BACWA
BAY AREA
CLEAN WATER
AGENCIES

Executive Board Meeting
AGENDA
Fri, July 16, 2021 9:00 AM - 12:30 PM (PDT)

To attend the meeting via Zoom or submit a comment please request access.

Agenda Item		Time	Pages
ROLL CALL, INTRODUCTIONS, AND TELECONFERENCE ETIQUETTE		**9:00 AM**	
PUBLIC COMMENT	Guidelines	**9:03 AM**	
CONSIDERATION TO TAKE AGENDA ITEMS OUT OF ORDER		**9:04 AM**	
CONSENT CALENDAR		**9:05 AM**	
1 June 18, 2021 BACWA Executive Board meeting minutes			**3-9**
2 May Treasurers Report			**10-18**
APPROVALS AND AUTHORIZATIONS		**9:12 AM**	
none			
POLICY/STRATEGIC		**9:30 AM**	
3 Discussion: Nutrients			
a. Regulatory			**19-37**
i. Trading memo and potential solicitation for support			
ii. NBS and RW Evaluation Status update to Water Board			
b. Technical Work			
i. WEFTEC Abstract	Draft HDR WEFTEC Abstract		
c. Governance Structure			
i. June 11, 2021 Steering Committee Notes	Link to Steering Committee materials		
BREAK (10min)	**10:30 AM**		
4 Discussion: Triennial review - BACWA comments	Link to Issues Descriptions		**38-44**
5 Discussion: Climate change adaptation planning and Regional Water Board meeting debrief			
6 Discussion: Biosolids regulation and collaboration on biosolids white paper			**45-48**
7 Discussion: AIR Issues Update			
8 Discussion: PFAS Study Phase I data discussion and Fact Sheet			**49**
9 Informational: Chlorine Residual Blanket Permit Amendment			
10 Informational: AIR and Biosolids Committee Surveys			**50-81**
11 Informational: Regulatory Issues Matrix update			**82-97**
12 Informational: Recycled Water Landscape Guide	Link to Complete Landscape Guide		**98-117**
13 Informational: SSS-WDR Informal Staff Draft Coalition Comments	Link to version with Attachments		**118-125**
OPERATIONAL		**12:00 PM**	
14 Informational: BACC Update	Link to BACC webpage		
15 Discussion: Pardee/Orinda planning - agreement on venue and timing			
16 Discussion: NMS Funding for FY22 - $2.2M			
17 Informational: Prop 84 closeout			**126-128**
REPORTS		**12:15 AM**	
18 Committee Reports			**129-130**
19 Member highlights			
20 Executive Director Report			**131-132**
21 Board Calendar and Action Items			**133-134**
22 Regulatory Program Manager Report			**135**
23 Other BACWA Representative Reports			**136-141**
a. RMP Technical Committee	Mary Lou Esparza, Yuyun Shang, Samantha Engelage		
b. RMP Steering Committee	Karin North; Amanda Roa; Eric Dunlavey		
c. Summit Partners	Lorien Fono; Lori Schectel		
d. ASC/SFEI	Lorien Fono; Eileen White		

e. Nutrient Governance Steering Committee	Eric Dunlavey; Eileen White; Lori Schectel		
e.i Nutrient Planning Subgroup	Eric Dunlavey		
e.ii NMS Technical Workgroup	Eric Dunlavey		
f. SWRCB Nutrient SAG	Lorien Fono		
g. NACWA Taskforce on Dental Amalgam	Tim Potter		
h. BAIRWMP	Cheryl Munoz; Florence Wedington		
i. NACWA Emerging Contaminants	Karin North; Melody LaBella		
j. CASA State Legislative Committee	Lori Schectel		
k. CASA Regulatory Workgroup	Lorien Fono; Mary Cousins		
l. ReNUWIt	Jackie Zipkin; Karin North		
m. ReNUWIt One Water	Jackie Zipkin, Eric Hansen		
n. RMP Microplastics Liaison	Artem Dyachenko		
o. Bay Area Regional Reliability Project	Eileen White		
p. WateReuse Working Group	Cheryl Munoz		
q. San Francisco Estuary Partnership	Eileen White; Lorien Fono		
r. CPSC Policy Education Advisory Committee	Colleen Henry		
s. California Ocean Protection Council	Lorien Fono		
t. Countywide Water Reuse Master Plan	Karin North, Pedro Hernandez		
u. CHARG - Coastal Hazards Adaptation Resiliency Group	Jackie Zipkin		

24 **SUGGESTIONS FOR FUTURE AGENDA ITEMS**	**12:25 PM**	

NEXT MEETING	**12:29 PM**	
The next meeting of the Board is scheduled for August 20, 2021		

ADJOURNMENT	**12:30 PM**	

Executive Board Meeting Minutes

June 18, 2021

ROLL CALL AND INTRODUCTIONS

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

Other Attendees and Guests:

Name	Agency/Company
Aaron Winer	West County Wastewater District
Azalea Mitch	City of San Mateo
Blake Brown	CCCSD
Don Gray	EBMUD
Eric Dunlavey	City of San Jose
Jennifer Dyment	BACWA
Jim Graydon	Woodard & Curran
Justin Irving	Hazen & Sawyer
Karin North	City of Palo Alto
Lorien Fono	BACWA
Michael Connor	Consultant
Robert Wilson	City of Santa Rosa
Sarah Deslauriers	Carollo Engineers
Talyon Sortor	Fairfield-Suisun Sewer District
Vicki Sherman	City of Redwood City

Amit Mutsuddy started meeting at 9:04

ROLL CALL - taken

PUBLIC COMMENT - none

CONSIDERATION TO TAKE AGENDA ITEMS OUT OF ORDER - none

CONSENT CALENDAR

1 May 21, 2021 BACWA Executive Board meeting minutes

2 May 24, 2021 NST meeting minutes

3 June 2, 2021 Joint meeting with R2 Water Board meeting minutes

4 April 2021 Treasurer's Reports

Consent Calendar Items 1, 2, 3 and 4*: A motion to approve was made by Jackie Zipkin (East Bay Dischargers Authority) and seconded by Lori Schectel (Central Contra Costa Sanitary District). The motion was approved unanimously.*

APPROVALS AND AUTHORIZATIONS

5 Approval: CIEA No-cost Extension for FY22

Approval Item 5: *A motion to approve was made by Eileen White (East Bay Municipal Utility District) and seconded by Lori Schectel (Central Contra Costa Sanitary District). The motion was approved unanimously.*

6 Approval: SGA Amendment # 3 for FY22 BAPPG Support - $30,000

Approval Item 6: *A motion to approve was made by Jackie Zipkin (East Bay Dischargers Authority) and seconded by Eileen White (East Bay Municipal Utility District). The motion was approved unanimously.*

7 Approval: Amendment # 2 Carollo Contract for FY22 BABC Support - $120,000

Approval Item 7: *A motion to approve was made by Amy Chastain (San Francisco Public Utilities Commission) and seconded by Amit Mutsuddy (City of San Jose). The motion was approved unanimously.*

8 Approval: Stephanie Hughes pesticides regulatory support FY22 Contract -$60,000

Approval Item 8: *A motion to approve was made by Lori Schectel (Central Contra Costa Sanitary District) and seconded by Amit Mutsuddy (City of San Jose). The motion was approved unanimously.*

9 Approval: Amendment #1 for FY22 NMS Reviewer Contract - $50,000

Approval Item 9: *A motion to approve was made by Lori Schectel (Central Contra Costa Sanitary District) and seconded by Amit Mutsuddy (City of San Jose). The motion was approved unanimously.*

10 Authorization: EDAR for QAS $4,680 FY22 Contract - The ED authorized a contract to provide TNI training to the Laboratory Committee.

11 Discussion: Post pandemic meeting transition phasing - Executive Director discussed Brown Act exemption for videoconference meetings is likely expiring on Sept 30 and how to transition back to in person meetings. Agencies shared their current in person meeting guidelines and challenges of holding large hybrid meetings where some participants are in person and some remote by teleconference. General discussion about Pardee Meeting in fall followed and group decided to explore a facility closer to the bay area, and make a decision at a subsequent meeting. Whether future Executive Board meetings will be held via videoconference or in person will be decided on a month-by-month basis depending on facility availability.

Action item *– BACWA staff to inquire if EBMUD Watershed Headquarters facility is available October 28 & 29th*

POLICY/STRATEGIC

12 Discussion: Nutrients

a. Regulatory

i. NST meeting recap - direction on trading - Executive Director shared points from NST meeting. Discussed implications of subembayment aggregate load caps, how to calculate compliance with future load caps and what to do when agencies exceed their load cap. Discussion on whether BACWA should investigate nutrient credit / trading scheme and how can regulators incentivize nature-based solution / recycled water projects followed.

ii. HDR Data Analysis update Executive Director shared that an NST meeting would be scheduled shortly to go over HDRs data analysis. Jackie Zipkin shared that she was asked to give presentation on horizontal levee at Oro Loma at Regional Water Board Meeting in July, and confirmed messaging related to nature-based systems challenges with other Board members.

BREAK

b. Technical Work Executive Director discussed the 4 Modeling Uncertainty Workshops that wrapped up in May. Michael Connor summarized workshops and important findings. There was a discussion about the differences in how to approach modelling uncertainty in North vs. South California.

i. Modeling uncertainty May 28 workshop debrief.

c. Governance Structure

i. May 18, 2021 PSC Meeting Notes - included in packet

ii. June 2, 2021 PSC Meeting Notes - included in packet

iii. June 11, 2021 Steering Committee – Executive Director shared that the Regional Water Board is developing a writeup of the science needs to support a Basin Plan Amendment related to nutrients. Writeup is targeted fall 2021. Next fiscal year $2.2M is anticipated from BACWA to the NMS, so there will be no more "frontloading" of NMS payments. SFEI will develop a list of projects to conduct should additional funding become available. USGS has approved continued support for R/V Peterson availability to SFEI, SFEI to negotiate a long term contract.

13 Discussion: Engagement with Air District - Comments on Regulation 2 – Executive Director shared that letter in packet was sent to Air District. General group discussion followed about engagement with Air District members on BACT, as well as the next meeting with Air District members.

14 Discussion: Chlorine Residual Permit Amendment Admin Draft - The Regional Water Board has prepared an administrative draft of a blanket NPDES permit amendment to implement the Basin Plan amendment that was adopted in November 2020. Executive Director shared a timeline slide. BACWA agencies were asked to provide comments and compiled comments will be submitted to Water Board by June 25th. The order is expected to be adopted in the fall.

15 Discussion: Alternative monitoring/CEC funding model and cost sharing - Executive Director shared the key elements to updating the 2016 Alternative Monitoring & Reporting Requirements from the Water Board. Shared timeline and new order should go into effect in 2022. An agreement on monitoring reductions and cost sharing needs to be reached in time for the RMP to send out invoices by Fall 2021.

16 Discussion: Triennial review - BACWA comments - Executive Director shared triennial review timeline and key issues that BACWA will support, as well as comment letter is due on July 8, 2021. Discussion followed about what issues BACWA wanted to stress in the letter. Letter will be circulated for review prior to submission.

Action item: *BACWA staff to share letter prior to submission date.*

17 Discussion: Four-party agreement on IRWMP funds Executive Director shared that group is deciding how to use additional funds. Group agreed with a proposal they should assist tribal environmental groups and disadvantaged community engagement. Members would like to know how the money will be spent and ensure that group selected is speaking for their community. More updates to come.

18 Discussion: Collaboration with Sonoma County Land trust and BABC on biosolids white paper - Executive Director said updated outline is in the packet. Board member expressed concern that the material to be discussed in the white paper may be too complex to be conveyed within a 10-15 page limit. The BABC Program Coordinator will be in touch with the agency staff who volunteered to review the white paper to discuss next steps.

19 Discussion: PFAS Study Schedule Update - Executive Director shared the PFAS tasks and outcome on a timeline slide. The final quality-reviewed data will be distributed to Phase I study participants and there will be a presentation in early July. PFAS Phase II study concepts will be presented at September BACWA Executive Board Meeting to inform the development of the Phase II sampling plan. A contract for SFEI to develop and conduct the Phase II sampling plan will be brought before the Board in September.

Action item: *BACWA staff to bring draft PFAS fact sheet to July Executive Board Meeting*

20 Informational: SSS-WDR Informal Staff Draft Update – Executive Director shared that RPM is working on a comment letter on behalf of BACWA, and CASA is finalizing a redline of the SSS WDR to submit to the state Water Board by the June 30 deadline. Comment letter will be sent out soon to the Board for review.

OPERATIONAL

21 Informational: BACC Update - AED shared that BACC agencies are setting up their individual contracts with chemical companies and invoices are being paid. A year-end meeting is scheduled for August 24, 2021. Agencies have expressed concerns over liquid chlorine supply and Thatcher is going to have a meeting with BACC agencies on tentatively June 28th to discuss the issue. AED shared email from Thatcher with the group. Chlorine hypochlorite suppliers have stated that they will not have difficulty meeting their contractual obligations. General discussion about chlorine supply followed.

22 Informational: Succession Planning Executive Director referred to document in the packet.

REPORTS

23 Committee Reports - Executive Director referred to packet.

24 Member highlights - EBMUD will be holding their first Executive Board Meeting in-person in 15 months. Discussion followed on return to work, proof of vaccine and rate of vaccination. Most agencies seem to be bringing staff back in the fall for 2-3 days a week and many have developed telecommuting policies.

25 Executive Director Report - Executive Director referred to packet.

26 Board Calendar and Action Items - Executive Director referred to packet.

27 Regulatory Program Manager Report - Executive Director referred to packet.

29 Other BACWA Representative Reports

30 a. RMP Technical Committee Mary Lou Esparza, Yuyun Shang, Samantha Engelage

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

c. Summit Partners Lorien Fono; Lori Schectel

d. ASC/SFEI Lorien Fono; Eileen White

e. Nutrient Governance Steering Committee Eric Dunlavey; Eileen White; Lori Schectel

e.i Nutrient Planning Subgroup Eric Dunlavey

e.ii NMS Technical Workgroup Eric Dunlavey

f. SWRCB Nutrient SAG Lorien Fono

g. NACWA Taskforce on Dental Amalgam Tim Potter

h. BAIRWMP Cheryl Munoz; Florence Wedington

i. NACWA Emerging Contaminants Karin North; Melody LaBella

j. CASA State Legislative Committee Lori Schectel

k. CASA Regulatory Workgroup Lorien Fono; Mary Cousins

l. ReNUWIt Jackie Zipkin; Karin North

m. ReNUWIt One Water Jackie Zipkin

n. RMP Microplastics Liaison Artem Dyachenko

o. Bay Area Regional Reliability Project Eileen White

p. WateReuse Working Group Cheryl Munoz

q. San Francisco Estuary Partnership Eileen White; Lorien Fono

r. CPSC Policy Education Advisory Committee Colleen Henry

s. California Ocean Protection Council Lorien Fono

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

u. CHARG - Coastal Hazards Adaptation Resiliency Group Jackie Zipkin

31 SUGGESTIONS FOR FUTURE AGENDA ITEMS

Climate change and sea level rise adaptation.

NEXT MEETING 12:29 PM

The next meeting of the Board is scheduled for July 16, 2021.

ADJOURNMENT 12:01 PM

Bay Area Clean Water Agencies
A Joint Powers Public Agency
Leading the Way to Protect our Bay

June 17, 2021

MEMO TO: Bay Area Clean Water Agencies Executive Board

MEMO FROM: Damien Charléty, Treasurer, East Bay Municipal Utility District

SUBJECT: Eleventh Month FY 2021 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, 2020 through May 31, 2021** (Eleven months of Fiscal Year 2021). 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),
- Water/Wastewater Operator Training (WOT),
- Prop84 Bay Area Integrated Regional Water Mgmt (PRP84)

Houck, Matt

From: Charléty, Damien
Sent: Thursday, June 24, 2021 10:26 AM
To: Houck, Matt
Subject: RE: BACWA - May 2021 Treasurer's Report

Approved.

From: Houck, Matt <matt.houck@ebmud.com>
Sent: Friday, June 18, 2021 9:12 AM
To: Charléty, Damien <damien.charlety@ebmud.com>
Subject: BACWA - May 2021 Treasurer's Report

Hi Damien,

Please approve BACWA - May 2021 Treasurer's Report for distribution.

Thanks,

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

Fund Balances

In FY21 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).

BACWA Fund: This fund provides the resources for BACWA staff, its committees, and other administrative needs. The ending fund balance on May 31, 2021 was $ 1,303,043 which is significantly higher than the target reserve of $209,430 which is intended to cover 3 months of normal operating expenses based on the BACWA FY21 budget. $ 104,074of the ending fund balance is shown on the BACWA Fund & Investments Balance Report May 31, 2021 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. This leaves actual unencumbered excess funds of $989,538 (i.e., actual fund balance of $ 1,198,969 less target reserves) as May 31, 2021. As the details of the costs of the various regulatory requirements included in the 2nd Nutrient Watershed Permit become better defined, these excess funds may be transferred to the CBC fund and used to offset potential Nutrient Surcharge increases to the BACWA members.

CBC Fund: This fund provides the resources for completing special investigations as well as meeting regulatory requirements. The ending fund balance on May 31, 2021 was $ 1,246,407 which is higher than the target reserve of $1,000,000. $652,738 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 fund balance of negative $406,331 (i.e., actual fund balance of $593,669 less $1,000,000 target reserves) as of May 31, 2021. 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. In FY22 the Board will be asked to approve a transfer from the BACWA Fund to replenish the CBC fund.

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 May 31, 2021 (91% of the FY) are at 99%.

Expenses as of May 31, 2021 (91% of the FY) are at 82%

FY 2021
BACWA BUDGET to ACTUAL

BACWA BAY AREA CLEAN WATER AGENCIES

BACWA FY21 BUDGET	Line Item Description	FY 2021 Budget	Actual May 2021	Actual % of Budget May 2021	Variance	NOTES
REVENUES & FUNDING						
Dues	Principals' Contributions	$516,909	$516,910	100%	$1	5 @ $103,382
	Associate & Affiliate Contributions	$187,793	$191,672	102%	$3,879	13 Assoc @ $8,531; 45 Affiliate @ $1,708.
Fees	Clean Bay Collaborative	$675,000	$675,750	100%	$750	Prin: $450,000; Assoc/Affil: $225,000
	Nutrient Surcharge	$1,700,000	$1,699,970	100%	-$30	See Nutrient Surcharge Spreadsheet
	Voluntary Nutrient Contributions	$0	$0	0%	$0	
Other Receipts	AIR Non-Member	$7,075	$7,075	100%	$0	Santa Rosa
	BAPPG Non-Members	$3,954	$3,953	100%	-$1	Stanta Rosa, Sac Reg'l, Vacaville; $1,317/each
	Other	$0	$2,601	0%	$2,601	
Fund Transfer	Special Program Admin Fees (WOT)	$5,202	$0	0%	-$5,202	Flat fee
	Special Program Admin Fees (BACC)	$20,010	$0	0%	-$20,010	300 hours of AED support, based on hours billed
	Special Program Admin Fees (BABC)	$6,000	$2,274	38%	-$3,726	AED and RPM support, hours billed
Interest Income	LAIF	$20,000	$19,125	96%	-$875	BACWA, Legal, & CBC Funds invested in LAIF
	Higher Yield Investments	$18,000	$0	0%	-$18,000	Alternative Investment Interest (Legal & CBC Funds invested in AltInv)
	Total Revenue	**$3,159,943**	**$3,119,330**	**98.71%**	**-$40,613**	

BACWA FY21 BUDGET	Line Item Description	FY 2021 Budget	Actual May 2021	Actual % of Budget May 2021	Variance	NOTES
EXPENSES						
Labor						
	Executive Director	$190,000	$158,333	83%	-$31,667	No change from FY20 contract
	Assistant Executive Director	$102,551	$95,359	93%	-$7,192	$66.7/hour; Reflects 1500 hours /yr
	Regulatory Program Manager	$141,170	$129,601	92%	-$11,569	$100.16/hour; Reflects 1375 hours/yr
	Total	**$433,721**	**$383,293**	**88%**	**-$50,428**	
Administration						
	EBMUD Financial Services	$42,448	$31,711	75%	-$10,737	
	Auditing Services	$5,345	$0	0%	-$5,345	Financial Audit Services through EBMUD
	Administrative Expenses	$7,959	$194	2%	-$7,765	Travel, Supplies, Parking, Mileage, Tolls, Misc.
	Insurance	$4,776	$4,971	104%	$195	SLIP Insurance. Alliant Insurance.
	Total	**$60,528**	**$36,876**	**61%**	**-$23,652**	
Meetings						
	EB Meetings	$2,653	$257	10%	-$2,396	Catering, Venue, other expenses
	Annual Meeting	$14,369	$2,519	18%	-$11,850	Catering, Venue, other expenses
	Pardee	$6,367	$0	0%	-$6,367	Catering, Venue, other expenses
	Misc. Meetings	$5,306	$571	11%	-$4,735	Hol & Comm Chair Lunch, Staff Mtgs, Fin Comm, Summit Ptnrs, CASA, NACWA Tech WS, Low Flow WS
	Total	**$28,695**	**$3,347**	**12%**	**-$25,348**	
Communication						
	Website Hosting	$612	$57	9%	-$555	Computer Courage
	File Storage	$765	$720	94%	-$45	Box.com
	Website Development/Maintenance	$1,530	$415	27%	-$1,115	Domain registrations, website changes
	IT Support	$2,652	$0	0%	-$2,652	As needed
	Other Commun	$1,785	$1,885	106%	$100	MS Exchange, Survey Monkey, Carbonite, Doodle Polls, PollEv, GoToMtg, HelloSign, Zoom
	Total	**$7,344**	**$3,077**	**42%**	**-$4,267**	

FY 2021
BACWA BUDGET to ACTUAL

EXPENSES						
Legal						
	Regulatory Support	$2,706	$0	0%	-$2,706	Downey Brand LLP
	Executive Board Support	$2,176	$1,166	54%	-$1,010	Day Carter & Murphy LLP
	Total	**$4,882**	**$1,166**	**24%**	**-$3,716**	
Committees						
	AIR	$76,000	$53,968	71%	-$22,032	$75k consulting support, $1k misc expenses. Carollo Engineers
	BAPPG	$130,000	$111,501	86%	-$18,499	Includes CPSC @ $10,000, OWOW @ $10,000, and Pest. Reg Spt. @ $60,000. S.Hughes, TDC and SGA
	Biosolids Committee	$1,000	$0	0%	-$1,000	
	Collections System	$1,000	$0	0%	-$1,000	
	InfoShare Groups	$1,750	$0	0%	-$1,750	Funds for 2 workgroups ($750 for Asset Mgmt - new in FY21; $1,000 for O&M)
	Laboratory Committee	$1,000	$0	0%	-$1,000	
	Permits Committee	$1,300	$0	0%	-$1,300	All meetings moved to include lunch hour for commuting purposes
	Pretreatment	$1,000	$0	0%	-$1,000	
	Recycled Water Committee	$1,000	$160	16%	-$840	
	Misc Committee Support	$45,000	$0	0%	-$45,000	
	Manager's Roundtable	$1,000	$0	0%	-$1,000	
	Total	**$260,050**	**$165,629**	**64%**	**-$94,421**	
Collaboratives						
	Collaboratives					
	State of the Estuary (SFEP-biennial)	$20,000	$0	0%	-$20,000	Biennial in Odd Fiscal Years. (Paid bienniely in odd years for even year conference)
	Arleen Navarret Award	$0	$0	0%	$0	Biennial in Even Fiscal Years. Award amount increased in FY20
	FWQC (Fred Andes)	$7,500	$0	0%	-$7,500	
	Stanford ERC (ReNUWIt)	$10,000	$0	0%	-$10,000	
	Misc	$5,000	$1,500	30%	-$3,500	BayCAN, NBWA
	Total	**$42,500**	**$1,500**	**4%**	**-$41,000**	
Other						
	Unbudgeted Items					
	Other	$0	$0	0%	$0	
		$0	**$0**	**0%**	**$0**	
Tech Support						
	Technical Support					
	Nutrients					
	Watershed	$2,800,000	$2,600,000	93%	-$200,000	Advance funding for 2nd Watershed Permit Science Studies. SFEI
	NMS Voluntary Contributions	$0	$30,000	0%	$30,000	SFEI \ City of Palo Alto 2017 Lower South Bay modeling
	Additional work under permit	$100,000	$34,500	35%	-$65,500	Includes HDR PO for $225k spread out over FY20-24.
	Regional Study on Nature based systems	$200,000	$124,033	62%	-$75,967	New Line item in FY20. SFEI
	Regional Recycling Evaluation	$60,000	$46,546	78%	-$13,454	HDR PO for $154K FY20-24
	Nutrient Workshop(s)	$0	$0	0%	$0	Pilot Studies/Plant Review/InDecative Technologies
	General Tech Support	$250,000	$72,437	29%	-$177,563	AB617 emission factors, nutrient technical review, other nutrient support, PFAS
	CEC Investigations	$50,000	$9,032	18%	-$40,968	Support for studies through RMP (PFAS in FY21). SFEI
	Risk Reduction	$7,500	$0	0%	-$7,500	$50,000 over 5 years (FY19-FY23) 2 Contracts for $25,000 each over FY19, 20, & 21
	Total	**$3,467,500**	**$2,916,548**	**84%**	**-$550,952**	
	TOTAL EXPENSES	**$4,305,220**	**$3,511,436**	**81.56%**	**-$793,784**	
	NET INCOME BEFORE TRANSFERS	**-$1,145,277**				
	TRANSFERS FROM RESERVES	**$1,145,277**				aligns with strategy of drawing down reserves to lessen impact of Nutrient Surcharge
	NET INCOME AFTER TRANSFERS	**$0**				
	TOTAL OPERATING BUDGET	**$837,720**				
	OPERATING RESERVE	**$209,430**				

BACWA Fund Report as of May 31, 2021

BACWA FUND BALANCES - DATA PROVIDED BY ACCOUNTING DEPT.

DEPTID	DESCRIPTION	FISCAL YEAR BEGINNING FUND BALANCE	TOTAL RECEIPTS TO-DATE	TOTAL DISBURSEMENTS TO-DATE	MONTH-ENDING FUND BALANCE	OUTSTANDING ENCUMBRANCES	MONTH-END UNOBLIGATED FUND BALANCE
800	BACWA	1,195,233	729,257	621,447	1,303,043	104,074	1,198,969
804	LEGAL RSRV	300,000	-	-	300,000	-	300,000
805	CBC	1,772,881	2,390,074	2,916,548	1,246,407	652,738	593,669
	SUBTOTAL 1	*3,268,114*	*3,119,331*	*3,537,995*	*2,849,450*	*756,812*	*2,092,638*
802	BABC	*216,514*	93,250	180,200	129,564	*24,720*	104,844
806	BACC	*(1,563)*	*51,313*	*12,045*	37,705	*145*	37,560
810	WOT	276,164	-	21	276,143	-	276,143
	SUBTOTAL 2	*491,115*	*144,563*	*192,266*	*443,412*	*24,865*	*418,547*
*811	PRP84	196,806	-	106,368	90,438	-	90,438
	SUBTOTAL 3	*196,806*	-	*106,368*	*90,438*	-	*90,438*
	GRAND TOTAL	**3,956,035**	**3,263,894**	**3,836,629**	**3,383,300**	**781,677**	**2,601,623**

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 RECEIPTS TO-DATE	TOTAL DISBURSEMENTS TO-DATE	MONTH-ENDING FUND BALANCE	RECONCILIATION TO FINANCIAL STATEMENTS	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
800	BACWA	1,195,233	729,257	621,447	1,303,043	76,685	1,379,728	663,535	716,193	32%	-		priority # 3 for allocation
804	LEGAL RSRV	300,000	-	-	300,000	-	300,000	-	300,000	13%	-		priority # 1 for allocation
805	CBC	1,772,881	2,390,074	2,916,548	1,246,407	-	1,246,407	-	1,246,407	55%	-		priority # 2 for allocation
	SUBTOTAL 1	3,268,114	3,119,331	3,537,995	2,849,450	76,685	2,926,135	663,535	2,262,600	100%	-		
802	BABC	216,514	93,250	180,200	129,564	-	129,564	129,564	-	0%	-		pass-through funds, no allocation
806	BACC	(1,563)	51,313	12,045	37,705	-	37,705	37,705	-	0%	-		
810	WOT	276,164	-	21	276,143	-	276,143	276,143	-	0%	-		pass-through funds, no allocation
	SUBTOTAL 2	491,115	144,563	192,266	443,412	-	443,412	443,412	-	0%	-		
811	PRP84	196,806	-	106,368	90,438	-	90,438	90,438	-	0%	-		pass-through funds, no allocation
	SUBTOTAL 3	196,806	-	106,368	90,438	-	90,438	90,438	-	0%	-		
	GRAND TOTAL	**3,956,035**	**3,263,894**	**3,836,629**	**3,383,300**	**76,685**	**3,459,985**	**1,197,385**	**2,262,600**	**-**			
							-	-	-		-		

*Org 811 beg balance adjusted to reflect disbursement (147.7K) accrued after June 2020 TR published.

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

Reconciliation to Trial Balance - accrual basis

Per Report above:						
General		3,119,331	STB	1493	2,262,600	
WOT		144,563	STB	1505	1,197,385	
					3,459,985	-
PROP		-	STB	2135	(76,685)	
subtotal		**3,263,894**			**3,383,300**	-

Billings-Pending Receipts

4686	Mem Contrib	21,627
4687	Transfer	-
4690	Assoc Contrib	(1,675)
4696	Other	(21,480)
4731	State Grant	-
4732	Grant Retention	-
subtotal		**(1,528)**

Trial Balance Revenue Accounts

4411	Interest	(19,126)
4686	Mem Contrib	(1,358,850)
4687	Transfer	(2,274)
4690	Assoc Contrib	(189,997)
4696	Other	(1,692,119)
4731	State Grant	-
4732	Grant Retention	-
subtotal		**(3,262,366)**
Difference		**(0)**

BACWA Revenue Report as of May 31, 2021

FUND #	DEPARTMENT	JOB	REVENUE TYPE	AMENDED BUDGET	CURRENT PERIOD			YEAR TO DATE				UNOBLIGATED
					Admin & General	Contributons	Interest, Transfers,Others	Admin & General	Contributons	Interest, Transfers,Others	ACTUAL	
800	Bay Area Clean Water Agencies	0408511	Administrative & General	-	-	-	-	-	-	-	-	-
800	Bay Area Clean Water Agencies	1011099	BDO Member Contributions	516,909	-	-	-	-	516,910	-	516,910	(1)
800	Bay Area Clean Water Agencies	1011108	BDO Other Receipts	-	-	-	-	-	-	-	-	-
800	Bay Area Clean Water Agencies	1011109	BDO Fund Transfers	5,202	-	-	-	-	-	-	-	5,202
800	Bay Area Clean Water Agencies	1011117	BDO- Interest Income from LAIF	20,000	-	-	-	-	-	4,772	4,772	15,228
800	Bay Area Clean Water Agencies	1011133	BDO Assoc.&Affiliate Contr	187,793	-	-	-	-	112,615	-	112,615	75,178
800	Bay Area Clean Water Agencies	1014251	BDO Non-Member Contr BAPPG	3,954	-	-	-	-	3,953	-	3,953	1
800	Bay Area Clean Water Agencies	1014252	BDO Non-Member Contr AIR	7,075	-	-	-	-	7,075	-	7,075	-
800	Bay Area Clean Water Agencies	1014511	BDO-Alternative Investment Inc	18,000	-	-	-	-	-	-	-	18,000
800	Bay Area Clean Water Agencies	1015567	BACC - AED Support	20,010	-	-	-	-	-	-	-	20,010
800	Bay Area Clean Water Agencies	1015568	BABC - AED and RPM Support	6,000	-	-	-	-	-	2,274	2,274	3,726
800	Bay Area Clean Water Agencies	1015265	BDO Other Receipts (Misc)	-	-	-	-	-	2,601	-	2,601	(2,601)
800	Bay Area Clean Water Agencies	1015266	BDO Affiliate/Associate Dues	-	-	-	-	-	41,004	-	41,004	(41,004)
800	Bay Area Clean Water Agencies	1015267	BDO Affil/CS/Assoc Dues	-	-	1,709	-	-	38,053	-	38,053	(38,053)
	BACWA TOTAL			**784,943**	**-**	**1,709**	**-**	**-**	**722,211**	**7,046**	**729,257**	**55,686**
805	WQA-CBC	1011099	BDO Member Contributions	675,000	-	-	-	-	675,750	-	675,750	(750)
805	WQA-CBC	1011108	BDO Other Receipts	1,700,000	-	-		-	1,699,970	-	1,699,970	30
805	WQA-CBC	1011117	BDO- Interest Income from LAIF	-	-	-	-	-	-	14,354	14,354	(14,354)
805	WQA-CBC	1014528	BDO-Voluntary Nutrient Contrib	-	-	-	-	-	-	-	-	-
	WQA CBC TOTAL			**2,375,000**	**-**	**-**	**-**	**-**	**2,375,720**	**14,354**	**2,390,074**	**(15,074)**
	TOTAL			**3,159,943**	**-**	**1,709**	**-**	**-**	**3,097,931**	**21,400**	**3,119,331**	**40,612**

	DEPARTMENT	JOB	REVENUE TYPE	AMENDED BUDGET	CURRENT PERIOD			YEAR TO DATE				UNOBLIGATED
					Admin & General	Contributons	Interest, Transfers, Others	Admin & General	Contributons	Interest, Transfers, Others	ACTUAL	
802	BABC	1011099	BDO Member Contributions	-	-	-	-	-	93,250	-	93,250	(93,250)
802	BABC	1011109	BDO Fund Transfers	-	-	-	-	-	-	-	-	-
	BABC TOTAL			**-**	**-**	**-**	**-**	**-**	**93,250**	**-**	**93,250**	**(93,250)**
806	BACC	1011099	BDO Member Contributions	-	-	44,368	-	-	51,313	-	51,313	(51,313)
	WOT TOTAL			**-**	**-**	**44,368**	**-**	**-**	**51,313**	**-**	**51,313**	**(51,313)**
810	WOT	1011117	BDO- Interest Income from LAIF	-	-	-	-	-	-	-	-	-
	WOT TOTAL			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

	DEPARTMENT	JOB	REVENUE TYPE	AMENDED BUDGET	CURRENT PERIOD			YEAR TO DATE				UNOBLIGATED
					Admin & General	Contributons	Interest, Transfers, Others	Admin & General	Contributons	Interest, Transfers, Others	ACTUAL	
811	PROP 84	1011142	Administrative Support	-	-	-	-	-	-	-	-	-
	PROP TOTAL			**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	Grand Total			**3,159,943**	**-**	**46,077**	**-**	**-**	**3,242,494**	**21,400**	**3,263,894**	**(103,951)**

BACWA Expense Detail Report for May 31, 2021

EXPENSE TYPE	JOB	AMENDED BUDGET	CURRENT PERIOD ENC	CURRENT PERIOD PV	CURRENT PERIOD DA	CURRENT PERIOD JV	YEAR TO DATE ENC	YEAR TO DATE PV	YEAR TO DATE DA	YEAR TO DATE JV	OBLIGATED	UNOBLIGATED
LABOR						-						
AS-Executive Director	1011123	190,000	-	-	-	-	31,667	158,333	-	-	190,000	-
AS-Assistant Executive Directo	1011124	102,551	(7,204)	7,204	-	-	7,192	95,359	-	-	102,551	-
AS-Regulatory Program Manager	1011149	141,170	(10,486)	10,486	-	-	9,996	129,601		-	139,597	1,573
ADMINISTRATION												
AS-EBMUD Financial Services	1011125	42,448	(11,150)	11,150	-	-	10,736	31,711	-	-	42,447	1
AS-Audit Services	1014512	5,345	-	-	-	-	5,240	5,240	-	(5,240)	5,240	105
BDO Other Receipts	1011108	-	-	-	26,559	-	-	-	26,559	-	26,559	(26,559)
AS-BACWA Admin Expense	1011118	7,959	-	-	-	-	-	-	194	-	194	7,765
AS-Insurance	1011126	4,776	-	-	-	-	-	-	4,971	-	4,971	(195)
MEETINGS												
GBS-Meeting Support-Annual	1014514	14,369	-	-	-	-	-	-	2,519	-	2,519	11,850
GBS-Meeting Support-Exec Bd	1014513	2,653	-	-	-	-	2,653	-	257	-	2,910	(257)
GBS-Meeting Support-Misc	1014516	5,306	-	-	-	-	-	-	571	-	571	4,735
GBS-Meeting Support-Pardee	1014515	6,367	-	-	-	-	-	-	-	-	-	6,367
COMMUNICATION												
CAR-BACWA File Storage	1014518	765	-	-	-	-	-	-	720	-	720	45
CAR-BACWA IT Software	1014520	1,785	-	-	244	-	-	-	1,885	-	1,885	(100)
CAR-BACWA IT Support	1014519	2,652	-	-	-	-	2,652	-	-	-	2,652	-
CAR-BACWA Website Dev/Maint	1011116	612	-	-	-	-	-	-	57	-	57	555
CAR-BACWA Website Hosting	1014517	1,530	-	-	415	-	-	-	415	-	415	1,115
LEGAL												
LS-Executive Board Support	1011110	2,176	-	-	-	-	1,090	1,166	-	-	2,256	(80)
LS-Regulatory Support	1011107	2,706	-	-	-	-	2,466	-	-	-	2,466	240
COMMITTEES												
AIR-Air Issues&Regulation Grp	1014253	76,000	(5,060)	5,060	-	-	21,032	53,968	-	-	75,000	1,000
BC-BAPPG	1011147	130,000	379	4,138	516	-	9,350	87,925	25,601	(2,025)	120,851	9,149
BC-Biosolids Committee	1011101	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Collections System	1011097	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-InfoShare Groups	1011102	1,750	-	-	-	-	-	-	-	-	-	1,750
BC-Laboratory Committee	1011103	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Permit Committee	1011098	1,300	-	-	-	-	-	-	-	-	-	1,300
BC-Pretreatment Committee	1011146	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Water Recycling Committee	1011100	1,000	-	-	-	-	-	160	-	-	160	840
BC-Manager's Roundtable	1014777	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Miscellaneous Committee Sup	1011104	45,000	-	-	-	-	-	-	-	-	-	45,000
COLLABORATIVES												
CAS-Arleen Navaret Award	1012201	-	-	-	-	-	-	-	-	-	-	-
CAS-FWQC	1012202	7,500	-	-	-	-	-	-	-	-	-	7,500
CAS-Misc Collaborative Sup	1014521	5,000	-	-	1,500	-	-	-	1,500	-	1,500	3,500
CAS-PSSEP	1011112	20,000	-	-	-	-	-	-	-	-	-	20,000
CAS-Stanford ERC	1011969	10,000	-	-	-	-	-	-	-	-	-	10,000
BACWA TOTAL		**837,720**	**(33,521)**	**38,038**	**29,234**	**-**	**104,074**	**563,463**	**65,249**	**(7,265)**	**725,521**	**112,199**
TECH SUPPORT												
WQA-CE-Technical Support	1011127	250,000	(60,031)	60,031	-	-	42,095	72,437	3,548	(3,548)	114,532	135,468
WQA-CE-Nutrient WS Permit Comm	1014021	2,800,000	-	-	-	-	-	-	2,600,000	-	2,600,000	200,000
WQA-CE Risk Reduction	1014023	7,500	-	-	-	-	-	-	-	-	-	7,500
WQA-CE Addl Work Under Permit	1014254	100,000	-	-	-	-	147,500	34,500	-	-	182,000	(82,000)
WQA-CE Voluntary Nutr Contrib	1014529	-	-	-	-	-	-	-	30,000	-	30,000	(30,000)
Nutrient Workshops	1015015	-	-	-	-	-	-	-	-	-	-	-
WQA-CE-Nature Based Solutions	1015367	200,000	-	-	-	-	311,887	124,033	-	-	435,920	(235,920)
Recycled Water Evaluation	1015566	60,000	-	-	-	-	95,288	46,546	-	-	141,834	(81,834)
WQA - CEC Investigations	1015569	50,000	-	-	-	-	55,968	9,032	-	-	65,000	(15,000)
TECH SUPPORT (CBC) TOTAL		**3,467,500**	**(60,031)**	**60,031**	**-**	**-**	**652,738**	**286,548**	**2,633,548**	**(3,548)**	**3,569,286**	**(101,786)**
GRAND TOTAL		**4,305,220**	**(93,552)**	**98,069**	**29,234**	**-**	**756,812**	**850,011**	**2,698,797**	**(10,813)**	**4,294,807**	**10,413**
BABC												
AS-Assistant Executive Directo	1011124	-	-	-	-	-	-	-	-	-	-	-
Administrative Support	1011142	-	-	-	-	-	-	-	-	2,274	2,274	(2,274)
BDO Contract Expenses	1011143	-	-	-	-	-	-	-	4,621	-	4,621	(4,621)
AS-Regulatory Program Manager	1011149	-	-	-	-	-	-	-	-	-	-	-
Technology Research & Developm	1015372	-	-	-	-	-	-	-	5,000	-	5,000	(5,000)
Academia Research & Developmen	1015373	-	-	-	-	-	-	64,500	-	-	64,500	(64,500)
Collateral Development	1015374	-	-	-	-	-	-	1,125	37,400	-	38,525	(38,525)
Program Manager Expense	1015376	-	(9,680)	9,680	-	-	24,720	65,280	-	-	90,000	(90,000)
BABC TOTAL		**-**	**(9,680)**	**9,680**	**-**	**-**	**24,720**	**130,905**	**47,021**	**2,274**	**204,920**	**(204,920)**
BACC												
Administrative Support	1011142	-	(6,375)	6,375	-	-	145	11,231	814	-	12,190	(12,190)
BACC TOTAL		**-**	**(6,375)**	**6,375**	**-**	**-**	**145**	**11,231**	**814**	**-**	**12,190**	**(12,190)**
WOT												
Administrative Support	1011142	-	-	-	21	-	-	-	21	-	21	(21)
BDO Contract Expenses	1011143	-	-	-	-	-	-	-	-	-	-	-
		-	**-**	**-**	**21**	**-**	**-**	**-**	**21**	**-**	**21**	**(21)**
GRAND TOTAL (BDO, CBC, BABC, BACC, WOT)		**4,305,220**	**(109,607)**	**114,124**	**29,255**	**-**	**781,677**	**992,147**	**2,746,653**	**(8,539)**	**4,511,938**	**(206,718)**

BACWA Expense Detail Report for May 31, 2021

EXPENSE TYPE	JOB	AMENDED BUDGET	CURRENT PERIOD ENC	CURRENT PERIOD PV	CURRENT PERIOD DA	CURRENT PERIOD JV	YEAR TO DATE ENC	YEAR TO DATE PV	YEAR TO DATE DA	YEAR TO DATE JV	OBLIGATED	UNOBLIGATED
LABOR						-						
AS-Executive Director	1011123	190,000	-	-	-	-	31,667	158,333	-	-	190,000	-
AS-Assistant Executive Directo	1011124	102,551	(7,204)	7,204	-	-	7,192	95,359	-	-	102,551	-
AS-Regulatory Program Manager	1011149	141,170	(10,486)	10,486	-	-	9,996	129,601		-	139,597	1,573
ADMINISTRATION												
AS-EBMUD Financial Services	1011125	42,448	(11,150)	11,150	-	-	10,736	31,711	-	-	42,447	1
AS-Audit Services	1014512	5,345	-	-	-	-	5,240	5,240	-	(5,240)	5,240	105
BDO Other Receipts	1011108	-	-	-	26,559	-	-	-	26,559	-	26,559	(26,559)
AS-BACWA Admin Expense	1011118	7,959	-	-	-	-	-	-	194	-	194	7,765
AS-Insurance	1011126	4,776	-	-	-	-	-	-	4,971	-	4,971	(195)
MEETINGS												
GBS-Meeting Support-Annual	1014514	14,369	-	-	-	-	-	-	2,519	-	2,519	11,850
GBS-Meeting Support-Exec Bd	1014513	2,653	-	-	-	-	2,653	-	257	-	2,910	(257)
GBS-Meeting Support-Misc	1014516	5,306	-	-	-	-	-	-	571	-	571	4,735
GBS-Meeting Support-Pardee	1014515	6,367	-	-	-	-	-	-	-	-	-	6,367
COMMUNICATION												
CAR-BACWA File Storage	1014518	765	-	-	-	-	-	-	720	-	720	45
CAR-BACWA IT Software	1014520	1,785	-	-	244	-	-	-	1,885	-	1,885	(100)
CAR-BACWA IT Support	1014519	2,652	-	-	-	-	2,652	-	-	-	2,652	-
CAR-BACWA Website Dev/Maint	1011116	612	-	-	-	-	-	-	57	-	57	555
CAR-BACWA Website Hosting	1014517	1,530	-	-	415	-	-	-	415	-	415	1,115
LEGAL												
LS-Executive Board Support	1011110	2,176	-	-	-	-	1,090	1,166	-	-	2,256	(80)
LS-Regulatory Support	1011107	2,706	-	-	-	-	2,466	-	-	-	2,466	240
COMMITTEES												
AIR-Air Issues&Regulation Grp	1014253	76,000	(5,060)	5,060	-	-	21,032	53,968	-	-	75,000	1,000
BC-BAPPG	1011147	130,000	379	4,138	516	-	9,350	87,925	25,601	(2,025)	120,851	9,149
BC-Biosolids Committee	1011101	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Collections System	1011097	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-InfoShare Groups	1011102	1,750	-	-	-	-	-	-	-	-	-	1,750
BC-Laboratory Committee	1011103	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Permit Committee	1011098	1,300	-	-	-	-	-	-	-	-	-	1,300
BC-Pretreatment Committee	1011146	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Water Recycling Committee	1011100	1,000	-	-	-	-	-	160	-	-	160	840
BC-Manager's Roundtable	1014777	1,000	-	-	-	-	-	-	-	-	-	1,000
BC-Miscellaneous Committee Sup	1011104	45,000	-	-	-	-	-	-	-	-	-	45,000
COLLABORATIVES												
CAS-Arleen Navaret Award	1012201	-	-	-	-	-	-	-	-	-	-	-
CAS-FWQC	1012202	7,500	-	-	-	-	-	-	-	-	-	7,500
CAS-Misc Collaborative Sup	1014521	5,000	-	-	1,500	-	-	-	1,500	-	1,500	3,500
CAS-PSSEP	1011112	20,000	-	-	-	-	-	-	-	-	-	20,000
CAS-Stanford ERC	1011969	10,000	-	-	-	-	-	-	-	-	-	10,000
BACWA TOTAL		**837,720**	**(33,521)**	**38,038**	**29,234**	**-**	**104,074**	**563,463**	**65,249**	**(7,265)**	**725,521**	**112,199**
TECH SUPPORT												
WQA-CE-Technical Support	1011127	250,000	(60,031)	60,031	-	-	42,095	72,437	3,548	(3,548)	114,532	135,468
WQA-CE-Nutrient WS Permit Comm	1014021	2,800,000	-	-	-	-	-	-	2,600,000	-	2,600,000	200,000
WQA-CE Risk Reduction	1014023	7,500	-	-	-	-	-	-	-	-	-	7,500
WQA-CE Addl Work Under Permit	1014254	100,000	-	-	-	-	147,500	34,500	-	-	182,000	(82,000)
WQA-CE Voluntary Nutr Contrib	1014529	-	-	-	-	-	-	-	30,000	-	30,000	(30,000)
Nutrient Workshops	1015015	-	-	-	-	-	-	-	-	-	-	-
WQA-CE-Nature Based Solutions	1015367	200,000	-	-	-	-	311,887	124,033	-	-	435,920	(235,920)
Recycled Water Evaluation	1015566	60,000	-	-	-	-	95,288	46,546	-	-	141,834	(81,834)
WQA - CEC Investigations	1015569	50,000	-	-	-	-	55,968	9,032	-	-	65,000	(15,000)
TECH SUPPORT (CBC) TOTAL		**3,467,500**	**(60,031)**	**60,031**	**-**	**-**	**652,738**	**286,548**	**2,633,548**	**(3,548)**	**3,569,286**	**(101,786)**
GRAND TOTAL		**4,305,220**	**(93,552)**	**98,069**	**29,234**	**-**	**756,812**	**850,011**	**2,698,797**	**(10,813)**	**4,294,807**	**10,413**
BABC												
AS-Assistant Executive Directo	1011124	-	-	-	-	-	-	-	-	-	-	-
Administrative Support	1011142	-	-	-	-	-	-	-	-	2,274	2,274	(2,274)
BDO Contract Expenses	1011143	-	-	-	-	-	-	-	4,621	-	4,621	(4,621)
AS-Regulatory Program Manager	1011149	-	-	-	-	-	-	-	-	-	-	-
Technology Research & Developm	1015372	-	-	-	-	-	-	-	5,000	-	5,000	(5,000)
Academia Research & Developmen	1015373	-	-	-	-	-	-	64,500	-	-	64,500	(64,500)
Collateral Development	1015374	-	-	-	-	-	-	1,125	37,400	-	38,525	(38,525)
Program Manager Expense	1015376	-	(9,680)	9,680	-	-	24,720	65,280	-	-	90,000	(90,000)
BABC TOTAL		**-**	**(9,680)**	**9,680**	**-**	**-**	**24,720**	**130,905**	**47,021**	**2,274**	**204,920**	**(204,920)**
BACC												
Administrative Support	1011142	-	(6,375)	6,375	-	-	145	11,231	814	-	12,190	(12,190)
BACC TOTAL		**-**	**(6,375)**	**6,375**	**-**	**-**	**145**	**11,231**	**814**	**-**	**12,190**	**(12,190)**
WOT												
Administrative Support	1011142	-	-	-	21	-	-	-	21	-	21	(21)
BDO Contract Expenses	1011143	-	-	-	-	-	-	-	-	-	-	-
		-	**-**	**-**	**21**	**-**	**-**	**-**	**21**	**-**	**21**	**(21)**
GRAND TOTAL (BDO, CBC, BABC, BACC, WOT)		**4,305,220**	**(109,607)**	**114,124**	**29,255**	**-**	**781,677**	**992,147**	**2,746,653**	**(8,539)**	**4,511,938**	**(206,718)**

BACWA Memo

DRAFT

Investigative needs prior to establishing a San Francisco Bay Nutrient Credit or Trading Framework

2021

Background

The municipal wastewater treatment plants in the San Francisco Bay Region are governed by a nutrient watershed NPDES permit (Watershed Permit). The San Francisco Bay Regional Water Board (Water Board) adopted the first Watershed Permit in April 2014, and the second and current issuance, R2-2019-0017, was adopted in May 2019. The key tenets of the current watershed permit are:

- Effluent nutrient monitoring by Publicly Owned Treatment Works (POTWs)
- Annual reporting on nutrient loads, including identification of trends
- Completion of regional studies on the potential for load reductions through recycled water and nature-based systems
- Support for ongoing monitoring, modeling, and other special scientific studies via the Nutrient Management Strategy (NMS) at $2.2M per year

In the next reissuance of the Watershed Permit, the Water Board has stated that ~~it intends to~~ "*Based on the most up-to-date scientific findings the Regional Water Board will consider establishing effluent limitations … to prevent further increases in nutrient loads from municipal wastewater treatment plants."* (R2-2019-0017, p. F-13) These load caps would be calculated on a subembayment basis, where agencies who are either located within a subembayment, or whose loads contribute to a subembayment, would likely have an aggregate Total Inorganic Nitrogen (TIN) limit that is the sum of load caps of agencies within that subembayment.

The geographical extent of these subembayments has yet to be determined, but concepts that have been discussed include a whole-Bay approach; a North and South Bay approach; and finer divisions of subembayments based on modeling of total organic nitrogen transport and transformation. If load caps are implemented in an aggregate fashion, then this could potentially support a nutrient credit trading framework. Water Board staff have stated that they are amenable to this approach and open to structuring the third Watershed Permit in such a way as to facilitate such a program.

Successful point-to-point nutrient trading programs have been established around the county, most notably in regions such as Long Island Sound and the Chesapeake Bay. Closer to the San Francisco Bay, agencies in the Laguna Santa Rosa Watershed can comply with the no net phosphorus loading requirements in their permits by buying credits that fund non-point source nutrient reduction projects elsewhere in their watershed.

The purpose of this memorandum is to identify BACWA's informational needs to support our internal discussions on whether to pursue the development of a nutrient credit trading framework.

Freshwater Trust White Paper on establishing a Nutrient Framework for the San Francisco Bay

In 2016 EBMUD collaborated with USEPA to develop a scope of work to investigate potential features of a nutrient trading framework for the San Francisco Bay. A White Paper, *Development of a Conceptual Nutrient Trading Program for San Francisco Bay*[1] (White Paper), was subsequently developed by the Freshwater Trust, working in conjunction with EBMUD staff. This white paper listed programmatic options for a nutrient trading program in the SF Bay, and provided the following major recommendations:

- *Utilize a watershed overlay permit* – This recommendation is in alignment with the existing Nutrient Watershed Permit structure.
- *Develop a trade agreement to frame a "Multiple Facility Trading Program"* – This agreement would allow trading between multiple point and non-point sources without a central exchange.
- *Engage a third party broker for trade administration* – This entity would assist with credit forecasting, transaction documentation, reporting, and credit accounting

Potential benefits and challenges of nutrient credit or trading program

BACWA's discussions on nutrient trading have taken place within the Nutrient Strategy Team (NST), a group that was first convened during negations for the first watershed permit, and whose purpose is to make sure that all agencies have the opportunity to have their voices heard while developing BACWA's negotiation positions. In Spring 2021, the NST expressed interest in exploring the elements of a potential nutrient credit or trading scheme and how it could be used within the structure of a future watershed permits. An ideal nutrient credit trading program would provide benefits to agencies who choose to participate without penalizing agencies who do not choose to participate. It would be supported but not required by future Watershed Permits.

[1] https://bacwa.org/wp-content/uploads/2017/07/Nutrient-Trading-2017-Nutrient-Symposium.pdf

Potential benefits of a credit or trading program that were identified by NST members were:

- *More efficient use of regional funds and facilitation of regional planning* – A trading program could support a market-based approach to most effectively use regional funds to reduce nutrients or mitigate a potential future impairment. Facilities with the ability to cost-effectively reduce nutrient loads could be incentivized to do improve their performance beyond compliance with individual load caps.
- *More flexibility for individual agencies* – Agencies who need a long planning horizon to execute a nutrient reduction project can buy time by purchasing credits.
- *Fund regional projects (science, restoration, ~~others~~ "green engineering")* – Projects that otherwise don't have a funding source but are of regional benefit could be approved as sources of nutrient credits.
- *Incentivize desirable types of projects* – Projects that achieve multiple benefits or promote other regional priorities could be eligible to generate more credits than projects that are less valuable from a regional perspective.

Potential challenges and risks of a SF Bay nutrient credit or trading program were identified as:

- *Large differential in agencies' loads* - BACWA member agencies' sizes and nutrient loads vary greatly, from 0 kg/d TIN up to more than 9,000 kg/d TIN. A small agency could not buy enough nutrient credits to significantly influence the economics of a nutrient reduction project at a large agency. Conversely, there would like not be enough credits available from nutrient removal projects at small agencies to offset increased nutrient loads at a large agency.
- *Legal risks and setting up legal framework* – Prior to adopting any type of trading framework, a legal evaluation would be necessary. Among other elements, this would include an investigation of the risk accepted by agencies purchasing credits in lieu of reducing nutrient loads. The review would also consider potential future scenarios, such as whether an agency planning to purchase credits could be in compliance jeopardy if insufficient credits were available.
- *Time boundaries for trade* – Credits could be made available on a water year basis, or banked for the future. Previous discussions with the NMS Science Team have indicated that it is important that all accounting be done within a water year (or a single dry season, which would be a subset of a water year), and this approach is supported by the Freshwater Trust White Paper. Conversely, EPA's 2019 Water Quality Trading Memo[2] allows credit banking for future use.
- *Ability to address impairments that are found in the future* – The Regional Water Board is contemplating nutrient load caps using antidegration as a rationale. A trading program would need to pivot in the future if impairments are identified that need to be addressed by further load reductions ~~in specific geographic locations~~. This could

[2] https://www.epa.gov/sites/production/files/2019-02/documents/trading-policy-memo-2019.pdf

potentially impact the list of trading partners that would be available to an agency based on the geographical location of those partners, and/or the value of certain actions in a trading market.

- *Unreliability of credit availability* - Credits may disappear from the market if agencies change strategies on how to use excess nutrient load capacity. Agencies who had been selling credits available from excess load capacity may decide to use it in other ways, such as implementing an organics codigestion projects.
- *Agencies need to see a good "bang for their buck" for credits purchased* – Prior to purchasing credits in lieu of nutrient reductions, some agencies may want to ensure that the projects being funded are attractive to governing boards and the rate-paying public, thus impacting the free market nature of the trading system.

BACWA's information needs to evaluate whether to move forward with a nutrient credit trading framework

BACWA may seek consultant support to further flesh out the nutrient trading concept to inform our internal discussions as well as our negotiations with the Water Board on the next watershed permit. Besides review of the Freshwater Trust White Paper, the consultant would be asked to investigate the following questions from a technical and regulatory standpoint:

- What provisions would need to be included in a subsequent Watershed Permit to support a nutrient credit trading framework?
- The Water Board is currently planning to implement TIN load caps using antidegradation as a legal justification, but in the future, loads may be capped at reduced levels if an impairment due to nutrients is identified. How would a nutrient credit trading program differ if it was implemented with an antidegradation rationale versus mitigation or prevention of an identified impairment?
- Designating subembayments to be as large as feasible under the antidegradation rationale would support the largest number of potential trading partners for agencies in that subembayment. However, should an impairment be designated, smaller subembayments would facilitate trades that target nutrient reductions within the location of the impairment. How would the list of an agency's potential trading partners differ, and how could trading ratios be used under each scenario?
- Is there technical or scientific justification for banking credits, or extending the trading timeframe beyond a single water year?
- What type of projects would be eligible to generate credits? Could they include restoration projects or scientific investigations, as is allowed in the Chesapeake Bay trading framework?

- If subsequent watershed permits include aggregate load caps, would it be necessary to have the Regional Water Board's involvement in approving TIN credit trades? Would the answer be different if non-point sources were able to generate credits?
- Could credits be generated by entities that are outside the San Francisco Regional water Board's jurisdiction, for example, upstream in the San Francisco Bay Delta?
- If a multiple facility trading program was established, could agencies choose their trading partners or would credits be available on a generic basis?
- From the perspective of an individual agency that has exceeded its load cap, how would "buying time" by purchasing credits differ from a time schedule order?
- How is the pricing determined for a nutrient credit?
- If BACWA or its members were to contract with a third party to serve as a broker for the nutrient credit trading program, what would be the scope of work for that entity?
- If a nutrient credit trading program is established, are there any potential risks to agencies who choose not to participate?

Water Quality Trading Programs Around the U.S.

WQT Program Name	State	Website	Credit Trading Ratio	Time/place restrictions on credits	Project/Trade Approval Process
Cherry Creek Basin Water Quality Authority Trading Program	CO	https://www.cherrycreekbasin.org/wp-content/uploads/2014/04/TradingProgramGuidelines-10-06.pdf	Minimum 2:1 Can be adjusted up based on factors like transport characteristic and site-specific monitoring data. Examples of actual trade ratios: January 2004 trade- 2.9:1 February 2006 trade- 2.5:1	Duration of credits: Credits received in approved trades or sales are valid in perpetuity, subject to modification or revocation by the Authority.	Pre-Application discussion with TAC (subcommittee of Cherry Creek Board of Directors), file application for new trade project, present project at next TAC meeting, TAC reivews project and will solicit and consider comments from the Division before making a recommendation to the Authority Board, Authority then holds a hearing where parties can submit comments, project owner given time to respond to comments, Authority votes on project.
Chatfield Watershed Authority WQT Program	CO	https://chatfieldwatershedauthority.org/wp-content/uploads/2013/04/Chatfield-Trading-Guidelines-Final-April-25-2007.pdf	2:1 Unless applicant requests an exemption from ratio based on adequate water quality data collected on a project-specific basis	Duration of credits: Credits received in approved trades or sales are valid in perpetuity, subject to modification or revocation	Applicant must present the trade project to the Authority and the Division at a meeting. Public notice and comment on the trade project Board of directors of Chatfield Watershed Authority will approve or deny project Application is then reviewed by the Colorado Water Quality Control Division to approve or deny within 60 days after receipt of Board's decision

Water Quality Trading Programs Around the U.S.

Idaho DEQ Water quality trading guidance from 2016	ID	https://www.deq.idaho.gov/media/60179211/water-quality-trading-guidance-1016.pdf	An overall trade ratio should be greater than 1.5:1 Credit life must be based in science and tied to the critical period for a watershed.	The proportion of a credit-eligible project funded by public dollars dedicated to conservation cannot be used to generate credits. Credits cannot be banked. Trading frameworks and plans can provide a limited look-back period to bring in otherwise eligible early action projects, typically no more than 2 years before TMDL is approved by EPA. Credits cannot be sold to offset the impacts from two different credit buyers. But proportional accounting is encouraged such that landowners can sell 25% of their phosphorous credits from a wetland as long as the seller proportionally reduces the amount of wetland credits available to sell by an equivalent 25%.	Proposed trading frameworks/plan needs public notice and comment before approval. All BMPs will be reviewed by DEQ as part of the review and approval of the trading framework or plan which includes public notice and comment.
Pennsylvania Chesapeake Bay nutrient trading program	PA	https://www.dep.pa.gov/Business/Water/CleanWater/NutrientTrading/Pages/Credit-Generation-Process.aspx	A delivery ratio is applied for nonpoint source generators of credits depending on the location of the generation in the watershed. The watershed is divided into segments. Segments close to the Chesapeake Bay have delivery ratios close to 1.0 while those further have lower values.	Verified credits may only be used in the Compliance Year in which they were generated which runs from Oct. 1 to Sept. 30th of each year.	Dept. of Environmental Protection (DEP) must approve a pollutant reduction activity to generate credits. The generator may then generate credits. DEP then verifies those credits and the verified credits are posted on Nutrient Credit Report page where buyers can check to see which credits are available. Once buyer and generator contact each other, they must get the trade approved by DEP. Certification to generate credits by NP sources

Water Quality Trading Programs Around the U.S.

					involves 30 day public comment period.
Maryland Water Quality Trading Program	MD	https://mde.maryland.gov/programs/Water/WQT/Pages/index.aspx https://mde.maryland.gov/programs/Water/WQT/Documents/WQT_regulations.pdf	Three different trading ratios: 1. Edge of tide ratio aka delivery ratio- accounts for attenuation of a pollutant on its way through tributaries to main stem of the Bay 2. Reserve ratio- a 5 percent reduction in the total number of certified credits that can be used by the buyer in a trade. Credits resulting from the application of this ratio are placed in an annual reserve pool and can be used to offset the loss or underperformance of purchased credits. 3. Uncertainty ratio- applied to a credit to compensate for the challenges that exist in accurately measuring nonpoint source credit generation. 2:1 ratio for trades involving credits generated by nonpoint sources and acquired by wastewater point sources but can be lowered if buyer can demonstrate that a lower ration is justified. 1:1 for trades involving credits generated by nonpoint sources and acquired by storm water point sources. 1:1 for trades involving implementations of BMPs for land conservation	Trades must occur within same trading region. Trading regions includes the three main watersheds. Public funding cannot be used to generate a credit except credits generated by a nonagricultural best management process funded in part by public funding shall be prorated based on the ratio of nonpublic funding used to generate the credit to the total cost incurred to generate the credit Credit's lifespan is determined during certification process. They can be certified for more than one year.	Credits can only be trade after they have been certified, verified, and registered by Maryland DEP (same as PA program) No public comment period requirement for certification or verification of credits. Notice will be provided and an opportunity for comment and a hearing will be provided if requested for NPDES and State discharge permits that propose to allow trading.

Water Quality Trading Programs Around the U.S.

Wisconsin Dept. of Natural Resources Guidance on developing a water quality trading strategy	WI	https://dnr.wi.gov/topic/surfacewater/documents/WQT_howto_9_9_2013signed.pdf	Minimum ratio for point to point source trades is 1:1. Minimum ratio for point to nonpoint source trades is 1.2:1.	Credit user and generator must discharge to same water body. Credits generated by nonpoint sources can be used throughout the calendar year. Credits generated by point sources need to be used in the same month they are generated in.	Not discussed
Minnesota River Basin Trading Program	MN	https://www.pca.state.mn.us/water/water-quality-trading	Point to point source trades: 1:1 for existing facilities 1.1:1 for new facilities Point to nonpoint source trades will have larger ratios to account for uncertainty or sources that are unmonitored Examples: 2015 Princeton Wastewater Treatment Facility implemented five trading projects consisting of bank and/or bluff stabilization along Rum River- 2.6:1 1997 Rahr Malting Company implements five trading projects consisting of livestock exclusion, bank stabilization, and establishing - 2.6:1	Credit generation and use must be upstream of the targeted body of water and trades may not occur where a water body that does not meet water quality standards for the pollutant of concern is located between an upstream credit user and a downstream credit generator. No info on banking or duration of credits.	Not discussed
Lower St. Johns River Water Quality trading program	FL	https://www.flrules.org/Gateway/View_notic	Default 2:1 ratio for urban stormwater and 3:1 for agricultural runoff	Credits are expressed as annual loading of nitrogen or phosphorus and cannot be rolled over or	No public comment period discussed

		e.asp?id=16270603 http://paxriverkeeper.org/prk/file/Trading-WaterQualityCreditReport-101410-Copy.pdf	When estimating credits for NP source pollution control activities, the estimate shall be the long-term average expected reduction and the Dept. will use uncertainty factors to adjust the credits. Credits also adjusted if seller and buyer discharge to different locations	aggregated from year to year. No banking of credits.	
Great Miami River Watershed Water Quality Credit Trading Program	OH	https://epa.ohio.gov/portals/35/WQ_trading/MCD%20Trading%20Program%20Operation%20Manual%20Feb%208%202005.pdf	Trading ratio depends on buyer status and the water quality attainment status at the buyer's discharge point. "Investors" are buyers that participate in the trading program before NPDES compliance requirements for nutrients. "Contributors" are buyers that choose to participate in the Trading Program but not in advance of their regulatory requirements Investors discharging into fully attaining waters get 1:1 ration. Investors discharging into impaired waters get 2:1 ratio. Contributors discharging into fully attaining waters get 2:1 ration. Investors discharging into impaired waters get 3:1 ratio.	No mention of credit banking or credit duration	No public comment mentioned to approve a proposed project
State of Oregon DEQ Internal Management	OR	https://www.oregon.gov/deq/Filtered%20Li	No recommended ratio but does require that the ratio	Credits generated under an approved trading plan may not include water quality benefits	Approval of a trading plan does require public notice and comment but approval of individual trading projects

Directive for Water Quality Trading - not an official rulemaking just guidance for DEQ employees and permit writers in Oregon		brary/WQTradingIMD.pdf https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=1456 https://www.oregon.gov/deq/wq/wqpermits/Pages/Trading.aspx	should always be greater than 1:1. Examples of different types of ratios: attenuation ratios, pollutant equivalency ratios, uncertainty ratios, ratios to incentivize trading projects in priority areas, ratios to address risk, time lag ratios, and ratios for credit retirement. There is only one permit with an approved water quality trading program on DEQs website and that is the permit for Medford Regional Water Reclamation Facility. It specifies a thermal credit trading ratio of 2:1.	obtained with public conservation funds DEQ staff may consider allowing a permittee to claim credit for multiple benefits generated by a single trading project- no proportionality requirement mentioned Credit duration: depends on type of PMP and pollution reduction generated as well as documentation the BMPs are effective. Staff may approve trading plans that allow credits to continue to be used for subsequent permit cycles. Also for BMPs that take a long time to realize full water quality benefits, DEQ may approve trading plan that allow the duration of credits to begin before the full water quality benefit is achieved.	does not require separate public notice and comment.

Programs with Non-point Source Credit Exchanges- centralized pool of credits established by a third-party who buys credits from nonpoint sources to sell to point sources.

1. **Long Island Sound Nitrogen Credit Exchange Program (CT)**

   - **Websites:** https://www.ct.gov/deep/lib/deep/water/municipal_wastewater/nitrogen_report_2017.pdf; https://www.ct.gov/deep/cwp/view.asp?a=2719&q=325572&deepNav_GID=1635

   - **Description**: Publically owned treatment works must purchase nitrogen credits necessary to meet its nitrogen limits from the government. The commissioner of Energy and Environmental Protection, in consultation with the Nitrogen Credit Advisory Board, aggregates point-source reductions for re-sale at a fixed price. Funds from the nitrogen credit exchange are used can be used for nitrogen removal projects, habitat restoration, and research.

2. **Virginia DEQ Chesapeake Bay Watershed Guidance (VA)**

   - **Websites:** https://www.deq.virginia.gov/Programs/Water/PermittingCompliance/PollutionDischargeElimination/NutrientTrading/Nutrientnbsp;CreditExchangeStudynbsp;.aspx; https://www.deq.virginia.gov/Portals/0/DEQ/Water/PollutionDischargeElimination/VANPSTradingManual_2-5-08.pdf.

   - **Description**: A third party, either private or public, acts as a broker to facilitate trades between nonpoint and point sources. 2:1 ratio is used. Credits must be used in same calendar year as when the discharge occurs.

July 1, 2021

James Parrish
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

VIA EMAIL: James.Parrish@waterboards.ca.gov

Subject: 2021 Nutrient Watershed Permit - Special Studies Status Report

Dear James Parrish,

On behalf of BACWA's member agencies covered by the Nutrient Watershed Permit (R2-2019-017), BACWA is pleased to submit this 2021 status update on our work to perform 1) the Regional Evaluation of Potential Nutrient Discharge Reduction by Natural Systems; and 2) the Regional Evaluation of Potential Nutrient Discharge Reduction by Water Recycling. This update is required by the Nutrient Watershed Permit Provisions VI.C.2.c and VI.C.3.c.

Following the submission of the two Scoping and Evaluation Plans in December 2019, BACWA has worked with its consulting teams to make significant progress on both of the Special Studies. The teams working on the two projects are collaborating to ensure that their work products will be comparable to one another as well as to the data provided in the Optimization and Upgrade Report submitted in compliance with the first Watershed Permit.

For the Regional Evaluation of Potential Nutrient Discharge Reduction by Natural Systems, the team has completed the following tasks:

- Quarterly meetings have taken place with the Contract Management Group, which is comprised of representatives from BACWA and aligned stakeholders, including the Regional Water Board, San Francisco Estuary Partnership, and Valley Water.
- The project team has convened and participated in meetings to encourage coordination among projects aligned to this project, including the Bay Area One Water Network, Transforming Shorelines, and Bay Adapt.
- A request for information from agencies participating in this project was completed in mid-2021. The information obtained from this request supports site-specific analyses that will inform future efforts, and identifies opportunities and constraints not reflected in the desk-based study.
- A desk-based analysis to identify candidate sites was completed in January 2021, serving to identify opportunities and constraints to nature-based systems deployment based primarily on geography. This effort was described in an Opportunities and Constraints report which will be incorporated in this effort's Final Report. This GIS-driven analysis

PO Box 24055, MS 702 • Oakland, CA 94623 • www.bacwa.org
Central Contra Costa Sanitary District • East Bay Dischargers Authority • City of San Jose • East Bay Municipal Utility District • City & County of San Francisco

identified sites most suitable for nature-based systems for nutrient management and will inform site-specific studies.

- Current activities, as of mid-2021, focus on site-specific outreach and investigations. Outreach has been performed to all thirty-eight agencies participating in this project. Of those, interviews were conducted with fourteen agencies; one site visit occurred at the Sewerage Agency of Southern Marin (SASM), and email responses were received from fifteen agencies. Outreach to an additional nine agencies is outstanding. Information collected through this outreach process will be reflected in revisions to the Opportunities and Constraints report. In addition, for those agencies where nature-based systems opportunities have been identified, memoranda shall be prepared to explore options and constraints further and identify design alternatives.

For the Regional Evaluation of Potential Nutrient Discharge Reduction by Water Recycling, the team has completed the following tasks:

- The project team has delivered bimonthly updates on progress to BACWA via our Recycled Water Committee.An initial request for information was sent out and returned by all the agencies who are participating in the evaluation. This request for information updated the recycled water volumes/types expected through year 2045 from the data collected in the first Watershed Permit Optimization and Upgrade Report. It also provided context on any barriers/drivers for the advancement of recycled projects at each agency.
- Draft individual agency report templates have been developed, reviewed, and finalized with oversight from BACWA's Recycled Water Committee.
- Eleven individual agency reports have been developed in draft form.
- The Final Report will have a similar layout to the first Watershed Permit Optimization and Upgrade Report, in that it will include a main body that summarizes and synthesizes the individual agency reports. The individual agency reports will be included as appendices.

BACWA anticipates submitting the Final Reports for the two Special Studies in advance of the July 1, 2023 deadline.

Please do not hesitate to contact me if you have any questions.

Respectfully,

Lorien Fono

Executive Director
Bay Area Clean Water Agencies

cc: BACWA Board
BACWA Watershed Permit Points of Contact
Tom Mumley, Regional Water Quality Control Board
Robert Schlipf, Regional Water Quality Control Board

San Francisco Bay Nutrient Management Strategy (NMS) Steering Committee Meeting Draft Minutes

Date/Time: June 11, 2020, 9:00 AM to 12:00 PM

Location: WEBCONFERENCE

Chair: Thomas Mumley

Steering Committee Attendees

Organization	First	Last	Role	Present	Comments
BASMAA	Adam	Olivieri	Member		
	Tom	Hall	Alternate	x	
	Matt	Fabry	Alternate		
	Geoff	Brosseau	Alternate		
BACWA	Eileen	White	Member	x	
	Lori	Schectel	Alternate		
	Eric	Dunlavey	Member	x	
	Jackie	Zipkin	Alternate	x	
Cal DFW	Becky	Ota	Member		
U.S. Geological Survey	Deb	Stoliker	Member		
NOAA Fisheries	Joe	Dillon	Member		
	Brian	Meux	Alternate	x	
Regional San	Lisa	Thompson	Member	x	
San Francisco Baykeeper	Ian	Wren	Member	x	
South Bay Salt Pond Restoration Project	David	Halsing	Member	x	
Interagency Ecological Program	Steve	Culberson	Member	x	
SFCWA	Lynda	Smith	Member	x	
	Frances	Brewster	Alternate		
U.S. EPA	Terry	Fleming	Member	x	
	Luisa	Valiela	Alternate		
U.S. FWS	Leanna	Zweig	Member		
WSPA	Kevin	Buchan	Member	x	
Ocean Protection Council	Justine	Kimball	Member		
Central Valley Water Board	Adam	Laputz	Member		
	Janis	Cooke	Alternate	x	

	Christine	Joab	Alternate		
SF Bay Water Board	Tom	Mumley	Member	x	
	Richard	Looker	Alternate		

Additional Attendees
Derek Roberts, SFEI
Lorien Fono, BACWA
Mary Cousins, BACWA
David Senn, SFEI, Science Manager, Program Coordinator Team
Robert Schlipf, Water Board
Richard Looker, Water Board
Allie King - SFEI
Blake Brown, Central San
Farid Karimpour, SFEI
Kristin Art, SFEI
Sienna White, SFEI
Don Grey, EBMUD
Ariella Chelsky, SFEI
Pradeep Mugunthan, SFEI
Blake Brown, CCCSD

1. **Welcome, Introductions and Agenda Review**

   The Chair gave a quick overview of the meeting agenda, and the timing of technical items. The facilitator directed a roll call of attendees.

2. **Decision: Approve Prior SC Meeting Summaries**

   A motion to approve the December 11, 2020 meeting summary was made by Eileen White (BACWA), and seconded by Eric Dunlavey (BACWA). The motion passed unanimously.

3. **Information: Action items**

   There were no action items from the December 11, 2020 meeting.

4. **Information: Planning Subcommittee Report Out**

   The Water Board is working on a document to inform the science needs prior to the next Watershed Permit reissuance, as well as the development of a Basin Planning standards action. Significant attention has been paid to the LSB DO track. We are using the Planning Subcommittee to make recommendations to the San Francisco Estuary Partnership for the Estuary Blueprint update.

5. **Information: NMS Program Update**

   The Science Manager, Dave Senn, introduced the new Program Manager, Lisa Hunt.

   - *Quarterly Financial Update* – Lisa provided the update on the carryover from FY21, which was $80k higher than previously estimated. Areas with budgets that are higher than previously estimated are program coordination and the mooring network. The current reserve level (unencumbered funds) is $172,464, although those numbers are from January so they are not precise, and are likely low. Dave pointed out that 40 to 50 percent of the ongoing work is beyond the level supported by permit funds.

- *Program Update* – SFEI will be partially back in the office over the summer. The team has been working over the past two months with investing in the program plan. There have been three successful field campaigns in the Lower South Bay in October, February and May. All three shoal stations are now installed in collaboration with USGS. An agreement has been reached with USGS for use of their vessel. There are six new work products that Dave will send out later next week.

6. Discussion: May 2021 Nutrient Technical Workgroup Update

This item was covered as part of the next agenda item, the Program Plan update.

7. Discussion: FY2021 Program Plan

- Dave gave an update on the Program Plan Approval Process, and how it has been iterative over the past several Steering Committee meetings and NTW meetings as the situation resulting from COVID restrictions has become clearer. Item 7b in the meeting materials was provided to give background information on the process. Dave reviewed the program areas where emphasis will be placed over the next Fiscal year.
- Feedback from the NTW included:
  Monitoring
  - Can we quantify microcycstin loads from the Delta? This will be on the backburner for now.
  - What the role of nature- based solutions vs. load managements?
  - Pursue work to better understand how pond management and other management actions will affect conditions over time, give that restoration effort are ongoing.

  Modelling
  - Future scenarios should be a priority to assist POTWs and regulators in near term planning, so an understanding of potential future responses can inform log-term planning
  - Uncertainty analysis should be performed to get clarity. (But don't get sidetracked too early on this).
- The primary goal of today's meeting is to get approval for the slate of projects that are included in Section 2 of the Program Plan, under the assumption that sufficient funds are available. If funds are not available, then SFEI will update the program plan in consultation with Planning Subcommittee.
- Anticipated funding is $2.2 from the Nutrient permit, plus RMP funding and RMP ship-based monitoring funding. There are additional potential funding sources available, plus carry-forward funds from the previous fiscal year. Dave reviewed how the proposed projects would contribute to moving forward different Science Plan Areas, and in which geographical areas within the Bay. Dave then showed work that is not going forward, but can do so if additional funding becomes available.
- *Terry Fleming (EPA) made a motion to approve the slate of projects in the Program Plan. Eileen White (BACWA) provided a second. The motion passed unanimously.*
- Tom Mumley pointed out that we have the option to identify additional projects to fund if new sources become available, such as a supplemental project associated with an enforcement action. Dave presented a spreadsheet showing projects that were underfunded compared to the original budget proposal that received less funding in the final proposal. There was a discussion about the best way to get feedback from the steering committee, after members have had a chance to consider the projects. The Planning Subcommittee will develop a list of preferred projects and propose those to the Steering Committee. The Planning Subcommittee will have the authority to approve projects that need to move forward between Steering committee meetings. Tom asked that this approach be formalized with a vote. *Terry Fleming (EPA) moved to formalize this approach with a motion and Steve Culbertson (IEP) provided a second. The motion passed unanimously.*

- Dave had developed a list of projects to propose for potential SEP funding:
    - Build/expand SFB monitoring capacity: SFB monitoring network/infrastructure, including outside the GG
    - Biogeochemical field investigations in Suisun/SP or LSB
    - Develop an open-source “community” sediment transport model
- Over the break, SFEI developed a first pass of priorities to present to the group for extra funding should it become available, which were:
    - P3 Sediment/light (field, model)
    - P4 LSB model development
    - P16 Zooplankton monitoring
    - P20 Delta-Suisun Modeling
    - P24+25
    - P1c+P1b – Biogeochemical Field Studies

  There was a discussion about the importance of providing synthesis work as part of adaptively managing planning how to spend additional funding and tracking our needs. It was recommended that synthesis work be added to the list of projects that could receive additional funding should it become available.

8. Discussion: Ship-based monitoring program update

- Deb Stoliker has been transferred to a different position, and will discuss her replacement to the NMS with the Science team.
- After four years, USGS approved continued support for R/V Peterson costs, including the captain, fuel, and maintenance. The USGS can now use it as much as needed as long as they pay for fuel and crew. Administration of the program will move to USGS-Sacramento (Water Science Center, soft money). In the near term the PI will be B Bergamaschi, our current collaborator on mooring and mapping work. In 2016, the NMS made a $200k investment into the vessel, and this agreement will hopefully allow the program to continue to recoup the investment. The RMP may also make use of the vessel for needs beyond nutrients.
- Dave asked for authorization to develop, negotiate, and enter into a multiyear agreement with USGS for use of their vessel. The goals are to get maximum use at rea There was a discussion about concerns about high costs and the level of overhead in USGS contracts. It was suggested that SFEI staff have the authority to negotiate the contract, but it would need to bring the contract back to the Steering committee for final approval. If this needs to happen in between Steering Committee meetings, a special meeting could be called for the approval. Smaller issues can be dealt with in the interim by the Planning subcommittee.

9. Other Business

Updates from NMS Steering Committee member agencies

- Lisa Thompson from Regional San reported that their flow is now being treated through their biological nutrient removal system, which just came online this spring. They are now removing all ammonia and 65% of nitrate.

- The Water Boards will be transitioning away from our emergency telework mode. The transition will take place over the summer and into September. They are looking at long term hybrid work and meeting options.

- EBMUD is also looking at transitioning back to in-person work and developing a long-term telecommuting policy.

10. Action items and wrap-up

- The Planning Subcommittee will develop a list of recommendations for funding priorities if additional funding becomes available to propose at the September Steering Committee Meeting.
- The SFEI team will negotiate a contract with USGS for use of their vessel, and determine whether the contract will need to be brought back to the Steering Committee for approval. If so, and if time is of the essence, then a special Steering Committee meeting may be called to consider approval. Otherwise, interim approval will be provided by the Planning subcommittee.

The next meeting will be held September 10, possibly in person!

Adjourned at 12:25pm

Lorien Fono

From: lyris@swrcb18.waterboards.ca.gov
Sent: Tuesday, June 29, 2021 4:18 AM
To: Lorien Fono
Subject: Triennial Review - Information about Project Ranking Criteria

Categories: Board Packet

This is a message from the California Regional Water Quality Control Board, San Francisco Bay Region (2).

Dear Stakeholders,

At the June 21, 2021 Triennial Review workshop, stakeholders requested that we communicate the criteria used to rank projects.

The table below contains the project ranking criteria and their point value. Every project will receive a score for each criterion, and these will be summed for the overall project score. The maximum overall score for a project is 90 points. We will also estimate a level of effort (person-years) for each project. After sorting the projects in descending order based on total points, the list of priority projects will comprise the highest-ranked projects that we can address with our available Basin Planning resources (approximately six person years over three years). Please let me know if you have questions about this process.

Criterion	Points
Water Board Mission (protecting Beneficial Uses)	20
Climate Change Nexus	15
Public Support	10
External Resources Invested	10
Staff Resources Invested	10
Implement State Board Policy	5
U.S. EPA Priority	5
External Resources Likely Available	5
Geographic Scope	5
Input from Water Board Divisions	5

Best,

Richard E. Looker
SF Bay Regional Water Quality Control Board
Richard.Looker@waterboards.ca.gov

July 7, 2021

Sami Harper
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

VIA EMAIL: Samantha.Harper@waterboards.ca.gov

Subject: Comments on the 2021 Triennial Review of the Water Quality Control Plan for the San Francisco Bay Basin

Dear Sami Harper:

The Bay Area Clean Water Agencies (BACWA) appreciates the opportunity to comment on the 2021 Triennial Review of the San Francisco Bay Basin Water Quality Control Plan (Basin Plan). BACWA is a joint powers agency whose members own and operate publicly-owned treatment works (POTWs) and sanitary sewer systems that collectively provide sanitary services to over 7.1 million people in the nine-county San Francisco Bay Area. BACWA members are public agencies, governed by elected officials and managed by professionals who protect the environment and public health.

BACWA supports the triennial review process and applauds the improvements made to the Basin Plan through this process in recent years. The issues proposed for review by the San Francisco Bay Regional Water Quality Control Board (RWQCB) in its April 2021 *Issues Descriptions for the 2021 Triennial Review of the San Francisco Bay Basin Water Quality Control Plan* address more than a dozen topics that affect broad sections of the residents, business, and public agencies of the San Francisco Bay Area. Because the Water Board has limited resources to address each of these issues, BACWA is limiting its substantive comments to four of the issues. The comments below are made with reference to, and in order of the Issue numbers in the Issue Descriptions document.

1. ***Issue 3.4 – Nutrient Management Strategy and Dissolved Oxygen Objectives in San Francisco Bay***

BACWA is a key stakeholder in the San Francisco Bay Nutrient Management Strategy (NMS), coordinating with RWQCB staff, scientists, and other regional stakeholders on nutrient-related regulatory development based on scientific research. Through the NMS, BACWA members fund a science program to conduct monitoring and modeling of San Francisco Bay, and to develop an Assessment Framework for evaluating the Bay ecosystem's status with respect to nutrient

PO Box 24055, MS 702 • Oakland, CA 94623 • www.bacwa.org
Central Contra Costa Sanitary District • East Bay Dischargers Authority • City of San Jose • East Bay Municipal Utility District • City & County of San Francisco

enrichment. Funding the science program is a requirement of the Nutrient Watershed Permit (NPDES Permit No. CA0038873, Order No. R2-2019-0017), which also requires BACWA members to conduct monitoring of nutrients in wastewater and to complete special studies that evaluate nutrient load reduction strategies.

BACWA strongly supports updating the Basin Plan to include a description of the NMS. Doing so would affirm our shared commitment to a science-based process for protecting the Bay's beneficial uses.

A Basin Plan amendment should describe the NMS in at least the level of detail found in the current (2019) Nutrient Watershed Permit[1]. Since that time, additional progress has been made towards developing an Assessment Framework to identify potential impairment in two different habitats: 1) the open Bay and 2) the shallow water margins areas and tidal sloughs. The Issues Description document includes a candidate Basin Planning project to investigate the need for site-specific dissolved oxygen objectives (SSOs) in margin habitats and tidal sloughs in South San Francisco Bay. BACWA recommends the NMS Assessment Framework as the appropriate forum for this work.

BACWA agrees, in part, with the statement in the Issue Descriptions document that "the approach taken to develop site-specific objectives in Suisun Marsh is expected to be applicable to other shallow-water habitats around the Bay" (p. 6). BACWA agrees that it would be appropriate to consider the USEPA Virginia Province approach (VPA), as used in the Suisun Marsh TMDL, to develop an objective that is tailored to site-specific species, habitats, and DO exposure regimes. Utilizing the VPA approach will provide important foundational information for developing SSOs for DO in the margins and tidal sloughs of South San Francisco Bay. In addition to pursuing the VPA as a foundation to guide the Assessment Framework, the NMS science team is also conducting a desktop examination of metabolic indices as well as field work to gather fish community data with concurrent water quality data. These additional evaluations and investigations follow the recommendations of an expert panel of scientists whose collective experience spans a number of relevant disciplines, including:

- Water quality standards development that considers physical, chemical and biological factors that play a role in determining appropriately protective water quality conditions,
- Multi-variate statistical trend analysis of ecological data, and
- Community and ecosystem level ecologists with expertise in fish and lower trophic level population and community dynamics.

Using these three lines of evidence, any efforts to develop site-specific DO objectives for the Bay should continue to build on the knowledge gained through the NMS. For example, the Suisun Marsh TMDL used laboratory data and published literature on laboratory studies of DO sensitivity for individual surrogate fish species, rather than the actual presence and abundance of

[1] See Section C.4, Attachment F of Order No. R2-20190-0017.
https://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2019/R2-2019-0017.pdf

resident fish under various real-world scenarios in Suisun Marsh. Thanks to the work of the NMS science team and affiliated researchers, there are much more extensive DO and wildlife data already available for Bay margins that could be used to link DO levels with beneficial uses more directly than the VPA approach alone. BACWA supports an approach to develop site-specific objectives that builds on this scientific foundation.

Recommendation: Amend the Basin Plan to describe the NMS, and note that that the NMS Assessment Framework is the appropriate forum for developing site-specific dissolved oxygen objectives for shallow habitats in the South San Francisco Bay.

2. *Issue 4.4 – Update Cyanide Dilution Credits*

BACWA supports the concept of updating Basin Plan Table 4-6 to add cyanide dilution credits for shallow water dischargers and discharge locations not already in the table, as this effort would streamline individual NPDES permitting for several shallow water dischargers. The Regional Water Board has already identified cyanide mixing zones for several dischargers that have secondary outfalls not listed in Basin Plan Table 4-6, such as the City of Palo Alto, Sonoma Valley County Sanitation District, and Fairfield-Suisun Sewer District. As a result, BACWA anticipates that much of the technical information required for this Basin Plan update will already be available within individual NPDES permits or Reports of Waste Discharge.

BACWA also supports the concept of identifying dilution credits and mixing zones for whole effluent chronic toxicity, either as part of a Basin Plan amendment to address cyanide mixing zones or in combination with other updates to Basin Plan section 4.5.5.3, "Whole Effluent Toxicity Limits and Control Program." New statewide toxicity provisions are anticipated to go before the State Water Board for re-adoption later in 2021. Since the proposed statewide toxicity provisions supersede aspects of the Basin Plan's current toxicity policy, most of Basin Plan section 4.5.5.3 will require editing.

For shallow water dischargers, BACWA recommends maintaining a link between dilution credits for whole effluent chronic toxicity and for cyanide. This approach is consistent with Basin Plan section 4.5.5.3.2, which allows for chronic toxicity "credit for dilution comparable to those allowed for numeric chemical-specific objectives." BACWA prefers this approach because it will not be feasible to immediately develop new chronic toxicity mixing zones that comply with the State Implementation Policy[2] requirement for mixing zones to be "as small as practicable," since the proposed statewide toxicity policy uses the Test of Significant Toxicity (TST). This statistical method has not been previously used by Bay dischargers, so compliance information to determine the size of a mixing zone that is "as small as practicable" will not be readily available for some time. To summarize, BACWA does not support listing dilution credits for whole effluent chronic

[2] State Water Resources Control Board, 2005. *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* ("State Implementation Policy"). Available online at https://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/docs/sip2005.pdf

toxicity in the Basin Plan itself, but supports an alternative approach of developing information in a staff report and linking chronic toxicity dilution credits with those for cyanide.

Recommendation: Basin Plan Table 4-6 should be updated to reflect cyanide dilution credits for all currently permitted shallow water outfalls. When the section on chronic toxicity is updated to reflect new statewide toxicity provisions, the Basin Plan should retain the narrative linkage between mixing zones for chronic toxicity and other chemical-specific mixing zones. This approach is preferred to establishing new, unique dilution credits for chronic toxicity at this time.

3. Issue 5.1 – Climate Change and Wetland Policy Update

BACWA supports the incorporation of climate change into the Basin Plan. BACWA and its member agencies have been examining the vulnerability of our facilities to sea level rise, as well as our ability to help reduce greenhouse gas emissions with a broad portfolio of waste-to-energy programs.

The Regional Water Board is reviewing how existing policies regulating wetland fill, ecosystem restoration and flood protection can best incorporate consideration of sea level rise; the need for a new policy to facilitate the use of highly treated wastewater and stormwater as a source of freshwater to nourish tidal marshes; as well as sediment management to enhance flood control, support baylands restoration and promote shoreline resilience. One additional component of these efforts that the Water Board should not overlook is the potential use of biosolids as material to restore, sustain, or develop marshland habitats, in upstream locations such as horizontal levees, or in salt marshes. While the concept needs further study for successful physical implementation and risk management, biosolids are an organic carbon-rich and nutrient-rich resource that is reliably available. Biosolids could be used to promote vegetative growth for stabilizing marshland, or for raising land elevations over time. They may be an important tool to address the sediment deficit around the bay margins for developing natural flood protection. BACWA's member agencies would be pleased to participate in pilot studies or other joint fact-finding initiatives to further explore this concept.

Additional information about encouraging use of wastewater to enhance wetlands is found in Comment #4, below.

Recommendation: Consider biosolids beneficial reuse when reviewing sediment management policies to enhance flood control, support baylands restoration and promote shoreline resilience.

4. Issue 7 – Removal of Candidate Project to Review and Update Policy 94-086, "Use of Wastewater to Create, Restore, and/or Enhance Wetlands"

The Issue Descriptions document states that no changes are necessary to Policy 94-086, *Use of Wastewater to Create, Restore, and/or Enhance Wetlands*[3], in order to permit foreseeable restoration projects. In contrast to this statement, BACWA believes that Basin Plan amendment(s) addressing climate change would be a logical way for the Regional Water Board to encourage wetlands projects using wastewater, because cost and permitting challenges are a significant barrier to the completion of such projects.

Policy 94-086 states that "It is not the intent of this policy to either encourage or discourage the use of the wastewater to create, restore, and/or enhance wetlands." Policy 94-086 contains helpful guidance for permitting wetlands, but does nothing to incentivize such projects. Wetlands restoration projects are expensive, and may not be cost-competitive with "grey infrastructure" projects to combat climate change or reduce nutrient loading. To promote multi-benefit projects, BACWA believes that the Regional Water Board should adopt a stance that actively encourages wetland restoration projects, rather than remaining neutral.

As noted above, BACWA supports Basin Plan amendment(s) to address climate change. Several BACWA member agencies are involved with baylands restoration or shoreline resiliency projects that involve use of wastewater in wetlands; such projects are, in part, a response to rising sea levels. Although NPDES permitting rules are not easily adapted to wetlands projects, which may not involve a clear engineering demarcation between a point source and a receiving water, the Regional Water Board has been successful in using Policy 94-086 to address NPDES permitting requirements. At this time, rather than specifically revising Policy 94-086, BACWA believes that the climate change basin plan update would be an appropriate vehicle to identify stronger language encouraging the use of wetlands to create, restore, and enhance wetlands.

Recommendation: When developing Basin Plan amendments(s) for Issue 5 (Climate Change and Wetland Policy Update), consider actively encouraging the use of wastewater in creating, restoring, and enhancing wetlands when such projects have the potential to increase shoreline resiliency.

In addition to the substantive comments above, BACWA encourages the Regional Water Board to update the Basin Plan with the items identified in the Issue Description that clarify ambiguous areas in the text. They could be incorporated into the Basin Plan as time and resources allow. These items are:

- **Issue 3.1 – Clarify Implementation Requirements for Municipal Supply and Agricultural Supply Water Quality Objectives**

- **Issue 3.7 – Clarify Turbidity Water Quality Objective**

[3]San Francisco Bay Regional Water Quality Control Board, 1994. *Resolution No. 94-086, Policy on the Use of Wastewater to Create, Restore, and/or Enhance Wetlands.* Available online at: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/basinplan/web/res/res_94-86.pdf

- **Issue 6.1 – Editorial Revisions, Minor Clarifications, or Corrections**

BACWA appreciates the opportunity to comment on the 2021 Triennial Review and thanks you for considering our input.

Respectfully Submitted,

Lorien Fono, Ph.D., P.E.
Executive Director
Bay Area Clean Water Agencies

cc: BACWA Executive Board
Michael Montgomery, San Francisco Bay Regional Water Quality Control Board
Thomas Mumley, San Francisco Bay Regional Water Quality Control Board

White Paper outline (approximately 15-20 pages)

Please note that this outline is a working draft and remains subject to revision.

1. Purpose and Introduction (**Renee lead** - Jeremy and Sarah to review & comment)
    a. How we got here
    b. Purpose of white paper – objectives, outcomes, intended audience
    c. The Baylands - Ecological and landscape importance
    d. Biosolids and Sea Level Rise: Shared community challenges and opportunities (with input from BACWA/Sarah)
    e. Context: Regional biosolids management and state-wide implications

2. The baylands fringing San Francisco Bay (**Jeremy lead** - Renee and Sarah to review & comment) (content largely exists in SR37 white paper and Sonoma Creek Baylands Strategy - can also illustrate this problem)
    a. The Baylands landscape (Jeremy)
        i. Characteristics of San Pablo Bay baylands and similarities/differences to the rest of the Bay
        ii. Importance of baylands, where we've been and where we're going (landscape change – historical marshes, present diked baylands, future marshes, climate change)
        iii. Restoration opportunities to address flooding vulnerabilities - illustrated using Petaluma and Sonoma Creek as examples
    b. Ecological/Restoration investments (Jeremy) - added up costs of investments for Ashley

3. Biosolids (**Sarah lead** - Renee and Jeremy to review & comment)
    a. What are they?
    b. How are they managed?
        i. Current quantities
        ii. Who manages biosolids?
            1. Individual entities - Cities, Districts, and Agencies
            2. Joint Agency Agreements
            3.
            4. Third Party Contracts
        iii. Where and how can they be disposed of or beneficially used?
            1. Landfill alternative daily cover
            2. Agricultural soil amendment
            3. Energy
        iv.
    c. Future opportunities / barriers

4. Current regulation of biosolids and wetlands (interview regulators) (**Renee & Sarah lead** - Jeremy and Sarah to review & comment)
    a. Existing sewage sludge/biosolids use and disposal regulations
        i. EPA 40 CFR Part 503
        ii. SWRCB General Order (RWQCB)
        iii. BCDC Jurisdiction

i.

1

b.
c. Impact of SB 1383 - diversion of organics from landfills to POTWs to reduce methane
d. How are emerging contaminants addressed (e.g., PFAS, microplastics)?
    i. SWRCB PFAS Order
e. SWRCB Microplastics
f. Regional context relative to San Pablo Bay(historical context relative to county regulation)
    i. Sonoma County
    ii. Marin, Napa, and Solano

5. Why baylands have received biosolids historically? (**Sarah lead** - Renee and Jeremy to review & comment)
    a. Local land application satisfying beneficial use and environmental regulations
    b.
    c. Influence of recent and developing legislation
        i. SB 1383 (Short-lived climate pollutants: organic waste methane emissions reductions)
        ii. Natural and Working Lands (NWL) restoration for climate mitigation

6. Biosolids in the baylands (**Sarah lead** - Renee and Jeremy to review & comment)
   Maps and tables of quantities - where are biosolids being placed? What are the spatial and temporal extent of placement; where would we expect biosolids to come from and go to?
    a. State of CA
    b. SF Bay Area
    c. Four counties of San Pablo Bay
        i. City of SR release of EIR in the 1990s
        ii. Vallejo San
        iii. Existing land application in Sonoma baylands (and elsewhere, if we have that info)
        iv. Marin might not be accepting any biosolids, does this shift the pressure to Sonoma County?

7. Future compatibility of biosolids use in baylands for restoration and conservation? (input from workshop) **Renee lead** - Jeremy and Sarah to review & comment
    a. Implications of contaminants in biosolids and nutrient dynamics for conservation compatibility
    b. What are the existing habitat values of agricultural areas where biosolids are land applied?
    c. How is agricultural application beneficial/harmful (e.g. application in baylands requires application of lime, tilling, perpetual herbicide use, etc.)
    d. Sea level rise
    e. Sediment deficit for restoration and opportunities for biosolids to help bridge that gap
    f. Conversion of existing agricultural areas to marsh.
    g. Competition for parcels
    h. impacts to adjacent lands
    i. Considerations of biosolids for restoration projects
        i. Soil amendment or as fill
        ii. Context of nutrient dynamics of estuarine habitats

i.

8. Holistic assessment of biosolids land application in the Baylands (input from workshop) **Jeremy lead** - Renee and Sarah to review & comment
    a. effects of not restoring to tidal marsh
    b. consequences of agricultural land application in baylands vs other locations vs other methods for biosolids reuse
        i. City of Santa Rosa Biosolids Management Strategic Plan https://srcity.org/DocumentCenter/View/13830/Biosolids---2014-Master-Plan
    c. consequences of agricultural land application in the baylands factoring in the threat of SLR with unintentional levee breaches
    d. risk of future requirement to remove or remediate
    e. opportunities to use biosolids for restoration instead of agriculture

9. Are there opportunities to manage Baylands restoration and beneficial use of biosolids projects together? (input from workshop) **Sarah & Jeremy lead** - Renee to review & comment
    a. Are there habitat enhancements to existing areas where biosolids are being applied to agriculture?
    b. Is there a way to do land application that facilitates future restoration?
    c. How can concerns regarding contaminants in biosolids be addressed?
    d. How can biosolids be used to support restoration?
    e. Can you design a site to accommodate both agricultural and restoration activities?
    f. What testing is needed to ensure contaminant remediation is not needed prior to restoration?
    g. Implications of land use – i.e. does oat hay harvest keep loading of contaminants of concern to a minimum by taking the crop off the land?

10. Recommendations (**Renee lead** with input from Sarah, Jeremy, SLT, JV, BACWA)
    a. SF Bay Area
    b. Four San Pablo Bay counties
    c. Sonoma County

i.

3

Schedule

Task	**Completion**	**Review**
Draft Section 1: Purpose and Introduction	By June 30, 2021	1. SLT/SFBJV/Biosolids Coalition
1st Draft Section 2 to 9: (Informational and Discussion Sections)	By August 15, 2021	2. Team review, SLT, external advisors review; 3. SFBJV/Biosolids Coalition
Stakeholder meeting	By August 30, 2021	
2nd Draft including Section 10 (Recommendations)	By September 15, 2021	4. Team review, SLT, external advisors review; 5. SFBJV/Biosolids Coalition
Final Draft to SFBJV Board and BACWA	By September 30, 2021	

i.

1

BACWA Region 2 PFAS Study Phase I

Schedule Update – July 12 2021

Date	Task and Outcome
June 21	Final QA'd data distributed to Phase I study participants
Early July	SFEI to host webinar for Phase I study participants/BACWA Board and staff to discuss compiled data and agree on presentation and messaging.
July 16	**BACWA Board meeting** - BACWA staff to update BACWA Board on Phase I data
July 21	Deadline to submit Phase I data to Geotracker.
August 10	SFEI to present data and conclusions of Phase I study to BACWA Permits/Lab committee and discuss options and priorities for Phase II
August	BACWA and SFEI to discuss Phase II, reach out informally to R2 and other stakeholders on Phase II recommendations.
August 20	**BACWA Board meeting -** SFEI to present Phase I data to BACWA Board with recommendations for Phase II study.
Mid-September	Technical Memo describing preliminary results of Phase I results and recommendations for monitoring.
September 17	**BACWA Board meeting** - Contract for development and implementation of Phase II Sampling Plan will be presented to the Board for approval.
Late September	Work with Water Boards to get approval for Sampling Plan.
Late October	Begin Sampling

Survey of Methane and VOC Management

The Bay Area Air Quality Management District (BAAQMD) is considering rulemaking to address Total Organic Compound (methane and volatile organic compound or VOC) emissions from publicly owned treatment works (POTWs) and anaerobic digesters. Regulation 13, Rule 4: Sewage Treatment and Anaerobic Digestion was initially being developed in anticipation of increased local handling and processing of organic waste diverted from landfills due to implementation of SB 1383. However, these rule development efforts were suspended in part due to COVID-19, but also due to the lack of data to properly understand existing management, maintenance, and safety practices at POTWs that control emissions.

BAAQMD recognizes the need to understand if a problem exists before going through the rule-development process. They have requested that BACWA members collect and summarize information on existing practices to manage methane and VOC emissions, with the potential to develop baseline emissions inventories, for anaerobic digestion and lagoons. The information will be used to determine if there is need for specifying best management practices (BMPs) in standard permit conditions for consistency of practices across the sector, and if additional limitations need to be imposed to achieve further reductions.

Some of the requested information is available in your existing Permit to Operate. However, it may not always be where you expect it to be. For example, a permit condition limiting the amount of digester gas production may be associated with a cogeneration engine, rather than the actual digester. If you would like, you may also submit a copy of your BAAQMD Permit to Operate as part of the response to this survey.

Only the information requested directly by BAAQMD will be submitted to them. **Portions of this survey (shown in blue text) include information requests in anticipation of future discussions; these responses will not be provided to BAAQMD.**

Part I. General Plant Information

*1. Name of Agency (and Plant name, if your agency has two Plants)

*2. Name of respondent

* 3. Respondent email address

4. If you are able to share a copy of your facility's BAAQMD permit, please upload it here.

Choose File | Choose File | No file chosen

* 5. What is the design Average Dry Weather Flow to the treatment plant? (MGD)

* 6. What was the actual 2020 Average Dry Weather Flow to the treatment plant? (MGD) *Either the lowest monthly flow rate or lowest 3-month flow rate are acceptable responses.*

* 7. Does your facility nitrify?

- Yes, all the time
- Yes, sometimes
- Minimally or not at all

* 8. Does your facility denitrify?

- Yes, all the time
- Yes, sometimes
- Minimally or not at all

* 9. Are nitrite and nitrate levels measured throughout the treatment plant?

- ◯ No
- ◯ If Yes, please specify where monitoring occurs:

* 10. Does your facility have anaerobic digestion?

- ◯ Yes
- ◯ No

Survey of Methane and VOC Management

11. Is your agency planning to add anaerobic digestion?

- ◯ Yes
- ◯ No

BACWA BAY AREA CLEAN WATER AGENCIES

Survey of Methane and VOC Management

Part II. Anaerobic Digestion

12. How many anaerobic digesters do you have?

13. What is the volume of each digester? (million gallons)

14. What type of digesters do you have?

- ◯ Mesophilic
- ◯ Thermophilic
- ◯ Acid-Phase
- ◯ Thermal hydrolysis

15. What type of cover(s) are on the anaerobic digester(s)? (Check all that apply)

- ☐ Fixed Cover
- ☐ Floating Cover
- ☐ Expandable Membrane
- ☐ Other (please specify)

16. How do you monitor the operation of your pressure relief valves?

- [ ] Visual observations
- [ ] Audible alarms
- [ ] SCADA
- [ ] Other (please specify)

17. Can you monitor pressure at your PRVs individually?

- ◯ Yes, pressure is monitored individually at PRVs
- ◯ No, pressure is monitored at a common manifold

18. How do you inspect or monitor your digesters for damage or biogas leaks?

- [ ] Visually
- [ ] Pressure monitoring
- [ ] Jerome meter
- [ ] Draeger tubes
- [ ] Other (please specify)

19. When are digester inspections performed?

- [ ] When alarmed
- [ ] Routinely. Please provide the frequency (daily, each shift, weekly, etc.)

20. Do you collect any other observations to control biogas leaks?

- [ ] Wear patterns in seals
- [ ] Holes in seals
- [ ] Binding at the seals
- [ ] Replacement schedule for seals
- [ ] Other (please specify)

21. Which of the following programs/procedures do you have to address biogas management to prevent leaking/venting?

- [ ] Maintenance Program
- [ ] Standard Operating Procedure(s)
- [ ] Inspection protocols
- [ ] Asset management plan
- [ ] Safety procedures

22. How do you estimate biogas volume during a release event? For example, if a PRV vents, how do you determine the release volume?

23. What are your permitted limits on the release of digester gas or hydrogen sulfide? (If applicable)

Part III. Biogas Production and Use

24. How much biogas did your facility produce in 2020? (standard cubic feet per year, or indicate other units)

25. What is your **permitted** biogas production, volume, or thermal output limit? (indicate units such as standard cubic feet per year or therms per year)

If you have a thermal limit, please provide the heating value of your facility's biogas.

26. How much methane does your biogas contain? (% methane)

27. What type of biogas conditioning is used?

- [ ] None
- [ ] Sulfur removal
- [ ] Siloxane removal
- [ ] Carbon dioxide removal
- [ ] Other (please specify)

Please fill in the table below for biogas utilized in 2020:

28. Permitted Capacity (Please indicate units of scf/year, kscf/year, or MMBTU)

Flare

Boilers

IC Engines

Fuel Cells

Turbines

Microturbines

CNG Fueling

CNG Pipeline injection

Other

29. 2020 Production (Please indicate units of scf/year, kscf/year, or MMBTU)

Flare

Boilers

IC Engines

Fuel Cells

Turbines

Microturbines

CNG Fueling

CNG Pipeline injection

Other

30. What does your agency plan to do with biogas in 2021?

- ◯ Same strategy as 2020
- ◯ Our agency will implement the following changes:

31. What does your agency plan to do with biogas in 5 years?

- ◯ Same strategy as 2020
- ◯ Our agency will implement the following changes:

Part IV. Dewatering of Digested Sludge

32. How does your facility dewater your digested sludge **after** digestion?

- ☐ No dewatering
- ☐ Centrifuge
- ☐ Belt filter press
- ☐ Screw press
- ☐ Indirect dryer
- ☐ Direct dryer
- ☐ Drying bed
- ☐ Other (please specify)

33. Is your dewatering system for digested sludge enclosed in a building?

- ◯ Yes, and the building or enclosed dewatering system has odor or VOC controls
- ◯ Yes, but the building or enclosed dewatering system does **not** have odor or VOC controls
- ◯ No, it is not in a building

Part V. Feedstock for Anaerobic Digestion

34. Does your facility receive and feed other feedstocks to the digesters? Check all that your receive.

- [ ] None / not applicable
- [ ] Fats, Oils, and Grease (FOG)
- [ ] Liquid food and beverage processing waste (e.g., dairy, winery, or slaughterhouse waste)
- [ ] Organic fraction of municipal solid waste (e.g., food waste)
- [ ] Source-separated commercial, institutional, or residential organic waste
- [ ] Sludge from another municipal facility
- [ ] Other (please specify)

BACWA BAY AREA CLEAN WATER AGENCIES

Survey of Methane and VOC Management

35. Is your facility planning to accept additional feedstocks for anaerobic digestion in the future? Check all that you are interested in co-digesting.

- [ ] No, we have no plans to accept other feedstocks for digestion
- [ ] Fats, Oils, and Grease (FOG)
- [ ] Liquid food and beverage processing waste (e.g., dairy, winery, or slaughterhouse waste)
- [ ] Organic fraction of municipal solid waste (e.g., food waste)
- [ ] Source-separated commercial, institutional, or residential organic waste
- [ ] Sludge from another municipal facility
- [ ] Other (please specify)

Part VI. Sludge Storage in Ponds & Lagoons

* 36. Does your facility use lagoons or ponds for storing and/or treating sludge?

- ◯ Yes
- ◯ No

BACWA BAY AREA CLEAN WATER AGENCIES

Survey of Methane and VOC Management

37. What type of sludge lagoons does your facility have?

- ◯ Facultative ponds with surface aeration to prevent methane release and odors
- ◯ Other (please specify)

38. To help us characterize potential emissions, please provide additional details about the sludge lagoons or ponds at your facility:

How many sludge lagoons do you have (number)?

What is the **water depth** of each sludge lagoon ? (indicate units, ft. or m)

What is the **total surface area** of all sludge lagoons? (indicate units, sq. feet, sq. m, or acres)

What is the **total volume** ? (indicate units, million gallons or acre-feet)

How often are solids removed from the sludge lagoon?

What is the typical **load sent** to the lagoons? (lb/day BOD or lb/day Volatile Solids)

What is the typical **load in the overflow or decant** from the lagoons (lb/day of BOD or Volatile Solids)

If loading is unknown, what is the typical Volatile Solids **Reduction** in the lagoons? (% reduction)

BACWA Biosolids Survey 2021

for Calendar Years 2018, 2019, and 2020

BACWA is continuing to track regional biosolids trends using this survey, following on previous surveys completed in 2016 and 2018. Please take a few minutes to answer the following questions regarding your agency's biosolids activities in calendar years 2018, 2019, and 2020. BACWA will compile the responses and distribute to all members.

The intent of this survey is to quantify specific biosolids information from BACWA's agencies to track industry trends for the following issues:

- Biosolids production volumes
- Treatment and dewatering technologies
- End use and disposal options
- Hauling and tipping costs
- Agency challenges
- Compliance with California's Short-Lived Climate Pollutants Reduction Strategy (SB-1383)
- Marketing and public outreach

A separate survey has been distributed regarding Methane and Volatile Organic Compound (VOC) management. BACWA appreciates your support in responding to both surveys.
Thank you!

* 1 Name of agency

* 2 Name of respondent

* 3 Respondent email address

4 What technology does your agency use to produce and/or treat biosolids? (Select all that apply)

- [ ] Anaerobic Digestion (Thermophilic)
- [ ] Anaerobic Digestion (Mesophilic)
- [ ] Thermal hydrolysis (at my facility)
- [ ] Composting (at my facility)
- [ ] Air Drying
- [ ] Lime stabilization
- [ ] Pond or Lagoon stabilization
- [ ] Pyrolysis
- [ ] Incineration
- [ ] Hauling to another facility for further treatment via Thermal Hydrolysis (e.g., Lystek)
- [ ] Hauling to another facility for further treatment via Composting
- [ ] Other (please specify)

This section asks about **wet tons** of biosolids produced in 2018, 2019, and 2020.

Please provide answers in units of wet tons, based on the treatment provided at your facility. If treatment occurred at another facility, please include under "Other."

* 5 How many **wet tons** of biosolids did your agency produce in 2018?

Class A or A-EQ, Wet Tons

Class B, Wet Tons

Other quality**, Wet Tons

* 6 How many **wet tons** of biosolids did your agency produce in 2019?

Class A or A-EQ, Wet Tons

Class B, Wet Tons

Other quality**, Wet Tons

* 7 How many **wet tons** of biosolids did your agency produce in 2020?

Class A or A-EQ, Wet Tons

Class B, Wet Tons

Other quality**, Wet Tons

8 If you answered "Other Quality**" in questions 5-7, what quality was produced?

9 Please identify your facility's dewatering process from the list below

- [ ] Centrifuge
- [ ] Belt Filter Press
- [ ] Indirect Dryer
- [ ] Direct Dryer
- [ ] Drying Bed
- [ ] Screw Press
- [ ] Biodryer (e.g., Bioforcetech)
- [ ] Other (please specify)

10 If desired, please give more detail about your dewatering process, for example - flow, polymer type, or polymer dose.

*11 Please list your dewatering equipment or dryer manufacturer.

* 12 What are the main challenges your agency faces with biosolids use and disposal? Please choose all that apply to your agency and prioritize your choices. Please rank, with #1 being the most important.

Rising costs

Public perception/relations

Hauling distance

Space for drying operations

Regulatory Restrictions on using Biosolids for Alternative Daily Cover (SB 1383)

Local restrictions on land application

Securing sustainable use and disposal options

Wet weather impeding drying operations

Public health concerns regarding biosolids land application (PFAS, microplastics, pathogens, etc.)

13 If desired, please add further explanations about the challenges your agency faces with biosolids.

14 What does your agency plan to do with your biosolids in 2021?

- ○ Same plan/strategy as 2020
- ○ Our agency will implement changes as described below.

Describe changes

15 Which of these most closely describes your agency's status with respect to preparing for implementation of SB 1383?

Link to Information about SB 1383 (prepared by CASA)

- ○ **No impacts.** SB 1383 will not significantly impact biosolids management at my agency.
- ○ **Still Planning.** My agency is still determining whether and how to support implementation of SB 1383.
- ○ **Changes underway.** My agency is planning changes to organics receiving or biosolids disposal to support SB 1383.
- ○ **Done.** My agency has already made changes in organics receiving or biosolids disposal to support SB 1383.

16 How is your agency responding to SB 1383's limits on landfill use and disposal? (Check all that apply)

- [ ] SB 1383 will not significantly impact biosolids management at my agency
- [ ] Adding a **receiving station** for diverted organic waste
- [ ] Entering into **contracts** to accept diverted organic waste
- [ ] Adding **digester capacity** for organics co-digestion at the plant
- [ ] Improving biosolids **treatment technology** at the plant to expand use and disposal options
- [ ] Increasing reliance on **land application** in lieu of other disposal options
- [ ] Increasing the volume of biosolids **sent to another facility or third party for additional treatment** (i.e., Lystek)
- [ ] Please elaborate on your agency's plans.

17 Please check all that apply regarding biosolids product marketing and branding.

- [ ] We market our own biosolids product(s).
- [ ] A third party such as Lystek or Synagro markets our biosolids product(s).
- [ ] We do not market biosolids product(s) currently, but have plans to do so in the future.
- [ ] We currently or have plans in the future to brand our biosolids product(s).
- [ ] We do not currently or have any plans in the future to market our biosolids product(s).

18 Does your agency do biosolids outreach/education? If yes, how? (Check all that apply)

- [ ] Social media (Twitter, Youtube, Facebook, etc.)
- [ ] Agency website or bill inserts
- [ ] Print media
- [ ] No, we do not publicize our biosolids program, but we do publicize our other services.
- [ ] No, we do not publicize any of our services.
- [ ] Other (please specify)

* 19 Please explain below how your agency manages biosolids staffing.

How many Full Time Equivalent (FTE) staff are required for biosolids management?

Please describe the roles of staff assisting with biosolids management.

20 If you would like to receive notice of the survey results and be added to the BACWA Biosolids Committee listserv, please include your name and email address or those of your staff.

BACWA Biosolids Survey 2021

for Calendar Years 2018, 2019, and 2020

The fields below allow you to input information for each destination where you sent biosolids in 2020. You may enter as many destinations as applicable for your agency.

If you prefer to enter this information into an Excel table, you can download a blank template and email the file to mcousins@bacwa.org

21 Alternate submittal

- [ ] I plan to email the Excel file to Mary (mcousins@bacwa.org) instead of filling out this form

22

Destination 1

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

23 Destination 2

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

24 Destination 3

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

25

Destination 4

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

26 Destination 5

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

27

Destination 6

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

28

Destination 7

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

29

Destination 8

Location of end use	
Type of end use (ADC, landfill disposal, land application, compost, onsite disposal, incineration, Lystek, other)	
Tons of wet weight sent to destination in 2020	
Percent solids (%)	
Class of solids (A or A-EQ, B, other)	
One-way hauling distance (miles)	
Cost $/ton (hauling + tipping + other fees)	
Any flat fees	
Other information you would like to share about this destination	

KEY REGULATORY ISSUE SUMMARY
Updated July 9, 2021

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

Contents

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 the SF Bay, stakeholders in the region are participating in a steering committee to prioritize scientific studies and ensure that all science to be used for policy decisions is conducted under one umbrella.	• For FY22, BACWA is contributing $2.2M to fund scientific research needed to make management decisions for the third Watershed Permit. This level of funding is required by the second Watershed Permit. • The focus of current scientific efforts is improving model representation of biogeochemistry, light attenuation, dissolved oxygen, and Harmful Algal Bloom dynamics. Field and lab observations are supporting these improvements. • The science team is developing an Assessment Framework for deep subtidal habitats and Lower South Bay sloughs. • The science team is assessing the geographic zone of influence of each plant's discharge, which will aid in developing management approaches.	• BACWA and the Regional Water Board are discussing the possibility of an extension of the current permit term to increase scientific certainty prior to making management decisions. • Continue to participate in steering committee, Nutrient Management Strategy, Nutrient Technical Workgroup, and planning subcommittee meetings, and provide funding for scientific studies. • Continue to engage with Nutrient Technical Team and BACWA's Nutrient Management Strategy technical consultant, Mike Connor, to provide review of work products and charge questions for the science team.	BACWA Nutrients Page: https://bacwa.org/nutrients/ SFEI Nutrient Science Plan Documents: http://sfbaynutrients.sfei.org/books/reports-and-work-products

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: ○ Continued individual POTW nutrient monitoring and reporting; ○ Continued group annual reporting; ○ Significantly increased funding for science; ○ Regional assessment of the feasibility and cost for reducing nutrients through nature-based systems and recycled water; ○ Establishing current performance for TIN, and "load targets" for nutrient loads based on 2014 to 2017 load data plus a 15% buffer for growth and variability ○ 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: ○ Group Annual Reporting ○ Regional Studies on Nature-Based Systems and Recycled Water ○ Support of scientific studies through the Regional Monitoring Program (RMP) at $2.2M per year through the five-year permit term.	• Studies related to Recycled Water and Nature-Based Systems are underway, and will be completed by the due date of July 1, 2023. • 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 (October 1 – September 30th). • Each year by February 1, BACWA and SFEI submit an annual science implementation plan and schedule update, as required by the 2nd Watershed Permit. • Agencies with plans to substantially reduce nutrients are recognized in the Fact Sheet of the 2nd watershed permit.	• **Agencies continue to report nutrient monitoring to the Water Boards through CIWQS and to BACWA via the data sheet.** • **Agencies with plans to implement projects that will substantially reduce nutrient loads should keep the Regional Water Board and BACWA apprised, to get credit for "early actions".** • **Work with HDR and SFEI as needed to collect information for Nutrient Removal by Recycled Water Evaluation and the Nature-Based Systems study. O**utreach to individual agencies is being conducted in several waves in 2021. • Continue working with HDR to develop compliance feasibility information about the use of subembayment vs. individual agency load limits in the 3rd Watershed Permit. • Continue discussions about development of a potential nutrient trading framework. • BACWA has reconvened the Nutrient Strategy Team (NST) that will negotiate with the Regional Water Board to develop the tenets for the 3rd Watershed Permit.	2nd Nutrient Watershed Permit: https://www.waterboards.ca.gov/sanfranciscobay/board_info/agendas/2019/May/6_ssr.pdf Special Studies of Recycled Water and Nature-Based Systems: https://bacwa.org/document-category/2nd-watershed-permit-studies/ Optimization/Upgrade Study Final Report: https://bacwa.org/wp-content/uploads/2018/06/BACWA_Final_Nutrient_Reduction_Report.pdf Optimization/Upgrade Report Brochure: https://bacwa.org/wp-content/uploads/2019/03/BACWA-2019-Nutrient-Brochure_Final_20190301.pdf BACWA Group Nutrient Annual Reports: http://bacwa.org/document-category/nutrient-annual-reports/

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CHLORINE RESIDUAL COMPLIANCE			
• The Basin Plan chlorine residual effluent limit is 0.0 mg/L. Chlorine residual is 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%). • Agencies are overdosing their effluent with the dechlorination agent, sodium bisulfite, to prevent chlorine violations, a practice which costs more than $1 million regionally each year.	• The Regional Water Board worked with BACWA to develop a Basin Plan Amendment (BPA) modifying the effluent limit for chlorine residual. • The draft BPA includes: ○ A 0.013 mg/L Water Quality Objective in marine and estuarine waters, which will be applied as a WQBEL in permits and calculated incorporating dilution. The WQBEL will be applied as a one-hour average. ○ A Minimum Level (ML), or Reporting Limit of 0.05 mg/L for online continuous monitoring system. • The BPA was adopted by the Regional Water Board on November 18, 2020, and was approved by the State Water Board on May 18, 2021. It will not go into effect until it is approved by the Office of Administrative Law and EPA, which is expected by late 2021. • The Regional Water Board is planning to issue a blanket permit amendment to implement the Basin Plan Amendment within each individual NPDES permit. An administrative draft of this blanket permit amendment was circulated for review in June 2021.	• Review the Tentative Order (public review draft) of a regional blanket permit amendment that will implement the new BPA for all Region 2 dischargers at one time. This approach will accelerate implementation compared to a slower, permit-by-permit rollout. • The Tentative Order review period is expected to occur in summer 2021. The earliest possible effective date for a blanket permit amendment is November 1, 2021.	Background and Status information about BPA on Regional Water Board site: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/amendments/chlorinebpa.html Final BPA adopted by Regional Water Board https://www.waterboards.ca.gov/sanfranciscobay//water_issues/programs/planningtmdls/amendments/chlorinebpa/2_Chlorine_Resolution_R2-2020-0031.pdf Final BPA Staff Report: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/amendments/chlorinebpa/3_Chlorine_BPA_Final_staff_report.pdf BACWA Comment Letter on draft BPA: https://bacwa.org/document/chlorine-basin-plan-amendment-bacwa-comment-letter/

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
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. • 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.	• EPA reviews all registered pesticides at least once every 15 years. Each review allows opportunity for public comment. • BACWA continues to fund consultant support to write comment letters advocating for the consideration of POTW and surface water issues during EPA's risk assessments as part of reregistration. Funding for pesticide regulatory outreach in FY22 is $60K. • The Regional Water Board leverages BACWA's efforts to provide their own comment letters to EPA. • With chronic toxicity limits likely in the near term, POTWs will be in compliance jeopardy if pesticides contribute to toxicity. • Baywise.org has launched webpages on flea and tick control messaging to pet owners and veterinarians.	• Continue to comment on pesticide re-registrations. • Work with veterinary associations on messaging with respect to flea and tick control alternatives. • Continue to develop summary of EPA actions on pesticides. • Look for opportunities to work with CalDPR on pesticides research. • Work with other regional associations, such as the California Stormwater Quality Association (CASQA), to collaborate on funding pesticide regulatory outreach.	BACWA Pesticides Regulatory Update and Call to action: https://bacwa.org/wp-content/uploads/2016/02/BACWA-Pesticide-Regulatory-Update-2016-1.pdf BACWA Pesticide Regulatory Support Page: https://bacwa.org/document-category/pesticides-regulatory-support/ Baywise flea and tick pages: https://baywise.org/
ENTEROCOCCUS LIMITS			
• In August 2018, the State Water Board adopted new statewide bacteria water quality objectives and implementation options to protect recreational users from the effects of pathogens in California water bodies. The objectives and implementation options are a new part 3 of the Water Quality Control Plan for the SIP and Ocean Plan. • The Objectives were approved by the Office of Administrative Law in February 2019 and by EPA in March 2019	• The new enterococcus objective for saline waters is a six-week rolling geometric mean of enterococci not to exceed 30 cfu/100 mL, calculated weekly, with a statistical threshold value of 110 cfu/100 mL, not to be exceeded by more than 10 percent of the samples collected in a calendar month, calculated in a static manner. • The Regional Water Board has been granting dilution credit upon request when implementing the new objectives in NPDES permits.	• BACWA worked with SFEI and funded a study of background enterococcus levels in the SF Bay. Surface water samples were collected in July (dry season) and January (wet season) throughout the Bay. Samples from all stations were below the 30 CFU/100 mL WQO, justifying allowing for dilution credits when implementing the WQO. The study was completed and submitted in June 2020.	SWB Bacterial Objective page: https://www.waterboards.ca.gov/bacterialobjectives/ SFEI Final Report on Enterococci in the SF Bay: https://bacwa.org/wp-content/uploads/2020/08/BACWA-2020_Enterococci-report_final.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
MERCURY AND PCBS			
• The Mercury & PCB Watershed Permit was reissued in November 2017 with an effective date of January 1, 2018. The Watershed Permit is based on the TMDLs for each of these pollutants. • Aggregate PCB and mercury loads have been well below waste load allocations through 2019, the last year for which data have been compiled. • Method 1668C for measuring PCB congeners has not been promulgated by EPA. Data collected during the first permit term varied widely depending on which laboratory performed the analyses. BACWA Laboratory Committee developed an updated PCB Protocol to reduce variability between laboratories running Method 1668C, effective January 1, 2014. Data have been more consistent since the distribution of this document. • 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.	• The 2017 watershed permit reduces monitoring frequencies via Method 1668C for agencies with design flows of less than 50 MGD. It also incorporates the laboratory guidance from the BACWA PCB Protocol. • The permit requires continued risk reduction program funding. For FY22, BACWA granted an extension to an ongoing contract worth $12,500 to the California Indian Environmental Alliance to conduct risk reduction activities related to fish consumption. A previous contract for APA Family Support Services is now complete. • In 2016, monitoring requirements for PCBs were modified for some agencies per Order No. R2-2016-0008, *Alternate Monitoring and Reporting Requirements for Municipal Wastewater Dischargers for the Purpose of Adding Support to the San Francisco Bay RMP*. Additional changes to mercury monitoring are expected when this 2016 Order is replaced, which is expected to occur in FY22. • As part of the 2021 Triennial Review of the Basin Plan, the Regional Water Board is considering whether to designate three new beneficial uses: Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB) and Subsistence Fishing (SUB). Water bodies designated these beneficial uses could also be assigned lower mercury objectives.	• **Complete any remaining outreach to dentists to ensure all facilities have completed the one-time compliance report required by the federal pretreatment program. The reports were due October 12, 2020**. • Continue outreach to dentists on mandatory amalgam separation through BAPPG and BACWA's pretreatment committee. • Schedule risk reduction presentations by the grantees to the Regional Water Board in 2021. • Continue to work with Regional Water Board staff to develop appropriate mercury and PCB monitoring requirements (as well as other constituents) when replacing the 2016 *Alternate Monitoring and Reporting Requirements* Order. • 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.	2017 Mercury/PCB Watershed Permit: http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0096.pdf Risk Reduction Materials: https://bacwa.org/mercurypcb-risk-reduction-materials/ Updated BACWA PCBs Protocol: https://bacwa.org/wp-content/uploads/2014/02/PCBs-Sampling-Analysis-and-Reporting-Protocols-Dec13.pdf One-Time Compliance Report for Dental Offices: https://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/one-time_compliance_report_for_dental_offices.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
STATE WATER BOARD TOXICITY PROVISIONS			
• The State Water Board has been working since before 2012 to establish Toxicity Provisions in the SIP that would introduce uniform Whole Effluent Toxicity Requirements for the State • During individual permit reissuances since 2015, the Regional Water Board has been performing RPAs for chronic toxicity and giving chronic toxicity limits to agencies with Reasonable Potential. • Proposed Final Statewide Toxicity Provisions were released in October 2020, incorporating revisions to previous versions from 2018 to 2020. The Provisions establish: ○ Use of Test of Significant Toxicity (TST) as statistical method to determine toxicity replacing EC25/IC25 (with concerns it will lead to more false positive results); ○ Numeric limits for chronic toxicity for POTWs >5 MGD and with a pretreatment program; smaller POTWs would receive effluent targets and only receive limits if Reasonable Potential is established; ○ Regional Water Board discretion on whether to require RPAs for acute toxicity; ○ For POTWs with *Ceriodaphnia dubia* as most sensitive species, numeric targets rather than limits until after completion of state-wide study on lab/ testing issues (Dec. 31, 2023).	• The State Water Board adopted the Statewide Toxicity Provisions at its December 2020 meeting. In October 2021, the State Water Board plans to vote on a resolution confirming that the Statewide Toxicity Provisions were adopted as state policy for water quality control for all inland surface waters and estuaries. The Provisions will not go into effect until later in 2022 after this second approval by the State Water Board, followed by review by OAL and EPA. • Implementation is likely to be on a permit-by-permit basis as new individual NPDES permits are issued. • 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. Once the Statewide Toxicity Provisions come into effect, agencies will once again be required by the provisions to do sensitive species screening once every 15 years. • BACWA has joined SCAP, CVCWA and NACWA in a lawsuit alleging EPA did not follow proper procedure in requiring use of the TST, which has not been officially promulgated. The lawsuit was dismissed on Statute of Limitation grounds, but the group has filed an appeal.	• **Continue to work with Regional Water Board on language for implementing Toxicity Provisions in Region 2 NPDES Permits.** • Regional Water Board staff presented draft permit language to the BACWA Permits Committee at its December 2020 meeting, and BACWA subsequently provided written feedback. A modified draft will be circulated for BACWA member review later in 2021. The sample permit language will ultimately be copied into each newly adopted permit in the region, filling in details about monitoring and screening requirements that the Provisions leave to Regional Water Board discretion. • Share information on the special study on the *Ceriodaphnia dubia* test method with agencies who have that species in their permits. • Develop an alternative funding mechanism for RMP CECs studies by seeking reduced monitoring for items other than chronic toxicity screening. A draft plan to replace the 2016 *Alternate Monitoring and Reporting Requirements* Order is under development by BACWA and Regional Water Board staff.	SWRCB Toxicity Page: http://www.swrcb.ca.gov/water_issues/programs/state_implementation_policy/tx_ass_cntrl.shtml Toxicity Workshop Presentations from 2017 BACWA Workshop: https://bacwa.org/bacwa-toxicity-workshop-september-18-2017/ 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

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
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 is considering developing a Pilot CECs Monitoring Plan for the State**.** • 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 Pilot Monitoring Plan 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 be used to support facility selection for these studies. It is intended to be a living document with ongoing updates • 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. • DDW has adopted a definition of Microplastics in Drinking Water (may apply to other matrices such as wastewater and stormwater in the future). • The OPC is funding a study in 2021 that will look at microplastic removal through wastewater treatment processes. The study will be carried out by SCCWRP and SFEI, and will commence with a pilot study in summer 2021 and full-scale sampling of about 15 facilities in Fall 2021.	• **Continue to participate in the RMP CEC Workgroup.** • **Participate in studies by collecting wastewater samples at member facilities.** Studies this year will include ethoxylated surfactants follow-up, sunscreens, and the OPC-funded microplastic study. • Provide ongoing updates to White Paper for use by the RMP in selecting representative POTWs for participation in CEC studies, and develop a proposal for ongoing monitoring. • Continue tracking State Water Board and Ocean Protection Council actions re: microplastics via the CASA Microplastics Workgroup. • Work with Regional Water Board to replace the 2016 *Alternate Monitoring and Reporting Requirements* Order. The new Order will provide a sustainable source of RMP CEC funding in exchange for reduced monitoring and reporting of other parameters.	RMP CEC 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/ BACWA Microplastics Fact Sheet: https://bacwa.org/wp-content/uploads/2019/09/BACWA-Microplastics-flyer.pdf SFEI Microplastics Science Strategy: www.sfei.org/documents/microplastic-monitoring-and-science-strategy-san-francisco-bay SWRCB Microplastics in Drinking Water page: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/microplastics.html

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)			
• Per- and polyfluoroalkyl substances made substances (PFAS) are a large group of human-made substances that are very resistant to heat, water, and oil. PFAS have been used extensively 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 that are 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. PFOA and PFOS were found in the blood of nearly all people tested in several national surveys. • 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 land applied biosolids. • In April 2021, the formation of an "EPA Council on PFAS" was announced.	• In Aug 2019, DDW lowered the drinking water notification levels (NLs) to 6.5 ng/L for PFOS and 5.1 ng/L for PFOA (lowest detection possible at the time). In Feb 2020, DDW also lowered the 'response levels' (RLs) to 10 ng/L for PFOA and 40 ng/L for PFOS. • Under AB756 (July 2019), DDW can order public water systems to monitor PFAS, consumers must be notified if NLs/RLs are exceeded, and water sources must be removed from service or blended/ treated if RLs are exceeded (if possible). DDW has requested OEHHA develop NLs for seven other PFAS compounds and public health goals (PHGs) for both PFOA and PFOS, the next step in establishing drinking water MCLs. • In 2019, the SWRCB developed a phased investigation action plan requiring testing of drinking water systems and site investigations at high risk locations for PFAS. Investigative orders are issued as follows: ○ Mar/Apr 2019 - landfills and airports and adjacent public water systems ○ Oct 2019 - chrome-platers ○ July 2020 - POTWs ○ March 2021 - refineries & bulk terminals • The Summit Partners held three PFAS Workshops on the SWRCB investigative order for POTWs in late 2020 and early 2021.	• The July 2020 SWRCB investigative Order for POTWs is not applicable to Region 2 agencies. Instead, BACWA worked with RWB staff and obtained State Water Board approval to fund and conduct a regional study through the RMP. • SFEI is conducting this study in two phases: ○ In Phase 1, fourteen representative facilities collected samples in Q4 2020 for influent, effluent, RO concentrate, and biosolids. SFEI is analyzing the data and will issue a report in September 2021. ○ Phase 2 will be conducted in Fall 2021 and will be designed based on recommendations from Phase 1 report. • BACWA will continue collaboration with Summit Partners and non-governmental organizations on legislation related to pollution prevention, as well as tracking developments at the State and Regional level. • A fourth Summit Partners PFAS workshop is planned for August 2021.	Region 2 PFAS Study Phase 1 Sampling Plan: https://bacwa.org/wp-content/uploads/2020/12/SFEI-Final-PFAS-SAP-Phase-1-2020-11-23.pdf Summit Partners PFAS Workshop presentations: https://casaweb.org/calendar/speaker-presentations/ SWRCB Investigative Order for POTWs: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2020/wqo2020_0015_dwq.pdf OEHHA Notification Levels for Drinking Water: https://oehha.ca.gov/water/notification-levels-chemicals-drinking-water EPA PFAS Resources https://www.epa.gov/pfas EPA PFAS Action Plan (updated Feb 2020) https://www.epa.gov/sites/production/files/2020-01/documents/pfas_action_plan_feb2020.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
SSS WDR REISSUANCE			
• The State Water Board plans to reissue the statewide Sanitary Sewer System General Order (SSS-WDR) in late 2021. • State Water Board staff have sought out early stakeholder engagement through outreach to CASA and the Regional Associations, and NGOs. • The State Water Board's goals for the update are: ○ Updating the 2006 Order ○ Clarifying compliance expectations and enhancing enforceability ○ Addressing system resiliency, including climate change impacts ○ Identifying valuable data and eliminating non-valuable reporting requirements	• In February 2021, the State Water Board released an informal staff draft of the updated SSS-WDR. The informal staff draft proposed the following new components: ○ SSMPs must include a detailed risk assessment, with findings to be used for prioritizing remediation actions ○ Spills must be reported to CIWQS within 2 hours ○ Sewershed boundaries must be provided to SWRCB ○ Agencies must report spills from private systems and laterals ○ Exfiltration is included in the definition of a spill ○ Well-performing systems have reduced reporting requirements for "Category 4" SSOs (those less than 50 gallons) ○ Legally Responsible Officials must have a PE license or be a CWEA-certified Grade III collection system operator • BACWA worked with CASA to provide proposed redlines to the informal staff draft, and discussed concerns in several meetings with State Water Board staff. BACWA also provided a comment letter on the informal staff draft. • A public review draft is expected later in summer 2021.	• Review and comment on the public review draft SSS-WDR when available for public comment, expected in Q3 2021. • Continue to coordinate with CASA, CVCWA, and SCAP on proposed revisions and reorganization of the SSMP requirements • Discuss response to issues such as exfiltration via BACWA's Collection Systems Committee.	SWB SSS WDR page: https://www.waterboards.ca.gov/water_issues/programs/sso/ SWB Informal Staff Draft (February 2021) https://www.waterboards.ca.gov/water_issues/programs/sso/docs/workshops/informal_staff_draft_statewide_sso_order.pdf BACWA / CASA Comment Letter on Informal Staff Draft: https://bacwa.org/wp-content/uploads/2021/07/6-30-21-SSS-WDR-Comment-Letter.pdf BACWA / CASA markup of Informal Staff Draft: https://bacwa.org/wp-content/uploads/2021/07/6-30-21-SSS-WDR-Redlines-Submission.docx

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
ELAP UPDATE			
• 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 will replace the current state-specific accreditation standards with a national laboratory standard established by The NELAC Institute (TNI).	• The new ELAP regulations became effective as of **January 1, 2021**. Compliance with TNI standards is required beginning **January 1, 2024**. • Adoption of TNI standards poses a challenge since there are more than 1,000 individual requirements. Setup costs may include: ○ Hiring and/or training staff; ○ Hiring consultants to set up the TNI documentation framework; ○ Purchasing Laboratory Information Management System (LIMS) software; ○ Purchasing documents and training material from TNI, etc. • The new standards will be a particular burden on small laboratories, which may choose to close if they cannot economically meet the new standards. • ELAP's "Roadmap to ELAP Accreditation" Program is the outreach and training component of the new regulations. ELAP staff have presented to the Lab Committee in June 2020, February 2021, and April 2021. ELAP has contracted with A2LA Workplace Training to provide training sessions. • The BACWA Lab Committee is providing a year-long series of monthly TNI training sessions beginning in July 2021.	• **Offer monthly training sessions to BACWA members.** The free virtual training sessions are open to BACWA members holding a valid copy of the 2016 TNI Standard, and will occur on the 3rd Tuesday of the month. Training is provided by Diane Lawver of Quality Assurance Solutions, LLC. • 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. • Provide a forum for BACWA laboratories to share experiences and lessons learned from various approaches to TNI implementation.	State Water Board's 'Roadmap to ELAP Accreditation' page: https://www.waterboards.ca.gov/drinking_water/certlic/labs/roadmap_to_elap_accreditation.html Roadmap to Accreditation Presentation to BACWA Lab Committee: https://bacwa.org/wp-content/uploads/2020/06/California-ELAP-Regulations-BACWA_06092020.pdf State Water Board's ELAP regulations page: http://www.waterboards.ca.gov/drinking_water/certlic/labs/elap_regulations.shtml Monthly Training Session flyer: https://bacwa.org/wp-content/uploads/2021/07/BACWA-Lab-TNI-Training-Series-Flyer.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
PHASE-OUT OF BIOSOLIDS AS ALTERNATIVE DAILY COVER			
• Regulatory drivers are indicating that biosolids used as alternative daily cover (ADC) or disposed in landfills will be phased out: ○ AB 341 set a goal to recycle 75% of solid waste by 2020 and CalRecycle's plan to achieve that goal called for a marked, but unquantified, reduction of organics to landfills. ○ SB 1383, adopted in September 2016 requires organics diversion: -50% by 2020 (relative to 2014) -75% by 2025 (relative to 2014) ○ In 2020, CalRecycle will count green waste as disposal (per AB 1594), rather than diversion, even when used as ADC. • Regulations implementing SB 1383 were approved by the Office of Administrative Law on November 9, 2020. The regulation will become effective on January 1, 2022, when states can begin enforcement on jurisdictions. Jurisdictions can begin local enforcement January 1, 2024, and compliance is required by January 1, 2025. • 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.	• In the 2018 BACWA Biosolids survey, more agencies reported that they are developing plans for the phase-out than in the 2016 Survey. • Requirements in the final regulations include: ○ Diverted biosolids must be anaerobically digested and/or composted to qualify as landfill reduction. ○ Incineration and surface land disposal sites are designated as "landfills" for accounting purposes. ○ Local ordinances restricting land application are disallowed. ○ Jurisdictions that divert organic waste must also procure the end products of diversion, such as biogas, biomethane, and compost (but not biosolids). ○ If SB 619 (Laird) passes in the 2021 state legislative session, enforcement of SB1383 on local jurisdictions will be delayed by one year to January 1, 2023. • In March 2020 and May 2021, the California Conference of Directors of Environmental Health (CCDEH) prepared letters expressing concern over the anticipated expansion of land application due to SB 1383, and requesting a moratorium on land application until new safety standards are developed.	• **In July 2021, BACWA will distribute a biosolids trends survey covering 2018- 2020 activities and SB 1383 implementation – please respond.** • 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. • Follow efforts of the Bay Area Biosolids Coalition (BABC) to investigate all-weather options for biosolids management. BABC is a BACWA Project of Special Benefit. • Coordinate with BABC, SFEI and Sonoma County Land Trust on preparation of a white paper regarding biosolids management in the baylands. • Participate in BAAQMD's Organics Recovery Technical Working Group to educate their staff on how to address implementation of SB 1383 at the Air District level. • Meet with BAAQMD management regularly in 2021 to discuss alignment of state and local regulations. • Work with CASA and others to respond to CCDEH concerns regarding safety standards for land application.	BACWA 2018 Biosolids Trends Survey Report: https://bacwa.org/document/2018-biosolids-trends-survey-report/ CASA White Paper on Biosolids Use in Landfills: https://bacwa.org/wp-content/uploads/2017/01/1-11-17-Sustainability-for-biosolids-use-at-landfills.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/

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, including additional policies to achieve 40% reduction below 1990 levels by 2030: ○ Short-lived climate pollutants ○ Carbon sequestration on Natural and Working Lands ○ Largest emitters (transportation, electricity, and industrial sectors) The Scoping Plan will be updated in 2022 targeting carbon neutrality by 2045. • SB 1383 (Short-Lived Climate Pollutant Reduction) calls for: ○ 40% methane reduction by 2030 ○ 75% diversion of organic waste from landfills by 2025 ○ Policy / regulatory development encouraging production/use of biogas • BAAQMD developed a Clean Air Plan requiring GHG emissions supporting CARB's 2050 target. • BAAQMD has proposed the development of Regulation 13 (climate pollutants) targeting GHG reductions related to organics diversion and management. • In October 2020, Governor Newsom signed Executive Order N-82-20 calling for nature-based land management strategies to address climate change, such as natural and working lands restoration.	• CARB states POTWs are part of the solution for reducing fugitive methane, and encourages diversion of organics to POTWs to use excess digester capacity and produce biogas. However, diversion also increases biosolids, which also need to be diverted from landfills. • Many POTWs are exploring energy generation, but BAAQMD TAC regulations could make such programs more difficult to implement. Direct injection of biogas to PG&E's pipelines or use as a transportation fuel may be more efficient. OSHA's PSM Standards, triggered by use of biogas offsite (if managing over 10k lbs of biogas onsite), may cause pipeline injection to be cost-prohibitive. CalOSHA has verbally agreed with scenarios exempt from PSM standards. • CARB's previous interest in nitrous oxide emission estimates and/or emission factors for POTWs has shifted to toxic air contaminants. See Toxic Air Contaminants - BAAQMD Rule 11-18, AB 617, and AB 2588. • BAAQMD is developing a suite of Rules under Regulation 13 for climate pollutants methane and nitrous oxide. However, rule development has been suspended due to COVID-19 and lack of data. The delay is allowing time to summarize information about current best management practices.	• **Respond to the July 2021 AIR committee-led survey regarding current methane management practices at anaerobic digesters and sludge lagoons.** • For Regulation 13, continue to work with BAAQMD staff to provide information and education about anaerobic digesters and POTW operations. Participate in the Organics Recovery Technical Working Group, as well as comment on draft Rules. • Work with CASA to look for opportunities for POTWs to help the State meet GHG reduction goals. • Look for ways to inform BAAQMD on opportunities and challenges for climate change mitigation by Bay Area POTWs. • Work with PG&E and BAAQMD to explore options for POTWs to inject biogas into PG&E pipelines. Note: CASA has been discussing the barriers to pipeline injection with CPUC staff, proposing a reduction in their standard from 990 Btu/scf to 970 Btu/scf.	AIR Committee Survey regarding management practices at digesters and lagoons: https://bacwa.org/document/methane-and-voc-survey-pdf-version-not-fillable/ Climate Change Scoping Plan, including 2022 Update: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan CARB Short Lived Climate Pollutant Reduction Strategy: https://www.arb.ca.gov/cc/shortlived/meetings/03142017/final_slcp_report.pdf SB 1383: https://www.calrecycle.ca.gov/organics/slcp BAAQMD Clean Air Plan: http://www.baaqmd.gov/plans-and-climate/air-quality-plans/current-plans BAAQMD Regulation 13 http://www.baaqmd.gov/rules-and-compliance/rules/regulation-13-climate-pollutants

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CLIMATE CHANGE ADAPTATION			
• In 2017, the State Water Board adopted a Climate Change Resolution addressing mitigation and adaptation. One requirement is Regional Water Boards will make recommendations to modify permits and/or create other regulatory requirements to reduce vulnerability of water and wastewater infrastructure to flooding, storm surges, and sea level rise. • The Regional Water Board is planning to modify the Basin Plan under its Climate Change and Wetland Policy Update. • Climate change and water resilience continue to be a strategic priority of the Regional Water Board in FY21. • 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.	• The State Water Board is planning to send a data request to all permitted facilities (collection systems and POTWs) in the State to better understand to what extent agencies are performing climate change vulnerability assessments and/or investing in adaptation measures. They plan to use this information to determine the need for funding assistance or permit requirements for climate change planning. • The Regional Water Board recently completed a survey of all POTWs in the region in 2021 to collect information about climate vulnerability and adaptation. This survey is more detailed than the State Water Board's survey. Responses were due on July 1. • The Regional Water Board hosted a workshop on its Wetlands Policy 94-086 on August 14 and solicited stakeholder input on potential revisions to the Policy. ○ BACWA provided the Regional Water Board staff specific case studies of wetlands projects that are being considered as well as written comments regarding Policy revisions that would help incentivize the development of wetlands projects by wastewater agencies, and reduce permitting hurdles.	• **Support the Regional Water Board's efforts to obtain a response from each agency on the climate change survey. Responses were due July 1.** • Review a draft Basin Plan Amendment from the Climate Change and Wetland Policy Update project, anticipated to be issued by the Regional Water Board in late 2021 or early 2022. • Continue to coordinate with State Water Board on the status of their data request on climate change planning, so members can provide the information they request as effectively as possible. Survey expected to be released towards the end of 2021. • Continue to work with Regional Water Board and other resource agencies to look for regulatory solutions to encourage wetlands projects for shoreline resiliency.	State Water Board 2017 Climate Change Resolution: https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2017/rs2017_0012.pdf Regional Water board Wetlands Policy Page: https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/climate_change/wetland_policies.html BACWA Comments on Wetlands Policy: https://bacwa.org/wp-content/uploads/2018/09/BACWA-comments-Wetland-Policy-9-14-18.pdf Information about Proposed Basin Plan Amendment (Issue 5.1): https://www.waterboards.ca.gov/sanfranciscobay/basin_planning.html#triennialreview BACWA Comments on Resilience Portfolio: https://bacwa.org/wp-content/uploads/2019/10/BACWA-Water-Resilience-Portfolio-10-01-19.pdf

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
TOXIC AIR CONTAMINANTS - BAAQMD RULE 11-18, AB 617, AND AB2588			
• Regulation 11, Rule 18 (Rule 11-18), adopted November 15, 2017, is BAAQMD's 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 (HRSAs) 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 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 >1,000.	• BACWA developed a White Paper on the BAAQMD Rule to describe its potential impacts on the POTW community. • In response to a request by BAAQMD, the AIR Committee delivered a letter report summarizing specific challenges that POTWs would face in complying with the rule due to budgeting and planning constraints related to being public agencies. • In response, BAAQMD moved all POTWs to Phase 2 to give sufficient time to update the model's inputs, and plan for emissions reduction or TBARCT, as needed. **Phase 2 has been slow to roll out and is now expected to begin in Q3 2021** with data collection and verification, followed by the development of HRAs for facilities with a cancer PS>10 or non-cancer PS>1.0. Implementation of the Rule for Phase 2 facilities will be spread out over two years depending on the PS. • AIR Committee gathered data on proximity factors from each facility and submitted to BAAQMD for updating prioritization scores, which will be use in HRA development.	• **Priority: Agencies should use the tool developed by the AIR Committee to address emission contributions from influent flows, which will be used to update emissions inventory values.** • **Respond to BAAQMD data request beginning in Q3 or Q4 2021. There will be a 60-day turn-around to comply with the data request.** • Meet with BAAQMD management more frequently in 2021 to discuss alignment of state and local regulations • Track both AB 617's regulation development and expansion of the toxics compound list under AB 2588's Air Toxics Hot Spots Program. Draft regulatory language under AB 617 stated all uncovered POTWs >5 MGD and covered (primary) POTWs >10 MGD must monitor and report all compounds listed under AB 2588. CARB has 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). CASA has prepared a one-page handout on this topic. Results could inform Rule 11-18 HRA's.	BAAQMD Rule 11-18 page: http://www.baaqmd.gov/rules-and-compliance/rule-development/rules-under-development/regulation-11-rule-18 BAAQMD Prioritization Scores for AB 11-18: https://www.baaqmd.gov/~/media/files/ab617-community-health/facility-risk-reduction/documents/implementation-procedures_august_2020-pdf.pdf?la=en Rule 11-18 Process Flowchart: https://bacwa.org/document/baaqmd-11-18-process-flowchart-08-17-17/ CARB page on AB 617 and AB 2588: https://ww2.arb.ca.gov/our-work/programs/criteria-and-toxics-reporting CASA One-Page Handout on Air Toxics Reporting: https://casaweb.org/wp-content/uploads/2021/06/CTR-EICG_CASAOnePageIssue-Approach_June2021.pdf

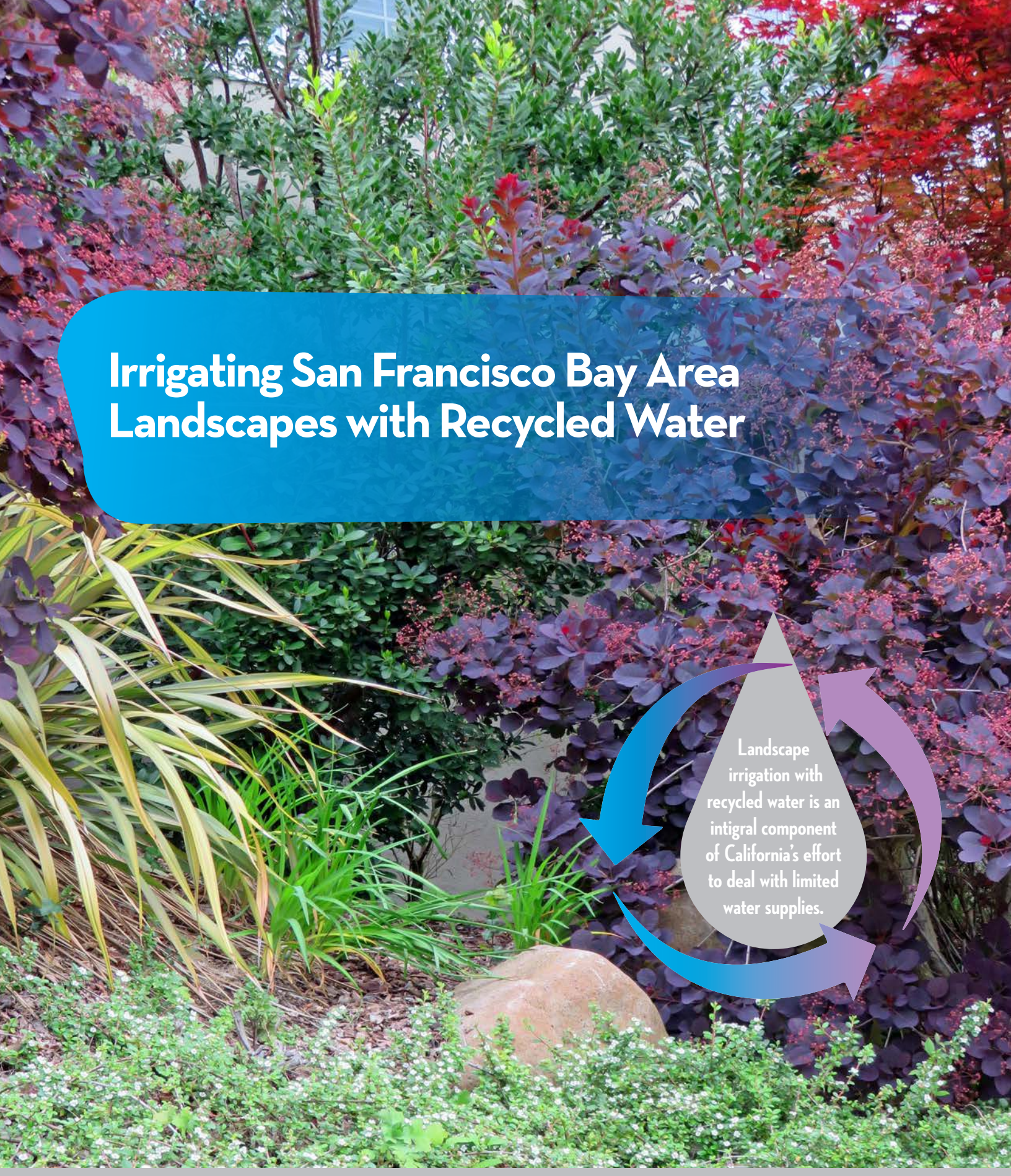
Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
BACT FOR STANDBY POWER			
• In December 2020, BAAQMD made a determination that diesel back-up engines greater than or equal to 1,000 bhp must meet EPA Tier 4 Emissions Standards under the Best Available Control Technology (BACT) Regulation.	• The determination was made retroactive to January 2020, affecting projects whose applications had been deemed complete at several BACWA member agencies. • BAAQMD did not consider reliability under emergency conditions in determining that Tier 4 Emissions Standards were "achieved-in-practice." Some Tier 4-compliant engines have malfunctioned during actual emergencies.	• Meet with BAAQMD management regularly in 2021 to provide earlier knowledge of new regulations, such as BACT determinations, and encourage a public notification and review process for future BACT determinations. • Work with CASA and Regional Associations to encourage consideration of reliability for essential public services in BACT determination being conducted by other Air Boards.	BAAQMD Program Page: https://www.baaqmd.gov/permits/permitting-manuals/bact-tbact-workbook BACWA Comment Letter on BACT Determination: https://bacwa.org/document/baaqmd-bact-letter-2021-02-23/
RECYCLED WATER GENERAL ORDER			
• In response to the Governor's proclamation of a Drought State of Emergency, the State Water Board adopted a General Order on June 3, 2014 to streamline permitting for recycled water. The State Water Board reissued the General Order on June 7, 2016, making enrollment mandatory for Regional Permittees. • In 2018, the State Water Board adopted Recycled Water Policy Amendments, which: ○ Introduced a goal of increasing recycled water where wastewater is otherwise discharged to saltwater; ○ Resulted in termination of Region 2's 96-011 Recycled Water General Order; ○ Added procedural burdens for Wastewater Change Petitions. ○ Removed requirements for priority pollutant monitoring.	• In April 2020, SF Regional Water Board transitioned 96-011 permittees to the statewide General Order by issuing a NOA and modified MRP. All permittees were transitioned with the exception of Livermore, Delta Diablo, Napa Sanitation, and SASM who have older Title 22 Engineering Reports; they will be enrolled at a later date following a review by DDW. • As of 2020, recycled water production must be reported to the state's GeoTracker.database by April 30 each year. This requirement is being included in all newly issued NPDES permits.	• Support member agencies as they implement new monitoring and reporting requirements. • BACWA Recycled Water Committee continues to collaborate with Regional Water Board staff. In September 2020, Committee leaders provided an update to Regional Water Board members on the transition to the General Order as well as recycled water projects and activities in the SF Bay area.	State Recycled Water Policy Amendment Page: https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/index.html#amendment NOA and MRP for enrollment of Bay Area agencies in statewide General Order (Includes 2016 General Order) https://bacwa.org/wp-content/uploads/2020/11/2020-04_NOA-Recycled-Water-04-08-20.pdf September 2020 Regional Water Board staff report: https://www.waterboards.ca.gov/rwqcb2/board_info/agendas/2020/September/7_ssr.pdf

"Parking lot" 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
BTU/SCF	British thermal units per standard cubic foot
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
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
HRSA	Health Risk Screening Analyses
HRA	Health Risk Assessment
MCL	Minimum Contaminant Level (Drinking Water)
MGD	Million Gallons per Day
NACWA	National Association of Clean Water Agencies
NELAC	National Environmental Laboratory Accreditation Conference
PCB	Polychlorinated Biphenyl
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
TAC	Toxic Air Contaminant
TMDL	Total Maximum Daily Load
TIN	Total Inorganic Nitrogen
TNI	The NELAC Institute
TST	Test of Significant Toxicity
WQBEL	Water Quality Based Effluent Limitation
WQO	Water Quality Objective

Irrigating San Francisco Bay Area Landscapes with Recycled Water



WATEREUSE CALIFORNIA

Prepared by
Nelda Matheny, Lawrence Costello, Carol Randisi and Ryan Gilpin, June 2021

About this Publication

This *Guide* is a tool to help landscape owners, designers and managers use recycled water effectively and successfully in San Francisco Bay Area landscapes. It is designed to help you understand the basic components of how to evaluate site conditions, adjust existing landscapes, design new landscapes, and care for landscapes irrigated with recycled water.

Many people and organizations were involved with the development and review of a larger body of work that has been summarized and condensed into this *Guide*. The original review team included landscape professionals, scientists and water engineers and managers. The breadth of experience and knowledge of these professionals is represented in the topics and recommendations provided here.

Sponsors for this work were the WateReuse Association, the Bay Area Clean Water Association, Dublin San Ramon Services District, the City of Palo Alto, the City of Redwood City, the City of San José, Valley Crest Landscape (now BrightView), Silicon Valley Clean Water, South Bay Water Recycling, Stanford University, Sonoma County Water Agency, and Santa Clara Valley Water District.

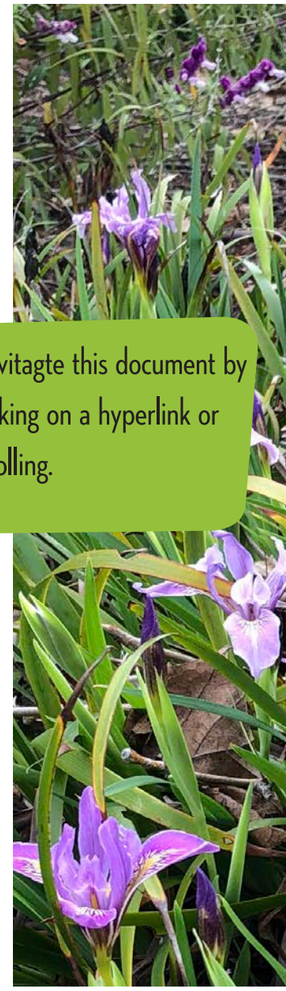
Recycled water is a local, sustainable source of water that is climate resistant. The time is right to expand the use of recycled water for landscape irrigation in the Bay Area. This guide was developed to share the best recycled water landscape practices from experts and experiences from recycled water landscape projects in our Bay Area climate. By using this knowledge and recycling our water, we hope to help keep our landscapes green and continue to make the Bay Area a great and sustainable place to live.

Jennifer West
Managing Director, WateReuse California

This document is available electronically through the WateReuse California website https://watereuse.org/sections/watereuse-california/.

When quoting text from this document, please use this citation:
Matheny, N. P., L. R Costello, C. Randisi, and R. M. Gilpin. 2021. *Irrigating San Francisco Bay Area Landscapes with Recycled Water*. WateReuse California. https://watereuse.org/sections/watereuse-california/.

Contents



Navitagte this document by clicking on a hyperlink or scrolling.

Getting Started

Landscape irrigation with recycled water is an integral component of California's efforts to deal with limited water supplies in the face of growing demand. It is safe, reliable, and more available than potable (drinking) water during droughts and periods of water use restrictions.

This *Guide* is a tool to help landscape owners, designers and managers use recycled water effectively and successfully in San Francisco Bay Area landscapes. It is designed to help you understand the basic components of how to evaluate site conditions, adjust existing landscapes, design new landscapes, and care for landscapes irrigated with recycled water.

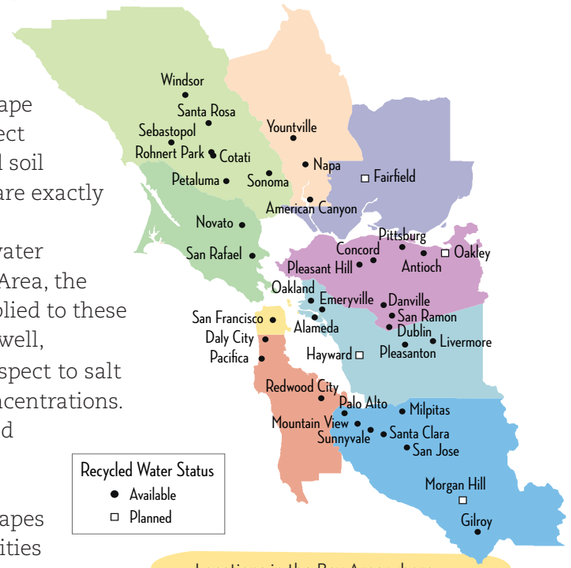
Using recycled water for landscape irrigation has a long history in the Bay Area, beginning in Golden Gate Park in 1948. The Livermore Municipal Golf Course has irrigated with recycled water since the 1960s. The City of Santa Clara started delivering recycled water to irrigate the Santa Clara Golf and Tennis Club in 1989. San Francisco Bay Area water agencies began studying the feasibility of using recycled water in the early 1990s. Its use for landscape irrigation has increased steadily since that time.

Recycled water is currently supplied for landscape irrigation to portions of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Sonoma, and Santa Clara Counties (see map below). Plans are underway to greatly expand the availability of recycled water for landscape irrigation throughout the Bay Area. There are currently 19 agencies in the Bay Area supplying recycled water.

In the San Francisco Bay Area, many established landscapes are being converted from irrigation with potable water to recycled water. These landscapes are composed of a large variety of plants growing in a wide range of soils. In fact, each landscape is unique with respect to plant species and soil conditions; no two are exactly the same.

With multiple water retailers in the Bay Area, the recycled water supplied to these landscapes vary as well, particularly with respect to salt and specific ion concentrations.

By using recycled water to irrigate landscapes we can keep landscapes green and communities healthy places to live, work and play.



Locations in the Bay Area where recycled water is now available for landscape irrigation or will soon be available.

Regulations Regarding Recycled Water for Landscape Irrigation

AB 324, California's Water Conservation in Landscaping Act, was signed into law in 1990. The statute required that the design, installation, and maintenance of landscapes be water efficient. In 2006, AB 1881, Water Conservation in California, required an update to the Model Water Efficient Landscape Ordinance.

By the end of 2008, Governor Schwarzenegger had declared a state of emergency due to drought conditions. With so many demands on our water resources, the State Water Resources Control Board adopted the Recycled Water Policy in 2009, and most recently amended in 2018/19. The policy was developed to increase the production of recycled water, make recycled water available to water suppliers, and substitute the use of recycled water for potable water as much as possible. The Recycled Water Policy set a goal of increasing the 0.6 million acre-feet of recycled water used in 2009 to 2.5 million acre-feet per year by 2030.

Recycled water quality is tightly controlled and monitored to protect human health and the environment. The State Water Board, Division of Drinking Water establishes and enforces the standards for recycled water used for human contact. The State Water Resources Control Board (the State Water Board), through regional water boards, sets and monitors the quality of recycled water to protect the environment and public health (for example, see California Code of Regulations Title 17 and Title 22, Chapter 3, Division 4). In addition, regional boards monitor recycled water quality and manage recycled water permitting, use, application, and associated runoff to protect waters of the State. Refer to Appendix 4 for further description and relevant portions of these documents.

In July 2009, the State Water Board adopted the General Permit for Landscape Irrigation Uses of Municipal Recycled Water (the General Permit, see https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/docs/draft_genpermit032809.pdf). The General Permit allows the use of recycled water for landscape irrigation in

- parks, greenbelts, and playgrounds
- schoolyards
- athletic fields
- golf courses
- cemeteries
- residential landscaping, common areas (individually owned residences are not included in the General Permit)
- commercial landscaping, except eating areas
- industrial landscaping, except eating areas
- freeway, highway, and street landscaping

Laws That Regulate Recycled Water for Landscape Irrigation

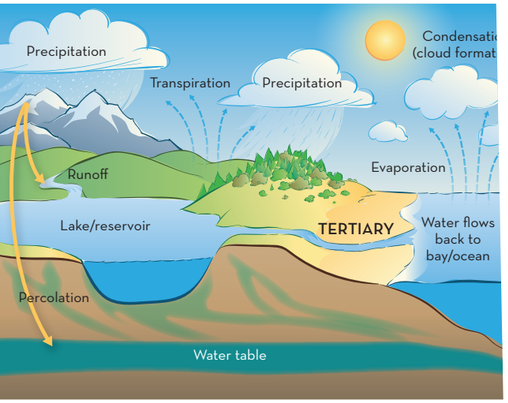
Water Recycling in Landscaping Act (SB 2095, 2000)
https://leginfo.legislature.ca.gov/

Health and Safety Code, Water Code
https://leginfo.legislature.ca.gov/

Title 17, Division 1, Chapter 5
www.calregs.com

Title 22, Division 4, Chapter 3
www.calregs.com

How Water is Recycled



Water is naturally recycled and purified through the hydrologic cycle of evaporation, transpiration, condensation, precipitation and runoff.

Water covers about 70% of the earth's surface and is fundamental to life. The amount of water on earth never changes. Water continually moves through the water cycle via the processes of evaporation, transpiration, condensation, precipitation, and runoff.

Nature recycles water through the water cycle. All of the water we consume has been used before and cycled through nature's cleaning processes. Municipal water is recycled using similar processes involving filtration and biological decomposition.

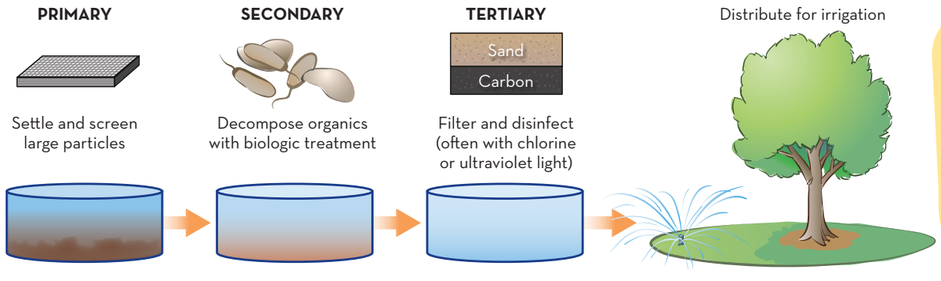
Recycled water, also called treated wastewater or reclaimed water, is water that has been previously used for municipal, industrial, or agricultural purposes and has undergone a level of purification or treatment. By law, wastewater is treated to meet local, state, and federal standards, making it suitable for irrigation.

There are several wastewater treatment processes; each step further improves the quality of the water.

- Primary treatment: Initial step where raw sewage flows through bar screens, removing large objects.
- Secondary treatment: Biodegradables and colloidal organic matter are removed using aerobic or anaerobic biological treatment processes.
- Tertiary treatment: Any remaining particulates are removed through sand and/or carbon filtration followed by chemical or nonchemical disinfection (chlorine, ultraviolet light, hydrogen peroxide, or ozone).
- Advanced treatment: While not required by the Department of Public Health, some agencies further treat recycled water using microfiltration followed by reverse osmosis (MF/RO) to remove dissolved salts that cannot be removed through previous treatments. MF/RO treatment is expensive and energy intensive.

During tertiary recycled water treatment, particulates and other organic materials are removed. However, many of the dissolved constituents, including minerals, salts, and other metals, remain in solution unless they are removed through advanced treatment described above.

Disinfected tertiary treatment including coagulation, filtering, and disinfection is required for irrigation of parks, playgrounds, schoolyards, and spray irrigation of food crops. All recycled water used for landscape irrigation in the Bay Area has undergone approved tertiary and disinfection treatment.



In the San Francisco Bay Area, recycling wastewater for landscape irrigation involves at least three categories of treatments: primary, secondary, and tertiary.

Water Quality

All water contains the same major constituents, but the composition and concentration can vary from location to location. The concentration of the constituents is used to assess the quality of the water for the intended use.

In the context of landscape irrigation, water quality refers to the presence and concentration of total salts (TDS, EC_w), several specific ions (Cl^-, Na^+, B^+), bicarbonate, pH, trace elements, and the nutrients nitrogen, phosphorus and potassium. Water that is recycled contains more salts than it did when it was first used unless it goes through advanced treatment such as reverse osmosis.

Salinity

Salinity is the most important measure of water quality for landscapes. Salts are compounds that dissolve in water, separating into positively or negatively charged ions. For example, when table salt (NaCl) dissolves in water, it separates into sodium (Na^+) and chloride (Cl^-). Water salinity is measured and expressed as total dissolved solids (TDS) and electrical conductivity (EC_w), where the subscript "w" stands for "water." Most recycled waters in the Bay Area contain 500 to 1,000 ppm TDS and EC_w 0.85 to 1.6 dS/m.

Specific ion concentration

Irrigation water with elevated concentration of specific ions (Cl^-, Na^+ and/or B^+) can injure sensitive plants even when total salinity is within tolerable range. The concentration of specific ions is usually expressed in ppm, mg/l, or meq/l.

Sodium and chloride concentrations are particularly important if irrigation water will be sprayed onto foliage, either directly by sprinklers or through drift in the wind. Many plants absorb sodium and chloride through their foliage. For this reason, interpretation of water quality is different for foliar-applied water (e.g., spray irrigation that wets plant foliage) than for soil-applied water (e.g., bubbler or drip irrigation).

Bicarbonate

Bicarbonate (HCO_3^-) affects plants through its influence on pH and interaction with sodium. High bicarbonate concentrations, which may occur in both potable and recycled waters, affect the availability of some nutrient elements, thereby affecting plant nutrition. Water that is high in bicarbonate, calcium, or magnesium can form precipitates that clog drip emitters and increase wear of valves.

Nutrients

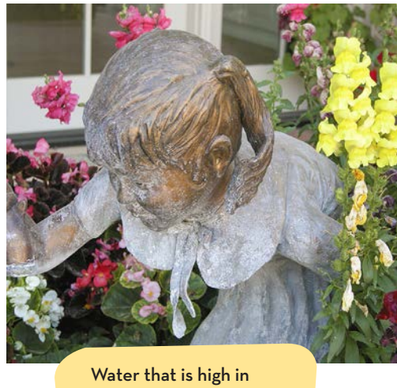
One of the advantages of using recycled water for landscape irrigation is that it contains nitrogen, phosphorus, and sulfur which are needed for plant growth. The need for added fertlizers is reduced.

Chlorine and Chloride: What's the Difference?

Chlorine (Cl_2) is a chemical element that under standard conditions is a gas. Commonly, chlorine is added to recycled water as a tertiary treatment before it is distributed. Chlorine eventually dissipates as a gas and is not a significant concern in landscapes unless concentrations are abnormally high (above 5 mg/l total residual chlorine).

Chloride (Cl^-) commonly occurs as a constituent of salts, such as sodium chloride (NaCl). Chloride salts are soluble in water and occur in high concentrations in seawater.

Recycled water contains chloride that was present in the potable water from which it was derived. Although chloride is an essential plant element, it can accumulate in soils and may be too high for sensitive plants. In soils where chloride has accumulated to higher levels, leaching is required to lower the concentration to a tolerable level.



Water that is high in bicarbonate left a white coating on the parts of this bronze statue that were wetted during irrigation.

Soil Quality

The clayey soil above is compacted and lacks structure. The soil in the photo below has good structure. It drains well and holds moisture and nutrients for plant roots. The structure was restored over years of incorporaing compost and maintaining wood chip mulch.

Landscape soils in the Bay Area are often composed of layers that restrict water movement and root development. Here, the soil profile reveales four layers of soils of different origin, colors, structure, and chemical characteristics.

Soil is a complex physical, chemical, and biological system that holds water and nutrients for plants. For our purposes, soil quality refers to the capacity of the soil to support landscape plants. Soil conditions have a significant effect on landscape performance, regardless of irrigation water source. It is particularly important, however, when the landscape is irrigated with recycled water because salts in irrigation water can build up in the soil over time.

Soil texture and structure

Many soils in the S. F. Bay Area are clayey in texture. Clayey soils hold more water and nutrients and drain more slowly than sandy soils. In urban areas, clayey soils tend to have poor structure, especially where the land has been graded and compacted for construction purposes. Such soils typically have low infiltration rates, drain very slowly, and are poorly aerated. It is difficult to manage salinity with leaching treatments in clayey, compacted soils.

Soil depth and layering

Urban soils in the San Francisco Bay Area often are composed of layers having different textures. A shallow, dense clay layer reduces the soil volume available for root growth and restricts drainage. In a soil with no noticeable layering, the effective root depth may be more than 5 feet; in a compacted soil or a soil with a shallow clay or other impermeable layer it may be less than 12 inches. Knowing if the soil profile on a site is layered and the depth to a restrictive layer is important to determining how best to manage irrigation and leaching.

Soil aeration and drainage

Soil aeration and drainage are intimately linked because water and air occupy soil pores. Maintaining a balance between air (oxygen) and moisture is important to the survival of plant roots and soil organisms. See page 16 for a discussion of drainage problems.

Soil pH

Soil reaction, expressed as pH, refers to the acidity or alkalinity of a soil. A pH of 7.0 is neutral; pH greater than 7.0 is alkaline; below 7.0, acidic. Many plants grow in soils with a wide range of pH, from about 5.5 to 8.3, particularly if the soil is well drained. An optimal pH for the availability of all essential nutrients without becoming toxic is in the range of 5.5 to 7.0. Most soils in the S. F Bay Area are alkaline. Plants native to the region and similar climate zones, such as the Mediterranean, are adapted to alkaline conditions and are able to maintain adequate nutrition at the higher pH.

Soil salinity

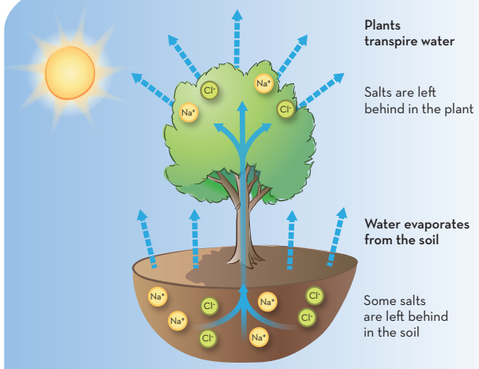
Soils naturally contain a mixture of salts that are necessary for plant growth and function. Those that contain high concentrations of soluble salts are considered to be saline. Salts may be present from the soil parent material or may accumulate in the soil from irrigation water, high groundwater tables, fertilizers and incorporation of saline soil amendments.

Alkali, or sodic, soils have excess sodium and usually have a pH greater than 8.5. Such soils are very slow to drain and are poorly aerated. Prolonged irrigation with water high in sodium and bicarbonate can create an alkali condition.

Evaluating Salinity

The concentration of soluble salts (salinity) in soil and water is commonly described by measuring its electrical conductivity (EC), and expressed as EC_w for water, and EC_e for soils. Conductivity is a measure of the ability of water to transfer an electrical current. Pure (distilled) water does not conduct electricity; water containing ions does. The higher the salinity, the greater the conductance. EC is usually expressed in units of millimhos per centimeter (mmhos/cm), microsiemens per centimeter (µS/cm), or decisiemens per meter (dS/m).

Another common way to describe water salinity is total dissolved solids (TDS), an expression of concentration of all the metals, minerals, and salts in the water. TDS meters measure the electrical conductivity and apply a conversion factor; different TDS meters use different conversion factors. The conversion is an estimate that can vary with salt concentration and composition. TDS is usually expressed in parts per million (ppm). Guidelines for evaluating water quality data and soil salinity are provided on page 14.



When irrigation water is applied, the constituents that are in the water become part of the soil water solution. As the plant transpires, roots pull water and salts from the soil, leaving some of the salts behind, and carrying some through the plant. The salt ions can reach a concentration that damages plants. Salt accumulation in the soil and plant tissue takes time, usually several years in Bay Area landscapes.

How do Salts Affect Soils and Plants?

When irrigation water is applied to the soil, the salts and other constituents that are in the water become part of the soil water solution. In well-drained soils, heavy rains lower salt concentrations in the root zone. But in areas with limited rainfall or poor drainage, salts accumulate in the soil over time.

As plants transpire, roots pull water out of the soil, carrying some of the salts with it. When water vapor is transpired from the foliage, salts are left behind. If chloride, sodium and/or boron ions reach damaging concentrations, leaf chlorosis and/or burn symptoms develop.

High concentrations of salts in soil and water affect plant physiological and biochemical processes. Three major effects of high salinity on plants and soils are

- plant water stress due to inability of roots to absorb water because of an increasing osmotic gradient (referred to as a physiological drought)
- salt (specific) ions, notably sodium, chloride, and boron, accumulating in cells to a harmful concentration
- slow water infiltration and soil permeability due to excess sodium breaking down soil aggregates and dispersing clays and organic matter.

Plant species vary widely in their tolerance or sensitivity to salts and specific ions (see pages 31-32 for plant salt tolerance ratings). Plants with moderate to high salt tolerance, including most drought tolerant plants, are adapted to sites that contain elevated concentrations of salt that may be too high for salt-sensitive species.

When irrigating with category 2 or 3 recycled water, salt acumulation in soils to concentrations where landscape plants are visibly damaged takes time - typically several years. In most cases, for plantings with moderate and high salt tolerant plants, the salt concentration can be managed with winter rainfall and leaching treatments.

Drought tolerant landscapes tend also to be recycled water-friendly landscapes. Drought tolerant plants tend to be more salt tolerant than plants native to humid climates.

Recycled Water and Landscapes

All landscapes, whether irrigated with recycled or potable water, rely on appropriately matching the plants to the site and space. How a landscape responds to irrigation with recycled water depends on the components of the specific water (water quality), the soil conditions such as texture and drainage, the salt sensitivity of the species in the landscape, and how the landscape is irrigated and managed.

Successful landscapes require careful attention to irrigation management and fostering healthy soils regardless of the water source. While most landscapes perform well when irrigated with recycled water, salt-sensitive plants that are irrigated with certain recycled waters may need extra care.

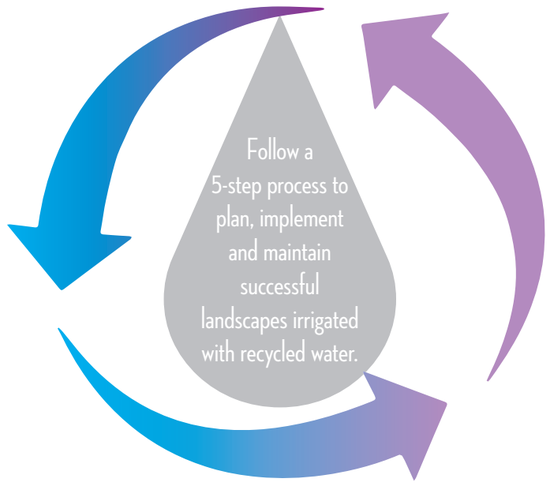
Plants that do well when irrigated with recycled water often include drought-tolerant native species as well as those from similar Mediterranean and dry climates. Some landscapes, however, are comprised of a variety of plants having a range of salt tolerance and soil that responds differently to recycled water.

This *Guide* is designed to help you design and manage landscapes irrigated with recycled water by following five steps: investigate the water, site and plant conditions; plan for irrigation with recycled water; implement the planned design and site modifications; monitor the landscape response to recycled water; and adjust landscape management as needed to maintain a healthy and attractive landscape.

An overview of each step is provided on the next page and discussed in greater detail in the following pages.

One Size Doesn't Fit All

Recycled water produced in different locations in the Bay Area varies in the amount of salt it contains. Because of this and differences in local site conditions and plants, landscapes may respond differently to irrigation with local recycled water. Understanding these differences is a key factor to designing and managing attractive, healthy landscapes with recycled water.



1. Investigate

Understanding the site you have to work with is the first step in successfully using recycled water. Do this by identifying existing conditions, assessing how the landscape is likely to respond to the specific recycled water that will be used for irrigation, and considering appropriate adjustments to the irrigation system, landscape design, and maintenance.

2. Plan

The second step is to take the information learned about the site in step one and consider what adjustments or treatments should be made to successfully irrigate with recycled water in existing and new landscapes.

3. Implement

In the third step, the designs for new landscapes and retrofit plans for existing landscapes are applied. The management goals are to provide site- and plant species-appropriate care and to minimize the accumulation of salts in the soil.

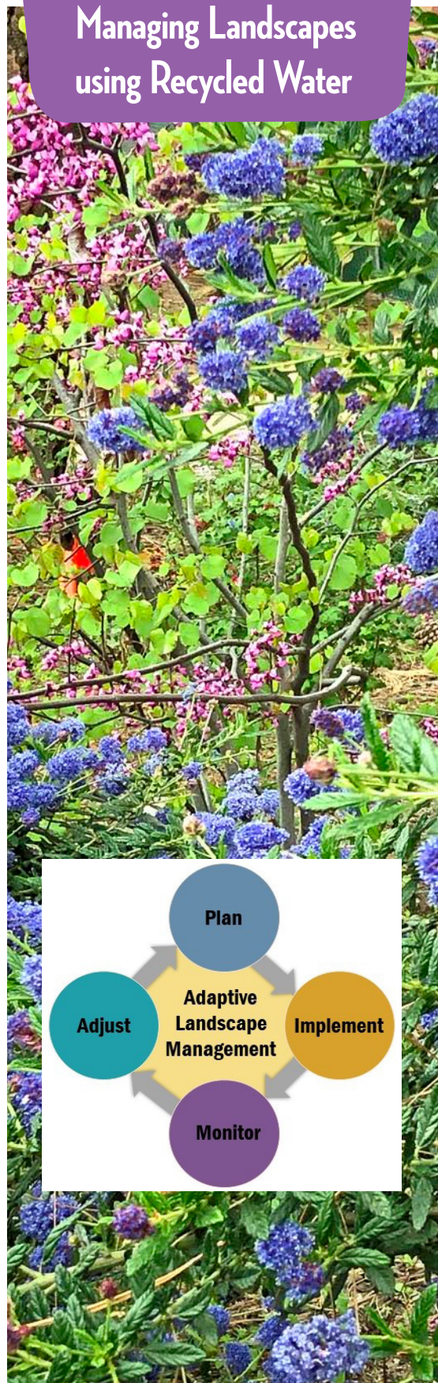
4. Monitor

Monitoring landscape performance is a normal part of managing any landscape. By checking the landscape regularly for changes in plant health and growth, the manager determines how the landscape is performing and assesses if any changes in management practices are needed. This adaptive management approach is effective whether the landscape is irrigated with potable or recycled water.

5. Adjust

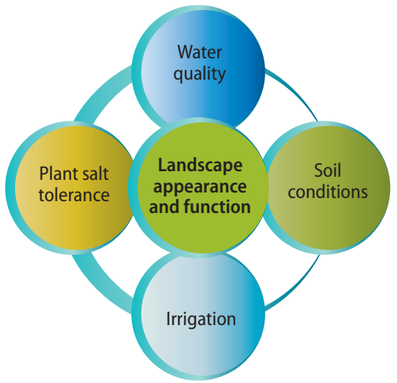
In an adaptive management program, the landscape manager devises maintenance activities in response to the conditions observed during monitoring. For example, if routine soil analyses reveal that the soil salinity is nearing the allowable threshold, leaching treatments should be scheduled to lower the soil salt concentration.

5 Steps to Designing and Managing Landscapes using Recycled Water



5 Steps to Designing and Managing Landscapes using Recycled Water

1. Investigate



How a landscape responds to irrigation with recycled water depends on the quality of the water, soil conditions, salt sensitivity of the plants, and how the landscape is irrigated.

Understanding the site you are working with is the first step in successfully using recycled water. Perform a landscape evaluation by identifying existing conditions, assessing how the landscape is likely to respond to the specific recycled water that will be used for irrigation, and considering appropriate adjustments to the landscape design and maintenance. Here is a step-by-step overview of how to perform a landscape evaluation.

Establish the recycled water quality available at the site.

Water quality is the aggregated chemical characteristics of water. For landscapes, we are primarily interested in the concentration of salts (EC_w, TDS) and specific ions (chloride, sodium, boron) that can affect plants and soils.

To assess water quality…

1. Review water quality reports from the recycled water provider or collect samples for analysis.
2. From the laboratory report, determine the water quality category from table on page 14.

The amount of salt and specific ions in recycled water in the San Francisco Bay Area varies by location, and ranges from category 1 (low salinity) to category 3 (moderate salinity); none are in category 4 (high salinity).

Identify plants and assess tolerance to recycled water.

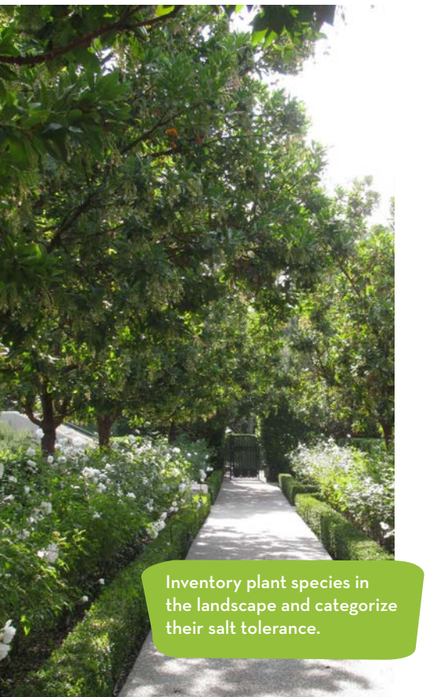
Landscape species exhibit a wide range of tolerance to salts (see Plant Salt Tolerance p. 31-32). Some, like coast redwoods, are highly sensitive and show stress at a relatively low soil salinity (EC_e = 1.5 dS/m), while others, like most drought tolerant plants, can tolerate relatively high soil salinity (EC_e > 4.0 dS/m).

To assess plant tolerance to recycled water…

- Identify plants in the landscape.
- Categorize each as having high, moderate, or low salt tolerance.

Investigate site and soil conditions.

Soil is vital to landscape health and appearance; it is the reservoir that holds water and plant nutrients, and it provides physical support for plants. As irrigation water percolates through the soil profile and is absorbed by plants, most of the water's constituents, such as salts, are left behind.



Inventory plant species in the landscape and categorize their salt tolerance.

Predicting how a landscape will respond to irrigation with a given quality of recycled water requires managers to know specific information about the soil, such as its pH, salinity, texture, and drainage.

To assess site and soil conditions…

- Investigate the soil profile (see photo on right).
- Collect samples for laboratory analysis.
- Evaluate drainage by performing a percolation test (see page 14).

Check irrigation system equipment and performance.

How, when, how long, and where water is applied to the landscape all affect soil and plant response. Having a functional irrigation system that delivers water consistently and at a rate the soil can absorb is critical to any landscape in the San Francisco Bay Area.

To assess the irrigation system…

- Identify how water is applied: sprinkler, drip, bubbler, etc.
- Look for irrigation equipment problems (see page 15).
- Evaluate irrigation uniformity by performing an irrigation water audit or catch can test.

Summing up the landscape evaluation

Once the site assessment has been completed, it is time to put all the information together. How will the recycled water, soil, and plant species work together to create an attractive and healthy landscape?

Assess landscape response to recycled water.

For greatest success, water quality should be appropriate for the salt tolerance of the plants in the landscape and the soil drainage conditions. In short, it should be fit for the intended use.

- Category 1 water is suitable for any Bay Area landscape.
- Prolonged irrigation with category 2 or 3 water would likely damage salt-sensitive species such as coast redwood or Japanese maple, but not salt-tolerant species such as olive and Canary Island pine.
- Landscapes having poorly drained soils are less suitable for category 2 or 3 water if plant salt tolerance is moderate to low.

Determine maximum soil salinity for landscape.

Over time and prolonged irrigation, the concentration of salts increases and may reach the point where sensitive plants are affected or drainage is impaired if the soil cannot be adequately leached (leaching is implemented in step 3). The soil salinity concentration at which plant damage occurs is called the salt tolerance threshold.

Landscape plant salt tolerance	Estimated EC_e threshold
high	6 dS/m
moderate	3 dS/m
low	1.5 dS/m

Results of Soil Investigations

The results of soil investigations should give you a good understanding of

- preexisting conditions that could affect landscape performance
- how readily water is likely to move into and through the soil
- the potential for salt accumulation in the root zone and restrictions to leaching
- the water-holding capacity of the soil for use in developing irrigation schedules
- the fertility of the soil for managing plant nutrition

Soil profiles are investigated by digging backhoe pits (top) or using a bucket auger (bottom) to remove soil to four feet deep or more. Soils that comprise the profile are described and samples collected at appropriate depths.

Evaluating water quality and soil conditions

Recycled water quality interpretive guide for irrigating San Francisco Bay Area landscapes

Parameter	Category 1	Category 2	Category 3	Category 4
Salinity				
TDS, mg/l	<640	640–830	830–1,600	>1,600
EC_w, dS/m	<1.0	1.0-–1.3	1.3–2.5	>2.5
Specific ion				
boron (mg/l)	<0.5	0.5–1.0	1.0–2.0	>2.0
chloride (mg/l)	<100	100–200	200–350	>350
sodium (mg/l)	<70	70–150	150–200	>200
sodium adsorption ratio (SAR)	<3	3–6	6-9	>9
bicarbonate (mg/l)	<90	90–200	200–500	>500
residual chlorine (mg/l)	<1.0	1–2.5	2.5–5.0	>5.0

How to evaluate water quality from a lab report

Request an annual recycled water quality report from a recycled water provider (or do an internet search). This report has important information for assessing how a landscape is likely to respond to irrigation.

Step 1: Identify key water quality parameters: electrical conductivity, total dissolved solids, sodium, boron, and chloride. Note that there are no values provided for sodium adsorption ratio (SAR) or bicarbonate; the laboratory would probably provide that data if requested. Note the annual average as well as the range (annual high and low) of each value.

Step 2: Compare each of the constituents to the ranges in water quality table (above) and note the water quality category. If the unit of measurement of a constituent is different than noted in table 1 you will need to convert to equivalent units.

Constituent	Average	Range	Water Quality Category
Electrical Conductivity (dS/m)	1.2	1.0–1.3	2
Total Dissolved Solids (mg/l)	595	498–722	2
Sodium mg/l)	128	112–159	2
Boron (mg/l)	0.4	<0.2- 0.6	1
Chloride (mg/l)	141.6	88.8–157.7	2

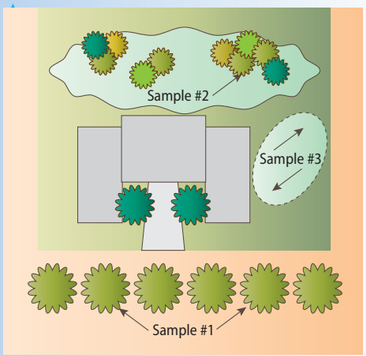
Step 3: Based on the analyses provided, the recycled water is primarily category 2. This means that the recycled water is fair quality and presents low risk to landscapes except those with plants sensitive to salt and poorly drained soils that cannot be leached. Boron is within category 1 range and poses no risk.

Soil salinity interpretative guide for landscapes in the San Francisco Bay Area

	Approximate soil salt thresholds based on landscape salt tolerance		
Salt assessment	**Low**	**Moderate**	**High**
salinity (EC_e, dS/cm)	2.0	2.0-–4.0	>4.0
sodium adsorption ratio (SAR)	<6	7-9	>9
sodium, mg/l	—	>230	—
boron, mg/l	0.5	2	>3
chloride, mg/l	<120	250	>300

How to collect a soil sample

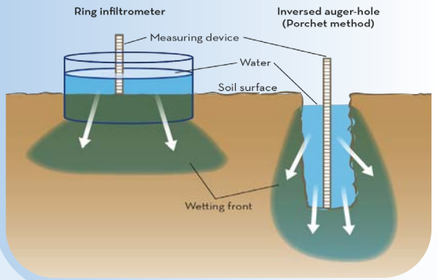
- Determine sampling areas. Divide the site into sampling areas of similar conditions. A single sample should represent only one soil type or growing condition. In this example the street trees, shrub bed and low-lying turf area are sampled separately.



- **Determine appropriate sampling depth.** Samples should be collected from within the existing or proposed plant rooting area, for instance 6 inches for turf, 18 inches for shrubs and trees.
- **Collect samples using a shovel, soil probe or auger.** About two cups of soil is needed for each sample.
- **Package the samples** and send them to a horticultural soil testing laboratory.

How to measure water infiltration rate into soil

- Infiltration rate can be determined by measuring the rate at which water moves into moist soil. Two methods are: ring infiltrometer and inverse auger hole. Wet the soil with 1 in. of water before measuring.
- Field measurements are more representative of site conditions than lab methods.
- Generally, infiltration rate for wetted sandy and silty soils is 0.4-0.8 inches/hour; for clayey soils, 0.04-0.2 inches per hour.



Clues to possible irrigation problems

During the site inspection, perform a cursory assessment of irrigation patterns, looking for dry spots, wet areas, and obvious irrigation equipment problems. Older irrigation systems are often a hodgepodge of equipment and spray heads with different water application rates and patterns. This can cause variation in water distribution over the site.

- Look for turf and ground cover areas that are brown and dry. This aerial view of a park taken mid-summer readily reveals dry areas and problems with sprinkler irrigation uniformity.

- Plants that are scorched may be a sign of insufficient water supply. In this photo, note that the English ivy in full sun is burned, while ivy in the shade is not. Plants in full sun require more water than those in shade. If the shaded and full sun areas are irrigated on the same valve, they receive the same amount of water regardless of need.

- Signs of excessive irrigation include soggy soils and algae and moss on pavement or soil.

- Soils that are wet, blue-black in color and smell of rotten eggs are another indicator of excessive irrigation and/or poor drainage.

- Poor irrigation performance may be due to damaged or offset sprinkler heads, dirt and debris in the spray nozzles, plugged emitters, dysfunctional valves, or plants blocking spray patterns.

5 Steps to Designing and Managing Landscapes using Recycled Water

2. Plan

The second step is to take the information learned about the site in step one, and consider what adjustments or treatments should be made to successfully irrigate with recycled water.

Recycled water irrigation systems are regulated by the California Department of Public Health.

Check with local recycled water suppliers for specific requirements of retrofit or newly installed landscape projects irrigated with recycled water.

Is recycled water coming to your community? While studying the feasibility of introducing recycled water to existing landscapes, consider protecting trees and other vegetation during installation of distribution systems. In this example, the water lines were moved into the street farther from the trees to reduce tree root and crown damage.

For existing landscapes

Assess how plants will likely perform.

Consider the plant species present, their cultural requirements and current condition, and site characteristics to assess how plants will likely perform with the specific recycled water to be applied.

- Identify salt-sensitive plants that may not tolerate the recycled water, considering the quality of the soils and water.
- Identify locations where site soils and plant exposure are unfavorable for particular species.

Determine what treatments are needed to improve soils and drainage.

Treat adverse soil conditions that may contribute to salt accumulation over time.

- Identify locations where treatments are needed to improve soil drainage.
- Determine where organic amendments and/or treatments to reduce soil chemical problems are needed.

Identify repairs and improvements needed to the irrigation system.

Plant performance relies greatly on the design, function, and management of irrigation systems, especially when irrigating with recycled water. Irrigation problems lead to plant problems.

- Identify worn, broken, and mismatched irrigation components that need to be repaired or replaced.
- Plan to modify irrigation systems (if needed) to match precipitation rates with infiltration rates and improve distribution uniformity.
- Plan to replace equipment with components specifically designed for use with recycled water (see *Key considerations for recycled water irrigation systems* on the next page).

For new landscapes

Select plants that are well suited to the site *and* tolerant of the recycled water that will be applied.

It is important to select plants that are well suited to the site. In addition to plant salt tolerance, consider species growth and structural characteristics, climatic tolerance, cultural requirements, maintenance requirements, and pest tolerance.

- Select plants that are compatible with the water quality that will be applied. If salts are relatively high (category 3 or 4 recycled water), chose species with a high tolerance to salts or specific ions (see *Plant Salt Tolerance*, page 31-32).
- Select plants that require irrigation only once or twice a month (low and very low WUCOLS water use rating) or less when established. Infrequent irrigation reduces the potential for salt buildup in the soil, and many drought tolerant plants are also salt tolerant.

Design the irrigation system using equipment intended for use with recycled water.

When using recycled water, you must consider cross-connections, meters, valves, pipes, emitters, and backflow devices and adhere to local and state regulations. For new irrigation systems...

- Select equipment specifically designed for use with recycled water (see sidebar at right).
- Avoid spray irrigation that would wet foliage of sensitive plants. Use low-trajectory nozzles to minimize foliage wetting.

Specify soil treatments if needed to improve conditions for the landscape.

Whether using recycled or potable water, preplant soil treatments are the same, especially when soils have good drainage and are low in salts. Soils can be modified to improve plant performance and reduce maintenance, but there are limits to what is both reasonable and effective. See *Improving soil conditions* on the following page.

Design drainage systems or specify treatments to solve drainage problems.

Identify locations where either surface or internal drainage are inadequate (see *Solving drainage problems* on p.19). Where drainage cannot be improved...

- Select species that are tolerant of wet soils and higher salt concentrations.
- Consider planting on mounds and raised beds to increase rooting area above saturated zones.

Turf and meadow areas are generally suitable for irrigation with category 3 and 4 recycled water. Turf usually benefits from the nutrients present in recycled water. If trees are present, their tolerance to salts should be assessed.

Key considerations for recycled water irrigation systems

Meet health and safety regulations

- Control cross-connections.
- Use purple pipe and include signage.
- Protect public areas from overspray, runoff, and ponding.

Select appropriate equipment

- Valves resistant to chlorine and other chemicals.
- Low-trajectory spray nozzles to reduce drift in windy conditions and avoid wetting plant foliage.
- Large-orifice, turbulent-flow drip emitters with micro-disc filtration.
- Incorporate central control with ET-based scheduling and flow sensors.

Design for success

- Use checklists for regulatory requirements and evaluation procedures.
- Check with your recycled water supplier for local requirements.
- Incorporate recycled-water friendly irrigation technology into your design.

Improving site soil conditions

Soil treatments for landscapes irrigated with recycled water are no different than standard treatments for landscapes irrigated with potable water, especially when soil is well-drained and low in salts. If soil is restrictive, for example, poorly draining or already containing salts or high pH, additional treatments may be needed, especially when category 3 or 4 water is to be applied.

A site that is less than ideal can sometimes be modified to improve plant performance and ease of maintenance. Site modification should not be considered a substitute for designing and planting landscapes that are well matched to site conditions, however. There are limits to what can be done to modify site conditions effectively and reasonably (see table below). For example, efforts to change soil texture are rarely effective.

It is unlikely that a single treatment or application will significantly alter soil characteristics or soil quality. More commonly, repeated treatments over time - possibly years - is needed to make lasting changes to soil organic matter or pH, for instance. In most cases, the best way to improve soil structure, water-holding capacity, chemical characteristics and biological activity is to incorporate quality compost and maintain an organic mulch on the soil surface, reapplying every two to three years.

Dealing with compacted soils

Compaction should be remediated before planting. Cultivation and the incorporation of soil amendments can break up compacted soils. The objective is to improve soil structure over time and increase macropore spaces that hold water and air. Commonly, surface decompaction is accomplished by cultivating with tillers or backhoes. Where compacted soil is present deeper than 6 to 8 in., fracturing, trenching, or ripping will be needed before tilling the surface soil.

Following cultivation, it is good to incorporate organic amendments. Combining amendments with different decomposition rates, such as compost and fine bark, can provide both short- and long-term benefits (see table below).

Importing landscape soil

When existing site soil is poor quality, topsoil is sometimes brought in and placed on top of the site soil before planting. This treatment usually is not as helpful as one might hope. Water movement and plant root development usually are restricted between the site soil and the topsoil, even when the interface is tilled to relieve compaction.

Topsoil is in short supply in the Bay Area. In fact, most soil sold as "topsoil" is actually excavated from deeper in the soil profile and then mixed with organic amendments. In most cases, you can accomplish the same thing by amending the site soil appropriately.

Comparison of ability to modify site conditions before and after planting

Site Characteristics	Ability to Modify	
	Preplant	Postplant
Soil texture		
increase coarseness	low	low
increase fineness	low	low
replace soil	good	moderate to low
Soil structure		
reduce compaction	moderate*	low
increase aeration	moderate*	low
Soil moisture		
increase water-holding capacity	moderate*	low
increase water percolation	good to moderate	moderate to low
increase surface drainage	good	good to low
increase internal drainage	good to low	moderate to low
lower water table	good to low	good to low
Soil chemical characteristics		
raise pH	good	moderate
lower pH in sodic soil	good to moderate	moderate to low
lower pH in high lime soil	low	low
lower salinity	good to moderate	good to moderate
lower boron	moderate	moderate

Note: ***Effects are usually short-term.**

Characteristics and principal uses of selected soil amendments

Material	Principal use in soil			
	Increase water holding capacity	Increase aeration/ drainage	Improve soil structure over time	Comments
peat	yes	no	yes	Acidic and can lower soil pH; expensive; generally texture too fine for Bay Area soils but is useful in sands. Hydrophobic when dry (needs to be wetted).
wood sawdust and shavings	no	yes	yes	High carbon to nitrogen ratio can lead to nitrogen deficiency in plants.
ground bark	no	yes	yes	Decomposes slowly. Has a high carbon to nitrogen (C:N) ratio.
leaf mold	yes	no	yes	Decomposes rapidly because of low C:N ratio.
composted manure	yes	no	yes	If not well leached, can have high salt content. Avoid amendment with salinity (EC_e) greater than 3.0 dS/m.
compost	yes	no	yes	Screened, mature compost with C:N of 20:1 to 30:1 is suitable as amendment.
sand	no	yes	no	Decreases drainage and aeration unless incorporated at rate of 50% or more by volume. Not recommended for use in most soils.

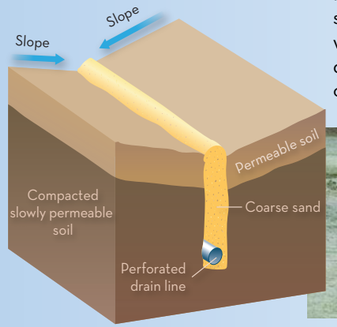
Solving drainage problems

Good drainage is important to landscape performance regardless of irrigation source: plants grow and function best in an aerated, well-drained soil. When landscapes are irrigated with recycled water, however, adequate drainage is even more important because without it, any increase in salt in the soil cannot be removed.

Drainage issues can include surface accumulation of water in low-lying areas as well as internal drainage that may be impeded by conditions in the soil profile. The causes should be investigated so that appropriate treatments can be incorporated into the design and implemented.

Guidelines for improving soil drainage caused by compaction, layers, and high water table

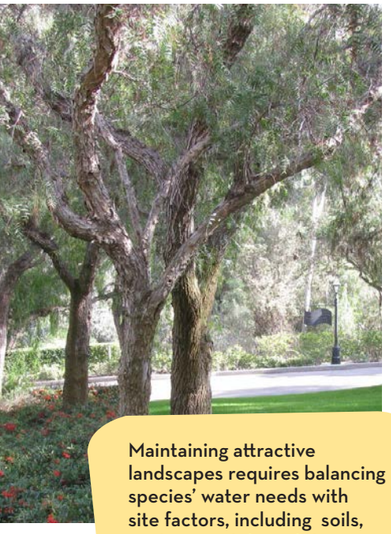
Problem	Possible causes	Treatments
standing water at soil surface (poor surface drainage)	compacted surface soil caused by construction or traffic	Thoroughly incorporate organic matter through depth of compaction.
	low-lying area with no outlet for ponded runoff	Adjust irrigation to reduce the amount of runoff.
		Fill in low area with soil the same texture as the native soil.
		Install a French drain with at least 2% fall to an area with a more permeable soil or outlet at a lower grade (see illustration below).
	dispersed soil caused by high sodium concentration (SAR greater than 6, pH greater than 8.3)	Incorporate gypsum into the soil (determine rate based on soil analysis).
		Apply several leaching irrigations; allow the soil to drain between the irrigations.
	high water table	Install a drainage system; spacing and depth depend on depth to water table, texture of soil, and depth of plant roots.
	impervious layer beneath surface prohibiting soil drainage	If pervious soil lies below the impervious layer, excavate holes through the layer to water to drain into lower profile (see photo below).
		If there no pervious soil below, install drainage system.
	coarse-textured soil underlain by fine-textured soil (clay)	Install drainage system above fine-textured soil.
saturated soil beneath the surface (poor internal drainage)	impervious layer less than 2 ft thick underlain with permeable soil	Deep-rip in two directions below depth of layer; subsoilers and slip plows can rip to depths of 5 to 7 ft; soil must be very dry; alternatively, break up layers with backhoe.
	impervious layer greater than 2 ft thick underlain with permeable soil or where ripping is impractical	1. Bore hole 4 to 6 inches in diameter in bottom of planting hole through the hardpan (see photo below).
		2. Fill the hole with aggregated soil of the same or coarser texture than site soil.
		3. Irrigate to settle soil.
	impervious layer less than 4 ft below surface, not underlain with permeable soil	Increase soil depth by creating mounds or raised beds.
		Use shallow-rooted plants.
	impervious layer greater than 4 ft from the surface, not underlain with permeable soil	Install a drainage system at least 4 ft below finish grade; the drain lines must have a continuous fall to an outlet at a lower elevation than the lines.
	fine-textured soil underlain by a coarse-textured soil	Thoroughly mix the two layers together to create a blended soil.
		Vertical mulch by digging vertical holes or trenches through the fine-textured soil into the coarse-textured soil; backfill with coarse-textured soil.



French drains can be used to improve surface drainage and thereby minimize water puddling or ponding. The French drain on this golf course channels water out of a low-lying area.

Above, impervious soil layers are being broken through using an auger. The size, depth, and spacing of auger holes should be specified for the soil conditions at the site.

5 Steps to Designing and Managing Landscapes using Recycled Water



Maintaining attractive landscapes requires balancing species' water needs with site factors, including soils, environmental conditions, and the performance of the irrigation system.

MWELO and recycled water

The Model Water Efficient Landscape Ordinance (MWELO) is a state regulation that restricts landscape water use to certain delivery methods, application rates and total use. Local agencies must either adopt MWELO or an alternative that is at least as effective for water conservation.

MWELO Section 492.14 includes the following requirements regarding use of recycled water:

- The installation of recycled water irrigation systems shall allow for the current and future use of recycled water.
- Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for new and existing (non-rehabilitated) Special Landscape Areas shall not exceed 1.0.

3. Implement

In the third step, the designs for new landscapes and retrofit plans for existing landscapes are applied The management goals are to provide site and plant species-appropriate care and to minimize the accumulation of salts in the soil.

Correct soil and drainage problems

Remediate soil conditions identified in step 2 that may contribute to salt accumulation by improving soil drainage and capacity to be leached if needed. These may include...

- Breaking through impervious soil layers and/or installing drainage systems.
- Incorporating organic and/or chemical amendments (gypsum or sulfur, for example) to improve soil physical and chemical qualities.

Repair and prepare existing irrigation system

Implement the repairs and equipment replacement identified in step 2.

- Flush irrigation system.
- Repair and replace irrigation components as needed.
- Adjust water application patterns to maximize uniformity.
- Install chemical-resistant valves to prevent premature diaphragm and solenoid corrosion.
- Check that local and state regulations and requirements for recycled water irrigation systems have been met.

Adjust fertilization programs

Because most recycled water contains nitrogen, phosphorus and potassium, you can reduce and in some instances eliminate applying fertilizers which contain these elements.

- Test soil and plant tissue for nutrient content to determine nutrient concentrations and if specific fertilizers are needed.

Develop a water budget

A water budget is an analysis of how much water a landscape will require based on supply and demand. It is used both as a design tool where water resources are limited and a management tool to help plan for and schedule irrigation. To develop a water budget...

- Know the factors affecting water supply and plant demand.
- Estimate the amount of water that is available in the soil for plant use by determining the water-holding capacity of the soil, the size of the soil moisture reservoir and plant water use (see page 19).

Establish a soil salinity threshold and leaching program

The soil salinity threshold is the concentration below which soil salinity should be maintained to avoid plant damage. If the landscape includes plants having a range of salt tolerance, determine the threshold for the most salt-sensitive species.

- Begin leaching treatments when soil salinity measurements (EC_e) reveal that the threshold is being approached.
- Repeat leaching treatments until soil analyses indicate that salinity measurements are below the threshold (see guidelines on page 16).

Modify irrigation schedules

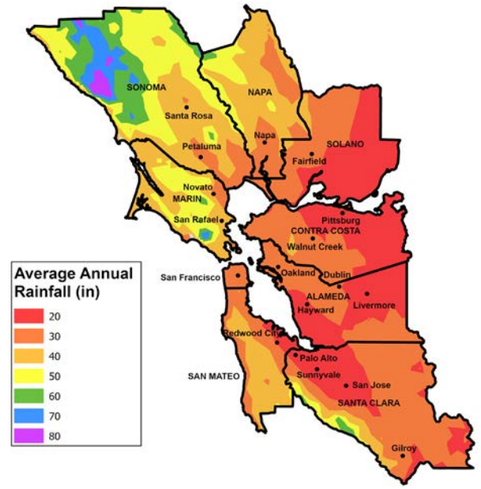
The objective of irrigation scheduling is to supply enough water to meet plant needs without wasting water.

- Modify irrigation systems if needed to match precipitation rates with soil infiltration rates and improve distribution uniformity.
- When using recycled water, keep soil moist (50% of field capacity or greater) for plants having moderate to low salt tolerance.
- When the soil salinity threshold is approached, increase irrigation as needed to include the leaching requirement (see page 16).
- Install "smart" ET-based controllers that adjust irrigation run times based on local weather conditions.

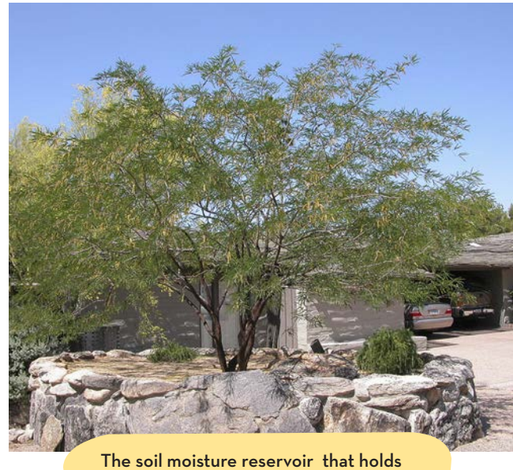
Replace salt-sensitive plants if needed

If soil salinity cannot be maintained below the soil salinity threshold, consider replacing sensitive plants identified in step 2 with more tolerant species. See p. 28-29 for discussion of plant species salt tolerance ratings.

- For sensitive species noted as being drought tolerant, consider withdrawing irrigation and applying mulch to the soil surface.
- If the species salt tolerance is not known, wait to see how it performs before considering replacement.



The average annual rainfall in the Bay Area varies dramatically, from a low of 20 inches to a high of 80 inches. The effectiveness of rainfall in reducing soil salinity also varies. In Marin County, for example, rainfall may provide all the leaching that is needed. In Livermore, on the other hand, leaching irrigation will likely be necessary.



The soil moisture reservoir that holds the water available to this tree is limited by the walls of this raised planter. Because of this restriction, the tree may need supplemental watering to maintain a healthy appearance even though it is drought tolerant.

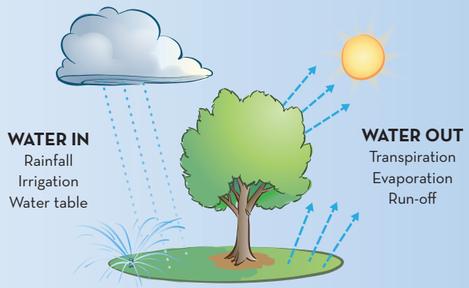
Determining irrigation schedules

Water management is of primary importance to successful maintenance of San Francisco Bay Area landscapes. Water budgeting, which is is based on supply and demand, is a good way to estimate irrigation schedules. The goal is to provide sufficient water through irrigation to meet plant needs. The challenge is to apply just enough water, not too much or too little.

Elements of a water budget

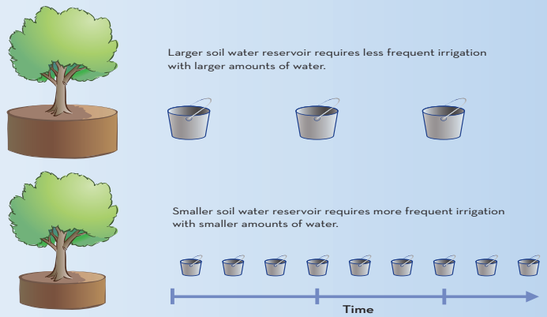
The elements of a water budget include inputs (precipitation and irrigation, along with capillary rise from groundwater) minus the outputs (evapotranspiration, runoff, and percolation beyond the plant root zone).

The rate that water transpires from the plant and evaporates from the soil (evapotranspiration, ET_0) is used to estimate how much water is needed for optimal plant growth. By deducting ET_0 from the amount of water stored in the soil water reservoir, the amount and frequency of irrigation can be estimated. This is basic water budgeting.



Soil water reservoir

The volume of the soil moisture reservoir affects irrigation frequency. Each irrigation should be of sufficient volume to fill the soil moisture reservoir.



Deciding when and how much to irrigate

The soil moisture reservoir is the volume of soil occupied by plant roots and the available water they can extract. The best time to irrigate is when half of the plant-available water in the soil moisture reservoir is depleted. For instance, in a sandy loam soil with a plant rooting depth of 12 inches, scheduled irrigation of non-drought tolerant plants after 50% of the available water (0.3-0.35 in.) is depleted. Drought-adapted plants that are established in the landscape and have reached mature size often can be maintained with only a few irrigations each year to extend the rainy season.

Soil texture	Depth of soil (ft)	Water-holding capacity (in)	Plant-available water (in)
Sandy loam	1	1.2–1.4	0.6–0.7
	2	2.4–2.8	1.2–1.4
	3	3.6-4.2	1.8–2.1
Silty loam	1	2.0–2.5	1.0–1.3
	2	4.0–5.0	2.0–2.6
	3	6.0–7.5	3.0–3.9
Clay loam	1	1.8–2.0	0.9–1.0
	2	2.6-4.0	1.8–2.0
	3	4.2–6.0	2.7–3.0

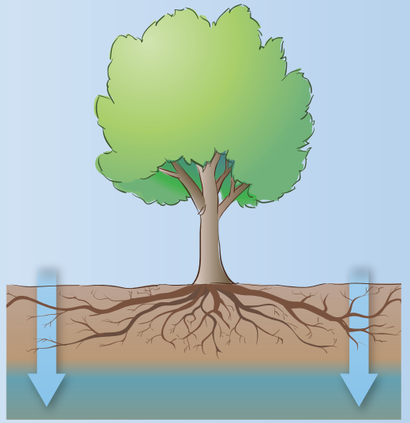
Source: Adapted from USDA National Research Initiative Competitive Grants CAP Project, http://passel.unl.edu/pages/informationmodule.php?idinformationmodule=1130447039&topicorder

Leaching to manage salt accumulation in soil

What's so important about leaching?

Leaching is our best management tool for controlling salt concentration in the landscape root zone. To leach soil salts, apply water to flush salts in the root zone deeper in the soil profile, beyond the reach of roots. As water moves downward, it carries salts in the soil solution along with it, out of the range of absorbing plant roots.

In the S. F. Bay Area, leaching occurs naturally in the winter months when rain repeatedly wets the soil. Note, however, that the average annual rainfall in the Bay Area varies widely - from 15 to 70 inches, so the effectiveness of rainfall to leach soils varies with location. Of course, in dry years less leaching occurs.



How to lower soil salinity with leaching treatments

Leaching during the dry season is accomplished by adjusting irrigation run times to apply enough water to meet the landscape's water requirements plus extra water to wet the soil deeper than the plant roots extend. The extra water moves the salts deeper into the soil and away from plant roots. Anything that impedes water movement through the soil, such as layers of different soil textures, compaction, or a high water table, limits the salt movement downward and makes leaching treatments ineffective. It is not possible to lower the salt content of the soil below the salt content of the water source used for leaching.

What is the leaching requirement?

The amount of extra water needed to flush excess salts below the roots is called the *leaching requirement*. In most landscapes in the Bay Area using category 2 and 3 recycled water, an appropriate leaching requirement is 10 to 20% more water than is applied to meet the landscape's irrigation needs. The higher the salinity of the water, the poorer the soil quality and the more salt-sensitive the landscape, the greater the leaching requirement needed (see *Water Quality Interpretive Guide*, p. 14,)

What is the soil salinity threshold?

The *soil salinity threshold* is the concentration below which soil salinity should be maintained to avoid plant damage. The threshold depends on the salt sensitivity of the plants in the landscape, the quality of the recycled water being applied, and the texture and chemical characteristics of the soil. As a guideline, consider the thresholds shown in the table on the right.

What to do when soil salinity is approaching the threshold?

When soil salinity measurements (EC_e) reveal that the threshold is being approached, leaching treatments should begin and repeated until soil analyses indicate that salinity measurements are below the threshold.

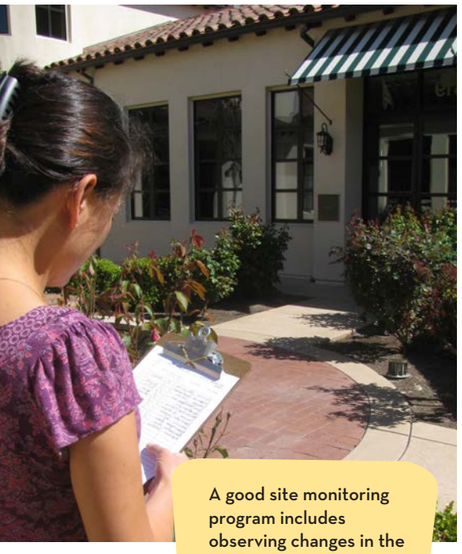
Estimated leaching requirement based on water quality, landscape water requirement, and soil conditions.

		Estimated leaching requirement (% increase of landscape water requirement)	
Water quality category[a]	Landscape water requirement	Coarse, well-drained soil	Heavy or poorly drained soil
1	very low to low	0	0
	moderate	0	0
	high	0	0
2	very low to low	0	0
	moderate	10%	10%
	high	10%	15%
3	very low to low	0	10%
	moderate	10%	15%
	high	20%	25%
4	very low to low	10%	10%
	moderate	20%	25%
	high	25%	30%

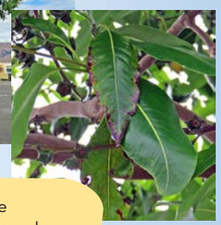
*see Water Quality Interpretive Guide, page 14.

Soil salinity threshold based on plant salt tolerance.

Plant salt tolerance	Soil salinity (EC_e) threshold
low	2 dS/m
moderate	4 dS/m
high	6 dS/m



A good site monitoring program includes observing changes in the landscape and keeping careful records.



What is an acceptible appearance? Even though there is marginal burn on some of this Brisbane box's interior foliage, the tree has an attractive, full, green canopy.

4. Monitor

Monitoring landscape performance is a normal part of managing any landscape. By checking the landscape regularly for changes in plant health and growth, the manager determines how the landscape is performing and assesses if any changes in management practices are needed. This adaptive management approach is effective whether the landscape is irrigated with potable or recycled water.

Here are the components of a successful landscape monitoring program.

Establish a baseline

Document the current condition of the landscape to establish a baseline against which changes in the landscape can be compared.

- Inventory species present.
- Evaluate the overall condition of each species in the landscape area.
- Define what an acceptable landscape looks like. Plants with dead or dying foliage is unacceptable. Some marginal leaf burn on older leaves is usually acceptable as long as the damage is not clearly visible from a distance.

Observe plant appearance and health

By closely monitoring plant appearance, stress-related problems can be identified and early corrective action taken.

- Know what is normal and abnormal for the species.
- Accurately diagnose plant problems. Landscapes can be affected by a variety of biotic (living) and abiotic (non-living) factors, some of which cause similar symptoms (see page 27 for some examples).
- Plant symptoms of water deficit (drought) and salt damage can appear the same: marginal leaf burn. Plant foliage analysis of sodium, boron, and chloride are needed to determine the cause and so you can provide appropriate treatments.

Test and observe soil conditions

Soil conditions should be assessed and monitored through observation, sampling, and laboratory analysis to identify when treatments such as fertilization or leaching are needed.

- In most cases, soil should be sampled at the beginning of the irrigation season in the spring and again at the end in the fall.
- Soil samples should be collected at the beginning and end of the irrigation season to monitor soil chemical changes and identify if the soil salinity threshold is being approached (see *Evaluating Soil Condition*, page 14).
- Watch for changes in soil infiltration and percolation (drainage).

Observe irrigation system performance

Failures in the irrigation system are common in any landscape. Finding line breaks, broken or misaligned nozzles and other problems early can avoid damage to the landscape from excessive or insufficient water resulting from system malfunctions.

Some of the most common causes of poor irrigation performance are irrigation heads that are broken (top) or obstructed by large shrubs (bottom).

Sample landscape monitoring and sampling program

Activity	When	Instructions	Criteria
visual plant inspection: trees	beginning, midway, and end of irrigation season	rate visual quality from a distance (15–20 feet)	good, fair, poor
visual plant inspection: shrubs, groundcover	beginning, midway, and end of irrigation season	rate visual quality of foliage (1–3 feet)	good, fair, poor
landscape condition	beginning, midway, and end of irrigation season	rate visual quality against criteria for acceptable appearance	good, fair, poor
foliage sampling	beginning and end of irrigation season	make composite sample and send to lab	
soil sampling	beginning and end of irrigation season	collect composite sample and send to lab	see p. 8 for interpretative guidelines
water sampling	review water agency's reports monthly for category 3 and 4 water, and annually for category 1 and 2 water	analyze for EC_w, pH, SAR, Cl, and Na	see p. 6 for interpretative guidelines
weather conditions	daily ET, temperature, rainfall		CIMIS website, by zip code or weather station

Tip

Keep in mind that maintenance practices, especially water management, can affect plant appearance regardless of water quality. Do not assume that all plant conditions observed result from use of recycled water.

Sampling Techniques for Monitoring

Soil sampling

- See "How to collect a soil sample", p. 8.
- Plan to sample soils at the beginning (spring) and end (fall) of the irrigation season.
- Analyze soil samples for EC_e, pH, SAR, Cl, Na, and B. If you plan to fertilize, include nutrient analyses.
- After receiving the lab report, compare the analyses to the interpretive guide on page 8.

Foliage Sampling

- Select fully mature leaves. When sampling conifers, choose needles that are at least one season old. About 100 grams of leaves are needed (25 to 50 leaves, depending on size).
- Where possible, collect leaves from different plants of the same species with and without symptoms. Keep the samples separated.
- Package in small paper bags, label, and send to the lab.
- If testing for salt injury, analyze for Cl, Na, and B. If testing for nutritional problems, include macro and micro elements.
- Note: Check with the laboratory that will be performing the analyses to see if they have additional sampling requirements.

A link to soil, water and tissue sampling labs is providing in Helpful Resources, page 33.

A soil sampling probe, auger or shovel can be used to collect soil samples. Remove surface vegetation before collecting the sample.

This David viburnum shrub's symptoms are leaf tip and marginal necrosis. To help diagnose the cause, the landscape manager removed about 20 leaves showing symptoms, and packaged them for shipment to a laboratory for analysis. The laboratory report noted high concentrations of chloride and sodium in the tissue, which supported a diagnosis of salt injury.

Leaf tissue analyses interpretive guide for landscape plants

(These are general values; specific values for most landscape species have not been established. Values have not been established for fields that are blank.)

Element	Normal range		Deficient		Toxic		
	%	ppm	%	ppm	%	ppm	meq/l
N	2.0-2.5						
P	0.2-0.4						
K	1.5-2.0						
Ca	0.5-1.0						
Mg	0.2-0.3						
S	0.2-0.3						
Fe		50-100					
Zn		25-50		<15		>200	
Cu		3-15		<5		>70	
Mn		50-100		<20		>200; 300-400 tree crops	
Mo	0.1-3.0			<0.1		>70	
Cl	0.2-0.4	2000-4000			0.5-1.0	5000-10,000	>28
B		30-50		<20		>200; 375-400 tree crops	
Na	0.1-0.3	1000-3000			0.5-1.0	5000-10,000	>22

Salt Look-Alike Disorders

Symptoms of salt injury can look similar to those caused by other factors. When in doubt, test - don't guess. Collecting and analyzing soil and foliage samples will identify if salts are the likely culprit or not (see previous page for sampling guidelines, and page 11 for soil analyses interpretive guide).

Salt injury due to chloride

Salt injury due to boron

Natural seasonal leaf senescence

Cold temperature injury

Herbicide injury

Desiccation injury (lack of water, hot, dry winds)

5 Steps to Designing and Managing Landscapes using Recycled Water

5. Adjust

In an adaptive management strategy the landscape manager monitors landscape conditions, compares conditions to desired thresholds, and adjusts treatments accordingly.

In an adaptive management program, the landscape manager devises maintenance activities in response to the conditions observed and measured during monitoring. For example, if routine soil analyses reveal that the soil salinity is nearing the allowable threshold, leaching treatments should be scheduled to lower the soil salt concentration.

Landscape managers need to know the cultural requirements of the species in the landscape, including water, pruning and nutritional requirements.

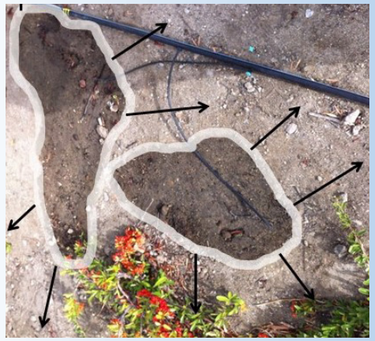
Adjust irrigation schedules

Knowing plant water needs is essential for successful landscape management, and it is particularly so for landscapes irrigated with recycled water. Water needs, however, change over time.

As soils dry, the salt concentration in the soil solution increases. For landscapes with low and moderate salt tolerance, water budgets should allow adequate irrigation to maintain moist soil to dilute soil solutes, avoid water stress, and minimize plant damage. It is not necessary to maintain moist soils for drought and salt-tolerant plants.

Adjustments should be made to irrigation schedules in response to...

- seasonal changes in day length, temperature, and humidity;
- periods of warmer or cooler weather than normal and sudden temperature changes;
- less or more rainfall than normal;
- extended or short rainy season;
- wind that disrupts spray patterns;
- leaching treatments.



Under prolonged drip irrigation, salts can accumulate at the outside edge of the wetted area. This is illustrated in the photo by the white band drawn around each drip emitter's wetting zone. Salts can be leached by doubling drip irrigation run times to wet a larger volume of soil and move salts outward. This treatment is most effective if performed in the winter during rain events that carry salts deeper into the soil profile and away from plant roots.

Leach to maintain soil salinity below threshold

When soil salinity measurements (EC_e) reveal that the threshold is being approached, leaching treatments should begin and be repeated until soil analyses indicate that salinity measurements are below the threshold (see p. 17).

- Adjust irrigation duration to apply extra water to move salts deeper into the soil profile.
- In low rainfall years, consider applying leaching irrigations in the winter to augment rainfall.

Adjust

Manage sodium concentrations in soils.

If soil sodium concentrations become too high, drainage will become impaired, especially in clayey soils. Incorporating calcium in the form of gypsum (calcium sulfate) into the soil and then leaching can regain soil structure, improve percolation and often lower pH.

- As a general guideline, apply gypsum when the SAR is greater than 6 or increases by more than 2 units above baseline values. For instance, if the baseline SAR was 3, plan to apply gypsum if the SAR reaches 5. Send a soil sample to a lab for a gypsum requirement test to determine how much gypsum is needed to reduce the SAR (see *Helpful Resources*, page 33 for link).
- In existing landscapes, large amounts of gypsum cannot be tilled into the soil. Split the applications over a few months. Applying pelletized gypsum through the winter months is ideal because rainfall helps the leaching process.
- Leach sodium by applying approximately 1 inch of water within 24 hours of gypsum application.
- Allow the soil to drain for 4 to 5 days and repeat leaching treatment. Plan to do this twice.
- Sample the soil a few weeks after the last leaching treatment to determine effectiveness in lowering SAR below 6.0.

Tip

Gypsum does not "break up" or "soften" clay soils. It improves drainage only if excess sodium is present in the soil.

Adjust fertilizer programs

Because recycled water contains nitrogen, phosphorus, and potassium, you can reduce, and in some instances eliminate, fertilizer applications. Many fertilizers contain soluble salts; choose those with a low salt index.

- In many cases, fertilizer application can be reduced by 50%, and in some cases eliminated.
- Keep in mind that many woody plants do not need to be fertilized, and unnecessary applications can adversely affect the health and appearance of the plants and pollute nearby water resources.
- When fertilization is deemed necessary based on soil and plant tissue analyses, use organic or controlled-release fertilizers to reduce the potential for salt buildup.
- Nutrient deficiencies may occur if soil pH is too high. Most plants tolerate a wide range in soil pH. Acid-requiring plants, which tend be poorly adapted to Bay Area soils, may develop micronutrient deficiencies regardless of irrigation water quality. If sodium is causing pH to rise, gypsum applications may help (see above).

Restore soil organic matter

Where leaving leaf litter is not an option, maintaining an organic mulch is the primary source for restoring soil organic matter.

- If you are using a coarse organic mulch that resists decomposition, such as bark chunks, scatter compost over the mulch and it will settle on the surface of the soil.
- Replace mulch before it becomes so thin that the soil surface is visible. Expect to replace every two to three years.

Keep your soil healthy

In the S. F. Bay Area's warm climate, soil organic matter is quickly decomposed. In natural systems, the organic component is replenished by natural leaf and twig litter.

In landscapes, leaf litter is often removed so that over time, soil organic matter is depleted. Soil organic matter is important to maintaining a porous, fertile, and resilient soil that supports a healthy landscape.

5 Step Overview

5 Steps to Designing and Managing Landscapes using Recycled Water

Like any healthy and attractive landscape, those irrigated with recycled water require skilled management that is appropriate to the site conditions and plant requirements. Five steps are designed to help you successfully incorporate recycled water into existing and new landscapes.

1. Investigate

- Determine the quality of recycled water available at the site.
- Identify plants and assess tolerance to recycled water.
- Investigate site and soil conditions.
- Check irrigation systems equipment and performance.
- Consider how the recycled water, soil, and plant species will work together to create an attractive and healthy landscape.

2. Plan

For existing landscapes

- Assess how plants will likely perform.
- Determine what treatments are needed to improve soils and drainage.
- Identify needed irrigation system repairs and improvements.

For new landscapes

- Select plants that are well suited to the site *and* tolerant of the recycled water that will be applied.
- Design the irrigation system using equipment intended for use with recycled water.
- Specify soil treatments to improve conditions for the landscape.
- Design drainage systems or specify treatments to solve drainage problems.

3. Implement

- Repair and prepare existing irrigation system.
- Correct soil and drainage problems.

- Adjust fertilization programs.
- Develop a water budget.
- Establish a soil salinity threshold and leaching program.
- Modify irrigation schedules.
- Replace salt-sensitive plants if needed.

4. Monitor

- Establish a baseline for plant appearance and soil conditions.
- Observe plant appearance and health over time and note changes.
- Test and observe soil conditions.
- Observe irrigation system performance.
- Keep records of condition and changes in the landscape, and treatments applied.

5. Adjust

- Adjust irrigation schedules to respond to weather, rainfall, and actual plant water use.
- Leach to maintain soil salinity below the soil sanity threshold for the landscape.
- Manage sodium concentrations to keep SAR below 6.0.
- Adjust fertilizer programs to account for nutrients supplied by recycled water and results of testing.
- Restore soil organic matter by retaining leaf litter where possible, and maintain 3 to 4 inches of organic mulch over the soil surface.

Become a Recycled Water Landscape Management Expert

Maintaining a healthy landscape with recycled water can be accomplished successfully with knowledge of the unique conditions in the San Francisco Bay Area. Monitoring plant responses to these conditions is the key to achieving a high level of aesthetic, environmental, and economic benefits from your landscape. By incorporating monitoring strategies into your site management program you will know whether adjustments are needed, and when and how to make them a timely manner.

The systematic approach outlined in this *Guide* will help you to look more closely at your landscape and take corrective action such as leaching early in order to meet soil and plant quality goals. A good place to start is by developing your own landscape monitoring program that includes soil and foliage sampling, keeping good records of your findings, regularly evaluating your management practices for effectiveness, and adapting maintenance activities to changing conditions.

Requirements for a Site Supervisor

From: *Rules and Regulations, South Bay Water Recycling*, City of San José

A Site Supervisor must be designated for each site using recycled water. The Site Supervisor represents the property owner, tenant, or property manager as a liaison to the agency providing recycled water. The Site Supervisor has the authority to carry out any requirements of the agency. It is recommended that the site supervisor be an employee who is permanently stationed at the use site. At a minimum, the Site Supervisor must make frequent visits to the use site and be knowledgeable about the operations of all water to the site (potable and nonpotable water).

Site Supervisors must be trained and certified through a formal recycled water educational program such as a training workshop.

The Site Supervisor:

- **is responsible for the appropriate use of recycled water at the site.**

  Some inappropriate uses include: a cross connection with the potable water supply, runoff to a storm drain or natural water body or stream, overspray on the general public, etc.

- **is responsible for the operation, maintenance, and prevention of potential violations on the inappropriate use of the recycled water system.**

  All irrigation systems must be maintained. If a site uses recycled water, the Site Supervisor must be notified of any system failures or breaks to assure proper safeguards are maintained and to assure any system failures are reported to the water retailer annually, as required.

- **must ensure there are no cross-connections made between the potable and recycled water systems.**

  Since recycled water for nonpotable uses is not approved for drinking, all recycled water systems must have oversight to ensure the system is not connected to the potable water supply. Before connecting a site to recycled water for nonpotable irrigation, a cross-connection test is performed by a certified American Water Works Association Cross-Connection Test Specialist.

- **must be present at all cross-connection tests.**

  The Site Supervisor must witness and document when a cross-connection test is performed to ensure the event is recorded and retain these records as part of the maintenance requirements.

- **must inform the water retailer of all changes or modifications/ improvements to the recycled water system.**
  All modifications or changes to the recycled water irrigation systems must be approved by the local water retailer to assure that all protections to the potable water supply are maintained. It is not unusual for the retailer to also obtain approval from a higher authority, should changes be necessary. Maintaining good communication with your local water retailer on the use and operation of the recycled water system is good practice since rules and regulations may change over the lifetime of the recycled water system and it is important to be informed of these changes.

- **must inform the water retailer of all failures, violations and emergencies that occur involving the recycled or potable water systems.**

  An example of an emergency is when there is a recycled water line break and recycled water is running into a natural water body for a long period of time. If the recycled water has a high level of chlorination, this could impact the health of a natural habitat. Calling the local water retailer is a way to get additional support to help manage this failure and incorporate appropriate measures to prevent an occurrence like this from happening in the future.

- **is expected to know the provisions contained in California Code of Regulations Title 17 and Title 22, relating to the safe use of recycled water and the maintenance of accurate records.**

  Recycled water for nonpotable uses is a valuable resource that reduces our demand on our limited potable water supplies. The use of recycled water is regulated under the California Code of Regulations Titles 17 and 22 to ensure the public potable water supply is not contaminated with nonpotable recycled water that is not suitable for drinking. Understanding what these codes require is included as part of the Site Supervisor training and is a requirement for all Site Supervisors managing recycled water. Some retailers may choose to be their own Site Supervisor and not delegate this authority to the customer, in this case oversight is covered by the local water retailer.

- **is expected to know the basic concepts of backflow and cross-connection prevention, system testing, and related emergency procedures.**

  These concepts are explained during the Site Supervisor training. Understanding how these systems operate will help ensure the system is operating properly.

- **is responsible for training personnel at the use site on the proper uses of recycled water.**

  Anyone working on the maintenance of a recycled water irrigation system is expected to be trained or under the supervision of a trained Site Supervisor.

- **must conduct an annual self-inspection of the use site and provide a written report to the water retailer.**

  Some water retailers are required by a higher authority to have an annual inspection program for all sites receiving recycled water for nonpotable uses. Some retailers may choose to be their own Site Supervisor and not delegate this authority to the customer, in this case oversight is covered by the local water retailer. Please contact your local water retailer to find out what requirements are in place for your existing or prospective recycled water system.

- **must conduct annual testing and submit records to the water retailer for all backflow prevention devices on the site.**

  Backflow prevention devices, like a Reduced Pressure Principle Backflow Preventer or RP or RPP, must have an annual test performed by a licensed Backflow Prevention expert or service.

Plant Salt Tolerance List

The Plant Salt Tolerance for San Francisco Bay Area Landscapes list contains over 500 trees, shrubs, vines, perennials and grasses. The list includes ratings for salt tolerance, water use, plant type, and whether the plant is native to California and/or invasive. Salt tolerance ratings are approximations of salt tolerance category. The category rating is based on scientific research when available, but most often is based on experience and anecdotal information. Considerable variation in ratings among plant lists is common because of differences in climate, soil conditions, salt type, whether ratings were based on soil or water salinity, length of the study, and other variables in reports. These variables were considered when assigning a salt tolerance rating for this list.

The list is available at https://watereuse.org/sections/watereuse-california as a spreadsheet that can be downloaded and then searched and sorted. On the "Instructions" tab is a description of how the list was developed, the parameters for use, and limitations to salt tolerance ratings.

Example of plants having low, moderate and high salt tolerance

In this example, the site soil is assumed to be favorable, with low potential for salt or specific ion accumulation when managed properly. For sites with restrictive soils, refer to step 2 on page 35 for adjustments to salt tolerance category. This list does not consider boron tolerance (boron concentration in water is assumed to be less than 0.5 ppm).

Plant type	Low	Moderate	High
trees	coast redwood (*Sequoia sempervirens*)	London plane (*Platanus × hispanica*)	goldenrain tree (*Koelreutaria paniculata*)
	Japanese maple (*Acer japonica*)	sawleaf zelkova (*Zelkova serrata*)	Nichol's willow-leafed peppermint (*Eucalyptus nicholii*)
	michelia (*Michelia doltsopa*)	Brisbane box (*Lophostemon confertus*)	Canary Island pine (*Pinus canariensis*)
shrubs	heavenly bamboo (*Nandina domestica*)	Japanese barberry (*Berberis thunbergii*)	blue mist (*Caryopteris · clandonensis*)
	Japanese aucuba (*Aucuba japonica*)	abelia (*Abelia grandiflora*)	*Ceanothus* spp.
	princess flower (*Tibouchina urvilleana*)	gardenia (*Gardenia augusta*)	toyon (*Heteromeles arbutifolia*)
groundcovers	creeping mahonia (*Mahonia repens*)	*Cotoneaster microphyllus*	*Acacia redolens*
	Pachysandra terminalis	dwarf periwinkle (*Vinca minor*)	*Juniperus horizontalis*
	baby tears (*Soleirolia solerolii*)	creeping St. Johnswort (*Hypericum calycinum*)	prostrate rosemary (*Rosmarinus officinalis* 'Prostratus'
herbaceous perennials	bear's breach (*Acanthus mollis*)	Shasta daisy (*Chrysanthemum maximum*)	sage (*Salvia* spp.)
	lily of the Nile (*Agapanthus orientalis*)	coral bells (*Heuchera* hybrid)	*Coreopsis grandiflora*
	western sword fern (*Polystichum munitum*)	big blue lily turf (*Liriope muscari*)	New Zealand flax (*Phormium tenax*)
grasses	colonial bentgrass (*Agrostis capillaris*)	Kentucky bluegrass (*Poa pratensis*)	red fescue (*Festuca rubra*)
	annual bluegrass (*Poa annua*)	perennial ryegrass (*Lolium perenne*)	buffalograss (*Buchole dactyloides*)
	hard fescue (*Festuca trachyphylla*)	creeping bentgrass (*Agostis stolonifera*)	blue grama (*Bouteloua gracilis*)

How to Develop a Salt Tolerant Plant Palette

To develop a plant palette for sites that will be irrigated with recycled water, follow these steps:

1. Identify the recycled water quality category (1, 2, 3, 4)

Water quality	Description	Laboratory analyses*
Category 1	Good water quality with no restrictions on site use.	ECw <1.0 dS/m, TDS <640 mg/l, B <0.5 mg/l, Cl <100 mg/l, and/or Na <70 mg/l.
Category 2	Moderately good water quality that is appropriate for all landscapes except those with salt- and/or boron-sensitive plants and poorly drained soils that cannot be leached.	ECw 1.0–1.3 dS/m, TDS 640–830 mg/l, B 0.5–1.0 mg/l, Cl 100–200 mg/l, and/or Na 70–150 mg/l.
Category 3	Fair water quality that can be used where plants have at least moderate salt and/or boron tolerance and soils are at least moderately drained. Landscapes on poorly drained sites must be comprised of plants with good salt and/or boron tolerance.	ECw 1.3–2.5 dS/m, TDS 830–1,600 mg/l, B 1.0–2.0 mg/l, Cl 200–350 mg/l, and/or Na 150–200 mg/l.
Category 4	Low water quality that is appropriate only for sites with salt- and/or boron-tolerant plants and moderate to good drainage.	ECw >2.5 dS/m, TDS >1,600 mg/l, B >2.0 mg/l, Cl >350 mg/l, and/or Na >200 mg/l.

2. Classify the soil conditions as favorable or restrictive.

Category	Description	Examples/laboratory analyses
Favorable	Low potential for salt or specific ion accumulation	Sandy to loam texture, well-aggregated clay loam, non-compacted granular structure, percolation rate at least 0.5 inch/hour, EC_e <1.5 dS/m, B <1.0 mg/l, Cl <100 mg/l, Na <230 mg/l, pH <8.0, SAR <6.0, and/or water table below 5 feet of soil surface.
Restrictive	Moderate to high potential for salt or specific ion accumulation.	Silty or clayey texture with compacted, massive, or platy structure; percolation rate less than 0.5 in/hr, EC_e >1.5 dS/m, B >1.0 mg/l.

3. Select trees, shrubs, ground covers, herbaceous plants, and grasses of the appropriate salt tolerance.

Water quality category[1]	Plant salt tolerance[2]	
	Favorable soil[3]	Restrictive soil[4]
1	low	low
2	moderate	moderate
3	moderate	high
4	high	high

[1]See Interpretive Guidelines for Recycled Water Quality, page 14.
[2]See page 31 for examples. Full plant list is available at https://watereuse.org/sections/watereuse-california.
[3]Favorable: low potential for salt or specific ion accumulation.
[4]Restrictive: moderate to high potential for salt or specific ion accumulation.

Helpful Resource Links

These resources provide technical details in inspecting landscapes and implementing solutions.

Online Educational Resources
WUCOLS - Water Use Classification of Landscape Species
MWELO - Model Water Efficient Landscape Ordinance
CIMIS - California Irrigation Management Information System
Estimating Soil Moisture by Feel and Appearance
California Center for Urban Horticulture
Stopwaste
Selectree
Bay-Friendly Landscape Guidelines
Web Soil Survey
UC Master Gardener Program
US Composting Council
The California Garden Web
UC Davis Arboretum Plant Database
Salinity Management Guide
Salinity Leaching
California Invasive Plant Council (Cal-ipc)

Below is a partial list of agencies providing, regulating and providing information on recycled water.

Water Agencies and Groups
South Bay Water Recycling
Palo Alto Regional Water Quality Control Plant
Sunnyvale Water Pollution Control Plant
South County Regional Wastewater Authority
Dublin San Ramon Services District/EBMUD (DERWA)
East Bay Municipal Utility District
City of Pleasanton, DERWA
Livermore Water Reclamation Plant
City of Hayward
Central Contra Costa Sanitary District
Delta Diablo Sanitation District
Ironhorse Sanitary District
North Coast County Water District
North San Mateo County Sanitation District
Napa Sanitation District
Town of Yountville/Veterans Home of California Joint Wastewater Treatment Plan
San Francisco Public Utilities Commission
Marin Water
North Marin Water District
City of Petaluma
North Bay Water Recycling Authority
Santa Rosa Subregional Water Reuse
Town of Windsor
Suisun Sewer District
Silicon Valley Clean Water
State Water Resources Control Board (State Water Board)
Bay Area Clean Water Agencies (BACWA)
Bay Area Water Supply & Conservation Agency (BAWSCA)
WateReuse California

Below is a partial list laws and regulations related to recycled water.

Laws and Regulations
Water Recycling in Landscaping Act
Health and Safety Code, Water Code
Title 17, Division 1, Chapter 5
Title 22, Division 4, Chapter 3
General Permit for Landscape Irrigation Uses of Municipal Recycled Water
Recycled water policy

Below is a partial list of organizations involved in horticulture related to recycled water.

Related Organizations
International Society of Arboriculture, Western Chapter
Bay Area Landscape Supervisors' Forum
Bay Area Urban Forest Ecosystem Council
Canopy
California Urban Forests Council
San Francisco Urban Forest Council
Our City Forest
California Landscape Contractors Association (CLCA) San Francisco Bay Area Chapter
California Testing Labs
ReScape California

Acknowledgements

The authors are indebted to the many individuals who contributed their time and expertise to earlier portions of this work. In particular, we appreciate the participation and countless hours of work, support and creative energy Eric Hansen, P.E., put into the project. He conceived the project, represented the funding agencies and solicited reviews from water scientists and engineers, and participated in writing and review.

Dr. Bahman Sheikh, Rhodora Biagtan and Stephanie Olson provided valuable input through several drafts. Special thanks to Jennifer West, Managing Director, WateReuse California, who helped bring this *Guide* to completion and - at last - publication.

A team of professionals representing a range of disciplines and end users formed our Review Committee. Some participants reviewed parts of the larger manuscript, while others reviewed it in its entirety. We thank each of the following professionals who provided reviews of the earlier work (in alphabetical order, with affiliation at the time of their review).

Dorothy Abeyta	California Urban Forest Council	Clifford Low	Perry Laboratory
Dr. Corey Barnes	Quarry Hill Botanic Garden	Dave Martin	Napa Sanitation District
Rhodora Biagtan	Dublin San Ramon Sanitation District	Catherine Martineau	Canopy
Rita Di Candia	City of Pleasanton	John Mendoza	City of Santa Clara
Jonathan Chavez	South Bay Water Recycling	Richard Mills	DWR, Water Recycling
Dr. James Clark	HortScience, Inc.	Mark Millan	Data Instincts
Carol Colein	Am. Soc. of Irrigation Consultants	Michael Mitchell	South Bay Water Recycling
Deborah Ellis	Consulting Horticulturist	Dr. Loren Oki	University of California, Davis
Rose Epperson	Western Ch. Int'l Soc. of Arboriculture	Monica Oakley	Napa Sanitation District
Elizabeth Flegel	City of Mountain View	Stephanie Olson	Dublin San Ramon Services District
Ben Glickstein	East Bay Municipal Utility District	Courtney Rubin	City of Redwood City
Tom Gorman	Kennedy/Jenks Consultants	John Serviss	Valley Crest Nursery
Dr. Steve Grattan	University of California, Davis	Dr. Bahman Sheikh	Water Reuse Consultant
Dr. Ali Harivandi	Univ. of CA Coop. Extension	Robert Siegfried	Carmel Valley Wastewater District
Pedro Hernandez	South Bay Water Recycling	Brandon Steene	Valley Crest Landscape
Stephanie Hughes	Water Quality Consultant	Sue Stephenson	Dublin San Ramon Services District
David Kelley	Kelley Environmental Sciences	Dr. Donald Suarez	USDA Salinity Lab, Riverside
Gary Laymon	The Guzzardo Partnership, Inc.	Dawn Taffler	WateReuse, N. California Chapter
Dave Langendorff	ISC Group, Inc.	Jim Williams	NUVIS
Dr. Igor Lacan	Univ. of CA Coop. Extension	George Young	San Jose Municipal Golf Course
Joe Liszewski	California ReLeaf		

We are also indebted to the staff at HortScience, Inc. and HortScience | Bartlett Consulting who participated in the many tasks required to produce this document including research, illustrations, manuscript review, coordination and communication with the Review Committee: Maryellen Bell, Darya Barar, Deanne Ecklund, John Leffingwell, Pam Nagle, Ruth Pineo, Michael Santos, and Jane Whitcomb.

Finally, a big thanks to our design, illustration and editing team: Celeste Rusconi, Rusconi Design; William Suckow; and Stephen Barnett. They brought our words to life with beautiful graphics, color and design.

Authors

Nelda Matheny, Horticultural Consultant, HortScience | Bartlett Consulting, Pleasanton, California
Principal corresponding author: Nelda@HortScience.com
Dr. L. R. Costello, Horticultural Consultant, Oaracle Oak LLC, San Francisco, California
Carol Randisi, Carol Randisi Arborist, Livermore, California
Ryan M. Gilpin, Principal Consultant, Nidus Consulting, Portland, Oregon

Tribute to Dr. Bahman Sheikh

With much gratitude for his devoted editorial review, the authors dedicate this Bay Area Recycled Water Landscape Guide to Dr. Bahman Sheikh who passed away on July 28, 2020 at his home in San Francisco, California. Bahman was a true water reuse pioneer and teacher of the safety and importance of locally sustainable water supplies, who for half a century helped countless communities recycle their water, across the United States and around the world.

Born in Mashad, Iran, Bahman came to California in 1962 and received his MS and Ph.D. at UC Davis in Irrigation and Soil Physics. His major effort was the demonstration project that became known as the Monterey Wastewater Reclamation Study for Agriculture. From its inception in 1976 through the publication of its final report in 1987, Bahman and his team evaluated the agricultural use of recycled water, tracking the fate and transport of pathogens and firmly establishing recycled water's safety for irrigation of California's "salad bowl."

Bahman also worked closely with local farmers and health authorities to communicate the significance of the study and garner acceptance for the concept of water reuse, and today recycled water is used to irrigate 12,000 acres in northern Monterey County.

Bahman evaluated opportunities for urban reuse in San Jose, Santa Rosa and Los Angeles. That work led to his appointment in 1989 as the first Executive Director of the Los Angeles Office of Water Reclamation, where he set water recycling goals, established funding mechanisms, ran pilot projects, and developed policy and legislative recommendations.

June 30, 2021

Walter Mobley
State Water Resources Control Board (State Water Board)
1001 I Street
Sacramento, California 95814
VIA EMAIL: Walter.Mobley@waterboards.ca.gov

Subject: February 2021 Informal Staff Draft of Statewide Sanitary Sewer System General Waste Discharge Requirements: Overview Comments and Redlines

Dear Ms. Mobley:

The Bay Area Clean Water Agencies ("BACWA"), the California Association of Sanitation Agencies ("CASA"), the Central Valley Clean Water Association ("CVCWA"), and the Southern California Alliance of Publicly Owned Treatment Works ("SCAP") appreciate the opportunity to provide feedback on the Informal Staff Draft of the Statewide Waste Discharge Requirements General Order for Sanitary Sewer System ("Informal Staff Draft"), which is proposed to replace the current order adopted in 2006 ("2006 Order"; WQO No. 2006-0003) as well as the accompanying Monitoring & Reporting Program adopted in 2013 ("2013 MRP"; Order No. WQ 2013-0058-EXEC). Collectively we represent the majority of sanitary sewer collection systems across the state, and descriptions of our organizations are available in Attachment 1. Additionally, a presentation we made to State Water Board staff in March about our concerns with the Informal Staff Draft is available in Attachment 2, and many of the concerns articulated therein are also contained in these comments.

Throughout 2021, we have been working collaboratively with representatives from across our sector to develop the enclosed redline markup of the Informal Staff Draft. We want to thank you, your team, and all the representatives from the Office of Enforcement and the Regional Water Quality Control Boards who met with us over the course of this year to share and discuss our concerns about the provisions in the Informal Staff Draft. Your willingness to engage our coalition is greatly appreciated. We are grateful for the opportunity to dialogue in search of appropriate, mutually agreeable revisions that achieve the Water Board's and enrolled agencies' shared underlying goals of water quality improvement and protection while not being prohibitively expensive, impractical, or creating unnecessary liability for local public agencies.

Recognizing the size and complexity of the markup, we also have prepared the following summary comments on key issues. We believe that the following "top ten" issues are the most important to address when revising the Informal Staff Draft. They are listed below generally in the order they appear in the Informal Staff Draft and are not in order of priority.

At a higher level, we have three overarching concerns with the Informal Staff Draft: (1) the expanded responsibilities placed on enrollees for certain activities not directly related to water quality improvements, (2) the extensive number of new prescriptive requirements contained in the Informal Staff Draft that deprive enrollees of flexibility in implementation, and (3) the use of a generalized approach that assumes all agencies have significant compliance problems rather than a targeted approach to assist certain systems that experience a high frequency of spills.

(1) The Substantive Expanded Burdens in the Informal Staff Draft are Not Tied to Water Quality Improvements and Fail to Recognize Improvements Made Since the 2006 Order Went Into Effect

The 2006 Order rightfully requires enrollees to take a *proactive* approach to continue reducing the number and frequency of Sanitary Sewer Overflows (SSOs) within the state.[1] As evidenced by the information in the California Integrated Water Quality System (CIWQS) SSO database, enrollees' efforts continue to be successful, having **driven Category 1 spills down nearly two-thirds since 2008**. Through their discretionary adoption of proactive approaches, the predominant number of enrollees have ensured the reduction of the frequency of SSOs. Enrollees' commitments, investments, and planning also have steadily decreased the volume of spill incidents across the state. This is, in large part, attributable to agencies' commitments to fulfill their obligations under the 2006 Order to develop and implement prioritized rehabilitation of identified system deficiencies.[2]

Despite this meaningful progress, the 2021 Informal Staff Draft imposes many new, unnecessary and prohibitively expensive obligations on all enrollees. The Informal Staff Draft does not attempt to distinguish between the limited number of unengaged or struggling systems/enrollees from whom more is justifiably expected after many years of the 2006 Order being in place, and the overwhelming majority of enrollees who are proactively working to reduce SSOs and comply with their obligations under the 2006 Order. Specifically, the new Informal Staff Draft establishes expanded expectations for all enrollees in Section 1, casting new obligations in terms of resiliency and further prevention of spills[3], then in Section 3 describes the re-defined scope of proactive management compared to the 2006 iteration (§ 3.2.3, § 3.2.5, and § 3.2.7), and finally delineates in Section 5 and Attachment D hundreds of new detailed and extensive requirements for an enrollee's Sewer System Management Plan (SSMP) to address and implement, with the onus on the enrollee to explain why each specific requirement is not applicable to the enrollee.[4]

Our members *are* committed to the current requirements of proactive and prioritized sewer system management, as exhibited by the substantial reduction of Category 1 incidents over the last fourteen years and general improvements in compliance with various aspects of the 2006 Order. Unfortunately, the new requirements in the Informal Staff Draft are overly burdensome and simply not the appropriate regulatory means to reduce SSO incidents further. Rather, a more narrowly tailored approach would be more fitting so that enrollees who are not fulfilling the requirements under the 2006 Order improve their systems, while the rest of enrollees could maintain their effective plans in place to manage sewer systems and prioritize rehabilitation. Though there can and should be relatively minor modifications of the requirements for specific, discrete features the State Water Board feels are needed to improve specific performance-related causes of SSOs, the new burdens contained in the Informal Staff Draft are not honed in such a manner.

(2) The Sheer Volume of New Requirements in the Informal Staff Draft are Expansive, and Will be an Extensive Financial Burden on Smaller Systems in Particular

In addition to a dramatic substantive expansion of enrollees' obligations under the Informal Staff Draft, the sheer volume of increase in the overall number of requirements that would be imposed is problematic, and not necessary or supportable given the overwhelming improvements by enrollees under the 2006 Order. To illustrate this point, the 2006 Order uses the word "must" 38 times. However, in the Informal Staff Draft, there now are 125 instances of the word "must," tripling the programmatic requirements with which all enrollees must comply. Given the dramatic two-thirds decrease in Category

[1] **2006 Order, ¶ 3**. Sanitary sewer systems experience periodic failures resulting in discharges that may affect waters of the state. There are many factors (including factors related to geology, design, construction methods and materials, age of the system, population growth, and system operation and maintenance), which affect the likelihood of an SSO. **A proactive approach that requires Enrollees to ensure a system-wide operation, maintenance, and management plan is in place will reduce the number and frequency of SSOs within the state.** This approach will in turn decrease the risk to human health and the environment caused by SSOs. (PDF p. 1 of 20; p. 1).

[2] **2006 Order, ¶ 13(iv)(c))**. Develop a rehabilitation and replacement plan to identify and prioritize system deficiencies and implement short-term and long-term rehabilitation actions to address each deficiency. (PDF p. 11 of 20; p. 11).

[3] **2021 Informal Staff Draft, § 1 Introduction** – "Proactively operate and maintain sewer systems to ensure system resiliency and prevention of spills." (PDF p. 5 of 85; p. 5).

[4] **2021 Informal Staff Draft, Attachment D – Introduction**. The Enrollee shall identify any required elements required in this Attachment that are not applicable to the Enrollee's system and shall provide justification in its Plan explaining why the element is not applicable. (PDF p. 41 of 85; p. D-3).

1 incidents since the 2006 Order, we do not feel such a requirement-heavy approach is appropriate to address the actual lingering challenges for enrollees with recurring high-volume spills under this mature regulatory program.

Similarly, the SSMP requirements in the 2006 Order are covered in five pages and eleven elements of plain language, and this framework of trust for enrollee's discretion has been very successful over the last decade. In contrast, in the Informal Staff Draft, the SSMP requirements now are spread out over 18 substantive pages and 16 elements of hundreds of detailed and complex provisions, which read more as though they are corrective actions that might be required of an enrollee that has not been proactive nor reduced its spill frequency under the 2006 Order. Imposing extensive and expanded elements upon all enrollees in an effort to address the under-performance of a small, non-representative set of enrollees who are not abiding by the existing requirements is inappropriate and an inefficient use of local agency resources.

Further, the brunt of the economic costs and obligations to become compliant with the Informal Staff Draft would be placed upon enrollees who are smaller in size and limited by available resources. As the State Water Board is aware, there are very distinct resource-levels across enrollees that correlate to the size of their system, the investments they feasibly can make to improve it, and the number of spill incidents.

From an analysis of the CIWQS databases, currently there are 1,182 enrollees under the 2006 Order. When cross referencing the Questionnaires and calculating their collection system miles, enrollees divide out into four broad categories of which nearly **80% are small or very small systems**: 40 Large, 226 Medium, 330 Small, 586 Very Small[5]. Instead of imposing such sweeping and steep new obligations upon all enrollees, it would be more effective and efficient to develop a more narrowly tailored approach that is focused on (a) ensuring resource-limited enrollees with a high frequency of Category 1 incidents meet their prioritization schedules, and (b) enforcing the current provisions about prioritization for those enrollees with resources yet a history of preventable Category 1 SSOs because they did not appropriately administer their SSMP. Such an approach is easily attainable at a fraction of the proposed new costs for compliance, and it is a more efficient use of public resources to concentrate on reducing preventable spills.

(3) The Informal Staff Draft Uses an Overly Broad Rather than a Nuanced Approach to Addressing Agencies That Continue to Have a High Number of Spills

As the State Water Board is aware, a principal driver of large volume SSO incidents is their inextricable linkage to storm events exceeding sewer system designs. When examining the CIWQS data, SSOs fluctuate annually according to wet weather, and there are significant volume spikes in SSOs to Waters of the US in wet years. Enrollees have acknowledged this and updated their SSMPs accordingly to minimize SSO incidents, particularly those tied to storm events. They also have sought training and professional development to respond when SSOs occur to minimize and mitigate any adverse impacts from an incident. By examining available data and information on spills, it is evident in the CIWQS database that SSOs during particularly wet years are decreasing over time, with significant drops from 2010 to 2017 and to 2019: 779 Cat. 1 spills in 2010 totaling 91 million gallons, 766 Cat. 1 spills in 2017 totaling 35 million gallons, and 644 Cat. 1 spills in 2019 totaling 13 million gallons. Thus, even in circumstances that are somewhat beyond a local agency's control (i.e. severity of wet weather events), there have been substantial improvements in both numbers and volumes under the existing Order.

Accordingly, we urge the State Water Board and Office of Enforcement to review the CIWQS database, identify systems with frequent Category 1 or high-volume Category 2 spills, and assist those systems to identify new approaches and utilize available resources to make improvements, rather than prescriptively requiring onerous and burdensome changes from all 1,182 enrollees to try and reduce a small subset of enrollees' high-volume spills. This would yield the direct results that the State Water Board has expressed it is seeking to achieve, and simultaneously would ensure the cost of compliance under the re-issued Order is only nominally more expensive for all. This alternative to a wholesale and substantial increase

[5] Large: 500+ miles, Medium: 101 – 500 miles, Small: 21 – 100 miles, Very Small: 1 – 20 miles

of the obligations on all enrollees offers a more nuanced approach that appropriately distinguishes requirements for systems with repeated high-volume spills, and it would provide a more acute means to further reduce SSO incidents without disrupting the current efforts, investments, and firm plans enrollees have in place.

With these high-level comments in mind, below are our top 10 concerns with specific provisions in the Informal Staff Draft:

1. Exfiltration should not be grouped together with other types of spills for reporting (Table 1)

Table 1 on the first page of the Informal Staff Draft provides key definitions from Attachment A, which has created a new term, "spills," that combines two types of events: (1) the traditional type of spills termed "Sanitary Sewer Overflows" (SSOs) in the 2006 WDR and (2) exfiltration. We object to the Informal Staff Draft's presumption that a similar reporting framework would be appropriate for both exfiltration and traditional SSOs. Exfiltration from sanitary sewers to storm drain systems or groundwater is unlikely for numerous reasons. Attachment 3 illustrates some of the reasons why this is uncommon and not likely to occur for enrollees. The Informal Staff Draft should not presume that exfiltration is occurring, or that exfiltration is somehow akin to an SSO. If exfiltration is suspected, the next logical step for a collection system agency would be to conduct an investigation to confirm it using dye tests or other detection techniques, and, if exfiltration is confirmed, develop a strategy to repair pipe defects and eliminate the leakage. On a more practical level, spill reporting metrics like duration and location would be quite different between exfiltration and SSOs. We would be pleased to participate in an exfiltration task force with the State Water Board to develop resources for enrollees to determine leakage and repair defects. Until such sorts of guidance exist, it is neither practical nor appropriate at this time to combine exfiltration with SSOs.

Recommendation: Remove exfiltration from the definition of other types of spills. Instead, address exfiltration by requiring investigation and response to suspected exfiltration as an element of the SSMP condition assessment requirements and/or annual reporting.

---

2. The prohibition on "Any spill of sewage from a sanitary sewer system" should be removed (Section 4.1)

The Informal Staff Draft contains a new prohibition on "any spill of sewage from a sanitary sewer system," even if it is not a nuisance or does not reach waters of the State. Whether the State Water Board possesses the authority to regulate such circumstances is unresolved, and the grounds for enforcement on spills of this type have not been established, nor a rationale or necessity for this new all-encompassing provision. This prohibition is not found in the 2006 WDR and does not belong in the proposed Informal Staff Draft. We anticipate that the inclusion of this prohibition, especially given the proposed definition of "spills," would significantly and unreasonably increase the risk and liability for an enrollee from third-party or State Water Board enforcement, without the concurrent ability to feasibly address proactively such risk and avoid incurring such liability.

Recommendation: Remove Prohibition 4.1.

---

3. The requirement for Legally Responsible Officials to hold a PE License or CWEA Certification (Section 5.5) is not necessary.

We support CWEA certification as a tool for our members and encourage the State Water Board to confirm and encourage the certification process without making it a requirement to be the Legally Responsible Official within the Informal Staff Draft. Many talented collection system professionals are certified Professional Engineers and/or CWEA-certified Collection System Operators. However, these technical certifications should not be required to qualify as a Legally Responsible Official. Legally Responsible Officials typically hold management and decision-making authority, rather than a technical

reporting role. In fact, we are aware of small agencies with no employees – including the General Manager – holding the requested technical certifications. This would mean some small agencies may not be able to certify their own SSMP and spill reports, requiring unnecessary outsourcing of what should be, fundamentally, an internal task.

Recommendation: Remove the requirement for Legally Responsible Officials to be Professional Engineers or CWEA-certified Collection System Operators. Encourage certification through other means such as State Water Board annual agency recognition a few years after the Effective Date of the reissued Order.

---

4. Reporting of spills from privately owned sewer laterals should be voluntary, not mandatory (Section 5.15).

We understand that the State Water Board has made two major modifications to the 2006 order to increase reporting of spills from private systems: (1) private systems can be compelled to enroll in the Informal Staff Draft, and (2) public enrollees are required to report within 2 hours of becoming aware of spills from private systems, under Section 5.15. We support the first of these reforms, but not the latter. It is not appropriate to place a duty to report private spills on a public agency, and we think the differing provision in Table E2-4 making reporting voluntary should be reflected in Section 5.15.

Recommendation: Remove the requirement to report spills from privately owner sewer laterals. Encourage public enrollees to report private spills in their annual report, rather than within 2 hours of becoming aware of such spills.

---

5. All agencies should be allowed to report Category 4 SSOs in the Annual Report rather than CIWQS. (Section 5.20 and E1 Section 3.5)

The State Water Board's approach to allow some well-performing agencies to report spills less than 50 gallons (Category 4 SSOs) in annual reports, rather than via CIWQS, is an affirmation of the reduced risk of these events to public health and the environment. We believe that if Category 4 events are less of a threat, then no agencies should be required to prepare individual spill reports for submittal to CIWQS. Instead, enrollees should report these occurrences in the Annual Report, documenting the start date, confirming it did not reach a stormwater drainpipe, confirming it did not reach surface water, the location of the event (Address, City, Zip Code), the public enrollee notification date, the spill cause if known, and the spill location description. Such a change to the Informal Staff Draft would also reduce significantly the cost to comply with the overall changes in the reissued Order.

Recommendation: Spills with a discharge volume of less than 50 gallons should be reported within Annual Reports for all agencies, rather than with individual spill reports.

---

6. SSMPs should be updated every 6 years, with audits after 2 and 4 years (Section 5.2 and 5.11)

The combination of a 2-year audit cycle and a 5-year SSMP cycle creates unnecessary logistical challenges, as audits are not performed at regular intervals between SSMP updates. We request that two audits be performed within a 6-year SSMP cycle: the first audit after two years and the second audit after four years. An audit-type analysis would also occur during the SSMP update in the sixth year, with findings going directly into the SSMP and the SSMP change log. We also request that the 6-year cycle restart any time there is a significant SSMP update, so that update schedules are no longer tied to the 2006 WDR or the original SSMP adoption date.

Recommendation: Allow synchronization of the audit and SSMP schedules.

---

7. The time window for reporting spills into CIWQS needs to be longer than 2 hours (Attachment E, Section 1.1)

Some of the items required for the CIWQS spill notification portal, such as property owner information, may not be known within 2 hours. It is an inappropriate use of public resources to enter non-critical information into CIWQS within 2 hours if such information can be included within the certified spill reports. We recommend a period of 24 or 48 hours as a more reasonable amount of time to gather and submit the necessary information, if a spill notification via the CIWQS portal is deemed critical by the State Water Board.

Recommendation: Allow agencies time to focus on spill response first – including coordination with OES – and not on gathering and entering data within a 2-hour window. Reporting to CIWQS is appropriate when the spill response phase has concluded.

---

8. Financial reporting requirements for SSMPs should be simplified (Attachment D, Section 2.5 and Section 11)

The SSMP requirements have been expanded from the 2006 Order to include numerous requirements related to budgeting and financing of sewer programs. Some of the requested information (e.g., agency's approved budget needs to address all system deficiencies, a 20-year budget forecast) is exceptionally broad and entirely unnecessary to demonstrate a financial commitment to properly maintaining an enrollee's collection system. The focus of the Informal Staff Draft should be on eliminating spills, not on financial accounting procedures and reports (e.g., CAFRs). We suggest requesting this detailed financial information from specific agencies if needed for a specific enforcement action, rather than requiring it be included in all SSMPs.

Recommendation: Remove detailed financial reporting requirements from the SSMP requirements.

---

9. SSMP Resiliency requirements should be streamlined (Attachment D, Section 7)

Attachment D contains a multiplicity of requirements related to system resiliency. However, as currently written, the requirements are duplicative with other requirements in the SSMP Elements. For example, Section 7.5.2 requires a capital improvement program to address system resiliency, while Section 9 of the SSMP contains separate requirements related to implementing the capital program. Most wastewater collection systems' capital projects promote resiliency in some form, so requirements related to condition assessment, capital planning, or operations and maintenance should be grouped together in the same Element of the SSMP. Also to note, based on our review, requirements related to Risk Assessment (Attachment D, Section 7.3) and Remediation Prioritization (Attachment D, Section 7.4) are completely new, and would not be as easily combined with the 11 Elements in the 2006 WDR.

Beyond the technical nature of this comment regarding the organization of duplicative provisions, we hold a broader concern that the requirements to prepare an SSMP that would be compliant with the resiliency provisions will be very expensive under the Informal Staff Draft. We previously estimated the cost of complying with resiliency planning requirements might be in the range of $50 - $100 million for all current enrollees, of which 80% are small or very small systems. Those cost estimates are displayed in the spreadsheet in Attachment 4, which was excerpted from an earlier version of the SSMP requirements that would further increase the costs of compliance estimated in the spreadsheet. (See Attachment 5 from 12/2020 with the provisions on which Attachment 4 computations are based.)[6]

[6] Some of the further requirements in the Informal Staff Draft that were not in Attachment 5, include: **[cont'd on next page]**

Beyond the costs of preparing the resiliency plan under the Informal Staff Draft is the separate requirement that the capital projects identified within the plan be delivered.[7] The above estimates do not include the subsequent extensive costs to fully implement an SSMP under the Informal Staff Draft requirements, as required by § 5.4.[8] The Informal Staff Draft is written in such a way that if resiliency actions are not performed immediately after an enrollee updates their SSMP under this Order, an enrollee will be out of compliance with the Order. Given enrollees' successful efforts over the last 15 years, this compulsory approach is improper and unnecessary.[9] This is one example of the need for a reasonable pathway for compliance with the new requirements in the Draft.

Recommendation: Integrate resiliency requirements into the existing SSMP elements rather than including duplicative, resiliency-specific requirements for condition assessment, capital planning, operations, and maintenance. Allow additional time for both small agencies and disadvantaged communities to incorporate resiliency-related elements into the SSMP.

---

10. The SSMP requirements should be re-organized to match, as closely as possible, the required elements from the 2006 WDR (Attachment D)

We look forward to working with the State Water Board on an effort to re-organize Attachment D to utilize the existing 11 elements in the 2006 WDR, as State Water Board staff have verbally expressed an intent to do. This will save unnecessary effort from enrollees and significantly reduce the cost to comply on the part of more than nearly 1,200 enrollees as they update their SSMPs to meet the new requirements. Attachment 6 is our preliminary suggested placement of the Informal Staff Draft requirements into the existing eleven 2006 SSMP Elements.

Recommendation: Work with CASA and other stakeholders in Summer 2021 to develop an outline for Attachment D that includes the mandatory elements of the 2006 WDR and clearly identifies new elements.

[Footnote 6 Cont'd]

- Detailed descriptions of information and data systems used for system resiliency planning of existing and future assets, system operations and maintenance, and remediation and capital improvement projects;
- Design criteria and standards that must be developed and updated to address underground and above-ground pipe in areas of potential flooding;
- Measuring risk for potential spills due to increased infiltration and inflow, bank erosion (in canyons and along coastal bluffs);
- Measuring inundation risk of low-lying pump stations;
- Measuring the severity of the consequences of the spills;
- Risk Assessment that must include a ranking system that categorizes all system components/segment areas, for subsequent prioritization of corrective actions. Risk measures and categorization must be based on the severity of the consequences of system spills. High-risk system components/areas must be further categorized as:
    - System or program areas to be addressed through short-term modifications to system operations and maintenance
    - System or program areas to be addressed through long-term operations and engineering mitigation.

[7] **2021 Informal Staff Draft, Attachment D, § 7.4: Remediation Prioritization:** The Sewer System Management Plan must provide procedures for the prioritization of short-term operation and maintenance modifications, and long-term operations and engineering improvement projects that are the subject of the Enrollee's System Resilience Actions per section 7.5 below. Remediation prioritization must be based on the immediacy of remediation of higher risk system areas identified in the Enrollee's Risk Assessment. (PDF p. 50 of 85; p. D-12).

[8] **2021 Informal Staff Draft, § 5.4**: The Enrollee's governing board shall approve the Sewer System Management Plan in its entirety (including change logs and other attachments and references made therein) and provide necessary staffing, contractor, and budget resources for full implementation of the approved Plan and full compliance with this General Order. The Enrollee's governing board shall allocate necessary resources for the planning, operation, maintenance, and repair of its sanitary sewer system. (PDF p. 16 of 85; p. 16).

[9] **2021 Informal Staff Draft, Attachment D, § 7.5.2: System Resiliency Actions** – Capital Improvement Component: The Sewer System Management Plan must include System Resiliency Actions that address capital improvement projects necessary to address high-risk system deficiencies identified in the most updated condition assessment and capacity assessment, as follows…

§ 7.5.3: Implementation and Update of System Resiliency Actions: The Enrollee shall implement its System Resiliency Actions immediately after System Resiliency Actions are identified. (PDF p. 51 of 85; p. D-13).

Conclusion

The 2006 Order has established a straightforward, practical, and successful approach to regulation of collection systems in the state and is one of the State Water Board's flagship Orders because of the accomplishments it has produced. The progress made and achievements attained since the 2006 Order was adopted can be attributed to our members' proactive planning, improved operations and maintenance, and capital improvement project prioritization. The Informal Staff Draft deviates significantly from this approach and creates a more complex and compulsory regulatory framework that is not likely to produce commensurate improvements in water quality. The new requirements in the Informal Staff Draft simply are not appropriate in light of our members' track record and the overwhelming number of enrollees who have achieved and continue to achieve the ultimate objectives of the 2006 Order.

Changes to the 2006 Order have been characterized as an "update," but the reality is that the Informal Staff Draft represents a full-scale rewrite with significant increases in agency costs and operational implications for our members. We urge the State Water Board to critically examine the necessity of each one of these proposed new obligations, and instead limit new requirements to the modification and refinement of specific provisions in the 2006 Order that will effectuate enrollees prioritizing rehabilitation of system deficiencies in high-risk areas if they currently are not doing as much. This more nuanced approach will achieve greater success and enrolled-agency acceptance, without the attendant new burdens on the significant number of well-performing systems (80-90% of enrollees; see Attachment 7, PDF pp. 9 and 10).

In closing, we appreciate the opportunity to comment on the Informal Staff Draft and look forward to continuing to work with the State Water Board further as the public review draft is developed. We also want to reiterate our gratitude to you and everyone we met with over the last few months for your accessibility and in-depth discussions about the Informal Staff Draft. If there are any questions about our comments, please do not hesitate to contact Jared Voskuhl at (916) 694-9269 or jvoskuhl@casaweb.org.

Respectfully submitted,

Lorien Fono, Ph.D., P.E.	Adam D. Link	Debbie Webster	Steve Jepsen
Executive Director	Executive Director	Executive Officer	Executive Director
BACWA	CASA	CVCWA	SCAP

Attachment 1 – Organizational Background Statements
Attachment 2 – Presentation to SWB Staff on Concerns with Informal Staff Draft (3/26/21)
Attachment 3 – SCAP Exfiltration Handout
Attachment 4 – Resiliency Costs of Compliance Spreadsheet (based on provisions from Attachment 5)
Attachment 5 – December 2020 Excerpt of Draft SSMP Resiliency Requirements
Attachment 6 – Suggested Relocation of Requirements to the 2006 SSMP Elements
Attachment 7 – Michael Flores CIWQS Database Presentation on Enrollee Performance at CWEA Conference (06/2021)

Enclosed: Informal Staff Draft (with redline markup)

cc: Steve Cheung, State Water Board
Afrooz Farsimadan, State Water Board
Diana Messina, State Water Board

Prop 84
Project 32
Grant ADM Costs

	BACWA	EBMUD	ABAG	CCCFCWCD	Total
DWR Grant Funding					
BACWA Share of Project 32 Funds	184,606.93				
Expenses charged against ORG 811					
Project 32 Funds Expensed	(52,964.24)				
Other Project Expensed	(41,205.25)				
Fund Balance	90,437.44				
Amount To be Disbursed	90,437.44				
Total Project 32 Funding					
Project 32 Funds Retained	90,437.44				90,437.44
Project 32 Funds Disbursed	94,169.49	294,806.56	101,445.16	5,351.50	495,772.71
Total Project 32 Funding	184,606.93	294,806.56	101,445.16	5,351.50	586,210.15

BAY AREA CLEAN WATER AGENCIES

RESOLUTION AUTHORIZING BACWA TO APPLY THE STATE OF CALIFORNIA FOR PROPOSITION 84 FUNDING ON BEHALF OF IRWMP PROJECT PROPONENTS.

WHEREAS, in 2003, the Bay Area Clean Water Agencies (BACWA) signed a Letter of Mutual Understanding (LOMU) agreeing to participate in and assist with the development of the San Francisco Bay Area's Integrated Regional Water Management Plan(IRWMP) by leading the development of the Wastewater and Recycled Water Functional Area Document; *and*

WHEREAS, consistent with the LOMU and with the intent of helping BACWA member agencies obtain funding for recycled water and other projects, BACWA applied for funding from the State of California Department of Water Resources (DWR) under the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (California Water Code Section 79500 *et seq.*); *and*

WHEREAS, in 2006 DWR awarded BACWA $12.5 million in funding for Bay Area IRWMP projects pursuant to Agreement No. 4600007654 between BACWA and the State; *and*

WHEREAS, the Bay Area is now eligible for up to $138 million in funding from the Safe Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84); *and*

WHEREAS, BACWA finds that it can benefit its members and help implement the Bay Area IRWMP by serving as the Proposition 84 grant applicant on behalf of the participants of the Bay Area IRWMP.

NOW, THEREFORE, BE IT RESOLVED that the Executive Board of BACWA hereby authorizes that application be made to DWR to obtain an IRWM grant pursuant to Proposition 84 and to enter into an agreement to receive the grant for the Bay Area Prop 84 Implementation Proposal. The Executive Director of BACWA is hereby authorized and directed to prepare the necessary data, conduct investigations, and file such application with DWR. The Chair of BACWA is hereby authorized to execute a grant agreement with DWR and other agreements as necessary to implement the award.

CERTIFICATION

The undersigned Chair and Executive Director of the Bay Area Clean Water Agencies hereby certify that the foregoing Resolution was duly adopted at a noticed meeting of the Executive Board of Bay Area Clean Water Agencies held on September 23, 2010.

_____

Ben Horenstein, Acting Chair

_____

Amy Chastain, Executive Director

Exhibit C: Budget

Bay Area Integrated Regiaonl Water Management (IRWM) Proposition 84 Grant, Round 1

No.	Project Title	Implementing Agency	Estimated Total Project Cost	Estimated Non-State Cost	Other State Funds	Requested State Grant Funds	Required Non-State Cost	5% Retention by DWR
1	Water Efficient Landscape Rebate Program	Sol CWA / Partner Agencies	$2,617,609	$1,237,984	$0	$1,379,625	$52,690	$68,981
2	Bay Friendly Landscape Training Program	Sol CWA / StopWaste.org	$470,979	$240,732	$0	$230,247	$30,000	$11,512
3	Weather Based Irrigation Controller Program	Sol CWA / Partner Agencies	$1,183,847	$532,622	$0	$651,225	$34,636	$32,561
4	High Efficiency Toilet & Urinal Rebate Program	Sol CWA / Partner Agencies	$3,151,325	$1,403,825	$0	$1,747,500	$1,169,171	$87,375
5	High Efficiency Toilet & Urinal Rebate Direct Install	Sol CWA / Partner Agencies	$3,756,950	$1,065,725	$0	$2,691,225	$1,065,725	$134,561
6	High Efficiency Clothes Washer Rebate Program	Sol CWA / Partner Agencies	$3,846,848	$1,925,985	$0	$1,920,863	$1,925,985	$96,043
7	Napa County Rainwater Harvesting Pilot Project	Sol CWA / Napa Co. RCD	$328,335	$78,335	$0	$250,000	$0	$12,500
8	Conservation Program Administration	Sol CWA / Partner Agencies	$322,785	$1,785	$0	$321,000	$1,785	$16,050
9	CCCSD-Concord Recycled Water Pipeline	Central Contra Costa Sanitary Dist	$4,230,000	$3,200,000	$0	$1,030,000	$1,100,000	$51,500
10	Central Dublin Recycled Water Distrib. & Retrofit Proj.	Dublin San Ramon Services Dist	$4,587,000	$3,457,000	$0	$1,130,000	$1,200,000	$56,500
11	East Bayshore Phase 1A - Interstate 80 Pipeline	East Bay Municipal Utility Dist	$2,152,000	$1,411,000	$0	$741,000	$600,000	$37,050
12	Novato North Service Area Project	Novato Sanitary District	$11,392,000	$10,767,000	$0	$625,000	$2,900,000	$31,250
13	Novato South Service Area - Hamilton Field, Stage 1	Las Gallinas Valley Sanitation Dist	$14,342,111	$13,717,111	$0	$625,000	$3,600,000	$31,250
14	Napa State Hospital Pipeline Construction, Stage 1	Napa Sanitation District	$3,057,000	$2,432,000	$0	$625,000	$800,000	$31,250
15	Sonoma Valley Recycled Water Project, Stage 1	Sonoma Valley Co Sanitation Dist	$5,000,000	$4,375,000	$0	$625,000	$1,300,000	$31,250
16	Harding Park Recycled Water Project	S.F. Public Utilities Commission	$7,436,000	$5,322,000	$0	$2,114,000	$2,300,000	$105,700
17	South Bay Advanced RW Treatment, Reverse Osmosis	Santa Clara Valley Water District	$7,676,700	$5,191,700	$0	$2,485,000	$4,455,446	$124,250
18	Sears Point Wetland and Watershed Restoration	State Coastal Conservancy	$17,080,121	$8,576,371	$7,238,750	$1,265,000	$4,280,000	$63,250
19	Bair Island Restoration	State Coastal Conservancy	$2,982,180	$1,717,180	$0	$1,265,000	$750,000	$63,250
20	South Bay Salt Pond 16A/17 Habitat Restoration	State Coastal Conservancy	$7,549,918	$5,625,000	$659,918	$1,265,000	$1,900,000	$63,250
21	Regional Green Infrastructure Project	S.F. Estuary Partnership (SFEP)	$4,481,259	$2,165,378	$0	$2,315,881	$300,000	$115,794
22	Hacienda Avenue Green Street Improvement Proj.	SFEP / City of Campbell	$4,632,555	$2,632,555	$0	$2,000,000	$1,200,000	$100,000
23	Watershed Partnership Technical Assistance	SFEP	$200,000	$50,000	$0	$150,000	$50,000	$7,500
24	Stream Restoration w/ Schools in North Bay DACs	SFEP / Point Reyes Bird Observ.	$264,976	$65,000	$0	$199,976	$65,000	$9,999
25	Flood Infrastructure Mapping & Communication Tool	SFEP / S.F. Estuary Institute	$840,000	$185,000	$0	$655,000	$185,000	$32,750
26	Storm Water Improvements & Pilot Project at Bay Pt.	SFEP / Watershed Project	$163,000	$3,000	$0	$160,000	$3,000	$8,000
27	Richmond Shoreline & San Pablo Flood Project	SFEP / Urban Tilth	$219,989	$134,989	$0	$85,000	$134,989	$4,250
28	Pescadero Integrated Flood Reduction & Habitat Enhancement Project	SFEP / San Mateo Co. RCD	$256,090	$36,780	$0	$219,310	$36,780	$10,966
29	Restoration Guidance and San Francisquito Watershed Restoration	SFEP / Community for Green Foothills	$292,000	$62,000	$0	$230,000	$62,000	$11,500
30	S.F. Estuary Steelhead Monitoring Program	SFEP / Center for Ecosystem Mgt & Research (CEMAR)	$498,537	$120,371	$0	$378,166	$120,371	$18,908
31	Watershed Program Administration	SFEP	$123,574	$0	$0	$123,574	$0	$6,179
32	Grant Administration	Bay Area Clean Water Agencies	$770,000	$130,000	$50,000	$590,000	$108,000	$29,500
		GRAND TOTAL	**$115,905,688**	**$77,863,428**	**$7,948,668**	**$30,093,592**	**$31,730,578**	**$1,504,680**

AIR Committee –
Report to BACWA Board

AIR Committee Meeting on: 05/26/2021
Executive Board Meeting Date: 7/16/2021
Committee Co-Chairs: Nohemy Revilla and Randy Schmidt

Committee Request for Board Action: Submit Responses to Methane and VOC Survey

Committee Leadership
The committee thanked Randy Schmidt for many years of service and dedication to the Committee. Jason Nettleton from the San Jose-Santa Clara RWF has replaced Randy as co-chair.

Proposed Amendments to BAAQMD Regulation 2: Permits
BAAQMD is in the process of amending Regulation 2, which applies to all regulated sources of air pollution that are required to obtain a permit form BAAQMD. Regulation 2 requires compliance with various emission types and exposure requirements, and BAAQMD is proposing to make the rules within Regulation 2 even more health protective in response to concerns regarding localized differences in air quality. BAAQMD is seeking to amend portions of the permitting rules to help ensure communities that are overburdened by poor air quality and health vulnerabilities are further protected from sources of air pollution. Following a May 12 public hearing on the BAAQMD's Concept Paper, BACWA submitted a comment letter noting that significant efforts are already underway to significantly reduce risk.

AB 617 Criteria Pollutant and Toxic Emissions Reporting (CTR) and AB 2588 Air Toxics "Hot Spots" Emission Inventory Criteria and Guidance (EICG) Updates
CARB has provided the wastewater sector until 2028 to perform a statewide "two-step process" in collaboration with CARB and air districts to determine a shortlist of compounds relevant to the wastewater sector to monitor and report. CASA is drafting a proposal for conducting the formal two-step process with member agencies (similar to the Pooled Emissions Estimation Program conducted in response to AB 2588 in 1988-1990). CASA has prepared a summary page presenting the concept for the sector data gathering process. For now, WWTPs are to report "business as usual" through 2028.

BAAQMD Rule 11-18: Risk Reduction from Air Toxic Emissions at Existing Facilities
All POTWs are in Phase II of the implementation schedule. The BAAQMD plans to send initial requests for information to Phase II facilities Q3 or Q4 of 2021, beginning with those plants having an estimated prioritization score >100. See the Implementation Procedures dated August 2020. POTWs are expected to respond to the data requests within 2-4 months.

In accordance with the Rule 11-18 Implementation Procedures (April 2018), BAAQMD provides opportunities for public review and comment on site-specific health risk assessment results and risk reduction plans. On the evening of May 7, the first draft HRA under Rule 11-18 was subject to public review and comment at a community workshop hosted jointly by BAAQMD and Citizens for a Better Environment.

SB 1383: Short-Lived Climate Pollutant (SLCP) Reduction Regulation and Implementation Status
This regulation targets methane reduction via diversion of organic waste from landfills to anaerobic digestion or composting facilities (the products of which are to be recycled). The Office of Administrative Law approved the regulation November 9, 2020. State enforcement begins in January 1 2022, local enforcement begins in 2024, and compliance is required by January 1, 2025

BAAQMD and Other Efforts to Monitor/Reduce Methane and Nitrous Oxide
BAAQMD Regulation 13 rule development is currently suspended due to COVID-19 and lack of data. However, BAAQMD continues to engage with BACWA in an effort to develop a baseline understanding of current methane (and VOC) management practices. After BAAQMD has had an opportunity to review the survey, BACWA will send out the survey to membership to identify best practices that are already in use, specifically surrounding anaerobic digesters and lagoons. BAAQMD plans to revisit Regulation 13 discussions in the fall 2021.

CARB Advanced Clean Vehicle Regulations

The Advanced Clean Truck Rule was adopted June 2020 and is the first of a series of regulations targeting electrification. It requires one-time reporting for large entities that operate or dispatch vehicles with a manufacturer's gross vehicle weight rating (GVWR) greater than 8,500 lbs in California. It includes medium duty vehicles like vans and ¾-ton pickups such as the F250 or Ram 2500 and heavier vehicles of all configurations and fuel types, but does not apply to lighter vehicles like cars and light duty pickups. The reporting deadline was extended to May 1, 2021, and we are waiting for a summary of that data to be released.

The Advanced Clean Fleet Rule targets zero-emission truck and bus fleets by 2045, with government entities identified as early adopters. CASA submitted comments regarding the proposed legislation; two drafts of the regulation are anticipated – one in July, the other in October. The goal is to adopt the regulation by the end of 2021, with implementation by 2024.

COVID-19: Regulatory Contingency Planning

The CASA website has many useful and timely resources. Members are encouraged to reach out or share information with the AIR committee.

Next AIR Committee Meeting: September 1, 2021 (Virtual)

Executive Director's Report to the Board

June 2021

EXECUTIVE BOARD MEETING AND SUPPORT

- Edited minutes and action items from 5/21 Executive Board meeting
- Worked with BACWA staff to plan and manage 6/18 Executive Board meeting
- Planned and hosted 6/2 BACWA/Regional Water Board joint meeting
- Conducted the Executive Board meeting agenda review with the BACWA Chair
- Continued to track all action items to completion

COMMITTEES:

- Hosted 6/7 Managers Roundtable meeting and began planning for September meeting
- Participated in 6/1 Permits Committee meeting
- Met with BAPPG Pesticides consultants on contracting details
- Reviewed AIR committee methane/VOC survey questions
- Reviewed 2021 BACWA Biosolids survey questions
-

REGULATORY:

- Attended triennial review workshop and reviewed triennial review comments
- Reviewed SSS WDR comments
- Met with SFEI staff to discuss PFAS study timing

NUTRIENTS:

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

- Discussed NMS issues with Science Manager
- Attended 6/2 Planning Subcommittee meeting, drafted and distributed meeting notes
- Attended 6/11 Steering Committee meeting, drafted and distributed meeting notes
- Attended 6/4 and 6/21 data steering committee meetings to review HDR scope of work and results
- Worked with Baykeeper and R2 EO on Estuary Blueprint actions on Nutrients
- Started developing draft Nutrient Trading Framework memo
- Met with SFEI staff to discuss FY22 payment schedule

FINANCE:

- Reviewed the monthly BACWA financial reports, summary, and budget to actual tracking sheet for March 2020
- Began update of 5-year plan accounting for $2.2 FY22 payment to NMS
- Developed BARs and EDAR for FY 22 contracts
- Reviewed and approved invoices

COLLABORATIONS:

- Met with IRWM subcommittee to discuss use of 4-party funds to support tribal and DAC involvement
- Met with SFEP on Recycled Water Estuary Blueprint actions
- Developed presentation for 6/17 San Mateo City and County Engineers Association Meeting
- Attended POTW PFAS Roundtable subgroup meeting

ASC

- Reviewed materials sent via email by ASC ED
- Attended 6/25 SFEI/ASC Board meeting

BABC:

- Attended meeting on 6/7 and developed meeting summary
- Met with program coordinator to discuss White Paper collaboration with Sonoma County Land Trust and SFEI

BACC:

- Answered member questions about bid award
- Discussed FY22 BACC process with AED
- Distributed information about chlorine availability related to regional shortages

BACCWE

- Reviewed BACCWE email discussions
- Discussed implementation of BACCWE scholarship invoicing with AED

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.
- Discussed web hosting transition to GoDaddy
- Worked with the RPM in the preparation of the monthly BACWA Bulletin.
- Initiated effort to compile BACWA's existing Policies and Procedures
- Developed and responded to numerous emails and phone calls as part of the conduct of BACWA business on a day-to-day basis.
- Began development of FY21 Performance Evaluation and FY22 Performance Plan

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

Board Calendar

August – October 2021 Meetings

DATE	AGENDA ITEMS
August 20, 2021	**Approvals & Authorizations:** • Biennial Conflict of Interest Code approval on Aug Agenda • NMS Payment **Policy / Strategic Discussion:** • PFAS Study Phase II • RMP Update **Operational:**
Sept 17, 2021	**Approvals & Authorizations:** • FY21 Annual Report • PFAS Study Phase II SFEI contract **Policy / Strategic Discussion:** • Climate change **Operational:**
October – 28 & 29th 2021, Pardee or Orinda Watershed HQ	
November 19, 2021	
December 17, 2021	
January 21, 2022	
February 10, 2022 – Annual Meeting	

BACWA ACTION ITEMS

Number	Subject	Task	Responsibiity	Deadline	Status
	Action Items from June 2021 BACWA Executive Board Meeting		**resp.**	**deadline**	**status**
2021.4.46	BAAQMD Engagement	Prepare draft letter for BAAQMD Board of Directors regarding BACT determination	RPM \ ED	5/21/2021	pending
2021.5.47	FY22 BAPPG Contract	BAPPG pesticides support contract will be presented at the June 2021 Executive Board Meeting for approval.	RPM \ ED	6/25/2021	complete
2021.5.48	FY22 NMS reviewer Contract	BACWA Executive Director to bring contract amendment for Mike Connor for FY22	ED	6/25/2021	complete
2021.6.49	Pardee Location	BACWA staff to inquire if EBMUD Watershed Headquarters facility is available October 28 & 29th	AED	6/25/2021	complete
2021.6.50	Triennal Review	BACWA staff to share letter prior to submission date.	RPM \ ED	6/25/2021	complete
2021.6.51	PFAS Study Schedule	BACWA staff to bring draft PFAS fact sheet to July Executive Board Meeting	RPM \ ED	7/16/2021	pending
	Action Items Remaining from Previous BACWA Executive Board Meetings				

FY21: 49 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

June 2021

BACWA BULLETIN: Completed and circulated June 2021 Bulletin

NUTRIENTS: Attended Nutrient Management Steering Committee; Participated in data analysis steering committee meetings; Reviewed draft memorandum regarding information needs for nutrient trading/credits in 3rd watershed permit.

COMMITTEE SUPPORT:

AIR

- Continued to coordinate with committee consultant team regarding methane management survey. Imported survey into SurveyMonkey and discussed format with consultant team.

BAPPG

- Reviewed draft comment letter regarding minimum risk pesticides. Circulated for Executive Board review.
- Attended June meeting and prepared meeting summary.
- Participated in pesticide subcommittee meeting.

Biosolids

- Prepared draft SurveyMonkey version of 2021 Biosolids Survey.

Collection System Committee

- Continued to review Internal Staff Draft of Sanitary Sewer Systems Waste Discharge Requirements (SSS-WDR), including coordination with CASA members to prepare markup.
- Participated in 2 meetings with State Water Board staff regarding Informal Staff SSS-WDR.
- Prepared draft comment letter for use by CASA, SCAP, and CVCWA. Circulated draft comment letters for Executive Board review.

Laboratory

- Attended June meeting and prepared meeting summary
- Assisted with preparations for TNI training series to be led by Diane Lawver.

Permits

- Attended June meeting and prepared meeting summary
- Prepared draft Triennial Review comment letter; circulated to Executive Board for review
- Completed markup of administrative draft chlorine residual blanket permit amendment; circulated for review by BACWA committees; compiled comments and transmitted to Regional Water Board staff.
- Began review of PFAS Phase 1 results; Coordinated with SFEI regarding presentations of study results.

ADMINISTRATION/STAFF MEETING – Participated in monthly staff meeting.

BACWA MEETINGS ATTENDED:
Permits Committee (6/1)
BAPPG (6/2)
Executive Board & Regional Water Board (6/2)
BAPPG Pesticides committee (6/8)
Laboratory Committee (6/8)

EXTERNAL EVENTS ATTENDED:
CASA-led outreach to State Water Board regarding SSS-WDR Informal Staff Draft (6/4, 6/11)
Nutrient Management Steering Committee (6/11)
CASA Regulatory Workgroup (6/17)
Triennial Review workshop (6/21)
CASA Air Quality, Climate Change, and Energy Workgroup (6/24)

Lorien Fono

From: Jared Voskuhl <JVoskuhl@casaweb.org>
Sent: Friday, July 2, 2021 9:46 AM
Subject: [Regulatory] CASA July 2021 Regulatory Update

Categories: Board Packet

Good Morning,

Please find below updates from June and for July. Our next Regulatory Workgroup meetings will be on Thursday, July 15. Our recent newsletters from May and June are hyperlinked. Please let us know if you have any problems accessing these resources. Hope you're all having a good summer!

Thank you,
The RWG Team

WATER

CASA's Annual Conference in San Diego August 11 – 13
CASA is pleased to announce that we will host our Annual Conference in-person this year in San Diego. This years' Annual Conference theme is "Building a Resilient Future," which centers on one of the clean water sector's most impressive and enduring traits: resiliency. The preliminary program is available here, and the Conference will feature a host of speakers covering important topics, including the impending drought, California's push for electrification, the changing nature of work, gender diversity, and pay equity in the workforce, communicating with diverse constituencies, and much more! There also will be a first day track focusing on regulatory hot topics and updates, and State Water Board member Sean Maguire will speak on the second day.

On our conference webpage, you will find registration, hotel, and COVID-related information that will be in place as part of this event. If you have any questions, please reach out to Cheryl Mackelvie, CASA's Executive Assistant for Meetings and Membership. Hope to see you next month!

CASA Submits Comments to SWB on SSS WDR Informal Staff Draft
On June 30, BACWA, CASA, CVCWA, and SCAP submitted an in-depth comment letter to the State Water Resources Control Board (State Water Board/SWB) summarizing our concerns with the Informal Staff Draft of the Statewide Sanitary Sewer Waste Discharge Requirements (Informal Staff Draft) along with detailed redlines and comments in Track Changes on the 85-page draft Order.

There are too many colleagues to list here, but we owe a huge debt to over twenty members and associates from around the state for their extensive and distinct contributions toward this multi-faceted project. The State Water Board will be revising the Informal Staff Draft over the months ahead and may publicly notice a formal draft in the fall or winter. Thank you to all our members who were working with us to analyze the Informal Staff Draft and provided their great insights. Please reach out to Jared Voskuhl with questions.

CASA Joins WRCA's Comments on the SWB's DPR Framework

On June 24, WateReuse California submitted a detailed comment letter to the State Water Board on the direct potable reuse framework that was released in March. CASA signed onto the letter after connecting with several members for their perspective on details in the framework, and we appreciated the chance to hear your thoughts about the draft criteria for this milestone policy that will be moving forward over the next couple of years. Please reach out to Jared Voskuhl if you have any questions.

CASA Provides Feedback to CSU on Survey Instrument for Estimating Conservation Impacts

On July 1, BACWA, CASA, CVCWA, and SCAP provided informal feedback on three survey instruments to the California State University (CSU) research team supporting the State Water Board's modeling of impacts under the 2018 water conservation legislation. Later this month, CSU will release the brief surveys, and we will reach out to request your participation. The high-level information provided through this project will be utilized by the CSU researchers to estimate the economic impacts to sanitation agencies and municipalities as they attempt to mitigate and adapt to decreased flow through their collection systems and treatment facilities. We will update you once the survey has been published, and we encourage all our members' participation so that the CSU analysis (and ultimately future Legislative or regulatory actions) may accurately model the concerns from our sector. Please reach out to your respective Summit Partner representative with questions about this project, or e-mail Jared Voskuhl.

CASA Submits Comments to DWR on IRWUS Report

On June 4, CASA submitted comments along with CVCWA, CWEA, and SCAP, to the Department of Water Resources (DWR) on their draft report for the Legislature to revise the indoor residential water use standards (IRWUS). A revised final report from DWR to the legislature is expected soon. Please reach out to Jared Voskuhl with questions or feedback.

CASA Request to Participate in Microplastics Survey – Responses Still Being Accepted

On June 9, CASA distributed a request to our coastal members for their participation in a survey that will support our collaboration with SCCWRP and SFEI on their research for the Ocean Protection Council pertaining to wastewater treatment technology effectiveness at removing microplastics. Data demonstrates that secondary and advanced treatment are very effective at removing microplastics, and this research will examine discrete processes along the treatment train so that we may better understand various technologies' roles at different stages. If interested in this project, you may still participate and complete the survey, which entails questions for basic information about the feasibility and types of samples that could be collected during the different stages in the treatment process, information about biosolids processing, and general background info about flow characteristics. A PDF of the questions is available here, and an abridged presentation of the current Study Plan is available here for your reference. Please reach out to Jared Voskuhl with questions.

Summit Partners Planning Fourth PFAS Workshop on the SWB Investigative Order

In August, the Clean Water Summit Partners (BACWA, CASA, CVCWA, CWEA, and SCAP) will host another virtual workshop and seminar on the State Water Board's investigative order, with an emphasis on the year-end sampling report that is due with 4th quarter results. There also will be other presentations on emerging trends and developments in this arena, so please keep an eye out for a Save-the-Date later this month.

SWB Releases 2020-22 Integrated Reports with 303(d) and 305(b) List

On June 4, the State Water Board released the 2020-22 integrated report for public review and comment, that had been Noticed on May 20. The recommendations for the 303(d) list are available here. A public hearing will be held on July 6, and comments are due by July 16. The SWB is planning to release a revised staff report in December 2021, adopt it in January 2022, and submit it to U.S. EPA by March 2022. You may visit the SWB's webpage here. Please reach out to Alma Musvosvi, CASA's Legislative and Regulatory Analyst, with your feedback, comments, or concerns on this item.

SWB Agenda Roundup

Here are the recent State Water Board agendas for their meetings on June 1 (CV-SALTS, drought), June 15 (CWSRF, drought) and their upcoming meeting on July 6 (303(d) list). The Executive Director reports are available for May (volumetric annual reports) and June (303(d) listing, wastewater change petition checklist, statewide construction stormwater general permit), and both feature links to the SWB's updated Statewide Policies and General Permits report.

BIOSOLIDS

CASA Submits Comments to CPUC on SB 1440 Staff Proposal

On June 30, CASA submitted comments to the California Public Utilities Commissions (CPUC), on their June 3 staff proposal to establish procurement requirements under SB 1440 (Hueso, 2018). A significant recommendation is to require Investor Owned Utilities to procure biomethane from wastewater treatment plants who co-digest diverted organic waste in conformance with SB 1383.. CPUC staff have been good to work with on this proceeding and were very responsive to our input. Please let Greg Kester know if you have any comments or questions.

New CalRecycle SB 1383 Webpage for Elected Officials

On June 25, CalRecycle published a new webpage on SB 1383 for public officials that summarizes the regulatory requirements and emphasizes that cities and counties need to plan now for any needed rate increases, changes in hauler agreements, or for implementing new programs, including mandatory organic waste collection services for all residents and businesses and edible food recovery for commercial food donors. Please let Greg Kester know if you have questions.

PFAS Study on Arizona Land Application Published

On June 18, the recent study was formally published in *Science of the Total Environment* by Dr. Ian Pepper et al., which examined soil impact potential from long term (1984 – 2019) Class B biosolids land application along with irrigation. The study was initiated after Pima County (Tuscon) had placed a moratorium on land application in January 2020. Following this study, the County lifted the moratorium, and land application has recommenced in Pima County. Many thanks to Dr. Pepper and his team for this important work. Please let Greg Kester know if you have any questions.

NACWA Releases Report on PFAS Land Application Fate and Transport Characterization
In May, NACWA, in partnership with the National Council for Air and Stream Improvement (NCASI) and the American Forest and Paper Association (AF&PA) shared with members a new report prepared by Stone Environmental detailing a more thorough "how-to" guide for understanding how to screen for PFAS potentially leaching into groundwater from land applied residuals and biosolids by using the Pesticide Root Zone Model (PRZM). The PRZM approach uses the Pesticide Water Calculator developed by EPA to simulate pesticide applications to land surfaces and the subsequent transport to and fate of these chemicals to surface water and groundwater. This method is widely used by EPA and states for screening level assessments and refined risk assessments and may be the best model for estimating PFAS fate and transport, and it contrasts with the ill-fitted oil transport model that was utilized by the state of Maine to develop their standards. NACWA encourage utilities share this guidance with state biosolids regulators. Reach out to Greg Kester with feedback, and if you're a member of NACWA, you may also contact Emily Remmel, NACWA's Regulatory Affairs Director.

SB 1383 Organic Waste Recycling Capacity Planning Tool Webinar
On June 7, CalRecycle hosted a webinar on the newly released organic waste recycling capacity planning calculator. This webinar was designed to help users on how to use the new tool for SB 1383 compliance and provided an opportunity for attendees to ask clarifying questions. Reach out to Greg Kester with questions.

CARB Public Workshop Series
Over June 8-10, CARB held a three-day public workshop on the update to the AB 32 Climate Change Scoping Plan. The first day focused on an overview and framework, the second day focused on natural and working lands and equity and environmental justice, and the final day focused on transportation and electricity. Please reach out with feedback and takeaways from the event to Greg Kester and Sarah Deslauriers, CASA's Climate Change Program Manager.

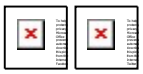
CASA Updates Biosolids Handout
On June 3, CASA released its updated biosolids flyer, which is on our website here. Many thanks to Deirdre Bingman (OC SAN), Ryan Batjiaka (SFPUC), Sarah Deslauriers (CASA/Carollo), and Layne Baroldi (Synagro) for their review and comments on it. CASA also has a brief biosolids primer on our website here. This 2-pager initially was developed in response to CARB questions about methane emissions from biosolids land application, and it provides a good overview of some of the regulations and research that govern land application in California. Please let Greg know if you have any questions or comments.

NW Biosolids Library for July – PFAS
The research library for July from Dr. Sally Brown and NW Biosolids is available here. This month's topic is a follow along to last month's library on PFAS. The introduction to the articles is available here. If you would like the complete articles, please contact Greg Kester.

DATES

July 01	SWB STORMS IC Meeting

July 06	SWB Meeting (2020-22 Integrated Reports/303(d) List)
July 15	CASA Regulatory Workgroup
July 16	SWB Comment Deadline on 303(d) List
July 20	SWB Meeting
July 21	CASA Collection Systems Workgroup
July 22	CASA ACE Workgroup
Aug 03	SWB Meeting
Aug 05	SWB WQ Fees Workshop
Aug 11 - 13	CASA Annual Conference



Visit our website

CASA | 1225 8th Street, Suite 595, Sacramento, CA 95814