Executive Board Meeting
AGENDA
Friday, February 16, 2024 9:00 AM - 12:00 PM (PDT)
EBMUD
Orinda Watershed Headquarters
500 San Pablo Dam Rd. Orinda
To attend the meeting via Zoom or submit a comment please request access.

	Agenda Item		Time	Pages
	ROLL CALL, INTRODUCTIONS, AND HYBRID MEETING ETIQUETTE		**9:00 AM**	
	PUBLIC COMMENT	Guidelines	**9:05 AM**	
	CONSIDERATION TO TAKE AGENDA ITEMS OUT OF ORDER		**9:10 AM**	
	CONSENT CALENDAR		**9:15 AM**	
1	January 19, 2024 BACWA Executive Board meeting minutes			**3-7**
2	January 19, 2024 BACWA NST Special Executive Board meeting minutes			**8-9**
3	January 30, 2024 BACWA/R2 Joint meeting minutes			**10-12**
4	December 2023 Treasurer's Report			**13-23**
	APPROVALS AND AUTHORIZATIONS		**9:20 AM**	
5	Authorization: CAR for Bri Communications signage			**24-26**
	POLICY/STRATEGIC		**9:25 AM**	
6	Informational: Regional shoreline adaptation planning update (presentation)			**27-28**
7	Informational: OPC SLR Guidance Update	OPC Draft Sea Level Rise Guidance		**29-41**
8	Informational: Regulatory Issues matrix			**42-58**
9	Discussion: EPA program office - proposed BACWA comments			**59-60**
10	Informational: PFAS Fact Sheet - Final			**61-67**
11	Informational: CASA Air Toxics update			**68-71**
12	Discussion: Recycled Water Survey - Please respond	Link to Survey		**72-74**
BREAK			**10:30 AM**	
13	Discussion: BACWA's role in lobbying for nutrient funding			**75**
14	Discussion: BACWA representative to MERHAB MaTAG			**76-95**
15	Informational: Press tours at Palo Alto and Oro Loma in March			
16	Discussion: AB805 - Consolidation of Water and Sewer Service	Text of AB805		
17	Discussion: Meeting with BAAQMD staff (2/28) and Phil Fine (2/29)			
	OPERATIONAL		**11:00 AM**	
18	Discussion: Future of BABC as a BACWA Project			
19	Informational: RFP schedule (AIR, BAPPG, GAR)			
20	Discussion: First draft of FY25 BACWA Budget			**96-99**
21	Informational: Form 700 reminder			
22	Discussion: 1st Draft of Annual Meeting Program			**100**
23	Informational: Arleen Navarret - send in your nominations	Nomination Form Due March 27th		**101-102**
24	Informational: BACC Update			**103**
			11:50 PM	
25	Committee Reports			**104**
26	Member Updates			
27	Executive Director Report			**105-106**
28	Board Calendar and Action Items			**107-108**
29	Regulatory Program Manager Report			**109**
30	Other BACWA Representative Reports			
	a. RMP Technical Review Committee	Samantha Engelage, Alicia Chakrabarti		
	b. RMP Steering Committee	Karin North; Amanda Roa; Eric Dunlavey		
	c. Summit Partners	Lorien Fono; Amit Mutsuddy		
	d. ASC/SFEI	Lorien Fono; Amit Mutsuddy; Lori Schectel		
	e. Nutrient Governance Steering Committee	Amit Mutsuddy, Eric Dunlavey; alternates: Lori Schectel, Jackie Zipkin		
	e.i Nutrient Planning Subcommittee	Eric Dunlavey		

e.ii MERHAB MaTAG			
f. SWRCB Nutrient SAG	Lorien Fono		
g. BAIRWMP	Cheryl Munoz; Florence Wedington; Jackie Zipkin		
h. NACWA Emerging Contaminants	Karin North; Melody LaBella		
i. CASA State Legislative Committee	Lori Schectel		
j. CASA Regulatory Workgroup	Lorien Fono; Mary Cousins		
k. RMP Microplastics Liaison	Artem Dyachenko		
l. Bay Area Regional Reliability Project	Jackie Zipkin		
m. WateReuse Working Group	Cheryl Munoz		
n. San Francisco Estuary Partnership	Lorien Fono; Jackie Zipkin		
o. CPSC Policy Education Advisory Committee	Colleen Henry		
p. California Ocean Protection Council	Lorien Fono		
q. Countywide Water Reuse Master Plan	Karin North, Pedro Hernandez		
r. CHARG - Coastal Hazards Adaptation Resiliency Group	Jackie Zipkin		
s. California Water Quality Monitoring Council	Lorien Fono		
t. CASA Air Toxics Steering Committee	Lorien Fono, Jason Nettleton		
31 **SUGGESTIONS FOR FUTURE AGENDA ITEMS**		**11:59 PM**	
NEXT MEETING			
The next meeting of the Board is scheduled for March 15, 2024 at Central San			
ADJOURNMENT		**12:00 PM**	

Executive Board Meeting Minutes

Friday January 19, 2024

ROLL CALL AND INTRODUCTIONS

Executive Board Representatives: Amy Chastain (San Francisco Public Utilities Commission); Amit Mutsuddy (East Bay Municipal Utility District); Eric Dunlavey (City of San Jose); Jackie Zipkin (East Bay Dischargers Authority); Lori Schectel (Central Contra Costa Sanitary District).

Other Attendees and Guests:

Name	Agency/Company
Amanda Roa	Delta Diablo
Amber Shipley	Civic Edge Consulting
Alicia Chakrabarti	EBMUD
Ben Lavender	Central San
Dan Gill	DSRSD
Dave Richardson	Woodard & Curran
David Donovan	City of Hayward
Emily Barnett	Central San
Greg Norby	Central San
Hector Aguirre	US EPA
Karin North	City of Palo Alto
Jennifer Dyment	BACWA
Jennifer Voccola-Brown	City of San Jose
Jordan Damerel	Fairfield-Suisun Sewer District
Lorien Fono	BACWA
Luisa Valiela	US EPA
Mark Tomko	Vallejo Flood & Wastewater District
Mary Cousins	BACWA
Meg Herston	Fairfield-Suisun Sewer District
Melody Tovar	City of Sunnyvale
Mike Falk	HDR
Michael Connor	Consultant
Nora Cibrian	City of San Jose
Sarah Deslauriers	Carollo Consultants
Taylon Sortor	Fairfield-Suisun Sewer District
Tim Lewis	City of San Jose
Tom Hall	EOA
Violetta Muselli	Civic Edge Consulting
Zoe Lake	EBMUD

Amit called the meeting to order at 9:03.

Agenda Item

ROLL CALL, INTRODUCTIONS, AND HYBRID MEETING ETIQUETTE

PUBLIC COMMENT **Guidelines**

CONSIDERATION TO TAKE AGENDA ITEMS OUT OF ORDER Item 18 was moved to follow Item 9.

CONSENT CALENDAR

1 December 15, 2023 BACWA Executive Board meeting minutes

2 December 15, 2023 BACWA NST Special Executive Board meeting minutes

3 November 2023 Treasurer's Report

Consent Calendar items 1 thru 3: A motion to approve was made by Lori Schectel (Central Contra Costa Sanitary District) and seconded by Jackie Zipkin (East Bay Dischargers Authority). The motion was approved by the remaining board members.

APPROVALS AND AUTHORIZATIONS

4 Approval: NMS Payment #2 for FY24, $800K

Approvals and Authorizations item 1: A motion to approve was made by Eric Dunlavey (City of San Jose) and seconded by Amy Chastain (SFPUC). The motion was approved by the remaining board members.

5 Approval: Approve CASA Air Toxics Passthrough up to $100K for FY24

Approvals and Authorizations item 2: A motion to approve was made by Amit Mutsuddy (East Bay Municipal Utility District) and seconded by Jackie Zipkin (East Bay Dischargers Authority). The motion was approved by the remaining board members.

6 Member Updates

Item from December 15, 2023, BACWA Board meeting. BACWA Member Agencies shared general updates.

POLICY/STRATEGIC

7 Presentation: Civic Edge Update - Consultants provided presentation summarizing update of communication & outreach plan. Amber shared that the goals for 2024 include: nutrient communication, proactive press, the value of clean water infrastructure and BACWA as a resource for the community. Amber shared infographics for nutrient communication and the group provided feedback.

Action Item: BACWA ED to share infographics images with board members.

8 Discussion: POTW Bike tours Central San "Go with the flow" – Ben Lavender (Central San) explained the program that developed during COVID. Central San hosts bike tours and partners with local bike organizations. Ben pointed out the many bay area facilities that are accessible by the Bay Bike Trail. Central San would like to coordinate with other agencies who are interested in offering bicycle tours of water/wastewater infrastructure.

9 Discussion: Shorelines and Waterways sponsorship activities - Zoe Lake from EBMUD shared Bay Area Shorelines & Waterways image and listing sponsorship options. Zoe was seeking sponsorship from BACWA for $8200. General discussion followed.

Action Item: BACWA ED to work on setting up sponsorship and will communicate outcome with the board.

BREAK

10 Informational: PFAS Fact Scheet Update - BACWA RPM requested that people review the PFAS Fact Sheet in the packet and provide feedback. The PFAS fact sheet is intended for BACWA member agencies or members of the public interested in technical details.

Action Item: BACWA ED and RPM will email out the word document for editing and feedback.

11 Informational: CASA Air Toxics Update link to Program Management RFQ - BACWA ED shared a series of updates.

12 Informational: 2023 NPDES Compliance Letter - Item is in the packet.

13 Discussion: Establishment of Climate Change Community of Practice - BACWA RPM is going to organize a series of workshops for BACWA community on a variety of climate change topics.

14 Informational: Update on SCCWRP OAH Model Independent Review Panel NWRI Project – BACWA ED summarized her meeting in southern California and shared the panel charge questions.

Action item: BACWA ED to prepare a short presentation for BACWA community.

15 Informational: Agenda for meeting with BAAQMD BACWA ED shared that the agenda has not changed, but the meeting has not yet been rescheduled. Attendees also discussed comments on an air permit for biogas conditioning equipment at Fairfield-Suisun Sewer District.

16 Informational: Agenda for 2/29 meeting with BAAQMD EO - BACWA ED shared the agenda with the group and got feedback.

Action item: BACWA ED to work with meeting attendees to finalize the agenda.

17 Discussion: Draft agenda for 1/30 Joint meeting with R2 - BACWA ED shared that the nutrient watershed permit is the only substantive item on the agenda.

18 Presentation: Update on EPA office priorities - This item was taken after item 9. Luisa Valiela from the EPA shared information about the establishment of a San Francisco Program Office within the EPA to allocate increased federal funding (about $50M/year) to priority projects for protecting and restoring San Francisco Bay. The increased funding will be allocated according to an annual priority list. Luisa shared a draft list of FY24 priorities and solicited the group for feedback. The list will be finalized in summer 2024. General questions & suggestions followed the presentation.

Action Item: BACWA ED to bring discussion to the February BACWA Board Meeting.

OPERATIONAL

19 Discussion: Potential new PSB for contingency biosolids hauling. - Jackie Zipkin from EBDA shared that she has been working with a small group regarding rail options for biosolids and the idea that this could be a new project of special benefit, where BACWA staff would assist in procurement. Jackie would like interested agencies to contact her.

20 Discussion: Launch discussion of annual meeting speakers - BACWA ED shared a list of speakers and hot topic ideas for the meeting. The Board agreed with the topics suggested.

21 Discussion: Arleen Navarret Award Nomination form - BACWA ED shared that the application is available in the packet and she requested 2 board members to be on the selection committee. Jackie & Lori volunteered.

22 Informational: BACC Update - BACWA AED shareed that bid documents are almost done and the bids will go live in planetbids on 1/25/2024.

23 Committee Reports - BACWA RPM shared that there is a land application of biosolids in Solano County Report in the packet. Additional committee reports are in the packet.

24 Executive Director Report - In the packet.

25 Board Calendar and Action Items - In the packet. Engagement with PG&E regarding power reliability was suggested as an agenda item for a future board meeting.

26 Regulatory Program Manager Report - In the packet.

27 Other BACWA Representative Reports

a. RMP Technical Review Committee Samantha Engelage, Alicia Chakrabarti

b. RMP Steering Committee Karin North; Amanda Roa; Eric Dunlavey

c. Summit Partners Lorien Fono; Amit Mutsuddy

d. ASC/SFEI Lorien Fono; Amit Mutsuddy; Lori Schectel

e. Nutrient Governance Steering Committee Eric Dunlavey; alternates: Lori Schectel

e.i Nutrient Planning Subgroup Eric Dunlavey

f. SWRCB Nutrient SAG Lorien Fono

h. BAIRWMP Cheryl Munoz; Florence Wedington; Jackie Zipkin

i. NACWA Emerging Contaminants Karin North; Melody LaBella

j. CASA State Legislative Committee Lori Schectel

k. CASA Regulatory Workgroup Lorien Fono; Mary Cousins

l. RMP Microplastics Liaison Artem Dyachenko

m. Bay Area Regional Reliability Project Jackie Zipkin

n. WateReuse Working Group Cheryl Munoz

o. San Francisco Estuary Partnership Lorien Fono; Jackie Zipkin

p. CPSC Policy Education Advisory Committee Colleen Henry

q. California Ocean Protection Council Lorien Fono

r. Countywide Water Reuse Master Plan Karin North, Pedro Hernandez

s. CHARG - Coastal Hazards Adaptation Resiliency Group Jackie Zipkin

t. California Water Quality Monitoring Council Lorien Fono

28 SUGGESTIONS FOR FUTURE AGENDA ITEMS - PG&E regional contact for POTWs

NEXT MEETING: The next meeting of the Board is scheduled for February 16, 2024 at EBMUD, Orinda Watershed HQ

ADJOURNMENT 12:15 pm

Nutrient Strategy Team
January 19, 2024 Meeting Summary

ATTENDEES:
Executive Board Representatives: Amit Mutsuddy (EBMUD), Jackie Zipkin (East Bay Dischargers Authority, Lori Schectel (Central San), Amy Chastain (SFPUC), and Eric Dunlavey (San José)

Other Attendees:

Name	Agency/Company
Lorien Fono, Mary Cousins	BACWA
Linda Sawyer	Brown and Caldwell
Andre Gharagozian, Jamie Pigott	Carollo
Jared Voskuhl	CASA
Greg Norby, Blake Brown, Rita Cheng	Central San
Michael Connor	Consultant
Amanda Roa	Delta Diablo
Don Gray	EBMUD
Tom Hall	EOA
Talyon Sortor, Jordan Damerel, Meg Herston	FSSD
Rion Merlo	Hazen and Sawyer
Mallika Ramanathan, Mike Falk	HDR
Denise Conners	LWA
Karin North	Palo Alto
Jeff Barich	Richmond
Tim Lewis, Jennifer Voccola-Brown	San José
Melody Tovar	Sunnyvale
Teresa Herrera, Kim Hackett, Monte Hamamoto	SVCW
Armando Lopez	Union Sanitary District
Jennifer Harrington	Vallejo FWD
Dave Richardson	Woodard & Curran

Amit Mutsuddy called the meeting to order at 12:33 pm and led introductions. The meeting was conducted in hybrid format, with participants joining virtually and in-person at EBMUD's headquarters in Oakland. There was no public comment.

GROUP ANNUAL REPORT
Mike Falk (HDR) provide a preview of the 2023 Group Annual Report required by the 2019 Nutrient Watershed Permit. The report is due Feb 1st. This year's report adds on flows and nutrient data for Oct 2022 – Sep 2023, spanning the wettest winter since sampling began in 2012. Despite the wet weather, ammonia and Total Inorganic Nitrogen (TIN) loads were relatively low compared to previous years. The draft report has been circulated to members, and comments are due Friday, January 26th.

NUTRIENT WATERSHED PERMIT ADOPTION SCHEDULE
BACWA'S Executive Director provided an update on the anticipated schedule for adoption of the 3rd Nutrient Watershed Permit in 2024. The next meeting with Regional Water Board staff is January 30th, and the administrative draft will likely be released for a two-week comment period around the same time. The permit is scheduled for adoption at the May 8th Regional Water Board meeting. Should the schedule slip, alternate adoption hearing dates are June 12th and July 10th.

DEVELOPMENT OF FINAL LOAD LIMITS

Attendees shared expectations for the 3rd Nutrient Watershed Permit's final load limits based on recent meetings between individual agencies and Regional Water Board staff. The Regional Water Board plans to include a final Baywide load limit equal to about 50% of the baseline from the 2019 permit, or about 40% lower than the 2022 dry season load. This will result in target effluent concentrations of around 20 – 22 mg/L, depending on flow assumptions and many other details. Regional Water Board staff feel constrained by the 2008 Compliance Policy, which only allows a ten-year compliance schedule.

Attendees agreed that a tailored approach will be necessary to capture two specific goals that were previously agreed upon: (1) flexibility to implement multi-benefit projects and (2) protection for early actors.

Attendees agreed that the more than ten years (at least 15, perhaps more) are needed for project implementation, especially for multi-benefit projects or those with innovative treatment technology. Longer time frames would also allow time to arrange for increased funding from the state and federal government. BACWA staff plan to write a letter to the Regional Water Board explaining this position. BACWA has reached out to Baykeeper on the issue and believes that we are in agreement that the 3rd Watershed Permit should allow longer time frames for completion of multi-benefit projects.

Attendees identified a need to identify possible alternatives to the 2008 Compliance Policy due to its firm ten-year limit on compliance schedules. Although Regional Water Board staff have explained that compliance schedules could be extended in the 2029 reissuance cycle, this change would be predicated on lower nutrient load limits, which adds undesirable levels of uncertainty into the long-term planning process by making limits a "moving target." Attendees recommended additional outreach to NGOs, attorneys, and state officials to explore options for compliance schedules longer than ten years.

NEXT STEPS

- Members and BACWA staff will prepare for engagement with Regional Water Board staff on January 30th.
- Members and BACWA staff will prepare for a two-week review period for the administrative draft permit.
- BACWA plans to submit a letter to the Regional Water Board describing the need for longer compliance schedules to allow for completion of cost-effective, multi-benefit projects.

Amit Mutsuddy adjourned the meeting at 3:09 PM.

Special Executive Board Meeting Minutes
Joint Meeting with Regional Water Board Staff
January 30, 2024

ROLL CALL AND INTRODUCTIONS

Executive Board Representatives: Amit Mutsuddy (EBMUD), Jackie Zipkin (East Bay Dischargers Authority); Eric Dunlavey (San José), Lori Schectel (Central San); Amy Chastain (SFPUC)

Other Attendees:

Name(s)	Agency
Eileen White, Tom Mumley, Bill Johnson, Richard Looker, Robert Schlipf, James Parrish and Gaurav Mittal	San Francisco Bay Regional Water Quality Control Board
Lorien Fono, Mary Cousins	BACWA
Linda Sawyer, Sara Sadreddini	Brown and Caldwell
Andre Gharagozian, Jamie Pigott	Carollo
Jean-Marc Petit	CDM Smith
Greg Norby, Dan Frost, Blake Brown, Amanda Cauble	Central San
Melody Tovar, Rohan Wikramanayake	City of Sunnyvale
Brian Thomas and Amanda Roa	Delta Diablo
Don Gray	EBMUD
Talyon Sortor, Jordan Damerel, Emily Corwin	Fairfield-Suisun Sewer District
David Donovan	Hayward
Irene Chu	Hazen and Sawyer
Mallika Ramanathan, Mike Falk	HDR
Jimmy Dang	Oro Loma
Karin North, Samantha Engelage	Palo Alto
Monty Dill	Richmond / Veolia
Tim Lewis	San José
Matt Fabry, Sven Edlund	San Mateo
Nohemy Revilla	SFPUC
Teresa Herrera, Kim Hackett	Silicon Valley Clean Water
Tim Grillo	Union Sanitary District
Jennifer Harrington	Vallejo FWD
Dave Richardson	Woodard & Curran

Amit Mutsuddy began the meeting at 9:05 am and led introductions. The meeting was conducted in hybrid format, with participants joining virtually and in-person at the Regional Water Board's offices in Oakland. There was no public comment.

AGENDA ITEMS

Agenda **Item 1 – Agency Updates**
Eileen White reported that the Regional Water Board has hired a new assistant Executive Officer, Ross Steenson, who will lead the Toxics Cleanup and Groundwater Protection and Waste Containment Divisions. Several agencies reported out on capital projects: The City of Sunnyvale is testing their new headworks facility, SVCW has completed upgrades to their conveyance system, and Central San is about to start their MABR pilot project. San Jose has hired a new General Manager for wastewater, Mariana Chavez-Vasquez. EBMUD recently received a FEMA grant for seismic improvements for the influent pump station at the main wastewater treatment plant.

Agenda **Item 2 – Nutrients**
Most of the meeting was concerned with a discussion of the final effluent limitations that will be included in the forthcoming 3rd Nutrient Watershed Permit:

- **Reasonable Potential / Need for WQBELs.** Bill Johnson explained that the permit Fact Sheet will include a finding that wastewater discharges have reasonable potential to cause or contribute to an exceedance of the narrative biostimulatory water quality objective. Regional Water Board staff are pursuing a water quality-based effluent limit (WQBEL) rather than a technology-based effluent limit. For reference, technology-based limits could require Total Inorganic Nitrogen (TIN) concentrations as low as 4-6 mg/L based on examples provided by USEPA.

- **Translating the Narrative Objective into a Limit**. Richard Looker explained how the permit will translate the narrative biostimulatory objective into WQBELs using Bay model results provided by the NMS science team. The translation is based on providing at least 4 mg/L of dissolved oxygen as a 24-hour average (acute conditions) in at least 90% of each subembayment following a bloom; South Bay is the critical location in this model scenario. The NMS science team and Richard Looker will each be preparing a brief report summarizing the technical details of their approaches. This modeling exercise suggests that a 40% TIN load reduction compared to the summer 2022 dry season (50% compared to the 2019 permit baseline) would be protective of beneficial uses. This equates to 26,600 kg N/day as a Baywide dry season limit.

- **Splitting up the Total Limit.** Regional Water Board staff explained their rationale for dividing up the total limit among dischargers: (a) small dischargers (<100 kg N/day) would be required to optimize treatment and/or maintain their current performance; (b) two early actors would be given limits based on 2022 dry season flows x 15 mg/L TIN; (c) everyone else would be given an allocation based on 2022 dry season flows x 22 mg/L. Regional Water Board staff indicated that they would be willing to share the draft load allocations ahead of the administrative draft, and would be receptive to a counterproposal from BACWA, if desired.

- **Compliance Timelines.** The statewide compliance policy limits compliance schedules to 10 years. BACWA has expressed a need for longer timelines, especially for muti-benefit projects.

Regional Water Board staff explained that this would be possible only under an enforcement action (e.g., time schedule order) which could begin as soon as the next (4th) watershed permit, if desired. Bill Johnson stated that there is no time limit on time schedule orders. Time schedule orders would likely be discharger-specific and tied to implementation of specific projects. A TMDL would also be an option; however, TMDLs require a long planning horizon and more definitive science, and are difficult to change because they are implemented through Basin Plan Amendments.

- **Multi-Benefit Projects.** Regional Water Board staff understand that there is stakeholder support for longer compliance timelines for multi-benefit projects. They plan to include a provision in the permit that provides regulatory authority to extend compliance timelines for these projects, provided that tangible deliverables and milestones are met. Regional Water Board staff emphasized their enthusiasm for a Bay Area One Water approach.

- **Early Actors.** The proposed limits do not include any consideration for dischargers that are "early actors," despite language in the 2019 permit.

- **Will the Limits Change?** BACWA members shared their perspectives about the importance of complying with the final limits at the 10-year mark, and their concern that compliance may not be feasible for some dischargers with large capital projects required. Regional Water Board staff shared an alternative viewpoint that BACWA members may be taking compliance with the final limits too literally, since they are likely to be modified before the 10-year compliance period is over. Regional Water Board staff explained that the limits in the 3rd watershed permit are not likely to be final, and that dischargers should aim lower when designing nutrient removal projects, because "the writing is on the wall" that lower limits will be needed someday. BACWA members shared dissatisfaction with the concept of constantly moving load targets.

Regional Water Board staff plan to share an administrative draft around February 14th – February 21st, and to hold a meeting with interested stakeholders (BACWA, NGOs, USEPA) shortly thereafter.

Agenda **Item 3 – Upcoming Events**
The 2024 BACWA Annual Members Meeting is scheduled for Friday, May 3rd. The 2024 Pardee Technical Seminar is slated to occur at Pardee Center on Friday, September 6th. The event may need to be re-located to the Bay Area to accommodate travel restrictions on State employees.

The meeting was adjourned by Amit Mutsuddy at 11:20 am.

BACWA
BAY AREA
CLEAN WATER
AGENCIES

January 29, 2024

MEMO TO**:** Bay Area Clean Water Agencies Executive Board

MEMO FROM: Phoebe Grow, Treasurer, East Bay Municipal Utility District

SUBJECT: Sixth Month FY 2024 Treasurer's Report

As required by section eight of the Joint Powers Agreement establishing the Bay Area Clean Water Agencies (BACWA) and California Government Code Sections 6500 et seq., attached is the BACWA Treasurer's Report for the period covering **July 1, 2023 through December 31, 2023** (Six months of Fiscal Year 2024). This report covers expenditures, cash receipts, and cash transfers for the following BACWA funds:

- Bay Area Clean Water Agencies (BACWA),
- BACWA Legal Reserve Fund (Legal Rsrv),
- Water Quality Attainment Strategy (WQA CBC),
- Bay Area Biosolids Coalition (BABC),
- Bay Area Chemical Consortium (BACC),
- BACC Legal Reserve Fund (BACC Legal Rsrv),
- Water/Wastewater Operator Training (WOT),

Houck, Matt

From: Grow, Phoebe
Sent: Tuesday, February 6, 2024 9:03 AM
To: Houck, Matt
Subject: RE: December 2023 Treasurer's Report

Hi Matt – Thanks for the reminder. Report looks good.

Phoebe Grow, P.E. (she/her) | **Principal Management Analyst** | 510.287.0205 | phoebe.grow@ebmud.com

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From: Houck, Matt <matt.houck@ebmud.com>
Sent: Monday, February 5, 2024 11:16 AM
To: Grow, Phoebe <phoebe.grow@ebmud.com>
Subject: FW: December 2023 Treasurer's Report

Hi Phoebe,

I just wanted to follow up on if you had a chance to review.

Thanks,

Matt Houck
Accountant III
East Bay Municipal Utility District
375 11TH St, MS 402, Oakland, CA 94607
P 510-287-0238

From: Houck, Matt
Sent: Tuesday, January 30, 2024 3:02 PM
To: Grow, Phoebe <phoebe.grow@ebmud.com>
Subject: December 2023 Treasurer's Report

Hi Phoebe,

Please approve BACWA – December 2023 Treasurer's Report for distribution.

Let me know if you have any questions.

Thanks,

Matt Houck
Accountant III
East Bay Municipal Utility District
375 11TH St, MS 402, Oakland, CA 94607

Fund Balances

In FY24 BACWA has three operating funds (BACWA, Legal, and CBC) and three pass-through funds for which BACWA provides only contract administration services (WOT, BABC & BACC). As of October 31st, 2021, revenues are recognized when billed, not when payments are received.

BACWA Fund: This fund provides resources for BACWA staff, its committees, and other administrative needs. The ending fund balance on December 31, 2023, was $756,363 which is significantly higher than the target reserve of $366,899 which is intended to cover 3 months of normal operating expenses based on the BACWA FY24 budget. $469,007 of the ending fund balance is shown on the BACWA Fund & Investments Balance Report December 31, 2023, as encumbered to meet ongoing operating line-item expenses for BAPPG Committee Support, Legal services, IT services, Board meeting expenses, accounting services and BACWA staff support.

CBC Fund: This fund provides the resources for completing special investigations as well as meeting regulatory requirements. The ending fund balance on December 31, 2023, was $2,945,078 which is higher than the target reserve of $1,000,000. $421,882 of the ending fund balance is encumbered to meet line-item expenses for completion of the Group Annual Report contract, completion of the NBS Study, Recycled Water Evaluation, and the PFAS Regional Study. This leaves an actual unencumbered reserve balance of $1,523,196 (i.e., actual fund balance of $2,523,196 less target reserves) as of December 31, 2023. As directed by the BACWA Executive Board, the CBC fund has diminished over time due to BACWA's ongoing funding of the NMS program to comply with the Nutrient Watershed Permit.

Legal Fund: This fund provides for needed legal services. The ending balance was $300,000 which is at the target reserve of $300,000.

Budget to Actual

The BACWA Annual Budget includes all expected revenues as well as budgeted expenses. Transfers are made from the BACWA Fund and/or the CBC Fund to balance the Annual Budget if expenses exceed revenues and vice versa. It is therefore important to achieve the anticipated revenues and not exceed the budgeted expenses on an annual basis to maintain the BACWA and CBC Fund balances at the levels projected in the 5 Year Plan.

Revenues as of December 31, 2023 (50% of the FY) are at 98%

Expenses as of December 31, 2023 (50% of the FY) are at 44%

FY 2024
BACWA BUDGET to ACTUAL

BACWA BAY AREA CLEAN WATER AGENCIES

BACWA FY24 BUDGET	*Line Item Description*	FY 2024 Budget	Projected Revenue as of Dec 2023 Changes from budget in blue	Actual Dec 2023	Actual % of Budget Dec 2023	Variance	NOTES
REVENUES & FUNDING							
Dues	Principals' Contributions	$537,795	$537,795	$537,795	100%	$0	FY24: 2% increase 5 @ $107,559
	Associate & Affiliate Contributions	$190,078	$190,078	$190,578	100%	$500	FY24: 2% increase. 12 Assoc: $8876; 47 Affiliate: $1778; UC Berkeley $500
Fees	Clean Bay Collaborative	$675,000	$675,000	$673,500	100%	-$1,500	Same as FY23 Prin: $450,000; Assoc/Affil: $225,000
	Nutrient Surcharge	$1,400,000	$1,400,000	$1,400,751	100%	$751	See Nutrient Surcharge Spreadsheet
	Voluntary Nutrient Contributions			$0	0%	$0	
Other Receipts	AIR Non-Member	$7,361	$7,361	$7,361	100%	$0	2% increase (Santa Rosa)
	BAPPG Non-Members	$4,114	$4,114	$4,140	101%	$26	2% increase (Sta Rosa, Sac Reg'l, Vacaville) $1,380/each
	Other			$2,653		$2,653	BAWSCA Annual Membership
Fund Transfer	Special Program Admin Fees (WOT)	$1,000	$1,000	$0	0%	-$1,000	
	Special Program Admin Fees (BACC)	$38,250	$38,250	$0	0%	-$38,250	400 hours of AED support $96.30/hr
	Special Program Admin Fees (BABC)	$6,000	$6,000	$0	0%	-$6,000	ED, AED and RPM support
Interest Income	LAIF	$60,000	$60,000	$38,170	64%	-$21,830	BACWA, Legal, & CBC Funds invested in LAIF
	Higher Yield Investments						
	Total Revenue	**$2,919,598**	**$2,919,598**	**$2,854,948**	**97.79%**	**-$64,650**	

BACWA FY24 BUDGET	*Line Item Description*	FY 2024 Budget	Projected Expense as of Dec 2023 Changes from budget in blue	Actual Dec 2023	Actual % of Budget Dec 2023	Variance	NOTES
EXPENSES							
Labor							
	Executive Director	$218,548	$218,548	$91,060	42%	-$127,488	7% (incl. 4.9% CPI SF Bay Metro Area Dec 2022)
	Assistant Executive Director	$92,024	$92,024	$43,445	47%	-$48,579	7% (incl. 4.9% CPI SF Bay Metro Area Dec 2022); $76.69/hour; Reflects 1200 hours
	BACC Administrator	$38,520	$38,520	$13,675	36%	-$24,845	400 hrs AED support at $96.30 per hr
	Regulatory Program Manager	$152,179	$152,179	$61,855	41%	-$90,324	7% (incl. 4.9% CPI SF Bay Metro Area Dec 2022); $112.72/hour, Reflects 1350 hours
	Total	**$501,271**	**$501,271**	**$210,035**	**42%**	**-$291,236**	
Administration							
	EBMUD Financial Services	$43,297	$43,297	$11,516	27%	-$31,781	FY24 no change
	Auditing Services	$5,561	$5,561	$0	0%	-$5,561	Finanical Auditors through EBMUD; per auditor rate schedule
	Administrative Expenses	$8,118	$8,118	$49	1%	-$8,070	FY24 no change
	Insurance	$9,351	$8,169	$8,169	87%	-$1,182	15% increase over FY23 (10-15% est. increase per Alliant)
	Total	**$66,327**	**$65,145**	**$19,733**	**30%**	**-$46,594**	
Meetings							
	EB Meetings	$2,760	$4,300	$2,768	100%	$8	2% increase from FY23
	Annual Meeting	$14,369	$14,369	$0	0%	-$14,369	FY24 no change
	Pardee	$6,801	$2,567	$2,567	38%	-$4,234	2% increase from FY23
	Misc. Meetings	$7,500	$7,500	$5,168	69%	-$2,332	30% increase from FY23 to accommodate conferences
	Total	**$31,430**	**$28,736**	**$10,502**	**33%**	**-$20,928**	
Communication							
	Website Hosting	$728	$728	$0	0%	-$728	2% increase from FY23, Go Daddy website hosting and domain registration
	File Storage	$796	$796	$0	0%	-$796	2% increase from FY22, box.net
	Website Development/Maintenance	$1,592	$1,592	$0	0%	-$1,592	2% increase from FY22
	IT Support	$2,759	$2,759	$0	0%	-$2,759	2% increase from FY22
	BACWA Value of Wastewater Communication	$40,000	$40,000	$11,105	28%	-$28,895	New line in FY24
	Other Commun	$1,857	$1,857	$160	9%	-$1,697	2% increase from FY23; MS Exchange, Survey Monkey, PollEv, Zoom, Netfile

FY 2024
BACWA BUDGET to ACTUAL

EXPENSES							
	Total	**$47,732**	**$47,732**	**$11,265**	**24%**	**-$36,467**	
Legal							
	Regulatory Support	$2,929	$2,929	$0	0%	-$2,929	2% increase from FY23, Downey Brand LLP
	Executive Board Support	$2,355	$2,355	$0	0%	-$2,355	2% increase from FY23, Day Carter & Murphy LLP
	Total	**$5,284**	**$5,284**	**$0**	**0%**	**-$5,284**	
Committees							
	AIR	$76,000	$76,000	$34,718	46%	-$41,282	$75k consulting support, $1k misc expenses. Carollo Engineers
	AIR Support for ACE	$20,000	$20,000	$0	0%	-$20,000	New in FY23
	BAPPG	$159,000	$159,000	$70,996	45%	-$88,004	17% increase from FY23. Includes CPSC @ $5,000, OWOW @ $10,000, NSAC @ $10,00 and Pest. Reg Spt. @ $71,500
	Biosolids Committee	$0	$0	$0		$0	
	Collections System	$56,000	$56,000	$0	0%	-$56,000	SSS WDR Support
	InfoShare Groups	$500	$500	$333	67%	-$167	$500 decrease from FY23
	Laboratory Committee	$4,050	$4,050	$2,075	51%	-$1,975	$2350 less than FY23, TNI Training
	Permits Committee	$500	$500	$255	51%	-$245	$500 decrease from FY23
	Pretreatment	$500	$500	$0	0%	-$500	$500 decrease from FY23
	Recycled Water Committee	$10,000	$10,000	$667	7%	-$9,333	Carry forward from FY23
	Misc Committee Support	$45,000	$45,000	$3,740	8%	-$41,260	Same as FY23
	Manager's Roundtable	$1,000	$1,000	$254	25%	-$746	Same as FY23
	Total	**$372,550**	**$372,550**	**$113,040**	**30%**	**-$259,510**	
Collaboratives							
	Collaboratives						
	State of the Estuary (SFEP-biennial)	$0	$0	$0	0%	$0	Bienniel in Odd Fiscal Years. (Paid bienniely in odd years for even year conference)
	Arleen Navarret Award	$2,500	$2,500	$0	0%	-$2,500	Bienniel in Even Fiscal Years. FY24 Award likely to be paid in FY24
	BayCAN	$5,000	$5,000	$0	0%	-$5,000	
	Bay Area One Water Network	$5,000	$5,000	$0	0%	-$5,000	Same as FY23
	Bruce Wolf Scholarship	$4,000	$4,000	$0	0%	-$4,000	FY22, FY23, FY24, FY25 FY26
	Passthrough for CASA for air toxics	$425,000	$100,000	$0	100%	-$425,000	Estimate - new line in FY24
	Misc	$1,500	$1,500	$0	0%	-$1,500	NBWA ($1,500)
	Total	**$443,000**	**$118,000**	**$0**	**0%**	**-$443,000**	
Other							
	Unbudgeted Items						
	Other	$0	$0	$0	0%	$0	
		$0		**$0**	**0%**	**$0**	
Tech Support							
	Technical Support						
	Nutrients						
	Watershed	$1,800,000	$1,800,000	$1,000,000	56%	-$800,000	Advance funding for 2nd Watershed Permit Sciece Studies; Final $ TBD
	NMS Voluntary Contributions	$0	$0	$0	0%	$0	
	Additional work under permit	$100,000	$100,000	$18,281	18%	-$81,719	Includes HDR PO for $225k spread out over FY20-24.
	Regional Study on Nature based systems	$80,000	$80,000	$95,464	119%	$15,464	SFEI $500K, expires 06/30/2023: Possible funds left over from FY23 to be spent on additional work
	Regional Recycling Evaluation	$0	$0	$17,493	0%	$17,493	HDR $154K, expires 12/31/2023
	Nutrient Workshop(s)	$0	$0	$0	0%	$0	Pilot Studies/Plant Review/InDecative Technologies
	NMS Reviewer	$50,000	$50,000	$11,390	23%	-$38,610	M. Connor Contract
	General Tech Support	$100,000	$100,000	$15,451	15%	-$84,549	AB617 emissions factors, PFAS, other nutrient support
	CEC Investigations	$60,000	$60,000	$86,529	144%	$26,529	PFAS Study Phase II
	Risk Reduction	$12,500	$12,500	$12,500	100%	$0	APA FSS completed $12,500 contract in FY20, CIEA will complete $12,500 contract in FY23
	Total	**$2,202,500**	**$2,202,500**	**$1,257,107**	**57%**	**-$945,393**	
	TOTAL EXPENSES	**$3,670,094**	**$3,341,218**	**$1,621,682**	**44.19%**	**-$2,048,413**	
	PROJECTED EXPENSE DEVIATION FROM BUDGET		**-$328,877**				
	NET INCOME BEFORE TRANSFERS	**-$750,496**	**-$421,620**				
	TRANSFERS FROM RESERVES	**$750,496**				17	aligns with strategy of drawing down reserves to lessen impact of Nutrient Surcharge

FY 2024

BACWA BUDGET to ACTUAL

EXPENSES							
	NET INCOME AFTER TRANSFERS	**$0**					
	TOTAL OPERATING BUDGET	**$1,467,594**					
	OPERATING RESERVE	**$366,899**					

BACWA Fund Report as of December 31, 2023

BACWA FUND BALANCES - DATA PROVIDED BY ACCOUNTING DEPT.

DEPTID	DESCRIPTION	FISCAL YEAR BEGINNING FUND BALANCE	TOTAL BILLED REVENUE TO-DATE	TOTAL DISBURSEMENTS TO-DATE	MONTH-ENDING FUND BALANCE	OUTSTANDING ENCUMBRANCES	MONTH-END UNOBLIGATED FUND BALANCE
600	BACWA	347,671	750,668	341,976	756,363	469,007	287,356
604	LEGAL RSRV	300,000	-	-	300,000	-	300,000
605	CBC	2,097,905	2,104,280	1,257,107	2,945,078	421,882	2,523,196
	SUBTOTAL 1	*2,745,576*	*2,854,948*	*1,599,083*	*4,001,441*	*890,889*	*3,110,552*
602	BABC	*190,244*	175,600	51,662	314,182	*58,930*	255,252
606	BACC	*31,025*	*837*	*43,675*	(11,813)	*24,845*	(36,658)
607	BACC LEGAL RSRV	*60,000*	*30,000*	-	90,000	-	90,000
610	WOT	*253,257*	-	*(10,000)*	263,257	-	263,257
	SUBTOTAL 2	*534,526*	*206,437*	*85,337*	*655,626*	*83,775*	*571,851*
	GRAND TOTAL	**3,280,102**	**3,061,385**	**1,684,420**	**4,657,067**	**974,664**	**3,682,403**

Top Chart: Reflects CASH on the Books — Includes Encumbrances
Bottom Chart: Reflects CASH in the Bank — Includes Payables (bills received but not paid)
Allocations: Priority for non-liquid investments

BACWA INVESTMENTS BALANCES - DATA PROVIDED BY TREASURY DEPT.

DEPTID	DESCRIPTION	FISCAL YEAR BEGINNING FUND BALANCE	TOTAL BILLED REVENUE TO-DATE	TOTAL DISBURSEMENTS TO-DATE	MONTH-ENDING FUND BALANCE	RECONCILIATION TO FINANCIAL STATEMENTS A/R	RECONCILIATION TO FINANCIAL STATEMENTS A/P	MONTH-END RECONCILED FUND BALANCE	UNINVESTED CASH BALANCES	LAIF INVESTMENTS AMOUNTS	LAIF INVESTMENTS PERCENTAGE	ALTERNATIVE INVESTMENTS AMOUNTS	ALTERNATIVE INVESTMENTS IDENTIFIERS	ALTERNATIVE INVESTMENT INSTRUCTIONS AND NOTES
600	BACWA	347,671	750,668	341,976	756,363	(278,605)	20,592	498,350	-	498,350	21%	-		priority # 3 for allocation
604	LEGAL RSRV	300,000	-	-	300,000	-	-	300,000	-	300,000	13%	-		priority # 1 for allocation
605	CBC	2,097,905	2,104,280	1,257,107	2,945,078	(717,412)	13,167	2,240,833	787,981	1,452,852	62%	-		priority # 4 for allocation
	SUBTOTAL 1	2,745,576	2,854,948	1,599,083	4,001,441	(996,017)	33,759	3,039,183	787,981	2,251,202	96%	-		
602	BABC	190,244	175,600	51,662	314,182	(65,500)	-	248,682	248,682	-	0%	-		pass-through funds, no allocation
606	BACC	31,025	837	43,675	(11,813)	-	-	(11,813)	(11,813)	-	0%	-		
607	BACC LEGAL RSRV	60,000	30,000	-	90,000	-	-	90,000	-	90,000	4%	-		priority # 2 for allocation
610	WOT	253,257	-	(10,000)	263,257	-	-	263,257	263,257	-	0%	-		pass-through funds, no allocation
	SUBTOTAL 2	534,526	206,437	85,337	655,626	(65,500)	-	590,126	500,126	90,000	4%	-		
	GRAND TOTAL	**3,280,102**	**3,061,385**	**1,684,420**	**4,657,067**	**(1,061,517)**	**33,759**	**3,629,309**	**1,288,107**	**2,341,202**	**100%**			
							-	-	-	-				

To be used to cover Reconciliation to Financial Statements ($0)

Reconciliation to Trial Balance

Per Report above:						
General	2,854,948		STB	14930	2,341,202	
WOT, BABC, & BACC	206,437		STB	15050	1,288,107	
PROP	-				**3,629,309**	-
subtotal	**3,061,385**		STB	16300	1,061,517	
			STB	21350	(33,759)	
					4,657,067	-

Trial Balance Revenue Accounts

40100	Interest	(39,007)
40101	Mem Contrib	(1,386,895)
40102	Transfer	(30,000)
40103	Assoc Contrib	(190,578)
40104	Other	(1,414,905)
47310	State Grant	-
47320	Grant Retention	-
subtotal		**(3,061,385)**
Difference		**-**

BACWA Revenue Report as of December 31, 2023

Cost Center Code	Cost Center Description	Program Segment Description	Program Segment Value	Amended Budget	Current Period	FY24 - Year to Date	Unobligated
600	Bay Area Clean Water Agencies	BABC - AED and RPM Support	6200	(6,000.00)	-	-	6,000.00
		BACC - AED Support	6199	(38,250.00)	-	-	38,250.00
		BDO Affil/CS/Assoc Dues	6104	-	-	(39,616.00)	(39,616.00)
		BDO Affiliate/Associate Dues	6103	-	-	(44,450.00)	(44,450.00)
		BDO Assoc.&Affiliate Contr	6102	(190,078.00)	-	(106,512.00)	83,566.00
		BDO Fund Transfers	6141	(1,000.00)	-	-	1,000.00
		BDO Member Contributions	6101	(537,795.00)	-	(537,795.00)	-
		BDO Non-Member Contr AIR	6136	(7,361.00)	-	(7,361.00)	-
		BDO Non-Member Contr BAPPG	6135	(4,114.00)	-	(4,140.00)	(26.00)
		BDO Other Receipts	6105	-	-	-	-
		BDO Other Receipts (Misc)	6140	-	-	(2,653.00)	(2,653.00)
		BDO- Interest Income from LAIF	6142	(60,000.00)	-	(8,140.78)	51,859.22
		BDO-Alternative Investment Inc	6143	-	-	-	-
600 Total				**(844,598.00)**	**-**	**(750,667.78)**	**93,930.22**
602	Bay Area Biosolids Coalition	BDO Fund Transfers	6141		-	-	-
		BDO Member Contributions	6101		-	(175,600.00)	(175,600.00)
602 Total				**-**	**-**	**(175,600.00)**	**(175,600.00)**
605	Clean Bay Collaborative	BDO Fund Transfers	6141	-	-	-	-
		BDO Member Contributions	6101	(675,000.00)	-	(673,500.00)	1,500.00
		BDO Other Receipts	6105	(1,400,000.00)	-	(1,400,751.00)	(751.00)
		BDO- Interest Income from LAIF	6142	-	-	(30,028.80)	(30,028.80)
605 Total				**(2,075,000.00)**	**-**	**(2,104,279.80)**	**(29,279.80)**
606	Bay Area Chemical Consortium	BDO Member Contributions	6101	-	-	-	-
		BDO- Interest Income from LAIF	6142	-	-	(837.24)	(837.24)
606 Total				**-**	**-**	**(837.24)**	**(837.24)**
607	BACC Legal RSRV	BDO Fund Transfers	6141	-	-	(30,000.00)	(30,000.00)
607 Total				**-**	**-**	**(30,000.00)**	**(30,000.00)**
Grand Total				**(2,919,598.00)**	**-**	**(3,061,384.82)**	**(141,786.82)**

BACWA Expense Detail Report for December 31, 2023

Cost Center Code	Program Segment Description	Program Segment Value	Balance Type	Current Period Activity	FY24 - Year to Date
600	AIR-Air Issues&Regulation Grp	6153	Actual	10,527.50	37,418.75
			Encumbrance	(10,527.50)	50,329.59
			Obligated	-	87,748.34
	AS-Assistant Executive Directo	6175	Actual	7,208.86	43,444.89
			Encumbrance	(7,208.86)	48,579.11
			Obligated	-	92,024.00
	AS-Audit Services	6180	Actual	-	-
			Encumbrance		
			Obligated	-	-
	AS-BACWA Admin Expense	6173	Actual	-	48.62
			Obligated	-	48.62
	AS-EBMUD Financial Services	6176	Actual	-	11,515.79
			Encumbrance	-	31,781.21
			Obligated	-	43,297.00
	AS-Executive Director	6174	Actual	18,212.00	91,060.00
			Encumbrance	(18,212.00)	127,488.00
			Obligated	-	218,548.00
	AS-Insurance	6177	Actual	-	8,168.68
			Obligated	-	8,168.68
	AS-Regulatory Program Manager	6179	Actual	11,610.16	61,855.10
			Encumbrance	(11,610.16)	78,955.40
			Obligated	-	140,810.50
	Administrative Support	6178	Actual	-	-
			Obligated	-	-
	BC-BAPPG	6152	Actual	5,866.01	70,996.48
			Encumbrance	(5,866.01)	74,509.43
			Obligated	-	145,505.91
	BC-Collections System	6144	Actual	-	-
			Encumbrance	-	50,000.00
			Obligated	-	50,000.00
	BC-InfoShare Groups	6148	Actual	-	333.41
			Obligated	-	333.41
	BC-Laboratory Committee	6149	Actual	255.32	2,075.32
			Encumbrance	-	2,080.00
			Obligated	255.32	4,155.32
	BC-Manager's Roundtable	6154	Actual	-	254.34
			Obligated	-	254.34
	BC-Miscellaneous Committee Sup	6150	Actual	-	3,740.15
			Encumbrance	-	-
			Obligated	-	3,740.15
	BC-Permit Committee	6145	Actual	255.32	255.32
			Obligated	255.32	255.32
	BC-Pretreatment Committee	6151	Actual	-	-
			Obligated	-	-
	BC-Water Recycling Committee	6146	Actual	666.74	666.74
			Encumbrance	(666.74)	-
			Obligated	-	666.74
	CAR-BACWA File Storage	6165	Actual	-	(720.00)
			Obligated	-	(720.00)
	CAR-BACWA IT Software	6167	Actual	-	159.79
			Obligated	-	159.79
	CAR-BACWA IT Support	6166	Actual	-	-
			Encumbrance	-	-
			Obligated	-	-
	CAR-BACWA Website Dev/Maint	6163	Actual	-	-
			Obligated	-	-

Cost Center Code	Program Segment Description	Program Segment Value	Balance Type	Current Period Activity	FY24 - Year to Date
	CAR-BACWA Website Hosting	6164	Actual	-	-
			Obligated	-	-
	CAS-Arleen Navaret Award	6160	Actual	-	-
			Obligated	-	-
	CAS-BayCAN	6204	Actual	-	-
			Obligated	-	-
	CAS-Misc Collaborative Sup	6162	Actual	-	-
			Obligated	-	-
	CAS-PSSEP	6157	Actual	-	-
			Obligated	-	-
	CAS-Stanford ERC	6159	Actual	-	-
			Obligated	-	-
	GBS-Meeting Support-Annual	6170	Actual	-	-
			Obligated	-	-
	GBS-Meeting Support-Exec Bd	6169	Actual	1,384.60	2,767.88
			Obligated	1,384.60	2,767.88
	GBS-Meeting Support-Misc	6172	Actual	92.77	5,260.30
			Obligated	92.77	5,260.30
	GBS-Meeting Support-Pardee	6171	Actual	107.42	2,674.12
			Obligated	107.42	2,674.12
	LS-Executive Board Support	6156	Actual	-	-
			Encumbrance	-	2,355.00
			Obligated	-	2,355.00
	LS-Regulatory Support	6155	Actual	-	-
			Encumbrance	-	2,929.00
			Obligated	-	2,929.00
	WQA-CE-Nature Based Solutions	6196	Actual	-	-
			Obligated	-	-
	Write-Off Doubtful Accounts	6208	Actual	-	-
			Obligated	-	-
600 Total			**Actual**	**56,186.70**	**341,975.68**
600 Total			**Encumbrance**	**(54,091.27)**	**469,006.74**
600 Total			**Obligated**	**2,095.43**	**810,982.42**
602	AS-Assistant Executive Directo	6175	Actual	-	-
			Obligated	-	-
	AS-Regulatory Program Manager	6179	Actual	-	-
			Obligated	-	-
	Academia Research & Development	6203	Actual	-	-
			Obligated	-	-
	Administrative Support	6178	Actual	-	-
			Obligated	-	-
	BDO Contract Expenses	6186	Actual	-	-
			Obligated	-	-
	Collateral Development	6197	Actual	-	-
			Obligated	-	-
	Program Manager Expense	6202	Actual	8,320.22	51,662.47
			Encumbrance	(8,320.22)	58,930.13
			Obligated	-	110,592.60
	Technology Research & Development	6206	Actual	-	-
			Obligated	-	-
602 Total			**Actual**	**8,320.22**	**51,662.47**
602 Total			**Encumbrance**	**(8,320.22)**	**58,930.13**
602 Total			**Obligated**	**-**	**110,592.60**
605	Recycled Water Evaluation	6198	Actual	-	17,492.59
			Encumbrance	-	34,999.76
			Obligated	-	52,492.35
	WQA - CEC Investigations	6201	Actual	-	86,528.60
			Encumbrance	-	54,413.60
			Obligated	-	140,942.20

Cost Center Code	Program Segment Description	Program Segment Value	Balance Type	Current Period Activity	FY24 - Year to Date
	WQA-CE Addl Work Under Permit	6191	Actual	-	18,281.05
			Encumbrance	-	60,116.95
			Obligated	-	78,398.00
	WQA-CE Risk Reduction	6190	Actual	12,500.00	12,500.00
			Encumbrance	(12,500.00)	-
			Obligated	-	12,500.00
	WQA-CE Voluntary Nutr Contrib	6193	Actual	-	-
			Obligated	-	-
	WQA-CE-Nature Based Solutions	6196	Actual	-	95,463.80
			Encumbrance	-	167,803.22
			Obligated	-	263,267.02
	WQA-CE-Nutrient WS Permit Comm	6188	Actual	-	1,000,000.00
			Obligated	-	1,000,000.00
	WQA-CE-Technical Support	6181	Actual	1,712.50	15,451.25
			Encumbrance	(1,712.50)	65,938.50
			Obligated	-	81,389.75
	WQA-NMSReviewer	6205	Actual	2,380.00	11,390.00
			Encumbrance	(2,380.00)	38,610.00
			Obligated	-	50,000.00
605 Total			**Actual**	**16,592.50**	**1,257,107.29**
605 Total			**Encumbrance**	**(16,592.50)**	**421,882.03**
605 Total			**Obligated**	**-**	**1,678,989.32**
606	Administrative Support	6178	Actual	3,852.00	13,674.60
			Encumbrance	(3,852.00)	24,845.40
			Obligated	-	38,520.00
	BDO Fund Transfers	6141	Actual	-	30,000.00
			Obligated	-	30,000.00
	GBS-Meeting Support-Misc	6172	Actual	-	-
			Obligated	-	-
606 Total			**Actual**	**3,852.00**	**43,674.60**
606 Total			**Encumbrance**	**(3,852.00)**	**24,845.40**
606 Total			**Obligated**	**-**	**68,520.00**
610	Administrative Support	6178	Actual	-	-
			Obligated	-	-
	BC-BAPPG	6152	Actual	-	(10,000.00)
			Obligated	-	(10,000.00)
	BDO Contract Expenses	6186	Actual	-	-
			Obligated	-	-
610 Total			**Actual**	**-**	**(10,000.00)**
610 Total			**Encumbrance**	**-**	**-**
610 Total			**Obligated**	**-**	**(10,000.00)**
Grand Total Actual				**84,951.42**	**1,684,420.04**
Grand Total Encumbrance				**(82,855.99)**	**974,664.30**
Grand Total Obligated				**2,095.43**	**2,659,084.34**

BACWA CHAIR AUTHORIZATION REQUEST

AGENDA NO.: 5

MEETING DATE: **February 16, 2024**

TITLE: BACWA Executive Board Chair Authorization for an Agreement in the amount of $8,200 in FY25 for sponsorship of Bri Communications Bay Area Shorelines and Waterways signage.

☐ **RECEIPT** ☐ **DISCUSSION** ☐ **RESOLUTION** ☒ **APPROVAL**

ACTION

Approve the sponsorship of Bri Communications Bay Area Shorelines and Waterways signage to raise awareness of BACWA and the value of wastewater in the region.

SUMMARY

Bri Communications posts Bay Area Shorelines and Waterways signage around the San Francisco Bay that carries clean water and environmental messaging. In the past, CASA and EBMUD have both sponsored wastewater-related messaging upon the signage. After discussion with the BACWA Executive Board at the January 19, 2024 Executive Board meeting, it was agreed that BACWA, rather than CASA and EBMUD, is the appropriate entity to sponsor Bay-wide signage and provide regional public communication messaging about the value of wastewater. At a sponsorship level of $8,200, BACWA would get a 3" by 3" Logo Slot and message on at least 60 displays for at least 23 months. A list of locations and example sign is provided in the attachment.

FISCAL IMPACT

This item will be paid for out of the Value of Wastewater Communication line item on the FY24 budget approved on April 21, 2023.

ALTERNATIVES

Do not provide the sponsorship – This is not recommended as the sponsorship and messaging is in alignment with the BACWA Board's direction to enhance public outreach on the value of wastewater. The BACWA Executive Board agreed that this is an appropriate use of BACWA funds and that BACWA is the right entity to provide the sponsorship.

.

Attachments: Bay Area Shorelines and Waterways examples

Approved:

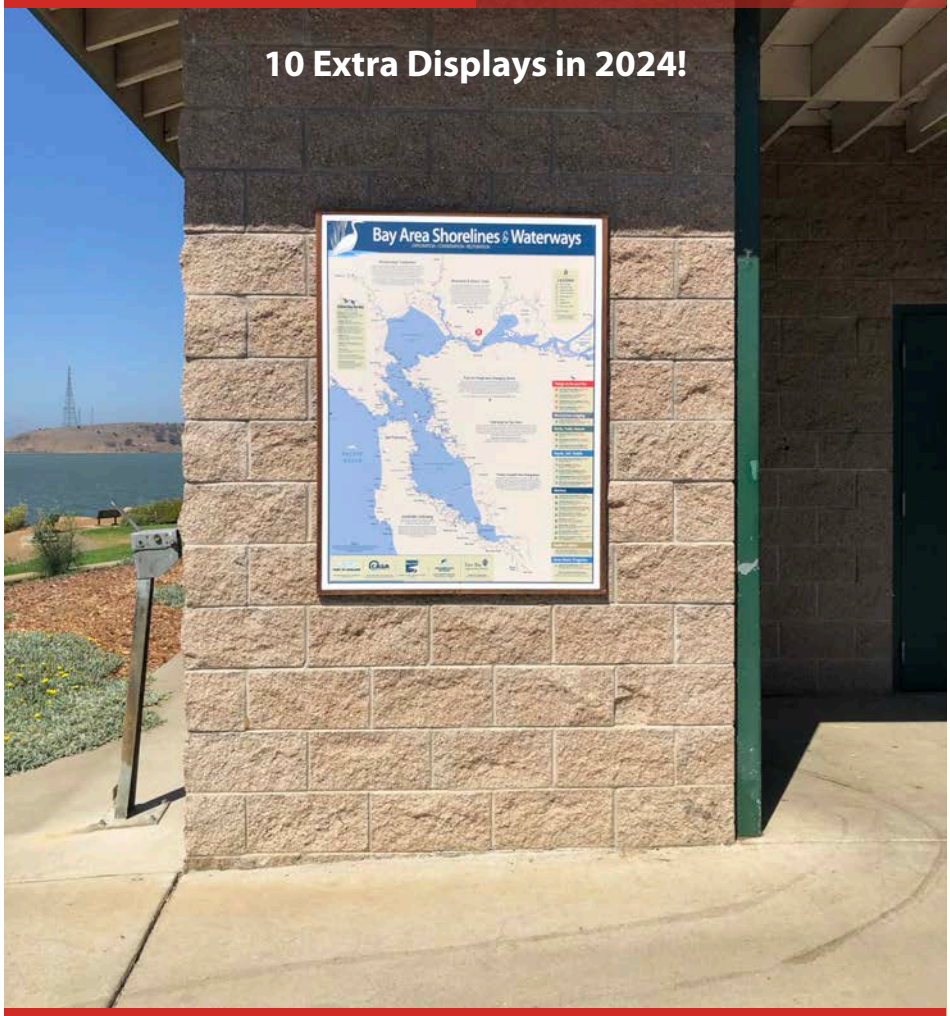
_____ Date: _____

Amit Mutsuddy, Chair
BACWA

Bay Area Shorelines & Waterways

Sixty strategically placed displays provide a unique, cost-effective opportunity to reach all those most interested the Bay Area's shorelines and waterways. Tourists, boaters, bike riders, water-sport enthusiasts, nature lovers and the general public will see and use these displays. People viewing these displays are in a relaxed frame of mind and looking for things to do and see. It's a very cost effective way to promote your shoreline business or reach out with a sustainability message.

Sustainability Theme | **Over 1 Million Viewers***



60 Outdoor Displays All Around the Bay!
Reach the Bay Area's shoreline and waterway enthusiasts

Sponsor Logo and Map Message: $8,200

60 prime locations • 23 month period • 3" tall by 3" wide formatted space

Optional: Generic paragraph of your choice including agency website/contact OR 3-line listing/locator
Cost effectiveness: Estimated viewers: 1,050,0000* • Cost per viewer: less than a penny • $357 per month
* based on an average of 25 viewers per day, per display

Listing and Locator: $1,960

3-line listing with 1 locator • Works out to $85 per month • Locates your business directly on map

For more information call Paul Sherwin at 206-378-1055 or email paul@bricomm.com
Bri Communications • www.bricomm.com

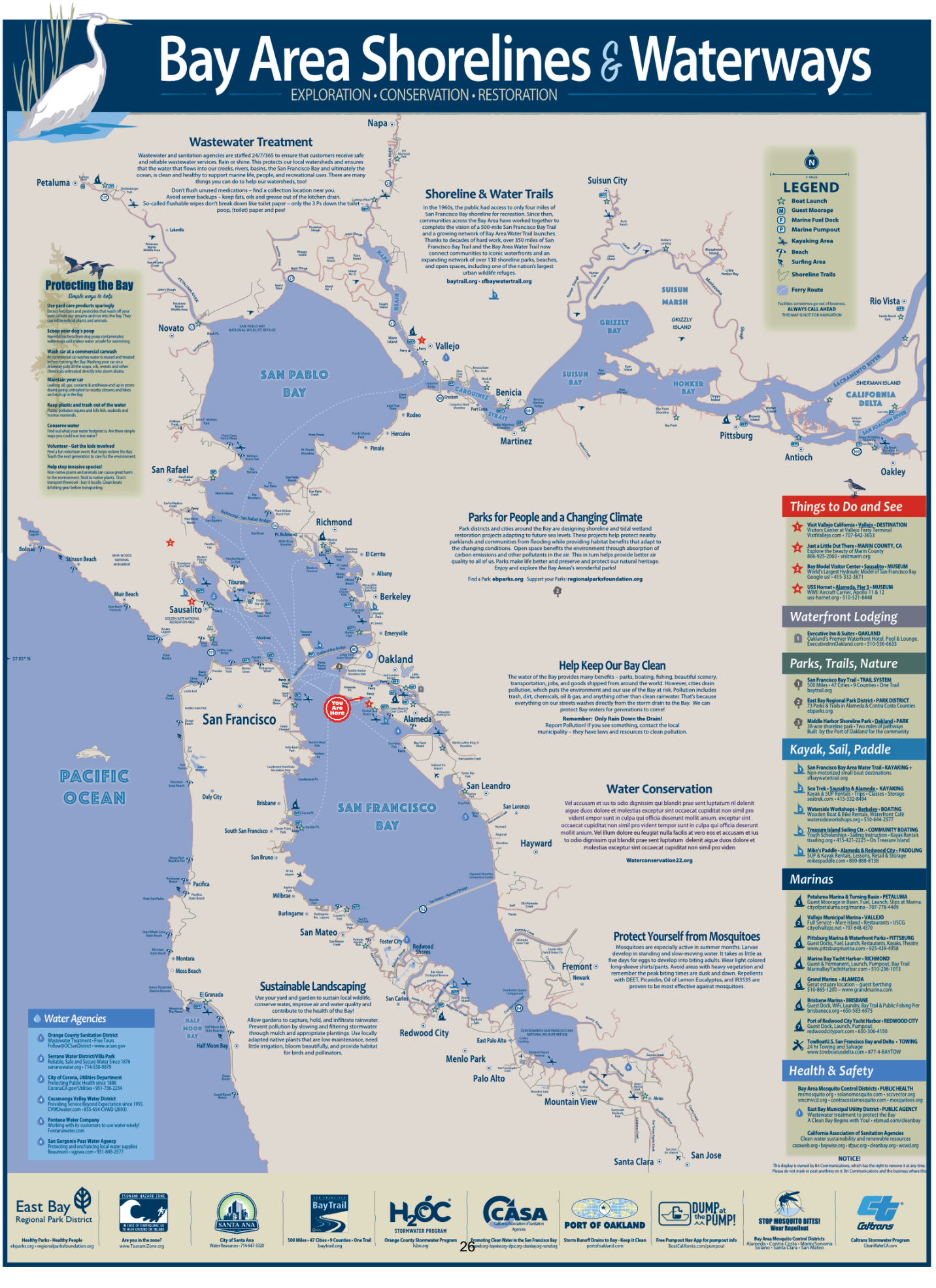
60 WATERFRONT LOCATIONS
23 month period

** Individual locations not guaranteed*
Berkeley Marina
Shorebird Center (Berkeley)
Seabreeze Market (Berkeley)
REI (Berkeley)*
Marina Bay (3) (Richmond)
Oakland-Alameda Ferry (JLS)
Brotzeit Lokal (Oakland)
Jack London Square (Oakland)
USS Hornet (Alameda)
Encinal Boat Launch (Alameda)*
Grand Street Boat Launch (Alameda)*
Shoreline Park (Alameda)*
Grand Marina (Alameda)
Ballena Isle Marina (Alameda)
Marina Park (San Leandro)
Suisun City Marina
Suisun City Boat Launch
Belden's Landing (Suisun Marsh)*
Benicia Marina
First Street Pier (Benicia)
Ninth Street Park (Benicia)
Vallejo Waterfront (2)
Vallejo Ferry Terminal
Martinez Waterfront
Pittsburg Marina (2)*
Treasure Island Sailing Center*
South Beach Waterfront (SF) (2)
Pier 40 (SF)
Fisherman's Wharf (Scoma Way)
Pier 23 Cafe (SF)
Marina Green (SF) (2)
Marina Park (2) (Emeryville)
Port of Redwood City (2)
Brisbane Waterfront (3)
Oyster Point Marina
Coyote Pt. Marina (San Mateo)
Coyote Pt. Co. Park Beach (San Mateo)
Seal Point Park (San Mateo)
Baylands Nature Preserve (Palo Alto)
Alviso County Park (San Jose)
Petaluma Marina*
Strawberry Cove Park (Marin Co.)
Harbor Cove Park (Marin Co.)
Schoonmaker Pt. (Sausalito)
Bicycle Odyssey (Sausalito)
Sea Trek (Sausalito)
Bay Model (Sauasalito)
Scoma's Restaurant (Sausalito)
Golden Gate Market (Sausalito)
Loch Lomond Marina
101 Surf Sports (San Rafael)
McNear's Beach Park (San Rafael)
China Camp State Park
* New Location

See page 2 for new display →

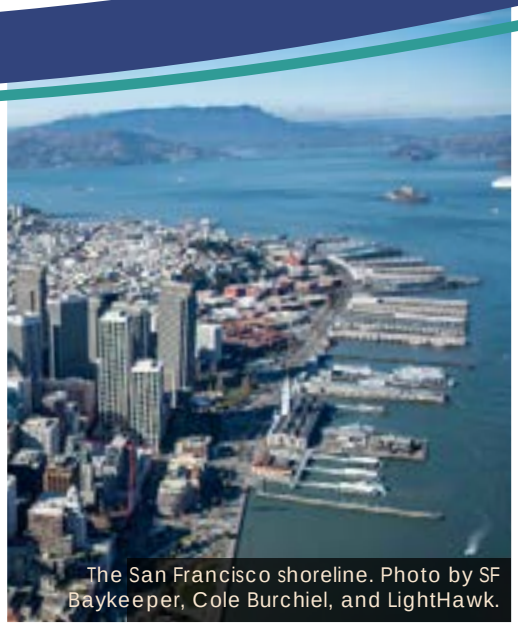
New Sustainability Theme • MOCK-UP ONLY

Actual Size: 36" by 48" • Made for Outdoors



Regional Shoreline Adaptation Plan

An implementing project of **BAY ADAPT**



The San Francisco shoreline. Photo by SF Baykeeper, Cole Burchiel, and LightHawk.

WHAT IS THE REGIONAL SHORELINE ADAPTATION PLAN?

Rising sea levels from climate change are already encroaching along our shorelines and will only accelerate in the coming decades. The impacts of sea level rise – and resources to plan and prepare for them – are unevenly distributed across the nine-county Bay Area. If everyone "goes it alone," we risk maladaptation - catastrophic consequences such as unintentional flooding of our neighbors, leaving behind communities most at risk and with the least resources to adapt, and missing out on opportunities to find shared solutions that benefit both local communities and the region as a whole.

The Regional Shoreline Adaptation Plan (RSAP) will set the region on a path towards more coordinated and consistent local adaptation planning that advances our shared goals together. The Shoreline Plan will be collaboratively developed and include:

Regional Guidelines

Sub-Regional Shoreline Plans

Online Regional Adaptation Map

Following adoption of the Vision and Regional Guidelines by BCDC's Commission by the end of 2024, BCDC will support cities and counties to develop sub-regional shoreline plans that are consistent with the guidelines to ensure that the region is prepared for sea level rise both locally and in alignment with the region.

WHAT WILL THE RSAP DO?

- Adaptation that **coordinates** with neighboring jurisdictions
- Priority resources to **frontline communities**
- Long-term **health of wetlands**
- Strategy for **adaptation implementation** based on risk
- Common **standards and methods** for plans, policies, and science
- **Pipeline of funding** that reduces burdens on jurisdictions
- Track and measuring progress towards a **collective vision**

WHO IS BCDC?

The San Francisco Bay Conservation and Development Commission ("BCDC") is a California State regulatory and planning agency in the nine-county San Francisco Bay Area with a mission to **protect and enhance the resources of the San Francisco Bay and ensure its responsible and productive use for this and future generations.**

www.bcdc.ca.gov

WHAT IS BAY ADAPT?

Bay Adapt: Regional Strategy for a Rising Bay is a BCDC-led initiative that brings together partners across the San Francisco Bay Area to establish regional agreement on the actions necessary to protect people and the natural and built environment from rising sea levels. The **Joint Platform** was adopted by BCDC in 2021 and has been endorsed by 55 cities and counties, regional, state, and federal agencies, non-profit organizations and more.

www.BayAdapt.org

Palo Alto Baylands Nature Preserve. Photo by Stanislav Sedov, CC BY 2.0.

WHAT IS SB 272?

SB 272: Sea Level Rise Adaptation and Planning (Laird, 2023) requires local governments along the San Francisco Bay shoreline to develop "subregional shoreline resiliency plans."

It requires BCDC to develop subregional resilience plan guidelines by end of 2024, which will be built on Bay Adapt's Guiding Principles, and developed in coordination with the California Coastal Commission, the Ocean Protection Council, and the California Sea Level Rise State and Regional Support Collaborative, for use by local governments as they develop plans. Subregional plans must be submitted to BCDC for review and approval by January 1, 2034.

The bill also includes an important carrot: Projects and strategies contained within approved plans by BCDC or CCC will be prioritized for State funding.

HOW ARE WE ALIGNED?

Bay Adapt, The Regional Shoreline Adaptation Plan, and SB 272 are **aligned**, **on track** and **linked to funding**.

BENEFITS OF SB 272

REGIONAL PREPARATION

The RSAP and SB 272 will establish common, regionwide standards and support for plans that transcend jurisdictions and issue areas.

COORDINATION

The RSAP and SB 272 will compel communities to prepare adaptation plans that prioritize disadvantaged communities, science and critical infrastructure – without endangering their neighbors, habitat, or infrastructure.

PRIORITIES & FUNDING

The RSAP and SB 272 will help us plan where and when to make smart investments that prioritize at-risk, low-income communities, natural areas, and the critical infrastructure, and links those plans to state funds to implement them.

ALIGNED

BCDC's Regional Shoreline Adaptation Plan mirrors the basic blueprint of SB 272.

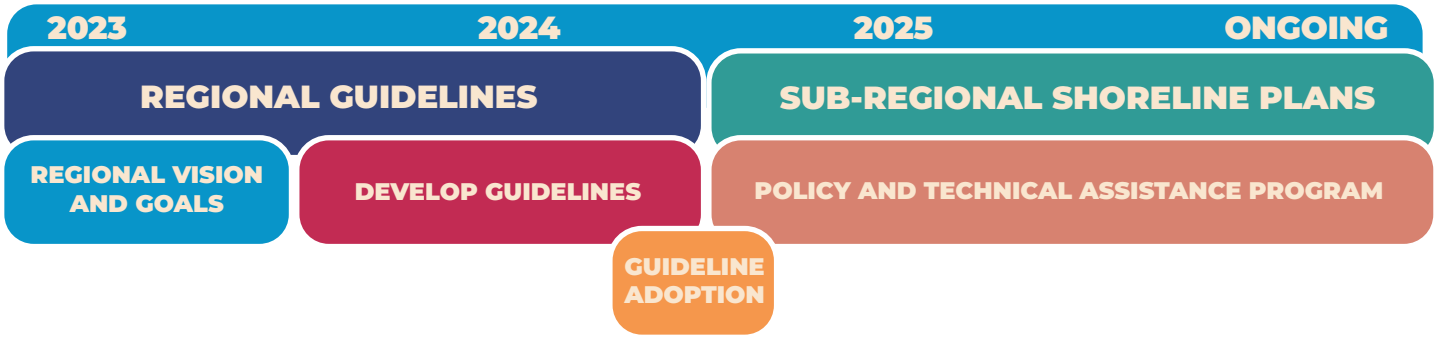
ON TRACK

BCDC is on track to develop Guidelines by end of 2024, in alignment with SB 272 requirements.

LINKED TO FUNDING

Grant funding for developing plans will be available starting at the end of 2023 from the Ocean Protection Council.

PROJECT TIMELINE



For additional questions, please contact the Project Manager of the Shoreline Plan, Jaclyn Mandoske at jaclyn.mandoske@bcdc.ca.gov.

This work is supported with grant funds provided by the Ocean Protection Council and the State Coastal Conservancy.

Draft Sea Level Rise Guidance: 2024 Science and Policy Update

BCDC Commission Meeting

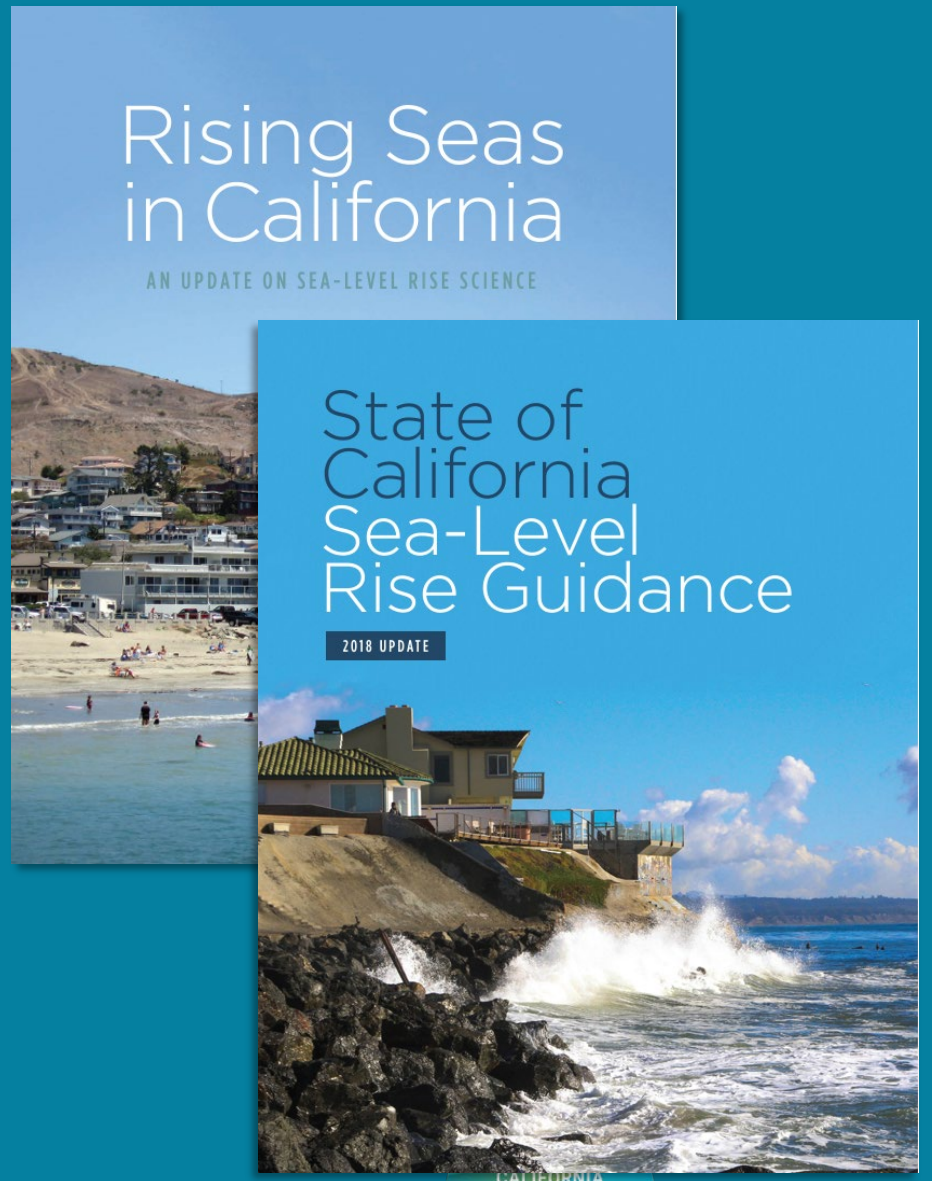
Justine Kimball, Senior Scientist, Ocean Protection Council (Alternate Commissioner)

February 1, 2023

CALIFORNIA OCEAN PROTECTION COUNCIL

Update to the 2017/18 Science and Policy Guidance

- Separate science and policy reports
- SLR projections for 12 tide gauge locations
- Probabilistic projections for high and low emissions (2030 – 2150), and an extreme scenario (H++)
- Stepwise (5 steps) process on how to select SLR projections based on risk tolerance
- Recommendations for planning and adaption



Partnered with Ocean Science Trust - Task Force Approach

Executive Summary

Chapter 1: Introduction

Chapter 2*: California Sea Level Scenarios

Chapter 3: California Sea Level Rise Policy Guidance

Chapter 4*: Combined Impacts of Sea Level Rise and Other Coastal Hazards

Appendices

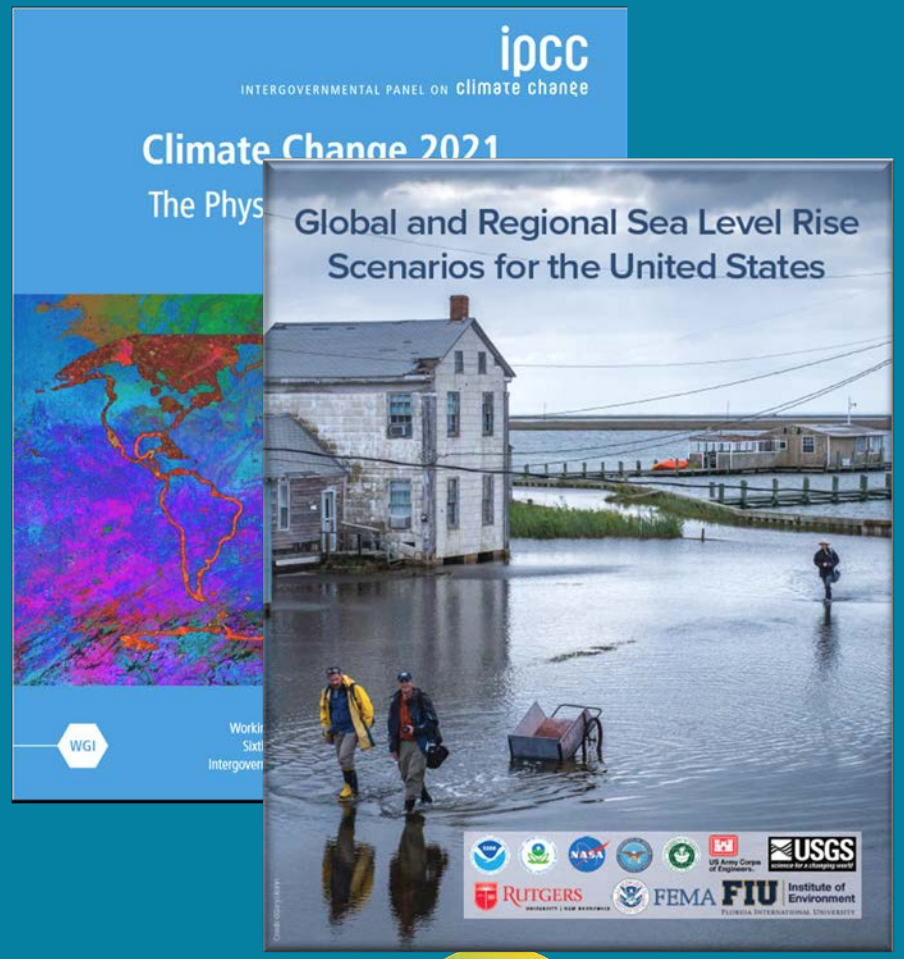
*Task Force authored

Dr. Susheel Adusumilli, University of California, San Diego
Dr. Patrick Barnard, United States Geological Survey (Co-Chair)
Dr. Daniel Cayan, University of California, San Diego
Laura Engeman, California Sea Grant & University of California, San Diego (Co-Chair)
Dr. Gary Griggs, University of California, Santa Cruz
Dr. Benjamin Hamlington, National Aeronautics and Space Administration (Co-Chair)
Dr. Kristina Hill, University of California, Berkeley
Dr. Felix Landerer, National Aeronautics and Space Administration
Dr. Phil Thompson, University of Hawaii at Manoa

+ Coordination with State Sea Level Rise Collaborative

Chapter 2: California Sea Level Scenarios

- Use IPCC Sixth Assessment Report (AR6) and observations to present best science
- From the probabilistic projections in AR6, develop a reduced set of sea level scenarios
- Localize these to California
- Scenarios available statewide and at 13 tide gauges



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Scenarios Storylines

- **Low Scenario**: the assumption of the current rate of sea level rise continuing on into the future
- **Intermediate-Low**: range of warming levels and emissions pathways; a reasonable lower bound of the most likely in 2100
- **Intermediate:** A range of future emissions pathways; could include contribution from low confidence processes; a reasonable estimate of the upper bound of most likely sea level rise in 2100
- **Intermediate-High:** Intermediate-to-high future emissions and high warming; this scenario is heavily reflective of a world where rapid ice sheet loss processes are contributing to sea level rise
- **High:** High future emissions and high warming with large potential contributions from rapid ice-sheet loss processes

CALIFORNIA OCEAN PROTECTION COUNCIL

California Sea Level Scenarios

	Low	Int-Low	Intermediate	Int-High	High
2020	0.2	0.2	0.2	0.2	0.3
2030	0.3	0.4	0.4	0.4	0.4
2040	0.4	0.5	0.6	0.7	0.8
2050	0.5	0.6	0.8	1.0	1.2
2060	0.6	0.8	1.1	1.5	2.0
2070	0.7	1.0	1.4	2.2	3.0
2080	0.8	1.2	1.8	3.0	4.1
2090	0.9	1.4	2.4	3.9	5.4
2100	1.0	1.6	3.1	4.9	6.6
2110	1.1	1.8	3.8	5.7	8.0
2120	1.1	2.0	4.5	6.4	9.1
2130	1.2	2.2	5.0	7.1	10.0
2140	1.3	2.4	5.6	7.7	11.0
2150	1.3	2.6	6.1	8.3	11.9

Global Mean Surface Air Temperature 2081-2100	1.5°C	2.0°C	3.0°C	4.0°C	5.0°C	Low Confidence Processes, Low Warming	Low Confidence Processes, High Warming
Low Scenario	92%	98%	>99%	>99%	>99%	90%	>99%
Intermediate-Low Scenario	37%	50%	82%	97%	>99%	49%	96%
Intermediate Scenario	<1%	2%	5%	10%	23%	7%	49%
Intermediate-High Scenario	<1%	<1%	<1%	1%	2%	1%	20%
High Scenario	<1%	<1%	<1%	<1%	<1%	<1%	8%

Science: Key Takeaways

- There is greater certainty and a narrowing range of the amount of sea level rise in the next 30 years. Statewide, sea levels are most likely to rise 0.8 ft (Intermediate Scenario) by 2050
- By 2100, statewide sea levels are most likely to rise between 1.6 ft and 3.1 ft (Int-Low to Intermediate Scenarios), and even higher amounts cannot be ruled out
- Beyond 2100, the range of sea level rise becomes increasingly large due to uncertainties associated with physical processes, such as earlier-than-expected ice sheet loss. By 2150, statewide sea levels may rise from 2.6 ft to 11.9 ft (Int-Low to High Scenarios), although even higher amounts are possible
- The extreme sea level rise scenario (i.e. H++) from Rising Seas 2017 is much higher than best available science suggests
- Vertical land motion (uplift or subsidence) is the primary driver of local variations in sea level rise across the state

Science: Comparison Takeaways

- Does not include episodic events (i.e., storms, king tides, ENSO, etc.)
- Direct comparison between 2018 and 2023 impossible
- Rough comparison from the policy perspective:
  - No comparable for Low Scenario
  - Low end of likely range vs Int-Low
  - High end of likely range vs Intermediate
  - 1-in-20 vs Int-High
  - 1-in-200 vs High
  - No comparable for H++

2050	Low end of likely range (vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	0.6	1.1	1.4	1.9	2.7
2023	0.6	0.8	1	1.2	-----

2100	Low end of likely range vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	1- 1.6	2.4- 3.4	3.2- 4.4	5.7- 6.9	10.2
2023	1.6	3.1	4.9	6.6	-----

2150	Low end of likely range vs Int-Low	High end of likely range vs Intermediate	1-in-20 vs Int-High	1-in-200 vs High	H++
2018	1.3- 2.8	3.8- 5.8	5.5- 7.7	11- 13	21.9
2023	2.6	6.1	8.3	11.9	-----

Chapter 3: California Sea Level Rise Policy Guidance

- For most planning and projects, it is recommended to evaluate **Intermediate, Intermediate-High, and High scenarios** to assess a spectrum of potential impacts, consequences, and responses. Consideration of storm conditions (for most applications 100-year storm) in combination with Sea Level Scenarios is also recommended to evaluate extreme water levels, as appropriate
- Existing vulnerability assessments can skip to Step 5, as appropriate
- Step 5: Explore adaptation options and feasibility – new Step!
- Selection of SLR should be guided by risk tolerance and is often a multi-factor process

CALIFORNIA OCEAN PROTECTION COUNCIL

Chapter 4: Combined Impacts of SLR and Other Coastal Hazards

- Increased Coastal Flood Frequency
- Groundwater Rise and Seawater Intrusion
- Coastal and Shoreline Erosion
  - Loss or Migration of Beaches
  - Cliff and Bluff Retreat
  - Loss or Migration of Coastal Ecosystems and Species
  - Threats to Coastal Access and Recreation
- Preparing for Extreme Coastal Storms

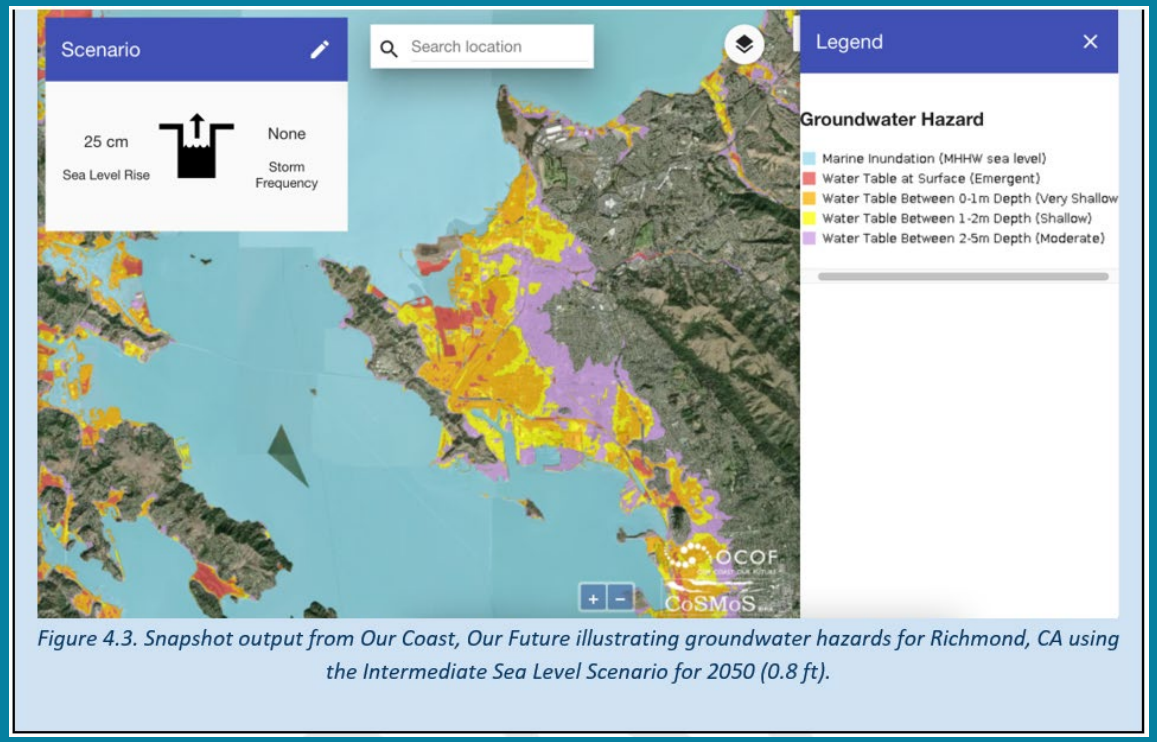

Figure 4.3. Snapshot output from Our Coast, Our Future illustrating groundwater hazards for Richmond, CA using the Intermediate Sea Level Scenario for 2050 (0.8 ft).

State Efforts to Prepare California for Sea Level Rise

- Senate Bill 1 Sea Level Rise Adaptation Grant Program (Track 1 recently launched! $71.4 available)
- $660 million maintained in the Governor's FY 24/25 Budget for critical coastal resilience programs and projects
- Ongoing coordination and efforts through the State Sea Level Rise Collaborative

Public Comment and Outreach Plans

Website: https://opc.ca.gov/2024/01/draft-slr-guidance-2024/

45-day public comment period – Closes March 4, 2024

Webinar: Monday, February 5th 1:00 – 2:00 pm

Regional Workshops:

- Central Coast: February 13 from 2:00 pm to 3:30 pm
- North Coast: February 14 from 10:00 am to 11:30 pm
- South Coast: February 15 from 10:00 am to 11:30 am
- **San Francisco Bay Area: February 16 from 10:30 am to 12:00 pm**

Questions? Justine Kimball, Justine.Kimball@resources.ca.gov
Public Comment? Ben Dorfman, Ben.Dorfman@resources.ca.gov

Thank you!

Questions? Justine Kimball, Justine.Kimball@resources.ca.gov
Public Comment? Ben Dorfman, Ben.Dorfman@resources.ca.gov

KEY REGULATORY ISSUE SUMMARY
Updated February 7, 2024

Action items for member agencies are in **bold**

Contents

New updates in this version are shown in Purple highlighting

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
NUTRIENTS IN SAN FRANCISCO BAY			
• San Francisco Bay receives some of the highest nitrogen loads among estuaries worldwide, yet has not historically experienced the water quality problems typical of other nutrient-enriched estuaries. It is not known whether this level of nitrogen loading, which will continue to increase in proportion to human population increase, is sustainable over the long term. • Because of the complexity of the science behind nutrient impacts in SF Bay, stakeholders in the region are participating in the Nutrient Management Strategy (NMS) steering committee to prioritize scientific studies and ensure that all science to be used for policy decisions is conducted under one umbrella.	• For FY24, BACWA is contributing $1.8M to fund scientific research needed to make management decisions for the 3rd Watershed Permit. This payment completes the science funding requirement in the 2nd Watershed Permit. • The focus of current scientific efforts is improving model representation of biogeochemistry, light attenuation, dissolved oxygen, and harmful algal bloom dynamics. • The science team is also developing an Assessment Framework for Open Bay habitats and Lower South Bay sloughs. • In summer 2022, a harmful algae bloom in San Francisco Bay brought increased public attention to this topic. A smaller bloom recurred in summer 2023. In both cases, the NMS science team modified the science plan to conduct monitoring and assist with data interpretation.	• **Continue to participate in NMS steering committee, Nutrient Technical Workgroup, and planning subcommittee meetings, and provide funding for scientific studies.** • Continue to assist with preparation of a brief "State of the Science" document summarizing the scientific accomplishments of the NMS team for public use. • Continue to engage with Nutrient Technical Team and BACWA's Nutrient Management Strategy technical consultant, Mike Connor, to provide review of recent work products and charge questions for the science team.	BACWA Nutrients Page: https://bacwa.org/nutrients/ NMS FY24 Science Program Plan Materials https://drive.google.com/drive/folders/16H_sQ8AuoqHv-eo9QZx2A9Ph9MTecg5j?usp=drive_link NMS Work Products https://sfbaynutrients.sfei.org/books/reports-and-work-products BACWA Nutrient FAQ https://bacwa.org/wp-content/uploads/2023/01/BACWA-Nutrient-Fact-Sheet.pdf 2023 SF Bay Algal Bloom https://bacwa.org/general/2023-algal-bloom-in-sf-bay-updated-8-3-2023/

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
SF BAY NUTRIENT WATERSHED PERMIT			
• The 1st Nutrient Watershed Permit was adopted in 2014, and required a regional study on Nutrient Treatment by Optimization and Upgrades, completed in 2018. • The 2nd Nutrient Watershed Permit was adopted in 2019. It includes: o Continued individual POTW nutrient monitoring and reporting; o Continued group annual reporting; o Significantly increased funding for science; o Regional assessment of the feasibility and cost for reducing nutrients through nature-based systems and recycled water; o Establishing current performance for Total Inorganic Nitrogen (TIN), and "load targets" for nutrient loads based on 2014 to 2017 load data plus a 15% buffer for growth and variability o Recognition of "early actors" who are planning projects that will substantially decrease TIN loads. • Through the nutrient surcharge levied on permittees, BACWA funds compliance with the following provisions on behalf of its members: o Group Annual Reporting o Regional Studies on Nature-Based Systems and Recycled Water o Support of scientific studies through the Regional Monitoring Program (RMP) with $11M over the five-year permit term.	• Studies related to Recycled Water and Nature-Based Systems were completed in June 2023, as required by the 2nd Nutrient Watershed Permit. • Each year by February 1, BACWA submits a Group Annual Report on behalf of its members. The report summarizes trends in nutrient concentrations and loading for each agency, and for all the agencies as a whole. The annual reporting period in the 2nd Watershed Permit is based on a water year (Oct. 1 – Sept. 30). The Group Annual Report for 2022-2023 was completed on February 1, 2024. • In response to the summer 2022 algae bloom, Regional Water Board staff plan to include significant TIN load reduction requirements in the 3rd Watershed Permit. The NMS modeling team tested several load reduction scenarios to inform the new requirements. Based on this modeling, Regional Water Board staff are currently proposing dry season load limits that are about 40% lower than actual loads from the 2022 dry season. • The current concept proposed by the Regional Water Board is for the permit to contain interim limits for dry season TIN loads that are effective immediately and "final limits" that become effective after 10 years. The 10-year clock could be modified in subsequent permits if the "final limits" become more stringent, so the term "final" only applies to this specific permitting action.	• **Review and comment on the administrative draft and Tentative Order versions of the forthcoming 3rd Nutrient Watershed Permit. The administrative draft is expected in February 2024, and the Tentative Order will be available later in the spring.** • Advocate for sufficient time for agencies to implement nutrient load reduction projects, include those with involving innovative technologies, recycled water, and nature-based solutions. • BACWA continues to convene a Nutrient Strategy Team to develop BACWA's key tenets for the 3rd Watershed Permit, and **members are encouraged to participate.** The Nutrient Strategy Team is actively engaging with the Regional Water Board to expand upon the key tenets and discuss implementation details for the 3rd Watershed Permit, including the magnitude and timing of required load reductions. • Agencies will continue to report nutrient monitoring data both through CIWQS and directly to BACWA.	2nd Nutrient Watershed Permit: www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2019/R2-2019-0017.pdf Special Studies of Recycled Water and Nature-Based Solutions: bacwa.org/document-category/2nd-watershed-permit-studies/ BACWA Group Nutrient Annual Reports: bacwa.org/document-category/nutrient-annual-reports/ Presentations from 2023 BACWA Annual Members Meeting bacwa.org/document-category/2023-annual-meeting/ BACWA September 2023 Status of 3rd Watershed Permit Negotiations bacwa.org/wp-content/uploads/2023/09/WSP-Negotiations-Update-2023-09-05.pdf BACWA Concerns related to Compliance Timelines in the 3rd Watershed Permit bacwa.org/document/bacwa-comments-on-nutrient-removal-timelines-2024-01-29/

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CHLORINE RESIDUAL COMPLIANCE			
• The Basin Plan effluent limit for residual chlorine is 0.0 mg/L. Prior to 2024, residual chlorine was the most frequent parameter for violations for Region 2 POTWs. Because there are 24 hourly reporting events each day, the "opportunities" for violations are enormous. However, the actual violation rates are infinitesimal (~0.001%). • Prior to 2024, agencies were overdosing their effluent with the dechlorination agent, sodium bisulfite, to prevent chlorine violations, a practice which cost the region approximately $2 million each year. • Regional Water Board staff and BACWA have worked together for more than decade to modify the effluent limit for chlorine residual.	• In 2020, the Regional Water Board adopted a Basin Plan Amendment that incorporated EPA's ambient water quality criteria for chlorine into the Basin Plan. Since the Basin Plan Amendment was not approved by EPA, it did not go into effect. • In November 2023, the Regional Water Board adopted an NPDES Permit Amendment that modifies effluent limits for residual chlorine for most dischargers. The revised limits are based on a translation of the Basin Plan's existing narrative toxicity objective. The NPDES Permit Amendment includes: o Limits calculated based on a 0.013 mg/L water quality objective in marine and estuarine waters, and incorporating dilution for deep water dischargers. The limits will be applied as a 1-hour average. o A Minimum Level of 0.05 mg/L for online continuous monitoring systems. • The NPDES Permit Amendment requires most dischargers to prepare a Chlorine Process Control Plan targeting a chlorine residual of 0.0 mg/L at discharge points. The Chlorine Process Control Plan is part of the Operation and Maintenance Manual; updates are to be summarized with annual self-monitoring reports.	• **Comply with new effluent limits for residual chlorine, new reporting requirements, and new Chlorine Process Control Plan requirements beginning January 1, 2024.** • BACWA has prepared a guidance document for agencies to use to meet the new chlorine process control requirement.	Blanket NPDES Permit Amendment, Effective January 1, 2024: www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2023/R2-2023-0023.pdf BACWA Guidance on Complying with Amended NPDES Permit Requirements for Residual Chlorine bacwa.org/document/complying-with-amended-npdes-permit-requirements-for-residual-chlorine-2023-12-20/

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PESTICIDES			
• Pesticides are regulated via FIFRA, and not the Clean Water Act. POTWs do not have the authority to regulate pesticide use in their service area, but may be responsible for pesticide impacts to their treatment processes or to surface water. • EPA reviews all registered pesticides at least once every 15 years. Each review allows opportunity for public comment. • Through BAPPG, BACWA aims to proactively support a scientific and regulatory advocacy program so that pesticides will not impact POTWs' primary functions of collecting and treating wastewater, recycling water, and managing biosolids, or impact receiving waters via the "down the drain" route.	• BACWA continues to fund consultant support to write comment letters advocating for the consideration of POTW and surface water issues by EPA and the California Department of Pesticide Registration (CalDPR). Funding for pesticide regulatory outreach in FY24 is $69k. • The Regional Water Board leverages BACWA's efforts to provide their own comment letters. • The August 2023 version of the BAPPG/BACWA Pesticide Watch List added indoor uses of Quaternary Ammonia Compounds, whose usage has been increasing in recent years. • In January 2023, CalDPR released a Sustainable Pest Management Roadmap. The Roadmap identifies actions that would enhance understanding of pesticide use in urban areas and enhance outreach to urban pesticide users. CalDPR is also pursuing a significant increase to the "Mill Fee," a tax on pesticide sales, to fund some activities identified in the Roadmap. The proposed tax increase was included with the Governor's State Budget Proposal for FY25 and would be applicable to all pesticides, including sodium hypochlorite. • Baywise.org has flea and tick control messaging for pet owners and veterinarians. In addition, the BACWA website offers toolkits for conducting outreach to pet owners and veterinary offices.	• **BACWA members can conduct public and veterinary office outreach using the newly available flea and tick outreach toolkits.** • Advocate for implementation of specific actions from the Sustainable Pesticide Management Roadmap. • Continue to comment on EPA pesticide re-registrations and CalDPR actions. • Engage with EPA on proposed changes to the regulatory approval process for pesticides. • Work with veterinary associations on messaging with respect to flea and tick control alternatives. • Continue to develop summaries of EPA actions on pesticides. • Look for opportunities to work with CalDPR on pesticides research. • Work with other regional associations, such as CASQA to collaborate on funding pesticide regulatory outreach.	BACWA Pesticide Regulatory Support Page: bacwa.org/bappg-pesticides/ Flea and Tick Outreach Toolkits: bacwa.org/bappg-pesticides/flea-and-tick-outreach-toolkits/ Baywise flea and tick pages: baywise.org/residential/for_your_pets/ CalDPR Sustainable Pest Management Roadmap www.cdpr.ca.gov/docs/sustainable_pest_management_roadmap/ BACWA coalition letter on modernizing the pesticide approval process bacwa.org/document/bacwa-nacwa-coalition-comments-on-fda-epa-pesticide-modernization-2023-04-25/ BAPPG/BACWA Pesticides Watch List bacwa.org/wp-content/uploads/2023/08/FINAL-BACWA-Pesticides-Watch-List-Aug-2023.pdf

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MERCURY AND PCBS			
• The Mercury & PCBs Watershed Permit is based on Total Maximum Daily Loads (TMDLs) for San Francisco Bay for each of these pollutants. • The Mercury & PCBs Watershed Permit was most recently reissued in December 2022, and it continues to require discharger support for risk reduction activities. BACWA is funding risk reduction activities on behalf of its members to comply with this permit provision. For FY24, BACWA has budgeted $12,500 to support risk reduction activities related to fish consumption. • Aggregate mercury and PCBs loads have been well below waste load allocations through 2022, the last year for which data have been compiled. • EPA Method 1668C for measuring PCB Congeners has not been promulgated by EPA. Effluent limitations are based on PCB Aroclors quantified using EPA Methods 625.1 or 608.3. • In 2017, EPA adopted federal pretreatment program rules requiring dental offices to install dental amalgam separators. The rule is intended to reduce dental office discharge of mercury. The compliance date was July 14, 2020.	• As part of the 2021 Triennial Review of the Basin Plan, the Regional Water Board has prioritized designation of three new beneficial uses: Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB) and Subsistence Fishing (SUB). Water bodies designated with these beneficial uses could also be assigned lower mercury objectives. • BACWA supported risk reduction programming by two grantees to fulfill requirements of the 2017 Mercury & PCBs Watershed Permit. In August 2023, BACWA arranged for the grantees to present their work to Regional and State Water Board staff. • Through 2026, State Water Board and Regional Water Board staff are working on a Bioaccumulation Monitoring Program Realignment effort in the San Francisco Bay region. BACWA intends to support risk reduction activities related to this effort, which may include tribal outreach on fishing and fish consumption. • In January 2022, monitoring requirements for mercury were reduced for most dischargers by a blanket NPDES Permit amendment (Order R2-2021-0028). Revised monitoring frequencies are also reflected in the reissued permit. • Recent consolidations among contract laboratory providers of PCB analysis via EPA Method 1668C has led to difficulties with electronic reporting.	• BACWA Lab and Permits Committee members are working to facilitate smoother electronic reporting of PCB congeners via EPA Method 1668C. • Continue to coordinate with local community-based organizations and Water Boards staff to develop concepts for risk reduction activities that BACWA could support during the term of the 2022 permit. • Continue outreach to dentists BAPPG and BACWA's pretreatment committee. Per federal rules, all dental facilities were required to submit one-time compliance reports by October 2020. • Track potential Basin Plan Amendments resulting from the Triennial Review project related to new beneficial use designations. The new designations are not expected to impact the Bay-wide mercury TMDL in the near term, but there could be localized or longer-term impacts.	2022 Mercury & PCBs Watershed Permit (Effective Feb. 1, 2023) https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2022/R2-2022-0038.pdf Risk Reduction Materials (Updated August 2023) https://bacwa.org/mercurypcb-risk-reduction-materials/ NPDES Permit Amendment for Monitoring and Reporting https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2021/R2-2021-0028.pdf Mercury and PCB Load Trends 2013- 2022 (Updated July 2023) https://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2023/July/6_ssr.pdf

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STATE WATER BOARD TOXICITY PROVISIONS			
• The State Water Board adopted the Statewide Toxicity Provisions in October 2021 as state policy for water quality control for all inland surface waters and estuaries. The Provisions establish: o Use of Test of Significant Toxicity (TST) as statistical method to determine toxicity, replacing EC25/IC25; o Numeric limits for chronic toxicity for POTWs >5 MGD and with a pretreatment program; smaller POTWs will receive effluent targets and only receive limits if Reasonable Potential is established; o Regional Water Board discretion on whether to require RPAs for acute toxicity o For POTWs with *Ceriodaphnia dubia* as most sensitive species, numeric targets rather than limits were in effect until completion of a statewide quality assurance study in December 2023.	• EPA approved the Statewide Toxicity Provisions on May 1, 2023, and they became effective on June 1, 2023. Individual NPDES permits reissued in the San Francisco Bay Region are implementing the Toxicity Provisions and requiring use of the TST for chronic toxicity testing. Reissued permits no longer require acute toxicity monitoring. • EPA has not yet approved the Alternate Test Procedure for whole effluent toxicity testing. Until the Alternate Test Procedures are approved, the Regional Water Board has advised that dischargers should use the full five-concentration series for all tests, including routine monitoring and Species Sensitivity Screening Studies. • Since 2016, agencies have had the option to skip sensitive species screening upon permit reissuance and pay the avoided funds to the RMP to be used for CECs studies. Under the Toxicity Provisions, agencies are now required by the provisions to do sensitive species screening once every 15 years. • The State Water Board is collaborating with stakeholders on a special study to improve the quality of *Ceriodaphnia dubia* testing. The multi-laboratory study of toxicity testing has been completed and presented to the State Water Board. CASA held an information webinar for members in December 2023.	• **Begin conducting toxicity testing using the Statewide Toxicity Provisions.** As of June 2023, member agencies with individual NPDES permits reissued after August 2022 have automatically transitioned to the new toxicity testing requirements. • **Plan to conduct a species sensitivity screening** to comply with the Toxicity Provisions, which require a study no more than 10 years old be used to determine a "Tier I" species for use in compliance monitoring. • Members hiring a contract laboratory to perform testing using *Ceridaphnia dubia* should utilize the *Ceriodaphnia dubia Quality Assurance Guidance Recommendations,* including the performance metrics listed in Appendix E of the report.	SWRCB Toxicity Page: http://www.swrcb.ca.gov/water_issues/programs/state_implementation_policy/tx_ass_cntrl.shtml Regional Water Board presentation on implementation of Statewide Toxicity Provisions from December 2020: https://bacwa.org/wp-content/uploads/2021/01/Slides-from-RWQCB-Regarding-R2-Tox-Language-in-NPDES-Permits-2020-12-08.pdf EPA Approval of Statewide Toxicity Provisions https://bacwa.org/wp-content/uploads/2023/05/05.01.2023-EPA-CWA-303c-Approval-of-California-Toxicity-Provisions.pdf *Ceriodaphnia dubia* Quality Assurance Guidance Recommendations (SCCWRP) https://ftp.sccwrp.org/pub/download/DOCUMENTS/CeriodaphniaQA/October2023Deliverable.pdf CASA Webinar on Lessons from Ceriodaphnia Study https://casaweb.org/resources/speaker-presentations/

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COMPOUNDS OF EMERGING CONCERN (CECS)			
• Pharmaceuticals and other trace compounds of emerging concern (CECs) are ubiquitous in wastewater at low concentrations and have unknown effects on aquatic organisms. • The State Water Board has formed a Pretreatment and CECs Unit. • Region 2's CEC strategy focuses on monitoring/tracking concentrations of constituents with high occurrence and high potential toxicity. Much of what the State Water Board is considering for its monitoring program is already being implemented in Region 2 through the RMP.	• The Regional Water Board has stated that voluntary and representative participation in RMP CECs studies is key to avoiding regulatory mandates for CECs monitoring. These studies are informational and not for compliance purposes. BACWA developed a White Paper on representative participation to support facility selection for these studies. • Bay dischargers are continuing to provide supplemental funding for RMP CECs studies through the NPDES Permit Amendment adopted in December 2021 by the Regional Water Board. • The State Water Board has recently increased its focus on CECs. In November 2022, a State Water Board Science Advisory Panel released a report identifying risk-based and occurrence-based monitoring strategies in aquatic ecosystems. Similar approaches are already in use in the Bay Area by the RMP.	• Continue to participate in the RMP Emerging Contaminants Workgroup. • Participate in RMP studies by collecting wastewater samples at member facilities. Recent studies have focused on Quaternary Ammonium Compounds (which can interfere with treatment plant biological processes), sunscreen chemicals, bisphenols, and ethoxylated surfactants. • Update the 2020 White Paper created for use by the RMP or others in selecting representative POTWs for participation in CEC studies. The 2020 White Paper will be updated to note recently completed and ongoing studies of CECs in Bay Area wastewater.	RMP Emerging Contaminant Workgroup: http://www.sfei.org/rmp/ecwg#tab-1-4 BACWA CECs White Paper: https://bacwa.org/document/bacwa-cec-white-paper-updated-june-2020/ NPDES Permit Amendment for Monitoring and Reporting https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2021/R2-2021-0028.pdf State Water Board CECs webpage: https://www.waterboards.ca.gov/water_issues/programs/cec/index.html

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MICROPLASTICS			
• Microplastic pollution is a environmental threat with the potential to impact wastewater disposal and reuse, as well as biosolids end uses. • Microplastics have been a focus of the RMP in recent years. BACWA has participated in the Workgroup and developed a POTW Fact Sheet. One conclusion of the RMP work is that POTWs contribute much lower microplastic loads than stormwater. As a result, the RMP is focusing future microplastics sampling efforts on stormwater pathways.	• In February 2022, the Ocean Protection Council (OPC) adopted a Statewide Microplastics Strategy that calls for increased water recycling, additional monitoring of wastewater, source control in wastewater, and additional scientific research. • OPC is funding a study of microplastic removal through wastewater treatment processes. The study commenced in 2021 with a pilot study involving BACWA member agency participation. Full-scale sampling and analysis of influent, effluent, and biosolids was completed in 2023. • The Revised Draft 2024 California Integrated Report (303(d) List) notes that San Francisco Bay is "potentially threatened" by microplastics. Due to data limitations, the Bay is not proposed to be listed as an impaired water body during this listing cycle. • Additional research to improve scientific understanding of microplastics in aquatic ecosystems will be needed to support a future impairment determination for the Bay. The Water Boards and OPC are supporting allocation of funding towards these research efforts. • Ongoing microplastics investigations by the RMP are focused on tire particles in stormwater.	• Continue to participate in the RMP Microplastics Workgroup. • Three BACWA member agencies are participating in the OPC-funded microplastic study. A final report is expected in spring 2024. CASA has also funded the study team at the Southern California Coastal Water Research Project (SCCWRP) to complete add-on work comparing results between different sampling methods, including use of an autosampler. The add-work will be completed approximately six months later. • Continue tracking State Water Board and Ocean Protection Council actions via the CASA Microplastics Workgroup.	BACWA Microplastics Fact Sheet: https://bacwa.org/wp-content/uploads/2019/09/BACWA-Microplastics-flyer.pdf SFEI Microplastics project: https://www.sfei.org/projects/microplastics Ocean Protection Council Microplastics Strategy: https://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20220223/Item_6_Exhibit_A_Statewide_Microplastics_Strategy.pdf 2024 California Integrated Report / 303(d) List https://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/2024-integrated-report.html

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PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)			
• Per- and polyfluoroalkyl substances (PFAS) are a group of human-made substances that are very resistant to heat, water, and oil. PFAS have been used in surface coating and protectant formulations. Common PFAS-containing products are non-stick cookware, cardboard/paper food packaging, water-resistant clothing, carpets, and fire-fighting foam. • Perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two types of PFAS no longer manufactured in the US; however, other types of PFAS are still produced and used in the US. • All PFAS are persistent in the environment, can accumulate within the human body, and have demonstrated toxicity at relatively low concentrations. • Potential regulatory efforts to address PFAS focus on drinking water in order to minimize human ingestion of these chemicals, although regulators have also expressed concern about uptake into food from biosolids. • In 2020, the SWRCB issued an investigative order for POTWs. At that time, BACWA obtained SWRCB approval to fund and conduct a Regional PFAS Study in lieu of the investigative order. • In 2021, the formation of an "EPA Council on PFAS" was announced.	• The EPA and State of California are developing drinking water standards for PFAS compounds. o DDW has developed drinking water notification and response levels for PFOA, PFOS, Perfluorobutane Sulfonic Acid (PFBS), and Perfluorohexane Sulfonic Acid (PFHxS). o EPA has released final health advisories for PFOA (0.004 ng/L) and PFOS (0.02 ng/L). o In 2023, EPA proposed Maximum Contaminant Levels for PFOA and PFOS as individual contaminants, and PFHxS, PFNA, PFBS, and HFPO-DA (commonly referred to as GenX Chemicals) as a PFAS mixture. By design, these MCLs are very close to the current limits of quantification. • EPA is conducting pretreatment standards rulemaking for three types of industrial users: Metal Finishing, Organic Chemicals, Plastics and Synthetic Fibers, and landfills. • In 2022, EPA proposed a rule designating PFOA and PFOS as hazardous substances under CERCLA (the Superfund law). The designation could impact effluent disposal and biosolids programs. • In January 2024, EPA completed development of Method 1633, a new analytical method for PFAS in complex matrices like wastewater. Method 1633 is a Clean Water Act method and is recommended for use in pretreatment programs and NPDES permitting.	• BACWA's Regional PFAS Study was conducted by SFEI in two phases: o In Phase 1 (2020), fourteen facilities collected samples of influent, effluent, reverse osmosis concentrate, and biosolids. o In Phase 2 (2022), six agencies conducted sampling of influent, effluent, and biosolids; residential sewersheds, commercial and industrial users; hauled organic waste used as digester feed; and groundwater. o The study found that residential areas and industrial laundries are potential sources of PFAS. o The final report is now complete, and is available upon request. BACWA has also prepared a PFAS Study Summary for members' use. • Continue tracking developments at the federal, state and regional level, in particular to understand the impact of the CERCLA designation on biosolids reporting. • Continue to support PFAS source control efforts by participating in monitoring studies, and by supporting regulatory and legislative efforts to limit the use of PFAS.	BACWA PFAS Study Summary bacwa.org/wp-content/uploads/2024/02/BACWA-PFAS-Study-Summary-2024-02-07.pdf SWRCB PFAS Resources: www.waterboards.ca.gov/pfas/ EPA PFAS Resources www.epa.gov/pfas EPA PFAS Strategic Roadmap www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024 EPA NPDES Permitting Guidance (Dec. 2022) www.epa.gov/system/files/documents/2022-12/NPDES_PFAS_State%20Memo_December_2022.pdf Presentation on BACWA's Regional PFAS Study at RMP 2023 Annual Meeting www.sfei.org/projects/rmp-annual-meeting EPA Methods for PFAS www.epa.gov/cwa-methods/cwa-analytical-methods-and-polyfluorinated-alkyl-substances-pfas CA Labs Certified for Method 1633 www.waterboards.ca.gov/pfas/docs/pfas-laboratories.pdf

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SANITARY SEWER SYSTEMS GENERAL ORDER			
• In 2022, the State Water Board reissued the statewide Sanitary Sewer Systems General Order (SSS-WDR). The reissued order replaced the 2006 Order and the 2013 Monitoring and Reporting Program. • The State Water Board's goals for the update were: o Updating the 2006 Order o Clarifying compliance expectations and enhancing enforceability o Addressing system resiliency, including climate change impacts o Identifying valuable data and eliminating non-valuable reporting requirements	• The reissued order became effective on June 5, 2023. • The first annual reports due under the reissued order are due April 1, 2024. • The reissued SSS-WDR contains numerous new and modified requirements, such as: o A prohibition on discharges to groundwater; o Reduced spill reporting requirements for small spills (spills from laterals or <50 gallons); o New spill monitoring requirements such as photo documentation and faster water quality sampling; o New requirements for preparation of Sewer System Management Plans (SSMPs), including a focus on system resiliency, prioritizing corrective actions, and coordinating with stormwater agencies; o Modified annual reporting requirements; o New mapping requirements; and o Modified timelines for preparation of audits and SSMPs. The State Water Board has prepared an online tool to assist agencies in determining compliance dates (at right). • Maintaining an updated SSMP continues to be a core requirement of the SSS-WDR. Beginning in May 2025, SSMP updates will be required every six years (instead of five) and must contain the 11 updated elements described in the reissued SSS-WDR.	• Continuing working through the Collections System Committee to update a guidance document for Sewer System Management Plans (SSMPs). BACWA has hired a consultant to assist with this task, and work is underway. • Complete a member survey of sewer lateral ordinances in the region. Prompted by changes to the reissued SSS-WDR and ongoing concerns about infiltration and inflow (I&I), some agencies are considering changes to their practices regarding sewer lateral maintenance and replacement. • Continue to coordinate with CASA and CWEA on training opportunities for members as they transition to enrollment under the new SSS-WDR.	State Water Board SSS-WDR page: https://www.waterboards.ca.gov/water_issues/programs/sso/ Reissued SSS-WDR (General Order 2022-0103-DWQ), Effective June 5, 2023 https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2022/wqo_2022-0103-dwq.pdf Materials from Clean Water Summit Partners Webinars on Reissued SSS-WDR https://casaweb.org/sss-wdr/ SSMP and Audit Due Dates Lookup Tool from State Water Board https://www.waterboards.ca.gov/water_issues/programs/sso/lookup/

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LABORATORY ACCREDITATION			
• In May 2020, the State Water Board adopted new comprehensive regulations for the Environmental Laboratory Accreditation Program. • Adoption of the new regulations was required by AB 1438, legislation that became effective in 2018. • The new ELAP regulations are replacing the current state-specific accreditation standards with a national laboratory standard established by The NELAC Institute (TNI). • Compliance with TNI standards was required beginning **January 1, 2024**.	• The TNI standards apply to every ELAP-certified laboratory, regardless of certificate expiration date and regardless of location. Some laboratories have not yet been assessed to the TNI standard. Starting January 1, 2024, ELAP will be sending laboratories a written request asking for information about assessment plans and requesting a TNI-compliant Quality Assurance manual. • The TNI standards pose a particular challenge to small laboratories, many of which are closing because they cannot economically meet the new standards. ELAP has reported a 15% reduction in the number of accredited laboratories in California since 2020, and a 25% reduction since 2015. This reduction is contributing to significantly higher ELAP fees for the remaining laboratories. ELAP fees increased by 30% in FY24. ELAP is investigating fee structure options that would reduce impacts on small laboratories. Fee restructuring will not occur until FY25 or later. • ELAP is now implementing EPA's 2021 Method Update Rule. ELAP has advised labs to update any outdated methods by February 2024. • Since 2021, the BACWA Lab Committee has been hosting training sessions on the TNI standards.	• The BACWA Lab Committee will host Q&A sessions on the TNI standards in February, April, and June 2024. The free virtual training sessions are open to BACWA members holding a valid copy of the 2016 TNI Standard. Diane Lawver of Quality Assurance Solutions, LLC, is providing the training. BACWA's TNI training sessions are recorded, and a link is available upon request. • Continue to work through BACWA's Laboratory Committee to support members as they navigate laboratory accreditation under the new TNI standards. • Publicize training opportunities offered by consultants, ELAP, and others.	State Water Board's 'Roadmap to ELAP Accreditation' page: https://www.waterboards.ca.gov/drinking_water/certlic/labs/roadmap_to_elap_accreditation.html State Water Board's ELAP regulations page: http://www.waterboards.ca.gov/drinking_water/certlic/labs/elap_regulations.shtml BACWA Training Session flyer: https://bacwa.org/wp-content/uploads/2023/06/BACWA-Lab-TNI-Training-Series-Flyer-FY24.pdf ELAP Timeline Guidance Tool: https://www.waterboards.ca.gov/drinking_water/certlic/labs/docs/2022/elap-scheduler-1-1.xlsx ELAP Implementation of 2021 Method Update Rule https://www.waterboards.ca.gov/drinking_water/certlic/labs/mur.html

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
BIOSOLIDS			
• Regulatory drivers are leading to the phase-out of biosolids used as alternative daily cover (ADC) or disposed in landfills. SB 1383, adopted in September 2016 requires organics diversion: -50% by 2020 (relative to 2014) -75% by 2025 (relative to 2014) CalRecycle is the state agency responsible for implementation. • Regulations implementing SB 1383 went into effect in 2022. Jurisdictions can begin local enforcement January 1, 2024, and compliance is required by January 1, 2025. Requirements include: o Diverted biosolids must be anaerobically digested and/or composted to qualify as landfill reduction. o CalRecycle is accepting applications to qualify other specific treatment technologies as landfill reduction (per Article 2 of SB 1383). o Local ordinances restricting land application are disallowed. • While the regulations implementing SB 1383 do not explicitly forbid biosolids disposal/reuse in landfills, it is assumed that since biosolids are a relatively "clean" waste stream that can be easily diverted, landfills will stop accepting biosolids. • The Bay Area Biosolids Coalition (BABC) was formed to find sustainable, cost-effective, all-weather options for biosolids management. BABC is a BACWA Project of Special Benefit.	• Jurisdictions that divert organic waste must also procure the end products of diversion, such as biogas, biomethane, and compost (but not biosolids). Procurement rules are being phased in over three years (2023 to 2025) and there are interim rules regarding procurement of biogas from POTWs. • In December 2023, Sutter County revised its ordinance to allow land application of Class A biosolids, reversing its previous ban. The change was made to conform to SB 1383. CalRecycle and biosolids stakeholders continue to conduct outreach to counties with restrictive ordinances. • CalRecycle reviewed the first application under Article 2 (“H Cycle”), and determined it conditionally qualifies as equivalent to landfill diversion/ reduction. CalRecycle plans to provide additional clarification on technologies that *already* comply with SB 1383, and need not apply under Article 2 (e.g., land application of biosolids that have not been anaerobically digested). • AB 1857, signed in 2022, removes a diversion credit for municipal solid waste incinerators. CalRecycle will soon prepare draft regulations implementing the law, which could apply to biosolids treated via pyrolysis. • New York and Michigan are imposing restrictions on land application of biosolids with levels of PFAS >20 ppb for PFOA or PFOS. Based on the recently completed regional study of PFAS, few BACWA members are likely to exceed those thresholds for land-applied biosolids.	• BACWA’s next Biosolids Trends Survey Report will be completed in 2024 and will cover 2021-2023. It will replace the most recent (2021) version, which covers 2018-2020. • Continue to follow emerging science and regulatory developments regarding PFAS in biosolids (see page 9). • Engage through CASA and BABC to follow development of regulations implementing AB 1857, with the goal of avoiding limits on POTWs using pyrolysis for organic waste management. • Actively work through CASA with California Air Resource Board, CalRecycle, State Water Board, and California Department of Food and Agriculture to develop sustainable long-term options for biosolids beneficial use. • Meet with BAAQMD regularly in 2024 to discuss alignment of state and local regulations.	BACWA 2021 Biosolids Trends Survey Report: https://bacwa.org/wp-content/uploads/2021/12/BACWA-2021-Biosolids-Trends-Survey-Report.pdf BABC website: http://www.bayareabiosolids.com/ CASA White Paper on SB 1383 Implementation: https://bacwa.org/document/summary-of-sb-1383-and-its-implementation-casa-2020/ CalRecycle - Short-Lived Climate Pollutant Reduction Strategy https://www.calrecycle.ca.gov/organics/slcp CalRecycle Procurement FAQ (Updated by AB 1985) https://calrecycle.ca.gov/organics/slcp/faq/recycledproducts/ SB1383 Article 2 Determination https://calrecycle.ca.gov/organics/slcp/recyclingfacilities/article2/ SB 1383 Procurement FAQ (including interim rules for POTWs) https://calrecycle.ca.gov/organics/slcp/faq/recycledproducts/

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CLIMATE CHANGE MITIGATION			
• CARB's Climate Change Scoping Plan Update lays out the approach for the State to meet its greenhouse gas (GHG) emissions reduction targets through 2030. The latest Scoping Plan was updated in 2022 targeting carbon neutrality by 2045, including policies addressing: o Short-lived climate pollutants o Carbon sequestration on Natural and Working Lands o Largest emitters (transportation, electricity, and industrial sectors) • SB 1383 (Short-Lived Climate Pollutant Reduction) calls for: o 40% methane reduction by 2030 o 75% diversion of organic waste from landfills by January 1, 2025 o Policy / regulatory development encouraging production/use of biogas • BAAQMD developed a Clean Air Plan requiring GHG emissions supporting CARB's 2050 target (80% below 1990 levels). • BAAQMD proposed the development of Regulation 13 (climate pollutants) targeting methane and nitrous oxide reductions related to organics diversion and management. After a pause of several years, BAAQMD may revisit Regulation 13 in 2024. • CARB states POTWs are part of the solution for reducing fugitive methane and encourages diversion of organics to POTWs to use available digester capacity and produce biogas.	• CARB is pursuing rapid fleet conversion to zero-emission vehicles (ZEVs), including medium and heavy-duty vehicles, through the Advanced Clean Fleet rule. The Advanced Clean Fleet rule allows organization to opt into one of two programs, with exceptions: o **Public Fleets (default):** Requires 50% of vehicles added to be ZEV by 2024, and 100% by 2027. o **High Priority Fleet** (**Group 3**): With exceptions, requiring 10% of vehicles added to be ZEV by 2030 and 100% by 2042. • Complete conversion will be difficult for heavy-duty specialty trucks and will remove a potential market for biogas. CASA has requested to continue allowance of biogas as a sustainable transportation fuel. • In addition to pushing for ZEVs, CARB is proposing changes to the Low Carbon Fuel Standard with increasing emphasis on hydrogen as a transportation fuel. Conversion of biogas into hydrogen remains to be demonstrated. • In 2022, the CPUC mandated that CA's four largest gas utilities (including PG&E) procure biomethane. PG&E has an active biomethane procurement program, with more solicitations expected in 2024. • In 2023, EPA finalized updates to its Renewable Fuel Standard Set Rule allowing apportionment of renewable identification numbers (RINs) or "Credits for food-waste-based (D5) or sludge-based (D3) biogas.	• Review and comment on the draft Low Carbon Fuel Standards, which reduces the viability of biomethane use as CNG in vehicles. Comments are due February 20th, and a public hearing will be held March 21st. • Track implementation of the Advanced Clean Fleet Regulations, which CARB is discussing with a newly formed Truck Regulation Implementation Group w/ supporting subgroups. • Follow the fate of proposed legislation (AB 1594) that could exempt some public utility specialty vehicles from the Advanced Clean Fleet Regulations as part of the TRIG discussions. Can only be integrated into the ACF with amendments to the ACF in 2025. • Closely follow rule development of Proposed Regulation 13 (climate pollutants), which BAAQMD may revisit in 2024. • Look for ways to inform BAAQMD on opportunities and challenges related to climate change mitigation by Bay Area POTWs, including education about anaerobic digesters and POTW operations. • Work with PG&E and BAAQMD to explore options for POTWs to inject biogas into PG&E pipelines.	Climate Change Scoping Plan, including 2022 Update: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan CARB Low Carbon Fuel Standard: https://ww2.arb.ca.gov/our-work/programs/low-carbon-fuel-standard CARB Advanced Clean Fleet Rule: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-fleets SB 1383: https://www.calrecycle.ca.gov/organics/slcp BAAQMD Regulation 13 http://www.baaqmd.gov/rules-and-compliance/rules/regulation-13-climate-pollutants EPA Renewable Fuel Standards https://www.epa.gov/renewable-fuel-standard-program/final-renewable-fuels-standards-rule-2023-2024-and-2025 PG&E Procurement http://www.pge.com/rngrfo, & https://casaweb.org/wp-content/uploads/2023/11/PGE-at-CASA-Webinar.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CLIMATE CHANGE ADAPTATION			
• Climate change and water resilience are a strategic priority of both the State Water Board and Regional Water Board. • In April 2019, Governor Newsom signed Executive Order N-10-19 directing State Agencies to recommend a suite of priorities and actions to build a climate-resilient water system and ensure healthy waterways through the 21st century. • Bay Area coordination occurs through Bay Adapt, the Bay Area Climate Adaptation Network (BayCAN), and other venues. BACWA has signed a letter of support for the Bay Adapt Joint Platform. • In April 2022, the State released a Climate Adaptation Strategy, including an updated climate change assessment for the Bay Area region. • The California Coastal Commission's November 2021 *Sea Level Rise Planning Guidance* recommends that agencies "understand and plan" for 2.7 feet of sea level rise (SLR) by 2050. • The Regional Water Board is modifying the Basin Plan to address climate change and wetland policy. The changes will occur through multiple Basin Plan amendments.	• In 2022, the Regional Water Board adopted a Climate Change Basin Plan amendment addressing dredge and fill procedures near the region's shorelines, especially for climate adaptation projects. • Separately from the Basin Plan amendment, the NDPES division has released information regarding permitting of nature-based solutions. • Shallow groundwater response to SLR is a concern in low-lying Bay Area communities. Information about current and future depth-to-groundwater maps is summarized in a January 2023 report now available from Pathways Climate Institute and SFEI. • The Bay Conservation and Development Commission (BCDC) is developing regional SLR adaptation planning guidelines for the Bay Area as part of the Regional Shoreline Adaptation Plan. The guidelines must be adopted by Dec 31, 2024, to comply with SB 272, signed by the Governor in Oct. 2023. SB 272 requires cities and counties to develop regional sea level rise adaptation plans by 2034. • The Ocean Protection Council (OPC) has issued a draft 2024 SLR guidance update reflecting the latest projections. Previous projections for extreme SLR (i.e., H++ scenario) have been removed, and the range of projections has narrowed considerably, especially for 2050. Updates to the Coastal Commission's "Critical Infrastructure at Risk" SLR planning guidance are expected to follow.	• **Review and understand the updated projections in the OPC's 2024 Draft SLR Guidance document.** OPC will hold informational webinars in February, and comments are due March 4th. • **Identify contact(s) at each agency to join BACWA's Climate Change Community of Practice.** BACWA plans to host a webinar series in 2024 on technical topics related to climate change, such as sea level rise projections and changes in precipitation. The Climate Change Community of Practice will provide a forum to discuss these topics. • Engage with BCDC during the agency's development of Regional Shoreline Adaptation Plan guidance, which will likely impact most BACWA member agencies. BACWA is participating in an advisory group for the Regional Shoreline Adaptation Plan. • Prepare for engagement with the Regional Water Board on expectations for SLR planning. • Continue to work with Regional Water Board and other resource agencies to look for regulatory solutions to encourage wetlands projects for shoreline resiliency.	OPC 2024 Draft Sea Level Rise Guidance https://opc.ca.gov/2024/01/draft-slr-guidance-2024/ California Coastal Commission's *Critical Infrastructure at Risk* https://documents.coastal.ca.gov/assets/slr/SLR%20Guidance_Critical%20Infrastructure_12.6.2021.pdf California Climate Adaptation Strategy https://climateresilience.ca.gov BayCAN Funding Tracker https://www.baycanadapt.org/ Bay Adapt Joint Platform (includes Regional Shoreline Adaptation Planning info) https://www.bayadapt.org/ NPDES Permitting for Nature-Based Solutions https://bacwa.org/wp-content/uploads/2022/08/NPDES-Permitting-for-Nature-Based-Solutions-5.pdf 2023 Report on Shallow Groundwater Response https://www.sfei.org/projects/shallow-groundwater-response-sea-level-rise

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
TOXIC AIR CONTAMINANTS			
• Regulation 11, Rule 18 (Rule 11-18), adopted in 2017, is BAAQMD's local effort to protect public health from toxic air pollution from existing facilities, including POTWs. • Per the Rule, BAAQMD will conduct site-specific Health Risk Screening Analyses and determine each facility's prioritization score (PS). BAAQMD will conduct Health Risk Assessments (HRAs) for all facilities with a cancer PS>10 or non-cancer PS>1.0. After verifying the model inputs, if the facility still has PS above that threshold, that facility would need to develop and implement a Risk Reduction Plan that may include employing Best Available Retrofit Control Technology for Toxics (TBARCT). • AB 617 (Community Air Protection Program) – requires CARB to harmonize community air monitoring, reporting, & local emissions reduction programs for air toxics and GHGs). POTWs within communities already impacted by air pollution may have to accelerate implementation of risk reduction measures. • AB 2588 (Air Toxics "Hot Spots" Program) - Establishes a statewide program for the inventory of air toxics emissions from individual facilities, as well as requirements for risk assessment and public notification of potential health risks. 2020 updates expanded compound list from >500 to >1,700.	• In December 2023, BAAQMD released Regulatory Concepts for Amendments to Rule 11-18. The amendments outline procedures for HRAs, among other program details. Updated prioritization scores were also released. • In the *Final Statement of Reasons* for rulemaking on AB 617 and AB 2588, CARB provided the wastewater sector time to develop a short-list of relevant compounds and perform a pooled emissions estimating effort to update outdated default emission factors (through 2028). • In 2021, BAAQMD amended Rule 2-5 to reduce allowable levels of toxic air contaminants in new source permitting. In 2022, BAAQMD and BACWA convened a working group to address concerns related to toxic air contaminants and rule-making, which is meeting quarterly. BACWA is coordinating with BAAQMD about implementation of the two-step process and its timing relative to BAAQMD Rule 11-18 and 2-5. • In July 2023, the EPA announced a proposal to revise its Air Emissions Reporting Requirements (AERR). CARB has applied to submit information on behalf of California facilities.	• **Review and Comment on the Regulatory Concepts for Amendments to Rule 11-18.** A public workshop will be held February 15th, and comments are due February 29th. • Continue participating in the BAAQMD workgroup to discuss toxic air contaminants, rule development, and related air quality regulatory issues. • **Report "business as usual" for air toxics through 2028 (through year 2027 data).** CARB is preparing a message to Air Districts confirming POTWs can delay reporting new compounds until the two-step process is complete. The wastewater sector has until 2028 to perform a statewide "two-step process" to determine a shortlist of compounds relevant to the wastewater sector to report. • **For budget planning purposes, BACWA members with permitted capacity ≥ 5 MGD should expect the study to cost approximately $3,700 per MGD of actual average annual daily flow (<u>not</u> permitted dry weather flow).** Study costs will be refined and spread over four years. BACWA will assist CASA in collecting funds from participants who are also BACWA's members.	BAAQMD Facility Risk Reduction Program Updates (Rule 11-18): https://www.baaqmd.gov/community-health/facility-risk-reduction-program BAAQMD Rule 2-5 https://www.baaqmd.gov/rules-and-compliance/rules/reg-2-permits?rule_version=2021%20Amendments CARB page on AB 617 and AB 2588: https://ww2.arb.ca.gov/our-work/programs/criteria-and-toxics-reporting *Final Statement of Reasons* https://ww3.arb.ca.gov/board/15day/ctr/fsor.pdf Timing of Rule 11-18 vs. Process for AB 617 https://bacwa.org/document/baaqmd-rule-11-18-vs-carb-two-step-process-for-ab-617-feb-2023/ EPA Air Emissions Reporting Requirements https://www.epa.gov/air-emissions-inventories/air-emissions-reporting-requirements-aerr

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
RECYCLED WATER			
• Approximately 10 percent of the municipal wastewater of Region 2 POTWs is currently recycled. Expansion of recycled water projects is a goal of many BACWA members, but implementation is slowed by high costs and administrative requirements. • In 2018, the State Water Board adopted uniform water recycling criteria for two types of Indirect Potable Reuse: surface water augmentation and groundwater augmentation. • In December 2023, the State Water Board adopted uniform water recycling criteria for two types of Direct Potable Reuse: raw water augmentation and treated water augmentation. • As of 2020, virtually all recycled water in Region 2 was produced at centralized facilities using municipal wastewater, and was treated to meet standards for non-potable reuse. There are not yet any Indirect or Direct Potable Reuse projects in Region 2, although several are in the planning stage.	• The State Water Board is currently developing standards for onsite treatment and reuse of non-potable water in multi-family, mixed use, and commercial buildings. The rulemaking process for onsite non-potable reuse is slated to begin by Spring 2024 with a projected Board adoption in Fall 2024. • In June 2023, BACWA completed a Regional Evaluation of Potential Nutrient Discharge Reduction by Water Recycling, as required by the 2nd Nutrient Watershed Permit. • The State Water Board has launched a "Strike Team" to assess how California will meet new recycled water goals listed in California's Water Supply Strategy: 800,000 acre-feet per year of recycled water by 2030 and 1.8 million acre-feet per year by 2040. The Strike Team will also document challenges to meeting these goals, such as funding. • In December 2023, the Regional Water Board approved a Basin Plan Amendment that will allow greater flexibility for NPDES permitting of reverse osmosis concentrate discharges to San Francisco Bay. The Basin Plan Amendment must be approved by the State and USEPA before it is goes into effect.	• Review draft regulations for Onsite Non-Potable Reuse when they are released by State Water Board staff, which is expected as soon as spring 2024. • Build on successes of the September 2023 workshop on interagency collaboration. Wastewater and water agency representatives convened to discuss challenges and opportunities for expanding water recycling in the Bay Area. • Continue to track the role of recycled water projects in diverting nutrient loads from San Francisco Bay. Load reductions are expected to be a requirement of the 2024 Nutrient Watershed Permit (see page 2). • Track California legislation with potential impacts on recycled water funding, mandates, or regulations.	Water Boards Recycled Water Policy and Regulations www.waterboards.ca.gov/water_issues/programs/recycled_water/ Direct Potable Reuse Regulations www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/dpr-regs.html Onsite Nonpotable Reuse Regulations www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/onsite_nonpotable_reuse_regulations.html BACWA Special Studies of Recycled Water and Nature-Based Systems: bacwa.org/document-category/2nd-watershed-permit-studies/ California's Water Supply Strategy (August 2022) Resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Water-Resilience/CA-Water-Supply-Strategy.pdf December 2023 Basin Plan Amendment www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/amendments/NPDES_corrections.html

Previously covered issues with no updates can be found in previous BACWA issues summaries.

ACRONYMS

ADC	Alternate Daily Cover
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BCDC	Bay Conservation and Development Commission
BTU/SCF	British thermal units per standard cubic foot
CalDPR	California Department of Pesticide Registration
CARB	California Air Resources Board
CASA	California Association of Sanitation Agencies
CAP	Criteria Air Pollutant
CEC	Compound of Emerging Concern
CIWQS	California Integrated Water Quality System
CVCWA	Central Valley Clean Water Agencies
CWEA	California Water Environment Association
DDW	Division of Drinking Water, State Water Resources Control Board
EC25/IC25	25% Effect Concentration/25% Inhibition Concentration
ELAP	Environmental Laboratory Accreditation Program
ELTAC	Environmental Laboratory Technical Advisory Committee
EPA	United States Environmental Protection Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FY	Fiscal Year
GHG	Greenhouse Gas
MCL	Minimum Contaminant Level (Drinking Water)
MGD	Million Gallons per Day
NACWA	National Association of Clean Water Agencies
NELAC	National Environmental Laboratory Accreditation Conference
NMS	Nutrient Management Strategy
OEHHA	Office of Environmental Health Hazard Assessment
OPC	Ocean Protection Council
PCB	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
POTW	Publicly Owned Treatment Works
PS	Prioritization Score
RMP	Regional Monitoring Program
RPA	Reasonable Potential Analysis
SCAP	Southern California Alliance of POTWs
SF Bay	San Francisco Bay
SFEI	San Francisco Estuary Institute
SLR	Sea Level Rise
SSMP	Sewer System Management Plan
TMDL	Total Maximum Daily Load
TIN	Total Inorganic Nitrogen
TNI	The NELAC Institute
TST	Test of Significant Toxicity
WQO	Water Quality Objective
ZEV	Zero-Emission Vehicle

DRAFT
EPA REGION 9 SAN FRANCISCO BAY PROGRAM OFFICE
FY24 ANNUAL PRIORITY LIST

- In December of 2022, the Fiscal Year 2023 National Defense Authorization Act (NDAA) was signed into law and authorized the establishment of San Francisco Bay Program Office, specifically with this language:

(1) Establishment

The Administrator shall establish in the Environmental Protection Agency a San Francisco Bay Program Office. The Office shall be located at the headquarters of Region 9 of the Environmental Protection Agency.

- The authorizing language in the NDAA set out certain expectations for the Program Office including an annual priority list to direct funding towards:

The annual priority list shall include the following:

(A) Projects, activities, and studies, including restoration projects and habitat improvement for fish, waterfowl, and wildlife, that advance the goals and objectives of the San Francisco Bay Plan, for-

(i) water quality improvement, including the reduction of marine litter;
(ii) wetland, riverine, and estuary restoration and protection;
(iii) nearshore and endangered species recovery; and
(iv) adaptation to climate change.

And consult with and consider the recommendations of-

(A) the Estuary Partnership;
(B) the State of California and affected local governments in the San Francisco Bay estuary watershed;
(C) the San Francisco Bay Restoration Authority; and
(D) other relevant stakeholder involved with the protection and restoration of the San Francisco Bay estuary.

- EPA has developed this list to reflect mutual priorities identified in the CCMP, the Water Board's Basin Plan, the Restoration Authority's stated objectives, and Implementation Plan of the San Francisco Bay Joint Venture.

Priority Projects, Activities and Studies Needed to Restore San Francisco Bay and Build Its Climate Resilience

Project/Activity/Study	**Link to CCMP**
Wetlands Regional Monitoring Program	Action 8: Implementing a Wetlands Regional Monitoring Program Action 10: Protect, restore, and enhance tidal marsh habitat
Beneficial Reuse of Dredged Material Support	Action 6: Manage sediment and soil on a regional scale and advance beneficial use.
Nutrient Management Strategy	Action 20: Advance nutrient management in the Estuary.
Subtidal habitat, eelgrass and oyster reef restoration	Action 4: Implement climate adaptation projects that prioritize natural and nature-based strategies. Action 9: Protect, restore, and enhance intertidal and subtidal habitats.
BRRIT	Action 3: Overcome challenges to accelerate implementation of climate adaptation projects that prioritize natural and nature-based strategies.

	Action 9: Protect, restore, and enhance intertidal and subtidal habitats.
Large scale tidal wetlands restoration	Action 4: Implement climate adaptation projects that prioritize natural and nature-based strategies. Action 7: Decrease carbon emissions and subsidence in the Delta and increase carbon sequestration on natural and agricultural lands. Action 12: Maximize habitat benefits of managed ponds and other non-tidal wetlands and waters.
In-Bay Monitoring of Pollutants, including trash, and Algal Species under the Regional Monitoring Program	Action 20: Advance nutrient management in the Estuary. Action 21: Address emerging contaminants in the Estuary's waters.
Large scale shoreline resilience, multi-benefit projects	Action 1: Plan for increased climate resilience that incorporates natural resource protection. Action 4: Implement climate adaptation projects that prioritize natural and nature-based strategies.
Large scale implementation of urban green stormwater infrastructure	Action 19: Manage stormwater with low impact development and green stormwater infrastructure. Action 23: Reduce trash and marine debris in the Estuary
Special studies/projects for addressing PFAS in SF Bay	Action 21: Address emerging contaminants in the Estuary’s waters. Action 22: Reduce human health risks due to legacy contaminants and contaminants in fish.
Special studies/projects for addressing PCBs under TMDL implementation plan	Action 22: Reduce human health risks due to legacy contaminants and contaminants in fish.

BACWA BAY AREA CLEAN WATER AGENCIES

FEBRUARY 2024

PFAS STUDY SUMMARY

Bay Area Clean Water Agencies and San Francisco Estuary Institute

Study of PFAS in Bay Area Wastewater

KEY POINTS

PFAS are ubiquitous in numerous everyday products and in the environment.

As long as PFAS continues to be produced and used in consumer products, PFAS will be present in wastewater influent, effluent, and biosolids.

WHAT MAKES THIS STUDY UNIQUE?

This study quantified PFAS in wastewater using a comprehensive lab method called the Total Oxidizable Precursors (TOP) assay. This method quantifies more of the PFAS than other typical lab methods, which means this study was able to better track PFAS through the treatment process. Sampling of residential areas was another unique study feature.

WHERE IS THE PFAS IN WASTEWATER COMING FROM?

Residential users appear to be a significant source of PFAS to Bay Area wastewater treatment plants. Among industrial and commercial facilities included in this study, industrial laundries showed the highest concentrations, followed by car washes.

HOW MUCH PFAS IS IN BAY AREA WASTEWATER?

PFAS concentrations in Bay Area wastewater (see Figure 1 on page 3) were similar to levels seen in other communities in California. There are currently no PFAS standards directly applicable to biosolids or San Francisco Bay wastewater discharges. Most biosolids samples were below the "action levels" for land application recently adopted in other states.

What are PFAS?

Per- and polyfluoroalkyl substances (PFAS) are a large group of human-made compounds that are resistant to heat, water, and oil. Common PFAS-containing products include non-stick cookware, cardboard/paper food packaging, water-resistant clothing, carpets, personal care products, and fire-fighting foam. PFAS do not break down in the environment, can accumulate within the human body, and can be toxic at relatively low concentrations.

Publicly Owned Treatment Works (POTWs) receive PFAS from residential, commercial, and industrial customers in their service areas. Some PFAS transform to other PFAS compounds during the treatment process, but are not destroyed. PFAS received in POTW influent ultimately partition into effluent, air, or biosolids depending on the individual compound's chemical characteristics.

BACWA BAY AREA CLEAN WATER AGENCIES

FEBRUARY 2024

PFAS STUDY SUMMARY

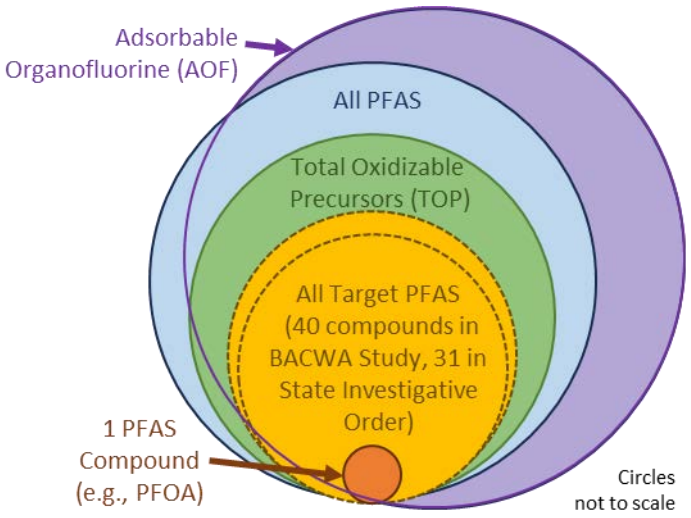
Why did BACWA Complete this Study?

In 2019, the State Water Board started requiring testing of drinking water systems and other high-risk locations for PFAS such as landfills, airports, industrial chrome-platers, refineries & bulk terminals, and POTWs[a]. The Bay Area Clean Water Agencies (BACWA) worked with State and Regional Water Board staff to respond to the need for testing at POTWs. BACWA worked with scientists at San Francisco Estuary Institute (SFEI) to design and complete a two-phase study[b,c]:

- **Phase 1** (Fall 2020). Fourteen representative facilities collected influent, effluent, and biosolids samples to test for PFAS. Facilities were selected based on their size, location, level of industry in their service area, treatment technology, and whether they had participated in previous SFEI PFAS studies, so that trends in individual PFAS compounds could be tracked over time. The final report for Phase 1 was released in October 2021[d].

- **Phase 2** (Mid-2022). Seven facilities collected influent and effluent samples, and five of the seven also collected biosolids samples for PFAS analysis. Samples were also collected upstream of POTWs in residential areas and at select industrial and commercial facilities. Industrial facilities were selected that had not already been included in the State Water Board's investigative orders. Phase 2 was completed by larger agencies that volunteered to participate. Results from Phase 2 were shared at the Regional Monitoring Program Annual Meeting in October 2023[e], and the final report for Phase 2 was completed in December 2023. The report is available from BACWA staff upon request.

While the State Water Board required wastewater samples (influent, effluent, biosolids) to be measured for a specified 31 individual PFAS analytes, the BACWA-SFEI study went beyond this list and used a target method that included 40 individual analytes. Additionally, this study included another method called the Total Oxidizable Precursors (TOP) assay. The TOP assay involves oxidizing the sample to convert PFAS to terminal transformation products, then analyzed with the Target method. The total PFAS quantified with the TOP method includes not only the 40 analytes in the Target method, but additionally includes PFAS precursors that can transform to those 40 analytes. The advantage of the TOP analysis is that it gives a better estimate of all PFAS in a sample, and not just the 40 individual analytes included in the analytical method (see conceptual schematic at left). Both the target and TOP assay quantified PFAS using USEPA Method 1633. Phase 2 also included analysis of Adsorbable Organofluorine (AOF) via USEPA Draft Method 1621.



What did the Study Find?

KEY FINDING

In Phase 2, TOP analysis was completed for influent, effluent, and biosolids from 5 facilities.

On average, about half of the mass of total quantified PFAS contained in POTW influent was partitioned to biosolids.

Phase 1 of the study demonstrated that sampling a representative selection of POTWs (rather than all POTWs) was an appropriate strategy for characterizing PFAS. PFAS levels were similar across the 14 participating facilities, as summarized in the Phase 1 report[d]. Both phases of this BACWA-SFEI study showed similar results to the State Water Board's Investigative Order[f] for the targeted analysis. This study also showed that the targeted analysis only captures a fraction of total PFAS compounds. In Phase 2 influent samples, for example, the median for sum of PFAS via the TOP method was 5 times greater than the median for sum of PFAS via target analysis, while the ratio was about 2 for effluent.

Phase 2 showed that PFAS in influent is both transformed and partitioned to biosolids before leaving as treated effluent, as shown below in **Figure 1.** This finding may seem self-evident, but the results of the Phase 1 study and the statewide Investigative Order were not conclusive on this point. Based on targeted analysis, the total quantified PFAS concentration is often *higher* in effluent than influent, potentially leading to the false conclusion that PFAS are added or created within treatment plants. As expected, total quantified PFAS based on Phase 2 TOP analysis conclusively showed substantial removal from influent to effluent at each of the seven facilities sampled (*see orange bars for influent and effluent, Figure 1*). AOF data showed a similar trend.

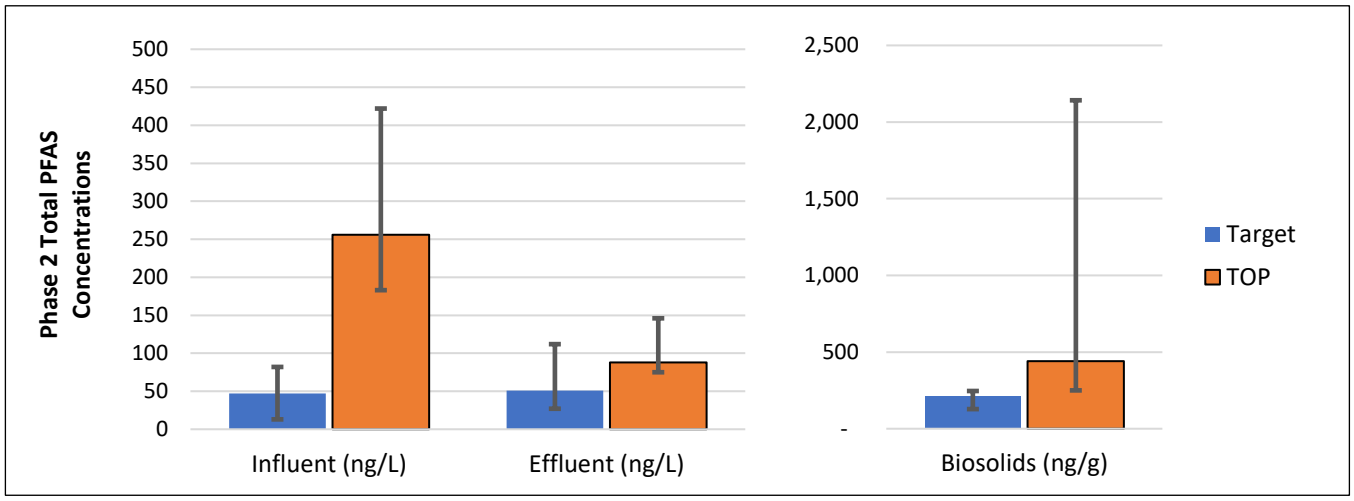


Figure 1. *Phase 2 Total Quantified PFAS based on a sum of targeted analysis of 40 compounds ("Target") and Total Oxidizable Precursors analysis ("TOP"). Note TOP results includes 40 compounds included in Target method, plus PFAS precursors that are converted to one of the 40 Target compounds. Influent and effluent data are in units ng/L and Biosolids are in ng/g (dry weight). The height of each bar chart indicates the median, while the error bars show the minimum and maximum. Phase 1 data are excluded because the TOP analysis was not performed.*

How do PFAS Levels in Bay Area Wastewater Compare to Regulatory Thresholds?

There are currently no water quality criteria for PFAS directly applicable to San Francisco Bay. USEPA has developed draft aquatic life criteria[g], and plans to develop human health criteria based on fish consumption (see side bar). Although surface water quality criteria are still in development, both the State Water Board and USEPA have developed regulatory thresholds for drinking water. Drinking water criteria are not applicable to most Bay Area POTWs, since the Bay is not used as a drinking water supply. They are included here for informational purposes only.

The State Water Board has adopted notification levels of 6.5 ng/L for perfluorooctane sulfonic acid (PFOS), 5.1 ng/L for perfluorooctanoic acid (PFOA), and 3 ng/L for perfluorohexane sulfonic acid (PFHxS)[h]. The USEPA's proposed drinking water Maximum Contaminant Level (MCL) is 4 ng/L for PFOS and PFOA[i]. The proposed MCL for PFHxS is included as part of a unitless "Hazard Index." Effluent concentrations observed from Phase 1 and 2 are compared to these thresholds in **Figure 2**. Although production of both PFOS and PFOA has been phased out in the United States, these compounds were detected in all but one of the study's effluent samples. Some PFOS and PFOA may come from the transformation of other PFAS compounds. Typical concentrations were near or above the proposed federal MCLs.

PFAS IN THE BAY

Through the Regional Monitoring Program, SFEI scientists are monitoring PFAS in San Francisco Bay water, sediment, and sport fish. PFOS is the predominant compound in sport fish, and fish caught in the South Bay have the highest concentrations. Stormwater and wastewater are both possible sources of PFAS in sport fish.

As part of its PFAS Strategic Roadmap, USEPA is planning to publish water quality criteria based on fish consumption in Fall 2024. In the future, the levels of PFAS in sport fish may cause San Francisco Bay to be listed as an impaired water body per section 303(d) of the federal Clean Water Act.

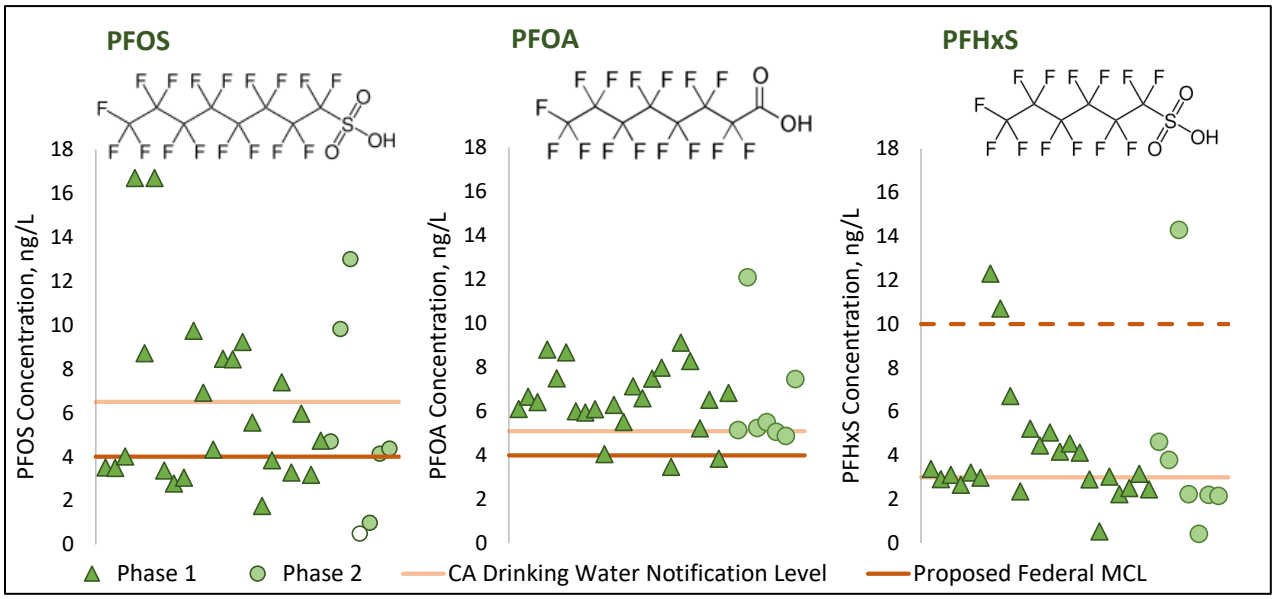


Figure 2. *Phase 1 and 2 effluent concentrations of PFOA, PFOS, and PFHxS compared to California notification levels and proposed USEPA Maximum Contaminant Levels (MCLs) for drinking water. For PFHxS, the proposed MCL is illustrated with a dashed line at 10 ng/L; the unitless Hazard Index of 1.0 is calculated by dividing PFHxS concentrations by 10. The 3 other compounds included in the Hazard Index were primarily non-detects. The open circle for PFOS indicates a non-detected value; all filled shapes indicate a detected result.*

How do PFAS Levels in Bay Area Biosolids Compare to Regulatory Thresholds?

PFAS is a potential concern for biosolids end uses, particularly land application or other uses where PFAS could migrate to food crops or drinking water. There are currently no federal or state standards for PFAS in biosolids. However, several other states have established "action levels" for biosolids that may be "industrially impacted." When PFOA or PFOS concentrations in biosolids exceed the action level of 20 ng/g (µg/kg or ppb), utilities in Michigan[j] and New York[k] are subject to restrictions on biosolids recycling. In this BACWA-SFEI study, the only biosolids samples that exceeded these thresholds were from agencies that have exceptionally long storage times in lagoons and storage beds, which may allow more time for PFAS transformations to occur or allow PFAS to become more concentrated on a dry weight basis.

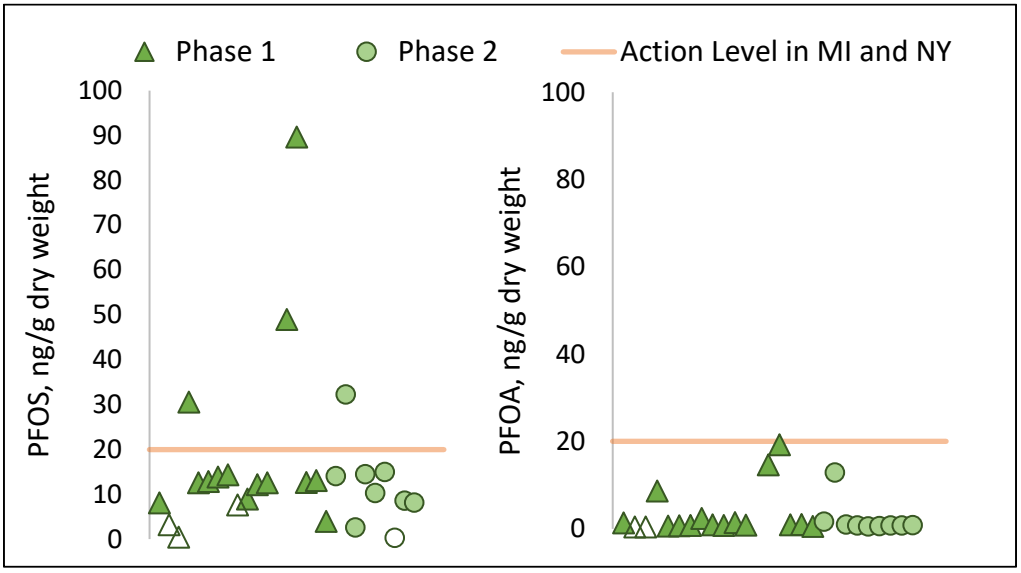


Figure 3. *Phase 1 and 2 biosolids concentrations of PFOA and PFOS (ng/g dry weight) compared to action levels in Michigan and New York. Filled shapes indicate detected values. Unfilled shapes indicate non-detects.*

Where is PFAS in Bay Area Wastewater Coming From?

To identify potential sources of PFAS, Phase 2 of the BACWA-SFEI study focused on sampling in residential areas and at commercial and industrial facilities. Samples were collected from residential areas (n=14), industrial laundries (n=5), hospitals (n=4), facilities with chrome plating onsite (n=3), semiconductor manufacturing (n=2), car washes (n=3), a military site, and a pulp paperboard manufacturing facility. Landfill leachate is also a known source of PFAS in wastewater that was previously sampled under a State Water Board investigative order[a]. Results of this study's collection system monitoring are shown in **Figure 4** and indicate that:

- **Residential** samples showed a large range of total quantified PFAS concentrations. The median sum of TOP and target analytes were only slightly lower than those found in plant influent.
- **Industrial Laundries.** Concentrations of total quantified PFAS measured as TOP were significantly higher than median influent concentrations at several (but not all) industrial

laundries. These facilities typically launder uniforms, linens, floor mats, and similar items. Some laundered textiles could contain intentionally added PFAS (e.g., for stain resistance).

- **Car Washes** showed total PFAS measured as TOP at moderately higher concentrations than plant influent. Unlike industrial laundries, however, there were not any extremely high values at the car washes, and discharge flow rates tend to be lower at the car washes.

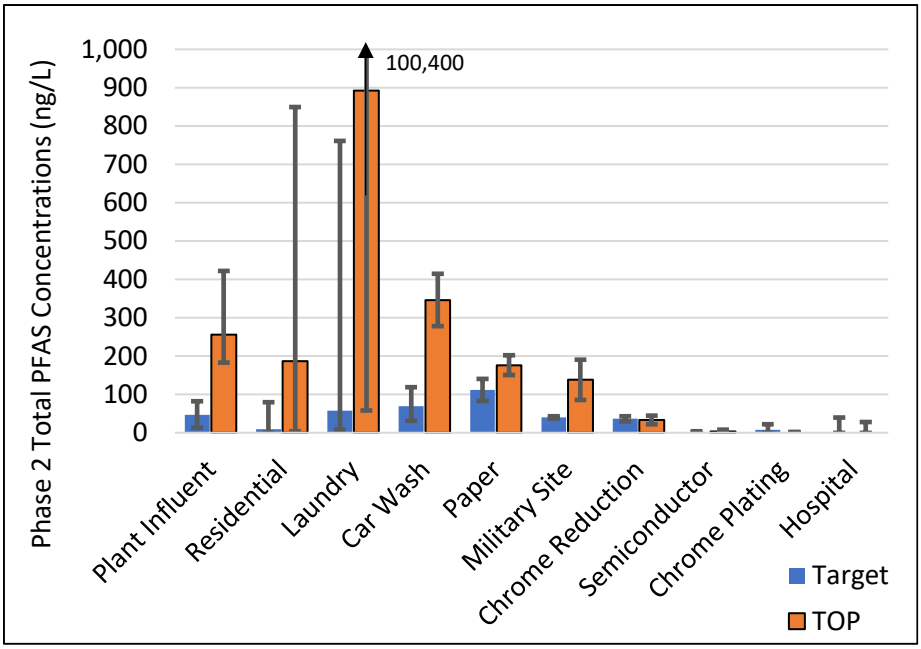


Figure 4. *Comparison of Phase 2 plant influent results with residential, commercial, and industrial wastewater (ng/L). Total PFAS is based on a sum of targeted analysis of 40 compounds("Target") and Total Oxidizable Precursor analysis ("TOP"). The height of each bar chart indicates the median, while the error bars show the minimum and maximum.*

At most Bay Area treatment plants, more than 95% of flows are from residential and commercial customers. Phase 2 results indicate that residential areas may contribute PFAS at concentrations similar to plant influent, which means that residential users may be the dominant source of PFAS to many treatment facilities. PFAS is found in many consumer products, including textiles, household chemicals, cosmetics, and food packaging, at concentrations several orders of magnitude higher than those found in this study, as shown in **Figure 5**. This source of PFAS can only be controlled by removing or reducing the amount of PFAS found in consumer products.

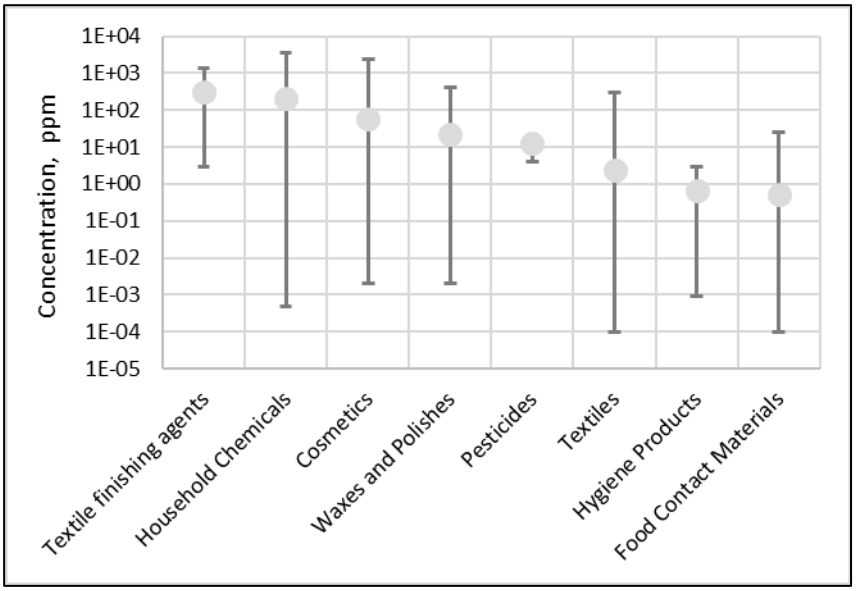


Figure 5. *PFAS concentrations in select categories of consumer products. Figure adapted from Dewapriya et al., 2023[l]. The round marker indicates the average, while the error bars show the minimum and maximum values. The units (ppm) are equivalent to ng/L x 1,000,000.*

What is BACWA Doing Next?

BACWA and its members are interested in developing actionable data that will inform future source control or other management efforts. To start, BACWA and its members plan to continue working with SFEI, the Water Board, and the California Department of Toxic Substances Control to identify consumer products with PFAS that have a potential nexus to wastewater, stormwater, and surface waters like San Francisco Bay. In the coming years, SFEI plans to continue studying PFAS in stormwater and the Bay, while BACWA will continue to focus on identifying controllable sources within sewer service areas.

Where Can I Find More Information?

USEPA PFAS Strategic Roadmap:
https://www.epa.gov/pfas/pfas-strategic-roadmap-epas-commitments-action-2021-2024

[a] SWRCB Investigative Order for POTWs: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2020/wqo2020_0015_dwq.pdf

[b] Study of PFAS in Bay Area POTWs: Phase 1 Sampling and Analysis Plan: https://bacwa.org/wp-content/uploads/2020/12/SFEI-Final-PFAS-SAP-Phase-1-2020-11-23.pdf

[c] Study of PFAS in Bay Area POTWs: Phase 2 Sampling and Analysis Plan: https://bacwa.org/wp-content/uploads/2022/03/Final-PFAS-Phase-2-SAP-2022-03-28.pdf

[d] Study of PFAS in Bay Area POTWs, Phase 1 Memo: https://bacwa.org/wp-content/uploads/2023/03/Memo_BACWA-PFAS-Phase-1.pdf

[e] Lin, D. and Fono, L. Investigation of PFAS Sources to Municipal Wastewater. Presentation to 2023 Regional Monitoring Program Annual Meeting, October 2023. Video and slides available at https://www.sfei.org/projects/rmp-annual-meeting

[f] Aflaki, R. "What can we learn from the GeoTracker PFAS data?" Presentation to CASA; Available at https://casaweb.org/wp-content/uploads/2023/10/Aflaki-Roshan.pdf

[g] USEPA, 2022. "Fact Sheet: Draft 2022 Aquatic Life Ambient Water Quality Criteria for PFOA and PFOS. "Available at https://www.epa.gov/system/files/documents/2022-04/pfoa-pfos-draft-factsheet-2022.pdf

[h] SWRCB. "PFAS Regulations for California Drinking Water." Available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/pfas.html

[i] USEPA. Proposed PFAS National Drinking Water Regulation. Available at https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas

[j] Michigan Department of Environment, Great Lakes, and Energy. "Interim Strategy – Land Application of Biosolids Containing PFAS (2024)." Available at https://www.michigan.gov/egle/about/organization/water-resources/biosolids/pfas-related

[k] New York State Department of Environmental Conservation. "Biosolids Recycling in New York State – Interim Strategy for the Control of PFAS Compounds." September 7, 2023. Available at https://extapps.dec.ny.gov/docs/materials_minerals_pdf/dmm7.pdf

[l] Dewapriya, P., et al. "Per- and polyfluoroalkyl substances (PFAS) in consumer products: Current knowledge and research gaps." Journal of Hazardous Materials Letters, Volume 4, November 2023, 100086. https://doi.org/10.1016/j.hazl.2023.100086

CASA and BACWA are reaching out to raise awareness of an air quality related regulation that impacts the entire wastewater sector and needs action now for the sector to be compliant by 2028.

As of January 1, 2022, the CA Air Resources Board (CARB) requires wastewater agencies treating 5 MGD or more to perform a study to determine if there are emissions of air toxics from WWTPs in addition to those already reported (refer to the attached primer for more detail). CARB agreed the wastewater sector could work as a group in order to reduce the overall costs to the sector, reduce the burden on source test specialists and laboratories, and reduce the burden on regulatory staff. The statewide study is estimated to cost up to $10 million spread over the next 3-4 years, to be shared by sector participants. The expected outcome is a shortlist of air toxics the sector must start monitoring and reporting beginning in 2028.

For this to be successful, the wastewater sector needs a champion – CASA has agreed to serve as the fiscal administrator with support from the regional associations (BACWA, CVCWA, Clean Water SoCal), and will also coordinate the needs of the statewide study with a hired Project Manager who will oversee day-to-day activities and coordination of source testing, laboratory analyses, and report development.

What do the regulations require of you? *CARB requires your participation in a study, either on your own or as a group, to determine which (if any) air toxics are being emitted from the WWTP that you do not already report, and to begin monitoring those in 2028 and reporting those emissions in 2029.*

What is our ask of you? *Participate in the statewide group to share the cost of the study (estimated contributions are based on your average annual daily flow for years 2019-2021) and support a more consistent/scientifically sound outcome for the wastewater sector.* ***If you choose to participate, BACWA will provide CASA funds on your behalf for FY24, and add the amount to your regular BACWA invoice in FY25. Please contact BACWA Executive Director Lorien Fono by email at lfono@bacwa.org to confirm your participation.***

PAY NOW FOR FY24	***BUDGET FOR FY25***	***BUDGET FOR FY26 & FY27***
$200 per MGD of Average Annual Daily Flow	*$1,000 per MGD of Average Annual Daily Flow*	*TBD, Budget for ~$2,500 per MGD of Average Annual Daily Flow*
If not budgeted, delayed payment in FY25 is OK	***Pre-paying now is Encouraged***	

Please see the attached for more details and let us know if you have any questions.

CALIFORNIA ASSOCIATION of SANITATION AGENCIES
925 L Street, Suite 200 • Sacramento, CA 95814 • TEL: (916) 446-0388 • www.casaweb.org

Statewide Wastewater Air Toxics Pooled Emissions Study

The following document describes the "two-step process" pooled emissions study that is required by the California Air Resources Board (CARB). CASA has agreed to serve as the fiscal agent for this project with support from the regional associations (Bay Area Clean Water Agencies, Clean Water SoCal, and Central Valley Clean Water Association).

Background

Reporting requirements for air toxics emitted from permitted stationary sources in California (including WWTPs) have expanded since CARB's latest amendments to the Emissions Inventory Criteria and Guidelines (EICG) and the Reporting of Criteria Air Pollutants and Toxic Air Contaminants Regulations (CTR) became effective January 1, 2022. WWTPs can report business-as-usual through 2027 but are required to conduct a two-step process (on their own or as a group) to determine which of the 1,700+ air toxics referenced in the latest EICG need to be monitored and reported beginning in 2028. CARB's provision for the wastewater sector to complete a two-step process to establish air toxics emission factors that can be adjusted for the capacity of the WWTP and will be applicable to all WWTPs. Identifying a shortlist of air toxic compounds to be tested requires:

1. Scanning emissions from representative WWTPs and unit processes to determine detectable air toxics
2. Quantifying emissions of the detectable air toxics using approved sampling and analysis methods to determine which must continue to be monitored and reported beginning with calendar year 2028

For the past few years, CASA has been working with a variety of agencies, regional associations, and the Air Quality, Climate Change, and Energy (ACE) Air Toxics Subgroup to develop an appropriate approach to initiating this two-step process on behalf of the wastewater community.

Benefits of Engaging in the Two-Step Process and Pooled Emissions Study

Through CASA and the regional associations' leadership, the wastewater sector is uniquely positioned to help lead the execution of a statewide two-step process in the form of a pooled emissions study (Study). Conducting the Study as a statewide group offers numerous benefits to the sector, including:

- **Representative Testing Cost Savings:** Having a select number of WWTPs[1] perform the Study and represent the sector versus every WWTP having to perform the Study. This allows the sector to streamline the work, avoid overwhelming source test specialists (which are already overextended across the state) and significantly reduce costs.[1]
- **Administrative Cost Savings:** Pooling funds as a sector and having CASA serve as the fiscal administrator relieves WWTPs of the burden of managing individual contracts and coordinating comparisons of the results across the state, significantly reducing overall administrative costs.
- **Streamlined Project Execution:** Hiring a single project manager (PM) to coordinate and produce a sound technical approach/source test protocol[2] that is consistently applied across the state, including selection of source test specialists and laboratory to streamline the execution of the Study and the analysis of results.
- **Coordinated Statewide Action:** Close coordination by the PM across CASA staff, regional association staff, WWTPs, CARB staff, Air District staff (including the California Air Pollution Control Officers' Association or CAPCOA), Source Test Specialists, and other technical experts as needed to complete the Study in time for expanded monitoring and reporting to begin in 2028.
- **Single Reference Set for Future Use:** Producing a single set of emission factors for a shortlist of air toxics that all WWTPs can use for reporting purposes beginning in 2028.

[1] Per the regulations, WWTPs include covered (≥10 million gallons annual average daily flow) and uncovered (≥5 million gallons annual average daily flow) systems. Covered systems are defined as "…wastewater treatment having a covering over the physical area where the primary settling process occurs in the wastewater treatment process, such as sedimentation tanks. The primary tanks may be sealed or covered with a fixed, floating or retractable cover and shall be airtight, thus preventing emissions from being released to the air."

[2] Scanning and sampling protocols will be developed in collaboration with and approved by local air districts and CARB staff. The PM and CASA Steering Committee will lead the coordination and development of the overarching Source Test Protocol.

The alternative would be for every WWTP (or smaller groups of WWTPs) to perform their own two-step process for the 1700+ air toxics identified by CARB. That approach poses significant challenges and increased costs for the wastewater sector. Additionally, the numerous efforts will likely yield inconsistent results, in part from having to use multiple source test specialists and laboratories, which will make it very challenging to determine a single emission factor for any air toxic. Finally, the sampling and analyses necessary would be cost prohibitive for most WWTPs on their own. That is why it is important to maximize individual WWTP participation and contributions to the Study, which will serve as documentation for your agency's compliance with the requirements under CARB's EICG and CTR.

Pooled Emissions Study Details and Next Steps

We estimate the Study could take three to four years and could cost up to or possibly more than $10 million for the wastewater sector to complete as a group. This time and cost factor is based on an assumption that we would be required to sample and analyze over seven families of air toxics across various WWTPs and unit processes, and extrapolation from a previous similar effort, the 1990 Pooled Emissions Estimation Program, which took just over two years to complete and focused on only one family of compounds.

The Study will be performed in two phases, with the vast majority of costs incurred in Phase 2:

1. During Phase 1 (2024), the selected PM in collaboration with CASA and Source Test Specialists will develop (and gain approval from CARB and Air Districts for) the overarching Source Test Protocol necessary to perform the two-step process.
2. During Phase 2 (2025-2027), the PM will coordinate completion of the two-step process with the selected Source Test Specialist(s) in close collaboration with CARB, air districts, the Steering Committee and WWTPs.

The results of Step 1 of this Study will inform the details needed as part of Step 2 (i.e., number of WWTPs, number of unit treatment processes to be sampled at each WWTP, and number of air toxics that will need to sampled and analyzed from each unit process), at which time we will be able to refine the estimated cost and timeline to perform Step 2. As of November 1, 2023, CASA and the regional associations distributed a request for qualifications to interested entities, and plan to select a suitable PM for Phase 1 in early 2024.

Agency Cost Sharing and Planning for Future Budget Allocations

The $10 million estimated budget is to be shared by the ~145 WWTPs[1] across the state who have annual average daily flows near or exceeding the regulatory threshold.[1] We have estimated contributions per million gallons of average annual daily flow, with the costs spread over the next three to four fiscal years. This resulted in a total project estimate of approximately **$3,700 per MGD of average annual daily flow** (based on 2019-2021 flows) for each of the ~145 WWTPs[1]. For smaller agencies who may be exempt from these regulations at this time, we are still requesting your participation. CASA is requesting the following of those who wish to participate:

Fiscal Year 2024: Pay now or July 1, 2024*	Fiscal Year 2025: Pay now or July 1, 2024*	Fiscal Year 2026: Pay July 1, 2025	Fiscal Year 2027: Pay July 1, 2026
$200 per MGD	$1,000 per MGD	TBD, budget ~$1,250 per MGD	TBD, budget ~$1,250 per MGD

***Paying now is encouraged. If not budgeted, please budget for Fiscal Year 2025 and send payment July 1, 2024.**

Agencies that have budgeted for this Study in FY24 are encouraged to make contributions promptly to the maximum extent possible to fund Phase 1 PM costs. We recognize that some agencies may not have budgeted for FY24 – those agencies may pay both the FY24 and FY25 amounts as a lump sum in FY25. Any funds not spent on Phase 1 of the Study will be applied to Phase 2. CASA will track early contributions to ensure equity across the sector. Funding levels for FY 26 and FY 27 will be determined as part of Phase 1.

Contact Information

Please contact Shacara Gamboa at sgamboa@casaweb.org to confirm participation in the statewide group and ability to contribute in FY 23/24 and 24/25. Please also provide a point of contact for invoicing. At the appropriate time, CASA can send an invoice for your contribution to the Study or work with your respective

regional association (BACWA, CVCWA, or Clean Water SoCal) to administer the invoice. For substantive questions about the Study, please reach out to Sarah Deslauriers at sdeslauriers@carollo.com.

Advancing Water Reuse in the Bay Area - What's Next?

Water and Wastewater industry representatives convened in September 2023 for the workshop *Advancing Water Reuse in the Bay Area: Exploring Opportunities and Challenges for Inter-agency Collaboration*. The workshop conveners value your input on Next Steps and Priorities to help carry the effort forward!

* 1. Please indicate your top 3 priorities from the following list of issues to help us determine focus area(s) for future workshops and/or other collaborative efforts as our next steps to promote water reuse.

- [ ] **Cost-Sharing:** Allocating recycled water costs across water supply and wastewater agencies.
- [ ] **Concentrate Management:** Addressing as a jointly shared challenge for water and wastewater utilities.
- [ ] **Potable Reuse Planning:** Promoting institutional collaboration on potable reuse between water and wastewater utilities.
- [ ] **Potable Reuse Public Outreach:** Developing strategies fof joint public outreach by water and wastewater utilities on Potable Reuse

- [ ] **Engaging regulators:** Building stronger rapport and joint understanding between utilities and regulators.
- [ ] **Sub-regional focus**: Convening with wastewater and water utilities in your local portion of the Bay Area.
- [ ] **Engaging utility leadership:** Bringing high-level utility managers into the discussions on reuse partnerships.
- [ ] **Increasing staff capacity**: Improving training, staff retention, and hiring to better support reuse efforts.
- [ ] **Promoting non-potable reuse:** Maximizing options to offset use of potable supplies for irrigation, etc.

2. If you have a high priority need that is not included above, please state it below.

3. Your Name:

4. Your Job title:

5. Your Organization:

6. Your email address:

7. Who should represent your utility/agency in future discussions and planning efforts? (Nominate yourself, if appropriate). Please provide their name and email.

8. Additional thoughts and comments.

Done

SFPUC Southeast Treatment Plant Mainstream Nutrient Reduction Project

Background

- Reducing nutrient loading into the San Francisco Bay is one of the most pressing water quality issues facing our region.
- The San Francisco Bay experienced a harmful algal bloom and fish kills in 2022 and a second bloom in 2023.
- Nutrient loading in the Bay is among several factors that contributed to the blooms.
- Climate change is increasing the frequency and severity of blooms due to increases in water and air temperature. In addition, increases in droughts and flooding, changes in salinity, increased amount of CO2, sea level rise, and coastal upswelling are also contributing to the blooms.
- The SFPUC is developing a nutrient reduction project that will be needed to meet expected regulatory requirements.

Project Facts

- The objective of the SFPUC project is to reduce the amount of nutrients, specifically total inorganic nitrogen, discharged from the Southeast Treatment Plant into San Francisco Bay.
- The project is scoped to comply with anticipated future nutrient-related regulations.
- Schedule: Planning and design to start in FY 24-25. Construction expected to start in FY 30-31. Project completion expected approximately 15 years after planning commences.
- SFPUC Estimated Total Project Cost: expected to exceed $1.5 billion.
- Location: Southeast Treatment Plant, which treats approximately 80% of the city's wastewater flows.

SFPUC Climate Bond Request Submitted to Asm. Phil Ting on November 20, 2023

Wastewater

- Nutrients Reduction – Funding for construction of wastewater processes that reduce nutrient loading by removing total inorganic nitrogen from effluent discharged into San Francisco Bay in response to algae blooms that result in the death of fish and other species and are more frequent due to climate change. Approximately $1.5 billion would fund SFPUC specific projects to address this issue. The funding need for Bay Area agencies including the SFPUC is expected to exceed $10 billion.

A. Proposed Research: Scientific objectives and research activities

Problem overview

Harmful algal blooms (HABs) pose growing and persistent threats to biological resources, local economies, and human health in coastal and estuarine ecosystems worldwide[1,2]. Over the last decade, HABs have emerged as one of the highest-priority water quality management issues in the San Francisco Estuary (Estuary), the U.S. Pacific Coast's largest estuarine system, which includes the San Francisco Bay (Bay) and Sacramento-San Joaquin River Delta (Delta) (Figure 1). Although the Bay has been recognized as nutrient-enriched for decades, there has not been a severe HAB event until recently. Nevertheless, increasing detections of multiple HAB-forming organisms[3,4] and HAB toxins[5,6] indicated the growing risk of a major HAB event[4,6]. Indeed, the loss of system resistance culminated in a *Heterosigma akashiwo* bloom in 2022 that caused the first HAB-related fish kill and low dissolved oxygen event in the Bay since water quality monitoring began in 1969. In the Delta, cyanobacterial blooms and associated toxins have expanded in frequency and severity since they were first recorded in 1999.

Scientists, regulators, managers, and stakeholders have recognized this issue's importance in the Estuary, and spearheaded major expansions in HAB monitoring over the last decade, leading to improved understanding of both HAB-related conditions and data types needed to effectively monitor HABs. However, monitoring activities largely proceeded as distinct projects–limited duration, sub-region focused – as opposed to being carried out as part of a sustained, Estuary-wide HAB monitoring program. The Estuary's large spatial footprint spans multiple regulatory jurisdictions and management agencies that have different regulatory-mandates and management drivers, with limited impetus or opportunity for inter-agency engagement on HAB monitoring. As a result, there is currently no sustained, coordinated program for monitoring HABs across the freshwater to marine continuum (FMC) in the Estuary. It is necessary to further develop these HAB modules, build capacity to address data gaps, and to support regional integration.

The overarching goal of this project is to establish the technical foundation, program design, and strategic plan for implementing a robust system-wide HAB program for the Estuary. Briefly, to accomplish this we propose to, 1) **enhance** and validate technologies and tools for HABs monitoring and event response, 2) **integrate** existing/on-going HAB-related data collection by regional partners along with new data streams into an Estuary HAB dashboard and related decision support tools for managers, 3) fill key knowledge gaps about the **transport** of HAB cells and toxins across the FMC, and 4) utilize information from objectives 1–3 and work with managers to develop a coordinated HABs monitoring **strategy** across the Estuary. The project team comprises − State water quality managers; academic, state, federal, and non-profit research scientists; and, non-governmental organizations (NGOs) − to help ensure project results will support priority management needs and contribute to a more effective and efficient HAB strategy in the Estuary.

Background: HABs management and monitoring in the San Francisco Estuary

San Francisco Estuary ecosystem overview −The Estuary is comprised of five main subembayments of the Bay and the Delta to the northeast. While designated as a single estuary, the Estuary may be more aptly viewed – in terms of physical and ecological processes – as two distinct branches that converge down-estuary in Central Bay, the system's gateway to the coastal ocean. With approximately 90% of annual freshwater flows entering through the Delta[7], its

Figure 1. Map of the San Francisco Estuary.

northern branch (San Pablo, Suisun, and Delta) behaves like a classic river-dominated estuary[8,9]. The southern branch (South and Lower South Bays) behaves like a tidal lagoon, receiving small freshwater inputs from adjacent watersheds in the wet season (Nov-Apr), and from wastewater treatment plant (WWTP) discharges in the dry season. Strong exchange with the coastal ocean influences physical (salinity, temperature) and biological/ biogeochemical characteristics of Central Bay and, to a lesser extent, South Bay[10].The Bay and the Delta are highly-enriched in nitrogen and phosphorus[4,11,12]. Nutrient enrichment in the Bay results primarily from WWTP discharges (in particular Lower South, South and Central Bays) [4,13]. The Delta receives nutrient inputs from intensive agricultural land-use in the upstream Central Valley and within the Delta itself, along with WWTP loads[14].

Despite the Bay's nutrient-enriched status, from the 1970s-2021, it had largely been spared the severe impacts that commonly occur in many other nutrient-enriched estuaries (e.g. Chesapeake Bay, Tokyo Bay, Tampa Bay, and Long Island Sound). The Bay's so-called 'resistance' to high-nutrients results from multiple factors[4,8], including: high suspended sediment concentrations (decreasing light to phytoplankton); strong tides (mixing the water column, short periods of stratification, further decreasing light levels); and dense populations of filter-feeding bivalves in some regions. Some of those factors may have discouraged growth of harmful algal taxa[4]. Analysis of long-term Bay water quality data, however, has revealed shifts in condition, beginning around 2000, suggesting the system was becoming increasingly sensitive to elevated nutrient levels, including: increased phytoplankton biomass and gross primary production in deep subtidal regions of South Bay[15] and Central Bay (SFEI, in prep); frequent detections of multiple harmful algae taxa and, the detection of multiple phycotoxins in water and bivalve tissue throughout the system[5,6,16].

Beyond its 'natural role' as the Estuary's major freshwater end-member, the Delta is foundational to California's water infrastructure system. California's economy relies on the transport of snowmelt and rainwater from Northern California southward to cities and farmland in more arid regions. Freshwater that flows into the Delta is pumped into aqueducts where it travels over 400 miles to provide drinking water for over 27 million Californians – 2/3 of the state's population – and irrigation water for over 3 million acres of farmland. Although habitat quality in the Delta is severely impacted by other anthropogenic factors (e.g, channelization, wetland loss), the Delta suffered few 'classic' eutrophication impacts through the late 1990s, with high suspended sediment concentrations and (introduced) bivalves resulting in decreased phytoplankton production. However, since 1999, *Microcystis* blooms have been occurring in the Delta with increasing frequency and severity.

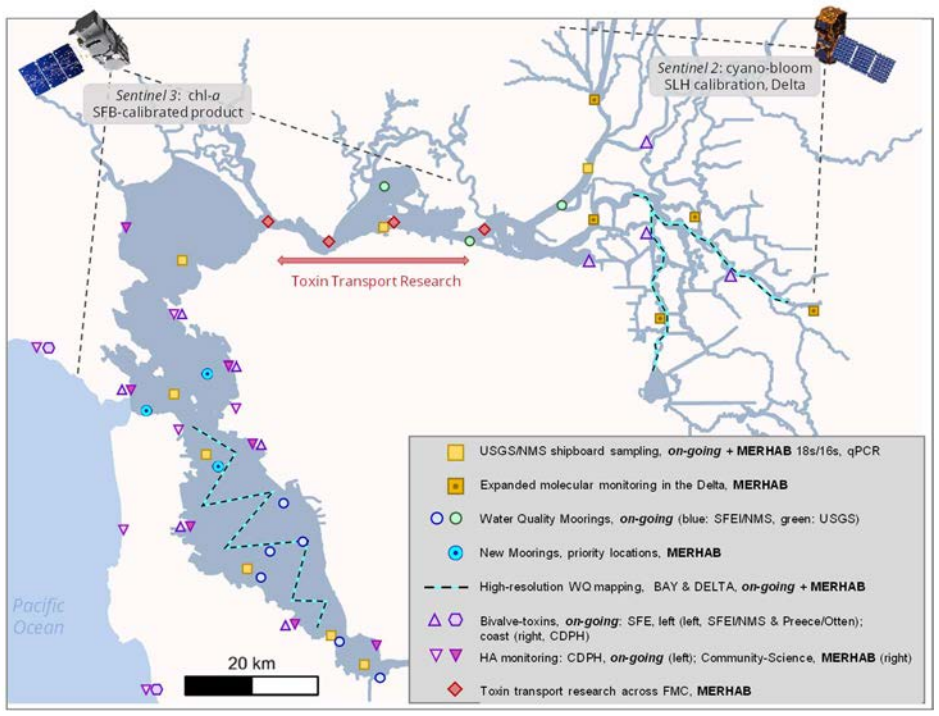


*Figure 2. HAB monitoring across the San Francisco Estuary: Existing/**on-going** work and proposed **MERHAB** work.*

Harmful Algae in the Estuary — Both marine and freshwater HABs occur within the Estuary. Across the 30-year record (1992-2022; microscopy and molecular), we have identified 14 priority HA taxa that occur with moderate to high-frequency (Figure 3). Four blooms have been documented: *Akashiwo sanguinea* (2004) [17] and *Mesodinium rubrum* (1993) in South Bay; [18]; the 2022 *H. akashiwo* bloom in South and Central Bays − the first time a fish kill resulted from a phytoplankton bloom in the Bay; and a smaller *H. akashiwo* bloom in 2002 (Richardson Bay)[19].

A diversity of phycotoxins are frequently detected in the Bay, even outside of bloom events. The toxin cocktail in the Bay includes marine and freshwater toxins[5,16]: saxitoxin, domoic acid, *Dinophysis* shellfish toxins, and microcystin. Some of these toxins have also been detected in Northern Anchovies (*Engraulis mordax*)[20], suggesting that toxins can enter the food web both through benthic and pelagic phytoplankton grazers. Microcystins have been detected in the Bay for over 10 years[5], but the source of these toxins is not known. Due to the hydrologic connection between the Delta and Bay it is likely that the Delta delivers microcystins, and possibly other cyanotoxins, into Bay waters. Indeed, *Microcystis* cells have been detected in the confluence area and the South Bay. However, more information is needed to determine, if and when, freshwater toxins derived from the Delta are entering the Bay and the food web.

CyanoHABs in the Delta frequently exceed the California recreational water quality guidance levels and produce taste and odor compounds that impact Delta drinking water intakes. Microcystins also accumulate to high concentrations in shellfish (e.g. >1000 ng/g; Preece et al. unpublished data) in the Delta, creating potential exposures to higher trophic levels and to subsistence consumers. Microcystins have been shown to have sublethal effects on pelagic fish in the Delta[21–23] and on copepods[24,25] that are important food sources for managed anadromous fishes. Additionally, anatoxin and saxitoxin were first detected in the Delta in 2016[26], and the impact of these additional cyanotoxins on the Estuary remains unknown. As HABs become more severe in the Delta waters downstream in the Bay will be increasingly impacted.

It is also not clear if HAB taxa from the Bay impede into Delta waters. Marine taxa, such as *Alexandrium*, *Gymnodinium*, *Heterocapsa*, *Gyrodinium*, *Akashiwo, Pseudo-nitzschia,* have been detected in and upstream of Suisun Bay (**Error! Reference source not found.**), but to date toxins produced by these organisms have not been monitored in the Delta. Salinity in Suisun Bay ranges from 10-20 PSU, within the range of many euryhaline harmful algal taxa, and a bloom in this region could be devastating to managed fish species.

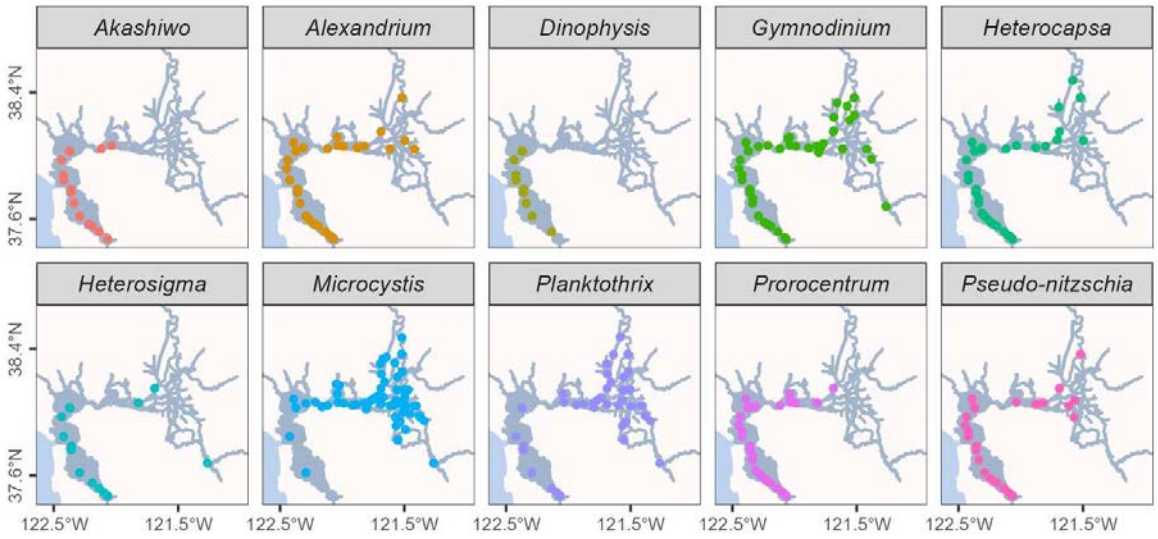


Figure 3. Microscopic detections of potentially harmful algae in the across the freshwater to marine continuum in the Bay-Delta, 1992-2021. Microscopy data used to show long-term monitoring results.

Current HAB-related monitoring in the Estuary — Prior to 2012, there were no monitoring activities or studies focused on harmful algae or their toxins in the Bay. Data from routine water quality monitoring and research projects, though, provided early records of multiple HA taxa detected throughout the system[3,27], and documented two short-lived (days) red tide patches or blooms (*Mesodinium rubrum*[18] and *Akashiwo sanquinea*[17]). Observed changes in phytoplankton productivity[15], however, brought increased attention to the impacts of elevated nutrients in the Bay (including HABs), and spurred the launch of the Bay Nutrient Management Strategy[4] (NMS) a regulatory-mandated science and monitoring program to inform multi-billion nutrient management decisions. Today, HABs is one of the NMS' highest priority science areas.

Bay regulators and stakeholders, via the NMS, endorsed directing increased funding toward a series of field and monitoring activities targeting HAB-related data identified in NMS planning documents[4,6,28]. This funding supported early collaborations by the Project Team (USGS, UCSC, SFEI, and others) and included re-analyzing long-term monitoring data along with pursuing new pilot HAB-focused field studies. These field studies have included; i) develop/apply molecular techniques for HA taxa and phytoplankton community composition, and integrate that into routine water quality monitoring[29]; ii) biweekly phycotoxin measurements in mussels from multiple regions of Central Bays and South Bays (2015-2022, SFEI in prep); iii) phycotoxin measurements in Bay anchovies (2018-2019)[20]; iv) microcystin measurements in Suisun Bay clams (2008-2016); and v) spatially-integrated dissolved toxin measurements aboard long-term monitoring cruises[5,6]. Findings show that the Bay hosts multiple HA genera, but generally at low

levels[3,4,6,30] and that multiple marine (domoic acid, saxitoxin, diarrhetic shellfish toxin) and freshwater (microcystins) phycotoxins were commonly detected in water and bivalve tissue[5,16]. NMS also funded a recently completed ~5 year intensive data collection combining results from the pilot studies with long-term data (SFEI in prep). NMS funding for monitoring HAB of parameters is expected to continue into the future.

In the Delta, there are multiple water quality and fish monitoring programs mandated by the different water rights decisions and permits that allow the movement of water from Northern to Southern California. The Interagency Ecological Program[31] was established in the 1970s to coordinate the monitoring programs and research projects among the different agencies. One of these programs, the Environmental Monitoring Program, has been collecting water quality and phytoplankton community data at fixed stations since 1975. However, these stations do not overlap with the areas that experience the most severe cyanobacteria problems. Over the past two decades several cyanobacteria special studies have been implemented to elucidate the factors that drive HABs in certain areas of the Delta. However, due to a lack of routine monitoring there are numerous data gaps that prevent HAB trend analysis in the Delta.

HAB Management in the Estuary — Complicating effective monitoring and management, the Estuary falls between jurisdictional boundaries. This confounds oversight and slows action toward addressing the far-reaching impact of HABs across the FMC. For federal agencies, HABs in estuaries reside between the Environmental Protection Agency's (EPA) freshwater-focus and the National Oceanic and Atmospheric Administration's (NOAA) coastal/marine focus. A California-defined jurisdictional boundary falls exactly along the boundary between the Bay and the Delta, assigning rulemaking and water quality regulatory activities to different Regional Water Quality Control Boards (Central Valley Regional Water Board, CVWB: Delta; San Francisco Bay Regional Water Board SFWB: Bay) and the State Water Board (SWB) for water flow and management activities. CDFW also has multiple jurisdictional boundaries in the Estuary, which slowed agencies response to the 2022 *H. akashiwo* bloom. CVWB, SFWB, and SWB all recognize HAB issues, but the challenge of identifying and quantifying multi-region sources and HAB fluxes has received little coordinated attention.

Estuary HAB Information and Management Needs —Estuary managers need consistent, routine, HABs monitoring data collected through a coordinated strategy. Currently, there is no HABs strategy for monitoring across the Estuary FMC. Delta water quality monitoring programs exist, but most facilitate compliance monitoring connected to water use permits and do not collect data relevant to HABs, nor are the monitoring plans easily modified. Additionally, water quality monitoring typically does not extend across the FMC creating sharp boundaries in data availability and methodologies that often do not match with the spatial boundaries of HABs-related processes that need monitoring. Compared to the Delta, the Bay has fewer sustained water quality monitoring resources, but has been maximizing HAB-related monitoring over the last decade through collaborations among research programs (e.g., USGS, UCSC, SFEI), leveraging NMS support, in-kind USGS support (cruises), and in-kind or other grant support through UCSC (e.g., IFCB).

The SWB and CVWB, and SFWB are California's regulatory agencies responsible for ensuring that the quality of the State's rivers, streams, lakes, wetlands, ocean, and groundwaters is protected. Assembly Bill 834[32], signed by the Governor in 2019, established a freshwater and

estuarine HAB program (FE-HAB Program) through the SWB to protect water quality and public health from HABs, and specifically identifies estuaries as a focal area. Subsequently, a HABs monitoring strategy (FE-HAB Strategy) was developed by national HAB experts (including PIs Bouma-Gregson, Kudela, and Howard) in 2021[33] that includes six recommended actions that agencies, managers, Tribes, and stakeholders can implement to develop a statewide monitoring program. Building off the FE-HAB Strategy and the recently published FMC recommendations in Howard et al[34] the Delta Science Program[35] is developing a Delta specific HAB monitoring strategy with PI Preece as the lead author. With the development of California HABs strategy documents[33,35], and the recent publication of recommendations for monitoring across the FMC[1,34], there is a robust conceptual foundation for developing a HABs strategy across the FMC. Our project would use this foundation to develop a strategy that implements a partner-based and interagency monitoring for HABs specific to the Bay-Delta system.

Scientific objectives

This proposal seeks to establish the technical foundation, program design, and strategic plan for implementing a robust Estuary-wide HAB monitoring program. Our objectives include:

1. **Enhance** existing monitoring data sources with new technologies and tools, and by leveraging community science, to facilitate the rapid detection of HAB events and to further our understanding of HAB drivers and ecology.
2. **Integrate** data streams to deliver data rapidly to managers as decision support tools to help mitigate the impact of HABs across the freshwater to marine continuum.
3. Fill data and knowledge gaps about processes that **transport** cells and toxins through regional management zones along the freshwater to marine continuum in the Estuary to inform monitoring strategies across ecological and management boundaries.
4. Develop a coordinated HAB monitoring and management **strategy** across the Estuary to improve HAB event response and manage HAB impacts.

Research approach

Objective 1: Enhance monitoring with new tools and technologies

Building upon the multi-decade water quality monitoring program of the USGS, the SFEI Nutrient Management Strategy (NMS) has been adding HAB related monitoring parameters within the Bay. We will capitalize upon the recent investments made by the NMS to further validate and develop HAB monitoring technologies and methods that remain under-developed in the Estuary: remote sensing (Obj. 1A), molecular methods (1B), and community science (1C).

Enhancing HAB monitoring with technologies *validated* and *calibrated* for the Estuary will fill important spatio-temporal gaps in current monitoring programs. With the additional validation of proven technologies in the Bay we will be able to work with Estuary managers to enhance HAB related monitoring by providing a more comprehensive ecosystem data for decision-making during HAB events and to inform future management decisions to mitigate HABs.

Project 1.A – Remote Sensing for spatially resolved and temporally rapid data delivery

Remote-sensing (RS) is increasingly being used for quantifying chl-*a*/ phytoplankton biomass in aquatic systems, including in water quality monitoring contexts using operationalized products (Chesapeake Bay[36,37], Lake Erie[38,39]) and with increasing use for HABs[40]. Despite its tremendous promise, satellite imagery has thus far been under-utilized in the Estuary for quantifying (chl-*a*),

due in large part to challenges posed by high turbidity, and limited research and funding available to collect the high-resolution observational data necessary to validate RS chl-*a* products. In spite of these limitations, in summer 2022, S3 chl-*a* products played a critical role in early-detection of the summer 2022 HAB event in South Bay (Figure 5), and proved invaluable as a resource for designing weekly field surveys to monitor the event. The actionable information provided by RS products during 2022, underscores the need for more accurate and trusted RS algorithms for the Bay.

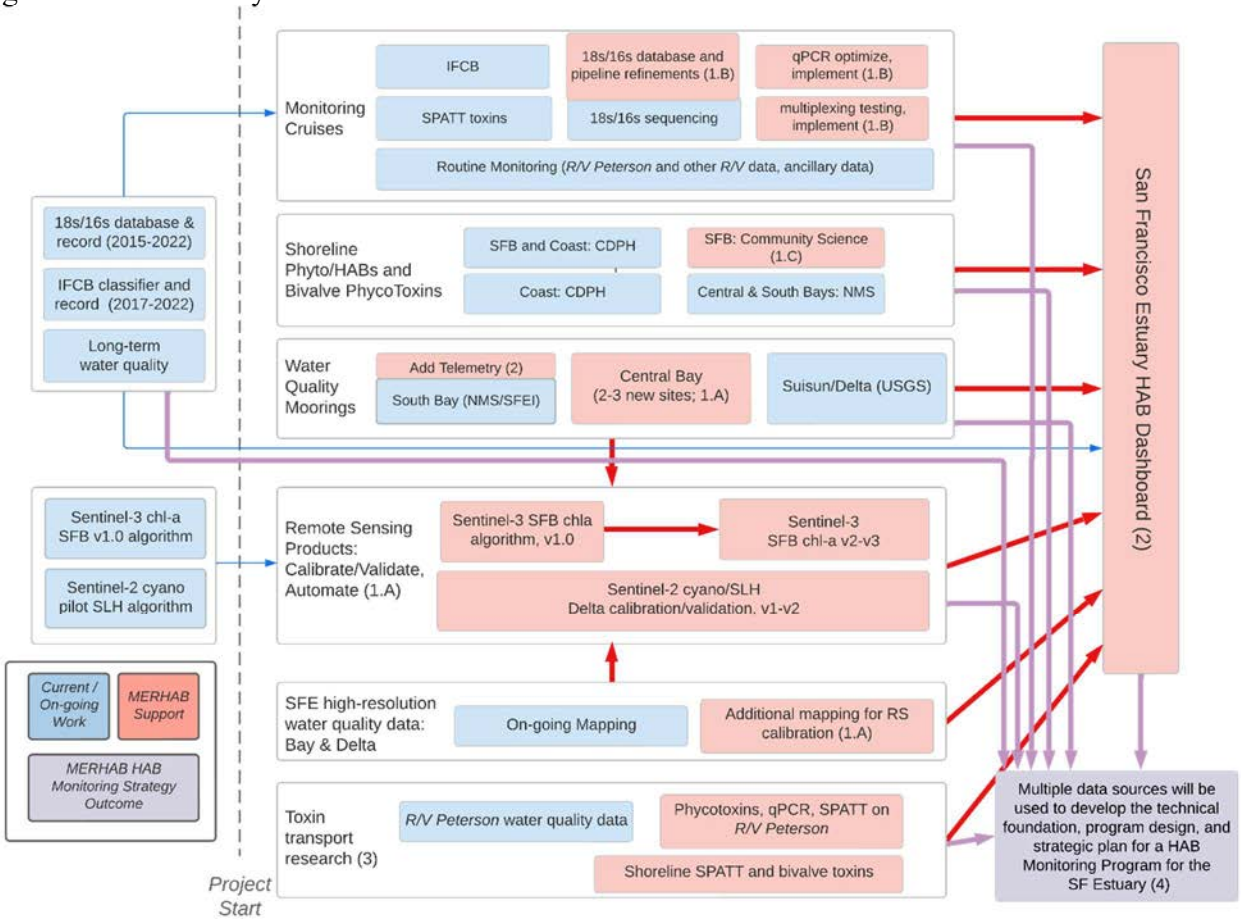


Figure 4. Flowchart describing the relationship between proposed MERHAB elements and ongoing monitoring funded by NMS, USGS, CDPH, and UCSC in San Francisco Estuary.

Building on recent pilot studies conducted by our team, in Project 1A we will refine, validate, and establish automated data-pipelines for two remote-sensed products for estimating chl-*a* and cyanobacterial biomass in the Estuary.

1.A.1 Refine and implement a regionally-calibrated Sentinel-3 chl-a product for the Bay

To begin to develop more accurate chl-*a* RS products for the Bay, our team has been piloting high-spatial resolution boat-based chl-*a* mapping (Figure 5A) to, calibrate and optimize the OC4ME[41,42] and RE10[43] algorithms. The RE10 algorithm was recently validated by NOAA for Chesapeake Bay[37], but has not been validated in the Bay. High-resolution boat-based mapping data collected by USGS involves pumping water through a flow-through system of sensors (YSI EXO2, bbe Fluoroprobe, and SUNA nitrate) providing georeferenced data every second,

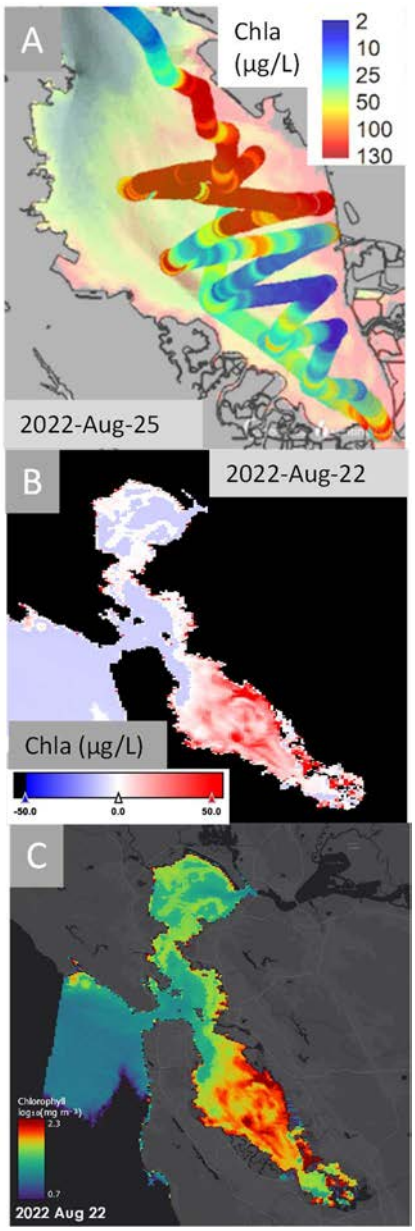


Figure 5. Preliminary data showing optimized chlorophyll (chl-a) algorithm for SFB. A) Example of how boat based high-resolution chl-a data is overlaid over chl-a products. B) Optimized-RE10 chl-a minus RE10 chl-a. C) Image of Optimized-RE10 algorithm result.

resulting in a spatially dense dataset that has been used to calibrate chl-*a* in Suisun Bay[44]. Using similar mapping data, preliminary optimized RE10 algorithm for the Bay improves chl-*a* retrieval significantly (Figure 5B), with Opt-RE10 RMSD of 1.59 compared to RE10 RMSD of 2.66. While the high-resolution mapping surveys provide spatially dense data, they can only be conducted episodically. Fortunately, SFEI maintains a network of water quality moorings in the Bay generating continuous chl-*a* data (Figure 2). Data from these stations will also be used to calibrate S3 chl-a algorithms. Three additional stations will be deployed in Central Bay to fill this data gap and provide more information about chlorophyll and exchanges with the Pacific Ocean.

In task 1.A.1, we will collaborate with researchers Rick Stumpf and Shelly Tomlinson in NOAA's National Centers for Coastal Ocean Science (NCCOS) to further develop the SFB S3 algorithm. Work will include: i) collecting new chl-*a* field data in years 1−3 (3−4 surveys per year) and using continuous *in situ* data from water quality moorings to obtain a dataset capturing a variety of chl-*a* and water quality conditions to optimize the Bay algorithm; ii) analyzing field data (both pre-existing and new MERHAB funded data) and S3 satellite imagery to identify the optimal calibration coefficients across the range of observations, with particular attention toward addressing potential interference from suspended sediment; iii) integrating the new algorithm into the products delivered by NCCOS. Once a final chl-*a* algorithm has been calibrated for the Bay, NCCOS will incorporate the Bay-algorithm into their automated data-processing pipeline to generate ~daily Bay chl-*a* estimates, which will be incorporated in the data integration elements of Obj. 2.

1.A.2 Refine, validate, and apply a high-spatial resolution RS-product for detecting cyanobacteria in the Delta using Sentinel-2

While S3 products are being widely used for cyanoHAB detection, including the operational Cyanobacterial Index product[45,46], S3 OLCI's spatial resolution restricts its use to larger water bodies (cf. >600 m wide). This size-cutoff excludes many small water bodies, including narrow channels and sloughs in the Delta where cyanoHABs are commonly observed, as well as any pixels close to shore (within 300m) because of land contamination in the remote sensing data . Our team has been developing and testing a higher-resolution Sentinel-2 (S2, pixel diameter

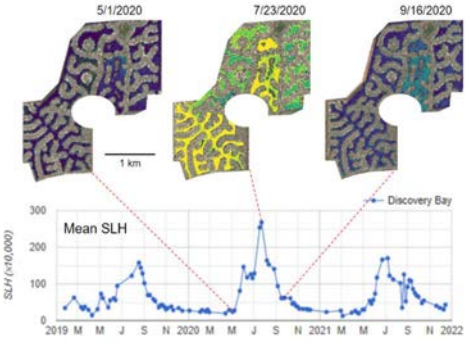


Figure 6. S2 Scattering Line Height (SLH) in Discovery Bay, a residential community in the Delta with an extensive network of narrow waterways used for recreational boating and swimming, that has experienced severe cyanoHAB events during recent summers. Top: Map-views of SLH signal (purple: low; yellow: high) before, during, and after a major event in 2020. Bottom: SLH time-series, Jan 2019- Dec 2021

<30m) product to estimate cyanobacteria bloom occurrence and intensity in narrow Delta channels and sloughs (Figure 6; Kudela et al, *in prep.*; SFEI, *in prep*.). For that Delta work, we adapted and tested scattering line height (SLH) algorithm, originally developed by Kudela et al.[47] using hyperspectral imagery, for application using S2 bands (B4 665 nm; B5 705 nm, and B7 783 nm).

While other factors have the potential to interfere with the SLH signal (e.g., elevated suspended sediment concentrations), the pilot work showed strong promise in terms of: i) SLH serving as a quantitative metric for cyano-bloom intensity that can be relied on with high-confidence/low-uncertainty for a broad range of seasonal-varying conditions (spanning low- and peak cyano-bloom season/summer occurrences); ii) complementary S2 metrics can be used for space/time assessment of confidence in SLH (e.g., High confidence: high-chl-*a*, low-SSC; lower confidence: low-chl-*a*, high-SSC). The same SLH methods have been tested in other waterbodies as part of a SWB project, and SLH is comparable in performance to the operational CIcyano index provided by NOAA when both are applied to larger water bodies (e.g. Lake Elsinore, CA).

Task 1.A.2, will: i) collect calibration data using high-resolution mapping surveys during years 1−3 (3−4 surveys per year); ii) test and refine the relationship between S2 SLH and *in situ* cyanobacteria conditions, using field data (pre-existing and new MERHAB funded data); iii) develop automated routines for generating the S2 SLH for relevant regions of the Estuary, which will be incorporated in the data integration elements of Obj. 2.

Project 1.B – Molecular monitoring of HAB taxa

Accurate and rapid identification of HA taxa within the phytoplankton community allows for early detection of HAB events and provides foundational data necessary for understanding HAB taxa ecology. Microscopic methods have been used to characterize Estuary phytoplankton since the 1970s, but the numerous methods that have changed over time have underscored the need for more consistent methods to develop an objective phytoplankton dataset. Additionally, there are inherent limitations to microscopic methods, including: the lack of stable morphological traits to distinguish some taxa, incongruities between morphology and evolutionary relationships, observer bias, and sample preservatives distorting or destroying taxa. Variations in microscopy methods have challenged phytoplankton trends, patterns, and interpretations across the FMC.

Molecular (DNA-based) methods[48,49] for characterizing phytoplankton community composition can overcome some limitations of traditional microscopic phytoplankton identification methods. Two common molecular methods are high throughput amplicon metagenomics (i.e., metabarcoding) and quantitative polymerase chain reaction (qPCR). Metabarcoding is used to sequence information rich gene targets and a variety of bioinformatic tools can then be utilized to

identify taxa represented in the sequencing pool. qPCR can quantify a gene of interest, this is often a taxonomic marker specific to a genus or group, or a toxin biosynthesis gene which is useful for estimating toxin production potential. qPCR generates results much faster than microscopy, in hours or a few days, while most microscopic contract labs take weeks or months to return phytoplankton enumeration results. Lastly, because qPCR amplifies DNA signal it tends to have a lower detection limit than microscopy methods, and thus is a more sensitive early warning indicator for presence of harmful taxa.

Metabarcoding has been used to monitor the phytoplankton community in the Bay since 2015 and it has become an integral part of the Bay monitoring program; however, it has been sparsely utilized in the Delta. In the Bay, 18S rRNA gene libraries are used to assign taxonomies for eukaryotes and the 16S rRNA gene is used to classify prokaryotes—including cyanobacteria. The method has been shown to reliably detect priority harmful taxa such as *Alexandrium* and *Pseudo-nitzschia* in the Bay[29]. Despite its complementary benefits to molecular monitoring, the 18S metabarcoding method cannot currently differentiate all desired HAB taxa. For example, *Akashiwo sanguinea*, which bloomed in 2005 in the Bay[17], cannot be identified using the SILVA database. Further, the initial database used for 18S metabarcoding (SILVA v132) did not identify *Pseudo-nitzschia*, even though this taxa frequently occurs in the Bay. By identifying and removing anomalous reference strains in the database, sequencing *Pseudo-nitzschia* cultures from California, and placing those sequences in the custom database, the bioinformatic pipeline can now reliably detect *Pseudo-nitzschia* in the Bay[29]. Efforts to curate a custom harmful algal 18S rRNA database for the Bay are underway. However, in the Delta, metabarcoding has only been used for research studies (e.g., [26,50,51]), but it is not integrated into any phytoplankton monitoring program. The initial metabarcoding work in the Bay has provided a framework for how to improve the accuracy and precision of 18S metabarcoding methods, but more work is needed in the Bay and Delta to resolve challenging taxa, such as *A. sanguinea*.

qPCR has been validated for *Alexandrium*, *Pseudo-nitzschia*, and *Microcystis* in the Estuary. However, it's use has been limited to special studies and, unlike the 18S and 16S metabarcoding, qPCR assays are not routinely used for monitoring in the Estuary.

Our goal is to 1) create a robust Bay-Delta metabarcoding database and implement metabarcoding in the Delta to create an integrated metabarcoding dataset for HAB monitoring across the FMC for, and 2) improve and validate qPCR assays to rapidly quantify the abundance of high priority harmful taxa.

1.B.1: Expanding and validating phytoplankton metabarcoding: We will collect samples for DNA metabarcoding analyses at 5 Delta stations (Figure 2). These stations will add to the 8 stations already sampled from Lower South Bay to Suisun Bay (Figure 2), providing the first Bay-Delta phytoplankton community dataset using the same method. Although phytoplankton have been monitored in the Estuary for 50 years, there has never been a single Estuary dataset collected by a single entity utilizing the same method. Samples from these 5 stations will be collected monthly in years 3 and 4. The same sample filtration and DNA extraction method will be used on all samples. After DNA is extracted the 18S rRNA gene will be amplified with PCR and sequenced on an Illumina MiSeq (300 bp). Sequences will be analyzed using the QIIME2 pipeline. We will continue to develop on Otten et al. 2021[29] work to refine the 18S database used for the Estuary. Using bioinformatic methods and resources (e.g. phylogenetic trees, BLAST, amplicon sequence variants), will continue to evaluate the performance of reference databases

(e.g., SILVA[52] and PR2[53]), for assigning taxonomic identities for eukaryotes. Additionally, we will begin to refine the 16S database for the Estuary, focusing on cyanobacterial sequences.

1.B.2: Expand and improve qPCR assays for rapid HAB enumeration: While there have been qPCR assays validated for *Alexandrium* and *Pseudo-nitzschia* in the Bay there are limitations to their design. These assays were designed to use the SYBR Green fluorescence chemistry method, which cannot be used in a multiplex assay. Assays will be enhanced to use Taqman (probe-based) chemistry, which will increase target specificity and enable assays to be multiplexed to detect multiple taxa simultaneously when using different fluoroprobes. We will develop and validate a Taqman qPCR assays for total *Alexandrium* and total *Pseudo-nitzschia*. Then we will develop a multiplex method (performing both qPCR assays simultaneously) to reduce analysis costs and time. We will also develop and/or validate new qPCR assays for other high-priority HAB taxa. Two potential candidates for consideration are *H. akashiwo* and *Dinophysis* because of the 2022 *H. akashiwo* bloom and *Dinophysis* has been identified as a high-priority taxa from the NMS and California Department of Health (CDPH) due to the frequent detection of diarrhetic shellfish (DSP) toxins in the Bay[5]. However, when choosing new organisms to target for qPCR development, we will consult with managers and other regional HAB scientists to make a selection based on management needs and expert opinions.

After the new qPCR assay is developed, we will integrate it into the multiplex developed for *Alexandrium* and *Pseudo-nitzschia*. The end goal will be to have a multiplex qPCR assay developed for 3 taxa that is then implemented into routine Bay monitoring programs. This will provide a lower cost method ($50-75 p/sample compared to $250-350 p/sample for microscopy) for monitoring programs to collect HAB abundance data. Furthermore, with all qPCR assays based on the Taqman method we can continue to develop additional assays that could be incorporated into the multiplex reactions. New instruments such as Bio-Rad's QX600 digital PCR platform enable multiplexing of up to 6 different gene targets within a single reaction.

Project 1.C – Community science phytoplankton monitoring for HAB taxa

In recent years, community scientists and environmental NGOs have demonstrated their ability to monitor HAB formation and resulting bloom impacts. For example, community scientists and individuals first documented the Bay's 2022 *H. akashiwo* bloom before agencies and regulators became aware of the situation. Citizen scientists then deployed crowd sourcing tools[54] to track observations of ~700 deceased White Sturgeon (*A. transmontanus*), at least 16 federally threatened Green Sturgeon, and scores of other fish. This work is now informing fishing regulations and multibillion-dollar management decisions affecting the Bay's wastewater sector. CDPH has a volunteer network that also send in water quality samples for phtyo identification.

Because of the proven value of community science in generating information related to HAB formation and impacts in the Bay, we will develop a community science monitoring program focused on monitoring HABs along shorelines and in marinas. This will spatially and temporally compliment the ongoing monitoring by CDPH volunteers. Sheltered shoreline and marinas can be incubators for HAB events, but due to their small size and proximity to land, they are difficult to monitor with satellites, and there is no consistent monitoring for HABs in these areas.

This task involves training 5−10 community scientist volunteers affiliated with proposal collaborator San Francisco (SF) Baykeeper, in microscopy methods and identification of key harmful algal taxa. Volunteers will monitor bimonthly from April through September, at ~5

shoreline or marina locations in the Bay (Figure 2). SF Baykeeper will allocate staff resources to recruit and train volunteers and work closely with co-PIs to oversee the successful implementation of the community science monitoring. We will not be creating new community science monitoring methods, but will partner with and join NOAA's Phytoplankton Monitoring Network[55] (PMN), receive training in their methods, and submit our data to their staff for data QA/QC. The PMN has been training and organizing community science monitoring for many years and will provide a foundation of expertise to generate reliable data on the occurrence of potentially harmful taxa along the Bay shoreline. SF Baykeeper will perform additional activities including maintenance of microscopy and field equipment, convening monthly meetings with citizen monitors to address issues of concern, and ensure volunteer engagement.

This task will result in three outputs to inform future monitoring programs in the Bay: 1) Data will serve as an early-warning indicator of potential HAB events developing along shorelines−with the potential to expand across the Bay (as occurred in 2022); 2) We will compare data documenting occurrences of harmful algal taxa along the shoreline with data collected from monthly monitoring cruises to determine if more comprehensive HAB monitoring is necessary along shoreline habitats; and 3) We will summarize the experience supporting a community science program and recommend best practices for implementing and continuing community science water quality programs in the Estuary.

Objective 2: Integrate and visualize data streams

Developing tools to deliver data to managers and stakeholders alike is a key goal for our project. The team will leverage new innovations in application programming interfaces (APIs) to facilitate the requisite data transfers, data processing, and resulting visualizations that are the key products made visible to researchers and managers. These innovations will form an abstraction layer between the raw data and the various applications that will be developed to render useful information. As a foundation for current and future work, this infrastructure will be open to a community of practitioners to enhance further, consistent with principles of open-source software development.). Upon these innovations, we will build data dashboards to enable managers to quickly retrieve and interpret water quality data in the Estuary (e.g. SFEI's cyanobacterial bloom dashboard[56] and API[57]. These data will be used to guide HAB event response, analyzed to understand HAB drivers, and utilized to inform management actions and policies. This data dashboard is also a point of accessibility for community-based scientists to recognize the potential for their scientific contributions and the ways that their own data fits into a bigger picture of water quality-related information. As such, this new data dashboard will incorporate existing data streams and also will include the new data products that will be generated by the proposed project.

Data telemetry: Not all SFEI water quality stations (Figure 2) are telemetered and able to provide real-time data. Currently, data is only available every 3−4 weeks when the instruments are serviced and files downloaded. Data must be telemetered to be integrated into a real-time dashboard and decision support tool. As part of Obj. 2, SFEI water quality stations will be equipped with telemetry infrastructure to deliver data remotely and enable real-time delivery.

HAB Data Dashboard: We will build an extensible, adaptable data dashboard to view all salient water quality monitoring data collected in the Bay. Currently, NOAA, USGS, and SFEI operate continuous water quality or hydrology stations in the Bay, some of which share their data through the CenCOOS Data Portal[58]. However, there is no Bay-specific data portal to rapidly

evaluate relevant information to determine the start of a HAB event, nor the impact of the event. The data dashboard will harness a mix of discrete sampled data that can capture a snapshot in time to furnish information relevant to research concerns. Thanks in large part to these long-term public investments and innovations pursued by technical partners at SFEI and USGS, such a dashboard for decision support is now possible. Bringing together various data types, including remotely sensed data, high-frequency data, and discrete data samples is not a trivial task. But the team has assembled data transformation libraries and special scripts to perform these integration tasks affordably and reliably. When pairing discrete and high-frequency data with new RS data sources, the data dashboard truly becomes a rich center of information about HABs.

Table 1. List of data streams that will be integrated into decision support tool dashboards. Bold text indicates new data streams generated by the MERHAB project.

Entity	Type	Locations	Data
Continuous data			
SFEI	**Continuous data Mooring**	Shoal moorings	fCHL, temp, turbidity
USGS	Continuous data mooring	San Mateo and Dumbarton Bridges	Temp, conductivity, turbidity
USGS	Continuous data Mooring	Suisun Bay, Confluence	fCHL, temp, turbidity, nitrate, conductivity
NOAA	Station	Alameda island	Tides, temperature, wind speed
Discrete data			
NMS	Discrete	Shoals	Nutrients, chl-*a*, phytoplankton
DWR EMP	Discrete	San Pablo and Suisun Bay	Nutrients, chl-a, phytoplankton
USGS Peterson	Discrete	Lower South Bay to Sacramento River	Nutrients, chl-*a*, phytoplankton
SF Baykeeper	**Community Science Microscopy**	East Bay	Phytoplankton
CDPH	Discrete	Pacific Ocean	Mussel toxins and phytoplankton
Remote sensing			
Sentinel 3 OLCI	**Remote sensing**	Bay	Chl-*a*
Sentinel 2 MSI	**Remote sensing**	Delta	Chl-*a*, cyanobacteria

Data Integration: While the data dashboard furnishes data visualizations including maps, graphics, and data summaries to aid in timely decision-making, the proposed work will also establish a strong foundation of durable data systems that undergird these visible assets. The team will integrate the various data streams mentioned above, such that their disparate formats and data sources are harmonized and, wherever possible, they can be rendered interoperable. Moreover, the scripting of the various data transformations and data exchange processes offer cost-effective automation to ensure that the data sources can continue to "talk to one another" into the future without incurring significant additional cost. This is a prudent way to establish a platform that can continue to evolve and adapt as new management questions emerge and new decisions must be made. The data integration platform and data dashboard work hand-in-hand to ensure alignment among various partners, stakeholders, researchers, and decision makers.

Objective 3: Fill knowledge and data gaps about transport of cells and toxins

The Northern portion of the Bay is the most ecologically fragile, with numerous managed fish species relying on it to access the Delta and upstream spawning areas. The North Bay is strongly

influenced by freshwater Delta inputs, and it is hypothesized that cyanotoxins are transported from the Delta to the Bay. Tracking toxins/HAB cells through the FMC will be used to inform managers if cyanotoxins and cyanobacteria cells are transported into the Bay from the Delta. Information will then be used to inform managers if it is necessary to conduct routine cyanotoxin monitoring in the transition zone between the Delta and the Bay.

To comprehensively understand HAB transport dynamics along the freshwater to marine continuum, multiple sampling modalities will be utilized including water grab samples, passive samplers (Solid Phase Adsorption Toxin Tracking, or SPATT), shellfish, and molecular tools. Sampling for this objective will be accomplished through two components; 1) boast based sampling of the center of the channel, and 2) shoreline sampling from docks. Boat based sampling will include sampling once per month for two years. Shoreline sampling will include sampling twice per month from June through November and once per month from December through May for a total of 18 sampling dates each year. Sampling for both components will cover an approximate 20-mile reach of the confluence.

Boat Based Sampling – This sampling effort will target water quality and HABs from the center of the channel. Samples will be collected from a USGS staffed boat (R/V Peterson) at four USGS Bay fixed monitoring stations between the Confluence to Carquinez Bridge (see Figure 2). At each station the following samples will be collected: 1) Phytoplankton– phytoplankton sample will be collected with a pump at 1 meter depth. Samples will be preserved in Lugol's iodine for phytoplankton microscopy identification and enumeration using established procedures[59,60]. 2) Chl-a – A Fluoroprobe will be utilized to collect spatial data. Water will also be collected on to filters for chl-a analysis. 3) Toxin samples – A filter will be collected for particulate toxin analysis. A SPATT sampler will also be deployed on a flow through system during the sampling of this region so that it traverses the entire 20-mile reach. SPATT samplers and filters will be analyzed at UCSC with LC-MS for microcystin, domoic acid, and (ELISA kits) saxitoxin. 4) Molecular samples – filters will be collected for DNA metabarcoding and qPCR assays. Refer to Obj. 1 on details for the molecular portion of this study.

Shoreline Sampling–This sampling effort will target four docks on the shoreline along the confluence. Stations will be accessed via vehicle and foot. Fixed shoreline stations will be used to 1) determine if toxins are present along the confluence shoreline and, 2) to determine if toxins are present in shellfish that are gathered by subsistence harvesters in the area. Samples will be collected by a USGS staff and a Restore the Delta community college intern from an underrepresented community (see Diversity and Inclusion statement with Stakeholder Engagement Plan). Shellfish will be sampled from dock pilings at 4 locations along this transect and/or collected directly from the substrate with a ponar. Species of shellfish in this area changes seasonally with salinity and we expect to sample *Corbicula fluminea* (lower salinity) *Potamocorbula amurensis* (higher salinity) depending on the time of year and overall annual precipitation. Both of these clams serve as a subsistence food source for local populations. SPATT samplers will be co-located at sites to enable comparison of SPATT and shellfish data as integrated samplers[61]. Samples will be collected approximately every two weeks from April – September for two years. We will collect approximately 30–80 shellfish (i.e., clams and/or mussels) from each station, on each date if possible. Both freshwater and marine toxins (microcystin, saxitoxin, domic acid) will be measured, using established methods [5,16,62,63], in shellfish and SPATT samples.

Objective 4: Develop a Coordinated HABs Strategy

This project was designed in close coordination with resource managers and stakeholders from across the region who identified two major challenges associated with monitoring and managing Bay-Delta HABs: 1) insufficient coordination among programs or regulatory-agencies charged with working on this topic, and 2) implementing and sustaining an integrated regional HAB monitoring program over such a large and diverse (biogeochemically, physically) system. The following two subtasks were designed to begin addressing these challenges.

*Project 4a – Convene a Management Transition Advisory Group (MaTAG)***:** This task includes working directly with managers to develop management relevant tools and deliverables that can be transitioned into State Agency and other local programs once the project ends. The MaTag will consist of State and Federal agency managers and NGOs. We have received commitment from the groups listed in **Error! Reference source not found.**, which represent a variety of management entities in the Bay-Delta. The MaTag will be co-chaired by an entity representing the Delta (PI Howard) and an entity representing the Bay (PI Mumley). The MaTag will have the following major tasks: 1) identify and refine the highest priority HAB-related management decisions; 2) receive updates from the co-PIs on the progress of the MERHAB tasks and provide feedback on the development of tools and the data dashboard to ensure these project deliverables are useful for managers 3) identify how tools developed in this project can be integrated into Bay-Delta water quality programs and water quality management decisions after MERHAB funding concludes; and 4) assist with development of the coordinated HABs Strategy. MaTAG meetings will be held at least twice a year (n=10 time over the course of the project). *Project 4b – Develop a Coordinated HABs Strategy (Strategy)*: Managers have identified a need for a coordinated HABs strategy across the Estuary to ensure optimal monitoring and response procedures are in place for the numerous groups that work on HAB-related science. The need for this strategy has been identified in a number of established California HAB documents – details of these specific documents are provided in the application to management section below. The Strategy will be a written document comprised of five primary components plus an adaptive management section. Strategy components include; 1) ideas for collaboratively and efficiently conducting monitoring activities; 2) identifying a common process for data reporting, storage, and sharing; 3) a framework to ensure continued communication between the various managers; 4) a decision tree to provide actions necessary to respond to a HAB event, and 5) a roadmap for implementing the strategy that identifies ideas avenues for future funding. The Strategy will incorporate information collected and tools developed in Objectives 1 – 3, findings from the Delta HAB strategy that is currently in preparation, and input from the numerous special studies that are being conducted on

Table 2. Entities participating in the Management Transition Advisory Group

Entity	Category	Region
San Francisco Water Board	Water quality regulator	Bay
Bay Area Clean Water Association	Wastewater treatment plant agency	Bay
Baykeeper	Advocacy NGO	Bay
State Water Board	Water quality regulator	Bay-Delta
CA Dept. of Fish and Wildlife	Fish and wildlife regulator	Bay-Delta
NOAA Fisheries	Fish regulator	Bay-Delta
Central Valley Water Board	Water quality regulator	Delta
CA Dept. of Water Resources	Water resources manager	Delta
Delta Stewardship Council	Independent science agency	Delta
Restore the Delta	Advocacy NGO	Delta

HABs across the Bay-Delta. PI's Preece and Howard will lead Strategy development and will incorporate input from managers involved in the MaTag. This will ensure that it includes all relevant information and the final Strategy is designed in a way that it useful to managers. As co-lead of the MaTag Howard will ensure managers play a key role in strategy development.

MERHAB Research Topics and Value to MERHAB Program Goals

Our proposed research meets the three MERHAB priorities stated in the 2022 RFP. First, we will "Mitigate HAB impacts by incorporating proven research products into monitoring applications and advocating for their adoption into routine operation." We will enhance existing monitoring strategies by expanding use of metabarcoding into the Delta and refining the metabarcoding database. This community-based genetic monitoring can then be used in combination with other field-based monitoring to better understand HAB dynamics across the Estuary. Utilizing genetic monitoring will reduce costs and effort while more reliably monitoring HABs. Second, we will "Support validation of HAB applications, comparison to existing technologies, and training needed to effectively utilize and support their adoption." This will be accomplished by field validation and calibration of remote sensing data. Finally, we will "Demonstrate the value of using HAB technologies to increase utility of enhanced monitoring and regional observing systems for HAB early warning and forecasting" by integrating data into a data dashboard.

Our project will also advance the following two MERHAB focus areas. 1) "Address management concerns associated with emerging ecosystem and public health threats associated with multiple HAB toxins, including cyanotoxins, in coastal waters" – Objective 3 was designed to address toxins in shellfish consumed by subsistence consumers while Object 4 was specifically designed to address HAB management concerns; and 2) "Enhance regional HAB observing capabilities and foster the National HAB Observing Network (NHABON) to support early warning, forecasting, and ecological research to better assess climate change impacts on HABs. Efforts will further NCCOS-IOOS collaboration and leverage capabilities of IOOS Regional Associations" – Task 1.A.1will work directly with NCCOS to incorporate the Bay-algorithm into their automated data-processing pipeline. Objectives 1–3 are in place to support early warning, forecasting, and research to assess climate change impacts on HABs.

Our work is also building off a previous MERHAB project, thus allowing our project to utilize previous NOAA investments in California. One goal of this project is to begin to implement recommendations made in the previously funded MERHAB: *Improving Tools for Monitoring Multiple HAB Toxins at the Land-Sea Interface in Coastal California*[34], by convening the MaTag and developing an Estuary specific Coordinated HABs Strategy.

Relation of research approach to previous work by PIs

All PIs have worked on HAB issues in the Estuary and elsewhere (see publication list and biosketches details). The PIs have worked together on various projects for over 10 years and bring deep expertise to the project. Senn is the lead scientist for the NMS and has led, or helped coordinate, all HAB research in the Bay in that time. Senn has worked with Kudela through a NASA funded project to evaluate RS of chl-*a*. In addition, to his RS expertise, Kudela has been the primary researcher to measure toxins in the Bay over the last decade. Bouma-Gregson has worked with both Kudela and Senn to collect field data for remote sensing validation, and he has researched cyanobacterial metagenomics. Bouma-Gregson, also co-authored the FE-HAB Strategy[33] for California and Kudela and Howard served on the Technical Advisory Committee

that informed the FE-HAB Strategy. Kudela and Howard have worked together to study HA across the FMC through two previous MERHAB projects, and have published papers[1,34] on how to approach HAB monitoring in estuaries. Kudela and Howard were instrumental in initiating the California HABMAP[64], an integrated statewide network which coordinates marine HAB researchers and responders by facilitating information exchange. Otten is a molecular ecologist who has developed many of the molecular methods[29] currently used for HA monitoring in the Bay. Preece, Otten, and Senn have collaborated on two prior projects studying presence of cyanotoxins in Delta shellfish and source tracking *Microcystis* through the Delta. Howard and Mumley work in regulatory agencies and are responsible for maintaining Estuary water quality. Mumley co-chairs the Bay Regional Monitoring Program and oversees implementation of the NMS documenting the technical studies required to support nutrient management decisions. Howard co-chairs the Delta Regional Monitoring Program and oversees implementation of the Delta Nutrient Research Plan[65] (NRP) adopted by the CVWB which highlights data gaps and research and monitoring needs to address nutrient and related Delta HAB issues. Together this team represents the required technical (remote sensing, molecular, fieldwork) and science-management interface experience to perform the proposed work.

Function of each PI

The core project team consists of Dr. Senn (SFEI), Dr. Bouma-Gregson (USGS), Dr. Preece (DWR), Dr. Otten (Bend Genetics, LLC), Dr. Kudela (UCSC), Dr. Chelsky (SFEI), Dr. Howard (CVRWB), and Dr. Mumley (SFRWB). The function of each PI is described below.

PI SENN: Will serve as joint lead PI and oversee subaward contracts. Senn will co-lead remote sensing tasks (Obj. 1A) and help coordinate Objective 2 with our SFEI and USGS collaborators. Senn will also co-lead the Coordinated Monitoring Strategy (Obj. 4) and help identify Bay management needs along with PI Mumley. He will also assist with coordination of data collection, analysis, reporting and dissemination and co-authored reports and publications.

PI-BOUMA-GREGSON: Will serve as joint lead PI and help coordinate the project team. He will also oversee data collection efforts conducted by the USGS (Obj. 1 and 3). He will also coordinate Project 1.C with the project collaborators (SF Baykeeper). He will provide analytical and technical support pertaining to all publications. He will be responsible for report writing and lead publication writing.

PI PREECE: Will serve as joint lead PI and oversee all research activities and project coordination, including communication with NOAA program managers. She will lead Obj. 3 ensure completion of all components on the project and its deliverables including data management. She will also co-lead the Coordinated Monitoring Strategy (Obj. 4). She will help coordinate interns from Restore the Delta interns. She will be responsible for report writing and lead publication writing.

PI OTTEN: Will oversee all molecular laboratory analyses and assay development through Bend Genetics, LLC (Obj. 1B and Obj. 3) and contribute to bioinformatic analyses (Obj. 1B). He will also provide analytical, technical, and writing support pertaining to all reports and publications.

PI KUDELA: Will co-lead remote sensing (Obj. 1A) project. He will also provide SPATT samplers and analyze shellfish/filtes/SPATT samples for toxins with LCMS or ELISA (Obj. 3) and will perform other associated laboratory analyses. He will also provide analytical, technical, and writing support pertaining to all reports and publications.

PI CHELSKY: Will lead the mooring network expansion (Obj. 1A) and addition of telemetry (Obj. 2); contribute to the Coordinated Monitoring Strategy (Obj. 4); contribute to project integration and overall project management including overseeing data sharing and data management (new data generated by MERHAB funds); She will also provide analytical, technical, and writing support pertaining to reports and publications.

PI-HOWARD: Will co-chair the MaTag and coordinate in-kind staff support from the CVWB (Obj. 1). She will also co-lead and coordinate the HAB Strategy (Obj. 4), and she will help identify resources to implement the tools and products developed through this project into State and local programs. She will also provide writing and analytical support pertaining to all reports and publications.

PI-MUMLEY: Will co-chair the MaTAG and provide a nexus to the management community within the Bay. He will also identify resources to implement the tools and products developed through this project into State and local programs.

B. Application to Management

This project was motivated by, and is designed to target, the urgent need for establishing a robust and sustained HAB monitoring program to assess condition and inform near-term management decisions in the Estuary. The PIs include researchers that are pursuing HAB-related monitoring estuary-wide (USGS, SFEI, UCSC, DWR) and state/regional water quality managers/regulators that have monitoring and decision-making mandates across the system (CVWB, SFWB). SFEI is a boundary organization working at the interface between science and policy, building consensus on and pursuing sound science to support effective environmental decision making and policy. Establishment of the MaTAG, provides a further connection to water management agencies and decision-makers. Thus, this project is uniquely positioned to ensure that results are incorporated into water quality and coastal management.

Significance of Project to Management Priorities and Needs

Our Project was designed to meet multiple management priorities and needs that are described in multiple Estuary specific and State documents. Our proposed technical components focus on refining and operationalizing HAB-related work that has already been pursued through pilot or on-going projects and is identified as high priority by management entities. For example, NMS has identified HABs as a high priority science issue since the program launched in 2014, and an even greater priority after the 2022 HAB event. NMS is a regulatory-mandated science and monitoring program charged with building the scientific foundation to inform major nutrient management decisions, including the potential for more than $10 billion in WWTP upgrades. SFEI serves as the technical lead of NMS, with programmatic oversight from a multi-stakeholder/regulator steering committee (chaired by PI-Mumley). Over the last 9 years, >$1.5mill of NMS funds have been directed toward HAB monitoring activities targeting high-priority data/monitoring needs, identified in planning documents[4,6,28] many of which form the basis for this project's technical tasks (e.g., toxins in bivalves; molecular work, Sentinel-3 chl-*a* work). Additionally, all objectives implement recommendations and priorities of the SWB's FE-HAB Monitoring Strategy (See section above *Estuary HAB information and management needs* for FE-HAB Monitoring Strategy overview). Below, is a description of how each objective meets management priorities described in these existing documents.

Objective 1 focuses on development of remote sensing and molecular tools which will increase

the monitoring information available that can serve as early warnings of HAB events and for evaluating HAB drivers. This objective directly informs FE-HAB strategy Recommendation #2, "*Strengthen the incorporation of remote sensing into FE-HAB monitoring program and can be integrated into the NOAA National HAB Observing Network framework*"[40]. The molecular tools developed will build upon and operationalize current efforts in the Bay by the NMS, and will provide valuable information to the Interagency Ecological Program Genetics Project Work Team[66], and will expand the SWB's eDNA Metabarcoding Monitoring and Analysis Project (SeMMAP)[67] program into marine and estuarine environments (currently only freshwater focused). Partnering with community science organizations to develop a partner monitoring program that generates HABs data is another priority in the FE-HAB Strategy (Recommendation #1: Develop and implement a partner monitoring program).

Objective 2 will inform multiple management priorities including the Delta Stewardship Council's Science Action Agenda priority 1.A, "*Establish publicly accessible repositories, interactive platforms, and protocols for sharing information, products, and tools associated with monitoring and modeling efforts, in support of forecast and scenario development, timely decision-making, and collaborative efforts*."[41]. The SWB funded SFEI to build a freshwater HABs web-portal[56], and we will expand this platform to include additional RS products and spatial coverage. Data delivery products and pipelines we will generate will support the State and Regional Water Boards goals in the Strategic Data Management Action Plan to generate open data that can be used to make decisions[42], "*Use Data to Govern: our organization uses data to govern and makes decisions that are in the best interest of our mission(s).*" This objective also aligns with the FE-HAB Strategy Recommendation #6, "*Work to integrate HAB monitoring elements into all relevant Water Board programs, permits, and policies, which includes decision support to facilitate use of HAB data for management decisions*."

Objective 3 will fill key information gaps about cell and toxin transport across the FMC. HABs coordination across jurisdictional boundaries is hindered by our lack of knowledge about how toxins and cells move across these boundaries. By conducting special studies, we are implementing recommendations made in the previously funded MERHAB, *Improving Tools for Monitoring Multiple HAB Toxins at the Land-Sea Interface in Coastal California*. Recommendations from the MERHAB FMC HAB Strategy include, monitoring multiple toxins and coordinated monitoring across boundaries[29]. The information generated also aligns with several recommendations in the State FE-HAB strategy (see above).

Objective 4 – the development of a coordinated Estuary HABs Strategy **–** implements recommendations from the NMS, FE-HAB, and FMC HAB Strategies and will inform nutrient management strategies and plans such as the Bay's NMS[4] and the Delta's NRP[65]. Coordinated monitoring among multiple partners and supplemented by technologies, like remote sensing (Obj. 1A), and data tools such as the data dashboard (Obj. 2) are key aspects for informing management decisions. Objective 4 also addresses Item 2B of the Delta Science Action agenda, "*Develop a framework for monitoring, modeling, and information dissemination in support of operational forecasting and near real-time visualization of the extent, toxicity, and health impacts of harmful algal blooms (HABs)*"[41]. Development of the Strategy will be leveraged with a current project by the Delta Science Program to develop a Delta specific HAB monitoring strategy and is based on a November 2022 workshop where Bouma-Gregson, Preece, Howard, and Senn were organizers and presenters. Preece is lead author of this document.

The MaTag will establish the first coordinated Bay-Delta HAB management group in the region. Development of this group is critical for future HAB management decisions to be made in a coordinated and cohesive way. It will provide a direct mechanism for management engagement in the development of project tools and the HAB Strategy.

Outputs and Outcomes

Outputs: Specific outputs from this are described in Table 3. Estuary managers need more HAB data for event response and to better understand the spatiotemporal distribution of HABs and HAB drivers. While more information will benefit managers it is also critical to have communication plans and inter-agency cooperation to ensure effective decision making.

Table 3. Outputs that will be generated by each project objective.

Objective	Description	Outputs
1.A	Remote sensing	Calibrated algorithms for the Estuary; new application of Sentinel-2 MSI data for narrow channels; integration into NCCOS operational products; publications; management decision making tool.
1.B	Molecular monitoring	Curated molecular databases for harmful algal identification; rapid qPCR data for measuring harmful algal abundance; integration of molecular methods across FMC; publications on utility of molecular methods (qPCR and metabarcoding) for HAB monitoring;
1.C	Community Science	Publications on potential of shoreline areas as habitats for harmful taxa; Publications on how to integrate community science into regional monitoring programs; establishment of partner monitoring; key data input to data dashboard.
2	Integrated data	Data dashboards visualizing real-time and discrete data for event response and ecosystem knowledge; management decision making tool.
3	Toxin transport	Publications about how toxins travel between riverine and coastal regions of SF Estuary; Information to inform multiple HAB strategies and management plans.
4	Coordinated strategy	Framework for how to coordinate HAB monitoring across the Estuary and establishment of a coordinated Estuary management group.

Management outcomes: This project will lead to demonstrable changes in knowledge within the Estuary management community by providing outputs that; 1) expand the use of metabarcoding and refine the metabarcoding database by improving specificity, detection limits, and turnaround time to better understand HAB dynamics, 2) clarify if HAB taxa and toxins move between the Delta and Bay, and 3) improve satellite RS output for smaller waterways to inform timely manager response. These **outcomes** of improved management knowledge can lead to **outcomes** that result in changes in management approach by; 1) informing monitoring program design; 2) informing future amendments or changes to Basin Plans that address water quality impairments due to HABs; 3) inform if or how the SFWB changes their strategy for managing Bay nutrients as they are currently evaluating if nutrient management need to be incorporated in WWTP permits that will renew in 2025; and, 4) inform decisions surrounding water management and drought issues that are relevant to the Water Resilience Portfolio[68], which will equip California to better cope with extreme droughts and floods, rising temperatures, and climate change. The ultimate goal of these changes in management approach **outcomes** is to improve the environmental condition of the Estuary to reduce the potential for future HAB events. Although this project is Estuary focused, information gathered in this project can be applied to other estuarine systems by providing a methodology to track blooms, determine best monitoring locations, and ideas for establishing management coordination.

BACWA BAY AREA CLEAN WATER AGENCIES

DRAFT

BACWA FY25 BUDGET	Line Item Description	FY24 Budget	FY25 Budget	% change	FY25 NOTES
REVENUES & FUNDING					
Dues	Principals' Contributions	$537,795	$553,929	3%	FY25: 3% increase 5 @ $110,786
	Associate & Affiliate Contributions	$190,078	$195,780	3%	FY25: 3% increase. 12 Assoc: $9142 47 Affiliate: $1831; UC Berkeley $500
Fees	Clean Bay Collaborative	$675,000	$675,000	0%	Same as FY23. Prin: $450,000; Assoc/Affil: $225,000
	Nutrient Surcharge	$1,400,000	$1,600,000	14%	See Nutrient Surcharge Spreadsheet
	Member Voluntary Nutrient Contributions				
Other Receipts	AIR Non-Member	$7,361	$7,582	3%	3% increase (Santa Rosa)
	BAPPG Non-Members	$4,140	$4,264	3%	3% increase (Sta Rosa, Sac Reg'l, Vacaville) $1,421/each
	Other				
Fund Transfer	Special Program Admin Fees (WOT)	$1,000	$1,000	0%	
	BACC Admin Fees	$38,520	$39,522	2.6%	400 hours of AED support $98.80/hr
	BABC Admin Fees	$6,000	$6,000	0%	ED, AED and RPM support
Air Toxics	CASA Passtrhough		$100,000		New in FY25
Interest Income	LAIF	$60,000	$60,000	0%	BACWA, Legal, & CBC Funds invested in LAIF
	Total Revenue	**$2,919,598**	**$3,243,077**		
BACWA FY25 BUDGET	***Line Item Description***	**FY24 Budget**	**FY25 Budget**		**FY25 NOTES**
EXPENSES					
Labor					
	Executive Director	$218,548	$224,230	2.6%	(incl 2.6% CPI SF Bay Metro Area Dec 2023)
	Assistant Executive Director	$92,024	$94,417	2.6%	(incl 2.6% CPI SF Bay Metro Area Dec 2023); $78.68/hour; Reflects 1200 hours
	BACC Administrator	$38,520	$39,522	2.6%	400 hrs AED support at $98.80 per hr
	Regulatory Program Manager	$152,179	$156,136	2.6%	(2.6% CPI SF Bay Metro Area Dec 2023); $115.65/hour, Reflects 1350 hours
	Total	**$501,271**	**$514,304**		
Administration					
	EBMUD Financial Services	$43,297	$43,297	0%	FY25 no change
	Auditing Services	$5,561	$5,672	2%	Finanical Auditors through EBMUD; per auditor rate schedule
	Administrative Expenses	$8,118	$4,059	-50%	50% less than FY24
	Insurance	$9,351	$10,753	15%	15% increase from FY24 (10-15% est. increase per Alliant)
	Total	**$66,327**	**$63,781**		
Meetings					
	EB Meetings	$2,760	$2,760	0%	No change from FY24
	Annual Meeting	$14,369	$14,369	0%	No change from FY24
	Pardee	$6,801	$6,801	0%	No change from FY24
	Misc. Meetings and conferences	$7,500	$10,000	33%	33% increase from FY24 to accommodate conferences
	Total	**$31,430**	**$33,930**		
Communication					

EXPENSES					
	Website Hosting / Domain registration	$728	$743	2%	2% increase from FY24, Go Daddy website hosting and domain registration
	File Storage	$796	$812	2%	2% increase from FY24, box.net
	Website Development/Maintenance	$1,592	$1,624	2%	2% increase from FY24
	IT Support (As Needed)	$2,759	$2,814	2%	2% increase from FY24
	BACWA Value of Wastewater Communication	$40,000	$40,000	0%	New line item in FY24, no change from FY24
	Other Communication	$1,857	$1,894	2%	2% increase from FY23; MS Exchange, Survey Monkey, PollEv, Zoom, Netfile
	Total	**$47,732**	**$47,887**		
Legal					
	Regulatory Support	$2,929	$2,987	2%	2% increase from FY24
	Executive Board Support	$2,355	$2,403	2%	2% increase from FY24
	Total	**$5,284**	**$5,390**		
Committees					
	AIR	$76,000	$76,000	0%	$75k consulting support, $1k misc expenses
	AIR support for ACE	$20,000	$0	-100%	sunset
	BAPPG	$159,000	$179,000	13%	Includes CPSC @ $5,000, OWOW @ $10,000, NSAC @ $10,000 and Pest. Reg Spt. @ $71,500
	Asset Management Committee		$500		New line in FY25
	Biosolids Committee	$0	$0		
	Collections System	$56,000	$30,500	-46%	SSS WDR Support
	InfoShare Groups	$500	$1,500	200%	Requested $1000 increase from FY24 for Annual Meeting lunch
	Laboratory Committee	$4,050	$500	-88%	TNI Training ending
	Permits Committee	$500	$500	0%	No change from FY24
	Pretreatment	$500	$500	0%	No change from FY24
	Recycled Water Committee	$10,000	$500	-95%	Requested default budget amount for FY25
	Misc Committee Support	$45,000	$45,000	0%	No change from FY24
	Manager's Roundtable	$1,000	$1,000	0%	No change from FY24
	Total	**$372,550**	**$335,500**		
Collaboratives					
	Collaboratives				
	State of the Estuary (SFEP-biennial)	$0	$0		Bienniel in Even Fiscal Years
	Arleen Navarret Award	$2,500	$2,500	0%	Next Award is FY26
	BayCAN	$5,000	$5,000	0%	
	~~Bay Area One Water Network~~	~~$5,000~~	~~$0~~		~~No change from FY24~~
	Bruce Wolfe Scholarship	$4,000	$4,000	0%	FY22, FY23, FY24, FY25 FY26
	Passthrough to CASA for air toxics	$425,000	$500,000	18%	New line item in FY24
	Misc	$1,500	$1,500	0%	NBWA
	Total	**$443,000**	**$513,000**		
Other					
	Unbudgeted Items				
	Other				

EXPENSES					
Tech Support					
	Technical Support				
	Nutrients				
	Watershed Permit NMS Contribution	$1,800,000	$2,200,000	22%	Advance funding for 2nd Watershed Permit Sciece Studies; Final $ TBD
	~~NMS Voluntary Contributions~~				
	Additional work under permit	$100,000	$100,000	0%	Includes HDR PO for $225k spread out over FY20-24.
	~~Regional Study on Nature-Based Systems~~	~~$80,000~~	~~$0~~		~~SFEI $500K, expires 06/30/2022; Possible funds left over from FY23 to be spent on additional work~~
	~~Regional Recycling Evaluation~~	~~$0~~	~~$0~~		~~HDR $154K, expires 12/31/2023~~
	~~Nutrient Workshop(s)~~	~~$0~~	~~$0~~		~~Pilot Studies/Plant Review/Innovative Technologies; Might change~~
	NMS Reviewer	$50,000	$50,000	0%	No change from FY24, M. Connor Contract
	Regional Nutrient Special Study		$100,000		New item in FY25
	General Tech Support	$100,000	$100,000	0%	AB617 emissions factors, PFAS, other nutrient support
	CEC Investigations	$60,000	$10,000	-83%	PFAS Study Phase 3
	Risk Reduction	$12,500	$12,500	0%	APA FSS completed $12,500 contract in FY20, CIEA will complete $12,500 contract in FY23
	Total	**$2,202,500**	**$2,572,500**		
	TOTAL EXPENSES	**$3,670,095**	**$4,086,292**		
	NET INCOME BEFORE TRANSFERS	**-$750,497**	**-$843,215**		
	TRANSFERS FROM RESERVES	**$750,497**	**$843,215**		aligns with strategy of drawing down reserves to lessen impact of Nutrient Surcharge
	NET INCOME AFTER TRANSFERS	**$0**	**$0**		
	TOTAL OPERATING BUDGET		**$1,513,792**		
	OPERATING RESERVE		**$378,448**		

Nutrient Surcharge; CBC reserve at $1,000,000

Draft FY25 Nutrient Surcharge

BACWA Agency	FY 25 Nutrient Surcharge*	% Change from FY24 to FY25	$$ Change from FY24 to FY25	% Change in 3-year-average Load	% Change in % Contribution from FY24 to FY25
Basis for Allocation	**TIN (Oct 2020-Sept 2023)**				
Amount Needed Science Funding	**$1,600,000**				
CCCSD	$140,602	16%	$ 19,357	0%	1%
EBDA	$270,608	13%	$ 30,465	-3%	-1%
EBMUD	$308,436	13%	$ 36,222	-3%	-1%
San Jose	$128,866	6%	$ 7,524	-9%	-7%
SFPUC Southeast	$226,513	13%	$ 25,188	-3%	-2%
American Canyon	$763	12%	$ 81	-4%	-2%
Benicia	$7,418	17%	$ 1,062	0%	2%
Burlingame	$12,123	2%	$ 282	-12%	-10%
CMSA	$35,777	11%	$ 3,608	-5%	-3%
Crockett (Port Costa)	$58	20%	$ 10	3%	5%
Delta Diablo	$41,246	16%	$ 5,655	-1%	1%
FSSD	$36,347	17%	$ 5,351	1%	3%
Las Gallinas[(b)]	$2,793	-16%	$ (543)	-28%	-27%
MSD 5 (Tiburon & Paradise Cove)	$1,707	28%	$ 377	10%	12%
Millbrae	$8,967	13%	$ 1,037	-3%	-1%
Mt. View	$2,900	5%	$ 144	-10%	-8%
Napa SD	$4,331	42%	$ 1,279	22%	24%
Novato SD	$4,680	60%	$ 1,759	37%	40%
Palo Alto	$74,289	20%	$ 12,493	3%	5%
Petaluma	$323	73%	$ 136	48%	51%
Pinole	$12,112	35%	$ 3,165	16%	18%
Rodeo SD	$1,559	32%	$ 375	13%	15%
SFO Airport	$3,280	119%	$ 1,783	88%	92%
San Mateo	$47,057	17%	$ 6,968	1%	3%
Sausalito-Marin City SD	$4,250	14%	$ 525	-2%	0%
Sewerage Agency of SM	$8,033	22%	$ 1,452	5%	7%
Sonoma Co Water Ag	$833	9676%	$ 824	8289%	8454%
SVCW	$87,164	16%	$ 12,169	0%	2%
South SF	$40,905	25%	$ 8,149	7%	9%
Sunnyvale	$32,997	32%	$ 8,005	13%	16%
Treasure Island	$696	25%	$ 141	8%	10%
Vallejo Sanitation & FCD	$28,348	15%	$ 3,650	-2%	0%
West County Agency	$24,019	6%	$ 1,305	-9%	-7%
Total					
Principals Only	$1,075,026	12%	$ 118,757	-4%	
Total w/o principals	$524,974	18%	$ 81,243	2%	
Total	**$1,600,000**				

BAY AREA CLEAN WATER AGENCIES
ANNUAL MEETING PROGRAM - DRAFT
May 3 2024
David Brower Center
Berkeley, CA

TIME	DESCRIPTION	SPEAKER
8:30am - 9:00am	**Coffee in the lobby**	
9:00 am - 9:15 am	**Welcome/Introduction** **Year in Review**	Amit Mutsuddy, BACWA Chair/ EBMUD Lorien Fono, BACWA
9:15 am - 10:30 am	**Regulator Priorities** Bay Area Air Quality Management District USEPA State Water Resources Control Board staff San Francisco Bay Regional Water Board staff Q&A	**Moderator:** Phil Fine? Ellen Blake Karen Mogus Eileen White
10:30 am - 11:00 am	**Break - Coffee and snacks in the foyer**	
11:00 am - 12:30 pm	**Nutrients - Moderated Discussion** Watershed permit Scientific Underpinnings **Facilitated Discussion**	**Moderator:**
12:30 pm - 1:30 pm	**Lunch - On the terrace**	
1:30 pm - 1:40 pm	**Arleen Navarret Award Presentation**	
1:40 pm - 1:50 pm	**BACWA Leadership Recognition**	**Amit Mutsuddy, BACWA Chair/EBMUD**
1:50 pm - 2:30 pm	**Workforce Development Panel**	**Moderator:**
2:30 - 2:50	CASA Pooled Emissions Study	**Moderator:**
2:50 - 3:10	Climate change subject - tbd	
3:20 pm - 3:30 pm	**Annual Meeting Wrap-Up**	**Amit Mutsuddy, BACWA Chair/EBMUD**
3:30pm	**Adjourn - Social hour**	

Arleen Navarret Leadership Award

Nominee:
Name: _____ *E-mail:* _____

Nominator:
Name: _____ *E-mail:* _____

Agency: _____ *Phone:* _____

What is it?

This award of $2,500 was created in honor of Arleen Navarret and her dedication to improving the health of the San Francisco Bay. Arleen spent nearly 30 years with the San Francisco Public Utilities Commission and provided leadership to BACWA and Tri-TAC boards and committees. Her combination of technical and regulatory expertise and interpersonal skills has been invaluable to BACWA. Her development of effective relationships with regulators and community-based non-profits has resulted in the development of more thoughtful and effective water quality regulations. This is a biennial award honoring emerging leaders in the wastewater community exhibiting characteristics possessed by former BACWA Chair, Arleen Navarret:

- Leadership in the workplace and wastewater community
- Commitment to environmental protection
- Mentorship of and compassion for others
- Technical expertise
- Ability to communicate effectively with a myriad of people
- Exemplary public service.

Who is eligible?

Only current employees of BACWA member agencies are eligible to receive this award.

How to apply

Applicants may nominate themselves, or be nominated by their colleagues. Applications must include:

1. Completed Nomination Form
2. Individual Narrative (in the following format)
    a. nominee name at the top of each page
    b. no more than 2 pages of double-spaced, 12 point font
    c. concise introductory paragraph describing who the individual is and why they are being nominated
    d. subsequent paragraphs that address
        i. specific work or activities of the nominee that meet the one or more of the following criteria for the award: leadership; environmental protection; mentorship; tech expertise; effective communication; public service
        ii. the specific opportunity to which the award could be applied and how it would benefit the awardee in their professional development related to one or more of the following: leadership; environmental protection; tech skills development

Arleen Navarret Leadership Award

e. concluding paragraph describing how this individual has or has the potential to positively impact and contribute to the wastewater community.

Deadline and Selection

Applications are due March 27, 2024 and should be submitted by e-mail as an attachment to jdyment@bacwa.org. The winner will be selected by the Award Committee and the award will be presented to the recipient at the BACWA Annual meeting on May 3, 2024. (Funds may be used for travel, lodging and meals, but not any alcoholic beverages.)

FY2024-25 BACC Update

February 2024

Based on the results of the BACC Annual Chemical Survey we will be preparing the bid documents for the following chemicals:
Aluminum Sulfate
Ammonium Sulfate
Aqueous Ammonia
Citric Acid
Ferric Chloride
Ferrous Chloride
Hydrofluosilicic Acid (Fluoride)
Liquid Chlorine
Sodium Bisulfite
Sodium Hydroxide
Sodium Hypochlorite
Sulfuric Acid

BACC Agencies submitted their Estimated Quantities and Delivery Details spreadsheets. By December 1, 2023.

FY2024-25 BACC Bid Timeline

- ~~Agency FY2024-25 Estimated Quantities, Delivery Details, Contact information due December 1, 2023~~
- ~~Updating database and preparing draft of bid documents. December 2023~~
- ~~Agencies will review and approve FY2024-25 BACC bid documents late December 2023 until first week or two of January 2024~~
- **Bids will go live in Planet Bids on January 25, 2024**
- **Bids will be opened in Planet Bids on February 22, 2024**
- Preliminary Bid Results reports will be available for agencies to review February 27, 2024
- Recommendations will be available for agencies to review mid March 2024
- Awards Letters will be issued to vendors late March early April 2024

Recycled Water Committee –
Report to BACWA Board

Recycled Water Committee Meeting on: 01/16/2024
Executive Board Meeting Date: 02/16/2024
Committee Chairs: Stefanie Olson, Reena Thomas

Committee Request for Board Action: None

44 attendees, all participating remotely, including representatives from 15 member agencies and two guest speakers

Direct Potable Reuse Feasibility Study at NapaSan / City of Napa

Andy Salveson (Carollo Engineers) provided an overview of a feasibility study that NapaSan and the City of Napa are completing to explore Direct Potable Reuse (DPR) in their community. The slides are available here. The purpose of the project is to help the City understand whether DPR would be a feasible water supply alternative now that the State Water Board has adopted DPR regulations (link). The presentation covered attributes of three DPR alternatives, including:

- Selection of source water - NapaSan treated wastewater and possibly stormwater;
- A facility flow rate, which is limited by the availability of NapaSan's treated wastewater to time periods when the recycled water is not currently being used (i.e., not summer);
- Project siting and treatment trains, including compliance with aspects of the new DPR regulations such as dilution of one-hour chemical spikes, design of Engineered Storage Buffers, and staffing requirements for operations.
- NPDES permitting considerations for RO Concentrate disposal into the Napa River, which would be affected by the Regional Water Board's proposed Basin Plan Amendment (link).

Cost estimates are still under development, but are expected to be relatively high because of the limited supply of wastewater. For more information, contact Carollo's Andy Salveson or NapaSan's Andrew Damron.

Cross-Connection Control Policy Handbook

Stefanie Olson (DSRSD) reported on revisions to the Cross-Connection Control Policy Handbook (CCCPH) which were adopted in December. Meeting attendees noted that In the 2021 public comments for the CCCPH a modification request was to clarify that installation of a swivel-ells is optional for a public water system. The State's response was that the "CCCPH sets the minimum requirements, public water systems can have more restrictive requirements."

Follow-up from September 2023 Workshop on Interagency Collaboration

BACWA will soon circulate a follow-up survey to the September 2023 workshop on interagency collaboration on water reuse. Slides and a meeting summary are now available.

Funding Opportunities

Sachi Itagaki (Kennedy Jenks) reported that the Bureau of Reclamation is accepting funding applications for large-scale recycling programs through March 29th (link). The State funding situation is currently uncertain. New state funding is unlikely unless a climate bond is passed.

Regional Water Board Updates

Melissa Gunter (Regional Water Board shared that draft regulations for Onsite Non-potable Reuse will be developed in spring 2024 (see State Water Board website). Also, she will be sharing information about planned Bay Area projects with the State Water Board "strike team" (see June 2023 BACWA report).

BACWA Updates

- Draft language is expected soon for the Nutrient Watershed Permit, which is slated for reissuance in mid-2024. The permit is expected to contain dry season load limits for nitrogen. Recycled water projects would help agencies comply with the new limits.
- Nominate a colleague for the Arleen Navarret Award by March 27th (link)
- BACWA is forming a Climate Change Community of Practice (link to join)
- The BACWA Annual Members Meeting will be held in Berkeley on Friday, May 3rd (link)
- Please continue to use the Site Supervisor Training Videos available on YouTube or the BACWA website

Remaining Meetings in 2024

April 16 (in-person option), July 16 (virtual only), and October 15 (in-person option)

Executive Director's Report to the Board

January 2024

EXECUTIVE BOARD MEETING AND SUPPORT

- Worked with BACWA staff to plan and manage 1/19 Executive Board meeting
- Conducted the Executive Board meeting agenda review with the BACWA Chair
- Hosted 12/15 Executive Board meeting and developed meeting notes
- Planned and participated in joint meeting with BACWA/R2, 1/30
- Continued to track all action items to completion

COMMITTEES:

- Attended Recycled Water Committee meeting, 1/17

REGULATORY:

- Submitted comments on FSSD Air Permit
- Reached out to BAAQMD staff to plan next meeting
- Worked to develop survey for RW collaboration workshop participants
- Held check-in meeting with EPA, 1/31

NUTRIENTS:

Completed a variety of tasks and activities associated with BACWA's interests on nutrients and collaborating with the Water Board including:

- Met with Water Board staff several times to discuss final TIN limits
- Discussed nutrient watershed permit with Baykeeper
- Discussed feasibility of nutrient reductions with consultant
- Met with SFEI staff to discuss budget reporting, 1/11
- Attended NBS CMG, 1/12
- Met with member agencies to discuss nutrient permitting
- Met with SFPUC to discuss funding advocacy, 1/24
- Participated in funding meeting with SWB, SFEI, etc. 1/30
- Met with CASA OAH subgroup, 1/8, 1/10
- Participated in NWRI OAH IPR Webinar #2, 1/9
- Attended 2-day in person NWRI OAH IPR meeting, 1/17-1/18
- Reviewed and updated nutrient data metrics for interim limits and possible final limit allocations
- Participated in Five-year Science Planning session, 1/17
- Planned and hosted NST meeting, 1/19

COMMUNICATIONS

- Held weekly progress meetings with Civic Edge
- Reviewed key messaging materials and provided edits
- Discussed Bri Communications signage with EBMUD
- Hosted Value of Wastewater kickoff with Steering Committee

- Worked to set up plant tours for NGOs

FINANCE:

- Reviewed the monthly BACWA financial reports
- Reviewed and approved invoices

COLLABORATIONS:

- Attended CASA Air Toxics meeting 1/10
- Met with Summit Partners to discuss Pooled emission funding, 1/11
- Met with participants of CASA Innovation Panel, 1/11
- Met with Pooled Emission steering committee to select consultant, 1/22
- Checked in with SFEP on Estuary Blueprint, 1/22

ASC (AQUATIC SCIENCE CENTER)

- Reviewed materials sent via email by ASC ED
- Met with SFEI Exec Comm., 1/22
- Attended ASC Board meeting, 1/25

BABC (BAY AREA BIOSOLIDS COALITION)

- Attended meeting and developed meeting summary, 1/8
- Discussed future of project with program manager

BACC (BAY AREA CHEMICAL CONSORTIUM)

- Discussed administrative and policy issues with administrator

BACWWE (BAY AREA COALITION FOR WATER/WASTEWATER EDUCATION)

- Discussed next steps for bringing on external support for program expansion

ADMINISTRATION:

- Planned for and conducted the monthly BACWA staff meeting to prepare for the Board Meeting and to coordinate and prioritize activities.
- Met with RPM to discuss progress on regulatory issues
- Signed off on invoices, reviewed correspondence, prepared for upcoming Board meetings, responded to inquiries on BACWA efforts, oversaw and participated in updating of web page and provided general direction to BACWA staff.
- Worked with RPM in the preparation of the monthly BACWA Bulletin.
- Developed and responded to numerous emails and phone calls as part of the conduct of BACWA business on a day-to-day basis.

MISCELLANEOUS MEETINGS/CALLS:

- Worked with BACWA Chair and Committee Chairs on items that arose during the month
- Other miscellaneous calls and inquiries regarding BACWA activities
- Responded to Board members' requests for information

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Board Calendar

March 2024 – May 2024 Meetings

DATE	AGENDA ITEMS
March 15, 2024 ***Central San***	**Approvals & Authorizations:** • **Policy / Strategic Discussion:** • **Operational:** • FY25 Draft Budget second review • Committee Budget presentations
April 19, 2024 ***SFPUC***	**Approvals & Authorizations:** • **Policy / Strategic Discussion:** • **Operational:** • FY25 Budget approval • FY25 Workplan approval
May 3, 2024 ***David Brower Center, Berkeley***	**Annual Meeting**

BACWA ACTION ITEMS

Number	Subject	Task	Responsibiity	Deadline	Status
	Action Items from January 19 2024 BACWA Executive Board Meeting		**resp.**	**deadline**	**status**
2024.1.26	Civic Edge Update	BACWA ED to share infographics images with board members	BACWA ED	2/1/2024	complete
2024.1.27	Shorelines and Waterways sponsorship activities	BACWA ED to work on setting up sponsorship and will communicate outcome with the board.	BACWA ED	2/15/2024	complete
2024.1.28	PFAS Fact Sheet Update	BACWA ED and RPM will email out the word document for editing and feedback	BACWA ED	1/30/2024	complete
2024.1.29	Update on SCCWRP OAH Model Independent Review Panel	BACWA ED to prepare a short presentation for BACWA community	BACWA ED	6/30/2024	WIP
2024.1.30	Agenda for 2/29 meeting with BAAQMD EO	BACWA ED to work with meeting attendees to finalize the agenda	BACWA ED	2/27/2024	WIP
2024.1.31	Update on EPA office priorities	BACWA ED to bring discussion to the February BACWA Board Meeting.	BACWA ED	2/15/2024	complete
	Action Items Remaining from Previous BACWA Executive Board Meetings				
2022.10.22	BACWA Reserve Policy	BACWA ED will bring a revised draft Reserve Policy to the Executive Board for approval at a future meeting.	ED		WIP
2022.3.42	Plain-language review of nutrient science program	BACWA ED to work with SFEI to augment plain-language review to include graphics, simplified text, and a summary of what we have learned so far.	ED		on going
2023.10.8	Informational: BAAQMD 9/18 Workgroup meeting debrief	BACWA Executive Director to request a meeting with BAAQMD's Executive officer.	ED	12/31/2023	WIP
2023.10.9	PFAS - Phase 2 draft report and Summit Partners Workshop	BACWA Executive Director and RPM to produce a FAQ sheet on the PFAS Phase 2 Study	ED / RPM	12/15/2023	WIP
2023.10.10	Debrief from Recycled Water Interagency Workshop Sept 20	BACWA Executive Director to send out a survey about next steps	ED	12/15/2023	WIP
2023.11.16	Recycled Water collaboration workshop follow-up survey	BACWA staff to circulate meeting summary and survey to recycled water workshop participants.	ED	12/15/2023	WIP
2023.11.18	Climate change scoping - AQPI Presentation	BACWA to share with members that they have an opportunity to participate in the AQPI user group led by Jon Rutz.	ED		WIP
2023.11.19	Climate change scoping - AQPI Presentation	BACWA to share information about AQPI with Collection System and O&M committees	ED		WIP

FY24: 25 of 31 Action Items are complete
FY23: 56 of 58 Action Items are complete
FY22: 51 of 52 Action items are completed
FY21: 51 of 51 Action items completed
FY20: *70 of 70 Action Items completed*
FY19: *110 of 110 action Items completed*
FY18: *66 of 66 Action Items completed*
FY17: *90 of 90 Action Items completed*

Regulatory Program Manager's Report to the Executive Board

January 2024

BACWA BULLETIN: Completed and circulated January Bulletin.

CLIMATE CHANGE: Continued to plan webinar series for 2024. Reviewed Ocean Protection Council draft 2024 Sea Level Rise guidance.

NPDES – Completed NPDES compliance letter for 2023 and circulated to BACWA members.

NUTRIENTS: Reviewed and provided comments on draft Group Annual Report; Participated in Nutrient Strategy Team meeting and prepared summary; participated in load projection discussions with member agencies.

PFAS: Completed preparation of draft PFAS Fact Sheet, circulated for review, and discussed comments with reviewers. Discussed potential PFAS outreach messaging campaign with Central San.

REGULATORY MATRIX: Began preparing latest draft of regulatory issues summary.

COMMITTEE SUPPORT:

AIR – Attended with review of data related to Air Toxics study cost-sharing.
BAPPG – Participated in pesticides and steering committee meetings; reviewed and circulated BAPPG annual report; hosted discussion about adding additional wastewater outreach to Baywise website; prepared for engagement with Department of Pesticide Registration.
Biosolids – Attended CASA Biosolids Regulatory Workgroup.
Collection System – Prepared for February meeting; attended data review group meetings with State Water Board staff; prepared draft sewer lateral survey and discussed with member agency staff; coordinated with consultants prepared SSMP guidance document.
O&M Infoshare Group – Assisted with planning for February meeting.
Permits – Provided support regarding inaccurate federal reporting instructions (DMRs) for residual chlorine. Reviewed Millbrae Tentative Order.
Pretreatment – Continued planning for February meeting.
Recycled Water – Assisted with January meeting; prepared notes and circulated to committee; finalized survey for September 2023 workshop and circulated to attendees.
Executive Board – Prepared regulatory updates for Executive Board meeting.

ADMINISTRATION/STAFF MEETING – Participated in BACWA staff meeting.

BACWA MEETINGS ATTENDED:
BACWA Communications Steering Committee (1/10)
Recycled Water Committee (1/16)
Executive Board (1/19)
Nutrient Strategy Team (1/19)
Executive Board - Joint Meeting with Regional Water Board Staff (1/30)

EXTERNAL EVENTS ATTENDED:
EBMUD Tour with Baykeeper and Sierra Club (1/17)
CASA Biosolids Workgroup (1/18)
State Water Board Data Review Group for Sanitary Sewer Spill Reporting (1/24, 1/31)