

California Regional Water Quality Control Board San Francisco Bay Region

RESPONSE TO WRITTEN COMMENTS On the Tentative Order Regulating Nutrients in Discharges from Municipal Wastewater Treatment Facilities to San Francisco Bay

The Regional Water Board received written comments from the parties below regarding a draft NPDES permit (tentative order) distributed for public comment on April 5, 2024.

Regulatory Agencies:

- U.S. Environmental Protection Agency

Associations:

- Bay Area Clean Water Agencies
- California Association of Sanitation Agencies

Large Dischargers:

- Central Contra Costa Sanitary District
- East Bay Dischargers Authority
- East Bay Municipal Utility District
- City of San Jose
- San Francisco Public Utilities Commission

Smaller Dischargers:

- Delta Diablo
- Dublin San Ramon Services District
- City of Millbrae
- Napa Sanitation District
- City of San Mateo
- City of Sunnyvale
- Vallejo Flood and Wastewater District

Community of Central Contra Costa Sanitary District:

- City of Concord
- City of Danville
- City of Lafayette
- City of Martinez
- Town of Moraga
- City of Orinda
- City of Pleasant Hill
- City of San Ramon
- East Bay Leadership Council
- Concord Chamber of Commerce
- Lafayette Chamber of Commerce

- Pleasant Hill Chamber of Commerce
- Rhea de Aenille
- Bella Ho
- Cheri Ho
- Winston Ho
- David Landsborough
- Michael McDermott
- Brent Meyers
- Kevin and Charlene Mulcahy

Non-Governmental Organizations:

- San Francisco Baykeeper
- San Francisco Baykeeper Members

The comments are summarized below in *italics* (paraphrased for brevity), followed by staff's response. For the full content and context of the comments, please refer to the comment letters. To request a copy of the letters, see the contact information in Attachment F, section 8.7, of the Revised Tentative Order.

Revisions are shown with strikethrough ~~text~~ for deletions and underline text for additions. The Revised Tentative Order also corrects typographical errors and contains minor editorial and formatting changes to the tentative order distributed for public comment.

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MAJOR COMMENTS¹

Major Comment 1

Support for load reductions (U.S. EPA, BACWA, Baykeeper and its members)

Many commenters support the need to reduce nutrient loads to San Francisco Bay.

Response

Many parties recognize the need to reduce nutrient loads to protect San Francisco Bay beneficial uses, even if various parties express concerns, particularly related to the cost and time allotted for compliance with the proposed requirements. We agree. Action to reduce nutrient loads is needed now.

Major Comment 2

Desire for more time to comply (BACWA, Dischargers)

Dischargers would like more time to comply with the proposed final effluent limits for total inorganic nitrogen. They are concerned that multi-benefit projects, in particular, may take longer than the 10 years allotted to comply, driving some dischargers to abandon such projects for more conventional options. Dischargers request that we work with the State Water Resources Control Board (State Water Board) to amend its “Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits” (Compliance Schedule Policy; Resolution 2008-0025). Alternatively, they request that we amend the San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan), for example to establish a Total Maximum Daily Load (TMDL), to extend compliance timelines. They request that the Board adopt a resolution directing staff to identify a plan to legally extend proposed compliance schedules.

Response

We recognize that agencies implementing multi-benefit solutions, such as nature-based treatment or water recycling, or needing to pilot innovative technologies before full-scale implementation, may find compliance within the 10-year timeline to be difficult. Multi-benefit projects may take longer to complete than conventional projects due to the additional challenges associated with interagency agreements, multi-agency permitting, and land acquisition.

- a. Recycled water projects require agreements between wastewater agencies and water supply agencies.

¹ Major comments are those made by multiple commenters. The term is not intended to imply that other comments are minor.

- b. Nature-based solutions require obtaining permits from multiple agencies. Where a discharger does not already own the project site, the land must be acquired.
- c. Innovative technologies could reduce energy use, chemical use, emissions, and costs. Piloting innovative technologies before implementation could be necessary but would take time.

We recognize that, if compliance must be achieved within 10 years, some dischargers contemplating alternative strategies may choose to consider only traditional gray infrastructure upgrades to ensure compliance. However, we strongly discourage this and instead encourage dischargers to also pursue strategies that provide multiple benefits to the communities they serve and the environment. We are committed to considering all available regulatory options to provide more time in the future, as warranted.

At this time, the Board has only two options to delay immediate compliance with the proposed final baywide effluent limit and, if necessary, individual limits: the Board could establish compliance schedules within the permit or issue cease and desist orders. Many dischargers do not want cease and desist orders because of the perceived stigma of enforcement and the potential for citizen suits even with cease and desist orders. Thus, we have proposed 10-year compliance schedules, the longest schedules the Compliance Schedule Policy allows.

Future regulatory options to provide more time could include the following, for example:

- a. Finding that a new compliance schedule is justified based on a revised interpretation of the biostimulatory substances water quality objective resulting in a more stringent limit;
- b. Working with the State Water Board to amend the Compliance Schedule Policy to allow longer compliance schedules (the compliance schedule provision in the Basin Plan was superseded by the Compliance Schedule Policy and is no longer in effect);
- c. Amending the Basin Plan, for example by establishing a TMDL, to provide more time for implementation; or
- d. Issuing cease and desist orders with extended compliance schedules.

Of these options, only two would not require advancements in our scientific understanding of nutrient impacts on San Francisco Bay: issuing cease and desist orders and amending the Compliance Schedule Policy to allow longer compliance schedules. Amending the Compliance Schedule Policy would require State Water Board action. We will consult with State Water Board staff to ascertain whether the State Water Board might be willing to consider the change. We will also continue to implement the Nutrient Management Strategy to collect information necessary to inform our interpretation of the biostimulatory substances water quality objective or amend the Basin Plan.

Our response to BACWA Comment 2, below, describes a draft resolution for Board consideration. If approved, the draft resolution would demonstrate the Board's commitment to encouraging multi-benefit solutions and innovative technologies by directing staff to explore ways to allow more time for nutrient removal projects that have multiple benefits or involve innovative technologies. The Board can consider adoption of the draft resolution after considering the Revised Tentative Order.

Major Comment 3

Concerns regarding costs to implement nutrient load reductions (BACWA, Dischargers, Central Contra Costa SD community members)

Many parties express concerns that if conventional technologies are used to achieve the proposed nutrient reductions, the total cost could be roughly \$11 billion throughout the region over 10 years. They request that the Board conduct a financial analysis and specifically consider costs to lower-income communities.

Response

We agree that the cost of necessary nutrient removal projects will be substantial, but a meticulous financial analysis is not required. The Clean Water Act does not allow final water quality-based effluent limitations to be relaxed to reduce costs at the expense of protecting water quality. The expenditures associated with the proposed nutrient removal requirements are necessary to prevent massive harmful algal blooms and fish kills in San Francisco Bay.

The Bay Area Clean Water Agencies (BACWA) has estimated costs on behalf of the dischargers. If every discharger were to undertake an upgrade to reduce its effluent nitrogen concentration to 15 mg/L, the cost in 2024 dollars would be roughly \$11 billion. Actual costs could be less because the Revised Tentative Order does not require all dischargers to implement the types of upgrades the estimate is based on. In fact, the final individual effluent limits reflect an effluent nitrogen concentration of 20.5 mg/L, which is higher than 15 mg/L. Some dischargers, such as the East Bay Municipal Utility District, may spend less than anticipated because they can find more cost-efficient options. However, the costs could also be greater than \$11 billion due to inflation.

Estimating the exact cost is infeasible because each discharger is different and will make different choices in how it will comply with the Revised Tentative Order. Some dischargers have larger financial reserves than others. Dischargers also carry different levels of debt and have different bond ratings and bonding capacities. In any case, dischargers will likely spread these costs over many years as they implement their capital improvement plans.

Since 2012, there were early indications that the Bay's resilience to nutrients was waning, and in 2014, the Board forecasted the need to control nutrients. Some dischargers prepared for these expenses; others did not. As BACWA points out, Hayward, Palo Alto, San Leandro, San Mateo, Sunnyvale, and Union Sanitary District are spending \$1.8 billion in treatment plant upgrades to reduce nutrient loads within the next five years. These dischargers were proactive in reducing nutrient loads. To relieve

the remaining dischargers of these requirements would be inequitable, essentially punishing early actors and rewarding the dischargers who have been slow to act.

To mitigate potential costs, the Revised Tentative Order affords dischargers flexibility to evaluate and select cost-efficient options as they see fit. This includes recognizing that compliance will first be determined based on attainment of the baywide limit. This allows dischargers to collaborate, including providing financial support, on implementation of load reduction options by certain dischargers that are more cost-effective than reductions by others. This could include a load trading program for future consideration by the Board when the permit is reissued (see Provision 6.3.4 of the Revised Tentative Order) or alternative individual limits that cumulatively add up to the baywide limit. Furthermore, it contains the maximum compliance schedule duration allowed so dischargers can spread the costs out over time. As explained in response to Major Comment 2, above, we also plan to provide more time, to the extent that regulations allow, to encourage multi-benefit projects, like nature-based solutions and wastewater recycling, and innovative technologies.

Some comments note the burden these costs will impose on lower-income communities. Many dischargers have found ways to lessen these burdens. For example, some dischargers may be able to qualify for grants and low-interest loans in part because they serve disadvantaged communities. Although the proposed nutrient reductions could impose cost burdens on disadvantaged communities, these reductions will also provide benefits to some of these communities, particularly those who reside along the shoreline or engage in subsistence fishing.

While we recognize the costs of complying with the Revised Tentative Order will be significant, the costs of not imposing these requirements would also be significant. Harmful algal blooms negatively affect many beneficial uses, such as water contact and non-contact recreation; fishing; shellfish harvesting; cold and warm freshwater, marine, and estuarine habitats; and preservation of rare and endangered species. Impacts to these beneficial uses threaten a multitude of potential losses.

Non-water contact recreation includes hiking, camping, boating, and sightseeing. The Bay Area receives roughly \$8.7 billion in tourism spending each year.² Even a fractional decrease due to negatively affected beneficial uses and resulting negative press from harmful algal blooms would have a significant financial impact on the region. Poor water quality can also lead to increased health care costs. Harmful algal bloom toxins can cause human illness through direct contact, airborne transmission, and fish and shellfish poisoning. In 1988, a harmful algal bloom in North Carolina sickened 48 people and caused an estimated \$50 million in damages.³

² San Francisco Travel Administration, March 2023, <https://www.sftravel.com/media/press-release/san-francisco-travel-association-announces-2022-results-2023-forecast#:~:text=San%20Francisco%20Travel%20reported%20a,visitor%20spend%20of%20%243.56%20billion.>

³ National Oceanic and Atmospheric Association, 2014, <https://www.fisheries.noaa.gov/west-coast/science-data/hitting-us-where-it-hurts-untold-story-harmful-algal-blooms>

Fishing includes commercial, sport and subsistence fishing. Commercial fishing is a \$23 million industry in San Francisco Bay that could be severely threatened by harmful algal blooms.⁴ San Francisco Bay sport fishing has an estimated value of \$100 million annually, with hundreds of thousands of fish caught each year.⁵ The State of California recently spent \$800 million to protect and restore salmon populations,⁶ showing the extent to which we value fish and their habitats. In 2015, a toxic algal bloom on the west coast of the United States cost Dungeness crab fisheries about \$98 million and coastal tourism in Washington about \$40 million. In Texas, a 2011 harmful algal bloom caused over \$10 million in losses to oyster harvesting.⁷ Indigenous communities and subsistence fishers, in particular, can experience negative impacts associated with harmful algal blooms. Harmful algal blooms can also harm indigenous communities through cultural events, agricultural use, and inhalation of particulates.⁸

The California Department of Fish and Wildlife recently evaluated a petition, dated November 29, 2023, from San Francisco Baykeeper, the Bay Institute, Restore the Delta, and the California Sportsfishing Protection Alliance to list white sturgeon, an ancient species that can live up to 100 years, as a threatened species under the California Endangered Species Act (CESA). Based on its review, the California Department of Fish and Wildlife recommended that the California Fish and Game Commission accept the petition for consideration under the CESA. On June 19, 2024, the California Fish and Game Commission determined that the petition provided sufficient scientific information to consider white sturgeon as a candidate for listing under the CESA due to (1) population decline and low recruitment due to current reservoir and river management, (2) flow conditions that may be further impacted by development, (3) high levels of harvest from recreational fishing, and (4) threats of harmful algae blooms. As part of its suggested management actions, the California Fish and Game Commission recommended reducing nutrient inputs to San Francisco Bay.⁹

In 2022, the California Department of Fish and Wildlife estimates that based on reports and pictures it received, 864 dead sturgeon were observed on the Bay shoreline due to the large harmful algae bloom.¹⁰ In 2023, a smaller harmful algae bloom killed at least 15 sturgeon that were observed on the Bay shoreline.¹¹ The California Department of Fish and Wildlife indicates that the number of sturgeon carcasses observed during and

⁴ California Department of Fish and Wildlife, 2020,

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=177859&inline>

⁵ San Francisco Bay Subtidal, 2020, <http://sfbaysubtidal.org/PDFS/Ap1-2%20Econ%20Evaluation.pdf>

⁶ Amanda Hari, April 2024, <https://www.cbsnews.com/sanfrancisco/news/san-francisco-fishermen-reeling-over-second-consecutive-year-of-commercial-salmon-fishing-ban/>

⁷ National Oceanic and Atmospheric Association, 2014, <https://www.fisheries.noaa.gov/west-coast/science-data/hitting-us-where-it-hurts-untold-story-harmful-algal-blooms>

⁸ Big Valley Band of Pomo Indians, 2019,

https://www.bvrancheria.com/_files/ugd/f2d74c_8a216bbc087e470f97d2d1623aed5a6.pdf

⁹ California Fish and Game Commission, June 19-20, 2024, meeting, Item 15: White Sturgeon Petition to List.

¹⁰ California Department of Fish and Wildlife. 2023,

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213229&inline>

¹¹ California Fish and Game Commission. 2023,

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=216457&inline>

immediately after the 2022 and 2023 harmful algae blooms likely represents a small fraction of total mortality during the blooms because most dead sturgeon probably drifted to the bottom, were swept out of the Bay by tides, or degraded before detection.

Allowing harmful algal blooms to be fueled by excessive nutrient loads would lead to devastating impacts to San Francisco Bay, its habitats, and its people, with incalculable losses. The investment in nutrient removal technology is necessary and will benefit the entire Bay Area community.

Major Comment 4

Desire for Best Management Practices in lieu of numeric limits (BACWA, CASA, Dischargers)

Many dischargers prefer a Best Management Practices (BMPs) approach over the proposed numeric final effluent limits, citing uncertainty in the science used to develop the numeric limits and the BMP approach used in the State of Washington for nutrient discharges to the Puget Sound. The types of BMPs proposed are actions to plan, design, finance, and construct nutrient reduction projects to achieve total inorganic nitrogen targets that would be the same as the proposed final effluent limits.

Response

We did not revise our approach. As proposed, using BMPs instead of numeric effluent limits would not comply with the Clean Water Act and NPDES regulations. An NPDES permit may only use BMPs to control pollutants if numeric effluent limits are infeasible or when necessary to protect beneficial uses (40 C.F.R. § 122.44(k)). As explained in the Fact Sheet and supporting documentation, available scientific information is sufficient to derive numeric effluent limitations for total inorganic nitrogen. With the proposed final effluent limits, no additional BMPs are necessary to ensure protection of beneficial uses.

The approach the State of Washington used for the Puget Sound Nutrient General Permit does not work for San Francisco Bay. That permit requires facilities to comply with narrative water quality-based effluent limits consisting of a suite of BMPs that include (1) monitoring, (2) nitrogen optimization to stay below an action level based on current performance, and (3) submittal of nutrient reduction evaluation plans that include available and reasonable treatment to reduce total inorganic nitrogen. The treatment reduction thresholds to be evaluated are total inorganic nitrogen concentrations of 10 mg/L (year-round discharge) and 3 mg/L (summertime discharge).

While the Puget Sound Nutrient General Permit found reasonable potential for municipal wastewater treatment plant discharges to cause or contribute to an excursion of the State of Washington's dissolved oxygen standards, it also found that, if each facility complied with the BMPs, water quality standards would be maintained for the initial permit term (2021-2026). That permit did not include numeric water quality-based effluent limits because of uncertainty with the model used to establish the nutrient levels that would be protective of their dissolved oxygen criteria. Thus, the State of Washington found it infeasible to calculate numeric limits, stating, however, that it

expects to resolve the uncertainties with its model and include numeric limits when the permit is reissued in 2026.

There are critical differences between the Puget Sound and San Francisco Bay situations. Notably, San Francisco Bay experienced an algal bloom in July and August 2022 that resulted in massive fish kills, and another large algal bloom in 2023. The Board cannot find, as the State of Washington did, that monitoring, maintaining current performance, and evaluating nutrient reduction options will be sufficient to meet water quality standards and protect beneficial uses, as required (40 C.F.R. § 122.44(d)(1)). In fact, the Board already required dischargers to monitor nutrient discharges and evaluate potential technologies to reduce nutrient loads in the previous nutrients watershed permits; yet the 2022 and 2023 algal blooms happened anyway. At a minimum, BMPs would include immediate treatment plant upgrades that significantly reduce nitrogen loads.

Similarly, the Board cannot find that numeric effluent limits are infeasible. Whereas the State of Washington relied solely on modeling, the severity of the 2022 bloom provides the Board with a simpler—yet defensible—way to calculate numeric limits because, in 2022, essentially all of the nitrogen in the Bay was consumed to make biomass and then essentially all of the decomposing biomass consumed oxygen. These features of the bloom were both confirmed through analysis of continuous monitoring data from moored sensors as well as boat-based measurements collected during the bloom from a U.S. Geological Survey research vessel. Therefore, numeric nitrogen limits can be calculated. Uncertainties remain because there is always more to learn, but we have enough information now that we can confidently propose numeric limits to reduce the risks posed by significant harmful algal blooms. Contrary to the comments, the proposed numeric limits are based on sound science and evidence in the record. See response to Major Comment 6, below.

Finally, the BMP approach is unworkable because the proposed BMPs (planning, designing, financing, and eventually constructing upgrades) would be insufficient to immediately achieve the biostimulatory objective. A BMP approach cannot be open-ended; the permit would have to prescribe the specific BMPs that would be necessary to comply with the biostimulatory objective in receiving waters. Furthermore, compliance schedules would be needed; however, the Compliance Schedule Policy does not allow compliance schedules for the type of narrative requirements envisioned. Compliance schedules for newly interpreted water quality objectives are only allowed for interpretations that result in more stringent *numeric* permit limitations. The dischargers propose to get around this by replacing the proposed numeric effluent limits with unenforceable numeric effluent targets, but including numeric targets within narrative BMPs does not make the BMPs numeric. No compliance schedule would be allowed, and without compliance schedules, the dischargers would need to comply with effluent limitations based on the biostimulatory water quality objective immediately upon the effective date of the permit.

Major Comment 5

Account for subembayment differences when setting effluent limits (Central Contra Costa Sanitary District, San Jose, Baykeeper)

Various parties contend that the proposed final effluent limitations are either too stringent or not stringent enough for particular subembayments.

The Central Contra Costa Sanitary District believes nutrient limits are premature until the science has progressed and load-response relationships are better understood. It points out that the proposed 40 percent reduction from 2022 nutrient loads would result in less than one percent change in Suisun Bay conditions. It states that future load reductions need to be clearly linked to evidence showing the benefits of such reductions on Suisun Bay and downstream water quality.

San Jose suggests that high turbidity, shallow depth, and vertical mixing in the Lower South Bay (the portion south of the Dumbarton Bridge¹²) contribute to that subembayment's resistance to algal blooms. It says current modeling tools are not appropriate for all subembayments. For example, the model predicts higher nitrogen levels than observed in the Lower South Bay. San Jose requests further scientific studies to better understand the potential for harmful algal blooms in the Lower South Bay.

Baykeeper requests that we acknowledge low dissolved oxygen in the Lower South Bay and require larger reductions in total inorganic nitrogen loads to that subembayment.

Response

We have not made changes in response to this comment. The Revised Tentative Order proposes an equitable approach for setting effluent limits. An overall 40 percent reduction in nitrogen loads (i.e., 26,700 kg/day) to San Francisco Bay is necessary to protect beneficial uses during critical conditions in the dry season. The individual WQBELs for major dischargers are based on the concentration that, when the various flows are considered, results in loads summing to the total aggregate average load of 26,700 kg/day, assuming 2022 dry season flows. This concentration is 20.5 mg/L total inorganic nitrogen. The baywide approach is based on available information and reasonable assumptions, and the potential for future blooms given the high concentrations of total inorganic nitrogen prevalent throughout San Francisco Bay (see Figure 1, below). In addition to the response below, please also see responses to Central San Comment 15, EBMUD Comment 10, and Baykeeper Comment 3.

¹² This permit and much of its supporting documentation employ Regional Monitoring Program definitions for San Francisco Bay segments. These definitions differ from those in the Basin Plan. For purposes of this permit, "Lower South Bay" refers to the portion of San Francisco Bay south of the Dumbarton Bridge. "South Bay" refers to the portion north of the Dumbarton Bridge and south of the Hayward Shoals. "Central Bay" refers to the portion north of the Hayward Shoals and south of the Richmond/San Rafael Bridge. The definitions for San Pablo Bay and Suisun Bay are the same as those in the Basin Plan.

To determine nitrogen load reductions protective of beneficial uses, we used the 2022 algal bloom as the critical condition. Even though the 2022 bloom primarily affected the Central Bay (north of the Hayward Shoals and south of the Richmond/San Rafael Bridge) and South Bay (north of the Dumbarton Bridge and south of the Hayward Shoals), the Revised Tentative Order requires baywide load reductions because all portions of San Francisco Bay are vulnerable to algal blooms due to high nitrogen loads. The Bay integrates nutrients from different sources throughout the water body. Nitrogen concentrations in the Bay are generally influenced by loads from various dischargers because mixing forces distribute and circulate nitrogen over large areas.¹³ The nitrogen load reductions the Revised Tentative Order requires are the *minimum* necessary to protect the Bay's aquatic life from an algal bloom that could form under conditions similar to those in July and August 2022, regardless of where the algal bloom were to occur.

For the permit reissuance scheduled for 2029, the Regional Water Board will consider any new information available to reassess and refine the final baywide and individual limits to ensure that they remain appropriate to protect San Francisco Bay beneficial uses. The Regional Water Board may take a different approach in the future, when more information is available. This could involve adjusting the spatial scale for the required load reductions (e.g., by calculating necessary reductions by subembayment instead of baywide). There is currently insufficient information to regulate all sub-embayments separately.

Central Contra Costa Sanitary District (Central San). Central San is one of the top five dischargers of nutrients to the Bay, making up over 60 percent of the nutrient discharge to Suisun Bay from municipal wastewater treatment plants. Central San's nutrients discharges have a reasonable potential to cause or contribute to an excursion of the biostimulatory substances water quality objective. Therefore, an effluent limitation is required (40 C.F.R. § 122.44(d)(1)(i)). While we agree that the modeled scenario of a 40 percent load reduction relative to 2022 loads did not show a significant difference in dissolved oxygen in Suisun Bay within the 2022 model, reducing Central San's nutrient loads is still necessary to protect beneficial uses. As explained in Fact Sheet section 4.1.3, San Francisco Bay is a nutrient enriched estuary whose historic resilience to harmful algal blooms is waning, as evidenced by the unprecedented 2022 harmful algal bloom.

The 40 percent baywide reduction in nitrogen needed to meet the objective and protect beneficial uses includes Central San's nitrogen discharges, which are not confined to Suisun Bay. Because the area is tidally influenced, these nutrients flow upstream to nutrient-sensitive areas in the Sacramento-San Joaquin Delta, an area known for its own nutrients-related problems, including harmful algal blooms. The Central Valley Regional Water Quality Control Board required the Sacramento Regional County Sanitation District (upstream of the Central San outfall) to reduce its effluent nitrogen

¹³ SFEI 2021. *Nutrient Source Apportionment in San Francisco Bay: Pilot Study*. SFEI Contribution #1022, San Francisco Estuary Institute, Richmond, CA.

concentrations significantly to comply with a nitrate limit of 10 mg/L (see Order R5-2010-0114). Central San's discharges also flow through San Pablo Bay and Central Bay into the Pacific Ocean, another nutrient-sensitive area, and home to the Monterey Bay National Marine Sanctuary, Greater Farallones National Marine Sanctuary, and Cordell Bank National Marine Sanctuary. In Appendix A of Central San's comment letter, it acknowledges that a small percentage of its discharge even reaches the South Bay.

Importantly, there is no reason to believe a harmful algal bloom similar to the one that occurred in 2022 could not happen in Suisun Bay because the total inorganic nitrogen levels there are comparable to the levels in the portions of the estuary where the 2022 algal bloom occurred (see Figure 1, below). Scientific evidence suggests that North Bay segments, including Suisun Bay, Carquinez Strait, and San Pablo Bay, are increasingly vulnerable to harmful algal blooms. Researchers have observed declining turbidity in the North Bay, which suggests that this portion of the estuary is losing its resilience against high nutrient loads.¹⁴ Losing this resilience makes it more likely that algae can make efficient use of available nitrogen, which is already sufficiently concentrated to support a significant algal bloom. In fact, algal toxins from harmful freshwater and marine algae species have been routinely detected in San Pablo Bay and Suisun Bay at relatively high concentrations,¹⁵ and San Pablo Bay experienced a harmful algal bloom in 2023 that resulted in observed fish mortality, including at least ten dead sturgeon (almost certainly an undercount).¹⁶ Given that Central San accounts for 50 percent of the nutrients discharged from POTWs to the North Bay (including San Pablo Bay, Carquinez Strait, and Suisun Bay), and that nutrients are the key fuel for severe algal blooms, the proposed nutrient reductions are necessary.

We cannot wait for another harmful algal bloom to occur in the North Bay before requiring reduced nutrient discharges. Delaying efforts to reduce nitrogen loads until we observe more impacts would be inconsistent with U.S. EPA's "Guiding Principles on an Optional Approach for Developing and Implementing a Numeric Nutrient Criterion that Integrates Causal and Response Parameters" (Publication Number EPA-820-F-13-039, September 2013), which indicates relying on higher trophic indicators, such as fish, may not be adequately sensitive as an indicator of nutrient pollution. Instead, U.S. EPA recommends developing assessment endpoints that are relevant to management goals (e.g., protecting aquatic life) and developing links to nutrient concentrations, as we propose.

¹⁴ Cloern J.E., Jassby, A.D. (2012). Drivers of change in estuarine-coastal ecosystems: Discoveries from four decades of study in San Francisco Bay. *Reviews of Geophysics*, October 2012.

¹⁵ Peacock, M. B., Gibble, C. M., Senn, D. B., Cloern, J. E., and Kudela, R. M. (2018). *Blurred lines: Multiple freshwater and marine algal toxins at the land-sea interface of San Francisco Bay, California*. *Harmful Algae* 73, 138–147.

¹⁶ <https://www.kqed.org/science/1983631/last-summers-fish-killing-algae-bloom-is-back-in-the-bay>. Green sturgeon are listed species under both state and federal Endangered Species Acts. White sturgeon numbers in California have dropped by about two-thirds since the early 2000s and could also become a listed species. <https://mavensnotebook.com/2023/05/31/feature-sturgeon-arose-during-the-jurassic-can-they-survive-the-anthropocene/>.

San Jose. We disagree with San Jose’s suggestion that the Lower South Bay is resistant to algal blooms. All portions of San Francisco Bay, including the Lower South Bay, are threatened because there is sufficient nitrogen to propagate an algal bloom to a degree that adversely affects beneficial uses. The Lower South Bay has long been vulnerable to the effects of nutrient enrichment because it has (1) higher total inorganic nitrogen concentrations than other portions of the estuary (see Figure 1), (2) higher chlorophyll-a levels (indicating higher algae abundance) than other portions of the estuary (see Figure 2), and (3) consistent algal toxin detections comparable with other parts of the estuary.

The Lower South Bay is the subembayment with the highest measured nitrogen levels. While we agree that the model somewhat overestimates nitrogen concentrations in the Lower South Bay (see Figure 1), the modest overprediction does not affect our calculations, which are driven by South Bay nitrogen concentrations. For the South Bay, the model results closely match observed data (see Figure 1).

Our scientific understanding of the threats nutrients pose to the Lower South Bay will continue to advance as we receive new information, but that does not mean actions to limit the driver and main food for algal blooms, i.e., nutrients, are not needed now.

Depth-averaged Model output vs USGS discrete data for WY2022: June 2022-July 2022

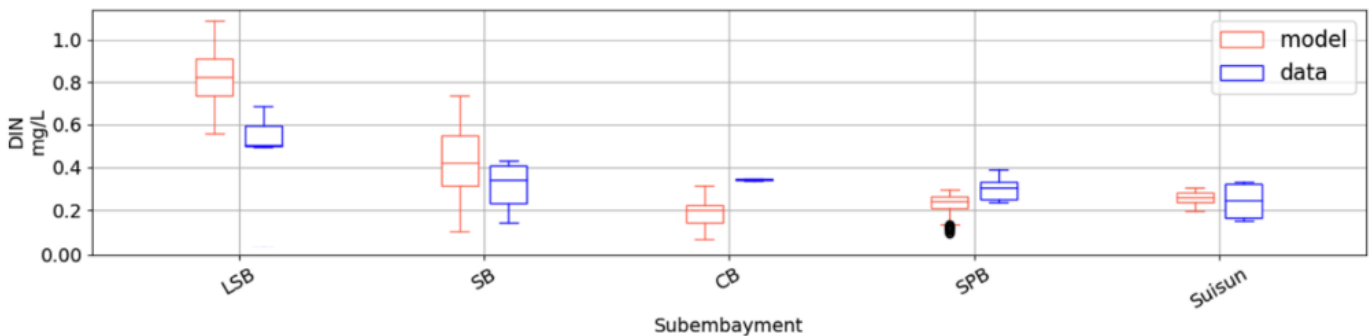


Figure 1: The blue box plots show that the Lower South Bay has the highest measured dissolved inorganic nitrogen concentrations. The Central Bay had lower dissolved inorganic nitrogen in early summer 2022 than the Lower South Bay.

Slough and Alviso Slough.¹⁷ However, as indicated above, these two sloughs receive discharges from former salt ponds. In other Lower South Bay sloughs relatively unaffected by discharges from former salt ponds (i.e., Coyote Creek, Mowry Slough, and Newark Slough), dissolved oxygen levels are supportive of aquatic life when compared with the expected acute criteria for dissolved oxygen using the Virginian Province Approach. To ensure that dissolved oxygen levels in Lower South Bay sloughs are protective of aquatic life, it will be necessary to consider restoration of former salt ponds, in particular those that discharge to Alviso Slough and Guadalupe Slough. The analysis of dissolved oxygen data relative to chronic criteria is in progress because the expected chronic criteria for dissolved oxygen have recently changed.

The total inorganic nitrogen limits in the Revised Tentative Order interpret and implement the biostimulatory substances water quality objective. They do not implement the dissolved oxygen water quality objectives. The individual NPDES permits listed in Attachment B of the Revised Tentative Order contain dissolved oxygen receiving water limits.

Major Comment 6

Scientific study needs to continue (U.S. EPA, Baykeeper, BACWA, Dischargers)

Most parties agree that ongoing scientific studies related to nutrients and their effects on San Francisco Bay need to continue. Many dischargers suggest the need to take more time to develop our collective scientific understanding before establishing final effluent limits, citing uncertainty inherent in the modeling and calculations used to develop the limits. They point out that our scientific understanding is evolving and say the permit should support an approach that can adapt to new scientific findings. Some dischargers suggest that the proposed limits are a mere policy decision not based on science. They question whether the science is sufficiently robust to require billions of dollars in capital upgrades.

Response

We agree on the need for ongoing scientific efforts to better understand the effects of nutrients on San Francisco Bay. We have been studying these issues since 2012, when we initiated the Nutrient Management Strategy. In 2014, we convened a Steering Committee with the participation of U.S. EPA, dischargers, scientific researchers, and non-governmental organizations. The committee oversees the Nutrient Science Program for San Francisco Bay. The ongoing monitoring, modeling, and special studies will continue to help us better understand how the Bay responds to nutrient loads. Provision 6.3.2 of the Revised Tentative Order requires Dischargers to collectively contribute \$2.2 million per year to fund studies that support this science program. In coming years, with careful study and data collection, it may be possible to model the dynamic behavior of algae during a severe bloom.

¹⁷ SFEI 2024. *Draft: Dissolved Oxygen Conditions in Lower South Bay Sloughs*. SFEI Contribution #1163, San Francisco Estuary Institute, Richmond, CA.

We disagree, however, that the existing science is not sufficiently robust to support the load reductions required by the Revised Tentative Order. We similarly disagree that the proposed 40 percent reduction in nitrogen loads is merely a policy decision based on a weak scientific foundation. Over the past decade, sufficient information has been collected to support the proposed reductions. Fact Sheet section 4.1.4.2 and related documentation provide ample support for the permit’s approach, which relies on available information and reasonable assumptions. The severity of the 2022 bloom provided the opportunity for a simple—yet scientifically defensible—way to calculate a baywide numeric limit, as reiterated below.

We chose the *Heterosigma akashiwo* (*H. akashiwo*) algal bloom that occurred during the summer of 2022 as the critical condition to determine necessary wastewater nitrogen load reductions because beneficial uses were severely harmed during that event. We do not know precisely why the algal bloom of 2022 occurred or why it was so severe, but clearly the conditions during the 2022 bloom were favorable for *H. akashiwo* to grow, propagate, and thrive as it did. The calculation methodology linking dissolved inorganic nitrogen wastewater loads to dissolved oxygen concentrations in San Francisco Bay is supported by key findings from analysis of nitrogen, chlorophyll-a, and dissolved oxygen data collected during the 2022 algal bloom. The calculation consists of three sequential steps as illustrated in Figure 3, below:

Modeled nitrogen ...to phytoplankton.... to oxygen

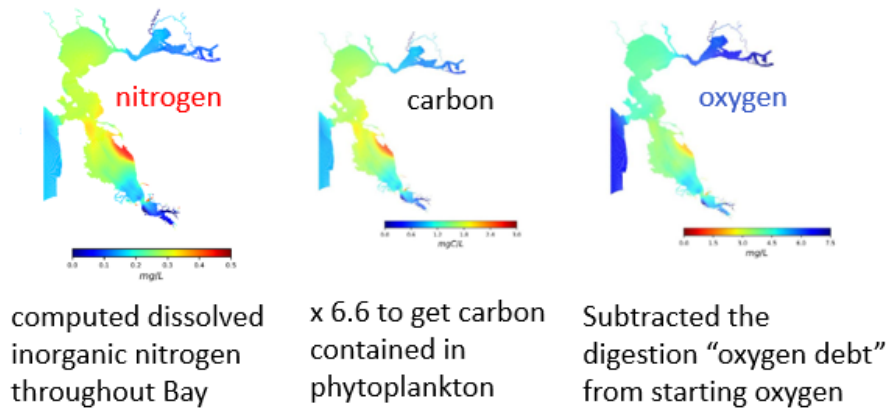


Figure 3: The calculation methodology linking wastewater nitrogen loads to dissolved oxygen concentrations can be illustrated as three sequential steps.

Starting with the left panel of Figure 3, the Nutrient Management Strategy science team investigated a suite of wastewater nitrogen load reduction scenarios by employing a state-of-the-art and well-calibrated model of the relevant physical transport and chemical transformation processes to predict nitrogen concentrations in grid cells throughout the Bay for the period in July 2022 immediately before the start of the algal bloom. The model predictions for current loads agree with real-world monitoring data in terms of the relative magnitude of nitrogen concentrations among the subembayments (i.e., nitrogen concentrations were highest in the Lower South Bay, followed by the South Bay, followed by the Central Bay, as shown in Figure 1). Moreover, the

magnitude of predicted nitrogen matches the magnitude of observed nitrogen quite well for all subembayments, with a modest overprediction for the Lower South Bay. However, the modest overprediction of nitrogen in the Lower South Bay did not affect the derivation of the necessary load reduction, which was driven by the load reduction required to achieve the dissolved oxygen goal for the South Bay, where the model performed well.

The next step in the calculation (middle panel of Figure 3) involved applying a well-established carbon-to-nitrogen ratio for algae of 6.6:1 from the scientific literature to the modeled nitrogen concentrations. This allowed us to convert the modeled nitrogen in the water within each grid cell of the model to the carbon contained in the algae produced within each grid cell, assuming all the predicted nitrogen was taken up by algae. Based on monitoring data collected during the 2022 algal bloom, this step of the calculation faithfully represents what actually occurred during the 2022 algal bloom, during which essentially all the available nitrogen was taken up by algae. The Nutrient Management Strategy science team calculated that all of the available nitrogen in the Bay at the start of the algal bloom closely matched the nitrogen contained in the algae present at the peak of the algal bloom.

The final step in the calculation (right panel of Figure 3) involved computing the oxygen required to digest the carbon in the algae produced by all the available nitrogen, and then subtracting this “oxygen debt” from the oxygen present in the water before the algal bloom ended. The result was the oxygen remaining in the water, which could then be compared to the amount of oxygen required to support beneficial uses. Defining the “oxygen debt” as the amount of oxygen required to digest all of the algae present at its peak concentration during the algal bloom faithfully represents what, according to monitoring observations, actually occurred at the end of the 2022 bloom.

The above calculation should not be dismissed as overly simplistic. It represents a successful and scientifically defensible representation of what actually happened during the 2022 algal bloom. We discuss this calculation further in responses to Central San Comment 15 and EBMUD Comment 10, below.

Although our scientific understanding of nutrients and San Francisco Bay is evolving, that does not relieve us of the obligation to comply with the Clean Water Act and propose requirements now based on currently available information and science. We will continue to work with stakeholders to improve our scientific understanding of the Bay’s response to nutrient loads and expect to refine our permitting approach when we reissue this permit in 2029. For example, an improved scientific understanding will be critical to pursuing several of the potential future regulatory options to extend compliance timelines, as described in response to Major Comment 2, above. The draft resolution described there would direct staff to continue participating in the Nutrients Science Program.

REGULATORY AGENCIES

U.S. Environmental Protection Agency (U.S. EPA)

U.S. EPA Comment 1

U.S. EPA supports adoption of the draft permit, with a few minor clarifications.

Response

See response to Major Comment 1, above, and the responses below.

U.S. EPA Comment 2

U.S. EPA cautions against broadly stating that the narrative biostimulatory substances water quality objective would be met if no more than 10 percent of the surface area in each subembayment had dissolved oxygen levels below 4.0 mg/L. Biostimulatory substances have adverse impacts other than low dissolved oxygen. Therefore, U.S. EPA supports the reopener provision in section 6.3.1.1.

Response

We agree. Fact Sheet section 4.1.4.2 of the Revised Tentative Order states that using a dissolved oxygen threshold to interpret the narrative biostimulatory substances objective is for the purposes of this Order. To consider other endpoints, such as algal toxins, we need to improve our scientific understanding. As mentioned above, Provision 6.3.2 of the Revised Tentative Order requires Dischargers to collectively contribute \$2.2 million per year to support the science program. This includes supporting studies to further understand harmful algae bloom development, and monitoring for algae species and algal toxins. We revised the eighth paragraph of Fact Sheet section 4.1.4.2 as follows:

U.S. EPA recognizes that beneficial uses can be supported even if water quality objectives are not achieved 100 percent of the time. U.S. EPA guidance provides an allowable exceedance threshold of 10 percent for conventional pollutants, like dissolved oxygen. Like many states, California uses this guidance. For example, the California Listing Policy, consistent with U.S. EPA guidance, allows for an exceedance frequency of up to 10 percent for conventional pollutants like dissolved oxygen to determine whether water quality standards are met. Accordingly, for purposes of this Order, the narrative biostimulatory substances water quality objective would be met if modeling results show that no more than 10 percent of the surface area in each subembayment has dissolved oxygen levels below 4.0 mg/L. When reissuing this permit, the Regional Water Board will consider additional endpoints, such as algal toxins, to interpret the narrative biostimulatory substances water quality objective if supported by new scientific evidence.

U.S. EPA Comment 3

U.S. EPA reminds us that 40 C.F.R. section 122.47(a)(3)(i) specifies that the time between the interim dates of a compliance schedule cannot exceed one year. Therefore, U.S. EPA recommends requiring all dischargers to submit annual progress reports, including the three minor facilities.

Response

We agree. Provision 6.3.3.1, as revised below in response to BACWA Comment 8, requires dischargers to submit an annual progress report for all dischargers in Table 4, including minor dischargers.

U.S. EPA Comment 4

U.S. EPA suggests revising Table E-4 footnote 1 to include the option to include wet weather samples on a case-by-case basis, stating that it may be appropriate to include some monitoring during wet weather events that may occur during the dry season.

Response

We agree. We revised Table E-4 footnote 1 to require sampling, but to allow Dischargers to exclude results that are unrepresentative of dry season conditions when evaluating compliance with dry season effluent limits as follows:

Samples need only to be collected when discharging (i.e., seasonal Dischargers shall collect samples only during the discharge season). For compliance monitoring (between May 1 and September 30), samples shall be representative of dry season conditions, ~~and shall not be collected~~ If effluent flows are higher than normal due to unseasonal wet weather that increases flows to the treatment plant or results in reduced recycled water demand, the ~~If a Discharger is unable to collect representative samples at the monitoring frequency required by Table E-4, it shall~~ exclude these results from the dry season average used for compliance determination ~~and shall~~ include documentation in the transmittal letter of its monthly self-monitoring report that explains effluent flows during that period were higher than normal due to wet weather.

U.S. EPA Comment 5

U.S. EPA supports development of a potential nutrient trading program.

Response

We agree. Provisions 6.3.3.1 and 6.3.4 of the Revised Tentative Order anticipate a possible trading program.

ASSOCIATIONS

Bay Area Clean Water Agencies (BACWA)

BACWA Comment 1

BACWA states that the proposed nutrient load reduction requirements will require the most significant simultaneous investment of public resources in treatment upgrades across our region since the inception of the Clean Water Act in the 1970s. If conventional technologies are used, the cost will be in the range of \$11 billion. BACWA contends that the proposed requirements cannot be completed within 10 years. It also claims its members have been told that, after the 10-year compliance schedules expire, the Board will issue enforcement orders to provide more time to comply. BACWA wants the draft permit to be revised to avoid significant economic burdens and compliance jeopardy. BACWA acknowledges the challenges the Board faces to satisfy both the federal Clean Water Act and the State Water Board's Compliance Schedule Policy. These constraints limit the flexibility needed to balance nutrient reductions with competing capital and environmental priorities, and to promote projects with multiple benefits.

Response

We agree that the proposed nutrient load reductions may require the most significant treatment upgrades since the 1970s. We disagree that it is categorically impossible to meet the 10-year deadline. Many options are available for reducing nutrients, ranging from optimizing treatment processes using existing wastewater infrastructure, re-engineering existing facilities, and constructing new treatment processes. Some dischargers have already started significantly reducing their nutrient loads. Others are planning, designing, and piloting technologies. Many of these efforts will require less than 10 years to complete.

Large capital improvements usually require about two years of planning and a few years to complete the final design drawings and specifications for bid. If the planning and design phase requires about five years to complete, that still allows another five years to complete construction. Many agencies have completed large capital improvements within a 10-year timeframe. For example, the Sacramento Regional County Sanitation District upgraded its wastewater treatment process to remove nearly all ammonia and nitrates. The district built a pilot project in 2012 and completed upgrades by 2023. It now removes 99 percent of ammonia and 89 percent of nitrogen from its wastewater.

We acknowledge that some dischargers may have difficulty meeting their final effluent limits within 10 years if they seek to comply by increasing wastewater recycling, undertaking multi-benefit projects, or choosing innovative technologies. Regarding ways the Board could provide more time, see response to Major Comment 2, above.

We have not told BACWA members that, after the 10-year compliance schedules expire, the Board will necessarily issue enforcement orders. That is just one of several options to address the need for more time to comply with final limits, if warranted, and staff do not assume how the Board will exercise its enforcement discretion.

BACWA Comment 2

BACWA requests that, concurrent with permit adoption, the Board approve a resolution directing staff to identify a plan to legally extend the compliance schedules beyond 10 years (BACWA submitted a sample resolution). BACWA says the proposed 10-year timeline will dissuade agencies from pursuing recycled water, nature-based solutions, and innovative technologies. BACWA explains that, for most elected governing boards considering multi-benefit projects, the risks associated with uncertainties in both timeline and in nutrient load reductions are disincentives, particularly when faced with permit limits and a 10-year compliance timeline. BACWA says spending substantial sums of money only to be issued an enforcement order is unacceptable. It further notes that a cease and desist order does not shield an agency from citizen suits, so an agency actively planning a recycled water project would be open to third-party lawsuits. BACWA identifies two acceptable legal approaches to address the compliance timeline outside of the enforcement context. One is to work with the State Water Board to amend the Compliance Schedule Policy. The other is to amend the Basin Plan to provide a mechanism for compliance periods longer than 10 years. BACWA requests a provision that better commits the Board to a regulatory mechanism to provide dischargers more time to comply and proposes related changes to section 2.2 of the draft permit and Fact Sheet section 6.3.5.

Response

We did not revise section 2.2 or Fact Sheet section 6.3.5 of the Tentative Order because the Board cannot direct itself to do something through an NPDES permit. However, consistent with the spirit of BACWA's request, we have prepared a draft resolution for Board consideration directing staff to look for ways to provide dischargers more time to comply with the proposed baywide final limit or individual final limits. Therefore, the suggested changes to the draft permit are unnecessary. See response to Major Comment 2, above.

BACWA Comment 3

BACWA points out that nutrient science is evolving and says the permit should support an approach that can adapt to new findings. BACWA describes uncertainty in the modeling used to help develop the final limits and requests that the permit clarify that the limits are a policy decision based on a weak scientific foundation. BACWA says an ideal regulatory approach would require closely monitoring of the Bay and improving the model, while implementing no-regrets nutrient management investments via strategic use of existing facilities, synergistic upgrades, and multi-benefit projects.

BACWA suggests revising Table F-5 to explain that nutrient sources, such as creeks, urban stormwater, and aerial deposition, are not included because load estimates are

unavailable. It also recommends changing Fact Sheet section 4.1.4.2 to clarify how the model was used.

Response

Regarding the evolving state of nutrient science, see responses to Major Comments 5 and 6, above. We revised Fact Sheet section 4.1.3 as follows:

Municipal wastewater treatment plants are a significant source of nutrients to San Francisco Bay and nutrients pose a threat to San Francisco Bay beneficial uses. ... As shown in the table below, municipal wastewater treatment plants account for about 86 percent of the annual average dry season total inorganic nitrogen load to San Francisco Bay and close to 100 percent of the total inorganic nitrogen load to Lower South Bay, South Bay, and Central Bay. The estimates in the table do not account for dry season inorganic nitrogen loads from other sources such as creeks, urban stormwater systems, or aerial deposition, because load estimates were not available and assumed to be relatively small.

We also revised paragraph 4 of Fact Sheet section 4.1.4.2 as follows:

The panel also found that the physical portion of the model used to predict the spatial patterns of nutrient concentrations is ready for near-term application. This Order's Aggregate Mass Load was calculated based on use of the physical portion of the model. This Order used the biogeochemical portion of the model to simulate nitrogen transformation, but did not use the biogeochemical portion of the model to predict chlorophyll-a and dissolved oxygen levels due to its limitations that will be resolved with ongoing and planned model improvements.

BACWA Comment 4

BACWA suggests a BMP-based approach in lieu of numeric effluent limits. BACWA asserts that the Clean Water Act provides some discretion to decide how to formulate the final limits. It points out that effluent limits include any restrictions on the concentration of pollutants and may consist of narrative or numeric limitations. BMPs may be used in lieu of a numeric effluent limits when numeric effluent limits are infeasible or when the BMPs are reasonably necessary to achieve effluent limits and standards or carry out the purposes and intent of the Clean Water Act.

BACWA points to the Puget Sound in the State of Washington as an example. The Washington Department of Ecology found, based on the state of the science there, that it was infeasible to calculate numeric water quality-based effluent limits. It instead required dischargers to implement BMPs. BACWA claims the Salish Sea numerical model used to quantify the impacts of nutrients on Puget Sound is significantly more advanced than the model used for the San Francisco Bay Region. BACWA believes the Board could make similar findings and require dischargers to implement BMPs aimed at reducing nutrient loads by 40 percent from 2022 loads.

With the BMP approach, the permit would include achievable BMP milestones and create a path toward attaining the narrative water quality standard. BACWA and its members would document planned projects, along with their design goals, to illustrate how they are intended to achieve the load targets. An adaptive management approach to nutrient management would allow course correction as more information about the impact of nutrients on the Bay becomes available. BMPs would also provide protection against mandatory minimum penalties for agencies diligently working toward nutrient reduction.

Response

See response to Major Comment 4, above. The proposed interim and final limits in the Revised Tentative Order would rarely result in mandatory minimum penalties for any discharger. The interim limits are based on current performance. The final limits are expressed as a single five-month-average total inorganic nitrogen load each year and would only be enforceable at the end of the compliance schedules. To be subject to a \$3,000 mandatory minimum penalty, a discharger would need to exceed its final limit by a large amount, 40 percent.

BACWA Comment 5

BACWA asserts that a BMP approach is consistent with the Compliance Schedule Policy. A compliance schedule is allowed when a newly interpreted water quality objective results in a more stringent numeric limit. BACWA points out that the policy does not say that the “numeric limit” must be an “effluent limit.” BACWA contends, therefore, that the Board does not need to impose a final numeric effluent limitation and the Board could instead impose numeric targets implemented via BMPs.

BACWA further submits that a BMP-based effluent limit is the only type of limit appropriate because NPDES regulations require an effluent limit that ensures it will achieve a water quality standard. At this time, actions that can feasibly be taken within 10 years provide the best set of restrictions on the concentration of pollutants to achieve the water quality standard. BACWA suggests changes to section 4.2 and Fact Sheet section 4 to this effect.

Response

See response to Major Comment 4, above. The Compliance Schedule Policy does require numeric limits to be effluent limits, specifically water quality-based effluent limitations. The Policy authorizes a compliance schedule to implement a “newly interpreted water quality objective” that “results in a permit limitation more stringent than the limitation previously imposed” and “permit limitation” is defined as “a water quality-based effluent limitation (WQBEL).” (Compliance Schedule Policy, sections 1.e., 1.f, and 2.) NPDES regulations require water quality-based effluent limits to achieve water quality standards. (40 C.F.R. § 122.44(d)(1).) As explained in response to Major Comment 4, above, contrary to BACWA’s assertion, the proposed BMPs will not achieve water quality standards, specifically the narrative biostimulatory substances water quality objective. If dischargers cannot meet the proposed final limits within 10 years, they cannot implement BMPs to achieve water quality standards within 10 years.

Because the suggested BMP approach is unworkable, we did not revise section 4.2 or Fact Sheet section 4 of the Tentative Order as requested.

BACWA Comment 6

BACWA says the BMP approach better addresses environmental justice concerns than numeric limits. BACWA points out that nearly half of all Bay Area residents who live in families are low income or very low income, and people of color make up a disproportionate amount of the very low-income residents of the nine-county Bay Area and suffer disproportionately from water unaffordability. Affordability concerns are central to environmental justice.

BACWA claims that our environmental justice outreach did not consider economic impacts and urges the Board to reconsider the finding that economic impacts need not be evaluated. Economic considerations fall within the scope of meaningful civil engagement under Water Board section 189.7 and within the scope of the findings required under Water Code section 13149.2. BACWA contends that spending \$11 billion or more over 10 years is too high a burden for disadvantaged communities. Spreading costs and resources over a longer period using a BMP approach can better support a phased approach to nutrient reductions that incorporates funding considerations.

Response

We disagree that a BMP approach would better address environmental justice concerns. As explained in response to Major Comment 4, above, the BMP approach BACWA envisions is unworkable because it would not comply with the Clean Water Act and NPDES regulations. Regarding the costs of complying with the proposed final limits, including costs to disadvantaged communities, see responses to Major Comment 3, above, and EBDA Comment 19, below.

BACWA prefers the BMP approach because it sees BMPs as a way to circumvent the Compliance Schedule Policy and allow more time to meet water quality standards. See response to Major Comment 2, above, regarding ways the Board might be able to provide more time.

For more on environmental justice community outreach, see response to EBDA Comment 19, below.

BACWA Comment 7

BACWA asks that references to year-round limits be removed. While it understands that future load limitations may change in response to new information, it believes mentioning the possibility of future year-round limits sends the wrong signal to those considering recycled water projects.

Response

We agree. The reference to potential future year-round limits is unnecessary. However, removing the year-round limits example does mean the Board could not consider the

possibility of year-round limits in the future if there were a scientific basis for doing so. We revised the last paragraph of section 2.2 of the draft permit as follows:

This Order requires Dischargers to continue funding the Nutrient Science Program. ... This may involve adjusting the magnitude of the required load reductions, the spatial scale for the load reductions (e.g., by subembayment instead of baywide), or the time-period used to evaluate nitrogen loading (e.g., year-round versus seasonal).

BACWA Comment 8

BACWA requests several clarifications to reporting requirements to facilitate orderly planning and prioritization of multi-benefit projects. For example, it requests extending the deadline to identify nutrient removal projects from July 1, 2025, until at least 2028, saying if dischargers must commit sooner, opportunities for lower-cost or multi-benefit projects will be lost. BACWA also suggests extending due dates for scoping plans, optimization, and governance, while removing due dates for draft design reports, final designs, and construction contracts. BACWA says imposing standardized due dates for all dischargers would exacerbate the regional strain on resources, such as engineers, construction contractors, and financing. As written, the draft permit would make compliance infeasible for a few dischargers and inflate construction costs for those able to comply.

Response

We agree. We revised the reporting requirements into a new table and revised provisions 6.3.3, 6.3.4, and 6.3.5 of the Revised Tentative Order accordingly as follows:

6.3.3. Compliance Schedule Milestones and Progress Reporting

~~6.3.3.1. **Compliance Schedule and Progress Reporting.**~~ This Order establishes a compliance schedules for Dischargers in Table 4 to meet the final water quality-based effluent limitations for total inorganic nitrogen within 10 years consistent with the State Water Board's Compliance Schedule Policy, as further explained in Fact Sheet section 4.2.1. To demonstrate progress in meeting these limits, each Discharger listed in Table 4 shall submit the information required below with the Annual Nutrients Report required by MRP section 5.2.2 starting with the Group Annual Report due ~~February~~ April 1, 2025~~6~~, and each year thereafter:

~~6.3.3.1.4.~~ Summary of progress toward meeting the total inorganic nitrogen final effluent limitations in Table 4, including actions taken to reduce total inorganic nitrogen loads. Table 5, below, includes specific milestones that must also be completed. Early Actors as defined by Provision 6.3.6 shall

instead provide annual status updates on project implementation.

~~If pursuing nature-based solutions consistent with Provision 6.3.5, the Dischargers shall provide annual updates to their nature-based treatment projects, the expected total inorganic nitrogen loads to be discharged when the nature-based project is completed, and other expected benefits from the project.~~

~~If pursuing a water recycling project consistent with Provision 6.3.5, the Dischargers shall provide annual updates regarding increases to their recycled water infrastructure, recycled water users, and recycled water production. Such Dischargers shall provide details, including formal agreements with users, schedule for design and construction, costs, the expected total inorganic nitrogen loads to be discharged when the recycled water project is complete, and other expected benefits from the project. If a Discharger proposes a recycled water project that will generate a reverse osmosis concentrate (e.g., potable reuse project), it shall indicate how it plans to manage the concentrate to reduce nutrient discharges to San Francisco Bay.~~

Table 5. Compliance Schedule Milestones

<u>Milestone</u>	<u>Compliance Date</u>
<p><u>Identify Compliance Alternatives.</u> Dischargers shall identify preliminary alternatives for meeting the final effluent limitations in Table 4. This may include traditional treatment infrastructure, optimization, nature-based solutions, recycled water, trading, or a combination thereof. The submittal shall note whether the identified alternatives require pilot projects.</p> <p><u>If a Discharger has already identified a compliance pathway (selected alternative or combination of alternatives), the Discharger shall instead describe the compliance pathway, begin implementation, and provide a status update.</u></p>	<p><u>April 1, 2025</u></p>
<p><u>Perform Alternatives Analysis.</u> Dischargers shall evaluate the compliance alternatives and identify which alternative or combination of alternatives (i.e., compliance pathway) best achieves compliance with the final effluent limitations in Table 4.</p> <p><u>If a Discharger has already identified a compliance pathway, the Discharger shall provide a status update regarding implementation.</u></p> <p><u>If a Discharger plans to meet the final effluent limits in Table 4 solely or in part through treatment optimization, it shall include a schedule to complete the optimization portion of the work no later than May 1, 2028, and begin implementation in accordance with its schedule.</u></p>	<p><u>April 1, 2026</u></p>

<u>Milestone</u>	<u>Compliance Date</u>
<p>Submit Compliance Plan. Dischargers shall describe proposed improvements and provide an implementation schedule for major milestones for the compliance pathway identified above, including a schedule for design and construction of improvements.</p> <p>If a Discharger chooses to implement a Multi-Benefit Solution consistent with Provision 6.3.5, it shall submit a governance plan that documents partnerships and a memorandum of understanding or agreement among parties to implement nature-based solutions (e.g., land ownership and funding partnerships) or wastewater recycling (e.g., agreement between wastewater agencies, water purification entity, water contractors).</p>	<p><u>April 1, 2027</u> ^[1]</p>
<p>Submit Design Progress Report. If a Discharger intends to implement a capital project, such as sidestream, split-stream, or full-scale treatment, to comply with the final effluent limits in Table 4, it shall provide project details for each capital project, including a project description, estimated nutrient removal from the project, evidence that the planned improvements have moved into the design stage, the percent completion of the design, an updated implementation schedule, estimated capital costs, a financial assessment, and a funding strategy.</p>	<p><u>April 1, 2028</u> ^[1]</p>
<p>Submit Design Progress Report and Compliance Update. Dischargers shall summarize their progress toward meeting the final effluent limits in Table 4 and provide a status update regarding implementation of their compliance pathway and an updated implementation schedule. If a Discharger is implementing a capital project, it shall provide a status update on its progress from the previous year, including, at minimum, the percent completion of the design, the status of contract documents used to bid projects, and an updated implementation schedule for the capital project.</p>	<p><u>April 1, 2029</u> ^[1]</p>

Footnote:

^[1] The compliance date for this task shall be extended by one year if a Discharger experiences significant delays related to (1) the need to conduct pilot studies prior to design, (2) unsuccessful pilot studies that cause the Discharger to change course, (3) the need to develop agreements to pursue water recycling or nature-based solutions, (4) legal challenges, or (5) engineering challenges that are beyond the Discharger’s control. The Discharger shall notify the Executive Officer at least 90 days before the deadline and provide documentation that it satisfies one of the conditions for an extension above.

~~6.3.3.1.2. — Status and plans to comply with final effluent limitations and expected nitrogen reductions with supporting evidence and timelines for design and construction. This may include an intent to purchase trading credits from another Discharger as a compliance strategy, as described in Provision 6.3.4.~~

6.3.3.2.3. Summary of changes to the project plans and design and construction schedules listed in the previous year’s update and rationale for the changes along with any additional plans for nitrogen reductions if current planned projects will not achieve the final effluent limits in Table 4.

- 6.3.3.3.4. Notification of the Discharger's compliance or noncompliance with this provision.
- ~~6.3.3.2. **Technical Reports.** Each Discharger shall submit technical reports as described below. These requirements may be satisfied by Dischargers choosing to collectively submit equivalent documentation through the Scoping Plan, Status Report, and Final Report required by Provision 6.3.4:~~
- ~~6.3.3.2.1. **Scoping Plan.** By July 1, 2025, submit a Scoping Plan describing proposed improvements and an implementation schedule including schedule for design and construction of improvements to meet the final effluent limitations in Table 4. This may include a Multi-Benefit Solution consistent with Provision 6.3.5.~~
- ~~6.3.3.2.2. **Optimization.** By July 1, 2025, if a Discharger plans to meet final effluent limits in Table 4 solely or in part through treatment optimization, it shall include a schedule to complete optimization no later than May 1, 2027, and begin implementation in accordance with its schedule.~~
- ~~6.3.3.2.3. **Draft Design Report.** By July 1, 2026, each Discharger that will implement treatment plant upgrades to comply with the final effluent limits in Table 4 shall submit a draft design report for planned capital improvements with estimated costs, a financial assessment, and a funding strategy. If a Discharger chooses to implement a multi-benefit solution consistent with Provision 6.3.5, it shall submit documentation by July 1, 2026, describing its intent and submit a draft design report for the multi-benefit solution by July 1, 2027.~~
- ~~6.3.3.2.4. **Governance Plan.** By July 1, 2027, each Discharger that chooses to implement a Multi-Benefit Solution consistent with Provision 6.3.5 shall submit a governance plan that documents partnerships and a memorandum of understanding or agreement among parties to implement nature-based solutions (e.g., land ownership and funding partnerships) or wastewater recycling (e.g., agreement between wastewater agencies, water purification entity, water contractors).~~
- ~~6.3.3.2.5. **Final Design Drawings and Specifications.** By July 1, 2028, each Discharger that will implement treatment plant upgrades to comply with final effluent limits in Table 4 shall submit final design drawings and specifications, and an updated implementation schedule. If a Discharger chooses~~

~~to implement a multi-benefit solution consistent with Provision 6.3.5, it shall submit drawings and specifications and updated implementation schedule by March 31, 2029.~~

~~6.3.3.2.6 **Construction Contract.** By March 31, 2029, each Discharger that will implement treatment plant upgrades to comply with the final effluent limits in Table 4 shall provide documentation that it has awarded a construction contract to proceed with treatment plant upgrades and include an updated implementation schedule and begin implementation.~~

6.3.4. **Regional Planning to Reduce Total Inorganic Nitrogen Loads.** The Dischargers listed in Table 4 and designated as “major” in Table 1 shall, individually or in collaboration with other regional stakeholders, develop a report that describes regionwide planning efforts to meet the final effluent limitations required by the end of the compliance schedules established through this permit. The report will complement individual reporting required by Provision 6.3.3 and provide a regionwide perspective toward ensuring compliance is achieved as soon as possible. The report shall include the following: ...

6.3.5. **Multi-Benefit Solutions for Load Reductions.** Dischargers that identify long-term multi-benefit solutions⁴ (e.g., water recycling or nature-based solutions) that cannot be completed by the effective date of the final effluent limitations in Table 4 shall identify such projects ~~by July 1, 2025,~~ and their intent to pursue and implement them, as required by Provision 6.3.3.2.1, including the due dates in Table 5. If these projects result in total inorganic nitrogen loads at or below the individual final effluent limitations in Table 4, the Regional Water Board will consider available regulatory mechanisms to provide more time to comply as explained in the Fact Sheet. ...

BACWA Comment 9

BACWA requests clarification that only dischargers in Table 4 would be required to participate in compliance schedule reporting and regional planning efforts. The other dischargers (Las Gallinas Valley Sanitation District, Napa Sanitation District, City of Petaluma, and Sonoma Valley County Sanitation District) do not discharge during the dry season.

Response

We agree and revised provisions 6.3.3 and 6.3.4, as shown in response to BACWA Comment 8, above.

BACWA Comment 10

BACWA says the draft permit should not require dischargers to investigate significant changes in nutrient loads, stating such investigations would be unnecessary since the draft permit requires load reductions and detailed reporting of load reduction plans.

Response

We disagree. The required load reductions and associated plans do not eliminate the need to investigate unexpected changes in nutrient loading. Many dischargers have told us their nutrient loads could increase due to population growth, aberrations during treatment piloting and installation, and wet weather events. Investigations will be necessary if unexpected load increases occur.

BACWA Comment 11

BACWA appreciates the inclusion of Monitoring and Reporting Program Table E-4 footnote 1, which is intended to encourage innovative and cost-effective compliance strategies, such as recycled water diversions and seasonal biological nutrient removal. However, it says the provision is impractical as written. Sample collection is typically scheduled several days before dischargers know about changes in recycled water deliveries. BACWA suggests that a more practical way to achieve the same objective is to exclude data points from the average rather than deferring sample collection.

Response

We agree and revised Table E-4 footnote 1 as shown above in response to U.S. EPA Comment 4, above.

BACWA Comment 12

BACWA requests that Monitoring and Reporting Program Table E-2 footnote 3 be revised to clarify that influent monitoring requirements for nitrate and nitrite may be waived based on monitoring data from the previous permit term because, unlike when the previous order was adopted, we now know which dischargers have de minimis concentrations of nitrate plus nitrite.

Response

We agree and revised Table E-2 as follows:

Table E-1. Influent Monitoring

Parameter ^[1]	Unit	Sample Type ^[2]
Ammonia, Total	mg/L and kg/day as N	C-24
Total Kjeldahl Nitrogen (TKN)	mg/L and kg/day as N	C-24
Nitrate-Nitrite ^[3]	mg/L and kg/day as N	C-24
Phosphorus, Total	mg/L and kg/day as p	C-24

Footnotes:

^[1] Influent samples shall be collected concurrently with effluent samples.

- ^[2] 24-hour composites may be made up of four discrete grab samples collected over a 24-hour period and volumetrically or mathematically flow-weighted. During a 24-hour period, the samples may be collected only when the plant is staffed, if necessary.
- ^[3] ~~If, after two years,~~ two years of monitoring data show all nitrate-nitrite concentrations a Discharger measures are below 2.0 mg/L, the Discharger may discontinue influent monitoring for this parameter.

BACWA Comment 13

BACWA points out the need to correct Monitoring and Reporting Program Table E-4 footnote citations to apply the nitrogen footnotes to phosphorus as well.

Response

We agree and revised Table E-4 as follows:

Table E-4. Minimum Sampling Frequencies

Discharger Size	Total Ammonia, Nitrate-Nitrite, <u>Influent TKN, Effluent Total Inorganic Nitrogen Sampling Frequencies</u> ^[1,2,3,4]	Total Phosphorous Sampling Frequency ^[1,2,3,4]
Major Dischargers (design flow ≥ 10 MGD)	Twice per month for effluent Once per quarter for influent	Once per month for effluent Twice per year for influent
⋮	⋮	⋮

BACWA Comment 14

BACWA requests that organics waste codigestion projects be considered multi-benefit solutions.

Response

We disagree. Multi-benefit solutions involve nutrient reductions as at least one of the benefits of implementing the technology. While codigestion provides benefits, such as energy recovery, it does not remove nutrients from wastewater.

BACWA Comment 15

BACWA refers to City of San Jose’s comments and asks for removal of the receiving water limit with respect to the narrative biostimulatory substances objective.

Response

See response to San Jose Comment 6, below.

California Association of Sanitation Agencies (CASA)

CASA Comment 1

CASA expressed concern regarding the \$11 billion estimate associated with the proposed nutrient reductions and the proposed 10-year compliance schedule. It says a more viable timeframe is necessary to avoid projects with higher costs and lower value. It says BMPs are an allowable means to express effluent limits and provide dischargers

with needed flexibility. It claims such an approach would keep Bay Area dischargers on the path toward attaining water quality standards.

Response

See responses to Major Comments 2, 3, and 4 above.

LARGE DISCHARGERS

Central Contra Costa Sanitary District (Central San)

Central San Comment 1

Central San contends that the draft permit's 10-year compliance schedule would force it to abandon innovative nutrient treatment methods in favor of traditional, economically impractical technology.

Response

We disagree. If Central San is committed to innovative treatment methods, we will work with Central San to provide a reasonable amount of time to undertake such projects. As explained in response to Major Comment 2, above, some options exist now, and more will likely be available in the future.

Central San Comment 2

Central San contends that the draft permit lacks a firm scientific foundation and would force it to spend almost \$700 million with no water quality benefit to Suisun Bay.

Response

We disagree. Fact Sheet section 4.1.4 of the Revised Tentative Order provides a reasonable basis for the proposed final limits, and Central San's cost estimate of almost \$700 million is based on worst-case assumptions. It is based on conventional treatment plant upgrades and does not account for potentially less expensive nutrient treatment technologies and multi-benefit projects, such as recycled water and nature-based solutions, including converting existing wet-weather storage basins to nutrient treatment wetlands during dry weather. Central San also does not account for collective means to meet the baywide load limit in conjunction with other dischargers, nor does it mention that its discharge has potential to adversely affect the Sacramento-San Joaquin Delta, San Pablo Bay, Central Bay, and Pacific Ocean. See responses to Major Comments 3, 5, and 6, above, and Central San Comment 6, below.

Central San Comment 3

Central San requests that the 10-year compliance period be replaced with a longer timeline.

Response

At this time, unless Central San prefers a cease and desist order, the proposed compliance schedule is the only existing option for delaying immediate compliance with the final limit. The Compliance Schedule Policy limits the compliance schedule to 10 years. More options may be available in the future. See response to Major Comment 2, above.

Central San Comment 4

Central San recommends a BMP approach and adaptive measures in lieu of numeric effluent limits.

Response

As proposed, the BMP approach would be inconsistent with the Clean Water Act and NPDES regulations. Numeric effluent limits are feasible, and a BMP approach can only be used when numeric limits are infeasible. Furthermore, a BMP approach cannot be open-ended; the permit would have to prescribe the specific BMPs that would be necessary to comply with applicable water quality standards in receiving waters. See response to Major Comment 4, above.

Central San Comment 5

Central San compares what it is likely to do under a 10-year scenario versus a 20-year scenario to illustrate that the draft permit would result in less efficient nutrient treatment technology, which would be an imprudent use of ratepayer resources. Central San is in the conceptual stages of investigating its wet weather storage basins for multi-benefit treatment wetlands. Central San states that it needs more than 10 years to investigate and implement such treatment. Central San also states that it plans to implement secondary treatment process improvements from 2028 through 2031, thereby reducing nutrient loads while also possibly reducing carbon emissions and energy use. It goes on to state that these potential plans would need to be scaled back to provide resources to reduce nutrients to the levels required in the draft permit. Central San estimates its cost to comply with the proposed effluent limit would be \$665 million, comparing it to its current 10-year Capital Improvement Plan budget of \$1 billion. Central San says it would need to increase its current budget by about 70 percent.

Response

We acknowledge Central San's cost and timeline concerns. Its wetlands and recycled water concepts would provide multiple benefits, and its proposed membrane aerated biofilm reactor pilot program would be an innovative technology. We are committed to using available regulatory mechanisms to provide Central San more time for such projects, as warranted. However, Central San's cost estimate of \$665 million is based on worst-case assumptions (see response to Central San Comment 2, above), and it should not take 10 years to investigate and implement conversion of its wet weather storage basins for multi-benefit treatment wetlands. See responses to Major Comments 2 and 3, above.

Central San Comment 6

Central San believes nutrient limits are premature until the science has progressed and load-response relationships are better understood. It refers to existing scientific uncertainties, such as the specific factors that triggered the 2022 algal bloom. It points out that the proposed 40 percent reduction from 2022 nutrient loads would result in a less than one percent change in Suisun Bay meeting a dissolved oxygen threshold of 4.0 mg/L. It states that future load reductions need to be clearly linked to future science-based evidence that shows the benefits of the limits on Suisun Bay and downstream water quality. It says the draft permit lacks a reliable scientific foundation and evidentiary support and does not explain a rational connection between its requirements and Central San's discharges. Central San reiterates the BACWA comment that the proposed numeric limits are a policy decision given the scientific uncertainty in their derivation.

Response

Fact Sheet section 4.2.4.1 and related documentation provide ample support for permit's approach, which relies on available information and reasonable assumptions. As explained in responses to Major Comments 5 and 6, above, the severity of the 2022 bloom provides a straightforward—yet defensible—way to calculate numeric limits because, in 2022, essentially all of the nitrogen in the Bay was consumed to make biomass and essentially all of the decomposing biomass consumed oxygen. Real-world observations support this approach. Therefore, numeric nitrogen limits can be calculated with sufficient certainty for this permit term.

As explained in response to Major Comment 5, above, the evidence supports the need for Central San to significantly reduce its nitrogen loads. We calculated that an overall baywide reduction in nitrogen loads is needed to protect beneficial uses during an algal bloom like the one in 2022. This corresponds to an average effluent nitrogen concentration of 20.5 mg/L. It is unreasonable to wait for a significant harmful algal bloom in Suisun Bay before requiring Central San to reduce its nitrogen loads, and furthermore, Central San's discharge has potential to adversely affect the Sacramento-San Joaquin Delta, San Pablo Bay, Central Bay, and Pacific Ocean. We revised paragraph 12 of Fact Sheet section 4.1.4.2 to clarify the rationale for the final limits as follows:

This Order uses an aggregate approach to regulating total inorganic nitrogen because, once nitrogen loads are introduced into San Francisco Bay, mixing forces distribute and circulate nitrogen over a large area. The nitrogen concentrations in various portions of San Francisco Bay include loads from other dischargers and the combined contributions from the various dischargers determine the nitrogen levels that could potentially fuel algae blooms. This is reasonable because all portions of the estuary, including the North Bay, are vulnerable to algal blooms given the high concentrations of total inorganic nitrogen prevalent throughout the Bay.

This aggregate approach does not exclude major nutrient dischargers in the North Bay, like the Central Contra Costa Sanitary District, which is one of the top five dischargers of nutrients to the Bay and contributes over 50 percent of the nutrient discharge to North Bay from municipal wastewater treatment plants. The 40 percent baywide reduction in nitrogen needed to meet the objective and protect beneficial uses includes North Bay nitrogen discharges because they are not confined to the North Bay. Because the area is tidally influenced, these nutrients flow upstream to nutrient-sensitive areas in the Sacramento-San Joaquin Delta, an area known for its own nutrients-related problems. The Central Valley Regional Water Quality Control Board required the Sacramento Regional County Sanitation District (upstream of the Central Contra Costa Sanitary District outfall) to reduce its effluent nitrogen concentrations significantly (Order R5-2010-0114). North Bay discharges also flow through San Pablo Bay and Central Bay into the Pacific Ocean, another nutrient-sensitive area, and home to the Monterey Bay National Marine Sanctuary, Greater Farallones National Marine Sanctuary, and Cordell Bank National Marine Sanctuary. A small percentage of North Bay discharges even reach the South Bay.

Suisun Bay itself has measured total inorganic nitrogen levels that are comparable to the levels in the portions of the estuary where the 2022 algal bloom occurred, as explained in the *Memo on Numerical Translation of Narrative Objective*. Scientific evidence suggests that Suisun and San Pablo Bays are increasingly vulnerable to harmful algal blooms. Researchers have observed declining turbidity in the North Bay, which suggests that this portion of the estuary is losing its resilience against high nutrient loads.¹⁰ Losing this resilience makes it more likely that algae can make efficient use of available nitrogen, which is already sufficiently concentrated to support a significant algal bloom. In fact, algal toxins from harmful freshwater and marine algae species have been routinely detected in San Pablo Bay and Suisun Bay at relatively high concentrations. Therefore, the 40 percent baywide reduction in nitrogen is needed in North Bay to meet the biostimulatory objective and protect beneficial uses.

The Regional Water Board calculated the final WQBELs for individual Dischargers based on meeting the total aggregate average load of 26,700 kg/day as follows. ... The resulting individual WQBELs are listed in Table 4 of the Order.

¹⁰ Cloern J.E., Jassby, A.D. (2012). Drivers of change in estuarine-coastal ecosystems: Discoveries from four decades of study in San Francisco Bay. *Reviews of Geophysics*, October 2012.

Central San's questions regarding uncertainties, such as what triggered the 2022 algal bloom, are a red herring. Regardless of what triggers algal blooms, they are fueled by

nutrient discharges. In nutrient-rich San Francisco Bay, nutrient loads must be reduced to reduce the potential consequences of harmful algal blooms. Contrary to Central San's comment, action is needed now, and the available scientific information is sufficient to get started. Indeed, for a dynamic nutrient-enriched estuary, such as San Francisco Bay, there will always be some uncertainty regarding the amount of nutrients that can be safely assimilated. These uncertainties suggest that future permits may need to impose even more stringent effluent limits due to changes in physical factors that have historically constrained algae production, the relationship between nutrient levels and algal toxins, and the long-term effects of nutrients that have accumulated in San Francisco Bay sediments.¹⁸ See response to Major Comment 6, above, and Central San Comment 15, below.

Central San Comment 7

Central San asks that we work with the State Water Board to amend the Compliance Schedule Policy or draft a Basin Plan amendment extending timelines to achieve nutrient-related water quality objectives.

Response

See response to Major Comment 2, above.

Central San Comment 8

Central San does not believe that the imposition of a time schedule order or cease and desist order would be fair or appropriate means of extending the compliance schedule. It states that these enforcement mechanisms can impose civil penalties and cast a stigma of impropriety.

Response

We acknowledge Central San's concerns. As explained in response to Major Comment 2, above, administrative enforcement, such as issuing a cease and desist order, is just one method available to provide more time to comply with a proposed final limit. A cease and desist order does not impose civil penalties. Not all time-schedule orders are associated with civil penalties.

Central San Comment 9

Central San requests that the Board require BMPs, possibly through a water quality attainment strategy, as opposed to the proposed final effluent limitations. It points to NPDES regulations that allow BMPs in lieu of numeric limits when numeric limits are infeasible or BMPs are necessary to achieve effluent limits. It argues that the science is insufficient to calculate limits.

¹⁸ Cloern, J.E., Schraga, T.S., Nejad, E. et al. Nutrient Status of San Francisco Bay and Its Management Implications. *Estuaries and Coasts* 43, 1299–1317 (2020).

Response

As proposed, the BMP approach would be inconsistent with the Clean Water Act and NPDES regulations. See responses to Major Comments 4 and 6, and Central San Comment 4, above.

Central San Comment 10

Central San says that if numeric effluent limits are imposed, BMPs are still reasonably necessary to achieve the effluent limitations because they will allow discharges to monitor and adapt to emerging science and changing conditions without being tethered to unrealistic deadlines.

Response

We disagree. The permit need not specify BMPs if it contains numeric effluent limits. Because the types of activities Central San envisions as BMPs would need to be implemented to comply with the final effluent limits, the permit need not spell them out. Instead, Provision 6.3.3 of the Revised Tentative Order requires interim measures, including progress reporting, to ensure adequate progress toward compliance with the final limits. Furthermore, a BMP approach cannot be open-ended; a permit would have to prescribe the specific BMPs that would be necessary to comply with applicable water quality standards in receiving waters. See responses to Major Comment 4 and Central San Comment 4, above.

Central San Comment 11

Central San points to NPDES regulations that allow use of best professional judgment to craft case-by-case effluent limits that account for the age of equipment and facilities, processes employed and required process changes, engineering and technological applications, costs, and non-water quality impacts. It calls for a BMP-based iterative approach, tied to a long-term compliance timeline. Central San calls for BMPs and milestone requirements to be incorporated into one or more subembayment water quality attainment strategies.

Response

Central San's reference to best professional judgment and the factors to be considered relate to technology-based effluent limits. The Revised Tentative Order does not contain technology-based effluent limits for nutrients. If it did, the limits could be more stringent than the proposed water quality-based effluent limits because many treatment systems can readily out-perform the 20.5 mg/L nitrogen concentration on which the proposed final limits are based. Regarding the need for more time to comply with the proposed final limits and the feasibility of a BMP approach, see responses to Major Comments 2 and 4, and Central San Comment 4, above. Dischargers may propose subembayment strategies with the regional planning undertaken to comply with Provision 6.3.4 of the Revised Tentative Order.

Central San Comment 12

Central San requests that we replace the word “potable” with “raw Delta” in Fact Sheet section 6.3.5.

Response

We agree and revised the second paragraph of Fact Sheet section 6.3.5 as follows:

Examples of multi-benefit solutions include three projects the Central Contra Costa Sanitary District has identified: (1) the Refinery Recycled Water Exchange Project would replace ~~potable~~ raw Delta water used at two Martinez refineries (PBF and Marathon)

Central San Comment 13

Central San questions whether nitrogen reductions are needed in the northern portion of San Francisco Bay because the memorandum, “Numeric Translation of Narrative Objective,” shows that, even at current nitrogen loadings, Suisun Bay and San Pablo Bay do not experience dissolved oxygen below 4.0 mg/L. To require load reductions, Central San says there must be evidence that demonstrates the benefits of reducing nutrient loads on Suisun Bay and downstream water quality.

Response

The memorandum focuses on the 2022 algal bloom as the critical condition for analysis purposes. That bloom occurred primarily in the South Bay. Because observed Suisun Bay nutrient levels are comparable to those in the South Bay (see Figure 1), Suisun Bay is similarly vulnerable to harmful algal blooms. Furthermore, Central San’s discharge has potential to adversely affect the Sacramento-San Joaquin Delta, San Pablo Bay, Central Bay, and Pacific Ocean. See response to Major Comment 5, above.

Central San Comment 14

Central San supports the need for further modeling work and a “no regrets” approach to reducing nitrogen discharges.

Response

While we agree that more modeling work is needed to refine nitrogen limits in future permit reissuances, the total inorganic nitrogen load reductions required by the Revised Tentative Order are the minimum necessary to protect aquatic life from an algal bloom that could form under conditions similar to those in July and August 2022. In this sense, there should be no regrets in undertaking efforts to achieve these reductions. We encourage dischargers to work collaboratively to attain the proposed baywide total inorganic nitrogen load limit, to anticipate the potential for more stringent limits in the future, and to consider scalable projects to the extent possible. See responses to Major Comments 5 and 6, above.

Central San Comment 15

Central San attached an appendix to its comments that expresses concerns regarding two documents cited as bases for the final effluent limit calculations. Central San points out that the model was not developed to simulate harmful algal blooms similar to the one observed in 2022. Thus, the calculations reflect worst-case assumptions and a sequence of “back of the envelope” calculations.

Central San points to uncertainties in what triggered the 2022 bloom and how it progressed. It notes that the model overstates and understates dissolved inorganic nitrogen concentrations in different subembayments. It refers to statements saying fully characterizing uncertainty was beyond scope of the scientific effort to date, but ongoing modeling work will be pursued to quantify and constrain uncertainties. Central San notes that the modeling approach and results have not been independently validated or peer-reviewed. It supports calls for modeling improvements to enhance confidence in the results. Central San supports BACWA’s comment that the limits represent a policy decision, not a scientific decision.

For these reasons, Central San prefers a more adaptive BMP-based approach. For context, Central San notes that it contributes only a few percent of the total nitrogen load to the South Bay, one of the areas affected by the 2022 bloom.

Response

The Fact Sheet and related documentation provide ample support for the permit’s approach, which relies on available information, reasonable assumptions, and well-established scientific principles. We agree that the model is not yet ready to predict harmful algal blooms; that is why we did not use the model to predict them. Instead, we used the model to predict nitrogen concentrations, which the model does reasonably well. For example, the model performed well in this regard for the 2022 conditions, as supported by real-world observations. No model is perfect, and some over or under estimation is to be expected.

During the 2022 harmful algal bloom, two types of data on nitrogen, chlorophyll-a, and dissolved oxygen were collected throughout much of San Francisco Bay from the Bay Bridge southward. These data consisted of continuous data from moored sensors in several locations as well as boat-based measurements collected from a U.S. Geological Survey research vessel. These data were not collected at all possible locations in the Bay, but the data were sufficient to allow the Nutrient Management Strategy science team to make reasonable inferences as to the concentrations of these parameters in locations other than those specific locations where the data were collected.

Using these data, the science team calculated that essentially all of the available nitrogen in the Bay water at the start of the bloom was taken up by algae and incorporated into the algae biomass measured near the end of the bloom. This calculation was accomplished by comparing the mass of nitrogen in the water at the start of the bloom (based on the nitrogen monitoring data) with the mass of nitrogen that would be contained in the algae present at the peak of the bloom (based on the

chlorophyll-a monitoring data, combined with information from the literature). The amount of nitrogen in the algae was derived through a calculation involving the ratio of chlorophyll-a to carbon in algae as well as the well-established ratio of carbon to nitrogen present in living matter. In the supporting memo,¹⁹ we referred to the foregoing analysis colloquially as a “back-of-the-envelope” calculation because the calculation was simple and straightforward, and based on well-established scientific principles. The calculation was supported by data collected during the 2002 harmful algal bloom.

Independent peer review is not required for permitting actions. As stated in the Fact Sheet section 4.1.4.2, an independent panel of experts “found that the model represents important transport processes and can reproduce the seasonal and spatial patterns of nutrient concentrations in the Bay. The panel also found that the physical portion of the model used to predict the spatial patterns of nutrient concentrations is ready for near-term application.” We have been studying these issues since 2012, when we initiated the Nutrient Management Strategy. In 2014, we convened a Steering Committee with the participation of U.S. EPA, dischargers, scientific researchers, and non-governmental organizations. The committee oversees the Nutrient Science Program for San Francisco Bay. We have not been working in isolation but have been employing the expertise of the entire Nutrient Management Strategy science team.

See responses to Major Comments 4, 5, and 6, and Central San Comment 6, above.

East Bay Dischargers Authority (EBDA)

EBDA Comment 1

EBDA believes the draft permit abandons the promise of better outcomes through collaboration, and in doing so risks becoming a national model for the wrong reasons. EBDA agrees that nutrient reductions should be made as expeditiously as possible and that, given the magnitude of expenditures required for meaningful reductions, we should focus on projects that are synergistic with other wastewater infrastructure needs and that provide multiple benefits, such as enhancing water supply and providing sea level rise resilience. EBDA says that, given financial, logistical, and practical constraints, most agencies will be unable to complete sufficient nutrient reduction projects, especially those with multiple benefits, in 10 years. EBDA asserts that, despite spending billions of dollars and working collaboratively, wastewater agencies will violate their effluent limits in 2035. EBDA acknowledges that the draft permit says the Board will use available regulatory mechanisms to provide more time, but it finds the idea of receiving a cease and desist order or the exercise of “enforcement discretion” to be cold comfort. Accordingly, EBDA urges the Board to consider a resolution to create a legal framework that provides more time.

Response

As explained in Finding 2.2 of the Revised Tentative Order, we have taken a very collaborative approach to nutrient management by initiating a Nutrient Management

¹⁹ San Francisco Bay Regional Water Board, *Memo on Numerical Translation of Narrative Objective*, February 2024.

Strategy in 2012 and convening a Steering Committee in 2014, with the participation of U.S. EPA, the dischargers, scientific researchers, and non-governmental organizations. For more than a decade, dischargers have supported the science program, conducted monitoring, and evaluated opportunities to reduce nutrient discharges through treatment options, water recycling, and nature-based solutions. In 2019, the program was honored with the National Association of Clean Water Agencies' (NACWA) National Environmental Achievement Award in the Special Recognition category. NACWA's "San Francisco Bay Nutrient Management Strategy Serves as a Model" article states in part:

In order to understand and respond to San Francisco Bay nutrient concerns, wastewater treatment plants in the region, regulators, scientific research entities, and non-governmental organizations created the San Francisco Bay Nutrient Management Strategy (NMS) to facilitate coordination on regulatory development, scientific research, and alternatives analysis of treatment technologies and management strategies with the following specific benefits and results:

- The Program's straightforward and transparent governance structure maximizes the effectiveness of stakeholder input and minimizes administrative burdens. In particular, the Nutrient Watershed Permit, negotiated through the NMS structure, benefits both dischargers and regulators as it obviates the need for multiple individual permits.
- The NMS Science Plan (funded by the dischargers in accordance with the Permit) has developed a receiving water monitoring program and a robust hydrodynamic model for the Bay, forming a sound scientific basis for future regulatory decisions that will impact millions of people and protect a large and critically important estuarine environment.
- The Program's Alternatives Analysis includes evaluations of established and cutting-edge wastewater treatment technologies (such as biological nutrient removal and anammox treatment) as well as assessments of strategies that go beyond wastewater treatment plant processes and achieve multiple benefits (wetlands creation, water recycling, water quality trading, etc.).

The NMS program's regional collaborative approach benefits the environment by developing the appropriate regulatory response to the nutrient challenge; benefits the utilities by fully evaluating the alternatives to arrive at the best overall solution; and benefits the community by spending cost-effectively to reduce the financial burden to individual households, while ensuring protection of the Bay. The approach identifies nutrient management solutions that are well-suited to the unique set of

scientific, regulatory, and economic challenges in San Francisco Bay and serves as a model for other watersheds nationwide. ...²⁰

We have every intention of continuing this collaboration. However, given the scale of the 2022 algal bloom, it is now clear that dischargers must substantially reduce nitrogen loads to San Francisco Bay to protect aquatic life. Even so, we expect to continue working with dischargers by continuing scientific studies and exploring ways to facilitate multi-benefit solutions and innovative treatment technologies. We share EBDA's desire for expeditious nutrient reductions from projects that are synergistic with other wastewater infrastructure needs and provide multiple benefits, such as enhancing water supply.

As for whether the Board might issue cease and desist orders or take other types of enforcement, we cannot assume how the Board will exercise its enforcement discretion. However, enforcement is just one of several options available to address the need for more time to comply with a final limit. See response to Major Comment 2, above, which describes a proposed resolution directing staff to evaluate options to provide more time, as warranted.

EBDA Comment 2

EBDA requests that we employ a BMP approach to establishing water quality-based effluent limits to allow for adaptive management. It claims such an approach would allow it to continue prudent investments in nutrient reduction without the threat of violating the permit and avoid establishing limits that may change given the nascent stage of our scientific understanding and the infeasibility of determining numerical limits.

Response

See responses to Major Comments 4 and 6, above.

EBDA Comment 3

EBDA states that it echoes BACWA's comments.

Response

See responses to BACWA Comments, above.

EBDA Comment 4

EBDA requests that we develop a legal framework to allow more time than the 10 years provided by the Compliance Schedule Policy. EBDA proposes that the Board consider a resolution committing staff to amend the Compliance Schedule Policy or, if that proves infeasible, the Basin Plan. A Basin Plan amendment could include new, revised, or newly interpreted water quality objectives with implementation timelines longer than 10 years, or a water quality attainment strategy that includes a realistic implementation

²⁰ <https://www.nacwa.org/news-publications/news-detail/2019/03/18/east-bay-mud-s-san-francisco-bay-nutrient-management-strategy-serves-as-model>

plan. EBDA acknowledges that this effort could require significant staffing resources; however, it also says this is the most impactful action the Board is likely to take in a generation, so allocating staffing is appropriate. EBDA commits to work with the Water Board and other stakeholders to find resources to support the effort.

Response

See response to Major Comment 2, above.

EBDA Comment 5

EBDA believes a BMP-based approach would be best. It envisions a permit with interim limits and BMPs, but no enforceable numeric final effluent limits. EBDA cites the Puget Sound example.

Response

As proposed, the BMP approach would be unworkable. See response to Major Comment 4, above.

EBDA Comment 6

EBDA requests that we revise the draft permit to expressly state that anti-backsliding rules do not apply to final effluent limits before they come into effect. EBDA also suggests specific revisions to sections 2.2 and 6.3.5 of the draft permit and Fact Sheet section 6.3.5.

Response

Revising the draft permit to describe how anti-backsliding rules apply is unnecessary. Regardless of what the permit says, anti-backsliding requirements apply to the final effluent limits only when they go into effect. Until then, the Board can revise the final limits as warranted without backsliding. See response to EBMUD Comment 2, below. Regarding the other revisions suggested, see response to BACWA Comment 2, above.

EBDA Comment 7

EBDA points out that the previous permit was issued with an incentive clause for early actions based on the understanding that, after implementing planned projects, early actors would be moved to the “back of the line” and would not be asked to make further upgrades until others reduced nutrient loads. EBDA says it went above and beyond what was required, yet its best efforts are still not enough. EBDA accuses the Board of not implementing its prior commitment to early actors. It says the Board is likely to issue a cease and desist order or other type of enforcement action to provide the extra time needed to comply. To receive an enforcement order would signal that EBDA should not have acted early.

Response

With respect to early actors, the Revised Tentative Order is consistent with the findings of the previous order, Order R2-2019-0017. Fact Sheet section II.E of the previous order states:

Although the Regional Water Board expects to implement effluent limitations in 2024 based on nutrient discharge performance, *scientific conclusions from monitoring, load response modeling, or the establishment of nutrient water quality objectives will be used to determine what effluent limitations are appropriate at that time.* The Regional Water Board also expects that, if effluent limitations in 2024 are necessary and based on performance, such limitations would be based on performance between May 1, 2014, to September 30, 2017, as projected in Table F-5, to ensure that Dischargers who have taken early actions to reduce nutrient discharges during this Order term are not penalized with more stringent effluent limitations in 2024. Before implementing any load targets as effluent limitations, the Regional Water Board may adjust them if necessary (e.g., to account for decreased recycled water demand, increased biosolids management, increased daytime worker population, or new or expanded waste-to-energy programs).

If the most up-to-date scientific information indicates that nutrient loads must be capped or reduced, the Regional Water Board will recognize early actions (i.e., Dischargers' capital or operational improvements or other means that significantly reduce nutrient loads during this Order term) when considering compliance with nutrient load caps or reductions in a subembayment. This will likely result in findings that no further actions by these Dischargers will be necessary for the design life of the associated capital improvements, *provided that other Dischargers can implement capital improvements to reduce nutrient loads below the subembayment cap.* Any Discharger who significantly reduces nutrient loads during this Order term will be considered for recognition as an early actor. ...
[emphasis added]

The algal blooms observed in 2022 and 2023 (after the previous order was issued) demonstrate that more stringent effluent limitations than those anticipated in 2019 are necessary. Merely capping existing loads would not prevent similarly significant algal blooms. Because of these new circumstances, early actors may need to do more during the design life of their current capital improvements, particularly since other dischargers are likely unable to reduce nutrient discharges sufficiently on their own.

Nevertheless, the Revised Tentative Order does recognize early actions. EBDA points out that the previous order (Fact Sheet Table F-6) listed two of its member agencies as early actors. The Oro Loma and Castro Valley Sanitary Districts expected to reduce total inorganic nitrogen concentrations below 15 mg/L by 2020, and the City of Hayward expected to reduce total inorganic nitrogen concentrations below 20 mg/L by 2025. If successful, these agencies can readily achieve their portion of EBDA's proposed final limit, which reflects a concentration of 20.5 mg/L (see Fact Sheet section 4.1.4.2 of the Revised Tentative Order).

How EBDA complies with its final limit is up to EBDA and the six wastewater treatment plants it represents. The four agencies other than the City of Hayward and Oro Loma

and Castro Valley Sanitary Districts are not early actors. They may need to undertake significant upgrades. Moreover, the early actors will likely experience population growth over the next 10 years, and the proposed 10-year compliance schedule provides time for them to implement relatively small projects to maintain their low nitrogen loads.

As for whether the Board might issue cease and desist orders or take other types of enforcement, see responses to EBDA Comment 1 and Major Comment 2, above.

EBDA Comment 8

EBDA suggests that the Board revise section 6.3.6 of the draft permit and Fact Sheet section 6.3.6 to direct itself to use all available regulatory mechanisms to provide more time. EBDA also requests adding a table listing its early actions.

Response

We did not revise the draft permit. The Board cannot use permits to impose requirements on itself or future Boards. The Board uses permits to impose requirements on dischargers. Furthermore, it would not make sense for the Board to use all available regulatory mechanisms to provide more time when only one regulatory mechanism would be needed. A table listing early actors is unnecessary because provision 6.3.6 of the Revised Tentative Order would require agencies to identify early actions. As explained in response to Major Comment 2, above, we drafted a resolution for Board consideration to address discharger concerns regarding the need for more time to complete multi-benefit projects.

EBDA Comment 9

EBDA says we have overstated our confidence in the science and modeling as a basis for imposing the final limits. For example, the factors that caused the 2022 algal bloom remain unknown. Moreover, the model overstates nitrogen concentrations in the lower portion of the South Bay and Lower South Bay. EBDA notes that the model does not simulate harmful algal blooms. It says the final limits are based on worst case assumptions. EBDA supports further modeling work to resolve uncertainties. It claims there is a critical need for an open and comprehensive evaluation of uncertainties before establishing final limits. EBDA calls for an adaptive management approach that allows the science to evolve before locking in final limits. Meanwhile, EBDA recommends a BMP approach. EBDA calls for no-regrets actions and synergistic upgrades with a focus on multi-benefit projects.

Response

We did not revise the draft permit. We share EBDA's desire for improved science and modeling; however, available information is sufficient to support the proposed effluent limits. See responses to Major Comment 6 and Central San Comment 6, above. Moreover, the proposed BMP approach is unworkable for reasons explained in response to Major Comment 4, above.

The Clean Water Act does not require that all uncertainties be resolved before establishing numeric limits. While the specific factors causing algal blooms may be

unknown, the source of the nutrients that feed algal blooms and support their extensive propagation, as took place in 2022 and 2023, is irrefutable. Municipal wastewater treatment plants are by far the greatest source of nutrients to San Francisco Bay. As shown in Figure 1 (see response to Major Comment 5, above), modeled total inorganic nitrogen concentrations correspond well with observed data in the South Bay. South Bay conditions reflected the worst consequences of the 2022 algal bloom, the critical condition considered for analysis purposes. Any overestimate in nitrogen concentrations in the Lower South Bay did not affect the calculation of the final effluent limits. (See response to Major Comment 5, above.)

EBDA's concern regarding uncertainties suggests a need to provide a greater margin of safety when deriving the limits. We instead prefer to take an adaptive approach and re-evaluate the final limits when reissuing the permit in 2029. The proposed final limits are not locked in. As explained in response to EBMUD Comment 2, above, they can be revised any time before the end of the compliance schedules. Even after the compliance schedules end, the Board can revise the final limits if doing so complies with anti-backsliding and antidegradation requirements.

As described in Fact Sheet section 4.1, the proposed final limits are based on a number of factors, not just the model. The limits are not based on unrealistic worst-case assumptions; they are based on assumptions comparable to the conditions actually observed during the 2022 algal bloom. While the limits do not directly account for possible algal toxins, the resultant nitrogen reductions would be expected to reduce the potential harm of algal toxins. See response to U.S. EPA Comment 2, above. If future scientific studies indicate that the proposed final limits are not sufficiently protective, the Board can make them more stringent when more information becomes available.

EBDA Comment 10

EBDA describes the discretion the Board has in formulating effluent limits, pointing out that BMPs may be used in lieu of numeric limits when numeric limits are infeasible or when BMPs are reasonably necessary to achieve effluent limits and standards. EBDA points to the Puget Sound as an example. EBDA proposes that we take a similar approach, requiring dischargers to implement actions aimed at reducing nutrient loads by 40 percent from 2022 loads via BMPs. The permit would include BMP milestones achievable within 10 years and create a path toward attaining the narrative water quality standard. EBDA envisions numeric targets implemented via BMPs instead of numeric limits. EBDA contends that BMP-based limits are the only type of limit appropriate because NPDES regulations require effluent limits that ensure water quality standards are achieved. EBDA supports BACWA's proposed edits related to the BMP approach.

Response

While we agree that NPDES regulations require water quality-based effluent limits to be derived to ensure that water quality standards are achieved, we do not agree that BMPs are the only type of limit appropriate. In fact, the BMPs proposed would be inconsistent with the Clean Water Act. A compliant BMP approach cannot be open-ended; a permit must prescribe the specific BMPs that would be necessary to comply with applicable

water quality standards, such as the biostimulatory water quality objective, in receiving waters. See responses to Major Comment 4 and BACWA Comment 5, above.

EBDA Comment 11

EBDA requests flexibility to account for variable recycled water demand. It asks (1) to exclude May, (2) to base compliance on a 3-year rolling average from June 1 through September 30, and (3) to exclude data when recycled water demand is low.

Response

We disagree. We cannot exclude data from May because loads from May will influence algal blooms in the following months and modeling shows that at least a 40 percent reduction in nitrogen loads is necessary from May through September to protect beneficial uses. Similarly, we cannot base compliance on a 3-year rolling average because nutrient levels in the Bay vary on a scale of months and using a 3-year average would allow for significant interannual variability that would not be protective of water quality. We also cannot selectively exclude data when water recycling demand is low; however, since effluent limits are based on dry season conditions, we do not propose to require dischargers to use data collected during any unseasonal wet weather that occurs between May and September. See responses to BACWA Comment 11 and U.S. EPA Comment 3, above.

EBDA Comment 12

EBDA believes Table E-4 footnote 1, which eliminates sampling when water demand is low, was intended to account for variable recycled water demand, but is impractical. Instead, EBDA requests that agencies be allowed to omit data when there is reduced recycled water demand.

Response

See responses to BACWA Comment 11 and U.S. EPA Comment 3, above.

EBDA Comment 13

EBDA requests flexibility to account for temporary excursions due to employment of innovative strategies. This flexibility would accommodate some trial and error. EBDA requests that agencies implementing innovative technologies be allowed to omit non-representative data.

Response

We disagree. Every NPDES permit requires dischargers to collect samples representative of the monitored activity (40 C.F.R. section 122.41(j)). If a discharger implements an innovative technology and discharges higher nitrogen concentrations, the results must be reported because they would still be representative of the discharge. Water Code section 13385(j)(1)(D) specifies specific conditions when dischargers operating new or reconstructed wastewater treatment units are not subject to mandatory minimum penalties for effluent limit violations.

EBDA Comment 14

EBDA requests that limits be calculated based on influent flow, not effluent flow, to better recognize the nutrients diverted through existing water recycling. EBDA contends that basing the calculations on effluent flows penalizes water recyclers. EBDA notes that the change would not significantly change its final limit, but it believes incentivizing water recycling should be an important policy objective.

Response

We did not revise the final effluent limit calculations. Considering influent flow instead of effluent flow would create more issues than it solves. Dischargers in rural areas with more access to recycled water users would benefit, while dischargers in more urban areas would bear the burden of additional nitrogen load reductions because they cannot recycle as much water. While we acknowledge the efforts by some EBDA members, such as the Dublin San Ramon Services District, to recycle a substantial portion of their dry weather flows, the past decision to implement recycled water projects was not driven by the need to reduce nutrient loads to the Bay. To determine the total inorganic nitrogen mass effluent limits, we chose 2022 flows as the baseline because 2022 is when the largest harmful algal bloom occurred. Future recycled water projects will count toward meeting the final effluent limits.

EBDA Comment 15

EBDA expresses concern regarding potential year-round limits and asks that mention of that future possibility be removed from the draft permit.

Response

See response to BACWA Comment 7, above.

EBDA Comment 16

EBDA requests that the permit acknowledge population growth, stating that the draft permit prevents growth in the absence of significant infrastructure investments. EBDA explains that reducing nutrient loads 40 percent from 2022 levels requires reductions greater than 40 percent to allow for foreseeable population growth. EBDA claims the draft permit, as written, is a growth moratorium contrary to regional and state priorities for creating more affordable housing.

Response

We disagree. If a discharger must implement significant treatment plant upgrades to achieve the total inorganic nitrogen final limits, such upgrades are needed regardless of population growth. We acknowledge that population growth could require wastewater treatment plants to take additional actions to reduce nutrient loads. The Revised Tentative Order is not a growth moratorium, however. In some cases, if service area populations grow significantly, dischargers may need to offset the growth with additional nutrient reduction efforts. These could include, for example, more water recycling to offset increased potable water demands. If water recycling projects keep up with

population growth, dischargers can ensure that their nutrient loads to the Bay will not increase.

EBDA Comment 17

EBDA requests that organics waste codigestion be considered a multi-benefit project that may justify more time for compliance with final nitrogen limits. Organic waste in landfills releases 20 percent of California’s methane. Codigesting food scraps at wastewater facilities captures this renewable energy.

Response

We disagree. See response to BACWA Comment 14, above.

EBDA Comment 18

EBDA requests clarification of reporting requirements by better differentiating the Group Annual Report and the Regional Planning Study, avoiding duplicative content, and removing overly prescriptive requirements. It says the aligned due dates will strain resources, the document submittal requirements are impractical, load reductions are an unwieldy measure, and the due date to identify multi-benefit projects is too early and the definition too constrained.

Response

See response to BACWA Comment 8, above.

EBDA Comment 19

EBDA claims our environmental justice outreach did not consider economic impacts. It requests that we reconsider the finding in Fact Sheet section 8.2 that suggests that economic impacts need not be evaluated. EBDA notes various requirements for outreach and findings related to potential environmental justice, tribal impact, and racial equity considerations for reissued permits that include time schedules.

EBDA contends that we did not highlight the significant costs associated with implementing the proposed requirements and the impact that associated rate increases will have on disadvantaged communities. EBDA suggests that, when presented with information on how nutrient reductions will reduce the likelihood and severity of future algal blooms, community groups are likely to express support. However, EBDA says leaving out information on rate increases that will disproportionately affect the most vulnerable Bay Area residents is misleading and irresponsible.

EBDA points to 40 C.F.R. section 25.4(b)(2) requirements that “social, economic, and environmental consequences of proposed decisions shall be clearly stated....” EBDA says we should conduct additional outreach and make findings showing how we considered the impact of the compliance schedules on disadvantaged communities. EBDA says we must (a) prepare a concise summary of the anticipated water quality impacts in disadvantaged communities as a result of the permitted activity and (b) identify measures to address the impacts of the permitted activity or facility in a

disadvantaged or tribal community. EBDA disagrees with the finding on Fact Sheet page F-40 of the draft permit that “cost concerns are beyond the scope of Water Code section 13149.2.” To the contrary, the second consideration under Water Code section 13149.29(b)(2) is to “address impacts of the permitted activity or facility in a disadvantaged or tribal community.” These impacts are not limited to water quality impacts as they are in Water Code subdivision (b)(1).

EBDA further disagrees that Finding 2.2 of the draft permit adequately considers economic impacts. It merely lists total costs, not how disadvantaged communities must bear portions of those costs. Under Proposition 218, utilities cannot provide discounts or otherwise shift costs based on affordability.

Response

We have engaged in equitable, culturally relevant community outreach as required by Water Code section 189.7 and consistent with State Water Board Resolution 2021-0050. As part of our outreach, we contacted 40 community and environmental justice groups and 26 tribes on February 14, 2024, to provide notice of the proposed permit and information regarding a workshop planned for March 5, 2024. The outreach letters discussed costs and compliance schedules: “Because these requirements will require municipalities to invest significant resources to upgrade their treatment facilities, the draft permit provides dischargers up to 10 years to implement these changes.” We sent a reminder regarding the workshop on February 27, 2024. Three parties indicated their intent to participate, but only one attended the March 5 workshop. At the workshop, we discussed the permit and its impacts, including potential costs and utility rate increases. We specifically noted challenges posed by Proposition 218, which requires utilities to develop rates based on the cost of service. Continuing our efforts to engage with disadvantaged communities and tribal communities on the draft permit, we notified environmental justice groups and tribes about the opportunity to comment on the draft permit during the public comment period and about the public hearing for the Revised Tentative Order.

Water Code section 13149.2 requires the Regional Water Board to make a concise programmatic finding on potential environmental justice, tribal impact, and racial equity considerations for reissued regional waste discharge requirements. The finding must include the following:

- (1) A concise summary of the anticipated water quality impact in disadvantaged or tribal communities as a result of the permitted activity or facility, and any environmental justice concerns within the scope of the state board or regional board’s authority previously raised to the applicable board by interested persons with regard to these impacts.
- (2) Identification of measures available and within the scope of the state board or regional board’s authority to address the impacts of the permitted activity or facility in a disadvantaged or tribal community.

Rate increases are not a water quality impact and are not within the Water Board's authority. We acknowledge that there will be significant costs associated with nutrient-removal projects and have considered how the costs could affect disadvantaged communities. See response to Major Comment 3, above. Although not required by Water Code section 13149.2, we revised the third paragraph of Fact Sheet section 8.2 as follows:

Dischargers raised concerns about the impact compliance costs will have on disadvantaged communities. Although the cost concerns are beyond the scope of Water Code section 13149.2, the Regional Water Board has considered these concerns. The Regional Water Board recognizes the costs to implement the Order may have a greater impact on disadvantaged communities; however, not implementing the Order could result in detrimental impacts to water quality in disadvantaged communities and the region overall. Harmful algal blooms negatively affect many beneficial uses, such as water contact and non-contact recreation; fishing; shellfish harvesting; cold and warm freshwater, marine, and estuarine habitats; and preservation of rare and endangered species. Poor water quality can also lead to increased health care costs. Harmful algal bloom toxins can cause human illness through direct contact, airborne transmission, and fish and shellfish poisoning. (See also finding 2.2 of the Order.)

The public participation requirements in 40 C.F.R. section 25.4(b)(2) do not apply to State NPDES programs (see 40 C.F.R. § 25.2(f)). Moreover, 40 C.F.R. § 25.4(b)(2) does not *compel* the disclosure of economic consequences; it merely states, "Whenever possible, consistent with applicable statutory requirements, the social, economic, and environmental consequences of proposed decisions shall be clearly stated in such material."

We recognize that the costs to comply with the proposed final effluent limits may have a greater impact on disadvantaged communities. By including the longest compliance schedules allowed at this time, the Revised Tentative Order would allow dischargers to spread these costs over several years. As explained in response to Major Comment 2, above, we also prepared a draft resolution for Board consideration that would direct staff to look for ways to extend to the 10-year compliance schedules as warranted.

EBDA Comment 20

EBDA requests edits to Fact Sheet section 2.3 to provide additional background regarding nature-based solutions.

Response

We agree and revised the eighth bullet item of Fact Sheet section 2.3 as follows:

Union Sanitary District. In conjunction with the South Bay Salt Pond Restoration Project, ~~The~~ district explored the feasibility of building a

horizontal levee on adjacent land. Although the district does not own the land, it has pledged support for the concept and will assist with moving the project forward. The district plans to significantly reduce nutrient discharges with treatment plant upgrades. Construction started in 2022 and is expected to be completed by 2029.

EBDA Comment 21

EBDA requests that Fact Sheet Table F-3 break out the individual EBDA member agencies.

Response

We agree and revised Table F-3 as follows:

Table F-3. Current and Projected Water Recycling

Discharger	Average Daily Discharge Oct 2019-Sept 2020	2020 Water Recycled (MGD)	2020 Fraction Recycled	2025 Projected Water Recycled (MGD)	2030 Projected Water Recycled (MGD)
American Canyon, City of	1.22	0.313	0.26	0.619	0.619
⋮	⋮	⋮	⋮	⋮	⋮
East Bay Dischargers Authority (EBDA)	62.1	6.0	0.10	6.5	6.8
<i><u>Dublin San Ramon Services District</u></i>	<u>10</u>	<u>3.5</u>	<u>0.34</u>	<u>3.7</u>	<u>3.7</u>
<i><u>City of Hayward</u></i>	<u>11</u>	<u>0.8</u>	<u>0.07</u>	<u>1.1</u>	<u>1.2</u>
<i><u>City of Livermore</u></i>	<u>4.1</u>	<u>1.4</u>	<u>0.35</u>	<u>1.5</u>	<u>1.5</u>
<i><u>Oro Loma Sanitary District and Castro Valley Sanitary District</u></i>	<u>11</u>	<u>0.03</u>	<u>0.00</u>	<u>0.0</u>	<u>0.0</u>
<i><u>City of San Leandro</u></i>	<u>5.0</u>	<u>0.3</u>	<u>0.05</u>	<u>0.3</u>	<u>0.3</u>
<i><u>Union Sanitary District</u></i>	<u>23</u>	<u>0.0</u>	<u>-</u>	<u>0.0</u>	<u>0.0</u>
East Bay Municipal Utility District	48.1	0.18	0.00	0.202	0.504
⋮	⋮	⋮	⋮	⋮	⋮
Total	408	43.2	0.11	52.8	76.4

East Bay Municipal Utility District (EBMUD)

EBMUD Comment 1

EBMUD states that there is significant scientific uncertainty and questions whether the science is sufficiently robust to require billions of dollars worth of capital upgrades. It asserts that the assumptions that underlie the proposed requirements are not universally accepted, citing an attached paper by Donald Gray (EBMUD staff).

Response

See responses to Major Comment 6 and EBDA Comment 9, above, and EBMUD Comment 10, below.

EBMUD Comment 2

EBMUD asks whether anti-backsliding rules would allow changes in final effluent limits as new scientific information becomes available. EBMUD requests information on how advances in science would allow less stringent limits to be adopted.

Response

Anti-backsliding restrictions do not apply to revisions to effluent limitations made before the scheduled date of compliance for those limitations because those limitations are not established for purposes of the anti-backsliding prohibition in CWA section 402(o)(1). In addition, U.S. EPA has interpreted the anti-backsliding prohibition as not applying to changes made to an effluent limitation prior to its compliance schedule deadline. See 58 Fed. Reg. 20802, 20837, 20981, 21045 (April 16, 1993) (Proposed Great Lakes Initiative) and 40 C.F.R. Part 132, Appendix E, Procedure 9 (Adopted Water Quality Guidance for the Great Lakes System) (A modification to an effluent limitation subject to a compliance schedule after studies have been completed and during the term of the compliance schedule is not considered a less stringent effluent limitation for purposes of Clean Water Act section 402(o)).

Anti-backsliding requirements would apply only after the final effluent limitations go into effect. Even then, Clean Water Act section 402(o) allows the relaxation of effluent limitations if either of the requirements of sections 303(d)(4) or 402(o)(2) are met. Section 303(d)(4) and 402(o)(2) are independent exceptions to the prohibition.²¹ Section 402(o)(2) lists many exceptions to backsliding.

In this case, before the final effluent limits go into effect at the end of the compliance schedules, the Board can revise the final limits without violating the anti-backsliding prohibition. For example, the Board may do so if new scientific information becomes available that justifies less stringent effluent limitations.

EBMUD Comment 3

EBMUD asks whether nutrient targets could be considered in lieu of the final limits.

Response

Nutrient targets cannot substitute for final effluent limits. When there is a finding of reasonable potential, the Clean Water Act requires a numeric effluent limitation, unless infeasible. See response to Major Comment 4, above.

²¹ U.S. EPA Permit Writers Manual, p. 7-3.

EBMUD Comment 4

EBMUD expresses support for requiring BMPs in lieu of final limits, citing BACWA's comments.

Response

See responses to Major Comment 4 and BACWA Comments 4 and 5, above.

EBMUD Comment 5

EBMUD requests clarification of the reporting requirements of sections 6.3.3 and 6.3.4 of the draft permit, and Attachment E section 5.2.2 (Group Annual Report). EBMUD suggests that the Group Annual Report focus on monitoring results and describe nutrient removal efforts. It also suggests consolidating sections 6.3.3.1 and 6.3.3.2 into a single section.

Response

We agree. See response to BACWA Comment 8, above.

EBMUD Comment 6

EBMUD refers to the BACWA comment regarding reporting requirements, stating that providing the technical reports described in section 6.3.3.2 would be particularly challenging. It requests that the scoping plan required by section 6.3.3.2.1 be postponed from July 1, 2025, to November 30, 2025, with annual updates thereafter, to allow dischargers an opportunity to evaluate facility performance for May 1 through September 30 each year. EBMUD also asserts that the requirements in section 6.3.3.2 are overly prescriptive. It suggests that dischargers be required to provide summaries of technical reports as opposed to the full reports due to their long and complex nature.

Response

See response to BACWA Comment 8, above.

EBMUD Comment 7

EBMUD is concerned that the Board could, in the future, consider year-round nutrient limits instead of seasonal limits. Its ability to reduce nutrients during wet weather, or even from May 1 through September 30, is unknown. It requests that any expansion of the seasonal limits beyond May 1 through September 30 be based on scientific evidence.

Response

We would only propose year-round nitrogen limits if there were clear evidence of necessity. See response to BACWA Comment 7, above.

EBMUD Comment 8

EBMUD says it is ready to implement biological nutrient removal (BNR) optimization quickly and requests that any benefits provided for early actions be provided for its BNR pilot efforts. EBMUD notes that it was able to reduce its dry season nutrient discharges by 30 percent from 2022 to 2023.

Response

Based on the information EBMUD has provided, it will qualify as an early actor under provision 6.3.6 of the Revised Tentative Order.

EBMUD Comment 9

EBMUD requests a variety of editorial changes.

Response

We agree. We revised Monitoring and Reporting Program Table E-4 as shown in response to BACWA Comment 13, above. We revised Table 4 of the draft permit as follows:

Table 4. Final Effluent Limitations

Discharger	Total Inorganic Nitrogen (kg/day)
American Canyon, City of	62
⋮	⋮

We revised the Attachment C footer as follows:

ATTACHMENT C — PROCESS FLOW DIAGRAM MAP OF MUNICIPAL DISCHARGE LOCATIONS

We updated Fact Sheet Tables F-1 and F-2 as follows:

Table F-1. Facility Information

Discharger	Facility Contact, Title, and Phone	Mailing Address	Effluent Description	Facility Design Flow (MGD)
American Canyon, City of	Pam Phillips Environmental Services Manager (707) 647-4544	151 Mezzetta Court American Canyon, CA 94503 Napa County	Advanced Secondary	2.5
⋮	⋮	⋮	⋮	⋮
East Bay Municipal Utility District	Chris Dembiezak Donald Gray Senior EH&S Specialist (925) 640-4738	P.O. Box 24055 Oakland, CA 94623-1055 Alameda County	Secondary	120
Fairfield-Suisun Sewer District	Meg Herston Director of Environmental Services (707) 428-9109	1010 Chadbourne Road Fairfield, CA 94534 Solano County	Advanced Secondary	23.7

Discharger	Facility Contact, Title, and Phone	Mailing Address	Effluent Description	Facility Design Flow (MGD)
⋮	⋮	⋮	⋮	⋮
Mt. View Sanitary District	Lilia Corona District Manager (925) 228-5635 ext. 18	P.O. Box 2757 Martinez, CA 94553 Contra Costa County	Advanced Secondary	3.2
Napa Sanitation District	James Keller Operations Services Director (707) 258-6020 ext. 604 <u>Andrew Damron General Manager (707) 258-6007</u>	1515 Soscol Ferry Road Napa, CA 94558 Napa County	Secondary	15.4
Novato Sanitary District	Sandeep Karkal General Manager-Chief Engineer (415) 892-1694	500 Davidson Street Novato, CA 94945 Marin County	Secondary	7.0
⋮	⋮	⋮	⋮	⋮

Table F-2. Additional Facility Information

Discharger	Authorized Person to Sign and Submit Reports	Billing Address
American Canyon, City of	Pam Phillips Environmental Services Manager (707) 647-4544	151 Mezzetta Court American Canyon, CA 94503 Napa County
⋮	⋮	⋮
East Bay Municipal Utility District	Glenn Dombeck <u>Amit Mutsuddy</u> Manager of Wastewater Treatment <u>Director of Wastewater</u> (510) 287-1407	P.O. Box 24055, MS#59 Oakland, CA 94623- 1055 Alameda County
Fairfield-Suisun Sewer District	Jordan Damerel Assistant General Manager/District Engineer (707) 428-9155	1010 Chadbourne Road Fairfield, CA 94534 Solano County
⋮	⋮	⋮
Mt. View Sanitary District	Stacey Ambrose Environmental Services Manager (925) 228-5635 ext. 12	P.O. Box 2757 Martinez, CA 94553 Contra Costa County
Napa Sanitation District	James Keller Operations Services Director (707) 258-6020 ext. 601 <u>Andrew Damron</u> <u>General Manager</u> <u>(707) 258-6007</u>	1515 Soscol Ferry Road Napa, CA 94558 Napa County
Novato Sanitary District	Sandeep Karkal General Manager-Chief Engineer (415) 892-1694	500 Davidson Street Novato, CA 94945 Marin County
⋮	⋮	⋮

Footnote 9 in Fact Sheet section 4.1.4.2 was not a typo. Microsoft Word formats footnotes across two pages when they do not fit on one.

EBMUD Comment 10

In a paper prepared by Don Gray, EBMUD suggests that the scientific literature does not support the approach used to develop the proposed final limits sufficiently to make a multi-billion-dollar investment. Specifically, EBMUD contends that the approach is overly simplistic in assuming that algae grow rapidly, then die and are consumed, along with dissolved oxygen. H. akashiwo is mixotrophic, meaning it can survive through photosynthesis (producing oxygen) or heterotrophically (consuming oxygen). Moreover, not all the algal carbon is necessarily consumed since some is used to generate cysts. EBMUD requests mass balance calculations.

EBMUD also notes that in 2022 a substantial number of fish died before oxygen levels were depleted. It asks whether dissolved oxygen data were collected in Central San Francisco Bay. EBMUD further questions the accuracy of the Redfield ratio during the rapid biological changes that occurred during the 2022 algal bloom. EBMUD concludes

*that there is reason to doubt the approach used to calculate the final limits. It asks why data from the 2023 algal bloom were not considered when calculating the final limits. EBMUD recommends further study of *H. akashiwo* as part of the science plan and further study and comparison between the 2022 and 2023 algal blooms (e.g., to discern why one event resulted in a massive fish kill and the other did not).*

Response

Nothing in the paper attached to the EBMUD comment letter provides cause to modify the approach used to develop the proposed final effluent limits. The Fact Sheet and related documentation provide ample support for the permit's approach, which relies on available information and reasonable assumptions. Essentially, the paper says the Board should delay action because the science is uncertain and evolving; however, science is always evolving and carries degrees of uncertainty. Actions are needed now to avoid large harmful algal blooms, and we cannot wait until there is perfect science with no uncertainty. The question here is whether the permit's approach is supported by sound science. It is.

The technical foundation of the permit's approach was developed by the Nutrient Management Strategy science team. The calculation linking dissolved inorganic nitrogen wastewater loads to dissolved oxygen concentrations in the Bay is informed by the following findings from an analysis of observational data:²²

- According to continuous SUNA nitrate sensors, the 2022 algal bloom used most, if not all, nitrogen in the South Bay water column.
- The biomass of algae produced was comparable to the amount expected from the available nitrogen based on the well-established Redfield ratio.^{23,24,25}
- When the bloom concluded at the end of August 2022, dissolved oxygen dropped by an amount consistent with the oxygen needed to respire the estimated biomass produced during the algal bloom (oxygen data were collected in the Central Bay and elsewhere²⁶).

We acknowledge concerns regarding the microbiological complexities during the 2022 bloom and address the most significant points from these comments below.

²² SFEI (2024) Simulations of load reduction scenarios to inform nutrient management planning for San Francisco Bay. SFEI Contribution #1175, San Francisco Estuary Institute, Richmond, California.

²³ Redfield, A. C. (1958). The biological control of chemical factors in the environment. *Am. Sci.* 46, 205–221.

²⁴ Goldman J.G, McCarthy J.J, Peavey D.G (1979) Growth rate influence on the chemical composition of phytoplankton in oceanic waters. *Nature* 279:210–215.

²⁵ Sardans, J., Rivas-Ubach, A., and Peñuelas, J. (2012) The elemental stoichiometry of aquatic and terrestrial ecosystems and its relationships with organismic lifestyle and ecosystem structure and function: a review and perspectives. *Biogeochemistry* (2012) 111:1–39.

²⁶ Continuous dissolved oxygen data were collected at five sondes placed in San Francisco Bay, one of which was in Central Bay near the San Leandro Bay Marina. Additionally, ship-based sampling was conducted throughout Central and South San Francisco Bay during the bloom.

Why focus on the 2022 algal bloom? We used the 2022 *H. akashiwo* bloom as the critical condition to determine the necessary wastewater nitrogen load reductions. We did not use the 2023 algal bloom because it, while significant, was not as widespread and did not cause as much harm as the 2022 algal bloom. It would be unreasonable to propose limits that only protect against an algal bloom less harmful than recently observed.

We do not know precisely why the algal bloom of 2022 was so severe or why a bloom of the same organism in 2023 did not become as widespread and persistent. Clearly, conditions in 2022 were more favorable for *H. akashiwo*. We are beginning to understand some of the factors that create favorable conditions for an algal bloom, but these conditions are not controllable factors because they involve meteorology and the chemistry, biology, and physics of nutrient fate and transport in the Bay. We propose to regulate nitrogen to reduce the adverse consequences of potential future algal blooms because it comes from controllable sources. We agree that further study is needed to better understand the relationship between nitrogen and harmful algal blooms, and we agree that the Nutrient Management Strategy should consider studying *H. akashiwo* in more depth. However, we cannot wait for these studies to be completed before taking action, and there is sufficient information to act now.

How did *H. akashiwo* grow during the late stage of the bloom? The paper suggests that the slower increase in chlorophyll-a and slight decrease in dissolved oxygen in late August 2022 could be explained by *H. akashiwo* switching from autotrophic growth (i.e., photosynthesis using dissolved carbon dioxide and producing oxygen) to heterotrophic growth (i.e., metabolizing dissolved carbon and consuming oxygen). One potential problem with this hypothesis is that it implies that *H. akashiwo* could get its needed nitrogen by consuming other microorganisms. The paper suggests that the organisms consumed heterotrophically were not simply dead *H. akashiwo*; however, the paper does not explain what other microorganisms could be present at sufficient abundance to provide a readily available food source for the newly heterotrophic *H. akashiwo*. *H. akashiwo* was the dominant microorganism in the Bay for several weeks prior to this phase of the bloom. Because *H. akashiwo* itself was consuming all available nutrients in the water column, including nitrogen, the only abundant food available for *H. akashiwo* consumption would have been dead *H. akashiwo*.

Another plausible hypothesis that accounts for the chlorophyll-a and dissolved oxygen observations during this slower growth phase is that, during the final stage of the algal bloom, some portion of the *H. akashiwo* may have already perished, causing oxygen depletion as it was digested by heterotrophs. The remaining *H. akashiwo* may also have been growing more slowly due to nitrogen scarcity. Nitrogen would have only been available from ongoing wastewater loads, any flux from sediments, and nitrogen cycling from dead *H. akashiwo*. *H. akashiwo* would have immediately used any available nitrogen so none would be detected in the water column. With slower growth, less oxygen was delivered to the water column through photosynthesis, and some oxygen was depleted as heterotrophs digested already dead *H. akashiwo*. With the reduced photosynthetic oxygen generation and increasing oxygen demand from digestion, the

super saturated dissolved oxygen concentration achieved during the period of maximum growth could not be sustained.

The specific details about how *H. akashiwo* grew during the late stage of the bloom are interesting, but inconsequential for purposes of our calculations. Whatever carbon source *H. akashiwo* used to achieve its high abundance, it also needed nitrogen to build biomass per the Redfield ratio. During photosynthetic growth, it would have taken dissolved nitrogen directly from the water. During heterotrophic growth, it would have used some other available microorganism or even dead *H. akashiwo*. In any case, the nitrogen in the biomass during any stage of the bloom would have originated from the water column and thus wastewater nitrogen loads. Our calculation does not depend on the pathway (autotrophy or heterotrophy) whereby *H. akashiwo* produced biomass.

Could carbon be sequestered in *H. akashiwo* cysts? The paper advances a hypothesis that *H. akashiwo* formed cysts at the end of the algal bloom so the carbon in that biomass could not be digested by heterotrophs. The paper contends that we therefore overestimated the oxygen depletion associated with degradation of dead algae. However, this hypothesis is inconsistent with continuous measurements collected from several fixed stations during the algal bloom.

We do not know what caused the bloom to end, but based on satellite and continuous monitoring data, we know it ended precipitously. There was a near-simultaneous drop in both chlorophyll-a and dissolved oxygen, suggesting that the oxygen depletion was caused by digestion of dead *H. akashiwo*. Cyst formation is possible and may have occurred, but it could not have been the fate for a substantial portion of the *H. akashiwo* cells because the amount of oxygen depletion revealed in the monitoring data closely matches the amount of oxygen depletion the Water Board calculated based on digestion of the carbon in the biomass present before the bloom ended.

The decrease in chlorophyll-a observed in the continuous data upon bloom termination was roughly 70 to 75 µg/L. Based on our calculations, this corresponds to a dissolved oxygen decrease of 6 to 8 mg/L.²⁷ These values bracket the dissolved oxygen decrease observed in the monitoring data, which ranged from 7 to 7.5 mg/L. If a substantial portion of *H. akashiwo*'s carbon went into cyst formation, much less oxygen depletion would have been observed because the carbon in the cysts would not have been digested. Because the data show a substantial drop in dissolved oxygen at the same time as the precipitous drop in chlorophyll-a, this oxygen was very likely used by organisms consuming carbon from the bloom.

Rates of cyst development are unknown. For modeling purposes, the Water Board assumed that all carbon produced during the algal bloom was eventually digested heterotrophically rather than going to form cysts. This is a reasonable assumption as explained in the preceding paragraphs and is scientifically defensible because it

²⁷ Cloern, J. et al. 1995. *An empirical model of the phytoplankton chlorophyll: carbon ratio-the conversion factor between productivity and growth rate*. *Limnology and Oceanography* 40 (7), 1313-1321. Calculations performed using chlorophyll-a to carbon mass ratio of 0.025 and 0.03 selected from Figure 1.

comports with observations made during the bloom in two respects. First, we are not aware of any evidence that cysts were formed in the latter stages of the bloom. Second, the amount of oxygen depleted, based on interpretation of continuous measurements collected at the end of the bloom, closely matches the amount of oxygen depletion expected based on digestion of the carbon in the biomass present before the bloom ended. Stated another way, we measured the amount of oxygen depletion, which occurred at the same time that chlorophyll-a dropped, and our independent calculations of what the depleted oxygen would be if all the algae were digested closely matched what was measured. More detailed mass balance calculations are unnecessary.

City of San Jose

San Jose Comment 1

San Jose states that investing significant time and money on upgrades and multi-benefit projects that could be inadequate to meet future potentially more stringent limits is a recipe for failure. Investments in nutrient management should not be regrettable due to ever-changing requirements.

Response

As explained in Fact Sheet section 4.1.4, because nitrogen discharges have reasonable potential to cause or contribute to an excursion of the biostimulatory substances water quality objective, we must impose effluent limitations to protect water quality (40 C.F.R. § 122.44(d)(1)(i)). Here, San Jose expresses fear that the nitrogen limits could become more stringent in the future. Below, in San Jose Comment 4, it comments that the proposed limits are already too stringent. We believe that the proposed limits are reasonable based on available information (see Fact Sheet section 4.1.4). Of course, the limits could change as more information becomes available. It may be prudent for dischargers to choose nitrogen removal projects that can be scaled up if new information compels more stringent limits in the future. Like San Jose, we prefer to avoid regrettable nutrient removal investments.

San Jose Comment 2

San Jose plans to cease treating biosolids in open-air lagoons and transition to mechanical dewatering. It requests the ability to amend the proposed interim limit or be given a conditional exception from enforcement for possible violations if it is unable to meet it. San Jose specifically requests a footnote to this effect be added to Table 3 of the draft permit.

Response

We have not made changes in response to this comment. To grant San Jose a compliance schedule, we are required to impose interim effluent limits based on current treatment performance. Specifically, the Compliance Schedule Policy states, "Numeric interim limitations for the pollutant must, at a minimum, be based on current treatment facility performance or on existing permit limitations, whichever is more stringent."

While San Jose's nitrogen loads may increase due to the change in biosolids processing, San Jose should be able to comply with the proposed interim effluent limit for total inorganic nitrogen. To account for variability and provide sufficient data for a statistical analysis, we evaluated current performance based on the period from 2013 through 2022. The interim limits are calculated as the 95th percentile of each discharger's loads. Because San Jose optimized nitrogen removal during the period from 2013 through 2022, its effluent data are relatively variable, resulting in a relatively high limit.

San Jose Comment 3

San Jose explains that it may be unable to meet its final limits within 10 years because it can only upgrade one of its four sets of biological nutrient removal aeration basins at a time, and each time it does so, the upgrades could take about 4 years to complete. It also hopes to reduce nutrient discharges through water recycling but says it cannot do so within 10 years. It claims a 10-year compliance schedule is not "reasonable" as required by Water Code section 13000. San Jose requests that we work with the State Water Board to amend the 2008 Compliance Schedule Policy to allow up to 20 years to comply with the final limits. Alternatively, it requests that we amend the Basin Plan to extend compliance timelines.

Response

Water Code section 13000 does not specifically relate to compliance schedules. It sets forth certain findings of the Legislature:

The Legislature finds and declares that the people of the state have a primary interest in the conservation, control, and utilization of the water resources of the state, and that the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state.

The Legislature further finds and declares that activities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.

The Legislature further finds and declares that the health, safety and welfare of the people of the state requires that there be a statewide program for the control of the quality of all the waters of the state; that the state must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation originating inside or outside the boundaries of the state; that the waters of the state are increasingly influenced by interbasin water development projects and other statewide considerations; that factors of precipitation, topography, population, recreation, agriculture, industry and economic development vary from region to region within the state; and that the statewide program

for water quality control can be most effectively administered regionally, within a framework of statewide coordination and policy.

The Legislature calls for the highest water quality that is reasonable, and the State Water Board has interpreted this to allow compliance schedules no longer than 10 years. As quoted above, the Legislature also finds that the health, safety, and welfare of the people of the state require that there be a statewide program for the control of the quality of all the waters of the state and that the state must be prepared to exercise its full power and jurisdiction to protect the quality of waters in the state from degradation.

Regarding potential options to provide more time to comply with the final effluent limits, see response to Major Comment 2, above.

San Jose Comment 4

San Jose suggests that the proposed final limits are based more on policy than data, stating there are no data to quantify the risk of recurrence for an algal bloom like the one in 2022. It suggests that high turbidity, shallow depth, and vertical mixing in the Lower South Bay contribute to that subembayment's resistance to algal blooms. It says current modeling tools are not appropriate for all subembayments. For example, the model predicts higher nitrogen levels than observed in the Lower South Bay. San Jose requests further scientific studies to better understand the potential for harmful algal blooms in the Lower South Bay.

Response

As explained in responses to Major Comments 5 and 6, above, the model predictions for current nitrogen loads agree with real-world monitoring data. The magnitude of predicted nitrogen matches the magnitude of observed nitrogen quite well for all subembayments, with a modest overprediction for the Lower South Bay. However, the modest overprediction in the Lower South Bay did not affect the derivation of the necessary baywide load reduction, which was driven by the load reduction required to achieve the dissolved oxygen goal for the South Bay, where the model performed well.

San Jose Comment 5

San Jose requests clarification of proposed technical reporting requirements. It mentions significant concerns regarding releasing proprietary information that could compromise facility security. Moreover, it objects to compliance deadlines for specific project milestones that do not account for potential delays in capital projects, which are common and unavoidable. San Jose asks what additional information is needed beyond what it already reports.

Response

See response to BACWA Comment 8, above, where we describe revisions clarifying the information that needs to be submitted. As explained in Fact Sheet section 4.2.1, to grant a compliance schedule, the permit must include interim requirements that are no longer than one year apart to demonstrate a discharger is progressing toward

compliance with final effluent limits (40 C.F.R. section 122.47(a)(3)(i)). Regarding proprietary information, provision 6.3.3 allows dischargers to summarize their projects, allowing them to exclude proprietary information.

San Jose Comment 6

San Jose requests that the narrative receiving water limits for the biostimulatory substances water quality objective be removed, stating that the language is unnecessary because the draft permit contains numeric effluent limits implementing the objective. It states that, when an effluent limit is imposed, no receiving water limit is required or authorized by federal or state law, and that it is duplicative. It points out the legality of “such a generic provision” is pending review by the U.S. Supreme Court.

San Jose states that receiving water limits lack specificity, eliminate the distinction between standards and limits, and fail to provide any guidance or pathway describing what is necessary to meet these requirements. San Jose further states that, instead of translating water quality standards into concrete permit requirements, receiving water limits create an “open-ended invitation for regulators or third parties to read in new requirements at any given time.” San Jose does not want the goal posts to be changed, where the water quality standards are interpreted differently mid-permit to require additional reductions beyond what is currently required by the current interpretation. That would be contrary to the Clean Water Act’s permit shield, which equates permit compliance with Clean Water Act compliance.

San Jose says this makes permittees consider filing a lawsuit on the current application of the biostimulatory substances water quality objective for failing to comply with state law upon the objective’s adoption because the translation did not meet Water Code sections 13241 or 13242. San Jose says, had the Board complied with Water Code sections 13241 or 13242 when the objective was adopted, a long-term compliance schedule could have been incorporated into the program of implementation for the objective.

Finally, San Jose asks that language in Fact Sheet section 5 related to dissolved oxygen be stricken because it is a new interpretation of the biostimulatory substances objective that modifies existing dissolved water quality objectives.

Response

Below, we propose revisions to the Tentative Order, but first we refute many of San Jose’s points.

On May 28, 2024, the U.S. Supreme Court granted certiorari in the *City and County of San Francisco v. U.S. EPA* case related to San Francisco’s Oceanside NPDES permit, issued jointly by U.S. EPA and the Board. The Court will consider whether certain narrative permit prohibitions, like receiving water limits, violate the Clean Water Act by failing to identify specific limits to which San Francisco’s discharges must conform. Previously, U.S. EPA’s Environmental Appeals Board and the Ninth Circuit Court of Appeals upheld the permit’s receiving water limits. The Ninth Circuit Court of Appeals

held that the plain text of the Clean Water Act and its regulations provide permitting agencies with broad authority to impose limitations necessary to ensure a discharger's compliance with water quality standards.²⁸ The Ninth Circuit Court of Appeals rejected San Francisco's argument that the narrative prohibitions, including the receiving water limits, failed to provide San Francisco with sufficiently clear direction as to how to ensure that its discharges comply with water quality standards.²⁹ It pointed out that other permit provisions provided San Francisco with substantial guidance on how to meet water quality standards and that the narrative prohibitions operated as a backstop if specific effluent limitations failed to achieve compliance.³⁰

This draft permit does not establish any receiving water limits. The existing individual permits established such limits. Thus, the time to challenge the receiving water limits based on San Jose's various arguments was when those individual permits were adopted. For clarity, we revised the reference to the individual permit receiving water limits in section 5 to be consistent with the reference to the individual permit prohibitions in section 3 of the Revised Tentative Order, as shown below.

Despite the fact that the Revised Tentative Order does not impose receiving water limitations, we nevertheless note that we disagree with San Jose's arguments that receiving water limits are not authorized under the Clean Water Act. As explained by the Ninth Circuit in *City and County of San Francisco v. U.S. EPA*, Clean Water Act section 1311(b)(1)(C) provides permitting agencies broad authority to impose limitations necessary to meet water quality standards, and 40 C.F.R. section 122.44(d) requires permits to include "any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards ... necessary to ... [a]chieve water quality standards established under section 303 of the [Clean Water Act], including State narrative criteria for water quality." As the court found, the Clean Water Act and its regulations require permitting agencies to impose any more stringent limitation necessary to meet state water quality objectives, including those beyond effluent limitations.

We also disagree with the general proposition that a receiving water limit is unnecessary when an effluent limitation is imposed because receiving water limits have the role of ensuring that quantitative effluent or other limitations in a permit are working and meeting the goals of the Clean Water Act to achieve water quality standards. We also disagree that the receiving water limits for the biostimulatory substances water quality objective lack specificity because the objective itself is detailed as to when it is exceeded: when aquatic growths cause nuisance or adversely affect beneficial uses. In the spirit of Water Code section 13360 (orders shall not dictate the specific manner of compliance) applicable to non-NPDES orders, the Board has long espoused the principle of imposing clear requirements but not being overly prescriptive so as to foster innovation among the regulated community.

²⁸ *City and County of San Francisco v. U.S. EPA*, 75 F.4th 1074, 1089-1090 (2023).

²⁹ *Id.* at p. 1091.

³⁰ *Id.*

Instead of establishing receiving water limits, the Revised Tentative Order overlays nitrogen reduction requirements and recognizes that immediate compliance with the final nitrogen effluent limitations to meet the biostimulatory substances water quality objective is impossible. It will take time, significant actions, and expenditures to come into compliance. The Revised Tentative Order thus grants compliance schedules that provide a pathway to comply. While dischargers are (a) undertaking significant actions to comply with the biostimulatory substances objective and (b) complying with the Revised Tentative Order in accordance with the compliance schedules granted, it would be inconsistent with the compliance schedules granted to hold dischargers responsible for failing to comply with receiving water limits for the biostimulatory substances objective related to nitrogen. Compliance with the Revised Tentative Order constitutes compliance with the receiving water limits for biostimulatory substances for discharges of nitrogen. Changes to the Tentative Order clarify this intent, as shown below.

San Jose also takes issue with translating the narrative biostimulatory substances objective, stating that Water Code sections 13241 and 13242 were not complied with. These two sections pertain to the factors that must be considered when adopting a water quality objective and creating a program of implementation to achieve that objective. These sections do not apply to translating a narrative water quality objective in an NPDES permit because doing so is not tantamount to establishing an objective. As the State Water Board held:³¹

When water quality objectives are established in a basin plan in narrative form, it is appropriate for a regional water board to exercise its professional judgment, relying on scientific studies, to establish numeric limits. This is a fundamental regulatory practice of the regional water boards in implementing basin plans and exercising their regulatory authority under the Water Code.

Federal regulations also envision the need to translate standards; they have specific procedures for translating narrative standards into numeric limits (40 C.F.R. section 122.44(d)(1)(vi)).

San Jose misinterprets Fact Sheet section 5 as it relates to dissolved oxygen. New water quality objectives cannot be adopted through a permitting action, such as the Revised Tentative Order. To avoid further confusion, we deleted text San Jose asked to be deleted and replaced it with clearer text as shown below.

We revised Provision 5 of the draft permit as follows:

~~This Order retains the nutrient receiving water limitations specified~~ The receiving water limitations for the biostimulatory substances water quality objective that are applicable to the Dischargers are established in the individual NPDES permits listed in Attachment B.

³¹ State Water Resources Control Board Order WQ 2023-0081, p. 28.

We revised Fact Sheet section 5 as follows:

The receiving water limitations for the biostimulatory substances water quality objective that are applicable to the Dischargers are established in the individual NPDES permits listed in Attachment B. This Order overlays nitrogen mass load reduction effluent limitations on the Dischargers that represent nitrogen reductions necessary to protect beneficial uses under limited duration, critical condition algal blooms. This Order recognizes that immediate compliance with the final effluent limitations to meet the biostimulatory substances water quality objective is impossible. Rather, it will take time, significant actions, and expenditures to comply. This Order provides a path and compliance schedules for Dischargers to comply with the biostimulatory substances water quality objective. As such, compliance with the conditions of this Order constitutes compliance with the receiving water limitations for biostimulatory substances for discharges of nitrogen.

This Order does not create new receiving water limitations. Specifically, the use of a dissolved oxygen threshold of 4.0 mg/L was an analytic step for purposes of translating the narrative biostimulatory water quality objective into numeric effluent limitations. The use of this dissolved oxygen value does not establish new receiving water limitations or promulgate any new, or amend existing, water quality objectives.

~~This Order retains receiving water limitations that apply to biostimulatory substances established as set forth in the individual NPDES permits listed in Attachment B. These limitations are based on the Basin Plan's water quality objective for biostimulatory substances (Basin Plan section 3.3.3). The receiving water limitation for dissolved oxygen of 5.0 mg/L in individual permits is intended to ensure that direct and immediate effects of discharges do not adversely affect beneficial uses. The use of a lower dissolved oxygen threshold of 4.0 mg/L is to ensure that the biostimulatory substances objective is met during a large algal bloom. This ensures that long-term nutrient loadings that San Francisco Bay integrates over time through biological and physical processes will not result in algal blooms that are unprotective of beneficial uses.~~

San Jose Comment 7

San Jose cites BACWA's comments and requests to replace the final limits with best management practices, citing the uncertainty behind the science used to develop the limits.

Response

See response to Major Comment 4, above.

San Jose Comment 8

San Jose suggests some editorial revisions to section 2.2 of the draft permit.

Response

We agree and revised paragraphs 6 and 9 of section 2.2 as follows:

In July and August 2022, San Francisco Bay experienced a significant ~~long-lasting and widespread~~ harmful algal bloom that resulted in nuisance odors and massive fish kills due in part to loss of dissolved oxygen in the water from decaying algae. ...

The cost to implement these load reductions will be significant. ... The evaluation found that to implement conventional technologies to reduce total nitrogen concentrations below 15 mg/L during the dry season would cost about \$8.8 billion regionwide in 2018 dollars, which amounts to nearly \$11 billion in 2024.

We did not accept San Jose's suggested change that the Bay "may" no longer be able to assimilate current nitrogen loads because the 2022 bloom demonstrated with certainty that it cannot assimilate these loads.

San Jose Comment 9

San Jose requests to add a citation to Fact Sheet section 1.3 and reword the title of Fact Sheet section 8.5.

Response

We revised Fact Sheet section 1.3 as follows:

The Dischargers are authorized to discharge nutrients subject to waste discharge requirements (WDRs) in this Order. Clean Water Act section 402(b)(1)(B) limits the duration of NPDES permits to a fixed term not to exceed five years (33 U.S.C. §1342(b)(1)(B); see also 40 C.F.R. § 122.46). Accordingly, Table 3 of this Order limits the effective period for this discharge authorization. Pursuant to California Code of Regulations, title 23, section 2235.4, the terms and conditions of an expired permit are automatically continued pending reissuance of the permit if the Dischargers comply with all requirements for continuation of expired permits (40 C.F.R § 122.6(d)).

We disagree with the suggested revision for Fact Sheet section 8.5 because it does not change the meaning of the sentence.

San Francisco Public Utilities Commission (SFPUC)

SFPUC Comment 1

San Francisco supports BACWA's comments.

Response

See responses to BACWA Comments 1 through 15, above.

SFPUC Comment 2

SFPUC states that the 10-year compliance schedule does not provide adequate time to complete a substantial project like the one it is undertaking to lower nitrogen discharge concentrations to 15 mg/L. It expects the project to take 15 years to complete due to site constraints and the complexities of planning and construction. It already has a \$6 billion capital improvement plan for the next 10 years. Its proposed nutrients upgrades will cost about \$1.5 billion more.

Response

See responses to Major Comments 2 and 3, above.

SMALLER DISCHARGERS

Delta Diablo

Delta Diablo Comment 1

Delta Diablo supports BACWA's comments.

Response

See responses to BACWA Comments 1 through 15, above.

Delta Diablo Comment 2

Delta Diablo is interested in exploring options for nutrient removal from its power plant blowdown stream and in pursuing nature-based solutions. It points out that the 10-year compliance schedule does not provide sufficient time for this and mentions technical and practical complications of the permit's approach. Delta Diablo states that it will be significantly affected by a decision not to extend the compliance timeframe using one of the mechanisms BACWA has suggested, or another means, such as by treating the proposed permit as a "single permitting action" under the Compliance Schedule Policy to grant more time. As a result, it states that the proposed permit is not supported by findings and evidence in the record. It requests site-specific limits that account for power plant blowdown (e.g., basing its final limit calculation on influent flow, not effluent flow, or adding back recycled water evaporative flow losses).

Response

When calculating the final effluent limits for Delta Diablo, we already included recycled water evaporative flow losses. See response to EBDA Comment 14, above, regarding not basing the final effluent limits on influent flows.

Regarding the need for more time to comply with the final limits, see response to Major Comment 2, above. The Compliance Schedule Policy dictates the maximum duration of the compliance schedules. Contrary to the comment, the Revised Tentative Order is not a “single permitting action” under that policy such that more time to comply may be granted. A “single permitting action” is one “in which a Regional Water Board incorporates all the requirements to implement a total maximum daily load (TMDL), developed pursuant to Clean Water Act section 303(d), in one NPDES permit.”³² The Revised Tentative Order is a watershed permit, but it is not implementing a TMDL because one does not exist. We understand that Delta Diablo would like more time to pursue nature-based solutions and we support those efforts. As explained in response to Major Comment 2, we will explore regulatory mechanisms to grant more time.

The fact that the Revised Tentative Order does not grant more than 10 years to comply does not mean it is not supported by findings and evidence in the record. As the Revised Tentative Order findings makes clear, the Compliance Schedule Policy prohibits the Regional Water Board from granting compliance schedules longer than 10 years. The only alternative for granting more time right now would be issuing cease and desist orders, which most dischargers do not want. Likewise, the proposed permit is supported by findings and evidence in the record even if it does not reflect the BMP approach BACWA and others propose. See responses to Major Comment 4 and BACWA Comments 4 and 5.

Dublin San Ramon Services District (DSRSD)

DSRSD Comment 1

DSRSD incorporates the EBDA and BACWA comments by reference.

Response

See responses to BACWA Comments 1 through 15 and EBDA Comments 1 through 21, above.

DSRSD Comment 2

DSRSD requests that we recognize agencies like DSRSD that have already invested to reduce nutrients through recycled water infrastructure. DSRSD has increased its water recycling consistently since 2006 and would like to expand its water recycling program further to reduce nutrient loads. DSRSD is not an individual discharger (it is part of EBDA); it is unclear how EBDA will allocate its interim and final limits. In EBDA’s comments, it requests that the individual EBDA dischargers be identified in Fact Sheet Table F-3. DSRSD supports this and also notes that projected water recycling in 2025

³² Compliance Schedule Policy, section 1.g.

and 2030 reflect existing conditions, with a connection moratorium in place. If a supplemental supply is secured, the DSRSD projections would be 5.36 and 6.06 MGD.

Response

As shown in response to EBDA Comment 21, above, we revised Fact Sheet Table F-3 to reflect DSRSD's existing water recycling efforts. We also acknowledge that DSRSD could recycle more water if it were able to supplement its wastewater supply.

DSRSD Comment 3

DSRSD requests that we address the inherent variability of recycled water demand due to weather, customer behavior, and emergencies. DSRSD points out that new conservation requirements include customer sites served with recycled water in determining an agency's urban water use objectives. The requirement puts pressure on DSRSD to improve recycled water use efficiency, which could decrease recycled water use and increase discharges. DSRSD would like the State Water Board to create a variance for its water use standards if they could negatively affect recycled water infrastructure, operations, or compliance. DSRSD asks that we work with the State Water Board to provide such a variance.

Response

This permit does not affect State Water Board water recycling requirements. However, we acknowledge DSRSD's concern that variations in recycled water use could affect its nutrient loads. While a variance for water use standards is outside the scope of the Revised Tentative Order, we acknowledge DSRSD's desire for us to work with the State Water Board on this matter.

DSRSD Comment 4

DSRSD requests that we address variabilities in recycled water demand beyond its control. It suggests some options, including (1) excluding May from the calculations, (2) basing compliance on a 3-year rolling average from June 1 through September 30, (3) excluding data when recycled water demand is low, and (4) excluding agencies that recycle a minimum of 50 percent of their dry weather flows from enforcement (or include language that commits the Board to consider factors outside an agency's control when contemplating enforcement).

Response

Regarding DSRSD's first three suggestions, see response to EBDA Comment 11, above. As for the fourth suggestion that we exclude certain agencies from enforcement, we cannot preemptively restrict how the Board might exercise its enforcement discretion in the future. However, consistent with the State Water Board's Water Quality Enforcement Policy, the Board would consider a discharger's culpability in deciding whether and to what extent to pursue enforcement. Moreover, carving out an exception for agencies that recycle a minimum of 50 percent of their dry weather flows would disincentivize further improvements to recycled water programs.

DSRSD Comment 5

DSRSD requests that load limits be based on influent flows, as opposed to effluent flows, to avoid penalizing dischargers that recycle water. DSRSD says the draft permit penalizes good actors that have already reduced nutrient discharges through present water recycling efforts.

Response

See response to EBDA Comment 14, above.

DSRSD Comment 6

DSRSD requests that we address how compliance and enforcement would be handled if an agency accepts wastewater from another agency for its recycled water supply, but then is unable to recycle it due to uncontrollable factors. DSRSD says the Board has an opportunity to encourage regional partnership by addressing this issue.

Response

We added footnote 2 to Table 4 of the draft permit for such scenarios, as follows:

If a Discharger accepts wastewater from another agency for its recycled water supply, but then is unable to recycle it due to uncontrollable factors, the Discharger shall document such factors in its related self-monitoring reports.

Providing documentation of factors beyond a discharger's control will help the Board decide how to exercise its enforcement discretion in such situations.

DSRSD Comment 7

DSRSD's primary strategy to reduce nutrient discharges relies on dry season water recycling. It is concerned about language suggesting that the Board could consider year-round limits in the future and requests that mention of the potential for year-round limits be removed.

Response

See response to BACWA Comment 7, above.

City of Millbrae

Millbrae Comment 1

Millbrae requests that we revise the final limits for small dischargers back to 200 kg/day as proposed in the administrative draft. Together, small dischargers represent less than 2 percent of the total nitrogen load to San Francisco Bay. Millbrae says the only way it can comply with the proposed 100 kg/day limit is by upgrading its treatment process, which may preclude a recycled water project.

Response

The proposed final limits are based on equitable calculations across dischargers. While we recognize that small dischargers contribute relatively little to overall nutrient loads, requiring larger dischargers to bear the entire burden of nutrient reductions would be inequitable, particularly since many large dischargers serve disadvantaged communities, while many smaller dischargers serve wealthier customers. Provision 6.3.4 would allow the possibility of nutrient trading among dischargers.

We strongly discourage Millbrae from abandoning its recycled water plans. As explained in response to Major Comment 2, above, we intend to take full advantage of available regulatory options to provide more time for multi-benefit solutions, as warranted.

Millbrae Comment 2

Millbrae requests language be added to extend the compliance timeline for those implementing multi-benefit solutions and more time to evaluate its options.

Response

See response to Major Comment 2, above.

Millbrae Comment 3

Millbrae requests stronger language be added to provide greater assurance that a nutrient trading program will be developed.

Response

We cannot force dischargers to trade with one another, but Provision 6.3.4 would facilitate development of a nutrient trading program. If and when dischargers develop an acceptable program, the Board could explicitly incorporate it into this permit.

Millbrae Comment 4

Millbrae asks that we retain the 200 kg/day limit proposed for Millbrae in the administrative draft for at least 5 years, postponing a lower limit until the permit is next reissued, thereby postponing the start of the 10-year compliance schedule until 2029.

Response

We cannot retain the 200 kg/day limit for 5 years and then lower it to 100 kg/day as a means to circumvent the Compliance Schedule Policy. Doing so would be inequitable. The additional 100 kg/day would need to be offset by decreasing the final limits for other dischargers, many of which have similar concerns regarding their ability to comply within 10 years. See response to Major Comment 2, above.

Millbrae Comment 5

Millbrae echoes BACWA's comments.

Response

See responses to BACWA Comments 1 through 15, above.

Napa Sanitation District (Napa San)**Napa San Comment 1**

Napa San supports the BACWA comments.

Response

See responses to BACWA Comments 1 through 15, above.

Napa San Comment 2

Napa San requests that we clarify the monitoring period definitions in Monitoring and Reporting Program Table E-5 for quarterly and biannual monitoring.

Response

We agree and revised Table E-5 as follows:

Table E-5. Monitoring Periods

Sampling Frequency	Monitoring Period Begins On...	Monitoring Period
Continuous/D	Order effective date	All times
⋮	⋮	⋮
1/Quarter	Closest January 1, April 1, July 1, or October 1 before or after Order effective date ^[1] ^[2]	January 1 through March 31 April 1 through June 30 July 1 through September 30 October 1 through December 31
1/Year 2/Year	Closest January 1 before or after Order effective date ^[1]	January 1 through December 31
<u>2/Year</u>	<u>Closest January 1 before or after Order effective date ^[1]</u>	<u>January 1 through June 30</u> <u>July 1 through December 31</u>

Footnotes:

⋮

^[2] Definitions of 1/Quarter in the individual NPDES permits listed in Attachment B of this Order supersede this definition.

Napa San Comment 3

Napa Sanitation District requests that we update the contact information in Fact Sheet Tables F-1 and F-2.

Response

We agree and revised Tables F-1 and F-2 as shown in response to EBMUD Comment 9, above.

City of San Mateo

San Mateo Comment 1

San Mateo committed to being an early actor and meeting an effluent total nitrogen concentration of 15 mg/L during dry weather. Construction is underway, with completion expected in 2025. After construction, San Mateo says it will need to undertake another project to ensure that it can meet its final limit because it will need to account for growth within its service area. San Mateo says the draft permit appears to account for some early actors but not others.

Response

San Mateo is considered an early actor because its construction to implement required nutrient reductions is well underway. As discussed further in response to EBDA Comments 7, above, the Revised Tentative Order accommodates early actors because the final limits reflect a total inorganic nitrogen concentration of 20.5 mg/L, well above San Mateo's projected 15 mg/L. The Regional Water Board understands that San Mateo may have to undertake additional projects to account for growth and meet its final effluent limitation, which is why the Revised Tentative Order provides San Mateo with a compliance schedule.

San Mateo Comment 2

San Mateo requests using the BMP approach described by others in lieu of numeric final limits.

Response

See response to Major Comment 4, above.

San Mateo Comment 3

San Mateo notes that it is pursuing a multi-benefit project with multiple stakeholders, but implementation will exceed the 10-year compliance schedule.

Response

See response to Major Comment 2, above.

San Mateo Comment 4

San Mateo suggests edits to provision 6.3.6 of the draft permit to better recognize early actors and provide additional detail regarding regulatory mechanisms to provide more time to comply.

Response

Regarding recognition of early actors, see response to EBDA Comment 8, above. Regarding regulatory mechanisms to provide more time to comply, see response to Major Comment 2, above.

City of Sunnyvale

Sunnyvale Comment 1

Sunnyvale incorporates BACWA's comment by reference.

Response

See responses to BACWA Comments 1 through 15, above.

Sunnyvale Comment 2

Sunnyvale requests a firm commitment to identify and employ a regulatory mechanism for longer compliance timelines without reliance on enforcement mechanisms, citing concerns over possible competition for resources over 10 years within the Bay Area.

Response

See response to Major Comment 2, above.

Sunnyvale Comment 3

Sunnyvale requests that organics waste codigestion projects be considered multi-benefit projects.

Response

See response to BACWA Comment 14, above.

Vallejo Flood and Wastewater District (VFWD)

VFWD Comment 1

VFWD agrees with BACWA's comments.

Response

See responses to BACWA Comments 1 through 15, above.

VFWD Comment 2

VFWD urges the Board to consider how the nutrient removal requirements in the draft permit, in addition to other parallel requirements, will affect already limited funding for necessary capital projects. Many of its ratepayers cannot afford to fund necessary capital investments needed to maintain aging infrastructure while simultaneously meeting regulatory mandates to reduce nutrient loading, especially when considered in the context of the additional community needs to fund stormwater trash capture and potable water. VFWD says the compounded burden on this community is just too great.

Response

We agree that the cost of necessary nutrient removal projects will be substantial and particularly burdensome for disadvantaged communities. See responses to Major Comment 3 and EBDA Comment 19, above.

VFWD Comment 3

VFWD says the one-size-fits-all 10-year compliance timeline pits all Bay Area wastewater dischargers in direct competition for alternative funding. Extending the time would allow dischargers to stagger projects, find alternative funding, or assess reasonable rate increases.

Response

See responses to Major Comments 2 and 3, above.

VFWD Comment 4

VFWD claims that the draft permit discourages use of innovative technologies and disincentivizes multi-benefit solutions, such as recycled water, due to its short timeline. As a result, VFWD may be unable to consider future recycled water projects. VFWD says it is abandoning a pilot project that would have tested a new nitrogen removal process because the innovative project would take more than 10 years to implement.

Response

As explained in response to Major Comment 2, above, we strongly discourage dischargers from abandoning innovative and multi-benefit projects, even if those projects could require more than 10 years to complete. We are committed to considering all available regulatory options to provide more time in the future as warranted.

COMMUNITY OF CENTRAL CONTRA COSTA SANITARY DISTRICT

Central San Community

All the community commenters listed on page 1 are served by the Central Contra Costa Sanitary District and submitted similar comments. We respond to these comments below.

Central San Community Comment 1

The community asks for a financial analysis to determine how complying with the proposed permit will affect Bay Area residents and how the financial burden might be mitigated.

Response

We recognize that the cost of necessary nutrient removal projects will be substantial, but a meticulous financial analysis is neither necessary nor required. See response to Major Comment 3, above.

Central San Community Comment 2

The community asks that we grant a 90-day extension to the comment period to allow more time for public outreach and input, and that the Board hold a hearing before adopting the proposed permit.

Response

We disagree that more time is needed for comment. Based on the volume, substance, and repetitiveness of the comments received, the community has had an adequate chance to review and comment on the draft permit. Moreover, prior to the formal comment period, we engaged with publicly owned wastewater treatment plants, U.S. EPA, San Francisco Baykeeper, the Sierra Club, environmental justice organizations, and tribal nations, and incorporated feedback on a pre-publication administrative draft of the permit. Therefore, there is no need for a 90-day extension. Community members may voice any remaining concerns at the public hearing scheduled for July 10, 2024.

Central San Community Comment 3

The community suggests taking more time to develop scientific information necessary to understand how nutrient reductions will benefit San Francisco Bay.

Response

As discussed further in response to Major Comment 6, above, we've been studying this issue since at least 2012. In July and August 2022, San Francisco Bay experienced a devastating harmful algal bloom that resulted in massive fish kills. In 2023, San Pablo Bay experienced another significant algal bloom. The draft permit requires wastewater treatment plants to reduce their nutrient loads because these loads result in high nutrient levels in Bay waters and provide fuel for algae to consume. Nutrient load reductions are necessary to ensure that future algal blooms will not have sufficient fuel available to cause widespread impacts. Because the high nutrient levels in the Bay have the potential to cause large harmful algal blooms and fish kills, we do not have time for delay. The draft permit makes good use of available scientific information, and we will continue our scientific studies into the future so we can refine our permitting approach when we reissue this permit in five years.

NON-GOVERNMENTAL ORGANIZATIONS

San Francisco Baykeeper

Baykeeper Comment 1

Baykeeper states that the prospect of continued harmful algal blooms and fish kills like those in 2022 and 2023 negatively affect Bay Area residents, businesses, and industries. It further states that many of the projects undertaken in response to this

permit represent long-overdue upgrades. Baykeeper explains that nutrient levels in San Francisco Bay exceed those in other estuaries worldwide. Monitoring over the most recent decade has found low dissolved oxygen in shallow South Bay sloughs. Municipal wastewater represents about 90 percent of the South Bay nutrient load. Baykeeper says that in 2022 a combination of the toxins from H. akashiwo and depressed oxygen levels decimated the white sturgeon population. Baykeeper urges the Board to require significant nutrient load reductions within the next 5 years and establish robust incentives for early and substantial reductions.

Response

As we stated in response to Major Comment 1, above, we agree that significant nutrient load reductions are needed. Some dischargers that can significantly reduce nutrients within five years are already making significant progress in their planning, design, and construction. Mandating these early actions would penalize those early actors, while allowing less ambitious agencies more time to comply. The looming 10-year deadline will provide a robust incentive for everyone to act in a timely manner.

Some agencies considering water recycling and nature-based solutions in addition to treatment upgrades may require more than 10 years to comply, as explained in Fact Sheet section 4.2.1. Many dischargers will need to implement multiple projects to comply with their final limits. Some projects may be completed within 5 years, others within 10 years, and some nature-based solutions may take longer. For this reason, we expect dischargers to decrease overall nutrients loads year-over-year throughout the 10-year compliance schedules. Provision 6.3.3 requires progress reporting to allow us to ensure that sufficient progress is being made.

Baykeeper Comment 2

Baykeeper is concerned that the proposed reduction in nutrient loads will not be enough. It points out that the final limits are based on modeling that assumes a starting dissolved oxygen concentration of 10 mg/L, whereas starting with a lower, more typical dissolved oxygen concentration of 7 mg/L would suggest the need for lower final limits. Baykeeper asserts that the proposed final limits represent an optimistic policy decision that is not grounded in rigorous scientific analysis. It requests that the Board commit to pursuing a total maximum daily load (TMDL) or equivalent regulatory tool over the next 5 years, develop targets for each major subembayment, and commit to an implementation plan that promotes early action and multi-benefit projects. Baykeeper cites the three-permit-term process the Washington Department of Ecology outlined in its 2021 draft Puget Sound nutrient general permit.

Response

As explained in response to Major Comment 6, above, we are committed to continuing to develop our scientific understanding of nutrients and their effects on San Francisco Bay. Nevertheless, the proposed final limits are based on available information and reasonable assumptions.

As explained in a technical memorandum³³ that supports the Revised Tentative Order, our analysis aims to protect San Francisco Bay aquatic life during a severe algal bloom similar to the 2022 algal bloom. We sought to ascertain the impact of such a bloom on dissolved oxygen. During the bloom, algae used up essentially all available nitrogen. If all of the algae created using that nitrogen was subsequently digested, a corresponding amount of oxygen was removed from the Bay. Using 10 mg/L dissolved oxygen as a starting point is based on empirical data collected in the Bay during the 2022 algal bloom. Although this is higher than typical dissolved oxygen concentrations in the Bay, this concentration was observed during the bloom in continuous data in several parts of the Bay where algae growth was most pronounced.

Using 10 mg/L as a starting point for dissolved oxygen just prior to the rapid oxygen decline is appropriate in the context of an algal bloom severe enough to depress oxygen. A temporary increase in dissolved oxygen would be expected during the intense photosynthetic activity of abundant algae during the latter stage of the bloom. A large amount of algae would need to be present to create the oxygen demand. Those algae would actively produce oxygen via photosynthesis, and the water would be supersaturated with oxygen prior to the oxygen depletion when the algae die and are digested.

No model simulation was performed with a starting oxygen concentration of 7 mg/L. Using a typical oxygen concentration (i.e., 7 mg/L) as the starting point prior to the oxygen depletion would be inappropriate. If the starting dissolved oxygen concentration were only 7 mg/L, there would not be enough algae present to cause a large oxygen decline.

Regarding the desire to pursue a TMDL or equivalent regulatory tool, see response to Baykeeper Comment 5, below.

Regarding the desire to develop specific targets for each subembayment, see response to Major Comment 5, above.

Regarding the Puget Sound permit, the State of Washington is in the early stages of its nutrients permitting strategy. The Puget Sound has not experienced an algal bloom as significant as the one we experienced in 2022. Since we are now issuing this permit for the third time, we are well ahead of the State of Washington, and its approach is not workable here. See response to Major Comment 4, above.

Baykeeper Comment 3

Baykeeper requests that we acknowledge low dissolved oxygen in the Lower South Bay and require reductions in its total inorganic nitrogen loads because of the link between nutrients and low dissolved oxygen in Lower South Bay. Baykeeper states that the

³³ San Francisco Bay Regional Water Board, Memo on Numerical Translation of Narrative Objective, February 2024, p. 10-11.

tentative order requirements for Lower South Bay violate antidegradation policies and are not stringent enough.

Response

Regarding dissolved oxygen levels in the Lower South Bay, see response to Major Comment 5, above. Regarding antidegradation policies, see response to Baykeeper Comment 6, below.

Baykeeper Comment 4

Baykeeper requests that we recognize that toxins can be associated with harmful algal blooms.

Response

We agree that some algae produce toxins that can directly harm aquatic organisms. Algae like *H. Akashiwo* may also produce substances that clog fish gills. The technical memorandum³⁴ that supports the Revised Tentative Order acknowledges that harmful algal blooms can produce chemicals directly harmful to aquatic organisms. Unfortunately, there is insufficient information to address potential toxins fully at this time because the state of the science is not yet advanced enough to do so. However, the proposed actions necessary to address dissolved oxygen will serve to address toxins, too, because reducing the nitrogen available to feed algal blooms will also suppress their growth and the toxins they produce. If additional scientific information becomes available, we may determine that more stringent effluent limits are needed and can revise the limits at that time. See responses to U.S. EPA Comment 2 and EBDA Comment 9, above.

Baykeeper Comment 5

Baykeeper requests that we commit to pursuing a TMDL or similar regulatory tool to regulate total inorganic nitrogen over the next five years.

Response

As explained in response to Major Comment 2, above, the Board will consider pursuing a TMDL or similar regulatory tool. Doing so, however, will require more advanced science than we currently have. The most obvious advantage of a TMDL or equivalent regulatory tool would be to extend the proposed compliance schedules. It may be more efficient to incorporate advances in our scientific understanding directly into this permit when it is reissued. Board staff will carefully consider the pros and cons of all available options.

Baykeeper Comment 6

Baykeeper states that the proposed permit would allow degradation of already impaired waters, particularly in the Lower South Bay, and thus violate antidegradation policies. The draft permit says the baseline for comparison is the best water quality achieved

³⁴ *Id.* at p. 2.

since the 1968 and 1975 policies were adopted, but does not disclose known degradation since that time, specifically in the shallow habitats around the margins of the South Bay, which the Nutrient Management Strategy has monitored over the last decade. It does not discuss issues of known habitat conversion from tidal marsh to brackish habitats due to wastewater discharges to shallow waters. Failing to control nutrients in the Lower South Bay violates antidegradation policies and risks further reducing the biodiversity of this critical region of the Bay, which serves as a vital nursery for local fish communities.

Baykeeper states that the proposed final limits for Lower South Bay dischargers are only 2 percent lower than the 11-year average for these agencies, and that the modeling suggests more stringent final limits are needed. The antidegradation finding lacks a comprehensive discussion and justification for its approach, particularly in light of data showing chronic and acute impairment of dissolved oxygen standards. A more detailed assessment and justification for the allowable nutrient loads would enhance the credibility and effectiveness of the draft permit in protecting water quality. The assessment would benefit from consultation with the National Marine Fisheries Service.

Response

We disagree. The Revised Tentative Order does not itself authorize discharges from the covered facilities. The discharges are authorized through the individual NPDES permits listed in Attachment B. The Revised Tentative Order also does not amend any receiving water limitations set forth in the individual NPDES permits. Rather, the draft permit overlays mass load nitrogen discharge effluent limitations, nutrient reduction-related requirements, and monitoring, modeling, and reporting requirements on top of the individual permits. The final effluent limitations require a 40 percent reduction (compared to 2022 levels) of nitrogen discharged into the Bay over ten years in a manner that will increasingly reduce the existing risk of limited duration, critical condition algal blooms. This represents a trajectory of increasingly improved water quality, not degradation.

Under the State Water Resources Control Board's Administrative Procedures Update, "Antidegradation Policy Implementation for NPDES Permitting," 90-004 (APU 90-004), a complete antidegradation analysis is unnecessary if the Board finds, using its best professional judgment and all available pertinent information, that the discharge will not be adverse to the intent and purpose of the state and federal antidegradation policies. That is the case here. As explained in the antidegradation analysis (Fact Sheet section 4.3.2), due to external factors San Francisco Bay has been resilient to nutrient discharges and has been meeting the biostimulatory water quality objective, except during the significant algal blooms in 2022 and 2023 that caused fish kills and nuisance conditions. Therefore, the Revised Tentative Order requires significant reductions in nitrogen discharges to continue to meet the narrative biostimulatory water quality objective as was the case before these blooms. Doing so will improve—not lower—water quality. The Revised Tentative Order will return the Bay to the best water quality achieved since the antidegradation policies became effective as it relates to biostimulatory substances.

Baykeeper focuses on the Lower South Bay and states it is impaired by dissolved oxygen. It says failing to control nutrients violates antidegradation policies. As explained above, we disagree that the proposed nutrient controls will degrade water quality. We also disagree that Lower South Bay waters are impaired for dissolved oxygen. The open waters of the Lower South Bay consistently achieve the 5 mg/L objective. To evaluate the sloughs, we are developing dissolved oxygen criteria based on the Virginian Province Approach. A preliminary analysis of data collected in Lower South Bay sloughs relative to expected acute criteria shows that dissolved oxygen conditions there support aquatic life at all monitoring locations, except for Guadalupe Slough and Alviso Slough, which receive discharges from former salt ponds.³⁵ Restoration of the former salt ponds is necessary to ensure that dissolved oxygen levels in these Lower South Bay sloughs are protective of aquatic life. Nevertheless, dissolved oxygen levels in the South Bay have greatly improved since the early 1970s, when the Lower South Bay had alarmingly low levels of dissolved oxygen due to the discharge of biostimulatory and high oxygen demanding substances from wastewater treatment plants. Like the rest of the Bay, the quality of Lower South Bay waters improved significantly as secondary treatment standards were implemented and that higher quality has been maintained.

The Revised Tentative Order does not authorize degradation of the Lower South Bay. Again, the draft permit does not authorize any additional discharge of pollutants into the Lower South Bay, but rather requires nitrogen reductions. With respect to dissolved oxygen, the Revised Tentative Order does not authorize additional discharges that will adversely affect dissolved oxygen in the South Bay or Lower South Bay. It is not establishing less stringent (or any) dissolved oxygen effluent limits or water quality objectives. Dissolved oxygen requirements are governed by the separate individual NPDES permits, which the Revised Tentative Order is not revising and cannot revise absent meeting the criteria for mid-permit-term amendments in 40 C.F.R. § 122.62. Instead, the Revised Tentative Order is translating the narrative biostimulatory water quality objective, in part, by using protective dissolved oxygen levels to calculate necessary reductions in nitrogen discharges. As explained in the response to Major Comment 5, above, the low dissolved oxygen levels in the Lower South Bay margins occur over a small spatial scale corresponding with discharges from former salt ponds (i.e., Pond A3W to Guadalupe Slough and Pond A7 to Alviso Slough)—not wastewater treatment plant discharges. The former salt ponds often discharge water low in dissolved oxygen because the physical conditions within the ponds (i.e., long residence times, shallow water depths, low turbidity) promote excessive algal growth. The Revised Tentative Order is, therefore, not the appropriate vehicle for considering potential degradation under antidegradation policies for dissolved oxygen exceedances in Guadalupe and Alviso sloughs.

Regarding the need for larger nutrient reductions from Lower South Bay dischargers (i.e., more stringent limits), see response to Major Comment 5, above.

³⁵ SFEI 2024. *Draft: Dissolved Oxygen Conditions in Lower South Bay Sloughs*. SFEI Contribution #1163, San Francisco Estuary Institute, Richmond, CA.

The Revised Tentative Order does not discuss habitat conversion from tidal marsh to brackish habitats due to wastewater discharges because the order only relates to biostimulatory substances. The issue of habitat conversion is discussed in Attachment I of Orders R2-2019-0015 (Palo Alto), R2-2020-0001 (San Jose/Santa Clara), and R2-2020-0002 (Sunnyvale).

Consultation with the National Marine Fisheries Service is neither necessary nor required because the Revised Tentative Order will improve conditions in the Lower South Bay.

To underscore the points above, we revised the antidegradation finding in Fact Sheet section 4.3.2 as follows:

Antidegradation. This Order complies with the antidegradation provisions of 40 C.F.R. section 131.12 (federal policy) and State Water Board Resolution 68-16 (state policy). Permitted discharges must be consistent with these policies. This Order does not decrease the quality nor increase the quantity of the Dischargers' nutrient discharges to San Francisco Bay and its tributaries. The Dischargers' discharges into San Francisco Bay are authorized by the individual NPDES permits listed in Attachment B. This Order does not authorize any additional discharges, but rather requires the amount of nitrogen authorized by these existing permits to be reduced. The performance-based interim limits ensure that the Dischargers will maintain existing performance and do not authorize increased nitrogen discharges, temporary or otherwise.

This Order complies with the antidegradation requirements of 40 C.F.R. section 131.12 and State Water Board Resolution 68-16, as well as the State Water Resources Control Board's Administrative Procedures Update, Antidegradation Policy Implementation for NPDES Permitting, 90-004 (APU 90-004). As explained below, this Order will not degrade San Francisco Bay water quality with respect to biostimulatory substances, including in the Lower South Bay. Instead, this Order will restore water quality to the typically high levels observed for many years and protect existing beneficial uses. For purposes of the antidegradation policies, the water quality this Order authorizes is compared with baseline water quality is the best water quality that has existed since 1968 (state policy) or 1975 (federal policy), unless some degradation has been authorized. No degradation for biostimulatory substances has been authorized since 1968 or 1975; therefore, the baseline for comparison with the biostimulatory water quality objective is the best water quality since then.

Prior to passage of the Clean Water Act in 1972, San Francisco Bay water quality was often poor. Pollutant discharges from many sources, including sewage systems, contributed to eutrophication, foul smells, and low dissolved oxygen. San Francisco Bay south of the Dumbarton Bridge had alarmingly low dissolved oxygen concentrations due to excessive algal

growths caused by biostimulatory substances in wastewater and the discharge of high oxygen-demanding substances (Interim Water Quality Control Plan, San Francisco Bay, Basin 2, June 1971). Water quality related to biostimulatory substances greatly improved during the 1970s and 1980s as secondary treatment was installed to remove biochemical oxygen demand from municipal wastewater.¹² These improvements have been consistently maintained since then.¹³ For example, dissolved oxygen concentrations have remained relatively constant and protective of beneficial uses, as demonstrated by U.S. Geological Survey data collected along the “spine” of the bay shown in the figure below on the right. The figure on the left below shows the numbered station locations where the data are collected during every cruise. Since 1993, the U.S. Geological Survey USGS has conducted monthly cruises along the entire Bay-Delta system as part of the Regional Monitoring Program for Water Quality in San Francisco Bay_ . . .

. . . For example, since nutrients contribute to the magnitude of an algal bloom by fueling algal growth, reducing nutrients will limit the effects of a bloom event. Reduced nutrient loads are expected to offset the increased probability of large algal blooms.

The baseline water quality (the highest water quality since 1968 and 1975) met the narrative biostimulatory water quality objective. In 2022 and 2023, however, nutrients in the Bay fed algal blooms to the extent that they adversely affected beneficial uses and caused nuisance conditions. Where the baseline water quality is equal to or less than the applicable water quality objective, antidegradation policies require water quality to be maintained or improved. As explained above and elsewhere in this Order, this Order will improve water quality by requiring a significant reduction in the discharge of nitrogen to meet the narrative biostimulatory water quality objective and maintain and protect beneficial uses. Since this Order will not lower existing or baseline water quality, under APU 90-004 no further antidegradation analysis and no findings authorizing degradation are required.

¹³ Guadalupe and Alviso sloughs, however, experiences low dissolved oxygen due to dischargers from former salt ponds in the Lower South Bay.

Baykeeper Comment 7

Baykeeper asserts that the proposed interim limits allow a 10 to 15 percent increase in nutrient loads compared to the 11-year average for all dischargers. It calls for numeric or performance-based interim limits and incentives for early actions similar to those in the previous permit. It says offering timeline extensions for early adopters provides the wrong incentive for agencies already prepared to implement upgrades or optimizations.

Response

We disagree. The proposed interim limits will not increase nutrient loads. They were calculated based on current performance using the 95th percentile of dry season loads from 2013 through 2022, as explained in Fact Sheet section 4.2.2. The approach is consistent with the Compliance Schedule Policy, which calls for interim limits that maintain current performance. The interim limits account for observed variability in the loads, which range above and below the average loads. If we were to set the interim limits at the 11-year average, dischargers would never be allowed to exceed the 11-year average, which would not be reflective of current performance. To comply, they would need to reduce their loads, thereby lowering the long-term average below current performance. Driving reductions in this way would be inconsistent with the Compliance Schedule Policy. Instead, the draft permit establishes final limits to drive necessary reductions, and the compliance schedules provide a path to achieve them.

Regarding the need for stronger requirements for the next 5 years, see response to Baykeeper Comment 1, above.

Baykeeper Comment 8

Baykeeper requests that we require load reductions from industries, such as the North Bay refineries, stating that the dissolved inorganic nitrogen loads from the refineries to Suisun Bay and San Pablo Bay was 970 kg/day. Baykeeper says regulation of refineries could offset the costs wastewater agencies must pass on to poorer communities and ratepayers.

Response

Based on 2011 data, the refineries are relatively small sources of nutrients to San Francisco Bay (about 2 percent combined). However, these data are more than 10 years old, and we do not have more recent data. For this reason, on January 26, 2024, we required the refineries to undertake updated monitoring, to report nutrient concentrations and loads, and to assess treatment optimization and upgrade options pursuant to Water Code section 13383, as noted in Fact Sheet Table F-5, footnote 2. If the information submitted in response to these requirements indicates that the refinery discharges have a reasonable potential to cause or contribute to exceedances of the biostimulatory substances objective, the Board will make such findings and impose appropriate effluent limitations. Because refineries are likely a relatively small source of nutrients to the Bay, any nutrient reductions they might make would be unlikely to meaningfully offset costs to wastewater agencies.

Baykeeper Comment 9

Baykeeper acknowledges that the proposed permit represents the most significant action to improve water quality in over four decades, saying upgrades are needed not only to reduce nutrients but to address aging systems, adopt to sea level rise, and comply with existing and anticipated regulatory requirements. Baykeeper is concerned, however, that shifting final limits in future permit iterations will lead to slower reductions and increased costs, particularly harming the region's most vulnerable communities.

Uncertainties regarding future limits disincentivize multi-benefit projects and other holistic approaches. Consequently, Baykeeper urges optimization and upgrades within the next five years while developing future science-based final limits.

Response

We agree that the proposed permit may represent the most significant action to improve water quality in many decades. However, we cannot guarantee that the proposed final effluent limits will remain unchanged indefinitely, particularly as science continues to evolve. We disagree that imposing the proposed limits and potentially revising them in the future will slow efforts to reduce nutrient loads. Imposing limits now incentivizes dischargers to act. We have provided dischargers with considerable flexibility in how they craft their compliance strategies, as discussed in responses to Major Comments 2 and 3, above. As dischargers consider nutrient reduction strategies, we encourage them to anticipate the potential for more stringent limits in the future and consider scalable projects to the extent possible.

San Francisco Baykeeper Members

Baykeeper Members Comment 1

Over 650 Baykeeper members echo Baykeeper's comments, urging that we significantly reduce nutrient pollution in San Francisco Bay. They note that costs will only increase if action is delayed and are dwarfed by the costs of maintaining the status quo. They ask that we prioritize research to understand the Bay's nutrient problems and accelerate the decision-making process.

Response

We agree that action should not be delayed. See responses to Major Comments 3 and 6, and Baykeeper Comments 1 through 9, above.

STAFF-INITIATED CHANGE

To provide clarity regarding total inorganic nitrogen calculations, we added the following language to Monitoring and Reporting Program Table E-3 footnote 2:

Total Inorganic Nitrogen = Total Ammonia + Nitrate-Nitrite. Dischargers may use approved analytical techniques that require filtration for analyte measurements that comprise Total Inorganic Nitrogen. When calculating total inorganic nitrogen, the Discharger shall assume data reported below the method detection limit equal half of the detection limit.