EAST BAY DISCHARGERS AUTHORITY
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A Joint Powers Public Agency

ITEM NO. 14

REGULATORY AFFAIRS COMMITTEE AGENDA

Tuesday, April 15, 2025

9:00 A.M.

East Bay Dischargers Authority
2651 Grant Avenue, San Lorenzo, CA 94580

Committee Members: Johnson (Chair); Young

RA1. Call to Order

RA2. Roll Call

RA3. Public Forum

RA4. EBDA NPDES Compliance – See Item No. OM4
(The Committee will review NPDES Permit compliance data.)

RA5. Nutrients Group Annual Report and Science Update
(The Committee will discuss recent reports related to nutrients in the Bay.)

RA6. SFPUC Supreme Court Decision
(The Committee will receive an overview of the recent Clean Water Act case and implications for EBDA.)

RA7. BACWA Key Regulatory Issues Summary
(The Committee will review BACWA's issues summary.)

RA8. Adjournment

Any member of the public may address the Committee at the commencement of the meeting on any matter within the jurisdiction of the Committee. This should not relate to any item on the agenda. Each person addressing the Committee should limit their presentation to three minutes. Non-English speakers using a translator will have a time limit of six minutes. Any member of the public desiring to provide comments to the Committee on any agenda item should do so at the time the item is considered. Oral comments should be limited to three minutes per individual or ten minutes for an organization. Speaker's cards will be available and are to be completed prior to speaking.

Agenda Explanation
East Bay Dischargers Authority
Regulatory Affairs Committee
April 15, 2025

In compliance with the Americans with Disabilities Act of 1990, if you need special assistance to participate in an Authority meeting, or you need a copy of the agenda, or the agenda packet, in an appropriate alternative format, please contact the Administration Manager at (510) 278-5910 or juanita@ebda.org. Notification of at least 48 hours prior to the meeting or time when services are needed will assist the Authority staff in assuring that reasonable arrangements can be made to provide accessibility to the meeting or service.

In compliance with SB 343, related writings of open session items are available for public inspection at East Bay Dischargers Authority, 2651 Grant Avenue, San Lorenzo, CA 94580. For your convenience, agenda items are also posted on the East Bay Dischargers Authority website located at http://www.ebda.org.

Next Scheduled Regulatory Affairs Committee Meeting
Tuesday, June 17, 2025 at 9:00 a.m.

ITEM NO. RA5 NUTRIENTS GROUP ANNUAL REPORT AND SCIENCE UPDATE

Recommendation
For the Committee's information only; no action is required.

Strategic Plan Linkage
1. **Regulatory Compliance:** Proactively meet or exceed regulatory requirements for protection of the environment and public health.
    a. Represent EBDA and the Member Agencies' interests by preemptively engaging in development of emerging regulations and permits and advocating for reasonable, science-based decisions.
    b. Maintain consistent compliance with EBDA's National Pollutant Discharge Elimination System (NPDES) Permit.
7. **External Collaboration:** Collaborate with external stakeholders to build strong relationships for joint problem-solving and to expand EBDA's and its Member Agencies' reach.
    a. Provide industry leadership through active engagement with wastewater associations including Bay Area Clean Water Agencies (BACWA), California Association of Sanitation Agencies (CASA), California Water Environment Association (CWEA), and Water Environment Federation (WEF).
    b. Partner with regulators to develop and implement permits and programs leading with science and lessons learned.

Background
While the loads of nutrients such as nitrogen and phosphorus to San Francisco Bay are higher than those of other estuaries, the Bay has historically been very resilient, and negative impacts of nutrient enrichment such as eutrophication have not occurred. Scientists believe this resilience to stem at least in part from high turbidity (i.e., the Bay is cloudy); which blocks the light that phytoplankton need to grow; presence of filter-feeding clams, which reduce phytoplankton concentrations; and strong tidal mixing, which reduces nutrient concentrations. Over the last decade, concerning trends caused the scientific and regulatory communities to question whether the Bay's resilience is weakening.

To begin to proactively address these nutrient-related risks, Bay Area wastewater agencies, through the Bay Area Clean Water Agencies (BACWA), have participated since 2012 in a positive collaboration with a wide variety of stakeholders to implement a Nutrient Management Strategy that focuses on conducting scientific research and modeling to determine the effects of nutrients on the Bay ecosystem, and protective levels of nutrient loading going forward. BACWA worked closely with the San Francisco Bay Regional Water Quality Control Board (Water Board) staff to negotiate a Watershed

Permit for nutrients, which was issued in 2014 and reissued in 2019.

In Summer 2022, a harmful algae bloom caused unprecedented decreases in dissolved oxygen in the Bay, resulting in significant fish kills. While it is unclear exactly what triggered this bloom, its timing did correspond with a prolonged period of unusually clear skies in the Bay Area, making available more light than usual for photosynthesis. Scientists believe the bloom was nitrogen limited, meaning that nitrogen loads to the Bay sustained the bloom and likely contributed to its extent and duration. This conclusion, along with the increased media attention garnered by the event, has led to public and political pressure on wastewater agencies and regulators, particularly the Water Board, to act quickly to reduce nutrient loads to the Bay, with a goal of preventing or lessening the impact of future blooms. A brief, and thankfully less consequential, recurrence of the bloom in 2023 amplified that pressure.

EBDA and our partners with BACWA negotiated the third Watershed Permit for nutrients, which was adopted on July 10, 2024 and became effective on October 1, 2024. The permit relies on modeling to set a Bay-wide target of a 40% reduction in nitrogen loads in ten years. Reductions are then allocated to individual dischargers in the form of effluent limits that would be enforceable in 2035.

The Water Board expressed support for continuing to refine the underlying science and allowing additional time for multi-benefit projects such as water recycling and nature-based solutions. While the permit does not expressly allow for more time to complete these projects, it states that the Water Board will "consider available regulatory mechanisms to provide more time to comply." A new section was also added to the permit at EBDA's request, recognizing early actors that have already completed or begun construction or implementation of projects to reduce total inorganic nitrogen discharges to San Francisco Bay. For these dischargers, the permit contains the same language regarding the Water Board considering available regulatory mechanisms to provide more time to comply.

In conjunction with adopting the permit, the Regional Water Board also adopted a Resolution directing staff to:

a) evaluate the feasibility of amending the Compliance Schedule Policy to provide more time for multi-benefit projects or innovative technologies;
b) compare the pros, cons, and timelines needed to pursue other available regulator mechanisms to provide more time, as warranted, particularly for multi-benefit projects; and
c) report to the Board on its findings.

Discussion

Group Annual Report

As it has every year since 2014, on April 1, 2025, BACWA submitted its Group Annual Report under the Nutrients Watershed Permit. The Report, prepared by consultant HDR, summarizes the nitrogen and phosphorus concentrations and loads from the forty

wastewater treatment plants that discharge to San Francisco Bay.

While EBDA's Member Agencies are also required to monitor for nutrients, the data contained in this report is only for the combined effluent discharged through EBDA's common outfall. EBDA's influent values are the sums of contributing plants' influent numbers.

The full report can be found at the following link:
https://bacwa.org/document/bacwa-group-annual-report-for-nutrients-2025-04-01/

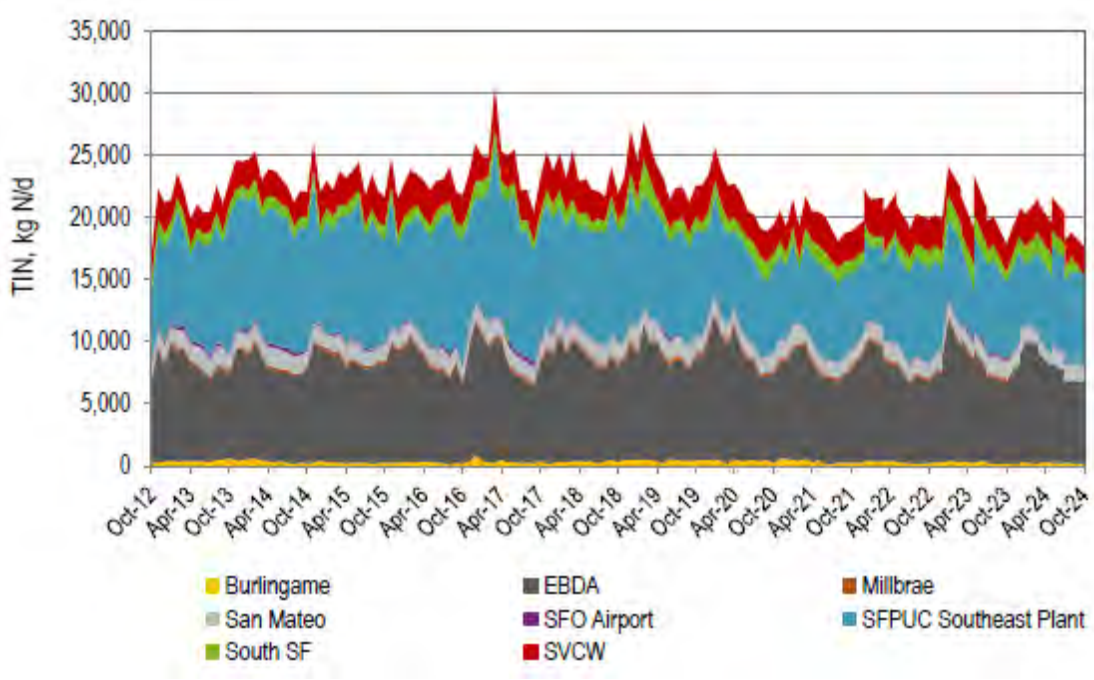
The table below summarizes dry season discharges and indicates current trends for the Bay as a whole. The Watershed Permit limits are for total inorganic nitrogen (TIN), which as shown in the table, is already trending down. EBDA's TIN loading shows no trend. However, it should be noted that as of a few years ago, EBDA's trend was slightly upward, likely as a result of population growth. The fact that TIN load has reverted back to flat is likely thanks to nutrient optimization at the EBDA plants, and the trend will move downward over time, as plant upgrades are commissioned.

Table 9-8. Discharge: Summary of Dry Season Flow and Concentrations to the Bay*

Constituent	2013 [a]	2014 [a]	2015 [a]	2016 [a]	2017 [a]	2018 [a]	2019 [a]	2020 [a]	2021 [a]	2022 [a]	2023 [a]	2024 [a]	Trend [b, c]	12-Year Average
Flow, mgd	393	374	351	372	396	383	393	363	339	337	381	388	None	373
Ammonia, mg N/L	22.8	25.6	27.3	26.5	26.0	26.8	25.6	25.8	26.2	28.1	22.5	22.0	None	25.7
NOx, mg N/L	8.98	8.36	9.41	7.89	7.81	7.56	7.26	7.28	7.25	6.69	7.40	7.65	Down (-2.0%/yr)	7.81
TIN, mg N/L [b]	31.8	34.0	36.7	34.4	33.8	34.4	33.0	33.2	33.6	34.8	30.0	29.7	Down (-0.7%/yr)	33.6
TP, mg P/L	2.28	2.34	2.69	2.81	2.44	2.76	2.69	2.76	2.87	2.58	2.60	2.49	Up (0.8%/yr)	2.62

** Dry season trending not applied to concentrations as the emphasis is on load. Focusing on concentration is limiting as it does not consider the impact of flow.
a. The dry season represents May 1 through September 30 for each calendar year.
b. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

The graph below shows EBDA's dry season TIN in relation to other dischargers to the South Bay.



For the first time this year, the permit required BACWA to report on the status of each agency's planning toward meeting the dry season TIN final effluent limits. By April 1, 2025, the permit requires agencies to identify preliminary alternatives for meeting final effluent limits. Early Actors are expected to provide an annual status update on their projects. This first regional Compliance Milestone Summary Report was included as Appendix B to the Group Annual Report and is attached for the Committee's information.

As highlighted in column E of Table 1 in the report, many agencies, including EBDA, are either unsure that they will be able to meet final limits in 2034 or expect not to be able to. This speaks to the need for additional time for compliance. As noted in the Background, the Water Board acknowledged at the time of permit adoption that a regulatory fix would be needed to allow Bay Area wastewater agencies additional time to comply. Senior Water Board staff informed BACWA last month that they are pursuing an amendment to the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) that will override the ten-year limitation in the state's Compliance Schedule Policy and will provide flexibility to grant longer compliance schedules in future iterations of the permit. Staff will be working closely with the Water Board and our BACWA colleagues to ensure that the Basin Plan Amendment language is broad enough to cover Early Actors including EBDA.

Science Program Update

The Nutrient Management Strategy science program, led by the San Francisco Estuary Institute (SFEI) provides the technical underpinning for regulatory actions on nutrients in the Bay. Work that the science program has conducted to date is summarized in the

attached report, *Science to Inform Management*. Hard copies of this report will be available for Member Agencies' use in the next few months.

BACWA is currently working with the Water Board and other stakeholders to develop a science plan for the next five years. Work that can be accomplished is highly dependent on the availability of federal funding that had previously been allocated through the Environmental Protection Agency (EPA), so the team is working on several versions of the plan representing different funding scenarios. The final five-year plan is expected to be approved by the Nutrient Management Strategy Steering Committee in June.

Bay Area Clean Water Agencies

Appendix B

Compliance Milestone Summary Report

2024

April 1, 2025

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1 Introduction

The Nutrient Watershed Permit (Permit) adopted by the Regional Water Board in July 2024 (Order R2-2024-0013) establishes final effluent limitations for Total Inorganic Nitrogen (TIN) for specific municipal wastewater dischargers to San Francisco Bay. The dischargers with final effluent limitations are listed in Table 4 of the Permit. The Permit also establishes a 10-year compliance schedule, such that the final effluent limitations do not go into effect until October 1, 2034. Dischargers are required to submit information annually to demonstrate that they are making progress per the Permit's compliance schedule, with specific milestones listed in Table 5 of the Permit. This document summarizes that annual progress, as required by Provision 6.3.3 of the Permit.

BACWA collected the information in this report via an online questionnaire. A flow diagram illustrating the questions asked of Dischargers is shown in Figure 1. Multiple response pathways are available to Dischargers depending on their status. Dischargers may have a portfolio of strategies to meet final effluent limits for TIN, and some dischargers that already comply with the final effluent limits are pursuing additional nitrogen removal opportunities.

In alignment with the text of Provision 6.3.3, Dischargers were placed into three groups based on their response.

1. Early Actors
2. Compliance Pathway Identified
3. Compliance Alternatives Identified

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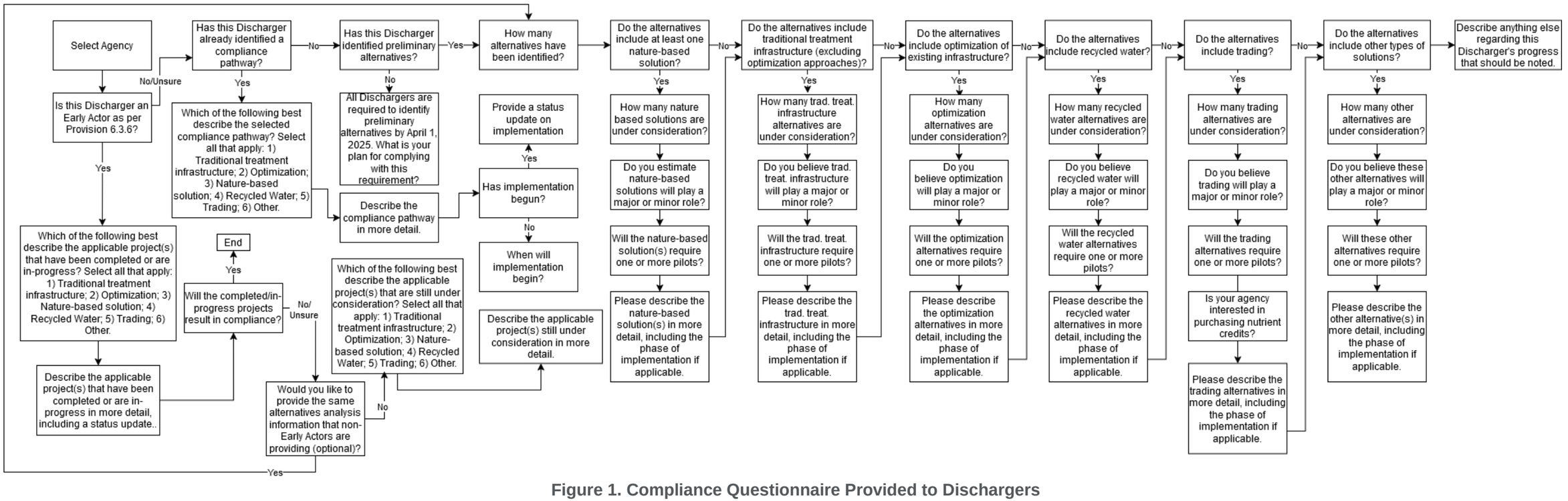

Figure 1. Compliance Questionnaire Provided to Dischargers

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2 Overview of Results

The distribution of the Dischargers among Groups 1, 2, and 3 is presented in Figure 2. The upper plot provides the number of Dischargers in each category, while the lower plot presents the Average Dry Weather Flow (ADWF) associated with the Dischargers in each group. Early Actors make up 55 percent of the listed Dischargers, while Groups 2 and 3 make up 17 percent and 28 percent, respectively. Collectively, the Early Actors represent 80 percent of the 798 mgd ADWF permitted capacity associated with the listed Dischargers, while Groups 2 and 3 represent 8 percent and 13 percent, respectively.

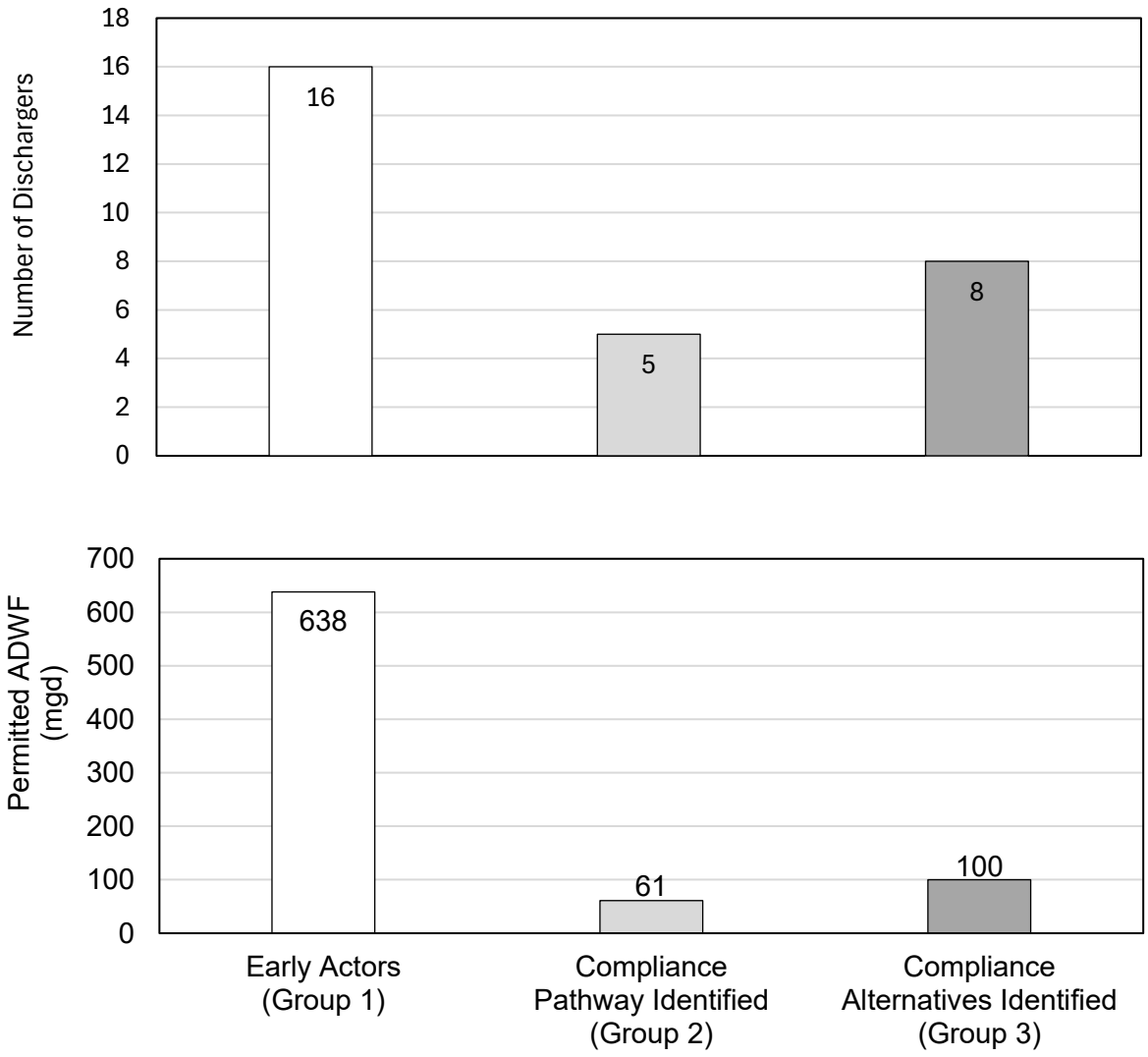

Figure 2. Distribution of Compliance Pathway Results by Grouping for all the Bay Area Treatment Plants (Top = Count by Grouping; Bottom = ADWF Permitted Capacity by Grouping)

The Dischargers also provided information on the types of compliance alternatives that are under consideration or have been completed. The compliance alternatives identified in the Permit are as follows:

- Nature-based Solution (NbS)
- Traditional Treatment Infrastructure (TTI)
- Optimization (OP)
- Recycled Water (RW)
- Nutrient Trading (NT)

Figure 3 presents the distribution of compliance alternatives among Groups 1, 2, and 3 based on the information provided by the Dischargers. Figure 3 shows a total of 64 projects for the 29 Dischargers listed in Table 1 as several Dischargers, including Early Actors, are pursuing multiple alternatives. Traditional treatment infrastructure represents the most common method of compliance, followed by optimization and recycled water. Nature-based solutions and nutrient trading are the least common. Based on these results, nature-based solutions are most common among Early Actors and have not been selected by any Discharger in Group 3 as a preliminary compliance alternative. This is likely because Nature-based Solutions are generally not feasible as a single solution and may be less attractive to Dischargers still in the initial phases of developing a compliance pathway.

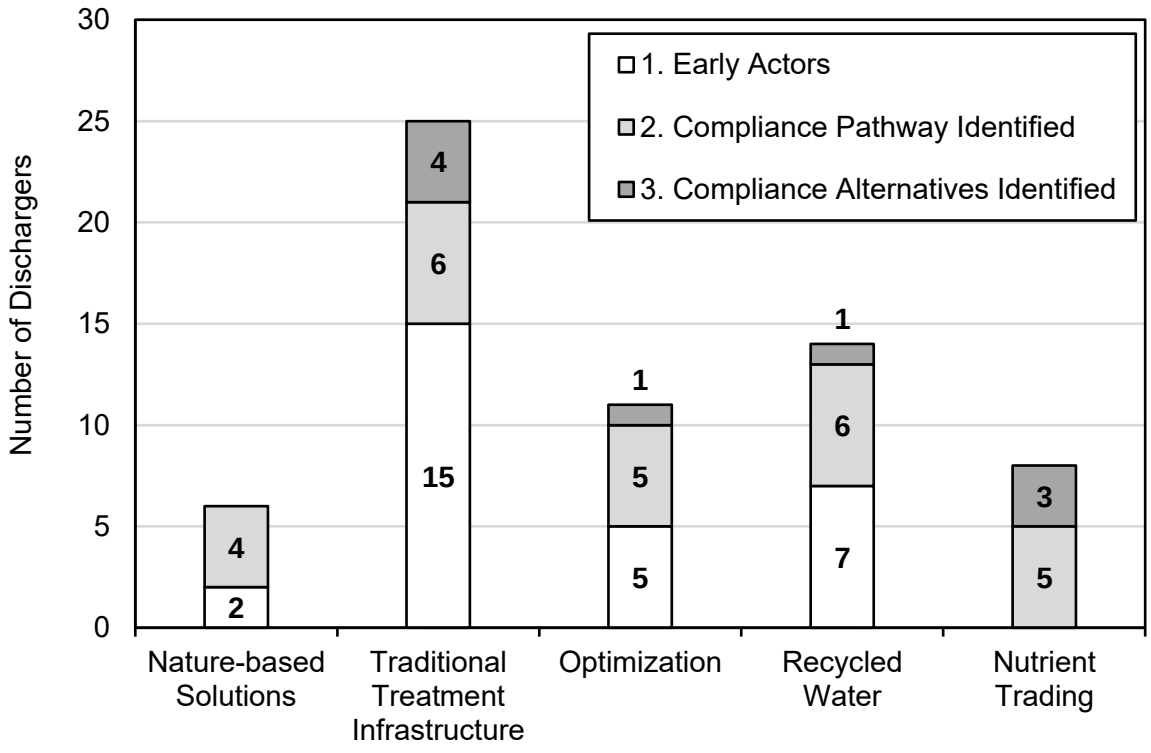

Figure 3. Distribution of Nutrient Reduction Strategies among Dischargers

Figure 4 presents a projection of load reductions that are anticipated due to projects currently underway by Early Actors (that are expected to result in compliance) and by agencies that have already identified a Compliance Pathway. Figure 4 includes the estimated 2024 dry season discharge load (43,700 kg N/d), the maximum historical load (55,000 kg N/d), the anticipated load accounting for in-progress and planned projects that are expected to result in compliance, and the Baywide TIN Load Limit in the 2024 Permit (26,700 kg N/d). The middle column in Figure 4 accounts for anticipated load reductions from two groups that represent a significant portion of the total TIN load: 1) Early Actors that anticipate meeting final effluent limits (i.e., “Yes” in Column E of Table 1) and 2) agencies that have already identified a compliance pathway (i.e., “2” in Column C of Table 1). There is no timeline associated with these load reductions. These Dischargers are assumed to discharge their final effluent limit as given in the 2024 Permit. All other agencies were conservatively assumed to discharge their 2024 dry season TIN discharge load. Figure 4 illustrates the planned TIN load reduction associated with in-progress and planned projects that are expected to result in final permit compliance. This approach does not account for the effects of population growth on TIN loads.

This approach suggests that in-progress or completed projects resulting in compliance and Dischargers that have identified a compliance pathway may provide an 18 percent reduction in TIN discharge load compared to the 2024 dry season TIN discharge loads. An additional 21 percent (approximately 9,100 kg N/d) reduction compared to the 2024 dry season TIN discharge load would be required to meet the Baywide final permit TIN limit of 26,700 kg N/d. Figure 4 illustrates that while significant progress has been made, several large Dischargers are unsure of compliance and/or know they will need more time.

Some Early Actors do not expect to achieve compliance with the 2024 Permit final effluent limits (Table 4 in R2-2024-0013) within the Compliance Schedule because their projects were designed based on targets in the 2019 Nutrients Watershed Permit (R2-2019-0017). These dischargers will need additional time to implement additional projects following completion of their early action projects. Further, some Early Actors are unsure whether their projects will result in compliance until they are commissioned and begin operation.

The information provided by the Dischargers is summarized in Table 1.

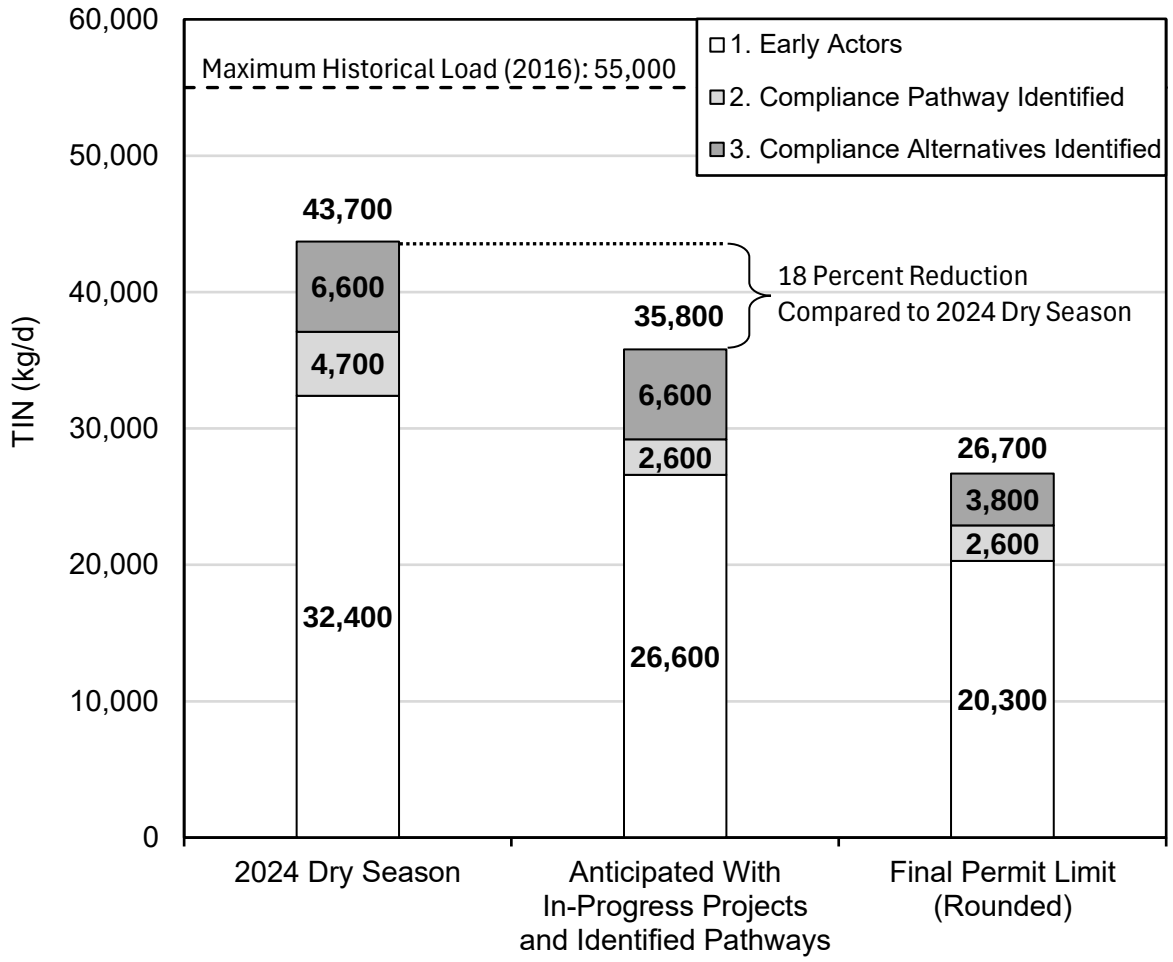

Figure 4. TIN Reduction Potential based on the Compiled Request for Information Results *,**

* The middle column uses the 2024 Permit TIN load limit values for Early Actors that anticipate meeting final effluent limits (i.e., "Yes" in Column E of Table 1) and agencies that have already identified a compliance pathway (i.e., "2" in Column C of Table 1). The values for agencies that have identified compliance alternative(s) used their respective 2024 dry season values (i.e., "3" in Column C of Table 1) as their anticipated values are unclear at this time.

** The total values might vary from the sum of the listed values by plant due to rounding.

Table 1. Summary of Questionnaire Results (Color Coded by Grouping; White = Early Actor, Light Grey = Compliance Pathway Identified; Dark Grey = Compliance Alternatives Identified)

A. Discharger[a]	B. ADWF Permitted Capacity (mgd)	C. Group[b]	D. Early Actor	E. Will Meet Final Effluent Limit	F. Projects Completed or In-Progress	G. Anticipated Compliance Pathway	H. Prelim. Alternatives Include [c]					I. Interested in Purchasing Credits	J. Schedule Summary for Projects
							NbS[d]	TTI[d]	OP[d]	RW[d]	NT[d]		
American Canyon, City of	2.5	1	Yes	Yes	RW; TTI	-	-	-	-	-	-	-	Complete
Benicia, City of	4.5	3	No	-	-	-	Yes	Yes	Yes	Yes	Yes	Maybe	TBD
Burlingame, City of	5.5	3	No	-	-	-	No	Yes	Yes	Yes	No	-	TBD
Central Contra Costa Sanitary District	53.8	3	No	-	-	-	Yes	Yes	No	Yes	Yes	Maybe	TBD
Central Marin Sanitation Agency	10	2	No	-	-	TTI; OP	-	-	-	-	-	-	Alternative to be selected in 2025
City of Richmond Municipal SD	16	1	Yes	Yes	TTI	-	-	-	-	-	-	-	TBD
Delta Diablo	19.5	2	No	-	-	TTI; NT	-	-	-	-	-	-	Construction to begin in 2026
EBDA (DSRSD, City of Hayward, City of Livermore, Oro Loma SD, City of San Leandro, Union SD)	107.8	1	Yes	Unsure	NbS; TTI; OP; RW	-	-	-	-	-	-	Maybe	DSRSD: Complete. Hayward: 2030. Livermore: RW complete, treatment evaluation is underway. Oro Loma SD: Complete. San Leandro: 2026. Union SD: Phases in 2027, 2029, 2031.
EBMUD	120	1	Yes	Unsure	OP	-	-	-	-	-	-	-	TBD
Fairfield Suisun SD	23.7	1	Yes	Yes	TTI; OP	-	-	-	-	-	-	-	2033
Millbrae, City of	3	2	No	-	-	RW, NT	-	-	-	-	-	-	Pre-design activities in 2025
Mt. View SD	3.2	1	Yes	Yes	TTI, NbS		-	-	-	-	-	-	Complete, but pursuing additional alternatives with schedule TBD.
Novato SD	7	1	Yes	Unsure	TTI; RW	-	-	-	-	-	-	-	Complete
Palo Alto, City of	39	1	Yes	Yes	TTI	-	-	-	-	-	-	-	2028
Pinole, City of	4.06	1	Yes	Yes	TTI	-	-	-	-	-	-	-	TBD. Study underway.
Rodeo SD	1.14	3	No	-	-	-	Yes	No	Yes	No	Yes	Yes	TBD
San Jose/Santa Clara WPCP	167	1	Yes	No	TTI; OP; RW	-	No	Yes	Yes	Yes	No		See individual response
San Mateo, City of	15.7	1	Yes	Yes	TTI	-	-	-	-	-	-	-	2025
Sausalito-Marin City SD	1.8	3	No	-	-	-	No	Yes	Yes	Yes	Yes	Maybe	TBD
SD N. 5 of Marin County (Tiburon)	0.98	3	No	-	-	-	-	Yes	-	-	-	Yes	TBD
Sewerage Agency of Southern Marin	3.6	3	No	-	-	-	Yes	No	No	Yes	Yes	Maybe	TBD
SFO Airport	2.2	1	Yes	Yes	TTI; RW	-	-	-	-	-	-	-	TBD. 50 percent design for current phase in 2025.
SFPUC Southeast	85.4	1	Yes	Yes	-	TTI	-	-	-	-	-	-	TBD. Design-build contractor to be selected 2025.
SFPUC Treasure Island	2.0	1	Yes	Yes	TTI; RW	-	-	-	-	-	-	-	2026
Silicon Valley Clean Water	29	3	No	-	-	-	-	Yes	Yes	Yes	-	-	TBD. Evaluating 4 alternatives.
South San Francisco and San Bruno	13	2	No	-	-	TTI	-	-	-	-	-	-	TBD. Evaluating process modification alternatives in 2025.
Sunnyvale, City of	29.5	1	Yes	Yes	TTI	-	-	-	-	-	-	-	2028
Vallejo Flood and Wastewater District	15.5	2	No	-	-	TTI; NT	-	-	-	-	Yes	-	TBD. Evaluating process alternatives in more detail in 2025 and 2026.
West County Wastewater District	12.5	1	Yes	Yes	TTI; OP; RW	-	-	-	-	-	-	-	Complete

a. Dischargers not included here due to dry season discharge prohibitions: Sonoma Valley County Sanitation District, Napa Sanitation District, City of Petaluma, and Las Gallinas Valley Sanitary District. Other Dischargers not included here: Crockett Community Services District (Port Costa Wastewater Treatment Facility) and Sanitary District Number 5 of Marin County (Paradise Cove Treatment Plant) (see Section 0).

b. Group 1 consists of Early Actors; Group 2 consists of other Dischargers that have identified a compliance pathway; Group 3 consists of other Dischargers that have identified preliminary alternatives.

c. In addition to projects listed under columns F and G.

d. NbS = Nature-based Solutions, TTI = Traditional Treatment Infrastructure; OP = Optimization; RW = Recycled Water, and NT = Nutrient Trading.

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3 Detailed Responses

Detailed responses provided by the Dischargers are provided below.

3.1 Groups 1, 2, and 3

The detailed responses provided by Group 1 (Early Actors), Group 2 (Compliance Pathway Identified), and Group 3 (Compliance Alternatives Identified) Dischargers are provided in Table 2. Groups 1, 2, and 3 provide an ADWF permitted capacity of 637.56, 61, and 100.32 mgd, respectively.

Table 2. Detailed Responses Provided by Dischargers (Sorted Alphabetically); White = Early Actor, Light Grey = Compliance Pathway Identified; Dark Grey = Compliance Alternatives Identified.

Group	Discharger	Detailed Response
1	American Canyon, City of	The City of American Canyon built a membrane bioreactor (MBR) plant that nitrifies and denitrifies. The City also has a robust recycled water program that will divert loads to irrigation.
3	Benicia, City of	BACWA worked with SFEI to develop a report of potential NbS for nutrient removal. The alternatives determined for Benicia include one potential site for open water wetlands to be utilized, and five potential sites where horizontal levees may be able to be used. Benicia will work with a consulting engineer to determine feasibility. From the 2018 HDR report we believe there are two potentially feasible upgrade projects. One to convert the gravity thickener or rotating biological contactors (RBC's) to treat belt filter press sidestream flows via Deammonification, considered an upgrade given the magnitude of the modifications needed. Second, to demolish existing RBC trains, add 2 aeration basins (1.07 MG) as MLE, retrofit existing aeration basins to MLE, add new aeration blowers, construct 1 new 75-ft diameter secondary clarifier, possibly construct caustic soda addition facilities, while maintaining ability to operate in contact stabilization mode for peak wet weather flows. Benicia will work with a consulting engineer to further assess and develop these two projects. Benicia will investigate feasibility of operating the plant to fully nitrify during dry season months without adversely impacting disinfection or other plant processes and final effluent compliance. Depending on the results may then investigate the feasibility of minor aeration system and tankage modifications to attain partial denitrification. There are 2 potential recycled water alternatives that may be considered. Benicia worked with Brown and Calwell to produce a feasibility report for a water reuse project to supply up to 2 MGD of

Group	Discharger	Detailed Response
		recycled water to a local refiner for use. Benicia also worked with Stantec Consulting Services Inc. on a Wastewater master plan update and major facility condition assessment. In this report a draft action plan is presented for a potential indirect potable reuse project. Benicia will work with a consulting engineer to determine feasibility. Benicia will work with BACWA towards developing a trading program and, based on the outcome, determine whether participation makes sense for Benicia. The City of Benicia is in the process of engaging a consulting engineer to review, assess and update previously identified potential nutrient removal alternatives. Based on those results, expected later in 2025, Benicia will refine its recommended pathway(s) towards compliance with final limits. More detailed planning, environmental studies, and design will follow beginning in 2026 to develop and implement future project(s) to ensure compliance.
3	Burlingame, City of	The preliminary compliance approaches may include traditional wastewater treatment infrastructure upgrades, optimization, recycled water, nature-based solutions, or a combination thereof. Due to space limitations at the WWTF, NbS are currently not a feasible approach and therefore will not be considered any further. However, optimization, wastewater treatment infrastructure upgrades, and recycled water approaches will be considered for further alternatives analysis. Non-Potable Reuse consists of modifying the WWTF to produce Title 22 water that would be diverted from San Francisco Bay. Anticipated improvements would include providing effluent filtration, additional disinfection, and potentially secondary process enhancements to improve filterability. Indirect or Direct Potable Reuse consists of modifying the WWTF and implementing a potable reuse project. Improvements to the secondary process may include constructing a membrane bioreactor and implementing advanced treatment including reverse osmosis, disinfection, and nutrient removal from the brine stream. Recycled water approaches alone may not be able to comply with the final TIN limits. Therefore, a combination of WWTF upgrades and recycled water implementation would be considered for evaluation. The alternatives identified include the following: Conventional Activated Sludge (CAS) Optimization. This alternative consists of operating the existing secondary process at longer solids retention times and utilizing existing infrastructure that is reserved for wet weather storage for treatment during the dry season. Structural and mechanical modifications will be needed to implement this alternative.

Group	Discharger	Detailed Response
		Activated Sludge Intensification. This alternative consists of optimizing the CAS system for nutrient removal and incorporating an intensification technology such as membrane aerated biofilm reactors (MABR) or densification. Intensification technologies will require less overall site area to implement but are not as mature as CAS and may require piloting and additional time for implementation. MABR is an intensification technology where membranes are installed in the anoxic zone of aeration basins. MABRs are efficient at growing nitrifiers and are effective at providing more nitrification nutrient removal capacity compared to CAS. Sludge Densification is an intensification technology that improves the settleability of an activated sludge system. By improving settleability, the activated sludge process can be operated at higher mixed liquor concentrations, resulting in more nutrient removal capacity within the same tankage. Reuse or Recycled Water Implementation. Non-Potable Reuse consists of modifying the WWTF to produce Title 22 water that would be diverted from San Francisco Bay. Anticipated improvements would include providing effluent filtration, additional disinfection, and potentially secondary process enhancements to improve filterability. Indirect or Direct Potable Reuse consists of modifying the WWTF and implementing a potable reuse project. Improvements to the secondary process may include constructing a membrane bioreactor and implementing advanced treatment including reverse osmosis, disinfection, and nutrient removal from the brine stream. Recycled water approaches alone may not be able to comply with the final TIN limits. Therefore, a combination of WWTF upgrades and recycled water implementation would be considered for evaluation.
3	Central Contra Costa Sanitary District (Central San)	Central San is considering nature-based solutions, including two potential configurations utilizing existing wet weather equalization basins; potential merger with Mt. View Sanitary District could divert a portion of Central San's flow for nutrient removal treatment; and a horizontal levee in the lower Walnut Creek watershed. Central San is evaluating traditional treatment infrastructure alternatives, which include secondary process conventional expansion with MLE, intensification with membrane aerated biofilm reactors (MABR), and/or densified activated sludge. The recycled water alternatives being evaluated include expansion of non-potable reuse, industrial water reuse, and potable reuse. Central San is interested in purchasing or exchanging nutrient credits between facilities/subembayments or through a centralized credit bank. BACWA will explore a potential trading program through the regional

Group	Discharger	Detailed Response
		planning study required under the Third Nutrient Permit. Several capital projects have been completed or are in progress at the treatment plant, with future nutrient removal considerations incorporated during the planning and design phases. These projects address key factors such as aging infrastructure and establish a solid foundation for Central San's compliance with nutrient limits. A selection of these projects is listed below: Aeration Basins Diffuser Replacement - Phase 1, DP 100019 (In Construction) -- Diffuser replacement and seismic upgrades to two of the four existing aeration tanks. Upgraded equipment will be essential for nutrient removal. Membrane Aerated Biofilm Reactor (MABR) Pilot Project (Completed November 2024) --Successfully demonstrated that MABR can remove TIN while being fed continuously with mixed liquor from Central San's treatment plant operating with a short solids retention time (SRT; 1.2- to 1.3-day SRT). Pilot was fed from various locations in existing treatment plant to identify best location for full-scale testing. Secondary Clarifier and Channel Improvements, DP 100047 (In Final Design) --Rehabilitate existing clarifiers and distribution channel concrete and coatings. Replace drain gates and other miscellaneous items. --Evaluate options for optimizing clarifier performance and hydraulic capacity, while ensuring improvements would remain effective for future nutrients removal operation. Ultraviolet (UV) Disinfection Replacement, DP 100012 (In Final Design) --The new UV Disinfection facilities will accept secondary effluent from any new secondary treatment facilities and allow the existing UV tank area to be repurposed for secondary treatment. Central San has recently selected consultants for the Nutrient Management Project, DP 100078. This project will identify viable nutrient mitigation alternatives to assist Central San in selecting an optimal solution, including a large-scale demonstration project of potential nutrient removal technologies, such as MABR and densification. The project will evaluate various potential recycled water opportunities and nature-based solutions, maximize the value of existing assets, and develop an optimal project phasing, schedule and delivery plan. The overarching goal is to comply with regulatory requirements on schedule,

Group	Discharger	Detailed Response
		while minimizing impact on Central San's ratepayers and integrating nutrient removal with multi-benefit projects.
2	Central Marin Sanitation Agency (CMSA)	As of February 2025, there are multiple alternatives being considered with a focus on traditional treatment infrastructure. Applicable technologies currently being considered include conventional nutrient removal (MLE and Bardenpho), intensified nutrient removal (MABR, DAS), post-secondary treatment, and side stream treatment. In addition to new traditional treatment infrastructure, the existing infrastructure will also be optimized to remove additional nutrients. The combined nutrient removal from the new traditional and optimized existing infrastructure will be enough to meet the permit limits. A final alternative will be selected by the fall of 2025, after which CMSA will begin pre-design of the selected alternative immediately. Final design and construction will follow.
1	City of Richmond Municipal SD	Project #1: aeration basins were converted from mechanical mixing & aeration to a diffused air aeration system. This system was put fully online in December of 2023, resulting in a decrease by about half of the sites nutrient loading to the Bay. Project #2 (Proposed): with the addition of three new screw presses for a thickening system, we have a proposed sidestream treatment project for nutrient reduction.
2	Delta Diablo (DD)	DD has selected biological nutrient removal technologies to achieve compliance with regulatory limits. Construction of five 1.5-million-gallon activated sludge tanks, or a combination of four new tanks with retrofits to existing tankage, will provide nutrient removal with the flexibility to operate in MLE plug flow and step-feed biological nutrient removal configurations. The systems will be designed with additional flexibility to accommodate intensification alternatives in the future, such as densification or membrane aerated biofilm reactor technologies. As of January 2025, the design for Phase 1 has reached the 30 percent milestone. The project is expected to go out to bid in late 2025, with construction anticipated to begin in 2026.

Group	Discharger	Detailed Response
1	East Bay Dischargers Authority (EBDA)	EBDA is a combined outfall system that discharges effluent for six treatment plants. The status of each plant's nutrient reduction efforts is summarized below. Because several of the major upgrades described herein were designed prior to development of the effluent limits in the current permit, EBDA anticipates that additional time will be needed to achieve compliance, consistent with permit provision 6.3.6. As outlined below, the EBDA agencies are already working to identify additional projects. Dublin San Ramon Services District In 1995, DSRSD and East Bay Municipal Utility District (EBMUD) formed a partnership called the DSRSD-EBMUD Recycled Water Authority (DERWA) to produce recycled water from DSRSD's wastewater treatment plant. The DERWA Program treats secondary effluent from the DSRSD Regional Wastewater Treatment Plant to produce disinfected tertiary recycled water suitable for irrigation and other approved uses, thereby diverting secondary effluent from discharging via the EBDA system into San Francisco Bay. The first deliveries of recycled water began in 2006 and have steadily grown ever since. DERWA recycled 1,569 million gallons in 2024, thereby reducing the percentage of effluent discharged into San Francisco Bay by 36 percent. During the dry months of May through September in 2024, DERWA recycled 1,199 gallons, reducing effluent flows and loads by 72 percent. Oro Loma Sanitary District Plant upgrades that resulted in nitrogen load reduction were completed in year 2019. The project involved the addition of additional activated sludge tankage, as well as modification of existing tankage to facilitate nitrogen removal. The new tankage and modified tankage offers the ability to operate in a continuous or step-feed aerobic-anoxic configuration. City of Hayward The City is currently at 90 percent design for nutrient upgrades, and construction is tentatively scheduled to begin in the Spring of 2026. Construction is anticipated to be completed in July 2030. This project will include: a. Installation of a new pair of 1.5-million-gallon equalization/diurnal flow basins (3-million gallons total storage) to free up the site where the new biological nutrient removal (BNR) basins are going to be installed. b. Installation of 5-1-million-gallon basins to operate with Anoxic selectors and a step feed BNR process. This will include constructing anoxic and aeration zones with surface wasting operations. A new blower building and an alkalinity control facility will also be constructed as well as a new return activated sludge (RAS) chlorination injection

Group	Discharger	Detailed Response
		system for foaming control. c. Installation of 1 new secondary clarifier with return-activated sludge pump station. d. Retrofitting and upgrading two existing secondary clarifier structures and mechanisms. e. Demolition and removal of the West Trickling filter, which will open the required area for a new grit facility in order to allow the new BNR basins to operate as efficiently and effectively as possible. In parallel with this major upgrade, Hayward is also working on the following future projects: • The City received a $600,000 grant that will be used to further develop a conceptual design (30 percent design) for converting the former oxidation ponds into a free water surface wetland with horizontal levee to further treat/polish the secondary treated effluent. The City issued the RFP for the project in the fourth quarter of 2024 and is currently selecting a consultant. • The City awarded a contract for consulting services to develop a recycled water master plan for the City. The master plan includes identifying potential customers, the current recycled water treatment system quality and quantity to meet potential customer demands, and expansion goals and opportunities. City of Livermore Since the 1960s, the City has been producing recycled water for irrigation. During the last decade on average, the City recycled 1/3 of the effluent that could have been discharged to the Bay, with an even higher proportion during the dry months covered by the Permit. In addition its existing recycled water diversion, the City is considering the following nutrient reduction measures: • The City will evaluate if MLE or other processes can be accommodated by using redundant capacity (basin, blower), and upgrading the pumping and instrumentation. The evaluation will start in April 2025. • The City will expand recycled water use in the existing service area to accommodate future population growth. The demand increase is ongoing as more development is constructed. The City will also investigate the possibility of selling additional recycled water to neighboring agencies. • The City will explore trading options within the EBDA system. City of San Leandro San Leandro has been working on converting a disused treatment basin into a treatment wetland since 2018. This project will include an MABR nitrification system followed by distribution to a woodchip and vegetation seepage slope and then an open water pond system. The project has

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		been awarded grants from Measure AA through the San Francisco Bay Restoration Authority and the US EPA through the San Francisco Bay Water Quality Improvement Fund. The project will require stabilization of the material in the pond. In late 2024, a pilot test was performed to test the quantity of cement necessary for stabilization. The City expects to issue an Invitation for Bids in March 2025 and commence rough grading in late summer 2025. The remainder of the project is anticipated for construction in 2026. The project will treat approximately 20 percent of San Leandro's dry weather flow and remove about 95 percent of the nitrogen from that flow. In addition to the treatment wetland, San Leandro staff are working with consultants to develop a nutrient reduction roadmap. This involves modeling the treatment plant and proposing options for removing nitrogen. Options being investigated include treating belt press filtrate and returning it to headworks for denitrification and treating return activated sludge flow. The City has several tanks that are currently used for emergency storage that could be used for nitrification. The roadmap project will include planning level cost estimates of the recommended approaches. This will inform whether nutrient trading within the EBDA system is a viable option for the City. Staff are meeting with other EBDA members to discuss this option and have meet with Stanford researchers who may model various trading scenarios. San Leandro influent has a high degree of biochemical oxygen demand (BOD) variability which may cause problems with traditional nitrogen reduction approaches such as Modified Ludzack-Ettinger (MLE). Also under consideration are approaches that would remove nitrogen from the secondary effluent. These approaches include algae treatment or an offsite nature-based solution. Union Sanitary District (USD) Starting in 2015, USD's Enhanced Treatment and Site Upgrade Program was developed to renew and replace aging infrastructure, enhance wastewater treatment process, facilitate nutrient removal, and increase USD's resilience to extreme wet weather events and climate change. The ETSU Program includes the following project phases: • Phase 1A (in Construction): Retrofitting existing aeration basins to operate with anaerobic selector and a biological nutrient removal process. This will include constructing deoxygenation, anoxic, and flexible aeration zones; installing internal recycle pumps; and establishing new step-feed aeration and surface wasting operations.

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		Construction is anticipated to be completed by May 2027. • Phase 1B (Currently Bidding for Construction): Constructing four (4) 155-foot diameter secondary clarifiers, a mixed liquor control box, centralized return-activated sludge pump station, and effluent facilities. This will also include building new chlorination and dichlorination contact basins and a new effluent pump station and relocating the existing effluent force main. Construction is anticipated to be completed by August 2029. • Phase 1C (In Design): Retrofitting existing secondary clarifiers to operate as wet weather flow equalization basins. Construction is anticipated to be completed by January 2031 USD is also looking to partner with the South Bay Salt Pond Restoration project to identify, develop, and pilot a nature-based solution. This is a new and recent endeavor for USD.
1	East Bay Municipal Utility District (EBMUD)	EBMUD has been developing a full-scale biological nutrient removal (BNR) process since 2020, utilizing the existing treatment facilities at the Main Wastewater Treatment Plant. This pilot project operates during the dry season to test and maximize total inorganic nitrogen (TIN) removal by adjusting the secondary treatment process parameters. The pilot project has used increasingly large portions of the secondary treatment process since 2020. Over the last two years, the pilot project utilized 50 percent of the secondary treatment process consistently and piloted 75 percent for two months in 2024. Additional pilot testing will continue into the future. The BNR pilot project has reduced the annual average dry season Total Inorganic Nitrogen loads in 2023 and 2024 from the 2019-2023 average load listed in Table F-4 of the Nutrients Watershed Permit (R2-2024-0013). The listed 2019-2023 average load was 8,900 kg/day. The 2023 and 2024 average loads were 6,900 and 7,700 kg/day, respectively. As the pilot project expands and continues the average TIN loads are expected to drop further. EBMUD also provided the following information regarding future projects: Initial results from the BNR pilot study indicate that achieving nutrient goals is possible, but there will be no redundancy in the system. To address this, and the possibility that the BNR pilot will not meet nutrient goals, an Alternatives Analysis is being undertaken concurrently with the pilot project.

Group	Discharger	Detailed Response
		The District anticipates exploring two types of preliminary alternatives: Traditional Treatment Infrastructure and Optimization of Existing Infrastructure. The District prepared a Request for Proposals from nutrient removal experts to support the District in completing the alternatives analysis. As part of this project, the preliminary alternatives will be refined before performing subsequent technical analysis and selection of a compliance pathway. The alternatives analysis will be completed in parallel to the BNR pilot. Results/findings from each project will complement the other. Traditional Treatment Infrastructure: Preliminary alternatives that may be considered include options for capacity addition (i.e., adding new reactors for redundancy), intensification (e.g., hydrocyclone-based wasting to improve settling), split treatment, secondary process conversion, and sidestream treatment. Preliminary alternatives may also consider a combination of these options. Resource recovery via sidestream algal treatment is another solution that may be considered. This would require piloting to evaluate nitrogen recovery as an option instead of nitrogen removal. Optimization of Existing Infrastructure: Options to enhance the current pilot BNR performance and capacity by adjusting the solids retention time (SRT) and other operational changes are being considered. The piloting of this alternative has been ongoing before the release of the 2024 Nutrients Watershed Permit and significant nitrogen reduction has already been demonstrated for part of the dry weather season.
1	Fairfield Suisun SD (FSSD)	Project #1: Optimization - Lystek Direct Digestate Dilution Project - Implemented process interactions that allow FSSD digestate to be delivered directly to Lystek's biofertilizer reactors (i.e., no mechanical dewatering and the corresponding sidestream laden with nutrients). The estimated TIN load reduction is on the order of 10 to 15 percent. This Project was completed in October 2023. Project #2: Upgrade - Nitrogen Removal - Modifications to aeration basin activated sludge process to implement anoxic zones (Phase 1) and implement mixed liquor recycling (Phase 2) to improve denitrification. Phase 1 is scheduled for completion in 2027, and Phase 2 is estimated to be completed in 2033. After both Phases, FSSD is expected to meet its final TIN limit. FSSD has and will continue to explore recycled water and nature-based solution options. Implementation of a Recycled Water Master Plan is included in FSSD's current CIP. FSSD was also a part of the San Francisco Estuary Institute NbS study. FSSD is exploring these avenues

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		in the event of potential future changes in TIN limits or development of a trading program.
2	Millbrae, City of	In October 2024, the City completed a recycled water feasibility study for non-potable use. The City's wastewater treatment plant does not currently produce recycled water, so the study report provides recommendations for recycled water treatment and conveyance infrastructure improvements. The City is working on advancing its recycled water project towards implementation as recommended in the study report. To advance to full implementation, project partners (e.g. other neighboring agencies) and external funding are needed. The City plans to advance preparation of the basis of design and pre-design of the recycled water project in Calendar Year 2025. The recycled water project is not envisioned by itself to provide adequate reduction of nitrogen discharge to the San Francisco Bay for the City of Millbrae. Nutrient credit trading, which is not yet available to pursue, would be needed to provide the additional reduction needed for permit compliance. In October 2024, the City completed a recycled water feasibility study for non-potable use. The City's wastewater treatment plant does not currently produce recycled water, so the study report provides recommendations for recycled water treatment and conveyance infrastructure improvements. The City is working on advancing its recycled water project towards implementation as recommended in the study report. To advance to full implementation, project partners (e.g. other neighboring agencies) and external funding are needed. The City plans to advance preparation of the basis of design and pre-design of the recycled water project in Calendar Year 2025. The City expects that BACWA or other larger agencies will lead development of the program, and the City will participate once the program is established.

Group	Discharger	Detailed Response
1	Mt. View SD	The plant provides secondary treatment, including nitrification, using trickling filters. After treatment at the plant using traditional treatment infrastructure, nitrified effluent flows through Moorhen Marsh. The Marsh, constructed in 1974, was the first treatment wetland in the region. The marsh provides partial denitrification of effluent, with removal rates varying by season. Our facility already meets the final limit of 78 kg/day. We are still moving forward with investigating options for further nutrient reduction through the existing Moorhen Marsh to ensure breathing room with the limit. We are considering additional floating islands, configured and managed differently from current islands. We are also expecting a proposal by end of February 2025 for an alternate approach. Once that proposal is received, an approach will be selected and a timeline developed. Implementation of the project will begin in July 2025.
1	Novato SD	Project #1 Traditional Treatment Infrastructure NSD completed significant upgrades totaling over $100 million to its treatment facilities in 2010 including addition of a Modified Ludzack-Ettinger (MLE) Process for biological nutrient removal. Project #2 Recycled Water NSD completed the first phase by adding a Recycled Water Facility to provide 0.85 MGD to North Marin Water District's purple pipes in 2012. The second phase of construction completed in 2019 brought the capacity of the Recycled Water Facility production to 1.7 MGD. Although NSD expects to be able to comply with the interim and final TIN limits, NSD is still evaluating additional projects. 1) Optimization Operational optimization of the Modified Ludzack-Ettinger (MLE) Process to improve removal of TIN. 2) Nature-based Solutions – NSD is participating in the wetlands' restoration projects described below, however, these projects are not directly under NSD's control. Therefore, while NSD cannot currently quantify any nutrient reductions that may result from the completion of these projects, NSD anticipates that they may be of future value for nutrient reduction. Bel Marin Keys Unit V: The California State Coastal Conservancy is restoring the Bel Marin Keys Unit V property to various habitat types. NSD is coordinating with this restoration, and NSD's outfall will be modified in conjunction with the restoration to provide treated effluent to

Group	Discharger	Detailed Response
		the site, supporting the development of brackish marsh habitat. https://www.scc.ca.gov/webmaster/project_sites/belmarin/grr-seir_intro.html Deer Island Basin Restoration: Marin County Flood Control District is in the process of restoring the Deer Island Basin (which is adjacent to NSD's treatment plant) to tidal marsh. The conceptual basis for this project includes incorporating wastewater discharge into future horizontal levees. https://www.sfei.org/documents/novato-creek-baylands-vision-integrating-ecological-functions-and-flood-protection-within https://flooddistrict.marincounty.gov/novato-creek-baylands-strategy-plan/ 3) Recycled Water NSD is currently able to produce and supply the North Marin Water District (NMWD) with 1.7 MGD of Title 22 recycled water for their purple pipe distribution system, or approximately half of NSD's dry weather flow. The current usage is approximately 1.3 MGD during the dry weather months so there is room for expansion/increased usage. However, current and future decisions on demand and supply of recycled water is driven by and under the control NMWD as the water supplier and not NSD; NSD only serves as a passive recycled water producer for NMWD.
1	Palo Alto, City of	The Palo Alto Regional Water Quality Control Plant is in the middle of a secondary treatment upgrade. This project involves reconfiguration of existing aeration basins to contain alternating nitrification and denitrification zones with eventual installation of membrane aerated biofilm reactors in the last stage of anoxic zones to enhance nitrogen removal. The project consists of six construction phases. As of this writing, Phase 1 of construction is near completion and has completed reconfiguration of one out of the four aeration basins. Upgraded aeration basins will be operated in nitrification mode until the fixed film reactors are decommissioned in Phase 5 of the project. Construction is ongoing and is anticipated to be completed in 2028. In addition to this project, smaller facility optimization, recycled water, and NbS projects that are anticipated to slightly decrease nutrient discharges are also in progress.

Group	Discharger	Detailed Response
1	Pinole, City of	The Pinole-Hercules Water Pollution Control Plant upgraded their treatment plant in 2019 with the ability to operate in either carbonaceous biochemical oxygen demand (cBOD) or nitrogen removal modes. As such, the plant should be listed as an early actor. To date, the plant primarily operates in cBOD mode as there are concerns with foaming associated with increasing the sludge age for nitrogen removal, as well as a low food:microorganism ratio issue in the middle of the night which is thought to impact sludge settleability. The plant is in the process of developing a strategy for addressing these challenges to operate in nitrogen removal mode.
3	Rodeo Sanitary District (RSD)	Living Levee - only in the preliminary understanding phase. RSD has been working with Chris Lim of the Contra Costa Resource Conservation District to see if there is a project and available funding/grants to implement such a project. RSD is looking to optimize the existing treatment system to see if a low nutrient discharge is possible. The primary focus will be the aeration basin system, primary flow routing into the aeration basin, other recirculation possibilities and control of centrifuge centrate. Only in the preliminary phase and no real analysis has been completed. RSD is not sure who we could trade with but the most logical would be the City of Pinole WPCP. RSD and the City of Pinole WPCP share a deep-water outfall into San Pablo Bay. Other discharges in the area would also be considered. Over the past 15 years, RSD has invested substantial capital to modernize its aging infrastructure and bring it into the 21st century. However, this work is far from complete. Numerous major projects remain critical to ensuring RSD can operate effectively and efficiently to protect public health and the environment. While RSD had also hoped to advance recycled water projects, budget constraints have made it impossible to pursue all initiatives simultaneously. As a result, some projects may face temporary delays or even permanent postponement to meet the increasingly stringent regulations imposed by State and Federal agencies, which continue to expand upon an already extensive regulatory framework.

Group	Discharger	Detailed Response
1	San Francisco Airport (SFO)	Project #1: The Recycled Water System Project will construct a new advanced water treatment plant (AWTP) downstream of the new sequence batch reactors. The AWTP will use microfiltration, reverse osmosis, and ultraviolet disinfection to create reusable non-potable water. Programming completed in June 2024 and 100 percent design is anticipated Spring 2025. Project #2: The Sequence Batch Reactor (SBR) Upgrade project will construct a new SBR equipped with aerobic granular sludge (AGS). The project will retrofit the existing SBRs with the same AGS technology, construct a new blower building, and install new infrastructure to operate, monitor, and maintain the new system. Programming is complete and 50 percent design is anticipated in May 2025.
1	San Francisco Public Utilities Commission Treasure Island (SFPUC TI)	The new Treasure Island Water Resource Recovery Facility (TIWRRF) is considered an early actor because construction was initiated prior to issuance of the 3rd Watershed Permit effective date; construction notice-to-proceed was issued August 2023. The objective of TIWRRF project is to provide tertiary treatment to achieve an average dry weather flow capacity of at least 1.3 million gallons per day (MGD) and peak wet weather flow of 3.9 MGD to support the ongoing and future development on Treasure Island and Yerba Buena Island. Project will produce recycled water for existing and future non-potable water demands. The following is the list of assets that has been designed and constructed: (1) Influent pumping structure consisting of solids handling submersible centrifugal pumps, (2) Fine screening and handling systems consisting of internally fed drum screens with 2 mm perforations and washer/compactor, (3) Biological Nutrient Removal and Membrane bioreactor (MBR) trains , (4) Ultraviolet disinfection system, (5) Solids handling facility consisting of waste activated sludge (WAS) holding tanks, aeration blowers, thickener feed pumps, rotary drum thickeners, sludge transfer/truck loading pumps, (6) Constructed wetland pond, (6) Odor control system consisting of bio trickling filter followed by carbon adsorber, and (7) Distributed Control System to integrate and optimize performance of all processes. Construction completion is planned for 2026.

Group	Discharger	Detailed Response
1	San Jose/Santa Clara WPCP	1. Upgrade of advanced secondary treatment system: previous conventional secondary treatment system followed by nitrification treatment operated in series was upgraded to a parallel biological nutrient removal (BNR) process. This upgrade, which was not required by any regulation, increased overall secondary basin and treatment capacity and incorporated denitrification (nitrogen removal) into the advanced secondary treatment system. The BNR system achieved approximately a 40 percent reduction of TIN from 1998 – 2019. 2. Recycled Water: secured one of the first Title 22 recycled water permits (95-117) in 1995 and in 1998 began a Title 22 recycled water program. Initial driver for recycled water was to keep dry season discharges below an average dry weather effluent flow of 120 mgd due to marsh conversion concerns. Since 1998, the south bay water recycling (SBWR) program has expanded from initially 1-2 mgd of dry season recycled water to 16 mgd of recycled water in the dry season and 11 mgd annual average. Today the SBWR diverts approximately 900 kg/day of TIN from the lower south bay. 3. Optimization of BNR: Following metering, flow, and sludge control instrumentation and automation equipment replacements and upgrades, optimized the existing advanced secondary BNR process by targeted reductions of DO in anoxic zones, mixed liquor channels, and clarifiers. This was accomplished by reducing aeration throughout the 4-stage BNR process but especially in treatment zones where it is currently used for mixing. The result was an increase in TIN removal in the BNR process from the previous 40 percent reduction to now a 55 percent reduction. San Jose also provided the following information: Upgrade of existing advanced secondary aeration basins. The existing BNR process will be upgraded to a new process (SND/inDense) that will reconfigure the aerated and anoxic zones of existing basins, install mechanical mixing in anoxic zones to replace pulsed aeration mixing, and install hydrocyclones to separate and more precisely select and control activated sludge. The process will achieve simultaneous nitrification and denitrification (SND) and improve sludge quality through inDense hydrocyclones. This upgrade is in planning/scoping phase. The upgrade technology has been evaluated and compared against other upgrade treatment options in terms of cost, scalability, ability to phase and utilize current footprint and existing infrastructure. Project has not been initiated or fully funded. RWF anticipates beginning initial phase of the project by end of 2025 after completion of a technical update of the 2014 plant master plan (update to be completed in spring 2025). First

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		step of initiation will identify the preferred procurement and project model pathway and timeline for project phases. RWF operators and engineers are continuously seeking opportunities to optimize and get the best removal out of our process while balancing energy, chemical, infrastructure, basin capacity, operational, and cost constraints as demonstrated by recent improvements in denitrification efficiency. "Ongoing and continuous efforts to expand non-potable recycled water with private companies and water retailers in San Jose, Santa Clara, and Milpitas. Current constraints are infrastructure expansion to deliver recycled water to more of the service area. Recently entered into agreement with water retailer San Jose Water Company for an additional 5 mgd of recycled water over the next 10 years. Expansion of non-potable reuse is an ongoing effort to identify interested new customers and existing customers interested in expanding recycled water use. The program has grown slowly but steadily over the past 26 years. A potable reuse project is in very early stages and under discussion with regional partner Valley Water. Any potable reuse project would need to include management or treatment of the reverse osmosis concentrate (ROC) through a technology treatment system or through a nature-based solution (NbS) in order to realize meaningful nitrogen reductions." Sidestream treatment: this may be a viable alternative to managing the concentrated centrate return from the mechanical dewatering facility that is expected to be commissioned and operational by end of 2025. A real-world evaluation of the strength of the centrate return would need to be conducted first, selection of technology, and feasibility and cost of a sidestream treatment system would also need to be evaluated. At this point, this is purely conceptual. RWF has done an initial evaluation of nature-based solutions. There are opportunities for NbS in the vicinity of the RWF, which include re-purposing areas currently and formerly used for solids management (lagoons and drying beds) as open-celled treatment wetlands. There is also the potential for a horizontal levee on the bayward side of the future south bay shoreline flood control levee. An ecotone levee is planned to be a feature of the future flood control levee. The levee project is led (and funded) by U.S. Army Corps of Engineering, Valley Water, and State Coastal Conservancy. The timeline for both the levee and the availability of the solids handling areas are approximately 10 years in the future. Additionally, the initial desktop evaluation indicates that the NbS options would not be sufficient to treat a large volume of RWF final

Group	Discharger	Detailed Response
		effluent. They would be more effective if used to treat a more concentrated waste stream such as reverse osmosis concentrate.
1	San Mateo, City of	Project #1: This project involves construction of a Biological Nutrient Removal (BNR) and MBR facility that will transition San Mateo away from a traditional activated sludge process. Facility is scheduled to start treatment in July 2025.
3	Sausalito-Marin City SD (SMCSD)	Traditional Treatment Infrastructure: 1. Secondary Process Modifications. 2. Sidestream Treatment 3. Recycled Water. Process Optimization: 1. Nitrifying Trickling Filters with Denitrifying Tertiary Filters. 2. Process optimization with use of Ferric Chloride to treat nutrients at headworks and at an offline tank of sidestreamed Reactivated Sludge(RAS). 3. Installation of Membrane Bioreactor (MBR) for dry weather nutrient removal and recycled water. Recycled Water 1. Installation of a 1 mgd Membrane Bioreactor (MBR) with UV Disinfection. 2. Conversion of one of two Secondary Sedimentation Basins into an aeration basin with the addition of UV disinfection after the existing tertiary Disc Filtration Issue an RFP for annual (capital and O&M) cost per kg N/Day to Bay Area POTWs. Regional Water Quality Control Board Negotiation - due to the size of our plant, the dry weather discharge volume of less than 1 MGD. the high dilution rate at discharge due to our location, unfairness of huge capital costs of a 40 percent reduction for small POTWs versus the large POTWs, and having to discharge recycled water into the bay due to having no water rights and no large customers in the area willing to take the water, we hope to be given consideration of our actual impact to San Francisco Bay.

Group	Discharger	Detailed Response
3	SD No. 5 of Marin County (Tiburon)	The District hired a consulting firm to evaluate the Districts options for preliminary alternatives as they were a minor discharger that did not receive an evaluation as part of the first regional nutrient watershed permit (R2-2014-0017). The evaluation suggests that the District move forward with one or more of the following alternatives: Sidestream Treatment to treat mechanical dewatering reject water. This stream is laden with 15 to 25 percent of the plant discharge nitrogen load. Seasonal MLE, whereby the sludge age would be increased in during the dry season foster ammonia removal, followed by creation of an anoxic zone within the existing aeration basins to facilitate biological denitrification. A concern with such a sludge age transition is the formation of nitrite associated with incomplete nitrification that could result in an increase in chlorine demand for several days (known as nitrite lock; on the order of five times greater than typical demand. Year-Round MLE: similar to alternative #1 with the exception that the District would operate in this mode year-round. The benefits of year-round operation would alleviate any concerns with nitrite lock, as well as the need to modify the biology a couple times per year. There are concerns with maintaining plant performance year-round. The compliance pathway will be more clearly defined in next year's update.
3	Sewerage Agency of Southern Marin (SASM)	Three potential sites have been identified as potential sites for a nature-based solution. These sites each have different limitations and are currently in the research phase. The Agency already supplies effluent to a recycled water plant owned by the City of Mill Valley with a capacity to treat and store approximately 0.1MGD. Acquiring and expanding this plant and identifying customers would be required to satisfy the nutrient reduction needs. This alternative is currently in the research phase. We are open to consider any viable and practical trading alternatives as we have a very small and restricted treatment plant site. We are researching what the options of partnering with CMSA could be and would welcome other partnerships if they help us comply with regulatory needs and make financial sense.
1	SFPUC Southeast Plant (SFPUC SEP)	The SFPUC considers itself an early actor in terms of the permit's recognition that early actors may be provided more time to comply with final limits. The SFPUC's construction of the new Treasure Island Facility includes biological nutrient removal and was started before approval of the 3rd Watershed Permit, which meets the permit definition of an early actor. The funding, contracting resources, and staff resources to implement improvements at Treasure Island and the Southeast Plants

Group	Discharger	Detailed Response
		are the same and rely on the same rate-payer base. For the Southeast Plant, the SFPUC will continue report on the status of improvements to SEP consistent with the requirements of Table 5 in 6.3.3.1. Based on a preliminary conceptual evaluation, the proposed project assumes a scope of work that includes: - the retrofit of the existing high purity oxygen activated sludge system to produce densified activated sludge; - the construction of a new biological nutrient removal system; - modification of existing aeration basins; - replacing the pure oxygen system; and - other major components, including supporting appurtenances and utilities. The proposed project includes planning, environmental review, progressive design-build contract procurement, design and construction, and closeout phases of the project. Note that the SFPUC requests to be considered an early actor because construction of the new Treasure Island Facility includes biological nutrient removal and was started before approval of the 3rd Watershed Permit. The funding, contracting resources, and staff resources to implement improvements at Treasure Island and the Southeast Plants are the same and rely on the same rate-payer base. Funding for this project has been approved in the capital improvement program budget based on an analysis of conceptual traditional infrastructure alternatives that was completed in 2023. The following planning started in 2024: - a project team has been assigned, - workshops to evaluate project delivery options have been completed, - updated flows and loads analysis and sensitivity analyses on population projections is underway, - coordination with the SFPUC Water Enterprise to evaluate synergies with water supply needs has been initiated, and - coordination with the SFPUC Power Enterprise to ensure adequate power supply has been initiated. The project delivery method of progressive design-build was selected in February 2025. A Needs Assessment Report is currently underway; thereafter, an Alternatives Analysis Report and a Conceptual Engineering Report will be completed. Design-build contractor is anticipated to be on board by end of 2025.

Group	Discharger	Detailed Response
3	Silicon Valley Clean Water (SVCW)	I wish to outline several strategic approaches that SVCW is currently evaluating in response to the new nutrient regulations: 1. **Strategic Treatment Advancement Roadmap (STAR):** We are collaborating with Hazen and Sawyer to formulate a comprehensive plan to enhance our wastewater treatment plant. This plan will leverage our existing tank capacity and identify opportunities for process improvements. 2. **Sidestream Treatment Approach:** After thorough analysis, we selected the DEMON process to remove nitrogen from the sidestream. 3. **PureWater Peninsula Initiative:** SVCW is engaged in meaningful discussions with the San Francisco Public Utilities Commission and other relevant organizations to advance the PureWater Peninsula project. This initiative aims to employ advanced technology to treat recycled water sourced from SVCW and San Mateo wastewater treatment plants, ensuring compliance with drinking water standards. 4. **Expansion of Recycled Water Delivery:** Furthermore, we are in ongoing discussions with Redwood City concerning the enhancement of our recycled water delivery capabilities as they expand their distribution system.
2	South San Francisco and San Bruno	In 2022 Contractors completed plant improvements prescribed in the ten-year Facility Plant Update. One of the major improvements to the activated sludge systems included the addition of anaerobic selectors to the aeration basins. Engineers designed the anaerobic selectors to improve secondary clarifier solids settleability. Although designed to control activated sludge bulking, the anaerobic selectors also facilitate enhanced biological phosphorus removal as evidenced by a total phosphorus load reduction of greater than 85 percent since commissioning. The compliance pathway consists of process modifications to the existing aeration basins to provide nutrient removal (Anaerobic zone, anoxic zone, and aeration zone). In July 2024, the City of South San Francisco-San Bruno entered into a contract with Hazen to design pathways for meeting the new nutrient permit. In October 2024, Hazen collected baseline data for the development of a Biowin model to assess the facility's capacity.

Group	Discharger	Detailed Response
		In January 2025, Hazen presented the available alternatives for consideration.
1	Sunnyvale, City of	New Secondary Treatment Facilities which include construction of a Conventional Activated Sludge system (MLE process) designed to achieve nitrification and partial denitrification, a DEMON (deammonification) sidestream treatment system , and more, that will help Sunnyvale to be less reliant on the current pond system that can be hard to control. This will also improve Recycled Water production. Construction completion due May 2028.
2	Vallejo Flood and Wastewater District	The compliance pathway consists of the addition of activated sludge tankage configured for nutrient removal (MLE). The District will explore nutrients credit trading if a program becomes available. The District is preparing to hire a program manager by the end of the year. At the same time, studies and sampling are underway to provide a foundation for future design activities.
1	West County Wastewater (WCW)	In 2017, WCW completed upgrades to its activated sludge process, converting to the Modified-Ludzack-Ettinger (MLE) configuration. Since August of 2019, effluent Total Inorganic Nitrogen has averaged 6.25 mg/l with a low value of 4.3 and a high of 10.0 mg/L. More recently, WCW has installed a dual core Neuros centrifugal blower as its main air supply for the aeration system. This project and associated control system stabilized dissolved oxygen levels in the aeration basins while reducing electrical consumption at the same time. In addition to the changes noted above, WCW, under agreement with, provides its final effluent to the East Bay Municipal Utility District for further treatment then provided to the Chevron in place of potable water. The recycled water is used for cooling towers and boiler makeup. During the dry weather season, about 90 percent of WCW effluent is recycled and does not impact San Francisco Bay.

3.2 Others

There are four agencies excluded from this Appendix: (i) City of Petaluma, ii) Las Gallinas Valley, iii) Napa Sanitation District Sanitary District, and iv) Sonoma Valley County Sanitation District) as they are subject to dry season discharge prohibitions. As a result, they do not have effluent limitations in Table 4 of the 2024 Permit.

There are three dischargers whose loads are already lower than the Permit's Table 4 final effluent limitations and are thus not currently planning or investigating alternatives for additional TIN load reductions. This list is expected to grow in coming years as agencies plan and implement actions identified in this appendix. As of 2025, the list includes:

- Two Facilities: i) **Crockett Community Services District (Port Costa Wastewater Treatment Facility)** and ii) **Sanitary District Number 5 of Marin County (Paradise Cove Treatment Plant)** are minor dischargers (less than 1 MGD) and their final effluent limits were developed differently from other dischargers, as described on page F-26 of the Permit. Their combined contribution is less than 0.02 percent of the aggregate dry season load to San Francisco Bay. These two facilities are not discussed further in this appendix.
- **The City of American Canyon** provides nutrient removal through treatment and recycled water diversions. The facility is listed as an "Early Actor" in this appendix.

4 Next Steps

This compliance milestone schedule report will be updated and submitted annually, as required by Section 6.3.3 of the 2024 Permit.

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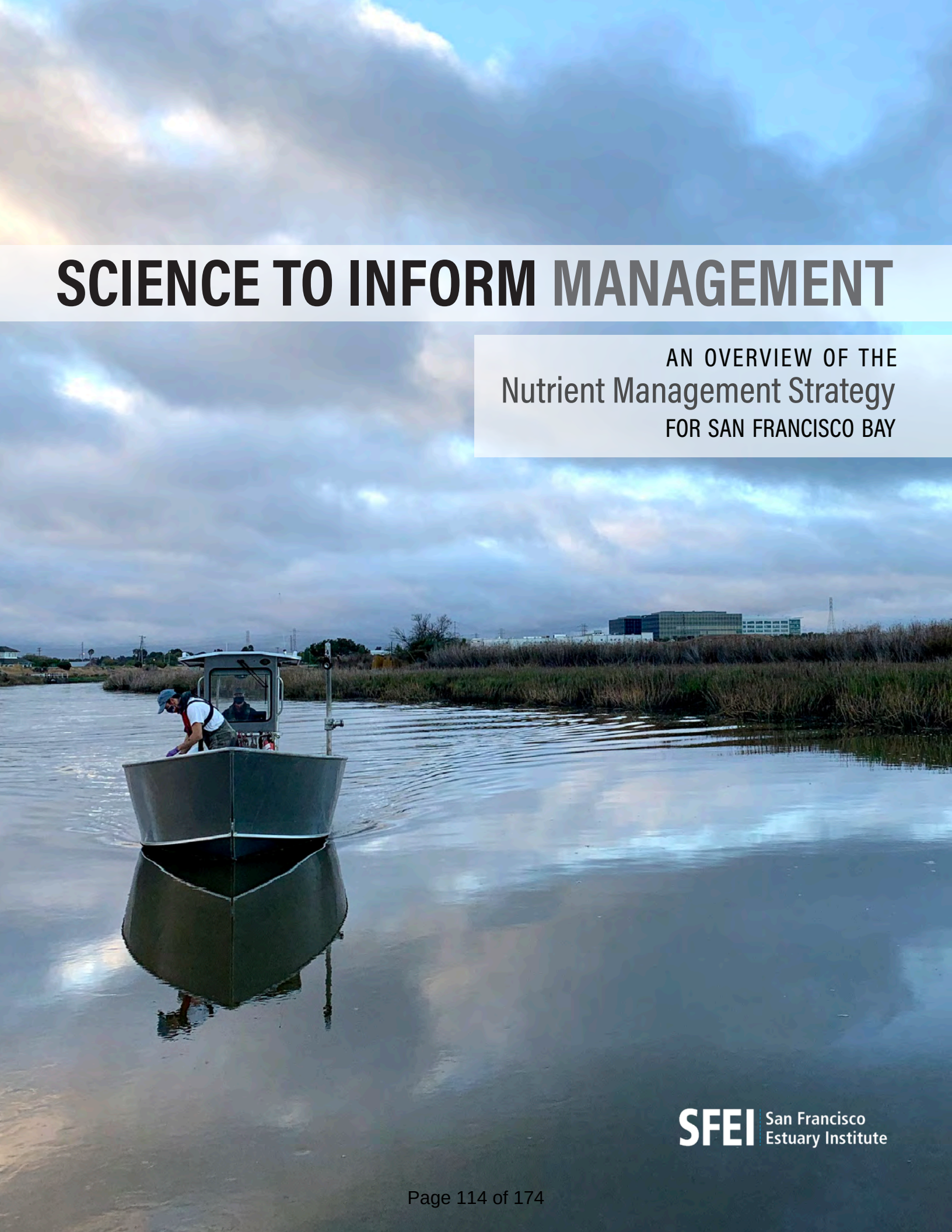

SCIENCE TO INFORM MANAGEMENT

AN OVERVIEW OF THE Nutrient Management Strategy FOR SAN FRANCISCO BAY

SFEI San Francisco Estuary Institute

Acknowledgements

We extend our gratitude to the San Francisco Bay Nutrient Management Strategy Steering Committee, technical advisors, and scientific collaborators for their invaluable guidance and feedback, which have been instrumental in shaping the program and ensuring its scientific integrity.

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SCIENCE TO INFORM MANAGEMENT

AN OVERVIEW OF THE
Nutrient Management Strategy
FOR SAN FRANCISCO BAY

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SFEI San Francisco Estuary Institute
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March 2025

*A product of the **Nutrient Management Strategy** team at SFEI*

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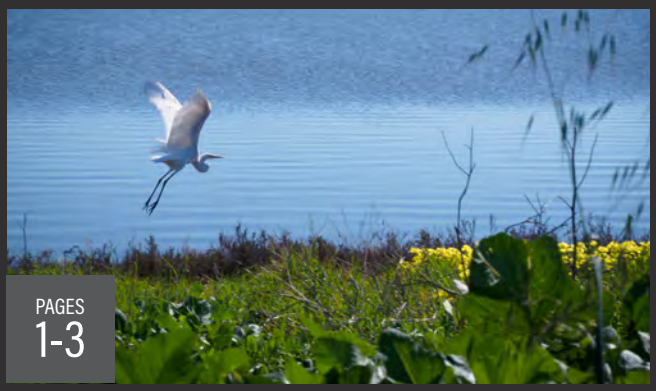

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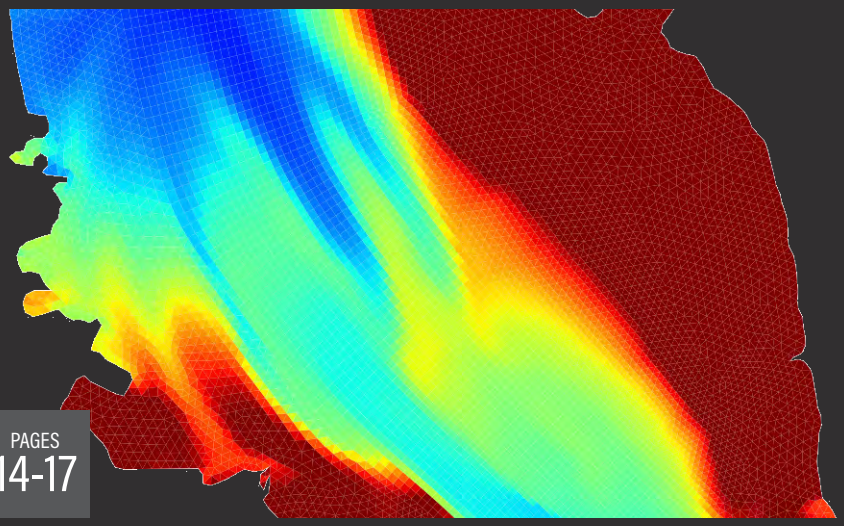

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IMAGES BY SFEI STAFF

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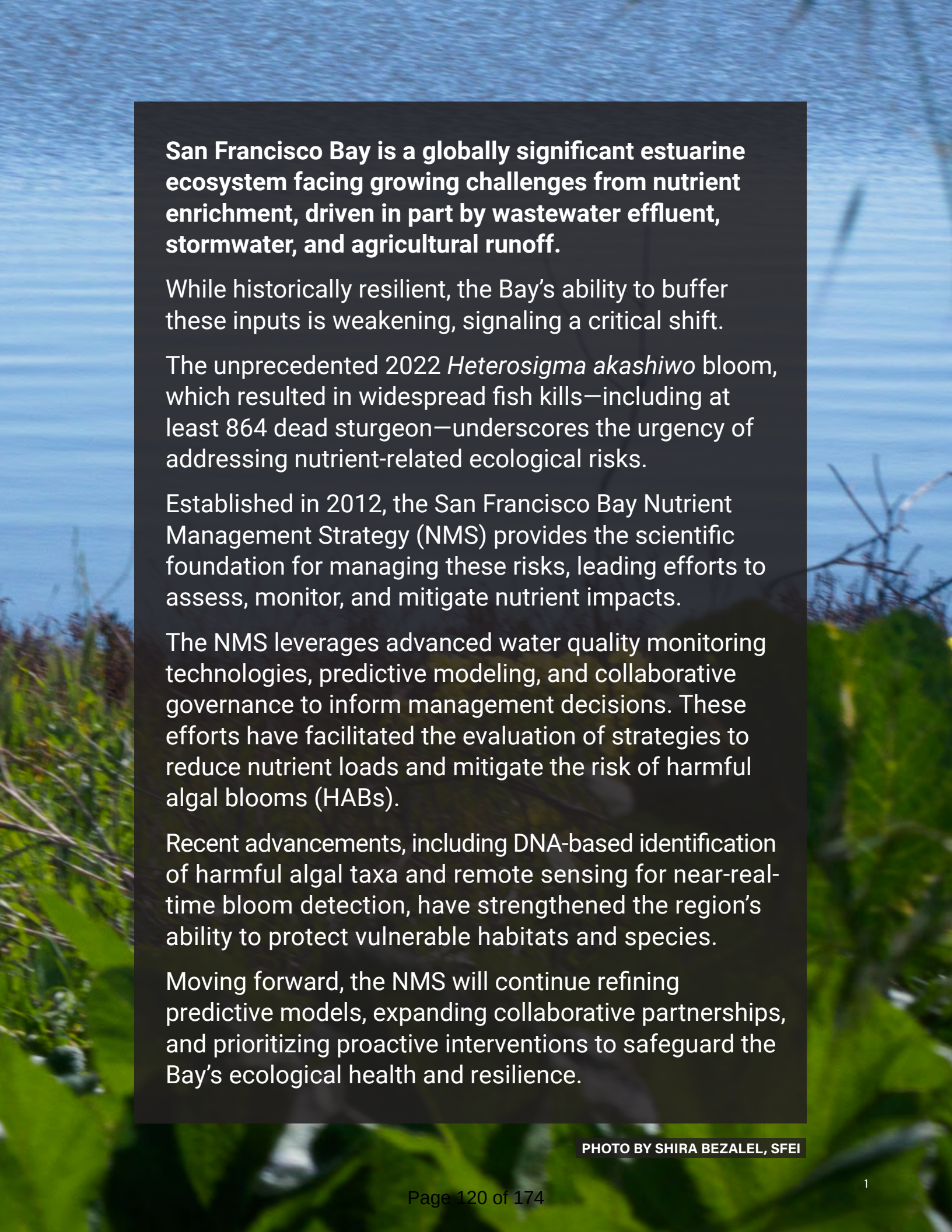
01 Executive Summary



San Francisco Bay is a globally significant estuarine ecosystem facing growing challenges from nutrient enrichment, driven in part by wastewater effluent, stormwater, and agricultural runoff.

While historically resilient, the Bay's ability to buffer these inputs is weakening, signaling a critical shift.

The unprecedented 2022 *Heterosigma akashiwo* bloom, which resulted in widespread fish kills—including at least 864 dead sturgeon—underscores the urgency of addressing nutrient-related ecological risks.

Established in 2012, the San Francisco Bay Nutrient Management Strategy (NMS) provides the scientific foundation for managing these risks, leading efforts to assess, monitor, and mitigate nutrient impacts.

The NMS leverages advanced water quality monitoring technologies, predictive modeling, and collaborative governance to inform management decisions. These efforts have facilitated the evaluation of strategies to reduce nutrient loads and mitigate the risk of harmful algal blooms (HABs).

Recent advancements, including DNA-based identification of harmful algal taxa and remote sensing for near-real-time bloom detection, have strengthened the region's ability to protect vulnerable habitats and species.

Moving forward, the NMS will continue refining predictive models, expanding collaborative partnerships, and prioritizing proactive interventions to safeguard the Bay's ecological health and resilience.

PHOTO BY SHIRA BEZALEL, SFEI

KEY TAKEAWAYS

Bay Resilience and Vulnerability

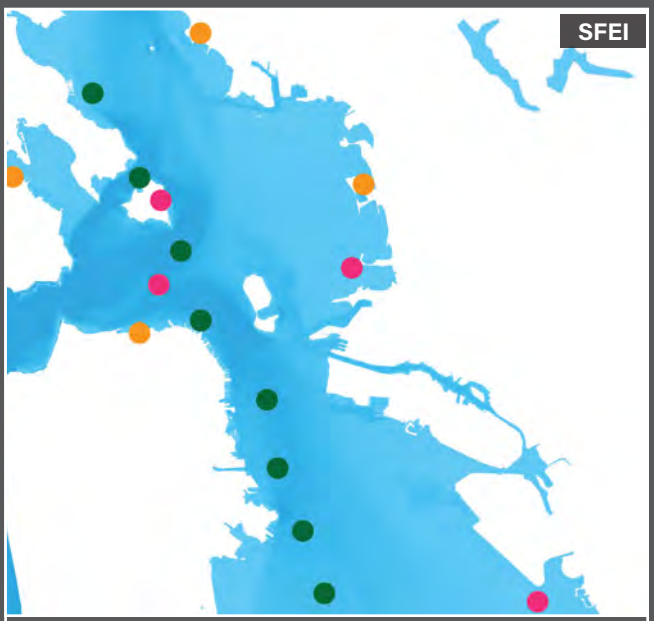
Historically, high turbidity, strong tidal mixing, and filter-feeding organisms, like oysters, helped mitigate nutrient impacts. However, recent trends (e.g., increased phytoplankton biomass and harmful algal blooms) demonstrate this resilience is weakening.

IMAGERY BY COPERNICUS SENTINEL (2019) CC BY-SA 3.0

Harmful Algal Blooms (HABs)

The 2022 *Heterosigma akashiwo* bloom exhibited unprecedented biomass levels, widespread dissolved oxygen depletion, and significant fish mortality, likely due to toxin production or other harmful mechanisms.

PHOTO CONTRIBUTION BY CITIZEN SCIENCE GROUP



Advancing Detection & Monitoring

Early detection of blooms through citizen science and advanced remote sensing has improved response capabilities. However, gaps remain in understanding the triggers of HABs and their long-term ecological impacts. The NMS is filling these gaps through world-class models, advanced sensors, and real-time monitoring.

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Critical Role of Nitrogen

Nitrogen levels are a key driver of algal blooms and chronic low dissolved oxygen, especially in shallow South Bay habitats, with strong links between nutrient availability, phytoplankton production, and oxygen depletion.

Wastewater Contributions

About 90% of dry season nutrient loads in San Francisco Bay come from wastewater treatment plants, dominated by dissolved inorganic nitrogen (DIN) and phosphorus, with South and Lower South Bays experiencing the highest concentrations.

ALAMY

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Ongoing Science Needs

Improved predictive tools to evaluate the potential for future HAB events and the consequences of nutrient load reductions are critical for informing actions to reduce the risk of HABs in the Bay and coastal areas.

4 PHOTO BY ARIELLA CHELSKY, SFEI

02

Introduction

The Bay's natural resistance to high nutrient concentrations is weakening

The East Bay Municipal Utility District main wastewater treatment plant (shown in the aerial photograph below) is one of the largest treatment facilities around the Bay that collects, treats, and safely discharges wastewater to the San Francisco Bay (photograph courtesy of Alamy).

Nutrient Dynamics in San Francisco Bay

San Francisco Bay is a vital estuarine ecosystem that supports a complex food web dependent on regular inflows of essential nutrients like nitrogen and phosphorus.

While these nutrients are crucial for ecological health, excessive inputs can degrade water quality and disrupt habitat stability. Over-enrichment can fuel excessive phytoplankton growth, deplete dissolved oxygen, and trigger harmful algal blooms (HABs).

As one of the most nutrient-enriched estuaries globally, San Francisco Bay receives the majority of its nutrients from treated effluent discharged by 37 wastewater treatment plants in the Bay.

Historically, high suspended sediment levels limited sunlight penetration, while strong tidal mixing kept phytoplankton from remaining in the light-rich upper water column long enough to proliferate.

However, recent data suggest the Bay's natural resistance to nutrient overloading is weakening. Rising phytoplankton biomass, declining dissolved oxygen in some regions, and increasing detections of multiple HAB species signal a critical shift in the Bay's resilience.

The San Francisco Bay Nutrient Management Strategy

The San Francisco Bay Nutrient Management Strategy (NMS) was established in 2012 as a response to escalating nutrient-related challenges in the Bay. The NMS Science Program, based at the San Francisco Estuary Institute (SFEI) and collaboratively managed with the Regional Water Quality Control Board and other key stakeholders, operates under a structured governance model.This framework includes a 15-member Steering Committee comprising stakeholders from various sectors, including regulators and dischargers. This committee, supported by technical advisors and specialized workgroups, oversees the strategic direction and implementation of the NMS, ensuring that it remains responsive to the evolving needs of San Francisco Bay.

Mission

The mission of the NMS is to develop a comprehensive understanding of nutrient dynamics within San Francisco Bay to inform and guide effective management and policy decisions. This mission encompasses a range of activities, including continuously monitoring water quality parameters and developing numerical models to simulate and assess the effectiveness of management alternatives. By deploying technologies like moored sensors and engaging in high-frequency biogeochemical mapping, the NMS aims to enhance the understanding of nutrient cycling and the impacts of HABs. These efforts are crucial for developing informed, science-based strategies to mitigate the negative effects of nutrient over-enrichment and to protect the Bay's ecological health.

Impact

The NMS has influenced critical water quality management decisions across San Francisco Bay through its rigorous research and monitoring efforts. Through real-time data and analyses of nutrient dynamics, the NMS delivers crucial information for the stakeholders managing the Bay's complex ecological challenges. These efforts have contributed to significant policy decisions, including the establishment of a regional permit regulating the discharge of treated effluent from thirty-seven wastewater agencies into the Bay.

The urgency of addressing nutrient enrichment was underscored by the 2022 HAB event, which triggered ecological impacts from San Pablo Bay to the Lower South Bay. This incident triggered regulatory action intended to preserve the Bay's health. Consequently, there is a heightened focus on continuous monitoring and data integration to support scenario modeling and adaptive management strategies. §

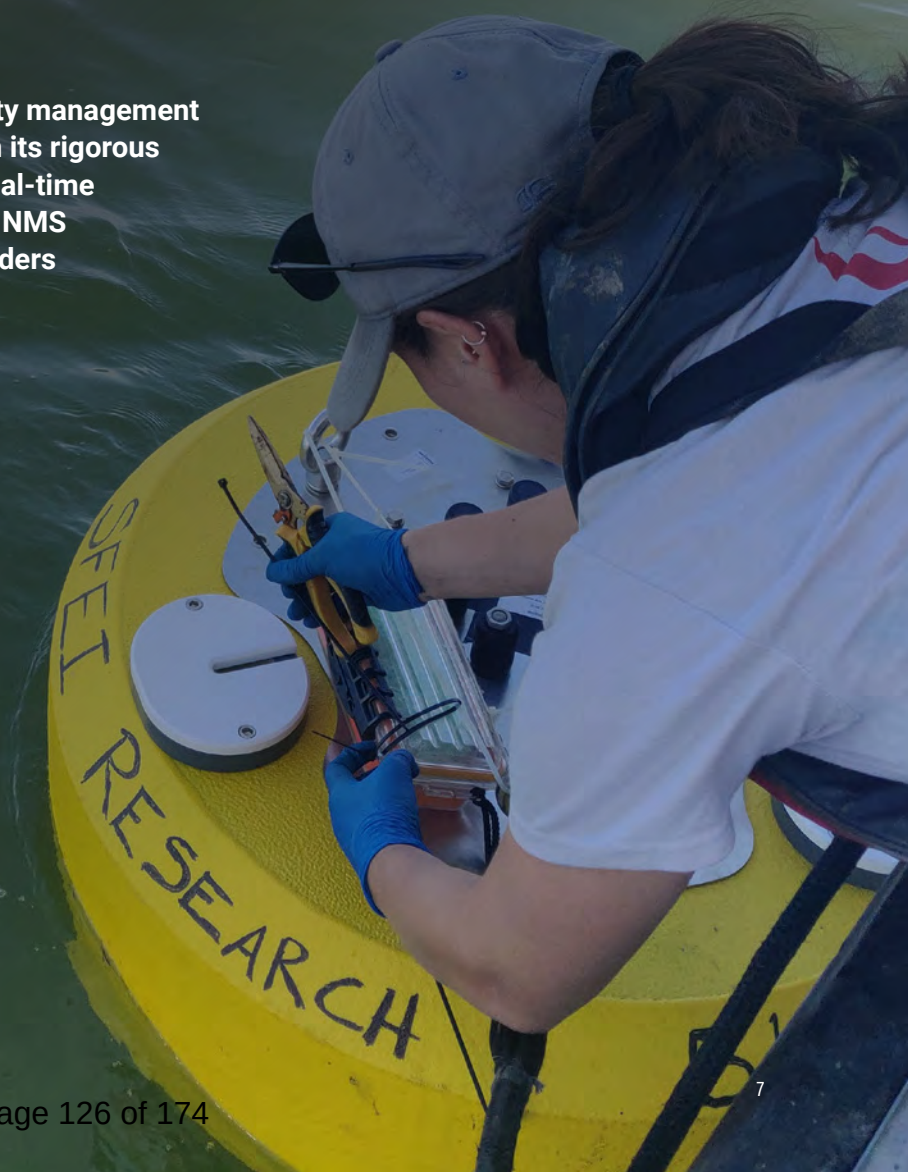


PHOTO BY LILIA MOURIER, SFEI

03 Monitoring Nutrients

in San Francisco Bay

Historical Context of Monitoring Efforts

Nutrient monitoring in San Francisco Bay has its roots in the late 1960s when the U.S. Geological Survey (USGS) began systematic water quality assessments. From the early 1980s, biweekly to monthly monitoring has tracked numerous nutrient-related water quality parameters and yielded key insights into the underlying physical and biogeochemical processes that produce those conditions. This early data collection set the stage for a comprehensive understanding of how nutrient levels have influenced the Bay's ecological dynamics.

In 1993, SFEI began implementing the Regional Monitoring Program (RMP) on behalf of regulators and stakeholders. The RMP was designed to consistently assess the Bay's ecological health. It established a robust monitoring collaboration with USGS and other partners aimed at identifying pollution sources, monitoring long-term trends, and evaluating water quality improvement measures. This partnership has significantly enhanced the depth and scope of data collection, profoundly shaping our understanding of the impacts of nutrients in San Francisco Bay.

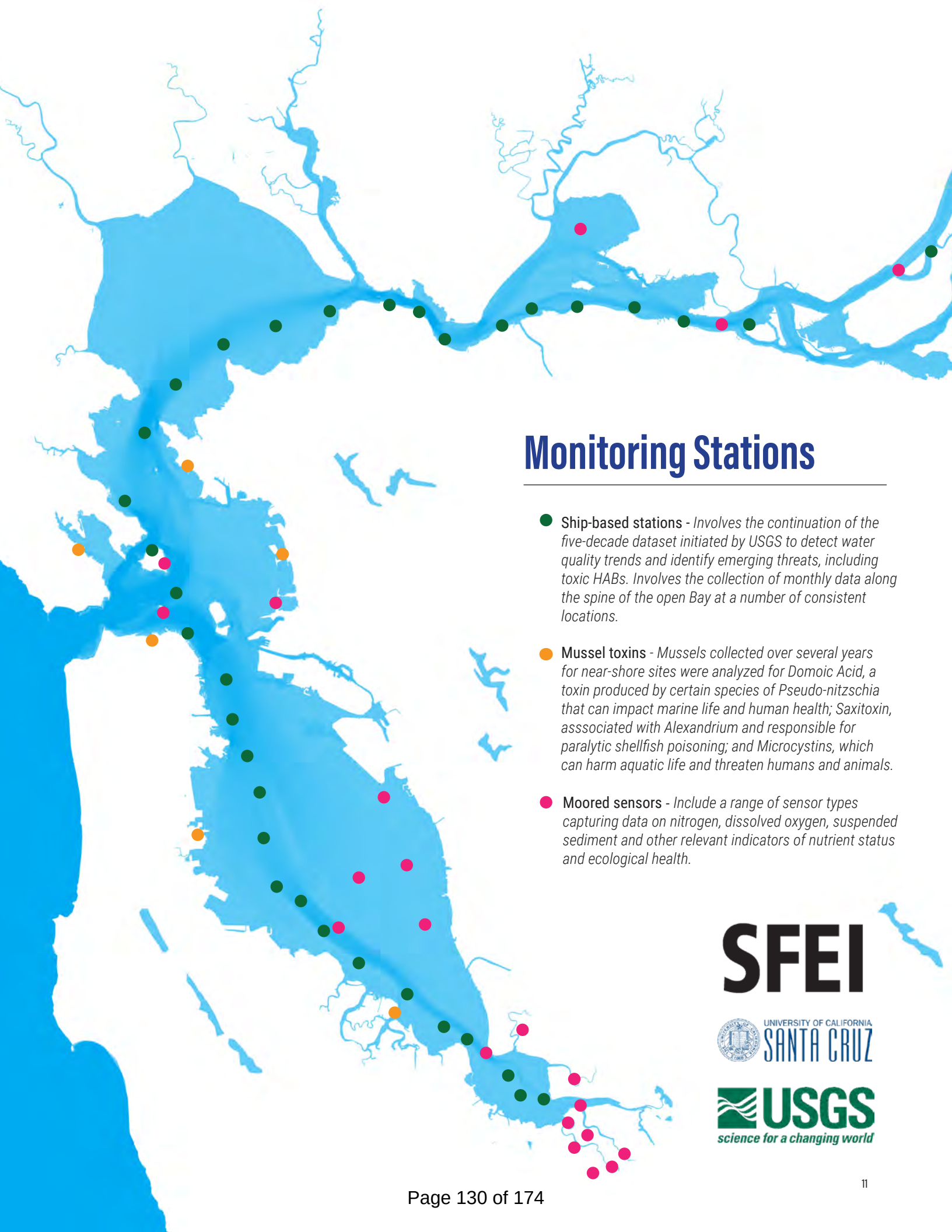
PHOTO BY SHIRA BEZALEL, SFEI

PHOTO BY EMILY CORWIN, SFEI

Advancements Under the Nutrient Management Strategy

In 2012, growing concerns over the potential impacts of nutrient overloading prompted the San Francisco Bay Regional Water Quality Control Board to initiate the NMS as a collaborative science effort targeting the highest-priority management and science questions identified by a diverse group of stakeholders, including wastewater agencies, regulators, and environmental groups. The science program was designed to proactively address the Bay's nutrient challenges before adverse conditions similar to those seen in other nutrient-enriched systems emerged. This forward-looking approach reflects a shared commitment to managing and protecting the Bay's ecosystem.

Through this collaborative effort, the NMS has advanced the understanding of nutrient dynamics, phytoplankton diversity, and harmful algal toxins, with contributions from enhanced nutrient and phytoplankton monitoring and HAB-related parameter measurements by USGS. A major innovation, the Moored Sensor Program, operates in South Bay and Lower South Bay, collecting critical data every 15 minutes in regions excluded from long-term monitoring programs, enabling detection and interpretation of phenomena missed by traditional ship-based sampling.



Monitoring Stations

- **Ship-based stations** - *Involves the continuation of the five-decade dataset initiated by USGS to detect water quality trends and identify emerging threats, including toxic HABs. Involves the collection of monthly data along the spine of the open Bay at a number of consistent locations.*
- **Mussel toxins** - *Mussels collected over several years for near-shore sites were analyzed for Domoic Acid, a toxin produced by certain species of Pseudo-nitzschia that can impact marine life and human health; Saxitoxin, asssociated with Alexandrium and responsible for paralytic shellfish poisoning; and Microcystins, which can harm aquatic life and threaten humans and animals.*
- **Moored sensors** - *Include a range of sensor types capturing data on nitrogen, dissolved oxygen, suspended sediment and other relevant indicators of nutrient status and ecological health.*

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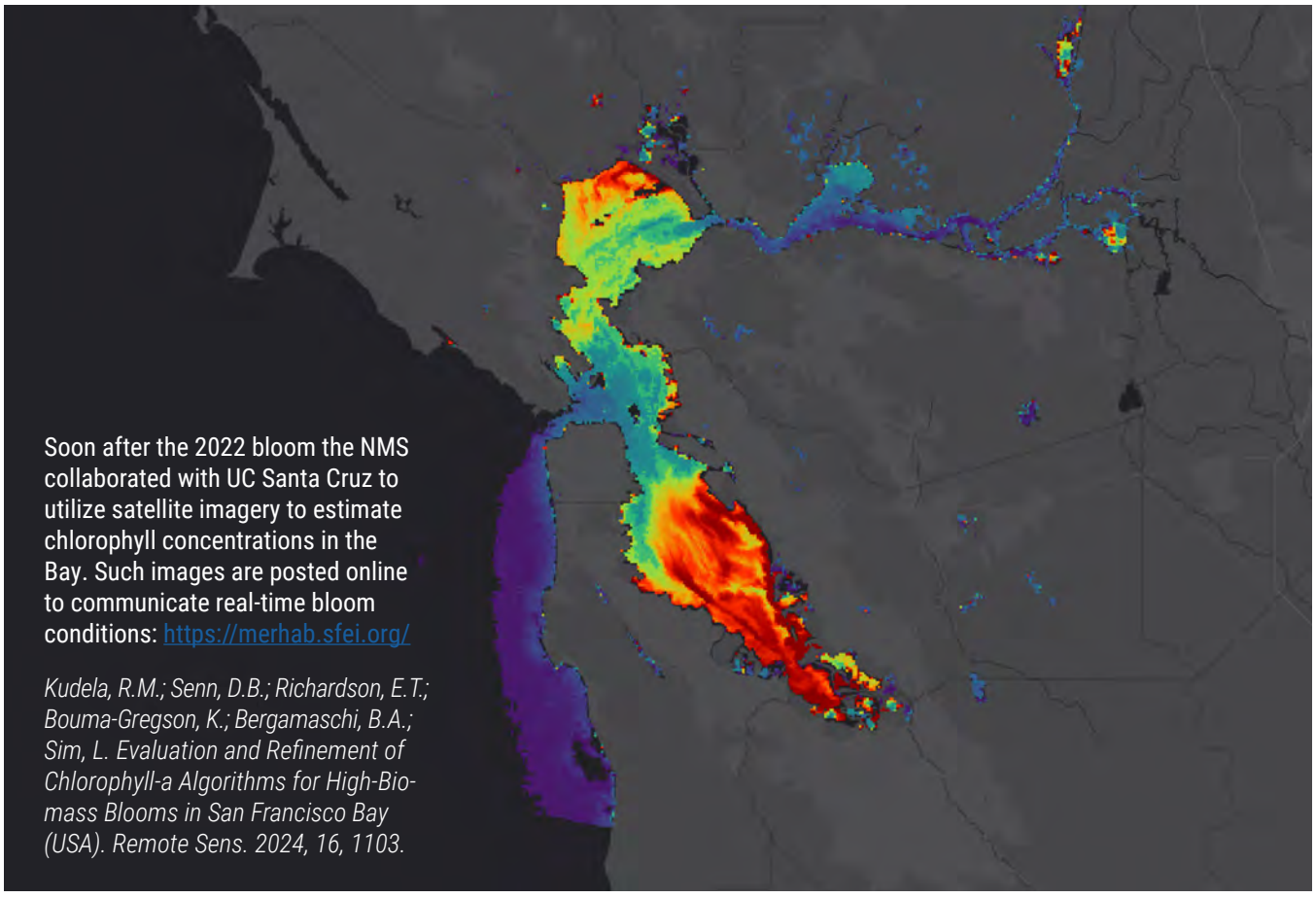
USGS science for a changing world

Enhanced Monitoring to Support Decision Making

Over the last several years the NMS incorporated multiple cutting-edge scientific methods into the nutrient monitoring framework:

- **DNA-Based Techniques:** Techniques like quantitative PCR (qPCR) precisely count specific harmful algae types, providing exact numbers of these organisms in water samples. Another method, metabarcoding, uses DNA sequencing to evaluate the relative abundance of various algae and bacteria, including harmful species, helping understand their ecological impact.
- **Biogeochemical Mapping Cruises:** In collaboration with the USGS Biogeochemistry group, these high-speed cruises target the biogeochemical processes in South Bay shoal habitats, improving our understanding of nutrient cycling and ecosystem productivity.
- **Algal Toxin Tracking:** Intended to monitor algal toxin presence, the biweekly collection of native mussels from the Bay's shoreline generates a record of toxins entering the local food web. Since 2015, its focus has been on monitoring harmful algal toxins like saxitoxin, domoic acid, and microcystin. Despite ongoing efforts, occasional exceedances of toxin thresholds highlight the persistent public health and ecological risks posed by HABs.
- **Remote Sensing for Bloom Detection:** Developed in collaboration with UC Santa Cruz to address the inadequacies of existing algorithms at detecting bloom extents, a refined two-band algorithm has proven effective in both bloom and non-bloom conditions. Near real-time data is available on a public map.



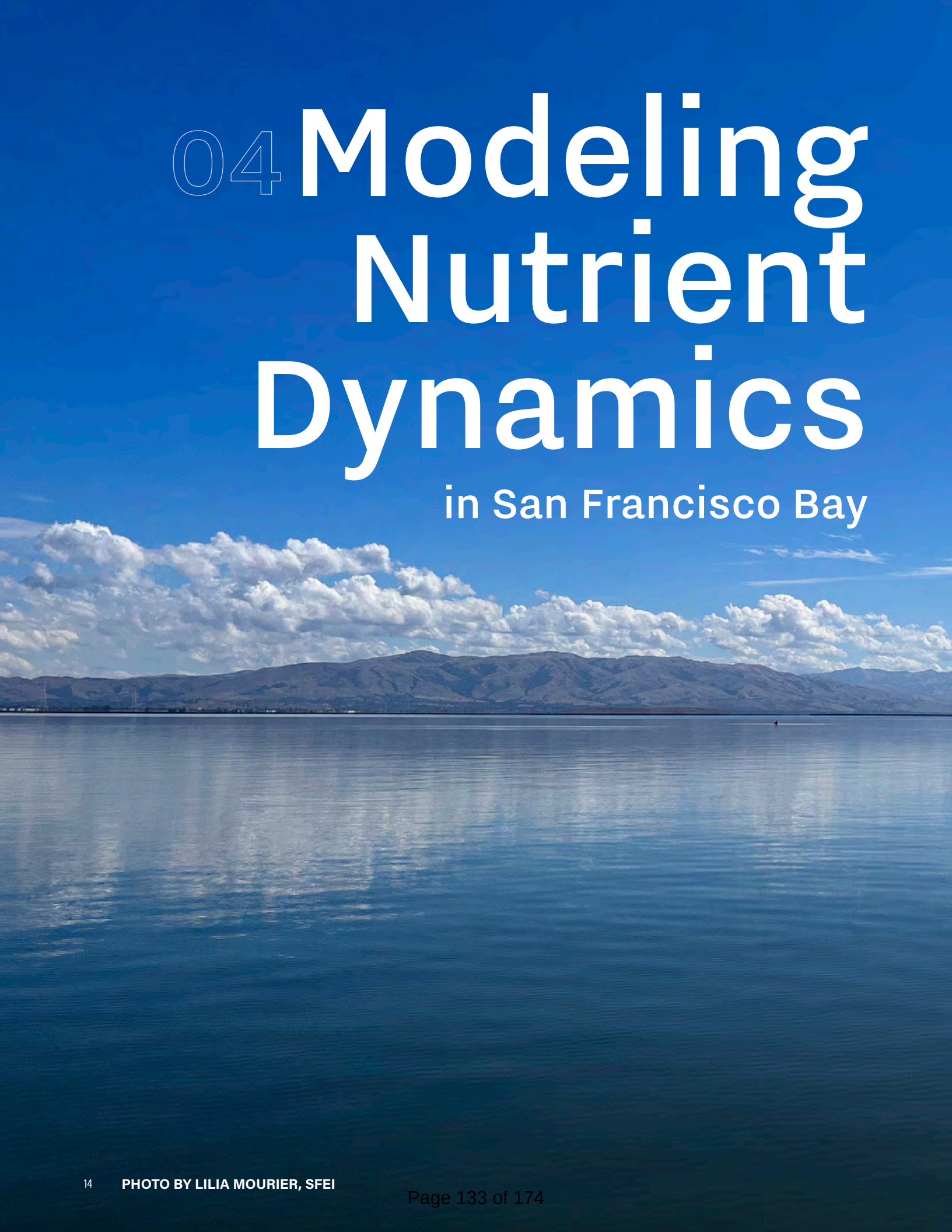
Soon after the 2022 bloom the NMS collaborated with UC Santa Cruz to utilize satellite imagery to estimate chlorophyll concentrations in the Bay. Such images are posted online to communicate real-time bloom conditions: https://merhab.sfei.org/

Kudela, R.M.; Senn, D.B.; Richardson, E.T.; Bouma-Gregson, K.; Bergamaschi, B.A.; Sim, L. Evaluation and Refinement of Chlorophyll-a Algorithms for High-Biomass Blooms in San Francisco Bay (USA). Remote Sens. 2024, 16, 1103.

Current and Future Directions

The NMS continues to evolve, leveraging traditional and modern scientific techniques to address the complex challenge of nutrient management in San Francisco Bay. The strategy's focus is not only on understanding current conditions but also on predicting future ecological responses and informing effective management decisions. With ongoing advancements in technology and methodology, nutrient monitoring in San Francisco Bay stands on a robust platform poised to tackle the environmental challenges of the future. This dynamic approach ensures that the Bay's management strategies remain responsive to the changing ecological landscape. §

PHOTO BY LUCY MONTGOMERY, SFEI

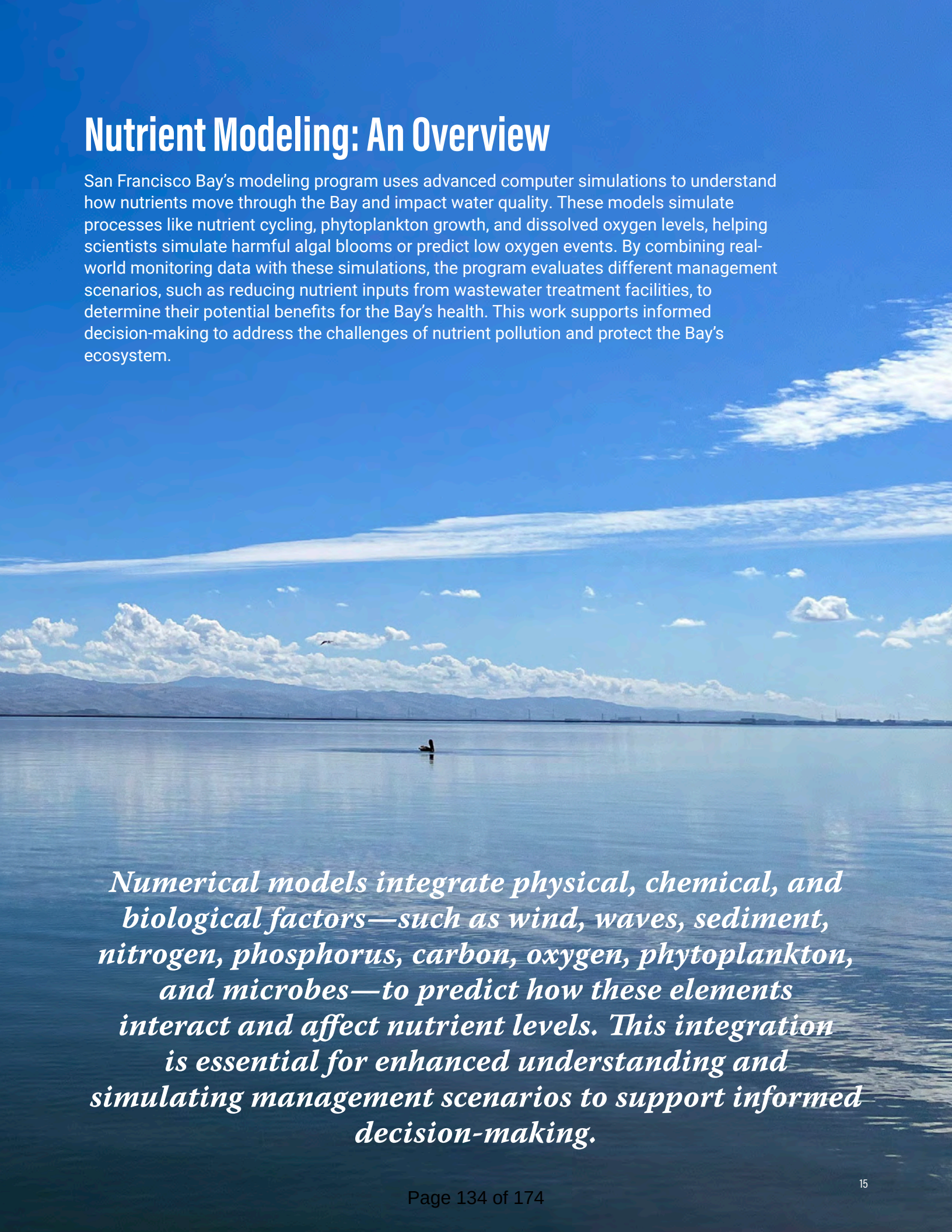


04 Modeling Nutrient Dynamics in San Francisco Bay

PHOTO BY LILIA MOURIER, SFEI

Nutrient Modeling: An Overview

San Francisco Bay's modeling program uses advanced computer simulations to understand how nutrients move through the Bay and impact water quality. These models simulate processes like nutrient cycling, phytoplankton growth, and dissolved oxygen levels, helping scientists simulate harmful algal blooms or predict low oxygen events. By combining real-world monitoring data with these simulations, the program evaluates different management scenarios, such as reducing nutrient inputs from wastewater treatment facilities, to determine their potential benefits for the Bay's health. This work supports informed decision-making to address the challenges of nutrient pollution and protect the Bay's ecosystem.

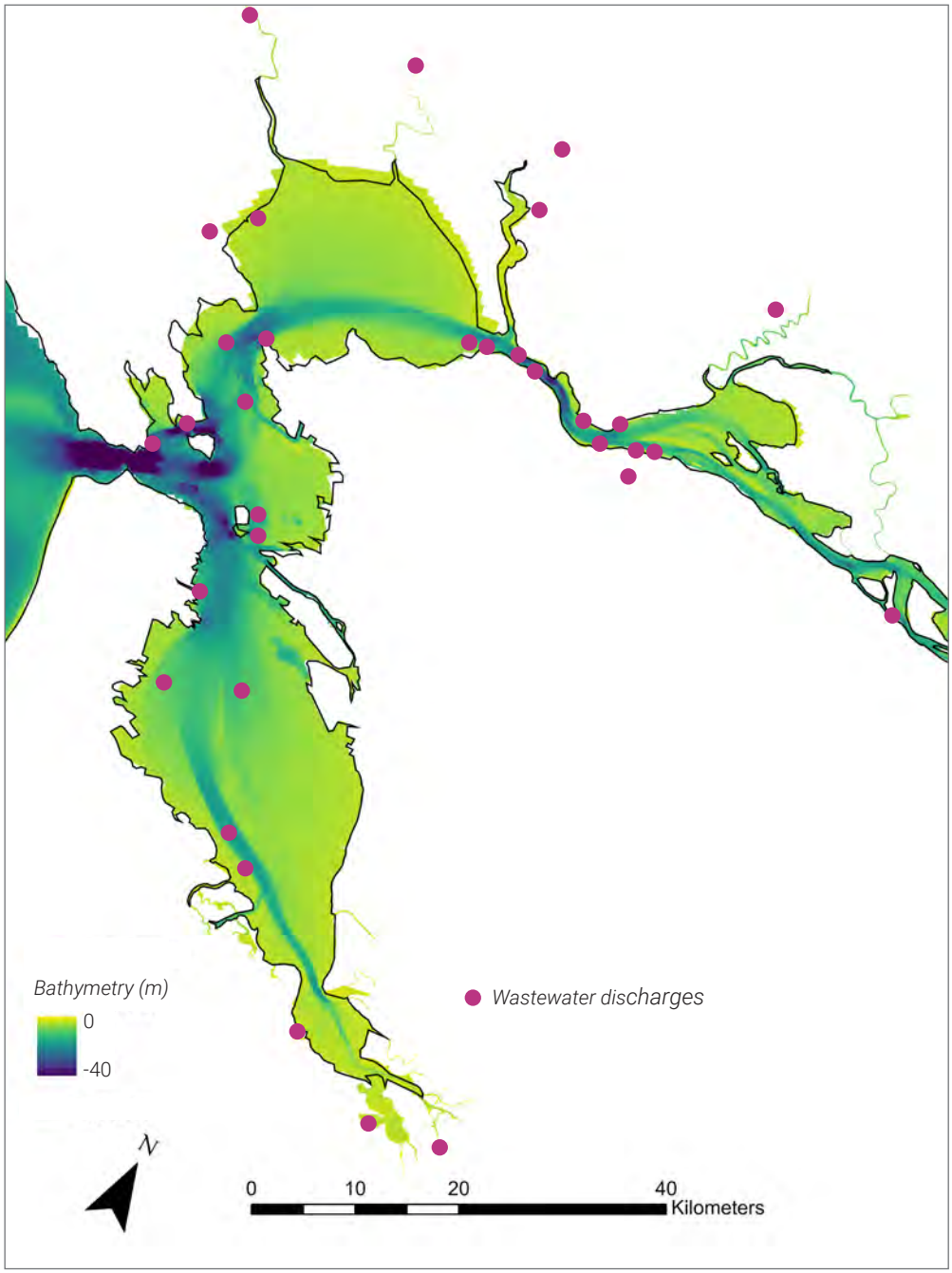


Numerical models integrate physical, chemical, and biological factors—such as wind, waves, sediment, nitrogen, phosphorus, carbon, oxygen, phytoplankton, and microbes—to predict how these elements interact and affect nutrient levels. This integration is essential for enhanced understanding and simulating management scenarios to support informed decision-making.

Recent Advances in Nutrient Modeling Capabilities

The NMS initiated the development of sophisticated 3D hydrodynamic and biogeochemical models in 2015, which marked a significant step in applying cutting-edge numerical modeling tools to nutrient management decisions in the Bay. The models aim to explore nutrient cycling, identify source contributions, track nutrient export to the coast, and assess the impacts of nutrient reductions on water quality.

From 2015 to 2019, the focus expanded to include various regions of the Bay, including Suisun Bay, Delta, and the Lower South Bay. Since 2020, modeling efforts underwent extensive peer-reviewed analyses and were instrumental in investigating nutrient dynamics over consecutive water years.



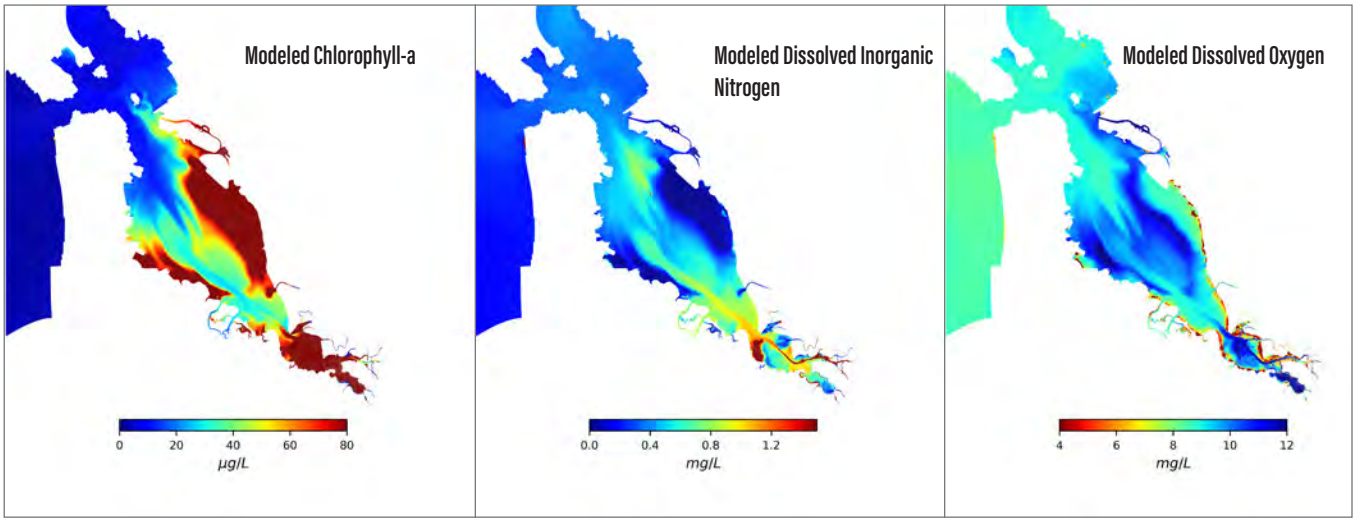
For over ten years, the NMS modeling team has developed a coupled hydrodynamic water quality simulation tool. Eventually, the model can be used to test nutrient management actions and the consequences of future scenarios, such as population growth and climate change.

Model Applications to Inform Management Decisions

The coupled hydrodynamic and water quality model is a key tool to inform nutrient management strategies for San Francisco Bay. Following years of development and refinement, it will be used to simulate various nutrient loading scenarios and responses to management actions. This information is vital as the region implements costly wastewater upgrades to reduce nutrient inputs. The model provides detailed insights into nutrient cycling and ecological controls by integrating processes like pelagic grazing, sediment-water column nutrient exchanges, and light extinction.

The NMS's advanced modeling capabilities are essential for identifying the drivers of nutrient cycling and understanding how nutrients move and transform within the Bay.

The evolving modeling capabilities of the NMS are crucial for regulators and decision-makers, offering vital insights that inform both short-term and long-term management strategies for San Francisco Bay. Recently, these models have been crucial in analyzing the 2022 *H. akashiwo* bloom and guiding strategies for nutrient load reduction. By simulating various scenarios and evaluating risks such as oxygen depletion, the models facilitate predictions of ecosystem responses, enabling informed and proactive management decisions.



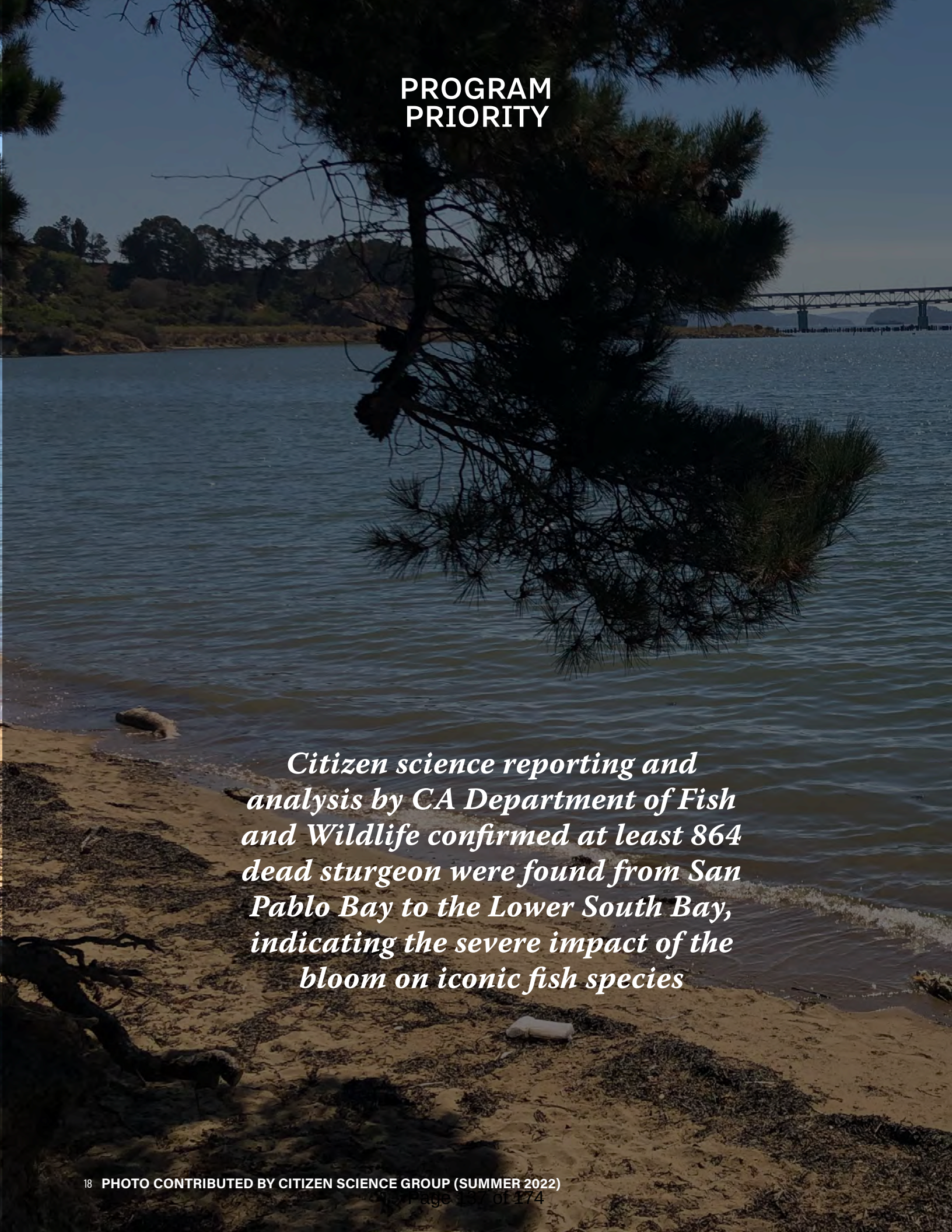
Predicted chlorophyll-a, DIN and dissolved oxygen concentrations within Central, South and Lower South bays in Spring 2018 from the NMS coupled hydrodynamic and water quality model.

Future Directions in Nutrient Modeling

Moving forward, the focus will shift from model development to application, leveraging the models to predict how human activities influence ecosystem responses and to guide nutrient management investments.

Planned analyses to provide actionable insights to manage nutrients in the Bay include:

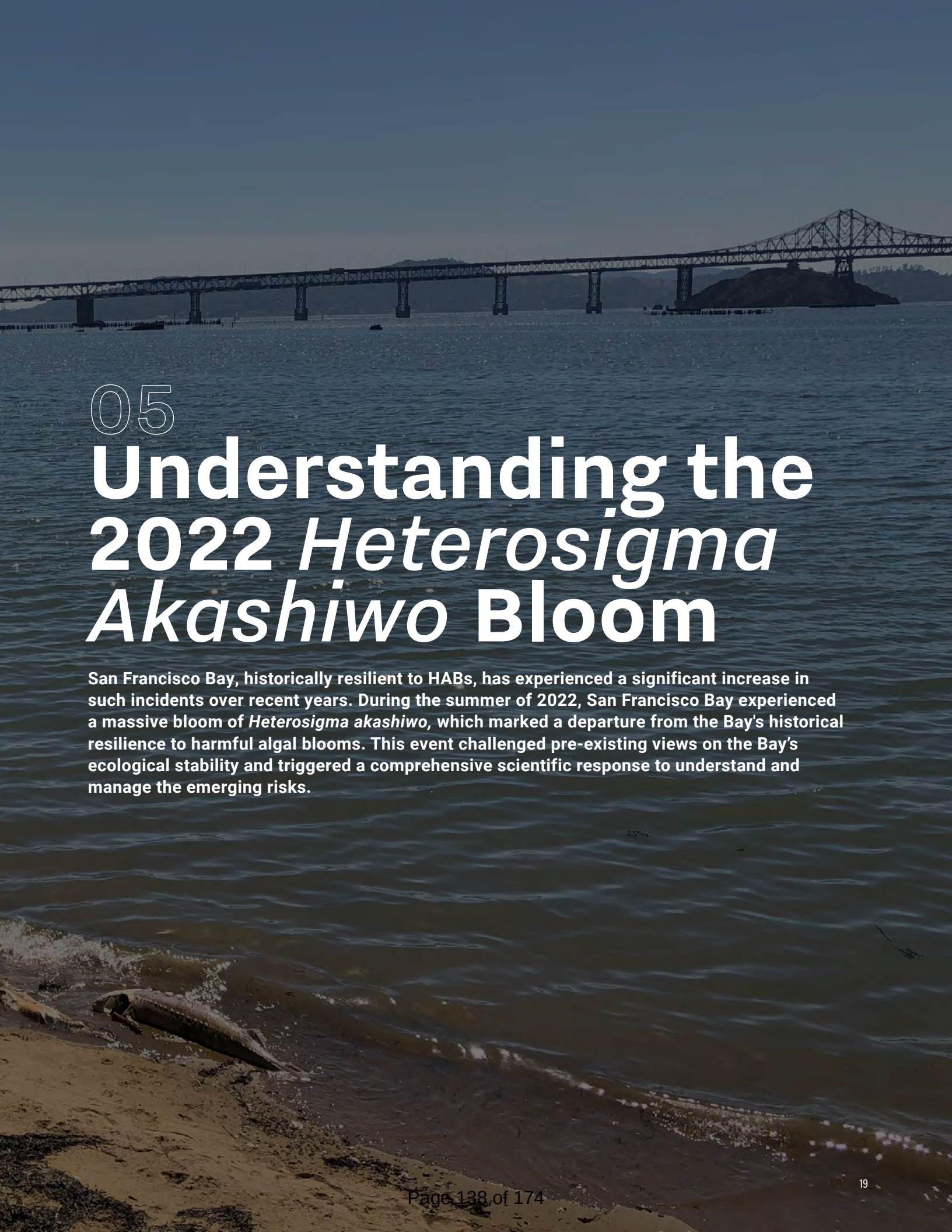
- Simulating management scenarios to evaluate the effectiveness of various nutrient reduction strategies.
- Examining nutrient load levels that trigger water quality threshold exceedances.
- Assessing hydrological and meteorological conditions contributing to major bloom events.
- Evaluating nutrient exchanges with the coastal ocean. §



PROGRAM
PRIORITY

Citizen science reporting and analysis by CA Department of Fish and Wildlife confirmed at least 864 dead sturgeon were found from San Pablo Bay to the Lower South Bay, indicating the severe impact of the bloom on iconic fish species

 PHOTO CONTRIBUTED BY CITIZEN SCIENCE GROUP (SUMMER 2022)



05

Understanding the 2022 *Heterosigma Akashiwo* Bloom

San Francisco Bay, historically resilient to HABs, has experienced a significant increase in such incidents over recent years. During the summer of 2022, San Francisco Bay experienced a massive bloom of *Heterosigma akashiwo,* which marked a departure from the Bay's historical resilience to harmful algal blooms. This event challenged pre-existing views on the Bay's ecological stability and triggered a comprehensive scientific response to understand and manage the emerging risks.

Dynamics and Impact of the Bloom

The *Heterosigma akashiwo* bloom, which began in July 2022 and lasted until September, was characterized by its rapid growth and massive consumption of nutrients. This led to a critical depletion of dissolved oxygen levels in the water, with concentrations falling below 5 mg/L for more than a week and, at times, dipping under 2 mg/L for several days. The result was a severe ecological disturbance marked by extensive fish kills across various species.

Microscopy image of *Heterosigma akashiwo*

Courtesy of Luis Solorzano, www.lasphotos.com

Sturgeon were one of the most affected species, with the California Department of Fish and Wildlife documenting significant casualties. Citizen science reporting confirmed that at least 864 dead sturgeon were found from San Pablo Bay to the Lower South Bay and the outer coast, indicating the severe impact of the bloom on iconic fish species. Most sturgeon deaths occurred before oxygen levels plummeted, suggesting an unknown mode of non-specific toxicity. The NMS continues to derive lessons from the 2022 bloom to identify the likely timing and conditions under which a future event may occur and to inform ongoing regulatory decisions impacting all wastewater agencies in the Bay Area.

Scientific Investigation and Findings

Prompted by the unprecedented scale and impact of the bloom, the NMS and its partners mobilized to investigate its dynamics and contributing factors. Utilizing moored sensor data from the NMS and USGS, along with additional targeted water quality sampling, the scientific community focused on several key aspects of the bloom:

- **Growth and Biomass Analysis:** Detailed studies quantified the bloom's biomass and growth rate. These studies helped understand how quickly *H. akashiwo* was able to exploit the nutrient-rich conditions in the Bay.
- **Nitrogen Utilization:** Nitrogen levels were closely monitored to assess how the bloom utilized available nitrogen sources, including sediment flux and point discharges. Given its critical role in algal metabolism and growth, nitrogen was a focal point in supporting the rapid growth of the bloom.
- **Model Development:** A mathematical model was developed to simulate the bloom's dynamics, from initiation to collapse. This model aimed to unravel the complex interactions between biological growth and environmental factors, providing insights into potential triggers and controls of future blooms.

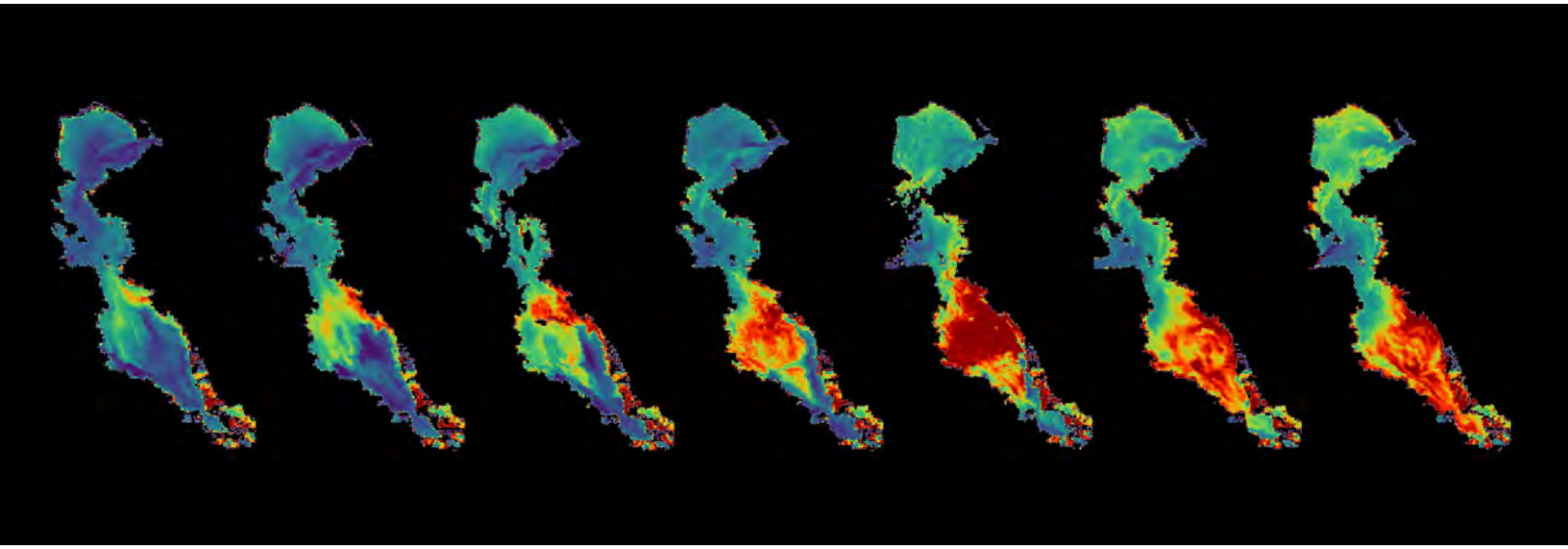
Ongoing Research and Future Directions

The 2022 *Heterosigma akashiwo* bloom underscored the critical need for enhanced monitoring and predictive modeling to manage and mitigate HABs. The NMS has responded by advancing its scientific methodologies to better understand and predict these events. By refining predictive models to analyze environmental triggers and nutrient levels, the NMS aims to proactively address HAB occurrences and minimize their impacts on the Bay's ecosystem.

Technological advances in HAB detection, such as quantitative PCR and metabarcoding, have significantly improved the NMS's ability to gather detailed data on algal taxa. This, coupled with ongoing toxin surveillance through mussel sampling, enables a more nuanced understanding of HAB dynamics. These efforts are crucial in tracking toxin levels and adapting strategies to ensure public health and ecological safety.

Looking forward, the NMS plans to deepen its exploration of nutrient load levels and the conditions that foster algal blooms. This involves refining existing monitoring and modeling techniques and working closely with regulators and wastewater agencies to inform effective management strategies. Additionally, the increased frequency and intensity of HABs have driven the NMS to bolster its response capabilities in collaboration with regional experts and citizen scientists to detect and track blooms more rapidly.

In 2023, the NMS received a substantial boost with a $3 million NOAA grant to enhance its HAB monitoring capabilities. This initiative, led by SFEI, USGS, and the Department of Water Resources (DWR), focuses on advancing monitoring technologies and developing an online HAB tracking dashboard. This tool is designed to improve the understanding of HAB dynamics and support the development of more effective mitigation strategies, addressing the Bay's challenges with nutrient over-enrichment and its ecological consequences. §



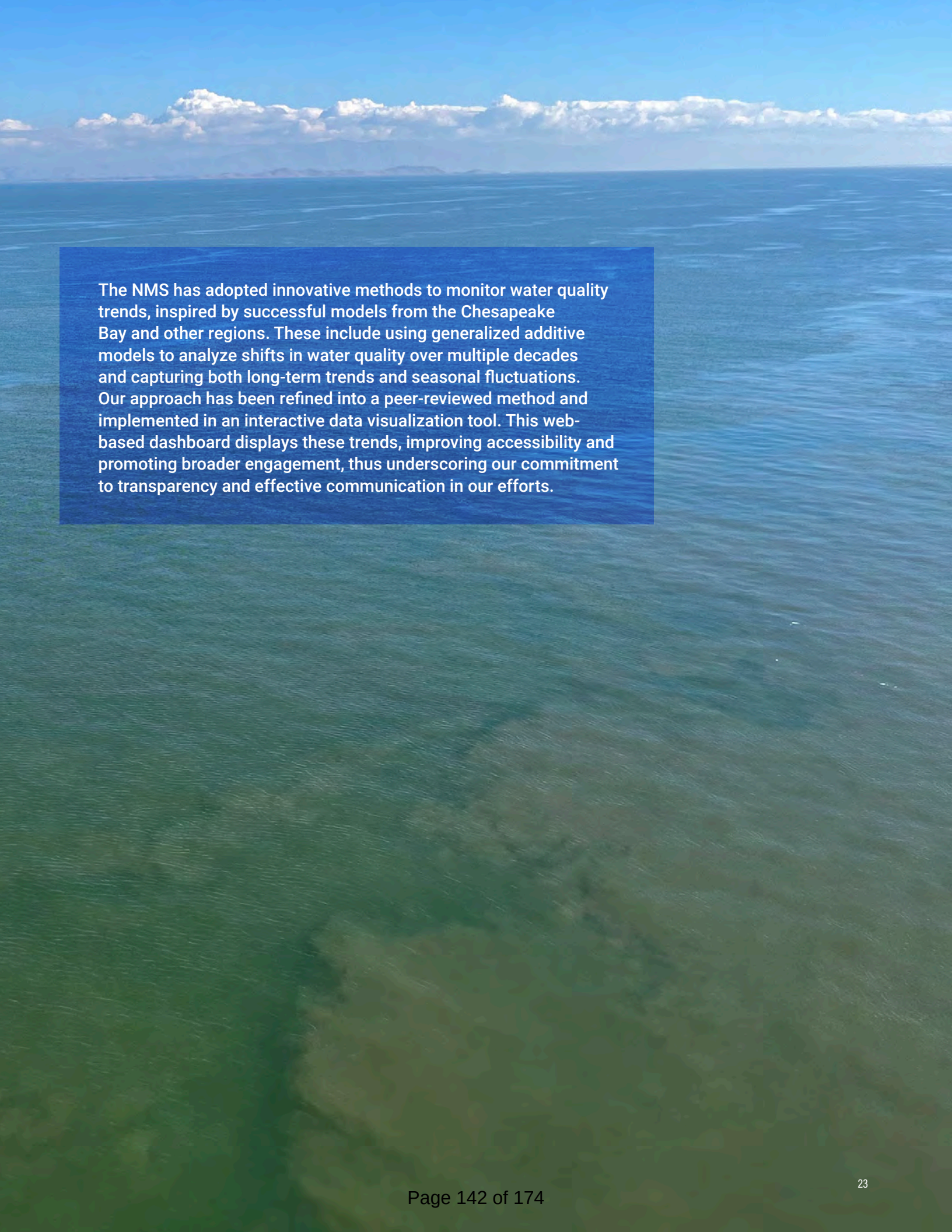
Remotely sensed chlorophyll estimates during the 2022 HAB event. The data are from the ESA Sentinel-3 satellite, processed using a locally tuned algorithm for San Francisco Bay.

06

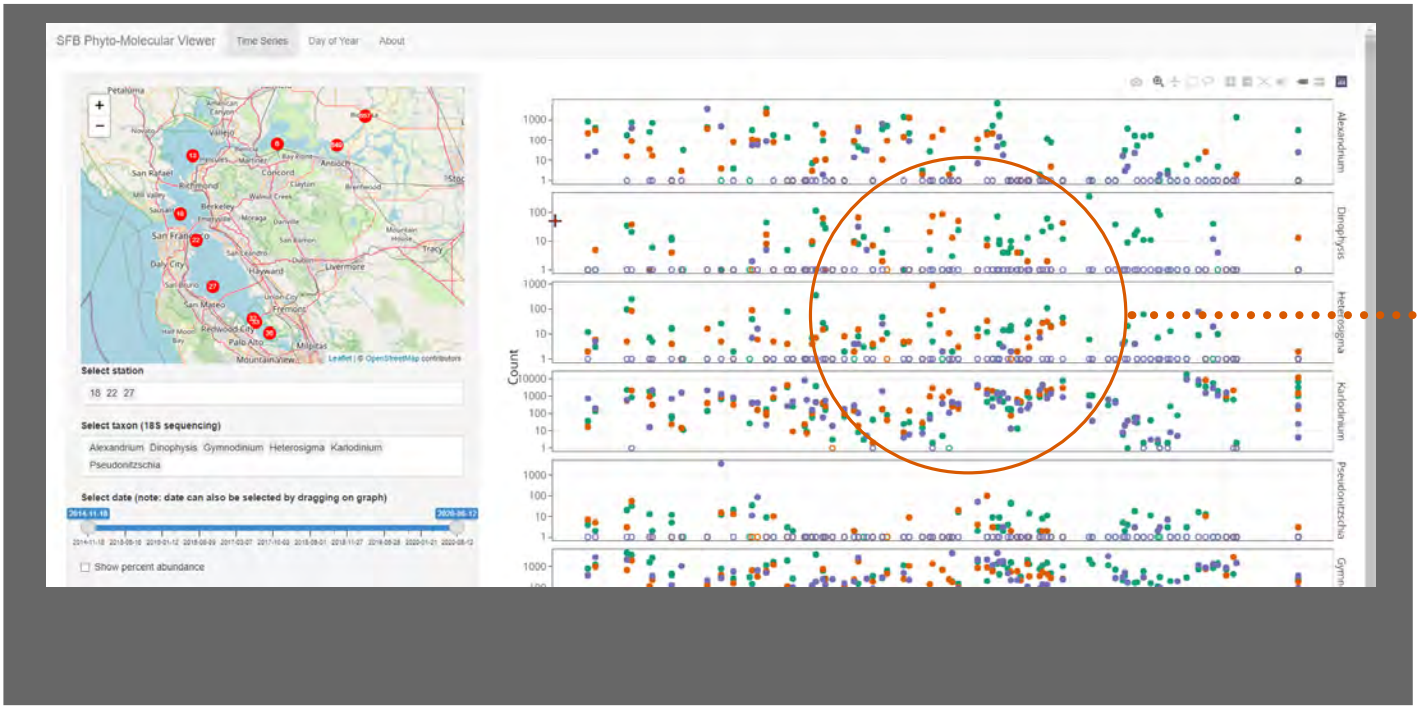
Status and Trends of Key Nutrient Indicators

A series of web-based dashboards display the status and trends of various nutrient indicators, improving accessibility and promoting broader engagement, thus underscoring our commitment to transparency and effective communication in our efforts

PHOTO BY LILIA MOURIER, SFEI



The NMS has adopted innovative methods to monitor water quality trends, inspired by successful models from the Chesapeake Bay and other regions. These include using generalized additive models to analyze shifts in water quality over multiple decades and capturing both long-term trends and seasonal fluctuations. Our approach has been refined into a peer-reviewed method and implemented in an interactive data visualization tool. This web-based dashboard displays these trends, improving accessibility and promoting broader engagement, thus underscoring our commitment to transparency and effective communication in our efforts.



Measuring phytoplankton communities over time

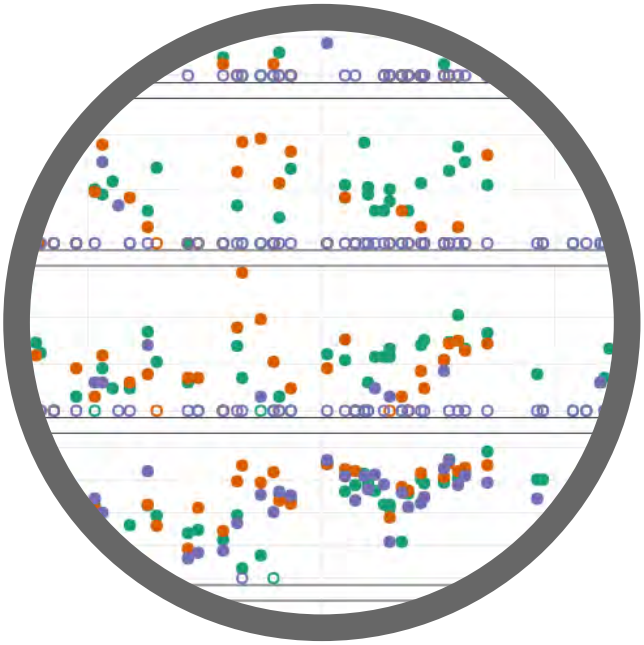
Looking at Data Online

What can we learn from looking at patterns?

Detecting trends in water quality data is essential for managing urban estuaries, which face pressures from nutrient loading, wastewater discharges, and climate variability. Tracking changes in chlorophyll-a or dissolved oxygen provides early warnings of ecosystem stress, such as harmful algal blooms or hypoxia, which can have severe ecological and economic consequences. These insights enable scientists and managers to understand the direction of ecosystem health, identify critical thresholds, and respond proactively with targeted interventions, like nutrient reduction strategies or habitat restoration efforts.

The NMS developed a trend detection tool to analyzes long-term water quality data from the USGS' ship-based monitoring program. This advanced tool identifies seasonal and long-term trends for nutrient-related parameters like chlorophyll-a, dissolved oxygen, gross primary productivity, and dissolved inorganic nitrogen. By using Generalized Additive Models (GAMs) and meta-analysis, the tool accounts for uncertainties in the data, such as missing or irregular sampling, ensuring robust detection of significant trends.

Complementing this tool, the NMS developed additional web-based visualization tools. These platforms allow users to explore trends in nutrient loading from wastewater treatment plants, dissolved oxygen conditions in the Lower South Bay, and harmful algae and phytoplankton communities detected using cutting-edge technologies. These tools serve to equip decision-makers with actionable insights to protect and sustain this vital ecosystem.



Available web-based visualization tools:

Long-term trends of several parameters, including chlorophyll-a, dissolved oxygen, and dissolved inorganic nitrogen, from ship-based monitoring data in the South Bay.

Chlorophyll-a and dissolved oxygen levels across all major long-term USGS water quality monitoring stations.

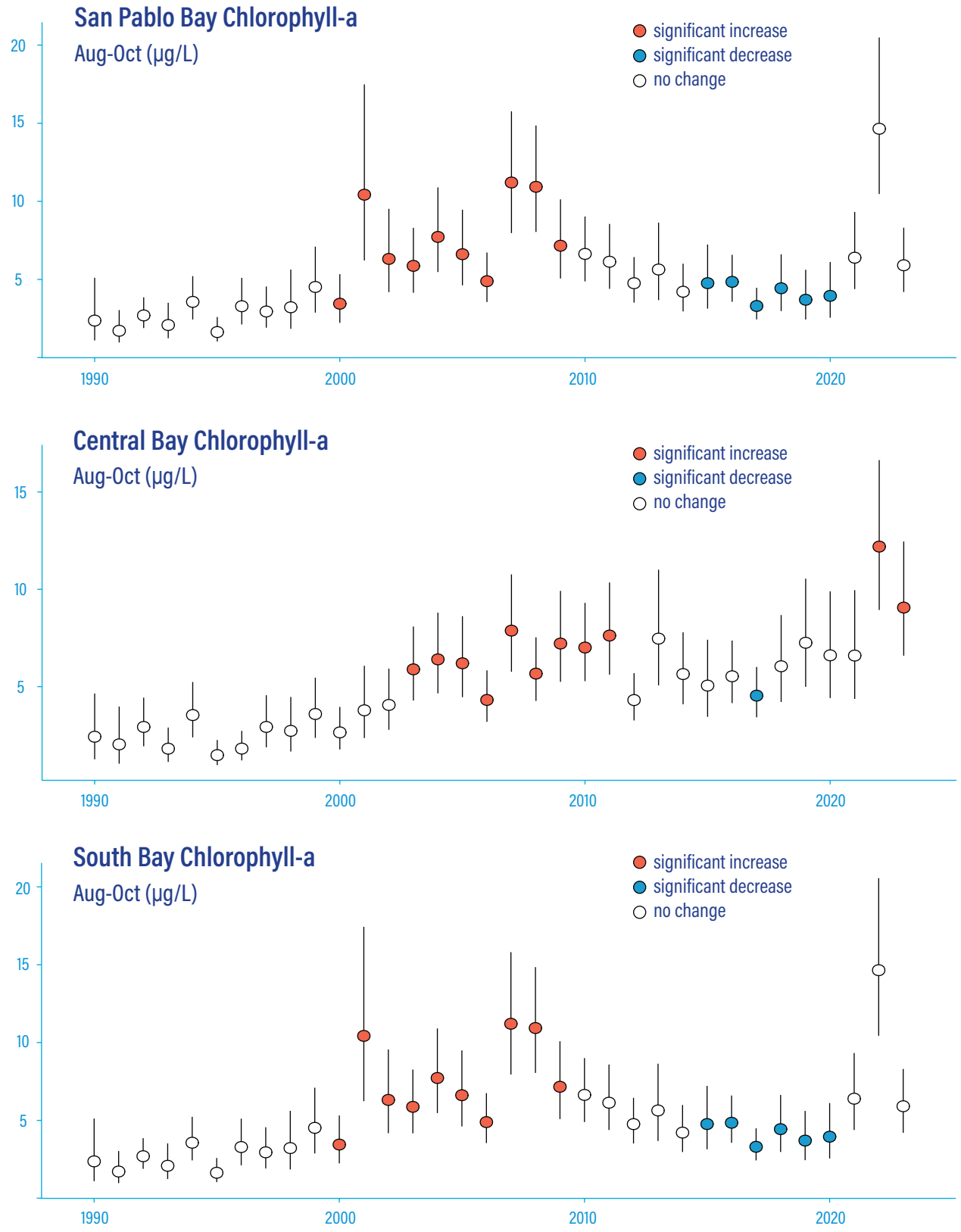
Dissolved Oxygen in Lower South Bay, based on high-frequency sensors deployed along the shallow margins.

Nutrient loading over time from wastewater plants throughout the region.

San Francisco Bay HAB data obtained through molecular analysis of surface water samples collected during USGS cruises.

Phytoplankton data collected since 2017 using an Imaging Flow Cytobot, in collaboration between the UCSC Kudela Lab and USGS CA Water Science Center.

PHOTO BY EMILY CORWIN, SFEI



Estimated mean Aug-Oct chla concentrations, 1990-2023 (vertical lines: 95% confidence intervals), in San Pablo Bay (s13), Central Bay (s21, near Bay Bridge), and South Bay (s30, midway between the San Mateo and Dumbarton Bridges). Symbol color represents long-term trend in Aug-Oct chla, based on an 11-yr rolling window (right justified). Visit this webtool to explore long-term trends in chla, dissolved oxygen, and gross primary productivity at South Bay and Central Bay stations. Note: 2022 mean chlorophyll values are skewed by the August Heterosigma bloom event.

Chlorophyll-a Trends

Chlorophyll-a serves as a key indicator of phytoplankton concentration because it is a primary pigment used in photosynthesis, directly correlating with the abundance and biomass of these microscopic algae in aquatic systems. Scientists at the USGS and other institutions have monitored chlorophyll-a concentrations in San Francisco Bay for decades to track changes in ecosystem productivity and water quality.

From 1990 to 2005, chlorophyll-a concentrations in the San Francisco Estuary showed a significant increase, driven by heightened phytoplankton biomass and primary production, particularly in the southern regions of the Bay. This trend peaked around 2005 to 2010, after which chlorophyll-a levels began to decline, with notable decreases observed through 2019. Seasonal patterns emerged, with spring chlorophyll-a peaks (January to June) consistently increasing in earlier years, while summer-fall peaks (July to December) displayed less variability across different locations.

The trends were more pronounced in the southern stations, where early increases in chlorophyll-a transitioned to significant declines after 2010. This regional variability suggests that local drivers, such as nutrient loads, hydrodynamics, and ecosystem-specific changes, played a critical role in shaping chlorophyll-a dynamics over time. These findings underscore the complexity of interactions between natural and anthropogenic influences in the estuary.

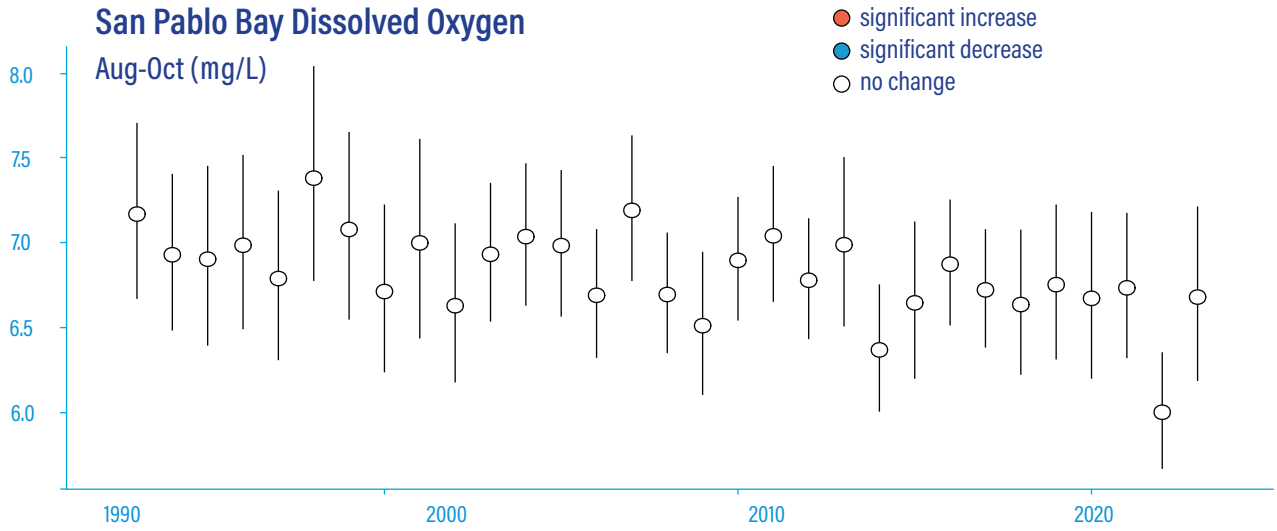
Generalized Additive Models (GAMs) were instrumental in analyzing these trends, enabling researchers to account for uncertainties in the monitoring data and identify nuanced seasonal and spatial patterns. This robust analytical approach highlights the importance of long-term monitoring and adaptive management to understand and address evolving water quality challenges in the San Francisco Estuary.

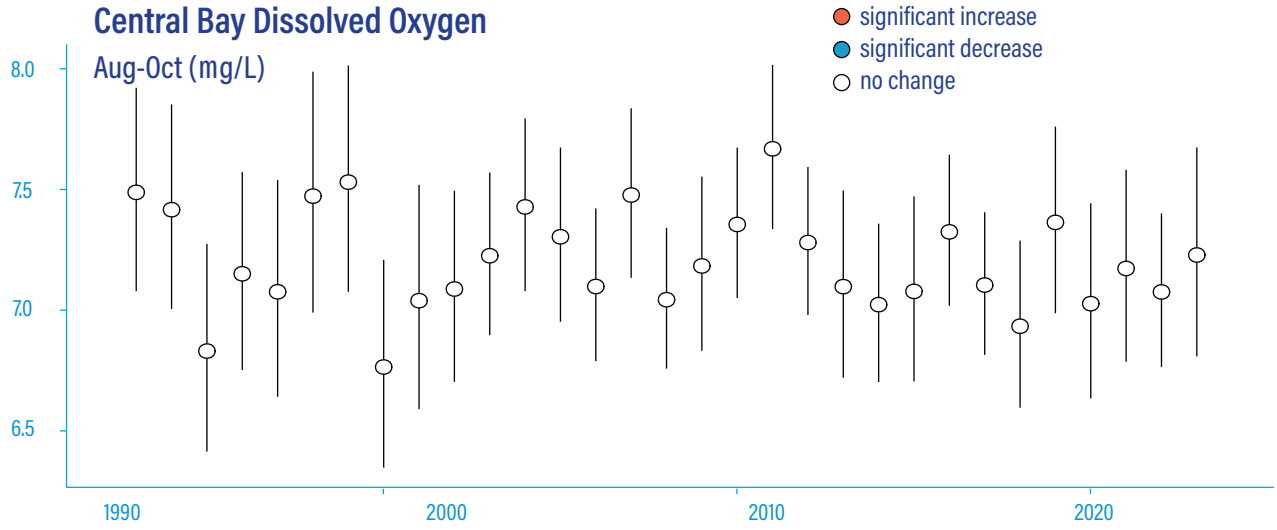
A water quality visualization tool is available to explore long-term trends in several parameters, including chlorophyll-a, dissolved oxygen, and dissolved inorganic nitrogen (DIN), based on ship-based monitoring data. The tool can be accessed at https://nutrient-data.sfei.org/SFbaytrends/app2/.

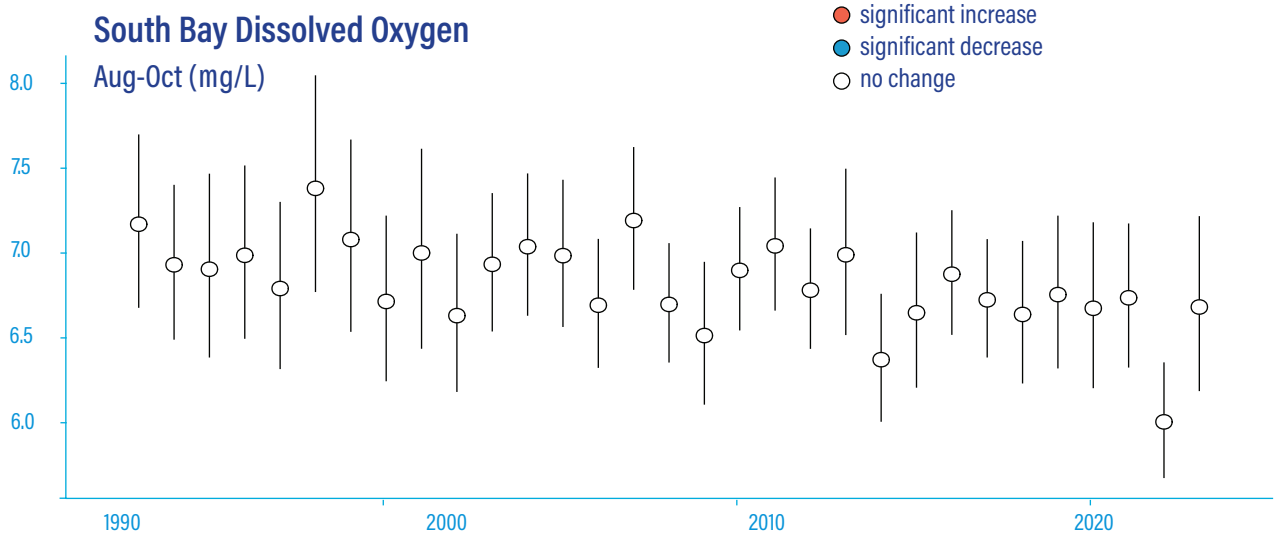
ADDITIONAL RESOURCES

Beck, Marcus W., et al. "Multi-scale trend analysis of water quality using error propagation of generalized additive models." Science of the Total Environment 802 (2022): 149927.

Cloern, J.E., and Schraga, T.S., 2016, USGS Measurements of Water Quality in San Francisco Bay (CA), 1969-2015 (ver. 4.0, March 2023): U. S. Geological Survey data release, https://doi.org/10.5066/F7TQ5ZPR.







Estimated mean Aug-Oct depth-averaged dissolved oxygen concentrations, 1990-2024 (vertical lines: 95% confidence intervals), in South Bay (s30) and Central Bay (s21). Symbol color represents long-term trend in Aug-Oct DO, based on an 11-yr rolling window (right-justified; same legend as for chla).

Dissolved Oxygen Trends

San Francisco Bay's open bay regions, which include deep subtidal habitats, exhibit relatively stable and well-oxygenated conditions despite significant nutrient loading from wastewater and urban runoff. Long-term monitoring data indicate that dissolved oxygen (DO) levels in these areas generally remain above 7 mg/L, satisfying the Basin Plan objective of 5 mg/L. Seasonal variability does occur, however, with DO levels slightly decreasing in summer and early fall due to higher temperatures and increased biological oxygen demand.

Recent events, such as the 2022 *Heterosigma akashiwo* algal bloom, underscore the Bay's vulnerability despite its historical resilience. The bloom led to transient reductions in DO, particularly in South Bay, with levels dropping to 2-3 mg/L in localized areas after the bloom's abrupt termination. Such events, while episodic, highlight the potential for nutrient enrichment and organic matter decomposition to stress the system, particularly during warm and low-flow periods. Nonetheless, the overall DO regime in the open bay has not shown a consistent trend toward hypoxia over recent decades, suggesting that the system remains generally resilient.

Proactive nutrient management and monitoring are critical to sustaining the open bay's favorable DO conditions amid changing climatic and anthropogenic pressures. While the Bay continues to demonstrate healthy oxygen in its deeper habitats, its ability to withstand high nutrient loads may decline if large-scale algal blooms and resulting crashes in oxygen levels become more frequent. Enhanced understanding of nutrient cycling and its influence on DO dynamics will be essential to maintaining ecological stability in these open bay environments. §

ADDITIONAL RESOURCES

Chelsky, A., D. Killam, L. Mourier, D. Senn. 2023. Updated Technical Report Virginian Province Approach to Dissolved Oxygen in Lower South San Francisco Bay Sloughs. SFEI, Richmond, CA.

MacVean, L., L. Lewis, P. Trowbridge, J. Hobbs, D. Senn. 2018. Dissolved Oxygen in South San Francisco Bay: Variability, Important Processes, and Implications for Understanding Fish Habitat. Technical Report. SFEI, Richmond, CA.

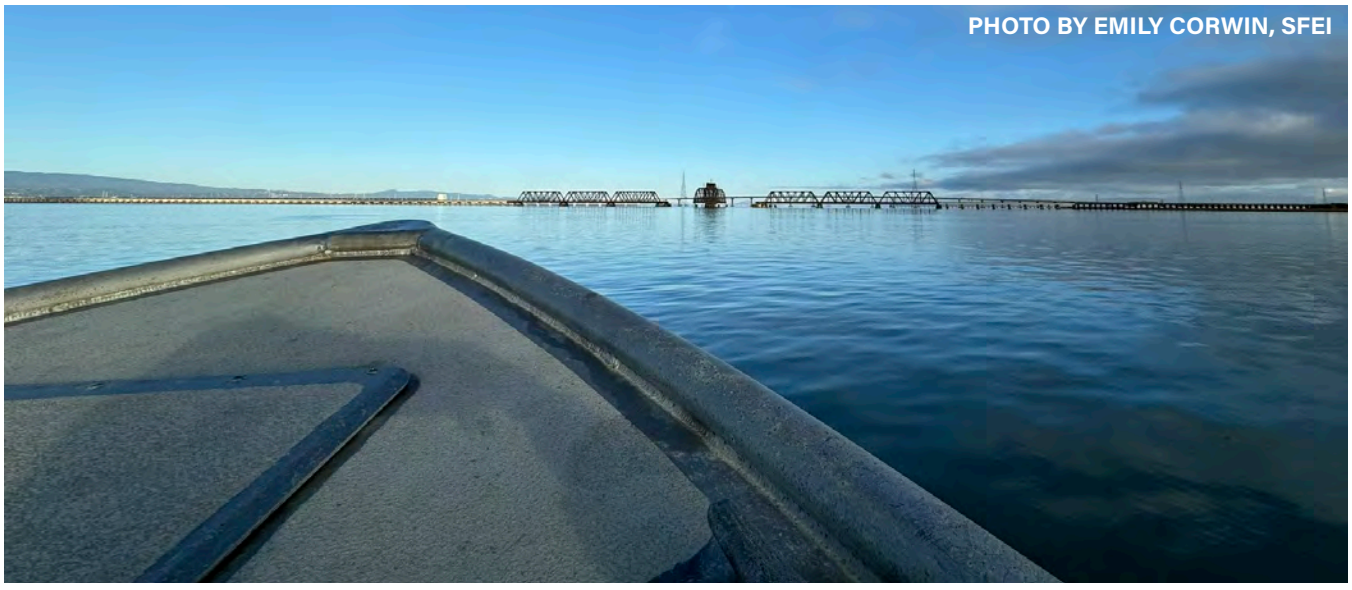


PHOTO BY EMILY CORWIN, SFEI

GLOSSARY

The nutrient composition of San Francisco Bay is influenced by various factors, including the inflow of freshwater, oceanic influences, and human activities. The Bay is an estuary, where freshwater from rivers and streams mixes with saltwater from the Pacific Ocean. Here are some general terms regarding nutrient status of San Francisco Bay.

Nutrients:
Chemicals such as nitrogen and phosphorus essential for plant and algal growth. Excessive amounts can lead to water quality issues.

Eutrophication:
A process where water bodies become overly enriched with nutrients, leading to excessive algal blooms and low oxygen levels.

Harmful Algal Blooms (HABs):
Rapid growth of algae that can produce toxins harmful to aquatic life, humans, and water quality.

Phytoplankton:
Microscopic plants that form the base of aquatic food webs. While essential, their overgrowth due to nutrient pollution can disrupt ecosystems.

Chlorophyll-a:
A pigment found in algae, used as an indicator of phytoplankton biomass and water quality.

Dissolved Oxygen (DO):
The amount of oxygen dissolved in water, critical for aquatic life. Low DO (hypoxia) can harm or kill fish and other organisms.

Subembayments:
Specific sections of San Francisco Bay (e.g., South Bay, Lower South Bay) with unique environmental characteristics and challenges.

Point Sources:
Direct sources of nutrient pollution, like wastewater treatment plants, contributing high loads of nitrogen and phosphorus to the Bay.

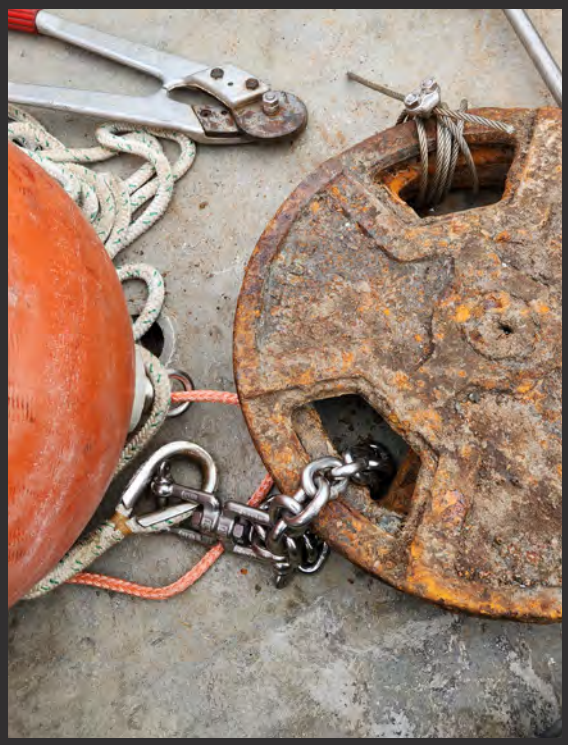
Resilience:
The Bay's ability to withstand impacts of nutrient loading without severe water quality problems, which may be decreasing due to recent changes.

Water Quality Objectives:
Standards set to ensure water remains healthy for aquatic life and human use. For example, the 5 mg/L DO threshold in San Francisco Bay.

Nutrient Management Strategy:
A coordinated effort to monitor, understand, and manage nutrient inputs in San Francisco Bay to protect water quality and ecosystem health.

Assessment Framework:
A structured approach to evaluate the condition of water bodies, using indicators like dissolved oxygen and chlorophyll-a to assess the health of aquatic habitats. §

PHOTO BY EMILY CORWIN, SFEI



Photographs from NMS field work by the SFEI NMS team.

SFEI San Francisco Estuary Institute

San Francisco Estuary Institute. 2025. *Science to Inform Management: An Overview of the Nutrient Management Strategy for San Francisco Bay.* SFEI Contribution #1239. San Francisco Estuary Institute, Richmond, CA.

ITEM NO. RA6 SFPUC SUPREME COURT DECISION

Recommendation
For the Committee's information only; no action is required.

Strategic Plan Linkage
1. **Regulatory Compliance:** Proactively meet or exceed regulatory requirements for protection of the environment and public health.
    a. Represent EBDA and the Member Agencies' interests by preemptively engaging in development of emerging regulations and permits and advocating for reasonable, science-based decisions.

Background
The San Francisco Public Utilities Commission (SFPUC) discharges to the Pacific Ocean from its Oceanside Water Pollution Control Plant. Because the discharge is to federal waters, the facility's National Pollutant Discharge Elimination System (NPDES) permit is issued by the US Environmental Protection Agency (EPA) rather than the Regional Water Quality Control Board. In 2023, SFPUC challenged its NPDES permit, with the case ultimately reaching the Supreme Court. On March 4, 2025, the Supreme Court ruled in favor of SFPUC. This report outlines the key issue in the case and potential implications for EBDA.

Discussion
EPA sets standards to protect water bodies in the US, and NPDES permits implement those standards to prevent discharges to the water body from degrading the quality of the water. NPDES permits, including EBDA's, generally have two types of limits, both intended to protect the water body receiving the discharge. Effluent limits impose specific measurable limits on the discharge itself, e.g., 30 mg/L Total Suspended Solids (TSS). Receiving water limits are narrative and require the discharger not to cause or contribute to undesirable conditions in the receiving water. For example: "The discharge shall not cause the following conditions at any place in receiving waters: Floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses."

At issue in the San Francisco case was the fact that EPA had previously threatened to enforce on SFPUC for violations of the receiving water limits, and so SFPUC objected to the inclusion of such limits in their Oceanside permit. SFPUC argued that it is EPA's responsibility to translate its water quality standards into specific effluent limits so that dischargers have clear expectations on what they must do to comply. They argued that holding a discharger responsible for compliance with receiving water conditions is inappropriate, given that they do not have full control over what contributes to those conditions. For example, another discharger may discharge to the same water body, and it is not fair to penalize one discharger for conditions that may be the fault of the other.
Given the consistent use of these receiving water limits in permits and the associated

risk, many other organizations, including the National League of Cities, California League of Cities, California Association of Sanitation Agencies (CASA), and National Association of Clean Water Agencies (NACWA) joined the suit in support of SFPUC's argument.

The Supreme Court found in favor of SFPUC, ruling that the Clean Water Act does not authorize EPA to include so-called "end result requirements" in permits. Per the San Francisco City Attorney's Office, "While the Clean Water Act authorizes EPA 'to set rules that a permittee must follow in order to achieve a desired result, namely, a certain degree of water quality,' the Act does not allow EPA to impose permit terms that hold permitholders responsible for conditions in the receiving water that the permitholder cannot control."

While some media coverage and environmental group messaging have characterized the decision as weakening EPA's ability to regulate under the Clean Water Act, the decision was in fact very narrow. No law, regulations, or detailed technical requirements of NPDES permits have been substantively changed. Rather, three sentences in SFPUC's 150-page permit have been invalidated. From the perspective of the wastewater community, the narrow decision will lead to clearer permit terms and protect ratepayers from potential costly and extensive litigation, while preserving the substantive requirements of the Clean Water Act. EPA retains the power to set permit limitations that will achieve water quality standards, they must translate those water quality standards into more specific effluent limits rather than relying on broad receiving water limits. Going forward, permitholders should have predictable, knowable standards to protect water quality.

EBDA and all dischargers that discharge to the San Francisco Bay also have receiving water limitations in their NPDES permits. The Regional Water Quality Control Board is currently reviewing the decision to determine what, if any, changes need to be made to permits in our region to comply with the decision. They have postponed reissuance of any NPDES permits until they make that determination. In addition to the Clean Water Act, NPDES permits in California also implement the Porter-Cologne Act of 1969 – California's clean water law. The Water Board's attorneys are, therefore, also examining their related authorities under Porter-Cologne and their ability to retain certain provisions in spite of this Clean Water Act ruling. When EBDA's permit is renewed in 2027, it is likely to be more specific and explicit with regard to effluent limitations. Staff will be watching closely as the next set of NPDES permits are reissued in our region.

Additional resources about the Court's decision can be found at the following links:
https://www.sfpuc.gov/about-us/news/supreme-court-issues-decision-san-franciscos-favor-water-quality-permitting-case
https://www.sfcityattorney.org/wp-content/uploads/2025/03/Memoradum-re-SCOTUS-decision.pdf
https://casaweb.org/in-case-you-missed-it-3-13-25/

ITEM NO. RA7 BACWA KEY REGULATORY ISSUES SUMMARY

Recommendation
For the Committee's information only; no action is required.

Strategic Plan Linkage
1. **Regulatory Compliance:** Proactively meet or exceed regulatory requirements for protection of the environment and public health.
    a. Represent EBDA and the Member Agencies' interests by preemptively engaging in development of emerging regulations and permits and advocating for reasonable, science-based decisions.
    c. Ensure compliance with non-NPDES permits and regulatory requirements, including air quality and hazardous waste.
    e. Track and share scientific and regulatory developments related to emerging contaminants, and advocate for source control.

Background
Periodically, BACWA's Regulatory Program Manager updates a Key Regulatory Issues Summary that contains succinct information on regulatory issues of interest to Bay Area wastewater agencies. The Summary matrix contains background, challenges and recent updates, next steps for BACWA, and links to key resources and documents.

Discussion
The most recent issue summary is attached. This latest version highlights updates made in purple. Previous versions are available at https://bacwa.org/regulatory-issues-summaries/.

KEY REGULATORY ISSUE SUMMARY
Updated February 28, 2025

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

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New updates in this version are shown in Purple highlighting

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
NUTRIENTS IN SAN FRANCISCO BAY			
• San Francisco Bay receives some of the highest nitrogen loads among estuaries worldwide, yet has not historically experienced the water quality problems typical of other nutrient-enriched estuaries. • In the early 2000s, monitoring data of the Bay suggested that this historic resilience could be weakening. In 2012, stakeholders in the region formed the Nutrient Management Strategy (NMS) to prioritize scientific studies and ensure that all science to be used for policy decisions is conducted under one umbrella. • Program management of the NMS is led by the San Francisco Estuary Institute (SFEI). • In summer 2022, a harmful algae bloom in San Francisco Bay brought increased public attention to this topic.	• For FY25, BACWA is contributing $2.2M to fund scientific research by the NMS science team, fulfilling a requirement of the 2024 Watershed Permit. • In recent years, the NMS has also been successful in attracting funding from other sources, such as NOAA and EPA, complementing BACWA's contributions. • The focus of current scientific efforts is improving model representation of biogeochemistry, light attenuation, dissolved oxygen, and harmful algal bloom dynamics. • The science team is currently working with stakeholders to develop a multi-year work plan for 2025-2029. • The science team is preparing to release a summary of recently completed and ongoing studies of nutrients in San Francisco Bay. The summary will be suitable for wide distribution.	• **Continue to participate in NMS steering committee, Nutrient Technical Workgroup, and planning subcommittee meetings, and provide funding for scientific studies via the Nutrient Surcharge.** • Continue to work with NMS scientists to obtain summaries of scientific accomplishments for public use. • Continue to engage with Nutrient Technical Team and BACWA's Nutrient Management Strategy technical consultant, Mike Connor, to provide review of recent work products and charge questions for the science team.	BACWA Nutrients Page SFEI Nutrient Management Strategy Page NMS FY25 Science Program Plan Materials NMS Steering Committee Meeting Materials NMS Work Products Real-Time Satellite Data on Harmful Algae Blooms Baywise Website

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
SF BAY NUTRIENT WATERSHED PERMIT			
• The Nutrient Watershed Permit was first adopted in 2014. It required effluent monitoring and a regional study on Nutrient Treatment by Optimization and Upgrades, completed in 2018. • The 2019 Nutrient Watershed Permit required continued monitoring and reporting of nutrient loads, significantly increased funding for scientific studies, and completion of a regional assessment of nutrient diversions through nature-based systems and recycled water, completed in 2023. • The Nutrient Watershed Permit was reissued in 2024 and requires: o Continued individual POTW nutrient monitoring and reporting; o Continued funding for science; o Effective in the 2025 dry season, interim performance-based effluent limits for Total Inorganic Nitrogen (TIN); o Effective in the 2035 dry season, final water quality-based effluent limits for TIN; o Continued group annual reporting for each water year (Oct. 1 – Sep. 30), with additional reporting related to the permit's 10-year compliance schedule; o Recognition of "early actors" that began implementing nutrient removal projects before October 1, 2024; and o Completion of a regional planning study.	• The final effluent limits in the 2024 Nutrient Watershed Permit are 40% lower than actual loads from the 2022 dry season, when San Francisco Bay experienced a harmful algae bloom. • The permit contains a 10-year compliance schedule for complying with the final effluent limits. Some agencies will have difficulty meeting this deadline due to the magnitude and complexity of anticipated projects. • To address this challenge, the Regional Water Board is working to identify a regulatory mechanism to extend the compliance schedule beyond 10 years where necessary. This commitment is outlined in a Board resolution and will likely require a change in the State Water Board compliance schedule policy. • Through the nutrient surcharge levied on permittees, BACWA will fund compliance with the following provisions of the 2024 Nutrient Watershed Permit behalf of its members: o Funding for scientific studies o Group Annual Reporting, including compliance milestone reporting o Completion of a regional planning study BACWA has hired the consulting firm HDR to assist with the completion of Group Annual Reports and the Regional Planning study. • In August 2024, BACWA assisted with hosting a technical seminar on nutrient removal technology at Bay Area wastewater treatment plants.	• **By early 2024, POTWs must identify their preliminary alternatives for meeting final effluent limits, per Table 5 of the Nutrient Watershed Permit.** "Early actors" will instead submit status updates. BACWA has circulated a Request for Information for agencies to provide this information for inclusion in the Group Annual Report due April 1st. • **Review the Draft Scoping Plan, which will be circulated in Spring 2025.** The scoping plan is due by July 1st, and will outline the approach BACWA intends to take on regional planning to reduce TIN loads. The Regional Planning study, due in March 2029, will address elements such as schedule, cost, cross-media impacts to air and biosolids, opportunities for multi-benefit projects, nutrient trading, and more. • Work with Regional Water Board staff and other stakeholders to identify a regulatory mechanism for extending compliance schedules beyond 10 years. Preliminary work is focusing on possible edits to the State's 2008 Compliance Schedule Policy. • Agencies will continue to report nutrient monitoring data directly to CIWQS, which HDR will compile for Group Annual Reports. For the 2025 Group Annual Report and beyond, separate submittal of nutrient monitoring data to BACWA is no longer needed. •	2024 Nutrient Watershed Permit 2024 Regional Water Board Resolution on Extending Compliance Schedule BACWA Nutrients Page Resources from Dr. David Jenkins Technical Series Nutrient Seminar (August 2024)

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
OCEAN ACIDIFICATION & HYPOXIA			
• Ocean acidification (low pH) is one of the potentially harmful effects of climate change in water bodies. It is caused by the uptake of carbon dioxide from the atmosphere and other sources. Ocean acidification threatens the survival of many marine organisms, especially those with carbonate shells which can dissolve under low-pH conditions. • Nutrients from wastewater and other sources can cause algae blooms which can lead to hypoxia (low dissolved oxygen) when the algae decays and exerts biological oxygen demand. This process can also lead to acidification when the carbon from the algae is released into the ocean as carbon dioxide. Because nutrient inputs and algal production can contribute to both problems, they are grouped together under the umbrella term "Ocean Acidification & Hypoxia." • State Water Board policy regarding discharges to the Ocean are contained in the California Ocean Plan. Currently, no regulations in the Ocean Plan directly address Ocean Acidification & Hypoxia caused by wastewater discharges. However, future regulations could limit coastal discharges of nutrients in order to reduce the potential for Ocean Acidification & Hypoxia.	• The Ocean Protection Council is the main State agency supporting scientific efforts related to Ocean Acidification & Hypoxia along the California coast. • The Ocean Protection Council has funded the Southern California Coastal Water Research Project (SCCWRP) to conduct research and modeling on Ocean Acidification & Hypoxia due to nutrient pollution in southern California and along the San Francisco and Monterey coasts. • In 2023-2024, the National Water Research Institute convened an expert review panel to review the modeling efforts led by SCCWRP. Because of the work's relevance to northern California wastewater agencies that discharge to coastal waters, BACWA's Executive Director is assisting with the Project Steering Committee. In 2024, the expert panel provided a final report with recommendations for improving the model to make it suitable for application in a regulatory context. • The State Water Board is scoping an amendment to the California Ocean Plan amendment to address ocean acidification, hypoxia, and the effects of anthropogenic sources of nutrients in ocean waters.	• Continue to track refinement of SCCWRP's modeling tools, which could be used to establish State Water Board policy on nutrient discharges to the coastal ocean. The wastewater community is advocating for model improvements to accurately capture the impacts of wastewater discharges, and to inform monitoring work that will support our understanding of ocean impacts of nutrients. • Continue to participate in the San Francisco Bay Nutrient Management Strategy, which is already addressing many related issues.	State Water Resources Control Board's California Ocean Plan Timelines for Planning, Policy, and Permitting Efforts at the State and Regional Water Boards Ocean Acidification and Hypoxia - California Ocean Protection Council National Water Research Institute - Expert Review Panel

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
PESTICIDES			
• Pesticides are regulated via the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and not the Clean Water Act. POTWs do not have the authority to regulate pesticide use in their service area, but may be responsible for pesticide impacts to their treatment processes or to surface water. • EPA reviews all registered pesticides at least once every 15 years. Each review allows an opportunity for public comment. • Through BAPPG's Pesticides Committee, 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. • Based on the most (2024) BAPPG/BACWA Pesticide Watch List, the pesticides of highest concern in wastewater are: o Pyrethroids (21 chemicals) o Fipronil o Imidacloprid	• BACWA continues to fund consultant support to write comment letters advocating for the consideration of POTW and surface water issues by EPA and the California Department of Pesticide Registration (CalDPR). Funding for pesticide regulatory outreach in FY25 is $72k. • The Regional Water Board leverages BACWA's efforts to provide their own comment letters. • The BAPPG Pesticides Committee has developed a workplan for outreach on pet pesticides (see January 2025 meeting presentation). • Additions to the BAPPG/BACWA Pesticides Watch List "moderate concern" tier in 2024 included: o Carbendazim, a preservative found in paints and other products o Quaternary Ammonium Compounds (see CECs, pg. 7). In December 2024, EPA released a proposal to use aquatic life benchmarks from the Office of Pesticide Programs in the Clean Water Act program, where they could be used as recommended water quality criteria. If adopted, the Clean Water Act program would have new recommended water quality criteria for more than 750 pesticides. Comments on the proposal are due February 26th, 2025.	• **BACWA members are encouraged to conduct public and veterinary office outreach using flea and tick outreach toolkits.** Baywise.org has flea and tick control messaging for pet owners and veterinarians. In addition, the BACWA website offers member agencies toolkits for conducting outreach to pet owners and veterinary offices. • Advocate for implementation of specific actions from the CalDPR Sustainable Pesticide Management Roadmap. • Continue to comment on EPA pesticide re-registrations and CalDPR actions. • Engage with EPA on proposed changes to the regulatory approval process for pesticides. • Work with veterinary associations on messaging with respect to flea and tick control alternatives. • Continue to develop summaries of EPA actions on pesticides. • Look for opportunities to work with CalDPR on pesticides research. • Work with other regional associations, such as CASQA, to collaborate on funding pesticide regulatory outreach.	BACWA Pesticide Regulatory Support Page Toolkits for Member Outreach on Flea and Tick Pest Control Baywise flea and tick pages CalDPR Sustainable Pest Management Roadmap BAPPG/BACWA Pesticides Watch List (2024) EPA Proposal: Common Effects Approach for Aquatic Life Protective Values for Pesticides January 2025 Presentation from S. Hughes to BAPPG on Pesticides

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
MERCURY AND PCBS			
• The Mercury & PCBs Watershed Permit is based on Total Maximum Daily Loads (TMDLs) for San Francisco Bay for each of these pollutants. • The Mercury & PCBs Watershed Permit was most recently reissued in December 2022, and it continues to require discharger support for risk reduction activities. BACWA is funding risk reduction activities on behalf of its members to comply with this permit provision. For FY25, BACWA has budgeted $12,500 to support risk reduction activities related to fish consumption. • Aggregate mercury and PCBs loads have been well below waste load allocations through 2023, the last year for which data have been compiled. • EPA Method 1668C for measuring PCB Congeners has not been promulgated by EPA. Effluent limitations are based on PCB Aroclors quantified using EPA Methods 625.1 or 608.3. • In 2017, EPA adopted federal pretreatment program rules requiring dental offices to install dental amalgam separators. The rule is intended to reduce dental office discharge of mercury. The compliance date was in 2020.	• The Regional Water Board plans to designate three new beneficial uses for Bay Area water bodies: Tribal Tradition and Culture (CUL), Tribal Subsistence Fishing (T-SUB) and Subsistence Fishing (SUB). Water bodies with these beneficial uses could also be assigned lower mercury objectives. • The Triennial Review determines the prioritization of Basin Plan amendments, including designation of new beneficial uses. The February 2025 revised draft Triennial Review staff report identified this effort as a high priority. • BACWA intends to support risk reduction activities related to the new subsistence fishing beneficial use. In 2024, SFEI worked with stakeholders to develop a fish consumption survey for subsistence fishers. BACWA is funding a small pilot project in 2025 related to this fish consumption survey. • Recent consolidations among contract laboratory providers of PCB analysis via EPA Method 1668C has led to difficulties with electronic reporting. BACWA prepared a guidance document to assist members with reporting, which Water Board staff endorsed. • In late 2024, EPA proposed a Methods Update Rule that would withdraw the existing analytical methods for Aroclors (PCB mixtures). The Mercury & PCBs permit uses Aroclors for compliance monitoring. However, even if the proposed rule is finalized, there will be no change to monitoring until the Permit is reissued (2027 or beyond).	• Work with members and contract laboratories to implement new guidance on sampling and reporting for PCB congeners analyzed via EPA Method 1668C. • Work with Regional Water Board staff to understand the potential impact of a withdrawal of the EPA analytical method for PCBs Aroclors. • Providing funding for one or more community-based organizations to test the fish consumption survey for subsistence fishers. This effort will inform a future large-scale survey effort. • Continue outreach to dentists BAPPG and BACWA's pretreatment committee. Per federal rules, all dental facilities were required to submit one-time compliance reports by October 2020. • Continue to track the outcome of the 2024 Triennial Review of the Basin Plan. It is currently scheduled to be considered for adoption in May 2025.	2022 Mercury & PCBs Watershed Permit (Effective Feb. 1, 2023) BACWA Risk Reduction Materials Mercury and PCB Load Trends 2013- 2023 Updated June 2024 2024 Triennial Review of the Basin Plan Planning for Fish Consumption Survey of Subsistence Fishers BACWA Guidance on PCB Congeners Sampling, Analysis, and Reporting Protocols (October 2024) EPA Methods Update Rules

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
STATE WATER BOARD TOXICITY PROVISIONS			
• The State Water Board adopted the Statewide Toxicity Provisions in 2021 as state policy for water quality control for all inland surface waters and estuaries. The Provisions establish: o Use of Test of Significant Toxicity (TST) as statistical method to determine toxicity, replacing EC25/IC25; o Numeric limits for chronic toxicity for POTWs >5 MGD and with a pretreatment program; smaller POTWs will receive effluent targets and only receive limits if Reasonable Potential is established; o Regional Water Board discretion on whether to require RPAs for acute toxicity o For POTWs with Ceriodaphnia dubia as most sensitive species, numeric targets rather than limits were initially in effect until completion of a statewide quality assurance study in December 2023. • EPA approved the Statewide Toxicity Provisions in May 2023, and they became effective in June 2023. Individual NPDES permits reissued in the San Francisco Bay Region are implementing the Toxicity Provisions and requiring use of the TST for chronic toxicity testing. Reissued permits no longer require acute toxicity monitoring.	• EPA has not yet approved the Alternate Test Procedure for whole effluent toxicity testing. Until the Alternate Test Procedures are approved, the Regional Water Board has advised that dischargers should use the full five-concentration series for all tests, including routine monitoring and Species Sensitivity Screening Studies. • From 2016 to 2023, agencies had the option to skip sensitive species screening upon permit reissuance and pay the avoided funds to the RMP to be used for CECs studies. Under the Toxicity Provisions, agencies are now required by the provisions to do sensitive species screening once every 15 years. • The State Water Board collaborated with stakeholders on a special study to improve the quality of Ceriodaphnia dubia testing. Upon completion of the study, the State Water Board compiled resources related to the study for dischargers that plan to use Ceriodaphnia dubia for chronic toxicity monitoring. • In November 2024, the State Water Board received a report from staff on implementation of the provisions. The report stressed the importance of laboratories being ready to complete 3 chronic toxicity tests within a calendar month, as required when there is a "fail" result. • In February 2025, the BACWA Permits Committee provided member training on using the TST to interpret test results.	• **Conduct toxicity testing using the Statewide Toxicity Provisions.** All member agencies with individual NPDES permits reissued after August 2022 have transitioned to the new toxicity testing requirements. • **Plan to conduct a species sensitivity screening** to comply with the Toxicity Provisions, which require a study no more than 10 years old be used to determine a "Tier I" species for use in compliance monitoring. The BACWA laboratory committee has compiled some tips related to sensitivity screening studies for member agencies' use. • Members hiring a contract laboratory to perform testing using Ceridaphnia dubia should utilize the Ceriodaphnia dubia Quality Assurance Guidance Recommendations from the multi-laboratory study, including the performance metrics listed in Appendix E of the report.	State Water Board Toxicity Page EPA Approval of Statewide Toxicity Provisions Ceriodaphnia dubia Study Resources, including link to Quality Assurance Guidance Recommendations CASA Webinar on Lessons from Ceriodaphnia Study Lab Committee Tips on Sensitive Species Screening State Water Board November 2024 Status Report on Implementation of Toxicity Provisions February 2025 Permits Committee Training on Using the Test of Significant Toxicity (McCampbell Analytical)

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CONTAMINANTS OF EMERGING CONCERN (CECS)			
• Pharmaceuticals and other trace contaminants of emerging concern (CECs) are ubiquitous in wastewater at low concentrations and have unknown effects on aquatic organisms. • The San Francisco Bay region has a CECs strategy focusing on monitoring/tracking concentrations of constituents with high occurrence and high potential toxicity. The State Water Board's Pretreatment and CECs Unit is also developing a similar monitoring strategy for use around the state. • The Regional Water Board has stated that wastewater agencies' voluntary and representative participation in RMP CECs studies is key to avoiding regulatory mandates for CECs monitoring. These studies are informational and not for compliance purposes. BACWA developed a White Paper on representative participation to support facility selection for these studies.	• Bay dischargers are continuing to provide supplemental funding for RMP CECs studies through the NPDES Permit Amendment adopted in 2021 by the Regional Water Board (R2-2021-0028). • The State Water Board has recently increased its focus on CECs. In April 2023, a State Water Board Science Advisory Panel released a report identifying risk-based and occurrence-based monitoring strategies in aquatic ecosystems. Similar approaches are already in use in the Bay Area by the RMP. • In the Bay Area, the RMP has designated organophosphate esters (OPEs) and PFAS as CECs of "high" concern. • CECs of "moderate" concern include alkylphenols and alkylphenol ethoxylates, bisphenols, fipronil and its degradates, imidacloprid, and microplastics. Carbendazim, a preservative used in paints and other products, was added to the "moderate" concern tier in 2024. • Quaternary Ammonium Compounds (QACs) are one of several classes of chemicals categorized as a "potential concern" due to lack of data. Monitoring studies of Bay water and stormwater are planned in coming years. A report on QACs in wastewater was published by SFEI in 2024. • In Fall 2024, both the RMP Annual Meeting and the RMP's annual publication, The Pulse of the Bay, focused on CECs in San Francisco Bay.	• Continue to participate in the RMP Emerging Contaminants Workgroup. • Participate in RMP studies by collecting wastewater samples at member facilities. For 2025, the Emerging Contaminants Workgroup plans to support studies of plastic additives in Bay water and sediment (OPEs, bisphenols, and other plastic additives); QACs in Bay water and sediment; synthetic dyes in Bay sediment, water, wastewater, and stormwater; and several other stormwater-related studies. • Work with RMP staff to assist with study design for any new studies of CECs in wastewater. In 2024, BACWA updated the white paper on POTW participation in CECs studies. It now includes a summary of recent CECs studies, in addition to updated statistical information about POTWs to assist with future CECs study design.	RMP Emerging Contaminant Workgroup BACWA CECs White Paper (2024 version) 2021 NPDES Permit Amendment for Monitoring and Reporting State Water Board CECs webpage SFEI Report on QACs in Wastewater The Pulse of the Bay 2024 – Contaminants of Emerging Concern RMP 2024 Annual Meeting Materials RMP Report: Contaminants of Emerging Concern in San Francisco Bay – A Strategy for Future Investigations (2024 version)

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MICROPLASTICS			
• Microplastic pollution is an environmental threat with the potential to impact wastewater disposal and reuse, as well as biosolids end uses. • Microplastics have been a focus of the RMP in recent years. BACWA has participated in the Workgroup and developed a POTW Fact Sheet. One conclusion of the RMP work is that POTWs contribute much lower microplastic loads than stormwater. As a result, the RMP is focusing future microplastics sampling efforts on stormwater pathways. • In February 2022, the Ocean Protection Council (OPC) adopted a Statewide Microplastics Strategy that calls for increased water recycling, additional monitoring of wastewater, source control in wastewater, and additional scientific research. • Ongoing microplastics investigations by the RMP are focused on tire particles in stormwater.	• OPC funded a study of microplastic removal through wastewater treatment processes. The study commenced in 2021 with a pilot study involving BACWA member agency participation. Full-scale sampling and analysis of influent, effluent, and biosolids was completed in 2023, and three BACWA members participated. The study was completed in August 2024 and found overall removal efficiencies between influent and effluent averaged 95% 99%, and 99.9% for primary, secondary, and tertiary treatment, respectively. • The 2024 California Integrated Report (303(d) List) was adopted by the State Water Board, and the majority of the report was approved by EPA in 2024. The Integrated Report notes that San Francisco Bay is "potentially threatened" by microplastics. Due to data limitations, the Bay was not listed as an impaired water body during this listing cycle. • Unlike the 2024 Integrated Report, the 2026 Draft California Integrated Report (303(d) List) did not include an assessment of impairment due to microplastics. • Additional research to improve scientific understanding of microplastics in aquatic ecosystems will be needed to support a future impairment determination for the Bay. The Water Boards and OPC are supporting allocation of funding towards these research efforts.	• Continue to participate in the RMP Microplastics Workgroup. • Review and share the results of CASA-funded work being completed at the Southern California Coastal Water Research Project (SCCWRP) that is an add-on component to the recently completed OPC microplastics study. The add-on study will assess how well autosampling equipment, typically used by POTWs to collect wastewater samples for monitoring and compliance purposes, may provide representative samples for microplastics. • Continue tracking State Water Board and Ocean Protection Council actions via the CASA Microplastics Workgroup.	BACWA Microplastics Fact Sheet RMP Microplastics Workgroup Ocean Protection Council Microplastics Strategy SCCWRP Report on Microplastics in California Wastewater Treatment Plants (2024) 2024 California Integrated Report / 303(d) List 2026 Draft California Integrated Report / 303(d) List

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PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)			
• Per- and polyfluoroalkyl substances (PFAS) are a group of human-made substances that are very resistant to heat, water, and oil. PFAS are used in surface coating and protectant formulations. Common PFAS-containing products are non-stick cookware, cardboard/paper food packaging, water-resistant clothing, carpets, and fire-fighting foam. PFAS in consumer products are a major source of PFAS to POTWs. • Perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two types of PFAS no longer manufactured in the US; however, other types of PFAS are still produced and used in the US. • All PFAS are persistent in the environment, can accumulate within the human body, and have demonstrated toxicity at relatively low concentrations. • Potential regulatory efforts to address PFAS focus on drinking water in order to minimize human ingestion of these chemicals, although regulators have also expressed concern about uptake through food, especially fish. • In 2020, the State Water Board issued an investigative order for POTWs. At that time, BACWA obtained approval to fund and conduct a Regional PFAS Study in lieu of the investigative order. • In 2021, EPA released a PFAS Strategic Roadmap.	• In 2024, EPA finalized Maximum Contaminant Levels for several PFAS compounds in drinking water. California has not yet adopted the EPA's drinking water limits, although this issue is a 2025 priority of the Division of Drinking Water. Drinking water limits will not be applicable to wastewater discharges to the Bay, but they could be used in NPDES permits for inland dischargers. • In December 2025, EPA released draft national recommended human health water quality criteria for PFOS, PFOA, and perfluorobutanesulfonic acid (PFBS). If finalized, local regulators could apply these criteria to San Francisco Bay and other inland water bodies for use in NPDES permitting. The draft criteria for PFOS and PFOA are several orders of magnitude lower than measured concentrations in wastewater effluent, measured concentrations in San Francisco Bay, and method detection limits. • In January 2025, a new EPA administrator was appointed, and EPA has already announced modifications to some portions of the PFAS Strategic Roadmap. The status of previous EPA efforts on source control is now uncertain. • For example, EPA had previously planned to develop pretreatment standards for industrial users (Metal Finishing, Organic Chemicals, Plastics and Synthetic Fibers, and landfills) and to conduct a nationwide POTW Influent PFAS Study to collect nationwide data on industrial and domestic sources of PFAS.	• BAPPG is developing materials for a public outreach campaign and website content related to PFAS. Materials will be shared with members prior to the April 2025 outreach campaign. BACWA will host a forum to strategize PFAS messaging to regulators pertaining to practical PFAS management. • **Members should use Clean Water Act methods (EPA Method 1633 or 1621) for monitoring effluent, biosolids, or industrial wastewater.** • Develop a sampling plan for the next phase of BACWA's regional PFAS study to support the "PFAS Sources to Solutions" project being led by SFEI and the California Department of Toxic Substances Control. In FY26, BACWA plans to sponsor additional wastewater sampling focusing on sewershed sources of PFAS. • Review EPA's January 2025 draft risk assessment for PFOA and PFOS in biosolids (see Biosolids page). • **Member agencies are encouraged to support legislative efforts to limit the use of PFAS in consumer products.** SB 682 (Allen), recently introduced for the 2025 California legislative session, would "phase out the sale of products with avoidable PFAS use."	BACWA PFAS Study Summary State Water Board PFAS Resources EPA PFAS Resources EPA Drinking Water Limits EPA POTW Influent Study EPA NPDES Permitting Guidance (Dec. 2022) Presentation on BACWA's Regional PFAS Study at RMP 2023 Annual Meeting UC Irvine Report on PFAS in Residential Wastewater "PFAS Sources to Solutions" Project Overview Senate Bill 682 (Allen) – Environmental health: Product Safety: PFAS

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SANITARY SEWER SYSTEMS GENERAL ORDER			
• In 2022, the State Water Board reissued the statewide Sanitary Sewer Systems General Order (SSS-WDR). The reissued order replaced the 2006 Order and the 2013 Monitoring and Reporting Program. • The 2022 SSS-WDR became effective in June 2023 and contains numerous new and modified requirements, such as: o A prohibition on discharges to groundwater o Reduced spill reporting requirements for small spills (spills from laterals or <50 gallons) o New spill monitoring requirements such as photo documentation and faster water quality sampling o New requirements for preparation of Sewer System Management Plans (SSMPs), including a focus on system resiliency, prioritizing corrective actions, and coordinating with stormwater agencies o Modified annual reporting requirements o New mapping requirements o Modified timelines for preparation of audits and SSMPs.	• The first annual reports under the reissued SSS-WDR were due April 1, 2024. • Due dates for the first audits and SSMPs under the reissued SSS-WDR vary by agency. Audit due dates begin later in 2024, and SSMP due dates begin in 2025. The State Water Board has prepared an online tool to assist agencies in determining compliance dates. • Maintaining an updated SSMP continues to be a core requirement of the SSS-WDR. SSMP updates are now required every six years (instead of five) and must contain the 11 updated elements described in the reissued SSS-WDR. BACWA has assisted members by preparing a Guide for Developing and Updating SSMPs, now available through the BACWA and State Water Board websites. • In May 2024, BACWA completed a member survey of sewer lateral ordinances in the region. Agencies are using sewer lateral replacement ordinances and incentive programs to address ongoing concerns about infiltration and inflow (I&I).	• Continue to use the Collections System Committee as a forum for discussing best practices for completing audits and SSMPs. • Continue to coordinate with CASA and CWEA on training opportunities for members to address compliance with new requirements in the 2022 SSS-WDR. The Summit Partners are tentatively planning to host the next virtual workshop on SSS-WDR compliance in Spring 2025.	State Water Board SSS-WDR page Reissued SSS-WDR (General Order 2022-0103-DWQ), Effective June 5, 2023 Materials from Clean Water Summit Partners Webinars on Reissued SSS-WDR SSMP and Audit Due Dates Lookup Tool from State Water Board Guide for Developing and Updating Sewer System Management Plans (2024) BACWA Private Sewer Lateral Survey Results (2024)

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LABORATORY ACCREDITATION			
• In May 2020, the State Water Board adopted new comprehensive regulations for the Environmental Laboratory Accreditation Program. • Adoption of the new regulations was required by AB 1438, legislation that became effective in 2018. • The new ELAP regulations replaced the previous state-specific accreditation standards with a national laboratory standard established by The NELAC Institute (TNI). • Compliance with TNI standards was required beginning **January 1, 2024**. • The TNI standards pose a particular challenge to small laboratories, many of which have closed because they cannot economically meet the new standards. This reduction has contributed to significant ELAP fee increases for the remaining laboratories. • From 2021 to 2024, the BACWA Lab Committee hosted 30 virtual sessions on the TNI standards. Diane Lawver of Quality Assurance Solutions, LLC, provided the training. The training sessions were recorded, and are available to download with a password (available upon request).	• The TNI standards apply to every ELAP-certified laboratory, regardless of certificate expiration date and regardless of location. Some laboratories have not yet been assessed to the TNI standard. Starting January 1, 2024, ELAP will be sending laboratories a written request asking for information about assessment plans and requesting a TNI-compliant Quality Assurance manual. • For FY25, ELAP restructured its fees to increase fees for large laboratories with more than 500 fields of accreditation. Smaller laboratories had no fee increase. In March 2025, the State Water Board will begin stakeholder outreach related to FY26 ELAP fees. • ELAP is now implementing EPA's 2021 Method Update Rule, and advised labs to update any outdated methods by February 2024. • In April 2024, EPA finalized a routine Methods Update Rule. The BACWA Laboratory Committee has provided member training on changes to Standard Methods affected by this Methods Update Rule, and will provide additional training later in 2025. This Methods Update Rule will be implemented by ELAP at a later date. • In December 2024, EPA proposed a Methods Update Rule to promulgate EPA Method 1633A for 40 PFAS compounds, EPA Method 1621 for adsorbable organic fluorine, and Method 1628 for 209 PCB Congeners. The action also proposes to withdraw the existing methods for PCB Aroclors.	• Continue to provide member training on the Methods Update Rule finalized in April 2024. • Review the EPA's December 2024 proposed Methods Update Rule to help members understand its potential impact on monitoring for PCBs and PFAS. • Continue to work through BACWA's Laboratory Committee to support members as they navigate laboratory accreditation under the new TNI standards. • Publicize training opportunities offered by consultants, ELAP, and others.	State Water Board's ELAP regulations page, including links to timeline and relocation guidance tools ELAP Implementation of 2021 Method Update Rule EPA Methods Update Rules ELAP Fees – Stakeholder Meeting Information Materials from BACWA TNI Training Sessions 2021-2024 - request password from BACWA staff

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
BIOSOLIDS			
• Regulatory drivers are leading to the phase-out of biosolids used as alternative daily cover (ADC) or disposed in landfills. SB 1383, requiring reductions in the amount of organic material deposited in landfills, went into effect in 2022. CalRecycle is the state agency responsible for implementation. • Local enforcement of SB 1383 began in 2024, and compliance was required by January 1, 2025. Requirements include: o Diverted biosolids must be anaerobically digested and/or composted to qualify as landfill reduction. o CalRecycle is accepting applications to qualify other specific treatment technologies as landfill reduction (per Article 2 of SB 1383). o Local ordinances restricting land application are disallowed. • While the regulations implementing SB 1383 do not explicitly forbid biosolids disposal/reuse in landfills, it is assumed that since biosolids are a relatively "clean" waste stream that can be easily diverted, landfills will stop accepting biosolids. • The Bay Area Biosolids Coalition (BABC) was formed to find sustainable, cost-effective, all-weather options for biosolids management. BABC is a BACWA Project of Special Benefit.	• Jurisdictions that divert organic waste must also procure the end products of diversion, such as biogas, biomethane, and compost (but not biosolids). Procurement rules are being phased in over three years (2023 to 2025) and there are interim rules regarding procurement of biogas from POTWs. • CalRecycle and biosolids stakeholders are continuing to conduct outreach to counties with ordinances that restrict land application of biosolids. • CalRecycle reviews technologies that may be equivalent to landfill diversion/reduction per Article 2 of SB 1383. CalRecycle has also provided clarification on technologies that already comply with SB 1383, and need not apply under Article 2 (e.g., land application of biosolids that have not been anaerobically digested). • In 2024, BACWA prepared an updated Biosolids Trends Survey Report for calendar years 2021-2023. • In early 2025, USEPA released a draft risk assessment for PFOA and PFOS in biosolids. The draft risk assessment estimates human health risks arising from biosolids land application and surface disposal. The assessment considers risks via surface water, ground water, fish consumption, and milk consumption pathways, among others. If EPA determines that regulation of biosolids disposal is needed to reduce risk, this will occur in a future phase.	• Continue to review the draft risk assessment for PFOA and PFOS in biosolids, and consider submitting comments. • **If requested, respond to EPA's Influent Study of POTWs**, which will also function as a nationwide sewage sludge survey. Facilities larger than 10 MGD may be required to participate in the survey and conduct sampling. EPA had planned to conduct the survey in 2025, but the current status is uncertain due to the change in EPA administration. • Continue to follow emerging science and regulatory developments regarding PFAS in biosolids, particularly related to EPA's draft risk assessment and CERCLA hazardous waste designations for PFOA and PFOS. • Engage through CASA and BABC to follow new legislation affecting biosolids processing and disposal. • Actively work through CASA with State agencies to develop sustainable long-term options for biosolids beneficial use. • Meet with Air District staff regularly to discuss alignment of state and local regulations that affect biosolids treatment and end uses.	BACWA Biosolids Trends Surveys Bay Area Biosolids Coalition CASA White Paper on SB 1383 Implementation CalRecycle - Short-Lived Climate Pollutant Reduction Strategy CalRecycle Procurement FAQ (Updated by AB 1985) SB1383 Article 2 Determination EPA National Sewage Sludge Survey

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CLIMATE CHANGE ADAPTATION			
• Climate change and water resilience are strategic priorities of both the State Water Board and Regional Water Board. • In 2019, Governor Newsom signed Executive Order N-10-19 directing State Agencies to recommend a suite of priorities and actions to build a climate-resilient water system and ensure healthy waterways through the 21st century. • Bay Area coordination occurs through Bay Adapt, the Bay Area Climate Adaptation Network (BayCAN), and other venues. BACWA has signed a letter of support for the Bay Adapt Joint Platform. • In 2022, the State released a Climate Adaptation Strategy, including an updated climate change assessment for the Bay Area region. • The Regional Water Board is modifying the Basin Plan to address climate change and wetland policy. The changes will occur through multiple Basin Plan amendments • Shallow groundwater response to SLR is a concern in low-lying Bay Area communities. Information about current and future depth-to-groundwater maps is summarized in a January 2023 report now available from Pathways Climate Institute and SFEI.	• In June 2024, the Regional Water Board adopted a Climate Change Basin Plan amendment addressing dredge and fill procedures near the region's shorelines, especially for climate adaptation projects. The amendment is awaiting Office of Administrative Law approval. • In 2024, the Ocean Protection Council (OPC) adopted updated SLR guidance. Compared to the 2018 version, projections for extreme SLR (i.e., H++ scenario) were removed, and the range of projections has narrowed considerably, especially for 2050. • In December 2024, the Bay Conservation and Development Commission (BCDC) adopted Sea Level Rise planning guidelines for the Bay Area as part of the Regional Shoreline Adaptation Plan. To comply with SB 272, the Plan requires cities and counties to develop subregional sea level rise adaptation plans by 2034. • In late 2024, the California Coastal Commission updated its sea level rise policy guidance to conform to OPC's new guidance. The guidance document also contains specific recommendations related to wastewater infrastructure.	• Understand and begin planning to participate in the development of Subregional Shoreline Adaptation Plans. These adaptation plans are required for cities and counties per BCDC's 2024 Regional Shoreline Adaptation Plan; special districts should also participate in their development. Plans are due by 2034. • **Begin using the OPC's updated Sea Level Rise Guidance.** Updates to the Coastal Commission's "Critical Infrastructure at Risk" SLR planning guidance are expected to follow. • Continue to develop webinars on technical topics related to climate change, such as sea level rise projections and changes in precipitation. The BACWA Climate Change Community of Practice will provide a forum to discuss these topics. • Work with Regional Water Board staff to update and revisit the Climate Change Information Request first sent to NPDES permittees in 2021. • Continue to work with Regional Water Board and other resource agencies to look for regulatory solutions to encourage wetlands projects for shoreline resiliency.	Regional Water Board Basin Plan Amendment on Climate Change and Aquatic Habitat SFEI Report on Shallow Groundwater Response (2023) OPC 2024 Sea Level Rise Guidance California Coastal Commission Sea Level Rise Policy Guidance Update (Nov. 2024) California Coastal Commission's Critical Infrastructure at Risk (2021) BayCAN Funding Tracker BCDC's Regional Shoreline Adaptation Plan (2024) Bay Adapt Joint Platform including information about the Regional Shoreline Adaptation Plan

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
CLIMATE CHANGE MITIGATION			
• The California Air Resources Board's (CARB's) Climate Change Scoping Plan Update lays out the approach for the State to meet its greenhouse gas (GHG) emissions reduction targets through 2030. The latest Scoping Plan was updated in 2022 targeting carbon neutrality by 2045, including policies addressing: o Short-lived climate pollutants o Carbon sequestration on Natural and Working Lands o Largest emitters (transportation, electricity, and industrial sectors) • CalRecycle is implementing SB 1383 (Short-Lived Climate Pollutant Reduction) to reduce methane emissions. SB 1383 requires diversion of organic waste from landfills, and re-routing organics from landfills to digesters at POTWs is one way to accomplish this. • The Bay Area Air District (Air District, formerly known as the Bay Area Air Quality Management District) developed a Clean Air Plan that outlines local strategies to address climate pollutants. • The Air District proposed the development of Regulation 13 (climate pollutants) targeting methane and nitrous oxide reductions related to organics diversion and management. After a pause of several years, the Air District began revisiting Regulation 13 in 2024.	• CARB has pursued rapid fleet conversion to zero-emission vehicles (ZEVs), including medium and heavy-duty vehicles, through the Advanced Clean Fleet rule. • In 2024, CARB re-opened the Advanced Clean Fleet regulations to incorporate requirements of AB 1594 by expanding ZEV purchase and daily usage exemptions for public agency utilities. Rulemaking is expected to be complete by early 2025. • In January 2025, CARB withdrew its waiver requests to EPA for key portions of the Advanced Clean Fleet rule. CARB plans to continue to enforce the State and Local Government Agency Fleets portion of the regulation, pointing to a 9th Circuit federal court decision from 2007 as the basis of their legal authority. • In early 2025, CARB released a streamlined ZEV purchase exemption list identifying vehicles that are not currently available as ZEVs, so no exemption request would be required. • In addition to pushing for ZEVs, CARB is revising the Low Carbon Fuel Standard to emphasize hydrogen rather than biomethane as a transportation fuel. CARB adopted amendments to the Low Carbon Fuel Standard in November 2024, and they are awaiting review by the Office of Administrative Law. • In fall 2024, as a first step in revisiting Regulation 13, Air District staff are developing a white paper on anaerobic digesters and potentially associated emissions.	• Support the Air District's development of a white paper on anaerobic digestion by providing applicable information on digestion and associated energy generation infrastructure. • Continue to track implementation of the Advanced Clean Fleet rule. This includes modifications to the rule that will exempt some traditional utility-specialized vehicles used by public agency utilities, per AB 1594. CARB plans to release draft regulatory revisions addressing AB1594 later in 2025. Although CARB plans to enforce the State and Local Government Agency Fleets portion of the regulation, regulatory uncertainty for other portions of the rule could impact ZEV availability. • Work with PG&E and the Air District to explore options for POTWs to inject biogas into PG&E pipelines under the utility's state-mandated biomethane procurement program.	CARB Climate Change Scoping Plan CARB Low Carbon Fuel Standard Rulemaking (Updated Jan. 2025) CARB Advanced Clean Fleet Rule (Updated Jan. 2025) CARB's ZEV Purchase Exemption List CARB AB 1594 Information CalRecycle and SB 1383 Bay Area Clean Air Plan Bay Area Air District's Regulation 13 for Climate Pollutants EPA Renewable Fuel Standards PG&E Procurement

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
TOXIC AIR CONTAMINANTS			
• Regulation 11, Rule 18 (Rule 11-18), adopted in 2017, is the Air District's local effort to protect public health from toxic air pollution from existing facilities, including POTWs. • Per the Rule, the Air District will conduct site-specific Health Risk Screening Analyses and determine each facility's prioritization score (PS). Health Risk Assessments (HRAs) will be conducted for all facilities with a cancer PS>10 or non-cancer PS>1. Facilities verified to be above the threshold will have 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 >1,700.	• In April 2024, the Air District finalized updated Implementation Procedures for Rule 11-18 describing how the Air District will conduct HRAs. It also establishes rules for vendors or contractors to conduct HRAs, if allowed by the Air District. The Air District plans to update the regulation again in 2025. • To comply with provisions of AB 617 and AB 2588, the wastewater sector has until 2028 to perform a Pooled Emissions Study to update outdated default emission factors for toxic air contaminants. CASA is directing the Pooled Emissions Study with consultant support from Yorke Engineering. 27 BACWA member agencies are participating in the study by providing financial contributions. In FY25, BACWA collected approximately $500,000 from participating BACWA member agencies to fund the effort. In early 2025, the project team is meeting with CARB and staff from Air Districts across the State to discuss concepts for sampling locations, analytes, and analytical methods. Regulator approval of the study plan is required before sampling can begin. • Since 2022, Air District staff and BACWA representatives have been meeting about 3-4 times per year to address concerns related to toxic air contaminants and associated rule-making. Workgroup materials are available on the AIR Committee website. • CARB maintains a list of approved independent contractors for source testing. Using the list may be helpful, but is not required.	• **Review and understand the updated Rule 11-18 Implementation Procedures.** For most POTWs with a relatively low prioritization score, the HRAs will not occur right away. These POTWs will likely be able to use updated emissions factors from the statewide poled emissions study, as described below. Review and provide comment on proposed rule changes expected later in 2025. • **Report "business as usual" for air toxics through 2028 (through year 2027 data).** The wastewater sector has until 2028 to perform the statewide Pooled Emissions Study. • Continue participating in the BACWA-Air District workgroup to discuss toxic air contaminants, rule development, and related air quality regulatory issues.	Bay Area Air District Facility Risk Reduction Program Updates (Rule 11-18) Bay Area Air District New Source Review of Toxic Air Contaminants (Rule 2-5) CARB page on AB 617 and AB 2588 and Final Statement of Reasons CASA Handout on Pooled Emissions Study CARB List of Approved Independent Contractors for Test Methods Timing of Rule 11-18 vs. Process for AB 617 July 2024 BACWA Update to Air District Stationary Source Committee BACWA AIR Committee website

Background Highlights	Challenges and Recent Updates	Next Steps for BACWA	Links/Resources
BEST AVAILABLE CONTROL TECHNOLOGY			
• Best Available Control Technology (BACT) is a requirement for major new or modified sources of air pollution. • BACT is defined locally as part of the Air District's Rule 2-2, "New Source Review." BACT is established based on the most stringent level of emissions control that is achieved in practice and that is technologically feasible & cost effective. • CARB is working on proposed amendments to the off-road new diesel engine standards, called "Tier 5" rulemaking. The Tier 5 rulemaking aims to reduce oxides of nitrogen (NOx), particulate matter, and may also include first-time carbon dioxide (CO_2) emissions standards.	• In December 2020, the Air District issued a BACT determination for Tier 4 emissions standards for large standby generators (≥ 1,000 bhp). The determination applied retroactively to applications deemed complete after January 1, 2020. The retroactive BACT designation resulted in cost increases and schedule delays for standby generator installations at some BACWA member agencies. • Based on this experience, BACWA has been working with BAAQMD to provide better notice of future BACT determinations. • In October 2024, the Air District issued a BACT determination for Tier 4 emissions standards for standby generators > 50 bhp and < 1,000 bhp. The BACT determination is effective as of December 2, 2024 and is not retroactive. Options to comply with the new standards include: (a) an EPA-certified Tier 4 engine, (b) a Tier 4-compliant engine that is packaged by the engine manufacturer with abatement equipment, or (c) A lower tier engine that has been retrofitted with after-market abatement equipment to meet Tier 4 standards. • In October 2024, CARB proposed amendments to the off-road diesel engine emissions standards (Tier 5 rulemaking). A workshop was also held in October 2024.	• **Design new or modified standby generators to meet Tier 4 emissions standards.** • Continue to coordinate with CASA to participate in review and public comment on CARB's Tier 5 rulemaking.	Air District BACT/TBACT Workbook Air District October 2024 Workshop on BACT Determination Slides and Video CARB Tier 5 Rulemaking

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RECYCLED WATER			
• Approximately 10 percent of the municipal wastewater of Bay Area POTWs is currently recycled. Expansion of recycled water projects is a goal of many BACWA members, but implementation is slowed by high costs and administrative requirements. • In 2018, the State Water Board adopted uniform water recycling criteria for two types of Indirect Potable Reuse: surface water augmentation and groundwater augmentation. • In December 2023, the State Water Board adopted uniform water recycling criteria for two types of Direct Potable Reuse: raw water augmentation and treated water augmentation. • As of 2020, virtually all recycled water in the Bay Area was produced at centralized facilities using municipal wastewater, and was treated to meet standards for non-potable reuse. There are not yet any Indirect or Direct Potable Reuse projects in the Bay Area, although several are in the planning stage.	• The State Water Board is currently developing standards for onsite treatment and reuse of non-potable water in multi-family, mixed use, and commercial buildings. The rulemaking process for Onsite Non-Potable Reuse is slated to begin in April 2025; once rulemaking begins, it must be completed within one year. • In June 2023, BACWA completed a Regional Evaluation of Potential Nutrient Discharge Reduction by Water Recycling, as required by the 2nd Nutrient Watershed Permit. • In December 2023, the Regional Water Board approved a Basin Plan Amendment that will allow greater flexibility for NPDES permitting of reverse osmosis concentrate discharges to San Francisco Bay. As of August 2024, this Basin Plan Amendment has received all necessary approvals and is now in effect. • The Direct Potable Reuse regulations were finalized in August 2024 upon approval from the state's Office of Administrative Law. The regulations go into effect October 1, 2024.	• Review draft regulations for Onsite Non-Potable Reuse when they are released by State Water Board staff, which is expected in April 2025. • Continue to provide members with technical resources related to interagency coordination, such as cost-sharing agreements and permitting. These topics are based on feedback from the September 2023 workshop on interagency collaboration in which wastewater and water agency representatives convened to discuss challenges and opportunities for expanding water recycling in the Bay Area. • Continue to track the role of recycled water projects in diverting nutrient loads from San Francisco Bay. Significant nutrient load reductions and annual reporting on recycled water nutrient load diversions are required by the 2024 Nutrient Watershed Permit (see page 2). In spring 2025, BACWA plans to co-host workshop with WateReuse's Northern California chapter that will focus on topics related to nutrient removal and recycled water. • Track California legislation with potential impacts on recycled water funding, mandates, or regulations.	Water Boards Recycled Water Policy and Regulations Direct Potable Reuse Regulations Onsite Nonpotable Reuse Regulations BACWA Special Studies of Recycled Water and Nature-Based Systems California's Water Supply Strategy (August 2022) Basin Plan Amendment affecting Water Recycling (now also incorporated into the Basin Plan)

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

ACRONYMS

ADC	Alternate Daily Cover
BACT	Best Available Control Technology
BCDC	Bay Conservation and Development Commission
bhp	brake horsepower
CalDPR	California Department of Pesticide Registration
CARB	California Air Resources Board
CASA	California Association of Sanitation Agencies
CEC	Compound of Emerging Concern
CIWQS	California Integrated Water Quality System
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
HFPA-DA	Hexafluoropropylene Oxide (HFPO) Dimer Acid, also known as GenX
MCL	Minimum Contaminant Level (Drinking Water)
MGD	Million Gallons per Day
NELAC	National Environmental Laboratory Accreditation Conference
NMS	Nutrient Management Strategy
OAH	Ocean Acidification and Hypoxia
OEHHA	Office of Environmental Health Hazard Assessment
OPC	Ocean Protection Council
PCB	Polychlorinated Biphenyl
PFAS	Per- and Polyfluoroalkyl Substances
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
POTW	Publicly-Owned Treatment Works
PS	Prioritization Score
QAC	Quaternary Ammonium Compound
RMP	Regional Monitoring Program
RPA	Reasonable Potential Analysis
SF Bay	San Francisco Bay
SFEI	San Francisco Estuary Institute
SLR	Sea Level Rise
SSMP	Sewer System Management Plan
TMDL	Total Maximum Daily Load
TIN	Total Inorganic Nitrogen
TNI	The NELAC Institute
TST	Test of Significant Toxicity
WQO	Water Quality Objective
ZEV	Zero-Emission Vehicle