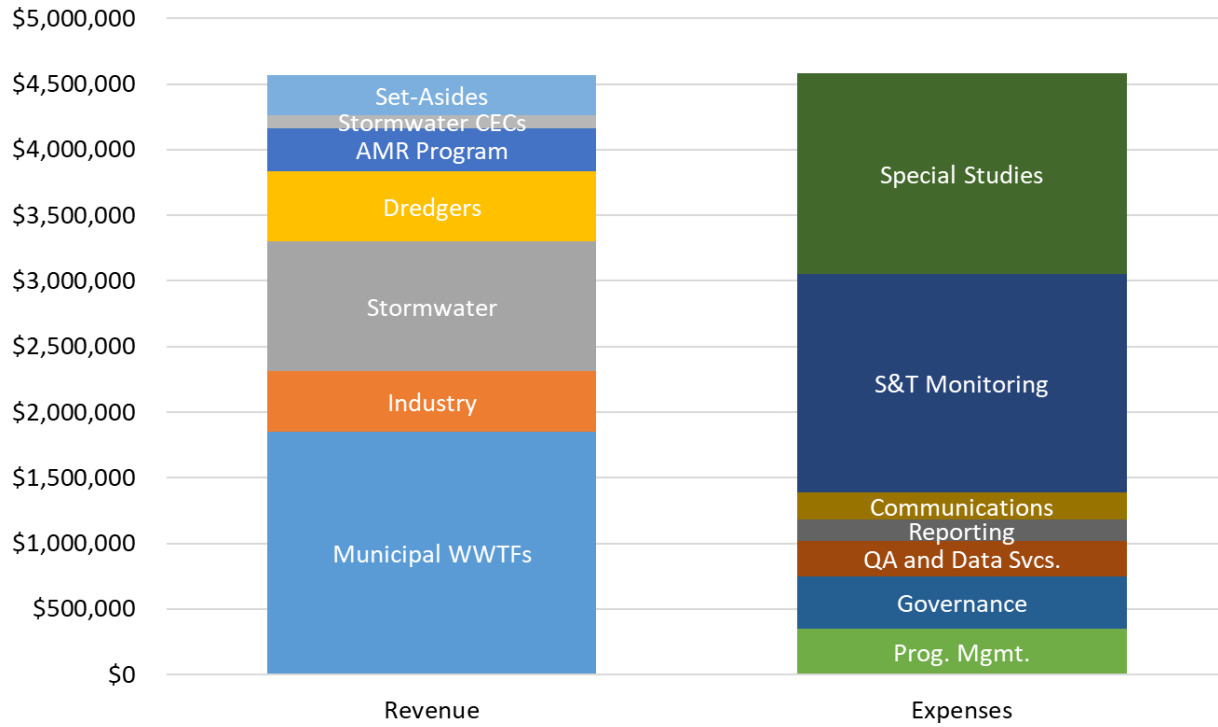
Table 1: Bay RMP 2023 Budget by Task.

|  | Grand Total |
|---|---:|
| 1. Program Management | $351,100 |
| 2. Governance | $396,800 |
| 3. QA and Data Services | $270,000 |
| 4. Annual Reporting | $165,000 |
| 5. Communications | $202,500 |
| 6. S&T Monitoring | $1,667,000 |
| 7. Special Studies | $1,533,000 |
| 8. S&T Reserves | $0 |
| 9. Unallocated | -$20,226 |
| **Grand Total for Expenses** | $4,585,400 |
| Revenue from Fees | $3,835,574 |
| Supplemental POTW Payments for AMR Program (FY23) | $329,600 |

| Supplemental Stormwater Payments for CEC Monitoring | $100,000 |
|---|---|

Figure 1: Bay RMP 2023 Revenue and Expenses.

Figure 2: Bay RMP 2023 Budget by Task.
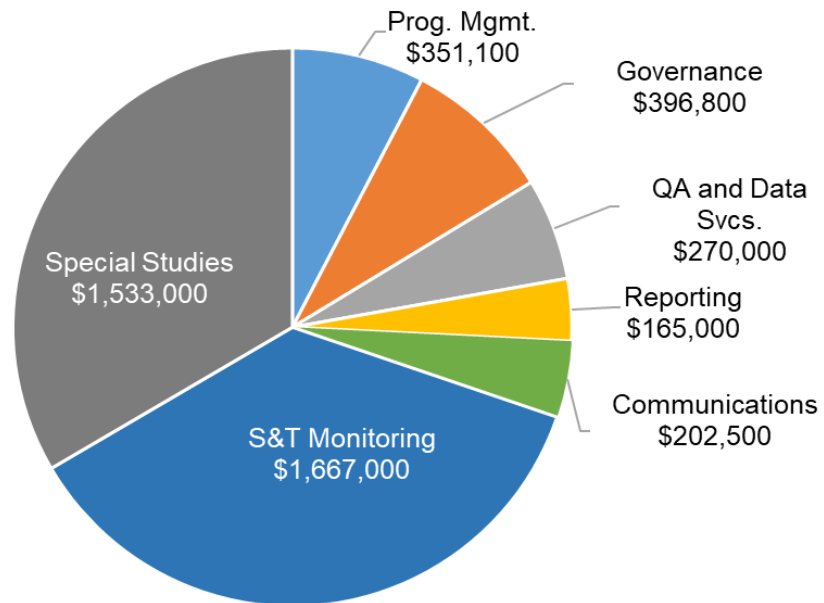


## 2023 Revenue

The total expected revenue for the RMP in 2023 is $4,565,174. The breakdown of this revenue between participant fees, interest income, designated reserve funds, and Undesignated Funds is shown in Table 2.

a. Participant Fee Revenue

The target fee revenue for the RMP in 2023 is $4,035,574. The manner in which the fees are divided up between Program Participants is shown in Figure 3. Fees were increased by 3% relative to the 2022 budget as approved by the Steering Committee on October 20, 2021.

b. Amended Monitoring & Reporting Order for RMP CEC studies (BACWA)

For FY2023, the RMP will receive approximately $329,600 of supplemental funding from the municipal wastewater agencies under the Amended Alternate Monitoring and Reporting (AMR) Program. The intended use of these funds is emerging contaminants studies.

c. Municipal Regional Stormwater Permit CEC monitoring (BAMS)

For FY2023, the RMP will receive $100,000 of supplemental funding from the municipal stormwater agencies as outlined in the Municipal Regional Stormwater Permit 3.0. The intended use of these funds is emerging contaminants studies.

d. Interest Revenue

RMP funds earn interest from the Local Agency Investment Fund. Interest in 2023 could be as high as $15k, but is likely to be lower than recent years due to continuing low interest rates. Similar to 2022, this interest will not be included in the budget. Instead, the interest will accumulate in the Undesignated Funds account. Accounting for interest as income during the year was confusing to staff and risky because the income was not guaranteed. This money will be available for the Steering Committee to use at its discretion but it will first be saved as Undesignated Funds. The potential for using interest revenue to fund a contribution to the Status and Trends Set-Aside account is discussed later in this document.

e. Designated Reserve Funds
   i. *Dredger Reserve Fund*

Dredging activity and in-Bay disposal of dredged material is variable in time. In years where there is a lot of activity, any dredger fees that are greater than the target fees are stored in the Dredger Reserve Fund. These funds are held in reserve and can only be used to pay for shortfalls in dredger fees in future years. The balance of the Dredger Reserve Fund is negative (-$920,375 not including the USACE shortfall) because dredger fees in 2018 through 2022 were lower than target fees. The 2023 budget assumes that dredger fees will fall $200k below the target of $734,474 due to a reduced amount of sediment being dredged and disposed of in the Bay. This is an approximation based on in-Bay disposal volumes in 2019 and 2021. Revenue (and expense) in the budget may need to be revised based on actual fees from in-Bay disposal. The 2023 dredger fees, and whether there is a shortfall beyond the planned $200k, will be adjusted in early 2023.

   ii. *Set-Aside Funds*

The RMP uses designated funds (called "Set-Asides") to smooth out the year-to-year expenses of the Status and Trends program. Rather than having a spike in expenses when multiple activities overlap in a single year, the Steering Committee designates some funds to be set aside in light years and withdrawn in years with a lot of monitoring. In 2023, the Status and Trends monitoring costs are higher than average so $300k will be withdrawn from the S&T Designated Reserve. This withdrawal is discussed more in the section on Status and Trends expenses.

f. Undesignated Funds

The RMP maintains a balance of Undesignated Funds for contingencies. Higher than anticipated revenues and elimination or reduction of lower priority elements sometimes leads

to accumulation of funds that can be used for high priority topics at the discretion of the Steering Committee. The current balance of Undesignated Funds is $1,305k (end Q2 2022).

Table 2: 2023 RMP Revenue.

| Revenue Category | Subcategory | Amount |
|---|---|---|
| Participant Fees | Municipal wastewater | $1,848,293 |
| Participant Fees | Industrial wastewater | $464,091 |
| Participant Fees | Stormwater | $988,716 |
| Participant Fees | Dredgers* | $534,474 |
| Supplemental POTW Payments for AMR Program (FY23) | Municipal wastewater | $329,600 |
| Supplemental Stormwater Payments for CEC Monitoring (FY23) | Municipal Stormwater | $100,000 |
| | | |
| Interest Income | | $0 |
| | | |
| Designated Reserve Funds | Set-Aside Funds for S&T Monitoring | $300,000 |
| Designated Reserve Funds | Dredger Reserve Funds | $0 |
| | | |
| Undesignated Reserve Funds | | $0 |
| | | |
| **TOTAL REVENUE** | | **$4,565,174** |

*This value does not represent the full 18% dredger contribution but rather the expected contribution from the USACE and non-USACE dredgers for in-Bay placement ($200k less than the full contribution).

Figure 3: Bay RMP 2023 Fee Allocations for Program Participants.
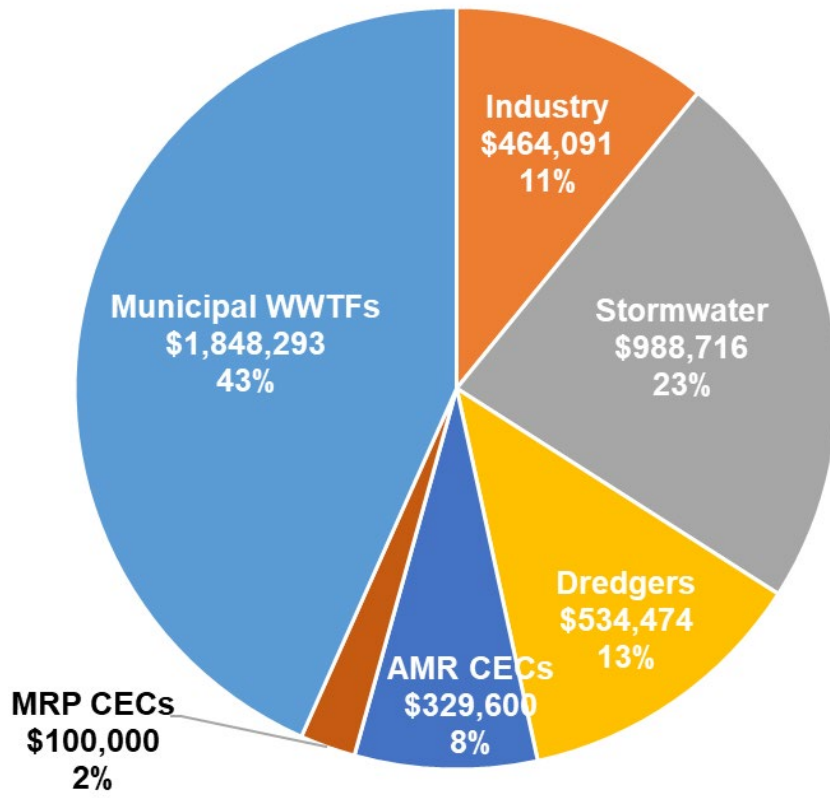
## 2023 Programmatic Tasks

RMP expenses fall into three broad categories: programmatic expenses, Status and Trends monitoring, and special studies. This section details the budgets for programmatic expenses for 2023.

The programmatic budget covers the following tasks:
- Program management
- Governance
- Quality Assurance (QA) and Data Services
- Annual reporting
- Communications

The total cost to implement these tasks in 2023 is $1,385k. This budget is $15k higher than the 2022 budget. The cost increases are summarized in Table 3. The budgets for Program Management, Governance, QA and Data Services, and Communication were all increased for 2023 to account for staff salary increases and a return to in-person meetings. The Annual Reporting task budget decreased from 2022. An RMP Update will be produced in 2023, which costs less than the Pulse.

Table 3: RMP 2023 Programmatic Budget Compared to the 2022 and 2023 Budgets.

|  | 2022 Budget | 2023 Budget | Difference |
|---|---|---|---|
| 1. Program Management | $360,000 | $351,100 | -$8,900 |
| 2. Governance | $372,100 | $396,800 | $24,700 |
| 3. QA and Data Services | $255,000 | $270,000 | $15,000 |
| 4. Annual Reporting | $199,000 | $165,000 | -$34,000 |
| 5. Communications | $184,000 | $202,500 | $18,500 |
| Total | $1,370,100 | $1,385,400 | $15,300 |

## 1. Program Management

Program management subtasks include program planning, contract and financial management, technical oversight, internal and external coordination, and administration. The total expense for these tasks is $351k, which is $9k less than the 2022 budget (Table 4). Costs for the subtasks were modified based on previous years budgets, including a decrease in Contract and Financial Management and an increase in Internal Coordination. Additional funds were also allocated to the Budget and Workplan Development subtask in anticipation of a full Multi-Year Plan update in autumn 2023. Approximately one-third of the cost for this category is fiduciary oversight of program expenses and contractors. These financial management funds also support staff time to manage funds and contracts for Supplemental Environmental Projects (SEPs) that are carried out by the RMP.

The major deliverables that will be completed under subtasks 1a and 1b include the Multi-Year Plan and Detailed Annual Workplan, quarterly financial updates to the Steering Committee, quarterly tracking of deliverables and action items, and contract management. Funds for technical oversight allow for senior staff to provide an internal review of the many reports, presentations, posters, workplans, memos, and other communications coming out of the RMP. The funds for external coordination cover participation in meetings with external partners to coordinate programs and leverage RMP funds (e.g., coordinating work on the Pulse and other reports, coordination with SCCWRP, and serving as liaison to the Wetland RMP).

## 2. Governance

Governance subtasks include convening, coordinating, and facilitating Steering Committee, Technical Review Committee, and Workgroup meetings. Tasks and deliverables include preparing agendas and agenda packages, participating in meetings, writing meeting summaries, following up on action items, reviewing minutes from past meetings, reviewing special study proposals, and coordinating with committee chairs, advisors, and key stakeholders. This budget item also includes honoraria and travel for external advisors. The total budget for these tasks is $397k which is 6% more than the 2022 amended budget (Table 4). The cost of workgroup meetings ($294k) accounts for nearly 75% of this task. The budget for staff time to prepare materials and proposals and attend workgroup meetings is $234k; the budget for honoraria and travel for external science advisors is $60k. This budget assumes in person meetings for 2023. The Emerging Contaminants and Sources, Pathways, and Loadings Workgroups will continue to meet for two days. An additional day to allow for overlap between ECWG and SPLWG advisors may be added in 2023. Budgets for every workgroup were increased to accommodate an increasing amount of inter-workgroup coordination.

## 3. QA and Data Services

Quality assurance and data management are critical foundations for the scientific investigations of the RMP. The total cost for these tasks is $270k, $15k more than 2022. The major quality assurance tasks for 2023 are keeping the Quality Assurance Project Plan up to

date and preparing QA summaries for datasets. In addition to processing new data, the RMP needs to maintain the millions of records generated since it began in 1993. Database maintenance includes incorporating updates and corrections to data, including re-analyzed results and updates implemented by CEDEN/SWAMP. RMP staff also maintain and enhance web-based data access and visualization tools, such as CD3, and an automated system to handle data submittals from the laboratories.

DMMO Database Support will continue in 2023. Special study funding in 2018 was used to migrate the DMMO database and website to the SFEI server. RMP funding ensures an updated and secure platform for the database. Benefits to the RMP include better access to sediment testing records in the DMMO database and more efficient invoicing methods for dredger fees. Ongoing funding for this project is included as part of the QA and Data Services task. The funding requested in 2023 is $53k and will be used to update data templates, data uploads, and database structure. DMMO agencies are also identifying staff that can help with these efforts so the burden does not fall solely on the RMP.

## 4. Annual Reporting

The total cost for these tasks is $165k. This budget is $34k less than it was in 2022. An *RMP Update* will be produced in 2023 and released at the Annual Meeting in October. The *RMP Update* is less expensive to produce than *The Pulse of the Bay*. The *RMP Update* will contain summaries of upcoming projects and recent findings for each of the focus areas of the Program.

Tasks related to the Annual Meeting include developing the meeting agenda, coordinating speaker participation, managing logistics, advertising the meeting, preparing presentations, and staffing the meeting. The 2023 budget for the Annual Meeting is $15k more than 2022 to account for the growing number of staff in the RMP and increasing costs associated with hosting the meeting.

## 5. Communications

Communications tasks include implementing the RMP Communications Strategy, approved by the Steering Committee in July 2014. The total cost for these tasks in 2023 is $202k, $18k more than the 2022 budget. The 2023 budget is higher because RMP staff are increasingly being asked to communicate RMP results to an increasing number of agencies and media outlets. In addition, funds were added to the Outreach Products subtask to provide support for graphic design staff who help produce our reports and factsheets. Deliverables include the distribution of RMP information to stakeholders, natural resource managers, and the public through multiple media channels (e.g., website, publications, email newsletters, fact sheets, social media). In 2023, the RMP will continue to provide support for *Estuary News* ($16k) plus staff time to plan and review content.

Stakeholder engagement is critically important to addressing the information needs of RMP participants. Tasks include preparing for and attending RMP stakeholder meetings (e.g.,

BACWA, BAMS, BPC, LTMS, WSPA, and RB2), as well as communicating directly with stakeholder representatives.

Other communications tasks include responding to inquiries for RMP data and reports, and producing summary information on important topics in convenient formats. Participation in workshops and conferences for SWAMP, SETAC, ACS, and other professional organizations allows sharing of RMP information, gathering of information from other investigators on the latest advances in monitoring and understanding, and identification of opportunities for collaboration with and funding from other organizations. Presentations at local meetings and to local audiences are also important for collaboration and information dissemination to scientific partners. Funding for this task also supports maintenance of the RMP website.

Table 4: Bay RMP 2023 Programmatic Budget by Subtask.

| Task | Subtask | Direct Cost | Labor | 2023 Total |
|---|---|---|---|---|
| 1. Program Management | A. Budget and Workplan Development | | $46,000 | $46,000 |
| | B. Contract and Financial Management | | $70,000 | $70,000 |
| | C. Technical Oversight | | $71,100 | $71,100 |
| | D. Internal Coordination | | $115,000 | $115,000 |
| | E. External Coordination | $4,000 | $37,500 | $41,500 |
| | F. Administration | $2,500 | $5,000 | $7,500 |
| 2. Governance | A. SC meetings | $1,000 | $50,000 | $51,000 |
| | B. TRC meetings | $1,000 | $50,000 | $51,000 |
| | C. WG meetings | $2,000 | $61,800 | $63,800 |
| | D. External Science Advisors | $60,000 | | $60,000 |

| | | | | |
|---|---|---|---|---|
| | E. Emerging Contaminants WG | | $52,000 | $52,000 |
| | F. Microplastics WG | | $13,000 | $13,000 |
| | G. PCB WG | | $22,000 | $22,000 |
| | H. Sediment WG | | $40,000 | $40,000 |
| | I. Sources, Pathways, Loadings WG | | $44,000 | $44,000 |
| 3. QA and Data Services | A. Quality Assurance System | | $38,200 | $38,200 |
| | B. Online Data Access: CD3 | | $73,200 | $73,200 |
| | C. Database Maintenance | | $62,000 | $62,000 |
| | D. Updates to SOPs and Templates | | $43,800 | $43,800 |
| | E. DMMO Database Support | | $52,800 | $52,800 |
| 4. Annual Reporting | A. RMP Update Report | $20,000 | $60,000 | $80,000 |
| | B. Annual Meeting | $20,000 | $65,000 | $85,000 |
| 5. Communications | A. Communications Plan Implementation | $16,000 | $35,200 | $51,200 |
| | B. Stakeholder Engagement | | $28,000 | $28,000 |
| | C. Responses to Information Requests | | $22,500 | $22,500 |

|  | | | | |
|---|---|---|---|---|
|  | D. Outreach Products | $1,000 | $16,000 | $17,000 |
|  | E. Presentations at Conferences and Meetings | $12,000 | $53,000 | $65,000 |
|  | G. RMP Website Maintenance |  | $18,800 | $18,800 |
| **Grand Total** |  | **$139,500** | **$1,245,900** | **$1,385,400** |

## 2023 Status and Trends Monitoring and Reserve Funds

In 2020, the Steering Committee and Technical Review Committee began reviewing the Status and Trends (S&T) Program to identify how the program could be altered to accommodate the inclusion of CECs. This review resulted in recommended changes to the sampling matrices, frequency, and analytes included in the S&T Program. The sampling frequency for each matrix  is shown in Figure 4. Sample collection from prey fish and marine mammals (special study from the Emerging Contaminants Workgroup) will be piloted in 2023.

Figure 4: RMP Status and Trends Monitoring Schedule
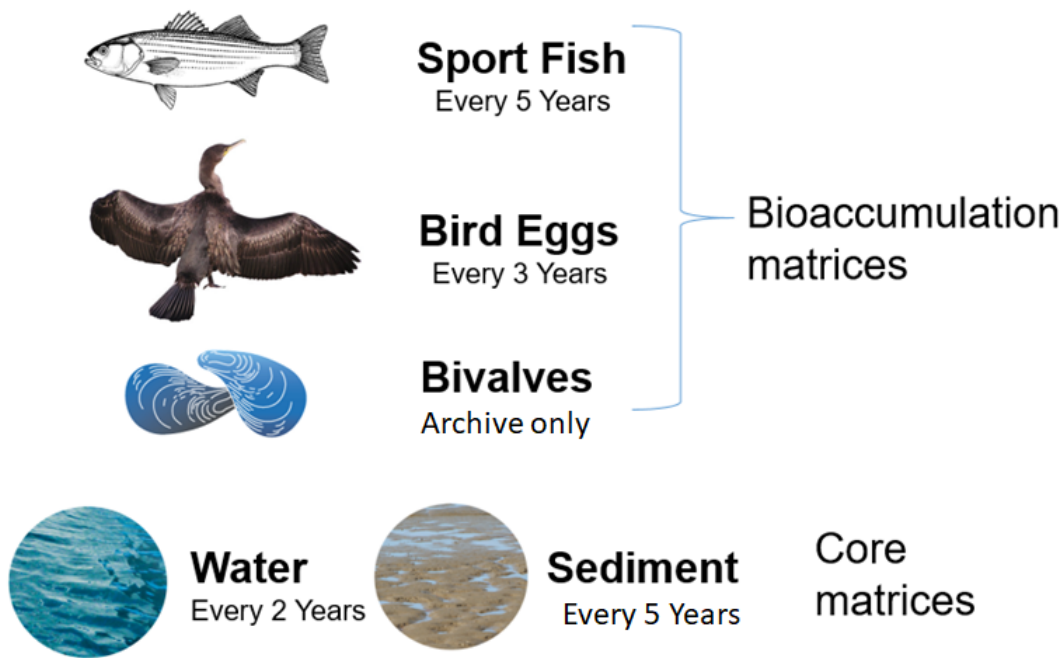
In 2023, based on the revised S&T design, wet weather and dry weather water sampling, prey fish, and margins and deep Bay sediment collections are scheduled to occur. In addition, the RMP provides annual support to the USGS for suspended sediment and nutrient monitoring. This support will continue in 2023. We are also including $66k for laboratory intercomparison studies given the multiple matrices that will be collected in 2023. The most likely intercomparison studies will include ongoing comparison of copper analysis methods, and comparison of CEC analytical methods for sediment and water. The total cost for S&T monitoring in 2023 will be $1,667k. Funds will be deducted ($300k) from the S&T set-aside account to offset the high cost of S&T activities in 2023.

More information about each of the S&T tasks is provided in the line item budget (Table 5) and the sections below.

**USGS Sacramento Support: Continuous Monitoring of Suspended Sediment ($400k)**

This work is led by Dr. Paul Work of the USGS California Water Science Center. The USGS maintains four suspended-sediment stations in the Estuary with RMP funding (Richmond Bridge, Alcatraz Island, Pier 17, and Dumbarton Bridge). This funding leverages suspended sediment monitoring at two other stations (Mallard Island and Benicia Bridge) and salinity at seven stations that are funded by other partners. Funding for these activities is provided by the U.S. Army Corps of Engineers directly to the USGS. The contribution in 2023 is $400k and will support ongoing suspended sediment monitoring in the Bay.

**USGS Menlo Park Support: Monthly Basic Water Quality ($265k)**

This work is led by Dr. Brian Bergamaschi of the USGS California Water Science Center. Monthly water sampling is conducted to evaluate the spatial and temporal trends of water quality parameters at fixed stations throughout the Bay-Delta system. Measurements include salinity, temperature, dissolved oxygen, suspended sediment, and phytoplankton biomass. This information is needed to follow the seasonal and inter-annual changes in water quality and estuarine habitat, which may influence biological communities and the distribution and reactivity of trace contaminants.

The RMP pays a fraction of the total cost of these cruises. The RMP, Nutrient Management Strategy, and USGS California Water Science Center recently expanded an existing agreement that now includes the monthly Bay cruises. A multi-year agreement was implemented in FY2022.

**Wet Weather Water Sampling ($60k)**

The Status and Trends schedule includes wet weather water sampling at targeted sites near stormwater inputs into the Bay, as well as ambient Bay stations. Water samples will be

collected following two storms from targeted locations, including stations in Lower South Bay, and sent to laboratories for analyses of bisphenols, organophosphate esters, and PFAS for S&T and tire contaminants in the Bay for a two year special study (WYs 2023-2024). Samples will also be collected from ambient Bay stations during the Bay-wide nutrient cruises that occur closest to the storm event.

**Dry season 2023 Water Cruise ($257k)**

The Status and Trends schedule calls for water sampling every two years. Water samples from 22 random and targeted sites will be collected and sent to laboratories for analysis of metals, CECs, and ancillary parameters (e.g., suspended sediment concentration, chlorophyll-a). Sample collection/logistics ($67k), and subcontracts for the vessel ($32k) and laboratories ($75k) make up the majority of the cost. The cost to QA and manage the data from this sampling effort will be $40k.

**Nearfield, Margins, and Deep Bay Sediment ($405k)**

The S&T review resulted in the addition of sediment sampling locations at nearfield and margins locations, adding CECs to the list of contaminants (PFAS and bisphenols), and decreasing the frequency of sampling for legacy contaminants at deep Bay stations. The suggested sampling locations include nearfield stations close to stormwater and wastewater inputs, margins stations near the perimeter of the Bay, and deep Bay stations. Sampling frequency is every five years for CECs and every 10 years for legacy contaminants.

In 2023, sediment will be collected from 12 nearfield, 16 margin, and 15 deep Bay stations in Central, South, and Lower South Bays. Sampling is not being completed in North Bay because the concentration of CECs is typically lower in that subembayment compared to the others due to the smaller amount of urban land use. Samples will be analyzed for PFAS, bisphenols, total organic carbon, nitrogen, % solids, grain size, and possibly the final sampling for PBDEs.

Funds will be used to plan, implement, and report the results of the study. A more detailed study plan will be prepared by RMP staff and the TRC for Steering Committee approval before sampling begins.

**Prey Fish Pilot Study ($120k)**

A pilot study for prey fish will be conducted in 2023 in concert with the nearfield and margin sediment sampling. Topsmelt from up to four locations (Richmond, San Leandro Bay, Redwood Creek, and Lower South Bay) will be collected and analyzed for PFAS and PCBs. These data fill a gap in our understanding of contaminant burden and bioaccumulation at lower levels of the food web and transfer of contaminants within the Bay food web.

**Laboratory Intercomparison Studies ($60k)**

Laboratory intercomparison studies boost confidence in analytical methods and results, act as an insurance policy for unforeseeable changes in analysis procedures and analytical contractors, and provide many other benefits. Potential intercalibration studies for 2023 include method comparisons for sediment, ongoing method comparisons for copper in water, and interlab comparisons for CEC samples.

**Sample Archive ($80k)**

The RMP stores archives of sediment, bivalve, bird egg, and sport fish samples, as well as other miscellaneous samples in archives for potential future analyses. Short-term archives (< 10 years) are stored at Schaefer's Meat and Storage in Oakland. Long-term archives are stored at the National Institute of Standards and Technology (NIST) in Charleston, South Carolina. Costs in 2023 will cover continued storage fees for the archives ($48k for Schaeffer's; $26k for NIST), as well as labor to manage the archives and the archive database ($6k). The cost includes subcontractor support from AMS to add samples to the archives and support ongoing organization and purging of samples. This task also includes time for the Data Services team to update and improve the archived sample tracking system. Multiple samples were used from the short-term archive in 2022 to support CEC analysis (PFAS and chlorinated paraffins in sediment and PFAS in sport fish).

**Field Sampling Report and Support ($20k)**

At the end of the field season, RMP staff will update the Sampling and Analysis plans for each S&T activity completed. They will also compile all of the Field Sampling Reports produced by our partners, which document where samples were collected and any complications during field sampling. Clear documentation of field sampling effort is part of the overall quality assurance system for the Program.

Table 5: Bay RMP 2022 Status and Trends Budget by Subtask.

| Task | Subtask | Direct Cost | Subcontract | Labor | 2023 Total |
|---|---|---|---|---|---|
| 6. S&T Monitoring | A. USGS Sacramento Support | | $400,000 | | $400,000 |
| | B. USGS Menlo Park Support | | $265,000 | | $265,000 |
| | C. Dry Season Water Cruise | $5,000 | $145,000 | $67,000 | $217,000 |
| | D. Dry Season Water Cruise Data Mgmt | | | $40,000 | $40,000 |
| | E. Wet Season Water Sampling | $5,000 | $20,000 | $20,000 | $45,000 |
| | F. Wet Season Data Mgmt | | | $15,000 | $15,000 |
| | G. Nearfield and Margins Sediment & Prey Fish | $5,000 | $240,000 | $30,000 | $275,000 |
| | H. Nearfield and Margins Sediment & Prey Fish Data Mgmt | | | $50,000 | $50,000 |
| | I. S&T Laboratory Intercomparison Studies | $10,000 | $20,000 | $30,000 | $60,000 |
| | J. Sample Archive | $48,000 | $26,000 | $6,000 | $80,000 |
| | K. S&T Field Sampling Report & Support | | | $20,000 | $20,000 |
| | L. Ambient Bay Sediment | $20,000 | $120,000 | $30,000 | $170,000 |

| | | | | |
|---|---|---|---|---|
| M. Ambient Bay Sediment Data Mgmt | | | $30,000 | $30,000 |
| **TOTAL** | $73,000 | $1,116,000 | $278,000 | $1,667,000 |

## 2023 Special Studies

The total costs for special studies in 2023 will be $1,533k and there's a budget of $1,413k. Figure 5 shows how these costs are distributed across the seven focus areas. Additional funding for the $119k overage is likely to be covered either by funds for a Supplemental Environmental Project or the additional funding for CEC monitoring from the municipal stormwater dischargers. If neither of those funding sources materialize, funds from the Undesignated Reserve may be used to cover the overage. Additional details on each of the studies are provided in the line item budget (Table 6).

Figure 5: RMP Special Studies Funding for 2023 by Focus Area.
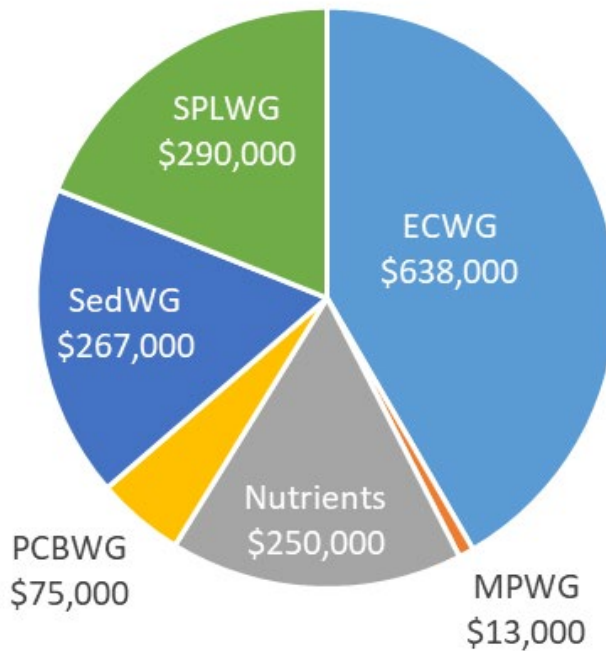
Table 6: Bay RMP 2023 Special Studies Budget by Subtask.

| Workgroup | Task | Direct Costs | Labor | Subcontracts | Total |
|---|---|---|---|---|---|
| Strategy | CECs Strategy | | $60,000 | | $60,000 |
| Strategy | Tires Strategy | | $10,000 | | $10,000 |
| Strategy | Microplastic Strategy | | $13,000 | | $13,000 |
| Strategy | Sediment Workplan | | $10,000 | | $10,000 |
| Strategy | STLS Program Management | | $35,000 | | $35,000 |
| Strategy | SPLWG Strategy | | $30,000 | | $30,000 |
| ECWG | Stormwater monitoring strategy for CECs (year 2 of 2) | $4,000 | $51,000 | | $55,000 |
| ECWG | Ethoxylated surfactants in ambient water, margin sediment, wastewater, Part 2 (year 2 of 2) | $1,700 | $17,100 | $11,200 | $30,000 |
| ECWG | Tire and roadway contaminants in wet season Bay water (year 1 of 2) | $9,500 | $10,500 | $20,000 | $40,000 |
| ECWG | Mining nontargeted analysis data for additional targets for future study | | $45,000 | | $45,000 |
| ECWG/SPLWG | CECs in stormwater: Groundwork | $6,000 | $222,000 | $22,000 | $250,000 |

| | | | | | |
|---|---|---|---|---|---|
| ECWG | PFAS and nontargeted analysis of marine mammal tissues (year 1 of 2) | $9,000 | $20,500 | $86,000 | $115,500 |
| ECWG | PFAS in archived sport fish | | $32,500 | | $32,500 |
| Nutrients | Moored sensor high-frequency observation network | | $250,000 | | $250,000 |
| PCBWG | Baseline Survey of PCBs in Surface Sediment and Prey Fish in the Steinberger Slough/Redwood Creek Complex (Year 2) | | $16,000 | $59,000 | $75,000 |
| SedWG | Temporal variability in sediment delivery to a North and a Central San Francisco Bay salt marsh | | | $135,000 | $135,000 |
| SedWG | Continuous Suspended Sediment and Wave Monitoring in South and Lower South San Francisco Bay | $1,360 | $28,315 | $22,325 | $52,000 |
| SedWG | Sediment flux at Richmond Bridge | | | $70,000 | $70,000 |

| | | | | | |
|---|---|---|---|---|---|
| SPLWG | Small Tributaries Loading Legacy Pollutant Discrete Monitoring to Support Modeling | | $10,000 | | $10,000 |
| SPLWG | Regional Model Development to Support Watershed Loads and Trends | | $130,000 | | $130,000 |
| SPLWG | Tidal Area Remote Sampler Development and Pilot Testing | $10,300 | $60,000 | $14,700.00 | $85,000 |
| | Total | $41,860 | $1,050,915 | $440,225 | $1,533,000 |

Studies highlighted in red are funded or partially funded with the $320k of Supplemental POTW Payments for the AMR Program (FY23).

Appendix A. Special Study descriptions for 2023 projects.

| Workgroup | Study Name | Budget | Summary | Deliverables |
|---|---|---|---|---|
| Emerging Contaminants | Stormwater monitoring strategy for CECs (year 2 of 2) | $55,000 | Prior RMP projects – including a multi-year stormwater CECs monitoring project initiated in 2018 – identified the presence of CECs of Moderate and Possible Concern in urban runoff. Available data from prior sampling are relatively limited, but nevertheless provide evidence that stormwater is a major pathway for CECs to enter San Francisco Bay. Due to high CECs monitoring costs and technical challenges, a well-thought out, carefully focused approach will be essential. The goals of this project are (1) to develop an approach for prioritizing CECs for stormwater monitoring, and (2) to develop an approach for sampling stormwater CECs in the context of the specific physico-chemical properties, sources, transport pathways, and fate of prioritized CECs. A stormwater CECs monitoring strategy is the first step in establishing a long-term stormwater CECs monitoring program and would form the basis for addressing both CECs and Sources, Pathways, and Loadings (SPL) management questions, such as estimating CECs loads discharged to the Bay. This proposal is for the second year of this two-year project | Development of draft stormwater CECs monitoring strategy, Update Presentations and draft strategy document to SPLWG and ECWG, Final strategy document |
| Emerging Contaminants | Ethoxylated surfactants in ambient water, margin sediment, wastewater, Part 2 (year 2 of 2) | $30,000 | Ethoxylated surfactants are nonionic surfactants that are widely used in industrial and household products. This contaminant class is currently classified as of Moderate Concern in the RMP tiered, risk-based framework for CECs. A 2019 RMP special study quantified a broad suite of ethoxylated surfactants in Bay water, effluent, and stormwater, including lauryl alcohol ethoxylates (C12-14EO), tridecyl alcohol ethoxylates (C16EO), nonylphenol ethoxylates, and octylphenol ethoxylates. Sum of ethoxylated surfactants concentrations ranged from 1-95 µg/L. A 2022 RMP special study supported Duke University to update analytical methods to include alkylphenols and short-chain alkylphenol ethoxylates. This new analytical method is the most comprehensive method available for this contaminant class, and few laboratories have the capabilities to perform this analysis. This project is the second half of the full proposal presented as a 2022 ECWG special study, and will include collection of | Finalize sampling design and protocol with wastewater treatment plants, wastewater effluent sample collection, laboratory analysis of samples, QA/QC and data management, draft/final report |

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| | | | additional wastewater samples that will be analyzed using the updated analytical method. These wastewater samples are needed to refine estimates of concentrations of ethoxylated surfactants in wastewater effluent, due to the wide range observed in the initial 2019 screening study. These additional samples are important to further compare relative loads from wastewater versus stormwater runoff, a comparison which was initiated by prior studies. This project will supplement remaining funds from the 2019 and 2022 studies to complete project deliverables, including more comprehensive monitoring of ambient water and margin sediment samples. The full dataset will guide re-evaluation of this contaminant class in the tiered framework for CECs and inform development of a monitoring strategy. | |
| Emerging Contaminants | Tire and roadway contaminants in wet season Bay water (year 1 of 2) | $40,000 | 6PPD-quinone and other toxicologically relevant contaminants derived from tires have been observed in Bay Area stormwater and in wet season Bay water samples from 2021. As part of its Status and Trends (S&T) program, the RMP is undertaking a pilot monitoring effort to quantify a number of contaminants in Bay water samples collected following storm events to provide information on the impact of stormwater discharges on Bay contaminant concentrations. This proposed study would leverage the pilot S&T effort to evaluate more fully the concentrations of tire and roadway contaminants in Bay water during the wet season. Results will indicate whether these stormwater-derived contaminants reach concentrations of concern within receiving waters, filling a data gap relevant to the RMP tiered, risk-based framework for emerging contaminants. Results will be shared with California Department of Toxic Substances Control's Safer Consumer Products Program, which seeks data to support its evaluation of tire chemical ingredients. | Update sampling plan, field sampling wet season Bay water samples, lab analysis, QA/QC, data management and upload, Present to ECWG, draft/final short report |

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| Emerging Contaminants | Mining nontargeted analysis data for additional targets for future study | $45,000 | The RMP has invested resources in nontargeted analysis (NTA) of Bay matrices as a tool to inform follow-up targeted analysis and risk screening studies. At present, hundreds of contaminants have been tentatively identified in the Bay via NTA. Ongoing studies of tire-derived contaminants and ethoxylated surfactants are examples of RMP studies that are addressing the most readily identifiable and urgent science priorities arising from this analysis. However, the majority of the CECs observed via NTA have not been screened for information as to potential sources and/or ecological concerns. This proposal would fund a desktop exercise to compile data on sources and ecotoxicological information for a larger proportion of these contaminants, aiming to identify additional CECs that could be high priorities for further study in the Bay. The RMP has invested resources in nontargeted analysis (NTA) of Bay matrices as a tool to inform follow-up targeted analysis and risk screening studies. At present, hundreds of contaminants have been tentatively identified in the Bay via NTA. Ongoing studies of tire-derived contaminants and ethoxylated surfactants are examples of RMP studies that are addressing the most readily identifiable and urgent science priorities arising from this analysis. However, the majority of the CECs observed via NTA have not been screened for information as to potential sources and/or ecological concerns. This proposal would fund a desktop exercise to compile data on sources and ecotoxicological information for a larger proportion of these contaminants, aiming to identify additional CECs that could be high priorities for further study in the Bay. | Develop spreadsheet structure, assemble available contaminant identifications, ancillary, and metadata, review available source and toxicity information, present to ECWG on additional targets, spreadsheet of compiled data mining results |

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| Emerging Contaminants and Sources, Pathways, and Loadings | CECs in stormwater: Groundwork | $250,000 | This project will provide a means for the RMP to complete the groundwork necessary to develop robust, practical, and cost-effective systems for stormwater CECs monitoring. Proposed project elements include: (1) developing and pilot-testing remote stormwater samplers to support CECs sample collection; (2) expanding and rebuilding the SFEI stormwater sampling sites lists and converting it into a database focused on flow-gauged sites that includes the most important site characteristics for CECs monitoring site selection; (3) analyzing prior CECs stormwater monitoring data to inform integrated monitoring and modeling; (4) CECs model development groundwork sufficient to support this project and prepare for implementation of CECs monitoring; and (5) convening an ECWG/SPLWG stakeholder and science advisor team to support this project in parallel with the Stormwater CECs Strategy project.<br><br>Because work in progress on the Stormwater CECs Strategy project, CEC Stormwater Loads Modeling Exploration project, and CECs monitoring data to be received in mid-2022 may create the need to refine the conceptual project scope and budget presented here, a revised budget with explanation of changes will be prepared upon project initiation and reviewed with stakeholders. | Identification of the best remote stormwater sampler for stormwater CECs monitoring; stormwater sampling locations database (internal SFEI resource); and a report documenting the project's outcomes (some of which will be wrapped into other RMP deliverables) |
| Emerging Contaminants | PFAS and nontargeted analysis of marine mammal tissues (year 1 of 2) | $115,500 | A recent review of the RMP Status and Trends (S&T) study design led to the recommendation to explore the addition of Bay marine mammals like harbor seals to the species included in periodic S&T monitoring. To inform the potential inclusion of marine mammals to the S&T program, this two-year study proposal includes examination of PFAS in multiple tissues of two local species, harbor seals and harbor porpoises. Nontargeted analysis of PFAS and hydrophobic halogenated compounds is recommended to leverage the sample collection in this pilot study, providing a means to identify unanticipated contaminants that may merit follow-up targeted monitoring. Anticipated study outcomes would include recommendations for S&T monitoring of marine mammals, as well as priorities for future investigations of newly identified CECs observed in marine mammal tissues. | Establish study design and sample collection protocol, sample collection, target PFAS analysis, nontargeted analysis, draft manuscript(s), S&T study design recommendations (technical memo), presentation to TRC, final manuscript(s) |

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| Emerging Contaminants | PFAS in archived sport fish | $32,500 | California state agencies are prioritizing efforts to characterize existing PFAS contamination in our state and the associated ecological and human health risks. Locally, a virtual forum on PFAS in San Francisco Bay fish in February drew over 250 participants into a discussion about the risks this contamination may pose to fishing communities, including tribal members and residents in disadvantaged African American neighborhoods like Bayview Hunters Point in San Francisco and Bayo Vista in Rodeo. While RMP monitoring has provided some of the only data on PFAS in sport fish in California, samples analyzed to date are insufficient to determine PFAS status and trends in different species in the Bay. We propose analyzing archived sport fish samples to fill data gaps and enhance the RMP Status and Trends (S&T) study design to support evaluation of temporal trends. | Study design, ship archived samples to analytical laboratory, PFAS analysis, data QA review, draft/final report |
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| Nutrients | Moored sensor high-frequency observation network | $250,000 | Bay-wide cruises have been critical to our understanding of the system. The Bay is spatially and temporally heterogeneous, however, and monthly measurements miss changes in water quality that are driven by short time scale processes, including tidal forcing, wind, and biological cycles. The eight sensors in the moored, high-frequency observation network in South Bay collect water quality data every 15 minutes and contribute to our understanding of Bay processes that affect nutrient and chlorophyll dynamics. | Sensor maintenance; data management |
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| PCBs | Baseline Survey of PCBs in Surface Sediment and Prey Fish in the Steinberger Slough/Redwood Creek | $75,000 | This study would assess the spatial distribution of PCBs in surface sediment and prey fish in the Steinberger Slough/Redwood Creek (SS/RC) priority margin unit (PMU) to address information gaps in the conceptual model for this area and establish baseline data for evaluating the response of these receiving waters to load reduction efforts in the watershed. Funding for this effort would be spread over two years. | Draft/final technical report |

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| Sediment | Temporal variability in sediment delivery to a North and a Central San Francisco Bay salt marsh | $100,000 | Salt marshes provide critical habitat as well as coastal protection. One of the key sediment management questions for San Francisco Bay is whether available sediment is sufficient for marshes to keep pace with sea-level rise. In 2022 the RMP funded Jessie Lacy and Karen Thorne to investigate the relationships between sediment accretion on marshes, suspended sediment concentration (SSC) in nearby shallows, and SSC at long-term channel stations, as well as temporal variability in these relationships, at the San Pablo Bay National Wildlife Refuge and Corte Madera Marsh Ecological Reserve. That project includes nine months of data collection; this proposal would extend all data collection at the two marshes for an additional six months. The longer study duration will span a full hydrologic year and capture a second spring-summer transition, following the drought conditions of 2022. Two new components are also proposed: collection of time-series of SSC at one marsh-top station at each site, and installation and monitoring of marker horizon plots. The project will produce data suitable for testing numerical models of sediment transport between the Bay and marshes. Results will be useful for prioritizing marsh restoration sites, assessing restoration actions, and understanding mechanisms of sediment delivery to marshes. | Data release: Bay shallows and marsh-top SSC data (PCMSC) Data release: deposition, accretion, and vegetation characteristics (WERC) Report (draft paper) investigating the relationships between SSC in the shallows, SSC at long-term channel stations, and sediment accretion on marshes Final Presentation to RMP Sediment Workgroup |

| Sediment | Continuous Suspended Sediment and Wave Monitoring in South and Lower South San Francisco Bay | $52,000 | The South Bay Salt Pond Restoration Project funded the collection of continuous suspended sediment (SSC) and wave monitoring in shallow areas (shoals and sloughs) of South and Lower South San Francisco Bay (SB and LSB, respectively) during 2022. This proposed project would support continued data collection for a second year, which is needed to develop a robust calibration between turbidity and SSC. Continuous SSC data are essential to both empirical and model-based sediment studies and until recently were only available at one SB/LSB station near the Dumbarton Bridge. The SB/LSB shoals play an important but understudied role in sediment dynamics, and these dynamics are strongly influenced by wind waves. This project will continue to generate continuous SSC time-series data at a the recently established SB station directly offshore from the Eden Landing "Whale's Tail" area along with three existing turbidity stations (several of which have been collecting turbidity data since 2015) in support of generating turbidity-to-SSC relationships for SB/LSB. The existing turbidity stations are supported by the Nutrient Management Strategy (NMS); parallel SSC sampling is also underway at four stations in South Bay; turbidity-SSC calibration will be developed for these stations as well. The proposed second year of the project would include: Ongoing collection and processing of SSC samples at four stations; Development of site-specific turbidity-to-SSC relationships at eight stations; Curation and public sharing of resulting SSC time series from all eight stations; Curation and public sharing of wave height and period data from one shoal station in South Bay. By leveraging existing NMS instrumentation and field servicing, this project would significantly expand available SSC data in SB and LSB at a considerably lower cost than independently implementing additional sediment monitoring stations. | Publically available 15-minute SSC time series from eight stations in South Bay and Lower South Bay Report detailing data collection, turbidity-to-SSC calibrations, and limited, descriptive interpretation Project update presentation to the RMP Sediment Workgroup Publically available wave height and period data from one station in South Bay |

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| Sediment | Sediment flux at the Richmond-San Rafael Bridge | $70,000 | Sediment budgets are integral in the San Francisco Bay (SFB) for management and research purposes regarding key habitats, light attenuation, contaminant transport, bathymetric change, as well as aiding the investigation of potential impacts from climate change or water-management decisions. These budgets are developed from numerical models calibrated and checked using direct measurements of suspended sediment at key points within the SFB system. Sediment flux at the cross section at Richmond-San Rafael Bridge (RIC) has been a major gap of knowledge in past sediment budgets due to the lack of available measurements. This proposal's goal is to collect suspended-sediment flux measurements at RIC as the necessary first step towards the eventual goal of developing a sediment flux model for the cross-section. The work will include 80 hours of cross-channel transects using an acoustic doppler current profiler (ADCP) to measure both velocity and acoustic backscatter (ABS). Velocity-integrated suspended-sediment concentration (SSC) samples will be taken during the transects to correlate to the ABS. An ABS to SSC empirical model will be developed for the site to convert the transects into sediment flux measurements. All measurements will be published in a data release and in a model archive summary outlining the ABS to SSC model. The data from this project can be used in a future study as calibration/validation data for a new/existing hydrodynamic numerical model which can supplement the time series to determine future location(s) for stationary ADCP sensors to measure continuous flux at the site. | Data release including all new project data including ADCP transects and velocity-integrated point-SSC samples Model archive summary detailing the ABS-SSC empirical model to convert ADCP transects to sediment flux measurements Presentation to the Sediment Workgroup |

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| Sources, Pathways, and Loadings | Small Tributaries Loading Legacy Pollutant Discrete Monitoring to Support Modeling | $10,000 | The RMP has monitored stormwater throughout the region using two main techniques over the last 20 years. With the exception of 2011, from 2002 to 2014, intensive load monitoring (discrete sampling during at least four storms per year and at least two years but mostly three or more) was carried out at eight watersheds to compute loads in single watersheds and extrapolate these to estimate regional loads. In contrast, in 2011 and from 2015 to 2021, a reconnaissance monitoring style (single storm composite samples) was adopted to identify high-leverage watersheds of potential management interest. While reconnaissance monitoring cannot be used to support modeling, discrete samples at flow monitoring locations serve as important calibration data for the regional model. In this study, we propose a two-year effort for sampling at two sites during six storm events each, collecting four discrete samples over the hydrograph. This level of data is sufficient and optimal for supporting a cost-effective modeling-monitoring approach for loads and trends estimation to support the PCB TMDL reevaluation planned for 2028. After two years of sample collection, and in consultation with our modeling team, the SPLWG will decide whether to continue sampling these same two sites or to move on to new locations to support model calibration. This is primarily a field study and the level of effort will be tailored to the amount of budget available. | Selected site list and preparation for sampling<br>Wet season water samples collected and sent to the labs for analysis<br>Laboratory analysis, QA, & Data Management<br>Interpretation & reporting for BAMSC<br>Draft report<br>Final report |
| Sources, Pathways, and Loadings | Regional Model Development to Support Watershed Loads and Trends | $130,000 | The RMP's 2018 Modeling and Trends Strategy prioritized further assessment of the regional estimates and temporal trends in contaminant loads from watersheds, and developed a multi-year plan for model development. Although initially conceived as a tool for evaluating only PCB and Hg trends, advice provided at the May 2019 RMP Sources, Pathways, and Loadings Work Group (SPLWG) meeting caused the RMP to broaden the modeling work plan to include support for better estimates of loads of sediment and other contaminants, such as contaminants of emerging concern (CECs), in addition to PCBs and Hg. The two main objectives of the pollutant of concern (POC) model development are to: 1) create a flexible watershed modeling platform for | Model data collation and preparation<br>Control measures impact estimation<br>Draft modeling report for peer review<br>Final modeling report and data sharing portal |

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| | | | general contaminant simulation; and 2) answer management questions related to PCBs, Hg, sediment, and (in the future) contaminants of emerging concern (CECs). This proposal is for funding in 2023 for phase 2 of the contaminant modeling. Phase 1 of the POC modeling, currently in progress, is developing a flexible modeling framework to quantify stormwater flow, sediment, and contaminant baseline loads at both watershed and regional scales, using PCBs and Hg as pilot examples. Phase 2 will focus on setting up a modeling framework for evaluating the benefits of control measures and developing a web-based data sharing platform. We also propose three meetings with key stakeholders to get input on model data needs and assumptions, interim model review, and model final review. The developed model structure will be a basis for and further modified for other contaminants in the future. Trends associated with control measures, land-use and climate change, or other scenarios could then be explored | |
| Sources, Pathways, and Loadings | Tidal Area Remote Sampler Development and Pilot Testing | $85,000 | Old industrial land use is the main source of the greatest yields as well as total mass of PCB loads in the Bay Area. Provisions C.11.c and C.12.c of the revised tentative order of the Municipal Stormwater Regional Permit (MRP) call for control measure implementation in old industrial areas. However, we have been unable to sample stormwater runoff from much of this area. Greater than 50% of the old industrial landscape in the Bay Area lies within 1 km of the Bay and is often tidally influenced. Such sites are difficult to sample, requiring stormwater runoff during a very low tide to avoid sampling Bay water. Furthermore, these areas often have public access limitations. In this study, we propose to modify and field test an EPA-developed remote sampler coupled with an auto-logging micro salinity probe that we can anchor in the water column in tidally influenced areas receiving stormwater runoff from old industrial areas. The sampling equipment would be installed just prior to a storm and retrieved after. The salinity probe will be used to control the sampling to ensure samples contain mostly fresh stormwater. Samples would be analyzed for total PCBs, total Hg, and suspended sediment. The primary focus in this first year is on modification of the samplers and pilot testing at up to four field sites, with field replicates and blanks tested at every | Development/selection/modification of remote sampler Pilot testing during rainy season Update presentation at SPLWG on the results to date Data upload to CEDEN Report (draft and final) |

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| | | | site. Prior to the first field deployment, two blanks will be collected in the SFEI laboratory to<br>ensure the equipment does not cause contamination. Once the EPA-sampler is successfully modified and piloted, it could be used to help identify which tidally influenced industrialized drainage areas on the Bay margin could be prioritized for management<br>consideration. | |