Bay RMP Steering Committee Meeting

22 January 2024

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1. Introductions and review goals of the meeting (10 min)
2. Approve Nov. meeting summaries, set future meeting dates (10 min)
3. TRC Meeting summary (15 min)
4. RMP Financial Update (15 min)
5. Status of Incomplete Projects from 2023 and Prior Years (20 min)
6. Funding Request to complete IWMM Strategy Report (10 min)
7. Approve Final Multi-Year Plan for 2024 (20 min)
8. Review Current SEP Proposals List (10 min)
9. Break

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10. EPA Program Office Update (50 min)
11. Science Update - Sediment/PCB Modeling (30 min)
12. Lunch
13. Communications (20 min)
14. Deliverables and Action Items (10 min)
15. Plan Agenda Items (15 min)
16. Plus/Delta (5 min)
17. Adjourn

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1. Introductions and Review Goals for the Meeting (10 minutes)

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2. Approve Meeting Summaries and Future Meeting Dates (10 minutes)

Desired outcomes:

- Approve meeting summaries
- Confirm future SC meeting and Annual Meeting dates

Meeting schedules

Scheduled Steering Committee meetings:

April 15 *(note ECWG is scheduled for April 16-17)*

Proposed Steering Committee meetings: (usually 3rd Monday)

?

Scheduled Technical Review Committee meetings:

March 26 & June 13

Annual Meeting:

October 16, 2024

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3. TRC Meeting Summary (15 minutes)

Desired outcome:

- Informed committee

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- EPA Program Office Update
- 2024 Workplan Overview
- Watershed Modeling Update
- S&T Monitoring Update
- Event-based Monitoring
- Informatics Update
- Communications

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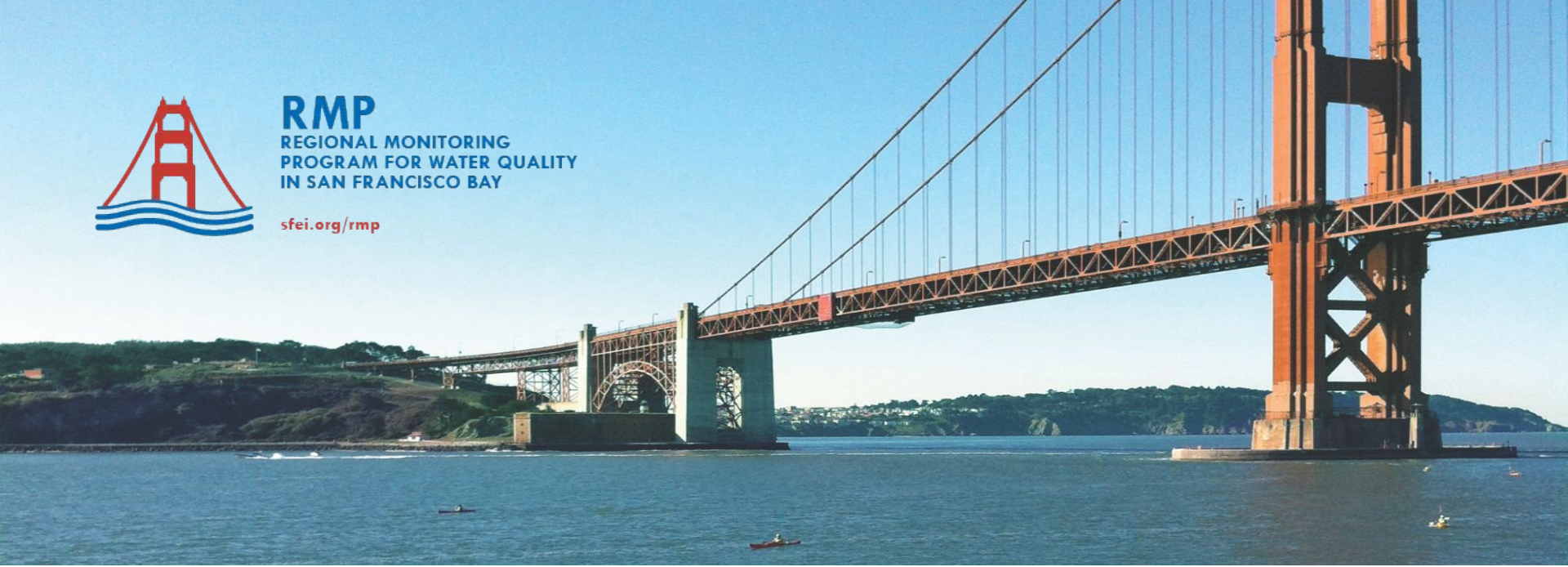
4. RMP Financial Update for 2023 Q4 (15 minutes)

Desired outcome:

- Informed committee

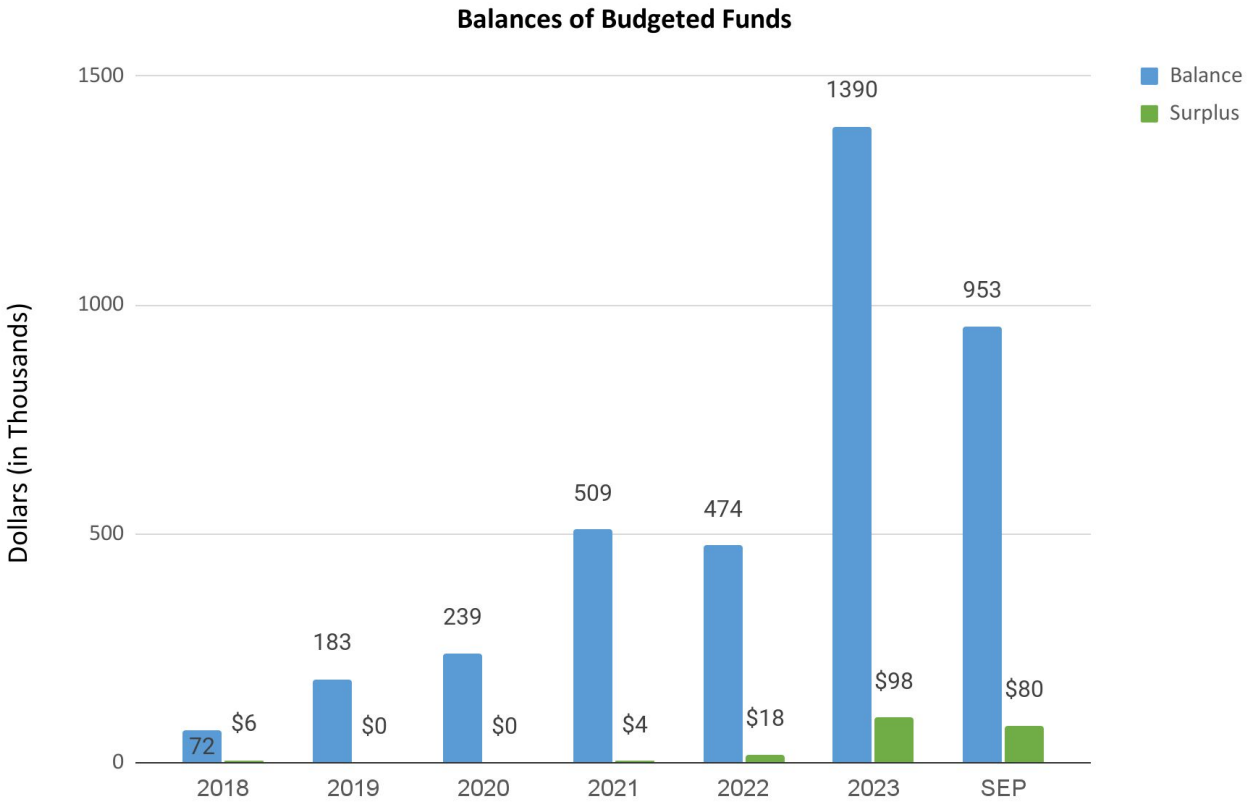


Steering Committee Meeting
January 22, 2024

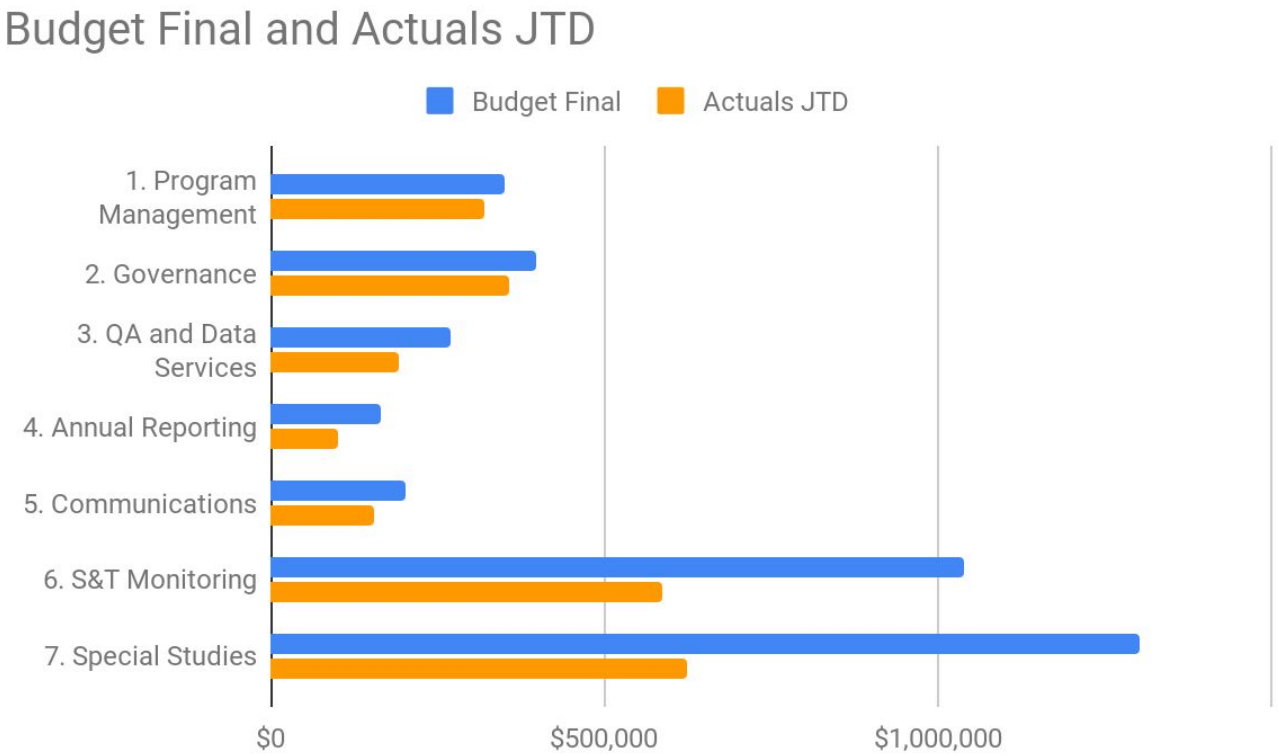
Item # 4

Financial Update

The Big Picture



2023 Budget and Expenses



Key Points

2023 Budget

- 59% expended
- 92% of invoiced fees received
- There is a surplus of $98k due to $118,250 in SEP funds supporting part of task 45 Sediment Delivery to Marshes in C&N Bays

Key Points

2022 Budget

- 82% expended
- 100% of 2022 invoiced fees received
- There’s a surplus of $18k (reduced from $138k in previous quarters)

Key Points

2021 Budget

- 86% expended
- 99% of 2021 invoiced RMP fees have been collected. The final $5,504 San Francisco Marina invoice to be paid in Jan 2024.

Key Points

2020 Budget

- 94% expended
- 100% of fees have been collected

Key Points

2019 Budget

- 95% expended
- 100% of fees have been collected

Key Points

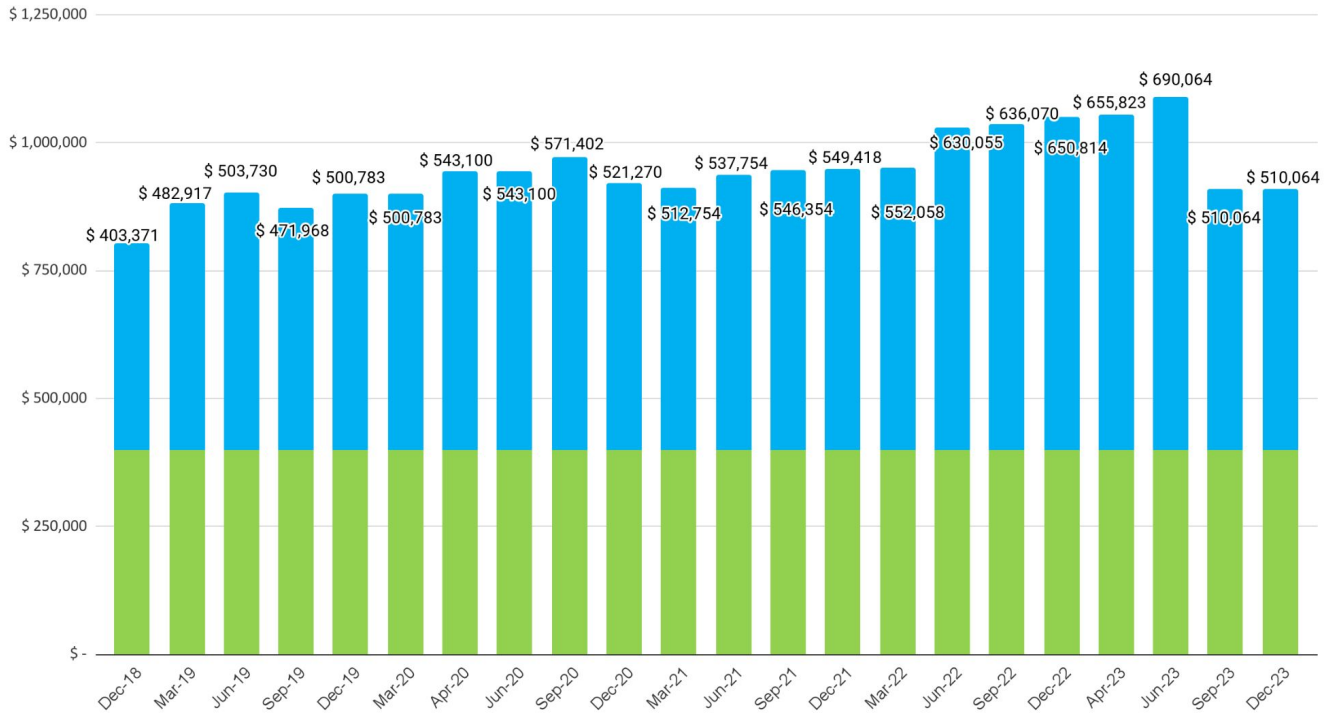
2018 Budget

- 98% expended
- 100% of fees have been collected
- Waiting on 1 final invoice and then will unencumber balance to reserve

Unencumbrances

- No requests this quarter

Undesignated Funds Balance



Undesignated Funds Changes

- Q1 LAIF interest of $34,081 (2.74% rate)
- Q2 LAIF interest of $38,160 (3.15% rate)
- Q3 LAIF interest of $55,146 (3.59% rate)
- Q4 LAIF interest totals will be reported next quarter (4.00% rate)

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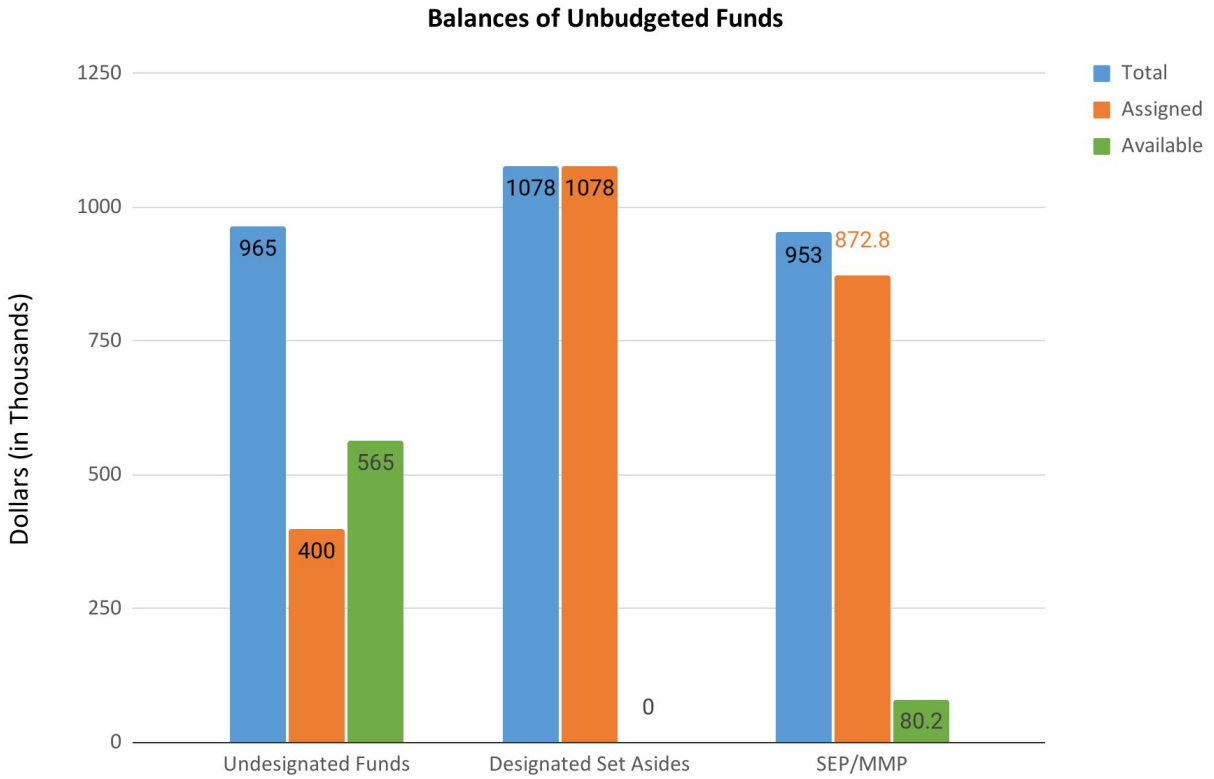
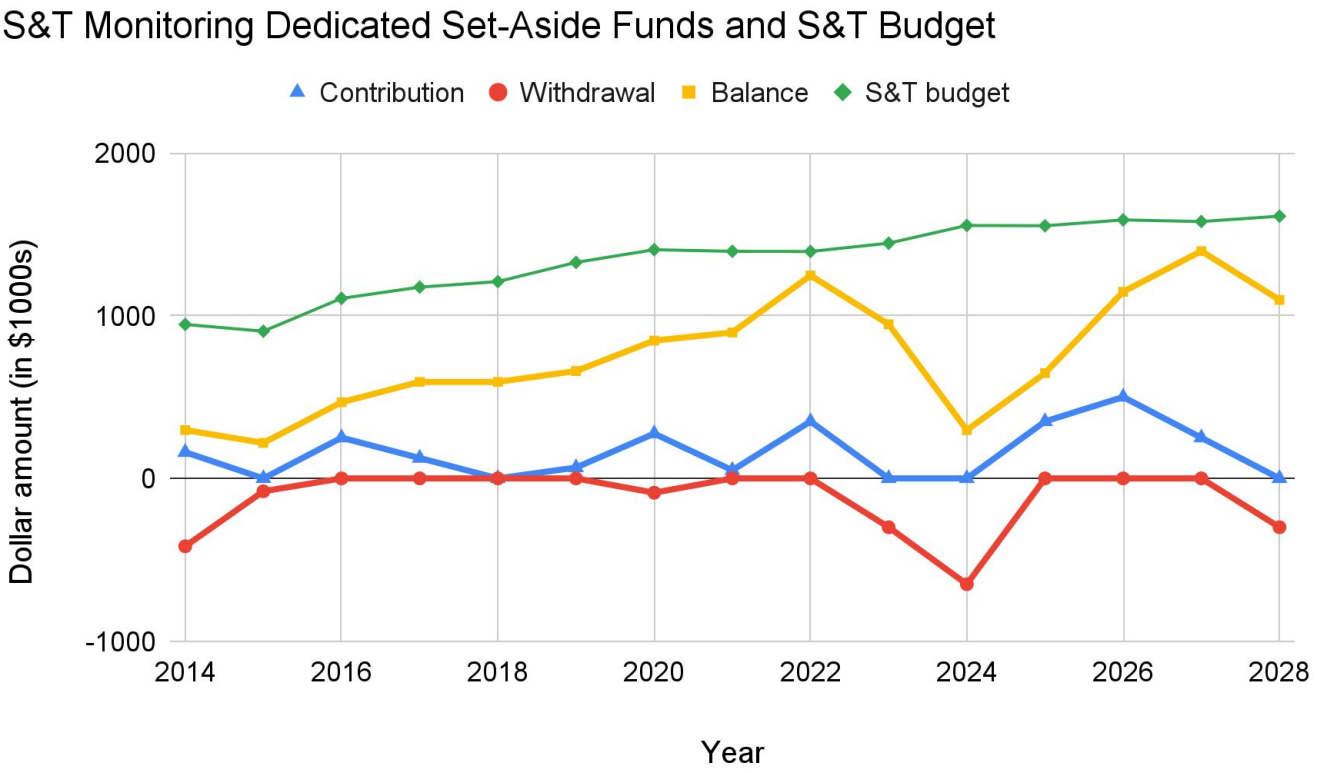
Unbudgeted Funds Summary



S&T Set Aside Funds



Requests to Steering Committee

- Funding request to complete the Integrated Watershed Modeling and Monitoring Strategy Special Study
  - $10,800 to complete the project
  - To be discussed in further detail during agenda item 6

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5. Review the Status of Incomplete Projects from 2023 and Prior Years (20 minutes)

Desired outcome:

- Informed committee
- Decisions on continuing incomplete projects

Incomplete RMP Projects – 2019

Project	Deliverable	Budget used	Status	Timeline
Selenium in sturgeon muscle plug	Collect and Analyze, Report*	100%	At Dec TRC meeting it was decided to forgo analysis of the sturgeon muscle plug samples collected in 2023. The freezer failure in Nov 2023 compromised the samples.	NA

Incomplete RMP Projects – 2020

Project	Deliverable	Budget used	Status	Timeline
North Bay margins	Report	98%	Draft report resulted in wanting re-analyses done on some ancillary vs. target analytes.	March 2024
Selenium in North Bay clams and water 2019-2020	Data Report	100%	Draft in review	March 2024

Incomplete RMP Projects – 2021

Project	Deliverable	Budget used	Status	Timeline
S&T Program Review	Report	63%	Draft under review, waiting on comments from Tom Grieb	2024
QA Summary for 2021 S&T Activities	Report	100%	In progress	March 2024
Impact of Remediation Actions on San Leandro Bay Recovery from PCB Contamination	Report	82%	Internal review is complete, Stanford is leading the revisions	March 2024
Integrated watershed modeling and monitoring implementation strategy	Report	100%	Draft in progress	April 2024

Incomplete RMP Projects – 2021 cont.

Project	Deliverable	Budget used	Status	Timeline
CEC in Urban Stormwater	Manuscript & Management summary	82%	Internal review of draft manuscript is complete.	March 2024
Nutrients Light Attenuation and moored sensors	Technical Memo	100%	In progress	Summer 2024
DMMO Database	Database Enhancements	12%	Waiting on final templates from Exa	Summer 2024

Incomplete RMP Projects – 2022

Project	Deliverable	Budget used	Status	Timeline
QA Summary for 2022 S&T Activities	Report	100%	Waiting on Bird Egg data	Summer 2024
Stormwater monitoring strategy for CECs	Report	45%	Ongoing	In development
Ethoxylated surfactants in ambient water, margin sediment, wastewater.	Report	47%	Draft report in development.	December 2024
PCB In-Bay contaminant modeling (SLB)	Report	100%	In progress	May 2024

Incomplete RMP Projects – 2022 cont.

Project	Deliverable	Budget used	Status	Timeline
DMMO Database Enhancements	Testing results accessible on DMMO website	1%	Delayed	December 2024
STLS WY21 POC Recon Monitoring	ADA Update	100%	In progress	March 2024
CEC Modeling Exploration	Report	95%	Draft in review	March 2024
Sediment delivery to marshes in Central and North Bay	Report	91%	In progress	September 2024

Incomplete RMP Projects – 2023

Project	Deliverable	Budget used	Status	Timeline
Nontargeted Data Mining	Spreadsheet of results	25%	Ongoing	Summer 2024
PFAS in Archived Sport Fish	Report	90%	Draft being finalized for submission	March 2024
STLS WY21 POC Recon Monitoring	Report	13%	Samples being collected	Summer 2025
STLS Regional Model Development	Report	70%	Delayed	?

Incomplete RMP Projects – 2023 cont.

Project	Deliverable	Budget used	Status	Timeline
Suspended Sediment in LSB	Report	46%	Ongoing	April 2024
Sediment Delivery to Marshes in C&N Bays: project expansion	Report	0%	Ongoing	Fall 2024
Sediment Flux Richmond Bridge	Data Release	0%	Delayed	Summer 2025
PCBs in sediment and fish SS/RC	Report	62%	Ongoing	Fall 2024

Incomplete SEP Projects

Project	Deliverable	Budget used	Status	Timeline
NB selenium clam and water	Report and data release	96%	Draft in review, data release complete.	March 2024
QACs in Bay Area Wastewater	Technical Memo	56%	Draft in review	August 2024
MTC Bay Area Land Use Update	Collect and transform data relevant to RMP stakeholders	100%	Waiting for MTC to release	TBD
Integrated watershed-Bay modeling strategy	Report	35%	Draft report in progress.	Summer 2024

Incomplete SEP Projects cont.

Project	Deliverable	Budget used	Status	Timeline
Regional Watershed Spreadsheet Model update	Updated model and technical report	6%	Waiting for land use update	Winter 2023
Sediment Deposition on South Bay Marsh (Whales Tail)	Report	100%	Draft in USGS review	Spring 2024
PFAS and Chlorinated Paraffins in Bay Sediment	Report	2%	Ongoing	Spring 2025
High speed mapping of water quality parameters on the eastern shoal of SSFB	Data release, technical report	81%	Ongoing	Summer 2025

Incomplete SEP Projects cont.

Project	Deliverable	Budget used	Status	Timeline
SF Bay Sediment Transport and Fate Modeling	Technical Report	21%	Ongoing	Fall 2025
PFAS in Archived Sport Fish	Manuscript	100%	Revisions underway	April 2024
Analysis and Reporting of NTA Sediment Data	Manuscript & Fact Sheet	76%	In prep	April 2024
Investigating HABs in SF Bay	Data release & Technical Report	15%	Ongoing	Summer 2026
Temporal variability in sediment delivery to a North and Central SF Bay Salt Marsh	Data release & Final Report	75%	Ongoing	Spring 2025

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6. Funding request to complete IWMM strategy project (10 minutes)

Desired Outcome:

- Decision on funding request

2021 proposed timeline and budget

Special Study Proposal: Integrated watershed modeling and monitoring implementation strategy

Summary: The RMP modeling of concentrations and loads delivered to the Bay from the small tributaries in the nine county Bay Area, along with monitoring to support the modeling, has largely been funded and led by the SPLWG and focused on PCBs and Hg. Other workgroups with modeling or monitoring needs have largely just retrofitted the models or piggybacked on the monitoring programs. As the focus of modeling moves towards supporting a broader suite of contaminants including sediment, nutrients and CECs beyond just PCBs and Hg, the information and the monitoring required to model contaminant groups with similar characteristics (chemical and physical properties, sources, pathways, etc.) needs to be systematically identified, and the model structure needed to support these priorities needs to be considered from inception. This proposal aims to address these issues by building an integrated watershed modeling and monitoring implementation strategy to lay out the information needs and associated monitoring and modeling processes to address management questions for any contaminant of interest when the need arises.

Estimated Cost: $50k
Oversight Group: TRC
Proposed by: L McKee and T Zi (SPLWG), R Sutton (ECWG), S Dusterhoff (SedWG), J Davis (PCBWG), D Senn (Nutrients Management Strategy), and M Foley (RMP Manager)
Time Sensitive: Yes, bridge monitoring and modeling efforts to avoid inefficiencies.

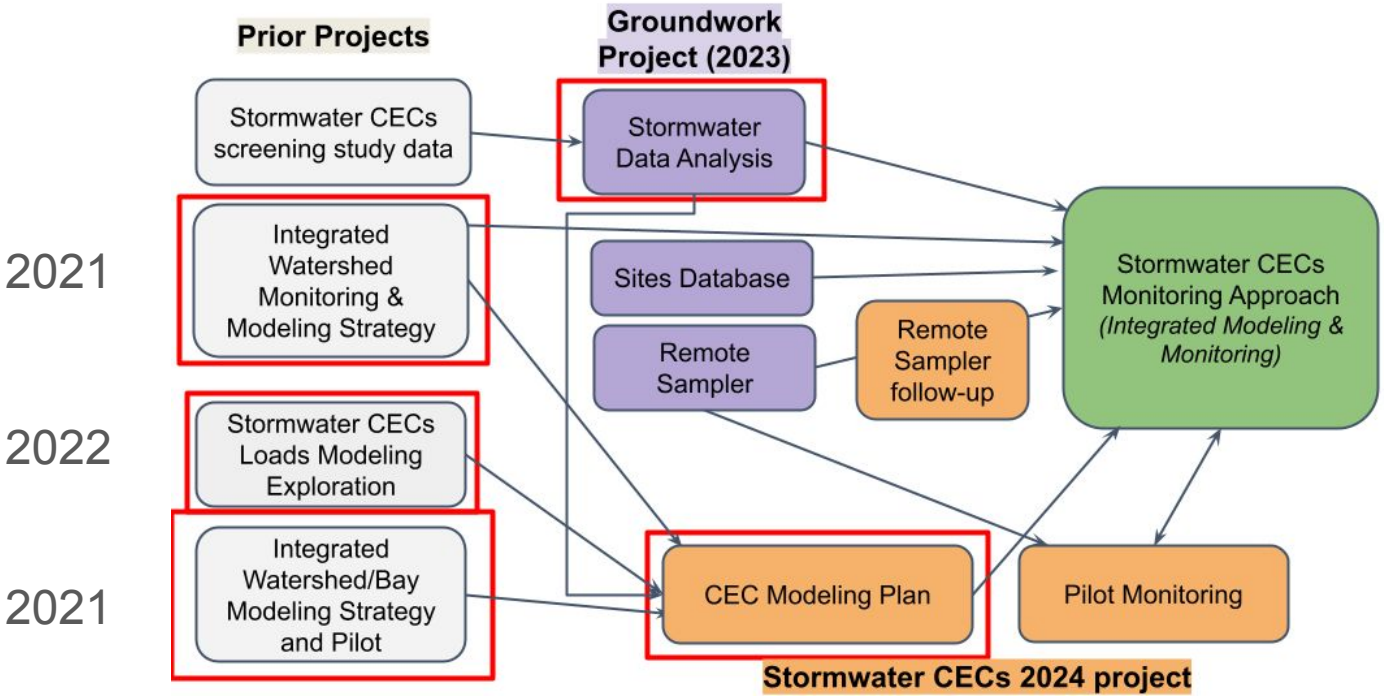
Proposed Deliverables and Timeline

Deliverable	Due Date
Draft strategy and processes for incorporating pollutants of concern into models and identifying monitoring needed to support the model	April 2021
Complete full draft FINAL integrated watershed modeling and monitoring implementation strategy	September 2021
Final report	December 2021

Revised timeline and budget

Deliverable	Due Date
Draft strategy internal review	Feb 2024
Draft strategy Workgroup review	Mar 2024
FINAL web published integrated watershed modeling and monitoring implementation strategy	Apr 2024
Stakeholder outreach / Presentations	Apr 2024

Additional funds requested = $10,800


Prior Projects
Groundwork Project (2023)
2021
2022
2021
Stormwater CECs screening study data
Stormwater Data Analysis
Integrated Watershed Monitoring & Modeling Strategy
Sites Database
Remote Sampler
Remote Sampler follow-up
Stormwater CECs Monitoring Approach (Integrated Modeling & Monitoring)
Stormwater CECs Loads Modeling Exploration
Integrated Watershed/Bay Modeling Strategy and Pilot
CEC Modeling Plan
Pilot Monitoring
Stormwater CECs 2024 project

Bookkeeping error - oops

- Revenue = **$5,216,129**
  $3,956,642 Core fees
  $339,488 AMR
  $100,000 MRP
  $500,000 S&T set aside fund ← Forecasted in 2023 MYP at $650k
  $320,000 Undesignated reserve ← $140k for strategy funds + $180k for remote sampler
- Expenses = $5,216,074 ← Did NOT include the cost of the remote sampler, actual expenses = $5,396,074
- Balance = $55 ← Actual balance = -$179,945

Bookkeeping error suggested correction

- Revenue = **$5,396,129**
  $3,956,642 Core fees
  $339,488 AMR
  $100,000 MRP
  $680,000 S&T set aside fund
  $320,000 Undesignated reserve

- Expenses = $5,396,074

- Balance = $55

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7. Approve Final Multi-Year Plan and Annual Workplan & Budget for 2024 (20 minutes)

Desired outcome:

- Approval of 2024 workplan and budget
- Discuss revisions to the 2024 MYP

Latest revisions/edits to MYP

- Updates to the Nutrients text page

Proposed revisions/edits to MYP & AWP

- Update S&T tables and figures to accurately reflect the Set Aside Funds used in 2024 (MYP)
- Update revenues in to accurately reflect the Set Aside Funds used in 2024. (AWP)
- Update expenses to include remote sampler (AWP)

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8. Review Current SEP Proposals List (10 minutes)

Desired outcome:

- Informed committee

RMP SUPPLEMENTAL ENVIRONMENTAL PROJECT CANDIDATE LIST Updated 08-14-23

Project	Estimated Budget Range	Nexus Keywords	Geography	Matrix	Oversight Group	Project Lead	Year Proposed
Projects that have been reviewed by a RMP workgroup, and/or the Technical Review Committee, (as indicated in the Oversight Group column) and approved by the Steering Committee.							
Identification and Pilot Monitoring of High-Priority Current Use Agricultural Pesticides in Region 2	$75,000 - $125,000	Emerging Contaminants, Pesticides	North Bay	Stormwater	ECWG	SFEI	2014
Monitoring for Halogenated Azo Dyes in Bay Sediments	$65,000 - $130,000	Emerging Contaminants, Azo dyes,	Whole Bay	Sediment	ECWG	SFEI	2020
Monitoring Microplastics in San Francisco Bay Sport Fish	$50,000- $200,000	Microplastic, Sport Fish	Whole Bay	Sport fish	MPWG	SFEI/U. Toronto	2019
Tire Particle/Contaminant Fate and Transport	$90,000 - $115,000	Microplastics	Whole Bay	Particles	MPWG	SFEI	2021
Size Distribution of Microplastic Particles in SF Bay	$65,000 - $105,000	Microplastics	Whole Bay	Particles	MPWG	SFEI	2023
Biogeochemical transformation rates in San Francisco Bay	$50,000 - $300,000	Nutrients	Whole Bay	Water	Nutrients	SFEI	2021
Richmond Harbor PCB Conceptual Model Development	$50,000- $100,000	PCBs, Central Bay	Richmond Harbor	Sediment, Fish, Water	PCBWG	SFEI	2018

Project	Estimated Budget Range	Nexus Keywords	Geography	Matrix	Oversight Group	Project Lead	Year Proposed
Filling Bathymetry Data Gaps	$50,000-$250,000	Bathymetry	Whole Bay	Sediment	SedWG	USGS	2019
Toxicity Reference Value Refinement	$30,000	Toxicity, Dredged sediment, Beneficial reuse	Whole Bay	Sediment	SedWG	SFEI	2019
Estimation of future sediment loadings from local tributaries	$70,000	Sediment, future conditions	Whole Bay	Water	SedWG	SFEI	2021
Napa and Sonoma Sediment Loads	$138,500	Watershed sediment supply	North Bay	Sediment	SedWG	SFEI	2022
Sediment Conceptual Model(s) for Individual San Francisco Bay Segments and Subembayments	modular	Sediment	Whole Bay	Sediment	SedWG	SFEI	2023
Identifying mechanisms controlling selenium bioavailability at the base of the food web in North versus South San Francisco Bay	$112,000	Selenium, Bioavailability, South Bay	North and South Bay	Water	SeWG	USGS	2020
Use of Remote Stormwater Sampling Devices to Improve Temporal Coverage of Sampling	Year 1: $160,000 Year 2: $120,000	PCBs, methods development, remote samplers	Whole Bay	Stormwater	SPLWG	SFEI	2017; revised 2022

Project	Estimated Budget Range	Nexus Keywords	Geography	Matrix	Oversight Group	Project Lead	Year Proposed
Develop a Statistical Model for Trends Evaluation	$35,000-$50,000	Stormwater flows, pollutant loads, PCBs	Whole Bay	Stormwater	SPLWG	SFEI	2018
Mallard Island Monitoring for Loads and Trends	$150,000 - $200,000	Sediment load, Delta, PCBs, Hg, Se, Pesticides microplastics, CECs, Bay mass balance	North Bay	Sediment	SedWG SPLWG ECWG	SFEI	2020
Nutrient exchanges between SFB and the coastal ocean (export, import)	$50,000-$300,000	Nutrients	Central, South Bays	Surface Water	Nutrients	SFEI	2023
Expanded water quality monitoring to support nutrient management decisions	$50,000-$300,000	Nutrients	Whole Bay	Surface Water	Nutrients	SFEI	2023
Biogeochemical transformation rates in San Francisco Bay: field studies and/or synthesis/interpretation	$50,000-$300,000	Nutrients	Whole Bay	Surface Water	Nutrients	SFEI	2023

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9. Break

Reconvene at 10:45

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10. Discussion: EPA Program Office Update (50 min)

Desired outcome:

- Informed Committee

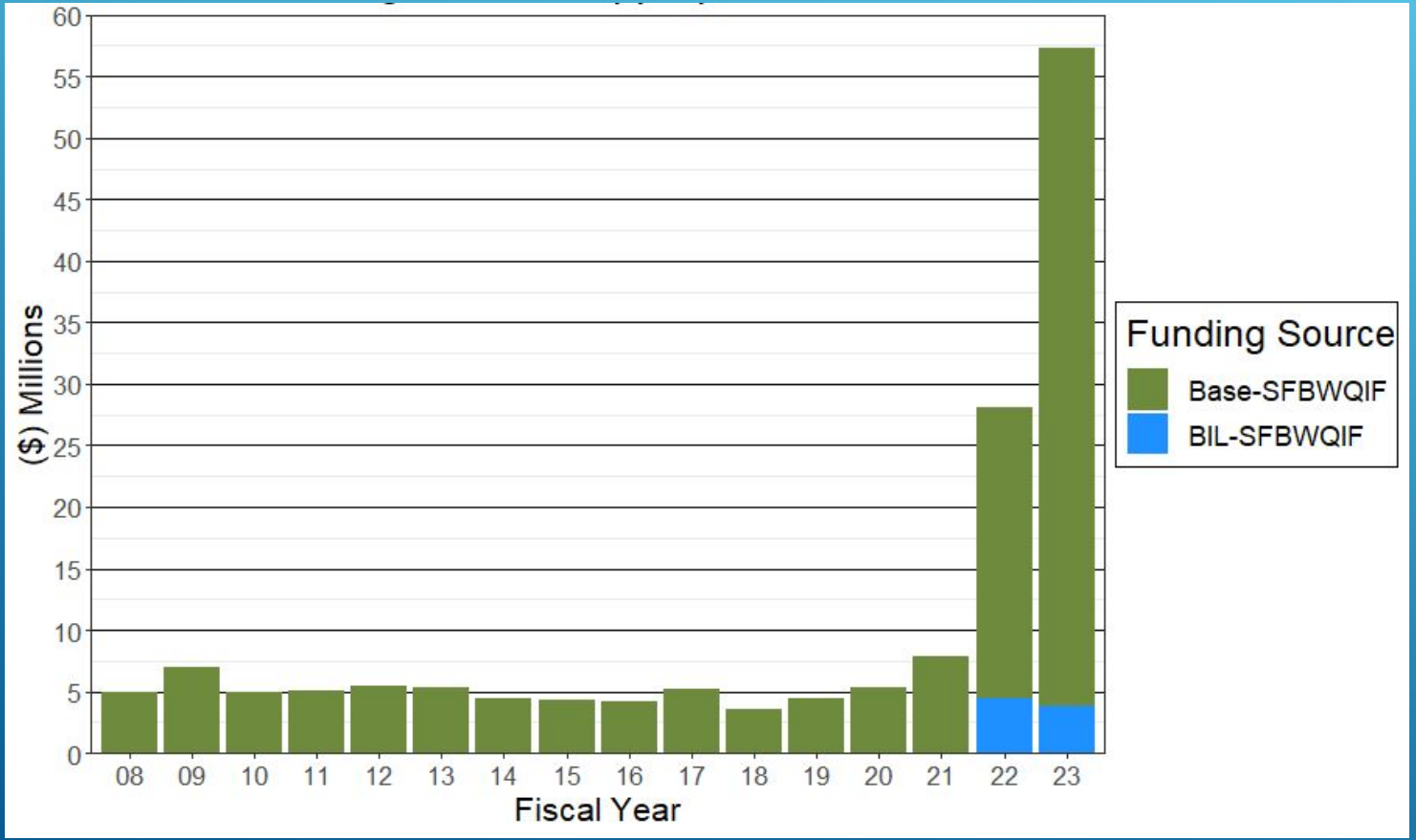
SAN FRANCISCO BAY PROGRAM OFFICE
Fiscal Year 2024 Draft Annual Priority List
US EPA Region 9

- SC Meeting
- January 22, 2024
- Luisa Valiela, valiela.luisa@epa.gov

Timeline Leading to Priority List

- National Defense Authorization Act (NDAA) passed Dec. 2022
- NDAA is legislation that included authorization for a new San Francisco Bay Program Office at EPA R9
  - Legislative language also included direction to EPA to create an Annual Priority List which identifies needed projects and studies
  - In creating the list, EPA should consider recommendations from:
    - SFEP, SF Water Board, SFBRA, other stakeholders

Congressional Appropriations to Date



EPA Region 9
San Francisco Bay Program Office
FY24 Draft Annual Priority List

Subtidal eelgrass and oyster reef restoration

Wetlands Regional Monitoring Program

Beneficial Reuse of Dredged Material Support

In-Bay Monitoring of Pollutants, including trash, and algal species under the Regional Monitoring Program

Large scale shoreline resilience, multi-benefit projects including horizontal levees and wastewater treatment/reuse

Nutrient Management Strategy

Special studies/projects for addressing PFAS in SF Bay

Large scale tidal wetlands restoration

Special studies/projects for addressing PCBs under TMDL implementation plan

Large scale implementation of urban green stormwater infrastructure

BRRIT (Bay Restoration Regulatory Integration Team)

What We are Asking of You

- Feedback on the draft Annual Priority List
- Any suggestions for other venues/stakeholders to present list to this year or in future years
- Recommendations for regular updates on funding allocations to priorities

Next Steps

- Present at other stakeholder meetings
- Finalize list in Winter/Spring 2024
- Summer 2024 begin putting in place grants to recipients that address priorities

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11. Information: Science Update - Sediment/PCB Modeling (30 minutes)

Desired outcomes:

- Informed Committee

Introduction

- PCB multi-year workplan is focused on informing the PCB TMDL process, **substantial** funding boost from EPA and a SEP
- Team includes Integral Consulting and SFEI
- PCBWG meeting on January 17
- Primary focus of the meeting was on in-Bay modeling
  - Ultimate goal is a whole-Bay model for PCBs, sediment, and CECs
  - First step is a PCB model for San Leandro Bay
  - Draft report on in-Bay modeling is now out for review
  - Draft report on results for San Leandro Bay coming in May

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12. Lunch

Reconvene at 1:00

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13. Communications (20 minutes)

Desired outcomes:

- Feedback on the 2023 RMP Update
- Input on plan for Pulse in 2024

Pulse 2024

- Theme: CECs
- Similar to the 2013 Pulse
- An updated go-to guide to CECs in the Bay
- Will start early in 2024

Comments or questions regarding *The Pulse* or the RMP can be addressed to Dr. Jay Davis, RMP Lead Scientist, (510) 746-7368, jay@sfei.org

Perfluorooctane Sulfonate (PFOS)

TIER 3
MODERATE CONCERN

MEG SEDLAK,
San Francisco Estuary Institute
(meg@sfei.org)

Quick Summary

Since the late 1940s, PFOS has been widely used as a stain repellant for textiles, furniture, and carpets; as a surfactant in fire-fighting foams and metal finishing processes; as an ingredient in the production of fluoropolymers; and as an insecticide. PFOS repels both water and oil and is highly stable. Consequently, it has been used extensively and has been widely detected in the global environment, including in San Francisco Bay birds and seals and to a lesser extent in fish and bivalves. Bird eggs collected in the southern portion of the Bay in 2006 and 2009 contained levels of PFOS above a threshold for impacts on offspring survival in birds. Fortunately, the most recent PFOS egg results in South Bay (2012) were 70% lower than prior levels and well below this threshold. However, PFOS concentrations in seals do not show similar declines. The pathways by which these compounds enter the Bay are not fully understood.

What Is It?

- PFOS is a fluorine-containing surfactant (chemical that is soluble in both water and oil) that is a very persistent environmental contaminant.
- PFOS is a type of perfluorinated chemical (PFC) – a diverse class of fluorine-containing compounds that are extremely stable in the environment, excellent surfactants, and used in a wide range of applications.
- PFOS accumulates in biota.

What Is It Used For?

- For the last 50 years, PFCs have been used extensively in industrial, commercial, and consumer applications. PFOS has been used as a stain repellent for carpets, textiles, and paper products ("grease-proof" paper); in aqueous film-forming foams (AFFF) used at refineries, airports, and military or industrial facilities to suppress fires; in electronics and metal-finishing; and as a pesticide.
- PFOS was first widely detected in wildlife throughout the world in 2000 (Giesy and Kannan 2001). At the same time, it was also found to be a pervasive contaminant in human blood in the US (Hansen et al. 2001). As a result, the major US manufacturer of PFCs voluntarily withdrew PFOS and other structurally similar compounds, and its use in North America and Europe was restricted. Despite use reductions, PFOS continues to be detected in the environment as a result of the continued use of PFOS precursors that degrade to PFOS, historic reservoirs of these chemicals in products and the environment, PFOS impurities in other PFCs, and the continued production of PFOS and PFC precursors in other parts of the world, such as China.

TIER 3

Perfluorooctane Sulfonate (PFOS)

How Is It Getting Into the Bay?

- The sources and pathways of PFOS to the Bay are not fully understood.
- Research in the Great Lakes and elsewhere suggests that wastewater effluent and urban tributaries are important pathways. Also potentially significant are point sources such as contaminated sites where PFOS has been directly released to the environment (e.g., as a result of the use of AFFF to fight fires, spills from production sites, and the land application of biosolids).
- Municipal wastewater treatment plant (WWTP) effluent is a major pathway. Uses in consumer, commercial, and industrial products result in transport to WWTPs. WWTPs are not effective at removing PFCs and in some instances promote the formation of PFOS from precursors (Schultz et al. 2006, Becker et al. 2008).
- In a recent RMP study, the average concentration in effluent from six Bay Area WWTPs was 24 nanograms per liter (ng/L) (Sedlak and Allen in prep). This value is on the low end of the range of concentrations commonly seen in effluent nationally (Plumlee et al. 2008). Concentrations from WWTPs receiving industrial wastewater are typically higher.
- Urban stormwater, which flows directly into the Bay untreated, is another potential source of PFOS to the Bay.
  - In a survey of three Bay Area tributaries, PFOS concentrations ranged from below detection to 14 ng/L (Sedlak and Allen in prep). These values are in the range observed in other Bay Area studies and nationally (Plumlee et al. 2008, Houtz and Sedlak 2012).
  - Unknown precursors in tributaries may be converted to PFOS (Houtz and Sedlak 2012).
- Rain can be a pathway for PFOS. Concentrations of PFOS in Bay Area rainwater have not been measured.
- Other possible point sources are facilities that may use AFFF such as refineries and airports, or facilities where these materials are discarded such as landfills. PFC concentrations at such point sources have not been monitored in the Bay Area.
- Shorter-chained fluorinated compounds are being substituted for PFOS. Perfluorobutanesulfonate (PFBS), one of the substitutes, has been detected in Bay effluents and tributaries at relatively low concentrations (10 ng/L). Shorter-chained compounds such as PFBS are believed to be less toxic and less bioaccumulative.
- Precursors that degrade to PFOS may be another source (Higgins et al. 2005).

What Happens to It in the Bay?

General Properties

- Longer-chained PFCs (with eight carbons or more) can degrade to PFOS, which is not known to undergo further degradation in the environment.
- Unlike legacy contaminants such as PCBs and DDT that accumulate in fatty tissues, PFOS binds to proteins and is most frequently detected in blood and liver.

Patterns of Occurrence in the Bay and in Other Aquatic Ecosystems

- Bay sediment concentrations ranged from 0.4 to 3.2 parts per billion (ppb) (Sedlak and Allen in prep). The highest concentrations were observed in the South Bay.
  - These values are consistent with prior studies of San Francisco Bay and are within the range of concentrations observed nationally in estuaries and lakes. For example, concentrations from Lake Ontario were higher on average (26 ppb) (Myers et al. 2012).
- Average PFOS concentrations in Bay surface water in 2009 were 7 ng/L. These were generally lower than other urban water bodies such as Tokyo Bay (0.3-58 ng/L) and Lake Ontario (3.6-38 ng/L), but exceed concentrations measured in more pristine environments.
- PFOS accumulates in Bay birds and seals to levels that may be of concern (FIGURES 1 AND 2). Bay seal and bird egg concentrations have been some of the highest observed worldwide.
- Cormorant eggs have been collected from three Bay sites on three occasions: 2006, 2009 and 2012. Average PFOS concentrations in eggs from the South Bay in 2006 (1,300 ppb) and 2009 (1,200 ppb) exceeded a threshold of 1,000 ppb, above which adverse outcomes have been observed for survival. In 2012, PFOS in South Bay bird eggs was substantially lower (385 ppb).
- Concentrations of PFOS in seal blood have remained relatively constant over time. Similar to birds, the highest concentrations were observed in the South Bay (1,000 ng/mL, parts per billion (ppb) followed by Central Bay (80 ppb)). Background concentrations observed in seals from Tomales Bay in the Point Reyes National Seashore were much lower (12 ppb).
- PFOS was infrequently detected in sport fish tissues. Of the 21 fish analyzed in 2009, PFOS was detected in four samples (leopard shark, anchovies, and white sturgeon) with a maximum concentration of 18 ppb. There are no California thresholds for evaluating risks to humans from PFOS concentrations in Bay sport fish. The State of Minnesota has established a sport fish threshold of 40 ppb for one serving of fish per week.
- PFCs do not appreciably bioaccumulate in mussels. As part of a larger California survey and a RMP special study, PFOS was monitored in mussels at 13 Bay sites in 2010. PFOS was detected in two samples from the South Bay at concentrations of 35 ng/g dw and 76 ng/g ww.

Trends in the Bay and Nationally

- No trend data for Bay sediment and water are available.
- PFOS was lower in the most recent sampling of Bay bird eggs, but no sign of a trend has been observed in Bay seals (FIGURES 1 AND 2).

Is There a Risk of Harm in the Bay?

- In mammals, PFOS exposure has been associated with compromised immune systems, reproductive and developmental defects, neurotoxicity, and cancer (DeWitt et al. 2012).

Perfluorooctane Sulfonate (PFOS)

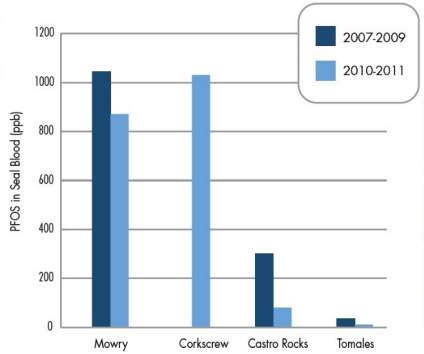


FIGURE 1
PFOS accumulates in Bay seals and birds to levels that may be of concern and are among the highest observed worldwide. Concentrations of PFOS in seal blood have remained relatively constant over time. The highest concentrations were observed in the South Bay (1,000 ng/mL, parts per billion (ppb)) followed by Central Bay (80 ppb). Background concentrations observed in seals from Tomales Bay in the Point Reyes National Seashore were much lower (12 ppb).

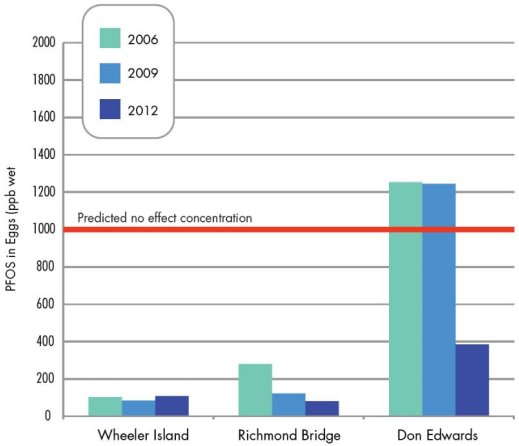


FIGURE 2
Average PFOS concentrations in cormorant eggs from the South Bay in 2006 (1,250 ppb) and 2009 (1,240 ppb) exceeded a threshold of 1,000 ppb, above which adverse outcomes have been observed for embryo survival. In 2012, PFOS concentrations in South Bay eggs were substantially lower (385 ppb).

Footnote: Each bar represents the average of three composite samples, with seven eggs in each composite.

TIER 3

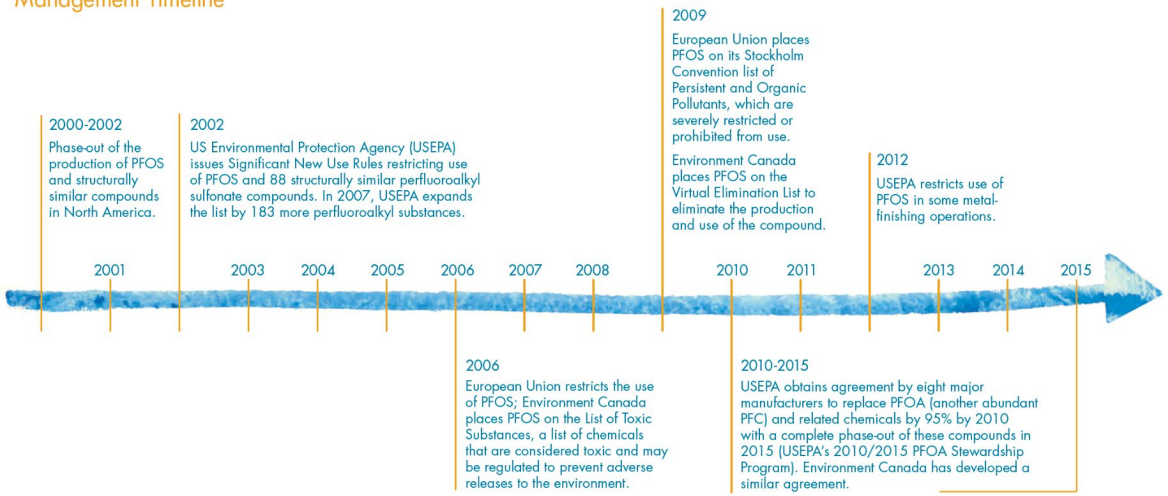
Perfluorooctane Sulfonate (PFOS)

- A predicted no effect concentration for PFOS has been developed for bird eggs of 1,000 ppb (Newsted et al. 2005). Concentrations in Bay cormorant eggs have exceeded this threshold, but the most recent data from 2012 were substantially below this threshold.
- In a study of California sea otters (Kannan et al. 2006), PFOS concentrations similar to those observed in Bay harbor seals were associated with a higher incidence of disease and mortality.

Key Information Gaps

- Few studies have evaluated the effects of PFOS exposure in seals.
- The sources of PFCs to Bay biota are not well understood.
- Little is known regarding the presence and pathways by which precursors form PFOS in the Bay.
- Manufacturers are shifting to fluorinated compounds that are expected to be less toxic and less likely to accumulate in biota. It will be important to monitor to ensure that these are not accumulating in the Bay or in Bay biota.

Management Timeline



- Water Board
- DTSC

Sidebars
- Tiered Risk-Based Framework
- EPA and PFAS
-

Comments or questions regarding *The Pulse* or the RMP can be addressed to Dr. Jay Davis, RMP Lead Scientist, (510) 746-7368, jay@sfei.org

- Summary of RMP CEC Strategy

Sidebars
- Challenges of analytical methods

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14. Deliverables and Action Items (10 minutes)

Desired outcomes:

- Informed committee
- Feedback on progress and due dates

Deliverables - recently completed!

- 2021 Cu & CN rolling averages
- RMP Participation Letters/Reports to BACWA and WSPA
- 2023 Honoraria payments and gifts to science advisors
- Q4 updates to to RMP webpage
- Updates to the sample archive database

Deliverables - overdue

- MTC Bay Area Land Use Update (SEP)
- STLS Regional Model Development
- Stormwater monitoring strategy for CECs
- Regional Watershed Spreadsheet Model (SEP)
- QA Summary Report for 2022 S&T

Deliverables – delayed

- DMMO database enhancements
- STLS WY21 POC Reconnaissance Monitoring - ADA Update
- Lab analysis of ethoxylated surfactants
- QA Summary Report for 2022 S&T

Deliverables – due before next meeting (4/15)

- Final Margins Report
- PFAS in Archived Sport Fish
- 2019-2020 Selenium Data Report
- NTA Sediment Report
- 2021 QA Summary Report for S&T Activities
- Stormwater manuscript
- San Leandro Bay PCB Recovery Report
- SFEI QAPP 2023 Update
- CEC Modeling Exploration Report

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15. Future agenda Items (5 minutes)

Desired outcome:

- Identify future agenda items, including science updates

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16. Plus/Delta (5 minutes)

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Thank you!