Group Annual Report

Bay Area Clean Water Agencies

Nutrients Watershed Permit

NPDES Permit CA0038873

Order R2-2024-0013

April 1, 2026

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Executive Summary

This Group Annual Report includes analyses of influent, discharge, and recycled water flows and loads, as well as a statistical analysis of flow and load trends, for the 34 Dischargers regulated under the Nutrients Watershed Permit (Figure ES-1). This report includes all available historical flow and nutrient data from 2012 through September 2025.



Figure ES-1. Locations of the Dischargers

Regulatory Framework

Discharges of nutrients from Publicly Owned Treatment Works (POTWs) to San Francisco Bay are regulated by the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) through the Nutrients Watershed Permit (National Pollution Discharge Elimination System [NPDES] Permit CA0038873). The Regional Water Board has issued three orders under the authority of the Nutrients Watershed Permit: R2-2014-0014, R2-2019-0017, and R2-2024-0013. The most recent order (R2-2024-0013) became effective on October 1, 2024. As with previous orders, the regulated POTWs are required to track and evaluate treatment plant performance and fund nutrient research and monitoring programs. Order R2-2024-0013 is the first to include enforceable total inorganic nitrogen (TIN) discharge load limits for the regulated facilities during the dry season (May 1 through September 30). Interim limits have been in effect since the 2025 dry season, and, unless otherwise modified by the Regional Water Board, the final limits are scheduled to be effective starting in the 2035 dry season. The final individual limits are only enforceable if the aggregate load from all regulated facilities exceeds the seasonal aggregate load limit (26,700 kg/d).

Influent

The 2024/2025[1] baywide annual average influent flow (448 mgd) was the lowest since 2021/2022 (415 mgd). The annual average flows for the last three years have correlated strongly with precipitation, as expected. The 2025 baywide dry season average influent flow (409 mgd) was 11 mgd lower than in 2024 (a 2.6% reduction) and 8 mgd higher than the average since 2019 (a 2.0% increase). Dry season average influent nitrogen loads remained consistent with the overall average. The 2025 influent dry season total nitrogen (TN) load (86,700 kg N/d) was 2.4% above the overall dry season average from 2012 through September 2025 (84,700 kg N/d) and 1.6% greater than the 2024 dry season influent TN load (85,300 kg N/d).

Discharge

A summary of the dry season discharge flows and loads is provided in Table ES-1. The information in the executive summary is limited to the dry season because the regional permit is focused on the dry season, and the dry season represents the base sanitary flows and loads. The 2025 dry season average discharge flow was 2 mgd higher than average (0.5% higher) and 13 mgd lower than in 2024 (3.4% lower). The last three years have seen steadily decreasing annual average discharge flows that correlate with the amount of precipitation each year (not shown).

The most notable finding this year is that the dry season average discharges of ammonia and TIN are the lowest yet recorded. The 2025 dry season ammonia discharge load for 2025 was 1,600 kg/d lower than in 2024 (5.0% lower) and 4,700 kg/d lower than average (13% lower). The 2025 dry season TIN discharge load for 2025 was 1,940 kg/d lower than in 2024 (4.5% lower) and 5,240 kg/d lower than the pre-2025 average (11% lower). **This reduction in ammonia and TIN load is attributed to a combination of reduced influent loads, increase in recycled water, and optimization/upgrades at various treatment plants. Details on various on-going plant optimization/upgrades is provided in Section 4.3.** The 2025 dry season total phosphorus

[1] October 1, 2024, through September 30, 2025.

(TP) discharge load for 2025 was 120 kg/d lower than in 2024 (3.0% lower) and 130 kg/d lower than average (3.6% lower).

Table ES-1. Discharge: Summary of Dry Season[a] Flow and Loads to San Francisco Bay for the Previous Five Years

Constituent	2021	2022	2023	2024	2025	Average[b]
Flow, mgd	339	337	381	388	375	373
Ammonia, kg N/d	33,600	35,800	32,400	32,400	30,700	35,400
NOx, kg N/d	9,290	8,550	10,700	11,200	11,200	11,000
TIN, kg N/d[c]	43,100	44,400	43,300	43,700	41,658.1[d]	46,500
TP, kg P/d	3,680	3,300	3,760	3,650	3,530	3,660

a. May 1 through September 30.
b. The average includes 2012 through 2025.
c. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.
d. See Section 2.1.2 for calculation method. The aggregated mass loading rate is calculated as the unrounded sum of the individual loading rates.

Trend Analysis

A trend analysis was performed on the flows and nutrient loads. This Group Annual Report includes a one-time analysis of the impact of the COVID-19 pandemic on flows and loads. The key findings are summarized below. Note that "trend" refers to a consistent directional change over time that results in a statistically significant coefficient. Trends are estimated over the entire discharge dataset, which spans from 2012 through 2025, unless otherwise specified.

- COVID-19: the estimated average impact was an initial decrease in discharge flows and loads followed by a steady return of flows and loads toward pre-pandemic levels. Interpretation of pandemic-related covariates is challenging because of external variables that could impact nutrient loads (e.g., changes to facility operations that reduce nitrogen discharge).
- Discharge flow: the subembayments appear to have no statistically significant trend for discharge flow except for South Bay, which appears to have experienced a small, statistically significant, downward trend.
- Ammonia: downward trends in Suisun Bay and South Bay only.
- NOx: appears to be trending downward with the exception of Central Bay.
- TIN: appears to be trending downward in South Bay and Lower South Bay.
- TP: appears to have no statistically significant trend except for Lower South Bay (decreasing).

Recycled Water

Recycled water data lag one year behind the rest of this report (i.e., the latest available recycled water data are for 2024) because of the due dates for reporting recycled water deliveries to the

State Water Resources Control Board. The 2024 dry season recycled water use increased by 4 mgd (7% increase) compared to 2023 and is identical to the average (58 mgd). Recycled water use peaked in 2021 at 63 mgd during a relatively dry year. Recycled water demand was reduced in subsequent years in proportion to the amount of precipitation each year.

The range of effluent flows and TIN loads diverted from San Francisco Bay are as follows (from average annual to dry season for each parameter):

- Flow: 12% to 16%
- TIN: 5% to 10%

The percent of TIN loads diverted from the Bay due to recycled water is lower than the percent of water volumes diverted because some recycled end uses result in flow diversions but not nutrient load diversions (e.g., chiller blowdown water that is eventually returned to the sanitary sewer).

Ongoing Upgrades and Optimization Efforts

Many Dischargers are undergoing upgrades or engaging in optimization efforts to reduce their TIN discharge. Details are provided in Section 4.3. A brief summary of the various ongoing optimization efforts and upgrades is provided below (in alphabetical order). This list does not include the Dischargers that have completed optimizations or upgrades.

- **Delta Diablo Wastewater Treatment Plant:** Completing Phase 1 design upgrades at the treatment plant to replace aging infrastructure and prepare for nitrogen reduction.
- **East Bay Municipal Utility District Water Pollution Control Plant:** Stopped accepting blood waste in 2024 and continues to optimize the treatment process to provide biological nitrogen removal.
- **Fairfield-Suisun Sanitary District:** In the process of nitrogen removal upgrades in Phase 1 (anticipated completion in 2027) that will include nitrogen reduction features.
- **Hayward Water Pollution Control Plant:** Completed the design in 2025 for plant upgrades to replace aging equipment and reduce nutrient discharge loads. Hayward is waiting for WIFIA funding prior to beginning construction.
- **Palo Alto Regional Water Quality Control Plant:** In construction for plant upgrades to reduce TIN loads, as well as in construction for a nature-based solution to polish a portion of the final effluent.
- **Pinole-Hercules Water Pollution Control Plant:** Completed plant upgrades in 2019 to replace aging infrastructure and reduce nutrient discharge loads. Plant staff are actively developing a plan to increase the solids residence time to provide ammonia/TIN load reduction.
- **San Jose-Santa Clara Regional Wastewater Facility:** In addition to the optimization work completed in 2019, secondary blowers, meters, process controls, and clarifiers have been or are currently undergoing substantial rehabilitation or replacement as part of the Facility CIP, which has aided further reduction of nutrient loads by providing better process control.

- **San Mateo Wastewater Treatment Plant:** Completing plant upgrades in 2026 to replace aging infrastructure and reduce nutrient loads.
- **Sunnyvale Water Pollution Control Plant:** Upgrading the plant with various wastewater projects that will reduce TIN discharge loads (anticipated completion date is 2028).
- **Treasure Island Water Resource Recovery Facility:** Anticipated completion of their new treatment plant (membrane bioreactor) in 2026.
- **Union Sanitary District:** Began construction in 2022 to rehabilitate various equipment and implement a process for reducing nutrient discharge loads.

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1 Introduction

San Francisco Bay is a large, nutrient-enriched estuary with a surrounding population of over seven million people. Despite the excessive quantities of nutrients (nitrogen and phosphorus) in San Francisco Bay, excessive phytoplankton growth and harmful algal blooms have historically not been a major issue. This is primarily attributed to two main factors: 1) high turbidity that limits the light penetration needed for phytoplankton to thrive and 2) filter-feeding clams that consume phytoplankton. However, starting in the early 2000s, phytoplankton levels began to increase, resulting in concerns about harmful algal blooms, especially considering the population growth experienced by the region and the associated additional nutrient loads.

In March 2012, the San Francisco Bay Regional Water Quality Control Board (Regional Water Board) issued a Water Code Section 13267 Technical Report Order that required POTWs to provide effluent nutrient data to the Regional Water Board. The 13267 Order coincided with the establishment of a Nutrient Management Strategy. In April 2014, the Regional Water Board adopted the first Nutrients Watershed Permit (National Pollution Discharge Elimination System [NPDES] Permit CA0038873), which required financial support for the Nutrient Science Program, reporting of effluent nutrient monitoring data, an evaluation of opportunities to reduce nutrient discharges through optimization and upgrades, and an annual nutrients report that may be submitted individually or as part of a group report (referred to hereafter as the Group Annual Report) submitted by the Bay Area Clean Water Agencies (BACWA). The Regional Water Board has since adopted two updates to the Nutrients Watershed Permit (first in May 2019 and then in July 2024), both of which have maintained the annual nutrients reporting requirement. All Dischargers included in the Nutrients Watershed Permit have elected to participate in the Group Annual Report rather than submit individual reports.

This Group Annual Report includes all available historical flow and nutrient data since 2012 and includes new data for October 2024 through September 2025. This report includes analyses of influent, discharge, and recycle water flows and loads, as well as a statistical analysis of flow and load trends. The main body of this report contains the methods, summary tables and figures, and a discussion section, while Appendices A through D and Attachment 1 satisfy the reporting requirements (Section 5.2.2) for each of the 34 Dischargers listed in the Permit. Attachment 2 contains a summary and analysis of the compliance milestone reporting information provided by the Dischargers as required by the Permit's compliance schedule and reporting requirements found in Section 6.3.3.

1.1 Regulatory Framework

Discharges of nutrients to San Francisco Bay and its subembayments by the Publicly Owned Treatment Works (POTWs) listed in Table 1-1 are regulated by the Regional Water Board through the Nutrients Watershed. The Regional Water Board has issued three orders under the authority of the Nutrients Watershed Permit: R2-2014-0014, R2-2019-0017, and R2-2024-0013. The most recent order (R2-2024-0013) was issued on July 10, 2024, and became effective on October 1, 2024. On December 5, 2025, the calculation method for dry season (May 1 through September 30) total inorganic nitrogen (TIN) load was modified through a letter issued by the Regional Water

Board (CW-894802)[2]. As with previous orders, the regulated POTWs are required to track and evaluate treatment plant performance and fund nutrient research and monitoring programs. Order R2-2024-0013 is the first to include enforceable total inorganic nitrogen (TIN) discharge load limits for the regulated facilities during the dry season (May 1 through September 30). Interim limits have been in effect since the 2025 dry season, and, unless otherwise modified by the Regional Water Board, the final limits are scheduled to be effective starting in the 2035 dry season. The final individual limits are only enforceable if the aggregate load from all regulated facilities exceeds the seasonal aggregate load limit (26,700 kg/d).

1.2 Dischargers

The regulated POTWs and their interim and final TIN discharge limits are given in Table 1-1. The location of each Discharger is presented in Figure 1-1.

Table 1-1. Municipal Wastewater Dischargers Included in the Nutrients Watershed Permit

Discharger Name (Abbreviation)	Facility Name	Interim TIN Limit (kg/d)[(a)]	Final TIN Limit (kg/d)[(b)]	Permitted Capacity (mgd)[(c)]	Subembayment
American Canyon, City of (American Canyon)	Wastewater Treatment and Reclamation Facility	79	62	2.5	San Pablo
Benicia, City of (Benicia)	Benicia Wastewater Treatment Plant	290	120	4.5	San Pablo
Burlingame, City of (Burlingame)	Burlingame Wastewater Treatment Plant	610	160	5.5	South
Central Contra Costa Sanitary District (Central San)	Central Contra Costa Sanitary District Wastewater Treatment Plant	4,300	2,300	53.8	Suisun
Central Marin Sanitation Agency (CMSA)	Central Marin Sanitation Agency Wastewater Treatment Plant	1,300	480	10	Central
Crockett Community Services District (Port Costa)	Port Costa Wastewater Treatment Plant	5.3	3.7	0.033	San Pablo
Delta Diablo (Delta Diablo)	Delta Diablo Wastewater Treatment Plant	2,000	920	19.5	Suisun
East Bay Dischargers Authority (EBDA): Cities of Hayward and San Leandro Oro Loma Sanitary District Castro Valley Sanitary District Union Sanitary District	San Leandro Water Pollution Control Plant Oro Loma/Castro Valley Sanitary Districts Water Pollution Control Plant Raymond A. Boege Alvarado Wastewater Treatment Plant Hayward Water Resource Recovery Facility	9,000	4,200	107.8	South

[2] Minor Modifications to Order R2-2024-0013 (CW-894802), December 5, 2025. https://bacwa.org/wp-content/uploads/2025/12/Corrected-Minor-Modification-Letter.pdf

Discharger Name (Abbreviation)	Facility Name	Interim TIN Limit (kg/d)[a]	Final TIN Limit (kg/d)[b]	Permitted Capacity (mgd)[c]	Subembayment
Livermore-Amador Valley Water Management Agency Dublin San Ramon Services District City of Livermore	Livermore-Amador Valley Water Management Agency Export and Storage Facilities				
	Dublin San Ramon Services District Wastewater Treatment Plant				
	City of Livermore Water Reclamation Plant				
East Bay Municipal Utility District (EBMUD)	East Bay Municipal Utility District, Special District No. 1 Wastewater Treatment Plant	11,000	3,300	120	Central
Fairfield-Suisun Sewer District (FSSD)	Fairfield-Suisun Wastewater Treatment Plant	1,600	880	23.7	Suisun
Las Gallinas Valley Sanitary District (Las Gallinas)	Las Gallinas Valley Sanitary District Sewage Treatment Plant	-[d]	-[d]	2.92	San Pablo
Marin County (Paradise Cove), Sanitary District No. 5 of	Paradise Cove Treatment Plant	3.7	3.5	0.04	Central
Marin County (Tiburon), Sanitary District No. 5 of	Wastewater Treatment Plant	69	47	0.98	Central
Millbrae, City of (Millbrae)	Water Pollution Control Plant	340	100	3.0	South
Mt. View Sanitary District (Mt View)	Mt View Sanitary District Wastewater Treatment Plant	190	78	3.2	Suisun
Napa Sanitation District (Napa)	Soscol Water Recycling Facility	-[d]	-[d]	15.4	San Pablo
Novato Sanitary District (Novato)	Novato Sanitary District Wastewater Treatment Plant	210	140	7.0	San Pablo
Palo Alto, City of (Palo Alto)	Palo Alto Regional Water Quality Control Plant	2,900	1,200	39	Lower South
Petaluma, City of (Petaluma)	Petaluma Ellis Creek Water Recycling Facility	-[d]	-[d]	6.7	San Pablo
Pinole, City of (Pinole)	Pinole-Hercules Water Pollution Control Plant	460	190	4.06	San Pablo
Rodeo Sanitary District (Rodeo)	Rodeo Sanitary District Water Pollution Control Facility	50	38	1.14	San Pablo
San Francisco (San Francisco International Airport), City and County of (SFO Airport)	Mel Leong Treatment Plant, Sanitary Plant	560	71	2.4	South
San Francisco, City and County of (SFPUC Southeast)	Southeast Water Pollution Control Plant	11,000	3,300	85.4	South

Discharger Name (Abbreviation)	Facility Name	Interim TIN Limit (kg/d)[a]	Final TIN Limit (kg/d)[b]	Permitted Capacity (mgd)[c]	Subembayment
San Jose/Santa Clara Water Pollution Control Plant and Cities of San Jose and Santa Clara (San Jose)	San Jose/Santa Clara Water Pollution Control Plant	6,400	5,000	167	Lower South
San Mateo, City of (San Mateo)	City of San Mateo Wastewater Treatment Plant	1,700	670	15.7	South
Sausalito-Marin City Sanitary District (SMCSD)	Sausalito-Marin City Sanitary District Wastewater Treatment Plant	180	69	1.8	Central
Sewerage Agency of Southern Marin (SASM)	Sewerage Agency of Southern Marin Wastewater Treatment Plant	280	140	3.6	Central
Silicon Valley Clean Water (SVCW)	Silicon Valley Clean Water Wastewater Treatment Plant	3,000	880	29	South
Sonoma Valley County Sanitary District (Sonoma Valley)	Sonoma Valley County Sanitary District Wastewater Treatment Plant	-[d]	-[d]	3.0	San Pablo
South San Francisco and San Bruno, Cities of (South SF)	South San Francisco and San Bruno Water Quality Control Plant	1,500	560	13	South
Sunnyvale, City of (Sunnyvale)	Sunnyvale Water Pollution Control Plant	830	740	29.5	Lower South
Treasure Island Development Authority (Treasure Island)	Treasure Island Wastewater Treatment Plant	29	21	2.0	Central
Vallejo Flood and Wastewater District (Vallejo)	Vallejo Wastewater Treatment Plant	1,000	580	15.5	San Pablo
West County Wastewater District (WCW) and City of Richmond Municipal Sewer District (Richmond)[e]	West County Wastewater-City of Richmond Combined Outfall (West County) West County Wastewater District Treatment Plant Richmond Municipal Sewer District Water Pollution Control Plant	1,100	430	28.5	Central
Total Aggregate Limit		-[f]	26,700[g]	-	-

a. The Dischargers shall comply with the following interim seasonal effluent limitations at the discharge points and monitoring locations specified in the Monitoring and Reporting Program (MRP) (Attachment E). Final effluent limitations shall become effective in accordance with the compliance schedule established by Provision 6.3.3 of this Order. Compliance with these interim limitations shall be determined seasonally for each Discharger based on discharges from May 1 through September 30. Mass loads shall be determined by calculating the daily average total inorganic nitrogen load from the average daily flows (i.e., total discharge volume from May 1 through September 30, divided by 153 days) and average concentration, and rounding to two significant figures.

b. In accordance with the compliance schedule established by this Order in Provision 6.3.3, starting October 1, 2034, the Dischargers shall comply with the following final seasonal water quality-based effluent limitations at the

discharge points and monitoring locations specified in the MRP. Compliance with these final limitations shall be determined seasonally based on discharges from May 1 through September 30. If the sum of all the individual Dischargers' total inorganic nitrogen mass loads is greater than the Aggregate Mass Load Limit set forth below, the Dischargers whose total inorganic nitrogen mass loads exceed their individual limitations shall be in violation of their individual limitations. Mass loads shall be determined by calculating the daily average total inorganic nitrogen load from the average daily flows (i.e., total discharge volume from May 1 through September 30, divided by 153 days) and average concentration and rounding to two significant figures. The Aggregate Mass Load shall be determined by summing each individual Discharger's average mass load.

c. Based on average dry weather flow (ADWF).

d. Agencies with a dry season discharge prohibition were excluded from TIN load limits.

e. Formerly West County Agency, a Joint Powers Authority that was dissolved effective December 31, 2024. West County Wastewater District and the City of Richmond now share responsibility for permit compliance. Throughout this report, "West County" refers to the sum of contributions from West County Wastewater District and City of Richmond.

f. Compliance with the interim limit is determined individually for each Discharger (see Section 4.1 of Order R2-2024-0013).

g. The sum of the individual final effluent TIN limits is 26,683.2 kg/d, which is lower than the total aggregate limit of 26,700.



Figure 1-1. Locations of the Dischargers

1.3 Definition of Dry Season

The Nutrients Watershed Permit regulates the discharge of TIN during the dry season, which it defines as May 1 through September 30. Distinguishing the dry and wet seasons is significant for the following reasons:

- The dry season is reflective of the base sanitary flows and loads from residential population and industrial contributions to wastewater. In contrast, the increased flows during wet weather events are attributed to inflow and infiltration (I&I) during such events, which can bias the discharge results.
- Conditions are generally more favorable for biological nutrient removal during the dry season due to warmer temperatures and fewer (if any) peak flow events.
- The San Francisco Bay is expected to be less sensitive to nutrients during the wet season because the water is cooler, day length and available sunlight are reduced, light penetration is reduced due to elevated turbidity, and the hydraulic residence time is reduced.

1.4 Purpose

This report fulfills the reporting and analysis requirement of the Nutrients Watershed Permit for the participating agencies for the 2025 dry season (May 1, 2025, through September 30, 2025). As per Attachment E, Section 5.2.2., of Order R2-2024-0013, the Group Annual Report must include the following:

1. Documentation that the Discharger is complying with Provisions 6.3.2, 6.3.3, 6.3.5, and 6.3.6 of Order R2-2024-0013. If reporting through a group report as described below, the Discharger shall submit certification that it has provided adequate support (i.e., contributed its portion of the required contribution) in accordance with Provision 6.3.2.
2. Summary tables depicting the Discharger's annual and monthly flows, nutrient concentrations, and nutrient mass loads, calculated as described in Attachment G section 8.1 (Arithmetic Calculations) of individual NPDES permits. The summary tables shall cover October 1 before the preceding year through September 30 of the preceding year and at least the previous five years of available data. Each Discharger shall document its nutrient loads relative to other facilities covered by this Order that discharge into the same subembayment (i.e., Suisun Bay, San Pablo Bay, Central Bay, South Bay, and Lower South Bay). These subembayment delineations may be refined through Provision 6.3.2 of the Order, in which case each Discharger shall document loads relative to the most recent delineation. Nutrient data from other Dischargers may be obtained from the State Water Board's California Integrated Water Quality System (CIWQS) website (https://www.waterboards.ca.gov/ciwqs/index.html).
3. Analysis of nutrient trends and load variability, and assessment as to whether nutrient mass discharges are increasing or decreasing.

4. A summary of the amount of water recycled annually by the Discharger, the corresponding decrease in the level of nutrients discharged to the Bay, and any updates to future water recycling plans.
5. Status and plans for investigation if the trend analysis shows a significant change in nutrient loading. In such cases, the Discharger shall investigate the cause. In the annual reports, the Discharger shall set forth its plans for investigation and report its results, providing necessary updates in subsequent annual reports. The investigation shall include, at a minimum, whether treatment process changes, increasing or decreasing water reclamation, or changes in total influent flow related to water conservation, population growth, transient work community, new industry, or wet weather flows have reduced or increased nutrient discharges.

1.5 Historical Monitoring

Monitoring data from Oct 2012 to Sept 2025 were collected under two separate regulatory frameworks: a Section 13267 Letter[3] and the Nutrients Watershed Permit. The Section 13267 Letter data were collected from October 2012 through June 2014. The Nutrients Watershed Permit data have been collected since July 2014. The monitoring and reporting requirements for each regulatory phase are given in Table 1-2. Note that samples only need to be collected when discharging (i.e., seasonal Dischargers shall collect samples only during the discharge season).[4]

Table 1-2. Comparison of Monitoring Requirements Among the Four Regulatory Phases

Scope	Section 13267 Letter	Nutrients Watershed Permit		
		R2-2014-0014	R2-2019-0017	R2-2024-0013
Major Dischargers and Sampling Frequency	Permitted capacity ≥ 5 mgd: a. *Year-round Dischargers: Sample twice per month and two additional samples each wet season during peak wet weather flow conditions* b. *Seasonal Dischargers: Sample twice per month during discharge (wet) season; sample once during non-discharge (dry) season* Permitted capacity between 1 and 5 mgd: a. *Year-round Dischargers: Sample twice per month and two additional samples each wet*	Permitted capacity > 10 mgd: a. *Sample effluent twice per month* Permitted capacity between 1 and 10 mgd: a. *Sample effluent once per month*	Permitted capacity > 10 mgd: a. *Sample effluent twice per month, and influent once per quarter.* Permitted capacity between 1 and 10 mgd: a. *Sample effluent once per month.*	Permitted capacity > 10 mgd: a. *Sample effluent twice per month for nitrogen species and once per month for total phosphorus* b. *Sample influent once per quarter for nitrogen species and twice per year for total phosphorus.* Permitted capacity between 1 and 10 mgd: a. *Sample effluent once per month*

[3] Wolfe, Bruce. (2012) Letter: Water Code Section 13267 Technical Report Order Requiring Submittal of Information on Nutrients in Wastewater Discharges. March 2, 2012.

[4] This can lead to challenges with quantifying nutrient loads diverted from San Francisco Bay due to lack of data describing the concentration of nutrients in the recycled water for months when there is no discharge (requires assumptions to be made regarding the concentrations).

Scope	Section 13267 Letter	Nutrients Watershed Permit		
		R2-2014-0014	R2-2019-0017	R2-2024-0013
	season during peak wet weather flow conditions b. *Seasonal Dischargers: Sample twice per month during discharge (wet) season; sample once during non-discharge (dry) season*			*for nitrogen species and once per quarter for total phosphorus*
Minor Dischargers and Sampling Frequency	Flows < 1 mgd permitted capacity *a. Year-round Dischargers: Sample once per month* b. *Seasonal Dischargers: Sample once per month during discharge (wet) season; sample once during non-discharge (dry) season*	Permitted capacity < 1 mgd: *a. Sample twice per year*	Permitted capacity < 1 mgd: *a. Sample twice per year*	Permitted capacity < 1 mgd: *a. Sample effluent twice per year for nitrogen species and once per year for total phosphorus*
Non-Nutrient Sampling Parameters	Flow pH Temperature	Flow	Flow	Flow
Nitrogen Species and Sample Type	1) Total Ammonia[(a)] 2) TDN[(b)], 3) TKN[(c)] 4) SKN[(d)] 5) Nitrate[(e)] 6) Nitrite[(f)] 7) Urea[(g)]	1) Total Ammonia[(a)] 2) TKN[(c)] 3) Nitrate[(e)] plus Nitrite[(f)] 4) TN[(h)]	Influent and Effluent: 1) Total Ammonia[(a)] 2) Nitrate[(e)] plus Nitrite[(f)] Influent Only: 1) TKN[(c)] Effluent Only: 1) TIN[(i)]	Influent and Effluent: 1) Total Ammonia[(a)] 2) Nitrate[(e)] plus Nitrite[(f)] Influent Only: 1) TKN[(c)] Effluent Only: 1) TIN[(i)]
Phosphorus Species and Sample Type	1) TP[(j)] 2) STP[(k)] 3) DOP[(l)] 4) TOP[(m)]	1) SRP[(n)] 2) TP[(j)]	1) TP[(j)]	1) TP[(j)]
Recycled Water	Not required	Not required	Not required	Annual volumes and diverted nutrients

a. NH_3 plus NH_4^+ (reported as N) – Composite Sample
b. Total Dissolved Nitrogen (reported as N) – Composite Sample
c. Total Kjeldahl Nitrogen (reported as N) – Composite Sample
d. Soluble Kjeldahl Nitrogen (reported as N) – Composite Sample
e. NO3- (reported as N) – Composite Sample
f. NO2- (reported as N) – Composite Sample
g. Limited to 5 largest Dischargers (reported as N) – Composite Sample
h. Total Nitrogen (calculated: TKN + Nitrate + Nitrite)
i. Total Inorganic Nitrogen (calculated: Total Ammonia + Nitrate plus Nitrite)
j. Total Phosphorus (reported as P) – Composite Sample
k. Soluble Total Phosphorus (reported as P) – Composite Sample
l. Dissolved Orthophosphate (reported as P) – Composite or Grab Sample
m. Total Orthophosphate (reported as P) – Composite Sample
n. Soluble Reactive Phosphorus (reported as P) – Grab Sample

2 Approach

The following sections provide details regarding the calculations, assumptions, and methods used to produce this report.

2.1 Calculation of Mass Loading Rates

A variety of methods may be used to calculate mass loading rates. The following sections describe how the loading rates of nutrients to San Francisco Bay were calculated historically for the Group Annual Report and how Order R2-2024-0013 requires the dry season TIN loading rates to be calculated starting in 2025.

2.1.1 Historical Calculations

Historically, the nutrient mass loading rates were calculated by multiplying each 24-hour composite concentration measurement by the corresponding day's average flow. Monthly averages were obtained by averaging the daily average loads for each month. Annual and dry season average loads were calculated by averaging the monthly average loads. The monthly average loads reported in the individual Discharger evaluations provided in Attachment 1 are consistent with this approach. Except for dry season TIN loading rates for 2025 and later, all annual and dry season average loading rates given in this report for 2025 and later are consistent with the historical approach described above (i.e., they have not been modified to match the Regional Water Board's required method for calculating the dry season average TIN loading rate).

2.1.2 Dry Season Average TIN Loading Rate

Order R2-2024-0013 originally required the dry season TIN load for each Discharger to be calculated by taking the dry season average of the daily average loads. In December 2025, the Regional Water Board issued an amendment (CW-894802) that modified the required method for calculating the dry season TIN discharge loading rates. The new method requires the TIN loads to be calculated from the average daily flow and the average TIN concentration during the dry season. This approach is appropriate for all Dischargers, including those with infrequent discharge during the dry season due to large water recycling programs. Historically, the Dischargers with infrequent discharge during the dry season were accommodated by multiplying each monthly average load by the proportion of days with non-zero discharge (e.g., in the past, if the monthly average load based on daily average loads was 100 kg/d, but the Discharger had zero discharge for half the days of that month, the effective load was calculated as 50 kg/d). It should be noted that Order R2-2024-0013 specifies that each individual loading rate shall be rounded to two significant figures (historically, this report has rounded flows and loads to three significant figures). The aggregated mass loading rate is calculated as the unrounded sum of the individual loading rates.

2.1.3 "Not Detected" Results

Each measurement result is assigned a qualifier that determines what value is used for calculating the mass load. The qualifiers associated with the reported measurement results are defined in Table 2-1. Order R2-2024-0013 requires one half the method detection limit (MDL) be used for

calculating TIN mass loads if the reported value is qualified as not detected (ND). For consistency, this method is applied to all other constituents (influent and effluent). Historical loads (prior to October 1, 2023) have not been revised to be consistent with this approach.

Table 2-1. Definitions of Value Qualifiers

Qualifier	Definition	Value Used for Calculations
=	Reported value is above the MDL	Reported value
ND	Not detected[a]	0.5×MDL[b]
DNQ	Detected but not quantified[c]	Reported value

a. Indicates the measurement result is less than the laboratory's minimum detection limit (MDL).

b. Required by Order R2-2024-0013 for calculation of TIN. For consistency, this approach is used for influent and discharge mass load calculations for all constituents starting with the 2023/2024 Group Annual Report.

c. Result is less than the reporting level (RL) but greater than or equal to the MDL

The following definitions are necessary for interpreting the qualifiers:

- The minimum level (ML) is defined as the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.
- The reporting level (RL) is defined as the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order, including an additional factor if applicable as discussed herein. For priority pollutants, the MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from State Implementation Plan (SIP) Appendix 4 in accordance with SIP section 2.4.2 or established in accordance with SIP section 2.4.3. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.
- MDL is defined in Order R2-2024-0013 as the minimum concentration of a substance that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results, as defined in 40 C.F.R. part 136, Appendix B.

2.2 Analytical Methods and Result Qualifiers

The analytical methods used to measure the required constituents are given in Table 2-2.

Table 2-2. List of Parameters, Methodology, and Sample Type

Parameter	Influent	Discharge	Rec. Wat.	Measured	Calculated	Continuous	Composite[a]	Method[b,c]	Calculation
Flow	X	X	X	X[d]	X[d]	X	-		
Total Ammonia	X	X	-	X	-	-	X	4500-NH3 EPA 350.1	
TKN	X	-	-	X	-	-	X	4500-N(org)	
NOx	X	X	-	X	-	-	X	4500-N	
TIN	X	X	-	-	X	-	X	Calculated	*TIN = Ammonia + NOx*
TN	X	-	-	-	X	-	X	Calculated	*TN = TKN + NOx*
TP	X	X	-	X	-	-	X	4500-P	

a. 24-hour composite.

b. Standard Methods for the Examination of Water and Wastewater 2017-23rd Edition, American Public Health Association/American Water Works Association/Water Environment Federation, Washington, D.C.

c. Dischargers may propose other U.S. EPA-approved analytical methods, if available, with detection limits low enough to quantify concentrations in wastewater.

d. Plant specific.

2.3 Data Acquisition and Confirmation

Prior to the 2025 Group Annual Report, data were requested from the Dischargers through a request for information. Starting with the 2025 Group Annual Report, the data are obtained directly from CIWQS, analyzed, and presented to the Dischargers for review and confirmation. Any changes to the data requested by the Discharger are reflected in this report.

2.4 Subembayments

The historically accepted delineation of subembayments by bridges is used throughout this report. The subembayment delineations are derived from the San Francisco Bay Basin Plan[5] and are not necessarily indicative of San Francisco Bay's hydraulics or ecosystems. Subembayments are included merely to describe the overall geographic distribution of flows and loads.

2.5 Recycled Water

Recycled water volumes were analyzed to estimate the flows and nutrient loads diverted from San Francisco Bay. Recycled water volumes have been included since the 2022 Group Annual Report. The first year, recycled water information (submitted February 1, 2022) was based on a

[5] State Water Resources Control Board. (2019) *Figure 2-2: Hydraulic Planning Areas*. Chapter 2: Beneficial Uses (ca.gov)

request for information. For all subsequent Group Annual Reports, data were obtained from the State Water Board's Volumetric Annual Report (VAR).[6] The recycled water data are available in both monthly and annual formats. However, the monthly data do not distinguish between the end-use categories defined by the State Water Board, which are defined as follows[7]:

- **Agricultural Irrigation:** pasture or crop irrigation.
- **Landscape irrigation:** irrigation of parks, greenbelts, and playgrounds; school yards; athletic fields; cemeteries; residential landscaping, common areas; commercial landscaping; industrial landscaping; and freeway, highway, and street landscaping.
- **Golf course Irrigation:** irrigation of golf courses, including water used to maintain aesthetic impoundments within golf courses.
- **Commercial Application:** commercial facilities, business use (such as laundries and office buildings), car washes, retail nurseries, and appurtenant landscaping that is not separately metered.
- **Geothermal Energy Production:** Augmentation of geothermal fields.
- **Industrial Application:** manufacturing facilities, cooling towers, process water, and appurtenant landscaping that is not separately metered.
- **Groundwater Recharge:** surface or subsurface application, except for seawater intrusion barrier use.
- **Seawater Intrusion Barrier:** groundwater recharge via subsurface application intended to reduce seawater intrusion into a coastal aquifer with a seawater interface.
- **Reservoir Water Augmentation:** the planned placement of recycled water into a raw surface water reservoir used as a source of domestic drinking.
- **Raw Water Augmentation:** the planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant that provides water to a public water system as defined in section 116275 of the Health and Safety Code (Water Code § 13561).
- **Other Non-Potable Uses:** including but not limited to dust control, flushing sewers, fire protection, fill stations, snow making, and recreational impoundments.
- **Other Potable Uses:** both indirect and direct potable reuse other than for groundwater recharge, seawater intrusion barrier, reservoir water augmentation, or raw water augmentation.

The monthly recycled water volume data were analyzed for both the water year (October through September) and the dry season (May through September), while the annual recycled

[6] https://www.waterboards.ca.gov/water_issues/programs/recycled_water/volumetric_annual_reporting.html

[7] https://www.waterboards.ca.gov/water_issues/programs/recycled_water/docs/2022/var_helpguide.pdf

water volume data are limited to the calendar year. The individual evaluations in Attachment 1 contain the analysis of annual recycled water volumes by calendar year.

To estimate diverted nutrient loads, the average concentrations of ammonia, TIN, and TP were estimated and multiplied by the recycled water volumes. The assumed nutrient concentrations used to estimate the diverted nutrient loads in the individual evaluations in Attachment 1 were calculated by dividing the sum of the nutrient loads in each calendar year by the sum of the flows. The concentrations assumed for analysis of the monthly recycled water volumes were estimated for each month based on average load and average flow. If a POTW sampled effluent during a period of zero discharge but discharged flow later or earlier in the month, the average flow and the average sampled concentration values were used for that month. Other minor assumptions were made on a case-by-case basis to fill in missing data for a small number of POTWs that do not discharge during the summer months and may not sample nutrient concentrations when recycled flows are highest.

In the case of EBDA, the recycled water is produced by each of the member agencies, which means the effluent water quality data for the common outfall does not apply. Effluent nutrient concentration data for each member of EBDA were used to estimate the diverted nutrient loads. The same applies for West County Wastewater and Richmond, which share an outfall.

The volume and percentage of water that is used by reuse customers is seasonally dependent. An example calculation for the percent of treated water that is diverted from San Francisco Bay and sent to reuse customers is as follows: In 2020/2021, the annual average recycled water flow represented a diversion of approximately 11% of flow from San Francisco Bay (average annual discharge flow = 374 mgd; recycled water = 48 mgd):

$$\frac{\text{Recycled Water Flow}}{\text{Discharge Flow + Recycled Water Flow}} = \frac{48 \text{ mgd}}{(48 \text{ mgd} + 374 \text{ mgd})} = 11\%$$

There are instances when flow and nutrient loads associated with recycled water applications end up in San Francisco Bay. For example, there could be an industrial application that uses recycled water for chillers. The chiller water that has nutrients is eventually exhausted and discharged to San Francisco Bay. This analysis attempts to exclude such recycled water nutrient loads that ultimately are discharged to San Francisco Bay. Based on discussions with POTW representatives, flow diversion factors (between 0 and 1) are applied to the calendar year average recycled water volumes (e.g., industrial use may have a flow diversion factor of 0.75, meaning 75% of the recycled water flow sent to that end use is diverted from San Francisco Bay). Based on the calendar year flow diversion factors, a total average flow diversion factor for each Discharger (across all end uses) was developed for each year. The load diversion factor for each POTW is identical to the corresponding flow diversion factor unless otherwise specified through discussions with a POTW representative. Assumptions made for flows and loads diverted from San Francisco Bay by each Discharger are detailed in the individual evaluations provided in Attachment 1.

2.6 Trend Analysis

The Nutrients Watershed Permit requires an analysis of nutrient loading trends and variability. To provide this analysis, multivariate linear regression was applied to the monthly time series for nutrient loads. To estimate the underlying trends without interference from external environmental

factors, the regression analysis accounts for precipitation and other seasonal factors. This Group Annual Report includes an analysis of flow and load trends before and during the COVID-19 pandemic as well as across the entire study period without including pandemic-related variables.

To assess flow and load trends before and during the pandemic, an interrupted time series regression approach was used. This approach involves characterizing both immediate changes (i.e., step changes) and sustained changes (i.e., changes to the trend) before, during, and after a defined period of time. For this analysis the pandemic is defined as the period of time between 2020-03-01 and 2022-03-01. This provides a two-year window to capture the effects of the pandemic. The variables included in the regressions are given in Table 2-3. To account for autocorrelation, the standard errors are adjusted using the Newey-West method.

Table 2-3.Variables Included in Trend Analysis

Explanatory Variable	Value	Purpose
Constant	1	If a constant is not provided the intercept is forced through zero, which may not be reflective of reality.
Time Step (t=0 at first time step)	0,1,2,…	Allows for estimation of the slope of the trendline prior to the start of the pandemic.
Pandemic Start	1 if t > pandemic start else 0	Provides a means of assessing the average impact of the pandemic on flow and loads during the pandemic.
Time Step (t=0 at Pandemic Start)	0,1,2,…	Allows the slope of the trend to change after the pandemic.
Pandemic End	1 if t > pandemic end else 0	Allows for a step-change after the pandemic ends.
Time Step (t=0 at Pandemic End	0,1,2,…	Allows the slope of the trend to change after the pandemic ends.
Precipitation (Only for Flow)	Continuous	Allows for assessment of trends while accounting for the effects of precipitation and seasonal effects.
Month of Year (Only for Loads)	Binary dummy variables indicating the month (0 or 1)	Deseasonalizes the loads to allow for more accurate assessment of long-term trends.

2.7 Compliance Schedule Milestones and Progress Reporting

Table 5 in Order R2-2024-0013 establishes a timeline for compliance schedule milestones and progress reporting and requires this Group Annual Report to provide a summary of the progress toward meeting these milestones. Early actors as defined by section 6.3.6 of Order R2-2024-0013 (clarified in a letter sent to the Dischargers on May 30, 2025) are required to provide an annual status update on project implementation. By April 1, 2026, all other Dischargers are required to submit information regarding the following permit requirements:

- 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.
- If a Discharger has already identified a compliance pathway, the Discharger shall provide a status update regarding implementation.
- 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.

To gather the needed information, a request for information was distributed to each Discharger. An analysis and summary of the collected information is presented in Attachment 2.

2.8 Precipitation

Precipitation data were obtained from the National Oceanic and Atmospheric Administration[8]. One station from the west (San Francisco), east (Walnut Creek), and south (San Jose) of the region were averaged to calculate the monthly total precipitation in inches.

2.9 Population Growth

Population data were obtained from the Metropolitan Transportation Commission, which cites the California Department of Finance[9]. City-level population estimates were assigned to each Discharger based on an approximation of their service territory.

[8] National Oceanic and Atmospheric Administration. Daily Summaries. https://www.ncei.noaa.gov/maps/daily-summaries/

[9] State of California Department of Finance. January Population and Housing Estimates. https://dof.ca.gov/Forecasting/Demographics/Estimates/

3 Findings

Section 3 contains a summary of the findings from the analysis of the data provided by the POTWs. More detailed tables related to influent, discharge, and recycled water are found in Appendices A through D and Attachment 1. For the compliance milestone reporting summary and analysis, see Attachment 2. Please note that a portion of the 2019/2020 and all of the 2020/2021 data were influenced by the COVID-19 pandemic that started in March 2020 (see Section 3.3).

3.1 Influent

Monitoring of influent loads is required by R2-2024-0013 for plants with a permitted average dry weather flow (ADWF)[10] capacity of greater than 10 mgd (see Table 1-2). The influent data are less frequently collected than discharge data and influent monitoring was not required until the second Nutrients Watershed Permit (R2-2019-0017; July 2019).

Figure 3-1 illustrates the available influent data for flows and ammonia, NOx, TIN, TKN, and TN loads. The data are aggregated by quarter. Gaps in the data indicate an incomplete dataset across the Dischargers for that quarter (i.e., even if only a single Discharger is missing a value, a break will appear in the line). Because Napa is not required to sample influent during the dry season when not discharging, there are a significant number of gaps in the data (other Dischargers with a small number of missing data points include EBDA, SVCW, San Jose, San Mateo, South SF, Sunnyvale, and Vallejo. These data points may be shown as missing even if the Discharger fulfilled the sampling requirements (e.g. TKN and NOx were sampled in the same quarter but not on the same day, which means the daily load for TN, which is the sum of TKN and NOx, could not be calculated).

Table 3-1 and Table 3-2 present overall summaries of the annual average and dry season influent flows and nutrient loads, respectively, between July 2019 and September 2024. Similarly, Table 3-3 and Table 3-4 present summaries of the corresponding dry season and annual average constituent concentrations, respectively, for the same period. The concentrations were calculated by dividing the loads by the flows for the corresponding averaging period.

[10] Average Dry Weather Flow (ADWF) is defined in each individual permit and is not the same as average dry season flow (see Section 1.3).

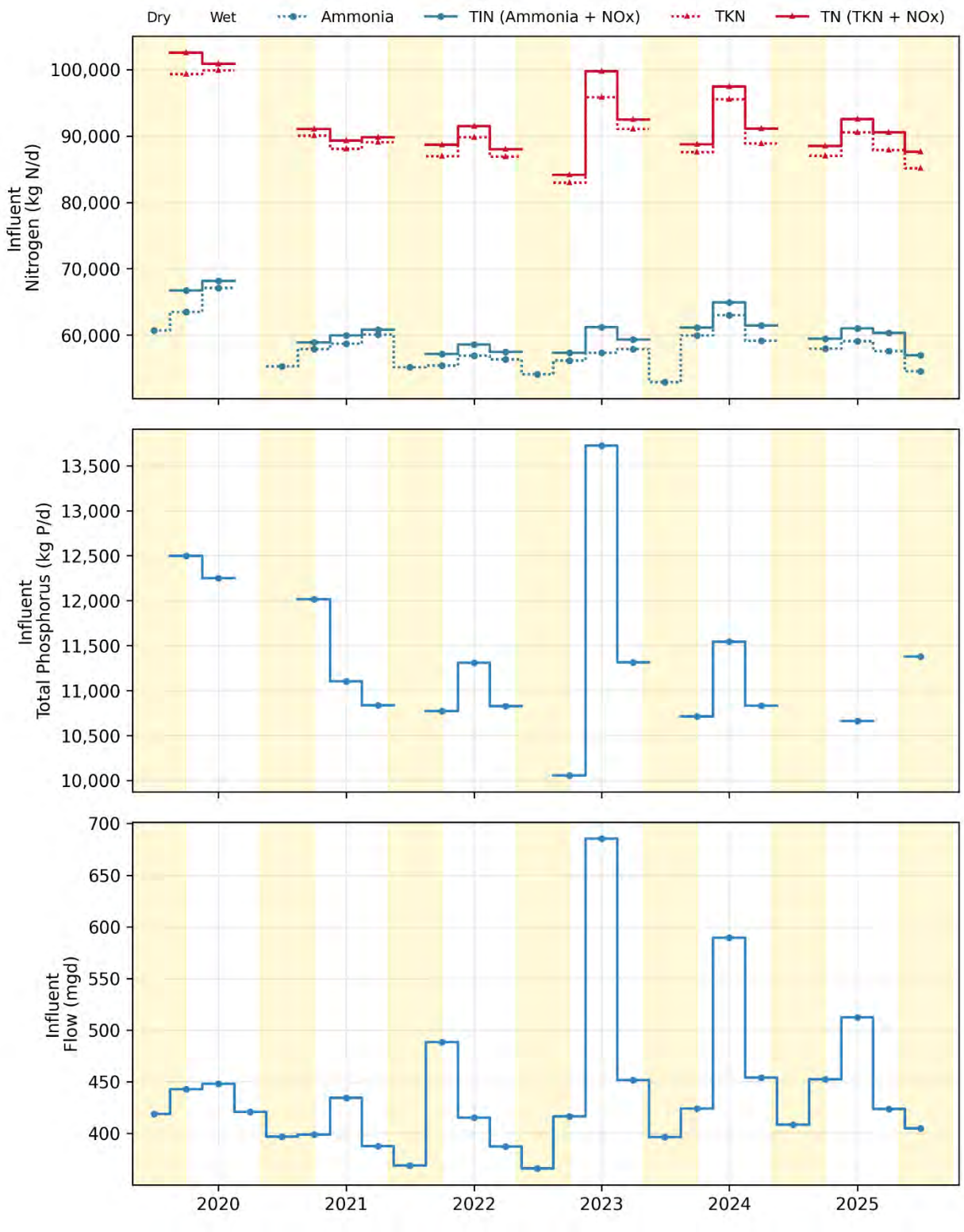


Figure 3-1. Historical Average Quarterly Influent Flows and Loads for Facilities Required to Report Influent Concentrations

Table 3-1. Influent: Summary of Average Annual[a] Flow and Loads[b]

Constituent	2018 / 2019[c]	2019 / 2020	2020 / 2021	2021 / 2022	2022 / 2023	2023 / 2024	2024 / 2025	Average
Flow, mgd	--	427	398	415	487	469	448	441
Ammonia, kg N/d	--	61,000	58,200	55,700	56,000	59,500	57,200	57,900
NOx, kg N/d	--	1,990	943	1,270	1,920	1,790	2,120	1,670
TIN, kg N/d[d]	--	63,100	59,500	57,400	57,900	61,100	59,300	59,700
TKN, kg N/d	--	96,600	87,400	87,300	87,700	88,700	87,800	89,200
TN, kg N/d	--	98,700	88,400	88,500	89,600	90,300	89,700	90,900
TP, kg P/d	--	11,800	10,800	11,100	11,200	11,000	11,300	11,200

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2019/2020 represents the period between October 1, 2019, and September 30, 2020.
b. Limited to POTWs with a permitted capacity greater than 10 mgd.
c. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.
d. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

Table 3-2. Influent: Summary of Dry Season[a] Flow and Loads[b]

Constituent	2019[c]	2020	2021	2022	2023	2024	2025	Average
Flow, mgd	419	402	374	372	411	420	409	401
Ammonia, kg N/d	58,200	55,800	56,400	54,500	53,900	55,800	54,300	55,900
NOx, kg N/d	2,830	1,760	989	950	1,250	1,850	2,430	1,730
TIN, kg N/d[d]	50,100	57,600	57,100	54,800	54,900	57,500	56,800	55,900
TKN, kg N/d	72,700	91,900	83,900	84,600	79,900	83,700	84,500	83,500
TN, kg N/d	73,900	93,600	85,000	84,000	81,100	85,300	86,700	84,700
TP, kg P/d	9,210	10,900	9,910	11,100	9,720	10,100	11,400	10,400

a. May 1 through September 30.
b. Limited to POTWs with a permitted capacity greater than 10 mgd.
c. 2019 dataset limited to July through September compared against May through September for 2019/2020.
d. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

Table 3-3. Influent: Summary of Average Annual[a] Flow and Concentrations[b]

Constituent	2018 / 2019[c]	2019 / 2020	2020 / 2021	2021 / 2022	2022 / 2023	2023 / 2024	2024 / 2025	Average
Flow, mgd	--	427	398	415	487	469	448	441
Ammonia, mg N/L	--	37.7	38.7	35.5	30.4	33.5	33.7	34.7
NOx, mg N/L	--	1.23	0.627	0.812	1.04	1.01	1.25	1.00
TIN, mg N/L[d]	--	39.0	39.5	36.5	31.4	34.4	35.0	35.8
TKN, mg N/L	--	59.7	58.1	55.6	47.5	50.0	51.7	53.5
TN, mg N/L	--	61.0	58.8	56.4	48.6	50.9	52.9	54.5
TP, mg P/L	--	7.28	7.21	7.09	6.08	6.08	6.64	6.70

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2019/2020 represents the period between October 1, 2019, and September 30, 2020.
b. Limited to POTWs with a permitted capacity greater than 10 mgd.
c. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.
d. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

Table 3-4. Influent: Summary of Dry Season[a] Flow and Concentrations[b]

Constituent	2019[c]	2020	2021	2022	2023	2024	2025	Average
Flow, mgd	419	402	374	372	411	420	409	401
Ammonia, mg N/L	36.7	36.7	39.8	38.7	34.6	35.0	35.1	36.8
NOx, mg N/L	1.79	1.16	0.698	0.675	0.805	1.16	1.57	1.14
TIN, mg N/L[d]	31.6	37.9	40.3	39.0	35.2	36.1	36.7	36.8
TKN, mg N/L	45.9	60.4	59.2	60.1	51.3	52.6	54.6	55.0
TN, mg N/L	46.6	61.5	60.0	59.7	52.1	53.6	56.0	55.8
TP, mg P/L	5.81	7.16	6.99	7.88	6.24	6.32	7.34	6.85

a. May 1 through September 30.
b. Limited to POTWs with a permitted capacity greater than 10 mgd.
c. 2019 dataset is limited to July through September compared against May through September for 2019/2020
d. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

3.2 Discharge

The tables and figures that follow contain summaries of the analysis of discharge flows and nutrient loads based on the monitoring data provided by the POTWs. Figure 3-2 illustrates the monthly average trends observed since data collection began in 2012. To generate Figure 3-2, missing data were interpolated to provide a complete dataset. Different sampling requirements for smaller Dischargers result in a dataset where not all months have data for all Dischargers. The linear interpolation used to fill the missing data is likely to have a negligible impact, since the Dischargers responsible for most of the missing data are relatively small (typically less than 1.0 mgd in plant capacity). Table 3-5 and Table 3-6 present summaries of the annual average and dry season average flows and nutrient loads discharged to San Francisco Bay, respectively, between October 2012 and September 2024. Similarly. Table 3-7 and Table 3-8 present summaries of the corresponding dry season and annual average nutrient concentrations. The concentrations were calculated by dividing the monthly average loads by the monthly average flows. Table 3-9 contains the dry season average TIN discharge load for each Discharger. It should be noted that the dry season TIN loads for 2025 are calculated using a different method than the loads reported for 2024 and earlier, as described in Section 2.1.2. Figure 3-3 shows the interim and final TIN limits compared to the calculated value for the 2025 dry season.

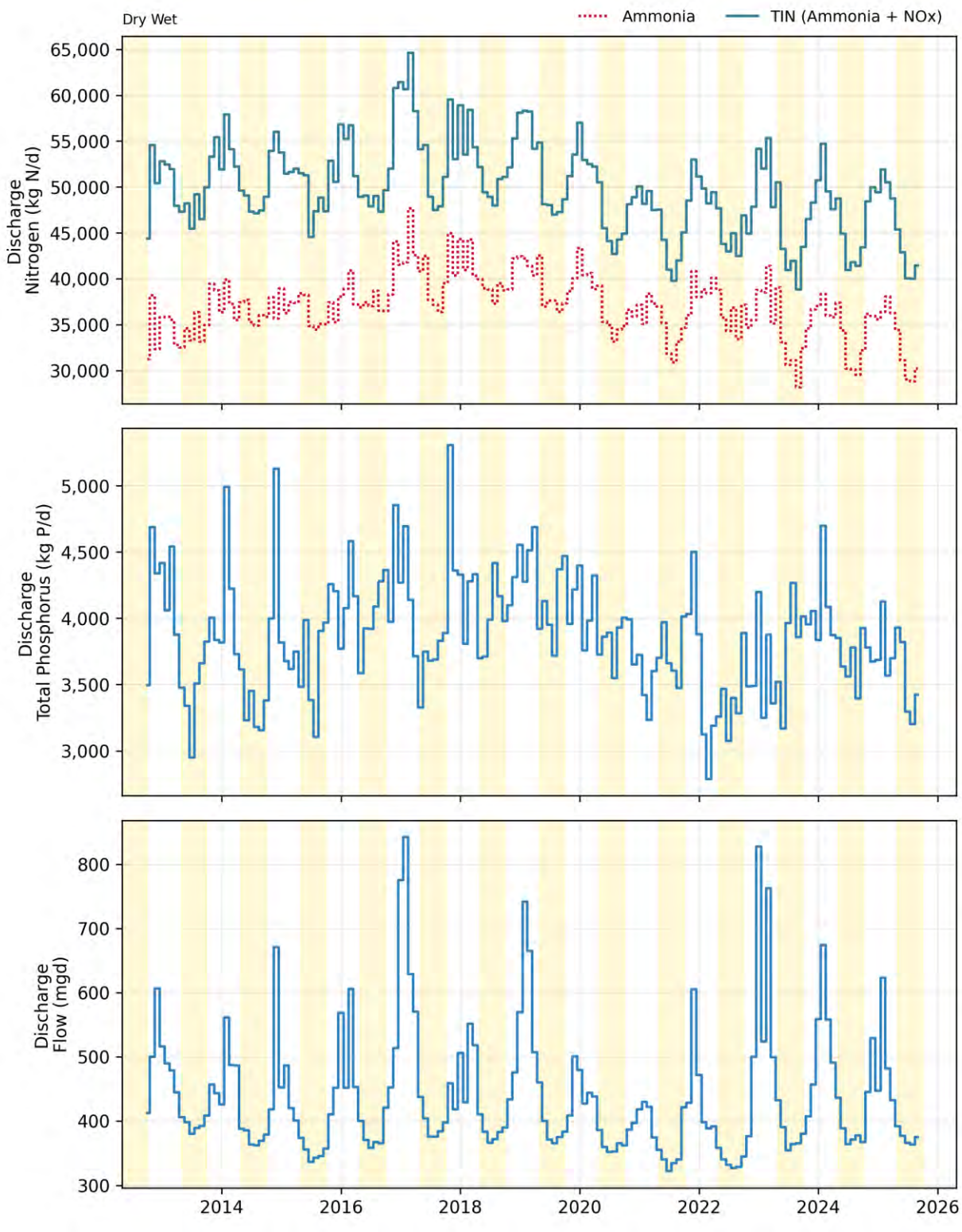


Figure 3-2. Historical Average Monthly Daily Discharge Flows and Loads

Table 3-5. Discharge: Summary of Average Annual[a] Flow and Loads to San Francisco Bay

Constituent	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017	2017 / 2018	2018 / 2019	2019 / 2020	2020 / 2021	2021 / 2022	2022 / 2023	2023 / 2024	2024 / 2025	Average
Flow, mgd	451	428	415	430	515	433	480	408	374	399	479	456	433	439
Ammonia, kg N/d	34,300	37,000	36,700	37,500	40,600	40,800	39,800	38,000	35,300	37,200	35,300	34,400	33,700	36,900
NOx, kg N/d	15,000	14,300	14,200	13,600	14,500	12,400	12,900	11,600	10,700	10,100	11,800	12,200	12,300	12,700
TIN, kg N/d[b]	49,300	51,300	50,900	51,100	55,000	53,200	53,100	49,900	46,000	47,300	47,100	46,500	45,700	49,700
TP, kg P/d	3,860	3,750	3,770	4,070	4,020	4,190	4,210	4,010	3,670	3,500	3,690	3,900	3,660	3,870

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2012/2013 represents the period between October 1, 2012, and September 30, 2013.

b. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

Table 3-6. Discharge: Summary of Dry Season[a] Flow and Loads to San Francisco Bay

Constituent	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Pre-2025 Average
Flow, mgd	393	374	351	372	396	383	394	363	339	337	381	388	375	373
Ammonia, kg N/d	34,000	36,300	36,200	37,300	38,900	38,900	38,200	35,400	33,600	35,800	32,400	32,400	30,700	35,400
NOx, kg N/d	13,400	11,800	12,500	11,100	11,700	11,000	10,800	10,000	9,290	8,550	10,700	11,200	11,200	11,000
TIN, kg N/d[b]	47,300	48,100	48,700	48,400	50,600	50,000	49,100	45,700	43,100	44,400	43,300	43,700	41,658.1[c]	46,500
TP, kg P/d	3,400	3,320	3,570	3,960	3,660	4,000	4,010	3,790	3,680	3,300	3,760	3,650	3,530	3,660

a. May 1 through September 30.

b. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

c. See Section 2.1.2 for calculation method.

Table 3-7. Discharge: Summary of Average Annual[a] Flow and Concentrations to San Francisco Bay

Constituent	2012 / 2013	2013 / 2014	2014 / 2015	2015 / 2016	2016 / 2017	2017 / 2018	2018 / 2019	2019 / 2020	2020 / 2021	2021 / 2022	2022 / 2023	2023 / 2024	2024 / 2025	Average
Flow, mgd	451	428	415	430	515	433	480	408	374	399	479	455	433	439
Ammonia, mg N/L	20.1	22.8	23.4	23.0	20.8	24.9	21.9	24.6	24.9	24.6	19.5	19.9	20.5	22.3
NOx, mg N/L	8.77	8.84	9.05	8.37	7.41	7.57	7.12	7.49	7.56	6.68	6.50	7.07	7.51	7.67
TIN, mg N/L[b]	28.8	31.6	32.4	31.4	28.2	32.5	29.3	32.3	32.5	31.3	26.0	27.0	27.9	30.0
TP, mg P/L	2.26	2.31	2.40	2.50	2.06	2.56	2.32	2.59	2.60	2.32	2.04	2.26	2.23	2.33

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2012/13 represents the period between October 1, 2012, and September 30, 2013.

b. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

Table 3-8. Discharge: Summary of Dry Season[a] Flow and Concentrations to San Francisco Bay

Constituent	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Flow, mgd	393	374	351	372	396	383	393	363	339	337	381	388	374	373
Ammonia, mg N/L	22.8	25.6	27.3	26.5	26.0	26.8	25.6	25.8	26.2	28.1	22.5	22.0	21.7	25.1
NOx, mg N/L	8.98	8.37	9.41	7.89	7.81	7.56	7.26	7.28	7.25	6.70	7.40	7.66	7.91	7.81
TIN, mg N/L[b]	31.8	34.0	36.7	34.4	33.8	34.4	33.0	33.2	33.6	34.8	30.0	29.7	29.5	32.9
TP, mg P/L	2.28	2.35	2.69	2.81	2.44	2.76	2.69	2.76	2.87	2.58	2.60	2.48	2.49	2.60

a. The dry season represents May 1 through September 30 for each calendar year.

b. The TIN values do not necessarily equal ammonia plus NOx due to instances when ammonia was sampled more frequently than NOx.

Table 3-9. Discharge: Dry Season[a] by Discharger, TIN (kg N/d)[b,c]

Discharger	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025[d]	Pre-2025 Average
American Canyon	111	79.7	30.7	20.1	24.7	31.8	29.2	19.4	15.4	11.3	15.0	23.7	28	34.3
Benicia	226	199	198	231	240	236	197	221	227	204	230	240	190	221
Burlingame	436	288	273	273	271	389	450	462	297	256	278	245	270	326
Central San	3,720	3,630	3,380	3,710	3,610	3,550	3,420	3,890	3,900	3,690	3,430	3,410	3,200	3,610
CMSA	844	841	721	964	1,220	954	1,090	1,170	1,100	1,090	997	1,100	1,200	1,010
Port Costa	--	0.0381	--	--	--	--	0.552	2.15	--	--	--	--	1.7	0.913
Delta Diablo	1,630	1,480	869	927	1,350	1,370	1,310	1,320	979	944	1,200	1,320	1,400	1,220
EBDA	7,170	7,190	7,870	7,440	6,940	8,080	7,880	7,700	6,870	6,890	7,320	7,030	7,200	7,370
EBMUD	8,910	9,070	9,390	8,960	9,760	10,200	9,900	8,960	8,410	9,960	7,330	7,610	6,000	9,040
FSSD	1,360	969	807	655	1,080	1,270	1,020	969	905	1,040	884	949	920	993
Las Gallinas[e]	0	0	0	0	8.99	0	51.4	47.1	0	0	0	0	0.0	8.96
Paradise Cove	2.52	0.287	2.61	1.53	2.62	2.11	2.13	1.31	0.977	0.877	2.22	2.45	2.4	1.80
Tiburon	46.8	56.1	53.2	62.6	45.0	57.6	--	27.7	45.5	46.7	43.5	41.8	54	47.9
Millbrae	247	207	236	293	291	250	307	276	276	245	254	268	300	262
Mt. View	101	112	103	122	116	110	106	108	90.4	41.6	56.5	49.3	54	93.1
Napa[e]	0	50.1	0	0	0	0	0	0	0	0	0	0	0.0	4.18
Novato[e]	39.9	42.3	37.5	38.2	98.2	43.1	100	23.1	8.21	0	118	38.9	87	49.0
Palo Alto	2,550	2,140	2,230	2,640	2,120	2,210	1,950	1,930	2,000	2,230	2,300	2,050	2,200	2,200
Petaluma[e]	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
Pinole	342	287	267	341	235	322	170	243	281	369	350	351	330	296
Rodeo	26.4	28.1	26.9	28.2	31.9	29.4	35.8	46.2	33.8	39.2	48.8	40.2	40	34.6
SFO Airport	257	285	165	205	343	89.2	169	19.4	68.4	90.5	212	55.2	95	163
SFPUC Southeast	8,650	10,300	10,000	9,880	10,600	9,050	8,260	6,780	6,840	7,400	7,040	7,380	7,000	8,510
San Jose	4,220	4,330	5,280	4,410	4,730	4,510	4,760	4,200	3,430	2,530	3,460	4,310	3,900	4,180
San Mateo	1,540	1,490	1,280	1,370	1,280	1,480	1,560	1,320	1,230	1,340	1,450	1,410	1,500	1,400
SMCSD	133	123	135	141	148	148	155	123	149	110	114	118	120	133
SASM	191	162	151	190	154	203	187	253	221	246	235	233	210	202
SVCW	1,880	1,940	2,380	2,510	2,440	2,320	2,500	2,350	2,500	2,460	2,560	2,280	2,500	2,350
Sonoma Valley[e]	0	0	0	0	4.21	0	0	0	0	0	2.33	0	0.0	0.546
South SF	916	906	879	915	919	995	1,020	1,250	1,220	1,220	1,230	1,040	620	1,050
Sunnyvale	360	371	324	341	630	392	617	391	446	460	720	621	750	473
Treasure Island	9.92	14.3	20.9	14.0	14.6	13.6	14.1	20.5	19.4	19.9	25.6	23.0	36	17.5
Vallejo	751	851	899	837	870	831	900	821	814	769	755	887	870	832
West County	663	663	683	918	1,040	806	955	731	734	692	628	462	580	748
Total [f]	**47,300**	**48,100**	**48,700**	**48,400**	**50,600**	**50,000**	**49,100**	**45,700**	**43,100**	**44,400**	**43,300**	**43,600**	**41,658.1[g]**	**46,900**

a. The dry season represents May 1 through September 30 for each calendar year.

b. Data are presented in detail and summarized for each Discharger in Attachment 1.

c. "--" indicates data were not available, whereas a "0" indicates a value of zero.

d. Dry season TIN loads reported for 2025 and later use the average dry season concentration and the average daily dry season flow to calculate the load. Dry season TIN loads reported for 2024 and earlier use the average of the monthly average dry season TIN loads for the dry season. Additionally, values prior to 2025 use three significant figures, while values for 2025 and later use two. The new method follows the requirements of the Regional Water Board as given in the minor modification letter issued on December 5th, 2025 (CW-894802).

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

g. Intentionally not rounded because the Permit does not specify rounding when comparing total baywide loads with the final aggregate effluent limit.

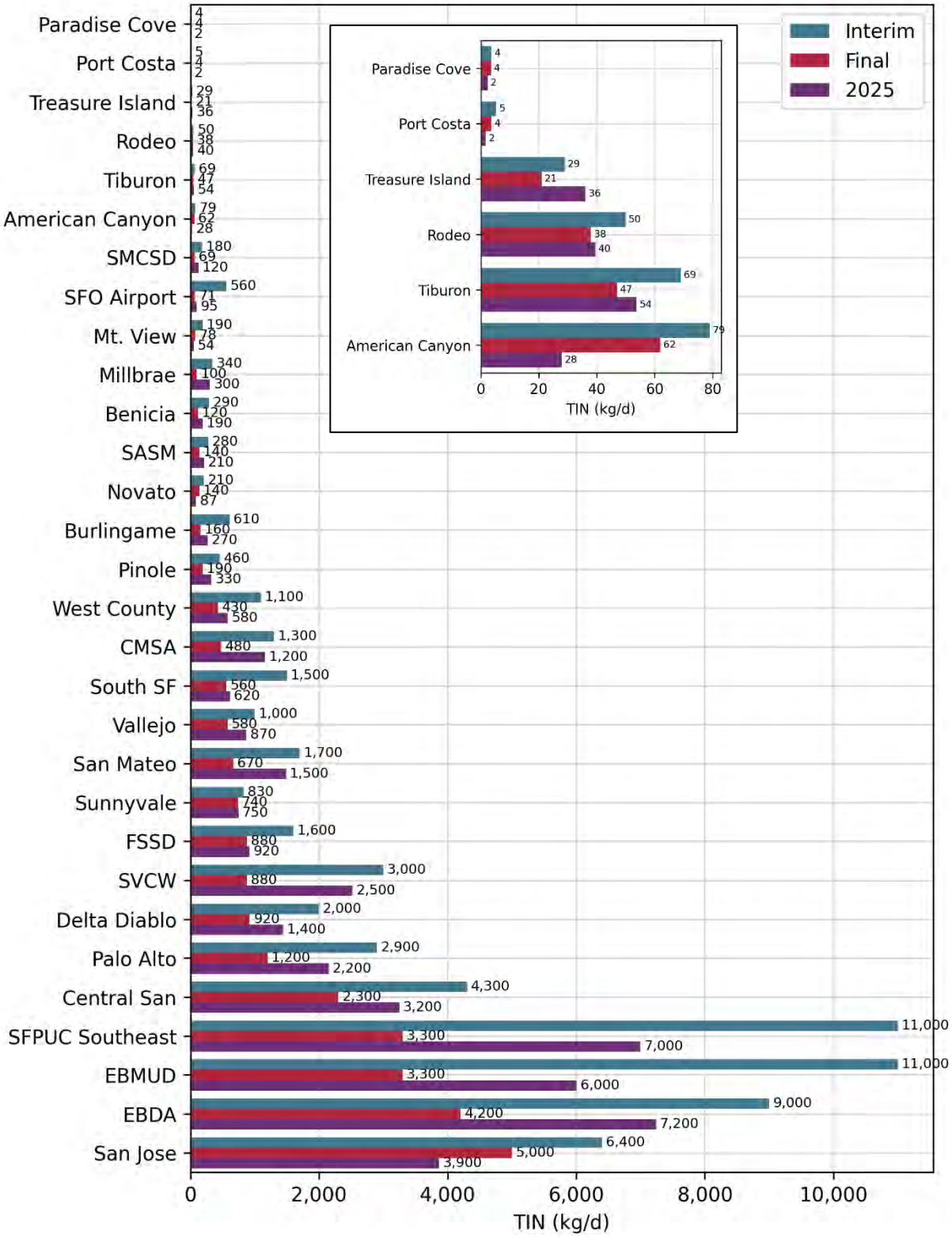


Figure 3-3. Individual Discharge Loads for 2025 Compared to the Dry Season TIN Limits (Interim and Final)

3.3 Trend Analysis

This section contains the findings from the trend analysis performed for aggregated (baywide and by subembayment) influent and effluent flows and nutrient loads. Results for individual Dischargers are found in Appendix B. Figure 3-4 displays the estimated coefficients and 95% confidence intervals for the average impact of the COVID-19 pandemic for San Francisco Bay and its subembayments (i.e., the average difference between the pandemic period and the non-pandemic period). Figure 3-5 and Figure 3-6 show the estimated coefficients and 95% confidence intervals for the slopes of the trends before, during, and on average for the entire period, for the entire bay and for each subembayment for all flows and loads. Figure 3-7 presents an example regression for baywide TIN. The coefficient representing the average impact of the pandemic is demonstrated in Figure 3-7 by the step decrease in 2020. It should be noted that interpreting pandemic-related coefficients is complicated by the nutrient reduction efforts taking place at the treatment facilities. This analysis provides correlative results that do not necessarily indicate causation.

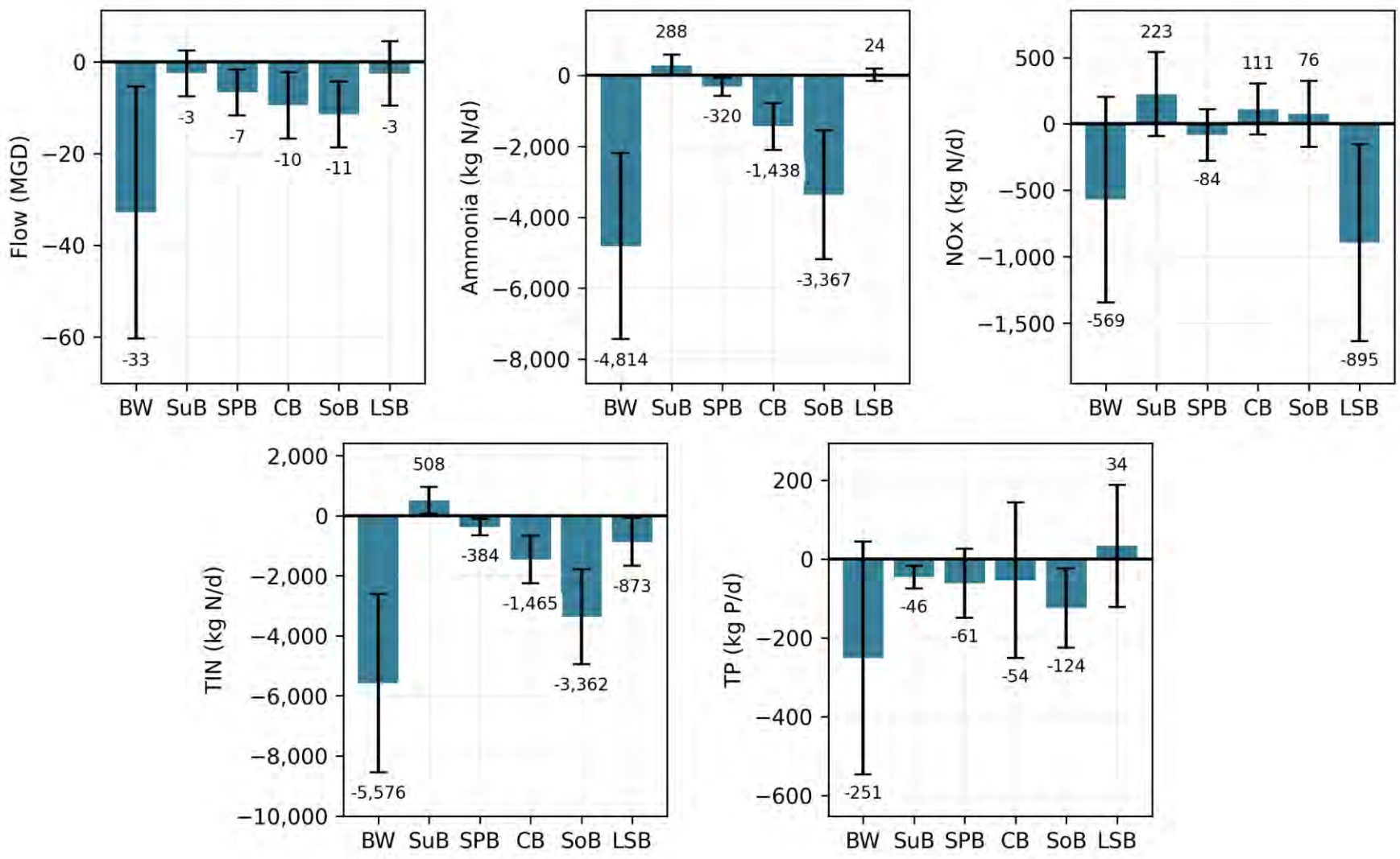


Figure 3-4. Estimated Coefficients and 95% Confidence Interval for the COVID-19 Pandemic Regression Variable (BW = Baywide, SuB = Suisun Bay, SPB = San Pablo Bay, CB = Central Bay, SoB = South Bay, LSB = Lower South Bay)

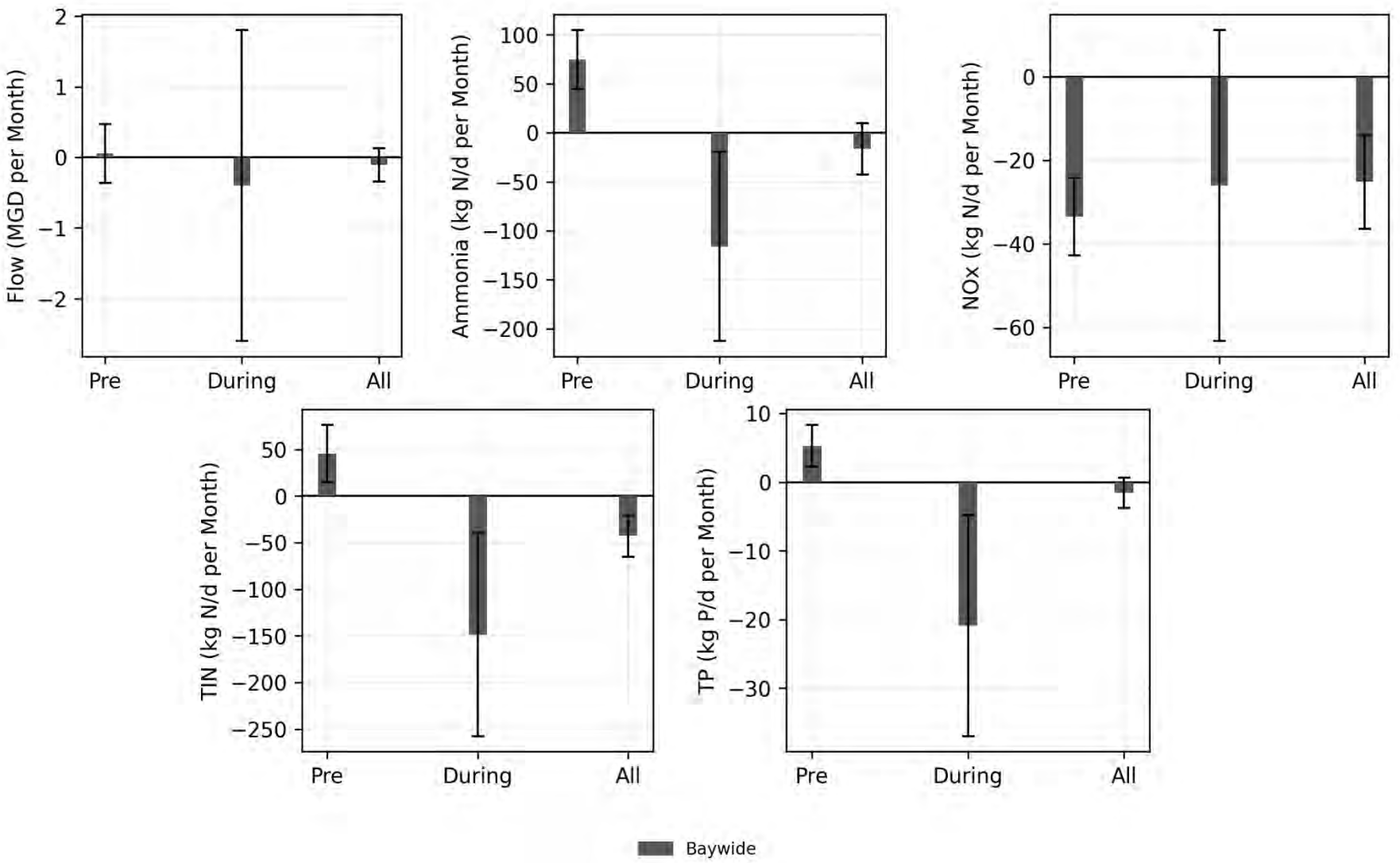


Figure 3-5. Flow and Load Trends for Pre-Pandemic, During Pandemic, and Across All Time for San Francisco Bay with 95% Confidence Interval

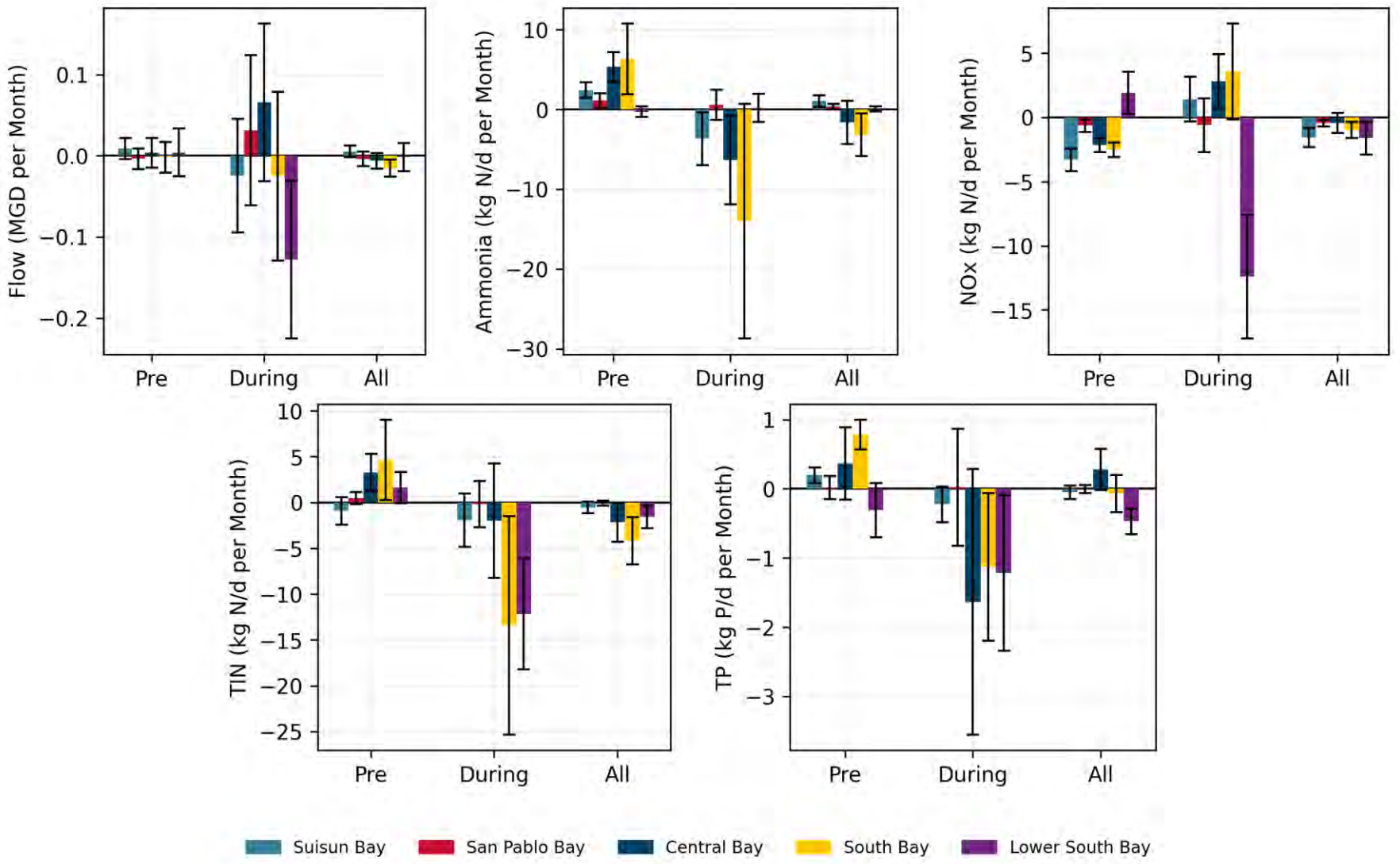


Figure 3-6. Flow and Load Trends for Subembayments Pre-Pandemic, During Pandemic, and Throughout the Study Period Without Accounting for the Pandemic (All), with 95% Confidence Interval

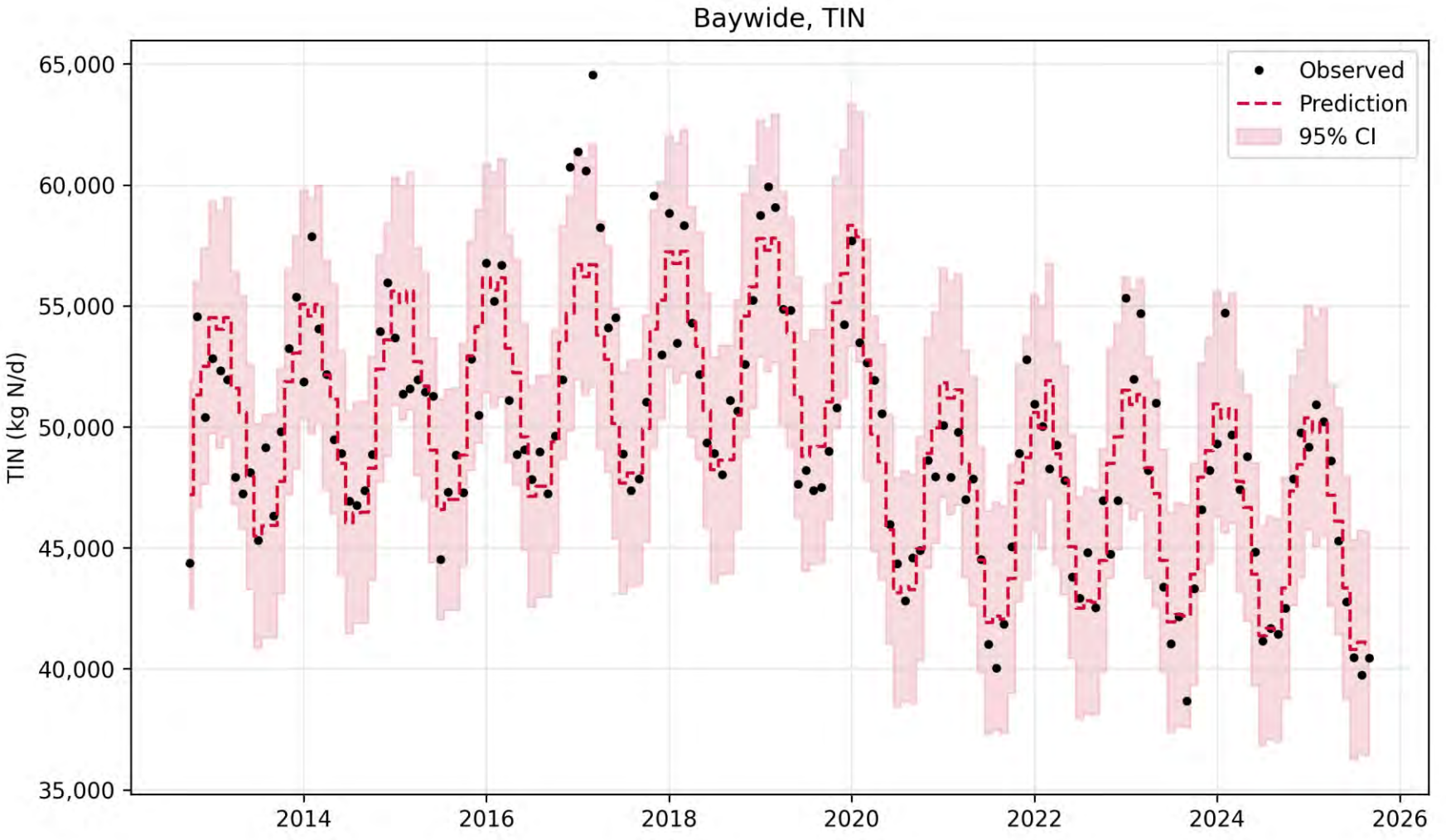


Figure 3-7. Example of Deseasonalized Linear Regression on Baywide Discharge TIN (Includes Covariates to Account for COVID-19 Pandemic)

3.4 Recycled Water

This report relies on the recycled water volume data compiled by the State Water Board in the Volumetric Annual Report (VAR) (see Section 2.5). In cases where the recycled water volumes reported by the Discharger vary from the VAR data, the volumes provided by the Discharger are used. This report couples those recycled water volumes with average effluent nutrient concentrations to estimate the reductions in nutrient loading to San Francisco Bay attributable to recycled water. Table 3-12 and Table 3-13 provide the percent flow and loads diverted from San Francisco Bay due to recycled water.

Table 3-10. Recycled Water: Annual Average[a] Flow and Loads Diverted from San Francisco Bay

Parameter	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024[b]	Average
Flow, mgd	42	47	44	37	40	42
Ammonia, kg N/d	1,600	1,800	2,300	1,300	1,400	1,700
NOx, kg N/d	1,300	1,300	1,100	9,00	970	1,200
TIN, kg N/d [b]	2,900	3,000	3,400	2,200	2,900	2,900
Total P, kg P/d	260	270	240	200	170	230

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2019/2020 represents the period between October 1, 2019, and September 30, 2020.

b. Starting in 2023/2024, flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions.

c. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

Table 3-11. Recycled Water: Dry Season[a] Average Flow and Loads Diverted from San Francisco Bay

Parameter	2019	2020	2021	2022	2023	2024	Average
Flow, mgd	55	60	64	61	54	58	59
Ammonia, kg N/d	3,000	1,900	2,300	3,500	1,900	2,100	2,500
NOx, kg N/d	1,600	1,900	1,800	1,600	1,400	1,400	1,600
TIN, kg N/d[b]	4,500	3,800	4,100	5,100	3,400	3,500	4,100
Total P, kg P/d	320	370	350	310	280	260	320

a. The dry season represents May 1 through September 30 for each calendar year.

b. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

Table 3-12. Recycled Water: Percent of Annual Average[a] Flow and Loads Diverted from San Francisco Bay[b]

Parameter	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Flow	9%	11%	10%	7%	8%	9%
Ammonia	4%	5%	6%	4%	4%	5%
NOx	10%	11%	10%	7%	7%	9%
TIN[c]	5%	6%	7%	5%	5%	6%
Total P	6%	7%	6%	5%	4%	6%

a. October 1 through September 30.

b. The percent diverted from San Francisco Bay due to recycled water is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

Table 3-13. Recycled Water: Percent of Dry Season[a] Average Flow and Loads Diverted from San Francisco Bay[b]

Parameter	2019	2020	2021	2022	2023	2024	Average
Flow	12%	14%	16%	15%	12%	13%	14%
Ammonia	7%	5%	7%	9%	6%	6%	7%
NOx	13%	16%	16%	16%	12%	11%	14%
TIN[c]	8%	8%	9%	10%	7%	7%	8%
Total P	7%	9%	9%	9%	7%	7%	8%

a. The dry season represents May 1 through September 30 for each calendar year.

b. The percent diverted from San Francisco Bay due to recycled water is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. The TIN values do not necessarily equal ammonia plus NOx due to a combination of rounding and instances when ammonia was sampled more frequently than NOx.

3.5 Removal Performance

Figure 3-8 shows the distribution of influent, discharge, and recycled water flows for the 2024 dry season for POTWs with permitted capacities greater than 10 mgd (major plants). Facilities with permitted capacities lower than 10 mgd are not required to report influent data. This analysis is limited to the previous year because the recycled water data lag one year behind the flow and load data. Figure 3-9 shows the influent, discharge, recycled water flows and loads and the estimated removal for TN (TN influent data are compared to discharge TIN data to estimate the nitrogen removal provided by each POTW). Figure 3-10 shows the influent, discharge, recycled water, and estimated removed TP loads. Several key concepts should be noted when interpreting these results:

- The analysis underestimates the removal performance for POTWs that accept trucked wastes for codigestion (e.g., EBMUD, CMSA, SVCW).
- The sum of discharge and recycled water flows may not equal the influent flow due to measurement errors in the data. Generally this error is within 2% of the total.

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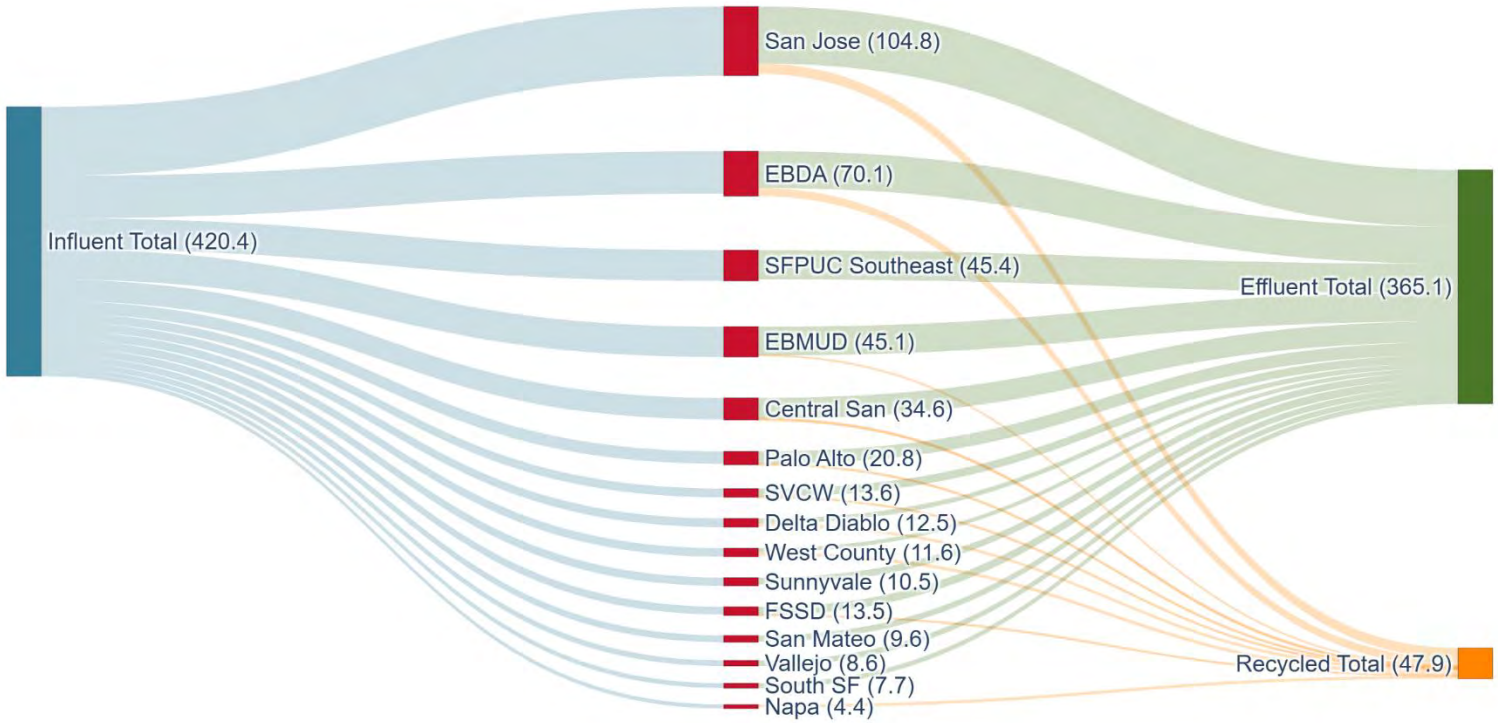


Figure 3-8. Dry Season Influent, Effluent, and Recycled Water Flows (mgd)

Note: limited to POTWs with ADWF permitted capacity of >10 mgd.

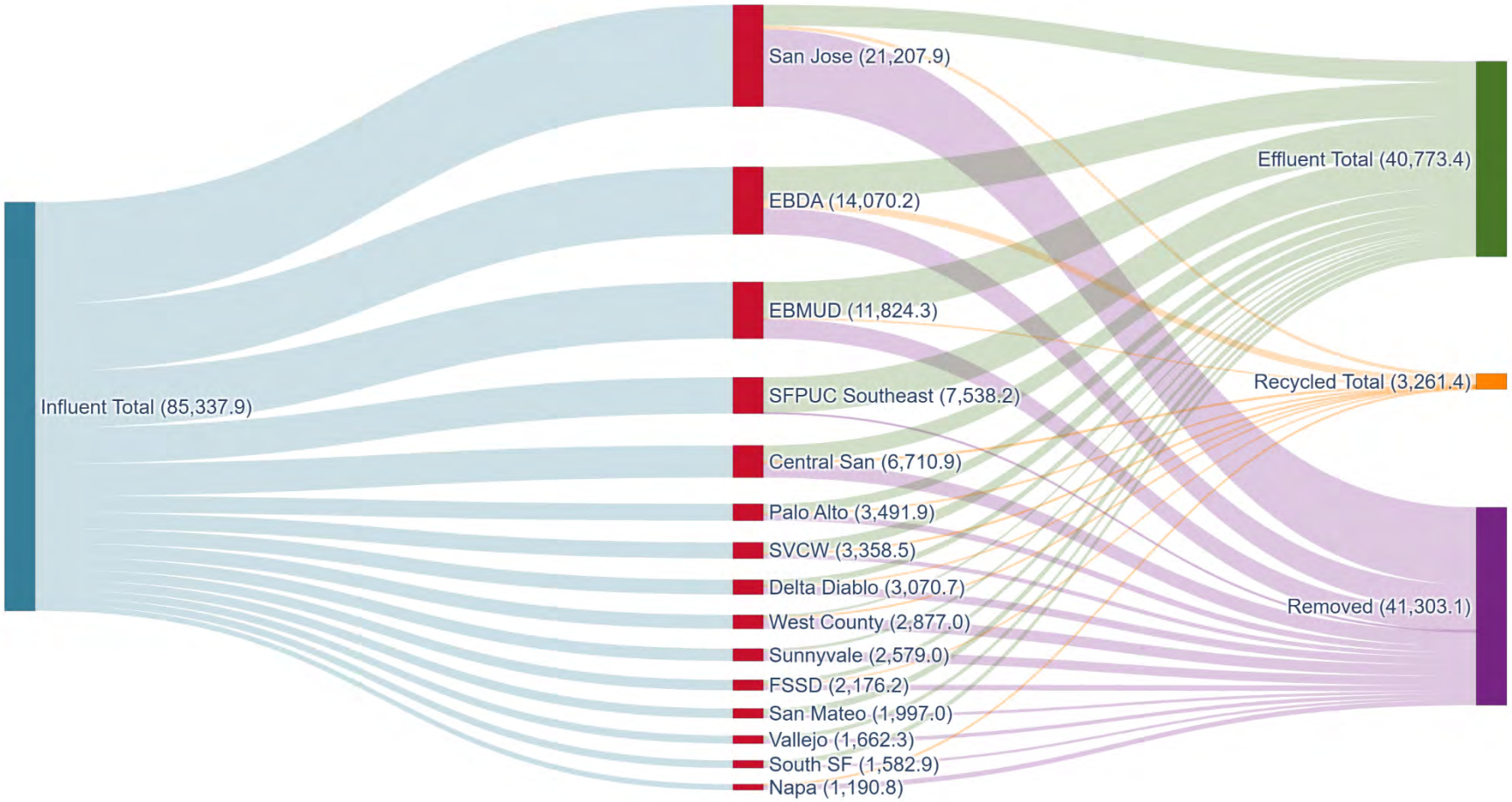


Figure 3-9. Dry Season Influent (TN), Effluent (TIN), and Recycled Water (TIN) Loads (kg N/d)

Note: limited to POTWs with ADWF permitted capacity of >10 mgd.

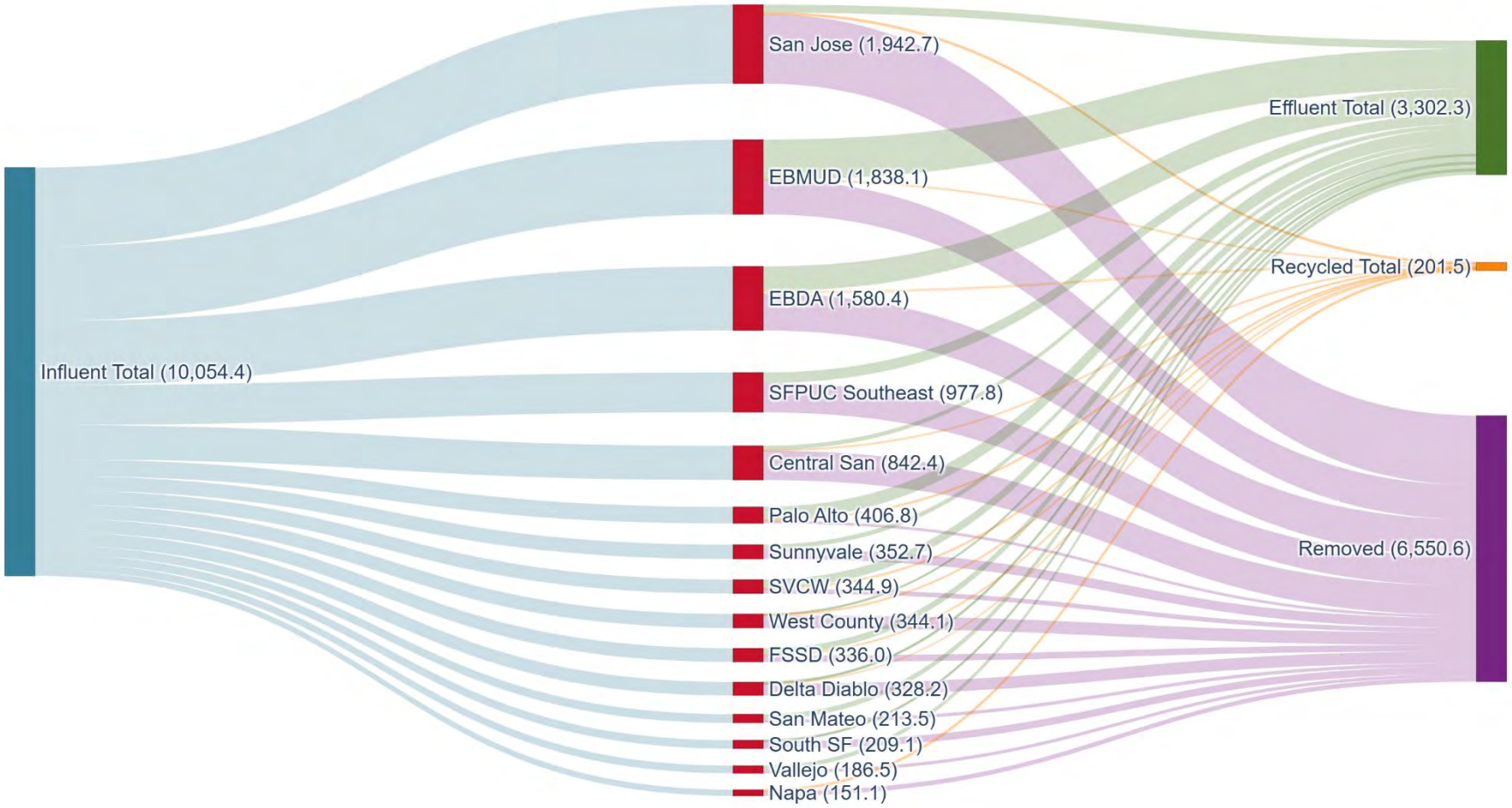


Figure 3-10. Dry Season Influent, Effluent, and Recycled Water TP Loads (kg P/d)

Note: limited to POTWs with ADWF permitted capacity of >10 mgd.

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4 Discussion

Flows and nutrient loads discharged to San Francisco Bay are affected by many factors, including weather, population growth, and treatment plant operations and upgrades. This section provides a discussion of the results of the flow and load analysis and provides context from relevant variables (precipitation, population growth, treatment plant upgrades).

4.1 Annual Precipitation

As shown in Figure 4-1, the 2024/2025 water year was the fourth driest among those considered in the plot (the earliest year shown is 2010/2011). Figure 4-2 shows that monthly precipitation and flows follow a similar pattern, which suggests a relationship between the two variables.

The impacts of relatively low precipitation are well-documented on wastewater treatment plants. The most notable impact is relatively low peak flows compared to the dry season flows. Accordingly, the ratio of the 2024/2025 annual average flow to the 2025 dry season flow is the lowest since the 2020/2021 water year, which was also a drier year. In general, because it was an average year rather than an extremely wet or dry year, the impact of precipitation during the 2024/2025 water year on variables other than flow is unlikely to be significant.

4.2 Population Trends

Figure 4-3 (top subplot) shows the total population of the cities associated with the Dischargers included in this report. The decreases in 2021 and 2022 were associated with the COVID-19 pandemic. The bottom subplot of Figure 4-3 shows the populations separated by subembayment. The South and Lower South subembayments experienced the greatest decline in population in both absolute numbers and year-on-year percent change (Figure 4-4). San Pablo and Suisun Bays experienced the smallest relative declines in population during the pandemic years while the Lower South Bay rebounded the fastest. The population has still not recovered to pre-pandemic levels, with a gap of approximately 100 thousand remaining. However, the total average year-on-year growth appears to have returned to the same as 2018 and 2019, the primary exception being Central Bay which experienced an unusually large growth rate from 2019-2020.

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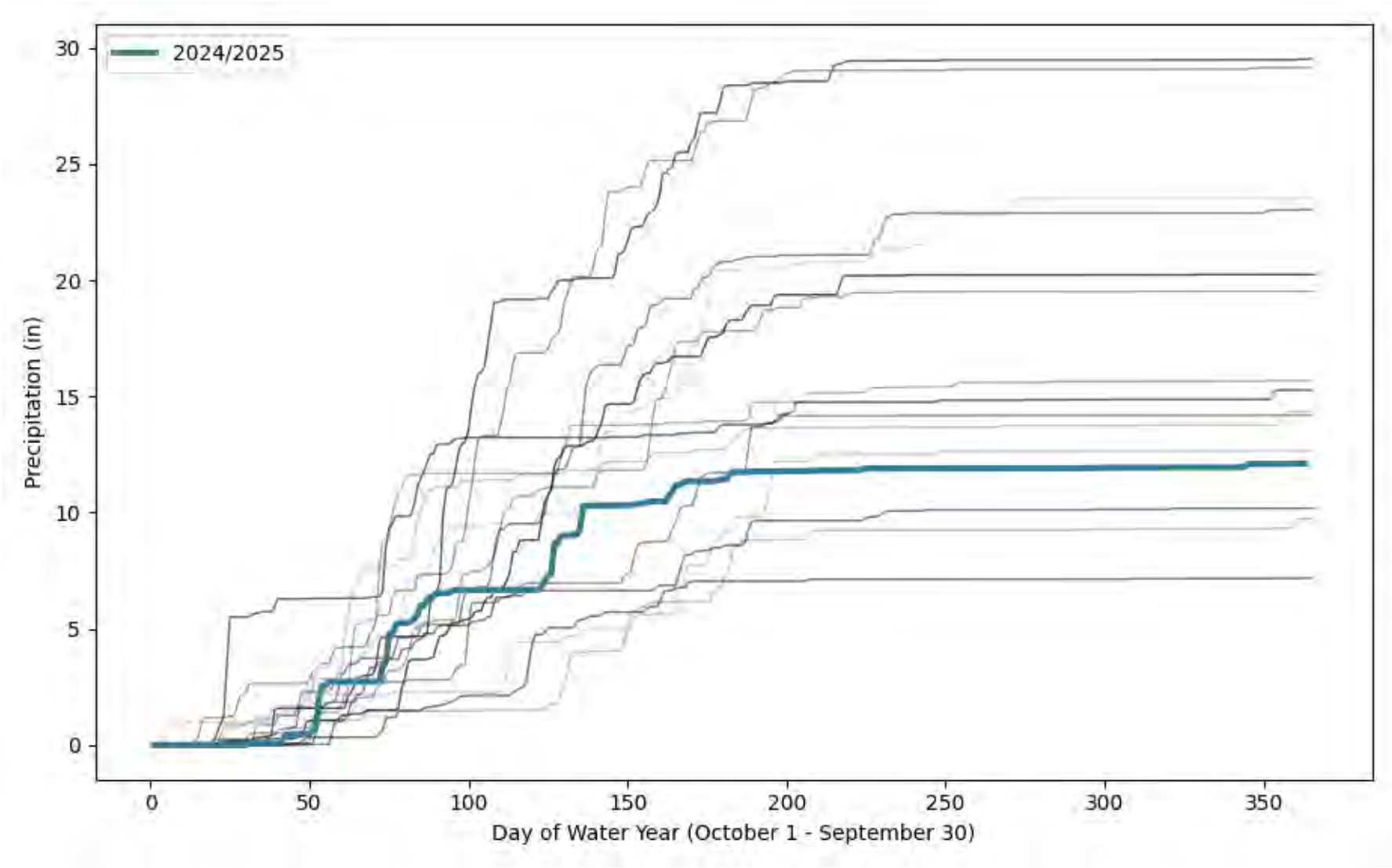


Figure 4-1. Daily Cumulative Precipitation (Average Regional)

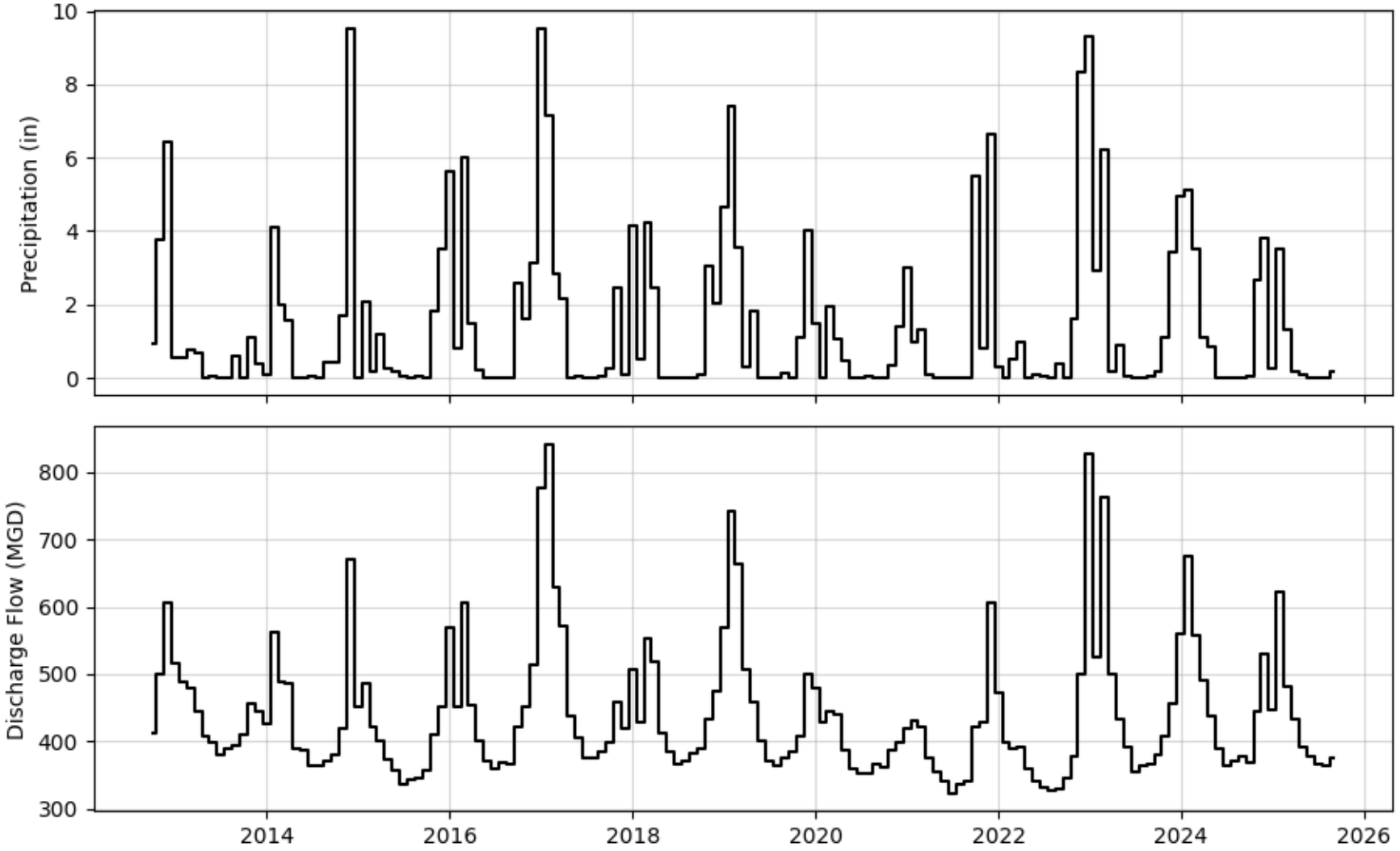


Figure 4-2. Historical Monthly Precipitation in the San Francisco Bay Area and Influent Flows (Data from the National Oceanic and Atmospheric Administration) (Gaps Are Due to Missing Data)

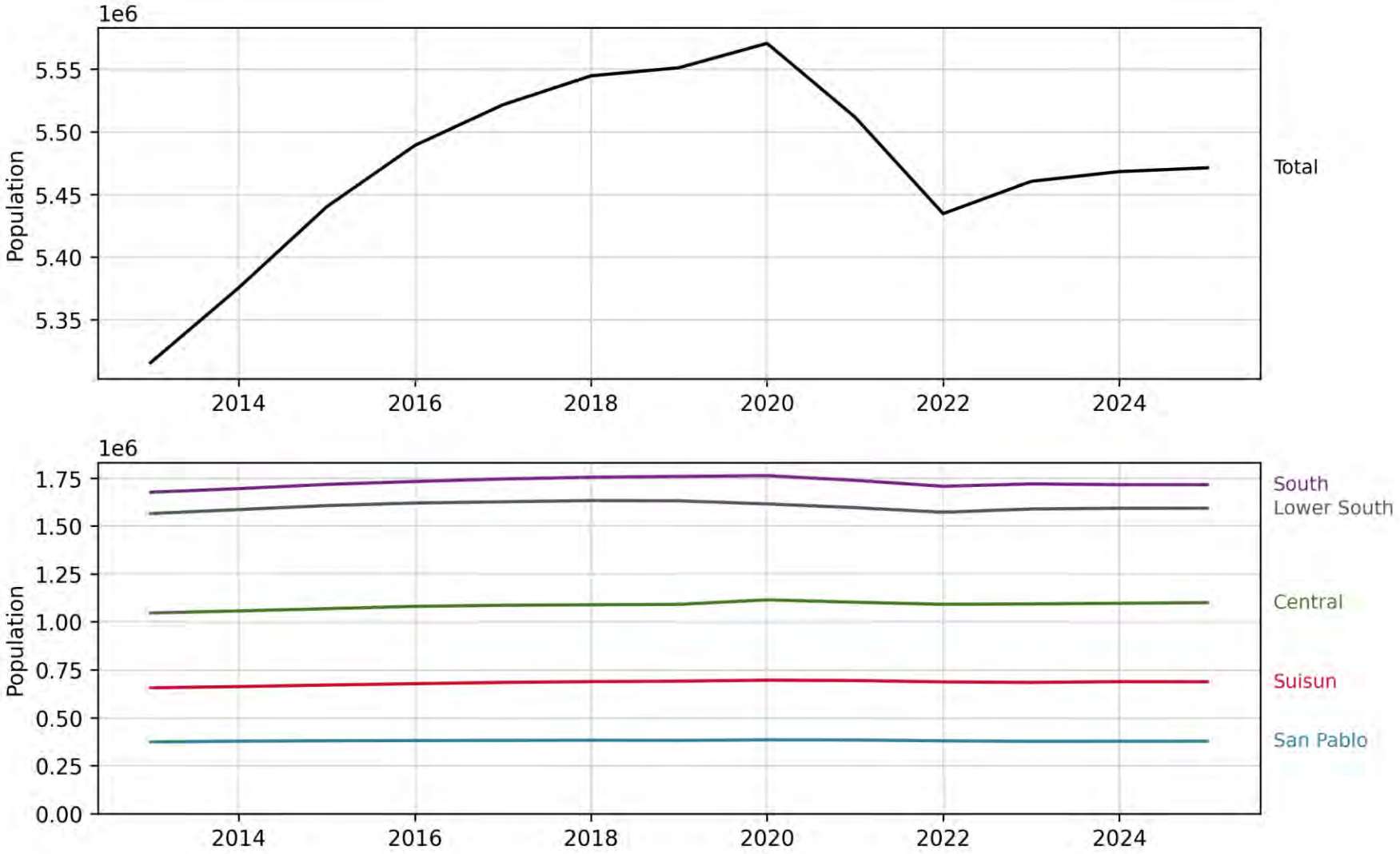


Figure 4-3. Population in the San Francisco Bay Area (See Section 2.9 for Methods)

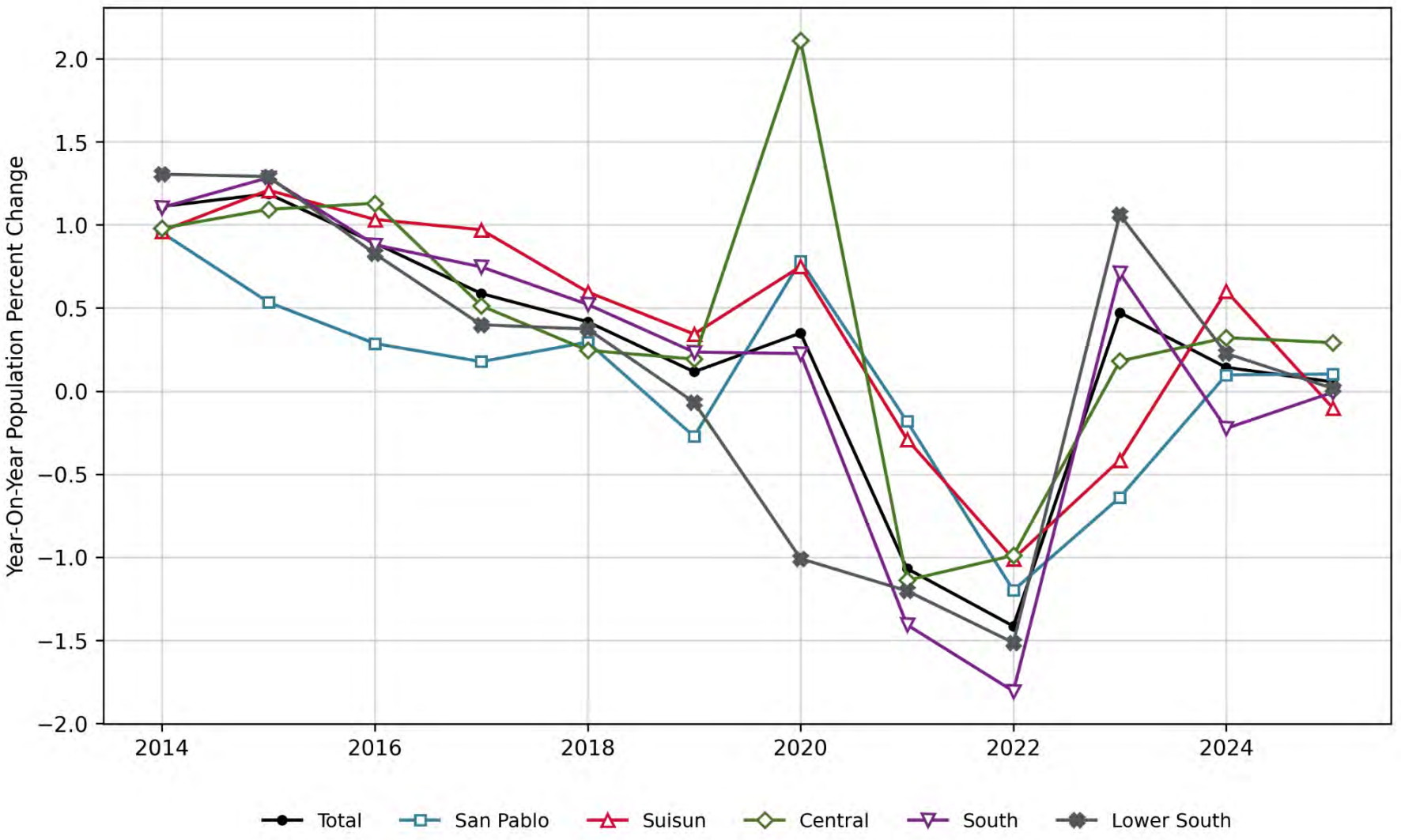


Figure 4-4. Year-On-Year Percent Change in Population Associated with Bay Area POTWs in Each Subembayment

4.3 Plant Optimization/Upgrades

Many POTWs have been or are in the process of being upgraded to improve nutrient removal. Brief descriptions of these upgrades are as follows (in alphabetical order):

- **Delta Diablo**
    - In the process of completing the design for Phase 1 upgrades at the treatment plant to replace aging infrastructure and prepare the plant for nitrogen reduction.
- **East Bay Municipal Utility District Water Pollution Control Plant**
    - On April 30, 2024, EBMUD stopped accepting trucked blood waste, which has a high concentration of nitrogenous compounds, for codigestion.
    - The treatment plant began treating up to 50% of the dry season plant flow via split treatment with biological nitrification/denitrification starting in the 2023 dry season.
    - During the 2025 dry season, optimization efforts improved the process performance by treating more of the flow which is anticipated into the future. Improved performance during the 2025 dry season is also attributable to EBMUD maintaining populations of bacteria necessary for nitrogen removal over the winter, which had not been done previously.
- **Fairfield-Suisun Sanitary District**
    - In the process of nitrogen removal upgrades in Phase 1 (anticipated completion in 2027) that will include anoxic zones and mixed liquor return pumping.
- **Hayward Water Pollution Control Plant**
    - Completed the design for plant upgrades to replace aging equipment and reduce nutrient discharge loads. The design has been completed. Hayward is waiting for WIFIA funding prior to selecting the contractor and beginning construction.
- **Oro Loma/Castro Valley Sanitary Districts Water Pollution Control Plant**
    - Implemented an ammonia and TIN load reduction technology by modifying and expanding their existing activated sludge system in the Summer of 2020. The technology upgrade is known as the Modified Ludzack-Ettinger (MLE) system.
    - Implemented a sidestream full-scale demonstration using Microvi's MicroNiche Engineering™ (MNE) technology that reduces the ammonia load associated with their biosolids dewatering return stream in 2019 which is still operational.
- **Palo Alto Regional Water Quality Control Plant**
    - Began construction in 2023 on a nearly $200M treatment plant upgrade. The upgrade includes replacement of various aged equipment and other capital improvements, including expansion of the activated sludge process to reduce TIN loads, construction of a new headworks facility, and relining of an aging joint intercepting sewer. While Palo Alto already reliably removes ammonia, these

upgrades will reduce their TIN loads. The upgrades are anticipated to take approximately 5 years to implement.

  - The decision has been made to move forward with a Nature-based Solution (NbS) project to further polish a portion of the final effluent prior to discharging to the Lower South Bay.

- **Pinole-Hercules Water Pollution Control Plant**
  - Implemented an ammonia and TIN load reduction technology by modifying and expanding their existing activated sludge system in Spring 2019 to an MLE system. Plant staff are actively developing a plan to increase the solids residence time to provide ammonia/TIN load reduction.
- **San Jose-Santa Clara Regional Wastewater Facility**
  - Began optimization in 2019 within the existing Biological Nutrient Removal (BNR) system which has been tested and subsequently improved upon from 2020 through 2022. For reference, the 2024 dry season loads were 500 kg N/d lower than the 12-Year average. Optimization of TIN load reduction has been achieved by the following:
    - Reduction in DO set-points for the BNR aeration basins, implemented through reduced fine-bubble diffuser aeration. The reduced DO along with reconfiguring aeration basins with baffles to improve mixing under reduced aeration conditions has increased denitrification zones and fostered additional TIN reduction.
    - Reduced aeration in the mixed liquor channels has also fostered additional TIN and TP load reductions.
    - In addition, secondary blowers, meters, process controls, and clarifiers have been or are currently undergoing substantial rehabilitation or replacement as part of the Facility CIP, which has aided further reduction of nutrient loads by providing better process control.
- **San Mateo Wastewater Treatment Plant**
  - Began construction in 2021 for a plant upgrade that will incorporate nutrient management technologies. Construction and commissioning are slated to be completed in 2026.
- **Sunnyvale – Water Pollution Control Plant:**
  - The Sunnyvale Cleanwater Program is upgrading the City's Water Pollution Control Plant with various wastewater projects that includes an MLE upgrade, sidestream treatment, and others. These efforts will reduce ammonia and TIN loads, as well as increasing the water quality for reuse. The project is expected to be completed in year 2028.

- **Treasure Island**
    - Completing construction of the new Treasure Island Water Resource Recovery Facility in 2026. The new treatment plant will be a membrane bioreactor with nitrogen reduction features.
- **Union Sanitary District**
    - Began construction in 2022 for a BNR through the Enhanced Treatment and Site Upgrade (ETSU) program. Phase 1 of ETSU began construction in 2022; the anticipated completion date has been revised to 2031. Phase 1 of ETSU includes retrofits of existing aeration basins to operate with an anaerobic selector and BNR process, new clarifiers, and new chlorination and dechlorination facilities. The estimated capital cost has been revised to $485M. The estimated TIN reduction is 44-50%.
- **West County Wastewater**
    - Completed several plant expansion and upgrade projects in late 2017. The expansion and upgrades reduced nutrient load by enhancing the nitrification reliability and facilitated denitrification by a MLE process configuration.

This list is limited to agencies that are in construction and/or have optimized their nutrient load management strategies. There are several agencies that are in the process of designing nutrient load management upgrades (e.g., Central San is replacing their aeration system and repurposing tankage to enable step-feed treatment) and others that have already implemented nutrient removal (e.g., American Canyon). See Attachment 2 for additional details on planned nutrient removal efforts.

4.4 Influent Flows and Loads

The influent data analysis is limited by several factors:

- Not all Dischargers monitor and report the influent nutrient concentrations (only Dischargers with a dry season permitted capacity greater than 10 mgd).
- Since Dischargers sample during different months, developing historical load plots requires plotting quarterly averages (e.g., refer to Figure A-2 for an example plot).
- There are instances during the first year of sampling where sampling for a particular nutrient did not occur.
- Throughout the dataset, there are occasionally quarters where a Discharger sampled within the requirements of the permit, but ammonia and NOx were not sampled on the same day, which means TIN could not be calculated (the same issue is observed for TN, which is the sum of TKN and NOx).
- Analytical measurement issues with the influent sampling matrix. Specifically, the effluent matrix is considerably cleaner compared to raw influent and as a result is less prone to analytical issues. There are several instances where the ammonia concentration is recorded as greater than the TKN concentration for the same sample. This is not possible because TKN is the sum of ammonia and organic nitrogen.

4.4.1 Flow

The 2024/2025[11] baywide annual average influent flow (448 mgd) was the lowest since 2021/2022 (415 mgd). The annual average flows for the last three years have correlated strongly with precipitation, as expected. The 2025 baywide dry season average influent flow (409 mgd) was 11 mgd lower than in 2024 (a 2.6% reduction) and 8 mgd higher than the average since 2019 (a 2.0% increase). While average annual flows appear to correlate strongly with precipitation, dry season flows do not appear to show the same relationship. For example, the 2024 dry season average flow was greater than the 2023 dry season average flow despite the 2022/2023 wet season having more precipitation. It is possible that the effects of having back-to-back very wet years (2022/2023 and 2023/2024) resulted in the 2024 dry season having greater flows.

4.4.2 Nitrogen

The 2024/2025 baywide annual average influent ammonia load was 3.9% lower than the 2023/2024 load and 1.2% lower than the average since 2019/2020. The 2025 dry season ammonia load was 2.7% lower than in 2024 and 2.9% lower than the average since 2018. The annual average influent NOx loads for 2024/2025 were 18% greater than in 2024 and 27% greater than the average since 2019/2020. Similarly, the 2025 dry season NOx loads were 31% and 40% greater than in 2024 and the average since 2018/2019, respectively. The increase in dry season NOx is significant and appears to be driven by large increases (relative to 2024) in influent NOx by SFPUC Southeast (200 kg N/d; 200%), San Jose (330 kg N/d; 34%), and West County (38 kg N/d; 180%). A notable decrease in dry season influent NOx was observed by SVCW (53 kg N/d; 81%). NOx accounts for approximately 1.8% of influent nitrogen on average.

The 2025 influent dry season TIN load was 1.2% lower than in 2024 and 2.2% below average. Influent TIN loads and concentrations contribute on average approximately two-thirds of the total nitrogen loads and TKN represents over 90%. Annual average and dry season TKN and TN loads remained relatively stable in 2025. The baywide influent dry season TKN load was 1% lower than in 2024 and 2.3% lower than the average since 2019. Similarly, the baywide influent dry season TN load was 1.6% lower than in 2024 and 1.6% lower than the average since 2019.

There are a few instances of missing data per plant that inform the TIN calculation (TIN = ammonia + nitrate + nitrite; refer Table A-13 and Table A-14). Due to missing data, the dry season TIN total loads for 2019 appear to be the lowest. After 2019, all Dischargers required to report values have provided the required data. As previously noted, seasonal Dischargers only need to collect samples when discharging (e.g., Napa typically does not discharge during the dry season and is not required to measure influent nutrient parameters during periods of zero discharge).

There are concerns that SFPUC Southeast dry season data for 2021 might have a sampling artifact as there are ELAP-certified samples for which the TKN concentration was less than the ammonia concentration. Such values will impact TN values as TN equals the sum of TKN and Nitrite+Nitrate.

TKN is included for the influent (but not discharge) because it captures the organic nitrogen loading into the plant (TKN = ammonia + organic nitrogen). The majority of influent organic

[11] October 1, 2024, through September 30, 2025.

nitrogen is oxidized to ammonia in the treatment plant. A small portion of this organic nitrogen, typically the fraction that is not bioavailable, is discharged (typically about 1.5 to 3.5 mg N/L). While this represents a relatively small proportion of discharge, it is an important component for the nitrogen balance within the treatment plant.

4.4.3 Phosphorus

The annual average influent TP loads for 2024/2025 were 4.6% greater than in 2024 and 0.89% greater than the average since 2019/2020. The 2025 dry season TP loads were 13% and 6.5% greater than in 2024 and the average since 2018/2019, respectively. The increase appears to be largely driven by an increase in influent dry season TP observed by San Jose (1,190 kg P/d; 61%).

4.5 Discharge Flows and Loads

Discharge flows and nutrient loads have been reported by all the Dischargers since 2012. The dataset is complete with occasional exceptions for smaller dischargers under 1 mgd permitted capacity.

4.5.1 Flow

The 2025 baywide dry season average discharge flow, which represents base sanitary flow more accurately than the annual average, was 0.5% higher than the all-time average and 3.4% lower than in 2024. The 2024/2025 baywide annual average discharge flow was 1.4% lower than the all-time average and 4.8% lower than in 2024. The last three years have seen steadily decreasing annual average flows that appear to be proportional to the amount of precipitation each year. The ratio of a Discharger's annual average flow to their dry season flow indicates the extent to which flows are impacted by precipitation each year and the amount of flow diverted from discharge through recycled water. A greater increase in the annual average indicates greater inflow and infiltration to the sewer system and/or greater recycled water volumes during the dry season. The average percent increase in average annual flow compared to dry season flow ranges from 6% for Paradise Cove to 332% for Novato. Most Dischargers are in the range of 6% to 23%, with several in the range of 31% to 49%. CMSA (45% increase) is a notable example where wet weather produces results in very large flows through the plant. Novato's increase is mainly attributable to large recycled water volumes during the dry season. (Note: SFPUC Southeast operates a combined stormwater/wastewater collection system and thus experiences extremely high peak wet weather flows. SFPUC Southeast's wet weather have been excluded from this analysis due to the bias that including stormwater flows would produce.)

Dischargers with notable year-on-year (2024 to 2025) reductions in dry season discharge flow include SFO airport (0.19 mgd; 17%) and West County (1.0 mgd; 15%). Notable increases relative to 2024 in dry season flow, although small in absolute terms compared to aggregate total flow, were observed for Novato (0.693 mgd; 98%) and Treasure Island (0.185 mgd; 63%).

4.5.2 Nitrogen

The four largest Dischargers in terms of TIN loads to San Francisco Bay during the 2025 dry season are EBDA (17%), SFPUC Southeast (17%), EBMUD (14%), and San Jose (9.4%). The Central Bay and South Bay received the highest dry season TIN loads during the 2025 dry season (20% and 47%, respectively, and 67% total).

The most notable finding this year is that the dry season average discharge of ammonia and TIN are the lowest yet recorded, continuing the downward trend that began in 2020. The average dry season ammonia load in 2025 was 1,700 kg/d lower than in 2024 (5.0% lower) and 4,700 kg/d lower than the average since 2013 (13% lower). This reduction is likely attributable to a combination of factors, including efforts made by Dischargers to reduce nitrogen and a lower dry season influent ammonia load (3.9% lower than in 2024). Comparison of the 2025 dry season average TIN to past years is complicated by the change in method of calculation, meaning the numbers are not directly comparable. However, in most cases the difference between the two calculation methods is slight. Assuming the numbers are comparable, the 2025 dry season average TIN discharge load is 1,940 kg/d lower than in 2024 (4.5% reduction) and 5,240 kg/d lower than the pre-2025 average (11% reduction).

This reduction in TIN discharge is likely attributable to a combination of factors, including activities by Dischargers to reduce nitrogen discharges as well as lower influent nitrogen loads (influent dry season total nitrogen was 1.6% lower in 2025 compared to 2024). Notable reductions in dry season TIN discharge were observed by EBMUD (1,600 kg/d; 21%), South SF (420 kg/d; 46%), San Jose (410 kg/d; 10%), SFPUC Southeast (380 kg/d; 5%), Central San (210 kg/d; 6%), Benicia (50 kg/d, 21%), SASM (23 kg/d; 10%). The significant reductions observed by EBMUD are due to two primary factors: 1) optimization efforts focused on improving nitrification and denitrification within the biological process and 2) as of April 30, 2024, EBMUD stopped accepting animal blood waste, which is a material that is high in nitrogen, for their digesters.

The downward trend in ammonia and TIN loads observed since 2020 is attributed to a variety of factors, including 1) COVID-19 pandemic (initially), 2) several treatment plants implementing nutrient load reduction strategies (e.g., Pinole, Oro Loma/Castro Valley Sanitary District, which is part of EBDA), 3) optimization of treatment plants for nutrient management (e.g., San Jose, EBMUD, etc.), 4) piloting of nutrient removal technologies, and 5) increased recycled water volumes.

While EBMUD's reduction in TIN is mainly due to a reduction in ammonia, San Jose's is a result of reduced NOx discharge. San Jose and the other Lower South Bay Dischargers are already required to treat wastewater to low discharge ammonia concentrations, as evidenced by the average Lower South Bay discharge ammonia concentrations that are consistently an order of magnitude lower than the other subembayments. This means the Lower South Bay Dischargers have the highest discharge NOx concentrations, and any TIN reductions will be a result of improving denitrification rather than nitrification. As more facilities improve or implement nitrification, NOx loads may increase.

Dry season discharge loads are generally lower than wet season loads. In theory, increased flows during the wet season due to precipitation should not increase the discharge loads because the input loads are approximately the same. Rather, the effluent concentrations should merely be lower (diluted) to compensate for the higher flows. The difference between wet and dry season

loads is attributed to three main factors: 1) the higher flows experienced during wet weather events may scour the collection system, bringing a greater load to the treatment plant, 2) warmer temperatures during the dry season facilitate nitrification and biological activity in general, and 3) recycled water diverts nutrient loads away from San Francisco Bay primarily during the dry season. In some cases, Dischargers discharge little or no flow during the entire dry season (e.g., Petaluma). Additional data would be needed to investigate the correlation between flow and loads during peak wet weather events.

In some cases, the tabulated TIN loads are not equal to the sum of ammonia and NOx loads. This most often occurs when Dischargers sample for ammonia more frequently than NOx, leading to more samples being included in the ammonia load calculation. The average monthly ammonia loads are based on the average for each sampling event during that particular month. In contrast, TIN loads can only be calculated when both ammonia and NOx are sampled on the same day.

The seasonal difference in TIN discharges from the wet to the dry season (based on the percent difference) are most pronounced in loads to San Pablo Bay and the Lower South Bay. San Pablo Bay has the most significant seasonal load reduction, as evidenced by an approximately 25% to 35% reduction from the wet to the dry season. Similar to ammonia, this is attributed to a combination of more effective nitrification/denitrification during the dry season due to higher temperatures and increased use of recycled water during the summer, which diverts loads from San Francisco Bay. For San Pablo Bay, the seasonal difference is due to many of the POTWs not discharging during the dry season (e.g., Petaluma).

4.5.3 Phosphorus

The 2025 dry season TP discharge loads were 3.0% lower compared to 2024 and 3.6% lower compared to the average since 2013. Notable year-on-year decreases in dry season TP discharge were experienced by Sunnyvale (39 kg P/d; 35%), Delta Diablo (16 kg P/d; 45%), South SF (8 kg P/d; 27%), Pinole (14 kg P/d; 34%), and Novato (5 kg P/d; 75%). Notable increases in TP discharge were observed by SFO Airport (26 kg P/d; 160%), Benicia (13 kg P/d; 69%), Millbrae (8 kg P/d; 42%), and Treasure Island (6 kg P/d; 189%).

Compared to nitrogen discharge loads, TP loads appear to be random from year to year with no clear trend. This variability is attributed to the inconsistent nature of many TP removal processes. For example, at facilities that occasionally use chemicals for odor control (e.g., ferric chloride in the collection system), the chemical addition binds a portion of TP and subsequently reduces loads when chemicals are applied. Furthermore, facilities with anaerobic selectors in their activated sludge process to improve solids settleability also reduces TP loads. This biological feature can be “finicky” at plants and lead to unstable TP load reduction.

The four largest TP dischargers are EBMUD (29%), EBDA (15%), Palo Alto (10%), and SFPUC Southeast (6.8%). SFPUC Southeast’s contribution is relatively low because its biological treatment process includes an anaerobic selector zone that provides biological phosphorus removal. As EBMUD seeks to optimize its nitrification and denitrification performance, its phosphorus discharge loads may increase as its anaerobic selector is utilized for other purposes. The Central Bay and South Bay received the highest dry season TP loads during the 2025 dry season (35% and 34%, respectively, and 69% total).

4.6 Trend Analysis

The linear regressions for baywide, subembayment, and individual flows and loads reveal striking variability across each category. Each parameter is discussed in more detail below. The trending results are presented throughout this report as bar plots of various estimated regression coefficients with the 95% confidence interval presented as error bars. If the 95% confidence interval includes zero, that is equivalent to the coefficient not being statistically significant with an alpha (significance threshold) of 0.05 (5%). It should be noted that interpretation of coefficients for variables related to the pandemic is complicated by nutrient reduction efforts taking place at the treatment plants. Thus, decreases associated with pandemic-related variables are not necessarily attributable to the pandemic alone or even in part. This analysis provides correlative results that are not indicative of causation. Note that "trend" refers to a consistent directional change over time that results in a statistically significant coefficient. Trends are estimated over the entire discharge dataset, which spans from 2012 through 2025, unless otherwise specified.

4.6.1 Flow

Baywide and for the subembayments, the estimated average impact of the COVID-19 pandemic was a decrease in discharge flows (Figure 3-4). However, it appears that only the bay as a whole, San Pablo Bay, Central Bay, and South Bay observed statistically significant average decreases (alpha = 0.05). As shown in Figure 3-5 and Figure 3-6, only the Lower South Bay showed a statistically significant decreasing trend over time during the pandemic. This may be interpreted to mean that the while entire bay and several subembayments experienced average total decreases in flows during the pandemic, only the Lower South Bay experienced a sustained downward trend. Overall, without accounting for the impact of the pandemic, only South Bay appears to have experienced a small, statistically significant, downward trends during the study period (Figure 3-6).

4.6.2 Loads

The discharge load trends contrast with the discharge flow trends in several ways. Key observations are given below.

- Ammonia discharge was trending upward prior to the pandemic for all but Lower South Bay (Figure 3-6).
- On average, ammonia discharge loads during the pandemic were lower than before or after, with the exception of loads to Suisun Bay and Lower South Bay (Figure 3-4).
- Overall, without considering the pandemic, ammonia loads appear to be trending downward in only the South Bay and may even be increasing slightly in San Pablo Bay and Suisun Bay (Figure 3-6).
- Baywide, the long-term trend for ammonia loads is not statistically significant (Figure 3-5), but visually appears to be trending downward from the peak around 2020.
- In contrast to ammonia, average NOx discharge loads were mostly not affected during the pandemic, with the exception of the Lower South Bay, which experienced a statistically significant decrease on average (Figure 3-4). During the pandemic, the

Lower South Bay was the only subembayment to experience a sustained, statistically significant, decrease in NOx loads (Figure 3-6).

- Prior to the pandemic, NOx discharge loads were generally trending down, with the exception being the loads to Lower South Bay (Figure 3-6).
- Overall, without considering the pandemic, NOx loads appear to be trending downward with the exception of loads to Central Bay (Figure 3-6).
- Baywide, the overall TIN discharge trend, without considering the pandemic, is downward (Figure 3-5). This is in contrast to the statistically significant increasing trend prior to the pandemic (Figure 3-5).
- The long-term TIN discharge trend without considering the pandemic among the subembayments is downward South Bay and Lower South Bay (Figure 3-6).
- Similar to ammonia, the average TIN discharge load was lower on average throughout the pandemic baywide and for all subembayments except Suisun Bay (Figure 3-4).
- Baywide, discharge phosphorus appears to have been increasing prior to the pandemic (Figure 3-5).
- The long-term baywide TP discharge trend without considering the pandemic appears to be neither increasing nor decreasing (Figure 3-5).
- Lower South Bay appears to be the only subembayment with a downward trend for discharge total phosphorus (over the entire study period without considering the pandemic) (Figure 3-6).

4.7 Recycled Water Flows and Loads

Recycled water data lag one year behind the rest of this report (i.e., the latest recycled water data are for 2024). Comparing 2024 to 2023, dry season recycled water use increased by 4 mgd (7%). However, the 2024 value is still 1% below the average (2019 through 2024). Dry season recycled water use peaked in 2021 at 64 mgd during a relatively dry year. Subsequent years saw recycled water demand reduced proportionally to the amount of precipitation each year.

The nutrient loads diverted by recycled water are affected by four variables 1) the flow diversion factor (how much of the recycled water is actually diverted from discharge), 2) the nutrient load diversion factor (may be different than the flow diversion factor depending on the circumstances, although it is usually the same), 3) the volume of recycled water, and 4) the concentration of the nutrients in the recycled water. Flow diversion factors are not 100% when some of the recycled water returns to the treatment plant (e.g., chiller blowdown water that is returned to the plant and eventually discharged). Nutrient load diversion factors can be decoupled from the flow diversion factors when removal takes place in a process where the flow is returned to the treatment plant (e.g., nitrification occurring while the water is being used but before it is returned to the plant and discharged).

If a treatment plant improves its treatment process and reduces effluent nutrient concentrations, then even if recycled water flows increase, the diverted nutrient load may remain the same or decrease. This means that interpreting the recycled water results requires consideration of

multiple variables. For example, decreasing diverted nutrient loads is not necessarily an undesirable trend, indeed it could be a result of highly desirable operational changes implemented by POTWs. This type of interpretation is evident in the Central Bay, where diverted ammonia decreased from 180 kg N/d in 2019 to 25 kg N/d in 2023 and 45 kg/d in 2024 (dry season), while diverted flow only decreased from 6.0 mgd to 4.6 mgd and 5.3 mgd. The diverted loads decreased by 86% and 75%, respectively, while the flows only decreased by 23% and 12%. The Central Bay includes several Dischargers making improvements to their treatment processes (e.g., EBMUD).

As POTWs implement treatment process upgrades, the total amount of nutrients diverted by recycled water is anticipated to decrease. However, if some Dischargers continue to rely on recycled water for complying with their permit limits (i.e., they don't reduce effluent concentrations), then the baywide diverted nutrient loads as a percentage of the total loads will increase.

The recycled water flows are seasonally dependent as evidenced by an increase of approximately 35% from average annual to dry season volumes. San Pablo and South Bays have the most pronounced seasonality impacts over the timeframe presented. During the dry season when recycled water volumes are at their peak, the recycled water volumes by subembayment are as follows (based on the average): Lower South Bay > South Bay > San Pablo Bay > Suisun Bay > Central Bay.

The percentage of flows and loads diverted from San Francisco Bay are as follows (from average annual to dry season for each parameter):

- Flow: 12% to 16%
- Ammonia 4% to 9%
- NOx: 7% to 16%
- TIN: 5% to 10%
- TP: 4% to 9%

West County (Central Bay Discharger): data has been amended since last year's 2022 Group Annual Report with recycled water volumes for both the Richmond Advanced Recycled Expansion (RARE) and the North Richmond Water Reclamation Plant. The previous reports were limited to recycled water volumes from RARE. As such, recycled water diversions have increased from previous reports.

EBDA (South Bay Discharger): data has been updated since the 2022 Group Annual Report with plant specific effluent concentrations (instead of EBDA effluent concentrations). As such, the recycled water diversions increased for EBDA as concentrations for the EBDA members with the largest recycled water production (e.g., Dublin San Ramon Services District) are typically higher than the EBDA discharge concentration.

CMSA: the recycled water volumes and loads in the main body of this report have been revised. In past years, the flows and loads diverted due to recycled water were overestimated.

4.8 Removal Performance

A major benefit of including an analysis of influent flows and loads is that it allows for estimates of flow and load reductions provided by the treatment plants and recycled water (recall that the recycled water data lag one year behind the flow and load data). However, it should be noted that this analysis does not include nitrogen or phosphorus contributions from trucked wastes, including food scraps, received by the POTWs. Diverting food scraps from landfills is a major environmental objective in California aimed at preventing the production and release of methane in landfills. Co-digestion of food scraps in POTWs with excess digester capacity is an alternative method of disposal that also allows for the production of renewable electricity from biogas. For example, EBMUD accepts a variety of types of trucked wastes, including food scraps, that are co-digested with solids produced within the treatment plant. This results in EBMUD producing more electricity than needed by the treatment plant. However, the nitrogen and phosphorus content of the trucked wastes contributes to the nutrient loads discharged by EBMUD. This means that the removal performance evaluation shown below underestimates the nutrient removal performance of POTWs that accept trucked wastes, which are typically added directly to the digesters and are therefore not typically included in the influent water quality characterization. The impact of trucked wastes on nutrient loads to San Francisco Bay has not been included in past Group Annual Reports. If the necessary data are available, future reports could include such an analysis.

Figure 3-8 shows that of the 2024 dry season average influent (420 mgd), approximately 366 mgd was discharged and 48 mgd was recycled (11% diverted from discharge). The influent and the discharge and recycled water flows have a gap of 6 mgd that is unaccounted for. This is likely due to accumulated errors in measurement and amounts to an error of only 1.4%. Figure 3-9 shows the estimated quantity of TN removed (48%) or diverted in recycled water (3.8%) during the 2024 dry season. Figure 3-10 shows the estimated quantity of TP removed (65%) or diverted in recycled water (2.0%) during the 2024 dry season.

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Appendix A. Influent Data Tables and Figures

The data are presented for both the annual average (October 1 through September 30 of the following year) and dry season average (May 1 through September 30 of the same year). There are several limitations for the overall influent dataset as follows:

- The data are limited to Dischargers with a permitted ADWF capacity of greater than 10 mgd (15 out of a possible 34 Dischargers; the permitted capacity for such Dischargers represents 92% of San Francisco Bay discharge permitted capacity).
- Quarterly sampling was not conducted by all Dischargers in the same month. To reconcile such time variance, a quarterly average was assumed while plotting loads (e.g., refer to Figure A-2).
- There are a few instances where sampling for a particular nutrient did not occur.
- Analytical issues with the influent sampling matrix. Specifically, the effluent matrix is relatively cleaner compared to raw influent and is subsequently less prone to analytical issues. There are several instances in the 2020/2021 dataset where ammonia values were greater than TKN for the same sample. This indicates an analytical and/or sampling issue, since TKN is the sum of ammonia and organic nitrogen. Such analytical issues can skew the trending.

A.1 Flow

The historical average monthly influent flows from July 2019 through September 2025 are presented in Figure A-1. The annual (October 1 to September 30) and dry season average (May 1 through September 30) influent flows are tabulated in Table A-1 and Table A-2, respectively. In addition, the annual average and dry season average monthly influent flows for each subembayment are provided in Table A-3 and Table A-4, respectively.

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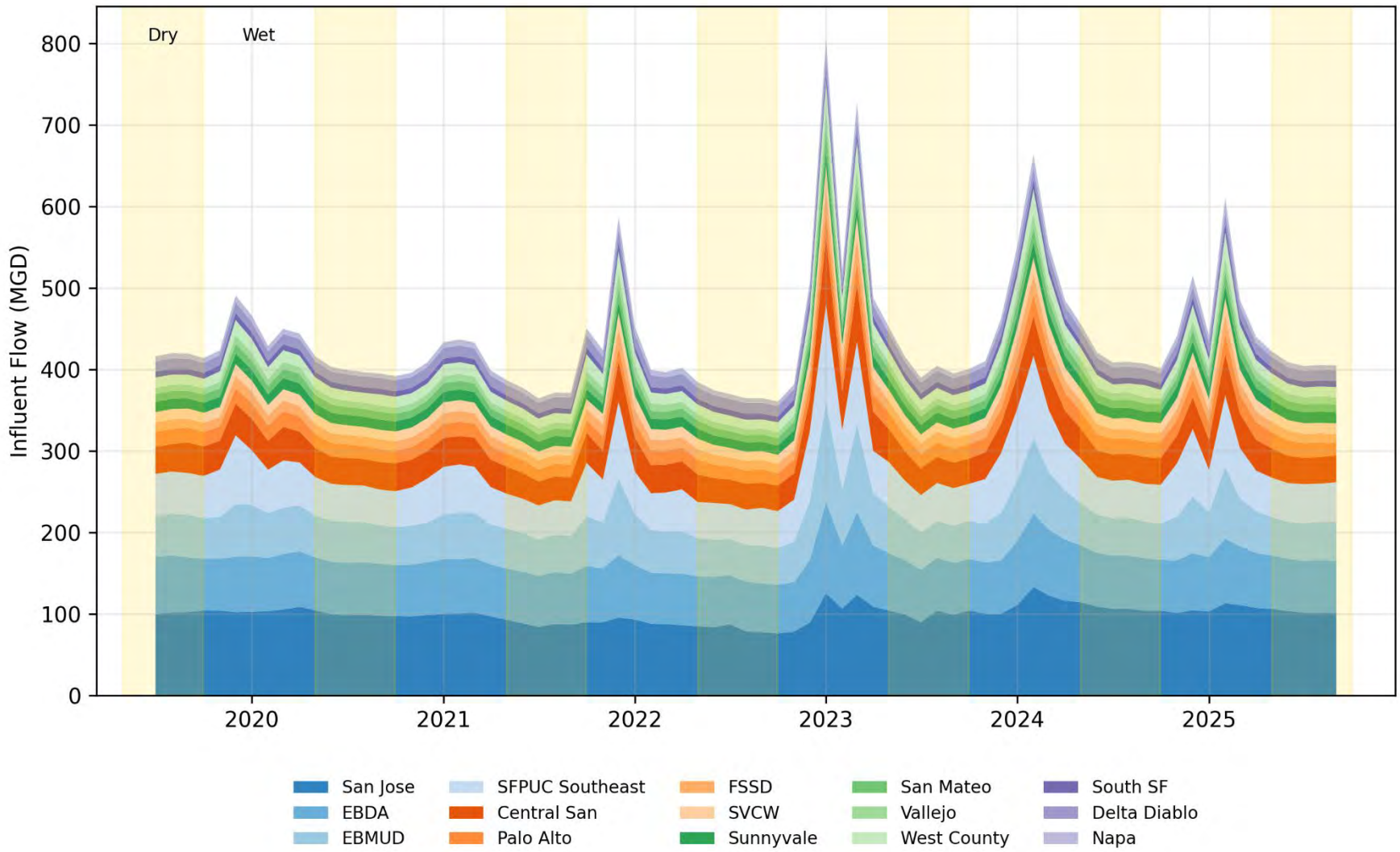


Figure A-1. Influent: Historical Average Quarterly Flow Values

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Table A-1. Influent: Annual Average[a] Flows to each Plant (mgd)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	36.1	32.9	35.4	43.9	36.9	36.8	37.0
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	12.7	13.2	14.1	14.3	13.7	13.2	13.5
EBDA	*	65.5	64.1	64.2	74.4	70.6	67.1	67.7
EBMUD	*	53.8	49.4	54.9	64.3	57.3	54.5	55.7
FSSD	*	12.6	11.9	13.9	16.6	14.7	14.1	14.0
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	6.27	6.04	7.44	9.05	8.19	8.30	7.55
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	17.6	16.1	16.9	20.3	20.3	19.8	18.5
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	54.3	48.1	52.6	64.4	61.3	57.3	56.3
San Jose	*	102	94.3	86.7	100	110	105	99.8
San Mateo	*	10.6	9.55	10.4	13.3	12.1	11.3	11.2
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	12.8	12.0	13.8	15.4	14.9	14.5	13.9
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	7.35	6.71	7.66	8.90	8.60	8.12	7.89
Sunnyvale	*	12.9	12.4	12.3	13.5	13.6	14.0	13.1
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	8.29	7.85	9.55	10.8	9.67	9.86	9.35
West County	*	14.1	12.9	14.9	18.0	16.6	15.0	15.2
Total[e]	*	**427**	**398**	**415**	**487**	**469**	**448**	**441**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

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

Table A-2. Influent: Dry Season[a] Average Flows to each Plant (mgd)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	34.7	33.8	30.7	31.5	34.6	33.5	33.4	33.2
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	12.6	13.0	13.2	13.5	13.6	13.5	13.1	13.2
EBDA	69.4	64.3	63.0	60.8	66.1	66.1	64.5	64.9
EBMUD	50.9	49.6	46.6	45.7	48.7	47.2	46.6	47.9
FSSD	11.4	12.0	11.3	12.0	13.4	12.1	11.7	12.0
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	6.28	5.50	5.60	5.94	6.33	6.26	6.10	6.00
Novato	--	--	--	--	--	--	--	--
Palo Alto	18.5	16.3	15.4	16.5	18.2	19.4	17.9	17.5
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	51.6	45.3	42.4	44.4	48.2	48.0	48.0	46.8
San Jose	101	99.8	87.9	82.3	99.1	108	103	97.2
San Mateo	9.38	9.93	9.15	9.17	10.5	10.4	10.0	9.79
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	12.5	12.1	11.1	11.9	11.9	13.6	13.2	12.3
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	7.29	6.97	6.45	7.17	7.56	7.56	7.30	7.19
Sunnyvale	12.6	12.6	12.1	11.7	12.1	12.9	13.5	12.5
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	7.74	7.75	7.66	7.42	7.77	8.62	8.93	7.98
West County	12.6	12.9	11.8	11.8	13.3	13.4	12.3	12.6
Total[e]	**419**	**402**	**374**	**372**	**411**	**420**	**409**	**401**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Limited to July through September.

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

Table A-3. Influent: Annual Average[a] Flows by Subembayment (mgd)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	61.4	58.0	63.4	74.7	65.3	64.0	64.5
San Pablo Bay	62.8	*	14.6	13.9	17.0	19.9	17.9	18.2	16.9
Central Bay	167	*	67.9	62.3	69.8	82.3	73.9	69.5	71.0
South Bay	262	*	151	141	149	176	167	158	157
Lower South Bay	236	*	133	123	116	134	144	138	131
Total	**827**	*	**427**	**397**	**415**	**487**	**469**	**448**	**441**

a. October 1 through September 30.

b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-4. Influent: Dry Season[a] Average Flows by Subembayment (mgd)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	58.7	58.8	55.2	57.0	61.5	59.1	58.3	58.4
San Pablo Bay	62.8	14.0	13.2	13.3	13.4	14.1	14.9	15.0	14.0
Central Bay	167	63.6	62.6	58.4	57.5	62.0	60.6	58.9	60.5
South Bay	262	150	139	132	133	144	146	143	141
Lower South Bay	236	132	129	115	110	129	140	134	127
Total	**827**	**419**	**402**	**374**	**372**	**411**	**420**	**409**	**401**

a. May 1 through September 30.

b. Limited to July through September.

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A.2 Total Ammonia

The historical average quarterly influent ammonia loads from July 2019 through September 2025 are presented in Figure A-2 The annual (October 1 to September 30) and dry season average (May 1 through September 30) influent ammonia loads are tabulated in Table A-5 and Table A-6, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. There are several cases of missing data (see Table A-5 and Table A-6; primarily in 2019). Influent ammonia loads for each subembayment are given in Table A-7and Table A-8. It should be noted that the quarterly sampling frequency makes it challenging to infer any impacts on influent nutrient loads from the relatively large wet weather events in December 2022, January 2023, and March 2023.

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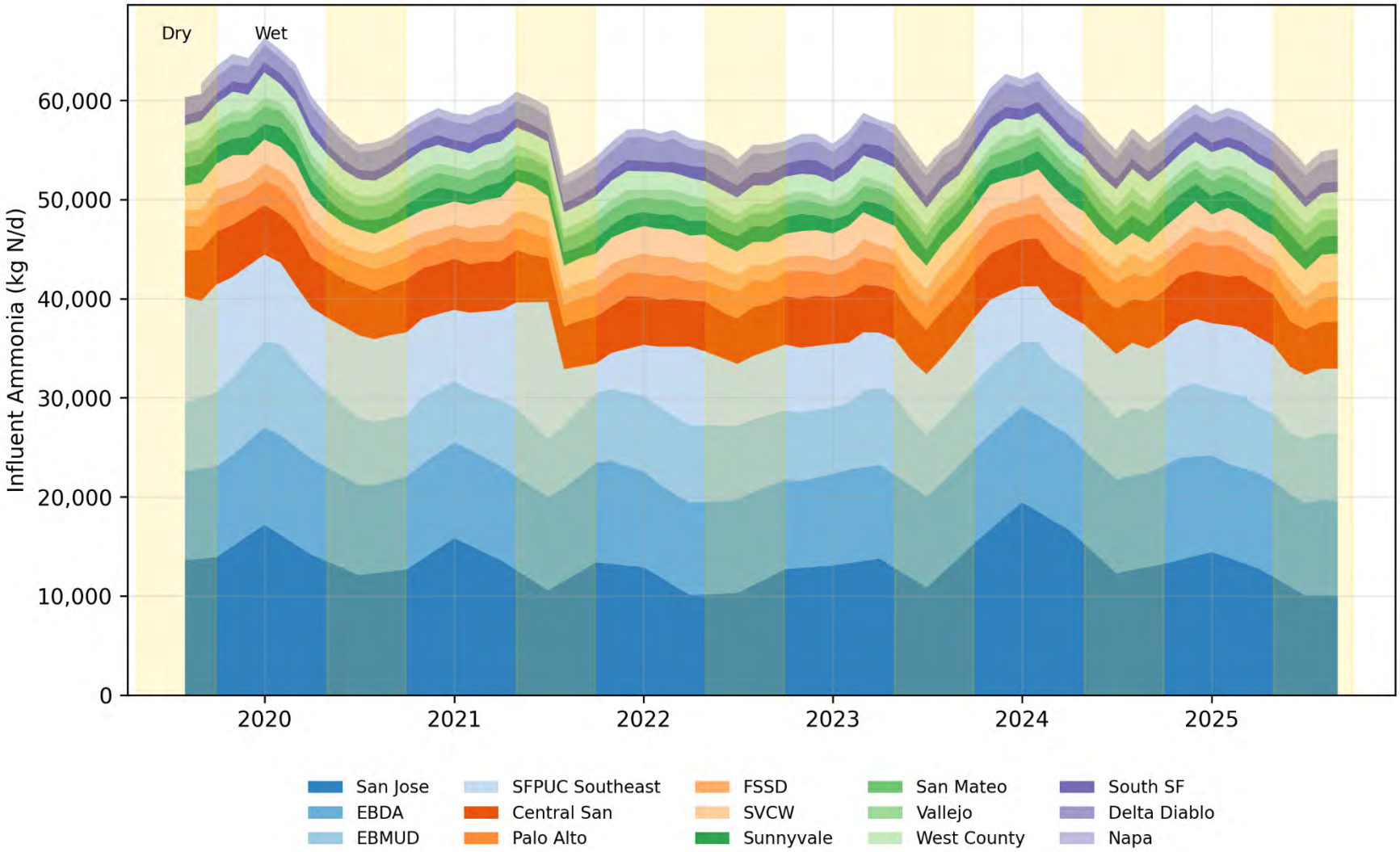


Figure A-2. Influent: Historical Average Quarterly Total Ammonia Loads

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Table A-5. Influent: Annual Average[a] Loads to each Plant, Total Ammonia (kg N/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	5,100	4,920	4,830	4,790	4,660	4,930	4,870
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	1,840	1,830	2,040	1,920	2,130	2,070	1,970
EBDA	*	9,390	9,530	9,600	9,180	9,530	9,610	9,470
EBMUD	*	7,460	6,340	7,490	7,000	6,660	6,830	6,960
FSSD	*	1,640	1,600	1,760	1,640	1,600	1,460	1,610
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	814	881	879	808	879	920	863
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	2,300	2,250	2,380	2,530	2,640	2,540	2,430
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	8,750	8,820	5,570	6,160	6,170	6,580	7,010
San Jose	*	14,300	13,200	11,700	12,600	15,900	12,600	13,400
San Mateo	*	1,590	1,440	1,490	1,410	1,450	1,570	1,490
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	2,410	2,490	2,600	2,400	2,330	2,330	2,430
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	1,030	971	1,170	1,300	1,100	1,040	1,100
Sunnyvale	*	1,500	1,390	1,500	1,550	1,760	1,890	1,600
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	966	954	926	872	954	1,050	953
West County	*	1,850	1,760	1,820	1,840	1,690	1,730	1,780
Total[e]	*****	**61,000**	**58,200**	**55,700**	**56,000**	**59,500**	**57,200**	**57,900**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

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

Table A-6. Influent: Dry Season[a] Average Loads to each Plant, Total Ammonia (kg N/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	4,810	4,980	4,700	4,790	4,680	4,590	4,770	4,760
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	1,820	1,910	1,830	1,880	2,010	2,090	2,150	1,960
EBDA	9,020	8,880	9,420	9,370	9,260	9,480	9,500	9,280
EBMUD	6,530	6,760	6,410	7,540	6,780	6,500	6,610	6,730
FSSD	1,680	1,530	1,710	1,720	1,730	1,560	1,430	1,620
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	1,050	799	888	897	861	932	962	912
Novato	--	--	--	--	--	--	--	--
Palo Alto	2,520	2,110	2,180	2,470	2,540	2,570	2,420	2,400
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	10,000	8,330	9,750	6,250	6,040	6,510	6,490	7,630
San Jose	13,600	12,100	10,600	10,300	10,800	12,300	10,000	11,400
San Mateo	1,440	1,430	1,390	1,320	1,430	1,490	1,560	1,440
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	2,550	2,090	2,660	2,460	2,250	2,260	2,550	2,400
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	1,020	988	909	1,310	1,190	1,030	1,060	1,070
Sunnyvale	1,820	1,180	1,340	1,530	1,670	1,750	1,940	1,600
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	1,060	988	908	883	891	954	1,170	979
West County	1,720	1,750	1,720	1,790	1,770	1,730	1,630	1,730
Total[e]	**60,700**	**55,800**	**56,400**	**54,500**	**53,900**	**55,800**	**54,300**	**55,900**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Limited to July through September.

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

Table A-7. Influent: Annual Average[a] Total Ammonia Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	8,580	8,350	8,620	8,350	8,380	8,450	8,450
San Pablo Bay	62.8	*	1,780	1,840	1,800	1,680	1,830	1,970	1,820
Central Bay	167	*	9,310	8,100	9,310	8,840	8,340	8,560	8,740
South Bay	262	*	23,200	23,200	20,400	20,500	20,600	21,100	21,500
Lower South Bay	236	*	18,200	16,700	15,500	16,700	20,300	17,100	17,400
Total	**827**	*****	**61,000**	**58,200**	**55,700**	**56,000**	**59,500**	**57,200**	**57,900**

a. October 1 through September 30.

b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-8. Influent: Dry Season[a] Average Total Ammonia Loads by Subembayment (kg N/d)*,**

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	8,300	8,420	8,240	8,380	8,420	8,240	8,350	8,340
San Pablo Bay	62.8	2,100	1,790	1,800	1,780	1,750	1,890	2,140	1,890
Central Bay	167	8,250	8,520	8,130	9,330	8,540	8,240	8,240	8,460
South Bay	262	24,100	21,700	24,100	20,700	20,200	20,800	21,200	21,800
Lower South Bay	236	15,400	15,400	14,100	14,300	15,000	16,600	14,400	15,400
Total	**827**	**58,200**	**55,800**	**56,400**	**54,500**	**53,900**	**55,800**	**54,300**	**55,900**

a. May 1 through September 30.

b. Limited to July through September.

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A.3 Nitrate + Nitrite

The historical average quarterly influent NOx loads from July 2019 through September 2025 are presented in Figure A-3. The annual (October 1 to September 30) and dry season average (May 1 through September 30) NOx loads are tabulated in Table A-9 and Table A-10, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. There are several cases of missing data, primarily in 2019 and for Napa in nearly all dry seasons. Influent NOx loads for each subembayment are given in Table A-11 and Table A-12. It should be noted that the quarterly sampling frequency makes it challenging to infer any impacts on influent nutrient loads from the relatively large wet weather events in December 2022, January 2023, and March 2023.

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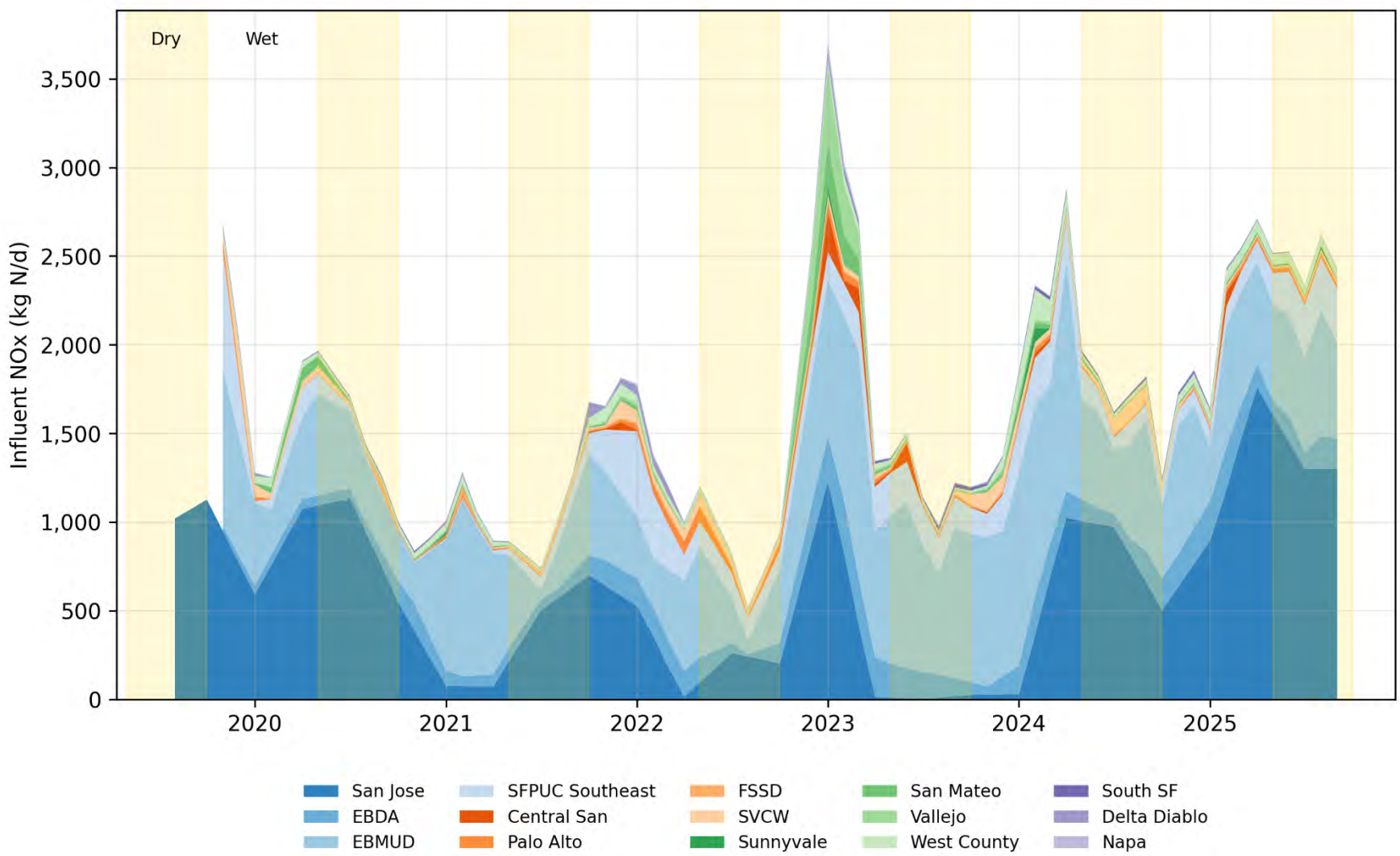


Figure A-3. Influent: Historical Average Quarterly NOx Loads

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Table A-9. Influent: Annual Average[a] Loads to each Plant, NOx (kg N/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	1.89	2.94	7.58	45.1	7.99	8.61	12.4
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	12.8	5.31	24.3	9.65	3.62	2.62	9.67
EBDA	*	46.9	84.0	114	195	115	156	119
EBMUD	*	520	450	390	838	799	578	596
FSSD	*	7.24	8.47	7.78	7.78	7.78	7.78	7.80
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	2.30	1.54	3.34	16.3	0.605	2.29	4.40
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	16.4	7.05	34.1	31.9	9.53	18.2	19.5
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	295	41.7	218	182	169	148	176
San Jose	*	982	299	375	362	512	1,110	607
San Mateo	*	22.3	4.61	7.59	66.2	16.3	5.14	20.3
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	47.0	4.95	47.9	16.9	65.2	12.5	32.4
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	6.48	3.73	2.39	13.0	11.6	7.44	7.43
Sunnyvale	*	2.87	2.98	2.00	6.25	9.94	5.32	4.88
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	2.01	1.37	6.36	108	8.07	3.41	21.6
West County	*	23.7	25.7	34.5	25.7	56.8	52.8	36.5
Total[e]	*****	**1,990**	**943**	**1,270**	**1,920**	**1,790**	**2,120**	**1,670**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

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

Table A-10. Influent: Dry Season[a] Average Loads to each Plant, NOx (kg N/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	2.71	2.11	1.79	2.32	25.6	3.24	1.37	5.59
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	2.93	3.12	3.32	3.28	4.87	2.59	3.11	3.32
EBDA	--[e]	55.0	63.5	76.6	159	109	134	99.5
EBMUD	649	467	290	352	785	548	582	525
FSSD	7.18	11.1	6.76	7.78[f]	7.78[f]	7.78[f]	7.78[f] [f]	8.02
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	--*	--*	--*	--*	--*	--*	0.605	0.302
Novato	--	--	--	--	--	--	--	--
Palo Alto	52.1	2.68	6.62	44.1	7.51	4.85	20.0[f]	19.7
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	1,080	28.0	88.5	134	217	98.9	298	277
San Jose	1,020	1,130	501	261	3.33[g]	971	1,300	741
San Mateo	7.98	5.10	1.73	3.43	1.84	4.63	2.18	3.84
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	37.1	22.5	9.90	47.4	7.84	65.5	12.3	28.9
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	1.11	5.75	2.45	1.94	12.8	7.45	0	4.50
Sunnyvale	--[e]	2.94	0.407	1.41	1.93	1.46	6.69	2.47
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	--[e]	1.09	<1	1.40	4.25	1.05	1.17	1.49
West County	25.2	18.3	13.2	14.0	14.4	20.8	58.7	23.5
Total[h]	**2,880**	**1,760**	**989**	**950**	**1,250**	**1,850**	**2,430**	**1,740**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Limited to July through September.
e. Permit required data not provided.
f. Discharger has invoked Footnote 3 of Table E-2 in the Permit. Value is no longer monitored. Value given is the average of historical monthly values.
g. Atypically low 2023 nitrate plus nitrite load for San Jose is attributed to a technical issue with an autosampler plugging.
h. The total values might vary from the sum of the listed values by plant due to rounding.
* No Data

Table A-11. Influent: Annual Average[a] NOx Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	22.0	16.7	39.6	62.6	19.1	19.0	29.8
San Pablo Bay	62.8	*	4.31	2.91	9.70	125	8.68	5.70	26.0
Central Bay	167	*	543	476	425	864	856	631	633
South Bay	262	*	418	139	390	472	377	330	354
Lower South Bay	236	*	1,000	309	411	400	531	1,140	631
Total	**827**	*****	**1,990**	**943**	**1,270**	**1,920**	**1,790**	**2,120**	**1,670**

a. October 1 through September 30.
b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-12. Influent: Dry Season[a] Average NOx Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	12.8	16.3	11.9	13.4	38.2	13.6	12.3	16.9
San Pablo Bay	62.8	--[c]	1.09	<1	1.40	4.25	1.05	1.77	1.37
Central Bay	167	674	485	303	366	799	569	641	548
South Bay	262	1,120	116	166	263	398	286	446	400
Lower South Bay	236	1,070	1,140	508	306	12.8[d]	978	1,330	763
Total	**827**	**2,830[e]**	**1,760**	**989**	**950**	**1,250**	**1,850**	**2,430**	**1,730**

a. May 1 through September 30.
b. Limited to July through September.
c. Incomplete dataset
d. Atypically low 2023 nitrate plus nitrite load for San Jose attributed to the new autosampler plugging issue.
e. Underestimate due to missing data.

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A.4 Total Inorganic Nitrogen

The historical average quarterly influent TIN loads from July 2019 through September 2025 are presented in Figure A-4. The annual (October 1 to September 30) and dry season average (May 1 through September 30) TIN loads are tabulated in Table A-13 and Table A-14, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. There are several cases of missing data, primarily in 2019 and for Napa in nearly all dry seasons. Influent TIN loads for each subembayment are given in Table A-14 and Table A-15. It should be noted that the quarterly sampling frequency makes it challenging to infer any impacts on influent nutrient loads from the relatively large wet weather events in December 2022, January 2023, and March 2023.

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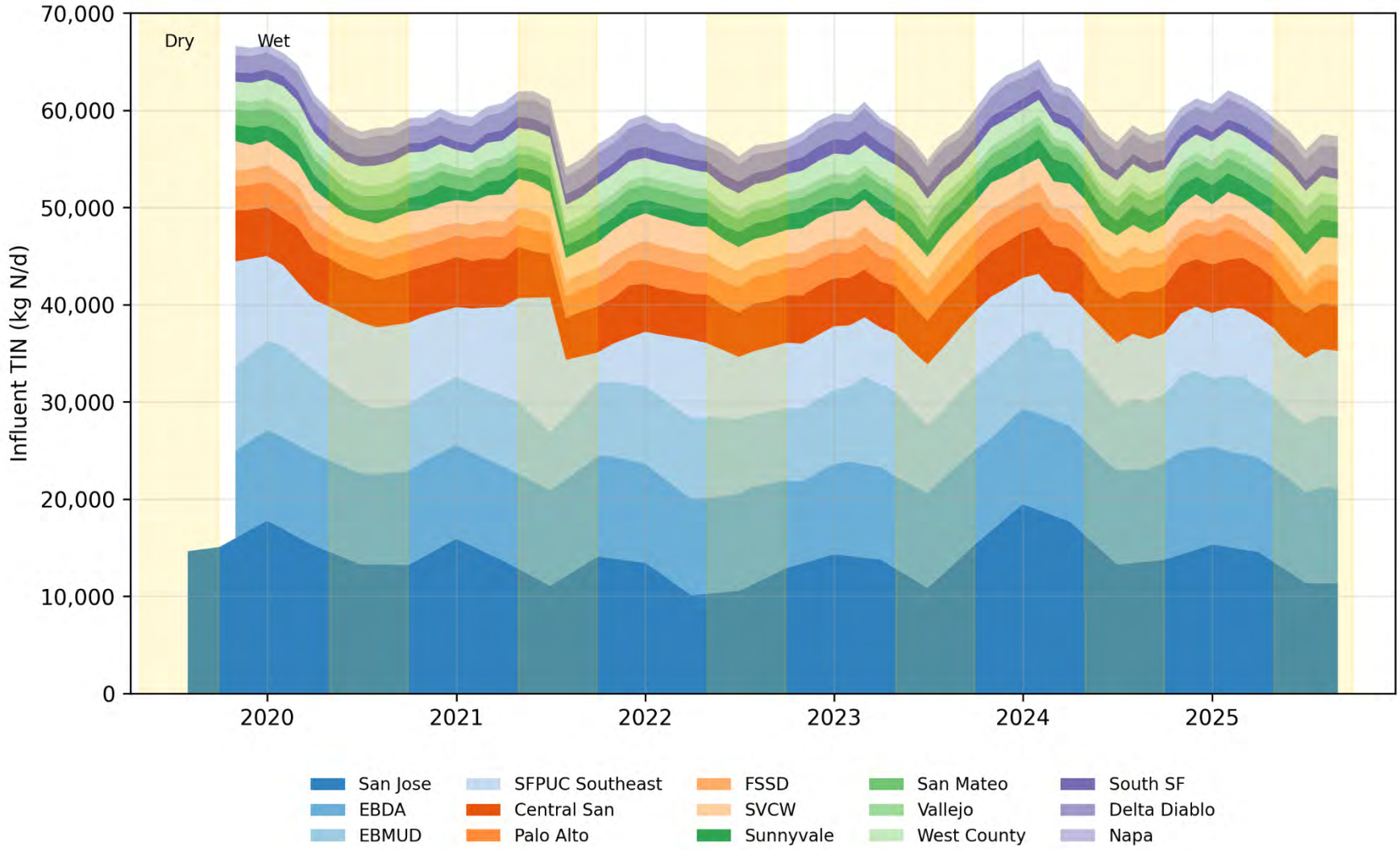


Figure A-4. Influent: Historical Average Quarterly TIN Loads

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Table A-13. Influent: Annual Average[a] Loads to each Plant, TIN (kg N/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	5,100	4,930	4,840	4,840	4,660	4,930	4,880
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	1,850	1,840	2,060	1,930	2,130	2,070	1,980
EBDA	*	9,250	9,780	10,100	9,380	9,650	9,810	9,660
EBMUD	*	8,260	6,830	7,880	7,840	7,450	7,400	7,610
FSSD	*	1,640	1,610	1,760	1,650	1,600	1,470	1,620
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	815	871	859	706	886	923	843
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	2,330	2,210	2,490	2,670	2,580	2,490	2,460
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	9,050	8,860	5,790	6,340	6,340	6,730	7,180
San Jose	*	15,300	13,500	12,000	13,000	16,500	13,700	14,000
San Mateo	*	1,610	1,450	1,500	1,470	1,470	1,570	1,510
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	2,460	2,490	2,660	2,420	2,400	2,350	2,460
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	1,010	1,020	1,160	1,350	1,110	1,050	1,120
Sunnyvale	*	1,510	1,400	1,500	1,560	1,810	1,910	1,610
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	978	891	887	934	836	1,080	935
West County	*	1,910	1,850	1,850	1,870	1,750	1,790	1,840
Total[e]	*****	**63,100**	**59,500**	**57,400**	**57,900**	**61,100**	**59,300**	**59,700**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table A-14. Influent: Dry Season[a] Average Loads to each Plant, TIN (kg N/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	4,810	4,980	4,700	4,790	4,710	4,570	4,770	4,760
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	1,820	1,910	1,850	1,870	2,020	2,100	2,150	1,960
EBDA	--[e]	9,330	9,830	9,920	9,670	9,620	9,640	9,670
EBMUD	7,180	7,450	6,700	7,890	7,560	7,050	7,190	7,290
FSSD	1,690	1,540	1,710	1,720	1,740	1,560	1,440	1,630
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	--*	--*	--*	--*	--*	847	1,010	930
Novato	--	--	--	--	--	--	--	--
Palo Alto	2,570	2,050	2,220	2,500	2,630	2,550	2,440	2,420
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	11,100	8,350	9,840	6,390	6,260	6,610	6,790	7,910
San Jose	14,600	13,200	11,100	10,600	10,800	13,300	11,300	12,100
San Mateo	1,440	1,430	1,390	1,330	1,440	1,500	1,560	1,440
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	2,590	2,110	2,670	2,510	2,250	2,340	2,560	2,430
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	1,070	989	1,150	1,180	1,200	1,040	1,060	1,100
Sunnyvale	1,820	1,180	1,340	1,530	1,670	1,790	1,960	1,610
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	--[e]	1,140	849	840	1,110	919	1,150	1,000
West County	1,900	1,900	1,850	1,800	1,780	1,750	1,690	1,810
Total[f]	--[g]	**57,600**	**57,100**	**54,800**	**54,900**	**57,500**	**56,800**	**58,100**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Limited to July through September.
e. Permit required data not provided.
f. The total values might vary from the sum of the listed values by plant due to rounding.
g. Due to missing data from EBDA and Vallejo, the sum is not shown because it is a significant underestimate.
* No Data

Table A-15. Influent: Annual Average[a] TIN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	8,600	8,370	8,660	8,410	8,390	8,460	8,480
San Pablo Bay	62.8	*	1,790	1,760	1,750	1,640	1,720	2,010	1,780
Central Bay	167	*	10,200	8,680	9,730	9,700	9,200	9,190	9,450
South Bay	262	*	23,400	23,600	21,200	21,000	21,000	21,500	21,900
Lower South Bay	236	*	19,200	17,100	16,000	17,200	20,800	18,100	18,100
Total	**827**	*****	**63,100**	**59,500**	**57,400**	**57,900**	**61,100**	**59,300**	**59,700**

a. October 1 through September 30.
b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-16. Influent: Dry Season Average[a] TIN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	8,310	8,430	8,260	8,390	8,460	8,230	8,360	8,350
San Pablo Bay	62.8	--[c]	1,140	849	840	1,110	1,770	2,170	1,120
Central Bay	167	9,080	9,350	8,550	9,690	9,340	8,800	8,880	9,100
South Bay	262	16,200	22,200	24,900	21,300	20,800	21,100	21,600	21,200
Lower South Bay	236	19,000	16,500	14,600	14,600	15,100	17,600	15,700	16,200
Total	**827**	**52,600[d]**	**57,600**	**57,100**	**54,800**	**54,900**	**57,500**	**56,800**	**55,900**

a. May 1 through September 30.
b. Limited to July through September.
c. Incomplete dataset.
d. Underestimate due to missing data.

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A.5 Total Kjeldahl Nitrogen

The historical average quarterly influent TKN loads from July 2019 through September 2025 are presented in Figure A-5. The annual (October 1 to September 30) and dry season average (May 1 through September 30) TKN loads are tabulated in Table A-17 and Table A-18, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. Influent TKN loads for each subembayment are given in Table A-19 and Table A-20. It should be noted that the quarterly sampling frequency makes it challenging to infer any impacts on influent nutrient loads from the relatively large wet weather events in December 2022, January 2023, and March 2023.

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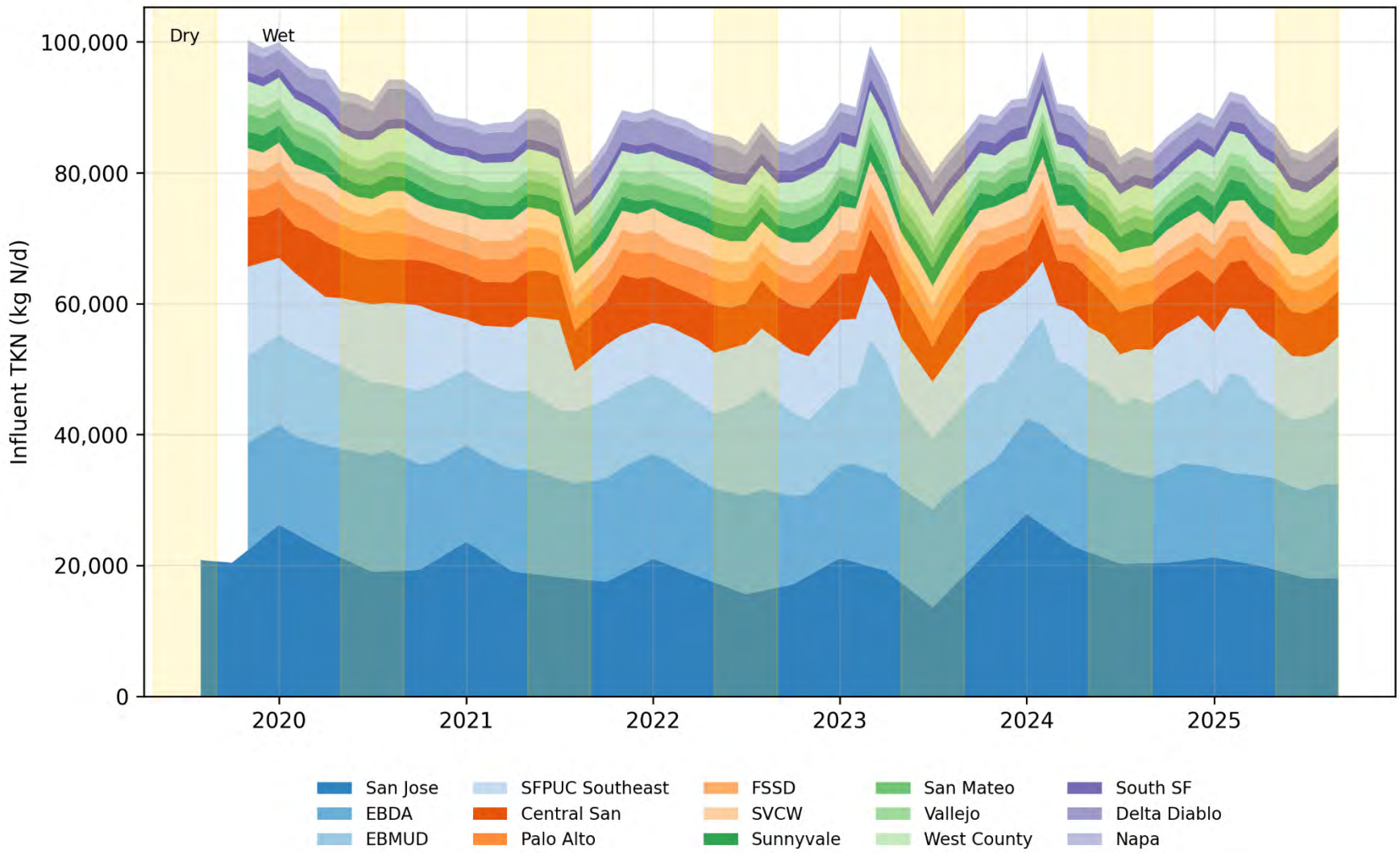


Figure A-5. Influent: Historical Average Quarterly TKN Loads

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Table A-17. Influent: Annual Average[a] Loads to each Plant, TKN (kg N/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	7,440	6,870	7,010	6,730	6,470	7,090	6,930
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	3,530	3,210	3,420	3,060	3,030	2,960	3,200
EBDA	*	16,600	15,100	15,500	14,300	14,000	14,000	14,900
EBMUD	*	12,500	11,400	12,800	13,500	12,200	12,200	12,400
FSSD	*	3,100	2,730	2,910	2,700	2,420	2,320	2,700
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	1,480	1,370	1,410	1,340	1,300	1,340	1,380
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	4,070	3,400	3,730	3,770	3,220	3,520	3,620
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	12,000	10,100	8,670	9,530	8,980	9,710	9,830
San Jose	*	22,000	20,000	18,100	17,700	23,000	19,900	20,100
San Mateo	*	2,500	2,090	2,340	2,320	2,010	2,150	2,240
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	2,840	2,980	3,210	3,160	3,340	3,390	3,150
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	1,420	1,400	1,590	1,760	1,830	1,630	1,610
Sunnyvale	*	2,360	2,180	2,090	2,480	2,650	2,740	2,420
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	1,600	1,630	1,660	1,640	1,480	1,830	1,640
West County	*	3,200	2,910	2,810	3,650	2,770	3,000	3,060
Total[e]	*****	**96,600**	**87,400**	**87,300**	**87,700**	**88,700**	**87,800**	**89,200**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table A-18. Influent: Dry Season[a] Loads to each Plant, TKN (kg N/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	6,890	6,950	6,760	6,770	6,370	6,710	6,970	6,770
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	3,250	3,980	3,070	3,280	3,040	3,070	2,990	3,240
EBDA	--[e]	18,500	15,300	14,900	14,900	14,000	14,000	15,300
EBMUD	10,800	11,400	11,200	13,500	11,900	11,300	11,300	11,600
FSSD	2,630	3,110	2,690	2,820	2,480	2,170	2,310	2,600
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	--*	--*	--*	1,610	--*	1,310	1,340	1,420
Novato	--	--	--	--	--	--	--	--
Palo Alto	3,500	3,950	3,530	3,660	3,820	3,490	3,420	3,620
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	13,800	12,000	9,970	8,960	8,680	7,410	9,300	10,000
San Jose	20,800	19,000	18,200	15,600	13,600	20,200	18,000	17,900
San Mateo	1,720	2,260	1,970	1,990	2,240	1,990	2,280	2,060
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	3,090	2,590	2,920	3,200	2,840	3,290	3,530	3,070
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	1,500	1,400	1,480	1,790	1,810	1,580	1,660	1,600
Sunnyvale	2,820	2,120	2,210	2,180	2,550	2,680	2,860	2,490
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	1,690	1,500	1,670	1,580	2,040	1,660	1,890	1,720
West County	3,760	3,120	2,860	2,750	3,610	2,860	2,660	3,090
Total[f]	**--[g]**	**91,900**	**83,900**	**84,600**	**79,900**	**83,700**	**84,500**	**86,500**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Limited to July through September.
e. Permit required data not provided.
f. The total values might vary from the sum of the listed values by plant due to rounding.
g. Due to missing data from EBDA, the sum is not shown because it is a significant underestimate.
* No data.

Table A-19. Influent: Annual Average[a] TKN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	14,100	12,800	13,300	12,500	11,900	12,400	12,800
San Pablo Bay	62.8	*	3,090	3,010	3,070	2,990	2,790	3,160	3,020
Central Bay	167	*	15,700	14,300	15,600	17,100	15,000	15,200	15,500
South Bay	262	*	35,300	31,700	31,300	31,100	30,200	30,900	31,800
Lower South Bay	236	*	28,400	25,600	23,900	24,000	28,900	26,200	26,200
Total	**827**	*****	**96,600**	**87,400**	**87,300**	**87,700**	**88,700**	**87,800**	**89,200**

a. October 1 through September 30.

b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-20. Influent: Dry Season[a] Average TKN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	12,800	14,000	12,500	12,900	11,900	11,900	12,300	12,600
San Pablo Bay	62.8	1,690	1,500	1,670	3,190	2,040	2,980	3,220	2,330
Central Bay	167	14,600	14,500	14,100	16,200	15,500	14,100	14,000	14,700
South Bay	262	20,100	36,700	31,700	30,800	30,500	28,200	30,800	29,800
Lower South Bay	236	27,100	25,100	23,900	21,400	20,000	26,400	24,300	24,000
Total	**827**	**76,200**	**91,900**	**83,900**	**84,600**	**79,900**	**83,700**	**84,500**	**83,500**

a. May 1 through September 30.

b. Limited to July through September.

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A.6 Total Nitrogen

The historical average quarterly influent TN loads from July 2019 through September 2025 are presented in Figure A-6. The annual (October 1 to September 30) and dry season average (May 1 through September 30) TN loads are tabulated in Table A-21 and Table A-22, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. Influent TN loads for each subembayment are given in Table A-23 and Table A-24. Similar to NOx, TIN, and TKN, there are a few instances of missing data per plant that inform the TN calculation (TN = TKN + NOx; refer Table A-21 and Table A-22).

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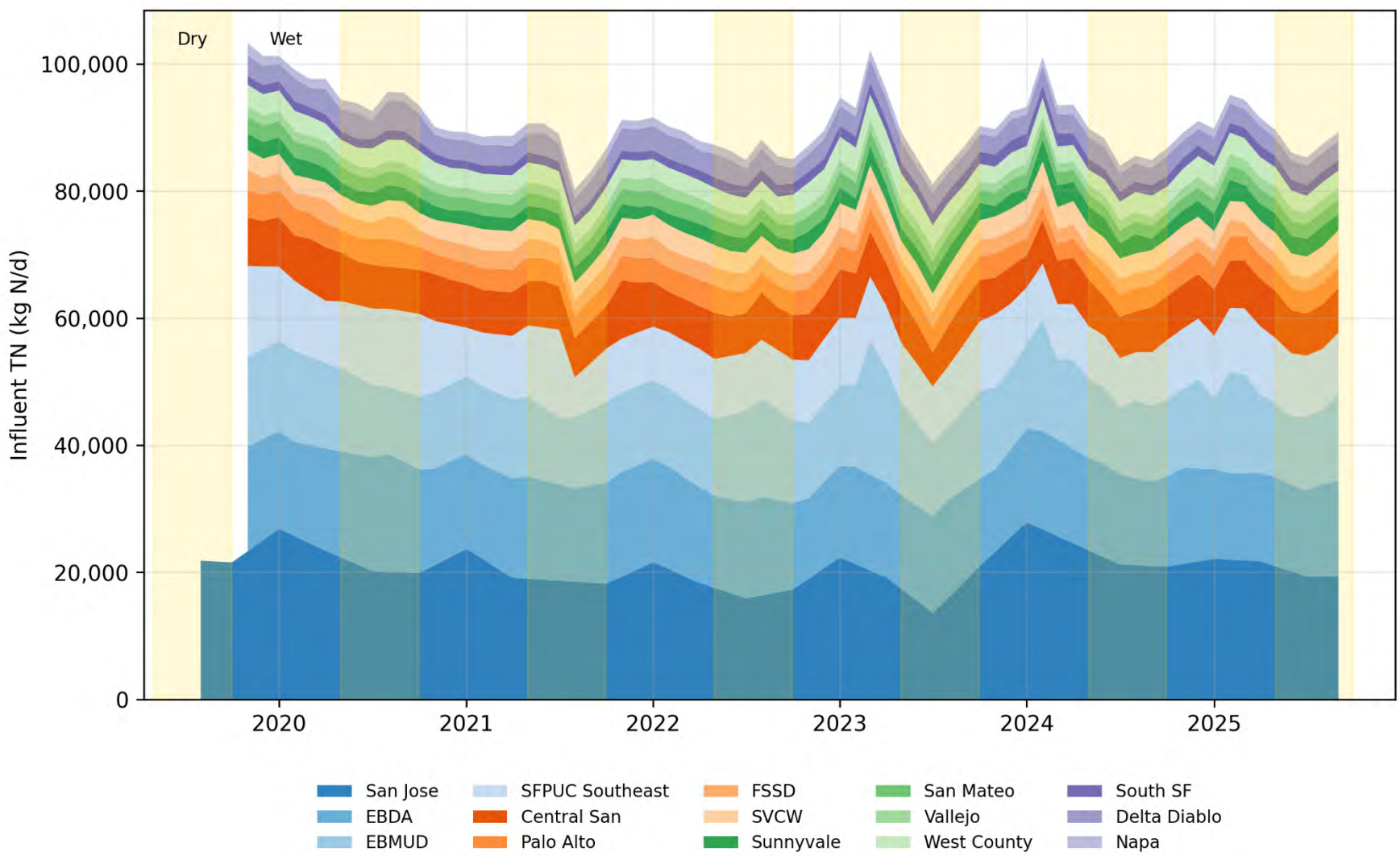


Figure A-6. Influent: Historical Average Quarterly TN Loads

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Table A-21. Influent: Annual Average[a] Loads to each Plant, TN (kg N/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	7,440	6,870	7,020	6,780	6,470	7,110	6,950
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	3,540	3,210	3,460	3,070	3,030	2,970	3,210
EBDA	*	16,600	15,200	15,600	14,500	14,100	14,200	15,000
EBMUD	*	13,000	11,800	13,200	14,300	13,000	12,800	13,000
FSSD	*	3,110	2,740	2,910	2,710	2,420	2,330	2,700
Las Gallinas	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa	*	1,570	1,380	1,370	1,360	1,280	1,300	1,380
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	4,090	3,410	3,770	3,800	3,230	3,540	3,640
Petaluma	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	12,300	10,100	8,890	9,710	9,170	9,850	10,000
San Jose	*	23,000	20,300	18,500	18,100	23,300	21,000	20,700
San Mateo	*	2,520	2,090	2,350	2,380	2,030	2,160	2,260
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	2,890	2,980	3,260	3,170	3,410	3,250	3,160
Sonoma Valley	*	--	--	--	--	--	--	--
South SF	*	1,430	1,410	1,590	1,780	1,840	1,640	1,610
Sunnyvale	*	2,370	2,180	2,090	2,490	2,620	2,740	2,420
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	1,600	1,630	1,670	1,750	1,490	1,810	1,660
West County	*	3,220	3,010	2,850	3,680	2,830	3,060	3,110
Total[e]	*****	**98,700**	**88,400**	**88,500**	**89,600**	**90,300**	**89,700**	**90,900**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table A-22. Influent: Dry Season[a] Average Loads to each Plant, TN (kg N/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	6,890	6,950	6,760	6,780	6,380	6,710	6,960	6,780
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	3,250	3,980	3,070	3,340	3,050	3,070	2,990	3,250
EBDA	--[e]	18,500	15,400	15,000	15,000	14,100	14,100	15,400
EBMUD	11,400	11,800	11,500	13,900	12,700	11,800	11,900	12,100
FSSD	2,640	3,120	2,700	2,830	2,490	2,180	2,320	2,610
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	--*	--*	--*	--*	--*	1,190	1,290	1,240
Novato	--	--	--	--	--	--	--	--
Palo Alto	3,550	3,950	3,540	3,700	3,830	3,490	3,440	3,640
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	14,900	12,000	10,100	9,090	8,890	7,540	9,590	10,300
San Jose	21,800	20,200	18,700	15,900	13,600	21,200	19,300	18,700
San Mateo	1,720	2,260	1,970	1,990	2,240	2,000	2,290	2,070
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	3,130	2,610	2,930	3,250	2,850	3,360	3,310	3,060
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	1,510	1,410	1,480	1,790	1,830	1,580	1,660	1,610
Sunnyvale	2,820	2,120	2,210	2,180	2,550	2,580	2,870	2,480
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	--[e]	1,500	1,670	1,580	2,050	1,660	1,880	1,720
West County	3,790	3,140	3,020	2,760	3,630	2,880	2,710	3,130
Total[f]	--[g]	**93,600**	**85,000**	**84,000**	**81,100**	**85,300**	**86,700**	**88,100**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Limited to July through September.
e. Permit required data not provided.
f. The total values might vary from the sum of the listed values by plant due to rounding.
g. Due to missing data from EBDA and Vallejo, the sum is not shown because it is a significant underestimate.
* No data.

Table A-23. Influent: Annual Average[a] TN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	14,100	12,800	13,400	12,600	11,900	12,400	12,900
San Pablo Bay	62.8	*	3,170	3,010	3,030	3,110	2,770	3,110	3,030
Central Bay	167	*	16,200	14,900	16,000	18,000	15,800	15,800	16,100
South Bay	262	*	35,700	31,800	31,700	31,600	30,600	31,100	32,100
Lower South Bay	236	*	29,400	25,900	24,400	24,400	29,200	27,300	26,800
Total	**827**	*****	**98,700**	**88,400**	**88,500**	**89,600**	**90,300**	**89,700**	**90,900**

a. October 1 through September 30.

b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-24. Influent: Dry Season[a] Average TN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	12,800	14,100	12,500	12,900	11,900	12,000	12,300	12,600
San Pablo Bay	62.8	--[c]	1,500	1,670	1,580	2,050	2,850	3,160	1,830
Central Bay	167	15,200	15,000	14,500	16,600	16,300	14,700	14,600	15,300
South Bay	262	21,300	36,800	31,800	31,100	30,900	28,500	31,000	30,200
Lower South Bay	236	24,600	26,200	24,400	21,800	20,000	27,300	25,600	24,800
Total	**827**	**77,400**	**93,600**	**85,000**	**84,000**	**81,100**	**85,300**	**86,700**	**84,700**

a. May 1 through September 30.

b. Limited to July through September.

c. Neither San Pablo Bay Discharger that monitors influent parameters (Napa and Vallejo) measured TN during the 2019 dry season.

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A.7 Total Phosphorus

The historical average quarterly influent TP loads from July 2019 through September 2025 are presented in Figure A-7. The annual (October 1 to September 30) and dry season average (May 1 through September 30) TP loads are tabulated in Table A-25 and Table A-26, respectively. Because the 2018/2019 dataset is limited to July 2019 through September 2019, annual average values were not calculated for 2019. Influent TP loads for each subembayment are given in Table A-27 and Table A-28.

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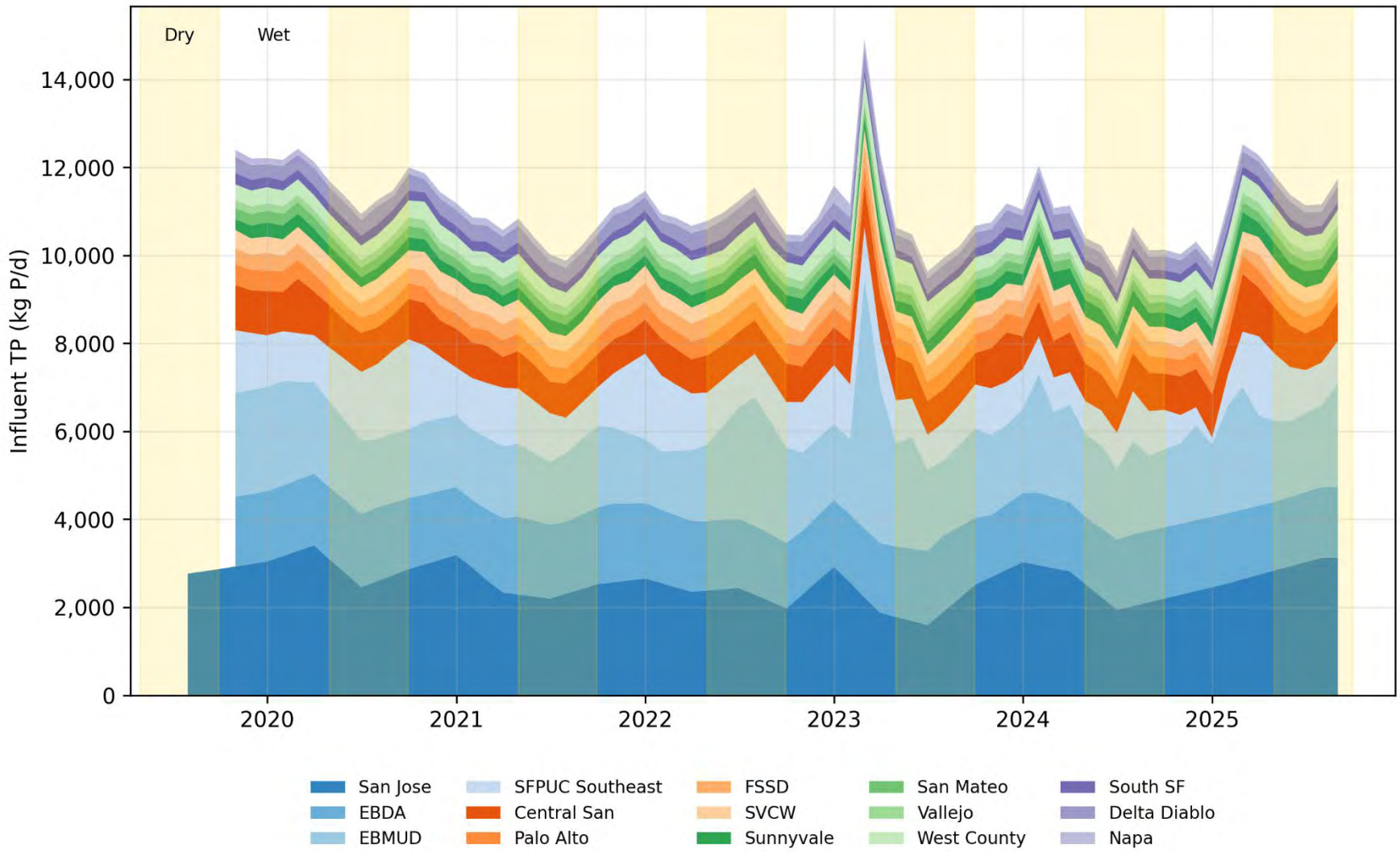


Figure A-7. Influent: Historical Average Quarterly TP Loads for Evaluation Period

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Table A-25. Influent: Annual Average[a] Loads to each Plant, TP (kg P/d)[b,c]

Discharger	2018/ 2019[d]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	*	--	--	--	--	--	--	--
Benicia	*	--	--	--	--	--	--	--
Burlingame	*	--	--	--	--	--	--	--
Central San	*	981	823	785	871	855	950	878
CMSA	*	--	--	--	--	--	--	--
Port Costa	*	--	--	--	--	--	--	--
Delta Diablo	*	339	362	353	344	345	342	348
EBDA	*	1,620	1,630	1,650	1,580	1,560	1,590	1,610
EBMUD	*	1,960	1,580	1,960	2,560	1,970	2,020	2,010
FSSD	*	369	373	403	392	350	302	365
Las Gallinas[c]	*	--	--	--	--	--	--	--
Paradise Cove	*	--	--	--	--	--	--	--
Tiburon	*	--	--	--	--	--	--	--
Millbrae	*	--	--	--	--	--	--	--
Mt. View	*	--	--	--	--	--	--	--
Napa[c]	*	146	150	160	227	153	154	165
Novato	*	--	--	--	--	--	--	--
Palo Alto	*	410	358	409	442	418	386	404
Petaluma[c]	*	--	--	--	--	--	--	--
Pinole	*	--	--	--	--	--	--	--
Rodeo	*	--	--	--	--	--	--	--
SFO Airport	*	--	--	--	--	--	--	--
SFPUC Southeast	*	1,330	1,270	1,260	1,060	930	954	1,140
San Jose	*	2,940	2,650	2,490	2,090	2,580	2,840	2,600
San Mateo	*	246	226	242	221	221	233	232
SMCSD	*	--	--	--	--	--	--	--
SASM	*	--	--	--	--	--	--	--
SVCW	*	387	390	369	327	354	360	364
Sonoma Valley[c]	*	--	--	--	--	--	--	--
South SF	*	234	224	232	193	214	186	214
Sunnyvale	*	283	267	280	291	335	352	302
Treasure Island	*	--	--	--	--	--	--	--
Vallejo	*	173	185	191	182	181	213	187
West County	*	347	357	340	434	338	383	367
Total[e]	*****	**11,800**	**10,800**	**11,100**	**11,200**	**10,800**	**11,300**	**11,200**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.

d. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

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

Table A-26. Influent: Dry Season Average[a] Loads to each Plant, TP (kg P/d)[b,c]

Discharger	2019[d]	2020	2021	2022	2023	2024	2025	Average
American Canyon	--	--	--	--	--	--	--	--
Benicia	--	--	--	--	--	--	--	--
Burlingame	--	--	--	--	--	--	--	--
Central San	1,030	875	783	793	813	842	913	865
CMSA	--	--	--	--	--	--	--	--
Port Costa	--	--	--	--	--	--	--	--
Delta Diablo	361	367	367	380	341	328	353	357
EBDA	--[e]	1,670	1,700	1,570	1,670	1,580	1,580	1,630
EBMUD	1,800	1,690	1,530	2,340	2,060	1,840	1,920	1,880
FSSD	372	371	381	402	382	336	302	364
Las Gallinas	--	--	--	--	--	--	--	--
Paradise Cove	--	--	--	--	--	--	--	--
Tiburon	--	--	--	--	--	--	--	--
Millbrae	--	--	--	--	--	--	--	--
Mt. View	--	--	--	--	--	--	--	--
Napa	--*	--*	--*	175	--*	151	160	162
Novato	--	--	--	--	--	--	--	--
Palo Alto	464	352	368	422	437	407	363	402
Petaluma	--	--	--	--	--	--	--	--
Pinole	--	--	--	--	--	--	--	--
Rodeo	--	--	--	--	--	--	--	--
SFO Airport	--	--	--	--	--	--	--	--
SFPUC Southeast	1,300	1,550	960	947	790	978	965	1,070
San Jose	2,770	2,460	2,200	2,440	1,600	1,940	3,130	2,360
San Mateo	223	218	207	212	213	213	236	218
SMCSD	--	--	--	--	--	--	--	--
SASM	--	--	--	--	--	--	--	--
SVCW	329	367	370	346	268	345	359	353
Sonoma Valley	--	--	--	--	--	--	--	--
South SF	209	228	226	255	188	209	184	214
Sunnyvale	322	245	269	302	289	353	344	304
Treasure Island	--	--	--	--	--	--	--	--
Vallejo	175	167	191	193	232	187	220	195
West County	321	333	345	313	441	344	345	349
Total[f]	**--[g]**	**10,900**	**9,910**	**11,100**	**9,720**	**10,100**	**11,400**	**10,700**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates data not required as such Dischargers have a permitted capacity of less than 10 mgd.
d. Limited to July through September.
e. Permit required data not provided.
f. The total values might vary from the sum of the listed values by plant due to rounding.
g. Due to missing data from EBDA, the sum is not shown because it is a significant underestimate.
* No data.

Table A-27. Influent: Annual Average[a] TP Loads by Subembayment (kg P/d)

Subembayment	Permitted Capacity	2018/ 2019[b]	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	100	*	1,690	1,560	1,540	1,610	1,550	1,590	1,590
San Pablo Bay	62.8	*	319	334	350	409	333	368	352
Central Bay	167	*	2,310	1,940	2,300	2,990	2,310	2,410	2,370
South Bay	262	*	3,820	3,740	3,760	3,380	3,270	3,330	3,550
Lower South Bay	236	*	3,640	3,270	3,180	2,820	3,330	3,570	3,300
Total	**827**	*****	**11,800**	**10,800**	**11,100**	**11,200**	**10,800**	**11,300**	**11,200**

a. October 1 through September 30.

b. Values for 2018/2019 are not shown as they are limited to July 2019 through September 2019.

Table A-28. Influent: Dry Season[a] Average TP Loads by Subembayment (kg P/d)

Subembayment	Permitted Capacity	2019[b]	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	100	1,770	1,610	1,530	1,580	1,540	1,510	1,570	1,580
San Pablo Bay	62.8	175	167	191	368	232	338	380	264
Central Bay	167	2,120	2,020	1,880	2,650	2,500	2,180	2,260	2,230
South Bay	262	2,060	4,040	3,470	3,330	3,130	3,330	3,330	3,240
Lower South Bay	236	3,550	3,060	2,840	3,170	2,320	2,700	3,830	3,070
Total	**827**	**9,670**	**10,900**	**9,910**	**11,100**	**9,720**	**10,100**	**11,400**	**10,400**

a. May 1 through September 30.

b. Limited to July through September.

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Appendix B. Discharge Data Tables and Figures

Data on flow (as mgd), load (as kg/d), and concentrations (mg/L) are summarized for each Discharger as well as for each of the five subembayments (concentrations by subembayment only). The data are also presented for both the annual average and dry season average. Data are presented based on the period of collection; for example, 2012/2013 represents the period between October 1, 2012 and September 30, 2013. Since the first Group Annual Report submitted in 2015, there have been several data amendments within CIWQS and the Group Annual Reports as follows:

- Data from the City of Palo Alto, the City of San Mateo, and Napa Sanitation District submitted under the 2015 Group Annual Report Submittal were initially updated in the 2016 Report with updated data that are reflected in this report.
- Data from the Rodeo Sanitary District 2014-2016 datasets were updated with values that are reflected in this report.
- Ammonia data for June 2017 from Sausalito Marin City Sanitation District were updated with values that are reflected in this report.
- Flow data from Tiburon for the 2014/2015 and 2015/2016 were inaccurately reported in the 2017 Group Annual Report. This report reflects the accurate data from CIWQS.
- Flow data for Mt View Sanitary District for a portion of the 2018 dry season and the 2018/2019 dataset were inaccurately reported in the 2018 and 2019 Group Annual Reports. This report reflects the accurate data since updated in CIWQS.

It should be noted that there are often missing monthly flows and loads for the smallest Dischargers with less rigorous sampling requirements. The plots shown in the following subsections use linear interpolation to fill the data gaps. The impact of the interpolated values is negligible, especially considering the size of the facilities that most often are missing data.

B.1 Flow

The historical average monthly discharge flow for each Discharger is shown in Figure B-1. The individual trending analysis results (with 95% confidence intervals) are shown in Figure B-2. The annual average (twelve months from October 1 to September 30) and dry season average (May 1 through September 30) discharge flows are presented in Table B-1 and Table B-2, respectively. The annual average and dry season average discharge flows for each subembayment are provided in Table B-3 through Table B-4.

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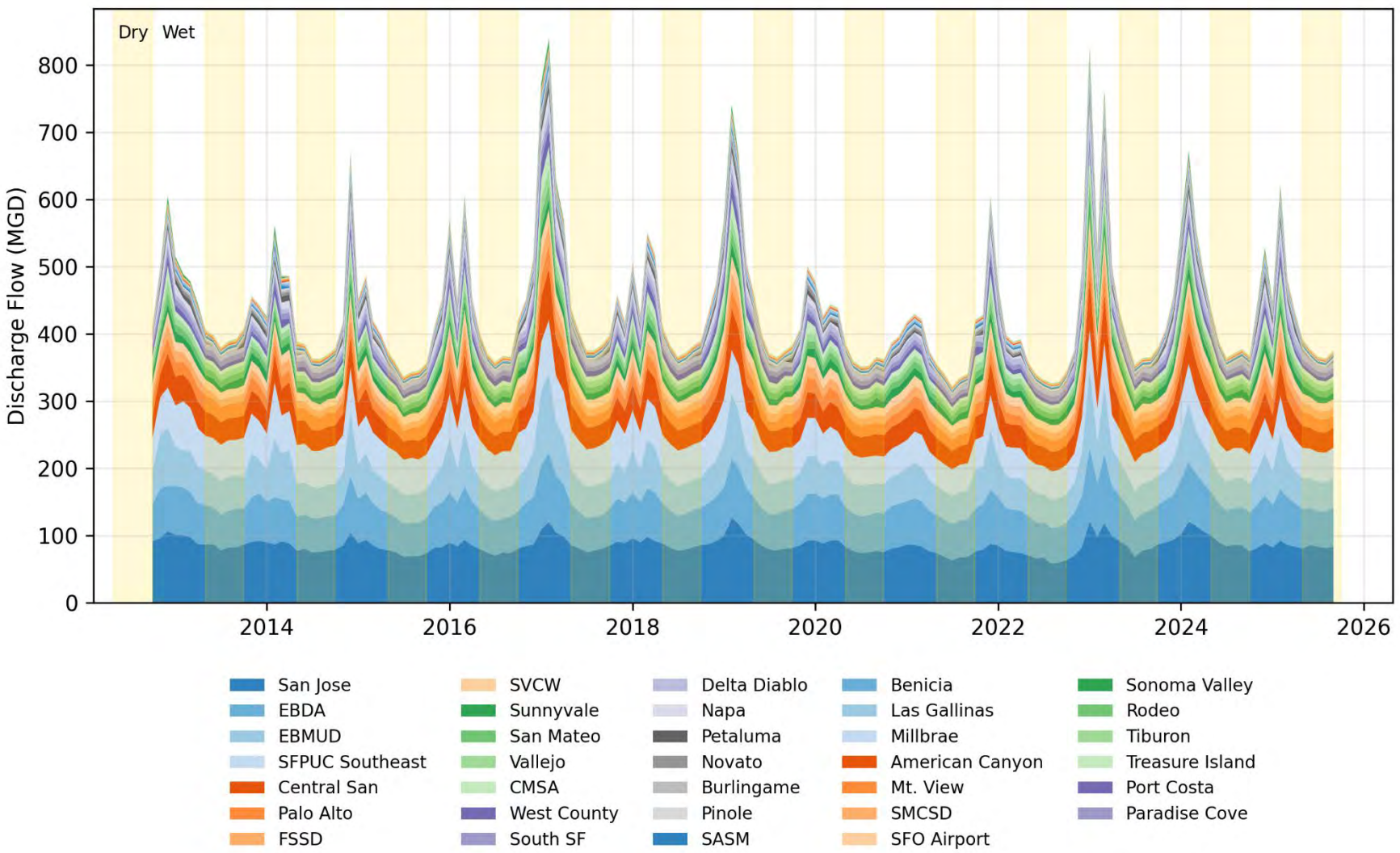


Figure B-1. Discharge: Average Monthly Discharge Flows

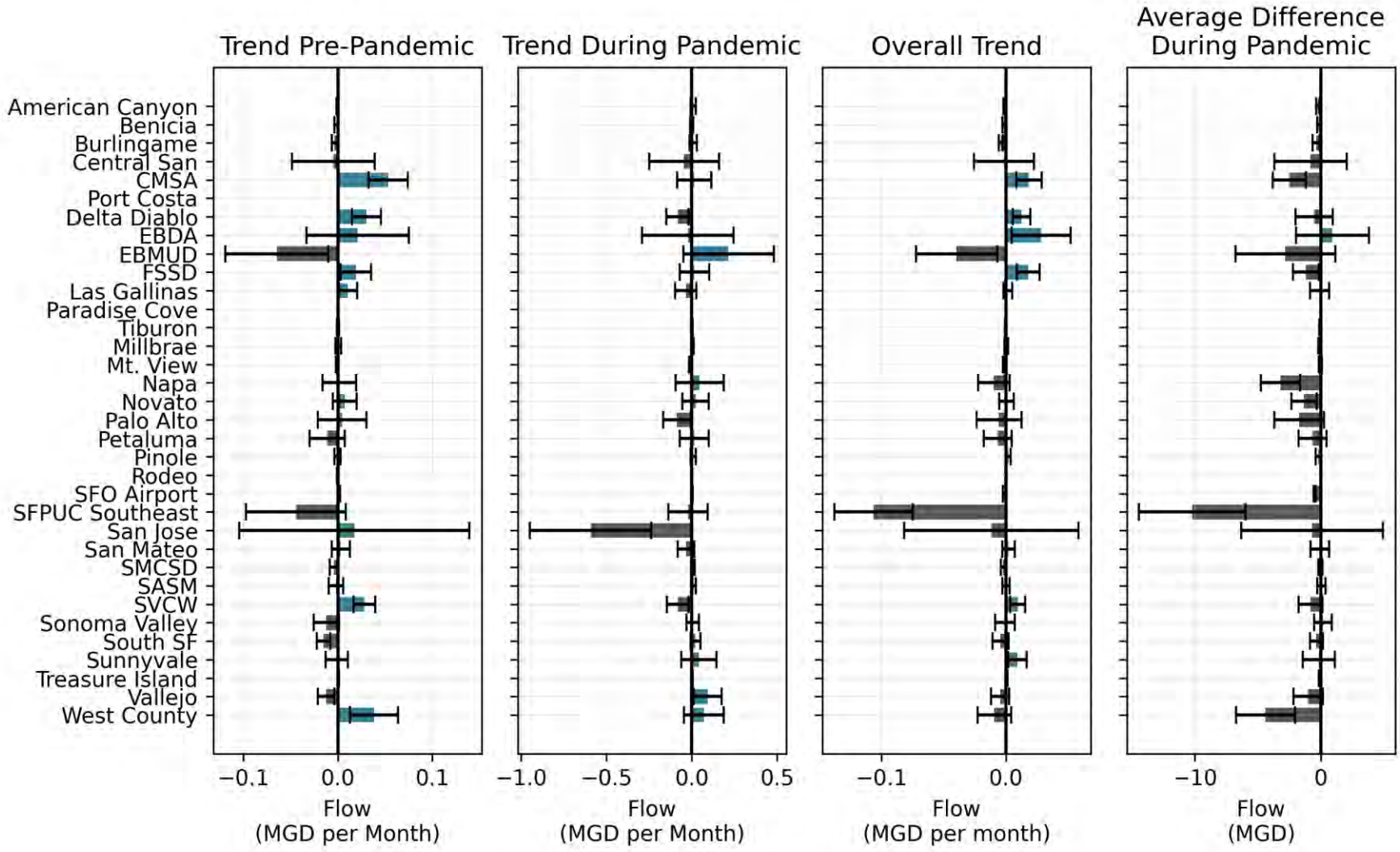


Figure B-2. Trend Coefficients for Flow (95% Confidence Interval Shown in Black)

Table B-1. Discharge: Annual Average[a] Flows by Discharger (mgd)[b,c]

Discharger	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	1.47	1.36	1.45	1.44	1.77	1.39	1.58	1.22	1.13	1.27	1.62	1.45	1.40	1.43
Benicia	2.18	2.04	1.98	2.00	2.46	1.99	2.23	1.80	1.67	1.79	2.28	1.99	1.86	2.02
Burlingame	3.03	2.91	2.96	2.84	3.62	2.74	2.99	2.44	2.12	2.53	3.15	2.53	2.54	2.80
Central San	37.5	35.5	32.8	33.7	43.5	34.9	38.6	33.3	31.4	34.1	42.8	36.3	34.8	36.1
CMSA	7.66	5.84	6.97	8.05	13.4	9.16	12.0	9.01	7.42	9.53	11.4	10.4	9.83	9.29
Port Costa	0.00682	0.00630	0.0102	0.0165	0.0308	0.0197	0.0240	0.0296	0.0145	0.0200	0.0409	0.0326	0.0193	0.0209
Delta Diablo	6.83	6.12	7.38	7.21	9.88	9.04	8.74	8.17	7.41	7.84	9.01	8.45	9.34	8.11
EBDA	62.2	58.5	59.1	61.0	68.1	60.5	65.0	62.1	60.2	62.0	71.5	66.2	62.3	63.0
EBMUD	58.3	56.2	51.5	53.4	66.1	52.0	58.0	48.1	45.3	51.5	60.0	53.6	51.2	54.2
FSSD	13.2	12.4	12.1	13.0	17.0	13.4	15.4	12.9	12.3	13.9	17.4	15.7	15.5	14.2
Las Gallinas[d]	1.37	1.19	1.25	1.66	2.86	1.35	2.62	1.93	1.44	1.38	2.14	1.78	1.88	1.76
Paradise Cove	0.0144	0.0138	0.0135	0.0129	0.0148	0.0159	0.0166	0.0149	0.0144	0.0141	0.0145	0.0126	0.0119	0.0142
Tiburon	0.587	0.592	0.665	0.551	0.791	0.641	0.670	0.573	0.526	0.592	0.714	0.629	0.578	0.624
Millbrae	1.58	1.65	1.35	1.49	1.87	1.48	1.73	1.48	1.38	1.54	1.76	1.66	1.60	1.58
Mt. View	1.34	1.27	1.26	1.20	1.53	1.27	1.36	1.19	1.02	1.08	1.34	1.13	1.09	1.24
Napa[d]	5.05	4.60	5.30	6.04	8.94	4.55	7.42	3.54	1.28	3.16	6.46	5.94	5.38	5.20
Novato[d]	3.18	2.89	3.33	2.94	5.08	2.98	4.78	2.75	2.04	2.52	4.82	3.70	3.89	3.45
Palo Alto	21.5	19.2	18.9	22.4	23.2	19.1	21.9	19.5	17.1	17.0	21.8	20.0	21.8	20.2
Petaluma[d]	3.67	4.32	3.18	2.83	4.63	3.18	4.02	2.89	1.61	2.25	3.59	4.02	3.86	3.39
Pinole	2.57	2.60	2.39	2.40	2.98	2.50	2.78	2.27	2.20	2.73	3.11	2.89	2.80	2.63
Rodeo	0.650	0.593	0.603	0.601	0.805	0.587	0.680	0.551	0.527	0.572	0.741	0.660	0.615	0.630
SFO Airport	1.13	1.17	1.02	1.10	1.25	1.15	1.22	0.943	0.748	0.900	1.05	1.11	1.02	1.06
SFPUC Southeast	56.9	58.9	55.3	56.6	63.0	56.5	55.5	46.8	42.2	44.3	48.3	48.2	47.3	52.3
San Jose	91.5	84.3	81.3	80.3	90.4	87.5	93.8	84.4	76.1	73.1	87.9	96.6	83.8	85.5
San Mateo	10.8	9.73	10.2	10.3	12.3	10.4	11.6	9.93	9.19	9.99	12.1	11.2	10.7	10.6
SMCSD	1.52	1.25	1.19	1.27	1.52	1.14	1.30	1.03	1.09	1.09	1.21	1.20	1.14	1.24
SASM	2.19	2.69	2.35	2.49	3.09	2.26	2.67	2.14	2.08	2.43	2.86	2.65	2.52	2.49
SVCW	12.9	12.2	12.8	14.1	16.0	13.9	15.6	13.7	12.5	13.1	16.1	14.8	14.1	14.0
Sonoma Valley[d]	1.59	1.29	0.317	0.567	2.22	0	1.48	0	0	0.339	1.760	1.33	1.47	0.951
South SF	8.99	8.68	8.43	8.25	8.98	7.60	8.55	7.34	6.72	7.66	8.90	8.66	8.42	8.24
Sunnyvale	10.8	10.8	10.2	10.2	11.9	10.5	11.6	10.1	10.7	10.6	12.9	12.5	11.9	11.1
Treasure Island	0.312	0.317	0.324	0.330	0.375	0.313	0.412	0.285	0.234	0.320	0.402	0.355	0.547	0.348
Vallejo	10.4	9.14	10.0	9.70	12.6	9.06	10.1	8.29	7.80	9.55	10.8	9.67	9.86	9.76
West County	8.32	8.39	7.40	10.1	13.1	9.93	13.3	7.37	6.29	8.75	8.47	8.16	8.38	9.07
Total[e]	**451**	**428**	**415**	**430**	**515**	**433**	**480**	**408**	**374**	**399**	**479**	**455**	**433**	**439**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-2. Discharge: Dry Season[a] Average Flows by Discharger (mgd)[b,c]

Discharger	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
American Canyon	1.19	1.18	1.14	1.04	1.12	1.09	1.17	0.949	0.892	0.796	1.04	0.955	0.870	1.03
Benicia	1.99	1.85	1.68	1.83	1.92	1.82	1.90	1.68	1.58	1.55	1.77	1.72	1.64	1.76
Burlingame	2.82	2.55	2.57	2.54	2.84	2.49	2.49	2.20	1.91	2.03	2.13	2.14	2.19	2.38
Central San	34.1	32.6	28.1	30.1	33.9	31.2	32.8	31.5	28.7	29.5	33.7	32.4	30.8	31.5
CMSA	5.59	4.97	4.71	5.72	7.49	6.93	7.96	7.14	6.08	6.15	6.86	6.72	6.34	6.36
Port Costa	0.00496	0.00400	0.00868	0.0157	0.0147	0.0208	0.0149	0.0149	0.0118	0.0188	0.0236	0.0167	0.0123	0.0140
Delta Diablo	6.19	5.72	5.89	6.24	8.81	7.43	8.28	8.00	6.48	6.72	8.41	7.88	8.14	7.25
EBDA	55.6	50.8	51.3	53.3	53.0	54.9	56.4	56.4	55.2	54.0	59.1	57.3	55.9	54.9
EBMUD	50.0	47.1	43.5	45.4	48.1	45.9	48.3	45.3	42.4	42.8	45.6	44.8	44.0	45.6
FSSD	10.3	10.2	9.12	10.2	12.2	11.7	12.8	11.3	10.8	11.4	13.6	12.8	12.8	11.5
Las Gallinas[d]	0	0	0	0	0.407	0	0.750	0.405	0	0	0	0	0	0.120
Paradise Cove	0.0140	0.0130	0.0126	0.0129	0.0125	0.0183	0.0149	0.0154	0.0127	0.0132	0.0125	0.0112	0.0108	0.0134
Tiburon	0.532	0.542	0.545	0.551	0.558	0.547	-	0.537	0.485	0.473	0.558	0.482	0.458	0.522
Millbrae	1.53	1.25	1.19	1.40	1.42	1.30	1.48	1.37	1.32	1.33	1.44	1.46	1.41	1.38
Mt. View	1.14	1.21	1.12	1.22	1.25	1.19	1.20	1.12	0.978	1.00	1.05	1.07	0.986	1.12
Napa[d]	0	1.20	0	0	0	0	0	0	0	0	0	0	0	0.0923
Novato[d]	0.806	0.743	0.736	0.763	2.28	0.779	2.30	0.503	0.264	0	2.22	0.707	1.40	1.04
Palo Alto	22.5	19.6	18.5	21.6	18.9	19.5	17.4	17.5	17.0	16.1	18.4	19.7	19.4	18.9
Petaluma[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinole	2.50	2.33	2.09	2.20	2.36	2.27	2.50	2.22	2.11	2.44	2.46	2.54	2.48	2.35
Rodeo	0.572	0.551	0.491	0.523	0.552	0.526	0.550	0.540	0.496	0.486	0.546	0.548	0.522	0.531
SFO Airport	1.07	1.13	0.949	1.06	1.14	1.12	1.17	0.665	0.688	0.915	0.990	1.09	0.900	0.992
SFPUC Southeast	53.3	56.0	52.8	54.6	57.1	52.9	49.6	42.0	40.4	42.2	44.4	45.4	44.6	48.9
San Jose	83.6	77.2	72.1	74.6	80.1	81.9	83.4	77.2	68.3	64.3	80.4	89.1	83.0	78.1
San Mateo	10.0	9.18	8.52	9.18	9.63	9.68	9.97	9.52	8.52	8.66	9.53	9.61	9.42	9.34
SMCSD	1.22	1.06	1.03	1.11	1.13	1.02	1.06	0.943	1.08	0.885	0.956	0.964	0.940	1.03
SASM	1.95	1.87	1.74	1.77	1.94	1.79	1.70	1.98	1.80	1.80	1.94	1.85	1.84	1.84
SVCW	11.8	11.0	11.9	12.5	13.1	12.5	13.3	12.6	11.3	11.4	12.7	12.7	12.4	12.2
Sonoma Valley[d]	0	0	0	0	0.0549	0	0	0	0	0	0.0741	0	0	0.00993
South SF	8.43	8.34	7.46	7.41	7.13	7.21	7.50	6.97	6.45	7.17	7.57	7.68	7.64	7.46
Sunnyvale	9.02	8.41	7.71	8.04	9.34	8.54	9.06	8.38	9.57	9.56	9.78	10.5	9.77	9.05
Treasure Island	0.281	0.293	0.275	0.273	0.277	0.306	0.307	0.253	0.238	0.272	0.323	0.296	0.481	0.298
Vallejo	8.75	8.73	8.21	8.40	8.70	7.94	8.10	7.75	7.66	7.42	7.77	8.62	8.93	8.23
West County	6.55	6.39	5.61	8.74	8.65	8.67	10.2	6.16	5.76	5.53	6.11	6.54	5.53	6.95
Total[e]	**393**	**374**	**351**	**372**	**396**	**383**	**394**	**363**	**339**	**337**	**381**	**388**	**375**	**373**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-3. Discharge: Annual Average[a] Flow by Subembayment (mgd)

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	58.9	55.3	53.5	55.1	71.9	58.6	64.1	55.6	52.1	56.9	70.5	61.6	60.7	59.6
San Pablo Bay[b]	32.1	30.0	29.8	30.2	44.4	27.6	37.7	25.5	19.7	25.6	37.4	33.5	33.0	31.2
Central Bay	78.9	75.2	70.3	75.9	98.3	75.3	88.4	68.5	62.9	74.2	85.4	77.0	74.2	77.3
South Bay	157	154	151	156	175	154	162	145	135	142	163	154	148	154
Lower South Bay	124	114	110	113	125	117	127	114	104	101	123	129	117	117
Total	**451**	**428**	**415**	**430**	**515**	**433**	**480**	**408**	**374**	**399**	**479**	**455**	**433**	**439**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-4. Discharge: Dry Season[a] Flow by Subembayment (mgd)

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	51.7	49.8	44.2	47.8	56.1	51.6	55.1	51.9	47.0	48.7	56.7	54.1	52.8	51.3
San Pablo Bay [b]	15.8	16.6	14.4	14.8	17.4	14.5	17.3	14.1	13.1	12.7	15.9	15.1	15.9	15.2
Central Bay	66.1	61.9	57.3	63.5	68.2	64.9	69.5	62.4	57.9	58.0	62.4	61.7	59.6	62.6
South Bay	145	140	137	142	145	142	142	132	126	128	138	137	134	138
Lower South Bay	115	106	98.3	104	108	110	110	103	94.9	90.0	109	119	112	106
Total	**393**	**374**	**351**	**372**	**396**	**383**	**394**	**363**	**339**	**337**	**381**	**388**	**375**	**373**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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B.2 Total Ammonia

The historical average monthly discharge load for each Discharger is shown in Figure B-3. The individual trending analysis results (with 95% confidence intervals) are shown in Figure B-4. The annual average (twelve months from October 1 to September 30) and dry season average (May 1 through September 30) discharge loads are presented in Table B-5 and Table B-6, respectively. The annual average and dry season average discharge loads and concentrations for each subembayment are provided in Table B-7 through Table B-10.

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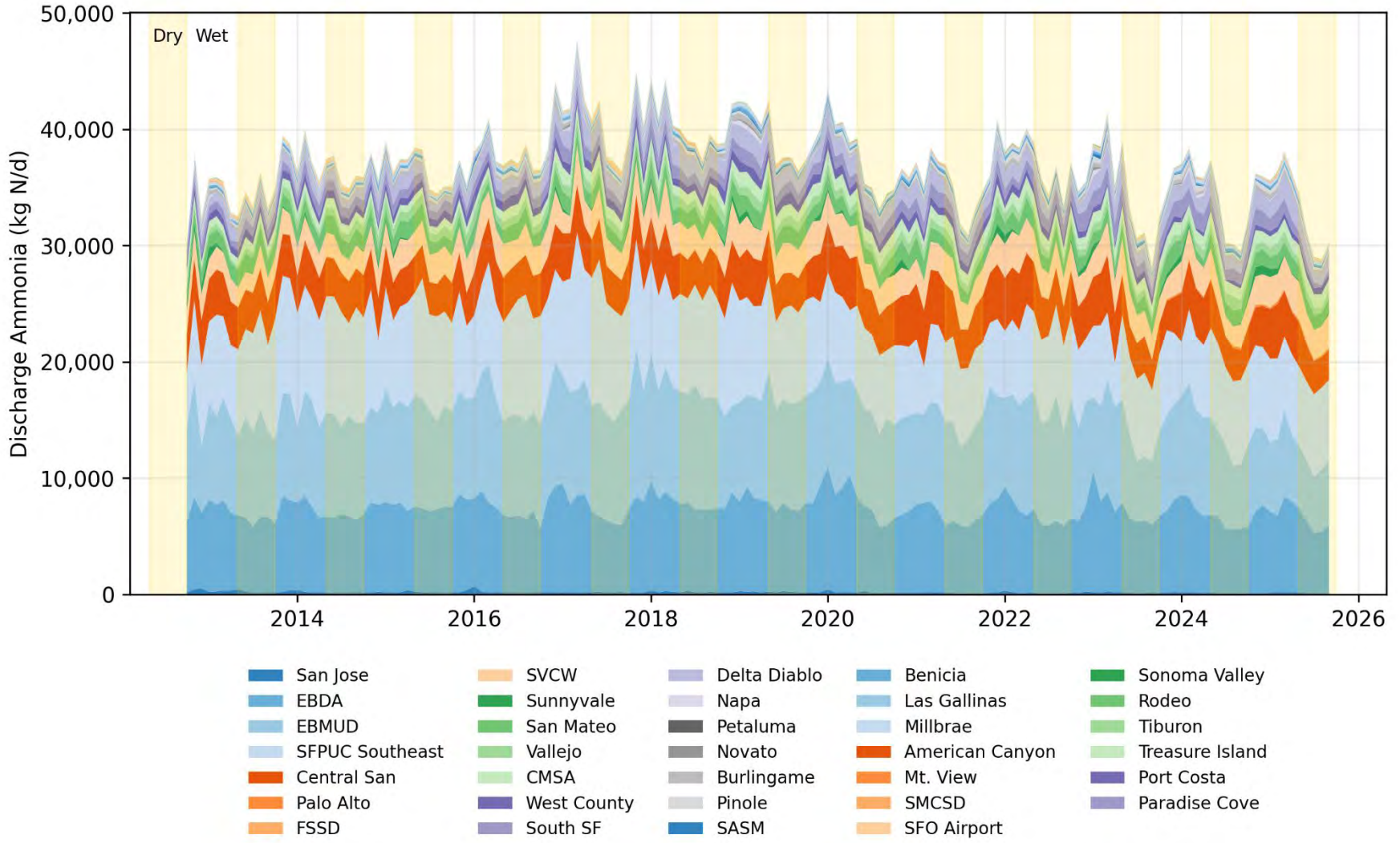


Figure B-3. Discharge: Average Monthly Discharge Total Ammonia Loads

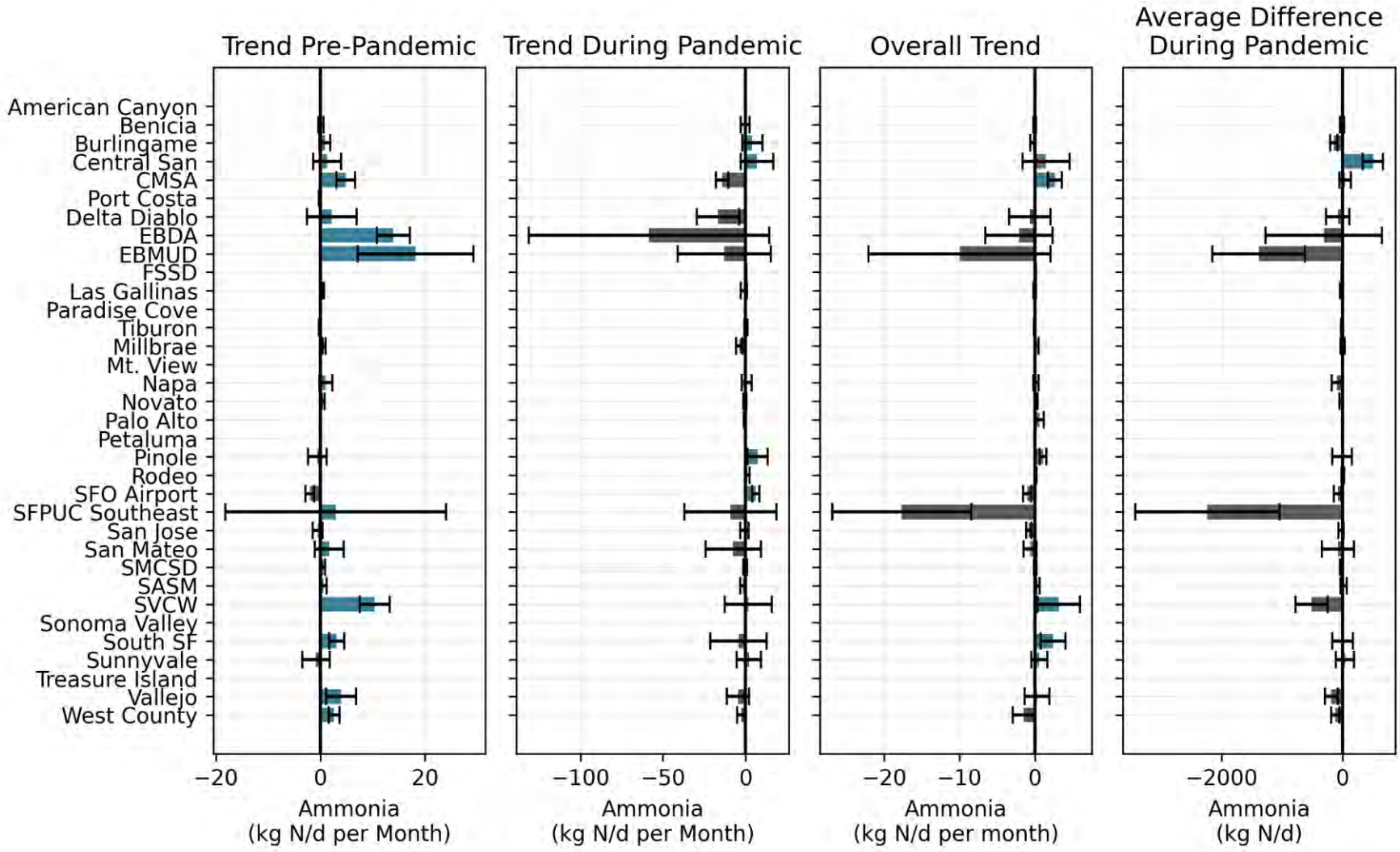


Figure B-4.Trend Coefficients for Ammonia (95% Confidence Interval Shown in Black).

Table B-5. Discharge: Annual Average[a] by Discharger, Total Ammonia (kg N/d)[b,c]

Discharger	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	1.77	5.43	3.25	1.54	2.31	4.83	4.12	1.33	0.390	0.650	1.82	2.51	3.04	2.54
Benicia	190	159	186	194	175	216	187	174	200	165	193	187	164	184
Burlingame	305	251	259	274	323	320	351	240	243	284	277	210	279	278
Central San	3,610	3,510	3,210	3,490	3,610	3,560	3,530	3,870	4,210	4,070	3,660	3,340	3,450	3,630
CMSA	720	779	603	753	1,010	861	1,060	1,070	987	993	971	1,050	1,080	918
Port Costa	0.255	0.337	0.344	0.431	0.716	0.885	0.565	3.65	0.793	0.594	0.811	0.911	0.714	0.847
Delta Diablo	757	740	903	873	1,420	1,500	1,480	1,290	1,130	1,050	1,270	1,280	1,470	1,170
EBDA	6,820	7,010	7,320	7,330	7,320	7,830	7,680	8,070	6,670	7,010	7,180	6,820	6,650	7,210
EBMUD	8,070	8,350	8,630	9,010	9,390	10,100	8,810	8,920	8,130	9,190	7,730	7,740	6,060	8,470
FSSD	1.45	1.68	1.56	1.91	2.67	7.66	9.09	5.17	3.85	15.0	18.02	10.3	8.26	6.66
Las Gallinas[d]	10.7	14.8	11.6	23.4	34.7	34.6	54.1	31.8	43.9	17.4	19.8	4.85	4.41	23.6
Paradise Cove	0.443	0.249	0.0102	1.35	0.0386	0.0197	0.0452	0.0624	0.155	0.367	0.114	0.0741	0.0361	0.266
Tiburon	40.2	48.3	53.0	55.0	33.6	55.1	48.7	29.4	32.3	31.8	33.3	31.8	36.4	40.7
Millbrae	237	233	237	265	292	260	284	281	269	232	250	291	302	264
Mt. View	3.09	0.824	2.08	3.80	2.61	2.53	4.25	3.60	3.90	1.25	1.99	1.23	0.843	2.46
Napa[d]	44.1	17.0	6.35	16.5	103	38.1	158	25.0	8.52	34.4	85.2	87.3	20.0	49.5
Novato[d]	7.25	10.0	17.5	6.92	40.6	16.5	57.1	23.1	22.1	23.3	70.8	29.4	23.5	26.8
Palo Alto	13.4	12.8	17.7	17.6	12.0	15.8	10.6	8.90	12.3	9.11	23.5	115	157	32.7
Petaluma[d]	3.22	7.17	2.82	5.43	2.57	3.15	7.47	2.94	2.22	4.42	3.21	4.11	4.94	4.13
Pinole	187	202	229	258	242	273	115	171	218	381	349	352	340	255
Rodeo	3.47	5.05	3.76	6.96	9.30	3.84	4.78	18.5	11.9	32.7	31.2	21.6	20.7	13.3
SFO Airport	227	242	132	141	212	115	82.4	3.75	50.5	68.1	157	44.5	112	122
SFPUC Southeast	7,280	9,580	8,630	8,400	9,780	8,460	8,380	7,110	6,400	6,800	6,360	6,680	6,940	7,750
San Jose	280	204	197	232	183	206	215	197	139	131	159	138	130	185
San Mateo	1,320	1,300	1,210	1,110	1,250	1,320	1,520	1,210	1,250	1,250	1,090	1,170	1,230	1,250
SMCSD	51.0	41.6	50.2	44.7	73.7	94.8	72.8	73.2	75.8	60.6	38.4	55.8	62.0	61.5
SASM	49.5	45.5	39.0	62.2	26.7	67.2	107	85.6	91.8	116	106.8	79.8	63.4	72.4
SVCW	1,900	1,980	2,240	2,540	2,390	2,670	2,610	2,560	2,380	2,620	2,520	2,200	2,660	2,410
Sonoma Valley[d]	1.53	2.45	0.178	0.130	0.788	0	0.411	0	0	0.130	0.839	0.466	0.305	0.556
South SF	772	828	863	746	1,030	1,000	1,010	943	1,110	1,020	1,288	1,160	938	977
Sunnyvale	305	86.5	163	30.0	101	171	196	116	133	184	213	206	308	170
Treasure Island	0.883	2.61	8.36	8.51	5.09	4.76	4.44	3.64	3.22	3.50	4.18	1.96	3.13	4.17
Vallejo	426	622	854	749	784	845	849	732	733	674	626	699	694	714
West County	650	651	620	812	720	705	877	769	714	694	521	347	484	659
Total[e]	**34,300**	**37,000**	**36,700**	**37,500**	**40,600**	**40,800**	**39,800**	**38,000**	**35,300**	**37,200**	**35,300**	**34,400**	**33,700**	**36,900**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-6. Discharge: Dry Season[a] by Discharger, Total Ammonia (kg N/d)[b,c]

Discharger	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
American Canyon	1.56	2.21	2.06	1.13	1.74	2.93	1.93	0.990	0.374	0.454	1.72	1.48	1.71	1.56
Benicia	190	149	143	192	195	195	140	188	199	157	221	219	144	179
Burlingame	311	209	241	246	220	366	224	219	214	216	234	196	212	239
Central San	3,540	3,390	2,960	3,510	3,240	3,250	3,170	3,740	3,830	3,520	2,980	3,080	3,010	3,320
CMSA	740	780	619	915	1,020	815	1,020	1,060	993	998	959	1,060	1,130	933
Port Costa	0.319	0.0381	0.133	--	0.290	0.296	0.461	0.749	0.613	0.525	0.552	--	0.615	0.417
Delta Diablo	709	674	650	858	1,320	1,360	1,310	1,280	839	846	1,170	1,270	1,230	1,040
EBDA	6,290	6,500	7,210	6,620	6,250	7,320	7,260	6,820	5,950	6,190	6,470	5,980	5,960	6,530
EBMUD	8,020	8,490	8,770	8,480	9,340	9,770	9,460	8,610	7,940	9,380	6,460	6,770	5,240	8,210
FSSD	0.938	1.27	1.02	1.26	1.84	6.83	7.41	3.18	3.47	12.1	13.09	7.82	5.94	5.09
Las Gallinas[d]	0	0	0	0	2.32	0	11.2	0.722	0	0	0	0	0	1.09
Paradise Cove	0.0284	0.249	0.0119	1.35	0.0169	0.0197	0.0677	0.121	0.258	0.0541	0.016	0.0316	0.0443	0.213
Tiburon	32.2	48.3	46.2	55.0	29.4	57.2	--	27.5	43.3	33.2	21.3	36.8	29.0	38.3
Millbrae	243	206	235	292	290	249	305	266	274	242	245	265	302	263
Mt. View	1.31	0.754	2.21	3.66	1.19	3.49	4.39	3.40	1.81	1.35	0.907	0.934	0.780	2.01
Napa[d]	0	0.415	0	0	0	0	0	0	0	0	0	0	0	0.0319
Novato[d]	0.305	2.39	1.20	0.902	18.0	2.40	20.5	5.15	1.44	0	12.0	1.28	10.5	5.88
Palo Alto	15.1	13.1	17.3	25.8	13.3	26.1	8.29	8.32	9.39	11.6	22.8	117	165	34.8
Petaluma[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinole	210	203	220	332	191	266	60.9	174	209	332	325	282	306	239
Rodeo	0.780	3.66	2.14	5.44	5.24	1.26	3.80	36.2	13.8	19.8	29.6	19.6	16.1	12.1
SFO Airport	234	263	142	192	337	48.9	146	3.84	61.7	82.5	210	50.6	110	145
SFPUC Southeast	7,910	9,580	8,930	9,300	10,100	8,670	7,980	6,730	6,770	7,300	6,880	7,290	6,960	8,030
San Jose	229	158	182	162	197	211	222	172	116	94.5	131	109	115	161
San Mateo	1,530	1,480	1,200	1,290	1,190	1,420	1,550	1,240	1,030	1,260	1,190	1,310	1,190	1,300
SMCSD	49.3	50.2	45.8	59.3	105	132	126	66.3	69.1	52.5	35.0	42.0	49.1	67.8
SASM	54.4	32.7	25.1	49.8	22.1	100	132	94.6	73.0	164	71.0	78.2	59.8	73.6
SVCW	1,760	1,900	2,310	2,470	2,390	2,300	2,480	2,320	2,470	2,410	2,510	2,010	2,750	2,310
Sonoma Valley[d]	0	0	0	0	0.0182	0	0	0	0	0	0.0337	0	0	0.00399
South SF	781	827	775	716	852	882	864	895	1,070	1,230	1,040	922	501	874
Sunnyvale	16.8	11.8	12.5	15.6	60.8	9.43	2.97	5.38	12.5	16.7	23.4	31.8	82.4	23.2
Treasure Island	1.23	4.55	10.5	4.16	4.05	6.65	3.41	3.81	3.73	3.01	4.02	1.55	3.07	4.14
Vallejo	435	645	795	705	752	767	791	722	692	600	579	872	619	690
West County	653	639	665	815	725	678	871	712	714	645	576	292	508	653
Total[e]	**34,000**	**36,300**	**36,200**	**37,300**	**38,900**	**38,900**	**38,200**	**35,400**	**33,600**	**35,800**	**32,400**	**32,300**	**30,700**	**35,400**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-7. Discharge: Annual Average[a] by Subembayment, Total Ammonia (kg N/d)

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	4,380	4,250	4,120	4,370	5,030	5,080	5,020	5,170	5,340	5,140	4,950	4,640	4,930	4,800
San Pablo Bay[b]	874	1,040	1,320	1,260	1,390	1,440	1,440	1,180	1,240	1,330	1,380	1,390	1,280	1,270
Central Bay	9,570	9,920	10,000	10,700	11,300	11,900	11,000	11,000	10,000	11,100	9,400	9,300	7,790	10,200
South Bay	18,900	21,400	20,900	20,800	22,600	22,000	21,900	20,400	18,400	19,300	19,100	18,600	19,100	20,300
Lower South Bay	598	303	378	280	296	393	421	321	284	325	396	459	594	388
Total	**34,300**	**37,000**	**36,700**	**37,500**	**40,600**	**40,800**	**39,800**	**38,000**	**35,300**	**37,200**	**35,300**	**34,400**	**33,700**	**36,900**

a. October 1 through September 30.
b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-8. Discharge: Dry Season[a] by Subembayment, Total Ammonia (kg N/d)

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	4,250	4,070	3,610	4,380	4,570	4,620	4,500	5,020	4,680	4,380	4,160	4,350	4,250	4,370
San Pablo Bay[b]	835	1,000	1,160	1,240	1,160	1,230	1,030	1,130	1,120	1,110	1,170	1,400	1,100	1,130
Central Bay	9,540	10,000	10,200	10,400	11,300	11,600	11,600	10,600	9,840	11,300	8,120	8,290	7,020	9,980
South Bay	19,100	21,000	21,000	21,100	21,600	21,300	20,800	18,500	17,800	18,900	18,800	18,000	18,000	19,700
Lower South Bay[c]	260	183	212	203	271	246	233	186	138	123	177	258	362	220
Total	**34,000**	**36,300**	**36,200**	**37,300**	**38,900**	**38,900**	**38,200**	**35,400**	**33,600**	**35,800**	**32,400**	**32,300**	**30,700**	**35,400**

a. May 1 through September 30.
b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.
c. Dischargers to the Lower South Bay are all required to fully nitrify.

Table B-9. Discharge: Annual Average[a] by Subembayment, Total Ammonia (mg N/L)[b]

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	19.6	20.3	20.3	21.0	18.5	22.9	20.7	24.5	27.1	23.9	18.6	19.9	21.5	21.3
San Pablo Bay[c]	7.21	9.20	11.7	11.0	8.31	13.7	10.1	12.3	16.6	13.8	9.76	11.0	10.2	10.8
Central Bay	32.1	34.8	37.6	37.2	30.3	41.6	32.8	42.2	42.2	39.5	29.1	31.9	27.7	35.0
South Bay	31.6	36.8	36.5	35.3	34.1	37.6	35.7	37.3	36.0	35.8	31.0	31.8	34.1	34.8
Lower South Bay	1.28	0.701	0.905	0.654	0.624	0.886	0.875	0.745	0.723	0.852	0.852	0.939	1.34	0.878
Total	**20.1**	**22.8**	**23.4**	**23.0**	**20.8**	**24.9**	**21.9**	**24.6**	**24.9**	**24.6**	**19.5**	19.9	20.5	22.3

a. October 1 through September 30.
b. Calculated by dividing the average annual load by the average annual flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-10. Discharge: Dry Season[a] by Subembayment, Total Ammonia (mg N/L)[b]

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	21.7	21.6	21.6	24.2	21.5	23.7	21.6	25.6	26.3	23.8	19.4	21.2	21.3	22.5
San Pablo Bay [c]	14.0	16.0	21.4	22.1	17.7	22.6	15.7	21.2	22.7	23.1	19.4	24.4	18.3	19.7
Central Bay	38.2	42.9	46.8	43.1	43.6	46.9	44.1	44.8	44.9	51.4	34.4	35.5	31.1	42.1
South Bay	34.9	39.5	40.7	39.3	39.3	39.5	38.8	37.1	37.5	39.1	36.0	34.6	35.3	37.8
Lower South Bay	0.598	0.458	0.569	0.516	0.662	0.592	0.560	0.476	0.383	0.360	0.431	0.572	0.853	0.547
Total	**22.8**	**25.6**	**27.3**	**26.5**	**26.0**	**26.8**	**25.6**	**25.8**	**26.2**	**28.1**	**22.5**	**22.0**	**21.7**	**25.1**

a. May 1 through September 30.
b. Calculated by dividing the average dry season load by the average dry season flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

B.3 Nitrate + Nitrite (NOx)

The historical average monthly discharge load for each Discharger is shown in Figure B-5. The individual trending analysis results (with 95% confidence intervals) are shown in Figure B-6. The annual average (twelve months from October 1 to September 30) and dry season average (May 1 through September 30) discharge loads are presented in Table B-11 and Table B-12, respectively. The annual average and dry season average discharge loads and concentrations for each subembayment are provided in Table B-13 through Table B-16.

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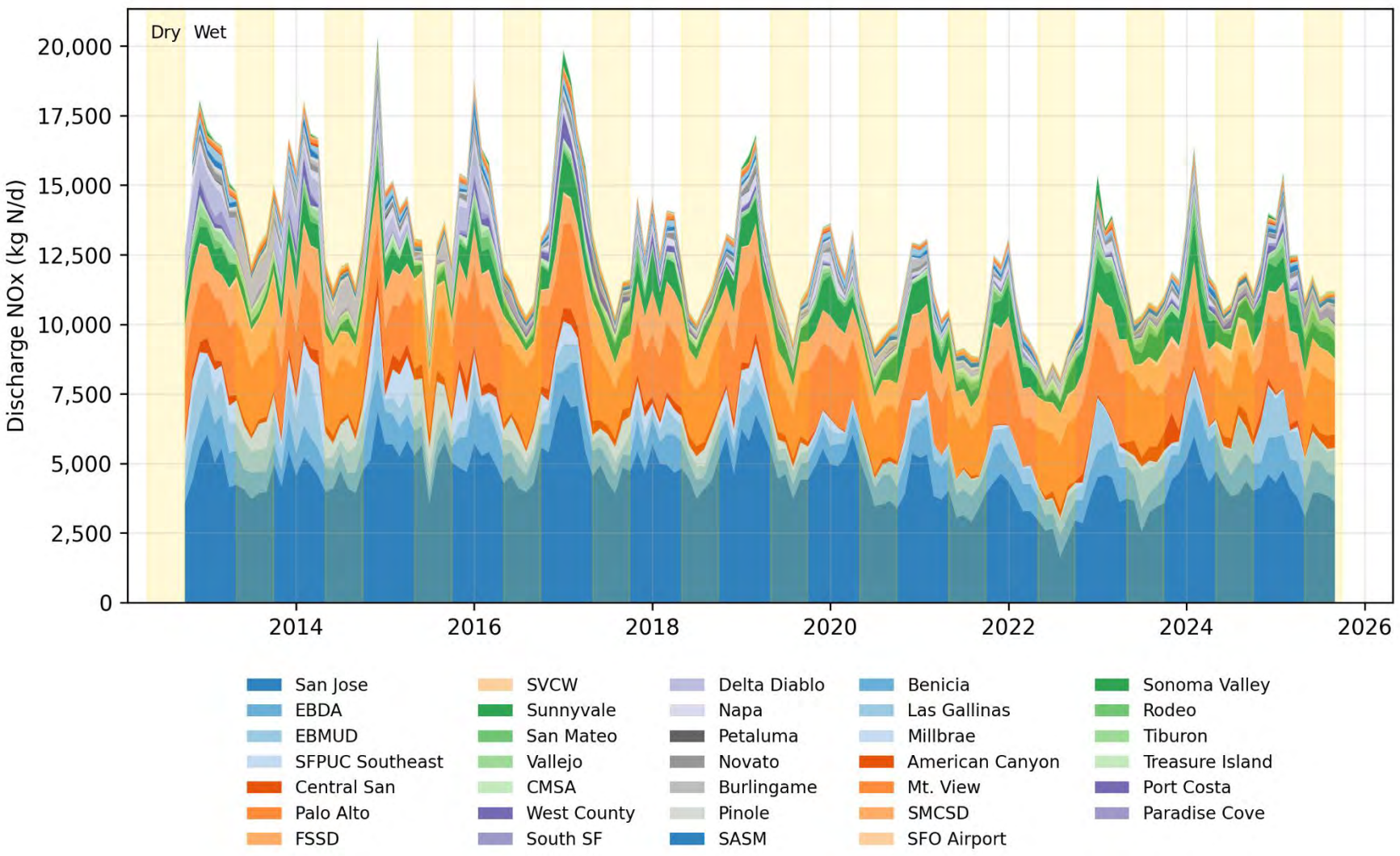


Figure B-5. Discharge: Average Monthly Discharge NOx Loads

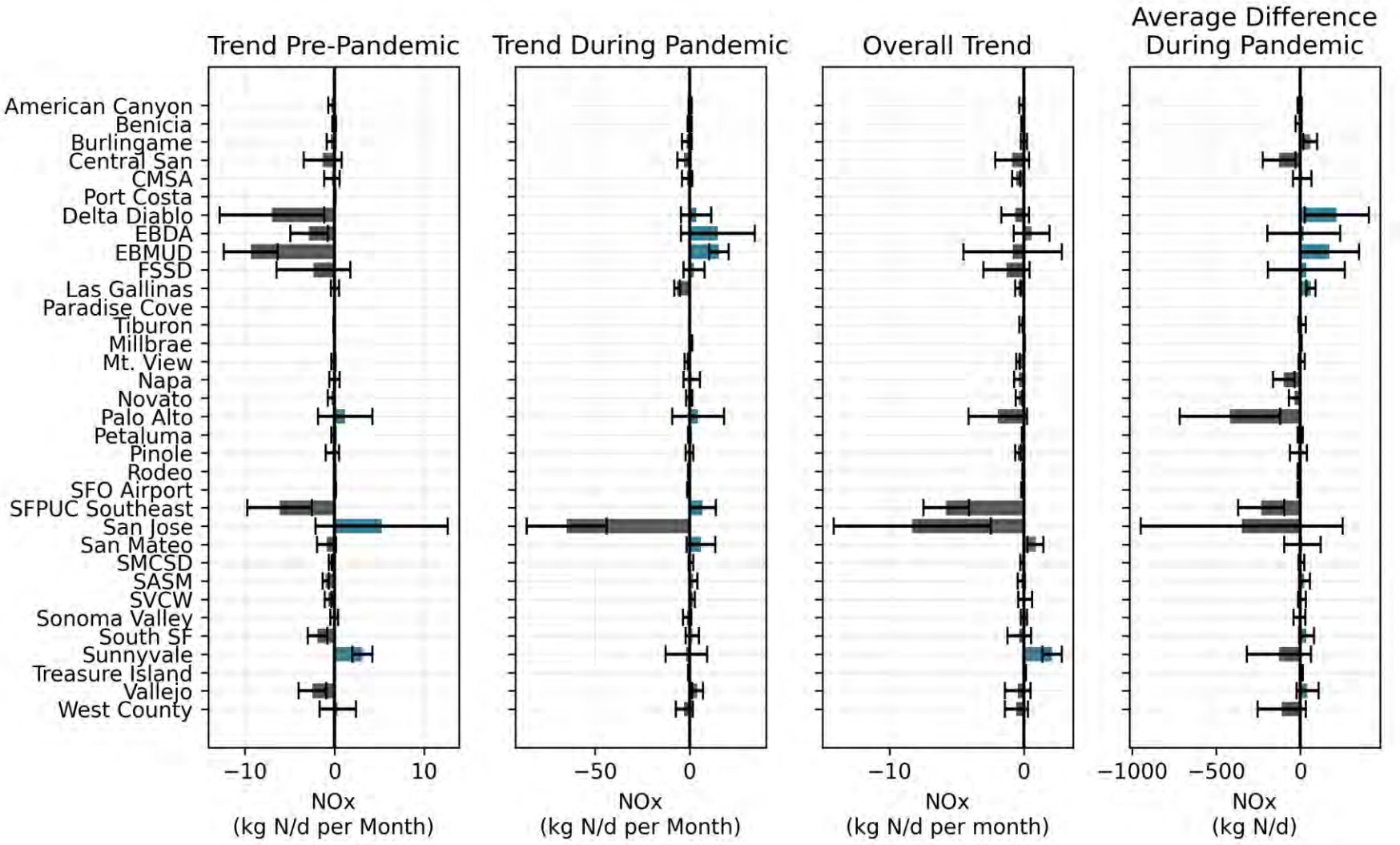


Figure B-6. Trend Coefficients for NOx (95% Confidence Interval Shown in Black)

Table B-11. Discharge: Annual Average[a] Values by Discharger, NOx (kg N/d)[b,c]

Discharger	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	68.6	74.9	41.2	30.6	39.1	31.9	33.2	31.8	17.5	18.3	28.5	38.0	42.6	38.2
Benicia	35.1	45.5	47.5	39.3	67.9	35.2	34.5	37.3	28.4	46.2	20.0	35.0	47.4	39.9
Burlingame	92.9	182	33.2	18.0	43.0	39.2	115	220	145	51.8	29.6	61.3	26.0	82.0
Central San	270	293	461	309	392	284	255	108	55.8	94.9	263	371	268	264
CMSA	124	67.2	158	115	171	125	58.4	95.2	104	70.3	58.4	54.6	41.3	95.6
Port Costa	0	0	0	1.30	1.13	0.700	0.143	0.573	0.776	0.744	0.935	0.477	0.666	0.744
Delta Diablo	936	774	382	450	31.4	34.1	48.2	46.1	68.6	55.0	39.5	43.4	52.8	228
EBDA	1,050	822	994	1,070	1,000	852	818	748	1,050	885	943	1,140	1,130	963
EBMUD	1,120	1,090	763	521	517	573	517	391	556	584	845	676	1,100	712
FSSD	1,310	1,330	1,030	874	914	1,290	1,120	1,030	1,010	1,110	1,050	1,060	944	1,080
Las Gallinas[d]	118	104	85.9	97.7	104	101	114	136	96.5	44.5	59.5	54.5	45.7	89.1
Paradise Cove	1.64	0	2.53	0.180	2.21	2.11	1.77	1.65	1.39	0.599	1.11	2.43	2.08	1.52
Tiburon	18.6	7.78	4.81	7.60	11.5	0.382	1.04	22.5	0.581	17.5	5.40	14.4	11.3	9.49
Millbrae	3.37	1.30	2.14	2.14	2.28	0.766	2.10	6.85	9.95	12.8	13.7	1.73	1.52	4.67
Mt. View	118	128	117	119	139	122	111	116	95.7	69.3	82.7	73.3	72.8	105
Napa[d]	129	158	165	154	156	123	149	127	36.5	84.6	135	114	122	127
Novato[d]	137	126	150	132	157	114	129	85.3	64.8	63.4	122	92.3	121	115
Palo Alto	2,340	2,150	2,110	2,630	2,550	2,160	2,300	2,220	1,940	2,140	2,400	1,800	2,170	2,220
Petaluma[d]	22.0	4.61	20.4	10.1	13.8	1.72	16.7	3.74	3.09	2.71	12.7	6.49	11.0	9.95
Pinole	114	93.1	48.4	51.4	78.1	44.1	104	60.3	54.7	28.6	30.5	42.5	27.4	59.8
Rodeo	32.9	25.6	29.5	23.4	35.1	28.7	33.5	20.1	19.6	18.3	22.8	29.6	26.9	26.6
SFO Airport	23.6	15.4	22.0	20.6	13.6	23.8	24.6	21.5	4.63	4.75	2.39	7.61	10.9	15.0
SFPUC Southeast	645	757	963	648	484	401	399	122	112	94.8	137	115	77.2	381
San Jose	4,520	4,570	5,390	4,760	5,610	4,720	5,290	4,680	3,940	3,320	3,620	4,520	4,010	4,540
San Mateo	129	102	94.8	190	105	112	12.7	121	122	139	267	201	267	143
SMCSD	77.4	76.2	76.8	87.6	62.3	41.4	62.3	50.5	63.0	55.1	72.8	61.1	60.3	65.7
SASM	162	158	134	172	138	110	92.7	115	124	99.6	138	137	153	133
SVCW	75.7	67.3	62.3	53.0	68.8	23.3	25.9	23.9	33.9	51.4	49.0	157	60.1	57.8
Sonoma Valley[d]	27.9	6.76	23.1	10.5	81.2	0	29.5	0	0	0.790	71.3	16.0	23.5	22.3
South SF	211	104	76.8	151	44.1	34.0	32.7	61.0	13.5	55.7	44.8	80.0	177	83.5
Sunnyvale	589	611	563	562	852	707	769	694	766	669	937	874	864	727
Treasure Island	9.96	11.2	10.6	8.91	11.2	7.22	8.73	17.3	15.8	13.4	21.0	21.8	30.0	14.4
Vallejo	341	224	106	153	122	95.0	105	112	111	152	188	131	200	157
West County	114	150	56.0	144	434	169	121	40.6	27.1	27.8	66.0	150	123	125
Total[e]	**15,000**	**14,300**	**14,200**	**13,600**	**14,500**	**12,400**	**12,900**	**11,600**	**10,700**	**10,100**	**11,800**	**12,200**	**12,300**	**12,700**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-12. Discharge: Dry Season Discharges by Discharger, NOx (kg N/d)

Discharger	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
American Canyon	109	77.5	28.7	19.0	23.0	28.6	27.3	18.4	15.0	10.8	13.3	22.2	24.4	32.1
Benicia	36.0	50.0	54.8	39.3	45.8	41.0	56.5	33.6	28.0	46.8	10.1	20.6	50.8	39.5
Burlingame	125	78.2	31.6	27.9	50.6	22.7	227	243	48.5	86.1	43.7	48.2	53.4	83.5
Central San	181	243	417	196	368	302	247	154	64.4	175	450	342	330	267
CMSA	104	60.5	103	48.8	196	139	68.5	105	111	89.0	37.3	31.6	22.6	85.8
Port Costa	--	--	--	--	--	--	0.203	0.769	--	--	0.591	--	0.666	0.557
Delta Diablo	925	807	219	69.0	27.0	47.2	51.0	47.4	107	99.9	26.9	53.8	75.2	197
EBDA	880	696	656	821	685	712	616	821	926	696	856	1,030	1,030	802
EBMUD	888	581	614	478	418	472	421	368	481	505	813	841	857	595
FSSD	1,360	968	806	653	1,080	1,230	1,010	966	901	1,030	871	941	903	978
Las Gallinas[d]	0	0	0	0	6.67	0	42.9	46.1	0	0	0	0	0	7.37
Paradise Cove	2.49	0.0374	2.60	0.180	2.60	2.11	2.09	0.848	0.545	0.783	2.20	2.41	1.94	1.61
Tiburon	14.5	7.78	6.99	7.60	15.6	0.339	--	26.3	0.0727	0.681	14.5	1.82	21.2	9.79
Millbrae	4.31	1.20	1.58	0.672	0.887	0.923	2.32	9.60	1.64	2.53	8.58	2.40	1.08	2.90
Mt. View	99.6	112	101	118	115	107	101	123	88.5	40.3	55.6	48.3	52.7	89.4
Napa[d]	0	49.7	0	0	0	0	0	0	0	0	0	0	0	3.82
Novato[d]	39.6	39.9	36.3	37.3	80.1	40.7	62.0	17.9	6.77	0	106	37.6	52.0	42.8
Palo Alto	2,530	2,130	2,210	2,620	2,110	2,190	1,940	1,920	1,990	2,220	2,280	1,920	2,040	2,160
Petaluma[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinole	133	103	47.2	9.16	44.2	55.8	109	68.4	71.9	37.3	24.8	69.1	32.9	62.0
Rodeo	25.6	24.4	24.8	22.8	26.3	28.2	32.0	10.2	20.2	19.6	19.0	20.5	22.4	22.8
SFO Airport	23.1	21.8	23.3	13.1	6.26	40.3	23.1	15.6	6.68	8.06	2.07	4.56	6.99	15.0
SFPUC Southeast	738	688	1,100	581	455	381	267	49.2	66.9	102	151	90.3	79.9	365
San Jose	3,990	4,180	5,100	4,250	4,530	4,290	4,540	4,030	3,310	2,440	3,330	4,210	3,680	3,990
San Mateo	6.26	5.81	77.9	78.9	94.1	61.4	4.83	76.8	195	83.0	255	103	290	102
SMCSD	83.8	72.5	88.9	81.6	42.4	15.2	32.5	56.0	75.2	59.8	76.0	70.1	69.3	63.3
SASM	136	130	126	140	132	79.0	43.7	140	146	56.9	154	154	152	122
SVCW	121	40.6	74.1	45.3	55.2	18.4	26.6	30.1	31.8	54.0	57.4	261	27.7	64.9
Sonoma Valley[d]	0	0	0	0	4.20	0	0	0	0	0	2.30	0	0	0.500
South SF	135	79.3	104	198	66.4	49.2	43.4	79.9	22.0	45.5	75.0	140	290	102
Sunnyvale	344	359	312	325	569	382	614	385	433	443	696	580	700	473
Treasure Island	8.69	9.76	10.4	9.86	10.6	6.94	10.7	16.7	15.7	16.9	21.6	21.5	33.8	14.9
Vallejo	317	206	104	131	118	86.5	110	98.3	122	169	175	15.1	251	146
West County	9.57	23.9	18.2	102	315	128	84.2	45.9	9.05	12.7	51.8	170	64.4	79.6
Total[e]	**13,400**	**11,800**	**12,500**	**11,100**	**11,700**	**11,000**	**10,800**	**10,000**	**9,290**	**8,540**	**10,700**	**11,200**	**11,200**	**11,000**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-13. Discharge: Annual Average[a] by Subembayment, NOx (kg N/d)

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	2,630	2,530	1,990	1,750	1,480	1,730	1,530	1,300	1,230	1,330	1,430	1,550	1,340	1,680
San Pablo Bay[b]	1,030	862	718	702	854	575	748	616	433	458	691	560	668	685
Central Bay	1,630	1,560	1,210	1,060	1,350	1,030	863	734	891	870	1,210	1,120	1,520	1,160
South Bay	2,230	2,050	2,250	2,150	1,770	1,490	1,430	1,320	1,490	1,300	1,490	1,760	1,760	1,730
Lower South Bay	7,450	7,330	8,070	7,960	9,010	7,590	8,350	7,590	6,650	6,130	6,950	7,200	7,040	7,490
Total	**15,000**	**14,300**	**14,200**	**13,600**	**14,500**	**12,400**	**12,900**	**11,600**	**10,700**	**10,100**	**11,800**	**12,200**	**12,300**	**12,700**

a. Each reporting year represents the period between October 1 of the first year and September 30 of the second year. For example, 2012/2013 represents the period between October 1, 2012, and September 30, 2013.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-14. Discharge: Dry Season[a] by Subembayment, NOx (kg N/d)

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	2,560	2,130	1,540	1,040	1,590	1,690	1,410	1,290	1,160	1,350	1,400	1,380	1,360	1,530
San Pablo Bay[b]	660	551	296	259	348	281	440	294	264	284	352	185	435	357
Central Bay	1,250	885	970	868	1,120	843	663	758	838	742	1,170	1,290	1,220	972
South Bay	2,030	1,610	2,070	1,770	1,410	1,290	1,210	1,330	1,300	1,080	1,450	1,670	1,780	1,540
Lower South Bay	6,870	6,660	7,620	7,190	7,210	6,860	7,090	6,340	5,730	5,100	6,310	6,700	6,430	6,620
Total	**13,400**	**11,800**	**12,500**	**11,100**	**11,700**	**11,000**	**10,800**	**10,000**	**9,290**	**8,550**	**10,700**	**11,200**	**11,200**	**11,000**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-15. Discharge: Annual Average[a] by Subembayment, NOx (mg N/L)[b]

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	11.8	12.1	9.81	8.41	5.43	7.82	6.32	6.18	6.22	6.16	5.36	6.64	5.83	7.44
San Pablo Bay[c]	8.44	7.59	6.36	6.15	5.08	5.51	5.24	6.38	5.81	4.75	4.88	4.42	5.34	5.80
Central Bay	5.46	5.49	4.52	3.66	3.62	3.60	2.58	2.83	3.74	3.09	3.75	3.83	5.41	3.95
South Bay	3.75	3.53	3.93	3.65	2.66	2.55	2.33	2.42	2.92	2.41	2.42	3.02	3.13	2.98
Lower South Bay	15.9	17.0	19.3	18.6	19.0	17.1	17.3	17.6	16.9	16.1	15.0	14.7	15.8	16.9
Total	**8.77**	**8.84**	**9.05**	**8.37**	**7.41**	**7.57**	**7.12**	**7.48**	**7.56**	**6.67**	**6.50**	**7.07**	**7.51**	**7.67**

a. October 1 through September 30.
b. Calculated by dividing the average annual load by the average annual flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-16. Discharge: Dry Season[a] by Subembayment, NOx (mg N/L)[b]

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	13.1	11.3	9.22	5.73	7.49	8.64	6.76	6.57	6.52	7.31	6.53	6.76	6.81	7.88
San Pablo Bay[c]	11.0	8.78	5.45	4.63	5.28	5.13	6.72	5.52	5.36	5.89	5.84	3.24	7.25	6.22
Central Bay	4.98	3.78	4.46	3.61	4.38	3.42	2.52	3.21	3.83	3.38	4.96	5.53	5.42	4.10
South Bay	3.72	3.04	3.99	3.28	2.57	2.39	2.25	2.66	2.73	2.22	2.78	3.22	3.50	2.95
Lower South Bay	15.8	16.7	20.5	18.2	17.6	16.5	17.0	16.2	16.0	15.0	15.3	14.8	15.1	16.5
Total	**8.98**	**8.36**	**9.41**	**7.89**	**7.81**	**7.56**	**7.26**	**7.28**	**7.25**	**6.69**	**7.40**	**7.66**	**7.91**	**7.81**

a. May 1 through September 30.
b. Calculated by dividing the average dry season load by the average dry season flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

B.4 Total Inorganic Nitrogen (TIN)

The historical average monthly discharge load for each Discharger is shown in Figure B-7. The individual trending analysis results (with 95% confidence intervals) are shown in Figure B-8. The annual average (i.e., twelve months from October 1 to September 30) discharge loads are presented in Table B-17. Note that the dry season TIN discharge loads are presented in Table 3-9 in the main body of this report. The annual average and dry season average discharge loads and concentrations for each subembayment are provided in Table B-18 through Table B-21.

For dry season TIN, please see Table 3-9.

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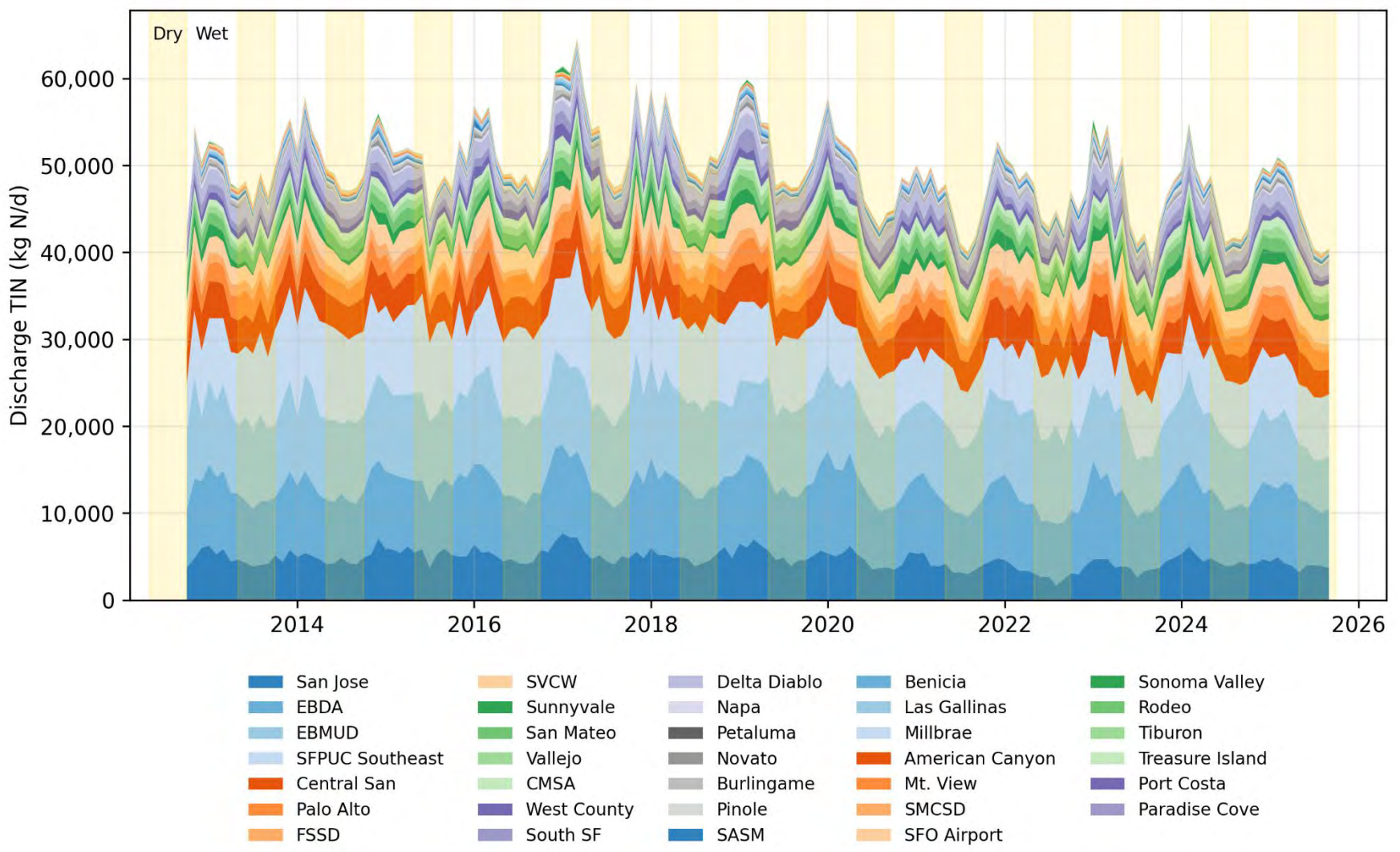


Figure B-7. Discharge: Average Monthly Discharge TIN Loads

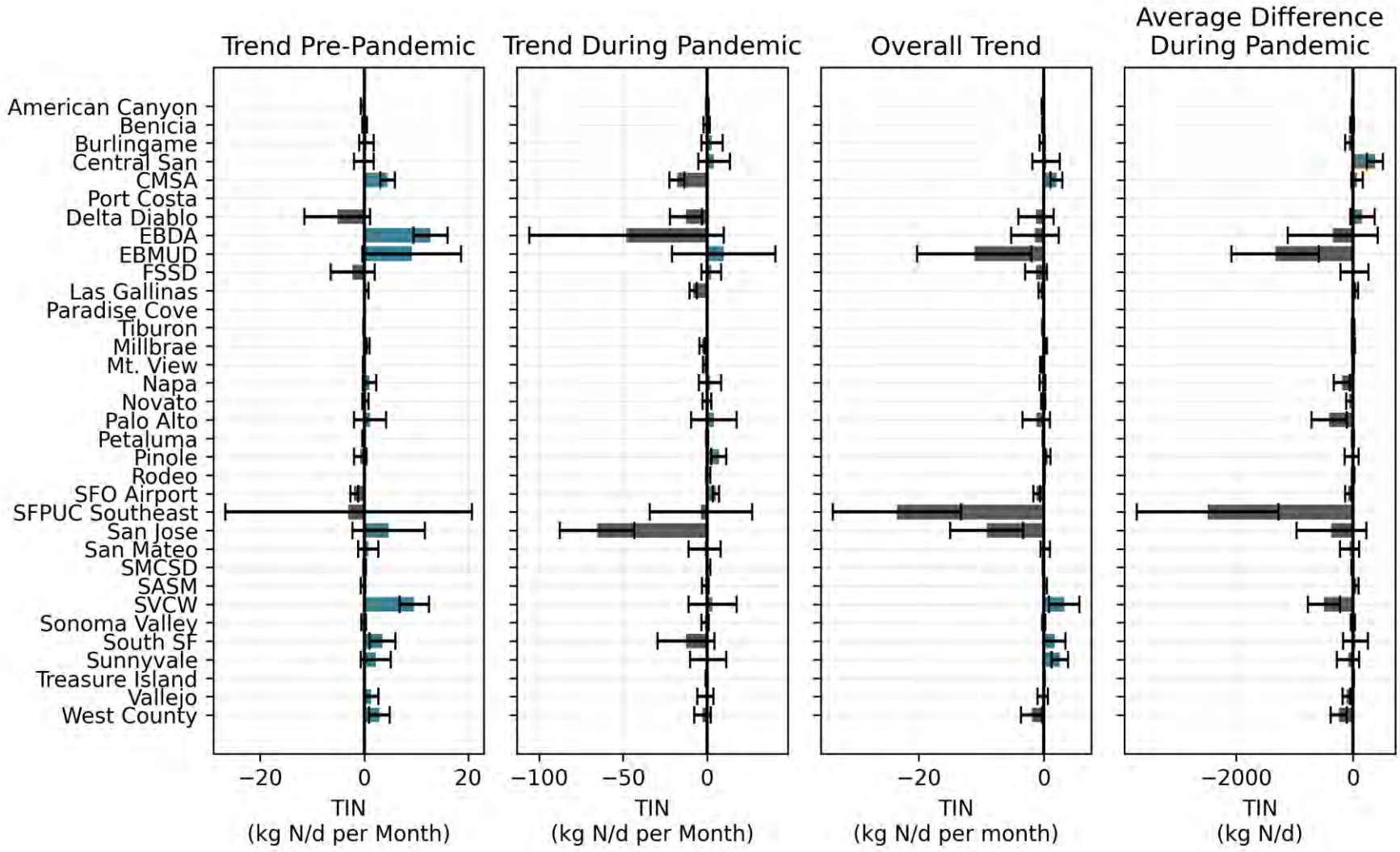


Figure B-8. Trend Coefficients for TIN (95% Confidence Interval Shown in Black)

Table B-17. Discharge: Annual Average[a] by Discharger, TIN (kg N/d)[b,c]

Discharger	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	70.4	80.3	44.4	32.2	41.4	36.8	37.3	33.1	17.8	18.9	30.3	40.5	45.6	40.7
Benicia	225	205	234	233	243	251	222	211	228	211	212	222	212	224
Burlingame	397	433	292	292	366	359	466	460	402	349	313	272	305	361
Central San	3,880	3,810	3,680	3,800	4,000	3,840	3,790	3,980	4,260	4,160	3,920	3,700	3,650	3,880
CMSA	844	846	761	869	1,180	986	1,120	1,170	1,090	1,030	1,020	1,100	1,110	1,010
Port Costa	0	0	0	1.52	2.06	1.99	0.705	1.45	1.29	2.22	1.61	--	1.90	1.48
Delta Diablo	1,690	1,510	1,290	1,320	1,450	1,520	1,500	1,330	1,210	1,100	1,310	1,330	1,520	1,390
EBDA	7,880	7,830	8,320	8,400	8,320	8,700	8,570	8,950	7,710	7,900	8,140	7,930	7,810	8,190
EBMUD	9,190	9,440	9,390	9,530	9,910	10,700	9,340	9,320	8,630	9,890	8,550	8,400	7,060	9,180
FSSD	1,310	1,330	1,030	876	916	1,320	1,130	1,040	1,010	1,120	1,060	1,070	952	1,090
Las Gallinas[d]	129	118	97.5	121	138	135	153	160	128	53.1	64.0	59.3	40.2	107
Paradise Cove	2.08	0.287	2.54	1.53	2.25	2.11	1.80	1.89	1.62	0.856	1.14	2.45	2.13	1.79
Tiburon	58.8	56.1	57.8	62.6	45.1	55.5	49.7	33.7	41.2	56.8	48.2	36.3	51.8	50.3
Millbrae	241	234	239	267	294	261	286	288	278	245	264	293	304	269
Mt. View	121	129	119	122	142	125	115	112	99.2	70.6	84.7	74.5	73.7	107
Napa[d]	173	175	172	170	259	161	309	152	41.1	119	220	202	142	177
Novato[d]	144	136	167	139	197	130	198	112	94.5	92.2	224	122	144	146
Palo Alto	2,360	2,160	2,130	2,650	2,560	2,180	2,310	2,220	1,950	2,150	2,420	1,930	2,370	2,260
Petaluma[d]	25.3	11.8	24.8	15.6	16.3	4.87	24.2	6.68	5.31	7.14	15.9	10.6	15.9	14.2
Pinole	301	289	278	309	320	317	227	232	273	410	380	395	368	315
Rodeo	36.4	30.6	33.3	30.4	45.4	32.6	38.3	38.7	31.4	50.8	54.4	49.9	47.6	40.0
SFO Airport	250	257	154	162	226	139	107	25.2	55.1	72.8	160	52.1	123	137
SFPUC Southeast	7,920	10,300	9,590	9,050	10,300	8,860	8,850	7,210	6,500	6,880	6,500	6,800	7,020	8,140
San Jose	4,800	4,770	5,590	5,000	5,790	4,920	5,500	4,880	4,080	3,450	3,780	4,660	4,140	4,720
San Mateo	1,450	1,400	1,310	1,300	1,350	1,430	1,530	1,330	1,380	1,390	1,360	1,370	1,490	1,390
SMCSD	128	118	127	132	136	137	134	124	141	116	116	117	118	127
SASM	212	204	173	234	164	187	211	219	227	227	251	224	221	212
SVCW	1,970	2,050	2,300	2,590	2,460	2,690	2,640	2,590	2,410	2,670	2,570	2,360	2,720	2,460
Sonoma Valley[d]	29.5	9.21	23.3	10.6	82.0	0	29.9	0	0	0.871	72.2	16.3	23.8	22.9
South SF	983	933	940	897	1,070	1,060	1,310	1,160	1,160	1,030	1,400	1,220	954	1,090
Sunnyvale	894	697	726	592	952	878	964	810	900	846	1,150	1,060	1,140	893
Treasure Island	10.8	13.9	19.0	17.4	16.3	12.0	13.9	20.9	19.0	16.9	25.2	23.8	33.1	18.6
Vallejo	768	846	961	901	906	931	928	851	849	826	813	829	895	869
West County	764	801	676	956	1,150	873	997	799	761	763	584	498	612	788
Total[e]	**49,300**	**51,300**	**50,900**	**51,100**	**55,000**	**53,200**	**53,100**	**49,900**	**46,000**	**47,300**	**47,100**	**46,500**	**45,700**	**49,700**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-18. Discharge: Annual Average[a] by Subembayment, TIN (kg N/d)

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	7,010	6,780	6,110	6,120	6,510	6,800	6,540	6,460	6,580	6,460	6,380	6,170	6,200	6,470
San Pablo Bay[b]	1,900	1,900	2,030	1,960	2,250	2,000	2,170	1,790	1,670	1,790	2,090	1,950	1,940	1,960
Central Bay	11,200	11,500	11,200	11,800	12,600	12,900	11,900	11,700	10,900	12,100	10,600	10,400	9,210	11,400
South Bay	21,100	23,500	23,100	23,000	24,400	23,500	23,800	22,000	19,900	20,500	20,700	20,300	20,700	22,000
Lower South Bay	8,050	7,630	8,440	8,240	9,310	7,980	8,770	7,910	6,930	6,450	7,350	7,640	7,650	7,870
Total	**49,300**	**51,300**	**50,900**	**51,100**	**55,000**	**53,200**	**53,100**	**49,900**	**46,000**	**47,300**	**47,100**	**46,500**	**45,700**	**49,700**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-19. Discharge: Dry Season[a] by Subembayment, TIN (kg N/d)

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025[b]	Pre-2025 Average
Suisun Bay	6,810	6,200	5,160	5,410	6,160	6,300	5,850	6,290	5,870	5,720	5,570	5,720	8,202.4	5,920
San Pablo Bay[c]	1,500	1,540	1,460	1,500	1,510	1,490	1,480	1,420	1,380	1,390	1,520	1,580	6,850.0	1,480
Central Bay	10,800	10,900	11,200	11,300	12,400	12,400	12,300	11,300	10,700	12,200	9,370	9,590	1,546.7	11,200
South Bay	21,100	22,600	23,100	22,900	23,100	22,700	22,200	20,200	19,300	19,900	20,300	19,800	19,485.0	21,400
Lower South Bay	7,130	6,850	7,840	7,390	7,480	7,110	7,320	6,520	5,870	5,220	6,490	6,990	5,574.0	6,850
Total	**47,300**	**48,100**	**48,700**	**48,400**	**50,600**	**50,000**	**49,100**	**45,700**	**43,100**	**44,400**	**43,300**	**43,700**	**41,658.1[d]**	**46,900**

a. May 1 through September 30.

b. Dry season TIN loads reported for 2025 and later use the average dry season concentration and the average daily dry season flow to calculate the load. Dry season TIN loads reported for 2024 and earlier use the average of the monthly average dry season TIN loads for the dry season. Additionally, values prior to 2025 use three significant figures, while values for 2025 and later use two. The new method follows the requirements of the Regional Water Board as given in the minor modification letter issued on December 5th, 2025 (CW-894802).

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

d. Intentionally not rounded because the Permit does not specify rounding when comparing total baywide loads with the final aggregate effluent

Table B-20. Discharge: Annual Average[a] by Subembayment, TIN (mg N/L)[b]

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	31.4	32.4	30.2	29.4	23.9	30.7	26.9	30.7	33.4	30.0	23.9	26.5	27.0	28.7
San Pablo Bay[c]	15.6	16.7	18.0	17.2	13.4	19.2	15.2	18.6	22.4	18.5	14.8	15.4	15.5	16.5
Central Bay	37.6	40.3	42.1	40.9	33.9	45.2	35.5	45.0	45.8	43.1	32.8	35.7	32.8	38.9
South Bay	35.4	40.4	40.4	38.9	36.7	40.3	38.7	40.2	38.9	38.2	33.6	34.8	37.0	37.9
Lower South Bay	17.2	17.7	20.2	19.3	19.6	18.0	18.2	18.3	17.6	16.9	15.8	15.7	17.2	17.8
Total	**28.8**	**31.6**	**32.4**	**31.4**	**28.2**	**32.5**	**29.3**	**32.3**	**32.5**	**31.3**	**26.0**	**27.0**	**27.9**	**30.0**

a. October 1 through September 30.
b. Calculated by dividing the average annual load by the average annual flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-21. Discharge: Dry Season[a] by Subembayment, TIN (mg N/L)[b]

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025[c]	Pre-2025 Average
Suisun Bay	34.8	32.9	30.8	29.9	29.0	32.3	28.0	32.0	33.0	31.1	25.9	27.9	36	30.6
San Pablo Bay[d]	25.0	24.5	26.9	26.8	23.0	27.3	22.7	26.7	28.0	28.9	25.2	27.6	16	26.0
Central Bay	43.2	46.6	51.3	46.8	48.0	50.3	46.7	47.8	48.8	55.5	39.7	41.1	26	47.2
South Bay	38.6	42.5	44.7	42.6	41.9	42.1	41.3	40.5	40.5	41.1	39.0	38.0	38	41.1
Lower South Bay	16.4	17.1	21.1	18.7	18.3	17.1	17.6	16.7	16.3	15.3	15.8	15.5	28	17.2
Total	**31.8**	**34.0**	**36.7**	**34.4**	**33.8**	**34.4**	**33.0**	**33.2**	**33.6**	**34.8**	**30.0**	**29.7**	**29**	**33.3**

a. May 1 through September 30.
b. Calculated by dividing the average dry season load by the average dry season flow.
c. Only has two significant figures because the loads used to calculate these concentrations only have two significant figures.
d. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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B.5 Total Phosphorus (TP)

The historical average monthly discharge load for each Discharger is shown in Figure B-9. The individual trending analysis results (with 95% confidence intervals) are shown in Figure B-10. The annual average (twelve months from October 1 to September 30) and dry season average (May 1 through September 30) discharge loads are presented in Table B-22 and Table B-23, respectively. The annual average and dry season average discharge loads and concentrations for each subembayment are provided in Table B-24 through Table B-27.

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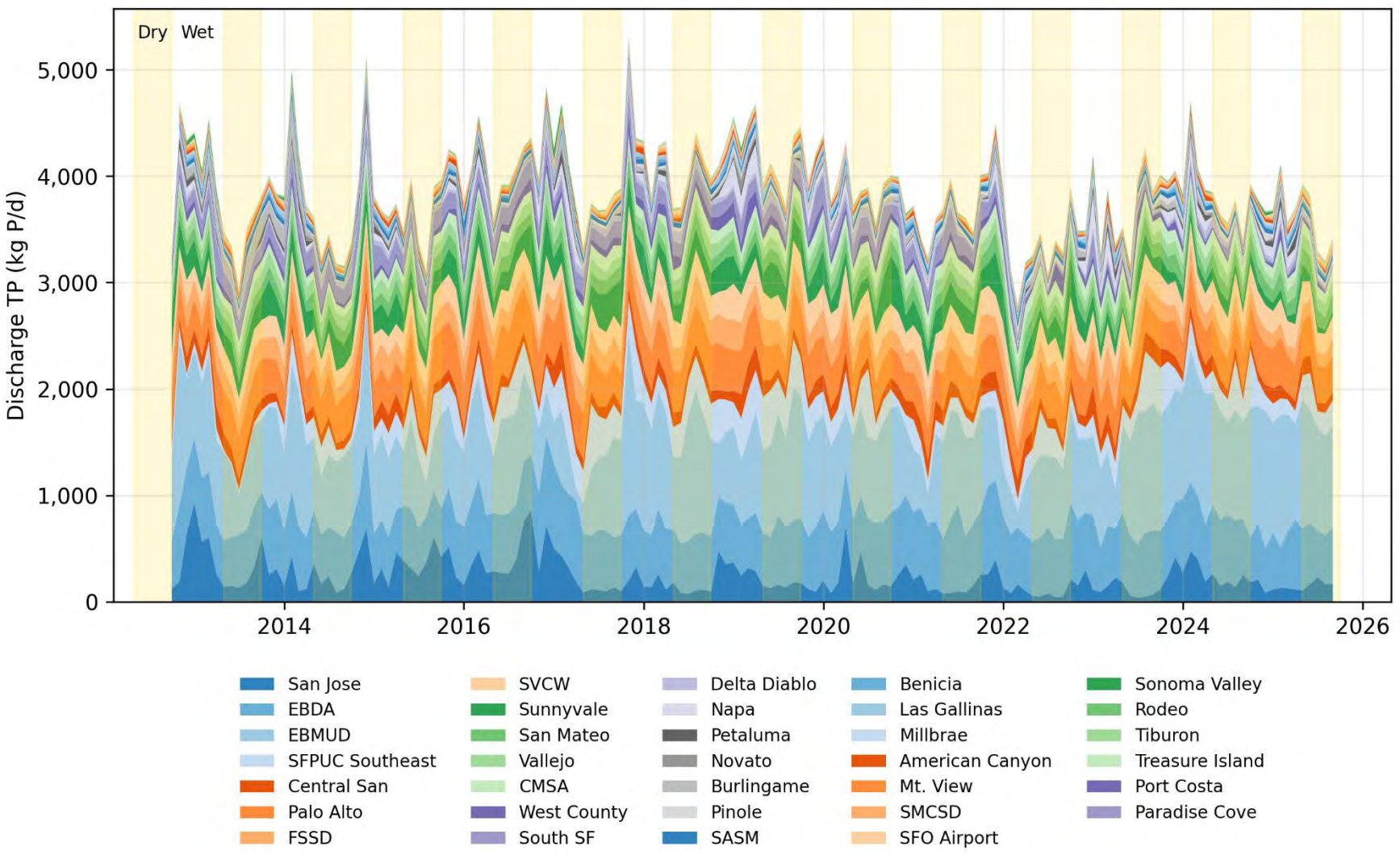


Figure B-9. Discharge: Average Monthly Discharge TP Loads

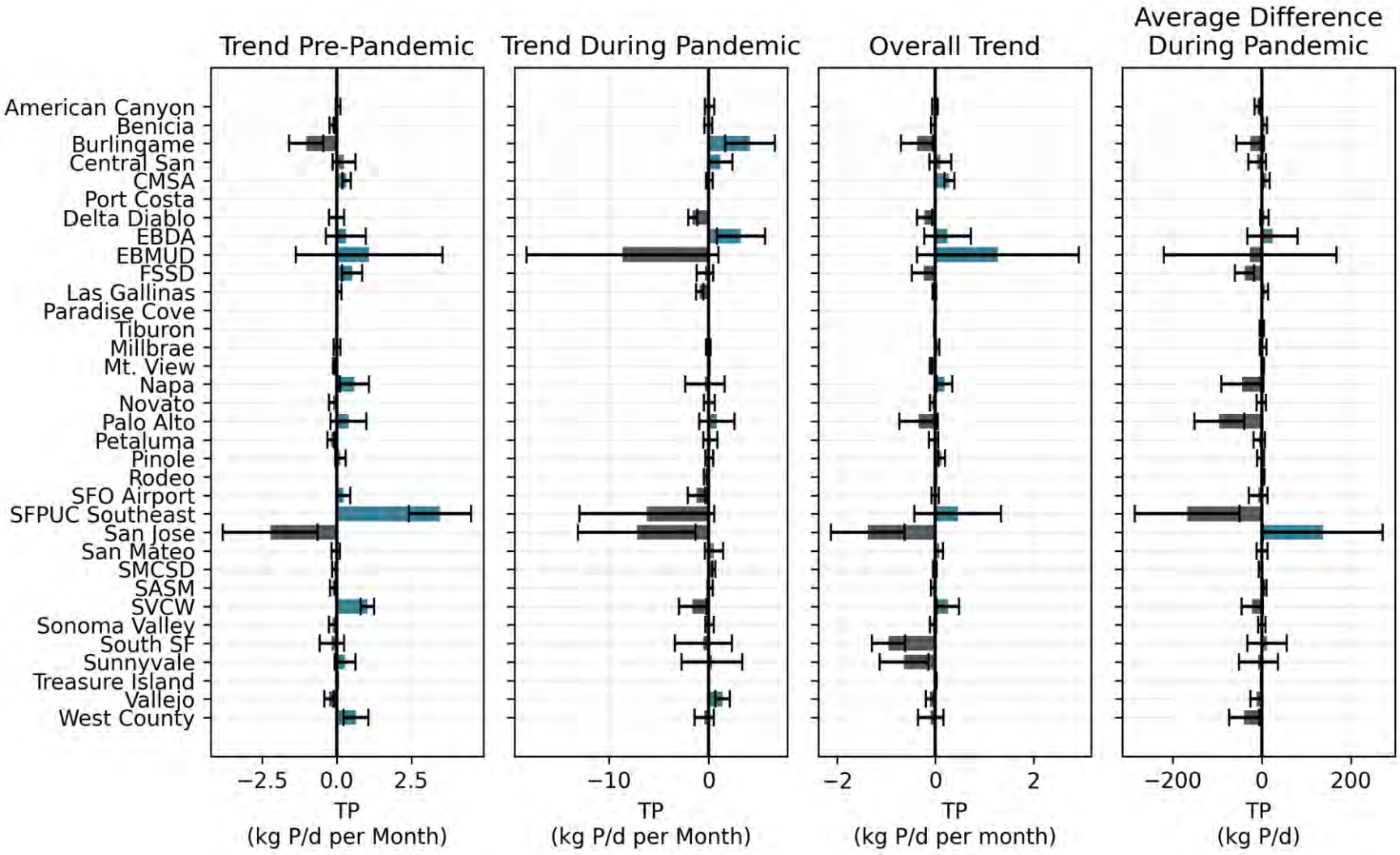


Figure B-10. Trend Coefficients for TP (95% Confidence Interval Shown in Black)

Table B-22. Discharge: Annual Average[a] by Discharger, TP (kg P/d)[b,c]

Discharger	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
American Canyon	29.0	17.9	28.7	27.6	24.0	26.0	23.4	24.7	15.5	18.5	22.4	28.2	23.6	23.8
Benicia	25.2	25.7	26.2	15.1	16.5	15.7	19.2	15.9	15.4	21.4	17.4	19.3	20.4	19.5
Burlingame	101	110	25.4	22.2	29.2	32.4	31.0	36.1	33.2	30.2	28.7	27.5	8.82	39.7
Central San	133	87.7	127	109	127	122	137	121	141	146	151	118	106	125
CMSA	92.4	81.7	94.2	84.5	106	100	108	123	127	128	116	123	113	107
Port Costa	0	0	0	0.598	0.479	0.352	0.226	0.777	0.200	0.289	0.154	0.00479	0.438	0.320
Delta Diablo	31.1	27.1	36.7	29.4	51.5	60.6	42.6	50.3	33.6	22.8	39.3	34.8	28.2	37.5
EBDA	544	534	501	551	642	534	534	583	636	603	577	592	503	564
EBMUD	843	824	718	827	538	1,100	818	856	775	618	852	1,060	1,090	840
FSSD	194	190	198	200	197	235	235	201	186	192	196	168	141	195
Las Gallinas[d]	19.7	17.2	14.6	22.6	21.5	16.5	23.8	27.8	19.6	15.7	13.6	14.7	15.9	18.7
Paradise Cove	0.270	--	0.358	0.223	0.495	0.490	0.246	0.301	0.270	0.187	0.248	0.306	0.233	0.288
Tiburon	8.36	7.88	8.44	9.20	8.56	7.84	6.21	5.60	6.45	9.08	3.18	5.36	5.87	7.08
Millbrae	16.5	13.5	13.0	12.0	11.9	7.41	17.9	19.8	15.6	13.9	14.5	18.9	22.9	15.2
Mt. View	18.2	17.0	16.2	15.4	13.5	15.2	10.0	12.0	12.6	11.3	8.00	4.41	3.50	12.1
Napa[d]	22.5	14.4	25.3	34.6	58.7	22.4	86.1	37.8	8.98	25.4	71.6	54.3	43.1	38.9
Novato[d]	15.7	10.9	20.6	9.59	12.9	2.74	13.9	6.62	1.62	7.26	11.6	9.10	5.83	9.87
Palo Alto	346	352	352	445	397	362	372	343	306	322	337	308	364	354
Petaluma[d]	27.5	31.0	24.6	19.1	24.7	16.1	21.3	11.5	4.12	12.3	28.0	22.6	30.1	21.0
Pinole	29.6	17.3	15.2	16.4	24.6	29.2	33.4	29.6	28.8	38.0	32.0	39.2	33.6	28.2
Rodeo	8.36	8.01	7.95	8.37	8.75	7.58	9.43	9.17	7.50	5.83	8.00	9.82	8.61	8.26
SFO Airport	17.5	13.4	8.97	9.69	16.2	32.0	35.5	18.2	7.10	4.33	11.1	17.4	24.2	16.6
SFPUC Southeast	67.2	164	205	271	332	287	389	279	146	231	222	256	228	237
San Jose	354	246	370	368	322	154	243	220	162	139	137	261	151	241
San Mateo	128	127	122	142	125	133	114	130	130	139	131	126	150	131
SMCSD	23.4	18.5	17.0	17.2	16.5	19.3	14.8	13.4	15.4	19.6	19.6	18.8	19.5	18.1
SASM	45.2	45.6	40.5	51.6	38.1	40.5	37.5	37.9	44.3	40.7	38.5	37.2	38.9	41.3
SVCW	174	172	189	213	218	234	242	244	217	225	210	214	211	213
Sonoma Valley[d]	16.5	10.5	2.83	2.51	21.3	0	5.35	0	0	1.87	8.34	5.10	7.07	6.25
South SF	149	160	171	150	133	138	134	168	156	60.5	41.0	32.8	25.2	117
Sunnyvale	200	214	213	193	257	225	231	198	247	201	166	119	82.7	196
Treasure Island	1.57	3.01	3.70	4.10	4.50	3.32	3.08	3.32	2.82	2.93	3.17	3.23	6.94	3.51
Vallejo	126	129	123	121	139	110	107	105	111	117	107	110	124	118
West County	53.4	60.7	46.6	67.6	88.5	101	110	71.9	57.6	76.6	70.9	36.3	32.9	67.2
Total[e]	**3,860**	**3,750**	**3,770**	**4,070**	**4,020**	**4,190**	**4,210**	**4,000**	**3,670**	**3,500**	**3,690**	**3,900**	**3,660**	**3,870**

a. October 1 through September 30.
b. Data are presented in detail and summarized for each plant in the Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-23. Discharge: Dry Season[a] by Discharger, TP (kg P/d)[b,c]

Discharger	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
American Canyon	47.4	8.23	29.1	15.4	14.5	24.8	16.2	19.9	14.8	11.0	15.3	16.0	17.8	19.3
Benicia	23.9	23.9	20.4	16.4	8.96	9.68	13.1	15.0	10.4	20.9	23.0	18.9	31.9	18.2
Burlingame	125	32.4	31.5	13.9	18.1	26.4	27.5	31.4	19.1	31.3	25.4	13.6	11.6	31.3
Central San	125	90.3	112	108	107	116	111	93.6	117	116	145	109	116	113
CMSA	101	79.6	89.3	87.5	127	112	109	129	133	125	123	129	112	112
Port Costa	--	--	--	--	--	--	0.138	0.587	--	--	0.00366	--	--	0.182
Delta Diablo	27.7	27.2	27.8	28.1	51.1	51.2	47.0	49.5	24.0	18.7	48.5	35.7	19.7	35.1
EBDA	490	494	480	546	533	505	555	592	627	557	583	609	515	545
EBMUD	668	668	576	813	643	1,030	938	820	905	711	1,060	984	1,020	834
FSSD	201	174	172	175	211	233	227	196	179	181	168	168	138	186
Las Gallinas[d]	0	0	0	0	0.844	0	10.8	8.69	0	0	0	0	0	1.56
Paradise Cove	0.334	0.0384	0.377	0.223	0.592	0.490	0.305	0.303	0.232	0.252	0.324	0.316	0.235	0.315
Tiburon	7.62	7.88	8.34	9.20	8.18	8.90	--	4.61	6.00	8.01	2.90	5.27	8.46	7.11
Millbrae	19.2	13.0	14.2	11.8	15.1	7.83	22.4	20.0	16.6	10.2	13.3	19.7	28.0	16.3
Mt. View	17.8	17.6	18.2	16.8	11.3	14.7	9.47	13.0	12.7	10.4	6.57	3.64	5.09	12.1
Napa[d]	0	3.77	0	0	0	0	0	0	0	0	0	0	0	0.290
Novato[d]	1.06	1.62	0.800	1.24	2.46	0.305	1.71	0.229	0.130	0	16.8	6.89	1.70	2.69
Palo Alto	386	381	381	450	354	382	311	296	327	334	325	320	351	354
Petaluma[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pinole	30.6	18.7	17.6	16.3	21.1	34.2	33.4	30.7	37.7	42.2	26.6	41.8	27.5	29.1
Rodeo	6.98	7.73	9.24	8.63	6.23	7.07	9.71	10.6	4.60	3.80	6.60	8.43	8.79	7.57
SFO Airport	25.0	8.95	8.79	4.12	21.6	42.4	33.7	8.42	8.72	4.04	18.5	16.5	42.9	18.7
SFPUC Southeast	24.0	184	263	322	395	321	433	287	149	260	297	257	239	264
San Jose	185	196	384	397	111	113	151	216	100	55.2	79.0	199	169	181
San Mateo	128	136	129	137	129	139	127	122	128	126	144	131	156	133
SMCSD	24.8	20.0	18.5	18.9	19.0	19.3	17.2	13.9	17.3	19.6	21.1	20.3	20.3	19.2
SASM	50.3	43.3	40.5	43.0	40.2	40.9	32.9	43.0	43.4	35.3	38.1	38.0	38.3	40.5
SVCW	185	161	216	191	211	237	226	225	210	214	226	216	198	209
Sonoma Valley[d]	0	0	0	0	0.711	0	0	0	0	0	1.23	0	0	0.150
South SF	145	170	163	161	140	127	124	176	184	20.2	27.6	30.1	22.1	115
Sunnyvale	180	183	177	172	256	189	248	189	215	182	127	113	74.0	177
Treasure Island	1.27	2.84	3.99	4.46	4.74	3.61	2.80	3.34	2.98	2.58	3.71	3.29	9.52	3.78
Vallejo	125	123	133	116	120	110	101	104	120	111	105	108	123	115
West County	45.5	42.0	46.5	75.2	72.9	94.1	72.4	73.3	68.5	85.8	75.4	20.9	25.2	61.4
Total[e]	**3,400**	**3,320**	**3,570**	**3,960**	**3,660**	**4,000**	**4,010**	**3,790**	**3,680**	**3,300**	**3,760**	**3,640**	**3,530**	**3,660**

a. May 1 through September 30.
b. Data are presented in detail and summarized for each plant in Attachment 1.
c. "--" indicates missing data.
d. No discharge during a portion or all the dry season months, except when necessary due to wet conditions.
e. The total values might vary from the sum of the listed values by plant due to rounding.

Table B-24. Discharge: Annual Average[a] by Subembayment, TP (kg P/d)

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	377	322	378	354	389	434	426	385	373	372	394	325	279	370
San Pablo Bay[b]	320	282	289	277	352	247	343	269	213	264	320	313	312	292
Central Bay	1,070	1,040	929	1,060	800	1,370	1,100	1,110	1,030	896	1,100	1,290	1,300	1,080
South Bay	1,200	1,300	1,240	1,370	1,510	1,400	1,500	1,480	1,340	1,310	1,240	1,290	1,170	1,330
Lower South Bay	900	811	935	1,010	976	741	846	760	715	662	640	688	597	791
Total	**3,860**	**3,750**	**3,770**	**4,070**	**4,020**	**4,190**	**4,210**	**4,000**	**3,670**	**3,500**	**3,690**	**3,900**	**3,660**	**3,870**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-25. Discharge: Dry Season[a] Average by Subembayment, TP (kg P/d)

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	372	309	330	328	381	415	394	352	333	327	368	317	279	346
San Pablo Bay[b]	235	187	210	174	175	186	186	189	188	189	195	200	211	194
Central Bay	899	864	783	1,050	916	1,310	1,170	1,090	1,180	988	1,330	1,200	1,240	1,080
South Bay	1,140	1,200	1,310	1,390	1,460	1,410	1,550	1,460	1,340	1,220	1,330	1,290	1,210	1,330
Lower South Bay	750	760	943	1,020	721	684	710	701	642	572	531	633	594	712
Total	**3,400**	**3,320**	**3,570**	**3,960**	**3,660**	**4,000**	**4,010**	**3,790**	**3,680**	**3,300**	**3,760**	**3,640**	**3,530**	**3,660**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-26. Discharge: Annual Average[a] by Subembayment, TP (mg P/L)[b]

Subembayment	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	2018/ 2019	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	Average
Suisun Bay	1.69	1.54	1.87	1.70	1.43	1.96	1.75	1.83	1.89	1.73	1.48	1.39	1.21	1.64
San Pablo Bay[c]	2.63	2.48	2.56	2.43	2.10	2.36	2.41	2.80	2.86	2.73	2.26	2.47	2.50	2.47
Central Bay	3.58	3.66	3.49	3.68	2.15	4.79	3.28	4.29	4.32	3.19	3.42	4.41	4.64	3.71
South Bay	2.01	2.23	2.16	2.32	2.27	2.40	2.44	2.70	2.62	2.43	2.01	2.20	2.09	2.29
Lower South Bay	1.92	1.88	2.24	2.35	2.06	1.67	1.76	1.76	1.82	1.74	1.38	1.41	1.34	1.79
Total	**2.26**	**2.31**	**2.40**	**2.50**	**2.06**	**2.56**	**2.32**	**2.59**	**2.60**	**2.32**	**2.04**	**2.26**	**2.23**	**2.33**

a. October 1 through September 30.
b. Calculated by dividing the average annual load by the average annual flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table B-27. Discharge: Dry Season[a] by Subembayment, TP (mg P/L)[b]

Subembayment	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average
Suisun Bay	1.90	1.64	1.97	1.81	1.79	2.13	1.89	1.79	1.87	1.77	1.71	1.55	1.40	1.78
San Pablo Bay[c]	3.93	2.99	3.88	3.11	2.65	3.41	2.84	3.56	3.81	3.92	3.24	3.50	3.51	3.38
Central Bay	3.59	3.69	3.60	4.37	3.55	5.29	4.46	4.61	5.37	4.50	5.62	5.14	5.49	4.55
South Bay	2.08	2.26	2.52	2.58	2.66	2.61	2.88	2.93	2.82	2.52	2.56	2.49	2.38	2.56
Lower South Bay	1.72	1.90	2.53	2.58	1.76	1.64	1.71	1.80	1.79	1.68	1.29	1.40	1.40	1.77
Total	**2.28**	**2.34**	**2.69**	**2.81**	**2.44**	**2.76**	**2.69**	**2.76**	**2.87**	**2.58**	**2.60**	**2.48**	**2.49**	**2.60**

a. May 1 through September 30.
b. Calculated by dividing the average dry season load by the average dry season flow.
c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Appendix C. Distribution of Flows and Nutrient Loads Within Subembayments

Flows and nutrient discharge loading for select nitrogen species and total phosphorus has been analyzed by subembayment to demonstrate the relative contributions for each Discharger. In this section, loading diagrams illustrate the discharge loads over time for the past thirteen years (Oct 2012 through Sept 2024). The cumulative figures in the following subsections are organized by subembayment and present the relative contribution of each Discharger within its respective subembayment for flow, ammonia, TIN, and TP.

C.1 Suisun Bay

The average monthly discharge to Suisun Bay by Discharger for flow, ammonia, TIN, and TP is provided in Figure C-1 through Figure C-5. Flows to Suisun Bay are dominated by the Central San discharge and followed, in terms of magnitude, by FSSD and Delta Diablo. Central San also discharges the largest loads of ammonia and TIN. FSSD discharges the largest TP load to Suisun Bay, followed by Central San.

C.2 San Pablo Bay

The average monthly discharge to San Pablo Bay by Discharger for discharge flows and loads are provided in Figure C-6 through Figure C-10. Figure C-6 clearly demonstrates the seasonal discharges at Las Gallinas, Napa, Petaluma, and Sonoma Valley. Similar to flow, TIN and TP loads to San Pablo Bay appear to exhibit a significant seasonal pattern with higher wintertime loads.

C.3 Central Bay

The average monthly discharge to Central Bay by Discharger for discharge flows and loads are provided in Figure C-11 through Figure C-15. Discharge flows and loads to Central Bay are dominated by EBMUD.

C.4 South Bay

The average monthly discharge to South Bay by Discharger for discharge flows and loads are provided in Figure C-16 through Figure C-20. In the South Bay, the largest wastewater discharges are from the SFPUC Southeast Plant and EBDA. Ammonia and TIN loads to the South Bay are also largest from the SFPUC Southeast Plant and EBDA. The TP discharges to the South Bay have the largest contribution from EBDA, followed by relatively equal contributions between SFPUC Southeast Plant, San Mateo, SVCW, and South SF. SFPUC's TP loads are a lower proportion of the total compared to flow, ammonia, and TIN.

C.5 Lower South Bay

The average monthly discharge to Lower South Bay by Discharger for discharge flows and loads are provided in Figure C-21 through Figure C-25. Lower South Bay wastewater flows are dominated by San Jose. San Jose also discharges the largest TIN load. Sunnyvale and San Jose's ammonia loads exhibit a significant seasonal pattern. San Jose's TIN loads have been

sporadic (e.g., July 2015), which is likely due to the biological nitrogen removal step feed process, but it has been more stable in recent years. Palo Alto is the largest Discharger of TP to Lower South Bay, followed by San Jose and Sunnyvale.

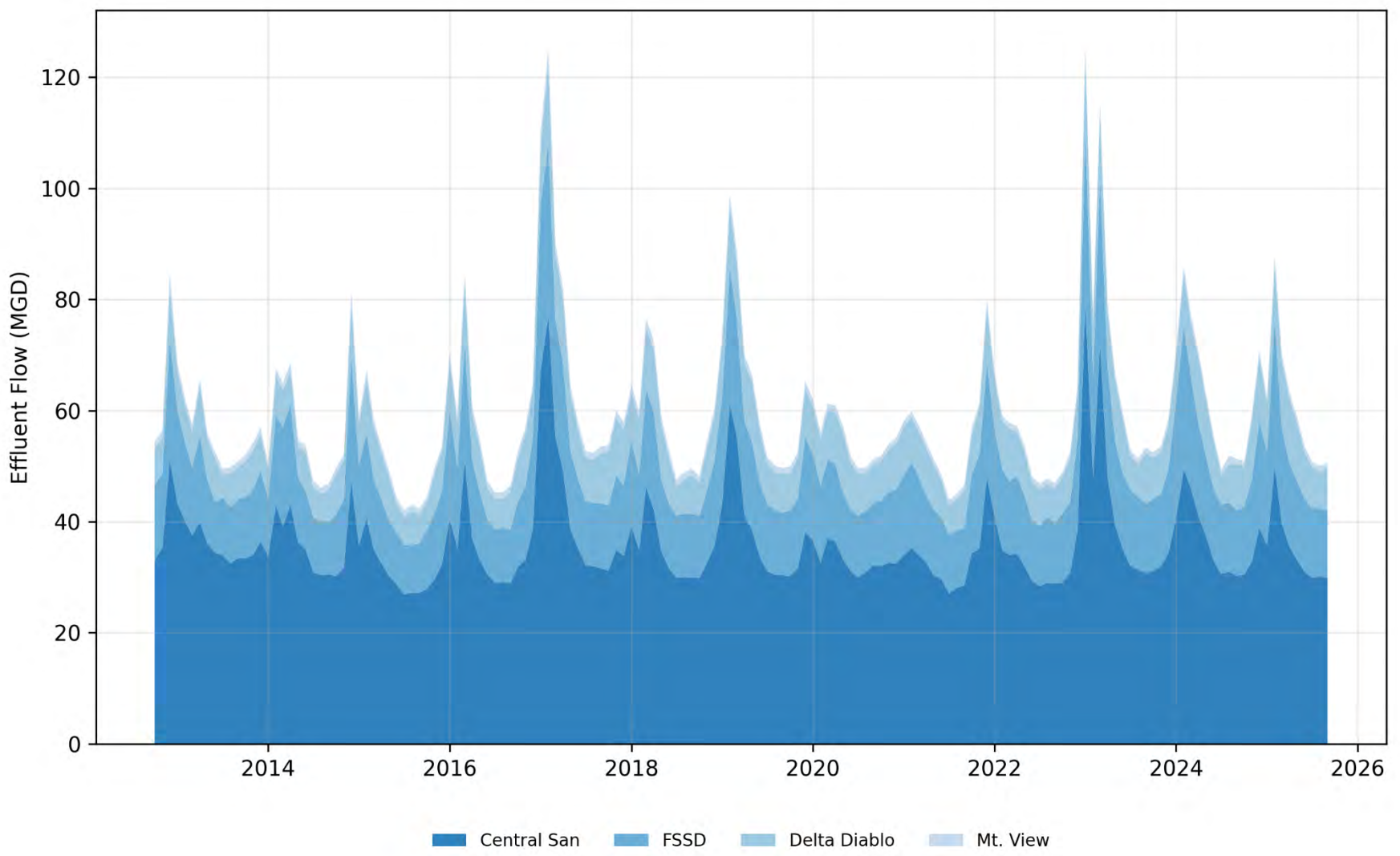


Figure C-1. Flow Contribution by Discharger to Suisun Bay

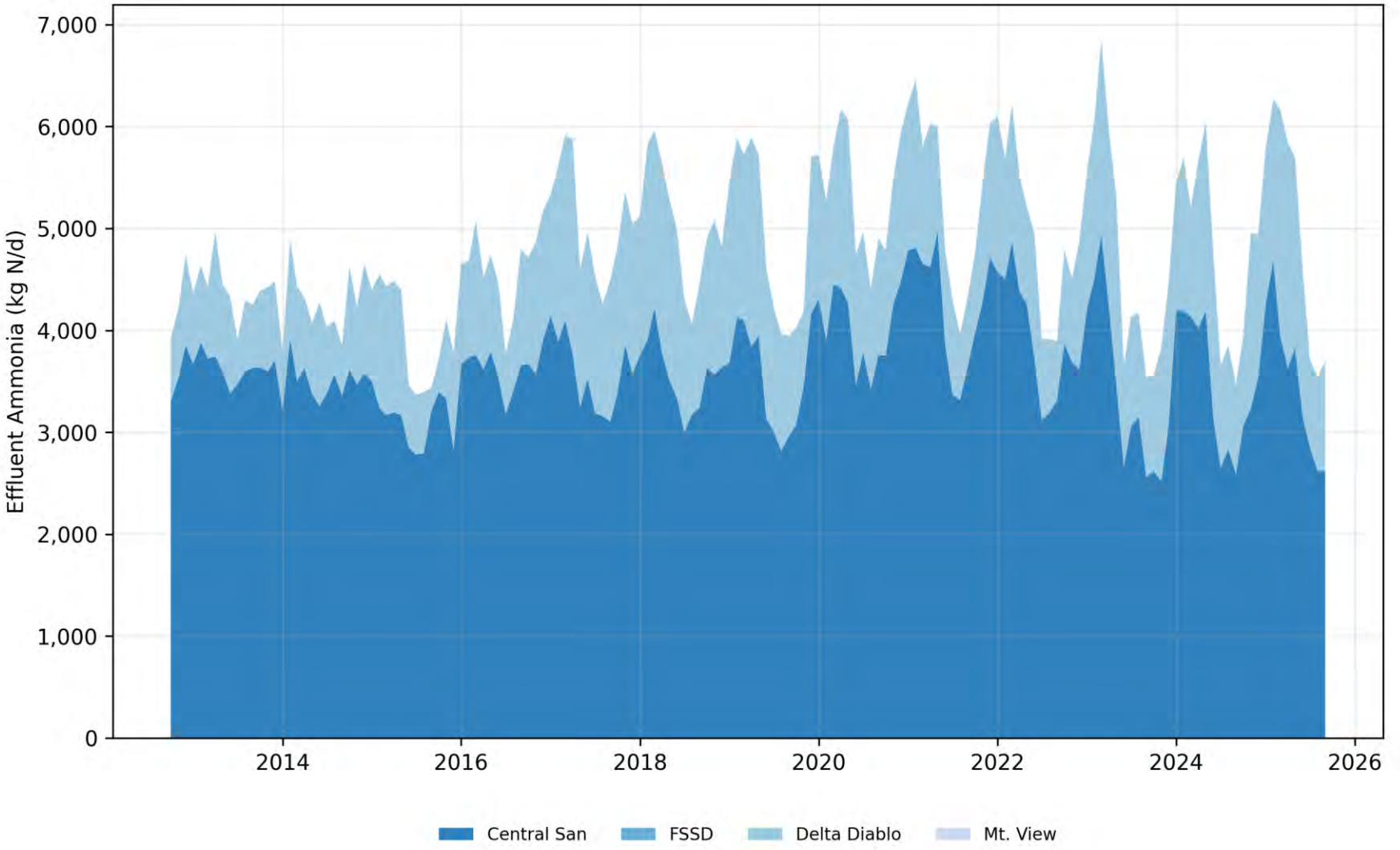


Figure C-2. Ammonia Load Contribution by Discharger to Suisun Bay

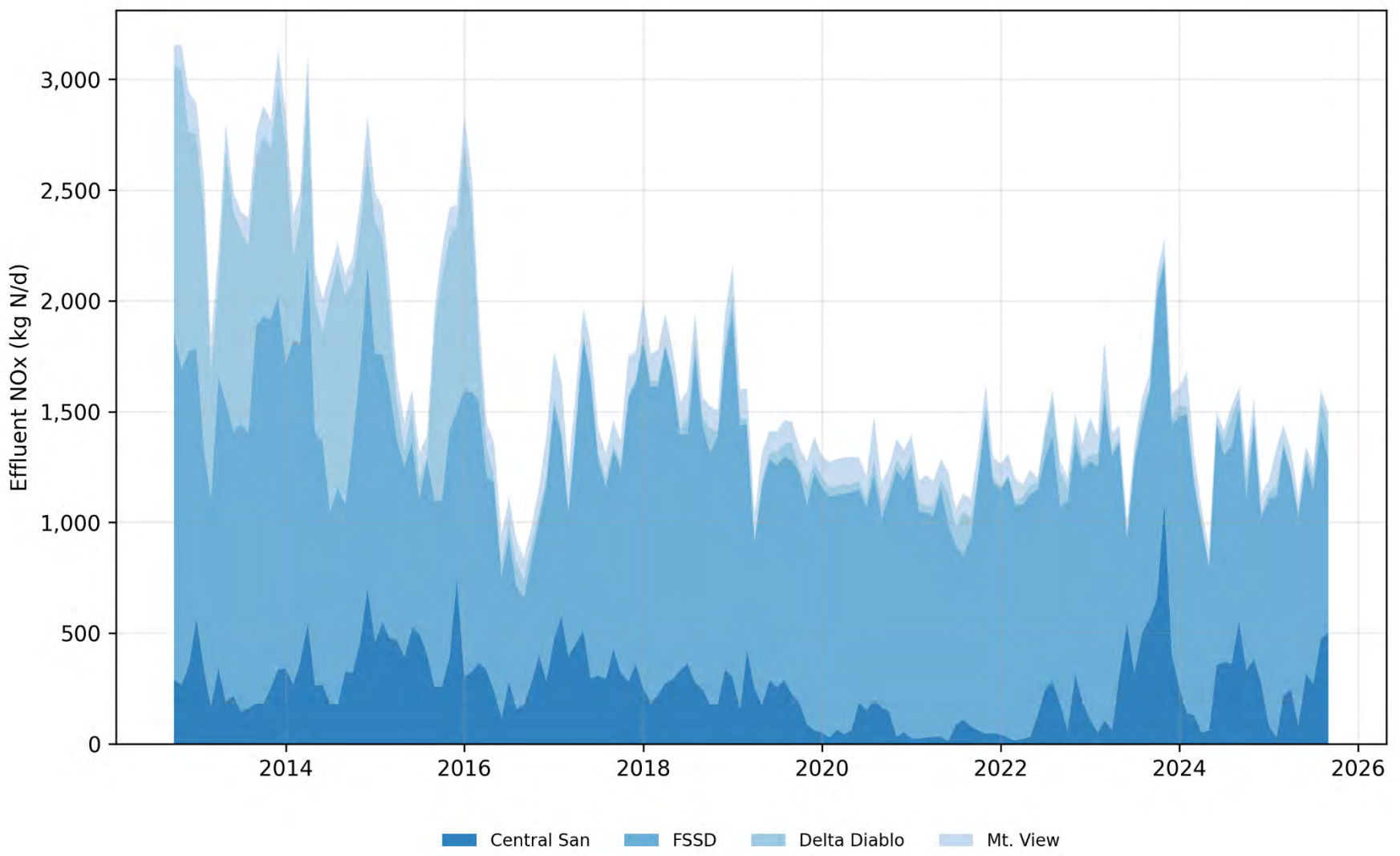


Figure C-3.NOx Load Contribution by Discharger to Suisun Bay

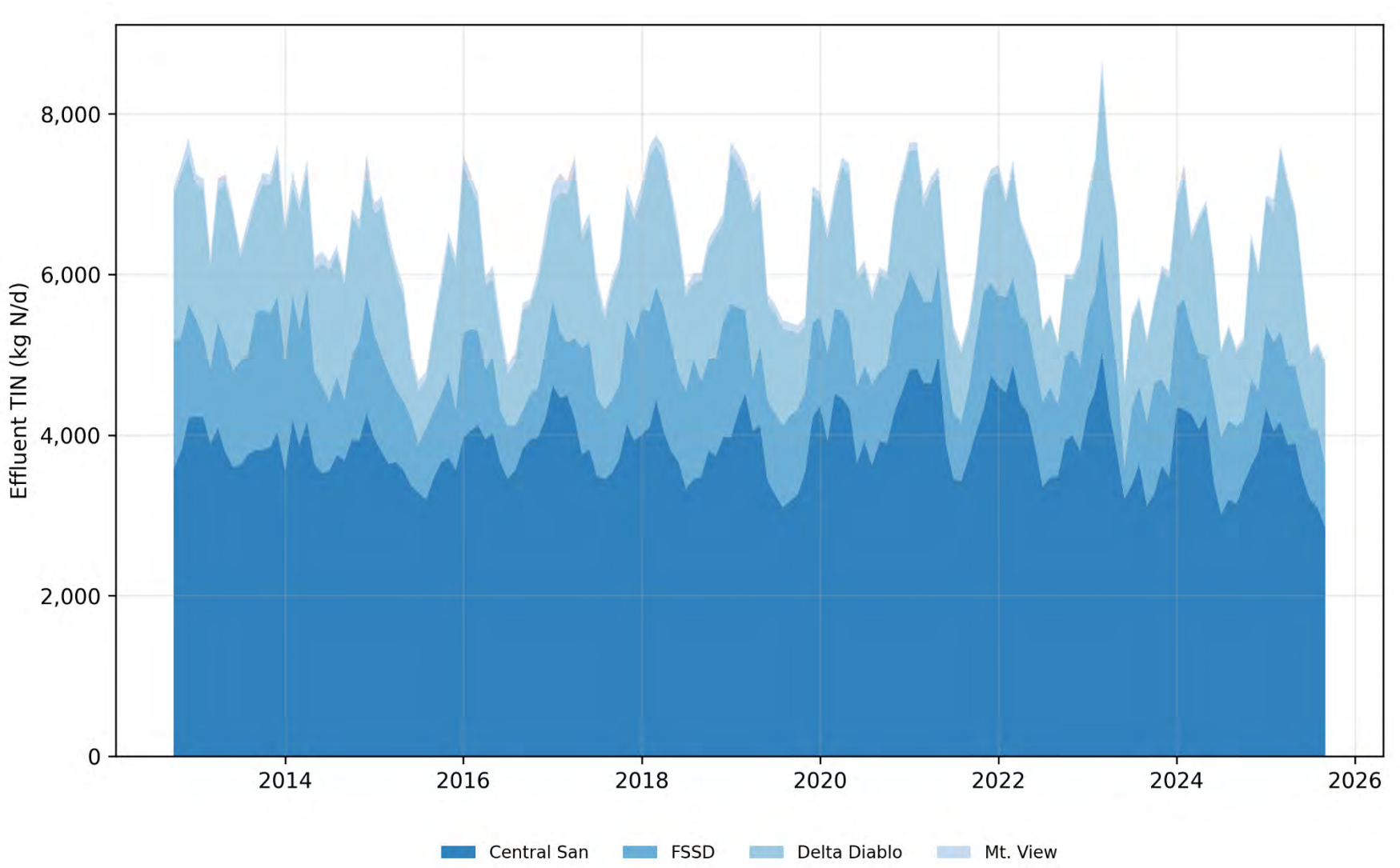


Figure C-4. TIN Load Contribution by Discharger to Suisun Bay

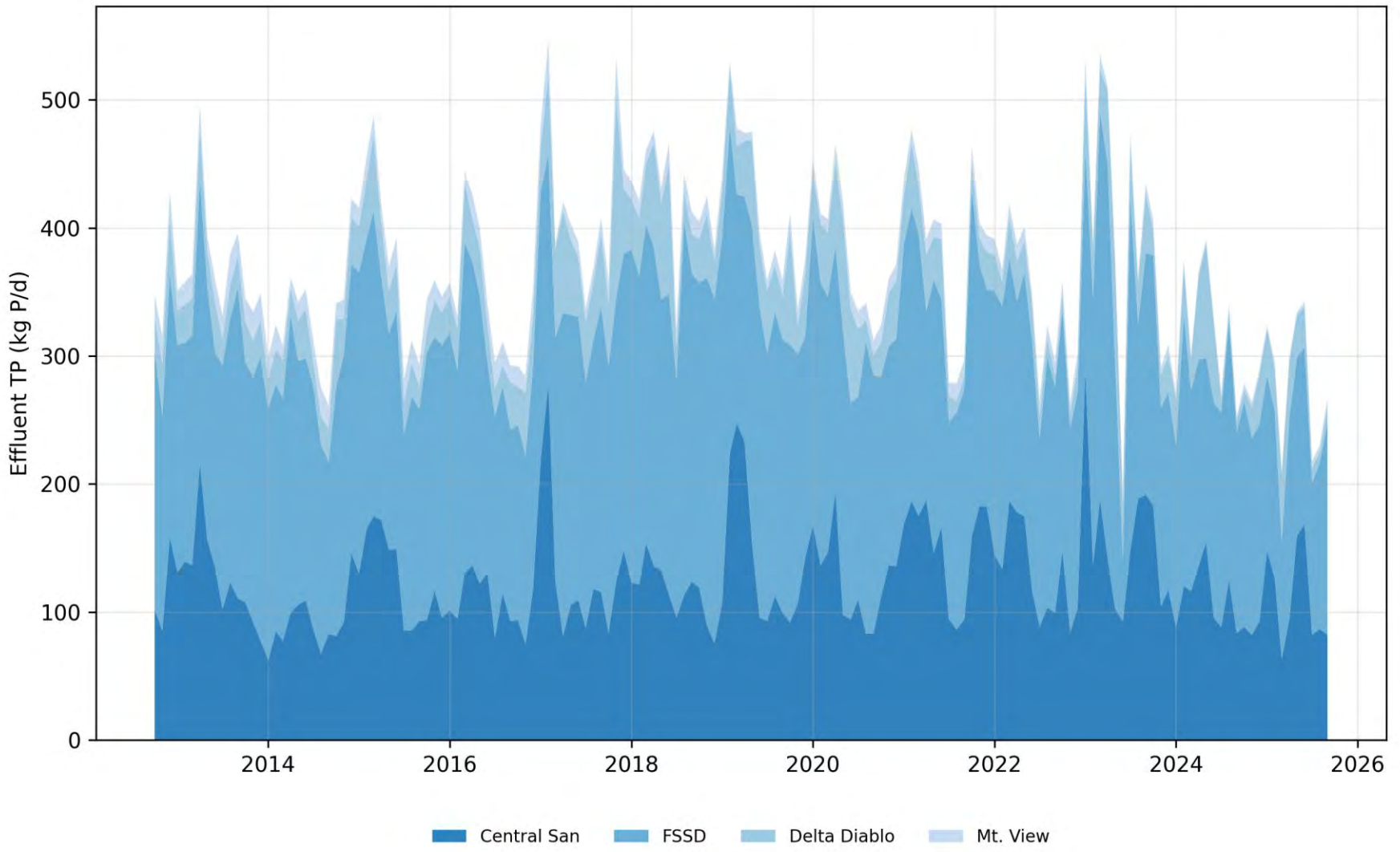


Figure C-5. TP Load Contribution by Discharger to Suisun Bay

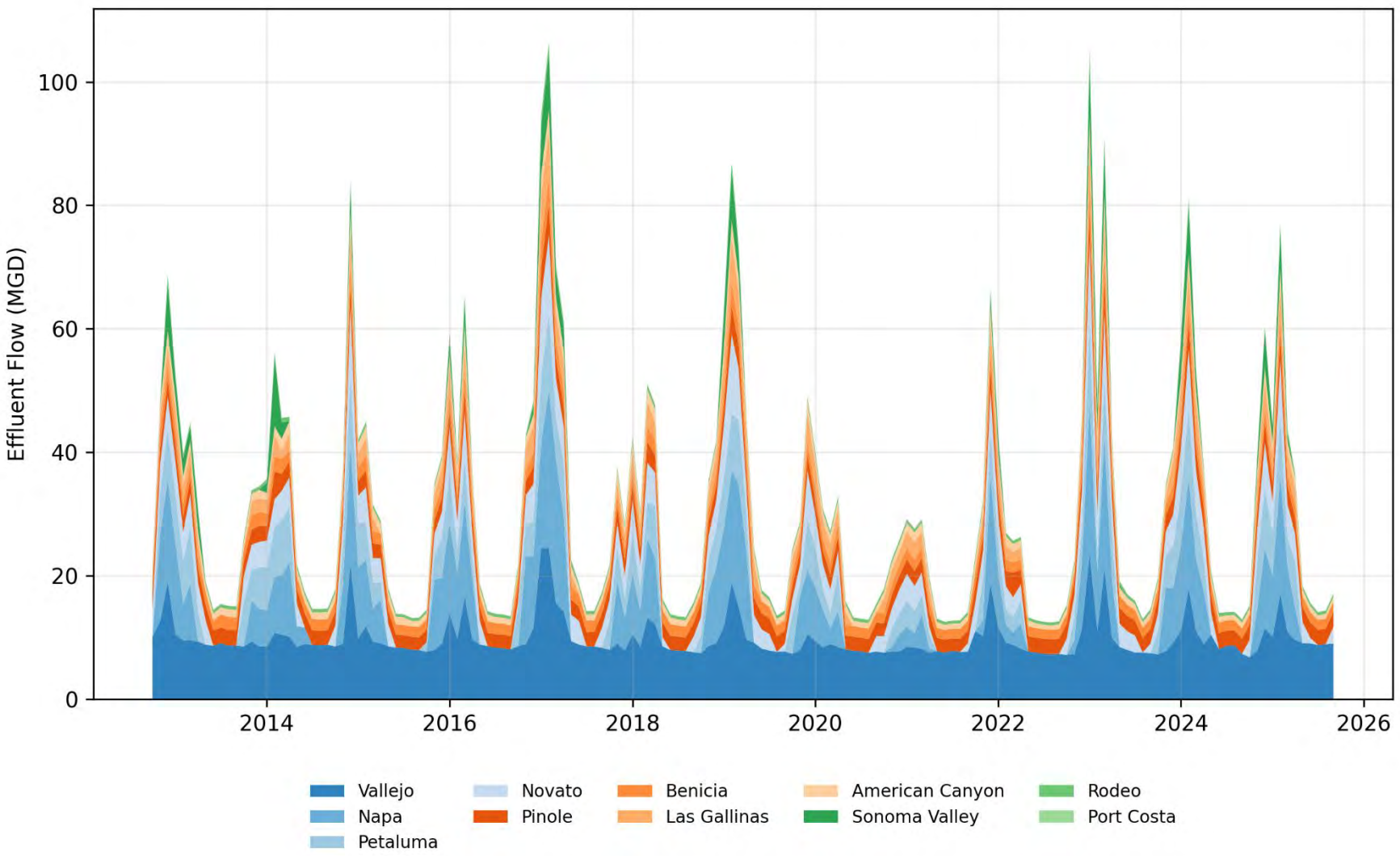


Figure C-6. Flow Contribution by Discharger to San Pablo Bay

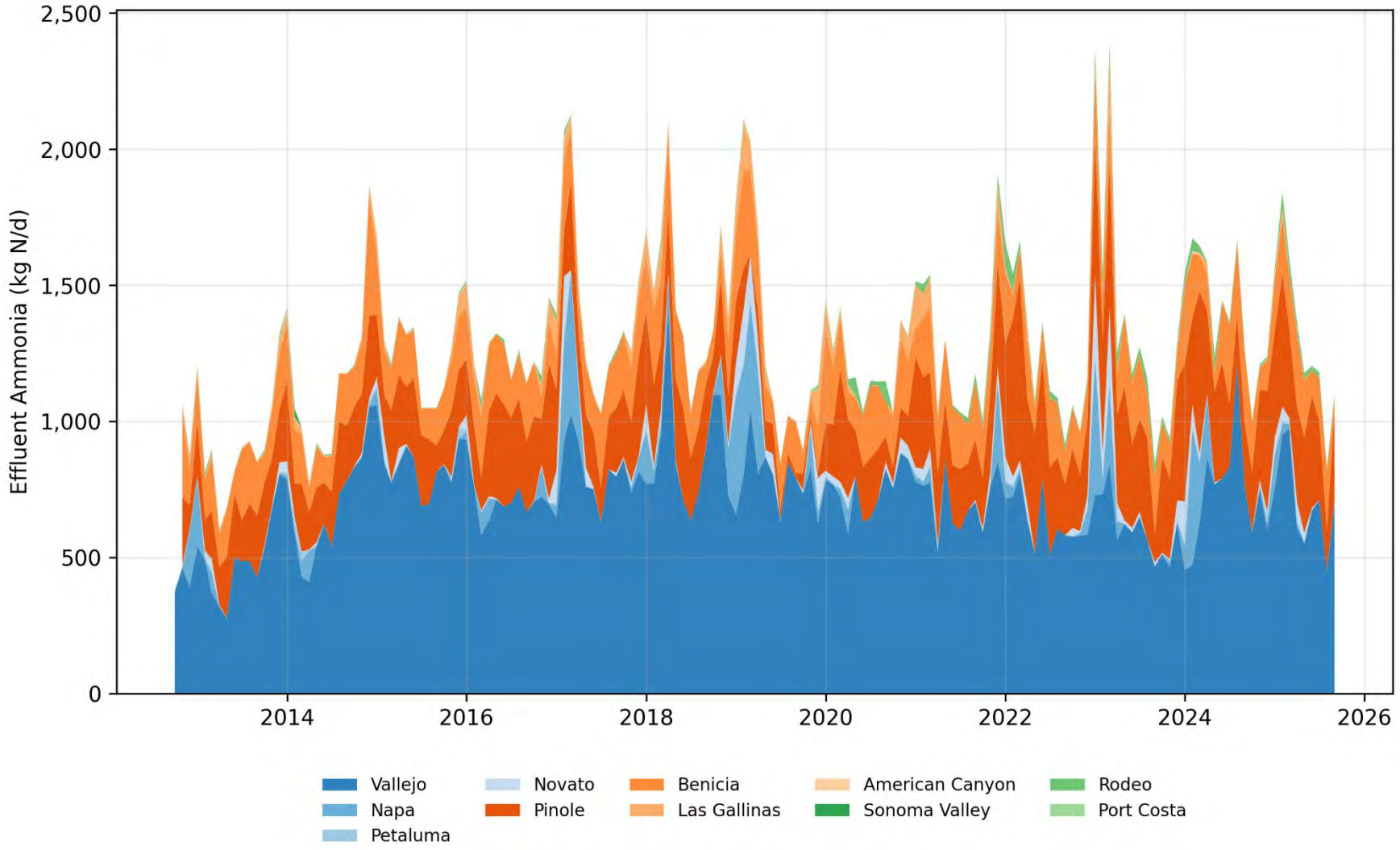


Figure C-7. Ammonia Load Contribution by Discharger to San Pablo Bay

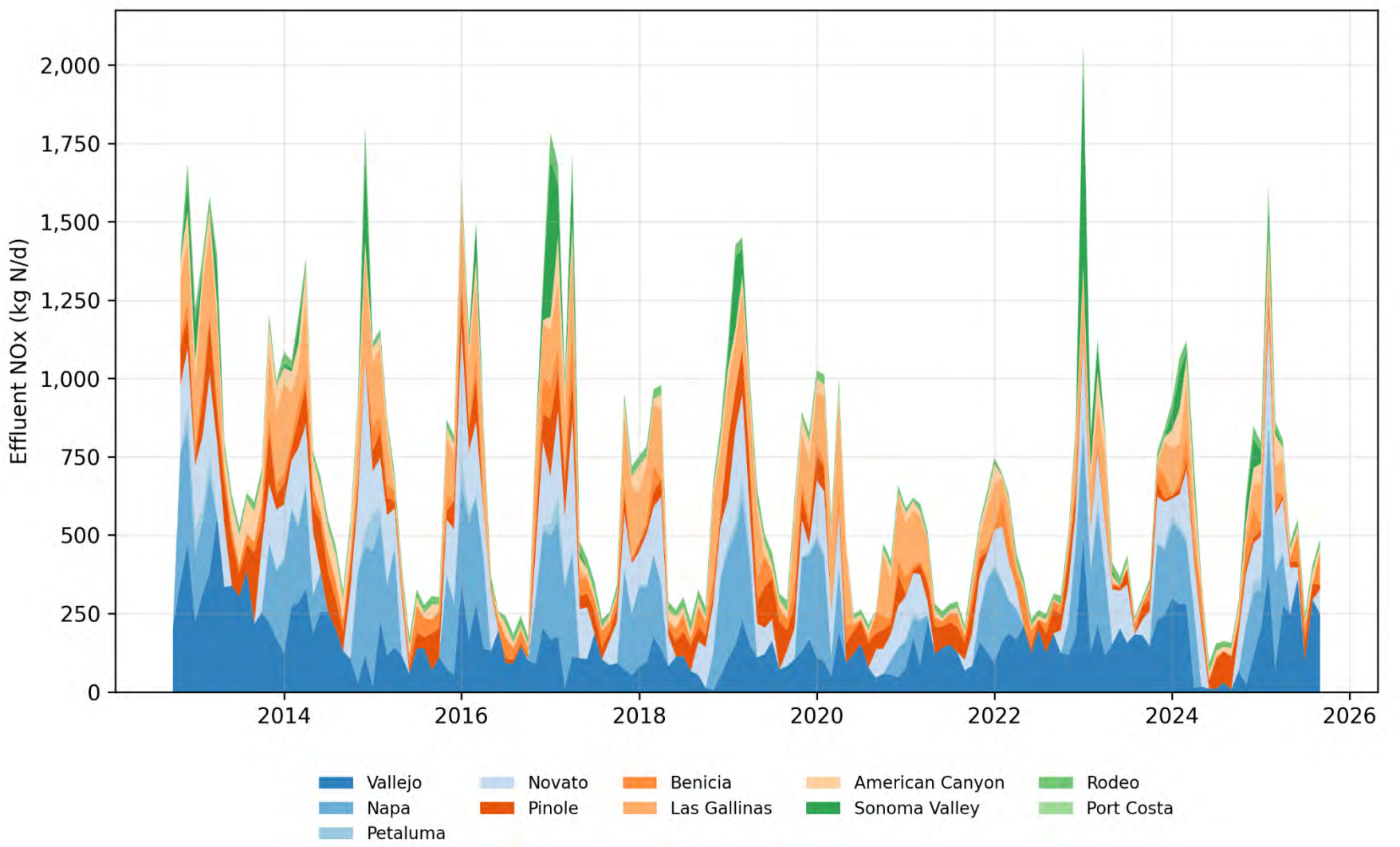


Figure C-8. NOx Load Contribution by Discharger to San Pablo Bay

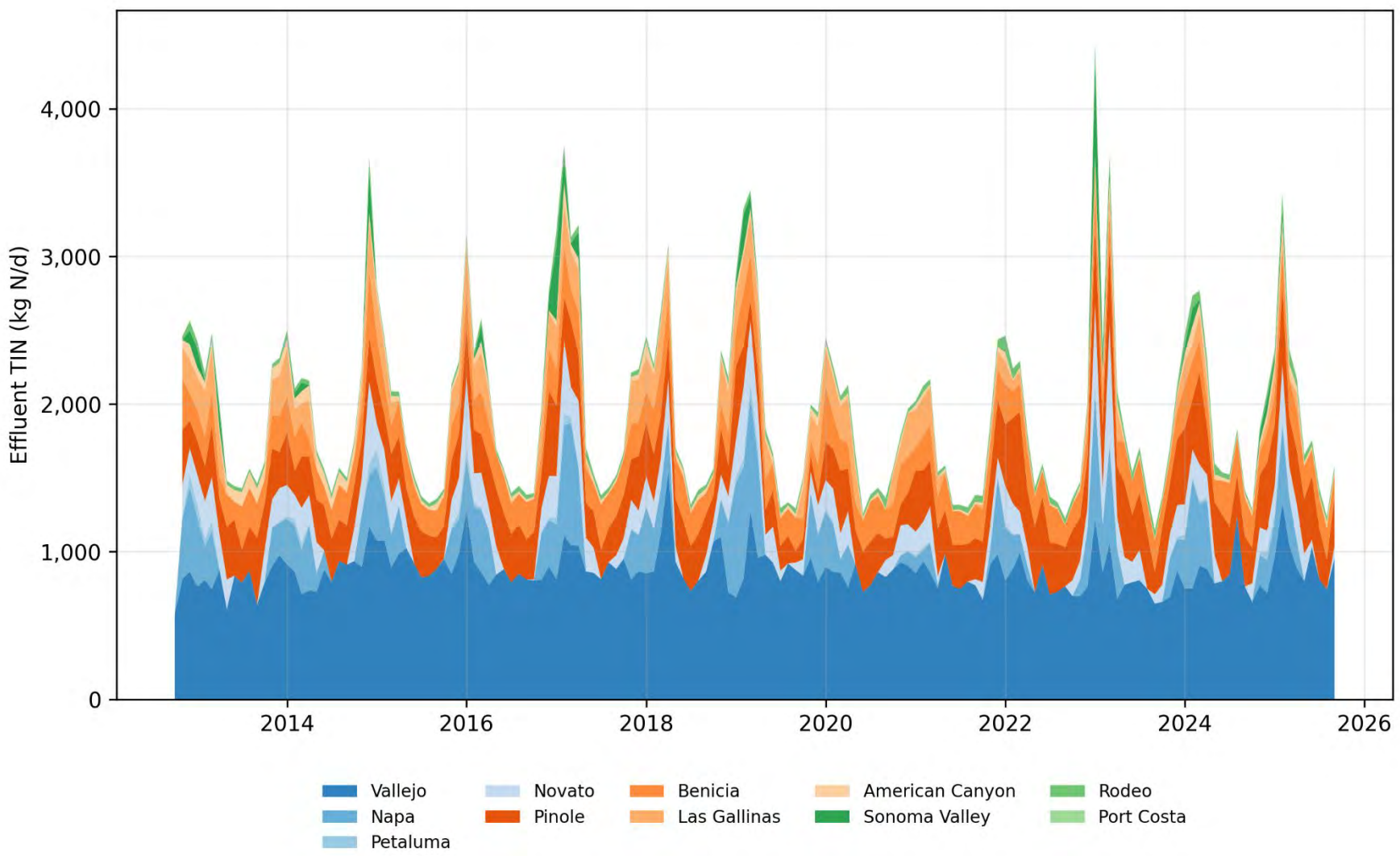


Figure C-9. TIN Load Contribution by Discharger to San Pablo Bay

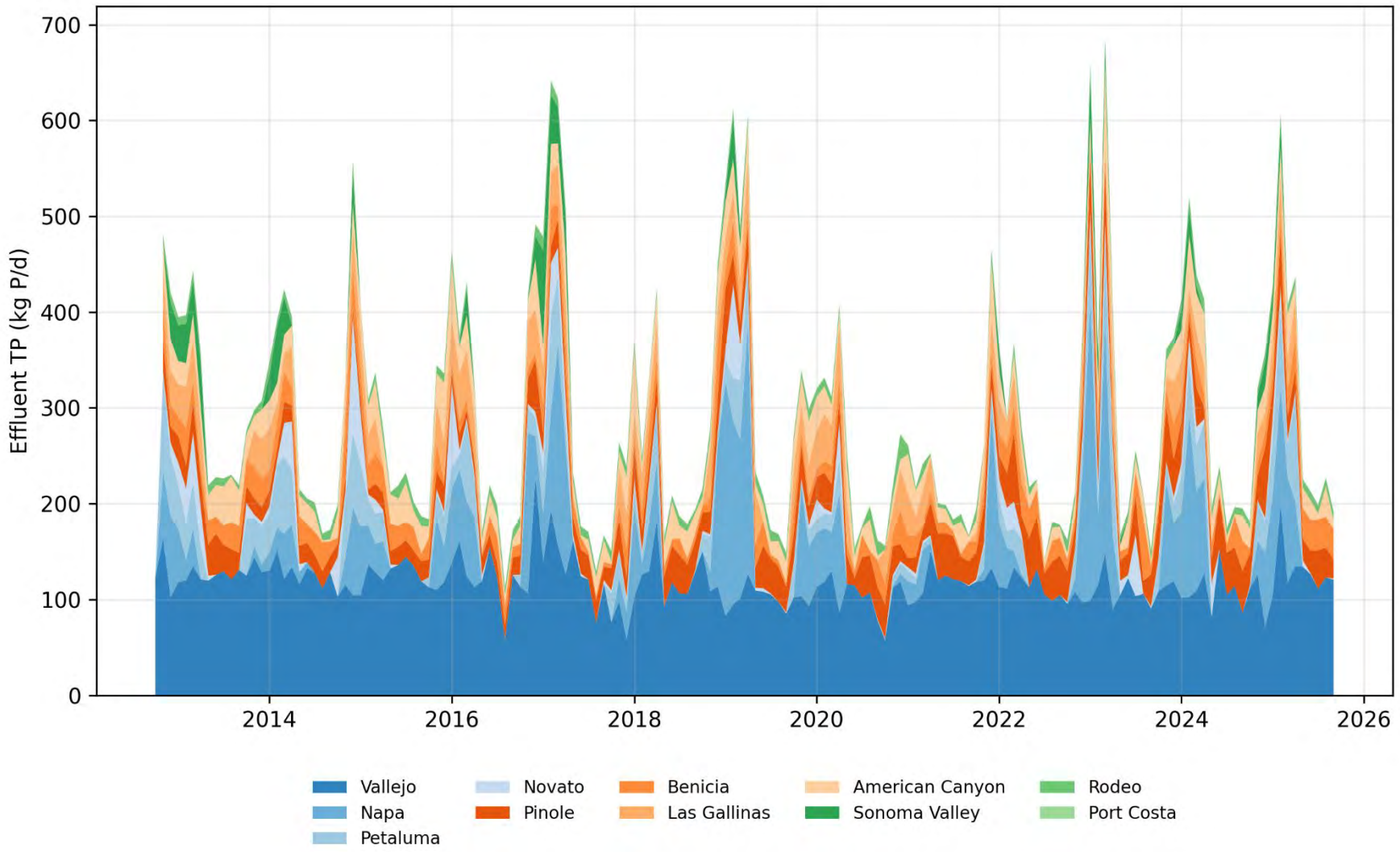


Figure C-10. TP Load Contribution by Discharger to San Pablo Bay

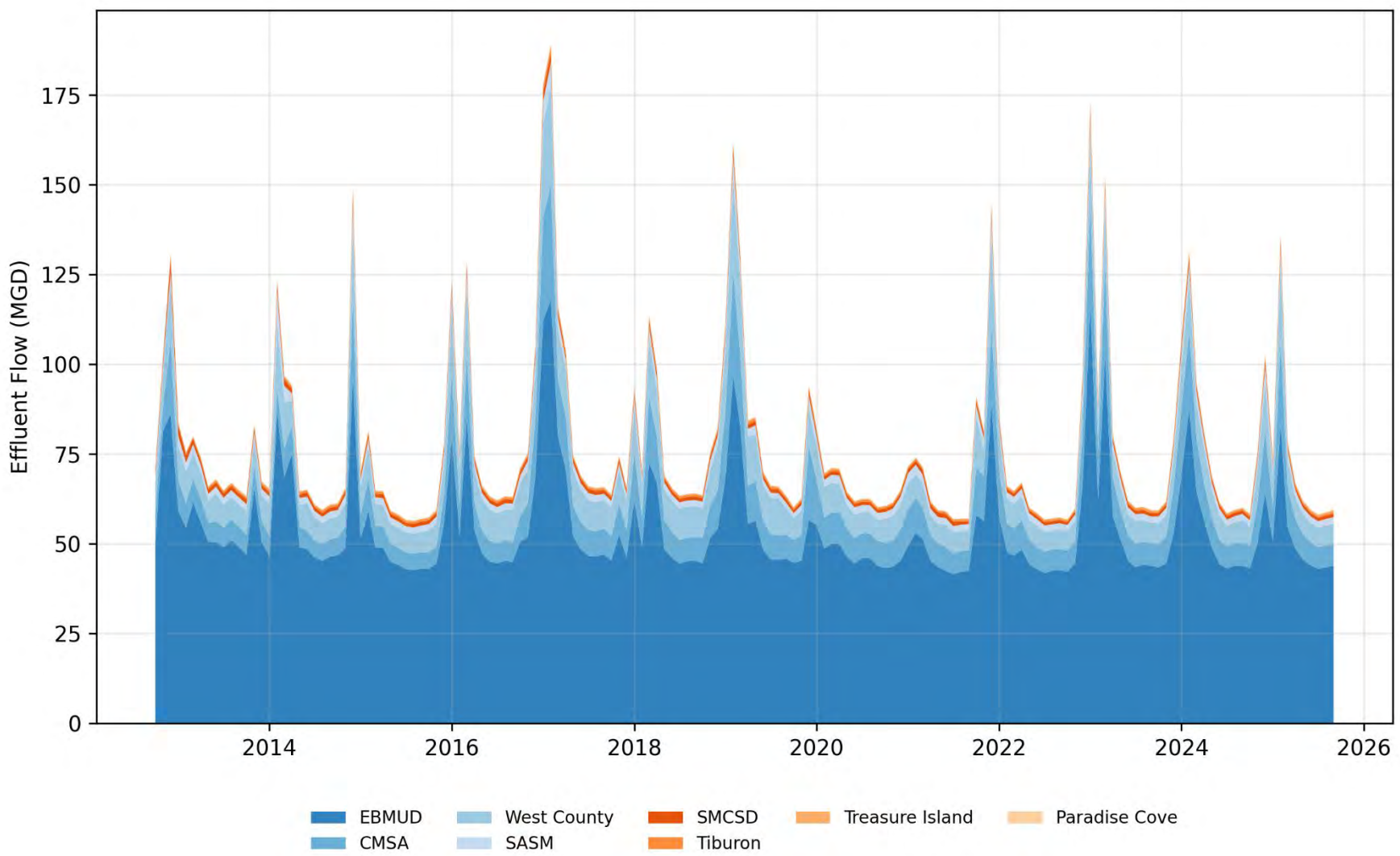


Figure C-11. Flow Contribution by Discharger to Central Bay

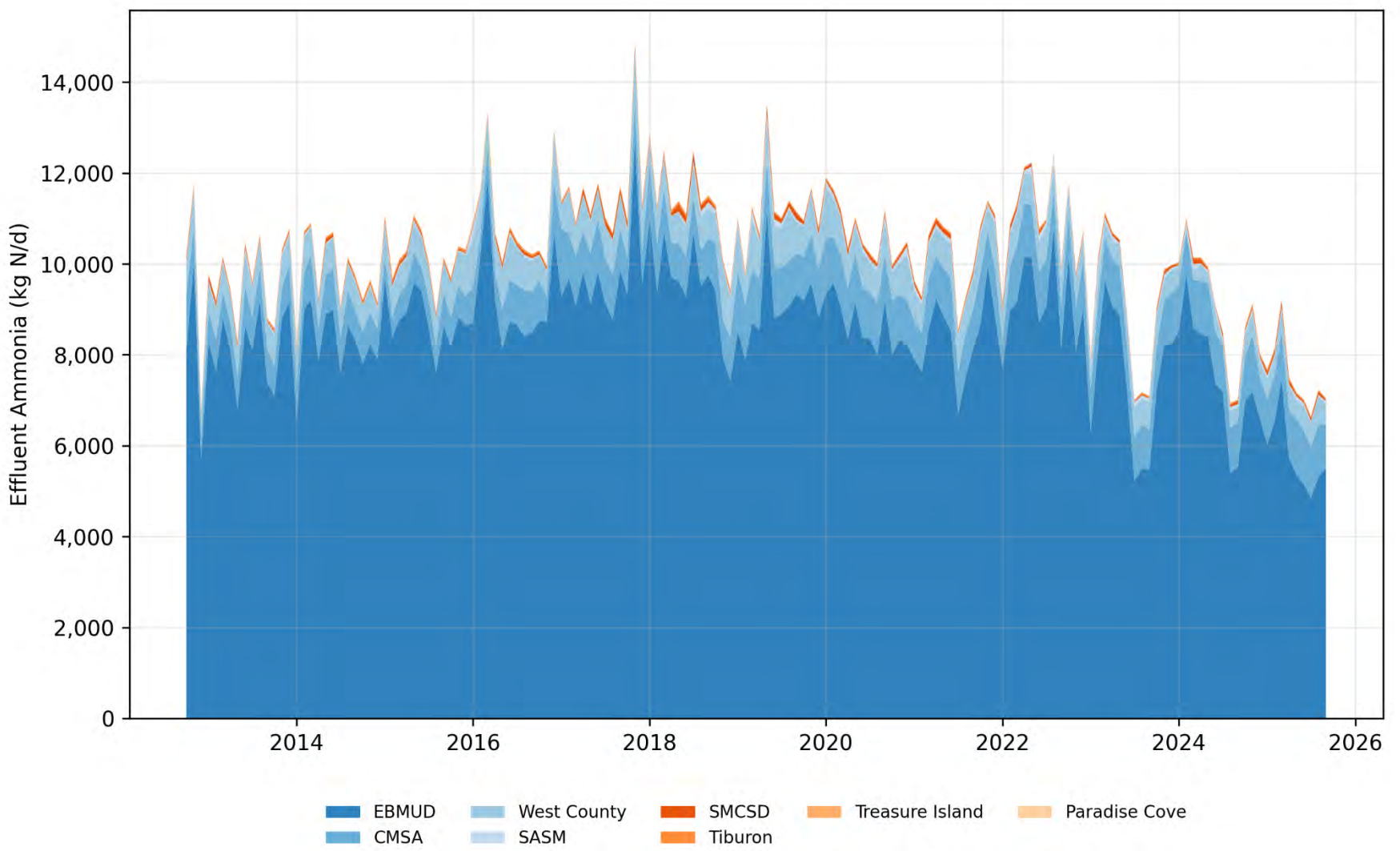


Figure C-12. Ammonia Load Contribution by Discharger to Central Bay

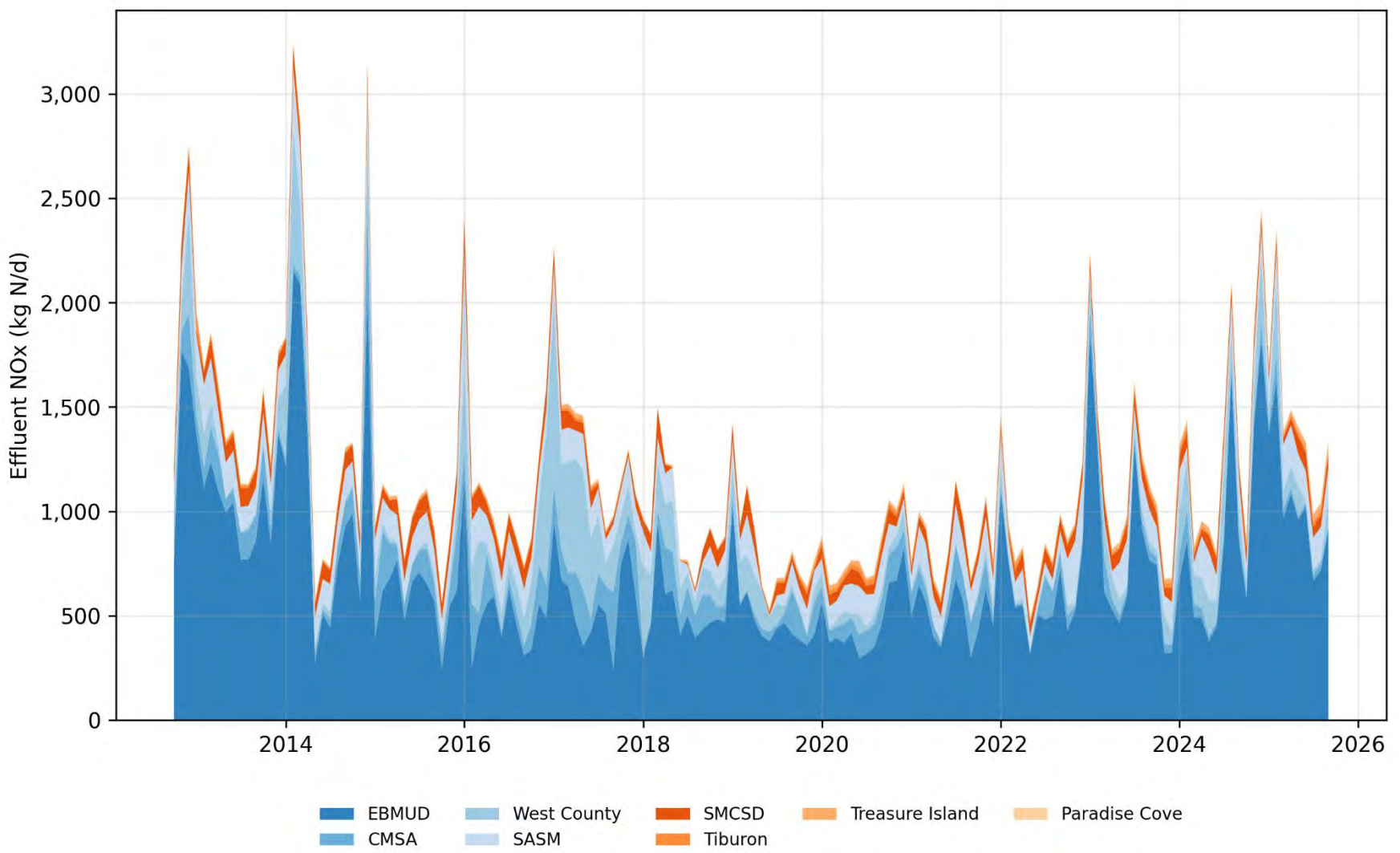


Figure C-13. NOx Load Contribution by Discharger to Central Bay

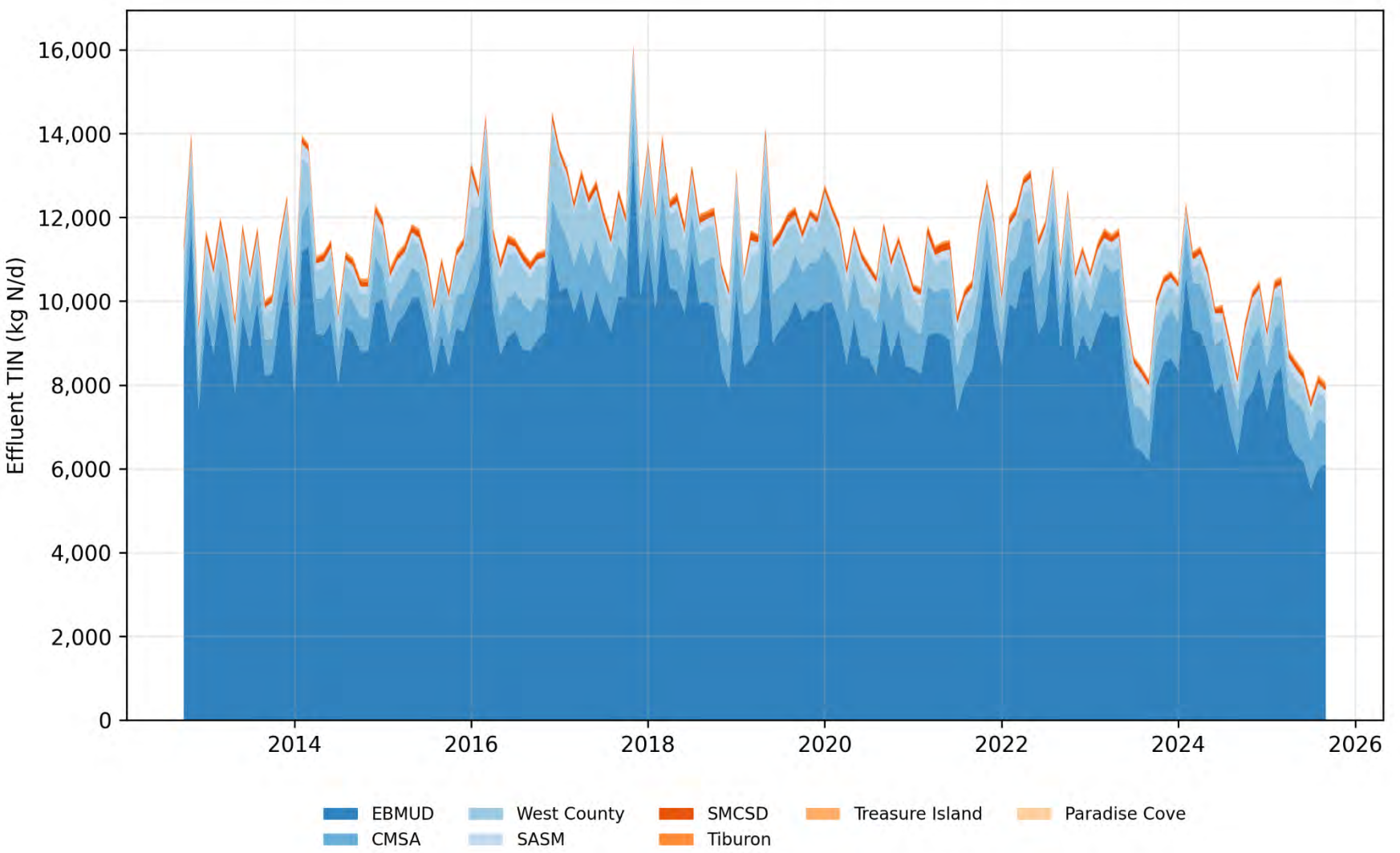


Figure C-14. TIN Load Contribution by Discharger to Central Bay

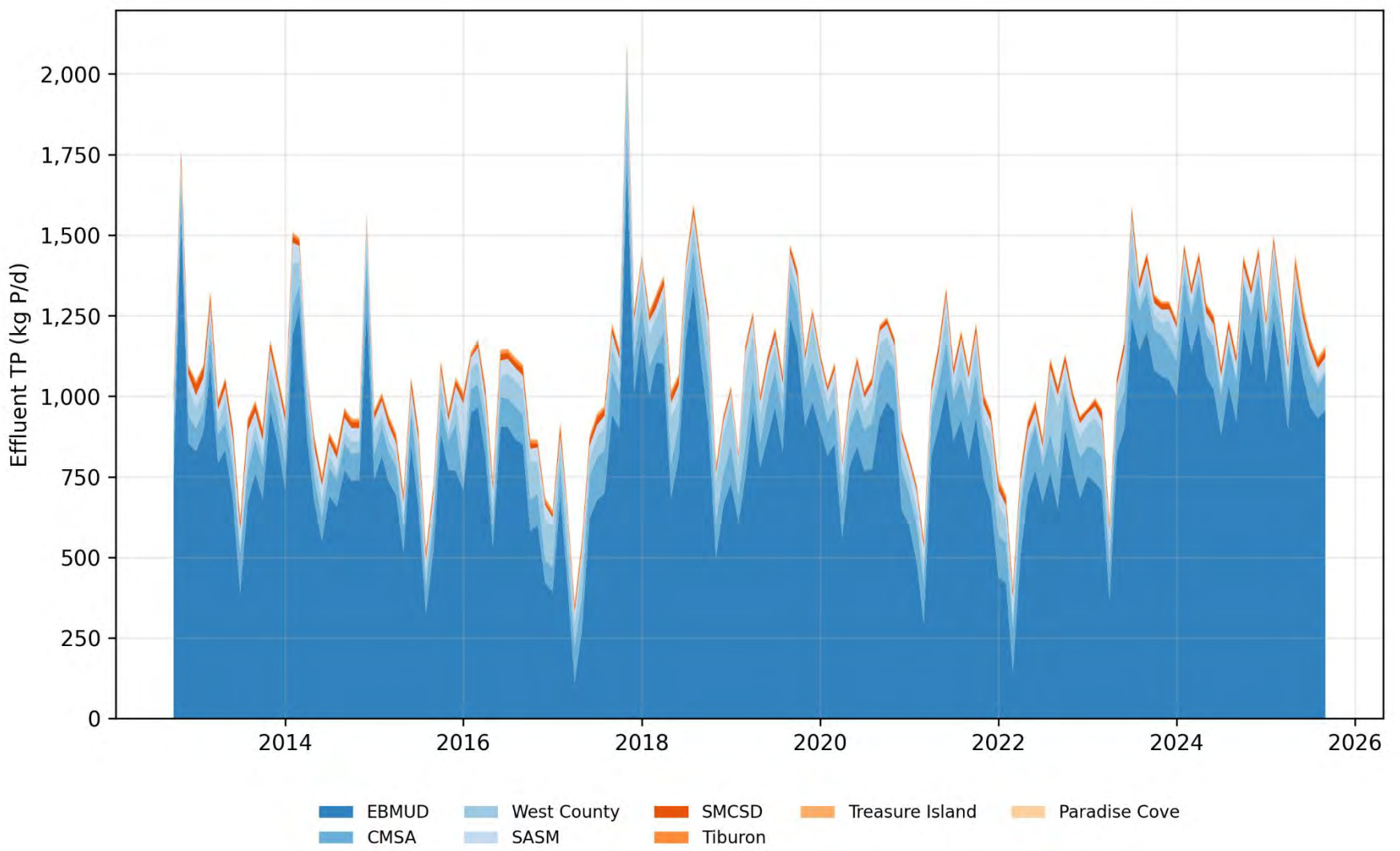


Figure C-15. TP Load Contribution by Discharger to Central Bay

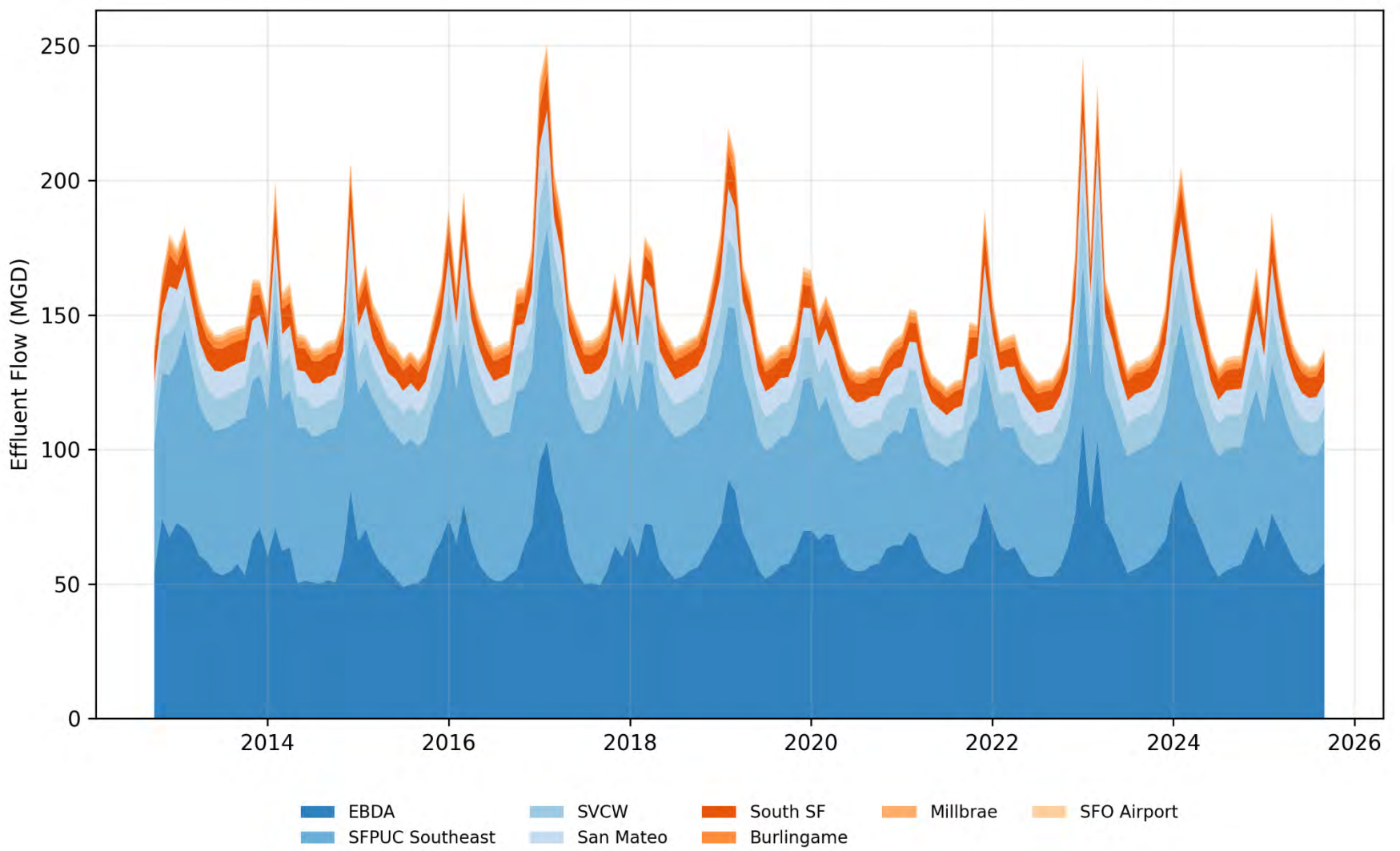


Figure C-16. Flow Contribution by Discharger to South Bay

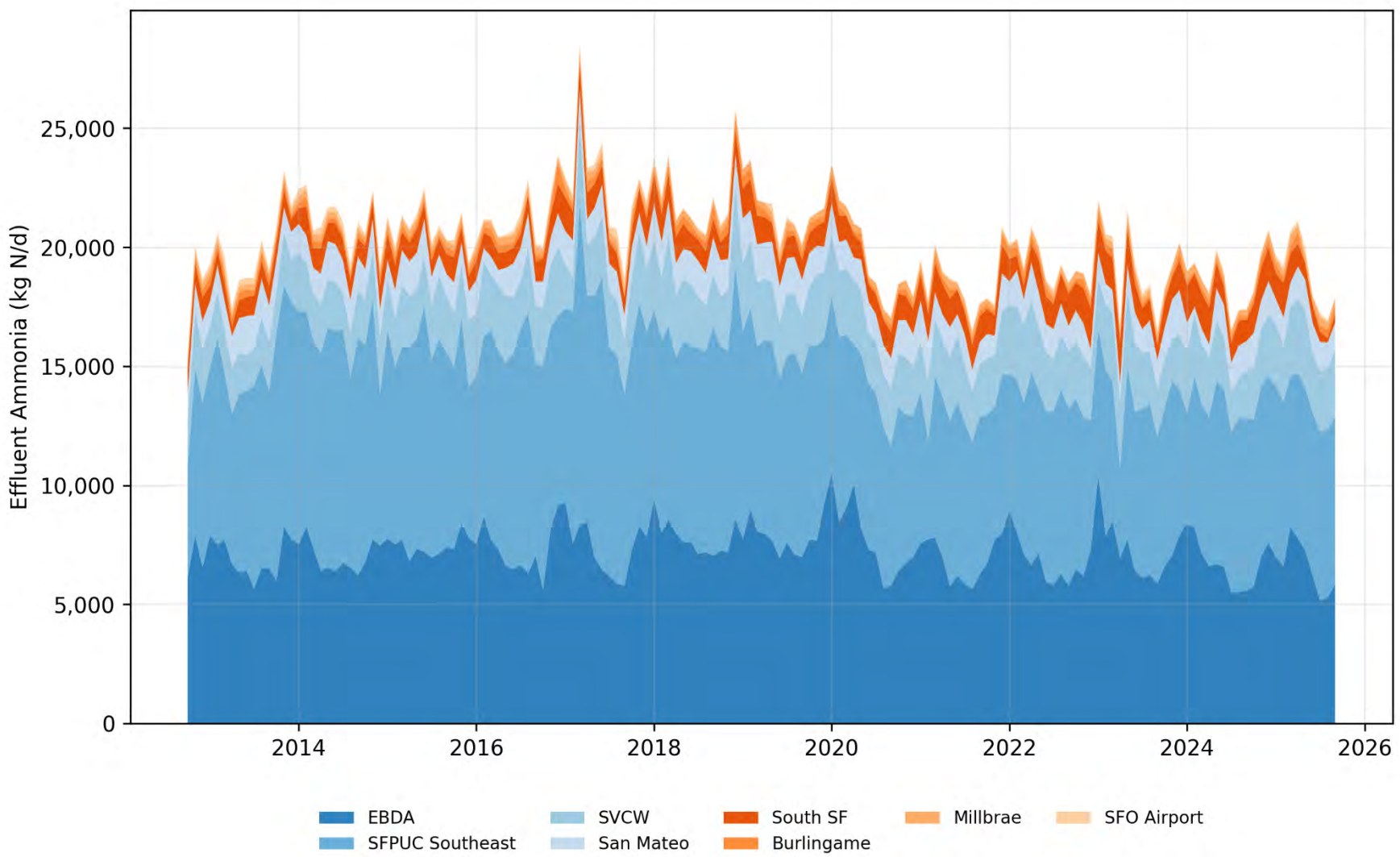


Figure C-17. Ammonia Load Contribution by Discharger to South Bay

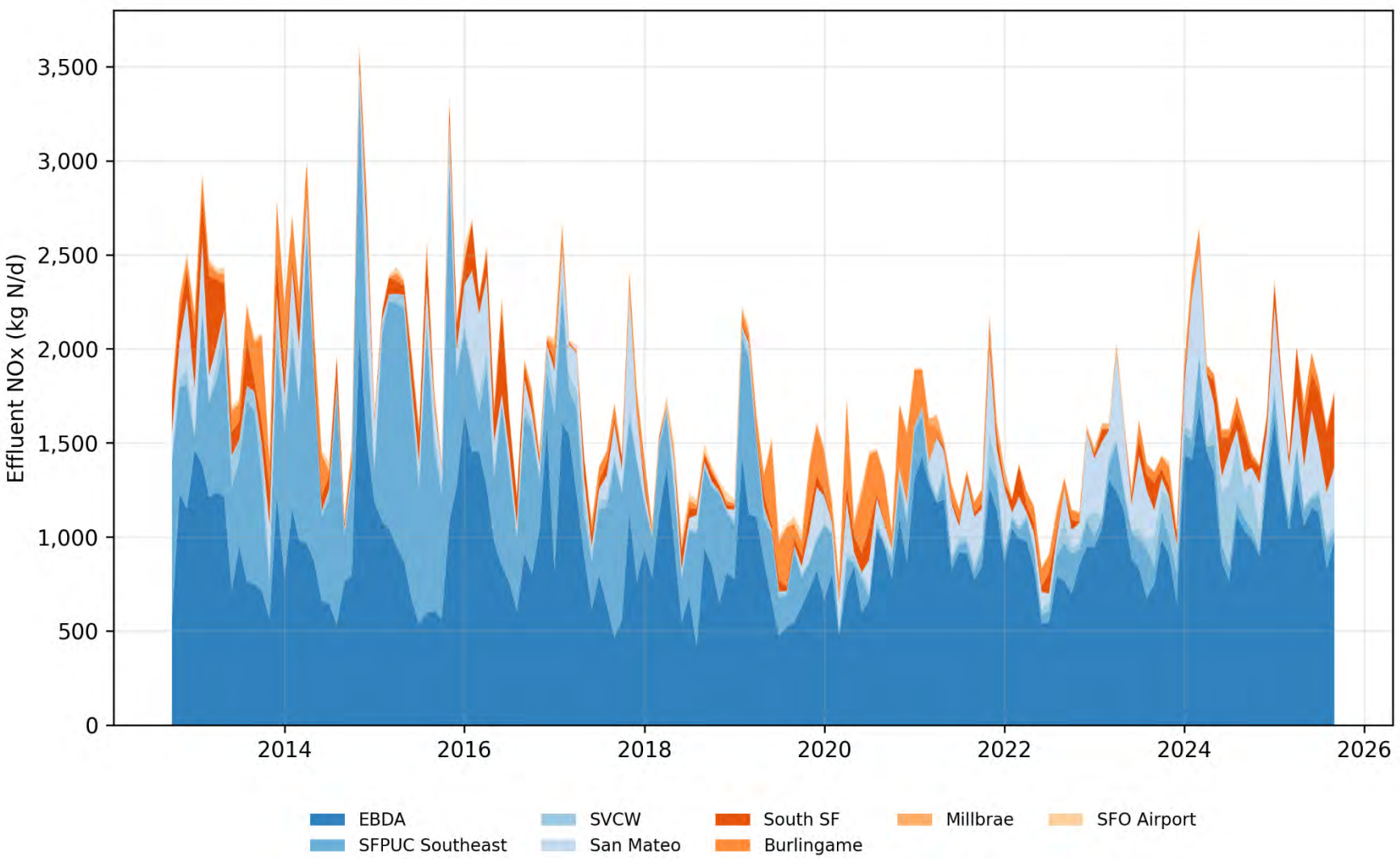


Figure C-18.NOx Load Contribution by Discharger to South Bay

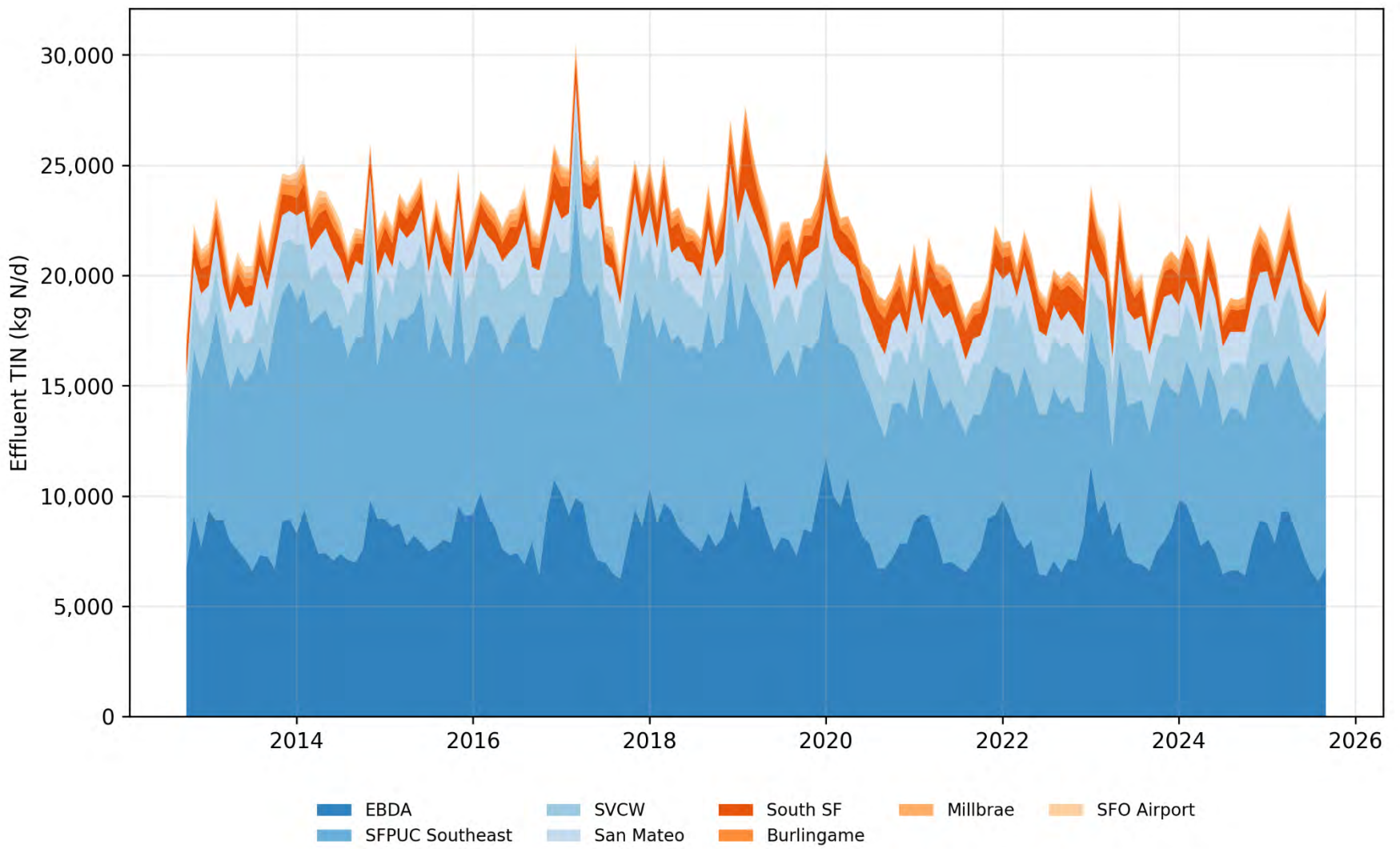


Figure C-19. TIN Load Contribution by Discharger to South Bay

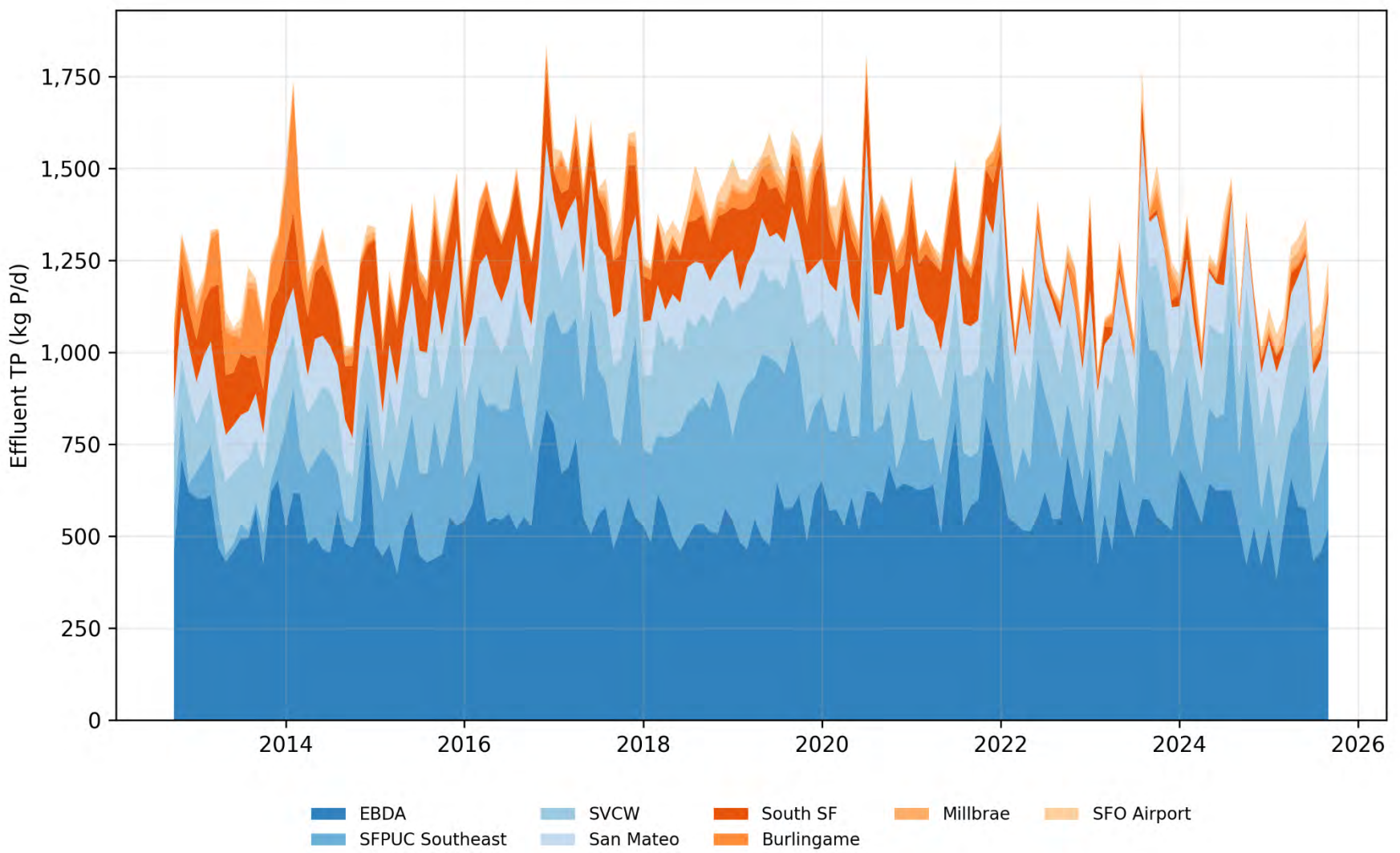


Figure C-20. TP Load Contribution by Discharger to South Bay

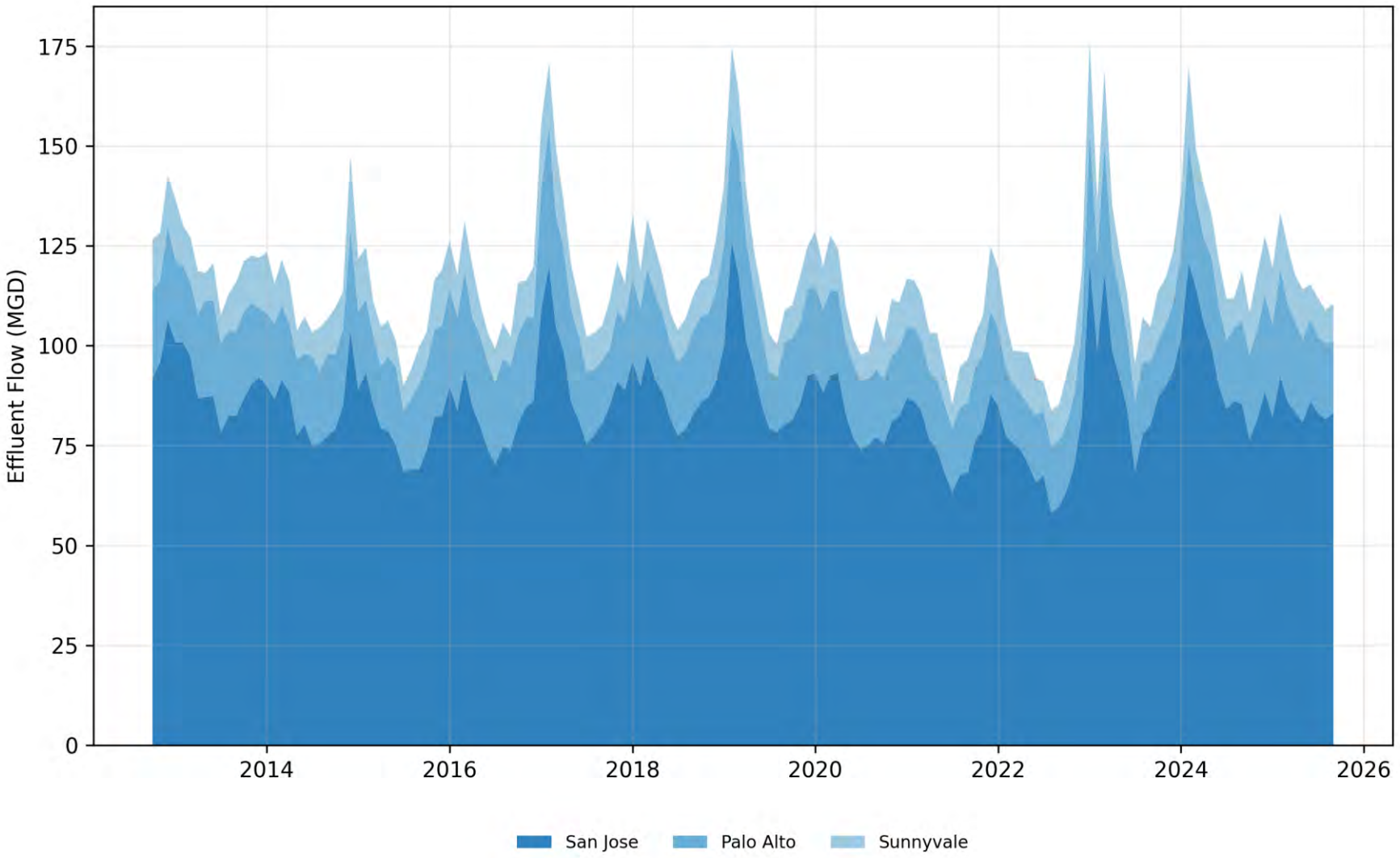


Figure C-21. Flow Contribution by Discharger to Lower South Bay

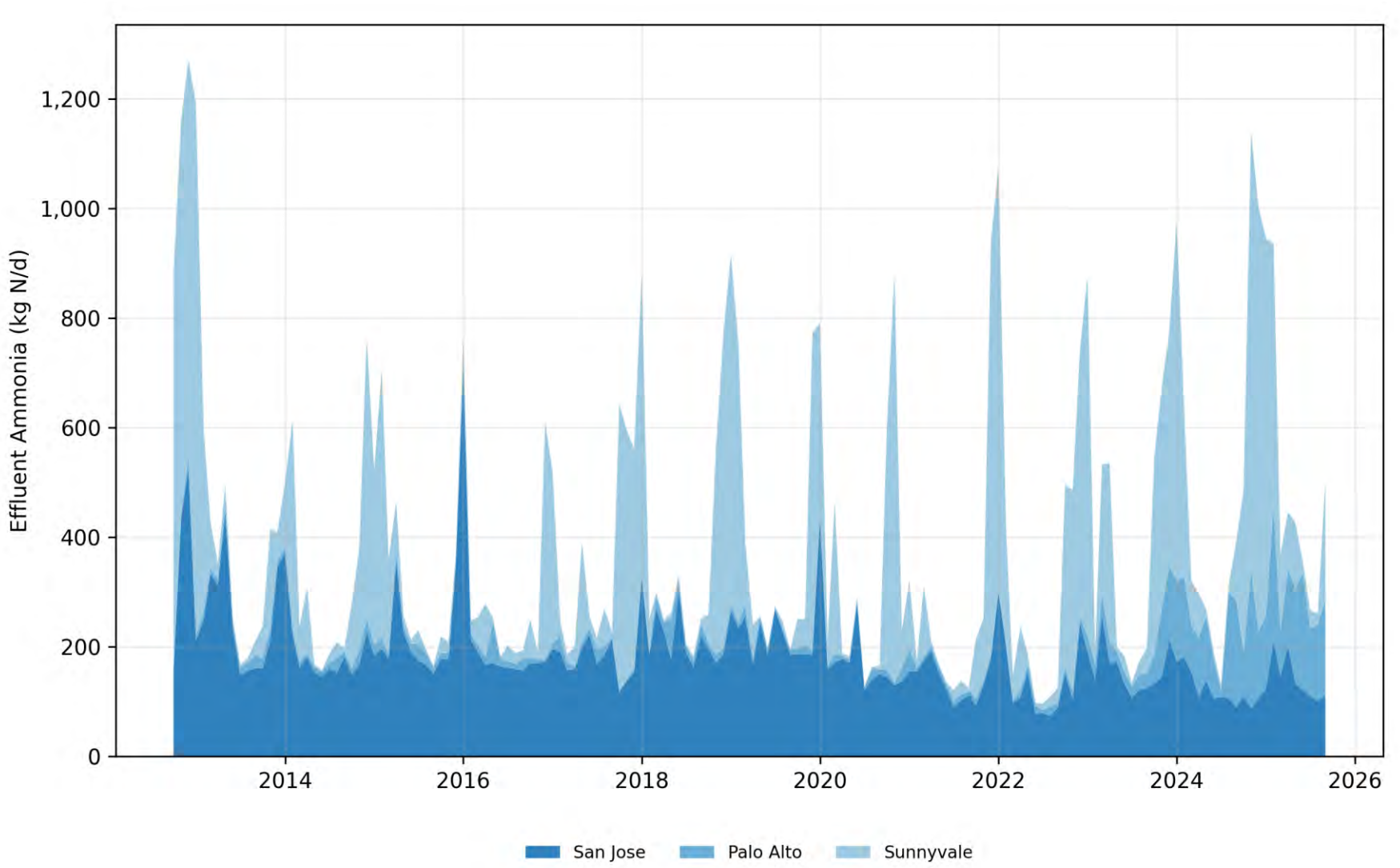


Figure C-22. Ammonia Load Contribution by Discharger to Lower South Bay

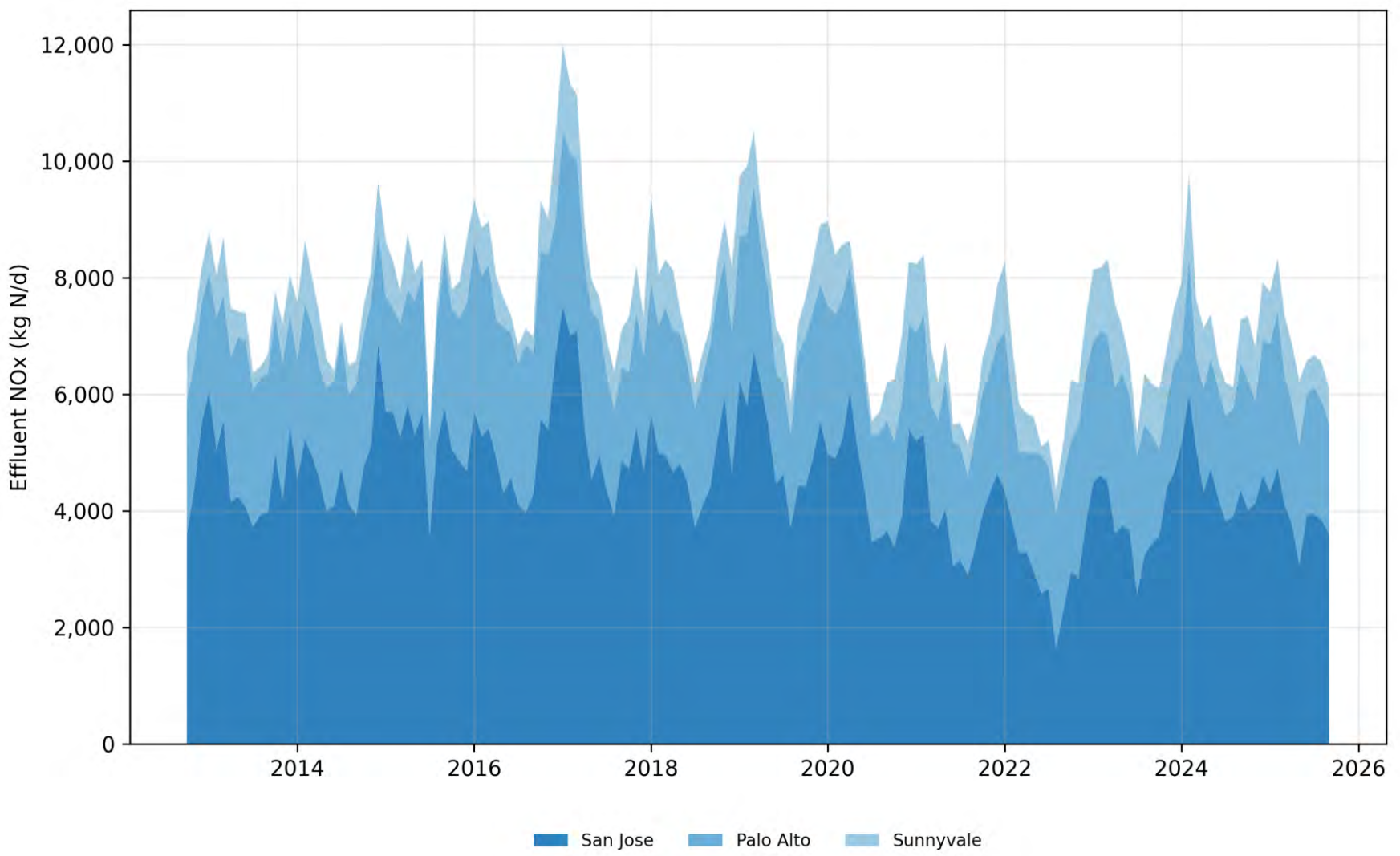


Figure C-23. Ammonia Load Contribution by Discharger to Lower South Bay

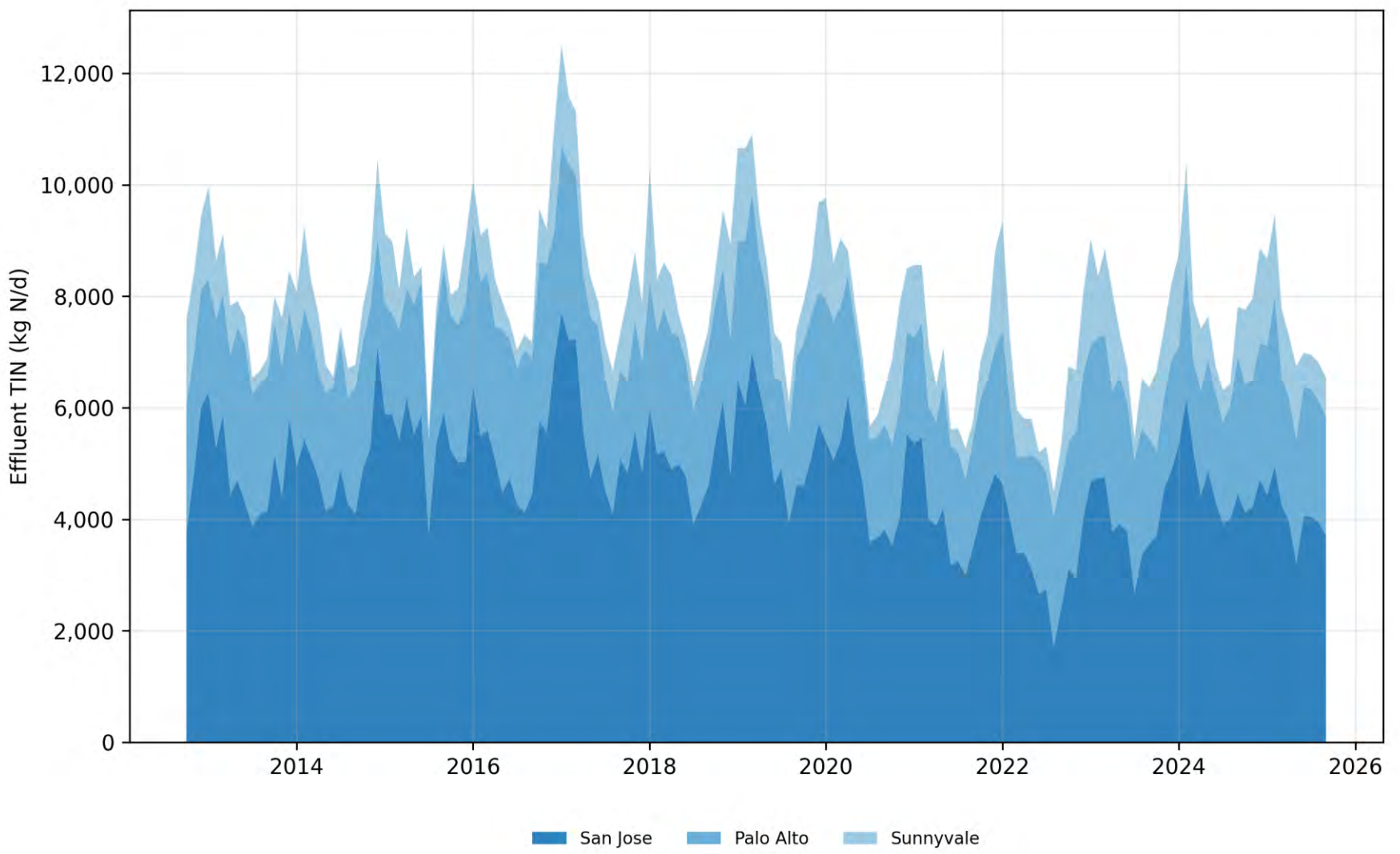


Figure C-24. TIN Load Contribution by Discharger to Lower South Bay

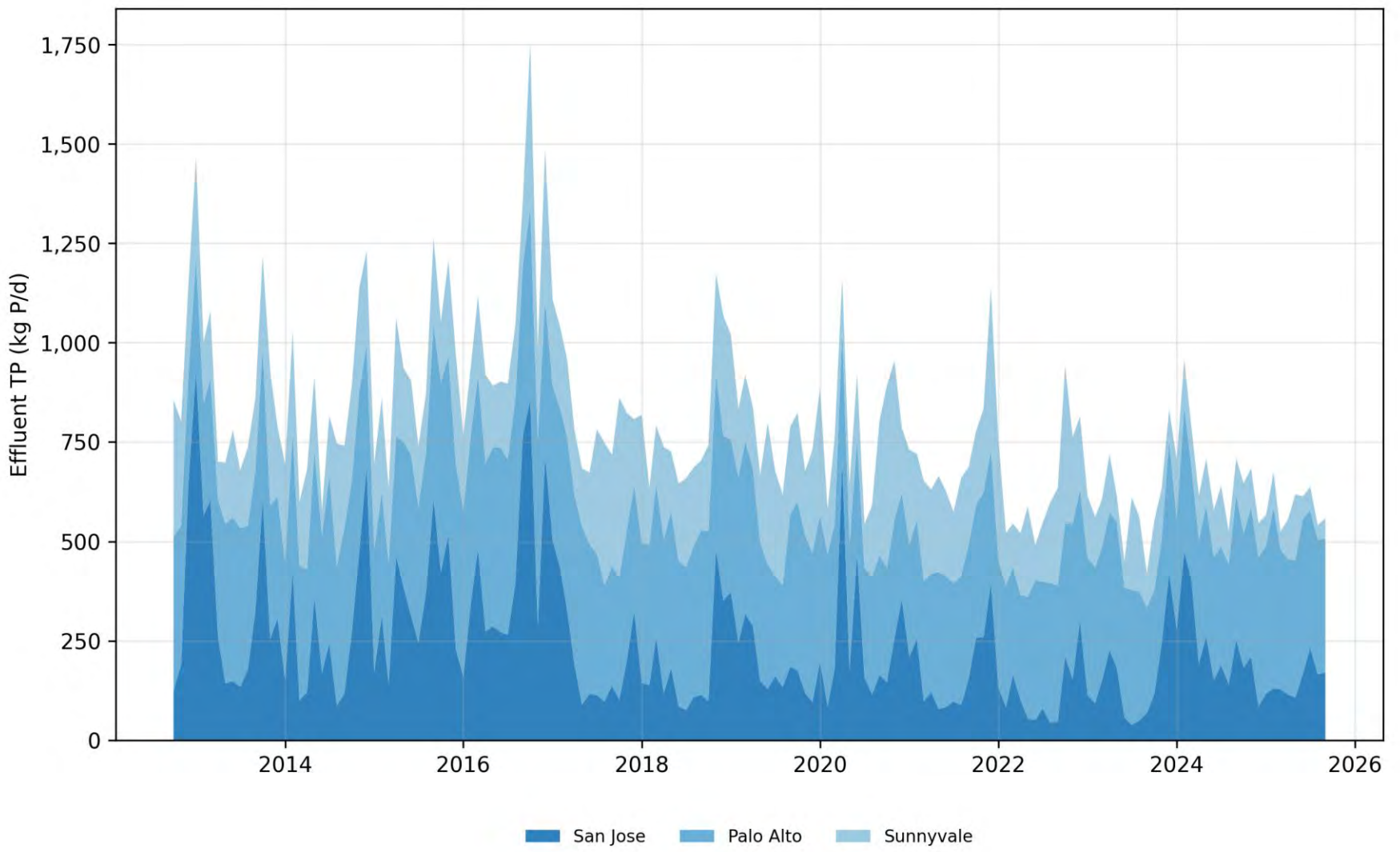


Figure C-25. TP Load Contribution by Discharger to Lower South Bay

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Appendix D. Recycled Water Data Tables

Recycled water data obtained from the State Water Board's Volumetric Annual Report and historical nutrient data were analyzed to estimate the flows and nutrients diverted from San Francisco Bay. It is important to note that the Volumetric Annual Report lags one year behind the Group Annual Report.

D.1 Flow

The annual average (i.e., twelve months from October 1 to September 30) and dry season average monthly (i.e., May 1 through September 30) recycled water flows are provided inTable D-1 and Table D-2, respectively. In addition, the annual average and dry season average monthly recycled water flows for each subembayment are provided in Table D-3 and Table D-4, respectively. An additional set of tables is provided in Table D-5 and Table D-6 that offers the percent reduction of flow/load diverted from San Francisco Bay from recycled water.

Table D-1. Recycled Water: Annual Average[a] Flows Diverted from San Francisco Bay (mgd)[b]

Discharger	2019/ 2020	2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024[c]	Average
American Canyon	0.4	0.4	0.4	0.4	0.41	0.40
Benicia[d]	0	0	0	0	--	0
Burlingame[d]	0	0	0	0	--	0
Central San	1.6	1.7	1.7	1.6	1.6	1.6
CMSA	0.04	0.04	0.02	0.02	0.028	0.030
Port Costa[d]	0	0	0	0	--	0
Delta Diablo	4.1	4.9	4.9	4.3	4.3	4.5
EBDA	8.5	9.3	8.6	8.3	8.3	8.6
EBMUD	0.8	0.8	0.3	0.1	0.14	0.43
FSSD	0.9	0.9	0.6	0.2	0.35	0.59
Las Gallinas[e]	0.4	0.7	1.0	1.0	0.89	0.80
Paradise Cove[d]	0	0	0	0	--	0
Tiburon[d]	0	0	0	0	--	0
Millbrae[d]	0	0	0	0	--	0
Mt. View[d]	0	0	0	0	--	0
Napa[e]	2.7	3.5	2.8	2.1	2.2	2.7
Novato	1.7	1.8	2.1	1.1	1.9	1.7
Palo Alto	0.7	0.7	0.7	0.6	0.62	0.66
Petaluma[e]	1.7	2.1	1.8	1.5	1.5	1.7
Pinole[d]	0	0	0	0	--	0
Rodeo[d]	0	0	0	0	--	0
SFO Airport	0	<0.01	0	0	--	0
SFPUC Southeast[d]	0	0	0	0	--	0
San Jose	11	12	11	10	12	11
San Mateo[d]	0	0	0	0	--	0
SMCSD[d]	0	0	0	0	--	0
SASM	0.03	0.02	0.03	0.03	0.015	0.025
SVCW	0.8	0.7	0.6	0.5	0.53	0.63
Sonoma Valley[e]	1.2	1.4	1.7	1.0	0.90	1.2
South SF[d]	0	0	0	0	--	0
Sunnyvale	0.8	0.8	0.3	0	--	0.48
Treasure Island[d]	0	0	0	0	--	0
Vallejo[d]	0	0	0	0	--	0
West County	5.3	5.2	4.8	4.3	4.9	4.9
Total[f]	**42**	**47**	**44**	**37**	**40**	**42**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in the Attachment 1.

c. Starting with 2023/2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2023/2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-2. Recycled Water: Dry Season[a] Flows Diverted from San Francisco Bay (mgd)[b]

Discharger	2019	2020	2021	2022	2023	2024[c]	Average
American Canyon	0.4	0.6	0.7	0.7	0.6	0.62	0.60
Benicia[d]	0	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0	0
Central San	2.2	2.1	2.3	2.3	2.2	2.2	2.2
CMSA	0.03	0.05	0.06	0.03	0.02	0.031	0.037
Port Costa[d]	0	0	0	0	0	0	0
Delta Diablo	3.7	4.3	5.7	5.5	4.0	4.6	4.6
EBDA	13	13	13	13	13	13	13
EBMUD	0.9	0.8	0.8	0.3	0.1	0.24	0.52
FSSD	1.2	1.8	1.7	1.1	0.4	0.73	1.2
Las Gallinas[e]	0.8	0.7	1.5	1.7	1.8	1.4	1.3
Paradise Cove[d]	0	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0	0
Napa[e]	3.8	4.6	5.9	5.0	4.0	4.4	4.6
Novato	1.6	3.1	2.9	3.4	1.5	3.0	2.6
Palo Alto	1.1	1.1	1.1	1.2	1.2	1.1	1.1
Petaluma[e]	2.3	3.2	3.4	2.7	2.4	2.8	2.8
Pinole[d]	0	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0	0
SFO Airport	0	0	<0.01	0	0	0	<0.01
SFPUC Southeast[d]	0	0	0	0	0	0	0
San Jose	15	16	16	16	16	16	16
San Mateo[d]	0	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0	0
SASM	0.05	0.03	0.03	0.03	0.03	0.018	0.031
SVCW	1.1	0.9	1.1	1.0	0.9	0.93	0.99
Sonoma Valley[e]	1.5	1.7	2.0	1.8	1.7	2.0	1.8
South SF[d]	0	0	0	0	0	0	0
Sunnyvale	0.9	1.2	0.8	0.4	0	0	0.55
Treasure Island[d]	0	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0	0
West County	5.0	5.3	5.0	4.5	4.4	5.0	4.9
Total[f]	**55**	**60**	**64**	**61**	**54**	**58**	**59**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in the Attachment 1.

c. Starting with 2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-3. Recycled Water: Annual Average[a] Flows by Subembayment (mgd)

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	6.5	7.5	7.2	6.2	6.3	6.7
San Pablo Bay[b]	62.8	8.2	10	9.8	7.0	7.8	8.6
Central Bay	167	6.1	6.0	5.1	4.4	5.1	5.3
South Bay	262	9.2	10	9.3	8.8	8.8	9.2
Lower South Bay	236	12	13	12	11	12	12
Total	**827**	**42**	**47**	**44**	**37**	**40**	**42**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-4. Recycled Water: Dry Season Average[a] Flows by Subembayment (mgd)

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	7.2	8.1	9.7	9.0	6.7	7.6	8.1
San Pablo Bay[b]	62.8	10	14	16	15	12	14	14
Central Bay	167	6.0	6.2	5.8	4.7	4.6	5.3	5.4
South Bay	262	15	14	14	14	14	14	14
Lower South Bay	236	17	18	17	17	17	17	17
Total	**827**	**55**	**60**	**64**	**61**	**54**	**58**	**59**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-5. Recycled Water: Percent of Annual Average[a] Flows Diverted from each Subembayment[b]

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	11%	13%	11%	8%	9%	10%
San Pablo Bay [c]	62.8	24%	34%	28%	16%	19%	24%
Central Bay	167	8%	9%	6%	5%	6%	7%
South Bay	262	6%	7%	6%	5%	5%	6%
Lower South Bay	236	10%	11%	11%	8%	9%	10%
Total	**827**	**9%**	**11%**	**10%**	**7%**	**8%**	**9%**

a. October 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-6. Recycled Water: Percent of Dry Season[a] Average Flows Diverted from each Subembayment[b]

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	11%	14%	17%	16%	11%	12%	14%
San Pablo Bay[c]	62.8	38%	50%	56%	55%	44%	48%	49%
Central Bay	167	8%	9%	9%	8%	7%	8%	8%
South Bay	262	9%	9%	10%	10%	9%	9%	9%
Lower South Bay	236	13%	16%	16%	16%	12%	13%	14%
Total	**827**	**12%**	**14%**	**16%**	**15%**	**12%**	**13%**	**14%**

a. May 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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D.2 Total Ammonia

The annual average (i.e., twelve months from October 1 to September 30) and dry season average monthly (i.e., May 1 through September 30) recycled water ammonia loads are provided in Table D-7 and Table D-8, respectively. In addition, the annual average and dry season average monthly recycled water ammonia loads for each subembayment are provided in Table D-9 and Table D-10, respectively. An additional set of tables is provided in Table D-11 and Table D-12 that offers the percent reduction of flow/load diverted from San Francisco Bay from recycled water.

Table D-7. Recycled Water: Annual Average[a] Total Ammonia Loads Diverted from San Francisco Bay (kg N/d)[b]

Discharger	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024[c]	Average
American Canyon	0.3	0.2	0.2	0.5	0.59	0.36
Benicia[d]	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0
Central San	180	230	210	150	150	180
CMSA	5	6	3	3	3.4	4.1
Port Costa[d]	0	0	0	0	0	0
Delta Diablo	58	67	59	58	62	61
EBDA	1,000	1,100	1,700	980	990	1,200
EBMUD	140	140	59	8	22	74
FSSD	0.3	0.3	0.7	0.2	0.21	0.34
Las Gallinas[e]	5	19	12	6	3.6	9.1
Paradise Cove[d]	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0
Napa[e]	22	22	19	20	30	23
Novato	17	14	17	9	9.4	13
Palo Alto	0.3	0.4	0.5	0.8	3.4	1.1
Petaluma[e]	2	3	3	2	2.1	2.4
Pinole[d]	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0
SFO Airport	0	<0.1	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0
San Jose	24	21	18	18	16	19
San Mateo[d]	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0
SASM	1	1	2	1	0.63	1.1
SVCW	140	140	130	91	83	120
Sonoma Valley[e]	0.5	1	2	0.6	0.27	0.87
South SF[d]	0	0	0	0	0	0
Sunnyvale	1	1	3	0	0	1.0
Treasure Island[d]	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0
West County	2.1	3.5	3.8	3.8	2.5	3.1
Total [f]	**1,600**	**1,800**	**2,300**	**1,300**	**1,400**	**1,700**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2023/2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2023/2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-8. Recycled Water: Dry Season[a] Total Ammonia Loads Diverted from San Francisco Bay (kg N/d)[b]

Discharger	2019	2020	2021	2022	2023	2024[c]	Average
American Canyon	0.6	0.5	0.3	0.4	1.0	0.85	0.61
Benicia[d]	0	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0	0
Central San	210	250	310	280	200	210	240
CMSA	4	7	9	5	3	4.9	5.5
Port Costa[d]	0	0	0	0	0	0	0
Delta Diablo	54	62	69	64	55	69	62
EBDA	2,200	1,200	1,400	2,800	1,400	1,500	1,800
EBMUD	170	150	150	59	18	36	97
FSSD	0.7	0.5	0.5	1.2	0.4	0.43	0.62
Las Gallinas[e]	15	11	40	21	10	5.0	17
Paradise Cove[d]	0	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0	0
Napa[e]	77	33	35	36	39	61	47
Novato	6	31	21	26	11	15	18
Palo Alto	0.5	0.5	0.6	0.8	1.5	5.9	1.6
Petaluma[e]	4	3	4	4	3	4.0	3.7
Pinole[d]	0	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0	0
SFO Airport	0	0	<0.1	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0	0
San Jose	41	35	26	22	25	19	28
San Mateo[d]	0	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0	0
SASM	4	2	1	3	1	0.76	2.0
SVCW	210	160	240	200	170	140	190
Sonoma Valley[e]	0.6	0.7	0.7	0.8	0.9	0.59	0.72
South SF[d]	0	0	0	0	0	0	0
Sunnyvale	1	1	1	1	0	0	0.67
Treasure Island[d]	0	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0	0
West County	3.2	1.7	3.7	3.5	1.1	3.3	2.8
Total[f]	**3,000**	**1,900**	**2,300**	**3,500**	**1,900**	**2,100**	**2,500**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-9. Recycled Water: Annual Average[a] Total Ammonia Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	240	300	270	210	210	250
San Pablo Bay[b]	62.8	47	59	52	37	46	48
Central Bay	167	150	150	68	15	28	82
South Bay	262	1,200	1,300	1,900	1,100	1,100	1,300
Lower South Bay	236	26	23	21	19	19	22
Total	**827**	**1,600**	**1,800**	**2,300**	**1,300**	**1,400**	**1,700**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-10. Recycled Water: Dry Season[a] Average Total Ammonia Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	270	310	380	340	250	280	310
San Pablo Bay[b]	62.8	100	79	100	87	65	86	86
Central Bay	167	180	160	160	51	25	45	100
South Bay	262	2,400	1,400	1,700	3,000	1,600	1,600	2,000
Lower South Bay	236	42	36	28	24	26	25	30
Total	**827**	**3,000**	**1,900**	**2,300**	**3,500**	**1,900**	**2,100**	**2,500**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-11. Recycled Water: Percent of Annual Average[a] Total Ammonia Loads Diverted from each Subembayment[b]

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	4%	5%	5%	4%	4%	4%
San Pablo Bay[c]	62.8	4%	5%	4%	3%	3%	4%
Central Bay	167	1%	1%	1%	0%	0%	1%
South Bay	262	5%	6%	9%	5%	6%	6%
Lower South Bay	236	7%	7%	6%	4%	4%	6%
Total	**827**	**4%**	**5%**	**6%**	**4%**	**4%**	**5%**

a. October 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-12. Recycled Water: Percent of Dry Season[a] Average Total Ammonia Loads Diverted from each Subembayment[b]

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	6%	6%	7%	7%	6%	6%	6%
San Pablo Bay [c]	62.8	9%	7%	8%	7%	5%	6%	7%
Central Bay	167	2%	1%	2%	0%	0%	1%	1%
South Bay	262	10%	7%	9%	14%	8%	8%	9%
Lower South Bay	236	15%	16%	17%	16%	13%	9%	14%
Total	**827**	**7%**	**5%**	**7%**	**9%**	**6%**	**6%**	**7%**

a. May 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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D.3 Nitrate + Nitrite (NOx)

The annual average (i.e., twelve months from October 1 to September 30) and dry season average monthly (i.e., May 1 through September 30) recycled water NOx loads are provided in Table D-13 and Table D-14, respectively. In addition, the annual average and dry season average monthly recycled water NOx loads for each subembayment are provided in Table D-15 and Table D-16, respectively. An additional set of tables is provided in Table D-17 and Table D-18 that offers the percent reduction of flow/load diverted from San Francisco Bay from recycled water.

Table D-13. Recycled Water: Annual Average[a] Nitrate + Nitrite Loads Diverted from San Francisco Bay (kg N/day)[b]

Discharger	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024[c]	Average
American Canyon	9	6	6	6	9.2	7.2
Benicia[d]	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0
Central San	6	4	7	15	19	10
CMSA	0	1	0	0	0.14	0.23
Port Costa[d]	0	0	0	0	0	0
Delta Diablo	2	5	4	2	2.7	3.1
EBDA	83	83	83	87	55	78
EBMUD	6	10	4	1	2.5	4.7
FSSD	77	75	55	17	28	50
Las Gallinas[e]	34	50	31	32	25	34
Paradise Cove[d]	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0
Napa[e]	87	120	100	57	46	82
Novato	63	62	73	47	57	60
Palo Alto	72	77	94	76	60	76
Petaluma[e]	2	4	2	5	2.5	3.1
Pinole[d]	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0
SFO Airport	0	<1	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0
San Jose	590	580	470	430	540	520
San Mateo[d]	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0
SASM	2	2	1	2	1.2	1.6
SVCW	2	2	2	2	9.9	3.6
Sonoma Valley[e]	49	65	53	46	14	45
South SF[d]	0	0	0	0	0	0
Sunnyvale	37	33	20	0	0	18
Treasure Island[d]	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0
West County	160	130	99	87	91	110
Total [f]	**1,300**	**1,300**	**1,100**	**900**	**970**	**1,100**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2023/2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2023/2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-14. Recycled Water: Dry Season[a] Nitrate + Nitrite Loads Diverted from San Francisco Bay (kg N/day)[b]

Discharger	2019	2020	2021	2022	2023	2024[c]	Average
American Canyon	9	10	10	9	8	14	10
Benicia[d]	0	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0	0
Central San	17	11	5	14	30	25	17
CMSA	0	1	1	0	0	0.16	0.36
Port Costa[d]	0	0	0	0	0	0	0
Delta Diablo	3	3	10	9	2	4.1	5.2
EBDA	32	190	43	230	140	79	120
EBMUD	8	6	9	3	2	4.9	5.5
FSSD	100	150	140	100	31	56	96
Las Gallinas[e]	41	59	100	54	51	39	57
Paradise Cove[d]	0	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0	0
Napa[e]	71	150	220	180	110	89	140
Novato	53	110	100	120	68	86	90
Palo Alto	120	120	120	160	150	110	130
Petaluma[e]	7	4	6	3	9	5.3	5.7
Pinole[d]	0	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0	0
SFO Airport	0	0	<1	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0	0
San Jose	810	800	750	580	640	740	720
San Mateo[d]	0	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0	0
SASM	2	2	2	1	2	1.5	1.8
SVCW	2	2	3	5	4	21	6.2
Sonoma Valley[e]	48	88	97	73	90	30	71
South SF[d]	0	0	0	0	0	0	0
Sunnyvale	61	50	33	23	0	0	33
Treasure Island[d]	0	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0	0
West County	180	150	120	92	91	94	120
Total [f]	**1,600**	**1,900**	**1,800**	**1,700**	**1,400**	**1,400**	**1,600**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-15. Recycled Water: Annual Average[a] Nitrate + Nitrite Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	85	84	66	34	50	64
San Pablo Bay[b]	62.8	240	300	270	190	150	230
Central Bay	167	170	140	100	90	95	120
South Bay	262	85	85	86	89	65	82
Lower South Bay	236	700	690	580	500	600	610
Total	**827**	**1,300**	**1,300**	**1,100**	**900**	**970**	**1,100**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-16. Recycled Water: Dry Season[a] Average Nitrate + Nitrite Loads by Subembayment, Flow (kg N/d)

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	120	160	150	120	63	85	120
San Pablo Bay[b]	62.8	230	420	540	430	340	260	370
Central Bay	167	190	160	130	95	96	100	130
South Bay	262	34	190	46	230	140	100	120
Lower South Bay	236	990	970	910	760	790	850	880
Total	**827**	**1,600**	**1,900**	**1,800**	**1,600**	**1,400**	**1,400**	**1,600**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-17. Recycled Water: Percent of Annual Average[(a)] Nitrate + Nitrite Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	6%	6%	5%	2%	3%	4%
San Pablo Bay [(c)]	62.8	28%	41%	37%	22%	21%	30%
Central Bay	167	19%	13%	11%	7%	8%	12%
South Bay	262	6%	5%	6%	6%	4%	5%
Lower South Bay	236	8%	9%	9%	7%	8%	8%
Total	**827**	**10%**	**11%**	**10%**	**7%**	**7%**	**9%**

a. October 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-18. Recycled Water: Percent of Dry Season[(a)] Average Nitrate + Nitrite Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	8%	11%	12%	8%	4%	6%	8%
San Pablo Bay [(c)]	62.8	34%	59%	67%	61%	49%	58%	55%
Central Bay	167	22%	17%	13%	11%	8%	7%	13%
South Bay	262	3%	12%	3%	18%	9%	6%	9%
Lower South Bay	236	12%	13%	14%	13%	11%	11%	12%
Total	**827**	**13%**	**16%**	**16%**	**16%**	**12%**	**11%**	**14%**

a. May 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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D.4 Total Inorganic Nitrogen (TIN)

The annual average (i.e., twelve months from October 1 to September 30) and dry season average monthly (i.e., May 1 through September 30) recycled water TIN loads are provided in Table D-19 and Table D-20, respectively. In addition, the annual average and dry season average monthly recycled water TIN loads for each subembayment are provided in Table D-21 and Table D-22, respectively. An additional set of tables is provided in Table D-23 and Table D-24 that offers the percent reduction of flow/load diverted from San Francisco Bay from recycled water.

Table D-19. Recycled Water: Annual Average[a] TIN Loads Diverted from San Francisco Bay (kg N/d)[b]

Discharger	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024[c]	Average
American Canyon	9	7	6	6	9.8	7.6
Benicia[d]	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0
Central San	190	230	220	160	170	190
CMSA	5	6	3	3	3.5	4.1
Port Costa[d]	0	0	0	0	0	0
Delta Diablo	60	73	63	60	65	64
EBDA	1,100	1,200	1,800	1,100	1,100	1,300
EBMUD	150	150	69	9	24	80
FSSD	77	76	56	18	28	51
Las Gallinas[e]	38	60	29	34	28	38
Paradise Cove[d]	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0
Napa[e]	110	140	120	77	75	100
Novato	80	77	90	55	66	74
Palo Alto	73	77	95	77	64	77
Petaluma[e]	4	7	5	7	4.6	5.5
Pinole[d]	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0
SFO Airport	0	0.0	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0
San Jose	610	600	480	440	560	540
San Mateo[d]	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0
SASM	4	3	3	3	1.9	3.0
SVCW	140	140	130	93	93	120
Sonoma Valley[e]	49	68	57	47	15	47
South SF[d]	0	0	0	0	0	0
Sunnyvale	38	35	23	0	0	19
Treasure Island[d]	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0
West County	160	130	100	89	94	110
Total [f]	**2,900**	**3,000**	**3,400**	**2,300**	**2,400**	**2,800**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2023/2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2023/2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-20. Recycled Water: Dry Season[a] TIN Loads Diverted from San Francisco Bay (kg N/day)[b]

Discharger	2019	2020	2021	2022	2023	2024[c]	Average
American Canyon	9	11	11	10	9	15	11
Benicia[d]	0	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0	0
Central San	230	260	310	290	230	230	260
CMSA	4	8	11	5	4	5.1	6.2
Port Costa[d]	0	0	0	0	0	0	0
Delta Diablo	55	65	81	72	57	73	67
EBDA	2,200	1,400	1,500	3,000	1,500	1,600	1,900
EBMUD	180	150	160	62	21	41	100
FSSD	100	150	140	100	32	57	97
Las Gallinas[e]	54	66	130	42	54	44	65
Paradise Cove[d]	0	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0	0
Napa[e]	140	180	260	210	150	150	180
Novato	63	140	120	150	80	100	110
Palo Alto	120	120	120	160	150	110	130
Petaluma[e]	10	7	10	7	12	9.3	9.2
Pinole[d]	0	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0	0
SFO Airport	0	0	0.0	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0	0
San Jose	850	840	780	600	660	760	750
San Mateo[d]	0	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0	0
SASM	6	4	4	4	3	2.3	3.9
SVCW	210	160	250	200	170	170	190
Sonoma Valley[e]	49	88	98	73	91	31	72
South SF[d]	0	0	0	0	0	0	0
Sunnyvale	62	51	35	24	0	0	29
Treasure Island[d]	0	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0	0
West County	180	150	120	95	92	97	120
Total [f]	**4,500**	**3,800**	**4,100**	**5,100**	**3,400**	**3,500**	**4,100**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-21. Recycled Water: Annual Average[a] TIN Loads by Subembayment (kg N/d)

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	320	380	330	240	260	310
San Pablo Bay[b]	62.8	280	360	310	230	200	280
Central Bay	167	320	290	170	100	120	200
South Bay	262	1,300	1,300	2,000	1,200	1,200	1,400
Lower South Bay	236	720	720	600	520	620	640
Total	**827**	**2,900**	**3,000**	**3,400**	**2,200**	**2,400**	**2,800**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-22. Recycled Water: Dry Season[a] Average TIN Loads by Subembayment, Flow (kg N/d)

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	390	470	530	470	320	360	420
San Pablo Bay [b]	62.8	330	490	620	490	390	350	450
Central Bay	167	370	320	290	150	120	150	230
South Bay	262	2,400	1,500	1,700	3,200	1,700	1,700	2,000
Lower South Bay	236	1,000	1,000	940	790	810	870	900
Total	**827**	**4,500**	**3,800**	**4,100**	**5,100**	**3,400**	**3,500**	**4,100**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-23. Recycled Water: Percent of Annual Average[(a)] TIN Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	5%	5%	5%	4%	4%	5%
San Pablo Bay [(c)]	62.8	13%	18%	15%	10%	9%	13%
Central Bay	167	3%	3%	1%	1%	1%	2%
South Bay	262	5%	6%	9%	5%	6%	6%
Lower South Bay	236	8%	9%	9%	7%	8%	8%
Total	**827**	**5%**	**6%**	**7%**	**5%**	**5%**	**6%**

a. October 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-24. Recycled Water: Percent of Dry Season[(a)] Average TIN Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	6%	7%	8%	8%	5%	6%	7%
San Pablo Bay [(c)]	62.8	18%	26%	31%	26%	21%	18%	23%
Central Bay	167	3%	3%	3%	1%	1%	2%	2%
South Bay	262	10%	7%	8%	14%	8%	8%	9%
Lower South Bay	236	12%	13%	14%	13%	11%	11%	12%
Total	**827**	**8%**	**8%**	**9%**	**10%**	**7%**	**7%**	**8%**

a. May 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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D.5 Total Phosphorus

The annual average (i.e., twelve months from October 1 to September 30) and dry season average monthly (i.e., May 1 through September 30) recycled water TP loads are provided in Table D-25 and Table D-26, respectively. The annual average and dry season average monthly recycled water TP loads for each subembayment are provided in Table D-27 and Table D-28, respectively. An additional set of tables is provided in Table D-29 and Table D-30 that offers the percent reduction of flow/load diverted from San Francisco Bay from recycled water.

Table D-25. Recycled Water: Annual Average[a] Total P Loads Diverted from San Francisco Bay (kg P/day)[b]

Discharger	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024[c]	Average
American Canyon	7	6	6	6	7.0	6.4
Benicia[d]	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0
Central San	5	8	7	6	5.6	6.3
CMSA	1	1	0	0	0.41	0.48
Port Costa[d]	0	0	0	0	0	0
Delta Diablo	2	2	1	2	1.4	1.7
EBDA	42	49	53	46	46	47
EBMUD	13	14	4	1	3.1	7.0
FSSD	15	14	10	3	4.7	9.3
Las Gallinas[e]	7	10	12	8	7.6	8.9
Paradise Cove[d]	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0
Napa[e]	32	27	18	20	19	23
Novato	1	1	2	8	5.2	3.4
Palo Alto	11	12	14	11	10	12
Petaluma[e]	7	5	12	12	9.3	9.1
Pinole[d]	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0
SFO Airport	0	0	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0
San Jose	29	22	17	14	29	22
San Mateo[d]	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0
SASM	1	1	1	1	0.31	0.86
SVCW	13	12	11	8	9.0	11
Sonoma Valley[e]	23	33	31	22	4.3	23
South SF[d]	0	0	0	0	0	0
Sunnyvale	15	18	8	0	0	8.2
Treasure Island[d]	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0
West County	44	38	30	11	13	27
Total [f]	**270**	**270**	**240**	**180**	**170**	**230**

a. October 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2023/2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2023/2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-26. Recycled Water: Dry Season[a] Total P Loads Diverted from San Francisco Bay (kg P/d)[b]

Discharger	2019	2020	2021	2022	2023	2024[c]	Average
American Canyon	6	11	11	9	10	9.2	9.4
Benicia[d]	0	0	0	0	0	0	0
Burlingame[d]	0	0	0	0	0	0	0
Central San	7	6	10	9	10	7.5	8.3
CMSA	0	1	1	1	0	0.60	0.60
Port Costa[d]	0	0	0	0	0	0	0
Delta Diablo	2	2	2	1	2	1.4	1.7
EBDA	74	50	50	77	61	59	62
EBMUD	17	14	17	5	3	5.3	10
FSSD	23	30	27	18	6	9.8	19
Las Gallinas[e]	9	12	21	20	12	11	14
Paradise Cove[d]	0	0	0	0	0	0	0
Tiburon[d]	0	0	0	0	0	0	0
Millbrae[d]	0	0	0	0	0	0	0
Mt. View[d]	0	0	0	0	0	0	0
Napa[e]	36	49	44	33	40	36	40
Novato	1	1	2	2	13	8.3	4.6
Palo Alto	19	18	20	25	21	18	20
Petaluma[e]	10	13	8	18	21	16	14
Pinole[d]	0	0	0	0	0	0	0
Rodeo[d]	0	0	0	0	0	0	0
SFO Airport	0	0	0	0	0	0	0
SFPUC Southeast[d]	0	0	0	0	0	0	0
San Jose	28	44	23	13	13	35	26
San Mateo[d]	0	0	0	0	0	0	0
SMCSD[d]	0	0	0	0	0	0	0
SASM	1	1	1	1	1	0.37	0.90
SVCW	19	15	21	18	16	16	18
Sonoma Valley[e]	9	35	49	35	39	9.4	29
South SF[d]	0	0	0	0	0	0	0
Sunnyvale	26	24	18	10	0	0	13
Treasure Island[d]	0	0	0	0	0	0	0
Vallejo[d]	0	0	0	0	0	0	0
West County	36	46	22	22	9	15	25
Total [f]	**320**	**370**	**350**	**310**	**280**	**260**	**320**

a. May 1 through September 30.

b. Data are presented in detail and summarized for each plant in Attachment 1.

c. Starting with 2024, values and the average are presented with two significant figures for consistency and flow and load diversion factors developed based on the calendar year recycled water data and calendar year flow diversion factors per end use (or provided by the Discharger) are used with the monthly data to develop annual average and dry season average flow and load diversions (except for Delta Diablo, which has had its flow and load diversion factors applied since 2019, and except for CMSA, which has had its historical values revised). Also starting in 2024, months with missing nutrient concentrations are assigned the average concentration for that calendar year.

d. This Discharger does not produce recycled water.

e. No discharge during a portion or all the dry season months except when necessary due to wet conditions.

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

Table D-27. Recycled Water: Annual Average[a] Total P Loads by Subembayment, Flow (kg P/d)

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	18	16	11	5	12	12
San Pablo Bay[b]	62.8	78	83	81	77	52	74
Central Bay	167	58	52	34	13	16	35
South Bay	262	60	69	72	61	55	63
Lower South Bay	236	55	53	38	25	39	42
Total	**827**	**270**	**270**	**240**	**180**	**170**	**230**

a. October 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-28. Recycled Water: Dry Season[a] Average Total P Loads by Subembayment, Flow (kg P/d)

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	32	39	39	28	18	19	29
San Pablo Bay[b]	62.8	72	120	130	120	140	90	110
Central Bay	167	54	62	41	26	13	21	36
South Bay	262	93	66	71	95	77	75	80
Lower South Bay	236	73	85	62	48	34	52	59
Total	**827**	**320**	**370**	**350**	**310**	**280**	**260**	**320**

a. May 1 through September 30.

b. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-29. Recycled Water: Percent of Annual Average[(a)] Total P Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	Average
Suisun Bay	100	4%	4%	3%	1%	4%	3%
San Pablo Bay[(c)]	62.8	22%	28%	23%	19%	14%	21%
Central Bay	167	5%	5%	4%	1%	1%	3%
South Bay	262	4%	5%	5%	5%	4%	5%
Lower South Bay	236	7%	7%	5%	4%	5%	6%
Total	**827**	**6%**	**7%**	**6%**	**5%**	**4%**	**6%**

a. October 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

Table D-30. Recycled Water: Percent of Dry Season[(a)] Average Total P Loads Diverted from each Subembayment[(b)]

Subembayment	Permitted Capacity	2019	2020	2021	2022	2023	2024	Average
Suisun Bay	100	7%	10%	10%	8%	5%	6%	8%
San Pablo Bay[(c)]	62.8	28%	39%	42%	38%	41%	31%	37%
Central Bay	167	4%	5%	3%	3%	1%	2%	3%
South Bay	262	6%	4%	5%	7%	5%	6%	6%
Lower South Bay	236	9%	11%	9%	8%	6%	8%	9%
Total	**827**	**7%**	**9%**	**9%**	**9%**	**7%**	**7%**	**8%**

a. May 1 through September 30.

b. The percent diverted is based on the recycled water value divided by the sum of recycled water value and discharge value.

c. Several of the plants that discharge to San Pablo Bay have no discharge during a portion or all the dry season months, except when necessary due to wet conditions.

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Attachment 1

Individual Discharger Evaluations

Bay Area Clean Water Agencies

Nutrients Watershed Permit

NPDES Permit CA0038873

Order R2-2024-0013

April 1, 2026

BACWA
BAY AREA
CLEAN WATER
AGENCIES

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1 City of American Canyon

American Canyon discharges to San Pablo Bay and serves approximately 5,562 connections. The plant is rated for an ADWF capacity of 2.5 mgd and a peak permitted wet weather flow of 5.0 mgd. This past year's dry season had a flow of approximately 1.0 mgd. The plant is a nitrifying and denitrifying MBR plant.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge:
  - NOx is the primary form of discharged nitrogen, regardless of season. This is expected since this plant fully nitrifies and converts ammonia to NOx.
  - Total phosphorus concentrations range from less than 1 mg P/L to 11 mg P/L.
- Recycled Water:
  - Recycled water uses have historically included landscape irrigation, industrial application, agricultural irrigation, and other non-potable uses within the plant (e.g., plumbing). A notable change for 2024 is that agricultural irrigation appears to have been discontinued as a recycled water use.
  - Based on Table 1-3 through Table 1-5, the plant diverted <1 kg ammonia-N/d, 12 kg TIN/d, and 7 kg P/d away from the San Francisco Bay in 2024.

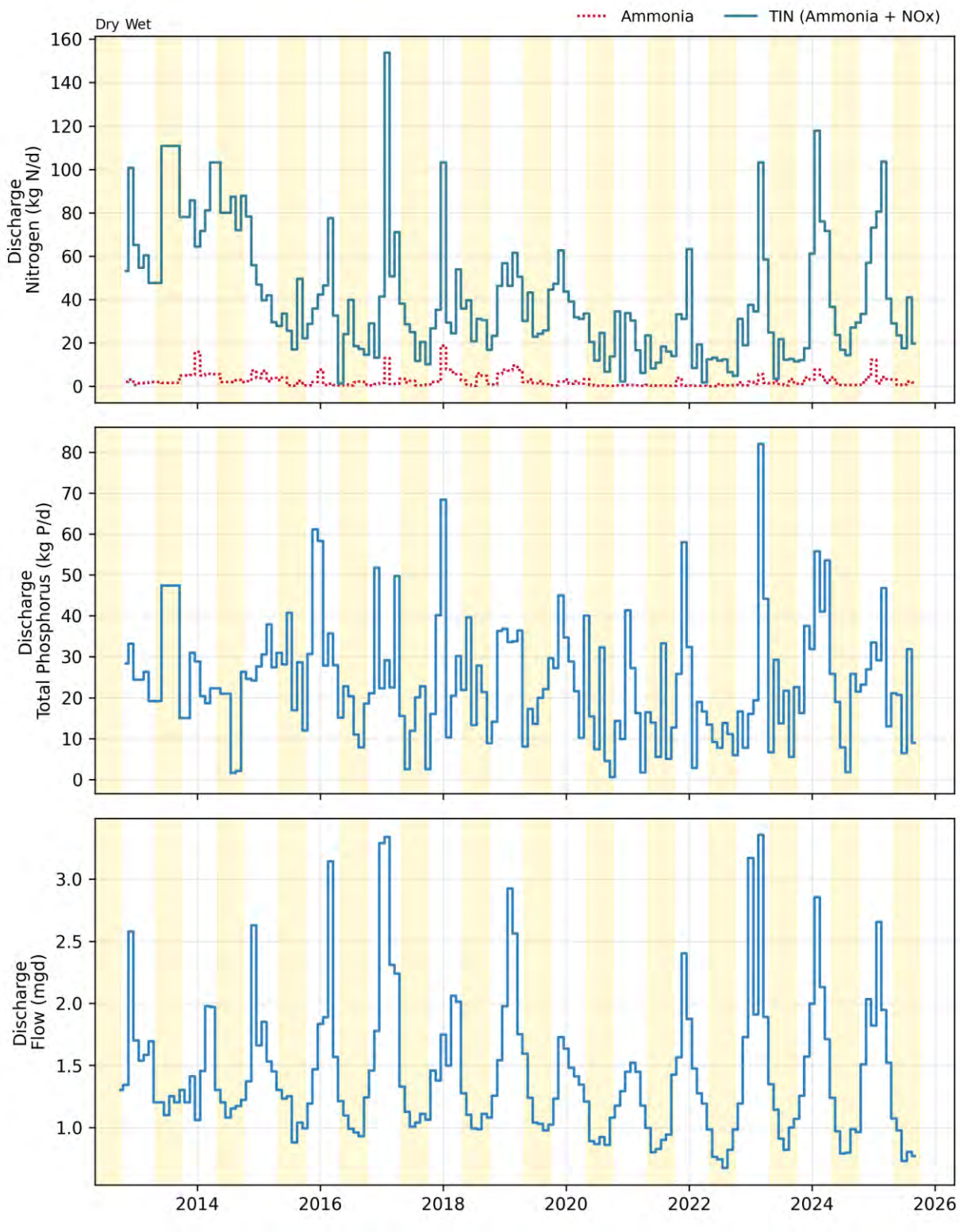


Figure 1-1. Discharge: American Canyon Monthly Flows and Loads

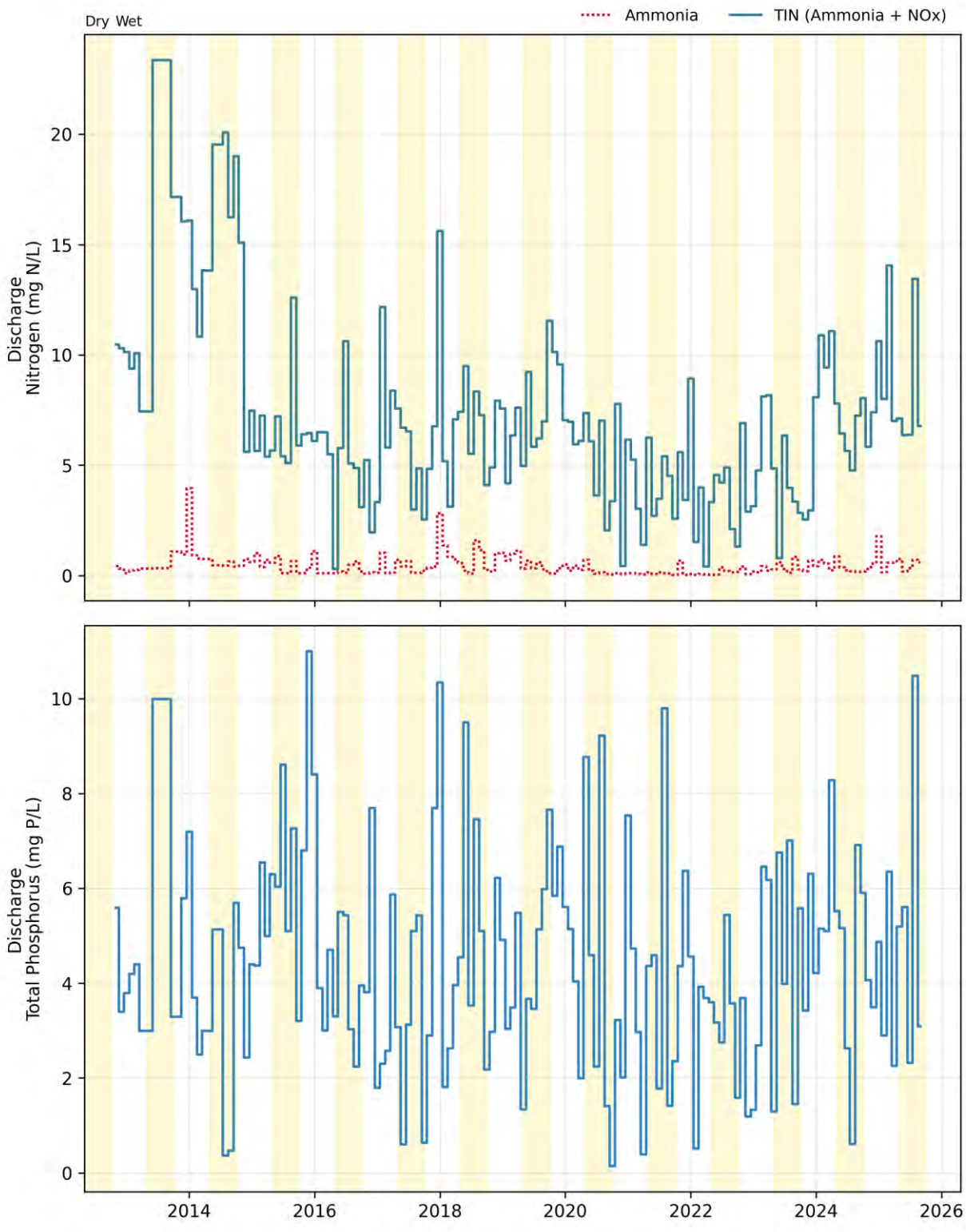


Figure 1-2. Discharge: American Canyon Monthly Nutrient Concentrations

Table 1-1. Discharge: American Canyon Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	1.30	--	--	--	--
Nov-12	1.34	2.13	51.0	53.1	28.4
Dec-12	2.58	3.12	97.5	101	33.2
Jan-13	1.70	0.643	64.6	65.2	24.4
Feb-13	1.54	1.40	53.2	54.6	24.4
Mar-13	1.59	1.50	59.0	60.5	26.4
Apr-13	1.69	2.05	45.7	47.7	19.2
May-13	1.20	--	--	--	--
Jun-13	1.20	--	--	--	--
Jul-13	1.10	--	--	--	--
Aug-13	1.25	1.56	109	111	47.4
Sep-13	1.20	--	--	--	--
Oct-13	1.30	--	--	--	--
Nov-13	1.20	4.91	73.2	78.1	15.0
Dec-13	1.41	5.12	80.5	85.6	30.9
Jan-14	1.06	15.8	48.6	64.4	28.8
Feb-14	1.46	5.06	66.4	71.5	20.3
Mar-14	1.98	5.75	75.3	81.0	18.7
Apr-14	1.97	5.58	97.5	103	22.3
May-14	1.30	--	--	--	--
Jun-14	1.20	--	--	--	--
Jul-14	1.08	1.88	78.0	79.9	21.0
Aug-14	1.15	1.91	85.5	87.4	1.60
Sep-14	1.17	2.83	69.1	71.9	2.10
Oct-14	1.22	1.89	85.9	87.8	26.3
Nov-14	1.37	2.33	75.9	78.2	24.6
Dec-14	2.63	7.36	48.4	55.8	24.2
Jan-15	1.66	3.83	43.1	46.9	27.6
Feb-15	1.85	7.13	32.4	39.5	30.6
Mar-15	1.53	2.26	39.7	42.0	37.9
Apr-15	1.45	3.89	25.6	29.5	27.4
May-15	1.30	2.85	25.0	27.9	31.0
Jun-15	1.23	4.04	29.5	33.5	28.1
Jul-15	1.25	0.474	25.1	25.6	40.8
Aug-15	0.879	0.333	16.6	17.0	17.0
Sep-15	1.04	2.59	47.0	49.6	28.6
Oct-15	0.993	0.376	21.8	22.2	12.0

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	1.19	0.451	28.4	28.9	30.7
Dec-15	1.47	1.94	33.9	35.8	61.1
Jan-16	1.83	7.63	34.7	42.3	58.3
Feb-16	1.89	0.714	45.7	46.4	27.9
Mar-16	3.15	1.19	76.2	77.4	35.7
Apr-16	1.57	0.593	32.0	32.6	27.9
May-16	1.21	0.458	0.916	1.37	15.1
Jun-16	1.10	0.746	23.2	24.0	22.8
Jul-16	0.989	0.462	39.3	39.7	20.3
Aug-16	0.958	1.74	16.7	18.4	11.0
Sep-16	0.927	2.22	14.9	17.1	7.85
Oct-16	1.24	0.825	13.7	14.6	18.6
Nov-16	1.46	0.438	28.5	28.9	21.0
Dec-16	1.78	0.941	12.2	13.2	51.7
Jan-17	3.29	1.59	39.8	41.4	22.3
Feb-17	3.34	13.1	141	154	29.1
Mar-17	2.31	0.938	49.7	50.6	22.5
Apr-17	2.24	1.18	69.9	71.1	49.7
May-17	1.33	3.57	34.5	38.1	15.5
Jun-17	1.12	1.70	26.8	28.5	2.56
Jul-17	1.01	2.45	22.4	24.9	11.9
Aug-17	1.04	0.488	11.2	11.7	20.0
Sep-17	1.11	0.484	19.9	20.3	22.8
Oct-17	1.06	0.846	9.31	10.2	2.54
Nov-17	1.46	1.94	24.7	26.6	16.0
Dec-17	1.38	2.17	33.1	35.3	40.2
Jan-18	1.75	18.6	84.5	103	68.4
Feb-18	1.50	7.71	21.6	29.3	10.3
Mar-18	2.06	6.59	17.8	24.4	20.4
Apr-18	2.01	5.49	48.5	54.0	30.2
May-18	1.27	2.68	33.1	35.8	21.9
Jun-18	1.10	0.881	38.8	39.7	39.7
Jul-18	0.993	0.324	20.4	20.7	13.3
Aug-18	0.986	5.98	25.2	32.5	27.8
Sep-18	1.11	4.76	25.8	30.5	21.4
Oct-18	1.08	1.02	15.8	16.8	8.90
Nov-18	1.26	0.832	22.5	23.3	14.1
Dec-18	1.54	5.85	40.3	46.2	36.3

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	1.98	7.66	49.0	56.7	36.8
Feb-19	2.93	7.35	38.9	46.2	33.6
Mar-19	2.56	9.65	51.9	61.5	33.8
Apr-19	1.75	7.42	43.0	50.4	36.4
May-19	1.59	1.91	28.1	30.0	8.10
Jun-19	1.24	3.13	40.1	43.3	17.2
Jul-19	1.04	1.29	21.6	22.9	13.6
Aug-19	1.03	2.31	21.9	24.2	20.0
Sep-19	0.975	1.02	24.8	25.8	22.1
Oct-19	1.02	0.442	44.2	44.6	29.6
Nov-19	1.23	0.425	46.8	47.2	27.2
Dec-19	1.73	2.11	60.5	62.6	45.0
Jan-20	1.64	3.16	40.4	43.6	34.7
Feb-20	1.48	1.20	37.8	39.0	28.8
Mar-20	1.41	2.40	29.4	31.8	21.6
Apr-20	1.35	1.27	29.8	31.0	10.1
May-20	1.21	3.22	30.4	33.6	40.1
Jun-20	0.890	0.718	19.8	20.5	15.4
Jul-20	0.865	0.305	11.6	11.9	7.32
Aug-20	0.923	0.511	24.0	24.5	32.2
Sep-20	0.858	0.190	6.46	6.65	4.56
Oct-20	1.08	0.199	13.6	13.8	0.598
Nov-20	1.17	0.494	34.1	34.5	14.3
Dec-20	1.29	0.351	1.76	2.11	9.83
Jan-21	1.45	0.582	33.2	33.7	41.3
Feb-21	1.52	0.605	29.7	30.3	27.2
Mar-21	1.45	0.361	16.2	16.6	16.2
Apr-21	1.18	0.220	5.93	6.15	1.76
May-21	0.994	0.547	23.0	23.5	16.4
Jun-21	0.798	0.190	7.98	8.17	13.9
Jul-21	0.827	0.463	10.4	10.9	5.56
Aug-21	0.898	0.374	18.0	18.3	33.3
Sep-21	0.941	0.298	15.8	16.1	5.06
Oct-21	1.42	0.176	13.7	13.9	12.7
Nov-21	1.56	3.93	29.2	33.1	25.8
Dec-21	2.40	0.308	30.8	31.1	58.0
Jan-22	1.87	0.462	62.8	63.3	32.3
Feb-22	1.47	0.159	8.27	8.43	2.86

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	1.27	0.296	18.9	19.2	18.9
Apr-22	1.19	0.203	1.62	1.83	16.6
May-22	0.982	0.146	12.2	12.4	13.4
Jun-22	0.764	0.148	13.0	13.1	9.15
Jul-22	0.743	1.03	10.8	11.9	7.73
Aug-22	0.671	0.503	11.9	12.4	13.8
Sep-22	0.820	0.444	6.07	6.51	11.1
Oct-22	0.983	0.600	4.30	4.90	5.90
Nov-22	1.19	1.80	29.3	31.1	16.6
Dec-22	1.73	0.500	18.4	18.9	7.80
Jan-23	3.17	2.20	35.4	37.6	16.0
Feb-23	1.91	1.00	33.4	34.4	19.4
Mar-23	3.36	5.50	97.7	103	82.0
Apr-23	1.89	1.60	56.8	58.4	44.2
May-23	1.35	1.40	23.4	24.8	6.60
Jun-23	1.14	2.60	0.800	3.40	29.2
Jul-23	0.908	1.00	20.8	21.8	13.7
Aug-23	0.818	0.400	11.9	12.3	21.7
Sep-23	1.00	3.20	9.50	12.7	5.50
Oct-23	1.07	1.15	10.3	11.5	22.6
Nov-23	1.25	0.975	11.1	12.0	16.3
Dec-23	1.57	4.00	13.5	17.5	37.5
Jan-24	2.00	3.18	57.9	61.1	31.8
Feb-24	2.86	7.60	110	118	55.7
Mar-24	2.13	4.37	71.7	76.0	41.1
Apr-24	1.71	1.51	70.2	71.7	53.6
May-24	1.24	4.05	32.4	36.5	25.8
Jun-24	0.968	1.37	22.2	23.6	18.9
Jul-24	0.788	0.712	16.1	16.8	7.83
Aug-24	0.794	0.614	13.7	14.3	1.84
Sep-24	0.985	0.629	26.4	27.0	25.8
Oct-24	0.962	0.651	28.6	29.3	21.5
Nov-24	1.51	1.69	31.6	33.3	23.2
Dec-24	2.03	4.21	52.7	56.9	26.9
Jan-25	1.82	12.3	60.9	73.2	33.5
Feb-25	2.65	1.39	79.1	80.5	29.1
Mar-25	1.95	4.26	99.3	104	46.8
Apr-25	1.52	3.36	37.0	40.4	13.0

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	1.07	3.06	25.8	28.9	21.1
Jun-25	0.975	0.702	22.8	23.5	20.7
Jul-25	0.728	0.889	16.7	17.6	6.40
Aug-25	0.803	2.15	38.7	40.9	31.8
Sep-25	0.769	1.75	18.0	19.7	8.99
Dry Season Average	**1.03**	**1.54**	**25.3**	**26.9**	**17.8**
Wet Season Average	**1.71**	**3.15**	**43.7**	**46.9**	**27.7**
Annual Average	**1.43**	**2.50**	**36.4**	**38.9**	**23.7**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 1-2. Recycled Water: American Canyon Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet/yr (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	211 (0.19)	0 (0)	58 (0.05)	2 (≤0.01)	0 (0)	15 (≤0.01)	286 (0.25)
2020	0 (0)	251 (0.22)	0 (0)	123 (0.11)	16 (≤0.01)	0 (0)	9 (≤0.01)	399 (0.35)
2021	0 (0)	316 (0.28)	0 (0)	103 (0.09)	17 (≤0.01)	0 (0)	32 (0.03)	468 (0.41)
2022	0 (0)	279 (0.25)	0 (0)	97 (0.09)	15 (≤0.01)	0 (0)	45 (0.04)	436 (0.39)
2023	0 (0)	314 (0.28)	0 (0)	119 (0.11)	5 (≤0.01)	0 (0)	21 (0.02)	459 (0.41)
2024	0 (0)	312 (0.28)	0 (0)	122 (0.11)	0 (0)	0 (0)	20 (0.02)	454 (0.41)
Average	**0 (0)**	**278 (0.25)**	**0 (0)**	**102 (0.09)**	**10 (≤0.01)**	**0 (0)**	**24 (0.02)**	**414 (0.37)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 1-3. Recycled Water: American Canyon Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	<1	<1	0	<1	<1
2020	0	<1	0	<1	<1	0	<1	<1
2021	0	<1	0	<1	<1	0	<1	<1
2022	0	<1	0	<1	<1	0	<1	<1
2023	0	<1	0	<1	<1	0	<1	<1
2024	0	<1	0	<1	0	0	<1	<1
Average	**0**	**<1**	**0**	**<1**	**<1**	**0**	**<1**	**<1**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 1-4. Recycled Water: American Canyon Yearly Recycled Water TIN Load Diverted from the Bay

Year**	TIN Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	5	0	1	<1	0	<1	7
2020	0	5	0	2	<1	0	<1	7
2021	0	4	0	1	<1	0	<1	6
2022	0	4	0	1	<1	0	<1	6
2023	0	6	0	2	<1	0	<1	8
2024	0	8	0	3	0	0	1	12
Average	**0**	**5**	**0**	**2**	**<1**	**0**	**<1**	**8**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 1-5. Recycled Water: American Canyon Yearly Recycled Water Total Phosphorus Load Diverted from the Bay

Year**	Total Phosphorus Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	--	3	--	1	<1	--	<1	4
2020	--	3	--	2	<1	--	<1	5
2021	--	5	--	2	<1	--	1	7
2022	--	3	--	1	<1	--	<1	4
2023	--	4	--	2	<1	--	<1	6
2024	0	5	0	2	0	0	0	7
Average	**0**	**4**	**0**	**2**	**<1**	**0**	**<1**	**6**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

2 City of Benicia

Benicia discharges to San Pablo Bay and it serves approximately 9,306 service connections. The plant has a permitted ADWF capacity of 4.5 mgd and 11 mgd wet weather design flow capacity. It has a current dry season flow of approximately 1.6 mgd. The plant performs secondary treatment using a combination of activated sludge and rotating biological contractors.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge
  - Wet season loads are greater and more variable year to year than the dry season loads.
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This is expected since this plant does not nitrify.
  - The ammonia discharge load for September 2025 is the lowest recorded for Benicia.
  - Ammonia concentrations vary in the range of 8 to 46 mg N/L throughout the year.
  - Total phosphorus concentrations range from less than 1 mg P/L to over 10 mg P/L.
- Recycled Water: No recycled water was produced or distributed this past year.

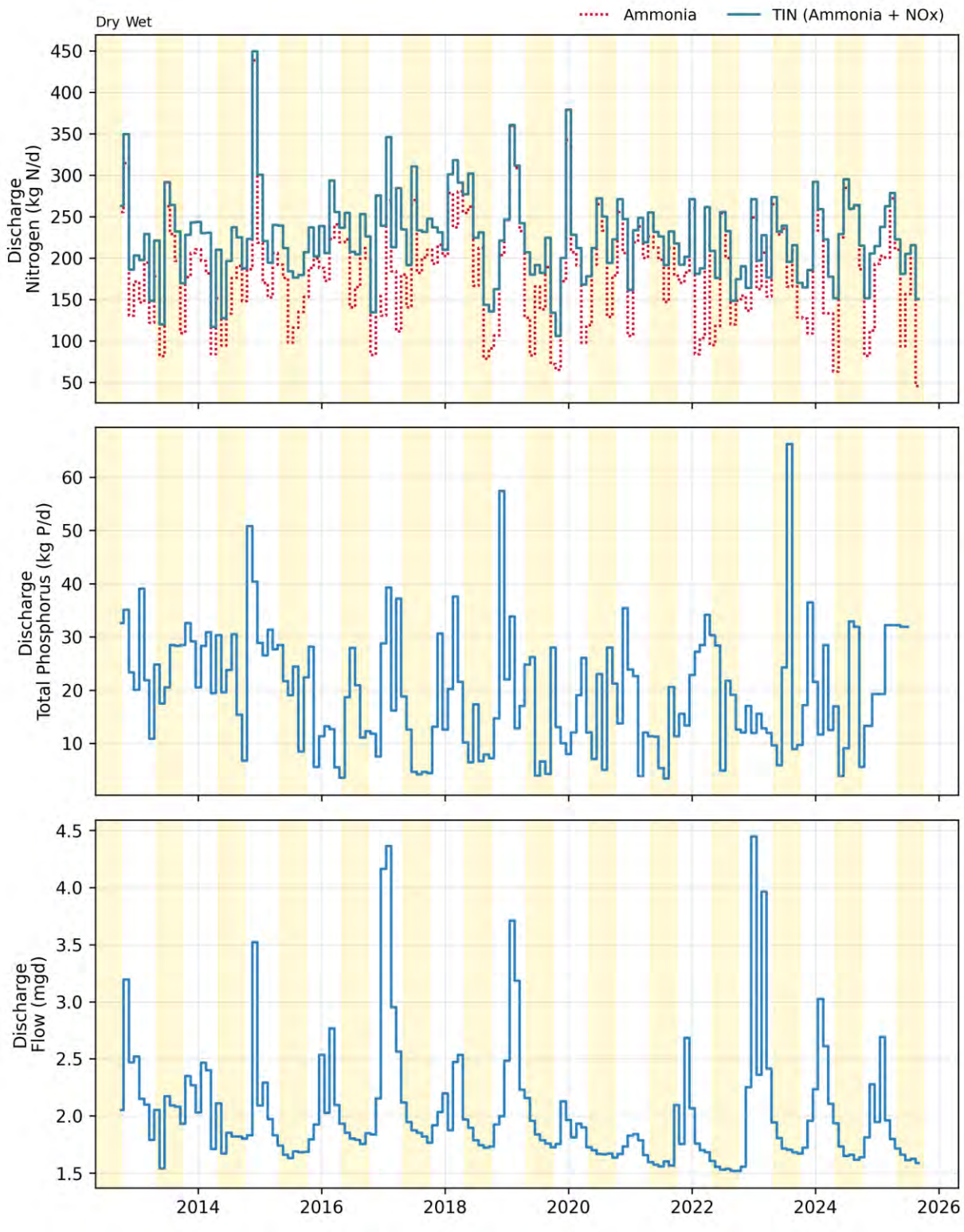


Figure 2-1. Discharge: Benicia Monthly Flows and Loads

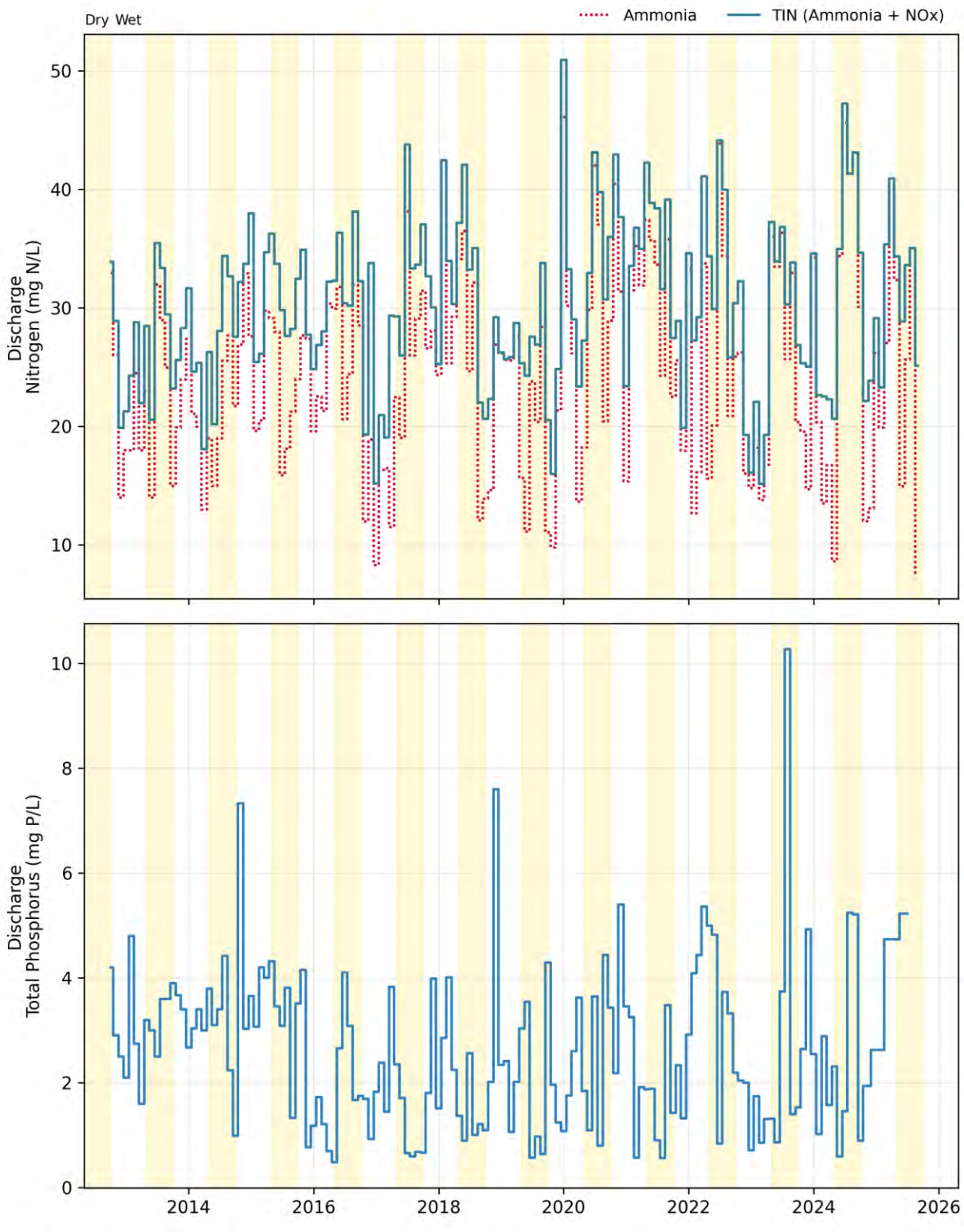


Figure 2-2. Discharge: Benicia Monthly Concentrations

Table 2-1. Discharge: Benicia Monthly Flows and Loads*

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	2.05	256	7.13	263	32.5
Nov-12	3.20	314	34.9	349	35.1
Dec-12	2.47	131	55.1	186	23.3
Jan-13	2.52	171	31.3	203	20.0
Feb-13	2.15	146	51.2	197	39.0
Mar-13	2.10	195	34.3	229	21.8
Apr-13	1.79	122	26.9	149	10.8
May-13	2.05	178	42.5	221	24.8
Jun-13	1.54	81.5	38.4	120	17.5
Jul-13	2.17	262	28.8	291	20.5
Aug-13	2.09	229	34.8	264	28.4
Sep-13	2.08	197	35.3	232	28.3
Oct-13	1.93	109	59.8	169	28.5
Nov-13	2.35	177	51.0	228	32.6
Dec-13	2.27	206	37.2	243	29.2
Jan-14	2.03	210	32.8	243	20.5
Feb-14	2.47	196	33.4	230	28.3
Mar-14	2.40	181	49.0	230	30.8
Apr-14	1.71	84.0	32.9	117	19.4
May-14	2.11	152	58.2	210	30.3
Jun-14	1.67	94.7	32.8	128	19.6
Jul-14	1.85	133	63.6	197	23.8
Aug-14	1.82	176	61.0	237	30.5
Sep-14	1.82	191	34.5	225	15.4
Oct-14	1.80	148	39.7	188	6.73
Nov-14	1.83	186	36.6	223	50.8
Dec-14	3.52	438	10.9	449	40.3
Jan-15	2.09	218	82.1	300	28.9
Feb-15	2.29	170	50.2	220	26.5
Mar-15	1.97	153	42.0	195	31.3
Apr-15	1.83	206	34.1	240	27.7
May-15	1.74	192	47.0	239	28.4
Jun-15	1.66	176	35.9	212	21.7
Jul-15	1.63	98.1	85.9	184	19.0
Aug-15	1.69	116	60.9	177	24.4
Sep-15	1.68	135	44.4	179	8.41

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	1.68	153	54.0	207	22.3
Nov-15	1.79	188	49.1	237	28.2
Dec-15	1.92	199	2.69	202	5.58
Jan-16	2.54	188	50.5	238	11.3
Feb-16	2.03	173	33.3	206	13.2
Mar-16	2.77	223	70.4	293	12.7
Apr-16	2.09	241	14.7	255	5.48
May-16	1.93	219	17.3	236	3.52
Jun-16	1.85	223	32.2	255	18.6
Jul-16	1.80	141	66.8	207	27.9
Aug-16	1.79	165	39.1	204	20.9
Sep-16	1.75	212	41.0	253	11.1
Oct-16	1.85	199	26.4	226	12.2
Nov-16	1.84	83.1	51.3	134	11.8
Dec-16	2.15	154	122	275	7.53
Jan-17	4.16	131	109	239	28.8
Feb-17	4.36	270	76.0	346	39.2
Mar-17	2.95	184	28.8	213	16.1
Apr-17	2.56	111	173	285	37.1
May-17	2.12	180	54.8	235	18.8
Jun-17	1.95	140	51.4	192	12.5
Jul-17	1.87	270	40.1	310	4.64
Aug-17	1.85	182	51.5	234	4.13
Sep-17	1.82	200	31.2	232	4.65
Oct-17	1.76	210	37.3	247	4.40
Nov-17	1.92	193	44.0	237	13.1
Dec-17	2.03	216	15.3	231	30.6
Jan-18	2.20	202	7.55	210	12.5
Feb-18	1.87	279	22.3	301	20.2
Mar-18	2.47	237	81.0	318	37.5
Apr-18	2.53	280	10.3	291	21.5
May-18	1.97	254	22.5	277	10.2
Jun-18	1.90	262	40.4	302	6.41
Jul-18	1.79	167	58.0	224	17.3
Aug-18	1.74	212	19.2	231	6.62
Sep-18	1.72	78.6	64.8	143	7.86
Oct-18	1.73	91.1	44.3	135	7.16
Nov-18	1.93	107	56.0	163	14.7

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-18	2.00	203	17.4	221	57.4
Jan-19	2.48	246	0.615	246	22.0
Feb-19	3.71	360	0.763	360	33.8
Mar-19	3.19	308	3.08	312	12.8
Apr-19	2.23	232	9.83	242	17.0
May-19	2.16	128	79.1	207	24.8
Jun-19	1.96	82.4	97.4	180	26.2
Jul-19	1.84	165	26.2	192	3.93
Aug-19	1.79	138	44.1	182	6.54
Sep-19	1.76	189	35.8	225	4.23
Oct-19	1.72	72.0	62.0	134	28.0
Nov-19	1.75	65.0	41.0	106	13.0
Dec-19	2.13	172	28.0	200	10.0
Jan-20	1.97	343	36.0	379	8.00
Feb-20	1.81	207	21.0	228	12.0
Mar-20	1.93	191	21.0	212	19.0
Apr-20	1.90	98.0	70.0	168	26.0
May-20	1.73	119	59.0	178	12.0
Jun-20	1.70	192	20.0	212	7.00
Jul-20	1.67	265	7.00	272	23.0
Aug-20	1.66	233	17.0	250	5.00
Sep-20	1.67	129	65.0	194	28.0
Oct-20	1.63	179	43.7	225	21.2
Nov-20	1.67	255	15.7	268	13.8
Dec-20	1.73	206	41.2	245	35.4
Jan-21	1.83	106	55.6	159	23.8
Feb-21	1.84	219	14.4	233	22.6
Mar-21	1.79	238	10.5	252	3.85
Apr-21	1.66	200	19.3	220	12.0
May-21	1.59	226	29.1	256	11.3
Jun-21	1.57	213	18.9	230	11.2
Jul-21	1.56	198	28.0	227	5.30
Aug-21	1.60	147	44.1	190	3.37
Sep-21	1.57	212	20.0	230	20.6
Oct-21	2.09	178	39.2	217	11.3
Nov-21	1.76	170	22.1	192	15.5
Dec-21	2.68	182	19.4	202	13.4
Jan-22	2.07	260	11.0	271	22.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-22	1.76	84.1	97.1	181	27.2
Mar-22	1.70	104	84.1	188	28.5
Apr-22	1.68	215	46.8	262	34.1
May-22	1.60	94.8	114	209	30.3
Jun-22	1.55	118	57.9	176	28.3
Jul-22	1.53	254	1.54	255	4.84
Aug-22	1.54	200	32.6	233	21.7
Sep-22	1.52	120	28.3	148	19.1
Oct-22	1.52	149	25.7	171	12.6
Nov-22	1.55	154	35.4	189	12.0
Dec-22	2.25	136	27.9	164	17.0
Jan-23	4.45	249	21.9	269	11.9
Feb-23	2.36	162	34.7	199	15.5
Mar-23	3.96	207	20.7	226	12.8
Apr-23	2.42	153	23.0	179	11.9
May-23	1.94	265	8.83	273	9.63
Jun-23	1.80	229	3.19	229	5.89
Jul-23	1.71	236	3.14	236	24.2
Aug-23	1.70	166	29.8	199	66.2
Sep-23	1.68	210	5.47	216	8.90
Oct-23	1.67	129	41.2	170	9.65
Nov-23	1.72	127	37.5	165	17.2
Dec-23	1.96	109	76.8	186	36.5
Jan-24	2.23	289	2.89	292	21.5
Feb-24	3.03	233	26.0	259	11.7
Mar-24	2.61	133	88.9	222	28.5
Apr-24	2.10	133	44.1	177	12.5
May-24	1.94	63.1	88.1	151	16.9
Jun-24	1.73	225	3.93	229	3.86
Jul-24	1.65	285	10.3	295	9.08
Aug-24	1.66	259	0.322	259	32.9
Sep-24	1.62	264	0.258	264	31.9
Oct-24	1.64	187	28.3	215	5.54
Nov-24	1.81	82.2	69.5	152	13.3
Dec-24	2.28	113	92.7	205	--
Jan-25	1.94	193	21.5	214	19.3
Feb-25	2.69	203	34.6	237	--
Mar-25	1.96	201	61.8	262	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-25	1.80	272	6.58	278	32.2
May-25	1.71	210	13.0	223	--
Jun-25	1.66	93.7	87.4	181	--
Jul-25	1.61	156	48.7	205	31.9
Aug-25	1.62	215	0.0777	215	--
Sep-25	1.59	45.7	105	151	--
Dry Season Average	**1.76**	**179**	**39.5**	**219**	**17.3**
Wet Season Average	**2.20**	**187**	**40.3**	**227**	**20.9**
Average Annual	**2.02**	**184**	**39.9**	**224**	**19.4**

* The City of Benicia has sampled more intensively since September 2015 than required under the Nutrient Watershed Permit. This data represents the average monthly loads during this intensive sampling period.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

3 City of Burlingame

Burlingame discharges to South Bay and it serves approximately 16,000 service connections. The plant has a permitted ADWF capacity of 5.5 mgd and a peak permitted wet weather flow of 16 mgd. It has a current dry season flow of approximately 2.2 mgd. The plant performs secondary treatment using activated sludge.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge
  - Both nitrogen and phosphorus loads increase with flow during wet weather events.
  - Wet season loads are greater and more variable year to year than the dry season loads.
  - Ammonia is typically the majority of the nitrogen species discharged, regardless of season.
  - Total phosphorus concentrations have been reliably less than 10 mg P/L in recent years.
  - Total phosphorus concentrations have stabilized over the past year compared to prior years.
- Recycled Water: No recycled water was produced or distributed this past year.

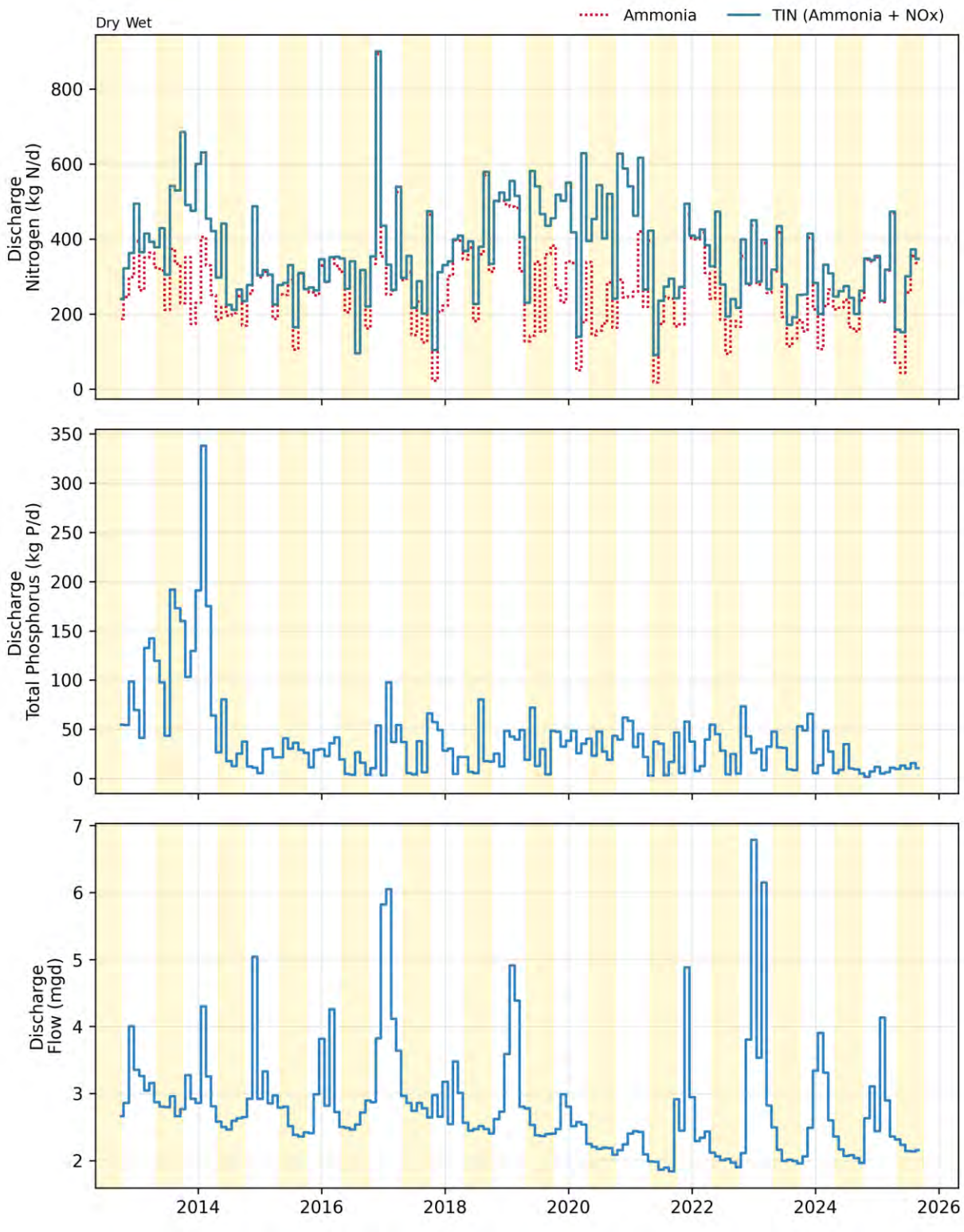


Figure 3-1. Discharge: Burlingame Monthly Flows and Loads

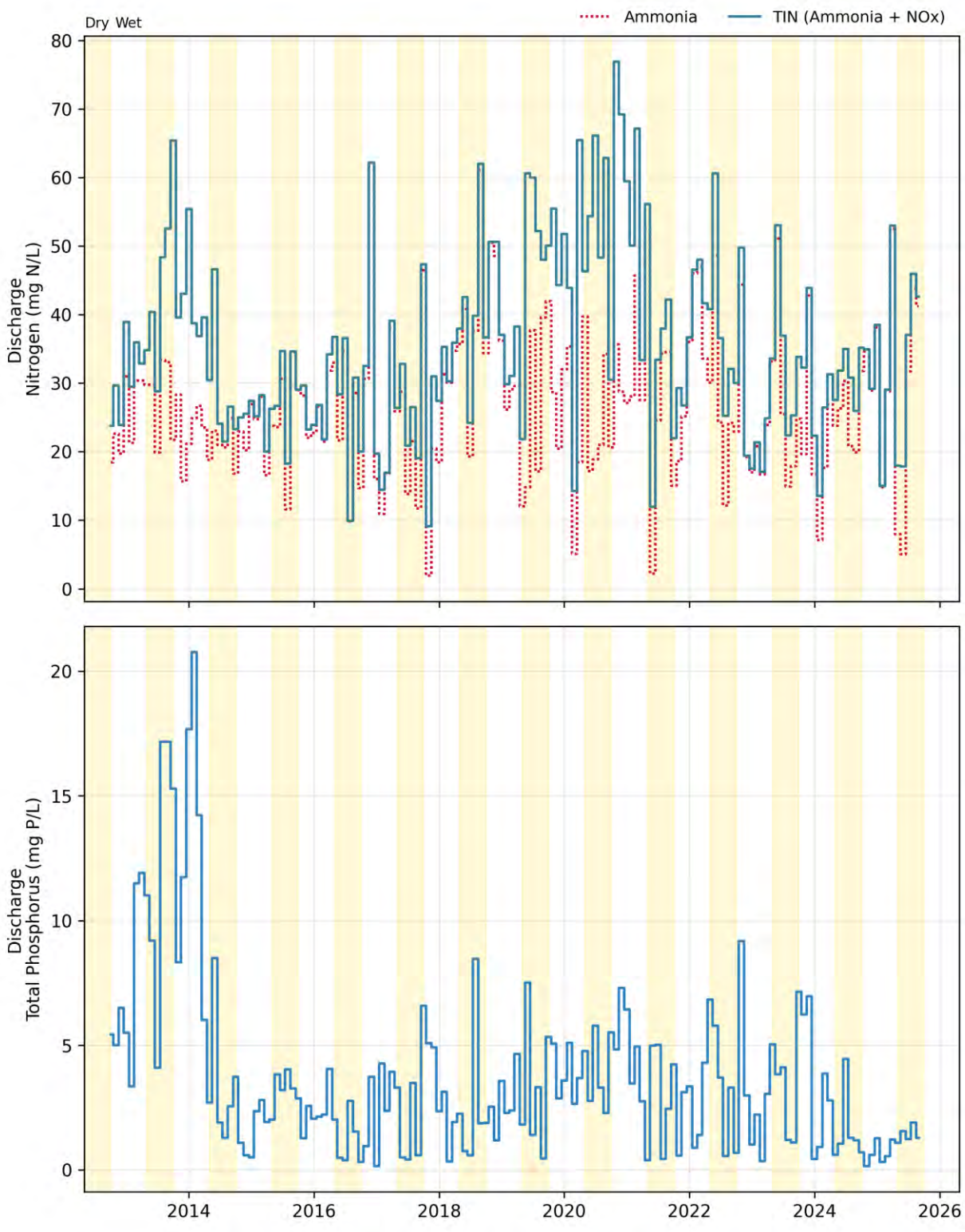


Figure 3-2. Discharge: Burlingame Monthly Concentrations

Table 3-1. Discharge: Burlingame Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	2.66	186	53.5	239	54.7
Nov-12	2.86	245	75.7	321	54.1
Dec-12	4.00	299	63.6	362	98.3
Jan-13	3.35	393	101	494	69.6
Feb-13	3.26	263	101	364	41.4
Mar-13	3.04	350	64.0	414	132
Apr-13	3.16	363	29.3	392	142
May-13	2.87	323	54.7	378	119
Jun-13	2.80	316	112	428	97.5
Jul-13	2.80	211	94.2	305	43.3
Aug-13	2.96	373	168	541	192
Sep-13	2.66	333	197	529	173
Oct-13	2.77	228	457	685	160
Nov-13	3.28	351	139	491	103
Dec-13	2.92	173	303	475	130
Jan-14	2.86	229	370	599	191
Feb-14	4.30	405	226	631	338
Mar-14	3.25	329	125	454	175
Apr-14	2.81	251	171	421	63.9
May-14	2.58	184	114	297	26.3
Jun-14	2.50	218	223	441	80.3
Jul-14	2.46	195	28.9	224	17.7
Aug-14	2.59	202	8.56	211	12.5
Sep-14	2.63	248	17.3	265	25.4
Oct-14	2.65	169	65.0	234	37.4
Nov-14	2.92	254	22.9	276	12.0
Dec-14	5.04	386	101	487	11.0
Jan-15	2.92	298	5.15	303	5.50
Feb-15	3.33	312	4.73	317	29.7
Mar-15	2.85	302	2.69	305	30.1
Apr-15	2.97	186	39.0	225	21.5
May-15	2.79	251	25.8	277	21.2
Jun-15	2.80	250	32.4	283	40.6
Jul-15	2.51	291	38.7	330	30.3
Aug-15	2.38	105	60.2	165	36.3
Sep-15	2.36	308	0.727	309	29.1
Oct-15	2.42	266	0.683	266	26.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	2.41	257	13.6	270	11.5
Dec-15	2.99	249	14.1	263	29.1
Jan-16	3.82	329	16.7	346	29.7
Feb-16	2.82	284	1.76	286	22.8
Mar-16	4.26	346	5.12	351	35.7
Apr-16	2.72	328	24.2	352	41.7
May-16	2.50	312	35.7	348	19.2
Jun-16	2.49	204	63.2	267	4.60
Jul-16	2.46	323	17.4	340	3.56
Aug-16	2.54	94.6	0.185	94.8	26.5
Sep-16	2.72	294	23.1	317	15.8
Oct-16	2.89	161	58.5	219	3.53
Nov-16	2.87	333	20.1	353	10.4
Dec-16	3.83	894	6.25	901	53.9
Jan-17	5.82	353	82.0	435	3.35
Feb-17	6.05	251	79.7	331	97.4
Mar-17	4.11	261	1.92	263	36.9
Apr-17	3.64	525	14.3	539	54.1
May-17	2.96	291	5.33	296	37.1
Jun-17	2.86	311	44.4	355	5.39
Jul-17	2.74	144	72.8	217	4.33
Aug-17	2.86	233	53.9	287	37.7
Sep-17	2.78	123	76.8	200	6.19
Oct-17	2.64	465	8.83	474	65.9
Nov-17	2.97	21.5	81.5	103	57.2
Dec-17	2.65	205	106	311	49.2
Jan-18	3.18	222	108	330	28.2
Feb-18	2.55	302	38.4	340	30.2
Mar-18	3.48	396	2.27	398	4.41
Apr-18	3.01	396	12.6	408	21.9
May-18	2.56	346	22.2	368	21.7
Jun-18	2.44	377	16.2	393	6.88
Jul-18	2.47	181	45.7	226	5.51
Aug-18	2.51	359	20.3	379	80.4
Sep-18	2.47	570	9.05	579	17.5
Oct-18	2.40	313	20.5	333	17.2
Nov-18	2.62	501	1.36	502	25.0
Dec-18	2.73	502	21.3	523	12.3

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	3.59	492	11.0	503	48.5
Feb-19	4.91	486	68.8	555	42.5
Mar-19	4.38	483	32.2	515	39.4
Apr-19	2.80	314	91.9	406	49.3
May-19	2.78	126	103	230	19.1
Jun-19	2.53	142	439	581	71.9
Jul-19	2.38	339	201	540	12.6
Aug-19	2.36	153	313	466	29.7
Sep-19	2.40	359	76.3	435	4.14
Oct-19	2.40	382	73.6	455	48.4
Nov-19	2.47	268	250	518	47.3
Dec-19	2.99	231	270	501	32.3
Jan-20	2.81	340	210	550	38.1
Feb-20	2.51	336	81.0	417	48.4
Mar-20	2.57	49.8	89.2	139	25.8
Apr-20	2.54	177	452	629	35.4
May-20	2.25	338	56.0	394	40.5
Jun-20	2.20	143	310	453	23.1
Jul-20	2.17	155	388	544	47.5
Aug-20	2.19	174	226	400	27.4
Sep-20	2.18	284	236	520	18.9
Oct-20	2.08	163	77.6	241	43.5
Nov-20	2.15	291	336	627	39.3
Dec-20	2.24	244	343	588	61.8
Jan-21	2.40	246	294	540	58.4
Feb-21	2.44	259	203	462	31.9
Mar-21	2.43	420	197	617	45.5
Apr-21	2.09	218	45.9	264	21.8
May-21	1.99	395	27.6	594	2.91
Jun-21	1.98	16.7	73.0	89.8	37.3
Jul-21	1.86	173	62.3	236	35.3
Aug-21	1.89	246	26.2	272	3.11
Sep-21	1.84	241	53.1	294	17.0
Oct-21	2.91	166	75.9**	282**	46.7
Nov-21	2.44	172	98.6	271	5.27
Dec-21	4.88	465	29.1	494	57.6
Jan-22	2.94	402	6.89	409	37.3
Feb-22	2.29	399	4.61	403	7.71

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	2.34	416	8.59	425	12.4
Apr-22	2.43	309	73.9	383	39.5
May-22	2.11	241	85.9	327	54.6
Jun-22	2.06	380	93.0**	260**	45.1
Jul-22	2.01	185	93.0**	260**	28.1
Aug-22	2.02	93.1	100	193	4.19
Sep-22	1.97	181	58.6	239	24.6
Oct-22	1.90	165	130	294	4.87
Nov-22	2.11	355	43.4	398	73.3
Dec-22	3.81	277	2.96	280	43.0
Jan-23	6.78	437	13.1	450	25.9
Feb-23	3.53	278	7.42	286	29.7
Mar-23	6.15	389	8.52	397	8.22
Apr-23	2.82	256	9.99	266	32.5
May-23	2.50	313	4.14	317	47.5
Jun-23	2.16	418	15.7	434	31.3
Jul-23	1.99	192	86.4	278	31.0
Aug-23	2.01	114	56.8	170	9.08
Sep-23	1.99	135	55.5	190	8.24
Oct-23	1.95	184	66.8	250	52.9
Nov-23	2.06	153	98.6	252	48.6
Dec-23	2.49	403	10.4	414	65.5
Jan-24	3.34	211	71.3	283	5.55
Feb-24	3.90	105	94.6	200	13.6
Mar-24	3.31	221	111	332	48.4
Apr-24	2.60	265	42.6	308	27.4
May-24	2.36	212	33.8	246	5.34
Jun-24	2.17	216	45.1	261	8.63
Jul-24	2.07	237	36.4	274	34.8
Aug-24	2.08	164	78.8	242	10.1
Sep-24	2.03	153	46.7	200	9.05
Oct-24	1.96	236	25.0	261	5.15
Nov-24	2.63	345	2.98	348	1.57
Dec-24	3.11	340	3.40	343	7.13
Jan-25	2.44	352	3.22	355	11.7
Feb-25	4.13	232	3.41	235	5.04
Mar-25	2.89	316	2.75	318	6.11
Apr-25	2.36	469	4.36	473	10.9

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	2.31	69.6	87.6	157	9.45
Jun-25	2.23	42.8	108	151	13.1
Jul-25	2.14	257	43.1	300	9.95
Aug-25	2.14	355	17.1	372	15.3
Sep-25	2.15	335	11.3	347	10.4
Dry Season Average	**2.38**	**239**	**83.5**	**322**	**31.3**
Wet Season Average	**3.10**	**306**	**81.7**	**388**	**45.7**
Annual Average	**2.80**	**278**	**82.5**	**361**	**39.7**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

** No nitrate plus nitrate and TIN samples taken during these months. In order to provide a complete dataset, the average of the months prior and post sampling for the missed months was used.

Recycled Water

No recycled water was produced or distributed this past year.

4 Central Contra Costa Sanitary District (Central San)

Central San discharges to Suisun Bay, and it serves approximately 118,000 service connections. The plant has a permitted ADWF capacity of 53.8 mgd. It has a current dry season discharge flow of approximately 30.8 mgd (2025 average dry season flow). The plant performs secondary treatment using activated sludge.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent and Load Reduction Across the Plant:
  - The average monthly flow reduction across the plant ranges from 0 to 19 percent. This reduction is attributed to recycled water, water bound with biosolids, evaporation, etc.
  - The average monthly nitrogen load reduction across the plant ranges from 12 to 60 percent. This load reduction is attributed primarily to biological assimilation in the activated sludge system, occasional nitrification (emphasis on the dry season), and load diversion with recycled water.
  - The monthly average phosphorus load reduction across the plant ranges from approximately 65 to 95 percent. This reduction is primarily attributed to biological phosphorus removal in the activated sludge system which has an anaerobic selector to improve settleability.
- Discharge:
  - Ammonia and TIN loads typically increase with flow during wet weather events.
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This would be expected since this plant is not designed to nitrify.
  - Total phosphorus concentrations are generally less than 1.6 mg P/L. This indicates the plant is reliably removing phosphorus.
- Recycled Water:
  - Based on Table 1-3, the plant has averaged 1.7 mgd of recycled water from 2019 - 2024. Recycled water uses included golf course irrigation, landscape irrigation, industrial applications, agricultural irrigation, and other non-potable uses such as a commercial residential truck fill program, sewer flushing, and a dust control/fill station.
  - Based on Table 1-4 through Table 1-6, the plant has diverted from the Bay via recycled water 175 kg ammonia-N/d, 183 kg TIN-N/d, and 6 kg P/d on average from 2019 - 2024.

Influent

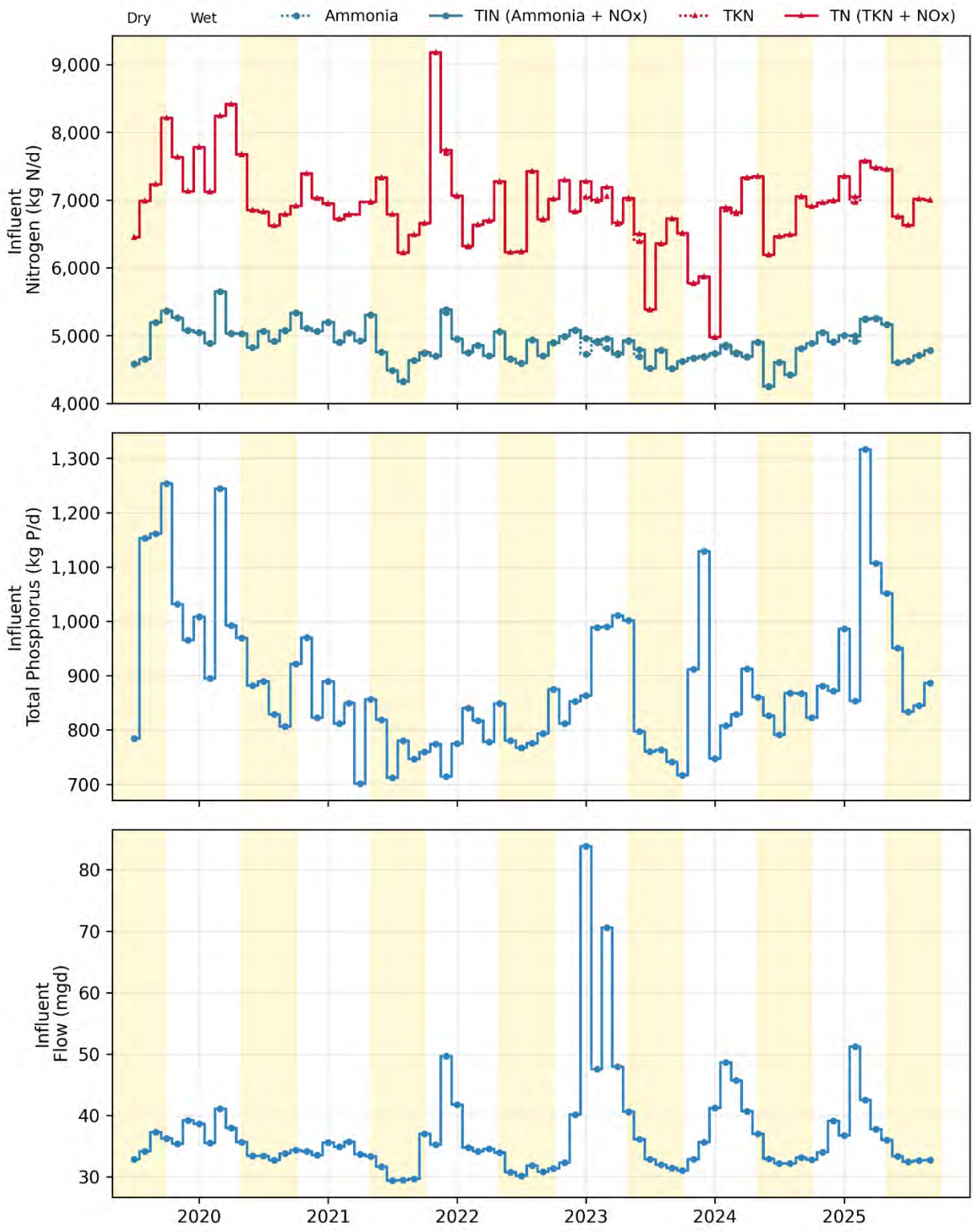


Figure 4-1. Influent: Central San Monthly Flows and Loads

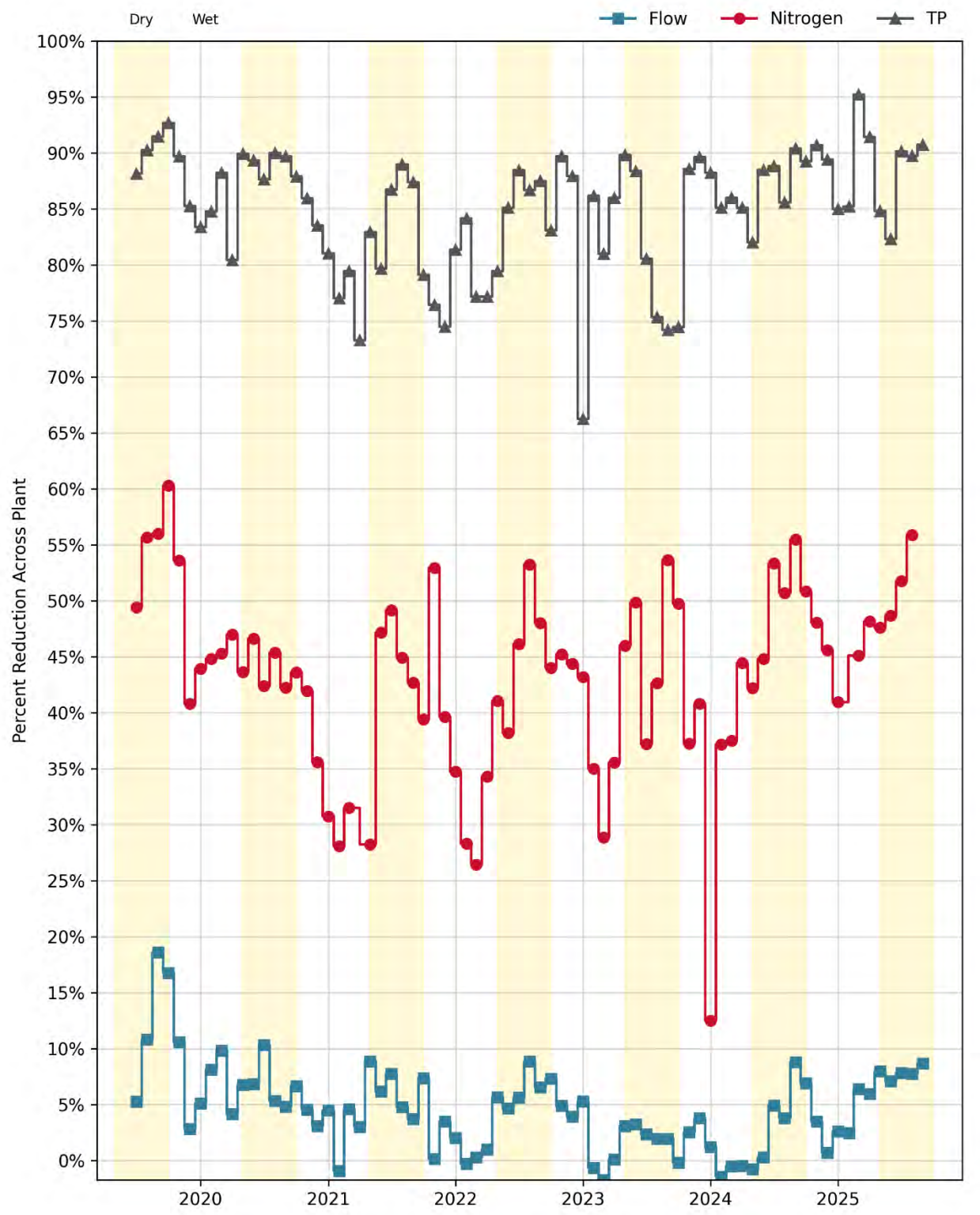


Figure 4-2. Influent: Central San Monthly Reductions Across the Plant

Note: Influent Total N was compared against Discharge TIN for calculating nitrogen load reduction.

Table 4-1. Influent: Central San Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	32.8	4,580	4.73	4,580	6,450	6,450	784
Aug-19	34.1	4,650	0.591	4,650	6,990	6,990	1,150
Sep-19	37.3	5,190	2.82	5,190	7,230	7,230	1,160
Oct-19	36.2	5,360	2.50	5,360	8,210	8,210	1,250
Nov-19	35.4	5,260	1.17	5,260	7,630	7,630	1,030
Dec-19	39.1	5,080	1.14	5,080	7,130	7,130	965
Jan-20	38.7	5,040	2.24	5,040	7,780	7,780	1,010
Feb-20	35.5	4,890	1.08	4,890	7,120	7,120	895
Mar-20	41.1	5,650	2.68	5,650	8,240	8,240	1,240
Apr-20	37.9	5,030	1.34	5,030	8,410	8,420	993
May-20	35.6	5,030	0.959	5,030	7,670	7,670	970
Jun-20	33.4	4,820	0.950	4,820	6,850	6,850	882
Jul-20	33.4	5,060	1.12	5,060	6,830	6,830	889
Aug-20	32.7	4,910	3.16	4,920	6,620	6,630	829
Sep-20	33.8	5,070	4.36	5,070	6,790	6,790	806
Oct-20	34.3	5,330	4.48	5,340	6,910	6,910	922
Nov-20	34.2	5,100	1.19	5,110	7,390	7,390	970
Dec-20	33.5	5,060	3.00	5,070	7,020	7,030	822
Jan-21	35.6	5,190	7.10	5,200	6,940	6,940	889
Feb-21	34.9	4,900	4.58	4,900	6,720	6,720	812
Mar-21	35.7	5,040	2.83	5,090	6,780	6,780	850
Apr-21	33.7	4,920	3.17	4,920	--	--	701
May-21	33.3	5,300	2.08	5,310	6,970	6,970	856
Jun-21	31.6	4,760	1.27	4,760	7,330	7,330	819
Jul-21	29.4	4,480	0.565	4,480	6,790	6,790	712
Aug-21	29.4	4,320	3.60	4,320	6,220	6,220	780
Sep-21	29.6	4,630	1.45	4,630	6,490	6,490	746
Oct-21	37.0	4,740	7.31	4,750	6,650	6,660	759
Nov-21	35.2	4,690	6.99	4,700	9,170	9,180	774
Dec-21	49.7	5,340	44.8	5,400	7,690	7,860	714
Jan-22	41.7	4,950	8.62	4,950	7,050	7,060	775
Feb-22	34.7	4,740	7.42	4,750	6,310	6,310	841
Mar-22	34.1	4,850	1.08	4,860	6,630	6,630	817
Apr-22	34.6	4,700	3.19	4,700	6,690	6,690	778

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
May-22	33.9	5,060	2.09	5,060	7,270	7,270	849
Jun-22	30.7	4,650	1.43	4,650	6,230	6,230	780
Jul-22	30.1	4,590	2.96	4,590	6,240	6,240	767
Aug-22	31.8	4,930	2.44	4,940	7,420	7,420	776
Sep-22	30.8	4,700	2.67	4,700	6,710	6,710	794
Oct-22	31.4	4,890	2.34	4,900	7,020	7,020	875
Nov-22	32.3	4,980	3.36	4,990	7,290	7,300	812
Dec-22	40.2	5,080	3.33	5,080	6,830	6,830	852
Jan-23	83.8	4,730	233	4,960	7,040	7,590	863
Feb-23	47.5	4,900	16.8	4,910	6,990	7,010	989
Mar-23	70.5	4,810	137	4,950	7,050	7,090	990
Apr-23	47.9	4,720	17.5	4,740	6,650	6,660	1,010
May-23	40.6	4,910	10.8	4,930	7,020	7,040	1,000
Jun-23	36.1	4,690	106	4,790	6,390	6,400	797
Jul-23	32.8	4,510	2.56	4,520	5,380	5,380	760
Aug-23	31.9	4,780	3.72	4,780	6,350	6,360	764
Sep-23	31.4	4,510	4.29	4,510	6,720	6,730	741
Oct-23	31.0	4,620	3.87	4,620	6,510	6,510	717
Nov-23	32.8	4,660	9.33	4,670	5,760	5,770	912
Dec-23	35.6	4,680	8.93	4,920	5,860	5,870	1,130
Jan-24	41.2	4,730	7.55	4,740	4,970	4,980	747
Feb-24	48.6	4,830	26.8	4,860	6,860	6,870	808
Mar-24	45.7	4,730	18.1	4,750	6,800	6,820	829
Apr-24	40.7	4,680	4.89	4,690	7,330	7,330	912
May-24	37.0	4,900	5.38	4,900	7,350	7,350	860
Jun-24	32.9	4,250	1.26	4,100	6,190	6,190	826
Jul-24	32.2	4,600	3.92	4,600	6,460	6,470	791
Aug-24	32.2	4,420	0.968	4,420	6,480	6,480	868
Sep-24	33.1	4,800	4.89	4,810	7,050	7,060	867
Oct-24	32.8	4,880	0.527	4,880	6,900	6,900	822
Nov-24	34.0	5,050	0.210	5,050	6,960	6,960	881
Dec-24	39.1	4,900	4.75	4,910	6,990	6,990	872
Jan-25	36.7	5,000	0.805	5,000	7,350	7,350	986
Feb-25	51.2	4,920	81.3	4,980	6,970	--	854
Mar-25	42.5	5,240	6.30	5,250	7,570	7,580	1,320

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Apr-25	37.7	5,250	2.46	5,250	7,470	7,480	1,110
May-25	36.0	5,160	1.55	5,160	7,450	7,450	1,050
Jun-25	33.3	4,600	0.707	4,600	6,750	6,750	950
Jul-25	32.4	4,620	1.71	4,690	6,630	6,630	833
Aug-25	32.7	4,700	0.628	4,710	7,020	7,020	844
Sep-25	32.7	4,780	2.27	4,700	6,990	--	886
Dry Season Average	**33.1**	**4,760**	**5.75**	**4,760**	**6,770**	**6,760**	**854**
Wet Season Average	**39.9**	**4,960**	**16.8**	**4,980**	**7,060**	**7,080**	**907**
Annual Average	**36.9**	**4,870**	**12.0**	**4,880**	**6,930**	**6,940**	**884**

* Central San typically samples more than the required influent quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

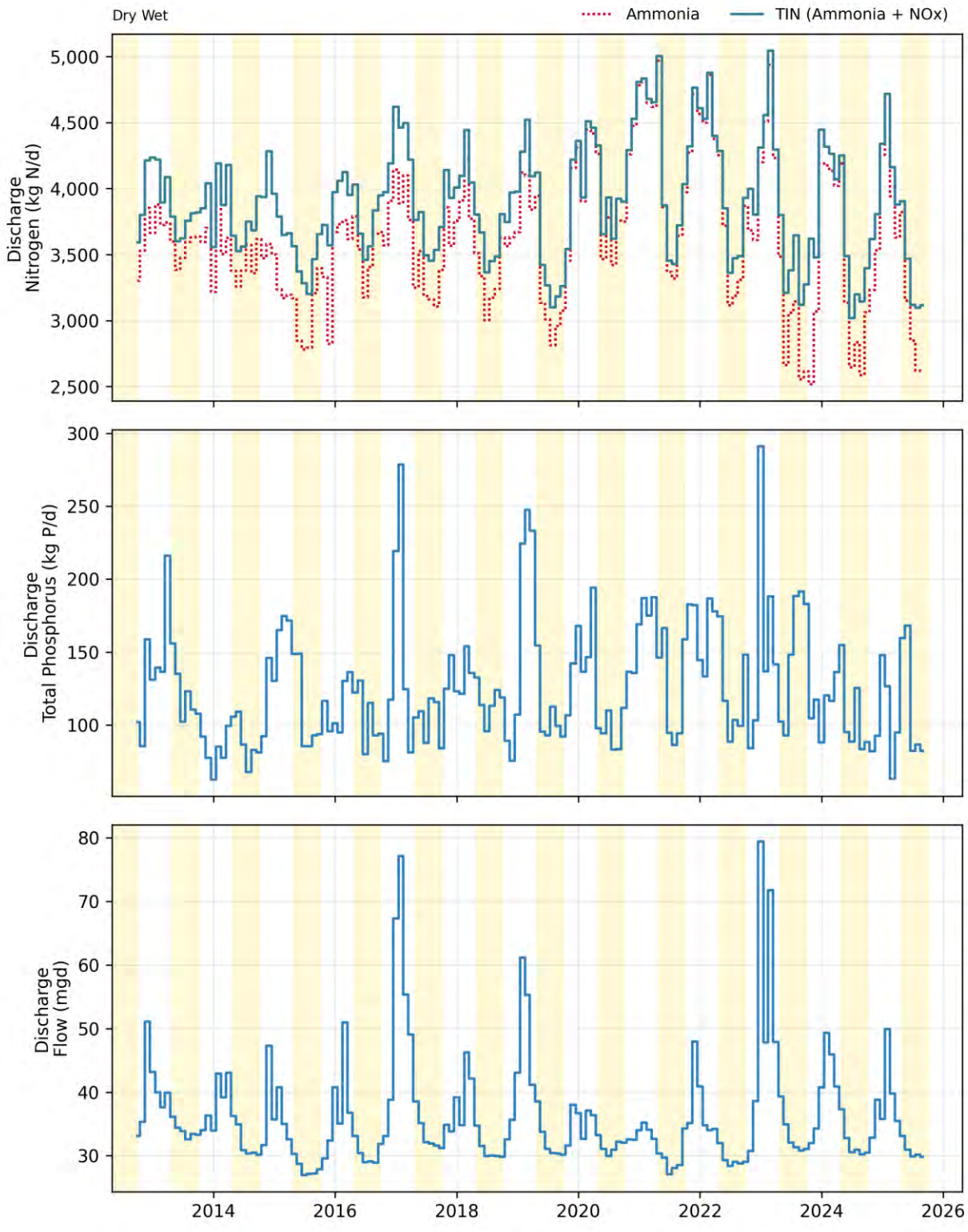


Figure 4-3. Discharge: Central San Monthly Flows and Loads

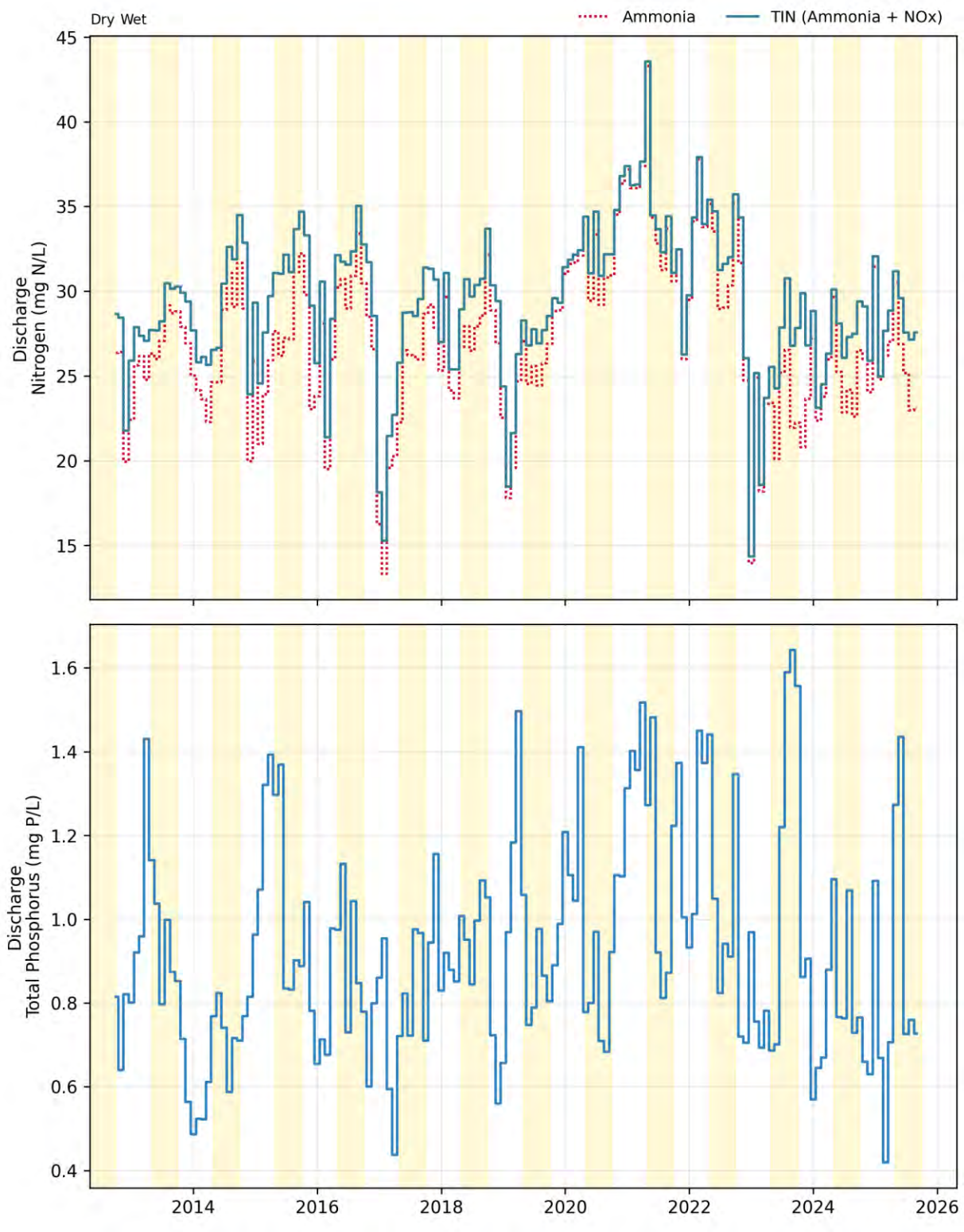


Figure 4-4. Discharge: Central San Monthly Concentrations

Table 4-2. Discharge: Central San Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	33.1	3,300	290	3,590	102
Nov-12	35.3	3,530	269	3,800	85.5
Dec-12	51.1	3,850	357	4,210	159
Jan-13	43.2	3,670	569	4,240	131
Feb-13	40.0	3,880	340	4,220	139
Mar-13	37.6	3,720	170	3,890	137
Apr-13	39.9	3,740	344	4,090	216
May-13	36.1	3,600	191	3,790	156
Jun-13	34.4	3,380	220	3,600	135
Jul-13	33.9	3,470	149	3,620	102
Aug-13	32.6	3,600	160	3,760	123
Sep-13	33.4	3,630	184	3,810	111
Oct-13	33.3	3,640	182	3,820	108
Nov-13	34.0	3,600	255	3,850	92.0
Dec-13	36.3	3,700	336	4,040	77.5
Jan-14	34.0	3,220	342	3,560	62.5
Feb-14	42.9	3,920	270	4,190	85.0
Mar-14	39.2	3,500	370	3,870	77.5
Apr-14	43.0	3,630	550	4,180	99.5
May-14	36.3	3,380	264	3,640	106
Jun-14	35.0	3,260	268	3,530	109
Jul-14	30.9	3,380	182	3,560	86.5
Aug-14	30.4	3,570	178	3,750	67.6
Sep-14	30.5	3,360	325	3,680	82.7
Oct-14	30.2	3,620	323	3,940	81.1
Nov-14	31.7	3,470	465	3,940	92.1
Dec-14	47.3	3,580	705	4,280	146
Jan-15	35.7	3,500	463	3,960	130
Feb-15	40.7	3,240	550	3,790	165
Mar-15	35.0	3,170	479	3,650	175
Apr-15	32.6	3,200	467	3,660	172
May-15	30.3	3,170	395	3,560	149
Jun-15	28.7	2,850	524	3,370	149
Jul-15	27.0	2,780	501	3,280	85.2
Aug-15	27.2	2,790	406	3,200	85.5
Sep-15	27.2	3,210	260	3,470	92.9

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	27.8	3,400	260	3,660	93.6
Nov-15	29.6	3,330	393	3,720	116
Dec-15	32.4	2,820	747	3,570	95.7
Jan-16	40.7	3,670	302	3,970	101
Feb-16	35.1	3,730	327	4,060	94.7
Mar-16	50.9	3,760	365	4,120	130
Apr-16	36.8	3,620	333	3,950	136
May-16	33.1	3,790	239	4,030	122
Jun-16	30.5	3,540	120	3,660	130
Jul-16	29.0	3,180	283	3,460	80.0
Aug-16	29.1	3,410	159	3,560	115
Sep-16	28.9	3,660	178	3,830	92.7
Oct-16	31.8	3,670	277	3,950	93.9
Nov-16	33.1	3,570	402	3,970	75.1
Dec-16	38.8	3,910	284	4,190	117
Jan-17	67.3	4,140	475	4,620	219
Feb-17	77.1	3,890	574	4,460	278
Mar-17	55.4	4,100	397	4,500	124
Apr-17	49.1	3,760	454	4,220	81.2
May-17	38.6	3,250	515	3,760	105
Jun-17	35.1	3,520	296	3,820	109
Jul-17	32.1	3,190	309	3,490	87.7
Aug-17	32.0	3,160	293	3,450	118
Sep-17	31.6	3,110	428	3,530	116
Oct-17	31.2	3,390	323	3,710	83.9
Nov-17	34.9	3,860	282	4,140	125
Dec-17	33.8	3,570	363	3,930	148
Jan-18	39.2	3,760	252	4,010	123
Feb-18	34.8	3,910	188	4,100	121
Mar-18	46.2	4,220	221	4,440	154
Apr-18	42.1	3,770	274	4,050	136
May-18	34.7	3,510	292	3,800	132
Jun-18	31.6	3,340	333	3,670	114
Jul-18	29.9	3,000	362	3,330	95.7
Aug-18	30.0	3,170	277	3,450	113
Sep-18	30.0	3,240	247	3,480	124
Oct-18	29.9	3,630	178	3,810	119
Nov-18	32.6	3,560	180	3,740	89.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-18	35.7	3,630	336	3,980	75.5
Jan-19	43.1	3,670	303	3,980	107
Feb-19	61.2	4,120	156	4,300	224
Mar-19	55.2	4,100	425	4,520	247
Apr-19	41.1	3,840	252	4,050	233
May-19	38.5	3,940	177	4,120	154
Jun-19	33.7	3,130	289	3,420	95.4
Jul-19	31.1	3,010	257	3,270	92.8
Aug-19	30.4	2,810	287	3,100	113
Sep-19	30.3	2,960	223	3,180	99.4
Oct-19	30.2	3,070	187	3,260	91.8
Nov-19	31.6	3,450	90.6	3,540	107
Dec-19	38.0	4,160	62.1	4,220	142
Jan-20	36.7	4,310	52.4	4,360	168
Feb-20	32.6	3,900	28.3	3,930	136
Mar-20	37.1	4,440	65.0	4,510	146
Apr-20	36.3	4,420	44.6	4,460	194
May-20	33.2	4,260	62.7	4,330	97.8
Jun-20	31.1	3,460	191	3,660	94.2
Jul-20	30.0	3,780	152	3,930	110
Aug-20	31.0	3,420	199	3,620	83.1
Sep-20	32.2	3,760	166	3,920	83.2
Oct-20	32.0	3,750	150	3,900	112
Nov-20	32.6	4,260	33.3	4,290	136
Dec-20	32.5	4,470	54.1	4,530	136
Jan-21	34.0	4,780	25.2	4,810	169
Feb-21	35.2	4,810	24.4	4,830	187
Mar-21	34.1	4,650	28.9	4,650	175
Apr-21	32.7	4,620	31.7	4,650	188
May-21	30.3	4,970	32.5	5,000	146
Jun-21	29.7	3,860	13.2	3,870	166
Jul-21	27.1	3,370	86.1	3,450	94.4
Aug-21	28.0	3,320	110	3,430	86.2
Sep-21	28.6	3,640	79.5	3,720	94.2
Oct-21	34.3	3,970	61.3	4,030	159
Nov-21	35.1	4,270	46.5	4,320	183
Dec-21	47.9	4,720	49.2	4,750	182
Jan-22	40.9	4,570	43.4	4,610	144

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-22	34.8	4,500	27.3	4,530	133
Mar-22	34.0	4,860	15.8	4,880	187
Apr-22	34.2	4,380	23.0	4,400	178
May-22	32.0	4,250	30.8	4,290	174
Jun-22	29.3	3,720	131	3,850	116
Jul-22	28.4	3,110	247	3,360	88.6
Aug-22	29.0	3,190	284	3,470	103
Sep-22	28.8	3,310	180	3,490	99.3
Oct-22	29.1	3,870	61.8	3,930	148
Nov-22	30.8	3,680	314	4,000	83.8
Dec-22	38.6	3,610	192	3,800	103
Jan-23	79.4	4,200	112	4,310	291
Feb-23	47.8	4,510	51.4	4,560	137
Mar-23	71.8	4,940	106	5,040	188
Apr-23	47.9	4,230	62.9	4,300	142
May-23	39.3	3,480	316	3,800	102
Jun-23	35.0	2,660	548	3,210	92.7
Jul-23	32.1	3,060	321	3,380	148
Aug-23	31.3	3,150	501	3,650	188
Sep-23	30.8	2,560	563	3,120	192
Oct-23	31.1	2,620	657	3,270	183
Nov-23	32.0	2,520	1,100	3,620	104
Dec-23	34.3	3,070	410	3,480	117
Jan-24	40.7	4,190	253	4,360	87.9
Feb-24	49.3	4,180	140	4,320	120
Mar-24	45.9	4,130	129	4,260	116
Apr-24	40.9	4,020	52.7	4,070	136
May-24	37.3	4,190	61.0	4,250	155
Jun-24	32.8	3,130	355	3,420	95.1
Jul-24	30.6	2,650	372	3,020	88.4
Aug-24	31.0	2,840	363	3,200	125
Sep-24	30.2	2,590	557	3,150	83.4
Oct-24	30.5	3,060	332	3,390	88.4
Nov-24	32.8	3,230	386	3,620	82.0
Dec-24	38.8	3,530	273	3,810	92.6
Jan-25	35.8	4,260	83.0	4,340	148
Feb-25	49.9	4,690	30.0	4,060	126
Mar-25	39.8	3,940	219	4,160	63.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-25	35.5	3,630	246	3,880	94.9
May-25	33.1	3,820	82.2	3,910	160
Jun-25	31.0	3,150	318	3,470	168
Jul-25	29.9	2,850	271	3,200	82.1
Aug-25	30.1	2,620	477	3,100	86.6
Sep-25	29.9	2,610	501	2,850	82.1
Dry Season Average	**31.5**	**3,330**	**267**	**3,590**	**113**
Wet Season Average	**39.4**	**3,840**	**261**	**4,090**	**134**
Annual Average	**36.1**	**3,630**	**264**	**3,880**	**125**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.
Note that the dry season average includes data from 2012 through 2025.

Table 4-3. Recycled Water: Central San Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet/yr (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	342 (0.31)	237 (0.21)	0 (0)	1,020 (0.91)	2 (≤0.01)	0 (0)	180 (0.16)	1,780 (1.59)
2020	373 (0.33)	242 (0.22)	0 (0)	924 (0.82)	3 (≤0.01)	0 (0)	262 (0.23)	1,800 (1.60)
2021	411 (0.37)	248 (0.22)	0 (0)	1,000 (0.89)	7 (0.01)	0 (0)	221 (0.20)	1,890 (1.69)
2022	355 (0.32)	264 (0.24)	0 (0)	1,070 (0.96)	9 (0.01)	0 (0)	265 (0.24)	1,960 (1.77)
2023	288 (0.26)	295 (0.26)	0 (0)	1,060 (0.95)	5 (≤0.01)	0 (0)	155 (0.14)	1,800 (1.61)
2024	287 (0.26)	360 (0.32)	0 (0)	1,050 (0.93)	6 (0.01)	0 (0)	114 (0.10)	1,820 (1.62)
Average	**343 (0.31)**	**274 (0.25)**	**0 (0)**	**1,020 (0.911)**	**5 (<0.01)**	**0 (0)**	**200 (0.18)**	**1,840 (1.65)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 4-4. Recycled Water: Central San Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	28	19	0	83	<1	0	15	145
2020	40	27	0	100	<1	0	28	194
2021	48	28	0	116	1	0	26	217
2022	39	29	0	116	1	0	29	214
2023	21	21	0	75	<1	0	11	129
2024	24	30	0	88	<1	0	10	153
Average	**33**	**26**	**0**	**96**	**1**	**0**	**20**	**175**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 4-5. Recycled Water: Central San Yearly Recycled Water TIN Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	30	20	0	88	<1	0	16	154
2020	41	27	0	102	<1	0	29	199
2021	48	29	0	115	1	0	26	219
2022	40	30	0	120	1	0	30	221
2023	23	23	0	85	<1	0	12	143
2024	26	33	0	95	1	0	10	165
Average	**35**	**27**	**0**	**101**	**1**	**0**	**20**	**183**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 4-6. Recycled Water: Central San Yearly Recycled Water Total Phosphorus Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	1	1	0	3	<1	0	1	6
2020	1	1	0	3	<1	0	1	6
2021	2	1	0	4	<1	0	1	8
2022	1	1	0	4	<1	0	1	7
2023	1	1	0	3	<1	0	1	6
2024	1	1	0	3	<1	0	<1	5
Average	**1**	**1**	**0**	**3**	**<1**	**0**	**1**	**6**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

5 Central Marin Sanitation Agency (CMSA)

CMSA discharges to the Central Bay and serves approximately 105,000 people via 52,200 service connections. The plant has a permitted ADWF capacity of 10.0 mgd. This past dry season average discharge flow was approximately 6.3 mgd. The plant performs secondary treatment using a trickling filter and activated sludge process.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This would be expected since the plant was not designed to nitrify (some nitrification does occur in the secondary process, most likely in the biotowers).
  - Ammonia/TIN concentrations and total phosphorus concentrations increase during the dry weather season as flows decline.
- Recycled Water:
  - The plant averages approximately 0.02 mgd of recycled water that is diverted from the Bay. Recycled water uses included landscape irrigation, industrial on-site application, and other, off-site non-potable uses such as sewer flushing and dust control.
  - Based on Table 5-3, Table 5-4, and Table 5-5 respectively, in the 2024 reporting period the plant diverted on average 3 kg ammonia-N/d, 3 kg TIN-N/d, and <1 kg P/d away from the Bay through recycled water.

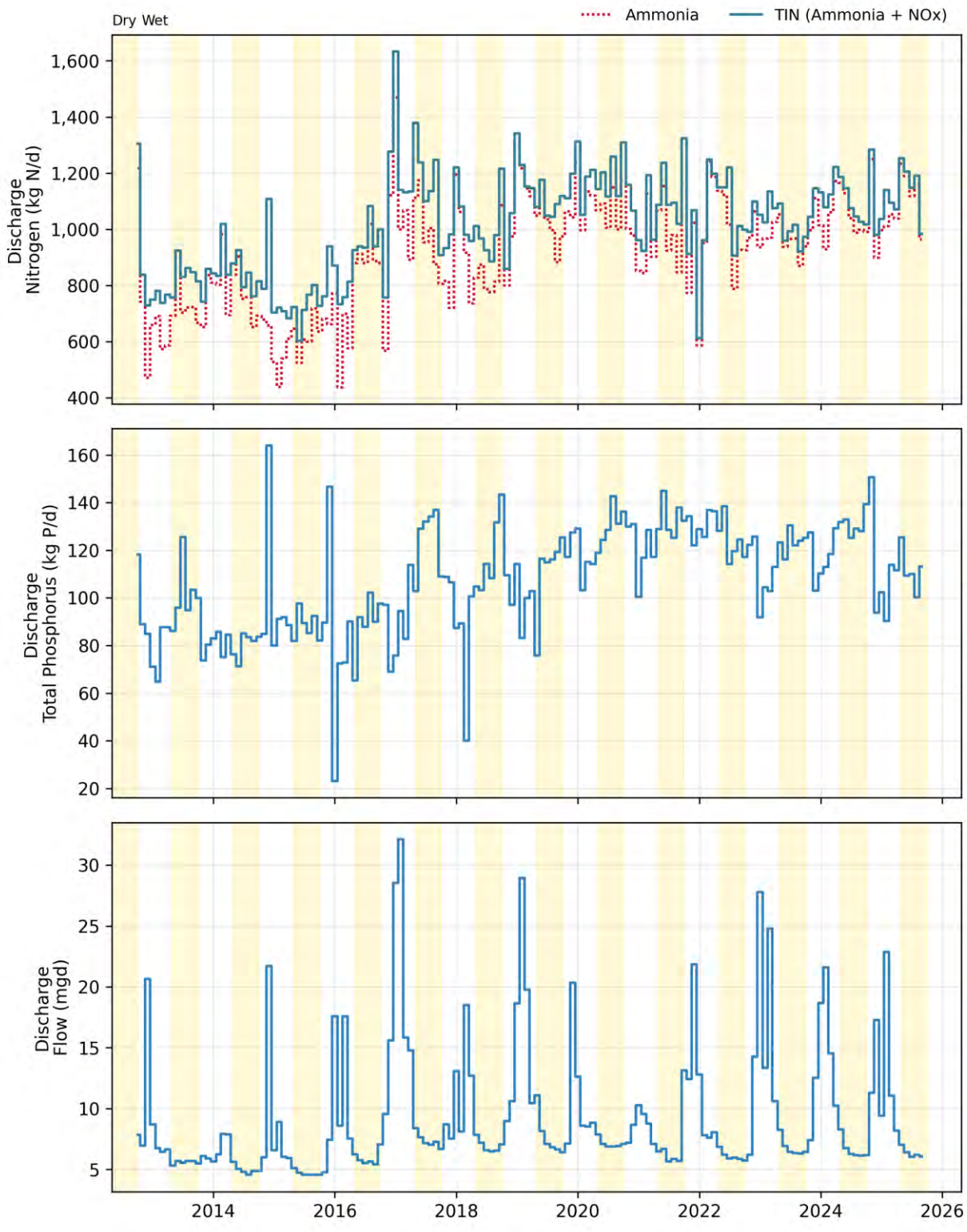


Figure 5-1. Discharge: CMSA Monthly Flows and Loads

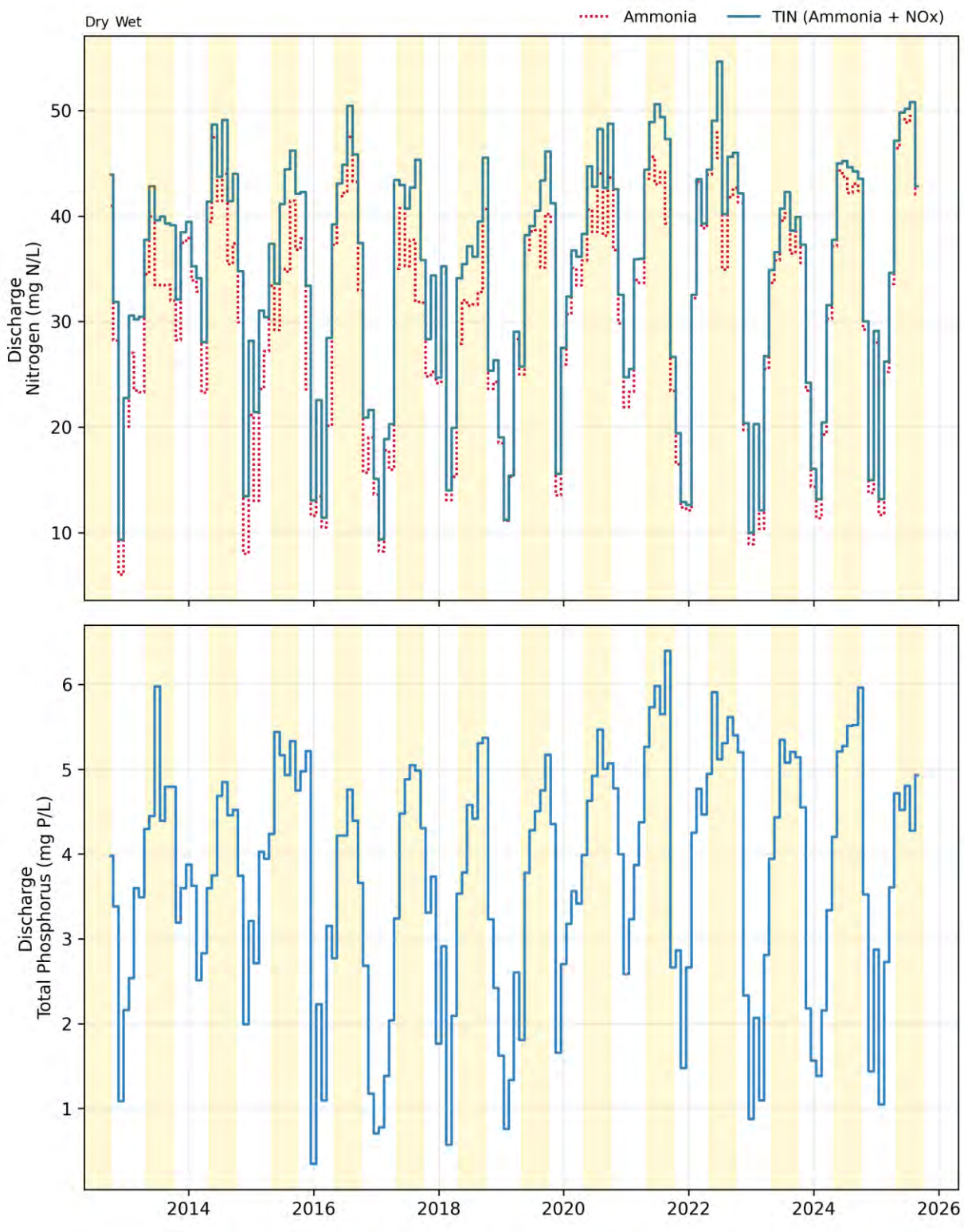


Figure 5-2. Discharge: CMSA Monthly Concentrations

Table 5-1. Discharge: CMSA Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	7.85	1,220	87.5	1,300	118
Nov-12	6.95	742	96.3	838	88.9
Dec-12	20.7	471	258	729	84.9
Jan-13	8.70	660	89.3	749	71.1
Feb-13	6.75	691	90.2	781	64.8
Mar-13	6.45	573	165	738	87.7
Apr-13	6.65	586	180	767	87.8
May-13	5.30	692	65.2	757	86.1
Jun-13	5.70	862	61.6	923	95.9
Jul-13	5.55	703	128	831	126
Aug-13	5.70	721	140	862	94.8
Sep-13	5.70	722	125	847	103
Oct-13	5.50	666	148	814	99.8
Nov-13	6.10	652	89.5	741	73.7
Dec-13	5.90	836	22.4	859	80.3
Jan-14	5.65	810	32.8	843	82.9
Feb-14	6.25	802	31.0	833	85.8
Mar-14	7.90	982	36.5	1,020	75.0
Apr-14	7.90	695	143	838	84.6
May-14	5.61	838	40.6	878	76.3
Jun-14	5.03	903	22.6	926	71.3
Jul-14	4.80	752	41.9	794	85.1
Aug-14	4.55	757	87.6	845	83.4
Sep-14	4.86	651	110	761	82.0
Oct-14	4.89	692	122	814	83.7
Nov-14	5.99	678	110	788	84.9
Dec-14	21.7	658	449	1,110	164
Jan-15	6.59	527	176	703	80.1
Feb-15	8.89	439	283	721	91.2
Mar-15	6.03	539	169	708	91.9
Apr-15	5.93	610	72.4	682	88.5
May-15	5.11	645	77.0	722	81.9
Jun-15	4.74	524	79.5	603	97.6
Jul-15	4.58	607	106	713	89.5
Aug-15	4.57	600	168	768	85.2
Sep-15	4.58	718	82.6	800	92.4
Oct-15	4.56	636	91.4	727	82.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	4.76	681	79.6	761	89.6
Dec-15	7.43	663	277	939	147
Jan-16	17.6	772	98.1	870	23.1
Feb-16	8.59	438	296	733	72.4
Mar-16	17.6	700	58.8	758	72.8
Apr-16	7.55	575	238	813	90.1
May-16	6.24	880	45.1	925	65.4
Jun-16	5.76	913	26.8	940	92.0
Jul-16	5.51	879	55.7	935	87.9
Aug-16	5.67	1,020	63.8	1,080	102
Sep-16	5.42	887	52.5	939	90.0
Oct-16	7.05	880	120	999	97.7
Nov-16	9.56	567	189	756	97.1
Dec-16	15.6	1,120	154	1,280	69.0
Jan-17	28.6	1,470	163	1,630	75.8
Feb-17	32.1	999	141	1,140	94.4
Mar-17	15.8	1,070	63.7	1,130	82.8
Apr-17	14.8	892	243	1,130	114
May-17	8.39	1,110	267	1,380	103
Jun-17	7.62	1,170	63.5	1,240	129
Jul-17	7.15	953	147	1,100	132
Aug-17	7.03	1,000	132	1,140	134
Sep-17	7.26	875	371	1,250	137
Oct-17	6.69	805	102	907	109
Nov-17	8.69	816	117	932	109
Dec-17	7.54	720	261	982	107
Jan-18	13.1	1,190	25.5	1,220	87.3
Feb-18	8.10	1,060	18.6	1,080	89.2
Mar-18	18.5	916	64.3	981	39.9
Apr-18	12.7	736	222	957	101
May-18	7.84	828	184	1,010	105
Jun-18	7.21	874	93.3	967	103
Jul-18	6.59	786	139	926	114
Aug-18	6.48	776	110	886	108
Sep-18	6.55	813	166	979	132
Oct-18	7.06	1,090	131	1,220	143
Nov-18	8.96	800	58.5	859	109
Dec-18	10.6	974	83.3	1,060	97.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	18.6	1,300	39.5	1,340	114
Feb-19	28.9	1,220	11.3	1,230	83.1
Mar-19	19.8	1,150	7.27	1,150	100.0
Apr-19	10.4	1,120	28.4	1,150	103
May-19	11.1	1,050	31.0	1,080	75.8
Jun-19	8.14	1,130	43.4	1,180	116
Jul-19	7.10	1,030	13.4	1,050	115
Aug-19	6.82	997	47.5	1,040	116
Sep-19	6.64	882	207	1,090	119
Oct-19	6.40	974	144	1,120	125
Nov-19	7.12	1,060	47.6	1,110	117
Dec-19	20.3	1,040	155	1,200	127
Jan-20	12.6	1,240	73.8	1,310	129
Feb-20	8.59	997	54.5	1,050	103
Mar-20	8.54	1,130	53.4	1,190	115
Apr-20	8.85	1,120	91.6	1,210	114
May-20	7.88	1,070	74.6	1,140	119
Jun-20	7.10	1,090	110	1,200	124
Jul-20	6.90	1,010	111	1,120	129
Aug-20	6.89	1,150	109	1,260	143
Sep-20	6.93	1,000	118	1,120	131
Oct-20	7.10	1,170	137	1,310	136
Nov-20	7.19	1,000	157	1,160	130
Dec-20	8.66	977	88.1	1,070	131
Jan-21	10.3	852	110	961	100
Feb-21	9.56	844	77.6	922	117
Mar-21	8.77	1,130	65.7	1,190	128
Apr-21	7.08	902	60.7	950	117
May-21	6.47	1,070	20.6	1,090	129
Jun-21	6.68	1,150	83.4	1,240	145
Jul-21	5.67	924	163	1,090	128
Aug-21	5.86	979	116	1,090	125
Sep-21	5.70	847	172	1,020	138
Oct-21	13.1	1,160	161	942	132
Nov-21	12.4	773	138	912	134
Dec-21	21.8	1,020	44.4	1,070	122
Jan-22	12.8	586	24.6	611	129
Feb-22	7.80	951	9.65	961	126

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	7.59	1,240	7.39	1,250	137
Apr-22	8.06	1,190	12.9	1,200	136
May-22	6.84	1,140	12.0	1,150	128
Jun-22	6.19	1,120	25.8	1,150	138
Jul-22	5.90	1,020	205	1,220	114
Aug-22	5.95	787	118	906	120
Sep-22	5.86	928	84.0	1,010	125
Oct-22	5.73	926	72.1	998	117
Nov-22	6.21	970	20.4	991	122
Dec-22	14.2	1,060	34.9	1,090	126
Jan-23	27.8	936	116	954	91.8
Feb-23	13.3	967	58.1	1,030	104
Mar-23	24.8	970	164	1,130	103
Apr-23	10.6	1,030	48.3	1,070	113
May-23	8.26	1,050	38.3	1,090	123
Jun-23	6.93	938	21.5	959	116
Jul-23	6.45	965	27.6	993	130
Aug-23	6.35	968	48.4	1,020	122
Sep-23	6.30	870	50.8	922	124
Oct-23	6.44	939	33.3	973	125
Nov-23	7.41	997	47.7	1,040	128
Dec-23	12.5	1,110	35.7	1,150	103
Jan-24	18.7	1,010	118	1,150	110
Feb-24	21.6	929	149	1,070	113
Mar-24	14.5	1,060	63.5	1,120	118
Apr-24	10.2	1,170	50.3	1,160	129
May-24	8.29	1,160	20.6	1,190	132
Jun-24	6.74	1,130	17.5	1,140	133
Jul-24	6.28	1,040	35.6	1,070	125
Aug-24	6.19	988	57.0	1,090	129
Sep-24	6.13	998	27.4	1,030	128
Oct-24	6.17	990	26.5	1,020	139
Nov-24	11.3	1,250	33.3	1,280	151
Dec-24	17.3	899	80.9	978	93.8
Jan-25	9.40	997	39.4	1,040	102
Feb-25	22.9	1,010	128	1,110	90.3
Mar-25	11.0	1,050	41.5	1,090	114
Apr-25	8.18	1,040	33.5	1,070	112

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	7.02	1,230	18.2	1,260	125
Jun-25	6.39	1,190	15.9	1,210	109
Jul-25	6.05	1,120	29.2	1,140	110
Aug-25	6.19	1,160	30.6	1,190	100
Sep-25	6.06	964	18.9	983	113
Dry Season Average	**6.36**	**933**	**85.8**	**1,020**	**112**
Wet Season Average	**11.4**	**907**	**103**	**1,000**	**104**
Annual Average	**9.29**	**918**	**95.6**	**1,010**	**107**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

Table 5-2. Recycled Water: CMSA Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	26 (0.02)	0 (0)	--***	0 (0)	0 (0)	--***	26 (0.02)
2020	0 (0)	29 (0.03)	0 (0)	--***	0 (0)	0 (0)	--***	29 (0.03)
2021	0 (0)	25 (0.02)	0 (0)	--***	0 (0)	0 (0)	--***	25 (0.02)
2022	0 (0)	25 (0.02)	0 (0)	--***	0 (0)	0 (0)	--**	25 (0.02)
2023	0 (0)	22 (0.02)	0 (0)	--***	0 (0)	0 (0)	--**	22 (0.02)
2024	0 (0)	35 (0.03)	0 (0)	--***	0 (0)	0 (0)	--**	35 (0.03)
Average	**0 (0)**	**27 (0.02)**	**0 (0)**	**--*** **	**0 (0)**	**0 (0)**	**--*** **	**27 (0.02)**

* Assumes 100% of the recycled flow is diverted from the Bay

** **Calendar year as opposed to California's water year (October 1 through September 30)**

*** **CMSA has a recycled water Industrial Application user (averages approximately 1,180 AF per year (1.05 mgd)) and an Other Non-Potable Uses" user (averages approximately 2 AF per year (<0.01 mgd)). In both applications, the flows are not diverted from the Bay and thus not included as part of this effort.**

Table 5-3. Recycled Water: CMSA Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	2	0	--***	0	0	--***	2
2020	0	4	0	--***	0	0	--***	4
2021	0	2	0	--***	0	0	--***	2
2022	0	3	0	--***	0	0	--***	3
2023	0	2	0	--***	0	0	--***	2
2024	0	3	0	--***	0	0	--***	3
Average	**0**	**3**	**0**	**--*** **	**0**	**0**	**--*** **	**3**

* Assumes 100% of the recycled load is diverted from the Bay

** **Calendar year as opposed to California's water year (October 1 through September 30)**

*** **CMSA has a recycled water Industrial Application user (averages approximately 127 kg N/d) and an Other Non-Potable Uses" user (averages approximately <1 kg N/d). In both applications, the loads are not diverted from the Bay and thus not included as part of this effort.**

Table 5-4. Recycled Water: CMSA Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	2	0	--***	0	0	--***	2
2020	0	4	0	--***	0	0	--***	4
2021	0	2	0	--***	0	0	--***	2
2022	0	3	0	--***	0	0	--***	3
2023	0	2	0	--***	0	0	--***	2
2024	0	3	0	--***	0	0	--***	3
Average	**0**	**3**	**0**	**--*** **	**0**	**0**	**--*** **	**3**

* Assumes 100% of the recycled load is diverted for all recycled water applications

** **Calendar year as opposed to California's water year (October 1 through September 30)**

*** **CMSA has a recycled water Industrial Application user (averages approximately 138 kg N/d) and an Other Non-Potable Uses" user (averages approximately <1 kg N/d). In both applications, the loads are not diverted from the Bay and thus not included as part of this effort.**

Table 5-5. Recycled Water: CMSA Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	--***	0	0	--***	<1
2020	0	<1	0	--***	0	0	--***	<1
2021	0	<1	0	--***	0	0	--***	<1
2022	0	<1	0	--***	0	0	--***	<1
2023	0	<1	0	--***	0	0	--***	<1
2024	0	<1	0	--***	0	0	--***	<1
Average	**0**	**<1**	**0**	**--*** **	**0**	**0**	**--*** **	**<1**

* Assumes 100% of the recycled load is diverted for all recycled water applications

** **Calendar year as opposed to California's water year (October 1 through September 30)**

*** **CMSA has a recycled water Industrial Application user (averages approximately 15 kg P/d) and an Other Non-Potable Uses" user (averages approximately <1 kg P/d). In both applications, the loads are not diverted from the Bay and thus not included as part of this effort.**

6 Crockett Community Services District - Port Costa

The Crockett Community Services District serves two distinct separate communities, the community of Crockett and the community of Port Costa, each with their own treatment plant facilities. The Crockett Sanitary Department is excluded from the requirements of the Nutrient NPDES Order No. R2-2014-0014 as it shares use of an industrial wastewater treatment plant with C&H Sugar which has submitted its own sampling plan. The town of Port Costa has its own municipal wastewater treatment plant which is covered under the Nutrient NPDES Order. This analysis focuses on Port Costa.

The Community of Port Costa uses the Port Costa Wastewater Treatment Plant to discharge to the Carquinez Straight, which is connected to San Pablo Bay. The service area population is approximately 250 people. The plant has a permitted ADWF capacity of 0.033 mgd. This past dry season average discharge flow was approximately 0.012 mgd. The plant performs secondary treatment using a septic tank for solids separation, followed by filtration and disinfection.

Port Costa was exempt from the Section 13267 Letter sampling requirements due to their permitted capacity flow (<1 mgd). The following observations are made based upon the available data presented in figures and table in the subsequent pages:

- Discharge
  - The dataset is limited to flow, ammonia a few times per year, and most recently occasional nitrate + nitrite, TIN and TP samples.
- Recycled Water: No recycled water was produced or distributed this past year.

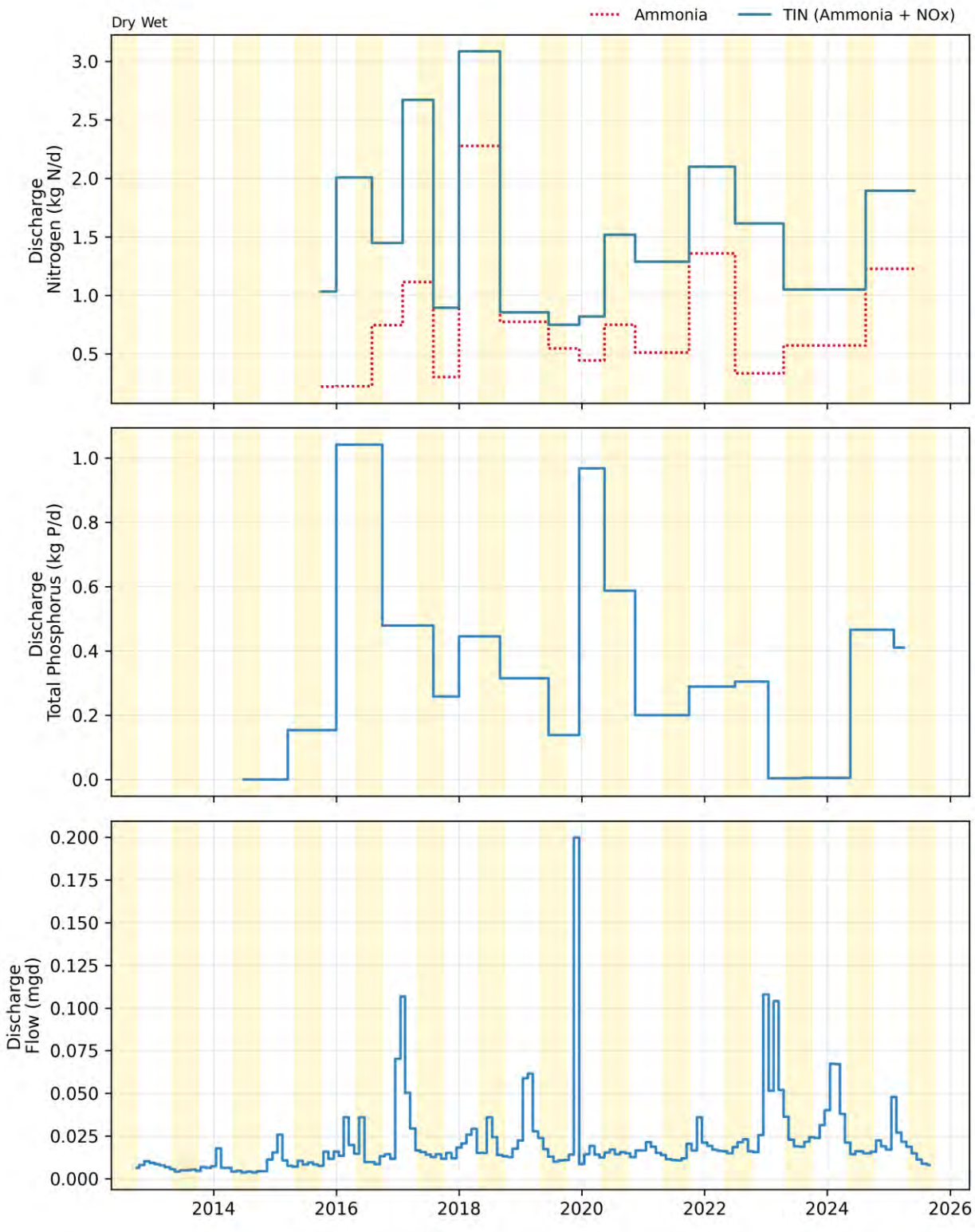


Figure 6-1. Discharge: Port Costa Monthly Flows and Loads

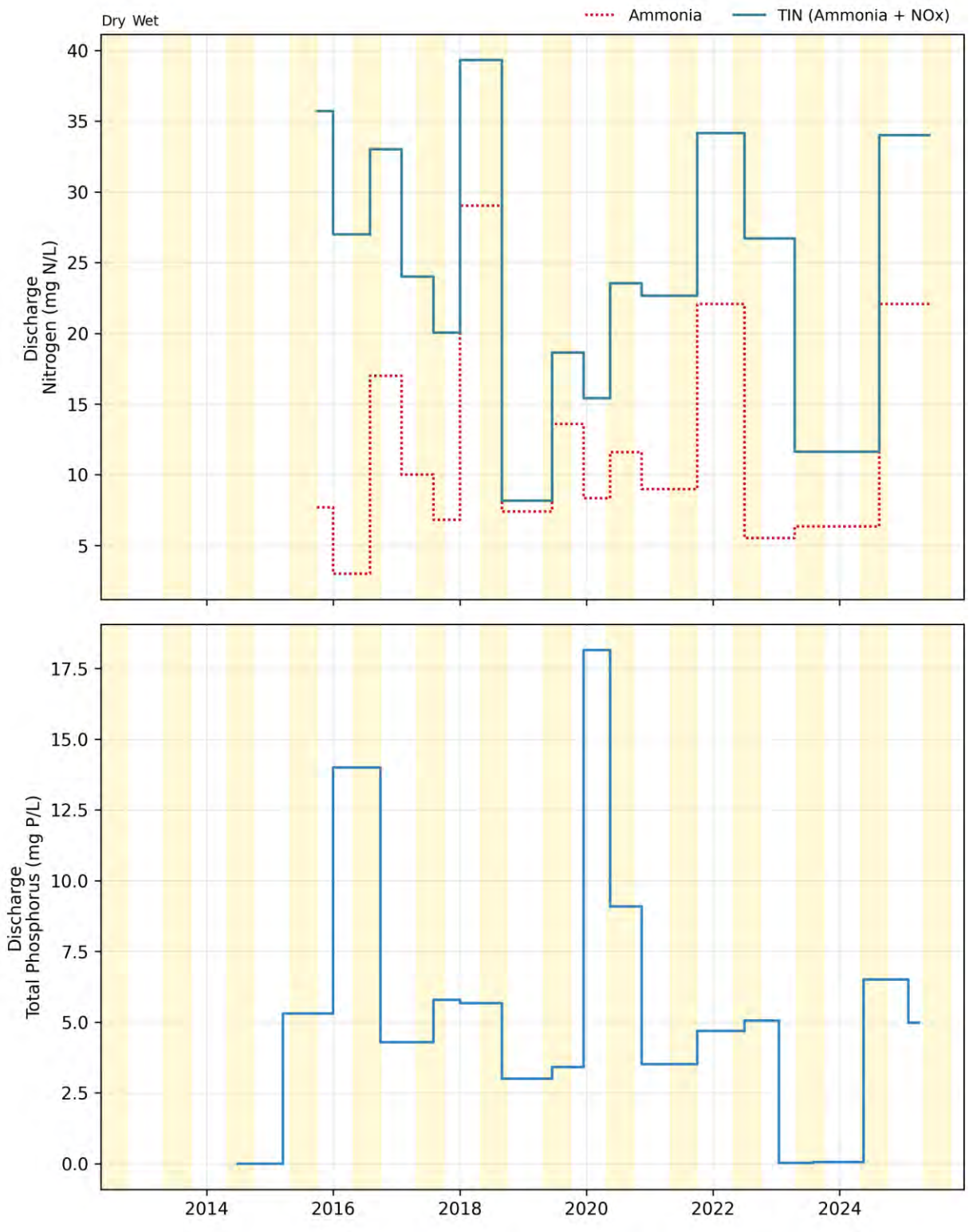


Figure 6-2. Discharge: Port Costa Monthly Concentrations

Table 6-1. Discharge: Port Costa Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.00640	--	--	--	--
Nov-12	0.00795	--	--	--	--
Dec-12	0.0103	--	--	--	--
Jan-13	0.00934	0.0636	--	--	--
Feb-13	0.00855	--	--	--	--
Mar-13	0.00780	--	--	--	--
Apr-13	0.00680	--	--	--	--
May-13	0.00555	0.650	--	--	--
Jun-13	0.00405	0.184	--	--	--
Jul-13	0.00497	0.124	--	--	--
Aug-13	0.00483	--	--	--	--
Sep-13	0.00538	--	--	--	--
Oct-13	0.00473	--	--	--	--
Nov-13	0.00688	--	--	--	--
Dec-13	0.00631	0.153	--	--	--
Jan-14	0.00720	0.585	--	--	--
Feb-14	0.0179	0.920	--	--	--
Mar-14	0.00644	0.179	--	--	--
Apr-14	0.00622	0.148	--	--	--
May-14	0.00409	--	--	--	--
Jun-14	0.00456	--	--	--	--
Jul-14	0.00354	0.0381	--	0.0381	--
Aug-14	0.00419	--	--	--	--
Sep-14	0.00361	--	--	--	--
Oct-14	0.00430	0.195	--	--	--
Nov-14	0.00433	0.524	--	--	--
Dec-14	0.0111	0.691	--	--	--
Jan-15	0.0153	--	--	--	--
Feb-15	0.0259	0.455	--	--	--
Mar-15	0.0108	--	--	--	--
Apr-15	0.00747	0.0678	--	--	--
May-15	0.00695	--	--	--	--
Jun-15	0.0103	0.133	--	--	--
Jul-15	0.00829	--	--	--	--
Aug-15	0.00941	--	--	--	--
Sep-15	0.00838	--	--	--	--
Oct-15	0.00765	0.223	0.810	1.03	0.153
Nov-15	0.0159	0.660	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	0.0118	--	--	--	--
Jan-16	0.0159	--	--	--	--
Feb-16	0.0133	--	--	--	--
Mar-16	0.0359	0.618	--	--	--
Apr-16	0.0197	0.223	1.79	2.01	1.04
May-16	0.0147	--	--	--	--
Jun-16	0.0359	--	--	--	--
Jul-16	0.00966	--	--	--	--
Aug-16	0.00964	--	--	--	--
Sep-16	0.00859	--	--	--	--
Oct-16	0.0132	--	--	--	--
Nov-16	0.0142	--	--	--	--
Dec-16	0.0116	0.746	0.702	1.45	
Jan-17	0.0702	--	--	--	--
Feb-17	0.107	--	--	--	--
Mar-17	0.0503	--	--	--	--
Apr-17	0.0294	1.11	1.56	2.67	0.479
May-17	0.0166	--	--	--	--
Jun-17	0.0156	--	--	--	--
Jul-17	0.0142	0.290	--	--	--
Aug-17	0.0127	--	--	--	--
Sep-17	0.0143	--	--	--	--
Oct-17	0.0117	--	--	--	--
Nov-17	0.0151	--	--	--	--
Dec-17	0.0118	0.304	0.591	0.896	0.259
Jan-18	0.0182	--	--	--	--
Feb-18	0.0207	2.28	0.808	3.09	0.445
Mar-18	0.0258	0.932	--	--	--
Apr-18	0.0292	0.618	--	--	--
May-18	0.0151	0.296	--	--	--
Jun-18	0.0150	--	--	--	--
Jul-18	0.0361	--	--	--	--
Aug-18	0.0242	--	--	--	--
Sep-18	0.0138	--	--	--	--
Oct-18	0.0131	--	--	--	--
Nov-18	0.0127	--	--	--	--
Dec-18	0.0176	--	--	--	--
Jan-19	0.0224	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	0.0587	--	--	--	--
Mar-19	0.0614	--	--	--	--
Apr-19	0.0277	0.775	0.0824	0.858	0.315
May-19	0.0237	--	--	--	--
Jun-19	0.0174	0.374	--	--	--
Jul-19	0.0128	--	--	--	--
Aug-19	0.0100	--	--	--	--
Sep-19	0.0106	0.547	0.203	0.552	0.138
Oct-19	0.0110	--	--	--	--
Nov-19	0.0141	--	--	--	--
Dec-19	0.200	9.75	--	--	--
Jan-20	0.00847	--	--	--	--
Feb-20	0.0144	--	--	--	--
Mar-20	0.0193	--	--	--	--
Apr-20	0.0141	0.444	0.378	0.746	0.968
May-20	0.0123	--	--	--	--
Jun-20	0.0152	--	--	--	--
Jul-20	0.0170	0.749	0.769	2.15	0.587
Aug-20	0.0144	--	--	--	--
Sep-20	0.0155	--	--	--	--
Oct-20	0.0148	1.51	--	--	--
Nov-20	0.0127	--	--	--	--
Dec-20	0.0165	--	--	--	--
Jan-21	0.0165	--	--	--	--
Feb-21	0.0214	0.715	--	--	--
Mar-21	0.0187	--	--	--	--
Apr-21	0.0150	0.511	0.776	1.29	0.200
May-21	0.0139	--	--	--	--
Jun-21	0.0113	0.546	--	--	--
Jul-21	0.0110	0.680	--	--	--
Aug-21	0.0106	--	--	--	--
Sep-21	0.0120	--	--	--	--
Oct-21	0.0204	0.0118	--	--	--
Nov-21	0.0165	--	--	--	--
Dec-21	0.0359	--	--	--	--
Jan-22	0.0211	0.550	--	--	--
Feb-22	0.0191	--	--	--	--
Mar-22	0.0169	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	0.0163	1.36	0.744	2.22	0.289
May-22	0.0161	--	--	--	--
Jun-22	0.0149	--	--	--	--
Jul-22	0.0186	0.905	--	--	--
Aug-22	0.0213	0.144	--	--	--
Sep-22	0.0231	--	--	--	--
Oct-22	0.0160	0.334	1.28	1.61	0.305
Nov-22	0.0157	2.11	--	--	--
Dec-22	0.0256	--	--	--	--
Jan-23	0.108	--	--	--	--
Feb-23	0.0514	--	--	--	--
Mar-23	0.104	0.506	--	--	--
Apr-23	0.0520	--	--	--	--
May-23	0.0363	--	0.591		0.00366
Jun-23	0.0228	0.583	--	--	--
Jul-23	0.0189	0.522	--	--	--
Aug-23	0.0186	--	--	--	--
Sep-23	0.0216	--	--	--	--
Oct-23	0.0242	--	--	--	--
Nov-23	0.0239	0.573	0.477	--	0.00958
Dec-23	0.0314	--	--	--	--
Jan-24	0.0400	--	--	--	--
Feb-24	0.0674	--	--	--	--
Mar-24	0.0671	1.25	--	--	--
Apr-24	0.0380	--	--	--	--
May-24	0.0213	--	--	--	--
Jun-24	0.0145	--	--	--	--
Jul-24	0.0162	--	--	--	--
Aug-24	--	--	--	--	--
Sep-24	0.0148	--	--	--	--
Oct-24	0.0159	0.00217	--	--	--
Nov-24	0.0224	--	--	--	--
Dec-24	0.0189	--	--	--	0.466
Jan-25	0.0169	1.15	--	--	--
Feb-25	0.0478	--	--	--	--
Mar-25	0.0270	--	--	--	--
Apr-25	0.0217	1.18	--	--	0.410
May-25	0.0187	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	0.0147	1.23	0.666	1.90	--
Jul-25	0.0111	0.00123	--	--	--
Aug-25	0.00866	--	--	--	--
Sep-25	0.00807	--	--	--	--
Dry Season Average	**0.0139**	**0.444**	**0.557**	**1.16**	**0.243**
Wet Season Average	**0.0256**	**0.906**	**0.833**	**1.62**	**0.410**
Annual Average	**0.0208**	**0.758**	**0.764**	**1.50**	**0.379**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

7 Delta Diablo

Delta Diablo discharges to New York Slough (part of the Suisun Bay) and serves approximately 72,100 service connections throughout Antioch, Pittsburg, and Bay Point. The plant has a permitted ADWF capacity of 19.5 mgd. The average discharge flow this past dry season was approximately 8.1 mgd. The plant performs secondary treatment using trickling filters, followed by activated sludge. Secondary effluent (up to 12.8 mgd) is diverted upstream of the disinfection process and sent for tertiary treatment prior to distribution to recycled water users. Approximately 90% of the recycled water is sent to two power plants for use in their cooling towers. The blowdown from the cooling towers is returned to the secondary treatment plant, blended with secondary effluent, and disinfected prior to discharge.

The following observations on influent and discharge are made based upon the figures and tables in the subsequent pages:

- Influent:
  - The overall plant reduction in effluent flow ranges from approximately 10 to 60 percent, depending on the quantity of water diverted to the cooling towers and other recycled water customers.
  - The nitrogen loads are reduced approximately 25 to 80 percent. This is largely attributed to a combination of biological assimilation and recycled water. Nitrogen reduction dropped below 30 percent in 2025 for the first time.
  - The total phosphorus load reductions across the plant are typically on the order of 75 to 95+ percent. This is largely attributed to chemical precipitation and removal at the plant, biological assimilation, and recycled water. In 2025, total phosphorus load reductions dropped to their lowest observed levels.
- Discharge:
  - The variability of nitrogen species in the effluent is due to the power plant cooling towers going in and out of nitrification and possible denitrification occurring sporadically. Since the summer of 2016, the predominant form of nitrogen returned with power plant blowdown has been the ammonia species due to the cessation of nitrification; however, there still appears to be unexplained reductions of TIN occurring in the cooling towers.
  - Nutrient loads typically increase with flow during wet weather events.
  - TIN concentrations are variable, ranging from 27 to 84 mg N/L, though concentrations have typically been <50 mg N/L in recent years. This is largely due to the variability associated with the ratio of blowdown to secondary effluent.
  - TP concentrations are generally less than 2 mg P/L, which suggests that the plant is removing phosphorus as previously noted.
  - The recently observed decrease in nitrogen reduction across the plant is primarily due to reduced recycled water demand.
- Recycled Water:
  - Based on Table 1-2, the plant averaged approximately 4.4 mgd in 2024 of recycled water that is diverted from the Bay. Users include Golf Course Irrigation, Landscape Irrigation, Commercial, and Industrial customers.

- Based on Table 5-3 through Table 5-5, the average load diverted from the Bay in 2024 was 63 kg ammonia-N/d, 66 kg TIN-N/d, and 2 kg P/d.

Influent

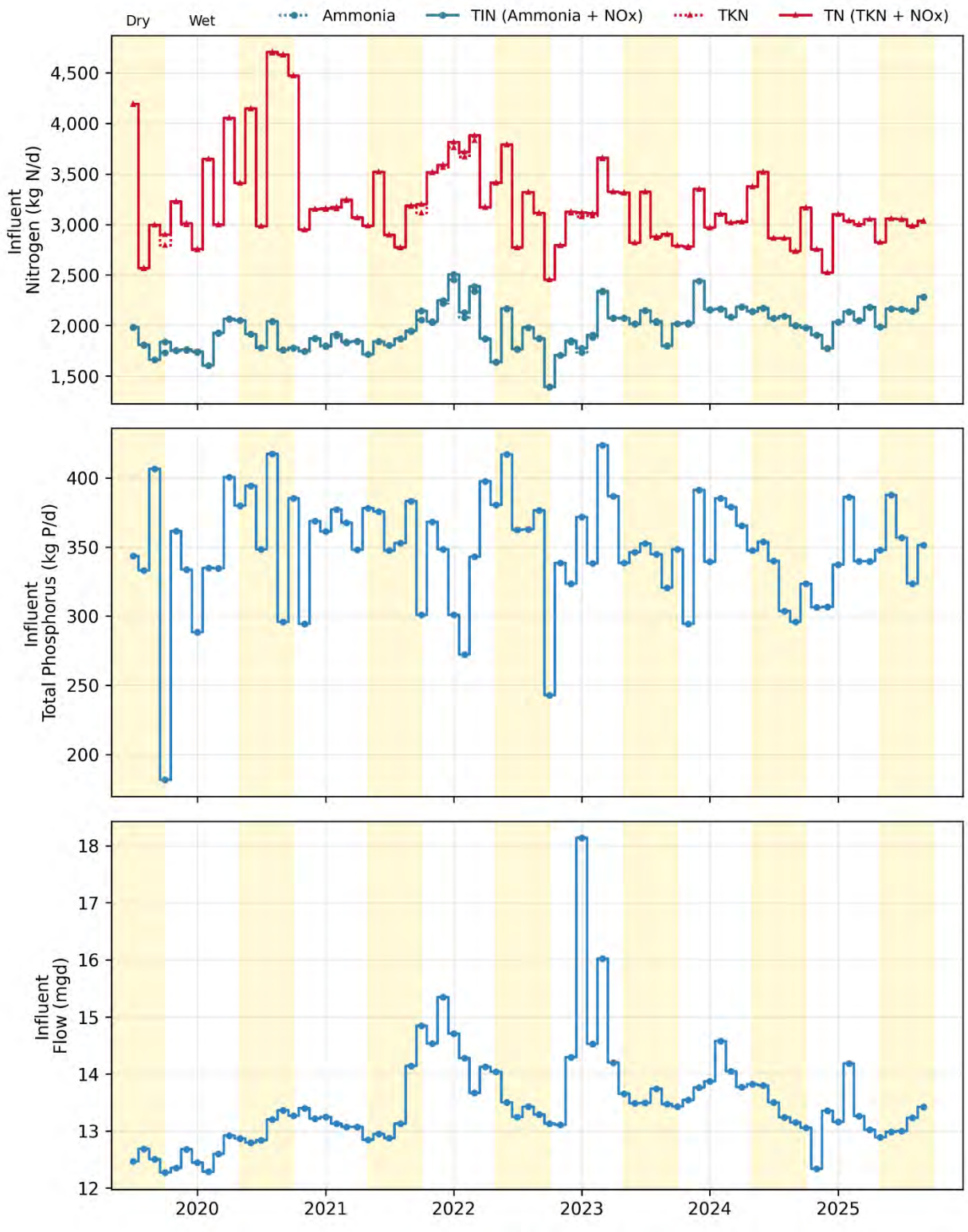


Figure 7-1. Influent: Delta Diablo Monthly Flows and Loads

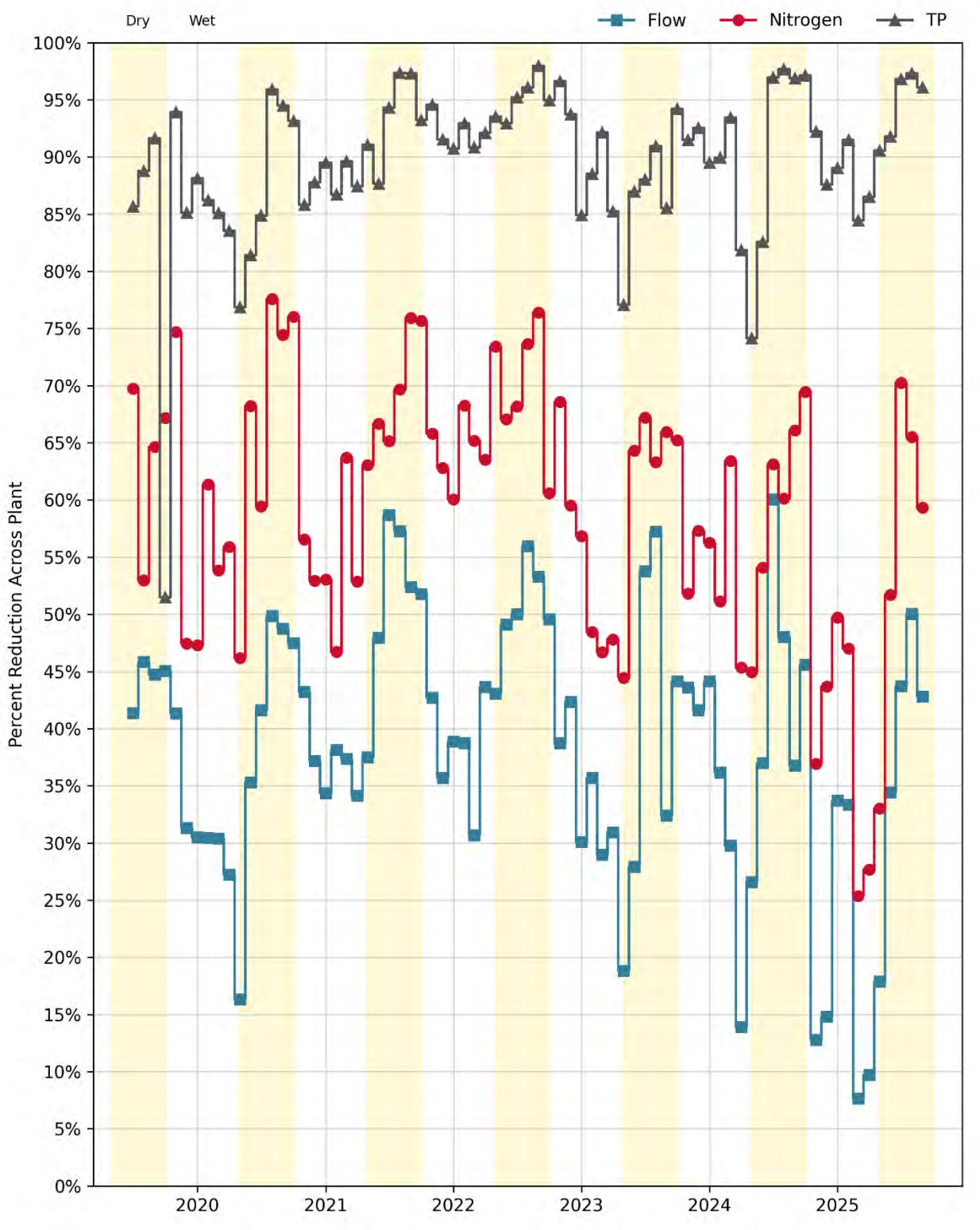


Figure 7-2. Influent: Delta Diablo Monthly Reductions Across the Plant

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 7-1. Influent: Delta Diablo Monthly Flows and Loads

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	12.5	1,980	3.27	1,980	4,188	4,190	344
Aug-19	12.7	1,800	3.35	1,810	2,562	2,565	333
Sep-19	12.5	1,660	2.18	1,660	2,992	2,994	407
Oct-19	12.3	1,730	106.00	1,840	2,793	2,899	182
Nov-19	12.4	1,750	4.72	1,760	3,222	3,227	362
Dec-19	12.7	1,760	9.47	1,770	3,000	3,009	334
Jan-20	12.4	1,730	9.95	1,740	2,748	2,758	289
Feb-20	12.3	1,600	2.58	1,600	3,645	3,647	335
Mar-20	12.6	1,920	3.74	1,930	2,994	2,997	334
Apr-20	12.9	2,060	2.25	2,070	4,051	4,053	401
May-20	12.9	2,050	2.31	2,050	3,407	3,408	380
Jun-20	12.8	1,910	1.90	1,920	4,144	4,145	394
Jul-20	12.8	1,780	1.92	1,780	2,981	2,982	349
Aug-20	13.2	2,040	5.42	2,040	4,698	4,702.	418
Sep-20	13.4	1,750	4.03	1,760	4,677	4,681	296
Oct-20	13.3	1,780	2.37	1,780	4,470	4,470	385
Nov-20	13.4	1,740	3.52	1,750	2,940	2,950	294
Dec-20	13.2	1,870	2.00	1,870	3,150	3,150	369
Jan-21	13.2	1,790	9.03	1,800	3,150	3,160	361
Feb-21	13.1	1,900	17.20	1,920	3,150	3,170	377
Mar-21	13.1	1,830	8.06	1,840	3,240	3,240	368
Apr-21	13.1	1,840	4.89	1,850	3,060	3,070	348
May-21	12.8	1,710	1.86	1,670	2,990	2,990	378
Jun-21	12.9	1,840	2.05	1,950	3,520	3,520	376
Jul-21	12.9	1,800	2.41	1,800	2,900	2,900	347
Aug-21	13.1	1,870	3.30	1,870	2,770	2,770	353
Sep-21	14.1	1,940	6.98	1,950	3,180	3,190	383
Oct-21	14.8	2,060	87.70	2,140	3,110	3,200	301
Nov-21	14.5	2,030	6.56	2,040	3,510	3,520	368
Dec-21	15.3	2,220	28.30	2,250	3,560	3,590	348
Jan-22	14.7	2,450	51.10	2,500	3,760	3,810	301
Feb-22	14.3	2,080	48.30	2,130	3,670	3,720	272
Mar-22	13.7	2,340	48.90	2,390	3,830	3,880	343
Apr-22	14.1	1,870	3.72	1,870	3,170	3,170	398
May-22	14.0	1,640	2.95	1,580	3,410	3,690	381
Jun-22	13.5	2,170	2.88	2,170	3,790	3,790	417
Jul-22	13.2	1,760	4.63	1,770	2,770	2,770	362

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	13.4	1,980	2.27	1,980	3,320	3,320	363
Sep-22	13.3	1,870	3.67	1,870	3,110	3,110	376
Oct-22	13.1	1,390	1.81	1,390	2,450	2,450	243
Nov-22	13.1	1,700	2.93	1,710	2,790	2,790	338
Dec-22	14.3	1,840	11.50	1,850	3,110	3,120	324
Jan-23	18.1	1,730	40.50	1,770	3,080	3,120	372
Feb-23	14.5	1,880	23.30	1,910	3,090	3,110	338
Mar-23	16.0	2,330	8.53	2,340	3,650	3,660	424
Apr-23	14.2	2,070	2.96	2,070	3,320	3,320	387
May-23	13.7	2,070	3.21	2,080	3,310	3,310	338
Jun-23	13.5	2,020	2.66	2,020	2,820	2,820	346
Jul-23	13.5	2,150	1.02	2,150	3,320	3,320	353
Aug-23	13.7	2,030	13.40	2,040	2,870	2,880	345
Sep-23	13.5	1,790	4.03	1,800	2,900	2,900	320
Oct-23	13.4	2,020	2.51	2,020	2,790	2,790	349
Nov-23	13.5	2,010	10.1	2,020	2,770	2,780	295
Dec-23	13.8	2,440	2.06	2,440	3,350	3,350	391
Jan-24	13.9	2,150	2.95	2,160	2,970	2,970	340
Feb-24	14.6	2,160	5.78	2,170	3,100	3,110	385
Mar-24	14.0	2,080	2.62	2,080	3,020	3,020	379
Apr-24	13.8	2,180	3.56	2,190	3,020	3,030	366
May-24	13.8	2,140	3.50	2,140	3,370	3,370	347
Jun-24	13.8	2,170	3.64	2,170	3,510	3,520	354
Jul-24	13.5	2,070	1.84	2,070	2,860	2,860	340
Aug-24	13.2	2,090	2.19	2,090	2,860	2,860	304
Sep-24	13.2	2,000	2.68	2,000	2,730	2,740	296
Oct-24	13.1	1,980	3.78	1,980	3,160	3,170	324
Nov-24	12.3	1,900	1.43	1,910	2,750	2,750	306
Dec-24	13.4	1,770	2.77	1,770	2,520	2,520	307
Jan-25	13.2	2,030	1.41	2,030	3,100	3,100	337
Feb-25	14.2	2,130	2.83	2,140	3,030	3,040	386
Mar-25	13.3	2,050	1.67	2,050	3,000	3,000	340
Apr-25	13.0	2,180	2.03	2,180	3,050	3,050	340
May-25	12.9	1,990	2.22	1,990	2,820	2,820	348
Jun-25	13.0	2,160	2.39	2,170	3,050	3,060	388
Jul-25	13.0	2,160	2.43	2,160	3,050	3,050	357
Aug-25	13.2	2,140	4.17	2,150	2,980	2,990	323
Sep-25	13.4	2,280	4.33	2,290	3,030	3,030	351

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	13.2	1,960	3.34	1,970	3,240	3,250	357
Wet Season Average	13.7	1,960	14.2	1,980	3,170	3,190	341
Average Annual	13.5	1,960	9.41	1,970	3,200	3,220	348

* Delta Diablo typically samples more than the required influent quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

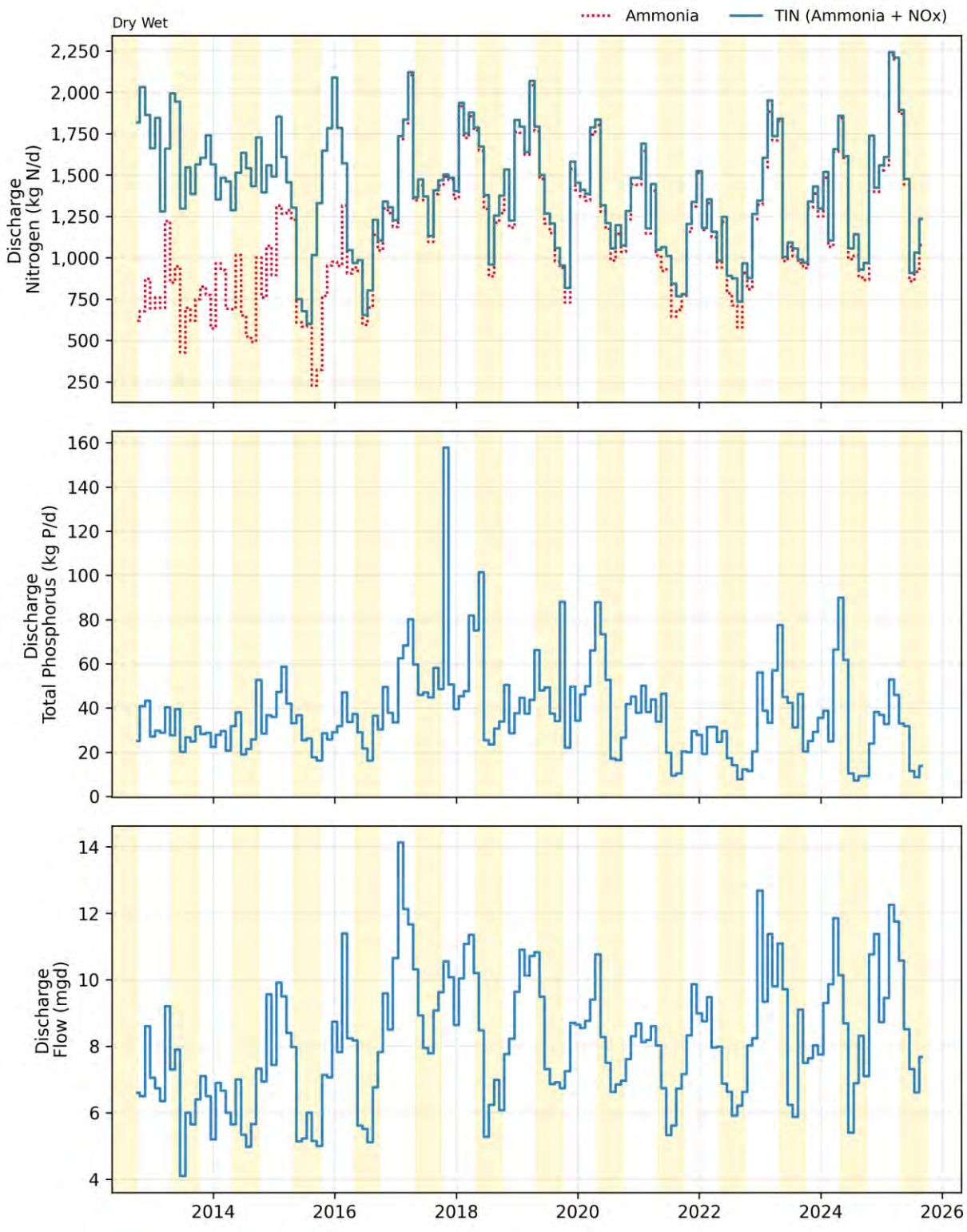


Figure 7-3. Discharge: Delta Diablo Monthly Flows and Loads

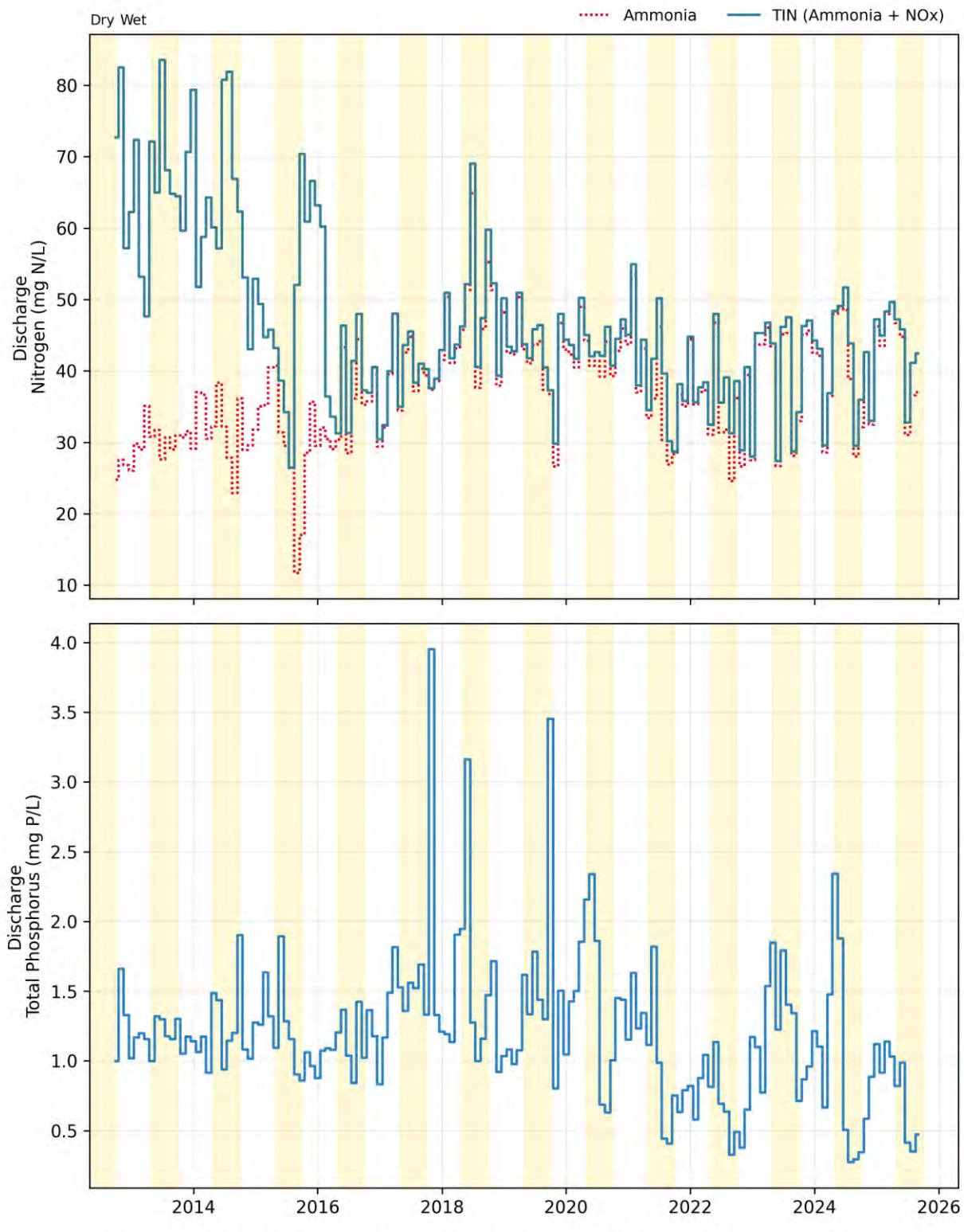


Figure 7-4. Discharge: Delta Diablo Monthly Concentrations

Table 7-2. Discharge: Delta Diablo Monthly Flows and Loads

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	6.60	618	1,200.0	1,820	24.9
Nov-12	6.50	677	1,350.0	2,030	40.9
Dec-12	8.60	872	991.0	1,860	43.2
Jan-13	7.05	694	967.0	1,660	27.2
Feb-13	6.73	760	1,080.0	1,840	29.7
Mar-13	6.35	697	582.0	1,280	28.7
Apr-13	9.20	1,220	437.0	1,660	40.2
May-13	7.30	850	1,140.0	1,990	27.6
Jun-13	7.90	948	995.0	1,940	39.4
Jul-13	4.10	429	868.0	1,300	20.1
Aug-13	6.00	697	850.0	1,550	26.7
Sep-13	5.65	619	767.0	1,390	24.7
Oct-13	6.40	750	812.0	1,560	31.5
Nov-13	7.10	824	778.0	1,600	28.3
Dec-13	6.50	776	963.0	1,740	28.9
Jan-14	5.20	573	990.0	1,560	22.5
Feb-14	6.90	966	385.0	1,350	27.8
Mar-14	6.67	925	559.0	1,480	29.6
Apr-14	6.00	693	767.0	1,460	20.8
May-14	5.65	690	596.0	1,290	31.8
Jun-14	7.00	1,020	498.0	1,510	38.0
Jul-14	5.34	651	982.0	1,630	19.0
Aug-14	4.97	524	1,020.0	1,540	21.5
Sep-14	5.66	490	942.0	1,430	25.7
Oct-14	7.32	1,000	725.0	1,730	52.7
Nov-14	6.94	761	633.0	1,390	28.4
Dec-14	9.56	1,070	488.0	1,560	36.8
Jan-15	7.44	894	595.0	1,490	35.9
Feb-15	9.91	1,310	538.0	1,850	47.3
Mar-15	9.50	1,270	341.0	1,610	58.8
Apr-15	8.40	1,290	167.0	1,450	41.9
May-15	7.97	1,230	73.8	1,300	33.0
Jun-15	5.13	609	142.0	751	36.8
Jul-15	5.22	583	92.7	676	25.4
Aug-15	6.00	599	1.4	601	26.2
Sep-15	5.15	228	787.0	1,010	17.6
Oct-15	4.99	322	1,010.0	1,330	16.2
Nov-15	7.13	771	875.0	1,650	28.6

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	7.07	954	828.0	1,780	25.7
Jan-16	8.73	975	1,110.0	2,090	29.0
Feb-16	7.83	951	834.0	1,780	31.8
Mar-16	11.40	1,310	256.0	1,570	47.0
Apr-16	8.23	905	141.0	1,050	33.6
May-16	8.18	940	28.2	968	37.2
Jun-16	5.62	921	64.4	985	29.1
Jul-16	5.51	593	59.9	653	21.6
Aug-16	5.11	699	102.0	801	16.2
Sep-16	6.76	1,140	89.9	1,230	36.4
Oct-16	7.83	1,040	60.0	1,100	30.2
Nov-16	9.59	1,300	43.5	1,340	49.5
Dec-16	8.50	1,270	36.7	1,310	37.9
Jan-17	10.70	1,190	41.1	1,230	33.5
Feb-17	14.10	1,720	18.9	1,730	62.4
Mar-17	12.10	1,810	22.5	1,840	68.4
Apr-17	11.70	2,100	19.5	2,120	80.2
May-17	10.30	1,350	19.5	1,370	59.6
Jun-17	8.92	1,440	34.7	1,470	45.8
Jul-17	7.95	1,350	22.1	1,370	47.0
Aug-17	7.79	1,100	34.7	1,130	44.8
Sep-17	9.07	1,380	23.8	1,410	58.1
Oct-17	9.63	1,440	32.0	1,470	48.5
Nov-17	10.60	1,490	11.1	1,500	158.0
Dec-17	10.10	1,470	12.8	1,480	50.6
Jan-18	8.64	1,360	45.8	1,400	39.6
Feb-18	10.00	1,910	21.7	1,940	45.3
Mar-18	11.10	1,720	26.3	1,750	47.6
Apr-18	11.40	1,850	23.6	1,880	81.8
May-18	10.20	1,770	17.6	1,790	75.1
Jun-18	8.47	1,650	25.6	1,670	101.0
Jul-18	5.27	1,290	82.6	1,170	25.4
Aug-18	6.24	888	69.2	957	23.6
Sep-18	6.98	1,210	40.8	1,250	30.6
Oct-18	6.08	1,270	104.0	1,370	33.8
Nov-18	7.76	1,510	26.2	1,530	50.3
Dec-18	8.23	1,180	43.2	1,230	28.7
Jan-19	9.64	1,760	71.9	1,860	37.7

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	10.90	1,750	36.2	1,790	44.6
Mar-19	10.10	1,620	16.6	1,640	37.5
Apr-19	10.70	2,040	25.3	2,070	43.6
May-19	10.80	1,760	27.8	1,810	66.3
Jun-19	9.49	1,480	25.0	1,210	48.0
Jul-19	7.31	1,210	61.8	1,270	49.3
Aug-19	6.87	1,150	58.2	1,210	37.4
Sep-19	6.91	977	82.2	1,060	34.0
Oct-19	6.74	938	13.6	952	88.1
Nov-19	7.24	730	86.9	817	22.0
Dec-19	8.71	1,540	42.7	1,580	49.6
Jan-20	8.65	1,410	46.7	1,450	34.3
Feb-20	8.54	1,370	42.0	1,410	46.1
Mar-20	8.77	1,340	39.3	1,380	49.8
Apr-20	9.40	1,740	44.8	1,790	66.0
May-20	10.80	1,800	33.2	1,830	87.8
Jun-20	8.28	1,280	41.3	1,320	73.3
Jul-20	7.50	1,170	35.2	1,210	52.7
Aug-20	6.62	982	72.9	1,050	17.2
Sep-20	6.85	1,140	54.5	1,200	16.3
Oct-20	6.96	1,030	37.6	1,070	26.4
Nov-20	7.61	1,230	48.3	1,280	41.8
Dec-20	8.30	1,440	40.4	1,480	45.1
Jan-21	8.69	1,440	43.3	1,480	37.9
Feb-21	8.12	1,640	44.8	1,690	50.1
Mar-21	8.19	1,150	31.5	1,180	38.2
Apr-21	8.61	1,400	42.1	1,450	43.8
May-21	8.03	1,010	34.0	1,100	33.8
Jun-21	6.74	921	142.0	1,170	46.4
Jul-21	5.32	930	79.7	1,010	19.8
Aug-21	5.61	644	197.0	841	9.4
Sep-21	6.73	685	82.4	768	10.4
Oct-21	7.16	769	9.7	778	20.4
Nov-21	8.33	1,160	47.3	1,200	20.0
Dec-21	9.87	1,310	27.6	1,340	29.5
Jan-22	8.99	1,510	10.7	1,520	27.9
Feb-22	8.75	1,170	9.9	1,180	19.2
Mar-22	9.48	1,330	21.6	1,350	31.4

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	7.96	1,120	33.2	1,160	31.4
May-22	7.99	940	41.9	982	24.7
Jun-22	6.87	1,220	31.3	1,250	29.5
Jul-22	6.62	786	105.0	882	17.3
Aug-22	5.91	711	164.0	875	14.2
Sep-22	6.21	578	157.0	734	7.7
Oct-22	6.62	907	59.3	967	12.3
Nov-22	8.03	809	68.3	877	11.4
Dec-22	8.24	1,230	34.7	1,270	20.3
Jan-23	12.70	1,320	26.4	1,350	56.1
Feb-23	9.34	1,540	57.6	1,600	38.8
Mar-23	11.40	1,880	68.2	1,950	33.3
Apr-23	9.81	1,710	24.7	1,730	57.1
May-23	11.10	1,820	16.5	1,840	77.6
Jun-23	9.72	980	25.8	1,010	45.0
Jul-23	6.24	1,070	24.1	1,090	42.3
Aug-23	5.88	1,010	48.3	1,060	31.2
Sep-23	9.11	969	19.8	988	46.3
Oct-23	7.50	937	34.1	971	20.2
Nov-23	7.64	1,300	35.9	1,340	25.1
Dec-23	8.03	1,390	42.6	1,430	29.1
Jan-24	7.75	1,250	48.8	1,300	35.6
Feb-24	9.30	1,480	35.4	1,520	38.8
Mar-24	9.86	1,070	37.3	1,100	24.8
Apr-24	11.9	1,640	18.1	1,660	66.3
May-24	10.1	1,840	14.9	1,860	89.9
Jun-24	8.69	1,600	11.1	1,610	61.7
Jul-24	5.39	990	66.0	1,060	10.3
Aug-24	6.88	1,010	130	1,140	7.11
Sep-24	8.31	881	47.2	928	9.23
Oct-24	7.10	864	103	967	9.28
Nov-24	10.8	1,720	19.9	1,740	23.8
Dec-24	11.4	1,400	22.9	1,420	38.1
Jan-25	8.72	1,530	32.5	1,560	37.0
Feb-25	9.46	1,560	51.5	1,610	32.8
Mar-25	12.2	2,220	17.9	2,240	52.8
Apr-25	11.8	2,200	10.3	2,210	45.8
May-25	10.6	1,870	21.7	1,890	32.8

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	8.51	1,440	32.8	1,480	31.8
Jul-25	7.32	858	49.1	907	11.4
Aug-25	6.61	916	113	1,030	8.74
Sep-25	7.67	1,070	159	1,230	13.7
Dry Season Average	**7.25**	**1,040**	**197**	**1,230**	**35.1**
Wet Season Average	**8.73**	**1,260**	**250**	**1,510**	**39.3**
Average Annual	**8.11**	**1,170**	**228**	**1,390**	**37.5**

* Delta Diablo typically samples each month more than the required frequency for ammonia. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 7-3. Recycled Water: Delta Diablo Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	54.8 (0.05)	228 (0.20)	0 (0)	3,840 (3.43)	0 (0)	0 (0)	119 (0.11)	4,240 (3.79)
2020	203 (0.18)	256 (0.23)	0 (0)	4,340 (3.88)	0 (0)	0 (0)	26.7 (0.02)	4,830 (4.31)
2021	246 (0.22)	273 (0.24)	0 (0)	5,220 (4.66)	0 (0)	0 (0)	2.6 (<0.01)	5,740 (5.12)
2022	215 (0.19)	259 (0.23)	0 (0)	5,160 (4.61)	0 (0)	0 (0)	2.6 (<0.01)	5,640 (5.03)
2023	152 (0.14)	245 (0.22)	0 (0)	4,830 (4.31)	0 (0)	0 (0)	2.6 (<0.01)	5,230 (4.67)
2024	229 (0.204)	257 (0.229)	0 (0)	4,410 (3.94)	0 (0)	0 (0)	2.6 (<0.01)	4,900 (4.38)
Average	**183 (0.164)**	**253 (0.226)**	**0 (0)**	**4,630 (4.14)**	**0 (0)**	**0 (0)**	**26 (0<.01)**	**5,100 (4.55)**

* Assumes 100% of the recycled flow is diverted from the Bay for all but the Industrial Application. The analysis assumed 65% of the recycled flow sent to Industrial Application was diverted from the Bay for years prior to 2023. For 2023 and later, the proportion assumed diverted from the Bay is 70%..

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 7-4. Recycled Water: Delta Diablo Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	8	32	0	0	0	0	18	58
2020	29	37	0	0	0	0	3	70
2021	31	34	0	0	0	0	0	66
2022	26	31	0	0	0	0	0	56
2023	20	32	0	0	0	0	0	52
2024	30	34	0	0	0	0	0	63
Average	**23**	**33**	**0**	**0**	**0**	**0**	**4**	**60**

* Assumes 100% of the recycled nutrient load is diverted from the Bay for all but the Industrial Application. The analysis conservatively assumed 0% of the recycled nutrient load sent to Industrial Application was diverted from the Bay. Preliminary analysis suggests that the Industrial Application may be removing some nutrient load; however, additional studies are needed to quantify the nutrient load diverted from the Bay.

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 7-5. Recycled Water: Delta Diablo Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	8	33	0	0	0	0	18	59
2020	30	39	0	0	0	0	3	72
2021	34	37	0	0	0	0	0	71
2022	27	33	0	0	0	0	0	60
2023	21	33	0	0	0	0	0	53
2024	31	35	0	0	0	0	0	66
Average	**24**	**35**	**0**	**0**	**0**	**0**	**4**	**63**

* Assumes 100% of the recycled nutrient load is diverted from the Bay for all but the Industrial Application. The analysis conservatively assumed 0% of the recycled nutrient load sent to Industrial Application was diverted from the Bay. Preliminary analysis suggests that the Industrial Application may be removing some nutrient load; however, additional studies are needed to quantify the nutrient load diverted from the Bay.

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 7-6. Recycled Water: Delta Diablo Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	1	0	0	0	0	1	2
2020	1	1	0	0	0	0	0	2
2021	1	1	0	0	0	0	0	2
2022	1	1	0	0	0	0	0	1
2023	1	1	0	0	0	0	0	2
2024	1	1	0	0	0	0	0	2
Average	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**2**

* Assumes 100% of the recycled nutrient load is diverted from the Bay for all but the Industrial Application. The analysis conservatively assumed 0% of the recycled nutrient load sent to Industrial Application was diverted from the Bay. Preliminary analysis suggests that the Industrial Application may be removing some nutrient load; however, additional studies are needed to quantify the nutrient load diverted from the Bay.

**** Calendar year as opposed to California's water year (October 1 through September 30)**

8 East Bay Dischargers Authority (EBDA)

EBDA discharges to the South Bay. EBDA has a permitted ADWF capacity of 107.8 mgd and a peak wet weather capacity of 189.1 mgd. The average dry season flow this past year was 55.9 mgd. EBDA's discharge is a combined flow from six wastewater treatment plants: EBDA members City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. The contributing plants have various types of secondary treatment.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent:
  - The flow reduction is seasonally influenced. The flows are reduced by up to 27 percent during the dry season, which is primarily attributed to recycled water.
  - Nitrogen load reductions across the plants have also been historically seasonally dependent (range from 35 to 65 percent load reductions across the plants).
  - Phosphorus load reductions across the plants have been relatively stable, with values ranging from approximately 60 to 75 percent. Several EBDA members perform phosphorus removal.
- Discharge:
  - The wet season flows are 10 to 20 mgd higher than the dry season due to a combination of recycled water demand during the dry season and inflow and infiltration.
  - Nitrogen loads typically increase with flow during wet weather events. This is attributed to a combination of scouring in the collection system and biological washout concerns for facilities performing nitrogen load reduction (e.g., Oro Loma/Castro Valley Sanitary District).
  - Ammonia represents the majority of the nitrogen species discharged, regardless of season. This is expected since the EBDA plants were not designed to nitrify (with the exception of the recent upgrades at Oro Loma/Castro Valley Sanitary District).
  - The lowest observed ammonia discharge load was observed during the 2025 dry season. This additional reduction from prior years is attributed to optimization work performed at DSRSD during the 2025 dry season.
- Recycled Water:
  - Based on Table 1-3, EBDA and its member agencies have averaged 8.7 mgd of Recycled Water over the 2019-2024 calendar years. Users include Golf Course, Landscape Irrigation, Industrial, and Other. The EBDA contributors with the largest recycled water volumes/flows are the City of Livermore and Dublin San Ramon Services District.
  - Based on Table 1-4 through Table 1-6, EBDA and its member agencies have averaged 1,237 kg ammonia-N/d, 1,286 kg TIN-N/d, and 95 kg P/d diverted from the Bay through recycled water over the 2019-2024 calendar years.

8.1 Influent

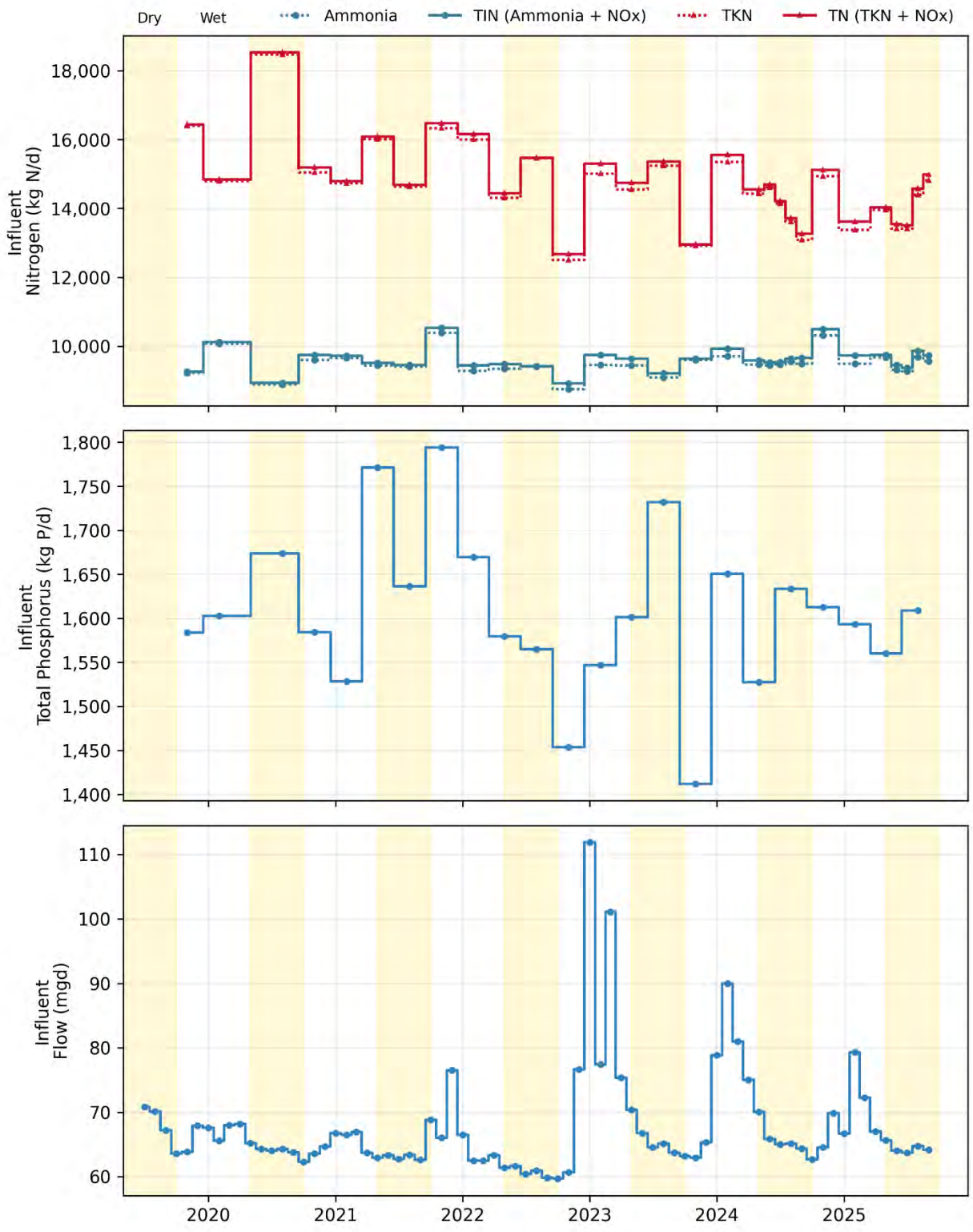


Figure 8-1. Influent: EBDA Monthly Flows and Loads (Values are only provided for months when all six agencies sampled; Loads are summed for all agencies.)

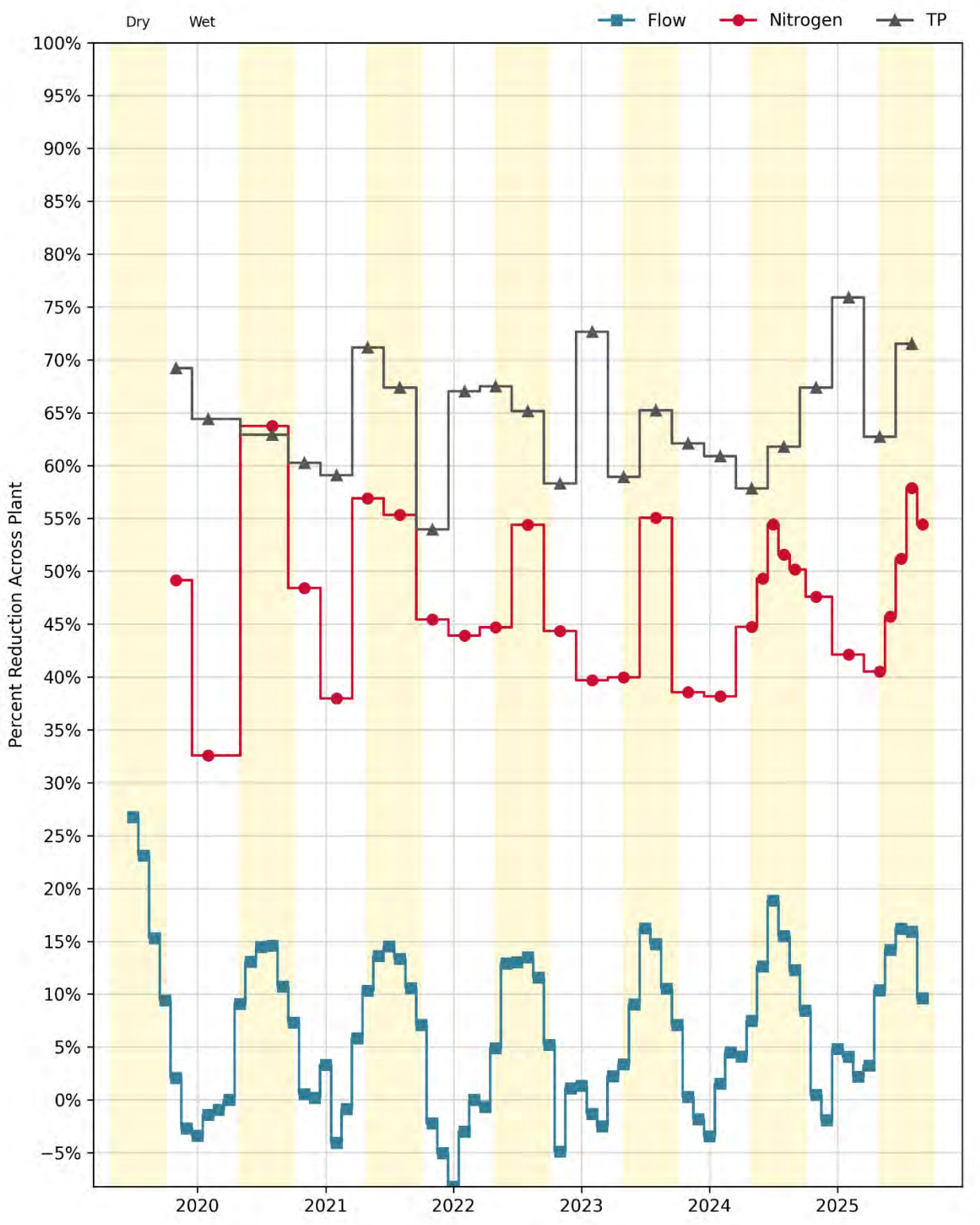


Figure 8-2. Influent: EBDA Monthly Reductions Across the Plants*

* The flow reduction across all the EBDA member agencies is occasionally negative during the wet season. This is attributed to stored water returned to the system.

Note: Influent Total N for the sum of all agencies was compared against EBDA Discharge TIN for calculating nitrogen load reduction.

Table 8-1. Influent: EBDA Members' Monthly Flows and Loads[1,*]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN **	TKN	Total N **	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	70.8	--	--	--	--	--	--
Aug-19	70.1	9,020	--	--	--	--	--
Sep-19	67.2	--	--	--	--	--	--
Oct-19	63.6	--	--	--	--	--	--
Nov-19	63.9	9,230	28.4	8,990	16,400	16,400	1,580
Dec-19	67.9	--	--	--	--	--	--
Jan-20	67.6	--	--	--	--	--	--
Feb-20	65.6	10,100	57.4	9,430	14,800	14,800	1,600
Mar-20	68.0	--	--	--	--	--	--
Apr-20	68.2	--	--	--	--	--	--
May-20	65.2	--	--	--	--	--	--
Jun-20	64.3	--	--	--	--	--	--
Jul-20	64.0	--	--	--	--	--	--
Aug-20	64.3	8,880	55.0	9,330	18,500	18,500	1,670
Sep-20	63.8	--	--	--	--	--	--
Oct-20	62.3	--	--	--	--	--	--
Nov-20	63.6	9,590	153	9,830	15,000	15,200	1,580
Dec-20	64.7	--	--	--	--	--	--
Jan-21	66.8	--	--	--	--	--	--
Feb-21	66.5	9,660	56.2	9,630	14,700	14,800	1,530
Mar-21	67.0	--	--	--	--	--	--
Apr-21	63.7	--	--	--	--	--	--
May-21	62.9	9,440	74.1	9,720	16,000	16,100	1,770
Jun-21	63.3	--	--	--	--	--	--
Jul-21	62.7	--	--	--	--	--	--
Aug-21	63.4	9,400	52.8	9,940	14,600	14,700	1,640
Sept-21	62.6	--	--	--	--	--	--
Oct-21	68.8	--	--	--	--	--	--
Nov-21	66.0	10,400	143	10,500	16,300	16,500	1,790
Dec-21	76.5	--	--	--	--	--	--
Jan-22	66.5	--	--	--	--	--	--
Feb-22	62.5	9,280	161	10,000	16,000	16,200	1,670
Mar-22	62.5	--	--	--	--	--	--
Apr-22	63.3	--	--	--	--	--	--
May-22	61.4	9,340	140	9,850	14,300	14,400	1,580
Jun-22	61.7	--	--	--	--	--	--
Jul-22	60.4	--	--	--	--	--	--
Aug-22	60.9	9,410	13.3	9,990	15,500	15,500	1,560
Sep-22	59.8	--	--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN **	TKN	Total N **	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Oct-22	59.7	--	--	--	--	--	--
Nov-22	60.7	8,760	164	8,470	12,500	12,700	1,450
Dec-22	76.7	--	--	--	--	--	--
Jan-23	112	--	--	--	--	--	--
Feb-23	77.4	9,450	297	9,710	15,000	15,300	1,550
Mar-23	101	--	--	--	--	--	--
Apr-23	75.4	--	--	--	--	--	--
May-23	70.4	9,440	189	9,450	14,500	14,700	1,600
Jun-23	66.7	--	--	--	--	--	--
Jul-23	64.6	--	--	--	--	--	--
Aug-23	65.1	9,090	129	9,890	15,200	15,400	1,730
Sep-23	63.7	--	--	--	--	--	--
Oct-23	63.2	--	--	--	--	--	--
Nov-23	62.9	9,590	44.7	9,560	12,900	13,000	1,410
Dec-23	65.4	--	--	--	--	--	--
Jan-24	78.8	--	--	--	--	--	--
Feb-24	89.9	9,710	217	9,740	15,300	15,600	1,650
Mar-24	81.0	--	--	--	--	--	--
Apr-24	75.1	--	--	--	--	--	--
May-24	70.1	9,460	122	9,740	14,400	14,500	1,530
Jun-24	65.9	9,440	87.5	9,590	14,600	14,700	--
Jul-24	65.0	9,470	70.9	9,770	14,100	14,200	--
Aug-24	65.2	9,550	88.3	9,540	13,600	13,700	1,630
Sep-24	64.3	9,480	176	9,490	13,100	13,300	--
Oct-24	62.7	--	--	--	--	--	--
Nov-24	64.6	10,300	185	10,600	14,900	15,100	1,610
Dec-24	69.9	--	--	--	--	--	--
Jan-25	66.8	--	--	--	--	--	--
Feb-25	79.4	9,490	242	9,860	13,400	13,600	1,590
Mar-25	72.3	--	--	--	--	--	--
Apr-25	67.0	--	--	--	--	--	--
May-25	65.5	9,670	77.5	9,660	14,000	14,000	1,560
Jun-25	64.0	9,300	140	9,580	13,400	13,600	--
Jul-25	63.7	9,270	93.5	9,340	13,400	13,500	--
Aug-25	64.8	9,680	185	9,880	14,400	14,500	1,610
Sep-25	64.1	9,560	172	9,750	14,800	15,000	--
Dry Season Average	**64.6**	**9,380**	**110**	**9,670**	**14,600**	**14,700**	**1,630**
Wet Season Average	**70.2**	**9,630**	**146**	**9,710**	**14,800**	**14,900**	**1,590**
Annual Average	**67.7**	**9,480**	**125**	**9,690**	**14,700**	**14,800**	**1,610**

1 After October 1, 2023, loads are calculated with 1/2 of the method detection limit if non-detect measurements are included. Prior to October 1, 2023, loads were calculated with the provided method detection limit if non-detect values were included.

* Agencies that Contribute to EBDA: City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. Values are only provided for months where all agencies sampled.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

8.2 Discharge

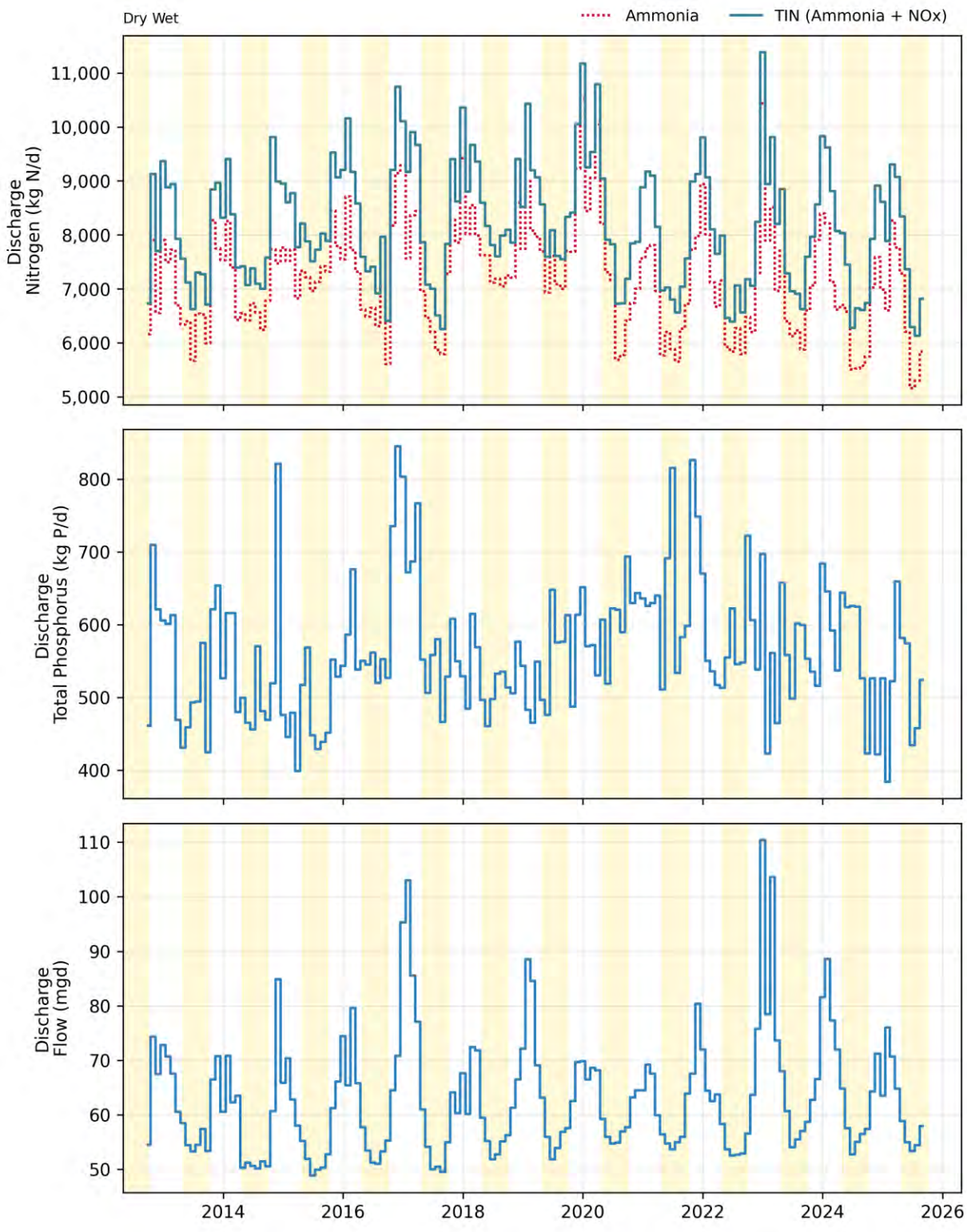


Figure 8-3. Discharge: EBDA Monthly Flows and Loads

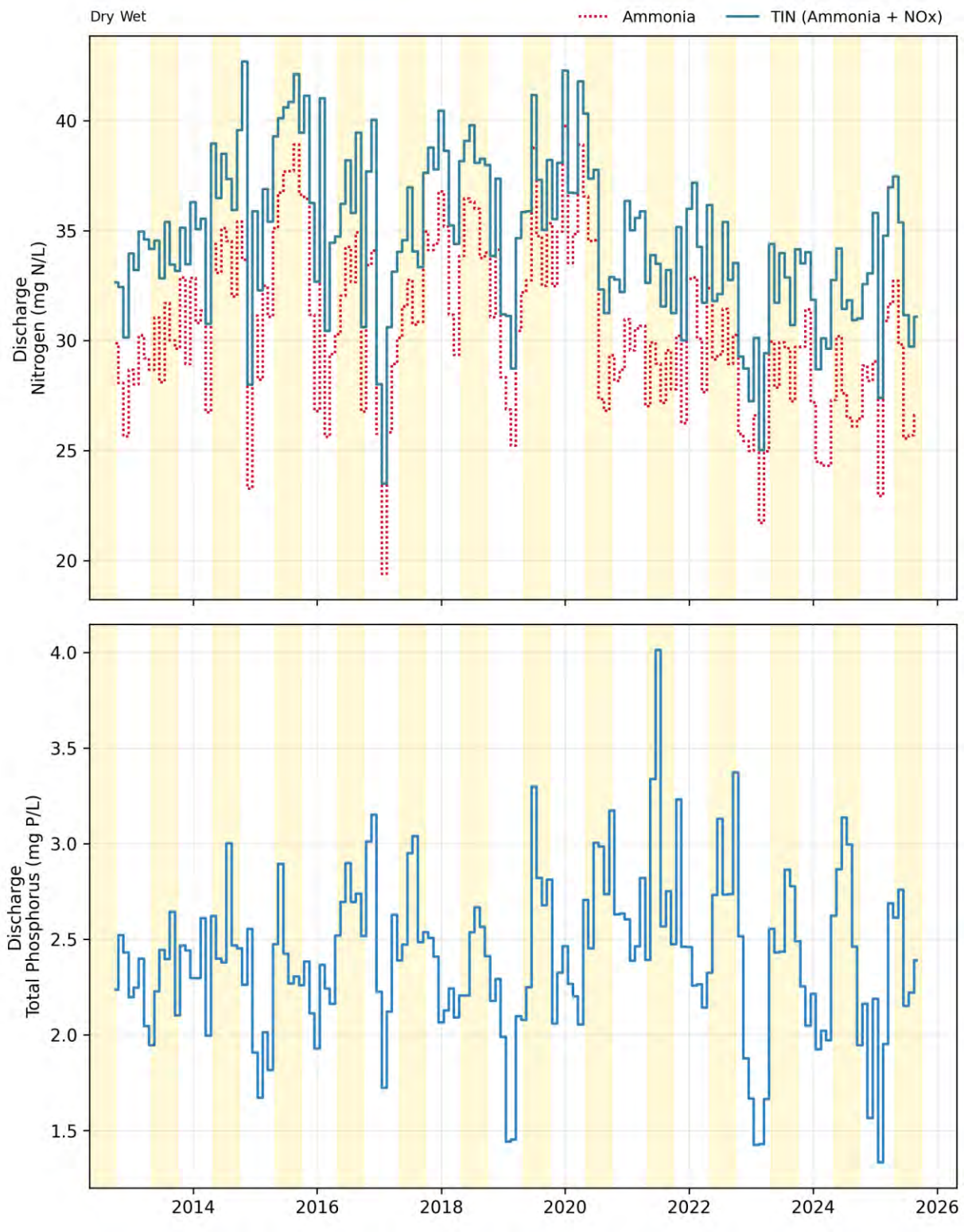


Figure 8-4. Discharge: EBDA Monthly Concentrations

Table 8-2. Discharge: EBDA Monthly Flows and Loads[1]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	54.5	6,160	568	6,730	462
Nov-12	74.3	7,900	1,230	9,130	710
Dec-12	67.5	6,550	1,150	7,700	621
Jan-13	72.9	7,900	1,460	9,360	606
Feb-13	70.7	7,490	1,390	8,880	601
Mar-13	67.6	7,730	1,210	8,940	613
Apr-13	60.6	6,690	1,240	7,930	469
May-13	58.5	6,340	1,220	7,560	431
Jun-13	54.5	6,400	719	7,120	459
Jul-13	53.3	5,670	953	6,620	493
Aug-13	54.5	6,540	763	7,300	494
Sep-13	57.5	6,520	750	7,270	575
Oct-13	53.4	5,990	715	6,700	425
Nov-13	66.5	8,270	567	8,840	621
Dec-13	70.7	7,740	1,220	8,960	654
Jan-14	60.6	7,530	789	8,320	526
Feb-14	70.9	8,260	1,150	9,410	616
Mar-14	62.3	7,400	986	8,380	616
Apr-14	63.5	6,430	966	7,390	480
May-14	50.3	6,550	873	7,420	499
Jun-14	51.2	6,410	660	7,070	465
Jul-14	50.7	6,730	649	7,380	456
Aug-14	50.2	6,560	534	7,090	570
Sep-14	51.5	6,240	765	7,000	481
Oct-14	50.6	6,780	795	7,570	470
Nov-14	60.7	7,740	2,070	9,810	520
Dec-14	84.9	7,470	1,520	8,990	821
Jan-15	65.9	7,770	1,180	8,950	476
Feb-15	70.4	7,520	1,080	8,600	446
Mar-15	62.8	7,720	1,050	8,770	479
Apr-15	58.0	6,820	948	7,770	399
May-15	55.2	7,340	874	8,210	517
Jun-15	51.9	7,220	667	7,880	569
Jul-15	48.8	6,970	540	7,510	448
Aug-15	50.0	7,130	594	7,730	429
Sep-15	50.3	7,410	609	8,020	439
Oct-15	52.8	7,320	564	7,880	452

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	61.2	8,440	1,080	9,530	552
Dec-15	66.1	7,790	1,270	9,070	529
Jan-16	74.4	7,550	1,660	9,200	543
Feb-16	65.4	8,710	1,450	10,200	586
Mar-16	79.6	7,710	1,450	9,170	676
Apr-16	65.8	7,310	1,260	8,580	539
May-16	57.7	6,620	972	7,590	550
Jun-16	53.5	6,480	845	7,330	545
Jul-16	51.2	6,650	763	7,410	562
Aug-16	51.0	6,310	608	6,920	520
Sep-16	53.3	7,040	916	7,960	552
Oct-16	55.3	5,600	802	6,410	527
Nov-16	64.5	8,170	1,040	9,200	736
Dec-16	70.9	9,140	1,600	10,700	845
Jan-17	95.3	9,290	819	10,100	803
Feb-17	103	7,560	1,600	9,160	672
Mar-17	85.5	8,360	1,540	9,910	687
Apr-17	77.1	8,440	1,220	9,670	767
May-17	61.0	6,960	905	7,860	552
Jun-17	54.1	6,460	617	7,080	506
Jul-17	50.0	6,200	797	7,000	559
Aug-17	50.5	5,870	638	6,500	580
Sep-17	49.6	5,790	467	6,260	466
Oct-17	55.0	7,280	559	7,830	528
Nov-17	64.1	8,280	1,130	9,410	608
Dec-17	60.3	7,850	767	8,620	550
Jan-18	67.7	9,420	937	10,400	529
Feb-18	60.2	8,010	785	8,800	485
Mar-18	72.4	8,550	1,110	9,660	615
Apr-18	71.9	7,980	1,370	9,360	569
May-18	59.5	7,620	972	8,590	497
Jun-18	55.2	7,620	545	8,160	461
Jul-18	51.8	7,120	686	7,850	498
Aug-18	52.8	7,190	415	7,490	533
Sep-18	55.1	7,040	942	8,330	535
Oct-18	56.3	7,240	849	7,720	514
Nov-18	61.3	7,210	647	8,130	506
Dec-18	66.5	8,590	810	9,400	577

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	72.2	7,740	777	8,520	544
Feb-19	88.5	9,000	1,430	10,700	483
Mar-19	84.6	8,080	1,120	9,390	465
Apr-19	69.1	7,960	1,110	9,570	549
May-19	63.1	7,690	872	8,490	497
Jun-19	55.9	6,930	665	7,510	476
Jul-19	51.9	7,610	473	8,130	648
Aug-19	53.9	7,090	523	8,000	576
Sep-19	56.9	7,000	548	7,280	577
Oct-19	57.6	7,700	629	8,510	613
Nov-19	62.6	7,690	722	8,360	488
Dec-19	69.7	9,220	823	10,000	614
Jan-20	69.9	10,500	667	11,700	652
Feb-20	66.5	8,440	804	10,000	571
Mar-20	68.6	9,050	483	9,540	572
Apr-20	68.2	10,000	745	10,800	531
May-20	59.3	8,200	843	9,050	607
Jun-20	55.9	7,310	602	8,180	519
Jul-20	54.7	7,160	663	7,820	623
Aug-20	54.9	5,680	1,040	6,720	621
Sep-20	56.9	5,780	956	6,730	590
Oct-20	57.7	6,410	779	7,190	694
Nov-20	63.2	6,740	1,100	7,840	630
Dec-20	64.5	7,000	868	7,870	644
Jan-21	64.5	7,560	1,310	8,880	636
Feb-21	69.2	7,750	1,430	9,170	626
Mar-21	67.5	7,810	1,280	9,090	630
Apr-21	60.0	6,960	1,180	8,140	640
May-21	56.4	5,770	1,200	6,930	511
Jun-21	54.7	6,200	826	7,020	692
Jul-21	53.7	5,880	919	6,800	815
Aug-21	54.9	5,650	913	6,560	534
Sep-21	56.0	6,260	775	7,040	583
Oct-21	63.9	6,720	840	7,560	599
Nov-21	67.5	7,720	1,270	8,990	826
Dec-21	80.4	7,980	1,150	9,130	749
Jan-22	72.0	8,940	866	9,800	670
Feb-22	64.4	8,010	1,050	9,060	551

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	62.5	7,120	990	8,110	536
Apr-22	63.7	6,670	979	7,650	517
May-22	58.4	7,150	838	7,990	514
Jun-22	53.7	5,920	541	6,460	555
Jul-22	52.5	5,840	548	6,390	623
Aug-22	52.7	6,270	791	7,060	546
Sep-22	52.9	5,790	765	6,560	548
Oct-22	56.6	6,480	701	7,180	722
Nov-22	63.6	6,200	851	7,050	606
Dec-22	75.8	7,300	948	8,240	539
Jan-23	110	10,400	947	11,400	697
Feb-23	78.4	7,890	1,050	9,230	423
Mar-23	104	8,510	1,300	9,810	561
Apr-23	73.7	6,960	1,240	8,200	465
May-23	68.0	7,710	1,140	8,850	658
Jun-23	60.7	6,400	885	7,290	559
Jul-23	54.1	6,120	833	6,960	499
Aug-23	55.5	6,230	675	6,910	602
Sep-23	57.0	5,880	749	6,630	600
Oct-23	58.7	6,600	988	7,510	553
Nov-23	62.8	7,060	901	7,960	535
Dec-23	66.5	7,910	653	8,570	516
Jan-24	81.5	8,390	1,440	9,840	684
Feb-24	88.6	8,210	1,410	9,620	646
Mar-24	77.3	7,120	1,690	8,810	592
Apr-24	72.0	6,620	1,450	7,740	538
May-24	64.8	6,700	1,340	8,040	644
Jun-24	57.5	6,580	869	7,450	624
Jul-24	52.7	5,510	768	6,450	626
Aug-24	55.1	5,520	1,120	6,640	624
Sep-24	56.5	5,580	1,030	6,610	526
Oct-24	57.4	5,750	989	6,400	423
Nov-24	64.3	7,020	901	7,920	526
Dec-24	71.2	7,590	1,320	8,910	422
Jan-25	63.5	6,980	1,630	8,770	526
Feb-25	76.1	6,600	1,280	7,880	384
Mar-25	70.7	8,260	1,040	9,300	522
Apr-25	64.8	7,770	1,300	9,290	659

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	58.8	7,280	1,060	8,340	582
Jun-25	55.0	6,200	1,150	7,360	574
Jul-25	53.4	5,160	1,130	6,590	435
Aug-25	54.5	5,300	831	6,130	458
Sep-25	58.0	5,840	981	6,820	524
Dry Season Average	**54.9**	**6,530**	**802**	**7,340**	**545**
Wet Season Average	**68.8**	**7,690**	**1,080**	**8,800**	**578**
Annual Average	**63.0**	**7,210**	**963**	**8,190**	**564**

1 After October 1, 2023, loads are calculated with 1/2 of the method detection limit if non-detect measurements are included. Prior to October 1, 2023, loads were calculated with the provided method detection limit if non-detect values were included.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

8.3 Recycled Water

Table 8-3. Recycled Water: EBDA Yearly Recycled Water Flows Diverted from the Bay*

Year**	Flow Diverted***, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	1,270 (1.1)	4,410 (3.9)	0 (0)	2,900 (2.6)	0 (0)	0 (0)	2,150 (1.9)	10,720 (9.6)
2020	1,200 (1.1)	4,250 (3.8)	0 (0)	3,220 (2.9)	668 (0.60)	0 (0)	166 (0.15)	9,500 (8.5)
2021	1,340 (1.2)	5,630 (5.0)	0 (0)	2,530 (2.3)	0 (0)	0 (0)	155 (0.14)	9,660 (8.6)
2022	1,260 (1.1)	5,180 (4.6)	0 (0)	3,140 (2.8)	0 (0)	0 (0)	538 (0.48)	10,100 (9.0)
2023	2,670 (2.4)	4,330 (3.9)	0 (0)	1,990 (1.8)	0 (0)	0 (0)	310 (0.28)	9,300 (8.3)
2024	1,080 (0.1)	4,650 (4.2)	0 (0)	3,060 (2.7)	0 (0)	0 (0)	158 (0.14)	8.950 (8.0)
Average	**1,470 (1.3)**	**4,740 (4.2)**	**0 (0)**	**2,810 (2.5)**	**111 (0.1)**	**0 (0)**	**580 (0.52)**	**9,700 (8.7)**

*** Agencies that Contribute to EBDA: City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. The recycled water values represent the sum of EBDA's member agencies.**

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** Assumes 100% of the recycled flow is diverted from the Bay**

Table 8-4. Recycled Water: EBDA Yearly Recycled Water Ammonia Load Diverted from the Bay*

Year**	Average Ammonia Load Diverted***, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	150	456	0	359	0	0	294	1,260
2020	166	560	0	459	113	0	23	1,320
2021	184	828	0	346	0	0	23	1,381
2022	188	727	0	468	0	0	91	1,473
2023	236	428	0	258	0	0	35	957
2024	129	525	0	356	0	0	21	1,031
Average	**176**	**587**	**0**	**374**	**19**	**0**	**81**	**1,237**

*** Agencies that Contribute to EBDA: City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. The recycled water values represent the sum of EBDA's member agencies.**

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** Assumes 100% of the recycled flow is diverted from the Bay**

Table 8-5. Recycled Water: EBDA Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay*

Year**	Average Total Inorganic Nitrogen Load Diverted***, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	151	465	0	375	0	0	285	1,276
2020	168	569	0	479	116	0	23	1,355
2021	186	832	0	352	0	0	23	1,394
2022	193	766	0	481	0	0	93	1,533
2023	284	479	0	267	0	0	38	1,068
2024	133	546	0	390	0	0	21	1,089
Average	**186**	**610**	**0**	**391**	**19**	**0**	**81**	**1,286**

***** **Agencies that Contribute to EBDA: City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. The recycled water values represent the sum of EBDA's member agencies.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled flow is diverted from the Bay**

Table 8-6. Recycled Water: EBDA Yearly Recycled Water Total P Load Diverted from the Bay*

Year**	Average Total P Load Diverted***, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	6	8	0	21	0	0	19	54
2020	8	20	0	27	2	0	1	57
2021	9	25	0	21	0	0	1	55
2022	6	31	0	119	0	0	2	157
2023	157	11	0	29	0	0	1	197
2024	5	18	0	24	0	0	1	48
Average	**32**	**19**	**0**	**40**	**<1**	**0**	**4**	**95**

***** **Agencies that Contribute to EBDA: City of Hayward, Oro Loma/Castro Valley Sanitary District, City of San Leandro, and Union Sanitary District, and Livermore-Amador Valley Water Management Agency members City of Livermore and Dublin-San Ramon Services District. The recycled water values represent the sum of EBDA's member agencies.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled flow is diverted from the Bay**

9 East Bay Municipal Utility District (EBMUD)

EBMUD's wastewater treatment plant discharges to the Central Bay and has an ADWF permitted capacity of 120 mgd and a peak wet weather capacity of 320 mgd. It has a current dry season discharge flow of approximately 44.0 mgd. The plant performs secondary treatment using a high purity oxygen activated sludge system. This plant accepts high-strength (organic) trucked wastes to its anaerobic digesters for renewable energy production. These wastes contribute to the plant discharge nutrient loads.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - The influent flows and loads do not include the high-strength (organic) trucked wastes sent to EBMUD's anaerobic digesters for renewable energy production.
  - Load Reduction Across the Plant: not performed for EBMUD as data on the high-strength (organic) trucked waste is not captured in the influent values. This calculation would not reflect actual load reduction across the plant.
- Discharge
  - Wet season loads are typically greater than the dry season loads.
  - Nitrogen loads typically increase with flow during wet weather events.
  - The ammonia and TIN loads have decreased in recent years. This reduction is attributed to several factors:
    - EBMUD stopped accepting trucked waste with relatively high nitrogen content (e.g., animal blood waste). Blood waste was paused during most of the 2023 dry season and then stopped all together in May 2024.
    - The treatment plant began operating up to 50% of the secondary treatment process during the 2023 dry season with biological nitrification/denitrification.
    - EBMUD is continuing significant optimization efforts for their biological process, which is evident in the significantly reduced dry season average TIN discharge compared to historical averages. Current efforts include maintaining BNR bacteria during the wet season.
- Recycled Water:
  - Based on Table 1-2 , the plant has averaged <1 mgd of Recycled Water from 2019-2023 calendar years that results in flow and/or load diversions from the Bay. Users include Landscape Irrigation and Industrial Applications.
  - Based on Table 5-3 through Table 5-5, the plant has averaged the diversion of 78 kg ammonia-N/d, 83 kg TIN-N/d, and 8 kg P/d from the Bay over the 2019-2024 calendar years via recycled water.

Influent

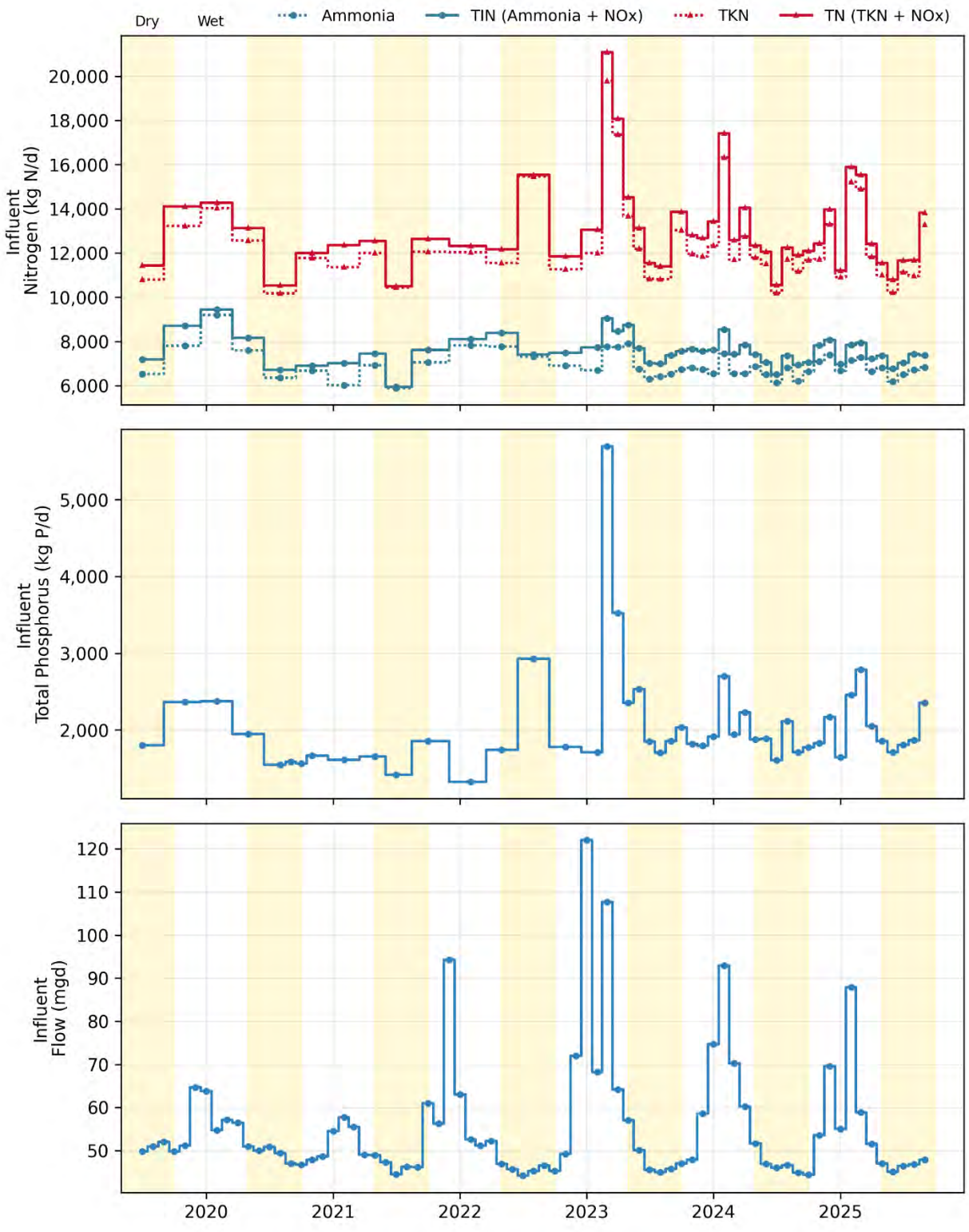


Figure 9-1. Influent: EBMUD Monthly Flows and Loads

Table 9-1. Influent: EBMUD Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	49.8	6,530	649	7,180	10,800	11,400	1,800
Aug-19	51.0	--	--	--	--	--	--
Sep-19	52.0	--	--	--	--	--	--
Oct-19	49.8	--	--	--	--	--	--
Nov-19	51.2	7,810	886	8,700	13,200	14,100	2,360
Dec-19	64.6	--	--	--	--	--	--
Jan-20	63.8	--	--	--	--	--	--
Feb-20	54.8	9,190	259	9,450	14,000	14,300	2,370
Mar-20	57.1	--	--	--	--	--	--
Apr-20	56.5	--	--	--	--	--	--
May-20	51.0	7,600	571	8,170	12,600	13,100	1,950
Jun-20	50.0	--	--	--	--	--	--
Jul-20	50.8	--	--	--	--	--	--
Aug-20	49.4	6,360	363	6,720	10,200	10,500	1,540
Sep-20	47.0	6,340	--	--	--	--	1,580
Oct-20	46.7	6,160	--	--	--	--	1,560
Nov-20	47.8	6,680	227	6,910	11,800	12,000	1,670
Dec-20	48.6	--	--	--	--	--	--
Jan-21	54.5	--	--	--	--	--	--
Feb-21	57.8	6,020	994	7,010	11,400	12,400	1,610
Mar-21	55.5	--	--	--	--	--	--
Apr-21	49.1	--	--	--	--	--	--
May-21	48.9	6,920	527	7,450	12,000	12,500	1,650
Jun-21	47.3	--	--	--	--	--	--
Jul-21	44.5	5,900	53.3	5,950	10,400	10,500	1,420
Aug-21	46.2	--	--	--	--	--	--
Sep-21	46.1	--	--	--	--	--	--
Oct-21	61.0	7,050	575	7,620	12,100	12,600	1,850
Nov-21	56.3	--	--	--	--	--	--
Dec-21	94.3	--	--	--	--	--	--
Jan-22	63.0	--	--	--	--	--	--
Feb-22	52.6	7,820	281	8,100	12,000	12,300	1,320
Mar-22	51.1	--	--	--	--	--	--
Apr-22	52.2	--	--	--	--	--	--
May-22	46.9	7,760	625	8,380	11,500	12,200	1,740
Jun-22	45.7	--	--	--	--	--	--
Jul-22	44.2	--	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	45.3	7,320	79.7	7,400	15,500	15,500	2,930
Sep-22	46.6	--	--	--	--	--	--
Oct-22	45.3	--	--	--	--	--	--
Nov-22	49.3	6,900	581	7,490	11,300	11,800	1,780
Dec-22	72.0	--	--	--	--	--	--
Jan-23	122	--	--	--	--	--	--
Feb-23	68.2	6,700	1,040	7,730	12,000	13,000	1,710
Mar-23	108	7,760	1,280	9,050	19,800	21,100	5,700
Apr-23	64.1	7,750	711	8,460	17,400	18,100	3,520
May-23	57.0	7,900	841	8,740	13,700	14,500	2,350
Jun-23	50.1	6,750	937	7,690	12,200	13,100	2,530
Jul-23	45.5	6,290	720	7,010	10,800	11,600	1,850
Aug-23	45.0	6,410	577	6,990	10,800	11,500	1,700
Sep-23	45.7	6,520	850	7,370	--	--	1,850
Oct-23	47.0	6,720	832	7,560	13,000	13,900	2,030
Nov-23	47.9	6,810	844	7,640	12,000	12,800	1,820
Dec-23	58.6	6,740	817	7,560	11,900	12,700	1,790
Jan-24	74.7	6,540	1,080	7,620	12,300	13,400	1,920
Feb-24	93.0	7,450	1,080	8,540	16,300	17,400	2,700
Mar-24	70.3	6,540	893	7,430	11,700	12,600	1,940
Apr-24	60.3	6,550	1,300	7,850	12,800	14,100	2,230
May-24	51.6	6,860	562	7,420	11,800	12,300	1,870
Jun-24	46.9	6,510	549	7,060	11,500	12,100	1,890
Jul-24	46.1	6,130	364	6,500	10,200	10,500	1,600
Aug-24	46.6	6,810	532	7,350	11,700	12,300	2,120
Sep-24	44.9	6,200	736	6,940	11,200	11,900	1,710
Oct-24	44.4	6,640	407	7,050	11,700	12,100	1,770
Nov-24	53.6	7,090	729	7,820	11,700	12,400	1,830
Dec-24	69.6	7,390	684	8,070	13,300	14,000	2,170
Jan-25	55.0	6,670	304	6,980	10,900	11,200	1,640
Feb-25	87.9	7,150	684	7,840	15,200	15,900	2,460
Mar-25	58.9	7,290	644	7,930	14,900	15,500	2,790
Apr-25	51.6	6,650	576	7,220	11,800	12,400	2,050
May-25	47.0	6,810	543	7,350	11,000	11,500	1,850
Jun-25	45.0	6,180	581	6,760	10,200	10,800	1,710
Jul-25	46.4	6,500	534	7,040	11,100	11,700	1,810
Aug-25	46.8	6,720	710	7,430	11,000	11,700	1,860
Sep-25	47.9	6,820	545	7,370	13,300	13,800	2,350

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	47.7	6,700	566	7,280	11,600	12,100	1,900
Wet Season Average	61.7	7,040	738	7,820	13,100	13,800	2,180
Average Annual	55.5	6,880	656	7,560	12,400	13,000	2,050

* EBMUD occasionally samples more than the required influent quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

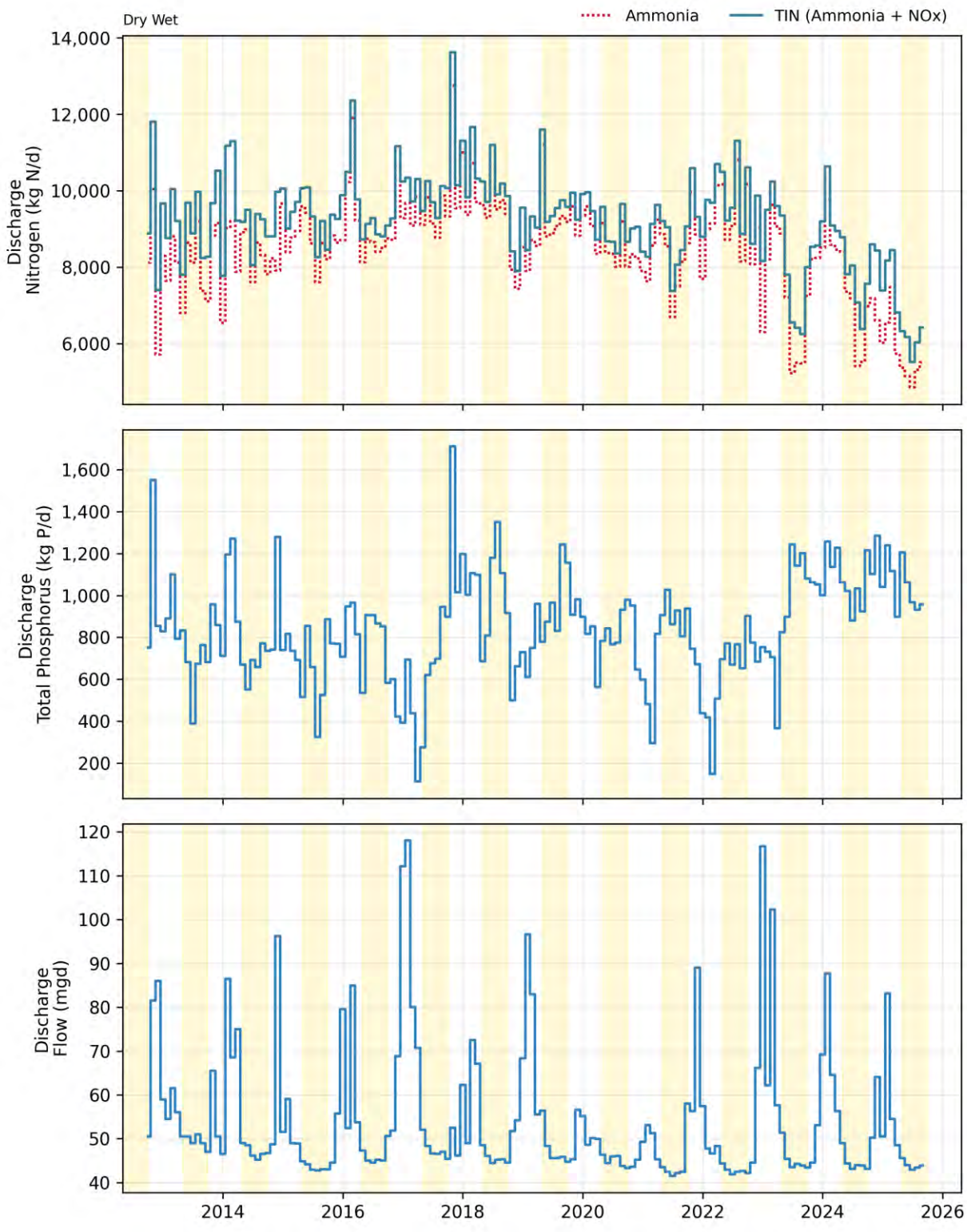


Figure 9-2. Discharge: EBMUD Monthly Flows and Loads

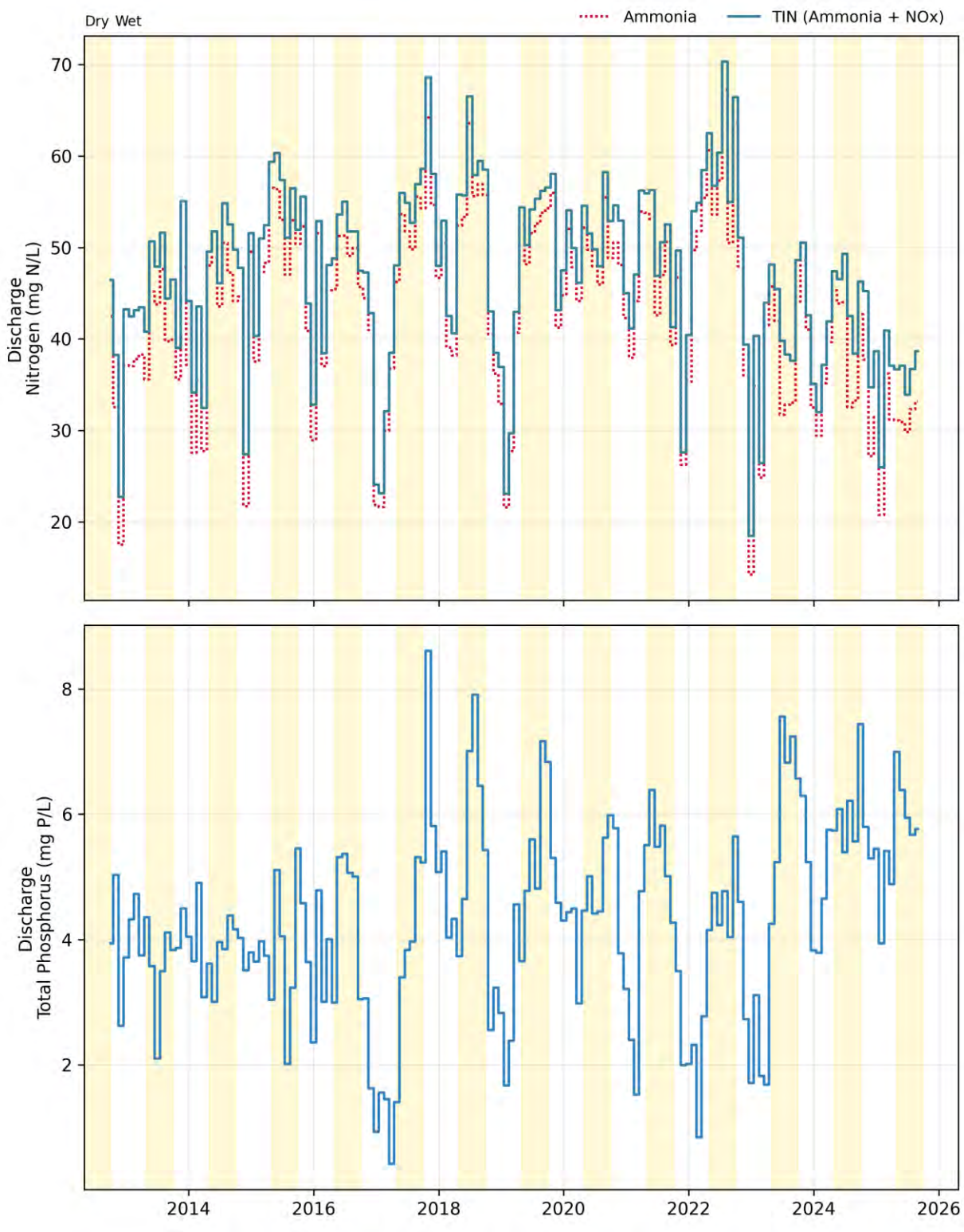


Figure 9-3. Discharge: EBMUD Monthly Concentrations

Table 9-2. Discharge: EBMUD Monthly Flows and Loads

Month, Year	Flow	Ammonia *	Nitrate + Nitrite *	TIN *,**	Total P *
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	50.5	8,120	756	8,880	752
Nov-12	81.5	10,000	1,770	11,800	1,550
Dec-12	86.0	5,710	1,690	7,400	854
Jan-13	59.0	8,290	1,370	9,660	829
Feb-13	54.5	7,640	1,120	8,760	891
Mar-13	61.5	8,800	1,240	10,000	1,100
Apr-13	56.0	8,110	1,090	9,210	794
May-13	50.5	6,800	996	7,800	832
Jun-13	50.5	8,640	1,050	9,680	683
Jul-13	49.0	8,120	767	8,880	389
Aug-13	51.0	9,200	771	9,970	675
Sep-13	49.0	7,380	858	8,230	762
Oct-13	47.0	7,100	1,170	8,270	681
Nov-13	65.5	8,820	847	9,670	958
Dec-13	50.5	9,150	1,380	10,500	859
Jan-14	46.5	6,550	1,220	7,770	711
Feb-14	86.5	9,020	2,150	11,200	1,200
Mar-14	68.5	9,200	2,090	11,300	1,270
Apr-14	75.0	7,880	1,340	9,220	874
May-14	49.0	8,910	277	9,190	671
Jun-14	48.5	8,990	509	9,500	551
Jul-14	46.1	7,610	444	8,050	691
Aug-14	45.2	8,640	749	9,390	658
Sep-14	46.5	8,320	927	9,240	771
Oct-14	46.7	7,810	992	8,800	737
Nov-14	48.7	8,230	574	8,800	742
Dec-14	96.2	7,910	2,060	9,970	1,280
Jan-15	51.5	9,660	392	10,100	740
Feb-15	59.1	8,390	623	9,010	816
Mar-15	49.0	8,770	679	9,450	736
Apr-15	48.9	8,940	765	9,710	693
May-15	44.8	9,590	479	10,100	516
Jun-15	44.2	9,420	664	10,100	854
Jul-15	42.9	8,620	708	9,320	658
Aug-15	42.7	7,600	652	8,260	326
Sep-15	43.1	8,630	570	9,200	526
Oct-15	43.0	8,200	247	8,450	887
Nov-15	44.6	8,820	543	9,370	772

Month, Year	Flow	Ammonia *	Nitrate + Nitrite *	TIN *,**	Total P *
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	55.8	8,630	624	9,260	769
Jan-16	79.5	8,700	1,170	9,880	709
Feb-16	52.4	10,200	259	10,500	948
Mar-16	85.0	11,900	457	12,400	966
Apr-16	53.7	9,210	557	9,770	814
May-16	47.3	8,130	595	8,730	535
Jun-16	45.0	8,730	400	9,130	905
Jul-16	44.6	8,650	629	9,280	906
Aug-16	45.2	8,400	458	8,860	866
Sep-16	45.0	8,500	309	8,810	852
Oct-16	50.6	8,740	340	9,080	583
Nov-16	51.8	8,720	554	9,270	600
Dec-16	68.8	10,700	494	11,200	422
Jan-17	112	9,290	953	10,200	393
Feb-17	118	9,670	669	10,300	695
Mar-17	80.0	9,080	640	9,720	438
Apr-17	70.7	9,840	463	10,300	112
May-17	52.1	9,110	357	9,470	277
Jun-17	48.4	9,820	423	10,200	622
Jul-17	46.6	9,140	555	9,690	677
Aug-17	46.5	8,770	511	9,280	698
Sep-17	47.0	9,870	243	10,100	945
Oct-17	45.4	9,320	742	10,100	898
Nov-17	52.5	12,800	867	13,600	1,710
Dec-17	46.2	9,550	593	10,100	1,020
Jan-18	62.3	11,000	303	11,300	1,200
Feb-18	49.0	9,360	458	9,820	1,000
Mar-18	72.5	10,700	945	11,700	1,110
Apr-18	67.1	9,700	606	10,300	1,100
May-18	48.5	9,620	622	10,200	686
Jun-18	46.0	9,290	409	9,700	809
Jul-18	44.5	10,700	499	11,200	1,180
Aug-18	45.2	9,510	394	9,950	1,350
Sep-18	45.3	9,750	435	9,990	1,110
Oct-18	44.5	9,400	467	9,860	915
Nov-18	51.7	7,930	484	8,420	500
Dec-18	54.2	7,430	468	7,900	663
Jan-19	68.4	8,520	1,030	10,300	731

Month, Year	Flow	Ammonia *	Nitrate + Nitrite *	TIN *,**	Total P *
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	96.6	7,890	552	8,450	610
Mar-19	82.9	8,710	614	8,610	749
Apr-19	55.5	8,560	477	9,030	959
May-19	56.4	11,200	406	11,600	780
Jun-19	48.3	8,810	380	9,010	874
Jul-19	45.5	8,890	440	9,330	965
Aug-19	45.5	9,070	467	9,540	830
Sep-19	45.9	9,340	413	10,000	1,240
Oct-19	44.7	9,190	387	9,570	1,160
Nov-19	45.3	9,580	357	9,810	908
Dec-19	56.6	8,830	409	9,740	982
Jan-20	55.2	9,350	568	9,970	898
Feb-20	48.7	9,580	373	9,950	816
Mar-20	50.1	9,080	394	9,470	852
Apr-20	49.9	8,350	369	8,500	563
May-20	46.4	9,150	418	9,570	783
Jun-20	44.5	8,370	298	8,670	843
Jul-20	46.0	8,350	317	8,660	768
Aug-20	46.0	8,010	348	8,240	775
Sep-20	43.8	9,190	459	9,630	932
Oct-20	43.3	8,010	657	8,660	980
Nov-20	43.6	8,330	671	9,300	952
Dec-20	45.2	8,230	823	8,460	646
Jan-21	49.3	7,900	501	8,400	599
Feb-21	53.1	7,620	647	8,270	482
Mar-21	51.3	8,560	566	9,180	295
Apr-21	45.3	9,240	396	9,250	818
May-21	43.5	8,850	353	9,210	906
Jun-21	42.5	8,540	505	9,040	1,030
Jul-21	41.5	6,700	676	7,370	862
Aug-21	42.2	7,500	569	8,070	928
Sep-21	42.5	8,140	301	8,360	806
Oct-21	58.0	8,630	431	9,470	937
Nov-21	56.3	9,950	633	11,000	745
Dec-21	89.1	8,860	453	9,440	672
Jan-22	57.5	7,690	1,110	8,490	439
Feb-22	47.8	8,990	768	9,940	419
Mar-22	46.6	9,140	541	9,810	149

Month, Year	Flow	Ammonia *	Nitrate + Nitrite *	TIN *,**	Total P *
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	48.3	10,100	551	10,700	507
May-22	44.3	10,200	318	10,900	696
Jun-22	42.9	8,710	507	9,220	771
Jul-22	41.8	9,070	483	9,560	670
Aug-22	42.5	10,800	500	11,300	766
Sep-22	42.7	8,150	720	8,900	652
Oct-22	42.2	10,200	430	10,600	901
Nov-22	44.5	8,080	525	8,600	774
Dec-22	66.2	9,030	830	9,220	683
Jan-23	117	6,300	1,860	8,800	753
Feb-23	62.2	8,200	1,290	9,330	732
Mar-23	102	9,630	610	9,770	705
Apr-23	57.7	9,070	530	9,590	368
May-23	51.3	8,880	467	9,690	826
Jun-23	45.4	7,210	594	7,800	899
Jul-23	43.5	5,220	1,330	6,550	1,240
Aug-23	44.2	5,500	914	6,410	1,140
Sep-23	43.8	5,480	763	6,180	1,200
Oct-23	43.4	7,250	745	7,990	1,080
Nov-23	44.6	8,200	320	8,530	1,060
Dec-23	53.1	8,240	323	8,630	1,050
Jan-24	69.2	8,510	677	8,340	1,000
Feb-24	87.7	9,770	858	10,600	1,260
Mar-24	64.5	8,590	495	9,320	1,140
Apr-24	56.3	8,450	487	9,240	1,230
May-24	49.0	8,400	381	8,750	1,060
Jun-24	44.3	7,360	451	7,810	1,020
Jul-24	43.1	7,180	861	8,040	879
Aug-24	43.9	5,410	1,660	7,070	1,030
Sep-24	43.8	5,520	853	6,370	924
Oct-24	43.2	6,970	587	7,560	1,210
Nov-24	50.2	7,180	1,420	7,840	1,100
Dec-24	64.1	6,610	1,820	8,430	1,280
Jan-25	50.5	6,020	1,370	7,390	1,040
Feb-25	83.1	6,550	1,630	8,230	1,240
Mar-25	54.5	7,470	969	8,440	1,120
Apr-25	48.6	5,730	1,080	6,690	898
May-25	45.5	5,360	960	6,320	1,210

Month, Year	Flow	Ammonia *	Nitrate + Nitrite *	TIN *,**	Total P *
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	44.0	5,150	1,020	6,170	1,060
Jul-25	43.0	4,850	667	5,520	967
Aug-25	43.4	5,320	717	6,010	932
Sep-25	43.9	5,510	915	6,100	957
Dry Season Average	**45.6**	**8,210**	**595**	**8,810**	**834**
Wet Season Average	**60.4**	**8,660**	**795**	**9,440**	**844**
Annual Average	**54.2**	**8,470**	**712**	**9,180**	**840**

* Numbers in this table are slightly different compared to those reported in the CIWQS, due to rounding of conversion factors used.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 9-3. Recycled Water: EBMUD Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application ***	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	162 (0.14)	0 (0)	813 (0.73)	0 (0)	0 (0)	0 (0)	975 (0.87)
2020	0 (0)	185 (0.17)	0 (0)	648 (0.58)	0 (0)	0 (0)	0 (0)	833 (0.74)
2021	0 (0)	193 (0.17)	0 (0)	652 (0.58)	0 (0)	0 (0)	0 (0)	845 (0.75)
2022	0 (0)	198 (0.18)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	198 (0.18)
2023	0 (0)	150 (0.13)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	150 (0.13)
2024	0 (0)	170 (0.15)	0 (0)	0 (0)	0 (0)	0 (0)	3 (0.0027)	173 (0.15)
Average	**0 (0)**	**176 (0.16)**	**0 (0)**	**352 (0.31)**	**0 (0)**	**0 (0)**	**0.5 (0.0004)**	**529 (0.47)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** The listed EBMUD volume and/or load represents the portion of industrial application that is diverted from the Bay. Approximately 4 to 10 times more volume and/or load is used for industrial applications, but they are not diverted from the Bay and thus not included with this dataset.**

Table 9-4. Recycled Water: EBMUD Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application ***	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	22	0	115	0	0	0	137
2020	0	31	0	107	0	0	0	137
2021	0	28	0	95	0	0	0	123
2022	0	35	0	0	0	0	0	35
2023	0	17	0	0	0	0	0	17
2024	0	21	0	0	0	0	<1	21
Average	**0**	**26**	**0**	**53**	**0**	**0**	**<1**	**78**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** The listed EBMUD volume and/or load represents the portion of industrial application that is diverted from the Bay. Approximately 4 to 10 times more volume and/or load is used for industrial applications, but they are not diverted from the Bay and thus not included with this dataset.**

Table 9-5. Recycled Water: EBMUD Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application ***	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	23	0	121	0	0	0	145
2020	0	33	0	112	0	0	0	143
2021	0	30	0	101	0	0	0	131
2022	0	37	0	0	0	0	0	37
2023	0	19	0	0	0	0	0	19
2024	0	23	0	0	0	0	<1	23
Average	**0**	**27**	**0**	**56**	**0**	**0**	**<1**	**83**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** The listed EBMUD volume and/or load represents the portion of industrial application that is diverted from the Bay. Approximately 4 to 10 times more volume and/or load is used for industrial applications, but they are not diverted from the Bay and thus not included with this dataset.**

Table 9-6. Recycled Water: EBMUD Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application ***	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	2	0	11	0	0	0	14
2020	0	3	0	10	0	0	0	13
2021	0	3	0	9	0	0	0	11
2022	0	2	0	0	0	0	0	2
2023	0	2	0	0	0	0	0	2
2024	0	3	0	0	0	0	<1	3
Average	**0**	**3**	**0**	**5**	**0**	**0**	**<1**	**8**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

***** The listed EBMUD volume and/or load represents the portion of industrial application that is diverted from the Bay. Approximately 4 to 10 times more volume and/or load is used for industrial applications, but they are not diverted from the Bay and thus not included with this dataset.**

10 Fairfield-Suisun Sewer District (FSSD)

FSSD discharges to waterways in the Suisun Marsh that flow more than 13 miles before reaching Suisun Bay. FSSD serves approximately 40,300 service connections. The plant has a permitted ADWF capacity of 23.7 mgd. This past dry season average discharge flow was approximately 12.8 mgd. The plant fully nitrifies and partially denitrifies using activated sludge.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - The flow reduction across the plant is typically 10 percent or less. This reduction is attributed to a blend of water bound with biosolids, evaporation, and recycled water.
  - Nitrogen load reduction values across the plant ranges from approximately 45 to 85 percent. This load reduction is attributed primarily to a combination of biological assimilation and nutrient load reduction in the activated sludge system.
  - Phosphorus load reduction across the plant ranges from approximately 25 to 85 percent. This reduction is primarily attributed to a combination of chemical removal, biological assimilation, and biological phosphorus removal in the activated sludge system.
- Discharge
  - NOx is the majority of the nitrogen species discharged, regardless of season. This is expected because the plant reliably nitrifies year-round.
  - Total phosphorus concentrations are wide ranging from approximately 0.9 to 6.8 mg P/L.
- Recycled Water
  - Based on Table 10-3, the plant has averaged 0.61 mgd of recycled water over the 2019-2024 calendar years. Recycled water uses include commercial, industrial, and agricultural uses. Note: the listed volume/flows in Table 10-3 does not include in-plant/utility flow volumes. Furthermore, the listed average does not include water that is discharged to the duck clubs adjacent to the plant which provides marsh enhancement. Such duck club discharges are included in the plant's effluent flows.
  - Based on Table 10-4 through Table 10-6 respectively, the plant has diverted an average of <1 kg ammonia-N/d, 47 kg TIN-N/d and 9 kg P/d away from the Bay through recycled water over the 2019-2024 calendar years.

Influent

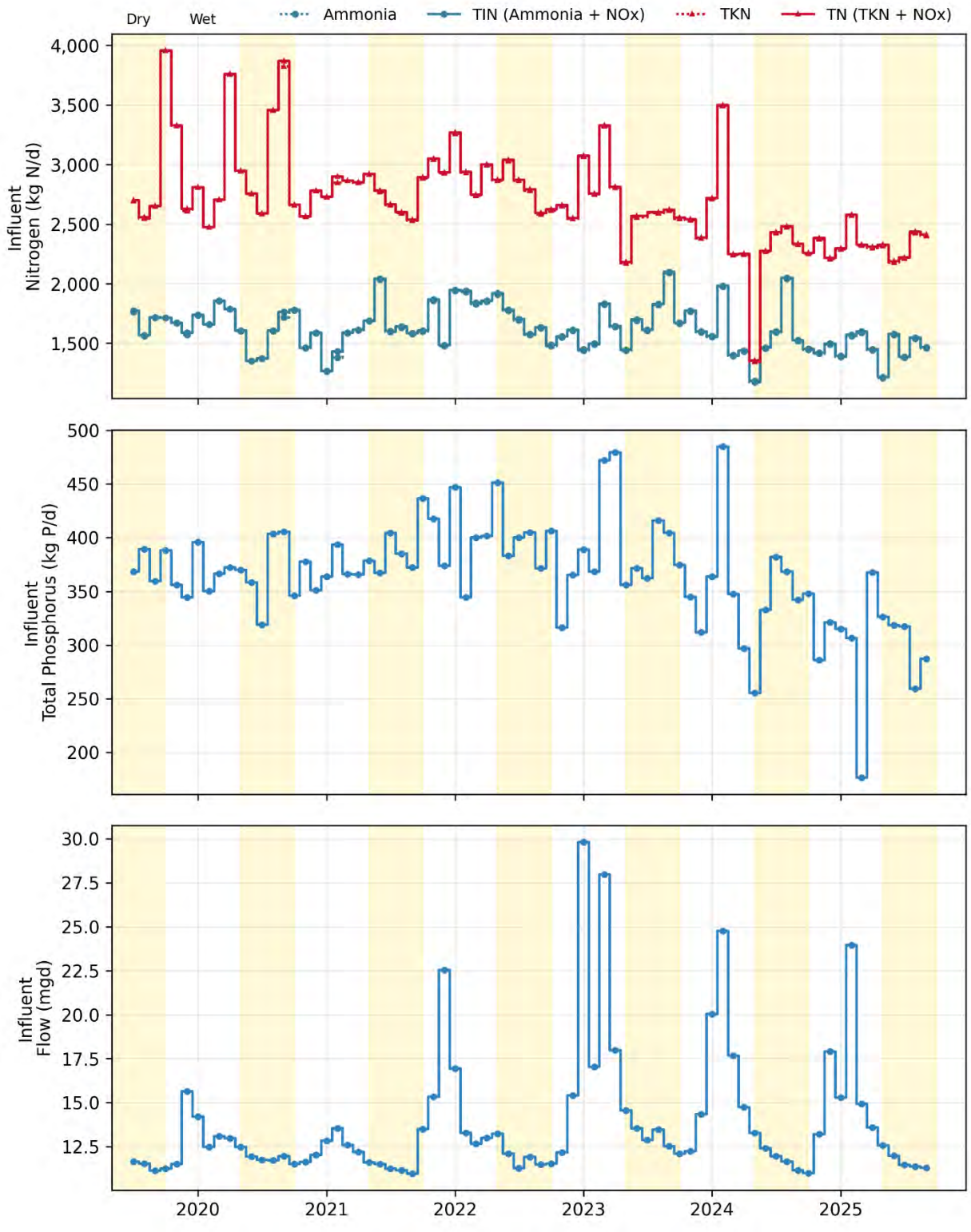


Figure 10-1. Influent: FSSD Monthly Flows and Loads

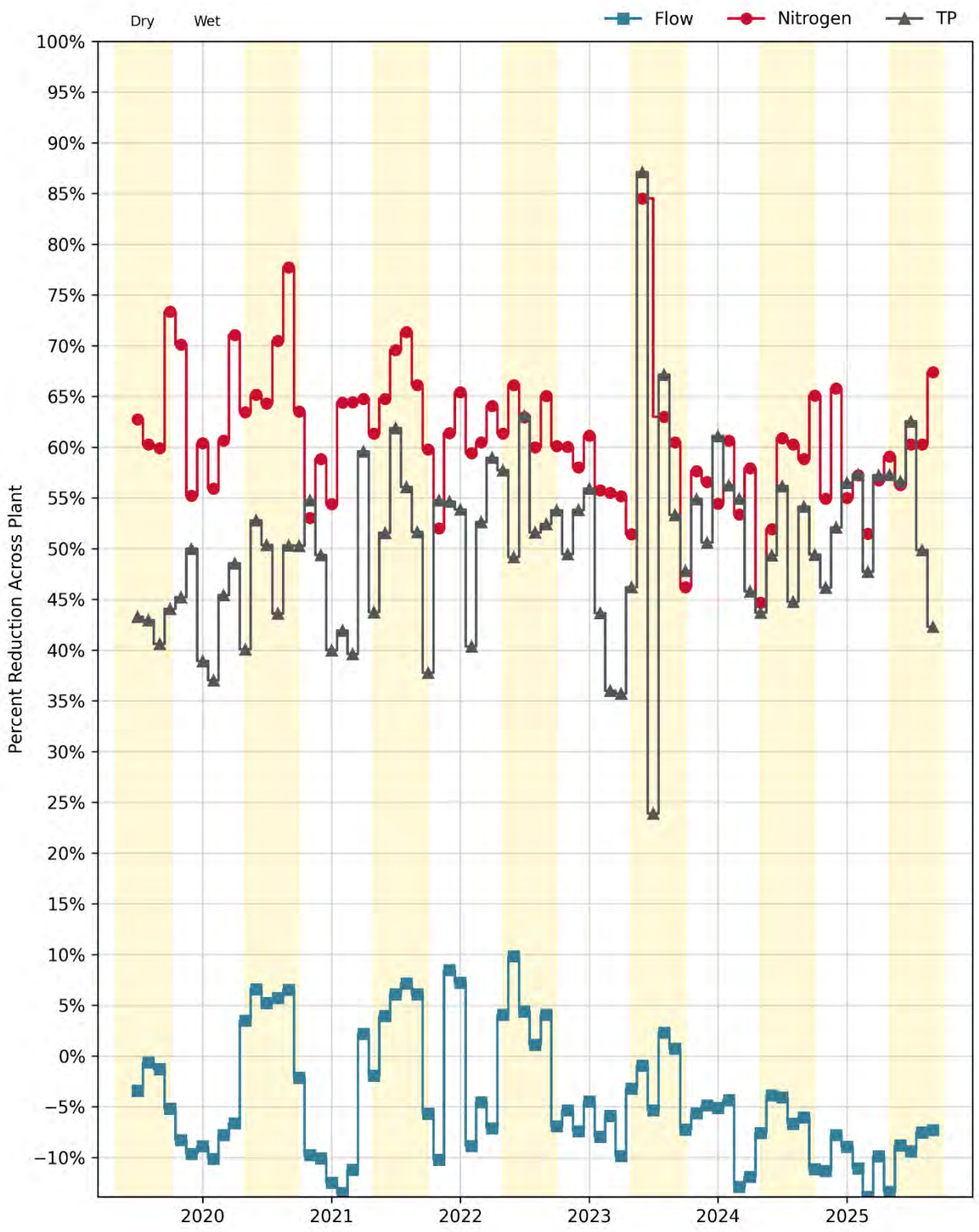


Figure 10-2. Influent: FSSD Monthly Reductions Across the Plant*

* Negative flow reduction values may be due to the timing of flows returned from flow equalization or general inaccuracies with the flow meters.

Note: Influent TKN (instead of Total N) was compared against Discharge TIN for calculating nitrogen load reduction as insufficient Total N data was available. The difference is anticipated to be negligible as the historical TKN and Total N data are comparable.

Table 10-1. Influent: FSSD Monthly Flows and Loads

Month, Year	Flow	Ammonia*	Nitrate + Nitrite[1]	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	11.7	1,760	10.2	1,770	2,690	2,700	368
Aug-19	11.5	1,560	8.34	1,570	2,550	2,560	389
Sep-19	11.1	1,710	3.00	1,720	2,650	2,650	359
Oct-19	11.2	1,710	1.74	1,720	3,950	3,960	388
Nov-19	11.5	1,670	2.62	1,670	3,320	3,330	356
Dec-19	15.7	1,570	17.2	1,590	2,610	2,630	344
Jan-20	14.2	1,740	2.40	1,740	2,810	2,810	396
Feb-20	12.5	1,660	2.15	1,660	2,470	2,470	350
Mar-20	13.1	1,850	2.57	1,860	2,700	2,700	367
Apr-20	13.0	1,790	2.63	1,790	3,760	3,760	372
May-20	12.5	1,600	4.90	1,610	2,940	2,950	370
Jun-20	11.9	1,350	2.11	1,350	2,750	2,750	358
Jul-20	11.7	1,370	1.73	1,370	2,590	2,590	319
Aug-20	11.7	1,600	2.67	1,610	3,450	3,460	404
Sep-20	12.0	1,720	44.2	1,760	3,820	3,870	405
Oct-20	11.5	1,780	4.43	1,780	2,660	2,660	346
Nov-20	11.6	1,460	3.45	1,460	2,560	2,560	378
Dec-20	12.0	1,590	2.58	1,590	2,780	2,780	351
Jan-21	12.8	1,260	2.35	1,270	2,730	2,730	364
Feb-21	13.5	1,380	49.6	1,430	2,850	2,900	394
Mar-21	12.6	1,590	1.97	1,590	2,860	2,870	366
Apr-21	12.2	1,610	3.49	1,610	2,850	2,850	366
May-21	11.6	1,690	2.54	1,690	2,920	2,920	378
Jun-21	11.5	2,030	7.91	2,040	2,770	2,780	367
Jul-21	11.2	1,600	7.78	1,600	2,660	2,670	404
Aug-21	11.1	1,630	7.78	1,640	2,590	2,600	385
Sep-21	11.0	1,580	7.78	1,590	2,530	2,540	372
Oct-21	13.5	1,600	7.78	1,610	2,880	2,890	437
Nov-21	15.3	1,860	7.78	1,870	3,040	3,050	418
Dec-21	22.5	1,480	7.78	1,490	2,930	2,940	374
Jan-22	16.9	1,940	7.78	1,950	3,260	3,270	447
Feb-22	13.3	1,930	7.78	1,940	2,930	2,940	344
Mar-22	12.7	1,830	7.78	1,840	2,740	2,750	400
Apr-22	13.0	1,850	7.78	1,860	2,990	3,000	402
May-22	13.2	1,910	7.78	1,920	2,860	2,870	451
Jun-22	12.1	1,770	7.78	1,780	3,030	3,040	383
Jul-22	11.3	1,690	7.78	1,700	2,860	2,870	400

Month, Year	Flow	Ammonia*	Nitrate + Nitrite[1]	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	11.9	1,570	7.78	1,580	2,780	2,790	405
Sep-22	11.5	1,630	7.78	1,630	2,580	2,590	371
Oct-22	11.5	1,480	7.78	1,490	2,610	2,620	406
Nov-22	12.2	1,550	7.78	1,560	2,650	2,660	316
Dec-22	15.4	1,610	7.78	1,610	2,540	2,550	365
Jan-23	29.8	1,440	7.78	1,450	3,070	3,070	389
Feb-23	17.0	1,490	7.78	1,500	2,750	2,760	369
Mar-23	28.0	1,820	7.78	1,830	3,320	3,330	472
Apr-23	18.0	1,640	7.78	1,650	2,810	2,810	479
May-23	14.6	1,440	7.78	1,450	2,170	2,180	356
Jun-23	13.6	1,690	7.78	1,700	2,560	2,570	371
Jul-23	12.9	1,610	7.78	1,610	--	--	362
Aug-23	13.5	1,820	7.78	1,830	2,590	2,600	416
Sep-23	12.5	2,090	7.78	2,100	2,610	2,620	404
Oct-23	12.1	1,670	7.78	1,670	2,550	2,550	374
Nov-23	12.3	1,770	7.78	1,770	2,530	2,540	345
Dec-23	14.4	1,590	7.78	1,600	2,380	2,390	312
Jan-24	20.0	1,550	7.78	1,560	2,710	2,720	364
Feb-24	24.8	1,980	7.78	1,980	3,490	3,500	485
Mar-24	17.7	1,390	7.78	1,400	2,240	2,250	348
Apr-24	14.7	1,430	7.78	1,440	2,240	2,250	297
May-24	13.3	1,180	7.78	1,180	1,350	1,350	255
Jun-24	12.4	1,460	7.78	1,460	2,270	2,280	333
Jul-24	12.0	1,590	7.78	1,600	2,430	2,430	382
Aug-24	11.7	2,040	7.78	2,050	2,470	2,480	368
Sep-24	11.2	1,520	7.78	1,530	2,330	2,340	342
Oct-24	11.0	1,440	7.78	1,450	2,250	2,260	348
Nov-24	13.2	1,410	7.78	1,420	2,370	2,380	286
Dec-24	17.9	1,490	7.78	1,500	2,210	2,220	321
Jan-25	15.3	1,390	7.78	1,390	2,290	2,300	315
Feb-25	24.0	1,560	7.78	1,570	2,570	2,580	307
Mar-25	14.9	1,590	7.78	1,600	2,320	2,330	176
Apr-25	13.6	1,440	7.78	1,450	2,300	2,310	367
May-25	12.6	1,210	7.78	1,220	2,320	2,330	326
Jun-25	12.0	1,570	7.78	1,580	2,180	2,190	319
Jul-25	11.5	1,380	7.78	1,390	2,210	2,220	317
Aug-25	11.4	1,540	7.78	1,550	2,430	2,430	259
Sep-25	11.3	1,460	7.78	1,470	2,400	2,410	287

Month, Year	Flow	Ammonia*	Nitrate + Nitrite[1]	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	12.0	1,620	8.08	1,630	2,600	2,570	363
Wet Season Average	15.3	1,620	7.55	1,620	2,760	2,730	367
Annual Average	13.9	1,620	7.78	1,620	2,690	2,660	365

1 After June 2021, Fairfield-Suisun Sewer District stopped sampling nitrate + nitrite as their values were reliably less than 1 mg N/L per the second watershed permit requirements (R2-2019-0017). Rather than placing values of zero, the historical average nitrate + nitrite value (7.78 kg N/d) has been applied from July 2021 to present.

* Fairfield-Suisun Sewer District typically samples more than the required influent quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

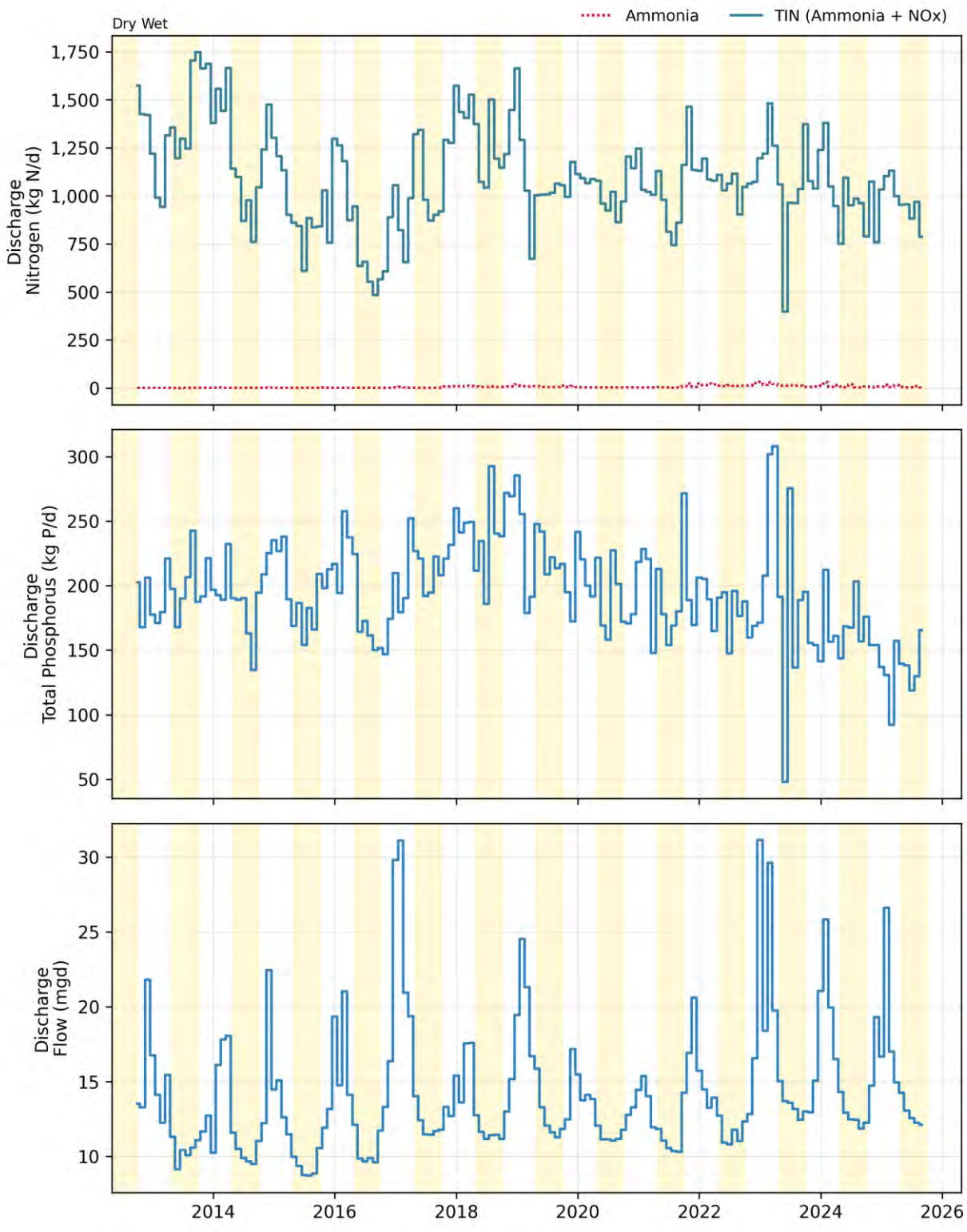


Figure 10-3. Discharge: FSSD Monthly Flows and Loads

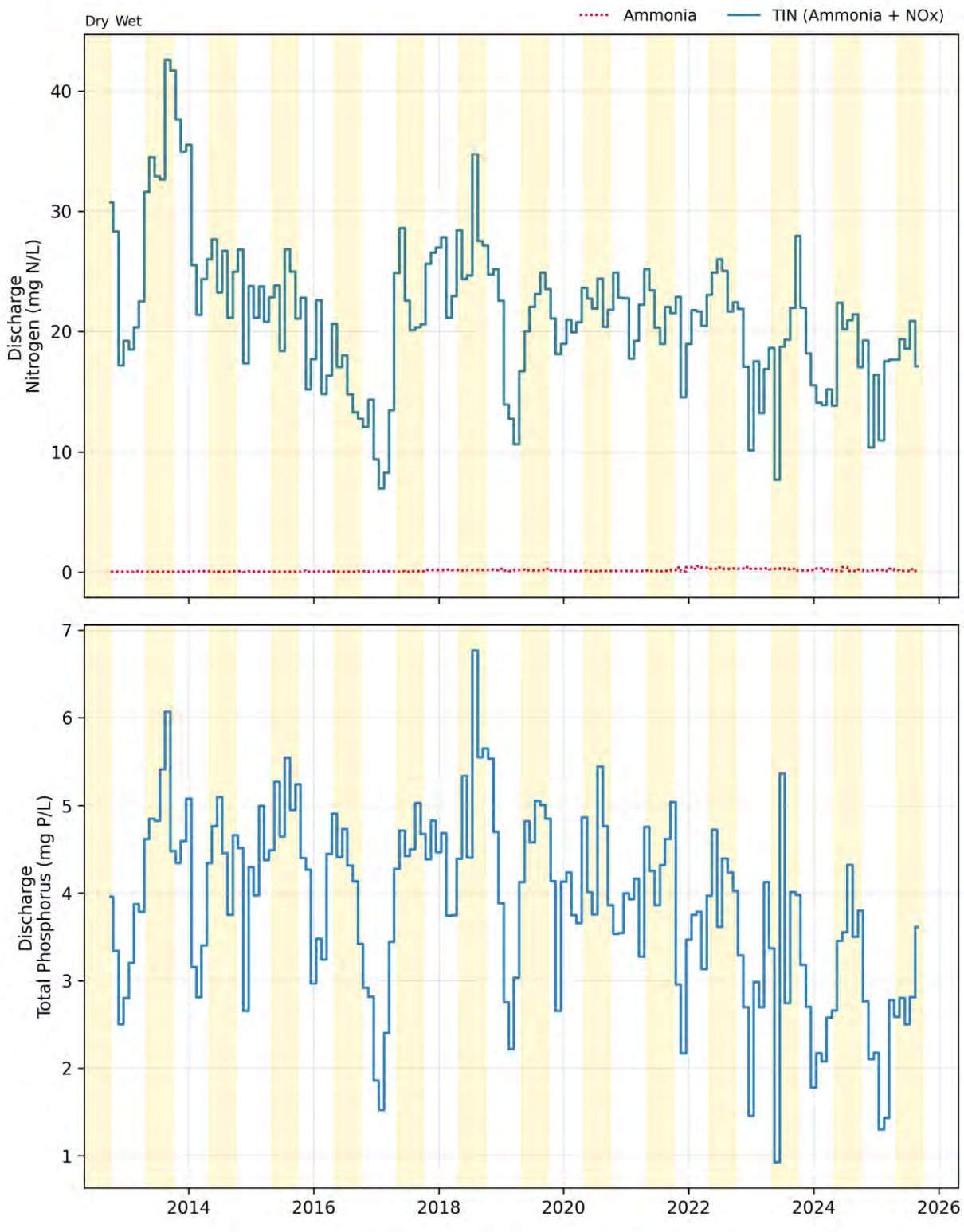


Figure 10-4. Discharge: FSSD Monthly Concentrations

Table 10-2. Discharge: FSSD Monthly Flows and Loads[1]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	13.5	1.26	1,570	1,570	203
Nov-12	13.3	1.81	1,420	1,420	168
Dec-12	21.8	2.74	1,420	1,420	206
Jan-13	16.7	1.90	1,220	1,220	177
Feb-13	14.1	1.60	987	989	171
Mar-13	12.2	1.95	941	943	179
Apr-13	15.4	1.46	1,310	1,320	221
May-13	11.3	0.855	1,350	1,350	198
Jun-13	9.15	0.691	1,190	1,190	168
Jul-13	10.4	0.787	1,300	1,300	190
Aug-13	10.1	0.940	1,240	1,250	206
Sep-13	10.6	1.42	1,700	1,700	243
Oct-13	11.1	1.25	1,740	1,750	187
Nov-13	11.7	1.50	1,660	1,660	192
Dec-13	12.7	0.962	1,680	1,690	221
Jan-14	10.3	0.775	1,380	1,380	197
Feb-14	16.1	3.57	1,550	1,560	193
Mar-14	17.8	2.89	1,440	1,440	189
Apr-14	18.1	2.82	1,660	1,670	232
May-14	11.6	1.75	1,140	1,140	191
Jun-14	10.5	0.982	1,100	1,100	189
Jul-14	9.88	1.12	868	869	190
Aug-14	9.67	1.18	977	978	163
Sep-14	9.50	1.32	759	761	135
Oct-14	11.0	1.83	1,040	1,040	195
Nov-14	12.2	2.00	1,240	1,240	209
Dec-14	22.4	3.12	1,470	1,480	225
Jan-15	14.5	2.18	1,300	1,300	235
Feb-15	15.1	1.78	1,210	1,210	227
Mar-15	12.6	1.45	1,130	1,130	238
Apr-15	11.5	1.34	901	902	190
May-15	9.95	1.18	860	861	169
Jun-15	9.35	1.07	842	843	187
Jul-15	8.75	0.924	608	609	154
Aug-15	8.70	1.03	883	884	183
Sep-15	8.85	0.896	836	837	166
Oct-15	10.6	1.17	840	842	209
Nov-15	11.9	4.73	1,020	1,030	198

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	13.2	1.36	756	757	213
Jan-16	19.3	2.38	1,290	1,300	217
Feb-16	14.8	2.69	1,260	1,260	194
Mar-16	21.0	2.77	1,180	1,180	258
Apr-16	14.1	1.58	871	873	238
May-16	12.1	1.99	942	944	225
Jun-16	9.86	1.01	634	635	164
Jul-16	9.65	1.04	657	658	173
Aug-16	9.88	0.910	552	553	161
Sep-16	9.60	1.33	482	483	150
Oct-16	11.7	1.76	565	566	152
Nov-16	13.3	2.52	604	607	147
Dec-16	16.4	2.15	885	887	174
Jan-17	29.8	4.77	1,050	1,060	210
Feb-17	31.1	5.60	815	821	179
Mar-17	20.9	3.24	653	656	190
Apr-17	19.4	2.83	984	987	252
May-17	14.0	1.96	1,320	1,320	227
Jun-17	12.4	2.10	1,340	1,340	221
Jul-17	11.5	1.58	979	980	192
Aug-17	11.4	1.73	868	870	195
Sep-17	11.7	1.84	900	902	223
Oct-17	11.8	1.94	916	918	208
Nov-17	13.3	7.91	1,280	1,290	221
Dec-17	12.7	7.81	1,270	1,280	232
Jan-18	15.4	9.74	1,560	1,570	260
Feb-18	13.6	8.61	1,430	1,440	241
Mar-18	17.6	12.0	1,390	1,410	249
Apr-18	17.6	9.75	1,520	1,530	249
May-18	12.8	7.29	1,370	1,370	212
Jun-18	11.6	5.97	1,070	1,070	235
Jul-18	11.2	6.74	1,040	1,230	186
Aug-18	11.4	7.57	1,490	1,500	293
Sep-18	11.4	6.56	1,190	1,190	240
Oct-18	11.2	6.63	1,140	1,150	238
Nov-18	13.0	9.32	1,210	1,220	272
Dec-18	15.2	8.32	1,440	1,450	269
Jan-19	19.4	19.9	1,640	1,660	286

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	24.5	10.6	1,280	1,290	256
Mar-19	21.3	7.67	1,020	1,030	179
Apr-19	16.7	9.60	663	672	191
May-19	15.9	11.4	991	1,000	248
Jun-19	13.3	6.98	998	1,010	242
Jul-19	12.1	6.36	1,000	1,010	209
Aug-19	11.6	5.73	1,010	1,020	222
Sep-19	11.3	6.57	1,060	1,060	214
Oct-19	11.8	12.0	1,040	1,050	217
Nov-19	12.5	6.04	989	995	195
Dec-19	17.2	9.73	1,170	1,180	172
Jan-20	15.5	5.95	1,110	1,110	242
Feb-20	13.8	3.98	1,090	1,090	220
Mar-20	14.1	4.18	1,060	1,060	200
Apr-20	13.8	4.22	1,080	1,090	192
May-20	12.0	3.52	1,070	1,080	222
Jun-20	11.1	2.96	956	959	169
Jul-20	11.1	3.01	920	923	158
Aug-20	11.1	3.15	1,020	1,020	228
Sep-20	11.2	3.24	859	862	201
Oct-20	11.8	3.51	968	971	172
Nov-20	12.8	3.55	1,200	1,200	171
Dec-20	13.3	4.66	1,140	1,140	178
Jan-21	14.4	4.40	1,240	1,240	218
Feb-21	15.4	4.93	1,030	1,030	229
Mar-21	14.0	4.50	1,020	1,020	221
Apr-21	11.9	3.34	1,000	1,000	148
May-21	11.8	5.16	1,120	1,130	213
Jun-21	11.0	3.27	976	980	178
Jul-21	10.6	2.97	809	812	154
Aug-21	10.4	2.74	741	744	169
Sep-21	10.3	3.19	857	860	180
Oct-21	14.3	9.49	1,150	1,160	272
Nov-21	16.9	23.4	1,440	1,460	189
Dec-21	20.6	5.23	1,130	1,130	170
Jan-22	15.7	23.0	1,110	1,130	206
Feb-22	14.5	14.6	1,180	1,190	205
Mar-22	13.2	24.0	1,060	1,090	190

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	13.9	20.1	1,060	1,080	165
May-22	12.7	12.3	1,100	1,110	191
Jun-22	10.9	11.3	1,020	1,030	195
Jul-22	10.8	14.7	1,050	1,060	148
Aug-22	11.8	11.7	1,100	1,120	196
Sep-22	11.0	10.4	894	904	177
Oct-22	12.3	13.4	1,030	1,050	188
Nov-22	12.8	12.0	1,050	1,060	160
Dec-22	16.6	25.3	1,050	1,070	169
Jan-23	31.1	31.2	1,160	1,190	171
Feb-23	18.4	17.8	1,200	1,220	208
Mar-23	29.6	29.3	1,450	1,480	302
Apr-23	19.7	21.8	1,240	1,260	308
May-23	15.0	13.5	1,050	1,060	192
Jun-23	13.7	13.6	384	398	48.0
Jul-22	13.6	14.7	949	963	276
Aug-23	13.2	11.8	951	962	137
Sep-23	12.4	11.7	1,020	1,040	189
Oct-23	13.0	6.82	1,370	1,370	195
Nov-23	12.9	6.25	1,070	1,080	156
Dec-23	15.1	8.01	1,030	1,040	154
Jan-24	21.1	12.3	1,230	1,240	142
Feb-24	25.8	29.8	1,350	1,380	212
Mar-24	19.9	7.08	1,040	1,050	157
Apr-24	16.5	14.0	934	948	161
May-24	14.3	7.55	742	749	144
Jun-24	12.9	4.58	1,090	1,090	168
Jul-24	12.5	19.0	933	952	167
Aug-24	12.4	4.01	982	986	203
Sep-24	11.8	3.95	958	962	157
Oct-24	12.2	8.58	780	789	176
Nov-24	14.7	4.48	1,070	1,070	154
Dec-24	19.3	8.70	750	758	154
Jan-25	16.7	9.38	1,020	1,030	137
Feb-25	26.6	17.1	1,090	1,100	131
Mar-25	17.0	5.60	1,120	1,130	92.3
Apr-25	14.9	15.6	983	999	157
May-25	14.2	7.10	945	952	139

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	13.0	4.16	952	956	138
Jul-25	12.5	4.29	877	881	119
Aug-25	12.2	10.0	957	967	130
Sep-25	12.1	4.09	782	786	166
Dry Season Average	**11.5**	**5.08**	**979**	**986**	**186**
Wet Season Average	**16.1**	**7.79**	**1,150**	**1,160**	**201**
Average Annual	**14.2**	**6.66**	**1,080**	**1,090**	**195**

1 For non-detects after October 1, 2023, 1/2 of the method detection limit was used to quantify values. Prior to October 1, 2023, non-detect values used the provided method detection limit.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 10-3. Recycled Water: FSSD Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	0 (0)	0 (0)	19 (0.02)	730 (0.65)	0 (0)	0 (0)	749 (0.67)
2020	0 (0)	0 (0)	13 (0.01)	28 (0.02)	989 (0.88)	0 (0)	0 (0)	1,030 (0.92)
2021	0 (0)	0 (0)	38 (0.03)	32 (0.03)	925 (0.83)	0 (0)	0 (0)	995 (0.89)
2022	0 (0)	0 (0)	7 (0.01)	36 (0.03)	647 (0.58)	0 (0)	0 (0)	690 (0.62)
2023	0 (0)	0 (0)	<1 (<0.01)	46 (0.04)	234 (0.21)	0 (0)	0 (0)	280 (0.25)
2024	0 (0)	0 (0)	<1 (<0.01)	8 (0.01)	374 (0.33)	0 (0)	0 (0)	382 (0.34)
Average	**0 (0)**	**0 (0)**	**10 (0.01)**	**28 (0.03)**	**650 (0.58)**	**0 (0)**	**0 (0)**	**688 (0.61)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 10-4. Recycled Water: FSSD Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	<1	<1	0	0	<1
2020	0	0	<1	<1	<1	0	0	<1
2021	0	0	<1	<1	<1	0	0	<1
2022	0	0	<1	<1	1	0	0	1
2023	0	0	<1	<1	<1	0	0	<1
2024	0	0	<1	<1	<1	0	0	<1
Average	**0**	**0**	**<1**	**<1**	**<1**	**0**	**0**	**<1**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 10-5. Recycled Water: FSSD Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	1	45	0	0	46
2020	0	0	<1	2	73	0	0	76
2021	0	0	2	2	65	0	0	69
2022	0	0	<1	2	48	0	0	51
2023	0	0	<1	3	13	0	0	16
2024	0	0	<1	<1	21	0	0	21
Average	**0**	**0**	**<1**	**2**	**44**	**0**	**0**	**47**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 10-6. Recycled Water: FSSD Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	<1	9	0	0	9
2020	0	0	<1	<1	14	0	0	14
2021	0	0	<1	<1	12	0	0	13
2022	0	0	<1	<1	8	0	0	9
2023	0	0	<1	<1	2	0	0	3
2024	0	0	<1	<1	3	0	0	4
Average	**0**	**0**	**<1**	**<1**	**8**	**0**	**0**	**9**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

11 City of Millbrae

Millbrae discharges to the South Bay. The plant has approximately 6,500 service connections and it has a permitted capacity of 3.0 mgd ADWF. The average dry season flow this past year was approximately 1.41 mgd. The plant performs secondary treatment using an activated sludge process.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge
  - Nutrient loads typically increase with flow during wet weather events. However, the loads typically stay elevated after the flows decline back to typical values.
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This would be expected since this plant does not nitrify.
  - Total phosphorus concentrations range from approximately 0.5 to 7.5 mg P/L. The plant has an anaerobic selector which is thought to be the removal mechanism for months with relatively low values.
- Recycled Water: No recycled water was produced or distributed this past year.

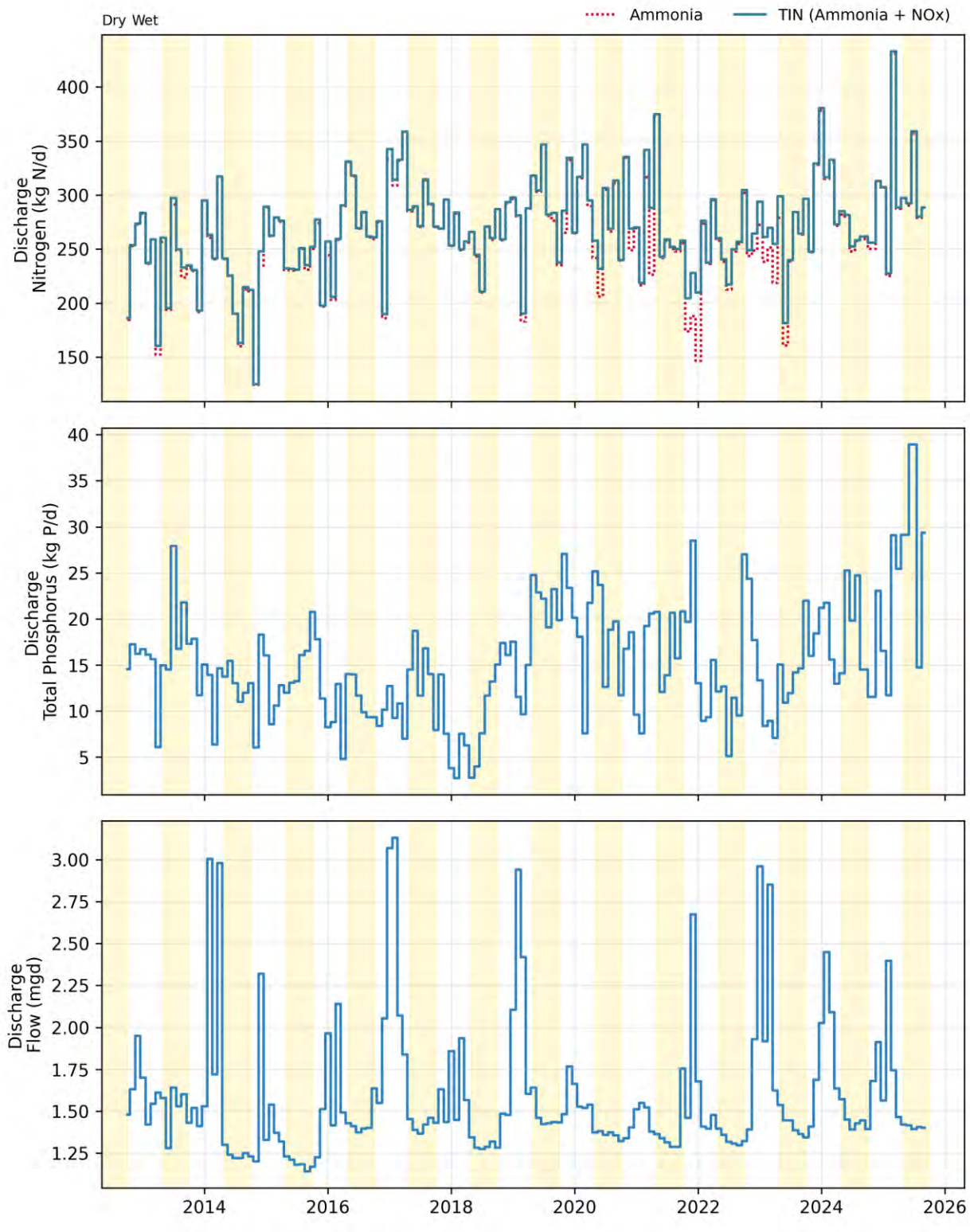


Figure 11-1. Discharge: Millbrae Monthly Flows and Loads

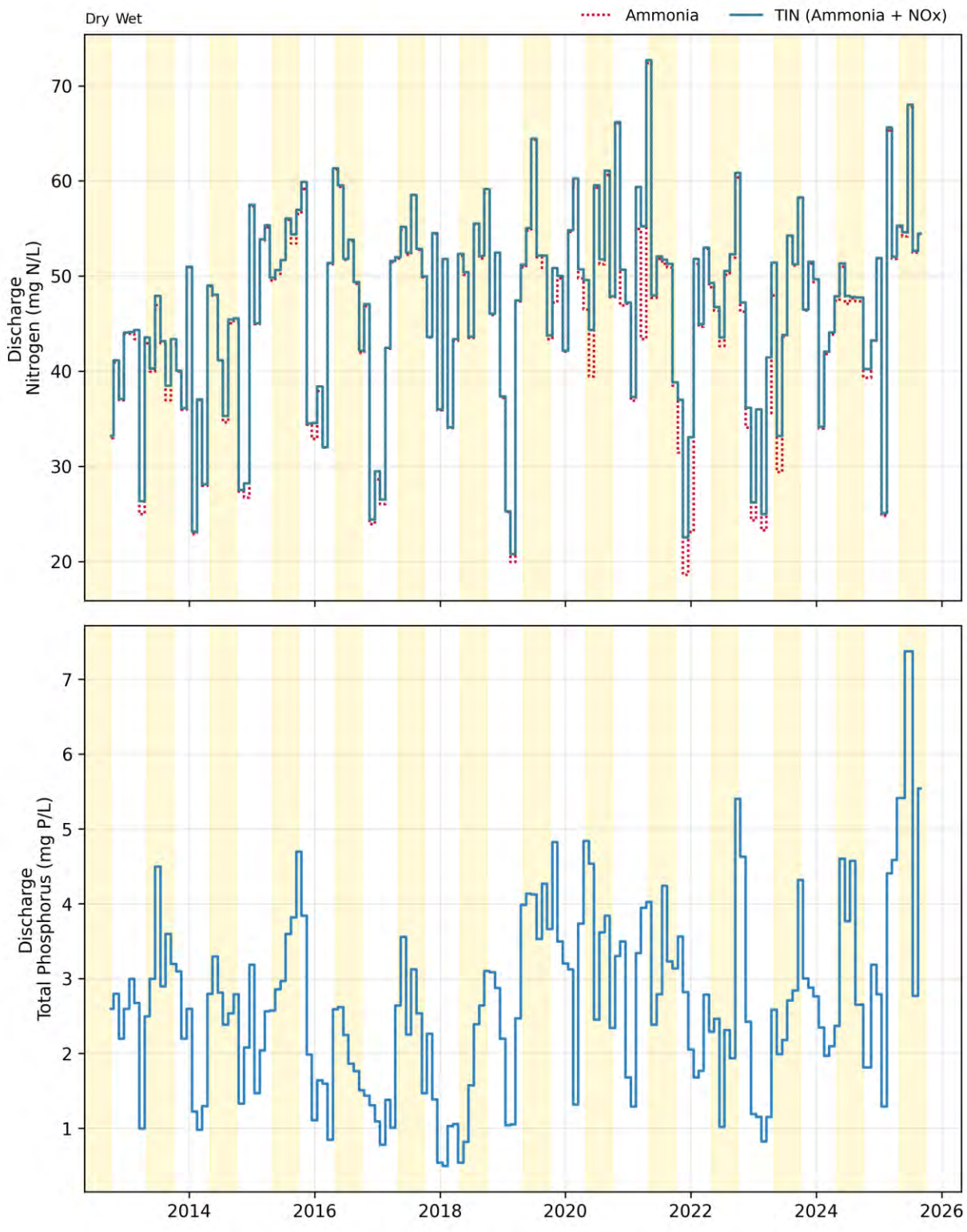


Figure 11-2. Discharge: Millbrae Monthly Concentrations

Table 11-1. Discharge: Millbrae Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	1.48	185	1.40	186	14.5
Nov-12	1.63	253	1.11	254	17.3
Dec-12	1.95	273	0.855	274	16.2
Jan-13	1.70	283	0.945	284	16.7
Feb-13	1.42	236	0.896	237	16.1
Mar-13	1.54	253	5.46	259	15.6
Apr-13	1.61	152	8.23	160	6.09
May-13	1.58	257	3.72	261	14.9
Jun-13	1.28	194	1.55	195	14.5
Jul-13	1.64	291	5.95	297	27.9
Aug-13	1.53	249	1.15	250	16.8
Sep-13	1.60	224	9.19	233	21.8
Oct-13	1.43	232	2.43	235	17.3
Nov-13	1.52	230	0.718	231	17.8
Dec-13	1.41	192	0.933	193	11.7
Jan-14	1.53	295	0.197	295	15.0
Feb-14	3.01	260	2.96	263	13.9
Mar-14	1.72	241	0.592	241	6.37
Apr-14	2.98	315	1.72	317	14.6
May-14	1.30	241	0.457	241	13.8
Jun-14	1.24	225	0.502	225	15.5
Jul-14	1.22	190	0.0650	190	13.0
Aug-14	1.22	160	3.00	163	11.0
Sep-14	1.25	213	2.00	215	12.0
Oct-14	1.23	211	1.00	212	13.0
Nov-14	1.20	124	0.670	125	6.05
Dec-14	2.32	235	13.0	248	18.3
Jan-15	1.33	289	0.750	289	16.0
Feb-15	1.54	262	0.690	263	8.55
Mar-15	1.37	279	0.780	279	10.6
Apr-15	1.32	276	0.900	276	12.8
May-15	1.23	231	1.33	232	12.0
Jun-15	1.21	230	1.76	232	13.1
Jul-15	1.18	231	0.0856	231	13.3
Aug-15	1.18	250	0.715	251	16.1
Sep-15	1.14	231	4.00	235	16.5
Oct-15	1.17	250	1.91	252	20.8
Nov-15	1.22	274	3.46	277	17.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	1.51	197	0.644	197	11.4
Jan-16	1.96	245	12.4	257	8.24
Feb-16	1.42	203	2.63	206	8.78
Mar-16	2.14	259	0.600	259	12.9
Apr-16	1.49	290	0.738	290	4.77
May-16	1.43	331	0.672	331	14.0
Jun-16	1.41	317	0.753	318	14.0
Jul-16	1.37	269	0.492	269	11.7
Aug-16	1.40	284	0.510	284	9.85
Sep-16	1.40	261	0.935	262	9.35
Oct-16	1.63	259	1.40	261	9.33
Nov-16	1.55	275	1.46	276	8.40
Dec-16	2.05	186	3.55	190	10.2
Jan-17	3.07	333	9.52	343	12.7
Feb-17	3.13	309	5.66	314	9.26
Mar-17	2.07	332	0.440	332	10.8
Apr-17	1.84	358	0.874	359	7.00
May-17	1.45	285	0.778	286	14.5
Jun-17	1.39	288	1.55	290	18.7
Jul-17	1.37	270	0.954	271	11.7
Aug-17	1.42	314	0.595	315	16.8
Sep-17	1.46	291	0.560	292	14.0
Oct-17	1.43	270	0.472	271	7.95
Nov-17	1.63	269	0.349	269	14.0
Dec-17	1.43	296	0.296	296	7.53
Jan-18	1.86	253	0.699	253	3.82
Feb-18	1.45	283	1.07	284	2.72
Mar-18	1.93	249	0.811	250	7.53
Apr-18	1.57	256	0.888	257	6.27
May-18	1.34	265	0.899	266	2.74
Jun-18	1.28	243	1.38	245	3.96
Jul-18	1.28	210	0.581	210	7.59
Aug-18	1.29	270	0.435	271	11.7
Sep-18	1.32	259	1.32	260	13.2
Oct-18	1.28	285	1.99	287	15.0
Nov-18	1.49	258	0.751	259	17.4
Dec-18	1.48	292	1.31	294	16.1
Jan-19	2.11	297	0.989	298	17.5

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	2.94	281	0.611	281	11.6
Mar-19	2.42	183	7.48	190	9.64
Apr-19	1.60	287	0.500	288	15.0
May-19	1.64	316	1.44	318	24.7
Jun-19	1.46	303	1.49	304	22.9
Jul-19	1.42	346	0.417	347	22.2
Aug-19	1.43	281	1.06	282	19.1
Sep-19	1.44	276	7.18	283	23.2
Oct-19	1.43	235	2.25	237	19.8
Nov-19	1.48	265	20.3	285	27.1
Dec-19	1.77	333	1.77	334	23.4
Jan-20	1.66	265	0.57	265	20.1
Feb-20	1.53	316	1.02	317	18.0
Mar-20	1.52	344	2.91	347	7.58
Apr-20	1.54	290	5.40	295	21.7
May-20	1.37	242	16.1	258	25.2
Jun-20	1.38	206	25.7	232	23.7
Jul-20	1.36	305	1.32	306	12.6
Apr-20	1.37	266	2.61	269	18.8
Sep-20	1.36	311	2.23	313	19.7
Oct-20	1.32	239	0.400	240	11.7
Nov-20	1.34	335	0.640	335	16.7
Dec-20	1.40	249	20.0	269	18.6
Jan-21	1.51	269	0.721	270	9.61
Feb-21	1.55	217	2.22	219	7.58
Mar-21	1.52	317	25.5	342	19.2
Apr-21	1.38	226	61.8	288	20.6
May-21	1.36	373	1.61	375	20.7
Jun-21	1.34	242	1.36	243	12.1
Jul-21	1.31	258	1.29	259	13.9
Aug-21	1.29	250	1.97	252	20.7
Sep-21	1.29	248	1.96	250	15.7
Oct-21	1.75	255	2.18	258	20.8
Nov-21	1.46	174	30.7	204	19.7
Dec-21	2.67	188	39.8	228	28.5
Jan-22	1.68	146	63.5	210	13.0
Feb-22	1.41	274	2.74	276	8.94
Mar-22	1.40	236	1.38	238	9.35

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	1.48	296	0.622	296	15.6
May-22	1.40	258	2.47	260	12.1
Jun-22	1.36	238	2.03	240	12.7
Jul-22	1.32	212	4.53	217	5.08
Aug-22	1.31	248	1.81	250	11.4
Sep-22	1.30	255	1.80	257	9.49
Oct-22	1.32	302	2.49	305	27.0
Nov-22	1.39	244	5.09	249	24.4
Dec-22	1.93	249	15.5	264	17.7
Jan-23	2.96	273	21.2	294	13.3
Feb-23	1.92	238	23.2	261	8.36
Mar-23	2.85	251	18.6	270	8.91
Apr-23	1.62	219	36.0	255	7.08
May-23	1.54	279	20.0	299	15.0
Jun-23	1.45	161	20.7	181	10.9
Jul-23	1.44	239	1.09	240	11.9
Aug-23	1.39	284	0.380	284	14.2
Sep-23	1.36	264	0.684	264	14.6
Oct-23	1.34	296	0.337	297	22.0
Nov-23	1.41	247	0.446	248	16.0
Dec-23	1.69	328	1.09	329	18.4
Jan-24	2.03	379	2.20	381	21.2
Feb-24	2.45	315	1.52	317	21.7
Mar-24	2.09	331	1.85	333	15.6
Apr-24	1.64	272	1.30	273	13.0
May-24	1.57	282	2.88	285	14.1
Jun-24	1.45	280	1.81	282	25.2
Jul-24	1.39	248	4.36	252	19.8
Aug-24	1.43	257	0.772	258	24.7
Sep-24	1.45	259	2.18	261	14.5
Oct-24	1.39	--	--	--	--
Nov-24	1.68	250	5.77	256	11.5
Dec-24	1.91	313	0.0988	313	23.1
Jan-25	1.56	307	0.295	307	16.5
Feb-25	2.40	225	2.25	227	11.7
Mar-25	1.74	431	1.81	433	29.1
Apr-25	1.47	287	1.05	288	25.4
May-25	1.42	297	0.527	297	29.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	1.42	290	2.26	292	--
Jul-25	1.39	358	1.21	359	38.9
Aug-25	1.41	279	0.964	280	14.7
Sep-25	1.40	288	0.443	289	29.4
Dry Season Average	**1.38**	**263**	**2.90**	**266**	**16.1**
Wet Season Average	**1.73**	**265**	**5.98**	**271**	**14.4**
Annual Average	**1.58**	**264**	**4.69**	**269**	**15.1**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

12 Mt. View Sanitary District

Mt. View Sanitary District discharges to Suisun Bay. The plant has approximately 10,500 service connections; it has a permitted capacity of 3.2 mgd ADWF and a peak wet weather design flow of 10.9 mgd. This past dry season average discharge flow was approximately 0.99 mgd. The plant performs nitrification using a series of trickling filters.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge
  - The average monthly concentrations for TIN have been lower than historical averages for the last several years due to a change in sampling location in 2021/2022. Sampling is now at the Moorhen Marsh effluent, whereby treatment occurs within the Marsh.
  - NOx is the majority of the nitrogen species discharged as would be expected since this plant nitrifies. A portion of ammonia bleeds through during the colder months. This increases the ammonia contribution during such months.
  - Total phosphorus concentrations range from less than 0.5 to 6.2 mg P/L, which suggests occasional P removal as typical effluent TP concentrations at treatment plants is typically 4 to 6 mg P/L. Over the last few years, total phosphorus has trended downwards for Mt. View.
- Recycled Water: No recycled water was produced or distributed this past year.

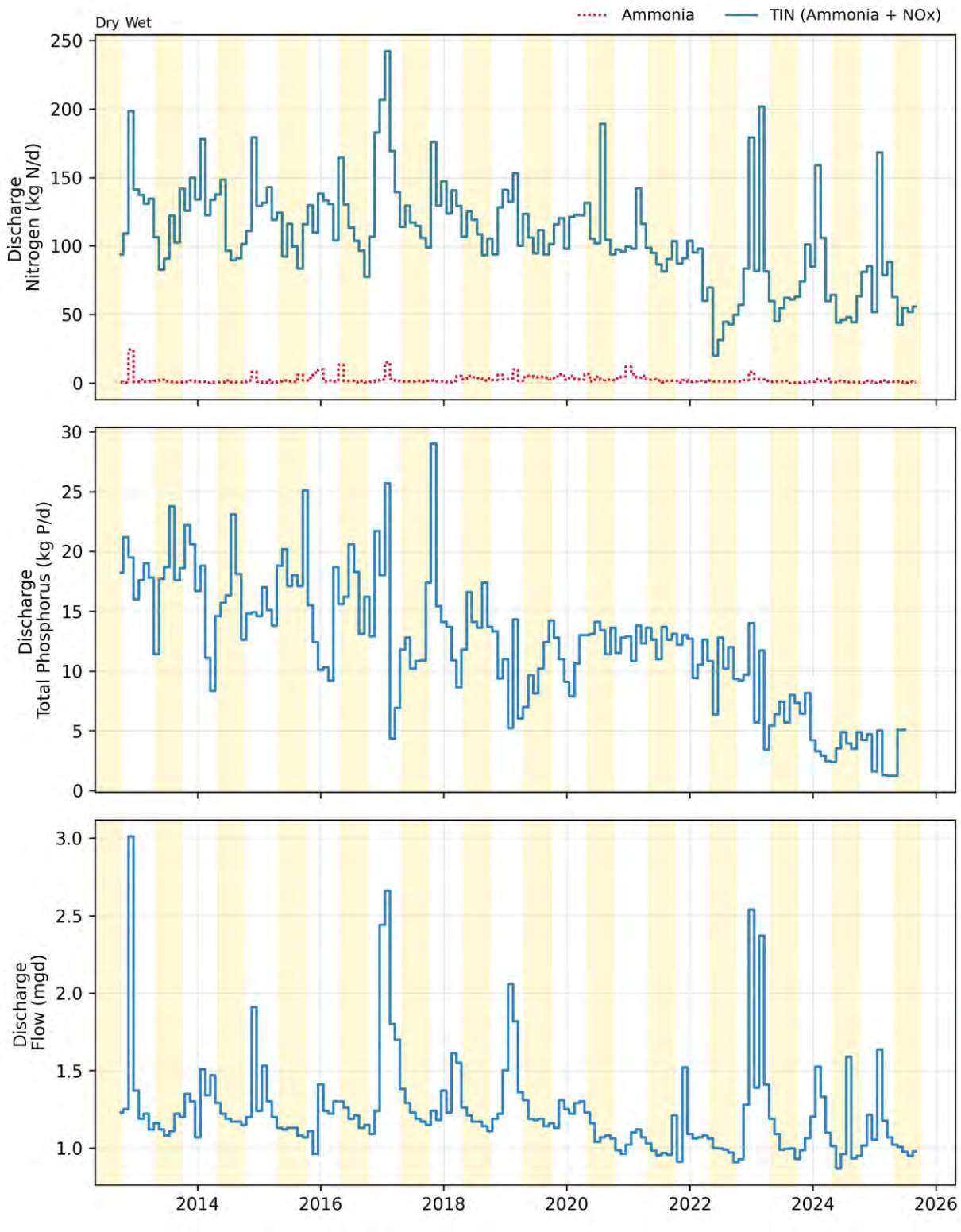


Figure 12-1. Discharge: Mt. View Sanitary District Monthly Flows and Loads

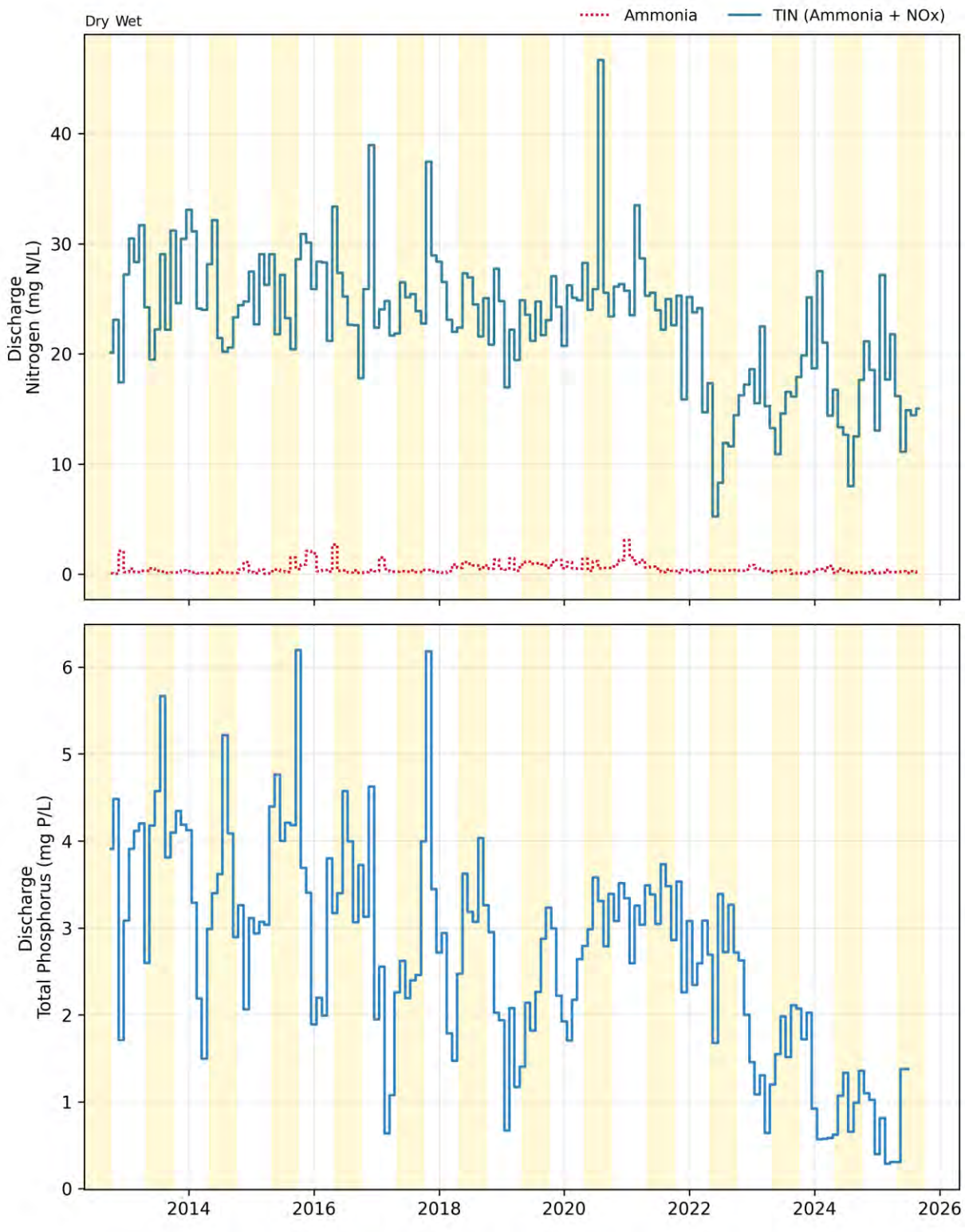


Figure 12-2. Discharge: Mt. View Sanitary District Monthly Concentrations

Table 12-1. Discharge: Mt. View Sanitary District Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	1.23	0.461	93.2	93.7	18.2
Nov-12	1.25	0.189	109	109	21.2
Dec-12	3.01	24.3	174	198	19.5
Jan-13	1.37	0.982	140	141	16.0
Feb-13	1.19	2.30	135	138	17.6
Mar-13	1.22	0.879	130	130	19.0
Apr-13	1.12	1.34	133	135	17.8
May-13	1.16	1.40	105	107	11.4
Jun-13	1.12	2.32	80.2	82.6	17.7
Jul-13	1.08	1.30	89.6	90.9	18.7
Aug-13	1.11	1.00	121	122	23.8
Sep-13	1.22	0.509	102	102	17.6
Oct-13	1.20	0.680	141	141	18.6
Nov-13	1.35	0.771	125	126	22.2
Dec-13	1.30	1.77	148	150	20.6
Jan-14	1.07	1.03	133	134	16.7
Feb-14	1.51	0.913	177	178	18.8
Mar-14	1.34	0.334	122	122	11.1
Apr-14	1.47	0.611	133	134	8.33
May-14	1.29	0.483	137	137	14.6
Jun-14	1.22	0.457	148	148	15.7
Jul-14	1.19	1.67	94.9	96.6	16.3
Aug-14	1.17	0.620	88.8	89.4	23.1
Sep-14	1.17	0.540	90.6	91.1	18.1
Oct-14	1.15	0.460	101	101	12.6
Nov-14	1.20	1.94	109	111	14.8
Dec-14	1.91	8.07	171	180	14.9
Jan-15	1.24	0.910	128	129	14.6
Feb-15	1.53	0.370	131	131	17.0
Mar-15	1.30	2.01	141	143	15.1
Apr-15	1.20	0.190	119	119	13.8
May-15	1.13	1.19	123	124	18.8
Jun-15	1.12	1.72	90.6	92.3	20.2
Jul-15	1.13	1.15	115	116	17.1
Aug-15	1.13	0.899	98.5	99.4	18.0
Sep-15	1.08	6.11	77.4	83.5	17.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	1.07	1.82	114	115	25.1
Nov-15	1.11	3.74	126	130	15.5
Dec-15	0.963	7.66	102	110	12.4
Jan-16	1.41	10.1	128	138	10.1
Feb-16	1.24	1.18	132	133	10.3
Mar-16	1.22	1.70	129	130	9.20
Apr-16	1.30	1.18	103	105	18.7
May-16	1.30	13.2	151	164	15.6
Jun-16	1.26	1.39	129	130	16.2
Jul-16	1.19	1.52	112	113	20.6
Aug-16	1.21	0.715	103	104	18.3
Sep-16	1.13	1.44	95.2	96.6	13.1
Oct-16	1.15	0.555	76.8	77.3	16.2
Nov-16	1.09	0.861	106	107	12.9
Dec-16	1.24	1.81	181	183	21.7
Jan-17	2.44	2.52	204	207	18.0
Feb-17	2.66	15.1	227	242	25.7
Mar-17	1.80	3.03	166	169	4.35
Apr-17	1.70	1.45	138	140	6.92
May-17	1.38	1.13	113	114	11.8
Jun-17	1.29	1.33	128	129	12.8
Jul-17	1.23	1.07	116	117	10.2
Aug-17	1.19	1.58	113	115	10.8
Sep-17	1.17	0.831	105	106	10.9
Oct-17	1.15	1.61	97.4	99.0	17.4
Nov-17	1.24	1.74	174	176	29.0
Dec-17	1.18	1.24	128	129	15.4
Jan-18	1.37	1.06	146	147	14.1
Feb-18	1.23	0.501	123	124	13.7
Mar-18	1.61	1.64	139	141	10.9
Apr-18	1.55	5.06	124	129	8.62
May-18	1.26	2.69	104	106	11.8
Jun-18	1.21	5.07	120	125	16.6
Jul-18	1.17	4.24	115	119	14.1
Aug-18	1.17	3.51	105	109	13.6
Sep-18	1.14	1.95	91.2	93.1	17.4
Oct-18	1.11	3.29	102	106	13.7

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	1.19	2.21	91.7	93.9	13.3
Dec-18	1.22	6.09	122	128	9.36
Jan-19	1.50	2.71	138	141	11.0
Feb-19	2.06	3.32	129	132	5.22
Mar-19	1.82	9.81	143	152	14.3
Apr-19	1.36	1.64	98.5	100	6.02
May-19	1.31	4.32	119	124	6.96
Jun-19	1.19	5.05	101	106	9.64
Jul-19	1.18	4.29	90.3	94.6	8.13
Aug-19	1.19	4.44	107	111	10.2
Sep-19	1.14	3.85	89.8	93.7	12.4
Oct-19	1.16	2.58	98.7	101	14.2
Nov-19	1.13	4.68	111	115	12.8
Dec-19	1.31	6.40	114	121	11.0
Jan-20	1.25	2.46	95.5	98.0	9.10
Feb-20	1.22	5.09	116	121	7.87
Mar-20	1.29	2.59	120	123	10.6
Apr-20	1.30	2.35	120	122	13.0
May-20	1.23	6.51	125	132	13.0
Jun-20	1.16	1.36	104	105	13.1
Jul-20	1.04	4.65	97.2	97.7	14.1
Aug-20	1.07	2.09	187	98.7	13.4
Sep-20	1.08	2.39	102	108	11.4
Oct-20	1.06	2.23	91.7	93.9	13.6
Nov-20	0.986	3.31	94.1	97.4	11.5
Dec-20	0.962	4.74	91.2	96.0	12.8
Jan-21	1.02	12.0	87.4	97.2	12.9
Feb-21	1.10	6.36	91.6	95.4	10.8
Mar-21	1.12	3.92	138	142	13.8
Apr-21	1.07	5.18	111	117	12.3
May-21	1.03	2.44	96.1	98.6	13.6
Jun-21	0.983	2.59	92.4	94.9	12.6
Jul-21	0.954	1.80	84.7	86.5	11.0
Aug-21	0.969	0.667	80.7	81.4	13.7
Sep-21	0.956	1.55	88.8	90.4	12.6
Oct-21	1.21	1.49	102	103	13.1
Nov-21	0.912	0.382	86.9	87.2	12.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	1.52	2.16	89.0	91.2	13.0
Jan-22	1.09	0.797	103	104	12.7
Feb-22	1.06	1.22	94.1	95.3	9.41
Mar-22	1.07	1.38	96.5	97.8	10.5
Apr-22	1.08	0.868	59.2	60.0	12.6
May-22	1.06	1.68	67.9	69.6	10.8
Jun-22	0.999	1.27	18.6	19.9	6.34
Jul-22	0.997	1.16	30.2	31.3	12.8
Aug-22	0.990	1.34	43.3	44.6	10.2
Sep-22	0.971	1.32	41.4	42.7	12.0
Oct-22	0.909	1.28	48.4	49.7	9.34
Nov-22	0.928	1.09	56.0	57.1	9.22
Dec-22	1.28	2.09	81.4	83.5	9.69
Jan-23	2.54	8.09	171	179	14.0
Feb-23	1.39	2.76	78.9	81.7	5.70
Mar-23	2.37	2.62	199	201	11.7
Apr-23	1.41	1.43	80.1	81.6	3.43
May-23	1.19	0.787	59.0	59.8	5.41
Jun-23	1.09	1.16	43.8	45.0	6.38
Jul-23	0.988	1.07	53.5	54.6	7.41
Aug-23	0.994	1.37	60.8	62.2	5.70
Sep-23	0.997	0.152	60.7	60.9	7.97
Oct-23	0.931	0.453	62.7	63.1	7.31
Nov-23	0.987	0.225	74.0	74.2	6.43
Dec-23	1.06	1.00	100	101	8.16
Jan-24	1.20	1.01	84.0	85.0	4.20
Feb-24	1.52	2.71	156	159	3.29
Mar-24	1.33	1.56	104	106	2.90
Apr-24	1.10	3.12	56.7	59.8	2.43
May-24	1.01	0.517	63.6	64.1	2.38
Jun-24	0.870	1.65	42.2	43.9	3.52
Jul-24	0.964	1.26	45.0	46.5	4.87
Aug-24	1.59	0.748	47.2	48.0	3.94
Sep-24	0.932	0.495	43.7	44.2	3.50
Oct-24	0.950	0.696	62.7	63.4	4.88
Nov-24	1.02	0.282	81.0	81.2	4.22
Dec-24	1.21	1.50	83.7	85.2	4.70

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	1.05	0.318	51.7	52.0	1.59
Feb-25	1.64	0.920	167	168	5.02
Mar-25	1.18	1.67	77.0	78.7	1.28
Apr-25	1.07	0.833	87.4	88.3	1.25
May-25	1.02	0.811	61.8	62.6	--
Jun-25	1.01	1.09	41.2	42.3	--
Jul-25	0.975	0.436	54.5	54.9	5.09
Aug-25	0.950	0.981	50.9	51.9	--
Sep-25	0.978	0.587	55.1	55.7	--
Dry Season Average	**1.12**	**2.01**	**89.4**	**90.0**	**12.6**
Wet Season Average	**1.32**	**2.78**	**116**	**119**	**12.2**
Annual Average	**1.24**	**2.46**	**105**	**107**	**12.3**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

13 Napa Sanitation District

Napa Sanitation District discharges to the Napa River that is connected to San Pablo Bay. The plant has a permitted capacity of 15.4 mgd ADWF. The plant performs nitrogen removal using a step-feed activated sludge process with anoxic zones coupled with oxidation ponds which also serve as equalization during peak flow. Discharge is prohibited July 1 through September 30. However, when conditions permit, the typical non-discharge period is May 1 through October 31, as was the case in 2024/2025.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent:
  - The flow reduction across the plant is seasonal and ranges from 0 to 100 percent. Periods with 100 percent load reduction are attributed to zero discharge where all the effluent is recycled.
  - The nitrogen load reduction during discharge periods is greater than 60 percent (except for the relatively wet January 2023). The variability in reduction across the plant is attributed to discharge TIN concentrations that range from 6 to 22 mg N/L.
  - The phosphorus load reduction during discharge periods is wide-ranging. This variability is attributed to occasional phosphorus load reduction across the plant as evidenced by discharge concentration occasionally less than 1 mg P/L. The mechanism for TP load reduction is likely from ferric chloride addition.
- Discharge:
  - Nitrogen and phosphorus loads generally increase with flow during wet weather events.
  - NOx is the majority of the nitrogen discharged as expected because the activated sludge system is operated to nitrify. During the wet season months partially nitrified pond effluent may be clarified then comingled with nitrified activated sludge effluent prior to discharge which may increase the ammonia levels during such months.
  - Based on average monthly values, the plant discharge typically meets Level 2 TIN limits (i.e., 15 mg N/L) developed as part of the first Watershed Permit (R2-2014-0014).
  - The average monthly phosphorus values range from 0.3 to 5.6 mg P/L. This suggests P is occasionally removed as previously noted from likely ferric chloride addition.
- Recycled Water:
  - Based on Table 13-3, the plant averaged 2.25 mgd in 2024. Users include Landscape Irrigation, Commercial, Agricultural, and Other Non-Potable Customers.
  - Based on values from Table 5-3 through Table 5-5, the average nutrient loads diverted from the Bay in 2024 due to recycled water is 33 kg ammonia-N/d, 75 kg TIN-N/d, and 20 kg P/d.

Influent

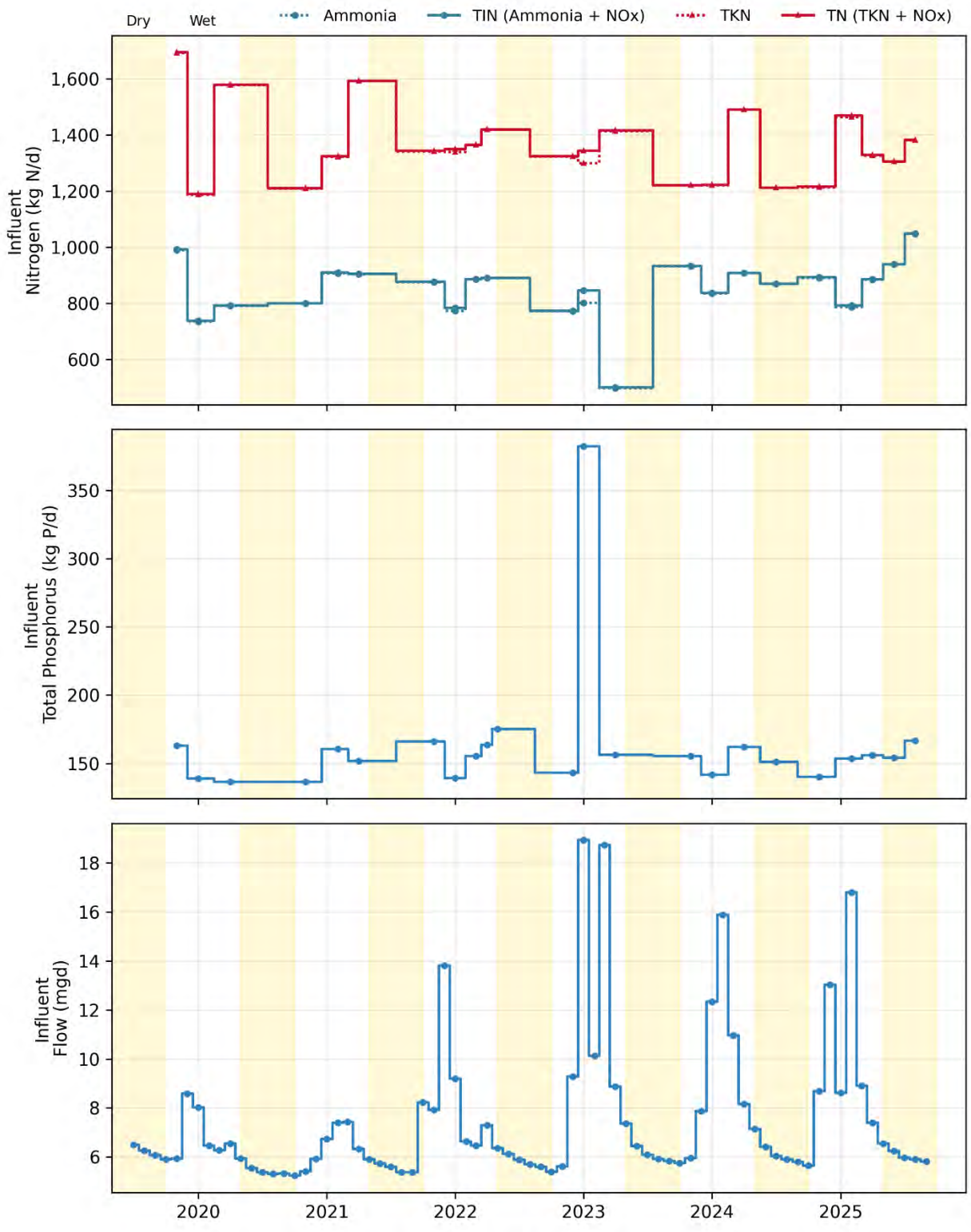


Figure 13-1. Influent: Napa Sanitation District Monthly Flows and Loads

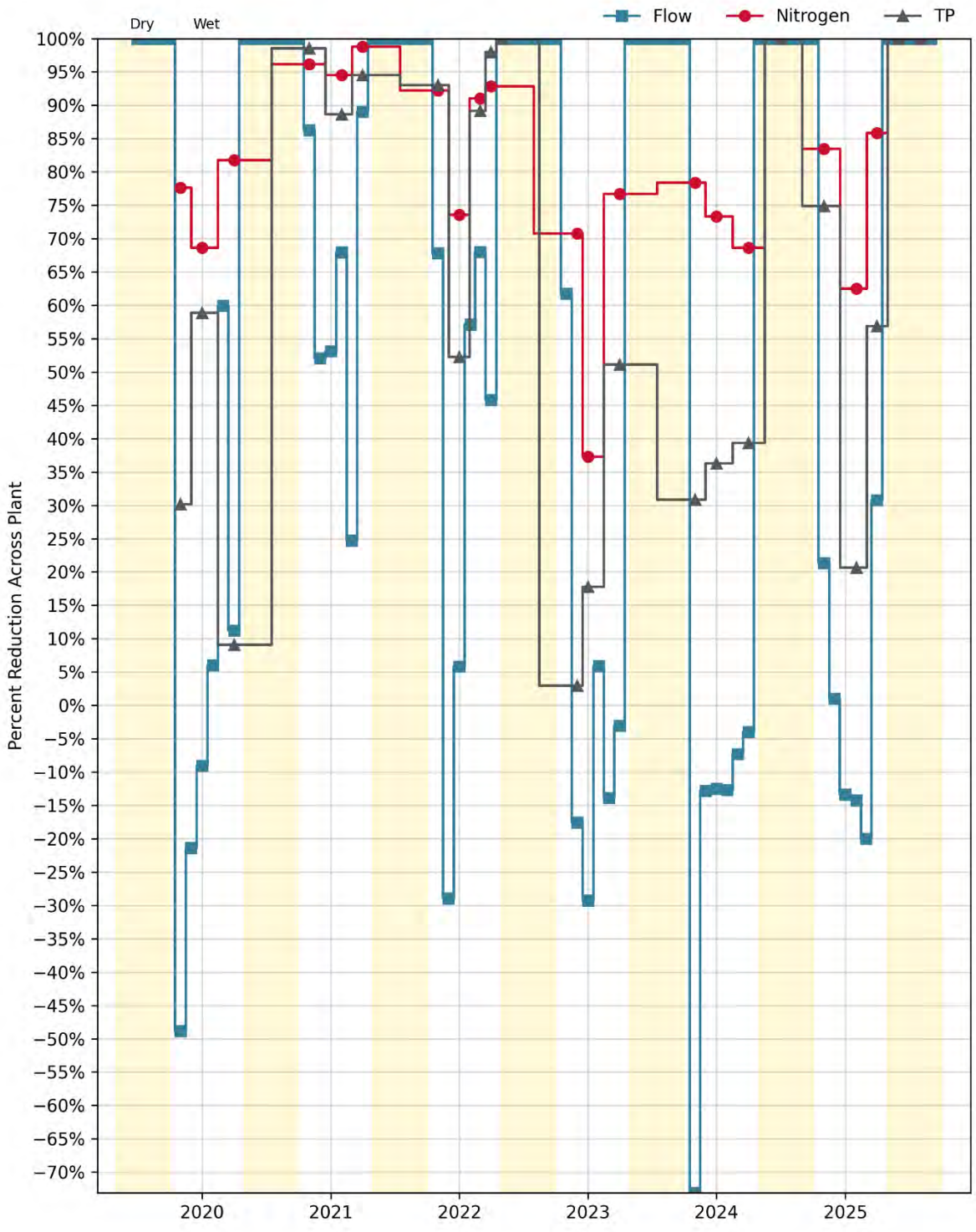


Figure 13-2. Influent: Napa Sanitation District Monthly Reductions Across the Plant*

* The negative percent reduction occurs during the wet season and it is attributed to discharging water stored in the storage ponds.

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 13-1. Influent: Napa Sanitation District Monthly Flows and Loads*

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	6.50	--	--	--	--	--	--
Aug-19	6.27	--	--	--	--	--	--
Sep-19	6.07	1,050	--	--	--	--	--
Oct-19	5.90	--	--	--	--	--	--
Nov-19	5.94	990	2.93	917	1,690	1,940	163
Dec-19	8.59	813	--	--	--	--	--
Jan-20	8.02	735	2.78	737	1,190	1,190	139
Feb-20	6.47	--	--	--	--	--	--
Mar-20	6.27	--	--	--	--	--	--
Apr-20	6.55	791	1.18	792	1,580	1,580	137
May-20	5.94		--	--	--	--	--
Jun-20	5.56		--	--	--	--	--
Jul-20	5.38	770	--	--	--	--	--
Aug-20	5.31		--	--	--	--	--
Sep-20	5.32		--	--	--	--	--
Oct-20	5.23	--	--	--	--	--	--
Nov-20	5.42	799	0.975	800	1,210	1,210	136
Dec-20	5.92	--	--	--	--	--	--
Jan-21	6.74	--	--	--	--	--	--
Feb-21	7.40	906	3.15	909	1,320	1,320	160
Mar-21	7.43	--	--	--	--	--	--
Apr-21	6.33	904	0.490	904	1,590	1,590	152
May-21	5.91		--	--	--	--	--
Jun-21	5.74		--	--	--	--	--
Jul-21	5.59	897	--	--	--	--	--
Aug-21	5.38		--	--	--	--	--
Sep-21	5.37		--	--	--	--	--
Oct-21	8.22	--	--	--	--	--	--
Nov-21	7.93	874	1.98	876	1,340	1,340	166
Dec-21	13.8	--	--	--	--	--	--
Jan-22	9.19	773	10.2	783	1,340	1,350	139
Feb-22	6.63	--	--	--	--	--	--
Mar-22	6.46	885	0.526	886	1,360	1,360	155
Apr-22	7.30	889	0.649	890	1,420	1,420	163
May-22	6.37	994	--	--	1,610	--	175
Jun-22	6.13		--	--	--	--	--
Jul-22	5.89		--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	5.70	845	--	--	--	--	--
Sep-22	5.59		--	--	--	--	--
Oct-22	5.40	869	--	--	--	--	--
Nov-22	5.61	872	--	--	--	--	--
Dec-22	9.29	772	1.65	773	1,320	1,320	143
Jan-23	18.9	801	44.7	846	1,300	1,340	382
Feb-23	10.1	822	--	--	--	--	--
Mar-23	18.7	759	--	--	--	--	--
Apr-23	8.88	498	2.60	501	1,410	1,420	156
May-23	7.36	995	--	--	--	--	--
Jun-23	6.44	978	--	--	--	--	--
Jul-23	6.09	803	--	--	--	--	--
Aug-23	5.93	687	--	--	--	--	--
Sep-23	5.84	844	--	--	--	--	--
Oct-23	5.76	665	--	--	--	--	--
Nov-23	5.96	932	0.670	932	1,220	1,220	155
Dec-23	7.87	871	--	--	--	--	--
Jan-24	12.3	835	1.75	859	1,220	1,220	142
Feb-24	15.9	857	--	--	1,320	--	--
Mar-24	11.0	821	--	--	1,230	--	--
Apr-24	8.16	907	0	907	1,490	1,490	162
May-24	7.15	937	--	--	1,250	--	--
Jun-24	6.41	929	--	--	1,560	--	--
Jul-24	6.05	869	0	847	1,210	1,190	151
Aug-24	5.90	976	--	--	1,330	--	--
Sep-24	5.80	949	--	--	1,210	--	--
Oct-24	5.65	911	--	--	1,340	--	--
Nov-24	8.69	890	2.49	859	1,210	1,250	140
Dec-24	13.0	962	--	--	1,390	--	--
Jan-25	8.62	857	--	--	1,380	--	--
Feb-25	16.8	787	5.82	853	1,460	1,380	154
Mar-25	8.91	936	--	--	1,270	--	--
Apr-25	7.39	884	1.93	875	1,330	1,300	156
May-25	6.54	839	--	--	1,410	--	--
Jun-25	6.24	939	0.510	944	1,300	1,220	154
Jul-25	5.97	984	--	--	1,300	--	--
Aug-25	5.90	1,050	0.700	1,080	1,380	1,350	167
Sep-25	5.82	998	--	--	1,290	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	5.98	917	0.403	957	1,350	1,250	162
Wet Season Average	8.68	840	4.55	837	1,360	1,380	163
Annual Average	7.49	869	3.99	853	1,360	1,360	163

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

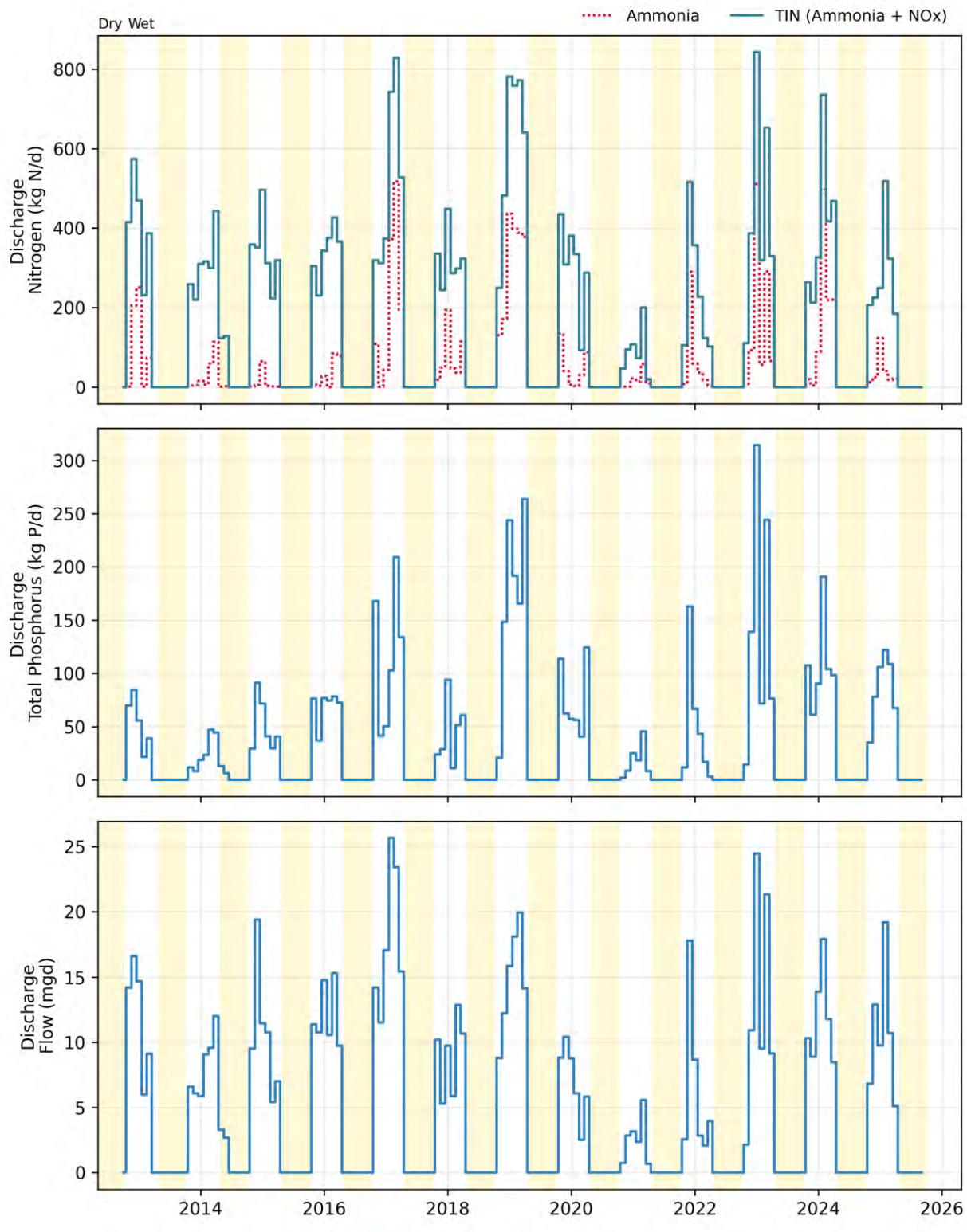


Figure 13-3. Discharge: Napa Sanitation District Monthly Flows and Loads

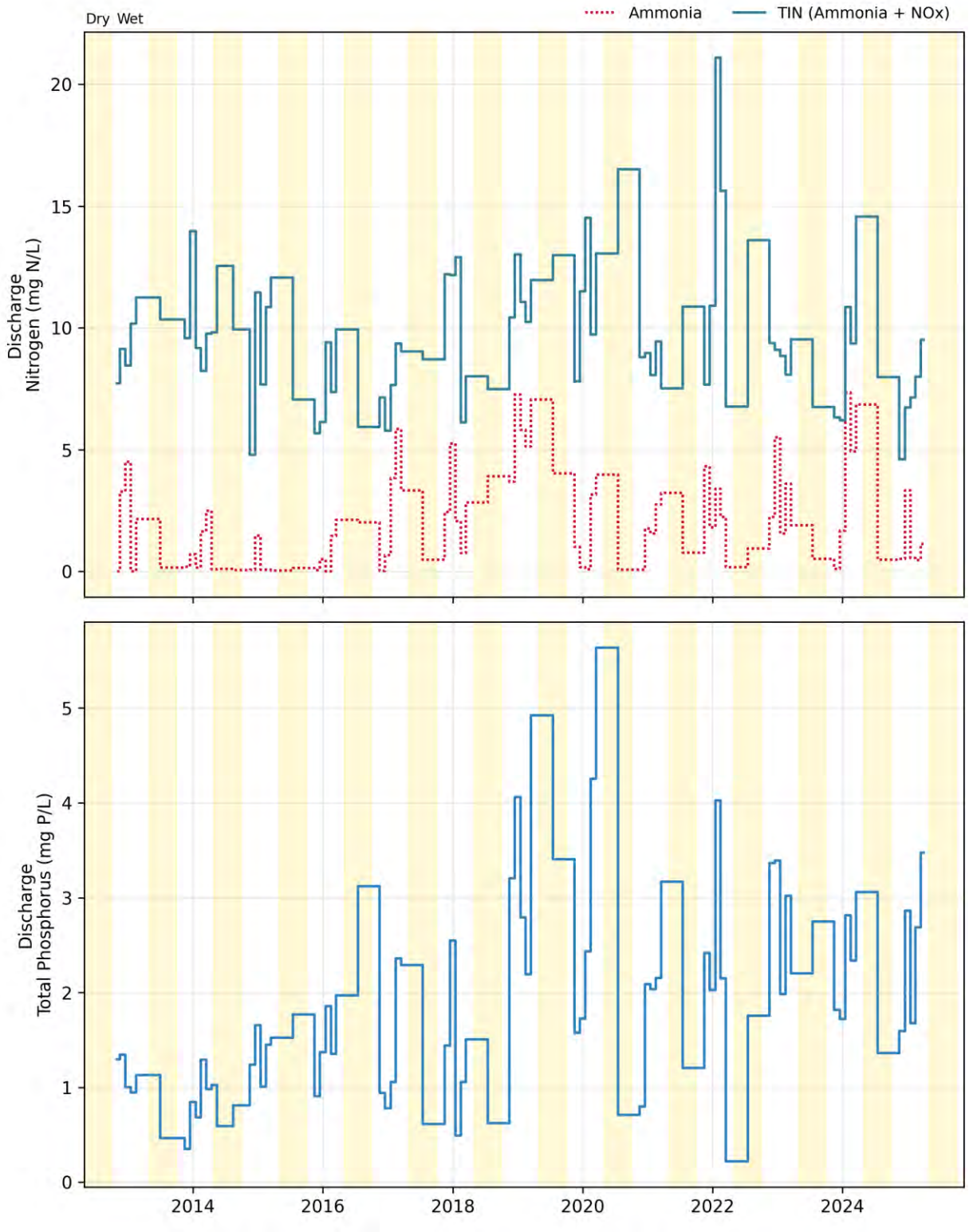


Figure 13-4. Discharge: Napa Sanitation District Monthly Concentrations

Table 13-2. Discharge: Napa Sanitation District Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0	0	0	0	0
Nov-12	14.2	0.268	414	415	69.8
Dec-12	16.6	205	369	574	84.4
Jan-13	14.7	250	220	470	55.8
Feb-13	5.99	0.113	231	231	21.5
Mar-13	9.10	73.6	314	387	38.9
Apr-13	0	0	0	0	0
May-13	0	0	0	0	0
Jun-13	0	0	0	0	0
Jul-13	0	0	0	0	0
Aug-13	0	0	0	0	0
Sep-13	0	0	0	0	0
Oct-13	0	0	0	0	0
Nov-13	6.61	3.77	255	259	11.6
Dec-13	6.08	4.25	216	220	8.04
Jan-14	5.85	15.4	294	309	18.7
Feb-14	9.09	5.49	310	315	23.5
Mar-14	9.60	59.3	239	299	47.0
Apr-14	12.0	113	330	443	44.5
May-14	3.30	0.988	122	122	12.8
Jun-14	2.70	1.09	127	128	6.06
Jul-14	0	0	0	0	0
Aug-14	0	0	0	0	0
Sep-14	0	0	0	0	0
Oct-14	0	0	0	0	0
Nov-14	9.53	1.91	356	358	29.3
Dec-14	19.4	5.30	347	352	91.0
Jan-15	11.5	63.8	433	497	71.8
Feb-15	10.8	2.73	309	312	41.1
Mar-15	5.42	1.51	221	223	29.8
Apr-15	7.00	0.900	319	319	40.4
May-15	0	0	0	0	0
Jun-15	0	0	0	0	0
Jul-15	0	0	0	0	0
Aug-15	0	0	0	0	0
Sep-15	0	0	0	0	0
Oct-15	0	0	0	0	0
Nov-15	11.4	5.66	298	304	76.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	10.7	2.26	228	231	37.0
Jan-16	14.8	27.7	315	343	76.5
Feb-16	10.6	0	376	376	74.3
Mar-16	15.3	84.3	342	426	78.3
Apr-16	9.74	78.1	288	366	72.6
May-16	0	0	0	0	0
Jun-16	0	0	0	0	0
Jul-16	0	0	0	0	0
Aug-16	0	0	0	0	0
Sep-16	0	0	0	0	0
Oct-16	0	0	0	0	0
Nov-16	14.2	109	210	319	168
Dec-16	11.5	0.778	311	312	41.1
Jan-17	17.1	43.5	330	374	50.3
Feb-17	25.7	372	371	743	103
Mar-17	23.4	517	311	829	209
Apr-17	15.4	194	333	528	134
May-17	0	0	0	0	0
Jun-17	0	0	0	0	0
Jul-17	0	0	0	0	0
Aug-17	0	0	0	0	0
Sep-17	0	0	0	0	0
Oct-17	0	0	0	0	0
Nov-17	10.2	18.1	317	336	23.6
Dec-17	5.29	48.8	195	244	28.8
Jan-18	9.74	194	255	449	93.9
Feb-18	5.88	46.1	241	287	10.9
Mar-18	12.9	36.3	262	298	51.4
Apr-18	10.7	114	209	323	60.7
May-18	0	0	0	0	0
Jun-18	0	0	0	0	0
Jul-18	0	0	0	0	0
Aug-18	0	0	0	0	0
Sep-18	0	0	0	0	0
Oct-18	0	0	0	0	0
Nov-18	8.79	130	119	249	20.7
Dec-18	12.2	171	312	464	148
Jan-19	15.9	436	345	781	244

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	18.1	399	359	758	191
Mar-19	19.9	388	385	772	166
Apr-19	14.1	377	263	680	264
May-19	0	0	0	0	0
Jun-19	0	0	0	0	0
Jul-19	0	0	0	0	0
Aug-19	0	0	0	0	0
Sep-19	0	0	0	0	0
Oct-19	0	0	0	0	0
Nov-19	8.84	134	300	434	114
Dec-19	10.4	39.9	268	317	62.2
Jan-20	8.75	5.78	375	373	57.1
Feb-20	6.08	2.12	332	324	56.0
Mar-20	2.51	30.1	62.5	92.5	40.5
Apr-20	5.82	87.5	200	287	124
May-20	0	0	0	0	0
Jun-20	0	0	0	0	0
Jul-20	0	0	0	0	0
Aug-20	0	0	0	0	0
Sep-20	0	0	0	0	0
Oct-20	0	0	0	0	0
Nov-20	0.745	0.192	46.4	46.6	2.00
Dec-20	2.84	0.712	93.8	94.6	8.57
Jan-21	3.16	20.9	86.3	107	25.0
Feb-21	2.37	13.9	58.3	72.3	18.3
Mar-21	5.59	58.2	142	200	45.6
Apr-21	0.696	8.47	11.3	19.8	8.34
May-21	0	0	0	0	0
Jun-21	0	0	0	0	0
Jul-21	0	0	0	0	0
Aug-21	0	0	0	0	0
Sep-21	0	0	0	0	0
Oct-21	0	0	0	0	0
Nov-21	2.55	7.40	97.4	105	11.6
Dec-21	17.8	290	226	517	163
Jan-22	8.65	59.2	298	357	66.4
Feb-22	2.84	36.4	191	227	43.4
Mar-22	2.07	17.4	105	122	16.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	3.96	2.50	98.8	101	3.30
May-22	0	0	0	0	0
Jun-22	0	0	0	0	0
Jul-22	0	0	0	0	0
Aug-22	0	0	0	0	0
Sep-22	0	0	0	0	0
Oct-22	0	0	0	0	0
Nov-22	2.15	7.67	103	111	14.3
Dec-22	10.9	92.2	295	387	139
Jan-23	24.5	511	332	843	314
Feb-23	9.53	55.9	263	319	71.5
Mar-23	21.3	290	362	653	244
Apr-23	9.15	65.7	264	330	76.3
May-23	0	0	0	0	0
Jun-23	0	0	0	0	0
Jul-23	0	0	0	0	0
Aug-23	0	0	0	0	0
Sep-23	0	0	0	0	0
Oct-23	0	0	0	0	0
Nov-23	10.3	19.7	244	263	107
Dec-23	8.88	3.23	209	213	61.1
Jan-24	13.9	87.7	238	326	90.3
Feb-24	17.9	498	237	735	191
Mar-24	11.8	219	198	417	104
Apr-24	8.48	220	248	468	98.2
May-24	0	0	0	0	0
Jun-24	0	0	0	0	0
Jul-24	0	0	0	0	0
Aug-24	0	0	0	0	0
Sep-24	0	0	0	0	0
Oct-24	0	0	0	0	0
Nov-24	6.84	12.4	194	206	35.2
Dec-24	12.9	24.7	200	224	77.8
Jan-25	9.77	123	126	249	106
Feb-25	19.2	40.0	479	518	122
Mar-25	10.7	18.5	305	323	109
Apr-25	5.12	21.9	162	184	67.3
May-25	0	0	0	0	0

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	0	0	0	0	0
Jul-25	0	0	0	0	0
Aug-25	0	0	0	0	0
Sep-25	0	0	0	0	0
Dry Season Average	**0.0923**	**0.032**	**3.83**	**3.85**	**0.29**
Wet Season Average	**8.91**	**85.6**	**217**	**303**	**67.4**
Annual Average	**5.24**	**49.9**	**128**	**178**	**39.4**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 13-3. Recycled Water: Napa Sanitation District Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	1,040 (0.92)	509 (0.45)	0 (0)	0 (0)	767 (0.68)	0 (0)	26 (0.02)	2,340 (2.07)
2020	1,310 (1.17)	595 (0.53)	0 (0)	0 (0)	1,110 (0.99)	0 (0)	70 (0.06)	3,080 (2.75)
2021	1,280 (1.15)	530 (0.47)	0 (0)	0 (0)	1,760 (1.57)	0 (0)	130 (0.12)	3,700 (3.31)
2022	1,290 (1.15)	572 (0.51)	0 (0)	0 (0)	1,340 (1.19)	0 (0)	76 (0.07)	3,280 (2.92)
2023	973 (0.87)	462 (0.41)	0 (0)	0 (0)	798 (0.71)	0 (0)	28 (0.02)	2,261 (2.01)
2024	1,040 (0.93)	573 (0.51)	0 (0)	0 (0)	878 (0.78)	0 (0)	28 (0.03)	2,519 (2.25)
Average	**1,160 (1.03)**	**540 (0.48)**	**0 (0)**	**0 (0)**	**1,110 (0.10)**	**0 (0)**	**59.7 (0.05)**	**2,870 (2.57)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 13-4. Recycled Water: Napa Sanitation District Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	19	9	0	0	14	0	<1	42
2020	6	3	0	0	5	0	<1	13
2021	14	6	0	0	20	0	1	41
2022	8	4	0	0	8	0	<1	21
2023	10	5	0	0	8	0	<1	23
2024	14	6	0	0	12	0	1	33
Average	**12**	**6**	**0**	**0**	**11**	**0**	**1**	**29**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 13-5. Recycled Water: Napa Sanitation District Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	39	19	0	0	29	0	1	89
2020	51	23	0	0	43	0	3	121
2021	37	15	0	0	50	0	4	105
2022	49	22	0	0	51	0	3	125
2023	27	13	0	0	22	0	<1	63
2024	31	17	0	0	26	0	1	75
Average	**39**	**18**	**0**	**0**	**37**	**0**	**2**	**96**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 13-6. Recycled Water: Napa Sanitation District Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	11	5	0	0	8	0	<1	25
2020	13	6	0	0	11	0	1	30
2021	10	4	0	0	13	0	1	28
2022	11	5	0	0	11	0	1	27
2023	9	4	0	0	7	0	<1	21
2024	8	4	0	0	7	0	<1	20
Average	**10**	**5**	**0**	**0**	**10**	**0**	**1**	**26**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

14 Novato Sanitary District

Novato discharges to San Pablo Bay. The plant has approximately 28,500 service connections; it has a permitted capacity of 7.0 mgd ADWF and a peak wet weather capacity of 47 mgd. The plant performs nitrogen removal using activated sludge. The District was issued a new NPDES permit (September 2020) that allows for year-round discharge to San Pablo Bay. The District will be transitioning to year-round discharge over the next several years as it winds down its ranching/irrigation spray field operation.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge:
  - Both nitrogen and phosphorus loads typically increase with wet weather flow events.
  - NOx is the majority of the nitrogen species discharged as is expected since this plant nitrifies. A portion of ammonia bleeds through during the colder months. This increases the ammonia contribution during such months.
  - The plant met Level 2 TIN concentration limits (i.e., 15 mg N/L) developed under the Scoping and Evaluation Plan during 2023/2024 and 2024/2025; historical values have been reliably less than 20 mg N/L.
  - Total phosphorus concentrations range from 0.1 to 6.1 mg P/L. This suggests a portion of P is removed as typical effluent TP concentrations for similar treatment plants are 4 to 6 mg P/L. The removal mechanism might be attributed to a combination of ferric chloride addition to the digester influent and/or biological P removal.
- Recycled Water:
  - Based on Table 1-2, the plant averages 1.2 mgd of recycled water. Recycled water uses included Golf Course, Landscape Irrigation, Agricultural, and Other Non-Potable.
  - Based on Table 1-3 through Table 1-5, the plant diverts on average 12 kg ammonia-N/d, 49 kg TIN-N/d, and 3 kg P/d away from the Bay through recycled water.

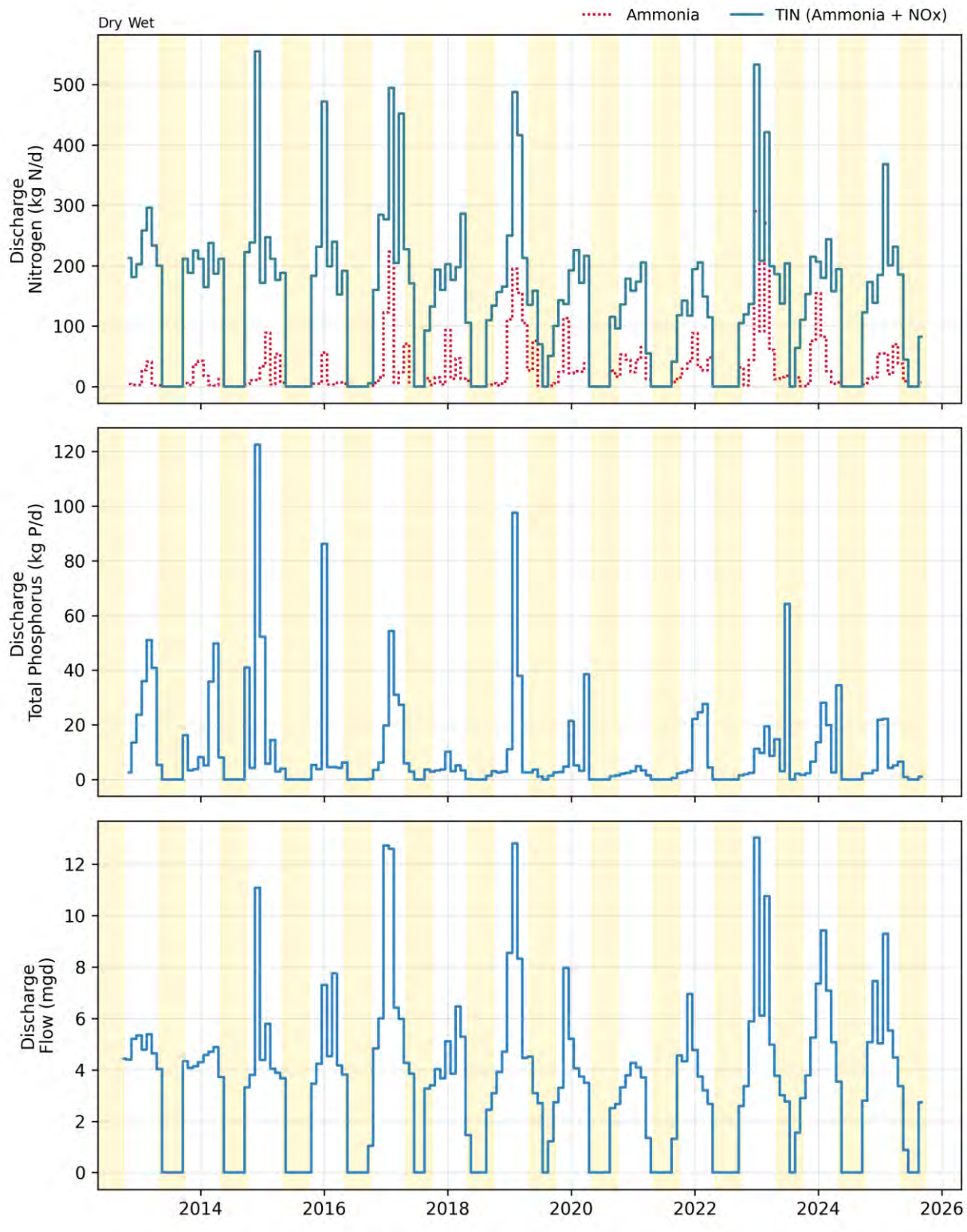


Figure 14-1. Discharge: Novato Monthly Flows and Loads

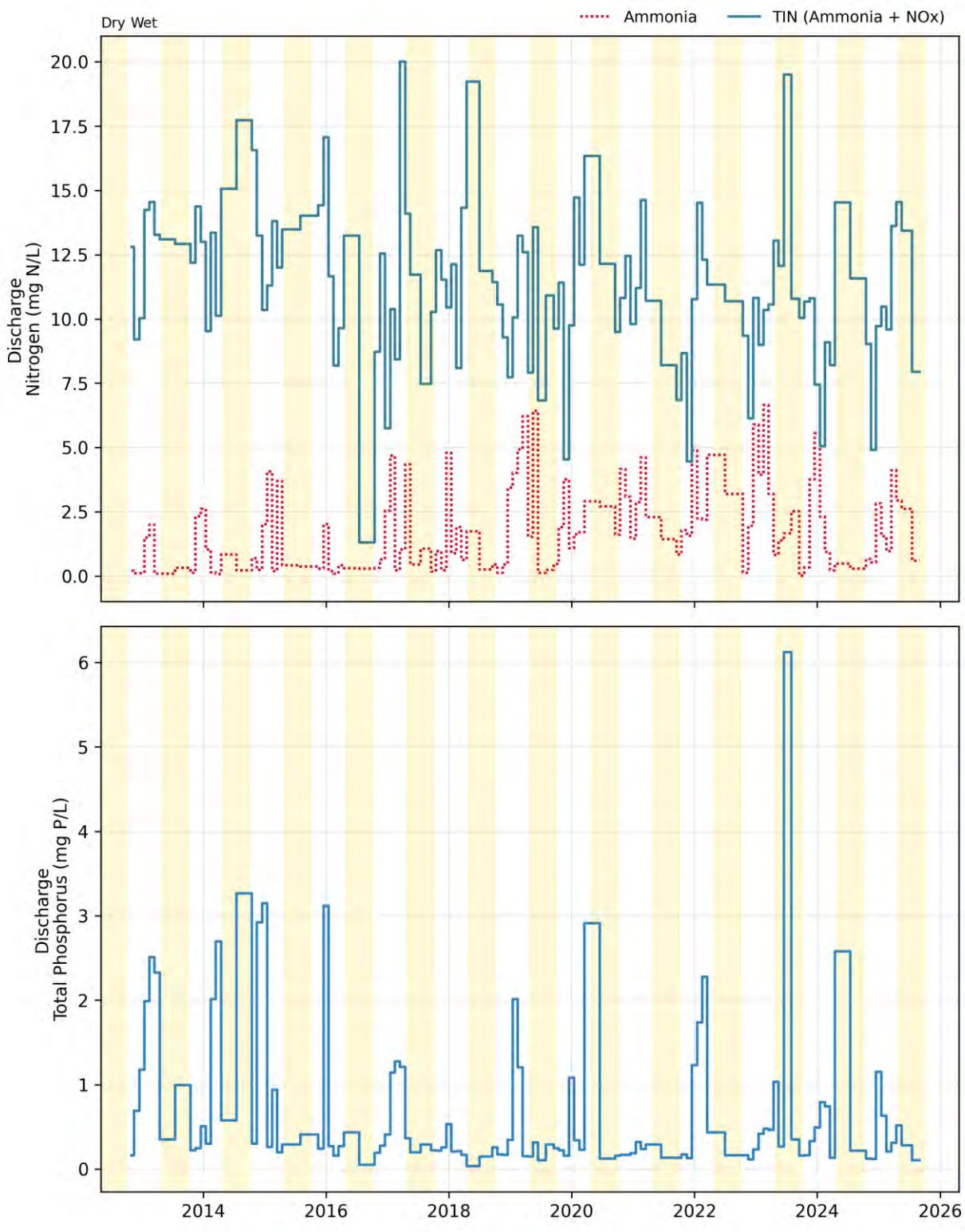


Figure 14-2. Discharge: Novato Monthly Concentrations

Table 14-1. Discharge: Novato Monthly Flows and Loads[1]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	4.44	--	--	--	--
Nov-12	4.39	3.63	209	213	2.65
Dec-12	5.21	2.16	179	181	13.6
Jan-13	5.34	2.30	200	203	23.7
Feb-13	4.79	27.3	231	258	36.0
Mar-13	5.39	41.0	255	296	51.1
Apr-13	4.64	1.85	231	233	40.9
May-13	4.03	1.52	198	200	5.32
Jun-13	0	0	0	0	0
Jul-13	0	0	0	0	0
Aug-13	0	0	0	0	0
Sep-13	0	0	0	0	0
Oct-13	4.33	5.24	207	212	16.3
Nov-13	4.07	2.16	186	188	3.39
Dec-13	4.14	36.4	189	225	3.82
Jan-14	4.30	42.6	169	211	8.23
Feb-14	4.57	17.8	147	165	5.18
Mar-14	4.70	2.52	235	238	35.8
Apr-14	4.88	1.66	185	187	49.8
May-14	3.71	11.9	200	212	8.09
Jun-14	0	0	0	0	0
Jul-14	0	0	0	0	0
Aug-14	0	0	0	0	0
Sep-14	0	0	0	0	0
Oct-14	3.32	2.88	220	222	41.0
Nov-14	3.80	10.1	228	238	4.30
Dec-14	11.1	10.6	544	555	123
Jan-15	4.38	33.6	138	172	52.2
Feb-15	5.78	89.0	158	247	5.70
Mar-15	4.05	3.10	208	212	14.4
Apr-15	3.88	54.3	122	176	2.90
May-15	3.68	6.00	182	188	4.00
Jun-15	0	0	0	0	0
Jul-15	0	0	0	0	0
Aug-15	0	0	0	0	0
Sep-15	0	0	0	0	0
Oct-15	0	0	0	0	0

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	3.46	4.81	179	183	5.36
Dec-15	4.24	4.67	227	231	3.82
Jan-16	7.30	55.8	416	472	86.2
Feb-16	4.52	3.43	196	199	4.57
Mar-16	7.75	3.16	237	240	4.58
Apr-16	4.18	6.68	146	152	4.25
May-16	3.82	4.51	187	191	6.22
Jun-16	0	0	0	0	0
Jul-16	0	0	0	0	0
Aug-16	0	0	0	0	0
Sep-16	0	0	0	0	0
Oct-16***	1.05	1.19	4.01	5.20	0.182
Nov-16	4.84	6.01	154	160	3.51
Dec-16	5.99	14.7	270	284	6.22
Jan-17	12.7	123	154	276	19.7
Feb-17	12.6	223	271	495	54.3
Mar-17	6.41	5.74	199	204	30.9
Apr-17	5.97	23.4	429	452	27.4
May-17	4.27	70.3	157	228	5.86
Jun-17	3.85	6.71	164	171	2.83
Jul-17	0	0	0	0	0
Aug-17	0	0	0	0	0
Sep-17	3.27	13.2	79.2	92.5	3.60
Oct-17	3.40	2.38	130	132	2.81
Nov-17	4.03	14.7	179	193	3.27
Dec-17	3.67	3.14	157	160	3.57
Jan-18	5.11	93.0	109	202	10.2
Feb-18	3.85	12.9	164	177	2.98
Mar-18	6.46	46.5	151	198	5.15
Apr-18	5.28	12.7	273	286	3.32
May-18**	1.45	9.61	96.1	106	0.186
Jun-18	0	0	0	0	0
Jul-18	0	0	0	0	0
Aug-18	0	0	0	0	0
Sep-18	2.44	2.41	107	110	1.34
Oct-18	3.10	5.28	129	134	2.96
Nov-18	3.91	2.06	154	156	2.57
Dec-18	4.71	8.23	157	165	2.93

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	8.54	111	139	250	11.1
Feb-19	12.8	195	293	488	97.6
Mar-19	8.32	155	262	417	37.9
Apr-19	4.47	105	108	265	2.58
May-19	4.51	26.3	109	135	2.51
Jun-19	3.09	75.1	83.5	245	3.66
Jul-19	2.70	1.35	68.4	69.7	1.03
Aug-19	0	0	0	0	0
Sep-19**	1.22	1.16	49.2	50.4	1.34
Oct-19	2.74	4.85	94.9	99.8	2.52
Nov-19	3.30	23.8	119	143	2.74
Dec-19	7.96	113	23.2	182	4.75
Jan-20	5.21	21.3	171	192	21.3
Feb-20	4.05	25.1	201	226	5.22
Mar-20	3.74	24.3	147	172	3.19
Apr-20	3.50	38.5	178	216	38.5
May-20	0	0	0	0	0
Jun-20	0	0	0	0	0
Jul-20	0	0	0	0	0
Aug-20	0	0	0	0	0
Sep-20	2.51	25.8	89.7	116	1.15
Oct-20	2.67	16.4	79.5	95.8	1.56
Nov-20	3.31	52.3	83.3	200	2.11
Dec-20	3.78	44.2	134	178	2.41
Jan-21	4.27	23.5	135	158	2.98
Feb-21	4.09	44.5	129	173	4.93
Mar-21	3.71	64.7	140	232	3.31
Apr-21**	1.35	11.8	43.0	54.8	1.48
May-21	0	0	0	0	0
Jun-21	0	0	0	0	0
Jul-21	0	0	0	0	0
Aug-21	0	0	0	0	0
Sep-21**	1.32	7.20	33.8	41.0	0.648
Oct-21	4.55	14.5	103	118	2.28
Nov-21	4.33	29.4	113	142	2.78
Dec-21	6.94	41.3	75.9	117	3.33
Jan-22	4.76	88.1	106	254	22.1
Feb-22	3.74	31.8	174	205	24.6

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	3.20	26.6	123	149	27.6
Apr-22**	2.67	47.7	67.0	120	4.39
May-22	0	0	0	0	0
Jun-22	0	0	0	0	0
Jul-22	0	0	0	0	0
Aug-22	0	0	0	0	0
Sep-22	0	0	0	0	0
Oct-22	2.59	31.5	73.4	105	1.57
Nov-22	3.37	1.62	118	119	2.03
Dec-22	5.88	43.5	93.1	137	2.48
Jan-23	13.0	291	242	533	11.3
Feb-23	6.10	91.2	117	233	9.67
Mar-23	10.8	271	150	776	19.4
Apr-23	4.97	60.3	138	199	8.71
May-23	3.76	11.8	174	186	14.7
Jun-23	3.00	15.8	121	137	3.03
Jul-23	2.77	17.5	187	204	64.1
Aug-23	0	0	0	0	0
Sep-23**	1.56	14.9	48.7	63.5	2.06
Oct-23	2.90	0.200	110	110	1.70
Nov-23	3.79	4.81	148	153	2.34
Dec-23	5.25	75.0	140	215	6.49
Jan-24	7.35	154	52.5	207	13.7
Feb-24	9.41	82.1	97.7	180	28.2
Mar-24	7.08	25.2	218	243	19.8
Apr-24	5.08	4.33	153	158	2.53
May-24	3.54	6.64	194	201	35.6
Jun-24	0	0	0	0	0
Jul-24	0	0	0	0	0
Aug-24	0	0	0	0	0
Sep-24	0	0	0	0	0
Oct-24	2.81	3.19	120	123	2.29
Nov-24	5.07	12.8	161	173	2.33
Dec-24	7.45	15.2	123	138	3.35
Jan-25	5.02	53.7	131	185	21.9
Feb-25	9.29	54.4	314	368	22.2
Mar-25	5.53	20.4	180	201	4.27
Apr-25	4.49	70.0	161	231	5.21

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	3.37	37.4	148	185	6.55
Jun-25	0.877	8.67	36.0	44.7	0.927
Jul-25	0	0	0	0	0
Aug-25	0	0	0	0	0
Sep-25	2.74	6.29	76.0	82.4	1.03
Dry Season Average	**1.04**	**5.87**	**42.8**	**50.0**	**2.69**
Wet Season Average	**5.18**	**42.1**	**167**	**216**	**15.0**
Annual Average	**3.45**	**26.9**	**115**	**146**	**9.83**

1 For non-detects after October 1, 2023, 1/2 of the method detection limit was used to quantify values. Prior to October 1, 2023, non-detect values used the provided method detection limit.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 14-2. Recycled Water: Novato Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	215 (0.19)	200 (0.18)	0 (0)	0 (0)	401 (0.36)	0 (0)	57.3 (0.05)	873 (0.78)
2020	0 (0)	640 (0.57)	0 (0)	0 (0)	902 (0.8)	0 (0)	99.5 (0.09)	1,642 (1.46)
2021	385 (0.34)	196 (0.18)	0 (0)	8 (0.01)	1010 (0.9)	0 (0)	49.4 (0.04)	1,649 (1.47)
2022	350 (0.31)	202 (0.18)	0 (0)	10 (0.01)	1,200 (1.07)	0 (0)	45.6 (0.04)	1,807 (1.61)
2023	260 (0.23)	135 (0.12)	0 (0)	10 (0.01)	366 (0.33)	0 (0)	1.08 (0)	772 (0.69)
2024	332 (0.30)	172 (0.15)	0 (0)	2 (<0.01)	924 (0.83)	0 (0)	74 (0.07)	1,504 (1.34)
Average	**257 (0.23)**	**258 (0.23)**	**0 (0)**	**5 (<0.01)**	**801 (0.71)**	**0 (0)**	**54 (0.05)**	**1374 (1.23)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 14-3. Recycled Water: Novato Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	3	2	0	0	5	0	1	11
2020	0	5	0	0	7	0	1	13
2021	3	1	0	<1	7	0	<1	11
2022	3	2	0	<1	11	0	<1	17
2023	3	2	0	<1	5	0	<1	10
2024	2	1	0	<1	5	0	<1	9
Average	**2**	**2**	**0**	**<1**	**7**	**0**	**<1**	**12**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 14-4. Recycled Water: Novato Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	7	7	0	0	14	0	2	31
2020	0	28	0	0	39	0	4	71
2021	12	6	0	<1	31	0	1	50
2022	13	7	0	<1	45	0	2	67
2023	11	6	0	<1	16	0	<1	33
2024	9	5	0	<1	24	0	2	40
Average	**9**	**10**	**0**	**<1**	**28**	**0**	**2**	**49**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 14-5. Recycled Water: Novato Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	1	1	0	0	1	0	<1	2
2020	0	2	0	0	2	0	<1	4
2021	<1	<1	0	<1	1	0	<1	1
2022	1	1	0	<1	3	0	<1	5
2023	1	<1	0	<1	1	0	<1	2
2024	1	<1	0	<1	2	0	<1	3
Average	**1**	**1**	**0**	**<1**	**2**	**0**	**<1**	**3**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

15 City of Palo Alto

Palo Alto discharges to the Lower South Bay. The plant serves an estimated population of 217,000 and it has a permitted ADWF capacity of 39 mgd and a peak wet weather capacity of 80 mgd. This past dry season average discharge flow was approximately 18.9 mgd. The plant performs ammonia and limited nitrogen removal using a combination of trickling filters and activated sludge.

The following observations are made based upon the figures and table in the subsequent pages:

- Influent
  - In recent years, minimal flow reductions have been achieved across the plant. The primary flow reductions are from a blend of new recycled water demands and flow management during wet weather events.
  - The nitrogen load reduction values across the plant typically ranges from approximately 20 to 60 percent. This load reduction is attributed primarily to a combination of biological assimilation and biological load reduction in the trickling filter/activated sludge system, as well as recycled water.
  - The phosphorus load reduction across the plant is up to 27 percent. Such a reduction is attributed primarily to biological assimilation within the plant, as well as recycled water.
  - NOx is no longer monitored as per Footnote 3 of Table E-2 in the Nutrients Watershed Permit. To calculate TIN and TN, a constant load of 19 kg/d is assumed starting in
- Discharge
  - NOx is the majority of the nitrogen species discharged, regardless of season. This is expected since this plant reliably nitrifies year-round. However, nitrification was not complete during 2024/2025, most likely due to construction occurring in one of the aeration basins in preparation for the future transition to a biological nitrogen removal process.
  - TP discharge concentrations range from 2.7 to 5.9 mg P/L. Such values suggest occasional removal beyond biological assimilation.
- Recycled Water:
  - Based on Table 1-2, the plant averages 0.65 mgd of Recycled Water. Recycled water uses include golf course irrigation, landscape irrigation, and other non-potable uses.
  - Based on Table 5-3through Table 5-5, the average load diverted from the Bay from recycled water is <1 kg ammonia-N/d, 72 kg TIN-N/d, and 11 kg P/d.

Influent

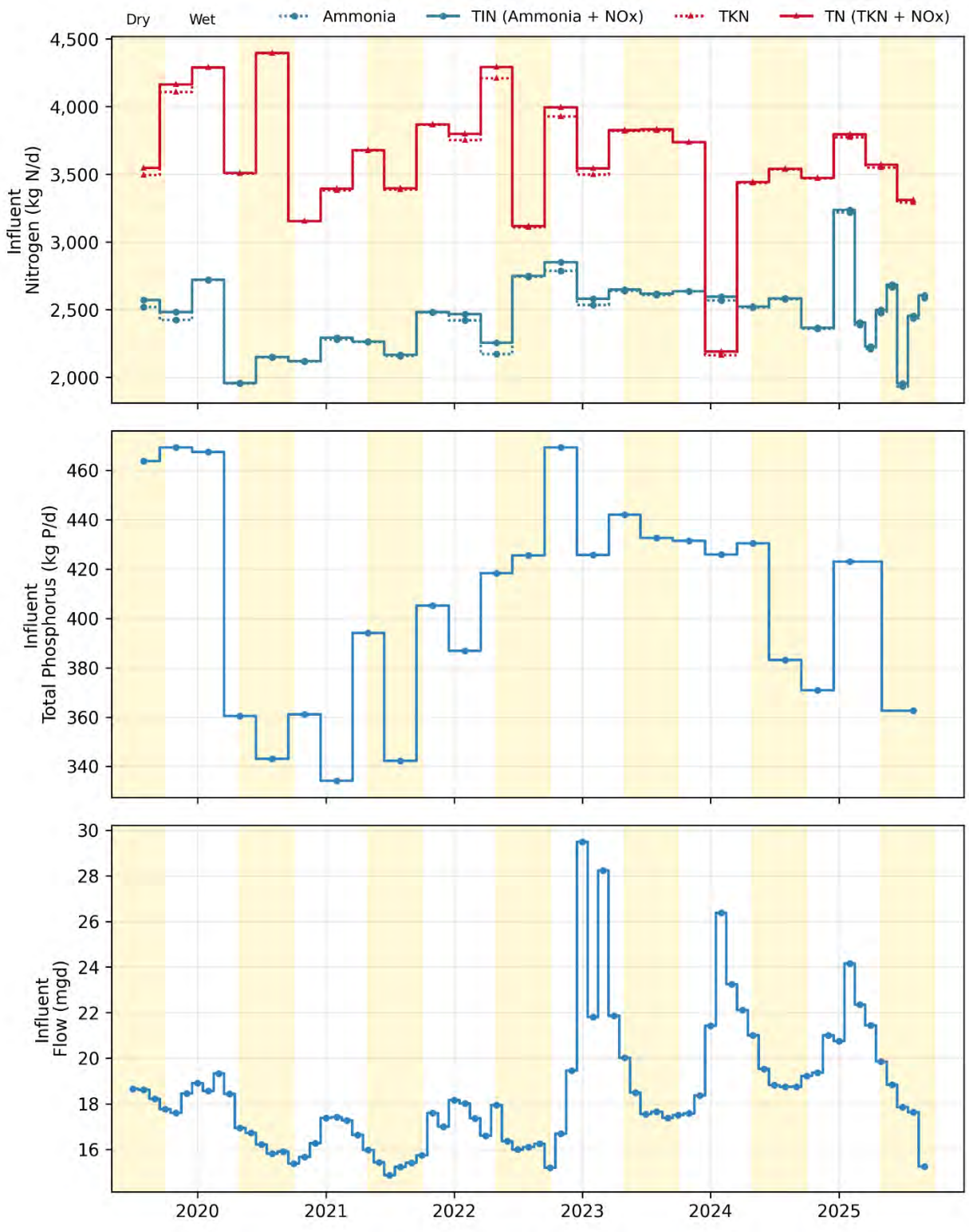


Figure 15-1. Influent: Palo Alto Monthly Flows and Loads

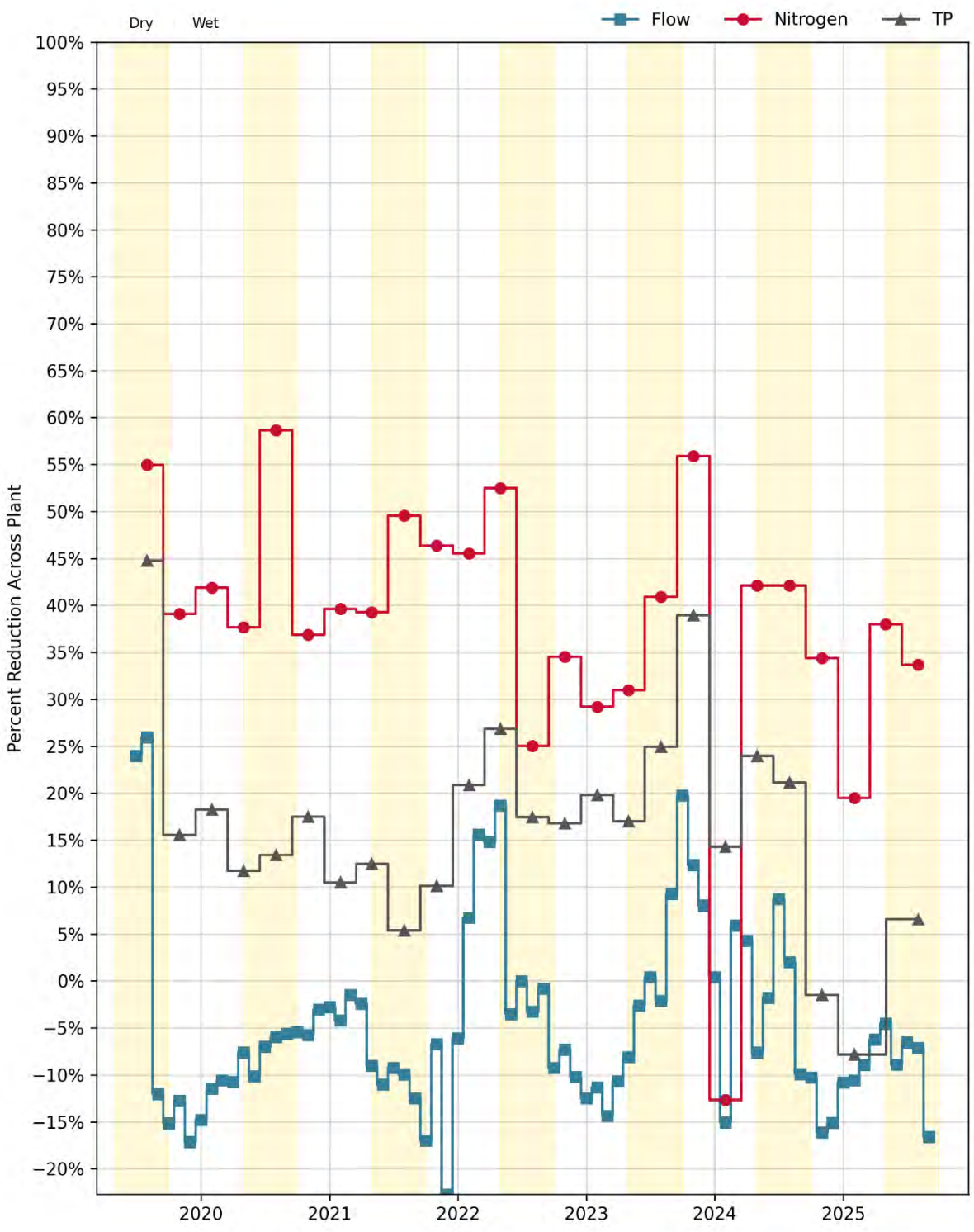


Figure 15-2. Influent: Palo Alto Monthly Reductions Across the Plant*

* The flow and total phosphorus reductions are occasionally negative. Negative flow reductions may be attributed to delays between inflow and outflow (hydraulic retention time through the plant is around 21 hours) or flow meter calibration issues. Negative nutrient reductions may be due flow meter issues or plant upsets due to construction.

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 15-1. Influent: Palo Alto Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	18.7	2,690	--	--	--	--	--
Aug-19	18.6	2,520	52.1	2,570	3,500	3,550	464
Sep-19	18.2	2,350	--	--	--	--	--
Oct-19	17.8	2,580	--	--	--	--	--
Nov-19	17.6	2,420	57.2	2,480	4,110	4,160	469
Dec-19	18.5	2,160	--	--	--	--	--
Jan-20	18.9	2,440	--	--	--	--	--
Feb-20	18.6	2,720	2.81	2,720	4,290	4,290	467
Mar-20	19.3	2,550	--	--	--	--	--
Apr-20	18.4	2,250	--	--	--	--	--
May-20	16.9	1,960	2.60	1,960	3,510	3,510	360
Jun-20	16.7	2,160	--	--	--	--	--
Jul-20	16.2	2,180	--	--	--	--	--
Aug-20	15.8	2,150	2.77	2,150	4,390	4,400	343
Sep-20	15.9	2,090	--	--	--	--	--
Oct-20	15.4	2,210	--	--	--	--	--
Nov-20	15.7	2,120	2.38	2,120	3,150	3,160	361
Dec-20	16.3	1,970	--	--	--	--	--
Jan-21	17.4	2,150	--	--	--	--	--
Feb-21	17.4	2,280	12.6	2,290	3,380	3,390	334
Mar-21	17.3	2,040	--	--	--	--	--
Apr-21	16.6	2,100	--	--	--	--	--
May-21	16.0	2,260	2.53	2,260	3,670	3,680	394
Jun-21	15.4	2,160	--	--	--	--	--
Jul-21	14.9	2,040	--	--	--	--	--
Aug-21	15.2	2,160	10.7	2,170	3,390	3,400	342
Sep-21	15.4	2,290	--	--	--	--	--
Oct-21	15.7	2,250	--	--	--	--	--
Nov-21	17.6	2,480	2.67	2,480	3,870	3,870	405
Dec-21	17.0	2,370	--	--	--	--	--
Jan-22	18.2	2,360	--	--	--	--	--
Feb-22	18.0	2,420	45.7	2,470	3,750	3,800	387
Mar-22	17.4	2,370	--	--	--	--	--
Apr-22	16.6	1,950	--	--	--	--	--
May-22	17.9	2,170	81.5	2,250	4,210	4,290	418
Jun-22	16.4	2,480	--	--	--	--	--
Jul-22	16.0	2,670	--	--	--	--	--
Aug-22	16.1	2,740	6.71	2,750	3,110	3,120	426
Sep-22	16.3	2,280	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Oct-22	15.2	2,440	--	--	--	--	--
Nov-22	16.7	2,790	66.4	2,850	3,930	3,990	469
Dec-22	19.5	2,420	--	--	--	--	--
Jan-23	29.5	2,270	--	--	--	--	--
Feb-23	21.8	2,540	46.3	2,580	3,500	3,540	426
Mar-23	28.2	2,760	--	--	--	--	--
Apr-23	21.9	2,490	--	--	--	--	--
May-23	20.0	2,640	7.64	2,650	3,820	3,830	442
Jun-23	18.5	2,390	--	--	--	--	--
Jul-23	17.6	2,500	--	--	--	--	--
Aug-23	17.7	2,610	7.38	2,620	3,820	3,830	433
Sep-23	17.4	2,550	--	--	--	--	--
Oct-23	17.5	2,650	--	--	--	--	--
Nov-23	17.6	2,640	1.02	2,640	3,740	3,740	431
Dec-23	18.4	2,630	--	--	--	--	--
Jan-24	21.4	2,370	--	--	--	--	--
Feb-24	26.4	2,570	27.0	2,600	2,160	2,190	426
Mar-24	23.2	3,320	--	--	--	--	--
Apr-24	22.1	2,710	--	--	--	--	--
May-24	21.0	2,520	6.01	2,520	3,440	3,440	430
Jun-24	19.5	2,740	--	--	--	--	--
Jul-24	18.8	2,600	--	--	--	--	--
Aug-24	18.8	2,580	3.68	2,580	3,540	3,540	383
Sep-24	18.7	2,390	--	--	--	--	--
Oct-24	19.2	2,510	--	--	--	--	--
Nov-24	19.4	2,360	3.40	2,360	3,470	3,470	371
Dec-24	21.0	2,990	--	--	--	--	--
Jan-25	20.8	2,770	--	--	--	--	--
Feb-25	24.1	3,220	8.94	3,240	3,770	3,790	423
Mar-25	22.3	2,390	20.0***	2,410	--	--	--
Apr-25	21.5	2,210	20.0***	2,230	--	--	--
May-25	19.9	2,480	20.0***	2,500	3,550	3,570	--
Jun-25	18.8	2,670	20.0***	2,690	--	--	--
Jul-25	17.9	1,930	20.0***	1,950	--	--	--
Aug-25	17.6	2,440	20.0***	2,460	3,290	3,310	363
Sep-25	15.2	2,590	20.0***	2,610	--	--	--
Dry Season Average	**17.4**	**2,390**	**16.7******	**2,420**	**3,630**	**3,650**	**400**
Wet Season Average	**19.4**	**2,460**	**23.0******	**2,530**	**3,590**	**3,620**	**414**
Annual Average	**18.5**	**2,430**	**20.0*****	**2,470**	**3,610**	**3,630**	**407**

* Palo Alto typically samples more than the required influent ammonia quarterly sampling. This dataset includes this additional sampling.
** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.
*** Assumed. Palo Alto invoked Footnote 3 of Table E-2 in the Nutrients Watershed Permit and ended monitoring of NOx in March 2025. The assumed value is the average of all available historical loads.
**** Averages apply only before March 2025.

Discharge

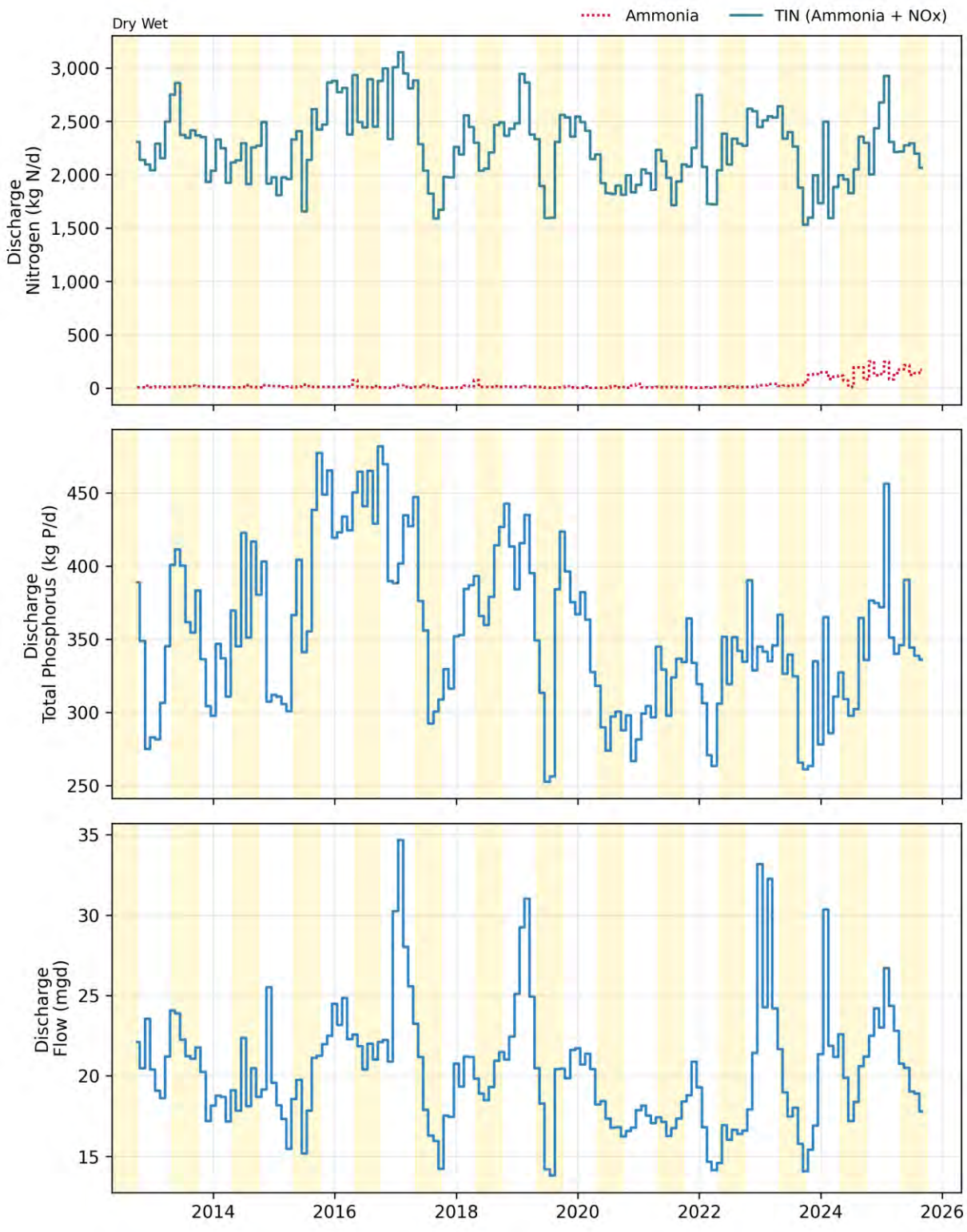


Figure 15-3. Discharge: Palo Alto Monthly Flows and Loads

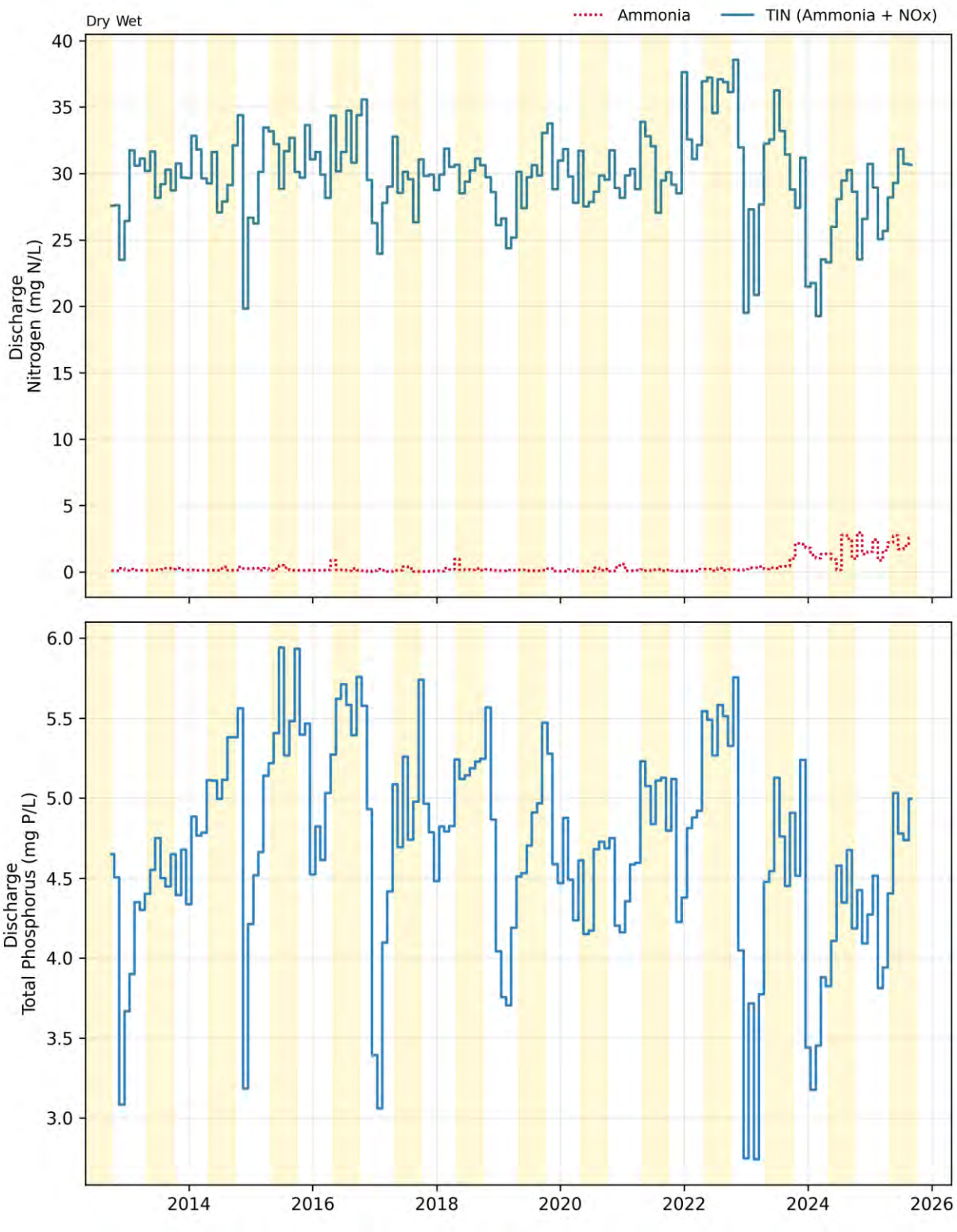


Figure 15-4. Discharge: Palo Alto Monthly Concentrations

Table 15-2. Discharge: Palo Alto Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	22.1	8.36	2,300	2,310	389
Nov-12	20.5	7.75	2,130	2,140	349
Dec-12	23.6	23.9	2,070	2,100	275
Jan-13	20.4	9.88	2,030	2,040	283
Feb-13	19.1	15.3	2,280	2,290	282
Mar-13	18.6	9.16	2,150	2,160	306
Apr-13	21.2	10.4	2,490	2,500	345
May-13	24.1	11.8	2,740	2,750	401
Jun-13	23.9	11.8	2,850	2,860	411
Jul-13	22.3	14.3	2,360	2,370	400
Aug-13	21.2	14.9	2,330	2,340	362
Sep-13	21.1	22.8	2,390	2,410	355
Oct-13	21.8	17.7	2,350	2,370	383
Nov-13	20.2	21.0	2,330	2,350	336
Dec-13	17.2	10.0	1,920	1,930	304
Jan-14	18.1	10.4	2,030	2,040	298
Feb-14	18.8	11.4	2,320	2,330	347
Mar-14	18.7	9.42	2,240	2,250	337
Apr-14	17.2	8.45	1,920	1,920	311
May-14	19.1	9.40	2,110	2,120	370
Jun-14	17.8	8.78	2,130	2,140	345
Jul-14	22.4	11.0	2,280	2,290	423
Aug-14	18.1	26.2	1,890	1,910	351
Sep-14	20.5	10.1	2,250	2,260	417
Oct-14	18.7	8.94	2,260	2,270	380
Nov-14	19.2	27.7	2,470	2,490	403
Dec-14	25.5	23.8	1,890	1,910	307
Jan-15	19.6	19.3	1,960	1,980	312
Feb-15	18.2	20.4	1,790	1,810	311
Mar-15	17.3	8.52	1,970	1,970	306
Apr-15	15.5	17.5	1,940	1,960	301
May-15	18.6	9.47	2,320	2,330	367
Jun-15	19.8	15.6	2,390	2,410	404
Jul-15	15.2	29.6	1,630	1,660	341
Aug-15	17.8	21.6	2,120	2,140	355
Sep-15	21.1	10.4	2,600	2,610	438
Oct-15	21.3	10.5	2,410	2,420	477
Nov-15	22.0	10.8	2,460	2,470	449

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	22.5	11.1	2,850	2,860	465
Jan-16	24.5	12.1	2,870	2,880	419
Feb-16	23.2	11.4	2,760	2,770	423
Mar-16	24.9	12.9	2,800	2,810	434
Apr-16	22.3	13.9	2,360	2,380	425
May-16	22.6	73.4	2,860	2,930	450
Jun-16	21.8	13.6	2,480	2,490	465
Jul-16	20.4	12.1	2,430	2,440	441
Aug-16	22.0	8.89	2,890	2,890	465
Sep-16	21.0	21.1	2,430	2,450	429
Oct-16	22.1	9.67	2,870	2,880	482
Nov-16	22.2	8.12	2,990	3,000	470
Dec-16	20.9	3.86	2,330	2,330	390
Jan-17	30.2	11.5	3,000	3,010	388
Feb-17	34.7	27.0	3,120	3,150	402
Mar-17	28.0	13.6	2,930	2,950	435
Apr-17	25.6	4.20	2,800	2,810	427
May-17	23.2	11.0	2,870	2,880	447
Jun-17	21.2	10.6	2,280	2,290	376
Jul-17	17.9	27.7	2,010	2,040	356
Aug-17	16.3	14.9	1,810	1,820	292
Sep-17	15.9	2.14	1,590	1,590	300
Oct-17	14.2	2.02	1,670	1,670	309
Nov-17	17.5	2.13	1,980	1,980	329
Dec-17	17.4	4.22	1,970	1,970	316
Jan-18	20.8	8.38	2,250	2,260	352
Feb-18	19.3	3.91	2,190	2,190	353
Mar-18	21.2	22.8	2,530	2,560	384
Apr-18	21.2	15.6	2,430	2,440	387
May-18	19.8	72.7	2,230	2,300	393
Jun-18	18.9	12.4	2,030	2,040	366
Jul-18	18.5	12.4	2,040	2,060	360
Aug-18	19.3	12.1	2,200	2,210	379
Sep-18	20.9	21.0	2,440	2,460	414
Oct-18	21.5	10.3	2,480	2,490	427
Nov-18	21.0	14.0	2,350	2,360	443
Dec-18	22.4	10.1	2,420	2,430	414
Jan-19	25.1	10.2	2,470	2,480	384

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	29.2	10.4	2,930	2,940	416
Mar-19	31.0	19.7	2,840	2,860	435
Apr-19	24.9	10.8	2,360	2,370	395
May-19	20.5	11.6	2,320	2,330	349
Jun-19	18.3	11.4	1,880	1,890	313
Jul-19	14.2	5.75	1,590	1,590	252
Aug-19	13.8	4.40	1,590	1,600	256
Sep-19	20.4	8.35	2,300	2,310	384
Oct-20	20.5	9.73	2,550	2,560	424
Nov-19	19.8	17.8	2,520	2,540	396
Dec-19	21.6	6.03	2,350	2,360	375
Jan-20	21.7	5.88	2,540	2,540	367
Feb-20	20.7	5.76	2,490	2,490	382
Mar-20	21.4	14.7	2,400	2,410	363
Apr-20	20.4	5.37	2,140	2,150	327
May-20	18.2	4.78	2,180	2,190	318
Jun-20	18.4	4.80	1,910	1,920	290
Jul-20	17.3	4.41	1,820	1,830	274
Aug-20	16.8	19.6	1,800	1,820	297
Sep-20	16.8	7.98	1,890	1,900	301
Oct-20	16.2	13.0	1,800	1,810	288
Nov-20	16.6	4.35	1,990	1,990	298
Dec-20	16.8	22.3	1,810	1,830	267
Jan-21	17.9	39.3	1,870	1,910	281
Feb-21	18.2	6.06	2,040	2,050	299
Mar-21	17.5	6.36	2,010	2,010	304
Apr-21	17.0	8.77	1,850	1,860	296
May-21	17.4	11.7	2,220	2,230	345
Jun-21	17.1	6.75	2,120	2,130	329
Jul-21	16.3	10.7	1,960	1,970	298
Aug-21	16.8	11.3	1,700	1,710	324
Sep-21	17.4	6.50	1,930	1,940	337
Oct-21	18.4	12.0	2,080	2,100	334
Nov-21	18.8	6.27	2,070	2,070	364
Dec-21	20.9	5.55	2,250	2,250	334
Jan-22	19.3	5.04	2,740	2,740	319
Feb-22	16.8	6.44	2,060	2,070	306
Mar-22	14.7	3.77	1,720	1,730	271

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	14.1	12.4	1,710	1,720	263
May-22	14.6	11.8	2,030	2,040	306
Jun-22	16.9	15.1	2,370	2,380	352
Jul-22	16.0	4.97	2,090	2,090	319
Aug-22	16.6	17.2	2,320	2,340	351
Sep-22	16.4	8.69	2,280	2,290	342
Oct-22	16.6	11.3	2,260	2,270	335
Nov-22	17.9	13.8	2,600	2,620	390
Dec-22	21.4	10.6	2,580	2,590	329
Jan-23	33.2	28.7	2,420	2,450	345
Feb-23	24.3	28.0	2,480	2,510	341
Mar-23	32.3	37.9	2,510	2,550	335
Apr-23	24.2	37.8	2,500	2,530	346
May-23	21.7	19.0	2,620	2,640	367
Jun-23	19.0	22.0	2,320	2,340	326
Jul-23	17.5	19.3	2,380	2,400	339
Aug-23	18.0	27.0	2,240	2,260	325
Sep-23	15.8	26.9	1,850	1,880	266
Oct-23	14.0	52.9	1,480	1,530	261
Nov-23	15.4	125	1,470	1,650	263
Dec-23	16.9	134	1,860	1,990	335
Jan-24	21.3	146	1,590	1,730	278
Feb-24	30.3	147	2,350	2,470	365
Mar-24	21.9	84.1	1,510	1,600	286
Apr-24	21.2	109	1,780	1,880	311
May-24	22.6	116	1,880	1,990	327
Jun-24	19.9	71.4	1,880	1,960	309
Jul-24	17.2	10.2	1,810	1,820	298
Aug-24	18.4	193	1,860	2,050	302
Sep-24	20.6	195	2,160	2,450	364
Oct-24	21.2	80.5	2,220	2,300	336
Nov-24	22.5	251	1,750	2,280	376
Dec-24	24.2	122	2,310	2,430	375
Jan-25	23.0	133	2,540	2,670	372
Feb-25	26.7	247	2,680	3,050	456
Mar-25	24.3	81.8	2,230	2,310	351
Apr-25	22.8	140	2,070	2,210	340
May-25	20.8	173	2,040	2,210	346

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	20.5	213	2,060	2,320	391
Jul-25	19.0	124	2,170	2,290	344
Aug-25	18.9	140	2,060	2,200	339
Sep-25	17.8	173	1,890	2,120	336
Dry Season Average	**18.9**	**34.8**	**2,160**	**2,200**	**354**
Wet Season Average	**21.2**	**31.2**	**2,270**	**2,300**	**355**
Average Annual	**20.2**	**32.7**	**2,220**	**2,260**	**354**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 15-3. Recycled Water: Palo Alto Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application ***	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	332 (0.30)	307 (0.27)	0 (0)	0 (0)	0 (0)	0 (0)	62 (0.06)	701 (0.63)
2020	356 (0.32)	300 (0.27)	0 (0)	0 (0)	0 (0)	0 (0)	76 (0.07)	732 (0.66)
2021	313 (0.28)	369 (0.33)	0 (0)	0 (0)	0 (0)	0 (0)	13 (0.01)	695 (0.62)
2022	434 (0.39)	320 (0.29)	0 (0)	0 (0)	0 (0)	0 (0)	75 (0.07)	829 (0.75)
2023	351 (0.31)	277 (0.25)	0 (0)	0 (0)	0 (0)	0 (0)	64 (0.06)	692 (0.62)
2024	308 (0.28)	304 (0.27)	0 (0)	0 (0)	0 (0)	0 (0)	86 (0.08)	698 (0.62)
Average	**349 (0.31)**	**313 (0.28)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**63 (0.06)**	**725 (0.65)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

*** Palo Alto provides commercial recycled water that ultimately is discharged back to the sanitary sewer.

Table 15-4. Recycled Water: Palo Alto Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	<1	<1	0	0	0	0	<1	<1
2020	<1	<1	0	0	0	0	<1	<1
2021	<1	<1	0	0	0	0	<1	<1
2022	<1	<1	0	0	0	0	<1	<1
2023	<1	<1	0	0	0	0	<1	1
2024	2	2	0	0	0	0	<1	4
Average	**<1**	**<1**	**0**	**0**	**0**	**0**	**<1**	**1**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 15-5. Recycled Water: Palo Alto Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	32	30	0	0	0	0	6	68
2020	36	30	0	0	0	0	8	74
2021	32	38	0	0	0	0	1	71
2022	51	38	0	0	0	0	9	98
2023	33	26	0	0	0	0	6	65
2024	26	26	0	0	0	0	7	60
Average	**35**	**31**	**0**	**0**	**0**	**0**	**6**	**72**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 15-6. Recycled Water: Palo Alto Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	5	5	0	0	0	0	1	11
2020	5	5	0	0	0	0	1	11
2021	5	6	0	0	0	0	<1	11
2022	7	5	0	0	0	0	1	14
2023	5	4	0	0	0	0	1	9
2024	4	4	0	0	0	0	1	9
Average	**5**	**5**	**0**	**0**	**0**	**0**	**1**	**11**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

16 Sanitary District No. 5 of Marin County - Paradise Cove Treatment Plant

The Paradise Cove Treatment Plant discharges to the Central Bay. The service area has approximately 65 service connections. The plant has a permitted ADWF capacity of 0.040 mgd and it has currents dry season flows of approximately 0.011 mgd. The plant performs secondary treatment using an activated sludge treatment process.

The plant is classified as a minor discharger (<1 mgd permitted capacity) and thus not required to sample as frequently as the major dischargers (>1 mgd permitted capacity). The minor dischargers are required to sample twice per year under the Nutrient Watershed Permit. As a result, there are several months of nutrient data gaps.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge
  - The plant occasionally nitrifies as evidenced by ammonia values of less than 0.2 mg N/L.
  - During months of nitrification, NOx is the majority of the nitrogen species discharged. During months of no nitrification, ammonia is the majority of discharged nitrogen species.
  - Total phosphorus concentrations are wide ranging from approximately 2 to 16 mg P/L. Typical effluent TP concentrations range from 4 to 6 mg P/L.
- Recycled Water: No recycled water was produced or distributed this past year.

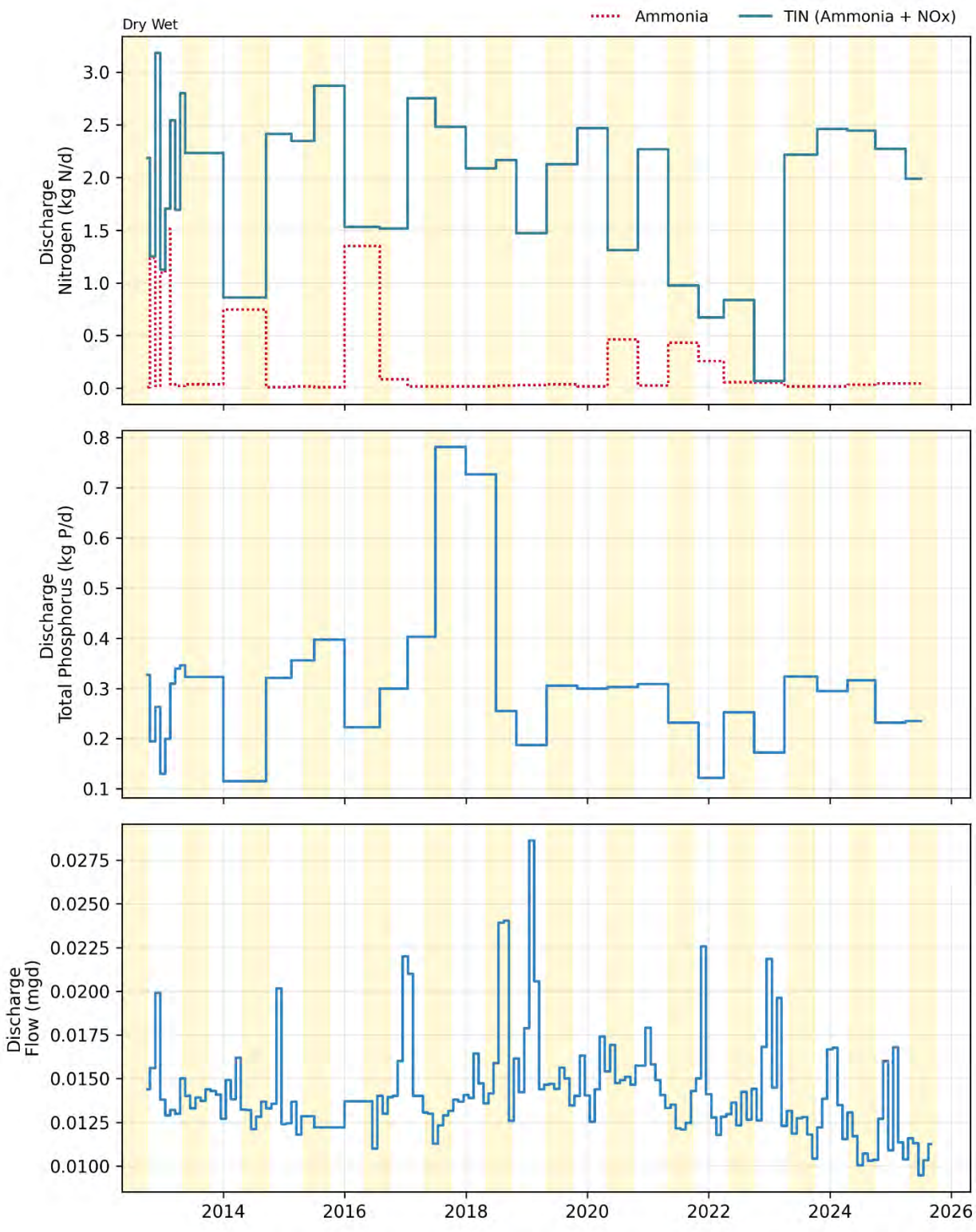


Figure 16-1. Discharge: Paradise Cove Monthly Flows and Loads

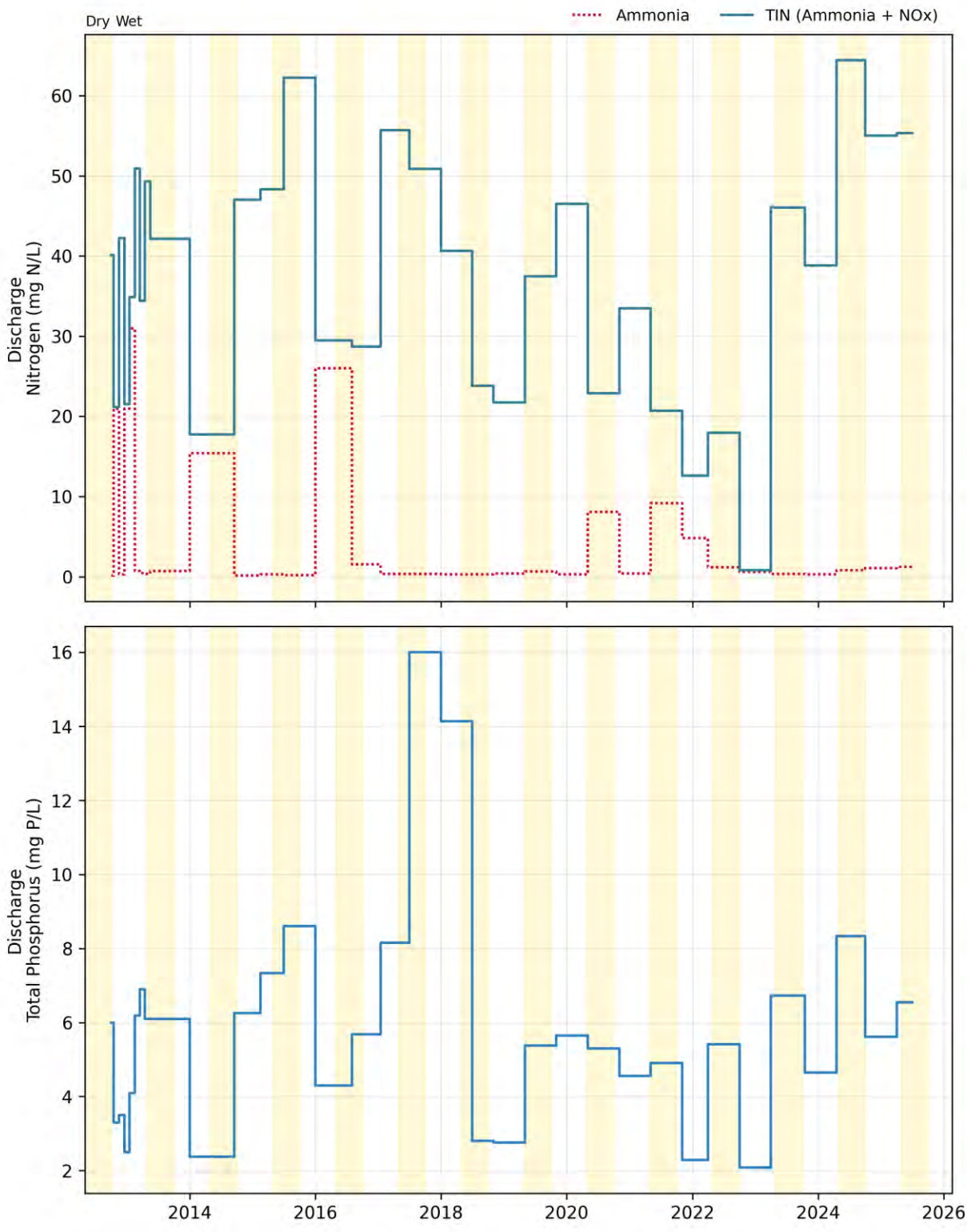


Figure 16-2. Discharge: Paradise Cove Monthly Concentrations

Table 16-1. Discharge: Paradise Cove Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.0144	0.00708	2.18	2.19	0.327
Nov-12	0.0156	1.24	0.0113	1.25	0.195
Dec-12	0.0199	0.0218	3.16	3.18	0.263
Jan-13	0.0138	1.10	0.0282	1.12	0.130
Feb-13	0.0129	1.51	0.191	1.70	0.200
Mar-13	0.0132	0.0349	2.51	2.54	0.309
Apr-13	0.0130	0.0216	1.67	1.69	0.339
May-13	0.0150	0.0198	2.78	2.80	0.346
Jun-13	0.0140	0.0370	2.20	2.23	0.323
Jul-13	0.0133	--	--	--	--
Aug-13	0.0139	--	--	--	--
Sep-13	0.0137	--	--	--	--
Oct-13	0.0144	--	--	--	--
Nov-13	0.0143	--	--	--	--
Dec-13	0.0141	--	--	--	--
Jan-14	0.0127	--	--	--	--
Feb-14	0.0149	--	--	--	--
Mar-14	0.0138	--	--	--	--
Apr-14	0.0162	--	--	--	--
May-14	0.0132	--	--	--	--
Jun-14	0.0132	--	--	--	--
Jul-14	0.0121	--	--	--	--
Aug-14	0.0128	0.748	0.112	0.860	0.115
Sep-14	0.0137	--	--	--	--
Oct-14	0.0133	--	--	--	--
Nov-14	0.0136	0.00689	2.41	2.41	0.321
Dec-14	0.0202	--	--	--	--
Jan-15	0.0124	--	--	--	--
Feb-15	0.0124	--	--	--	--
Mar-15	0.0137	--	--	--	--
Apr-15	0.0118	--	--	--	--
May-15	0.0128	--	--	--	--
Jun-15	0.0128	0.0146	2.33	2.35	0.356
Jul-15	--	--	--	--	--
Aug-15	0.0122	0.00924	2.86	2.87	0.397
Sep-15	--	--	--	--	--
Oct-15	--	--	--	--	--
Nov-15	--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	--	--	--	--	--
Jan-16	--	--	--	--	--
Feb-16	--	--	--	--	--
Mar-16	--	--	--	--	--
Apr-16	--	--	--	--	--
May-16	--	--	--	--	--
Jun-16	0.0137	1.35	0.180	1.53	0.223
Jul-16	0.0110	--	--	--	--
Aug-16	0.0140	--	--	--	--
Sep-16	0.0130	--	--	--	--
Oct-16	0.0139	0.0818	1.43	1.51	0.300
Nov-16	0.0140	--	--	--	--
Dec-16	0.0160	--	--	--	--
Jan-17	0.0220	--	--	--	--
Feb-17	0.0210	--	--	--	--
Mar-17	0.0140	--	--	--	--
Apr-17	0.0140	--	--	--	--
May-17	0.0131	0.0165	2.74	2.75	0.403
Jun-17	0.0130	--	--	--	--
Jul-17	0.0113	--	--	--	--
Aug-17	0.0123	--	--	--	--
Sep-17	0.0129	0.0174	2.46	2.48	0.781
Oct-17	0.0131	--	--	--	--
Nov-17	0.0138	--	--	--	--
Dec-17	0.0137	--	--	--	--
Jan-18	0.0141	--	--	--	--
Feb-18	0.0139	--	--	--	--
Mar-18	0.0164	--	--	--	--
Apr-18	0.0147	--	--	--	--
May-18	0.0136	0.0149	2.07	2.09	0.726
Jun-18	0.0142	--	--	--	--
Jul-18	0.0159	0.0159	--	--	--
Aug-18	0.0239	0.0239	--	--	--
Sep-18	0.0240	0.0240	2.14	2.13	0.255
Oct-18	0.0126	0.0229	--	--	--
Nov-18	0.0162	0.0102	--	--	--
Dec-18	0.0142	0.0469	--	--	--
Jan-19	0.0179	0.0277	1.44	1.47	0.187

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	0.0286	0.0401	--	--	--
Mar-19	0.0206	--	--	--	--
Apr-19	0.0144	0.0114	--	--	--
May-19	0.0147	0.0113	--	--	--
Jun-19	0.0147	0.233	--	--	--
Jul-19	0.0144	0.0158	--	--	--
Aug-19	0.0156	0.0413	--	--	--
Sep-19	0.0150	0.0368	2.09	2.13	0.305
Oct-19	0.0135	0.0120	--	--	--
Nov-19	0.0140	0.0101	--	--	--
Dec-19	0.0163	0.0407	--	--	--
Jan-20	0.0140	0.0158	2.45	2.47	0.300
Feb-20	0.0125	0.0256	--	--	--
Mar-20	0.0144	0.0254	--	--	--
Apr-20	0.0174	0.0130	--	--	--
May-20	0.0154	0.0616	--	--	--
Jun-20	0.0169	0.0531	--	--	--
Jul-20	0.0147	0.0106	--	--	--
Aug-20	0.0149	0.0204	--	--	--
Sep-20	0.0151	0.460	0.848	1.31	0.303
Oct-20	0.0147	0.113	--	--	--
Nov-20	0.0157	0.0366	--	--	--
Dec-20	0.0157	0.119	--	--	--
Jan-21	0.0179	0.0263	2.24	2.27	0.309
Feb-21	0.0158	0.209	--	--	--
Mar-21	0.0149	0.0363	--	--	--
Apr-21	0.0141	0.0336	--	--	--
May-21	0.0133	0.154	--	--	--
Jun-21	0.0135	0.0763	--	--	--
Jul-21	0.0122	0.0132	--	--	--
Aug-21	0.0121	0.613	--	--	--
Sep-21	0.0125	0.431	0.545	0.977	0.232
Oct-21	0.0143	1.62	--	--	--
Nov-21	0.0150	0.00954	--	--	--
Dec-21	0.0225	0.568	--	--	--
Jan-22	0.0141	0.258	0.415	0.836	0.122
Feb-22	0.0128	0.0454	--	--	--
Mar-22	0.0118	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	0.0128	0.0151	--	--	--
May-22	0.0130	--	--	--	--
Jun-22	0.0136	--	--	--	--
Jul-22	0.0123	0.0541	0.783	0.877	0.252
Aug-22	0.0143	--	--	--	--
Sep-22	0.0127	--	--	--	--
Oct-22	0.0144	0.204	--	--	--
Nov-22	0.0126	--	--	--	--
Dec-22	0.0168	--	--	--	--
Jan-23	0.0218	0.0516	0.0143	0.0660	0.172
Feb-23	0.0145	0.233	--	--	--
Mar-23	0.0196	--	--	--	--
Apr-23	0.0123	0.0673	--	--	--
May-23	0.0131	--	--	--	--
Jun-23	0.0119	--	--	--	--
Jul-23	0.0127	0.0155	2.20	2.22	0.324
Aug-23	0.0128	--	--	--	--
Sep-23	0.0118	--	--	--	--
Oct-23	0.0104	0.0284	--	--	--
Nov-23	0.0122	--	--	--	--
Dec-23	0.0138	--	--	--	--
Jan-24	0.0167	0.268	--	--	--
Feb-24	0.0168	0.0173	2.45	2.46	0.295
Mar-24	0.0135	--	--	--	--
Apr-24	0.0115	0.0254	--	--	--
May-24	0.0131	--	--	--	--
Jun-24	0.0117	--	--	--	--
Jul-24	0.0100	0.0316	2.41	2.45	0.316
Aug-24	0.0107	--	--	--	--
Sep-24	0.0103	--	--	--	--
Oct-24	0.0104	0.0193	--	--	--
Nov-24	0.0127	--	--	--	--
Dec-24	0.016	--	--	--	--
Jan-25	0.0109	0.0445	2.23	2.27	0.232
Feb-25	0.0168	--	--	--	--
Mar-25	0.0114	--	--	--	--
Apr-25	0.0104	0.0362	--	--	--
May-25	0.0116	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	0.0113	--	--	--	--
Jul-25	0.00948	0.0443	1.94	1.99	0.235
Aug-25	0.0103	--	--	--	--
Sep-25	0.0113	--	--	--	--
Dry Season Average	**0.0134**	**0.151**	**1.81**	**2.00**	**0.347**
Wet Season Average	**0.0149**	**0.183**	**1.55**	**1.84**	**0.250**
Annual Average	**0.0143**	**0.170**	**1.68**	**1.92**	**0.300**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

** Refer to the Section 3.5 in the main body for a description on the statistical analysis.

Recycled Water

No recycled water was produced or distributed this past year.

17 City of Pinole

The Pinole-Hercules Water Pollution Control Plant discharges to San Pablo Bay. The plant has approximately 11,215 service connections; it has a permitted capacity of 4.06 mgd ADWF and a peak wet weather capacity of 20.0 mgd. The average dry season discharge flow this past year was approximately 2.48 mgd.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge:
  - The City of Pinole completed a $45M plant upgrade project that included the ability to remove ammonia and TIN loads during the dry season (commissioned in 2019 in conventional cBOD mode). While the system was upgraded to provide ammonia and TIN load reduction, the plant experiences multiple process upsets when the aeration basin is operated in biological nutrient removal mode. The plant is in the process of developing a plan on transitioning in and out biological nutrient removal mode and whether the plant can operate in this mode year-round or limited to the dry season. Additional upgrades may be necessary to operate in biological nutrient removal mode.
  - As of the last few years, nitrogen and phosphorus loads track with the flow, though this has not been the case historically at this facility.
  - Total phosphorus concentrations range from 0.5 to 6.0 mg P/L which suggests occasional removal.
- Recycled Water: No recycled water was produced or distributed this past year.

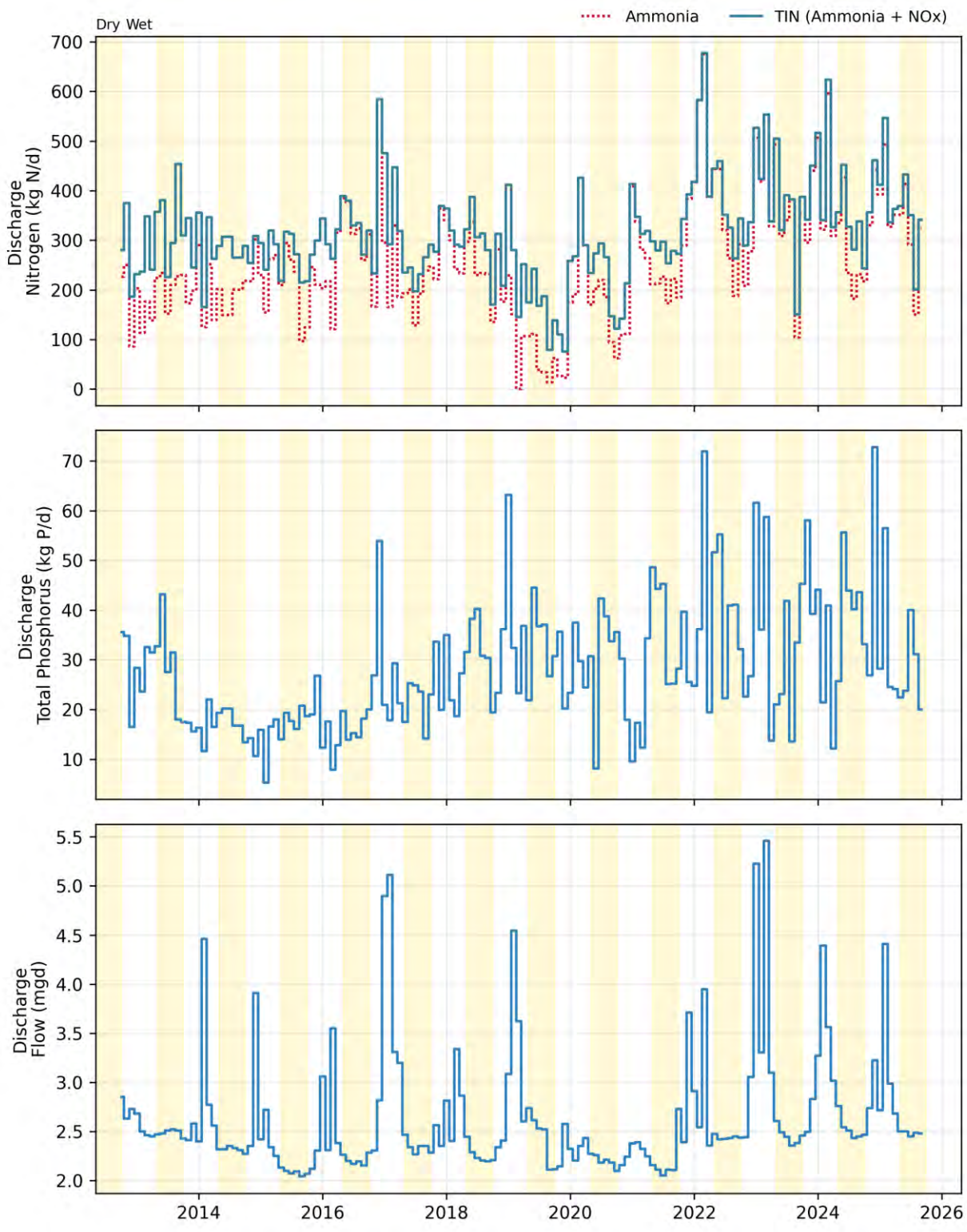


Figure 17-1. Discharge: Pinole Monthly Flows and Loads

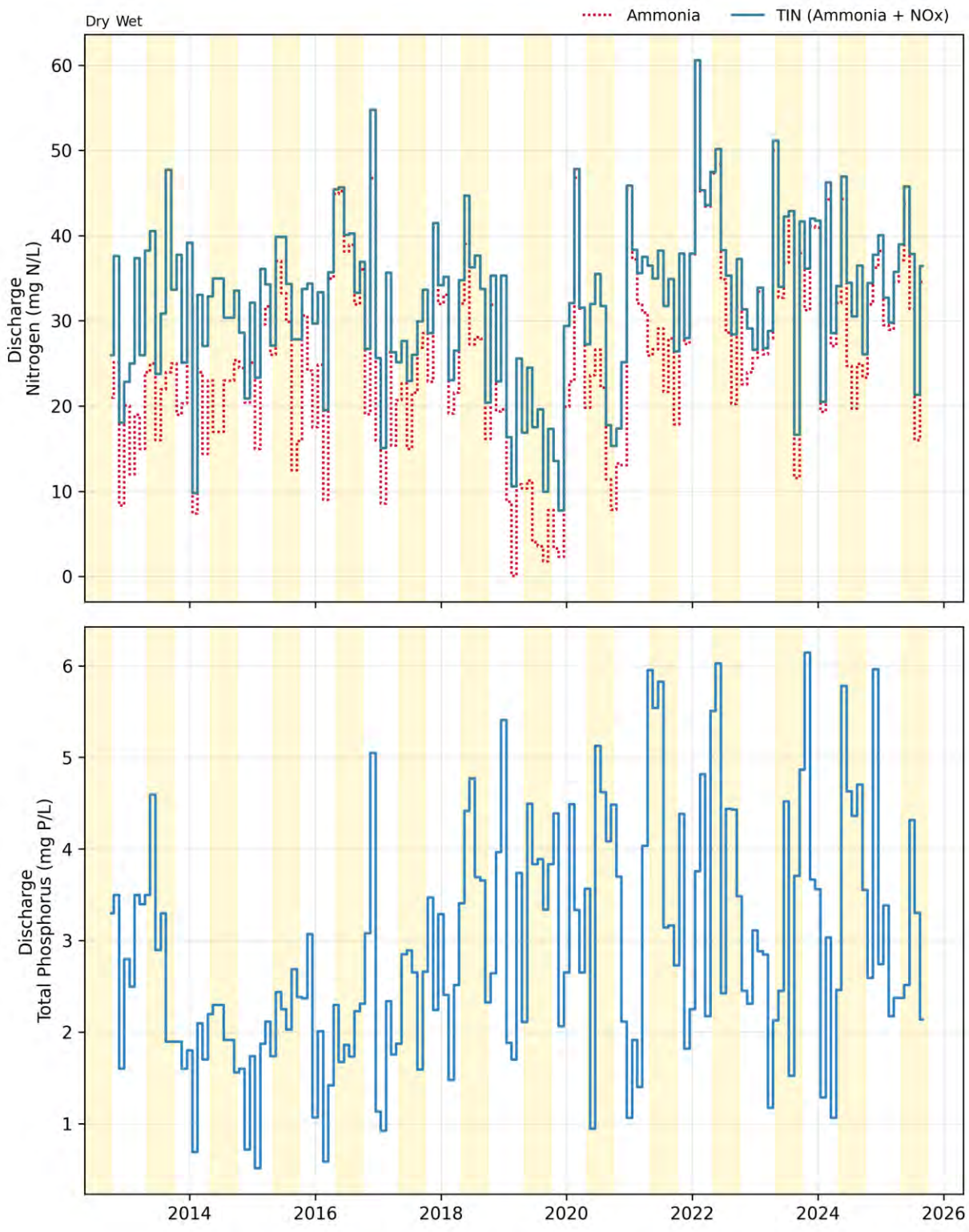


Figure 17-2. Discharge: Pinole Monthly Concentrations

Table 17-1. Discharge: Pinole Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	2.85	226	54.0	280	35.6
Nov-12	2.63	250	124	374	34.8
Dec-12	2.73	86.2	100	186	16.5
Jan-13	2.68	203	28.4	232	28.4
Feb-13	2.50	113	123	236	23.6
Mar-13	2.46	177	171	348	32.5
Apr-13	2.45	139	102	241	31.5
May-13	2.47	224	134	358	32.7
Jun-13	2.48	234	146	381	43.1
Jul-13	2.51	152	74.0	226	27.5
Aug-13	2.52	210	84.8	294	31.4
Sep-13	2.51	228	226	454	18.0
Oct-13	2.43	230	79.9	310	17.5
Nov-13	2.41	173	171	344	17.3
Dec-13	2.58	198	46.8	245	15.6
Jan-14	2.40	290	65.3	356	16.3
Feb-14	4.46	125	40.5	165	11.6
Mar-14	2.77	251	95.3	347	22.0
Apr-14	2.56	139	123	262	16.5
May-14	2.32	202	86.8	289	19.3
Jun-14	2.32	149	158	307	20.2
Jul-14	2.35	201	**	**	**
Aug-14	2.33	264	**	**	**
Sep-14	2.31	201	64.5	265	16.7
Oct-14	2.27	218	70.4	288	13.4
Nov-14	2.35	218	36.8	254	14.2
Dec-14	3.91	302	7.06	309	10.6
Jan-15	2.42	230	64.5	294	15.9
Feb-15	2.72	154	86.2	240	5.28
Mar-15	2.34	262	57.7	320	16.6
Apr-15	2.25	270	22.1	292	18.0
May-15	2.13	210	8.55	218	14.0
Jun-15	2.10	294	22.5	317	19.4
Jul-15	2.07	261	51.4	312	17.7
Aug-15	2.09	237	35.2	272	16.0
Sep-15	2.04	96.4	119	215	20.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	2.07	124	93.2	217	18.6
Nov-15	2.12	246	25.4	271	19.0
Dec-15	2.30	211	89.1	300	26.7
Jan-16	3.06	203	141	344	12.3
Feb-16	2.31	217	74.4	292	17.5
Mar-16	3.55	121	141	262	7.84
Apr-16	2.38	315	6.65	322	12.8
May-16	2.26	385	4.56	389	19.7
Jun-16	2.20	377	3.36	380	13.9
Jul-16	2.17	313	16.1	329	15.3
Aug-16	2.20	324	10.8	334	14.4
Sep-16	2.15	260	11.0	271	18.1
Oct-16	2.28	312	7.51	319	20.0
Nov-16	2.31	166	67.1	233	26.9
Dec-16	2.82	498	85.7	584	53.8
Jan-17	4.89	295	180	475	20.9
Feb-17	5.11	166	126	292	17.8
Mar-17	3.31	330	117	447	29.3
Apr-17	3.20	186	133	318	21.2
May-17	2.46	193	41.4	235	17.5
Jun-17	2.34	200	44.4	245	25.2
Jul-17	2.27	128	68.5	197	24.8
Aug-17	2.35	192	39.3	232	23.6
Sep-17	2.35	239	27.4	266	14.2
Oct-17	2.29	247	44.3	291	23.0
Nov-17	2.56	221	55.8	277	33.6
Dec-17	2.35	364	4.51	369	19.9
Jan-18	2.81	340	23.6	364	35.0
Feb-18	2.40	301	19.1	320	21.9
Mar-18	3.34	242	49.4	291	18.7
Apr-18	2.86	233	53.5	287	27.2
May-18	2.45	297	25.0	322	31.5
Jun-18	2.29	338	48.9	387	38.3
Jul-18	2.23	230	76.4	306	40.2
Aug-18	2.20	234	80.0	314	30.8
Sep-18	2.19	232	48.7	280	30.3
Oct-18	2.21	135	35.5	170	19.4

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	2.34	282	30.6	313	23.4
Dec-18	2.41	176	31.9	208	36.1
Jan-19	3.08	229	183	499	63.1
Feb-19	4.54	151	129	280	32.4
Mar-19	3.62	0.765	144	145	23.3
Apr-19	2.60	107	145	252	36.8
May-19	2.74	107	68.0	175	21.9
Jun-19	2.62	111	131	243	44.5
Jul-19	2.53	38.7	129	168	36.7
Aug-19	2.52	33.5	154	187	37.1
Sep-19	2.11	14.1	65.2	79.3	26.7
Oct-19	2.12	62.2	76.3	138	30.7
Nov-19	2.14	26.5	83.3	110	35.6
Dec-19	2.58	22.6	52.8	75.5	20.1
Jan-20	2.32	175	83.3	258	23.3
Feb-20	2.20	191	76.5	268	37.5
Mar-20	2.35	417	8.78	425	29.7
Apr-20	2.43	289	1.09	291	24.4
May-20	2.27	170	63.9	234	30.7
Jun-20	2.26	202	71.2	274	8.09
Jul-20	2.18	220	73.7	293	42.3
Aug-20	2.21	185	80.6	266	38.7
Sep-20	2.18	94.1	52.5	147	33.7
Oct-20	2.10	62.1	59.6	122	35.6
Nov-20	2.16	108	33.3	142	30.2
Dec-20	2.24	111	102	213	17.9
Jan-21	2.38	408	4.61	413	9.56
Feb-21	2.39	337	10.0	347	17.3
Mar-21	2.32	281	31.6	313	12.3
Apr-21	2.25	263	55.8	319	34.3
May-21	2.16	212	86.2	298	48.6
Jun-21	2.11	213	66.3	279	44.2
Jul-21	2.05	226	70.8	297	45.2
Aug-21	2.11	173	80.5	254	25.1
Sep-21	2.10	222	55.6	278	25.2
Oct-21	2.73	184	88.1	272	28.2
Nov-21	2.39	289	53.7	343	39.7

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	3.71	383	9.36	392	25.5
Jan-22	2.91	417	1.19	418	24.8
Feb-22	2.54	582	0.973	583	36.1
Mar-22	3.95	674	2.40	677	71.9
Apr-22	2.36	388	0.959	389	19.4
May-22	2.47	443	1.36	445	51.6
Jun-22	2.42	443	16.3	460	55.2
Jul-22	2.43	320	31.1	351	22.2
Aug-22	2.43	263	61.8	325	40.9
Sep-22	2.45	188	75.9	264	41.1
Oct-22	2.44	292	51.6	343	32.1
Nov-22	2.44	208	81.4	289	22.6
Dec-22	3.05	277	59.0	336	26.7
Jan-23	5.23	507	19.9	526	61.5
Feb-23	3.30	418	5.23	424	36.0
Mar-23	5.46	538	15.4	553	58.7
Apr-23	3.10	328	9.38	338	13.8
May-23	2.61	493	11.5	504	21.0
Jun-23	2.49	309	11.9	321	23.1
Jul-23	2.44	340	50.6	391	41.8
Aug-23	2.36	378	4.21	383	13.6
Sep-23	2.38	104	45.9	150	33.4
Oct-23	2.46	353	34.4	387	45.2
Nov-23	2.50	295	46.3	341	58.1
Dec-23	2.83	440	9.38	450	39.3
Jan-24	3.27	507	9.80	516	44.1
Feb-24	4.39	321	19.6	341	21.4
Mar-24	3.56	596	27.3	623	40.9
Apr-24	3.02	308	17.6	326	12.1
May-24	2.76	335	21.2	356	25.7
Jun-24	2.54	427	25.0	452	55.6
Jul-24	2.51	234	92.8	327	43.9
Aug-24	2.43	182	99.5	281	40.2
Sep-24	2.45	231	107	338	43.6
Oct-24	2.46	218	25.5	243	33.1
Nov-24	2.74	331	25.8	356	26.9
Dec-24	3.23	442	18.6	461	72.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	2.72	393	19.1	412	28.2
Feb-25	4.41	493	53.7	546	56.5
Mar-25	2.99	327	9.30	336	24.5
Apr-25	2.68	351	12.0	363	24.1
May-25	2.50	352	17.6	369	22.5
Jun-25	2.50	413	19.6	433	23.8
Jul-25	2.45	291	60.0	351	40.0
Aug-25	2.49	150	50.2	201	31.1
Dry Season Average	**2.34**	**239**	**60.7**	**300**	**29.4**
Wet Season Average	**2.84**	**267**	**58.4**	**326**	**27.6**
Average Annual	**2.63**	**255**	**59.3**	**316**	**28.4**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.
** No samples taken this month.

Recycled Water

No recycled water was produced or distributed this past year.

18 Rodeo Sanitary District

Rodeo discharges to San Pablo Bay. The plant services approximately 10,000 people and it has a permitted capacity of 1.14 mgd ADWF. This past dry season average discharge flow was approximately 0.52 mgd. The plant performs nitrification and phosphorus removal using an activated e process. The District has historically collected and analyzed one data point per month for effluent nutrient monitoring. However, during the 2025 dry season, Rodeo collected and analyzed data for only eight months of the year.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge:
  - The annual average monthly ammonia and TIN loads and concentrations in the last couple years are the highest since nutrient sampling was initiated under the Section 13267 Letter Data in 2012. This increase is attributed to a combination of struggles in maintaining the biology that performs ammonia removal during precipitation events coupled with maintaining an ammonia residual to form chloramines as a strategy to reduce chlorine demand.
  - Total inorganic nitrogen loads generally increase with flow during wet weather events.
  - Ammonia has been the majority of the nitrogen species discharged since the 2021/2022 period. This is attributed to biological washout and maintaining ammonia residual.
  - Total phosphorus concentrations are wide ranging from 0.3 to 12.7 mg P/L. This suggests occasional P removal for periods with values less than 1 mg P/L. The removal mechanism is thought to be the anaerobic selector in the activated sludge process.
- Recycled Water: No recycled water was produced or distributed this past year.

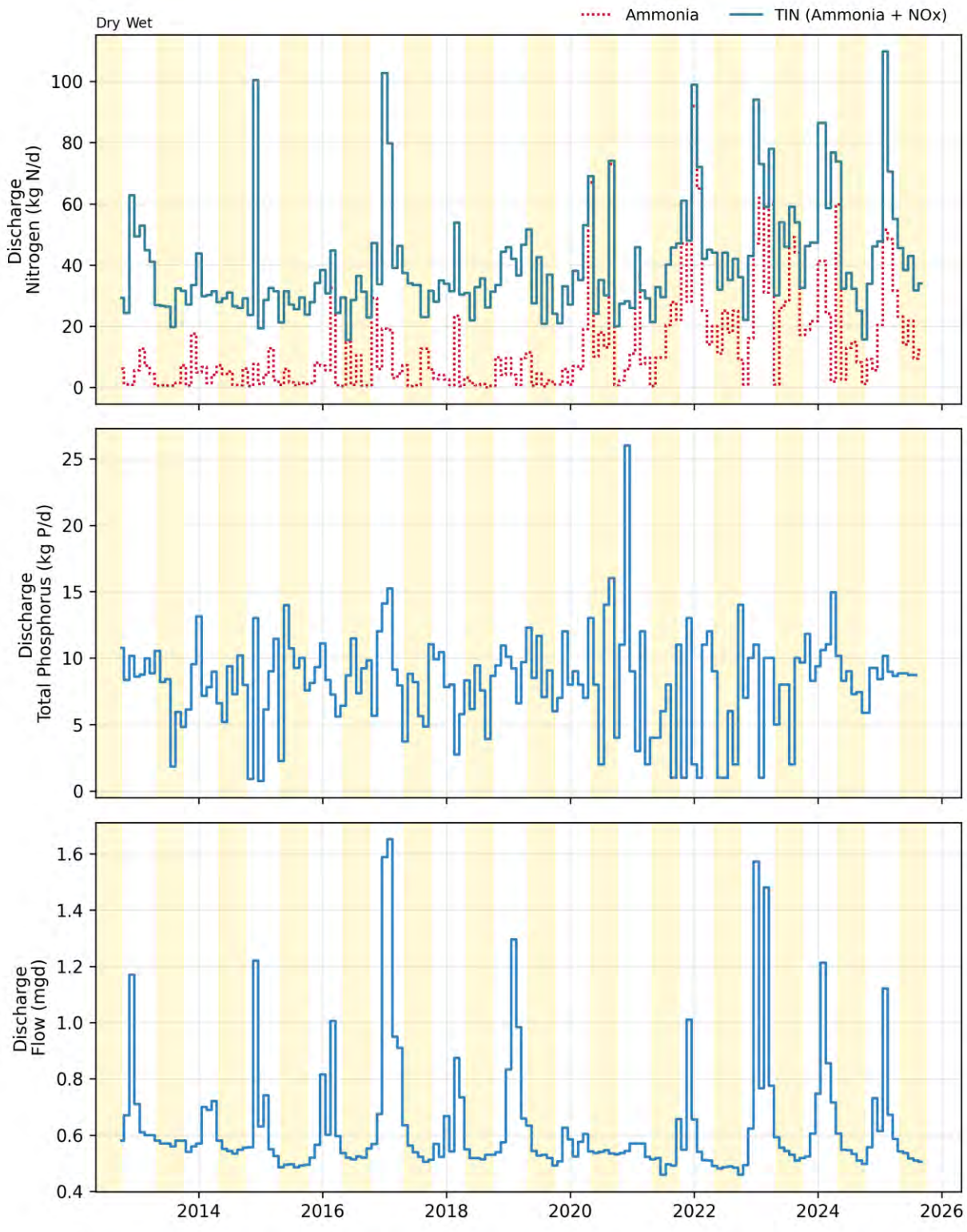


Figure 18-1. Discharge: Rodeo Monthly Flows and Loads

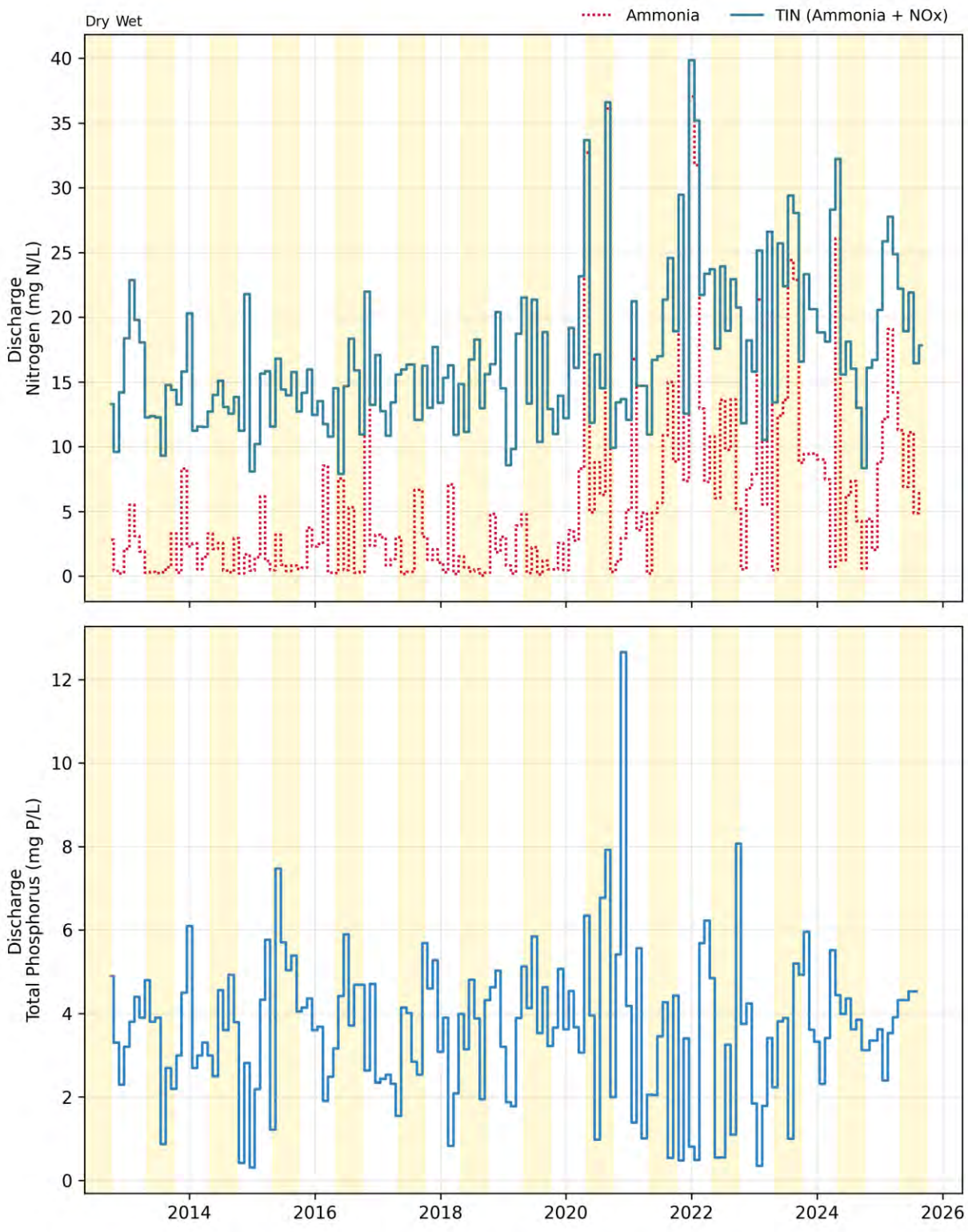


Figure 18-2. Discharge: Rodeo Monthly Concentrations

Table 18-1. Discharge: Rodeo Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.580	6.14	23.0	29.2	10.7
Nov-12	0.670	1.01	23.3	24.3	8.36
Dec-12	1.17	0.885	61.9	62.8	10.2
Jan-13	0.710	5.64	43.7	49.4	8.59
Feb-13	0.610	12.7	40.1	52.8	8.76
Mar-13	0.600	7.03	37.9	44.9	9.98
Apr-13	0.600	4.31	36.7	41.0	8.85
May-13	0.580	0.548	26.4	26.9	10.5
Jun-13	0.570	0.733	25.9	26.7	8.19
Jul-13	0.570	0.517	25.9	26.4	8.40
Aug-13	0.560	0.614	19.1	19.7	1.84
Sep-13	0.580	1.49	30.9	32.4	5.92
Oct-13	0.580	7.21	24.3	31.6	4.81
Nov-13	0.540	0.510	26.6	27.1	6.12
Dec-13	0.560	17.6	15.9	33.4	9.53
Jan-14	0.570	4.96	38.8	43.8	13.1
Feb-14	0.700	6.65	23.1	29.7	7.14
Mar-14	0.690	1.36	28.8	30.1	7.82
Apr-14	0.720	4.08	27.3	31.4	8.98
May-14	0.580	7.23	20.7	27.9	6.58
Jun-14	0.550	4.37	24.7	29.1	5.20
Jul-14	0.543	5.20	25.8	31.0	9.37
Aug-14	0.535	0.846	25.6	26.4	7.28
Sep-14	0.547	0.625	25.3	26.0	10.2
Oct-14	0.555	6.13	22.9	29.0	7.97
Nov-14	0.556	0.444	23.2	23.6	0.888
Dec-14	1.22	7.68	92.8	100	13.0
Jan-15	0.631	1.04	18.2	19.3	0.739
Feb-15	0.741	4.08	24.5	28.6	6.12
Mar-15	0.549	12.8	19.7	32.5	9.00
Apr-15	0.525	2.29	29.1	31.4	11.4
May-15	0.485	0.816	20.4	21.2	2.23
Jun-15	0.495	6.00	25.4	31.4	14.0
Jul-15	0.496	1.67	25.4	27.1	10.7
Aug-15	0.485	0.712	24.9	25.6	9.25
Sep-15	0.491	1.48	27.8	29.3	10.0
Oct-15	0.494	1.06	22.7	23.8	7.57
Nov-15	0.519	1.31	26.5	27.8	8.14

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	0.565	8.01	26.1	34.1	9.31
Jan-16	0.815	7.11	31.3	38.4	11.1
Feb-16	0.600	5.64	25.1	30.7	8.36
Mar-16	1.01	32.5	12.2	44.7	7.26
Apr-16	0.597	0.625	23.7	24.3	5.60
May-16	0.536	0.475	28.9	29.4	6.41
Jun-16	0.520	14.8	0.692	15.5	8.69
Jul-16	0.514	0.869	27.7	28.5	11.5
Aug-16	0.524	10.5	25.8	36.4	7.35
Sep-16	0.520	0.527	30.7	31.3	9.22
Oct-16	0.552	0.685	22.2	22.9	9.81
Nov-16	0.568	29.2	17.9	47.2	5.65
Dec-16	0.674	6.00	27.7	33.7	12.0
Jan-17	1.59	19.1	83.6	103	14.1
Feb-17	1.65	18.8	61.0	79.7	15.2
Mar-17	0.950	3.04	35.9	39.0	9.12
Apr-17	0.910	4.54	41.6	46.2	7.95
May-17	0.634	7.19	30.2	37.4	3.71
Jun-17	0.562	0.377	33.6	33.9	8.81
Jul-17	0.539	0.675	32.7	33.4	8.18
Aug-17	0.522	--**	25.0	--**	5.62
Sep-17	0.504	12.7	10.3	23.0	4.84
Oct-17	0.512	5.91	25.6	31.5	11.0
Nov-17	0.569	2.72	25.2	28.0	9.90
Dec-17	0.522	4.05	30.9	34.9	10.4
Jan-18	0.668	2.60	31.2	33.8	7.80
Feb-18	0.542	0.636	30.8	31.4	8.00
Mar-18	0.874	23.4	30.4	53.8	2.73
Apr-18	0.733	0.456	29.8	30.2	5.78
May-18	0.549	3.16	27.7	30.8	8.30
Jun-18	0.518	1.31	20.5	21.8	6.16
Jul-18	0.518	0.702	32.1	32.8	9.43
Aug-18	0.514	1.04	34.5	35.6	7.55
Sep-18	0.530	0.0742	26.0	26.0	3.89
Oct-18	0.530	0.501	30.8	31.3	8.67
Nov-18	0.539	9.81	23.6	33.4	9.45
Dec-18	0.574	4.03	40.3	44.3	10.9
Jan-19	0.833	9.57	36.2	45.8	10.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	1.30	4.03	38.0	42.0	9.21
Mar-19	0.983	0.770	35.8	36.5	6.60
Apr-19	0.659	9.70	36.9	46.6	9.70
May-19	0.633	11.4	40.2	51.6	12.3
Jun-19	0.544	0.497	26.9	27.4	8.49
Jul-19	0.527	4.45	38.2	42.6	11.7
Aug-19	0.529	0.297	20.4	20.7	7.06
Sep-19	0.517	2.37	34.5	36.9	9.06
Oct-19	0.492	1.00	23.0	23.0	6.00
Nov-19	0.506	1.00	20.0	22.0	7.00
Dec-19	0.626	6.00	27.0	34.0	12.0
Jan-20	0.585	1.00	26.0	27.0	8.00
Feb-20	0.524	7.00	31.0	38.0	9.00
Mar-20	0.575	6.00	29.0	35.0	8.00
Apr-20	0.604	19.0	34.0	54.0	7.00
May-20	0.541	67.0	2.00	69.0	13.0
Jun-20	0.536	10.0	14.0	25.0	8.00
Jul-20	0.541	18.0	17.0	34.0	2.00
Aug-20	0.546	13.0	17.0	30.0	14.0
Sep-20	0.534	73.0	1.00	73.0	16.0
Oct-20	0.531	0.630	19.3	19.9	4.00
Nov-20	0.537	2.29	25.0	27.1	11.0
Dec-20	0.543	6.02	22.1	28.1	26.0
Jan-21	0.569	11.0	15.0	26.0	9.00
Feb-21	0.570	36.2	9.65	46.2	3.00
Mar-21	0.570	7.62	24.1	32.1	12.0
Apr-21	0.523	9.70	19.4	29.1	2.00
May-21	0.514	0.417	20.9	20.9	4.00
Jun-21	0.518	9.63	23.1	32.8	4.00
Jul-21	0.460	9.84	19.7	30.3	6.00
Aug-21	0.495	20.4	19.7	40.8	8.00
Sep-21	0.491	27.8	17.8	46.4	1.00
Oct-21	0.657	22.0	25.0	47.0	11.0
Nov-21	0.547	47.0	14.0	61.0	1.00
Dec-21	1.01	28.0	20.0	48.0	13.0
Jan-22	0.656	92.0	7.00	99.0	2.00
Feb-22	0.541	65.0	7.00	72.0	1.00
Mar-22	0.511	25.0	17.0	41.0	11.0

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	0.509	14.0	31.0	46.0	12.0
May-22	0.490	20.0	24.0	44.0	9.00
Jun-22	0.482	11.0	21.0	31.0	1.00
Jul-22	0.486	25.0	19.0	45.0	1.00
Aug-22	0.488	18.0	17.0	35.0	6.00
Sep-22	0.484	25.0	17.0	41.0	2.00
Oct-22	0.458	9.00	27.0	37.0	14.0
Nov-22	0.493	1.00	21.0	22.0	7.00
Dec-22	0.624	16.0	27.0	43.0	10.0
Jan-23	1.57	47.0	47.0	95.0	11.0
Feb-23	0.767	62.0	11.0	73.0	1.00
Mar-23	1.48	31.0	28.0	60.0	10.0
Apr-23	0.775	60.0	18.0	79.0	10.0
May-23	0.591	1.00	29.0	30.0	5.00
Jun-23	0.555	26.0	28.0	54.0	8.00
Jul-23	0.543	28.0	18.0	46.0	8.00
Aug-23	0.530	49.0	10.0	59.0	2.00
Sep-23	0.509	44.0	10.0	55.0	10.0
Oct-23	0.518	17.2	15.2	32.4	9.65
Nov-23	0.524	18.7	27.6	46.3	11.8
Dec-23	0.605	21.7	25.6	47.2	8.27
Jan-24	0.747	35.5	--†	--†	9.38
Feb-24	1.21	41.3	45.0	86.4	10.6
Mar-24	0.855	24.1	34.4	58.6	11.0
Apr-24	0.716	1.92	74.8	76.7	15.0
May-24	0.605	59.8	14.1	73.9	10.2
Jun-24	0.547	2.54	29.7	32.2	8.27
Jul-24	0.546	12.9	24.5	37.4	8.99
Aug-24	0.532	14.8	17.5	32.3	7.29
Sep-24	0.510	8.22	16.9	25.1	7.42
Oct-24	0.497	1.10	14.6	15.7	5.87
Nov-24	0.557	9.27	24.6	33.9	--
Dec-24	0.731	5.60	40.5	46.1	9.27
Jan-25	0.614	20.4	27.3	47.7	8.40
Feb-25	1.12	51.5	58.3	110	10.2
Mar-25	0.671	48.4	22.0	70.5	8.96
Apr-25	0.586	31.5	23.6	55.1	8.66
May-25	0.542	23.1	22.4	45.5	8.86

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	0.536	13.9	24.4	38.3	--
Jul-25	0.517	21.7	21.2	42.9	--
Aug-25	0.509	9.37	22.3	31.6	8.72
Sep-25	0.504	12.3	21.8	34.0	--
Dry Season Average	**0.531**	**12.2**	**22.8**	**35.0**	**7.51**
Wet Season Average	**0.700**	**14.2**	**29.4**	**43.4**	**8.76**
Annual Average	**0.630**	**13.4**	**26.6**	**39.9**	**8.25**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.
** Missing data due to Caltest missing request for ammonia analysis.
† Missing data due to contract laboratory not analyzing the samples within the allowed hold time.

Recycled Water

No recycled water was produced or distributed this past year.

19 San Jose-Santa Clara Regional Wastewater Facility

The San Jose-Santa Clara Regional Wastewater Facility discharges to the Lower South Bay. It serves an estimated population of 1.5 million with approximately 17,000 commercial and industrial connections. The plant has a permitted ADWF capacity of 167 mgd and a peak wet weather capacity of 261 mgd. This past year's dry season discharge flows were approximately 83 mgd. The process includes advanced treatment with a Biological Nutrient Removal system for N and P removal.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - The flow reduction across the plant is seasonal and it ranges from approximately 5 to 25 percent. This reduction is attributed to recycled water, water bound with biosolids, evaporation, etc.
  - The nitrogen species and phosphorus load reductions across the plant ranges from approximately 70 to 98 percent. This load reduction is attributed primarily to nutrient load reduction in the activated sludge system and load diversion from recycled water.
- Discharge
  - Wet season loads are greater and generally more variable than the dry season loads.
  - NOx is the majority of the nitrogen species discharged, regardless of season. This is expected since the plant fully nitrifies year-round and discharges very little ammonia.
  - Since April 2017, the facility has enhanced the total phosphorus load reduction capabilities as evidenced by total phosphorus concentrations typically below 1 mg P/L.
- Recycled Water
  - Based on Table 1-2, the plant has averaged 11 mgd of recycled water from 2019 through 2024. Recycled water uses included golf course irrigation, landscape irrigation, industrial application, agricultural irrigation, and other non-potable uses.
  - Based on Table 5-3 through Table 5-5, the plant has diverted on average 21 kg ammonia-N/d, 558 kg TIN-N/d, and 24 kg P/d from the Bay through reuse from 2019 through 2024. Note: these values are for year-round values and not limited to the dry season when the facility has the highest non-potable recycled water demand.

Influent

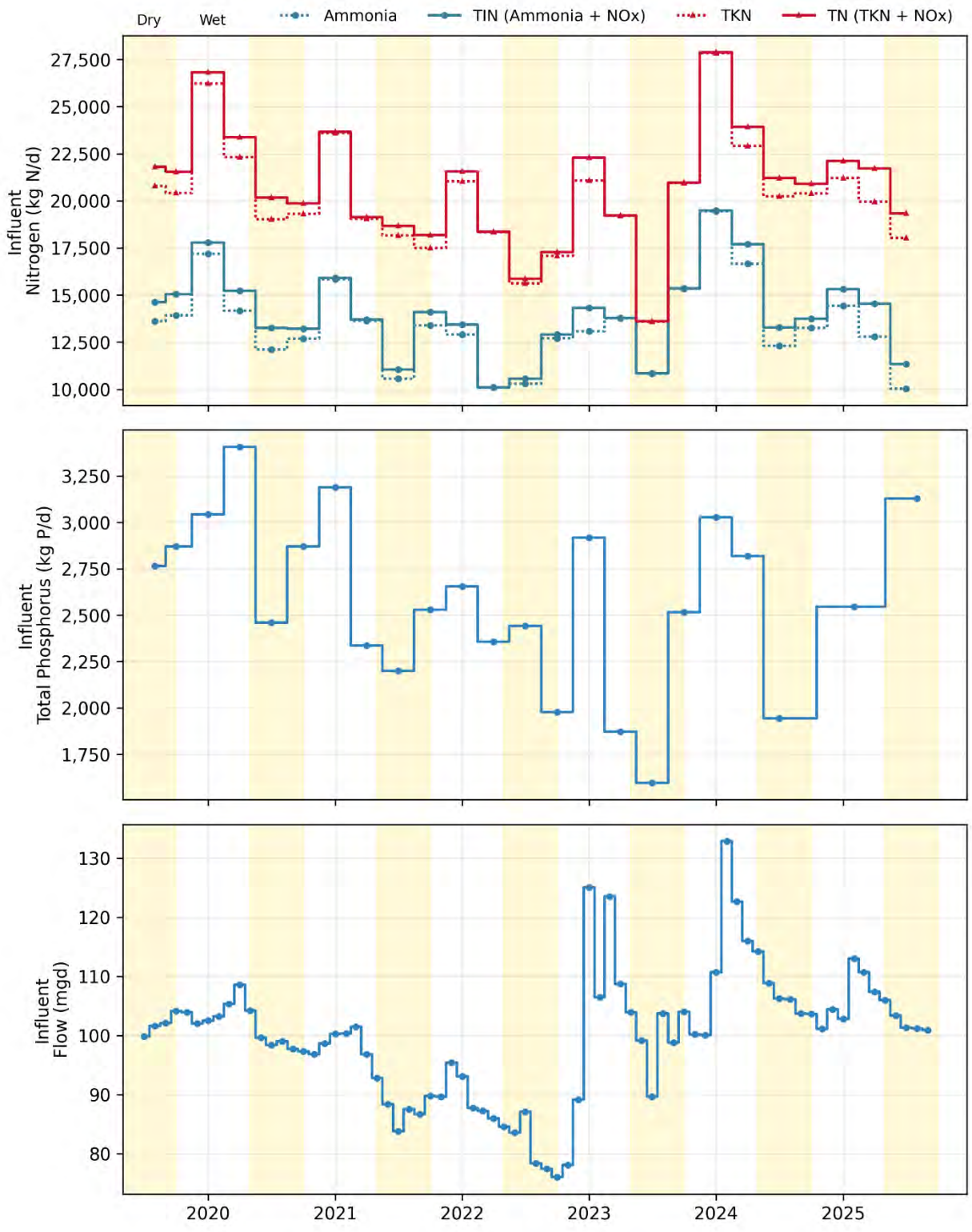


Figure 19-1. Influent: San Jose Monthly Flows and Loads

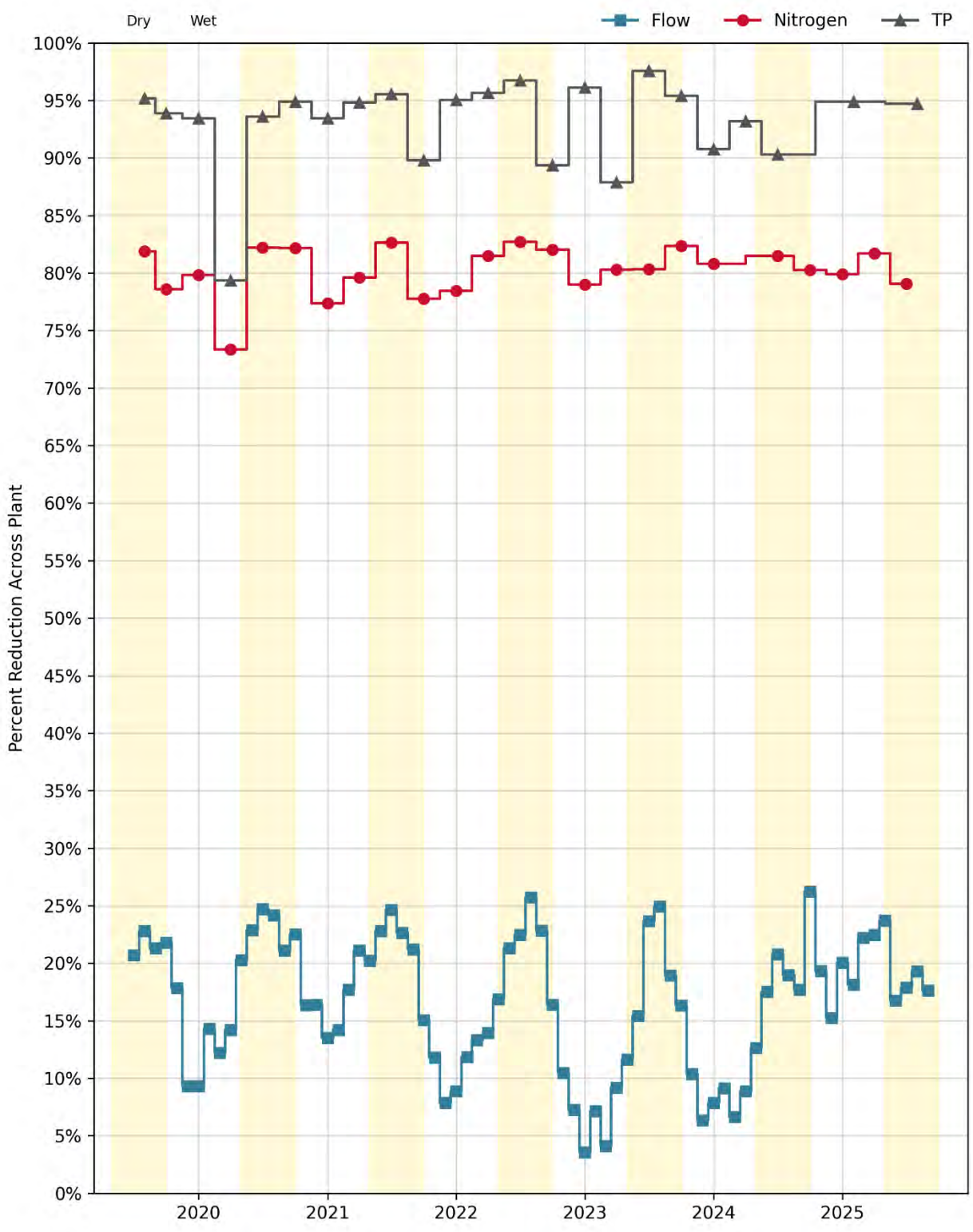


Figure 19-2. Influent: San Jose Monthly Reductions Across the Plant

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 19-1. Influent: San Jose Monthly Flows and Loads*

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	99.9	--	--	--	--	--	--
Aug-19	102	13,600	1,020	14,600	20,800	21,800	2,770
Sep-19	102	--	--	--	--	--	--
Oct-19	104	13,900	1,130	15,100	20,400	21,500	2,870
Nov-19	104	--	--	--	--	--	--
Dec-19	102	--	--	--	--	--	--
Jan-20	103	17,200	594	17,800	26,200	26,800	3,040
Feb-20	103	--	--	--	--	--	--
Mar-20	105	--	--	--	--	--	--
Apr-20	109	14,200	1,070	15,200	22,300	23,400	3,410
May-20	104	--	--	--	--	--	--
Jun-20	99.6	--	--	--	--	--	--
Jul-20	98.4	12,100	1,130	13,200	19,000	20,200	2,460
Aug-20	99.0	--	--	--	--	--	--
Sep-20	97.8	--	--	--	--	--	--
Oct-20	97.3	12,700	546	13,200	19,300	19,900	2,870
Nov-20	96.9	--	--	--	--	--	--
Dec-20	98.7	--	--	--	--	--	--
Jan-21	100	15,800	74.9	15,900	23,600	23,700	3,190
Feb-21	100	--	--	--	--	--	--
Mar-21	101	--	--	--	--	--	--
Apr-21	96.8	13,600	71.9	13,700	19,100	19,100	2,340
May-21	92.8	--	--	--	--	--	--
Jun-21	88.4	--	--	--	--	--	--
Jul-21	83.9	10,600	501	11,100	18,200	18,700	2,200
Aug-21	87.5	--	--	--	--	--	--
Sep-21	86.7	--	--	--	--	--	--
Oct-21	89.8	13,400	700	14,100	17,500	18,200	2,530
Nov-21	89.7	--	--	--	--	--	--
Dec-21	95.4	--	--	--	--	--	--
Jan-22	93.1	12,900	526	13,400	21,000	21,600	2,650
Feb-22	87.8	--	--	--	--	--	--
Mar-22	87.3	--	--	--	--	--	--
Apr-22	86.0	10,100	14.1	10,100	18,300	18,400	2,360
May-22	84.6	--	--	--	--	--	--
Jun-22	83.6	--	--	--	--	--	--
Jul-22	87.1	10,300	261	10,600	15,600	15,900	2,440

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	78.4	--	--	--	--	--	--
Sep-22	77.5	--	--	--	--	--	--
Oct-22	76.1	12,700	203	12,900	17,100	17,300	1,980
Nov-22	78.2	--	--	--	--	--	--
Dec-22	89.2	--	--	--	--	--	--
Jan-23	125	13,100	1,230	14,300	21,100	22,300	2,920
Feb-23	106	--	--	--	--	--	--
Mar-23	123	--	--	--	--	--	--
Apr-23	109	13,800	12.9 **	13,800	19,200	19,200	1,870
May-23	104	--	--	--	--	--	--
Jun-23	99.2	--	--	--	--	--	--
Jul-23	89.7	10,800	3.33 **	10,800	13,600	13,600	1,600
Aug-23	104	--	--	--	--	--	--
Sep-23	98.8	--	--	--	--	--	--
Oct-23	104	15,300	24.2	15,400	20,900	21,000	2,520
Nov-23	100	--	--	--	--	--	--
Dec-23	100	--	--	--	--	--	--
Jan-24	111	19,400	28.2	19,500	27,800	27,900	3,030
Feb-24	133	--	--	--	--	--	--
Mar-24	123	--	--	--	--	--	--
Apr-24	116	16,700	1,020	17,700	22,900	--	2,820
May-24	114	--	--	--	--	--	--
Jun-24	109	--	--	--	--	--	--
Jul-24	106	12,300	971	13,300	20,200	21,200	1,940
Aug-24	106	--	--	--	--	--	--
Sep-24	104	--	--	--	--	--	--
Oct-24	104	13,300	502	13,800	20,400	20,900	--
Nov-24	101	--	--	--	--	--	--
Dec-24	104	--	--	--	--	--	--
Jan-25	103	14,400	894	15,300	21,200	22,100	--
Feb-25	113	--	--	--	--	--	2,550
Mar-25	111	--	--	--	--	--	--
Apr-25	107	12,800	1,760	14,600	20,000	21,700	--
May-25	106	--	--	--	--	--	--
Jun-25	103	--	--	--	--	--	--
Jul-25	101	10,000	1,300	11,300	18,000	19,300	--
Aug-25	101	--	--	--	--	--	3,130
Sep-25	101	--	--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	103	10,100	1300	11,400	18,100	19,400	3,190
Wet Season Average	106	13,500	1030	14,600	20,600	21,600	2,350
Average Annual	104.6	12,573	1,094	13,667	19,819	20,913	2,787

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

** “Nitrate + Nitrite” values that were non-detect. The listed values are equal to 50 percent of the method detection limit.

Discharge

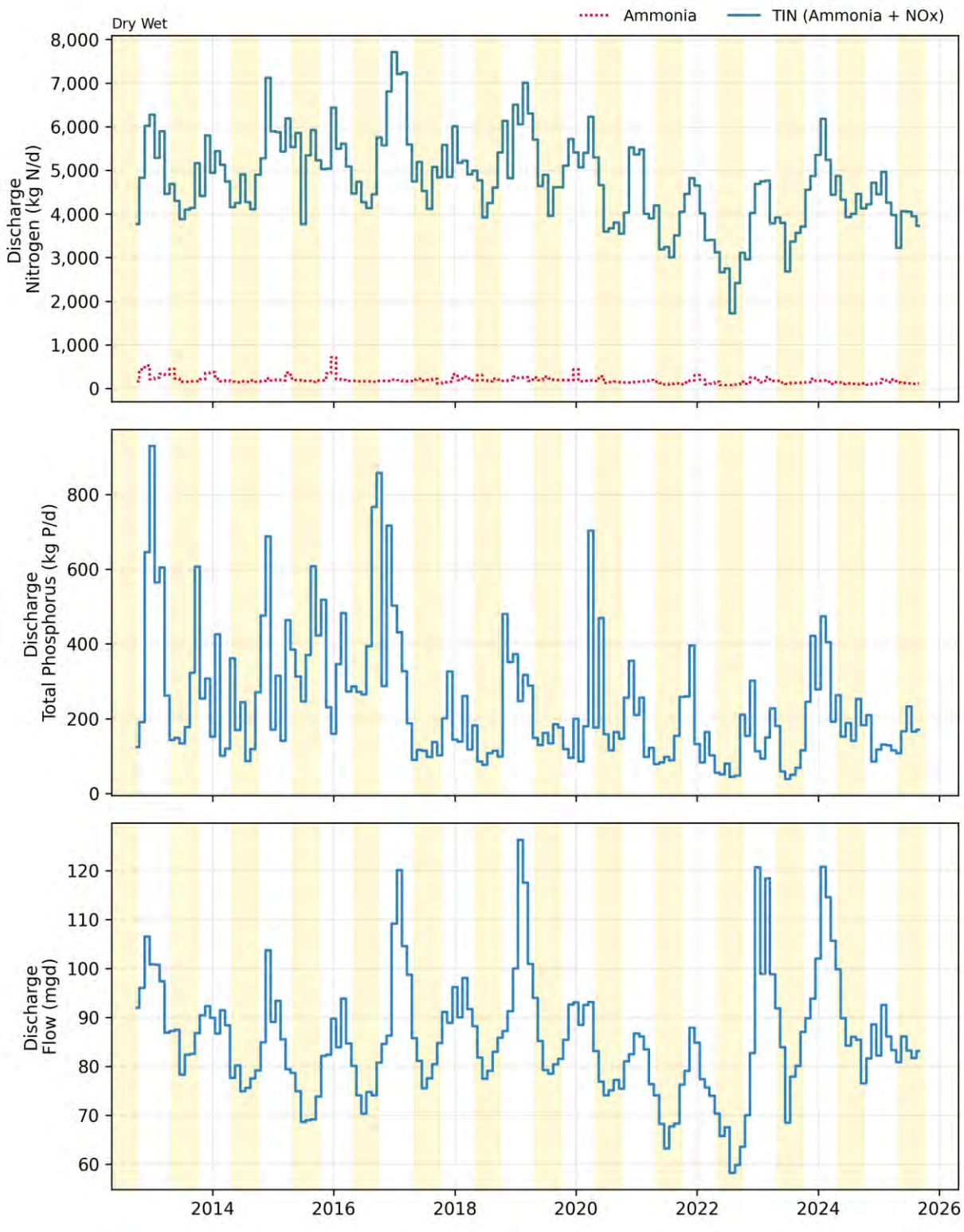


Figure 19-3. Discharge: San Jose Monthly Flows and Loads

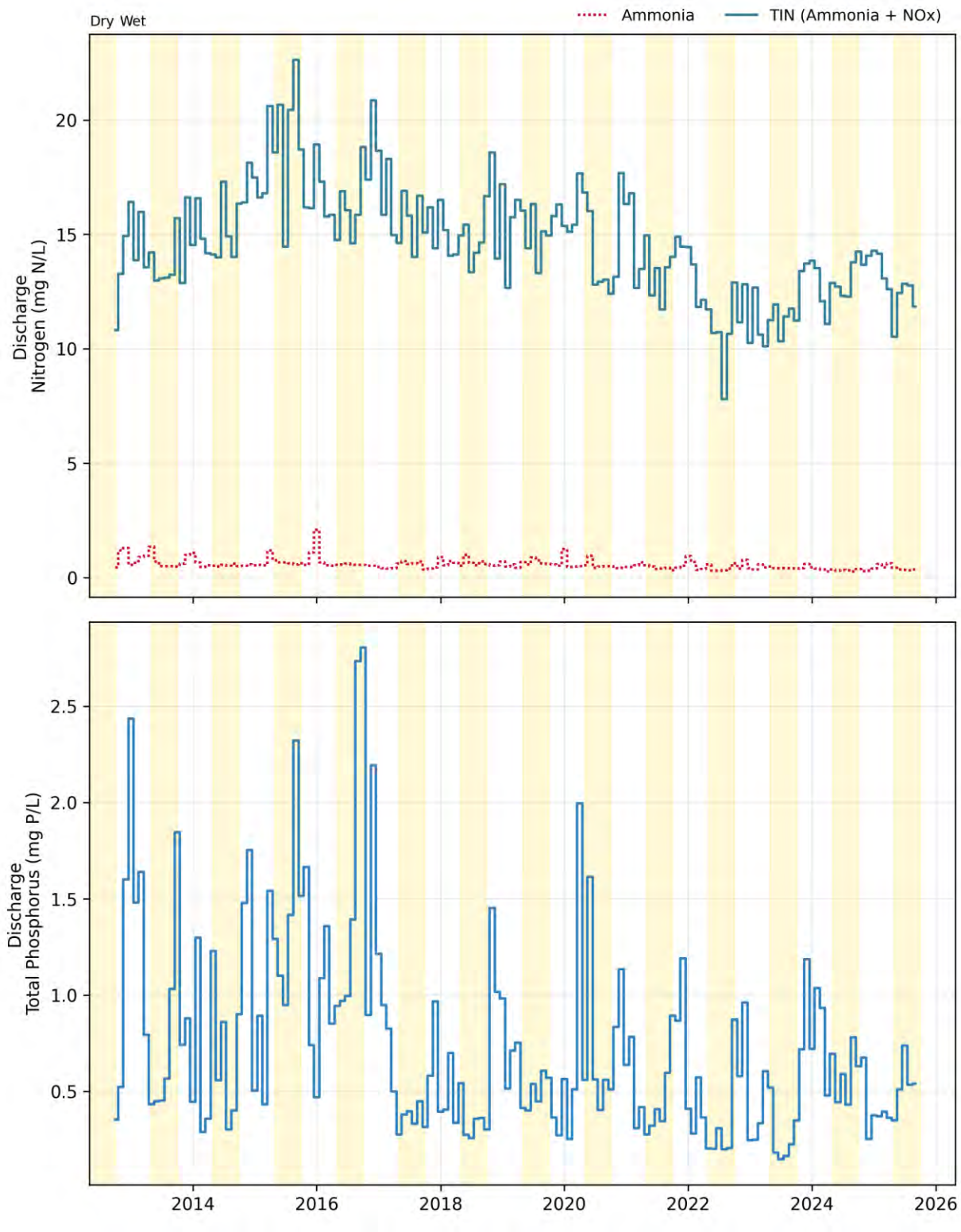


Figure 19-4. Discharge: San Jose Monthly Concentrations

Table 19-2. Discharge: San Jose Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	91.9	157	3,600	3,760	124
Nov-12	96.0	433	4,390	4,830	190
Dec-12	107	523	5,490	6,020	646
Jan-13	101	211	6,060	6,270	930
Feb-13	101	247	5,040	5,290	565
Mar-13	97.3	332	5,560	5,890	605
Apr-13	86.9	313	4,150	4,460	261
May-13	87.2	446	4,240	4,690	143
Jun-13	87.5	232	4,070	4,300	149
Jul-13	78.3	148	3,730	3,870	134
Aug-13	82.4	156	3,940	4,090	177
Sep-13	82.6	161	3,970	4,140	323
Oct-13	86.8	161	5,000	5,160	606
Nov-13	90.4	211	4,190	4,410	254
Dec-13	92.3	347	5,450	5,800	307
Jan-14	89.9	370	4,580	4,950	152
Feb-14	86.7	220	5,220	5,440	426
Mar-14	91.5	162	4,960	5,120	101
Apr-14	88.4	180	4,560	4,740	120
May-14	77.6	153	4,000	4,150	361
Jun-14	80.2	146	4,100	4,240	169
Jul-14	74.9	160	4,740	4,900	244
Aug-14	75.6	152	4,110	4,270	86.8
Sep-14	77.5	181	3,930	4,110	118
Oct-14	79.1	149	4,750	4,900	270
Nov-14	84.9	166	5,110	5,270	475
Dec-14	104	226	6,890	7,120	688
Jan-15	89.0	184	5,710	5,890	171
Feb-15	93.3	195	5,680	5,870	315
Mar-15	85.5	178	5,250	5,430	141
Apr-15	79.4	356	5,830	6,190	463
May-15	78.7	227	5,310	5,530	385
Jun-15	74.9	190	5,670	5,860	312
Jul-15	68.6	175	3,580	3,760	246
Aug-15	69.0	167	5,170	5,340	370
Sep-15	69.2	151	5,770	5,920	608
Oct-15	73.8	178	5,050	5,220	423
Nov-15	82.1	177	4,850	5,030	518

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	82.4	343	4,690	5,030	231
Jan-16	89.8	710	5,720	6,430	160
Feb-16	83.8	212	5,280	5,490	346
Mar-16	93.8	190	5,420	5,610	483
Apr-16	84.7	166	4,910	5,080	273
May-16	80.1	170	4,300	4,470	287
Jun-16	74.1	163	4,570	4,740	272
Jul-16	70.3	161	4,110	4,270	265
Aug-16	74.7	159	3,970	4,130	394
Sep-16	74.1	156	4,290	4,450	766
Oct-16	80.7	171	5,580	5,750	857
Nov-16	84.6	169	5,400	5,570	287
Dec-16	86.2	172	6,640	6,810	716
Jan-17	109	196	7,510	7,710	502
Feb-17	120	190	7,020	7,210	432
Mar-17	105	157	7,080	7,240	327
Apr-17	98.7	159	5,430	5,590	187
May-17	85.7	198	4,550	4,750	89.9
Jun-17	81.1	222	4,960	5,190	117
Jul-17	75.5	168	4,360	4,520	114
Aug-17	77.6	185	3,930	4,110	97.8
Sep-17	80.5	214	4,870	5,080	137
Oct-17	84.8	117	4,720	4,840	101
Nov-17	91.1	138	5,440	5,580	201
Dec-17	88.9	154	4,690	4,850	326
Jan-18	96.2	327	5,680	6,010	144
Feb-18	90.0	185	4,990	5,170	139
Mar-18	98.0	269	4,950	5,220	260
Apr-18	91.7	229	4,670	4,900	117
May-18	88.2	177	4,810	4,990	182
Jun-18	81.7	305	4,470	4,770	85.3
Jul-18	77.4	189	3,720	3,910	75.8
Aug-18	79.1	162	4,090	4,250	108
Sep-18	82.9	220	4,380	4,600	114
Oct-18	85.8	195	5,220	5,410	98.7
Nov-18	87.2	171	5,960	6,130	480
Dec-18	91.3	186	4,630	4,820	352
Jan-19	100.0	265	6,240	6,500	372

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	126	234	5,820	6,050	247
Mar-19	117	255	6,750	7,000	317
Apr-19	101	168	6,130	6,300	288
May-19	94.0	244	5,460	5,710	148
Jun-19	85.2	185	4,450	4,640	129
Jul-19	79.2	267	4,630	4,900	162
Aug-19	78.5	227	3,720	3,950	134
Sep-19	80.4	186	4,420	4,610	185
Oct-19	81.5	185	4,420	4,610	176
Nov-19	85.4	186	4,920	5,110	118
Dec-19	92.6	185	5,530	5,710	95.7
Jan-20	93.0	436	4,970	5,410	199
Feb-20	88.4	159	4,900	5,060	84.9
Mar-20	92.5	171	5,230	5,400	179
Apr-20	93.2	178	6,050	6,230	704
May-20	83.1	171	5,120	5,290	176
Jun-20	76.8	279	4,380	4,660	469
Jul-20	74.1	121	3,470	3,590	158
Aug-20	75.1	140	3,530	3,670	115
Sep-20	77.2	150	3,650	3,800	164
Oct-20	75.4	145	3,400	3,540	146
Nov-20	81.0	129	3,900	4,030	256
Dec-20	82.5	137	5,390	5,520	355
Jan-21	86.7	155	5,200	5,360	209
Feb-21	86.1	156	5,320	5,470	256
Mar-21	83.5	174	3,830	4,000	97.8
Apr-21	76.4	192	3,710	3,900	121
May-21	74.0	152	4,040	4,190	78.1
Jun-21	68.2	124	3,060	3,190	83.2
Jul-21	63.2	89.4	3,150	3,240	97.8
Aug-21	67.7	101	2,900	3,000	88.6
Sep-21	68.3	112	3,400	3,510	155
Oct-21	76.3	92.8	3,950	4,040	258
Nov-21	79.1	131	4,330	4,460	260
Dec-21	87.9	177	4,640	4,820	396
Jan-22	84.9	299	4,340	4,640	132
Feb-22	77.4	201	3,810	4,010	82.9
Mar-22	75.7	97.0	3,290	3,390	164

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	74.0	107	3,290	3,400	102
May-22	70.3	154	2,970	3,120	54.8
Jun-22	65.8	77.2	2,580	2,660	50.5
Jul-22	67.6	79.0	2,670	2,740	79.3
Aug-22	58.3	73.5	1,650	1,720	44.2
Sep-22	59.8	88.5	2,330	2,410	47.0
Oct-22	63.6	152	2,950	3,100	211
Nov-22	70.0	103	2,850	2,960	154
Dec-22	82.7	242	3,770	4,020	301
Jan-23	121	191	4,490	4,680	113
Feb-23	98.8	139	4,600	4,740	93.4
Mar-23	118	257	4,510	4,760	150
Apr-23	98.8	170	3,610	3,780	227
May-23	91.9	172	3,740	3,910	181
Jun-23	83.9	132	3,660	3,790	58.0
Jul-23	68.4	107	2,570	2,680	38.7
Aug-23	77.9	121	3,240	3,370	49.2
Sep-23	80.1	124	3,440	3,560	68.3
Oct-23	87.0	132	3,570	3,700	116
Nov-23	89.8	144	4,410	4,550	245
Dec-23	93.8	213	4,660	4,870	421
Jan-24	102	173	5,180	5,350	279
Feb-24	121	180	6,000	6,180	474
Mar-24	115	153	5,080	5,240	405
Apr-24	106	108	4,330	4,440	192
May-24	99.8	138	4,730	4,860	263
Jun-24	89.8	105	4,220	4,320	151
Jul-24	84.2	108	3,820	3,930	189
Aug-24	86.0	106	3,900	4,000	141
Sep-24	85.4	89.6	4,370	4,460	253
Oct-24	76.5	109	4,020	4,130	183
Nov-24	81.6	88.5	4,130	4,220	209
Dec-24	88.5	105	4,610	4,710	85.4
Jan-25	82.2	124	4,320	4,450	117
Feb-25	92.5	210	4,750	4,960	130
Mar-25	86.1	146	4,110	4,260	129
Apr-25	83.3	201	3,770	3,970	115
May-25	80.9	133	3,090	3,220	108

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	86.1	121	3,930	4,050	167
Jul-25	83.2	109	3,940	4,050	233
Aug-25	81.6	101	3,840	3,950	165
Sep-25	83.1	112	3,610	3,720	171
Dry Season Average	**83.0**	**118**	**3,750**	**3870**	**172**
Wet Season Average	**84.3**	**140**	**4,300**	**4,440**	**146**
Average Annual	**83.7**	**131**	**4,066**	**4,197**	**157**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 19-3. Recycled Water: San Jose-Santa Clara Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	1,100 (0.98)	6,320 (5.64)	0 (0)	4,220 (3.77)	1 (<0.01)	0 (0)	39 (0.03)	11,680 (10.4)
2020	938 (0.84)	7,130 (6.37)	0 (0)	4,270 (3.82)	2 (<0.01)	0 (0)	59 (0.05)	12,400 (11.1)
2021	823 (0.73)	6,990 (6.24)	0 (0)	4,320 (3.86)	2 (<0.01)	0 (0)	38 (0.03)	12,170 (10.9)
2022	936 (0.84)	6,830 (6.10)	0 (0)	4,500 (4.01)	2 (<0.01)	0 (0)	8 (0.01)	12,280 (11.0)
2023	934 (0.83)	6,120 (5.46)	0 (0)	5,210 (4.65)	2 (<0.01)	0 (0)	7 (0.01)	12,270 (11.0)
2024	1,450 (1.29)	6,270 (5.60)	0 (0)	5,080 (4.54)	2 (<0.01)	0 (0)	4 (0.01)	12,810 (11.4)
Average	**1,030 (0.92)**	**6,610 (5.90)**	**0 (0)**	**4,600 (4.11)**	**2 (<0.01)**	**0 (0)**	**26 (0.02)**	**12,300 (11.0)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 19-4. Recycled Water: San Jose-Santa Clara Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	2	13	0	9	<1	0	<1	24
2020	2	14	0	8	<1	0	<1	25
2021	1	11	0	7	<1	0	<1	20
2022	2	12	0	8	<1	0	<1	22
2023	1	9	0	8	<1	0	<1	19
2024	2	7	0	6	<1	0	<1	15
Average	**2**	**11**	**0**	**8**	**<1**	**0**	**<1**	**21**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 19-5. Recycled Water: San Jose-Santa Clara Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	57	327	0	219	<1	0	2	605
2020	48	361	0	216	<1	0	3	627
2021	39	334	0	207	<1	0	2	582
2022	38	274	0	180	<1	0	<1	492
2023	36	238	0	203	<1	0	<1	477
2024	64	275	0	223	<1	0	<1	562
Average	**47**	**302**	**0**	**208**	**<1**	**0**	**1**	**558**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 19-6. Recycled Water: San Jose-Santa Clara Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	2	12	0	8	<1	0	<1	22
2020	3	19	0	12	<1	0	<1	34
2021	2	14	0	9	<1	0	<1	25
2022	1	10	0	7	<1	0	<1	18
2023	1	9	0	7	<1	0	<1	17
2024	3	14	0	11	<1	0	<1	28
Average	**2**	**13**	**0**	**9**	**<1**	**0**	**<1**	**24**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

20 City of San Mateo

San Mateo discharges to the South Bay and it has approximately 41,434 service connections. The plant has a permitted ADWF capacity of 15.7 mgd and a peak wet weather capacity of 60 mgd. This past dry season average discharge flow was approximately 9.4 mgd. The plant performs secondary treatment using activated sludge. Note: the plant has on-going construction for upgrades that will result in nutrient reduction (emphasis on ammonia and TIN load reduction). The upgrades are expected to be completed in 2026.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent and Reduction Across the Plant
  - The flow reduction across the plant can be upwards of 17 percent. The reduction is attributed to biosolids, evaporation associated with the process, and/or flow management during wet weather events.
  - The nitrogen load reduction across the plant is upwards of approximately 54 percent. This load reduction is attributed to a combination of biological assimilation, biosolids management, and/or biological load reduction in the activated sludge system.
  - The phosphorus load reduction across the plant is upwards of approximately 63 percent. This load reduction is attributed to a combination of biological assimilation, biosolids management, and/or chemical precipitation associated with chemical addition in the collection system, headworks, and/or during solids thickening.
- Discharge
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This is expected since this plant does not fully nitrify. Note: the plant does occasionally nitrify as evidenced by nitrite plus nitrate discharge concentrations greater than influent concentrations. A portion of this produced nitrite plus nitrate is removed.
  - Nitrogen species concentrations are typically highest during the dry season.
  - Total phosphorus concentrations range from 0.5 to 5.0 mg P/L across the entire dataset. A portion of P is removed as influent concentrations are typically 4.6 mg P/L or greater for all sampling events. The removal mechanism is most likely from ferric addition at solids thickening.
- Recycled Water: No recycled water was produced or distributed this past year.

Influent

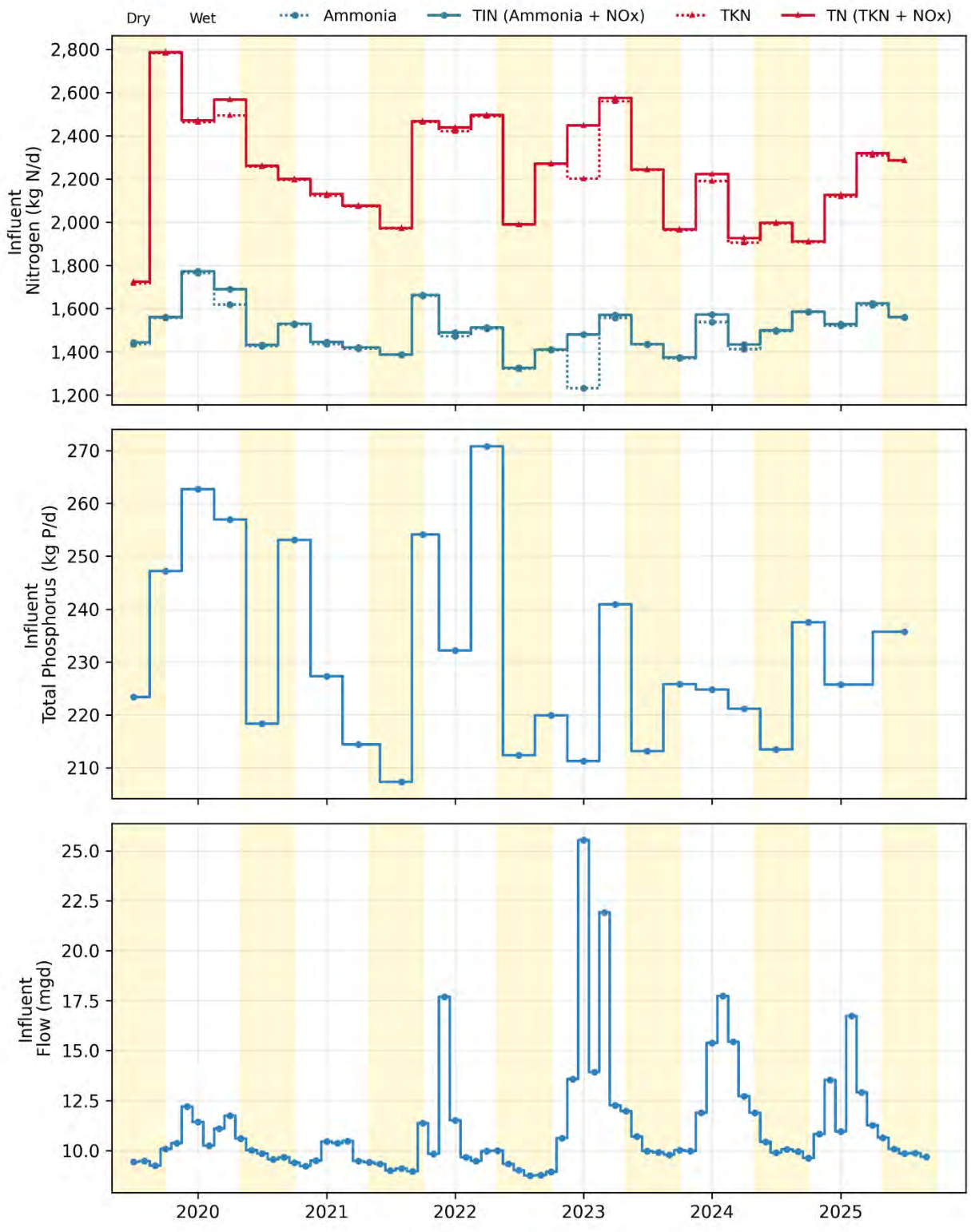


Figure 20-1. Influent: San Mateo Monthly Flows and Loads

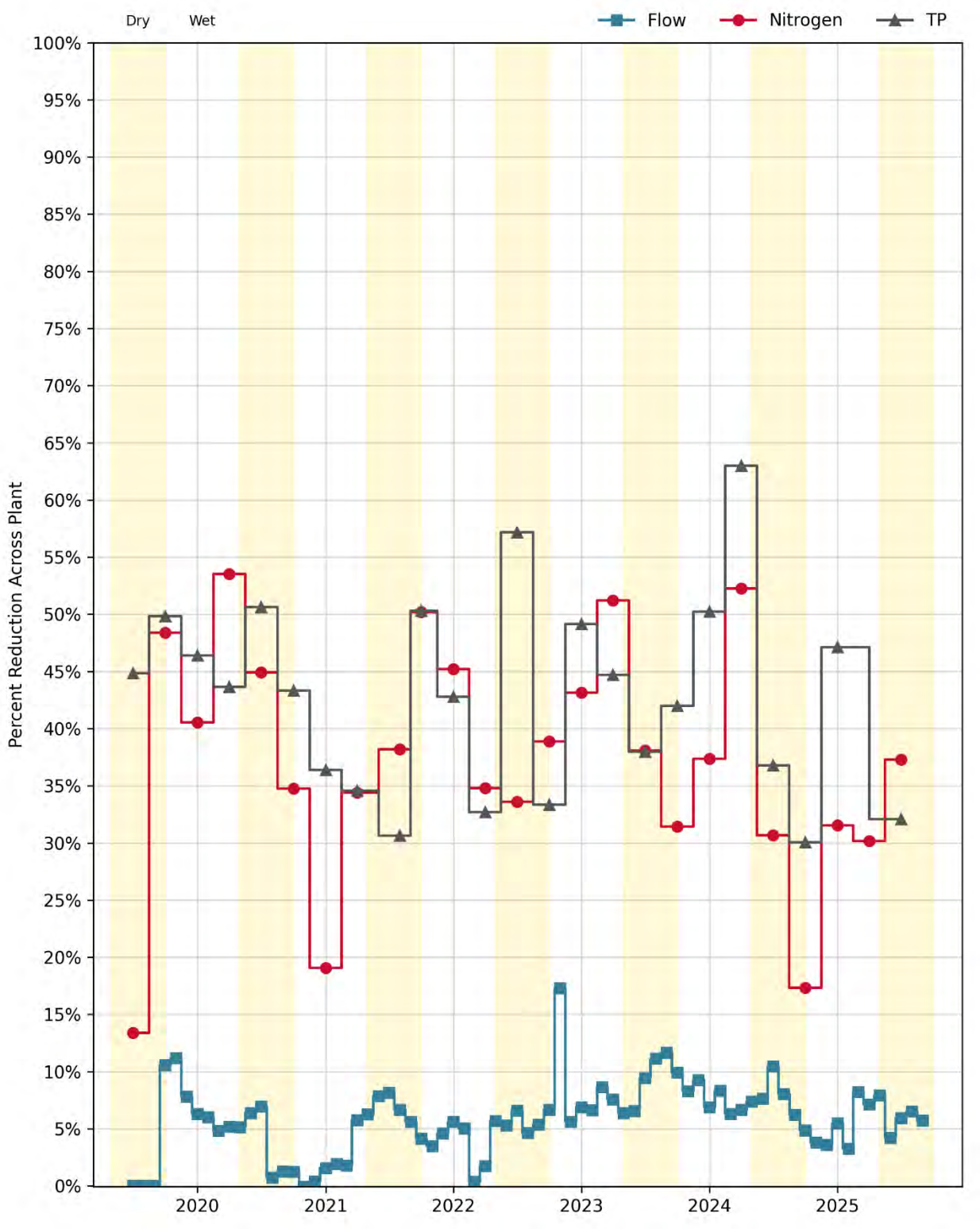


Figure 20-2. Influent: San Mateo Monthly Reductions Across the Plant

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 20-1. Influent: San Mateo Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	9.44	1,440	7.98	1,440	1,720	1,720	223
Aug-19	9.47	--	--	--	--	--	--
Sep-19	9.24	--	--	--	--	--	--
Oct-19	10.1	1,560	3.86	1,560	2,780	2,790	247
Nov-19	10.4	--	--	--	--	--	--
Dec-19	12.2	--	--	--	--	--	--
Jan-20	11.4	1,760	7.80	1,770	2,460	2,470	263
Feb-20	10.2	--	--	--	--	--	--
Mar-20	11.1	--	--	--	--	--	--
Apr-20	11.7	1,620	72.6	1,690	2,490	2,570	257
May-20	10.6	--	--	--	--	--	--
Jun-20	10.0	--	--	--	--	--	--
Jul-20	9.84	1,430	5.10	1,430	2,260	2,260	218
Aug-20	9.56	--	--	--	--	--	--
Sep-20	9.65	--	--	--	--	--	--
Oct-20	9.39	1,530	3.72	1,530	2,200	2,200	253
Nov-20	9.22	--	--	--	--	--	--
Dec-20	9.49	--	--	--	--	--	--
Jan-21	10.5	1,440	8.34	1,440	2,120	2,130	227
Feb-21	10.4	--	--	--	--	--	--
Mar-21	10.5	--	--	--	--	--	--
Apr-21	9.48	1,410	4.64	1,420	2,070	2,080	214
May-21	9.41	--	--	--	--	--	--
Jun-21	9.32	--	--	--	--	--	--
Jul-21	8.99	--	--	--	--	--	--
Aug-21	9.10	1,390	1.73	1,390	1,970	1,970	207
Sep-21	8.94	--	--	--	--	--	--
Oct-21	11.4	1,660	3.91	1,660	2,460	2,470	254
Nov-21	9.83	--	--	--	--	--	--
Dec-21	17.7	--	--	--	--	--	--
Jan-22	11.5	1,470	17.8	1,490	2,420	2,440	232
Feb-22	9.66	--	--	--	--	--	--
Mar-22	9.48	--	--	--	--	--	--
Apr-22	9.97	1,510	5.24	1,510	2,490	2,490	271
May-22	9.99	--	--	--	--	--	--
Jun-22	9.33	--	--	--	--	--	--
Jul-22	9.02	1,320	3.43	1,330	1,990	1,990	212

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-22	8.73	--	--	--	--	--	--
Sep-22	8.76	--	--	--	--	--	--
Oct-22	8.93	1,410	1.72	1,410	2,270	2,270	220
Nov-22	10.6	--	--	--	--	--	--
Dec-22	13.6	--	--	--	--	--	--
Jan-23	25.5	1,230	247	1,480	2,200	2,450	211
Feb-23	13.9	--	--	--	--	--	--
Mar-23	21.9	--	--	--	--	--	--
Apr-23	12.3	1,560	14.6	1,570	2,560	2,570	241
May-23	12.0	--	--	--	--	--	--
Jun-23	10.7	--	--	--	--	--	--
Jul-23	9.96	1,430	1.84	1,440	2,240	2,240	213
Aug-23	9.90	--	--	--	--	--	--
Sep-23	9.78	--	--	--	--	--	--
Oct-23	10.0	1,370	5.18	1,370	1,960	1,970	226
Nov-23	9.97	--	--	--	--	--	--
Dec-23	11.9	--	--	--	--	--	--
Jan-24	15.4	1,540	33.7	1,570	2,190	2,220	225
Feb-24	17.7	--	--	--	--	--	--
Mar-24	15.4	--	--	--	--	--	--
Apr-24	12.7	1,410	21.5	1,430	1,900	1,930	221
May-24	11.9	--	--	--	--	--	--
Jun-24	10.4	--	--	--	--	--	--
Jul-24	9.88	1,490	4.63	1,500	1,990	2,000	213
Aug-24	10.1	--	--	--	--	--	--
Sep-24	9.94	--	--	--	--	--	--
Oct-24	9.61	1,580	2.7	1,590	1,910	1,910	238
Nov-24	10.8	--	--	--	--	--	--
Dec-24	13.5	--	--	--	--	--	--
Jan-25	10.9	1,520	6.91	1,530	2,120	2,130	226
Feb-25	16.7	--	--	--	--	--	--
Mar-25	12.9	--	--	--	--	--	--
Apr-25	11.3	1,620	8.77	1,620	2,310	2,320	--
May-25	10.6	--	--	--	--	--	--
Jun-25	10.1	--	--	--	--	--	--
Jul-25	9.86	1,560	2.18	1,560	2,280	2,290	236
Aug-25	9.87	--	--	--	--	--	--
Sep-25	9.68	--	--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Dry Season Average	9.82	1,440	3.84	1,440	2,060	2,070	217
Wet Season Average	12.2	1,510	26.1	1,540	2,270	2,300	237
Average Annual	11.1	1,490	19.9	1,510	2,210	2,240	231

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

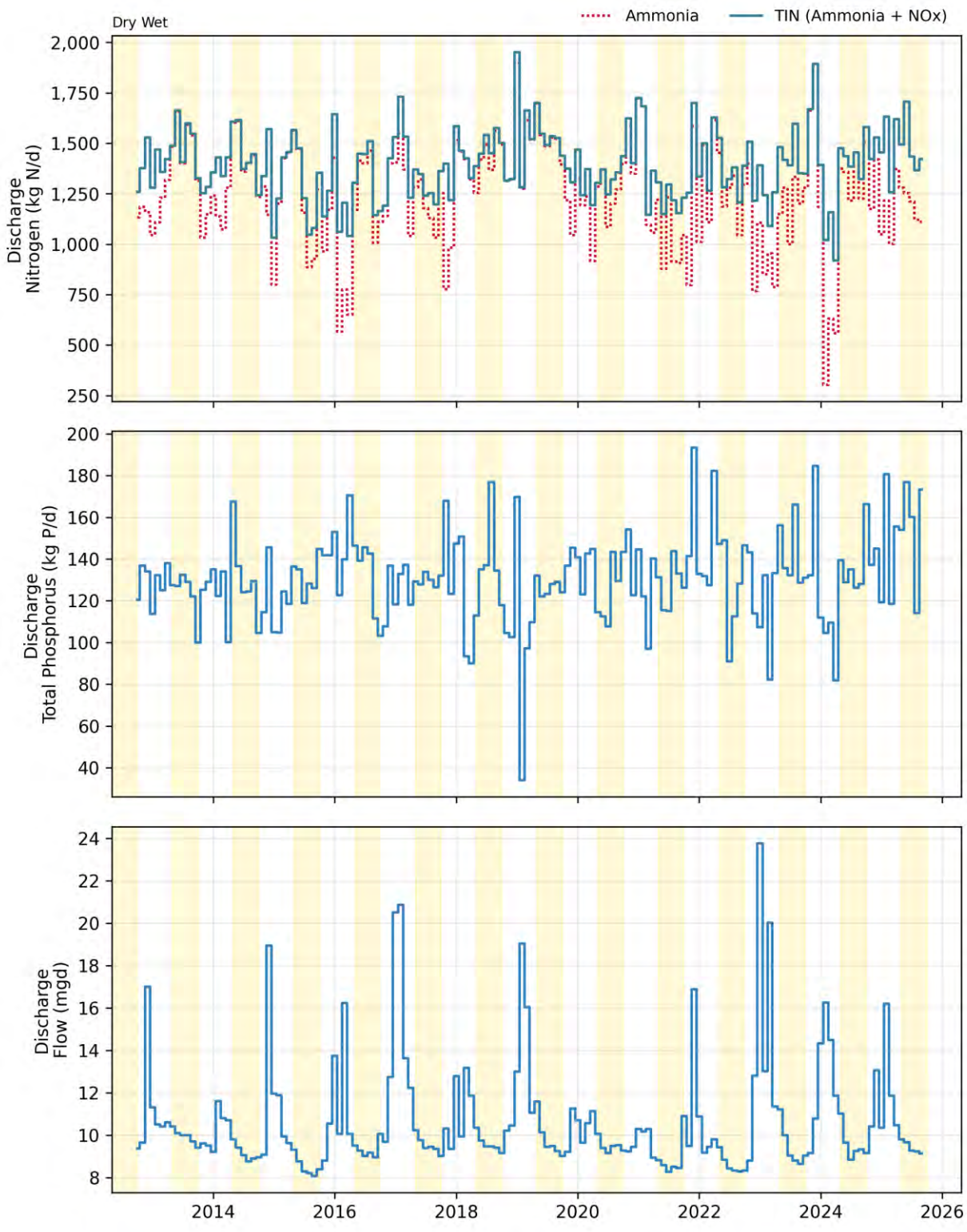


Figure 20-3. Discharge: San Mateo Monthly Flows and Loads

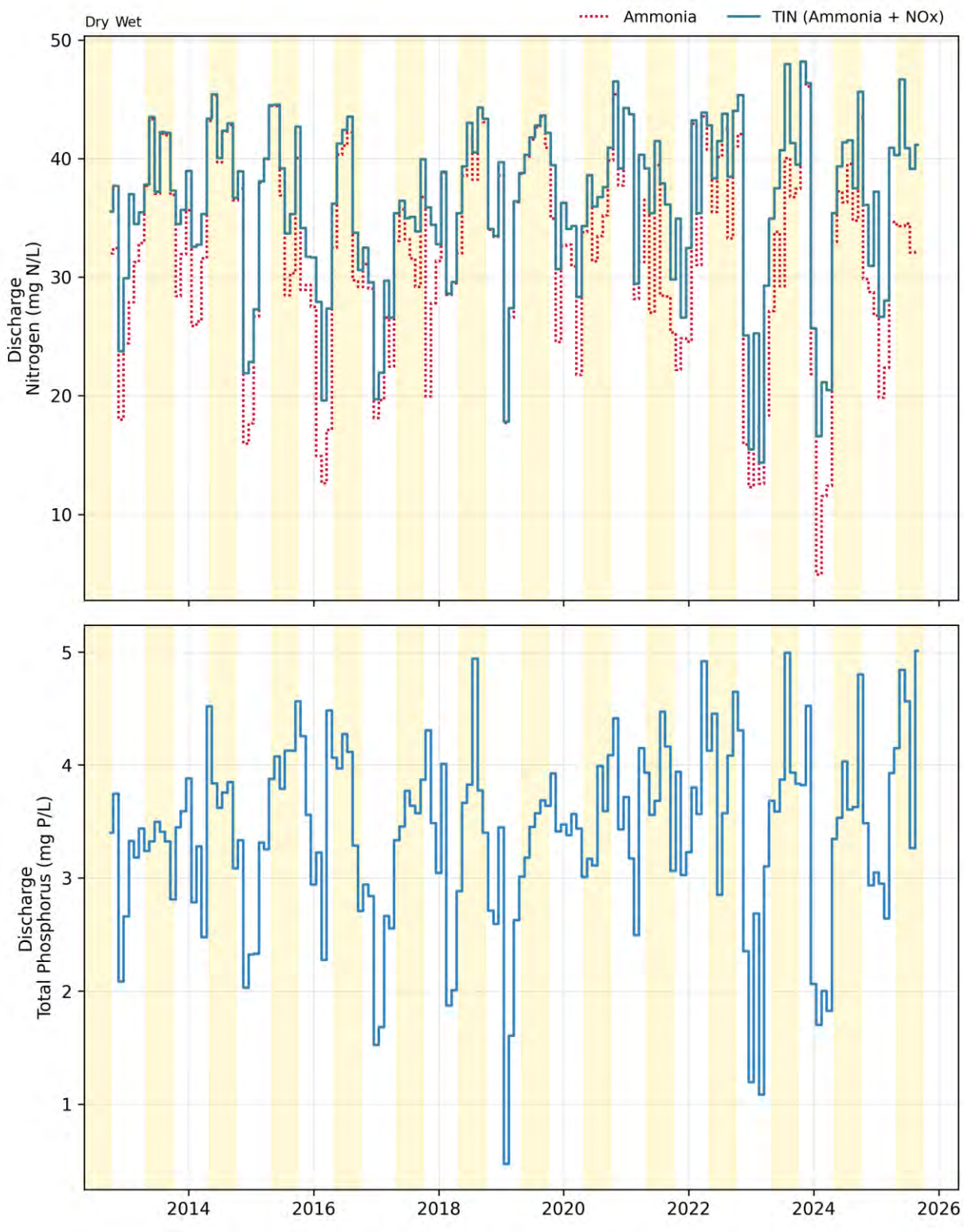


Figure 20-4. Discharge: San Mateo Monthly Concentrations

Table 20-2. Discharge: San Mateo Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	9.37	1,130	126	1,260	121
Nov-12	9.65	1,180	192	1,380	137
Dec-12	17.0	1,160	371	1,530	134
Jan-13	11.3	1,040	235	1,280	114
Feb-13	10.5	1,110	362	1,470	132
Mar-13	10.4	1,230	127	1,360	125
Apr-13	10.6	1,320	104	1,420	138
May-13	10.4	1,480	4.45	1,490	128
Jun-13	10.1	1,660	6.85	1,660	127
Jul-13	10.0	1,400	6.42	1,410	132
Aug-13	10.0	1,590	5.84	1,600	129
Sep-13	9.70	1,540	7.72	1,550	122
Oct-13	9.40	1,310	14.1	1,330	100
Nov-13	9.60	1,030	221	1,250	125
Dec-13	9.50	1,150	135	1,280	129
Jan-14	9.20	1,240	115	1,360	135
Feb-14	11.6	1,140	294	1,430	122
Mar-14	10.8	1,070	263	1,340	134
Apr-14	10.7	1,280	151	1,430	100
May-14	9.80	1,600	5.87	1,610	168
Jun-14	9.40	1,610	3.53	1,620	137
Jul-14	9.05	1,360	12.1	1,370	124
Aug-14	8.76	1,400	2.57	1,400	125
Sep-14	8.89	1,440	4.97	1,450	130
Oct-14	8.95	1,230	7.47	1,240	105
Nov-14	9.07	1,290	50.8	1,340	115
Dec-14	18.9	1,150	425	1,570	146
Jan-15	12.0	800	233	1,030	105
Feb-15	11.9	1,200	26.7	1,230	105
Mar-15	9.93	1,430	3.91	1,430	125
Apr-15	9.62	1,450	1.75	1,460	119
May-15	9.30	1,560	1.95	1,570	137
Jun-15	8.75	1,470	2.84	1,470	135
Jul-15	8.28	1,160	71.4	1,230	119
Aug-15	8.21	885	161	1,050	128
Sep-15	8.07	927	153	1,080	126
Oct-15	8.38	1,270	84.2	1,350	145

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-15	8.80	963	173	1,140	142
Dec-15	10.5	1,170	95.8	1,270	142
Jan-16	13.7	1,430	217	1,650	153
Feb-16	10.1	567	495	1,060	123
Mar-16	16.2	775	430	1,200	140
Apr-16	10.0	651	389	1,040	170
May-16	9.51	1,170	134	1,300	146
Jun-16	9.27	1,410	33.1	1,450	139
Jul-16	9.01	1,400	44.4	1,450	146
Aug-16	9.16	1,460	46.7	1,510	143
Sep-16	8.96	1,010	136	1,140	111
Oct-16	10.1	1,110	53.9	1,160	103
Nov-16	9.67	1,140	51.6	1,190	108
Dec-16	12.7	1,400	24.5	1,430	137
Jan-17	20.5	1,410	124	1,530	118
Feb-17	20.9	1,550	182	1,730	133
Mar-17	13.6	1,370	162	1,530	137
Apr-17	12.2	1,040	190	1,230	118
May-17	10.2	1,280	90.0	1,370	129
Jun-17	9.76	1,320	27.1	1,350	128
Jul-17	9.38	1,180	63.4	1,240	134
Aug-17	9.45	1,130	124	1,250	130
Sep-17	9.34	1,030	166	1,200	126
Oct-17	9.02	1,250	109	1,360	132
Nov-17	10.3	778	621	1,400	168
Dec-17	9.34	983	233	1,220	123
Jan-18	12.8	1,520	67.5	1,580	147
Feb-18	9.93	1,460	2.59	1,460	151
Mar-18	13.2	1,420	3.92	1,420	93.4
Apr-18	11.8	1,320	5.13	1,330	90.0
May-18	10.4	1,250	132	1,390	113
Jun-18	9.73	1,420	29.2	1,450	135
Jul-18	9.46	1,490	47.2	1,540	137
Aug-18	9.46	1,370	82.6	1,450	177
Sep-18	9.40	1,560	15.5	1,580	134
Oct-18	9.16	1,490	9.07	1,500	118
Nov-18	10.2	1,310	2.58	1,310	105
Dec-18	10.4	1,320	2.88	1,320	103

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-19	13.0	1,900	54.5	1,950	170
Feb-19	19.0	1,280	6.80	1,280	34.0
Mar-19	16.0	1,610	49.0	1,660	97.3
Apr-19	11.0	1,520	2.96	1,520	110
May-19	11.6	1,700	3.84	1,700	132
Jun-19	10.1	1,540	4.55	1,550	122
Jul-19	9.44	1,490	6.55	1,490	123
Aug-19	9.47	1,530	5.47	1,530	128
Sep-19	9.24	1,520	3.76	1,530	129
Oct-19	9.01	1,400	42.5	1,440	124
Nov-19	9.20	1,220	158	1,370	137
Dec-19	11.3	1,040	261	1,310	145
Jan-20	10.7	1,320	147	1,470	141
Feb-20	9.63	1,190	48.4	1,240	123
Mar-20	10.6	1,240	135	1,370	143
Apr-20	11.1	917	277	1,190	145
May-20	10.1	1,290	19.2	1,300	114
Jun-20	9.38	1,370	1.43	1,370	113
Jul-20	9.16	1,090	160	1,250	108
Aug-20	9.49	1,200	118	1,320	143
Sep-20	9.53	1,270	85.6	1,360	129
Oct-20	9.27	1,400	38.2	1,440	143
Nov-20	9.23	1,590	36.9	1,620	154
Dec-20	9.45	1,350	52.0	1,400	123
Jan-21	10.3	1,720	1.49	1,720	145
Feb-21	10.2	1,680	1.78	1,680	122
Mar-21	10.3	1,100	50.2	1,150	97.1
Apr-21	8.93	1,060	306	1,360	140
May-21	8.82	1,220	87.9	1,310	131
Jun-21	8.59	878	273	1,150	116
Jul-21	8.26	1,230	63.8	1,300	115
Aug-21	8.50	914	304	1,220	144
Sep-21	8.44	906	247	1,150	133
Oct-21	10.9	1,040	184	1,230	126
Nov-21	9.49	797	458	1,250	141
Dec-21	16.9	1,590	112	1,700	193
Jan-22	10.9	1,010	325	1,340	133
Feb-22	9.17	1,490	9.14	1,500	132

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Mar-22	9.44	1,110	157	1,260	127
Apr-22	9.80	1,610	12.7	1,630	182
May-22	9.43	1,450	74.3	1,530	147
Jun-22	8.84	1,190	95.2	1,280	149
Jul-22	8.42	1,280	42.4	1,320	90.9
Aug-22	8.33	1,340	39.9	1,380	113
Sep-22	8.29	1,040	163	1,210	128
Oct-22	8.33	1,290	94.2	1,390	147
Nov-22	8.79	1,400	109	1,510	143
Dec-22	12.8	769	445	1,210	114
Jan-23	23.8	1,110	286	1,390	107
Feb-23	13.0	851	392	1,240	132
Mar-23	20.0	953	135	1,090	82.2
Apr-23	11.3	786	469	1,260	133
May-23	11.2	1,150	331	1,480	156
Jun-23	10.00	1,280	139	1,420	136
Jul-23	9.02	999	391	1,390	132
Aug-23	8.80	1,330	264	1,600	166
Sep-23	8.64	1,200	149	1,350	129
Oct-23	9.03	1,280	69.6	1,350	131
Nov-23	9.15	1,660	5.95	1,670	132
Dec-23	10.8	1,880	11.9	1,890	185
Jan-24	14.3	1,180	208	1,390	112
Feb-24	16.3	302	718	1,020	105
Mar-24	14.5	631	526	1,160	110
Apr-24	11.9	557	362	919	81.9
May-24	11.0	1,370	102	1,480	139
Jun-24	9.64	1,360	77.0	1,440	129
Jul-24	8.84	1,210	170	1,380	135
Aug-24	9.25	1,380	69.8	1,450	126
Sep-24	9.32	1,230	95.9	1,320	128
Oct-24	9.14	1,500	76.1	1,580	166
Nov-24	10.4	1,170	247	1,420	137
Dec-24	13.0	1,420	108	1,530	145
Jan-25	10.3	1,050	408	1,460	119
Feb-25	16.2	1,220	416	1,630	181
Mar-25	11.8	1,000	255	1,260	119
Apr-25	10.5	1,370	247	1,620	155

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
May-25	9.8	1,280	216	1,490	154
Jun-25	9.65	1,250	452	1,710	177
Jul-25	9.27	1,210	223	1,430	160
Aug-25	9.23	1,120	247	1,370	114
Sep-25	9.13	1,110	312	1,420	173
Dry Season Average	**9.34**	**1,300**	**102**	**1,400**	**133**
Wet Season Average	**11.6**	**1,210**	**173**	**1,380**	**129**
Annual Average	**10.6**	**1,250**	**143**	**1,390**	**131**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

21 Sewerage Agency of Southern Marin (SASM)

SASM discharges to the Central Bay. The plant has approximately 14,800 service connections and it has a permitted capacity of 3.6 mgd ADWF. This past dry season average discharge flow was approximately 1.84 mgd. The existing plant performs nitrification using trickling filters.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge
  - Significant plant improvements in 2018/2019 included new vertical flow trickling filter media to provide ammonia load reduction resulted in ammonia bleed through; in 2022 the trickling filter media was replaced again with cross-flow media. 2024/2025 data showed the lowest average monthly ammonia load since the improvements were implemented in 2018/2019.
  - TIN concentrations range from approximately 10 to 35 mg N/L in 2024/2025. NOx once more represents the majority of nitrogen species, following the brief period of increased ammonia bleed through that began in 2018/2019 as previously stated.
  - Total phosphorus concentrations range from 1.1 to 11 mg P/L (<7 mg P/L since November 2018).
- Recycled Water
  - Based on Table 8-3, the plant averaged 0.01 mgd of recycled water over the 2024 calendar year. The primary recycled water use is landscape irrigation.
  - Based on Table 8-4 through Table 8-6, in 2024 the plant averaged the diversion of <1 kg ammonia-N/d, 1 kg TIN-N/d, and <1 kg P/d from the Bay through recycled water.

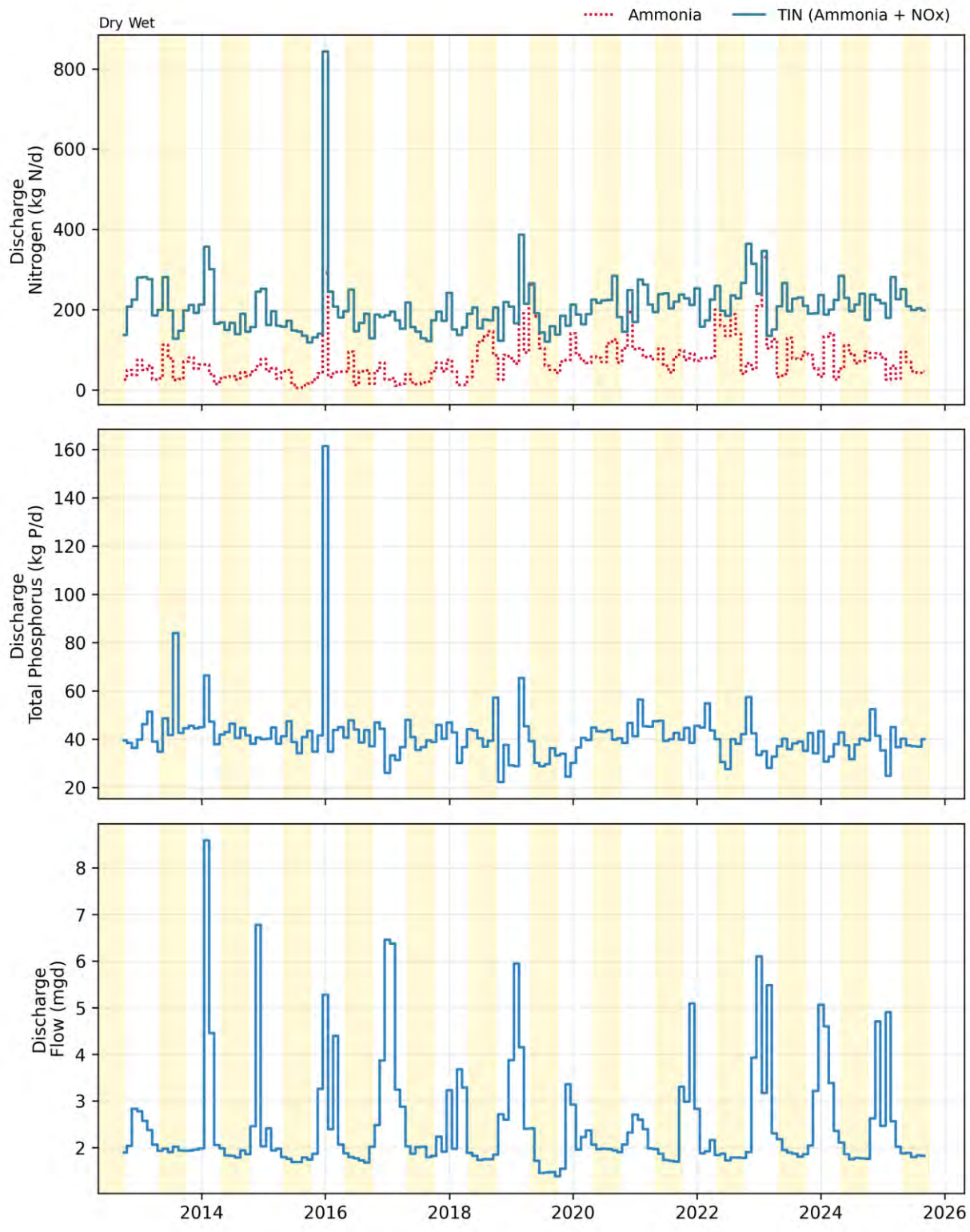


Figure 21-1. Discharge: SASM Monthly Flows and Loads

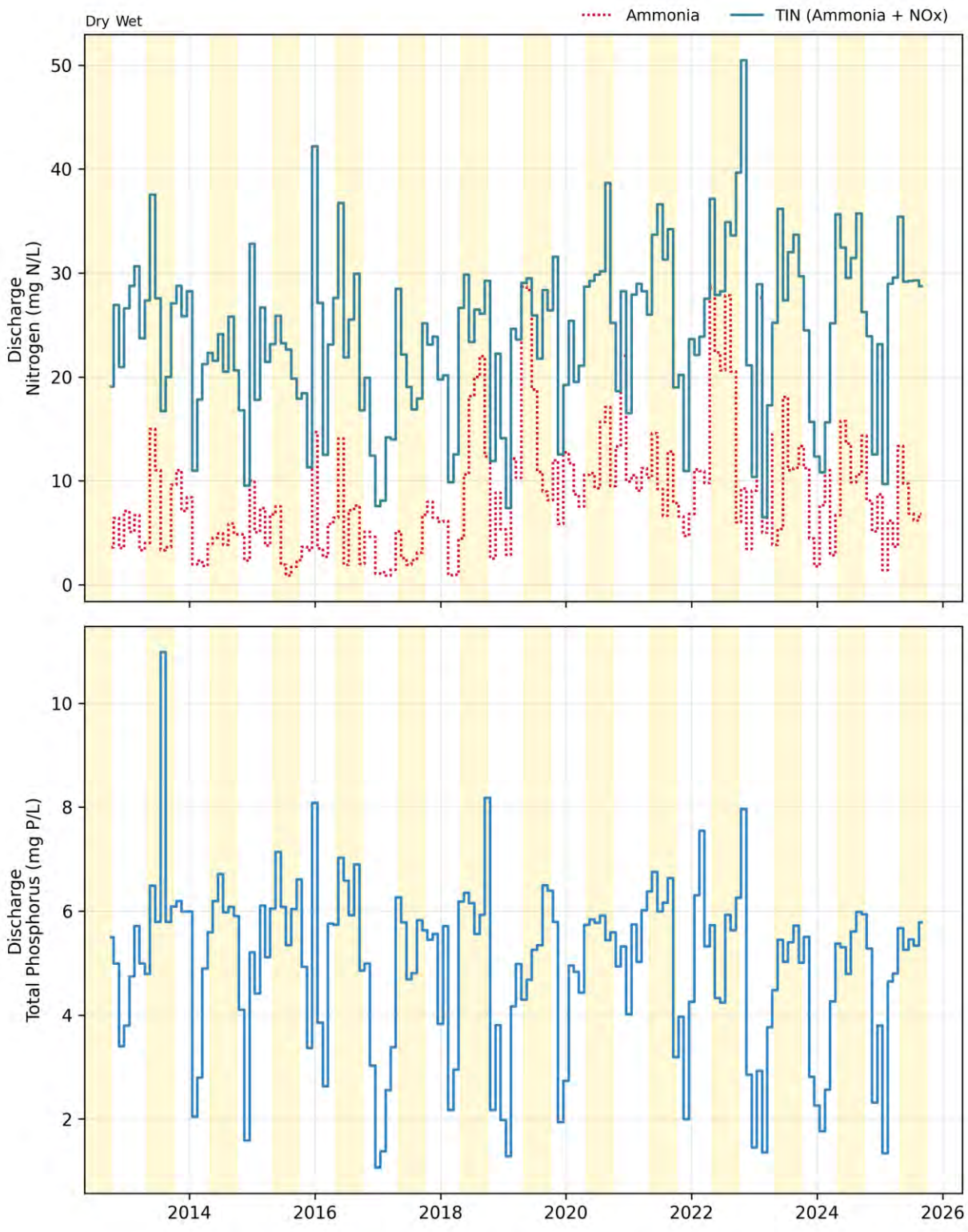


Figure 21-2. Discharge: SASM Monthly Concentrations

Table 21-1. Discharge: SASM Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	1.90	25.8	111	137	39.4
Nov-12	2.04	49.3	158	208	38.5
Dec-12	2.83	37.5	187	224	36.4
Jan-13	2.78	74.6	205	280	39.9
Feb-13	2.58	49.5	231	280	46.3
Mar-13	2.38	60.0	216	276	51.4
Apr-13	2.06	25.7	159	185	39.0
May-13	1.93	29.1	170	199	34.9
Jun-13	1.98	112	169	281	48.6
Jul-13	1.90	79.0	119	198	41.7
Aug-13	2.02	25.2	102	128	84.0
Sep-13	1.94	26.4	120	147	42.5
Oct-13	1.93	70.0	128	198	44.5
Nov-13	1.94	80.7	130	211	45.5
Dec-13	1.96	52.6	139	192	44.5
Jan-14	1.99	63.0	149	212	45.0
Feb-14	8.59	63.1	294	357	66.3
Mar-14	4.46	38.8	262	301	47.2
Apr-14	2.05	13.9	151	165	38.0
May-14	1.98	29.2	138	167	42.0
Jun-14	1.83	31.1	118	149	42.9
Jul-14	1.82	34.0	132	166	46.3
Aug-14	1.79	26.0	113	139	40.5
Sep-14	1.94	43.0	146	189	44.6
Oct-14	1.86	34.0	111	145	41.6
Nov-14	2.46	45.0	111	156	38.1
Dec-14	6.78	59.0	185	244	40.8
Jan-15	2.03	77.0	175	252	40.0
Feb-15	2.41	46.0	116	162	40.2
Mar-15	1.94	54.0	142	196	44.8
Apr-15	1.97	28.0	132	160	38.2
May-15	1.80	46.0	112	158	41.2
Jun-15	1.76	50.0	122	172	47.5
Jul-15	1.69	12.3	136	149	38.8
Aug-15	1.69	5.50	139	145	34.1
Sep-15	1.79	11.6	123	134	40.9
Oct-15	1.74	15.4	102	118	43.5
Nov-15	1.87	25.8	104	130	34.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	3.26	40.8	98.6	139	41.5
Jan-16	5.28	294	549	843	161
Feb-16	2.39	31.5	214	245	34.9
Mar-16	4.40	44.5	163	208	43.8
Apr-16	2.06	45.7	135	181	45.0
May-16	1.88	45.8	150	196	40.8
Jun-16	1.80	95.5	154	250	47.7
Jul-16	1.76	12.7	133	146	44.0
Aug-16	1.73	46.6	120	167	38.6
Sep-16	1.68	48.3	142	190	43.8
Oct-16	2.02	15.1	113	128	37.1
Nov-16	2.49	47.7	140	187	47.0
Dec-16	3.86	67.3	114	182	44.4
Jan-17	6.46	25.7	159	185	26.1
Feb-17	6.38	28.5	166	195	33.3
Mar-17	3.24	10.7	163	174	31.3
Apr-17	2.88	15.4	137	152	36.8
May-17	2.02	39.1	179	218	48.0
Jun-17	1.87	18.0	139	157	40.9
Jul-17	2.01	14.4	130	145	35.6
Aug-17	2.02	18.0	111	129	36.7
Sep-17	1.79	20.9	101	122	39.6
Oct-17	1.82	46.2	127	174	38.9
Nov-17	2.23	67.0	128	195	46.0
Dec-17	1.91	46.5	126	172	40.2
Jan-18	3.23	74.0	168	242	46.9
Feb-18	1.98	45.7	105	151	42.7
Mar-18	3.68	12.5	125	137	30.2
Apr-18	3.29	12.0	144	156	36.7
May-18	1.88	31.5	158	190	44.1
Jun-18	1.82	72.9	132	205	43.7
Jul-18	1.74	119	34.3	206	40.4
Aug-18	1.75	133	42.9	210	36.8
Sep-18	1.75	146	27.1	203	39.3
Oct-18	1.85	86.3	119	237	57.3
Nov-18	2.71	25.6	96.6	122	22.3
Dec-18	2.60	87.2	132	219	37.5
Jan-19	3.88	78.2	129	207	29.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	5.95	64.9	101	166	28.8
Mar-19	4.15	191	196	387	65.4
Apr-19	2.40	93.6	121	252	45.3
May-19	2.41	262	3.29	269	39.2
Jun-19	1.71	184	7.27	165	30.3
Jul-19	1.45	103	39.2	159	28.9
Aug-19	1.46	60.1	60.4	148	29.6
Sep-19	1.47	49.9	108	195	36.3
Oct-19	1.38	42.4	95.4	164	33.4
Nov-19	1.55	70.0	115	209	34.0
Dec-19	3.35	74.3	84.8	170	24.6
Jan-20	2.92	140	71.9	187	30.2
Feb-20	1.96	86.5	101	234	36.6
Mar-20	2.22	72.9	91.0	196	40.6
Apr-20	2.37	67.2	121	211	39.7
May-20	2.07	82.7	142	268	44.9
Jun-20	1.96	79.5	137	217	43.4
Jul-20	1.97	69.4	153	248	43.1
Aug-20	1.96	116	108	245	43.9
Sep-20	1.94	125	158	286	39.9
Oct-20	1.91	68.4	113	205	40.3
Nov-20	2.06	104	41.4	172	38.5
Dec-20	2.32	193	54.8	230	46.8
Jan-21	2.71	102	67.4	193	41.2
Feb-21	2.60	104	171	315	56.5
Mar-21	2.39	81.9	180	274	45.4
Apr-21	1.98	84.0	128	233	45.2
May-21	1.97	76.6	117	212	47.5
Jun-21	1.87	103	135	235	47.7
Jul-21	1.73	60.3	180	232	39.3
Aug-21	1.72	43.2	160	204	40.1
Sep-21	1.70	82.1	138	223	42.6
Oct-21	3.30	98.0	139	215	39.8
Nov-21	2.98	74.0	154	223	44.7
Dec-21	5.09	90.4	121	211	38.4
Jan-22	2.83	72.8	180	255	45.5
Feb-22	1.88	78.8	78.3	178	44.8
Mar-22	1.92	79.5	94.0	188	54.8

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	2.16	79.9	145	225	43.6
May-22	1.84	200	59.2	262	40.0
Jun-22	1.87	158	39.1	221	30.6
Jul-22	1.72	135	49.6	220	27.6
Aug-22	1.79	188	47.7	261	40.1
Sep-22	1.79	139	88.6	266	38.2
Oct-22	1.78	40.3	227	263	42.1
Nov-22	1.91	66.7	297	364	57.4
Dec-22	3.93	51.2	263	338	42.4
Jan-23	6.10	209	30.4	243	33.5
Feb-23	3.17	330	16.3	264	35.1
Mar-23	5.48	104	30.3	134	28.1
Apr-23	2.30	126	24.6	222	32.9
May-23	2.18	31.7	176	208	37.0
Jun-23	1.95	39.4	227	266	40.1
Jul-23	1.89	129	66.7	247	36.0
Aug-23	1.87	77.9	149	226	38.2
Sep-23	1.80	76.6	153	230	39.0
Oct-23	1.86	93.7	115	237	35.2
Nov-23	2.05	86.7	103	250	42.6
Dec-23	3.22	53.9	137	191	34.2
Jan-24	5.07	33.3	203	236	43.3
Feb-24	4.62	133	55.2	188	30.7
Mar-24	3.39	141	59.1	200	32.9
Apr-24	2.36	25.3	199	224	38.0
May-24	2.10	53.0	231	284	42.8
Jun-24	1.86	111	118	229	37.4
Jul-24	1.75	89.8	106	195	31.7
Aug-24	1.78	66.2	146	219	37.8
Sep-24	1.77	71.2	168	239	40.1
Oct-24	1.76	95.5	79.0	191	39.5
Nov-24	2.62	80.2	157	280	52.5
Dec-24	4.71	90.8	133	221	41.3
Jan-25	2.47	81.0	135	216	35.5
Feb-25	4.91	26.0	154	179	24.8
Mar-25	2.57	59.6	222	281	45.1
Apr-25	2.02	27.9	198	226	36.7
May-25	1.87	94.3	156	251	40.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	1.88	69.3	139	208	37.4
Jul-25	1.80	46.4	152	199	37.1
Aug-25	1.83	42.5	160	203	36.9
Sep-25	1.83	46.8	152	198	40.0
Dry Season Average	**1.84**	**73.6**	**122**	**203**	**40.5**
Wet Season Average	**2.96**	**71.5**	**141**	**218**	**41.8**
Annual Average	**2.49**	**72.4**	**133**	**212**	**41.3**

Table 21-2. Recycled Water: SASM Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	28 (0.02)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	29 (0.02)
2020	0 (0)	17 (0.02)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	18 (0.02)
2021	0 (0)	14 (0.01)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	15 (0.01)
2022	0 (0)	21 (0.02)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	23 (0.01)
2023	0 (0)	14 (0.01)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	15 (0.01)
2024	0 (0)	10 (0.01)	0 (0)	0 (0)	0 (0)	0 (0)	1 (<0.01)	10 (0.01)
Average	**0 (0)**	**18 (0.02)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**1 (<0.01)**	**18 (0.02)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 21-3. Recycled Water: SASM Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	1	0	0	0	0	<1	1
2020	0	1	0	0	0	0	<1	1
2021	0	<1	0	0	0	0	<1	<1
2022	0	1	0	0	0	0	<1	1
2023	0	<1	0	0	0	0	<1	<1
2024	0	<1	0	0	0	0	<1	<1
Average	**0**	**1**	**0**	**0**	**0**	**0**	**<1**	**1**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 21-4. Recycled Water: SASM Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	2	0	0	0	0	<1	2
2020	0	2	0	0	0	0	<1	2
2021	0	1	0	0	0	0	<1	1
2022	0	2	0	0	0	0	<1	2
2023	0	1	0	0	0	0	<1	1
2024	0	1	0	0	0	0	<1	1
Average	**0**	**1**	**0**	**0**	**0**	**0**	**<1**	**2**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 21-5. Recycled Water: SASM Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	0	0	0	<1	<1
2020	0	<1	0	0	0	0	<1	<1
2021	0	<1	0	0	0	0	<1	<1
2022	0	<1	0	0	0	0	<1	<1
2023	0	<1	0	0	0	0	<1	<1
2024	0	<1	0	0	0	0	<1	<1
Average	**0**	**<1**	**0**	**0**	**0**	**0**	**<1**	**<1**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

22 San Francisco International Airport – MLTP (SFO)

SFO discharges to the South Bay. The plant has a permitted capacity of 3.8 mgd during wet weather and 2.4 during dry weather. The average dry season flow this past year was approximately 0.90 mgd. The process includes two separate treatment processes. Domestic water from the airport facilities is collected through the sanitary sewer collection system and treated with a sequential batch reactor (SBR). Industrial wastewater and storm run-off is treated in the industrial plant, which includes dissolve air flotation tanks and biological aerated filters. SFO is in the process of constructing a nutrient removal technology that will be online over the next few years.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge
  - Dry season ammonia load increased in 2025 compared to 2024, though it remains below historical averages.
  - Historically, phosphorus loads have increased with flow during wet weather events, though in the last several years load distribution has been similar between wet and dry seasons.
  - Total phosphorus concentrations range from <1 to 26.9 mg P/L. This wide range is attributed to a combination of highly variable industrial waste and recent construction.
- Recycled Water
  - Based on Table 1-2, no water was recycled in the 2025 calendar year. Historically, recycled water has been used for landscape irrigation.

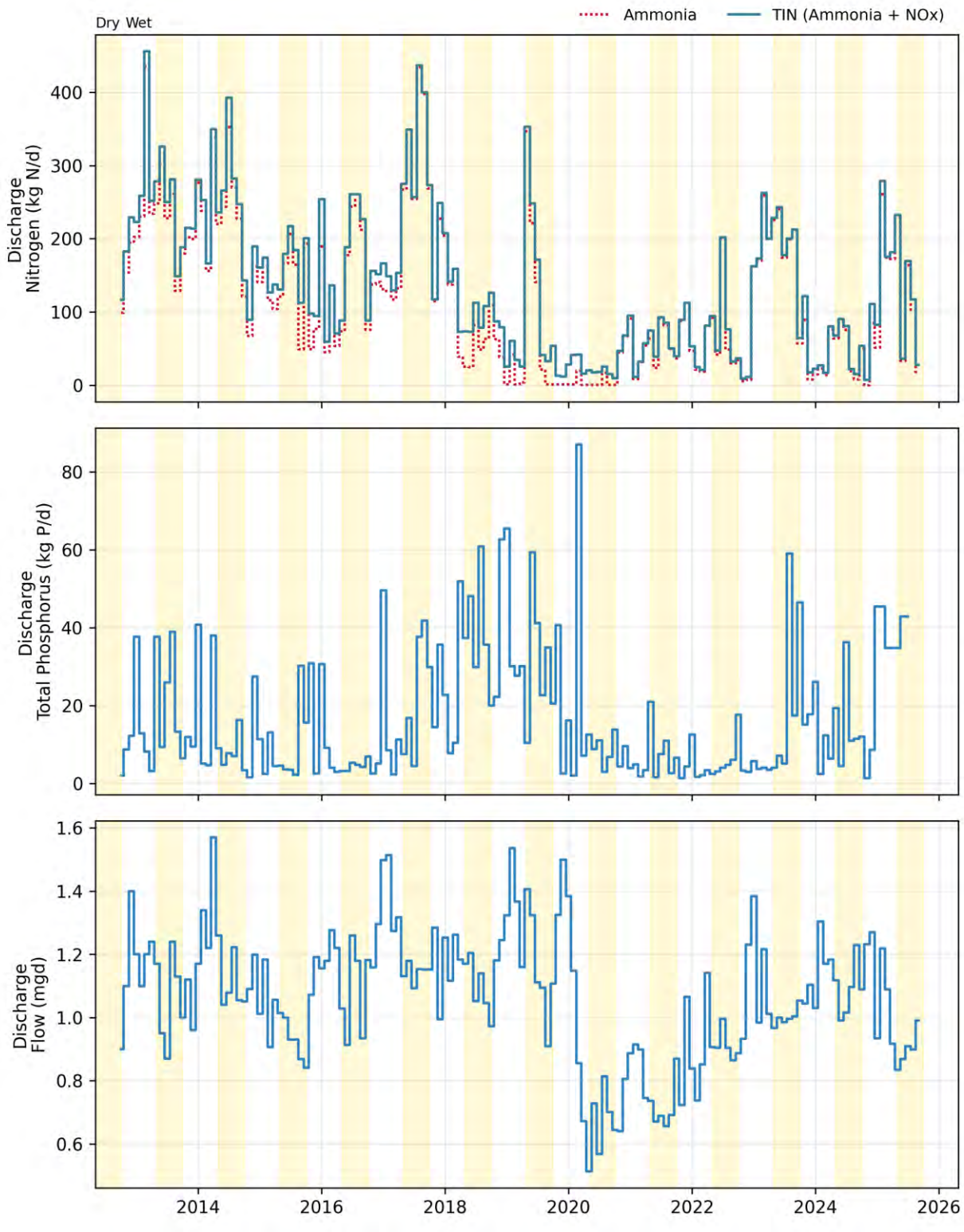


Figure 22-1. Discharge: SFO Airport Monthly Flows and Loads

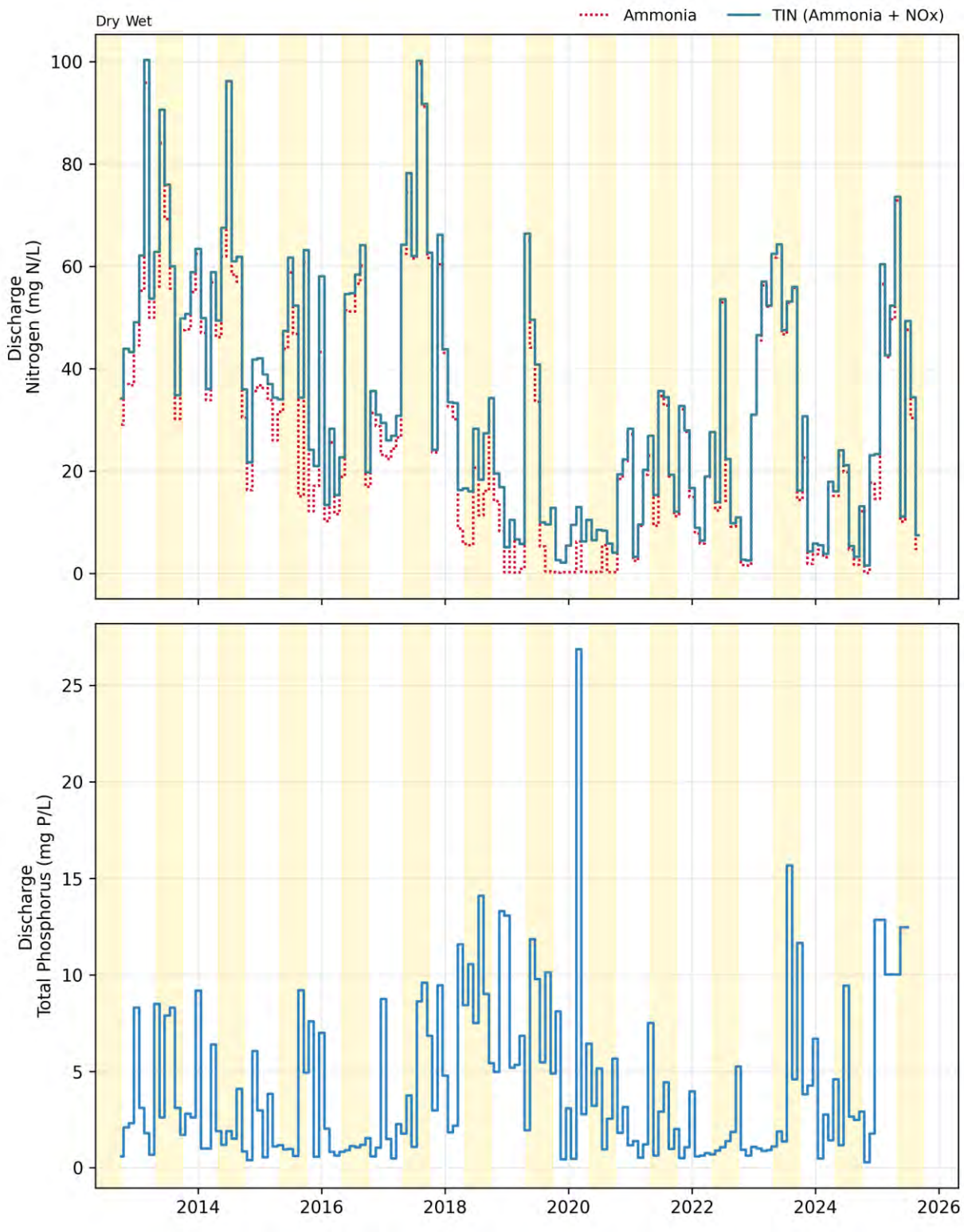


Figure 22-2. Discharge: SFO Airport Monthly Concentrations

Table 22-1. Discharge: SFO Airport Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.900	99.0	17.3	116	2.01
Nov-12	1.10	154	28.7	183	8.73
Dec-12	1.40	195	34.3	229	12.2
Jan-13	1.20	202	20.4	223	37.6
Feb-13	1.10	230	28.6	259	12.9
Mar-13	1.20	435	20.2	456	8.16
Apr-13	1.24	234	17.5	252	3.19
May-13	1.17	248	30.1	278	37.6
Jun-13	0.950	302	23.4	326	9.34
Jul-13	0.870	228	22.0	250	26.0
Aug-13	1.24	261	20.2	281	38.9
Sep-13	1.13	129	19.9	149	13.2
Oct-13	1.00	180	8.32	188	6.43
Nov-13	1.12	202	12.9	215	11.9
Dec-13	0.960	200	14.3	214	9.43
Jan-14	1.17	276	4.16	281	40.7
Feb-14	1.34	238	14.7	253	5.07
Mar-14	1.22	156	9.78	166	4.61
Apr-14	1.57	338	11.9	350	38.0
May-14	1.26	220	15.5	236	9.05
Jun-14	1.04	244	22.0	266	4.72
Jul-14	1.08	352	40.3	393	7.74
Aug-14	1.22	270	12.1	282	6.96
Sep-14	1.06	228	19.3	247	16.3
Oct-14	1.05	121	21.9	143	3.40
Nov-14	1.09	67.0	22.3	89.3	1.60
Dec-14	1.20	162	28.0	190	27.4
Jan-15	1.01	141	20.1	161	11.4
Feb-15	1.18	162	12.0	174	2.40
Mar-15	0.906	116	10.8	127	13.1
Apr-15	1.06	104	33.2	137	4.40
May-15	1.01	121	9.52	131	4.50
Jun-15	1.00	166	13.2	179	3.60
Jul-15	0.930	207	10.5	217	3.45
Aug-15	0.930	165	19.6	184	2.17
Sep-15	0.868	49.3	63.4	113	30.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	0.841	194	7.19	201	15.7
Nov-15	1.07	49.1	48.7	97.9	30.8
Dec-15	1.19	77.0	17.5	94.5	2.51
Jan-16	1.16	189	64.7	254	30.6
Feb-16	1.18	45.4	14.0	59.4	9.08
Mar-16	1.28	124	12.8	136	4.00
Apr-16	1.22	53.4	17.1	70.5	2.96
May-16	1.03	73.2	15.0	88.2	3.19
Jun-16	0.913	178	11.0	189	3.14
Jul-16	1.26	244	17.2	261	5.34
Aug-16	1.18	253	7.79	261	4.72
Sep-16	0.934	212	14.5	227	4.22
Oct-16	1.18	75.7	12.7	88.4	6.88
Nov-16	1.16	137	18.7	156	2.57
Dec-16	1.30	141	11.1	152	5.09
Jan-17	1.50	131	35.5	166	49.6
Feb-17	1.51	128	20.7	149	8.49
Mar-17	1.27	117	12.1	129	2.31
Apr-17	1.32	132	20.8	153	11.2
May-17	1.13	267	7.76	275	7.57
Jun-17	1.18	332	17.0	349	16.8
Jul-17	1.09	255	1.99	257	4.47
Aug-17	1.15	434	2.30	437	37.6
Sep-17	1.15	397	2.26	400	41.8
Oct-17	1.15	268	4.41	273	29.8
Nov-17	1.28	115	2.37	117	14.4
Dec-17	0.995	227	21.6	249	35.6
Jan-18	1.25	204	3.47	208	22.7
Feb-18	1.12	137	3.82	141	7.72
Mar-18	1.26	144	14.9	159	10.4
Apr-18	1.18	39.2	33.7	72.9	51.9
May-18	1.17	25.2	48.3	73.6	37.3
Jun-18	1.20	24.8	48.1	72.9	48.1
Jul-18	1.05	82.2	30.4	113	29.9
Aug-18	1.14	48.8	29.9	78.8	60.9
Sep-18	1.05	63.6	44.5	108	35.6
Oct-18	0.972	109	17.0	126	19.9

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	1.18	62.7	24.4	87.1	22.2
Dec-18	1.25	38.7	40.7	79.4	62.7
Jan-19	1.32	1.13	24.1	25.2	65.4
Feb-19	1.54	42.0	18.7	60.7	30.1
Mar-19	1.37	0.866	33.6	34.4	27.6
Apr-19	1.16	3.83	21.3	25.1	30.0
May-19	1.41	346	6.74	353	10.4
Jun-19	1.32	221	27.1	248	59.3
Jul-19	1.11	141	30.7	172	41.2
Aug-19	1.09	21.6	19.6	41.2	22.6
Sep-19	0.910	1.18	31.5	32.7	34.9
Oct-19	1.11	0.842	52.6	53.5	20.5
Nov-19	1.33	0.878	12.1	13.0	40.6
Dec-19	1.50	1.28	10.7	12.0	2.50
Jan-20	1.38	1.15	27.0	28.2	16.1
Feb-20	1.15	0.946	40.2	41.2	2.03
Mar-20	0.855	20.0	21.8	41.8	87.1
Apr-20	0.672	0.674	15.2	15.8	7.07
May-20	0.514	0.431	19.8	20.3	12.5
Jun-20	0.728	0.553	17.1	17.7	8.84
Jul-20	0.568	0.568	17.6	18.2	11.1
Aug-20	0.813	17.0	8.61	25.6	2.95
Sep-20	0.701	0.674	14.8	15.5	6.74
Oct-20	0.645	0.530	9.27	9.80	13.8
Nov-20	0.641	44.8	2.08	46.8	4.37
Dec-20	0.806	66.9	0.956	67.9	9.56
Jan-21	0.887	91.1	3.73	94.9	3.90
Feb-21	0.915	8.22	2.81	11.0	4.81
Mar-21	0.899	31.7	0.625	32.4	1.80
Apr-21	0.745	54.3	2.64	57.0	3.41
May-21	0.736	63.9	10.9	74.8	20.9
Jun-21	0.671	23.5	15.2	38.8	1.60
Jul-21	0.688	90.2	2.51	92.7	7.57
Aug-21	0.655	81.4	3.97	85.4	11.0
Sep-21	0.692	49.6	0.785	50.4	2.58
Oct-21	0.870	36.8	2.86	39.6	6.60
Nov-21	0.722	87.7	1.68	89.3	1.34

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	1.07	112	0.894	112	4.29
Jan-22	0.838	47.1	5.81	52.9	12.6
Feb-22	0.737	21.7	3.01	24.7	1.65
Mar-22	0.852	18.7	1.93	20.7	2.07
Apr-22	1.14	81.1	0.483	81.6	3.32
May-22	0.906	92.4	2.12	94.6	2.37
Jun-22	0.904	42.1	5.49	47.6	3.05
Jul-22	0.996	199	2.63	202	3.97
Aug-22	0.905	48.3	28.0	76.3	4.72
Sep-22	0.864	29.9	2.08	32.0	6.06
Oct-22	0.887	34.5	2.10	36.6	17.6
Nov-22	0.933	5.62	3.67	9.29	3.30
Dec-22	1.23	7.15	4.24	11.4	2.96
Jan-23	1.38	162	0.118	162	5.68
Feb-23	0.984	169	3.80	173	3.71
Mar-23	1.22	259	3.67	262	3.97
Apr-23	1.01	200	0.648	200	3.53
May-23	0.966	226	2.59	228	4.05
Jun-23	1.00	240	2.98	243	7.10
Jul-23	0.986	174	3.28	177	5.11
Aug-23	0.996	199	0.689	200	59.0
Sep-23	1.00	212	0.824	213	17.4
Oct-23	1.05	57.1	7.47	64.6	46.4
Nov-23	1.04	89.2	32.1	121	15.0
Dec-23	1.10	7.61	10.1	17.8	17.8
Jan-24	1.03	14.4	8.04	22.5	26.0
Feb-24	1.30	22.5	4.32	26.9	2.37
Mar-24	1.17	13.9	2.71	16.7	12.3
Apr-24	1.18	76.3	3.68	80.0	6.40
May-24	1.12	64.0	3.68	67.6	19.4
Jun-24	0.990	86.7	3.50	90.2	4.39
Jul-24	1.02	75.7	5.38	81.1	36.2
Aug-24	1.10	19.0	2.93	21.9	11.0
Sep-24	1.23	7.73	7.31	15.0	11.5
Oct-24	1.09	49.9	4.06	53.9	12.0
Nov-24	1.23	0.239	6.96	7.20	1.35
Dec-24	1.27	85.1	25.7	111	8.56

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	0.935	51.5	31.0	82.5	45.4
Feb-25	1.22	261	18.1	279	--
Mar-25	1.09	174	1.30	175	--
Apr-25	0.918	172	9.14	182	34.8
May-25	0.834	230	2.20	232	--
Jun-25	0.868	33.3	3.04	36.3	--
Jul-25	0.909	164	5.81	170	42.9
Aug-25	0.898	103	13.8	117	--
Sep-25	0.990	17.9	10.1	27.9	--
Dry Season Average	**0.992**	**145**	**15.0**	**160**	**17.2**
Wet Season Average	**1.11**	**106**	**15.1**	**121**	**15.7**
Annual Average	**1.06**	**122**	**15.0**	**137**	**16.3**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 22-2. Recycled Water: SFO Airport Yearly Recycled Water Volume Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	<1 (<0.01)	0 (0)	0 (0)	0 (0)	0 (0)	<1 (<0.01)	<1 (<0.01)
2020	0 (0)	<1 (<0.01)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	<1 (<0.01)
2021	0 (0)	<1 (<0.01)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	<1 (<0.01)
2022	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2023	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2024	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Average	**0 (0)**	**<1 (<0.01)**	**0 (0)**	**0 (0)**	**0 (0)**	**0 (0)**	**<1 (<0.01)**	**<1 (<0.01)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 22-3. Recycled Water: SFO Airport Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	0	0	0	<1	<1
2020	0	<1	0	0	0	0	0	<1
2021	0	<1	0	0	0	0	0	<1
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**0**	**<1**	**0**	**0**	**0**	**0**	**<1**	**<1**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 22-4. Recycled Water: SFO Airport Yearly Recycled Water TIN Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	0	0	0	<1	<1
2020	0	<1	0	0	0	0	0	<1
2021	0	<1	0	0	0	0	0	<1
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**0**	**<1**	**0**	**0**	**0**	**0**	**<1**	**<1**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 22-5. Recycled Water: SFO Airport Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	<1	0	0	0	0	<1	<1
2020	0	<1	0	0	0	0	0	<1
2021	0	<1	0	0	0	0	0	<1
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**0**	**<1**	**0**	**0**	**0**	**0**	**<1**	**<1**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

23 SFPUC Southeast Plant

SFPUC has a combined sewer/stormwater collection system, discharges to the South Bay, and serves approximately 450,000 service connections. The plant has a permitted ADWF capacity of 85.4 mgd and a peak wet weather capacity of 250 mgd (150 mgd secondary, 100 mgd primary). The average dry season (May 1 through September 30) flow this past year was approximately 44.6 mgd. The plant performs secondary treatment using a high purity oxygen system.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - Detailed analysis of reductions of flows and loads across the plant is not provided here because the individual NPDES permit has separate permit-designated monitoring locations for dry and wet weather effluent, and a single monitoring location for influent. No significant flow reduction is expected because there is no planned production of recycled water.
  - Nitrogen loads are not reduced beyond typical biological assimilation because SFPUC uses a high purity oxygen activated sludge process that is not designed for nitrogen removal. However, significant phosphorus removal is observed due to the anaerobic selector upstream of the activated sludge process.
- Discharge
  - Ammonia and TIN loads do not always increase with elevated flows typically associated with rain events during the wet season.
  - The majority of the nitrogen discharged consists of ammonia, regardless of season. This is expected because this plant does not nitrify.
  - Wet weather flows (monitoring locations EFF-001B and EFF-002) are excluded from the discharge analysis because they largely represent stormwater. Including these large stormwater flows would bias the discharge loads for SFPUC. This year, selected flows from EFF-002 were included due to dry weather bypasses through that monitoring location (primarily in August 2025).
  - Discharge flows decreased due to the COVID-19 pandemic and have not fully returned to pre-pandemic levels.
- Recycled Water: No recycled water was produced or distributed last year.

Influent

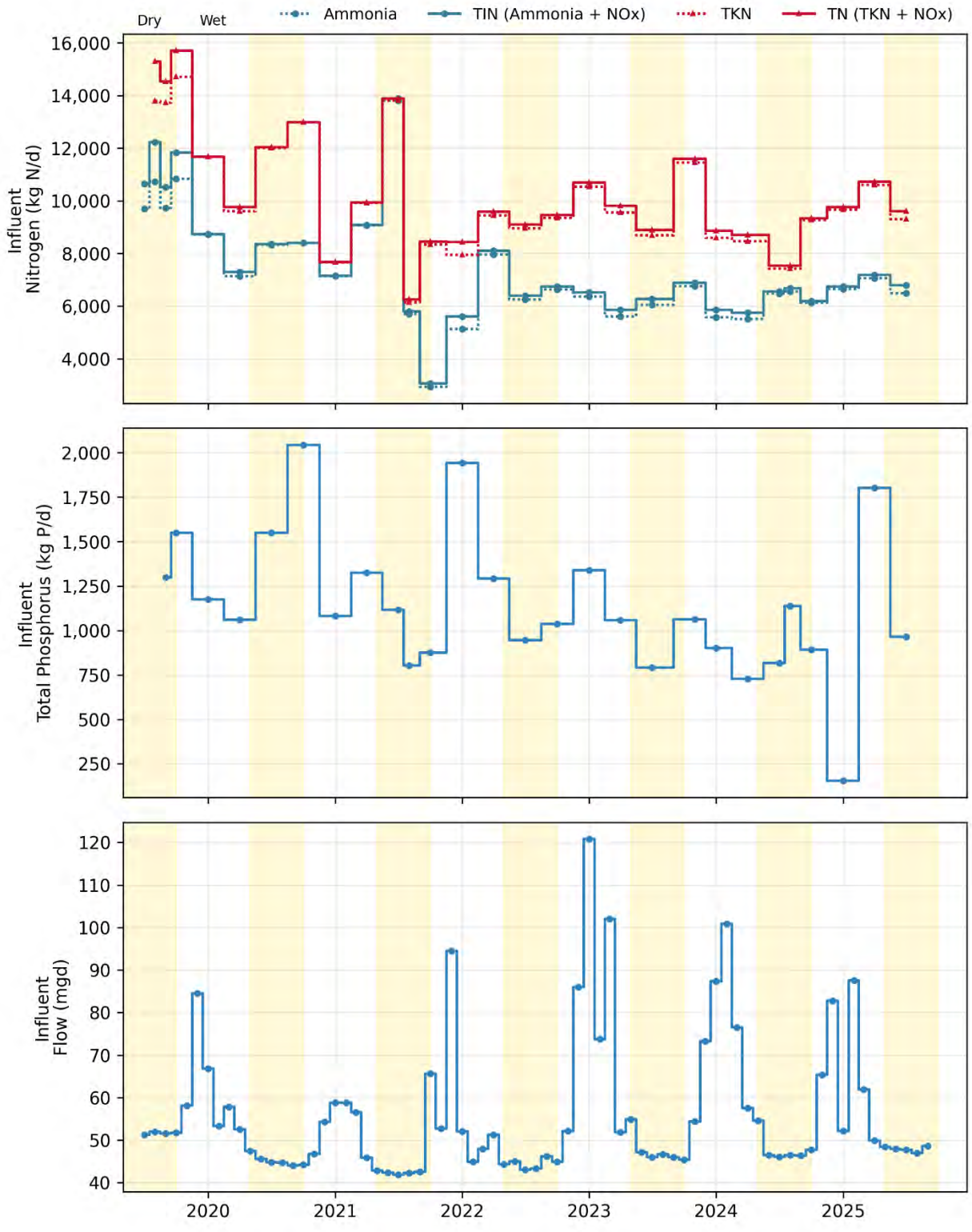


Figure 23-1. Influent: SFPUC Southeast Monthly Flows and Loads

Table 23-1. Influent: SFPUC Southeast Monthly Flows and Loads[1,*]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	51.3	9,700	940	10,600	--	--	--
Aug-19	51.9	10,700	1,500	12,200	13,800	15,300	--
Sep-19	51.6	9,730	797	10,500	13,700	14,500	1,300
Oct-19	51.8	10,800	986	11,800	14,700	15,700	1,550
Nov-19	58.1	--	--	--	--	--	--
Dec-19	84.5	--	--	--	--	--	--
Jan-20	66.8	8,720	8.74	8,730	11,700	11,700	1,170
Feb-20	53.3	--	--	--	--	--	--
Mar-20	57.9	--	--	--	--	--	--
Apr-20	52.6	7,130	158	7,290	9,600	9,750	1,060
May-20	47.5	--	--	--	--	--	--
Jun-20	45.6	--	--	--	--	--	--
Jul-20	44.8	8,330	28.0	8,350	12,000	12,000	1,550
Aug-20	44.8	--	--	--	--	--	--
Sep-20	44.0	--	--	--	--	--	--
Oct-20	44.2	8,400	7.66	8,400	13,000	13,000	2,040
Nov-20	46.8	--	--	--	--	--	--
Dec-20	54.3	--	--	--	--	--	--
Jan-21	58.8	7,140	8.10	7,150	7,670	7,670	1,080
Feb-21	58.8	--	--	--	--	--	--
Mar-21	56.6	--	--	--	--	--	--
Apr-21	46.0	9,060	15.7	9,080	9,920	9,940	1,330
May-21	42.9	--	--	--	--	--	--
Jun-21	42.4	--	--	--	--	--	--
Jul-21	41.8	13,800	75.8	13,900	13,800**	13,900**	1,120
Aug-21	42.3	5,700	101	5,800	6,150	6,250	804
Sep-21	42.6	--	--	--	--	--	--
Oct-21	65.7	2,940	114	3,060	8,330	8,450	874
Nov-21	52.8	--	--	--	--	--	--
Dec-21	94.5	--	--	--	--	--	--
Jan-22	52.1	5,120	477	5,600	7,950	8,430	1,940
Feb-22	45.0	--	--	--	--	--	--
Mar-22	48.0	--	--	--	--	--	--
Apr-22	51.3	7,950	146	8,100	9,450	9,590	1,290
May-22	44.4	--	--	--	--	--	--
Jun-22	45.1	--	--	--	--	--	--
Jul-22	43.1	6,250	134	6,390	8,960	9,090	947
Aug-22	43.3	--	--	--	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Sep-22	46.2	--	--	--	--	--	--
Oct-22	45.0	6,630	107	6,740	9,350	9,460	1,040
Nov-22	52.2	--	--	--	--	--	--
Dec-22	86.0	--	--	--	--	--	--
Jan-23	121	6,360	154	6,520	10,500	10,700	1,340
Feb-23	73.8	--	--	--	--	--	--
Mar-23	102	--	--	--	--	--	--
Apr-23	51.9	5,610	249	5,860	9,550	9,800	1,060
May-23	54.9	--	--	--	--	--	--
Jun-23	47.2	--	--	--	--	--	--
Jul-23	46.0	6,040	217	6,260	8,680	8,890	790
Aug-23	46.7	--	--	--	--	--	--
Sep-23	46.0	--	--	--	--	--	--
Oct-23	45.4	--	--	--	--	--	--
Nov-23	54.4	6,750	131	6,880	11,500	11,600	1,060
Dec-23	73.2	--	--	--	--	--	--
Jan-24	87.4	5,580	279	5,860	8,580	8,860	901
Feb-24	101	--	--	--	--	--	--
Mar-24	76.5	--	--	--	--	--	--
Apr-24	57.5	5,510	236	5,750	8,460	8,700	728
May-24	54.6	--	--	--	--	--	--
Jun-24	46.5	--	--	--	--	--	--
Jul-24	46.1	6,470	74.1	6,550	--	--	818
Aug-24	46.5	6,560	124	6,680	7,410	7,540	1,140
Sep-24	46.4	--	--	--	--	--	--
Oct-24	47.8	6,120	73.4	6,190	9,260	9,340	891
Nov-24	65.3	--	--	--	--	--	--
Dec-24	82.8	--	--	--	--	--	--
Jan-25	52.2	6,640	101	6,750	9,670	9,770	155
Feb-25	87.6	--	--	--	--	--	--
Mar-25	61.9	--	--	--	--	--	--
Apr-25	49.9	7,060	121	7,180	10,600	10,700	1,800
May-25	48.5	--	--	--	--	--	--
Jun-25	48	--	--	--	--	--	--
Jul-25	47.7	6,490	298	6,790	9,300	9,590	965
Aug-25	47	--	--	--	--	--	--
Sep-25	48.7	--	--	--	--	--	--
Dry Season Average	**46.6**	**8,160**	**390**	**8,550**	**10,400**	**10,800**	**1,050**
Wet Season Average	**63.7**	**6,860**	**187**	**7,050**	**9,990**	**10,200**	**1,180**

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN *	TKN	Total N *	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Average Annual	56.1	7,350	264	7,620	10,100	10,400	1,140

1 For non-detects after October 1, 2023, 1/2 of the method detection limit was used to quantify values. Prior to October 1, 2023, non-detect values used the provided method detection limit.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

** The Total Kjeldahl Nitrogen value for July 2021 has been assumed equal to the “Ammonia” value as the reported Total Kjeldahl Nitrogen value for July 2021 was less than the “Ammonia” value.

Discharge

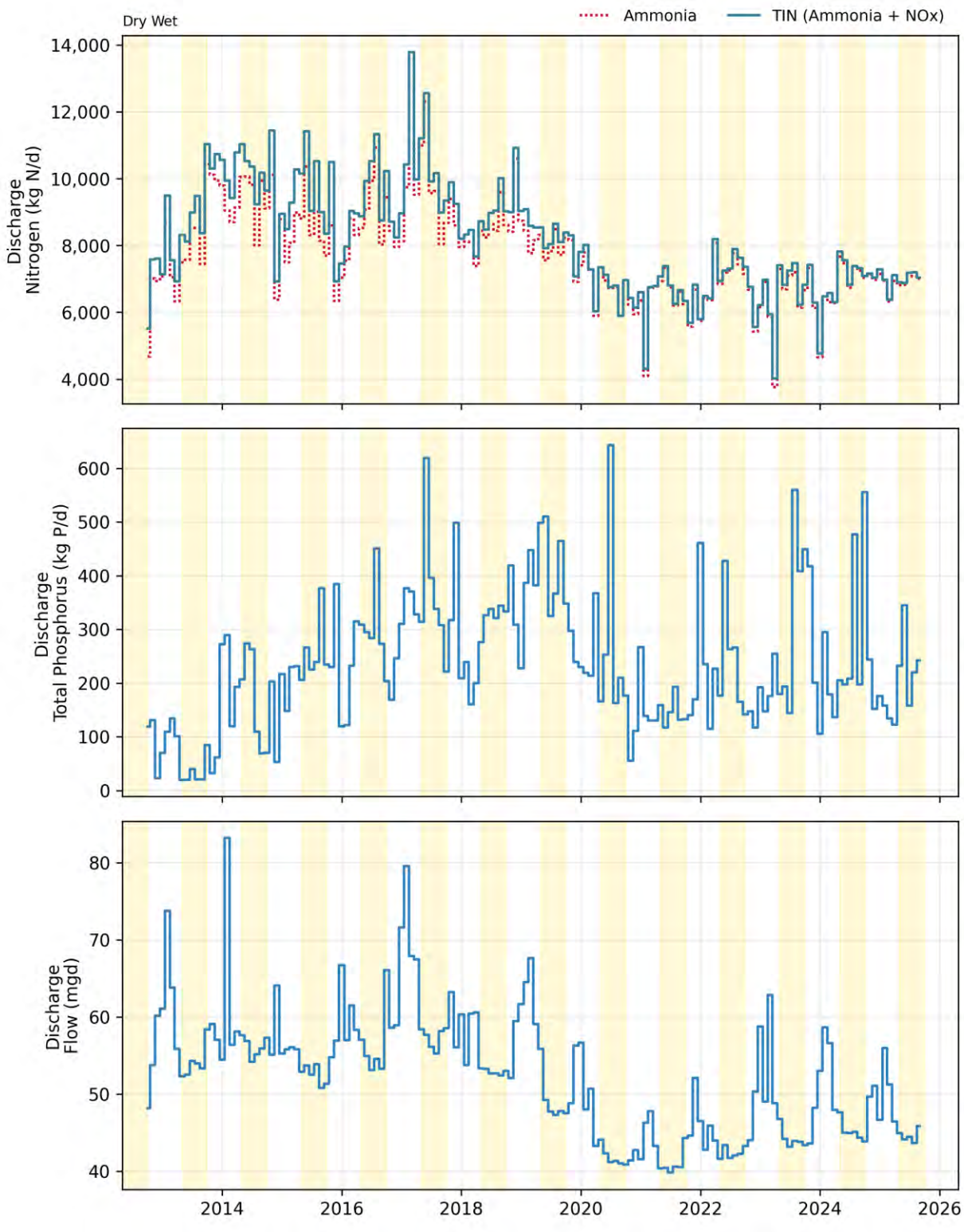


Figure 23-2. Discharge: SFPUC Southeast Monthly Flows and Loads

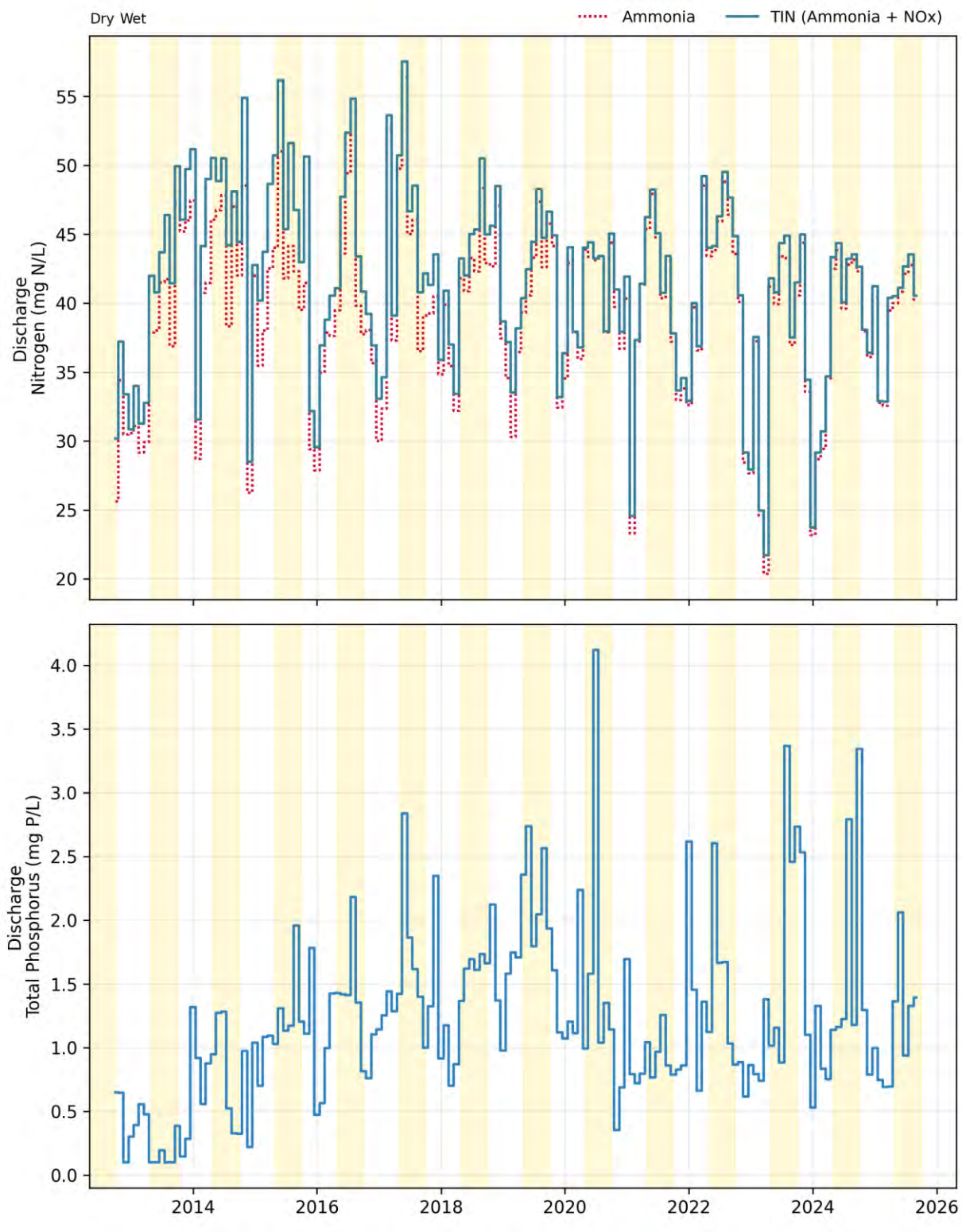


Figure 23-3. Discharge: SFPUC Southeast Monthly Concentrations

Table 23-2. Discharge: SFPUC Southeast Monthly Flows and Loads[1]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	48.2	4,670	832	5,510	118
Nov-12	53.8	7,010	570	7,580	131
Dec-12	60.2	6,940	663	7,600	22.7
Jan-13	61.1	7,070	65.0	7,130	69.9
Feb-13	73.8	8,680	810	9,490	110
Mar-13	63.8	7,050	506	7,560	134
Apr-13	55.9	6,330	600	6,930	100
May-13	52.3	7,500	813	8,310	19.8
Jun-13	52.6	7,560	550	8,110	19.9
Jul-13	54.3	8,530	451	8,980	39.9
Aug-13	54.0	8,530	956	9,480	20.4
Sep-13	53.4	7,450	920	8,370	20.2
Oct-13	58.4	10,400	600	11,000	84.9
Nov-13	59.1	10,100	194	10,300	32.2
Dec-13	57.1	9,930	804	10,700	61.1
Jan-14	54.5	9,780	769	10,600	272
Feb-14	83.2	9,040	895	9,940	289
Mar-14	56.4	8,700	726	9,420	119
Apr-14	58.2	9,130	1,650	10,800	192
May-14	57.7	10,100	973	11,000	207
Jun-14	56.9	10,100	452	10,500	274
Jul-14	54.2	9,810	549	10,400	263
Aug-14	55.2	8,010	1,230	9,240	109
Sep-14	55.9	9,940	235	10,200	69.0
Oct-14	57.3	9,110	528	9,640	70.0
Nov-14	55.1	10,100	1,330	11,400	203
Dec-14	64.1	6,370	544	6,920	53.0
Jan-15	55.3	8,780	168	8,950	217
Feb-15	55.8	7,490	997	8,490	148
Mar-15	56.1	8,070	1,210	9,280	230
Apr-15	55.8	8,980	1,300	10,300	231
May-15	52.9	8,810	1,340	10,200	206
Jun-15	53.7	10,400	1,050	11,400	266
Jul-15	52.6	8,310	714	9,030	226
Aug-15	53.9	9,000	1,520	10,500	239
Sep-15	50.8	8,140	856	8,990	377
Oct-15	51.4	7,690	668	8,360	234
Nov-15	54.8	8,600	1,900	10,500	230

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-15	56.9	6,340	591	6,930	384
Jan-16	66.7	7,040	425	7,460	120
Feb-16	57.0	7,540	427	7,970	122
Mar-16	61.5	8,810	217	9,030	232
Apr-16	58.3	8,310	643	8,950	315
May-16	57.1	8,530	344	8,870	309
Jun-16	55.0	9,070	856	9,930	295
Jul-16	53.1	9,930	591	10,500	284
Aug-16	54.6	10,900	388	11,300	450
Sep-16	53.3	8,030	723	8,750	273
Oct-16	66.1	9,440	777	10,200	204
Nov-16	58.6	8,440	263	8,710	169
Dec-16	58.9	7,950	287	8,240	246
Jan-17	71.6	8,130	828	8,960	310
Feb-17	79.6	9,740	686	10,400	377
Mar-17	67.9	13,500	236	13,800	370
Apr-17	67.5	9,520	458	9,980	328
May-17	58.4	11,000	213	11,200	314
Jun-17	57.7	12,300	253	12,600	619
Jul-17	56.1	9,570	349	9,920	396
Aug-17	55.3	9,630	524	10,200	338
Sep-17	58.2	8,040	938	8,980	308
Oct-17	58.6	8,670	680	9,350	221
Nov-17	63.3	9,390	495	9,890	317
Dec-17	56.1	8,600	641	9,240	498
Jan-18	60.4	7,960	239	8,200	209
Feb-18	53.8	8,120	211	8,330	239
Mar-18	60.4	8,110	359	8,470	160
Apr-18	60.6	7,380	284	7,660	200
May-18	53.3	8,430	291	8,730	276
Jun-18	53.3	8,240	235	8,470	327
Jul-18	52.7	8,630	346	8,980	338
Aug-18	52.7	8,440	607	9,040	321
Sep-18	52.4	9,590	423	10,000	344
Oct-18	53.0	8,610	419	9,030	333
Nov-18	52.1	8,420	579	9,000	419
Dec-18	59.5	10,600	317	10,900	308
Jan-19	61.7	8,740	290	9,030	228

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Feb-19	64.5	8,440	636	9,080	386
Mar-19	67.7	7,760	825	9,320	448
Apr-19	59.1	8,150	388	8,540	382
May-19	55.9	8,310	222	8,530	498
Jun-19	49.3	7,560	357	7,970	510
Jul-19	47.8	7,830	207	8,030	324
Aug-19	47.3	8,480	167	8,650	366
Sep-19	47.8	7,720	384	8,100	464
Oct-19	47.5	8,230	160	8,390	348
Nov-19	48.8	8,160	140	8,300	297
Dec-19	56.3	6,910	159	7,070	239
Jan-20	56.7	7,410	393	7,800	230
Feb-20	48.0	7,800	211	7,670	219
Mar-20	50.7	7,270	12.9	7,380	214
Apr-20	43.3	5,890	138	6,030	367
May-20	44.1	7,330	20.6	7,350	166
Jun-20	42.3	6,950	171	7,120	253
Jul-20	41.2	6,730	19.1	6,750	643
Aug-20	41.3	6,760	28.9	6,790	163
Sep-20	41.0	5,890	6.83	5,900	209
Oct-20	40.9	6,870	100	6,970	177
Nov-20	41.4	6,230	197	6,420	55.4
Dec-20	42.8	5,940	201	5,960	111
Jan-21	41.6	6,350	252	6,600	267
Feb-21	46.3	4,090	223	4,310	139
Mar-21	47.8	6,730	21.7	6,750	130
Apr-21	43.3	6,770	10.3	6,780	130
May-21	40.4	6,930	137	7,070	159
Jun-21	40.5	7,340	49.2	7,390	117
Jul-21	39.8	6,750	44.7	6,790	146
Aug-21	40.6	6,200	58.0	6,260	193
Sep-21	40.6	6,620	45.8	6,670	132
Oct-21	44.3	6,240	97.6	6,110	132
Nov-21	44.6	5,570	116	5,690	140
Dec-21	52.1	6,670	149	6,820	169
Jan-22	46.5	5,740	51.0	5,790	461
Feb-22	42.8	6,440	47.4	6,480	236
Mar-22	45.9	6,360	48.0	6,410	115

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Apr-22	44.0	8,080	117	8,190	226
May-22	41.6	6,840	90.1	6,930	177
Jun-22	43.4	7,200	49.0	7,250	428
Jul-22	41.7	7,250	57.5	7,310	263
Aug-22	42.1	7,770	117	7,890	266
Sep-22	42.3	7,430	198	7,620	165
Oct-22	43.3	7,140	209	7,350	142
Nov-22	44.0	6,680	81.5	6,760	148
Dec-22	50.4	5,420	140	5,560	117
Jan-23	58.8	6,150	57.8	6,210	192
Feb-23	49.1	6,920	55.9	6,970	147
Mar-23	62.9	5,860	84.8	5,940	176
Apr-23	48.8	3,760	252	4,020	255
May-23	46.8	7,300	104	7,400	180
Jun-23	44.2	6,690	140	6,830	193
Jul-23	43.2	7,100	155	7,250	144
Aug-23	43.9	7,200	268	7,460	560
Sep-23	43.9	6,140	90.7	6,230	408
Oct-23	43.4	6,660	155	6,820	449
Nov-23	43.6	7,320	99.2	7,420	418
Dec-23	48.2	6,130	159	6,290	200
Jan-24	53.0	4,650	111	4,770	106
Feb-24	58.7	6,370	107	6,480	294
Mar-24	56.6	6,300	273	6,580	179
Apr-24	48.0	6,280	26.4	6,300	137
May-24	47.7	7,670	148	7,820	205
Jun-24	45.0	7,470	86.9	7,560	198
Jul-24	45.0	6,740	76.8	6,820	208
Aug-24	45.2	7,310	73.8	7,390	477
Sep-24	44.4	7,250	65.9	7,320	198
Oct-24	43.9	7,030	51.2	7,080	555
Nov-24	49.7	7,140	24.1	7,160	244
Dec-24	51.1	6,980	61.1	7,040	152
Jan-25	46.7	7,150	133	7,280	176
Feb-25	56.0	6,940	28.3	6,970	158
Mar-25	51.2	6,310	62.1	6,370	134
Apr-25	46.5	6,940	167	7,100	122
May-25	45.0	6,810	87.6	6,900	232

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jun-25	44.2	6,830	44.4	6,870	345
Jul-25	44.5	7,090	93.6	7,180	158
Aug-25	43.7	7,070	130	7,200	220
Sep-25	45.9	6,990	44.2	7,040	242
Dry Season Average	**48.9**	**8,030**	**365**	**8,400**	**264**
Wet Season Average	**54.7**	**7,560**	**392**	**7,950**	**217**
Average Annual	**52.3**	**7,750**	**381**	**8,140**	**237**

1 For non-detects after October 1, 2023, 1/2 of the method detection limit was used to quantify values. Prior to October 1, 2023, non-detect values used the provided method detection limit.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

24 Sausalito-Marin City Sanitary District (SMCSD)

SMCSD discharges to the San Francisco Bay. The plant has approximately 6,500 service connections and permitted capacity of 1.8 mgd ADWF. The average dry season discharge flow this past year was approximately 0.96 mgd. The plant performs partial nitrification using a trickling filter.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge:
  - Nutrient loads do not appear to track with flows during wet weather events.
  - Historically, NOx has represented the majority of the nitrogen species discharged as expected since this plant nitrifies. Over the last couple years, the distribution between ammonia and NOx has been more evenly split.
  - Total phosphorus concentrations range from 0.8 to 6.5 mg P/L. This suggests occasional P removal as typical concentrations at treatment plants is approximately 4 to 6 mg P/L. The removal mechanism is most likely from metal salt addition at the headworks.
- Recycled Water: No recycled water was produced or distributed this past year. All treatment plant processes utilize reclaimed utility water.

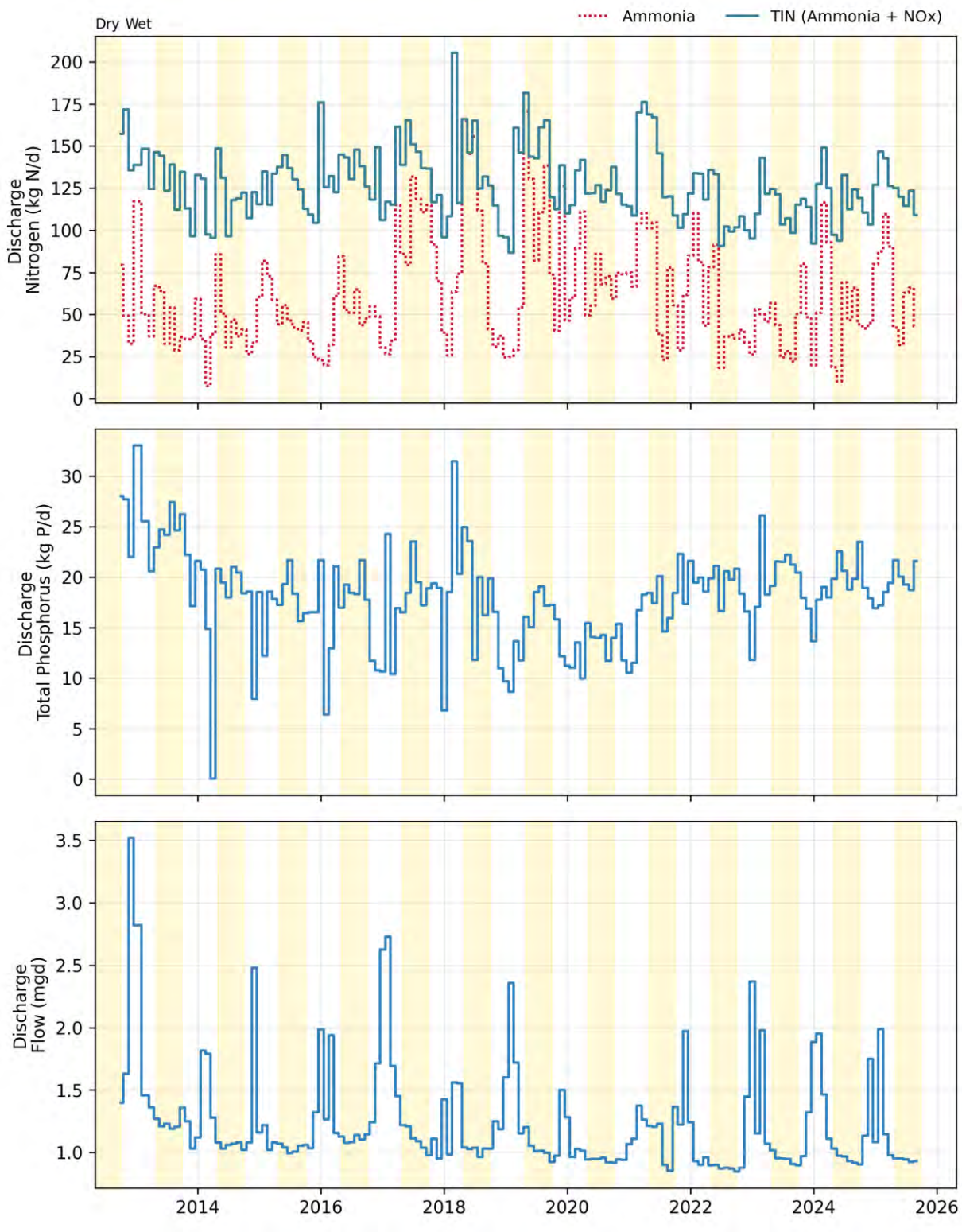


Figure 24-1. Discharge: SMCSD Monthly Flows and Loads

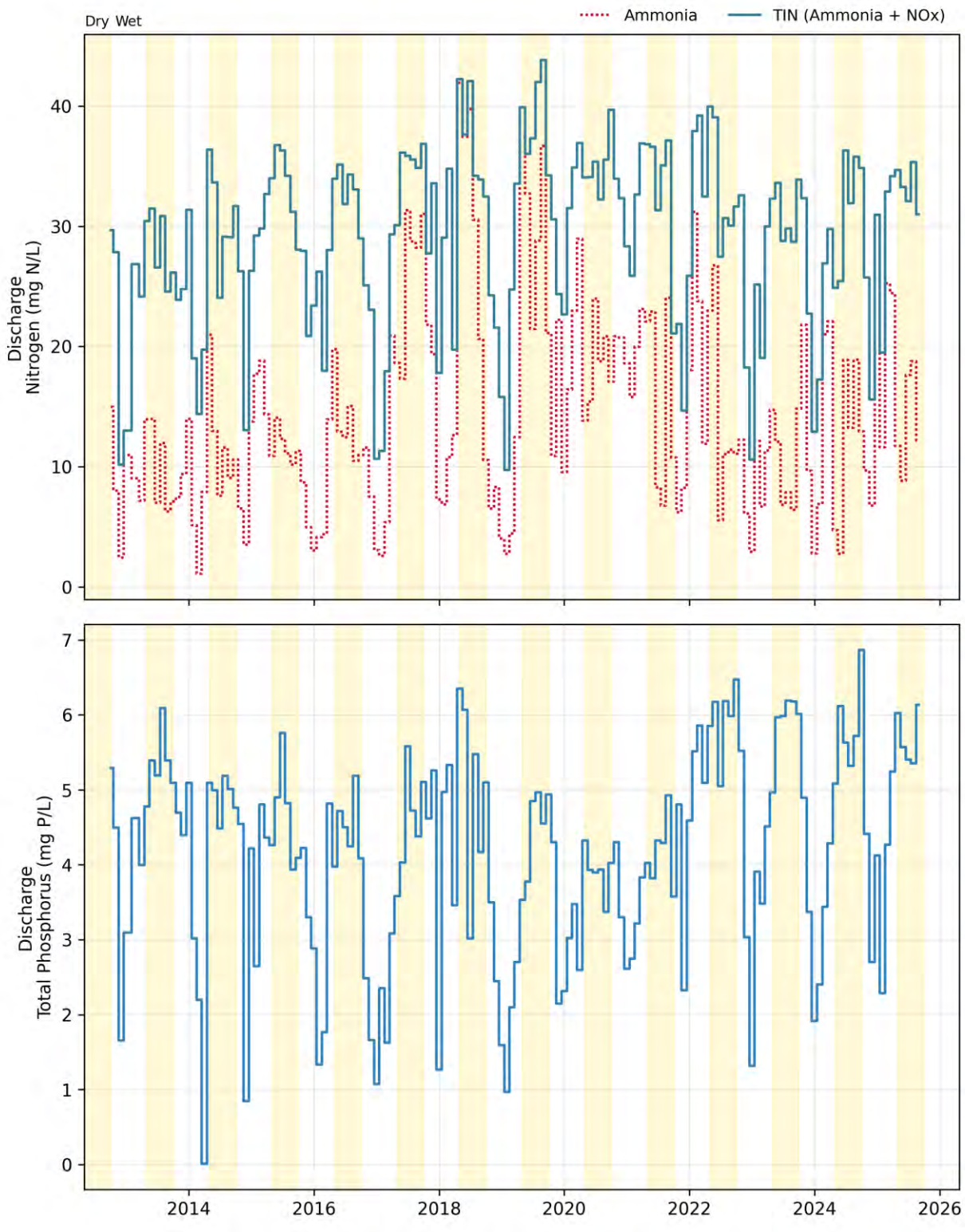


Figure 24-2. Discharge: SMCSD Monthly Concentrations

Table 24-1. Discharge: SMCSD Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	1.40	79.4	77.8	157	28.0
Nov-12	1.63	49.3	122	172	27.7
Dec-12	3.52	32.7	103	136	22.0
Jan-13	2.82	117	21.5	139	33.0
Feb-13	--	--	--	--	--
Mar-13	1.46	50.0	98.3	148	25.6
Apr-13	1.36	37.1	87.4	124	20.6
May-13	1.27	66.9	79.4	146	23.0
Jun-13	1.21	64.1	80.1	144	24.7
Jul-13	1.23	32.5	91.1	124	24.2
Aug-13	1.19	54.0	85.0	139	27.4
Sep-13	1.21	28.7	83.4	112	24.6
Oct-13	1.36	36.5	98.2	135	26.2
Nov-13	1.25	35.4	77.5	113	22.2
Dec-13	1.03	36.6	60.0	96.6	17.1
Jan-14	1.12	59.3	73.7	133	21.6
Feb-14	1.82	35.3	95.4	131	20.7
Mar-14	1.79	7.44	90.1	97.6	14.9
Apr-14	1.28	38.2	57.4	95.7	0.0484
May-14	1.08	85.7	62.9	149	20.8
Jun-14	1.03	50.6	80.6	131	19.5
Jul-14	1.06	30.5	66.0	96.5	18.0
Aug-14	1.07	47.0	71.0	118	21.0
Sep-14	1.08	37.1	81.9	119	20.5
Oct-14	1.02	40.9	81.4	122	18.4
Nov-14	1.08	26.6	80.8	107	18.6
Dec-14	2.48	33.1	89.4	123	7.94
Jan-15	1.16	60.5	55.0	115	18.5
Feb-15	1.22	81.8	53.1	135	12.2
Mar-15	1.02	72.6	42.5	115	18.6
Apr-15	1.08	58.6	75.0	134	17.8
May-15	1.07	44.2	93.5	138	17.3
Jun-15	1.04	55.5	89.2	145	19.3
Jul-15	0.996	46.5	90.4	137	21.7
Aug-15	1.01	42.2	87.9	130	18.4
Sep-15	1.05	40.5	83.7	124	15.7

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	1.06	45.5	67.3	113	16.4
Nov-15	1.03	34.0	75.3	109	16.5
Dec-15	1.32	24.8	79.7	105	16.5
Jan-16	1.99	22.7	153	176	21.7
Feb-16	1.27	19.9	106	126	6.40
Mar-16	1.94	32.1	100	132	13.0
Apr-16	1.16	60.9	61.6	123	21.1
May-16	1.13	84.4	60.5	145	17.0
Jun-16	1.08	52.7	90.7	143	19.2
Jul-16	1.08	51.1	79.4	131	18.5
Aug-16	1.14	64.8	83.1	148	18.3
Sep-16	1.10	43.7	94.3	138	21.7
Oct-16	1.15	47.6	78.4	126	17.8
Nov-16	1.24	54.6	63.5	118	11.7
Dec-16	1.71	48.9	101	150	10.8
Jan-17	2.63	30.5	75.5	106	10.7
Feb-17	2.73	26.5	90.5	117	24.3
Mar-17	1.69	34.4	80.7	115	10.4
Apr-17	1.45	115	46.3	161	16.9
May-17	1.22	86.0	52.9	139	16.5
Jun-17	1.21	79.3	86.1	165	18.4
Jul-17	1.11	132	19.0	151	23.5
Aug-17	1.09	119	28.0	147	19.5
Sep-17	1.04	111	26.0	137	17.2
Oct-17	0.979	115	21.5	137	18.9
Nov-17	1.11	91.6	24.9	117	19.4
Dec-17	0.951	69.7	51.1	121	18.9
Jan-18	1.42	39.2	56.6	95.9	6.83
Feb-18	0.986	25.7	82.7	108	18.5
Mar-18	1.56	63.7	142	205	31.5
Apr-18	1.55	74.2	42.0	116	20.4
May-18	1.04	165	1.29	166	25.0
Jun-18	1.03	146	0.669	146	23.6
Jul-18	1.04	156	9.16	142	11.8
Aug-18	0.965	111	13.5	160	20.0
Sep-18	1.03	80.3	51.7	126	16.2
Oct-18	1.03	41.1	85.3	135	19.9

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	1.25	30.8	83.9	113	16.6
Dec-18	1.19	37.2	59.5	95.8	11.0
Jan-19	1.60	24.5	71.2	94.9	9.66
Feb-19	2.36	24.7	62.0	72.0	8.64
Mar-19	1.72	29.1	132	181	13.7
Apr-19	1.15	54.3	91.9	139	11.8
May-19	1.20	170	11.0	172	16.1
Jun-19	1.05	131	13.2	126	15.1
Jul-19	1.01	82.1	60.6	154	18.5
Aug-19	1.01	111	50.6	167	19.1
Sep-19	0.997	138	27.0	159	17.2
Oct-19	0.923	73.8	45.8	130	17.2
Nov-19	0.973	40.2	72.3	118	15.8
Dec-19	1.50	126	12.2	130	12.2
Jan-20	1.28	46.4	63.7	109	11.2
Feb-20	0.963	59.8	55.1	113	11.0
Mar-20	1.03	89.4	46.3	125	13.5
Apr-20	1.01	111	30.6	144	9.96
May-20	0.945	49.5	72.3	125	15.5
Jun-20	0.947	55.2	66.9	122	14.1
Jul-20	0.947	86.0	40.9	126	14.0
Aug-20	0.958	68.1	48.8	118	14.3
Sep-20	0.921	72.6	51.2	122	11.7
Oct-20	0.917	59.3	78.3	143	14.0
Nov-20	0.945	74.5	46.9	121	15.4
Dec-20	0.942	73.9	41.3	102	11.8
Jan-21	1.07	75.0	39.3	112	10.5
Feb-21	1.11	66.4	42.3	124	11.5
Mar-21	1.38	104	65.9	178	16.7
Apr-21	1.26	110	65.7	169	18.3
May-21	1.21	101	67.6	171	18.5
Jun-21	1.21	105	62.5	174	17.4
Jul-21	1.23	38.5	107	156	20.1
Aug-21	0.902	23.1	96.6	124	14.7
Sep-21	0.855	77.8	42.3	120	15.9
Oct-21	1.36	55.6	53.2	103	18.5
Nov-21	1.22	28.8	72.5	114	22.3

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	1.97	61.6	47.9	118	17.3
Jan-22	1.24	84.9	37.0	139	21.6
Feb-22	0.933	110	23.7	134	19.5
Mar-22	0.901	81.0	52.6	127	20.0
Apr-22	0.962	43.4	74.9	112	18.6
May-22	0.899	78.1	57.8	128	19.9
Jun-22	0.903	91.3	42.2	137	21.1
Jul-22	0.871	18.4	72.3	82.3	16.7
Aug-22	0.879	36.8	65.3	98.0	20.6
Sep-22	0.873	37.7	61.6	104	19.8
Oct-22	0.850	35.6	66.2	116	20.8
Nov-22	0.879	40.7	67.6	112	18.4
Dec-22	1.45	33.5	66.5	97.1	16.6
Jan-23	2.37	26.2	68.9	90.3	11.8
Feb-23	1.15	53.0	56.8	113	17.0
Mar-23	1.98	50.2	92.7	173	26.1
Apr-23	1.07	46.0	75.6	123	18.3
May-23	1.02	56.7	67.8	128	19.1
Jun-23	0.954	43.7	77.8	124	21.6
Jul-23	0.950	24.5	78.9	103	21.5
Aug-23	0.949	28.2	78.9	115	22.2
Sep-23	0.908	22.1	76.5	100	21.2
Oct-23	0.898	50.4	64.7	124	20.4
Nov-23	0.969	80.0	38.7	120	18.0
Dec-23	1.32	48.3	65.4	112	16.9
Jan-24	1.89	19.9	72.3	88.9	13.7
Feb-24	1.95	51.1	76.4	98.1	17.8
Mar-24	1.46	116	32.8	143	19.0
Apr-24	1.11	92.8	32.2	126	18.0
May-24	1.03	18.5	78.7	110	19.9
Jun-24	0.973	10.2	83.6	93.7	22.5
Jul-24	0.967	69.1	63.7	141	20.6
Aug-24	0.932	46.7	65.9	113	18.8
Sep-24	0.917	65.7	58.6	132	19.9
Oct-24	0.904	44.3	74.9	119	23.5
Nov-24	1.13	41.6	68.9	102	18.9
Dec-24	1.75	44.9	58.6	104	17.9

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	1.08	79.8	47.2	118	16.9
Feb-25	1.99	87.5	59.1	116	17.2
Mar-25	1.15	110	33.0	120	18.5
Apr-25	0.978	90.4	36.0	131	19.4
May-25	0.952	42.3	82.7	131	21.7
Jun-25	0.952	31.8	88.0	121	20.1
Jul-25	0.943	62.9	51.7	115	19.3
Aug-25	0.925	65.7	57.9	127	18.7
Sep-25	0.930	42.9	66.2	109	21.6
Dry Season Average	**1.03**	**67.9**	**63.3**	**132**	**19.3**
Wet Season Average	**1.38**	**56.9**	**67.2**	**124**	**17.2**
Annual Average	**1.23**	**61.5**	**65.6**	**127**	**18.0**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year. All treatment plant processes utilize reclaimed utility water.

25 South San Francisco-San Bruno

South SF-San Bruno discharges to Lower San Francisco Bay (referred to as South Bay in the Group Annual Report). The plant has a permitted capacity of 13 mgd ADWF and a peak wet weather capacity of 30 mgd (blending allowable above 30 mgd). The average dry season discharge flow this past year was 7.6 mgd. The process includes a conventional activated sludge system.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - The nitrogen load reduction values across the plant ranges from approximately 5 to 60 percent. This load reduction is attributed primarily to a combination of biosolids management, biological assimilation, and/or occasional load reduction in the activated sludge system.
  - The phosphorus load reduction across the plant ranges from approximately 20 to 95 percent, with a significant increase in removal rates starting in 2022 following installation of the anaerobic selector in the aeration basins. Such a load reduction is attributed to a combination of biological assimilation for growth, chemical precipitation, biosolids management, and biological removal.
- Discharge
  - TIN loads generally increase with flow during wet weather events.
  - Ammonia loads are occasionally greater than TIN loads, and TIN monthly loads occasionally differ from the sum of ammonia and NOx monthly loads. This is attributed to sampling frequency as ammonia is sampled daily and other nitrogen species bimonthly.
  - Total phosphorus concentrations range from 0.2 to 9 mg P/L. The plant has reliably produced discharge of less than 3 mg P/L the past two dry seasons, with the exception of August 2024. This has resulted in considerable total P load reduction across the plant as noted.
- Recycled Water: No recycled water was produced or distributed this past year.

Influent

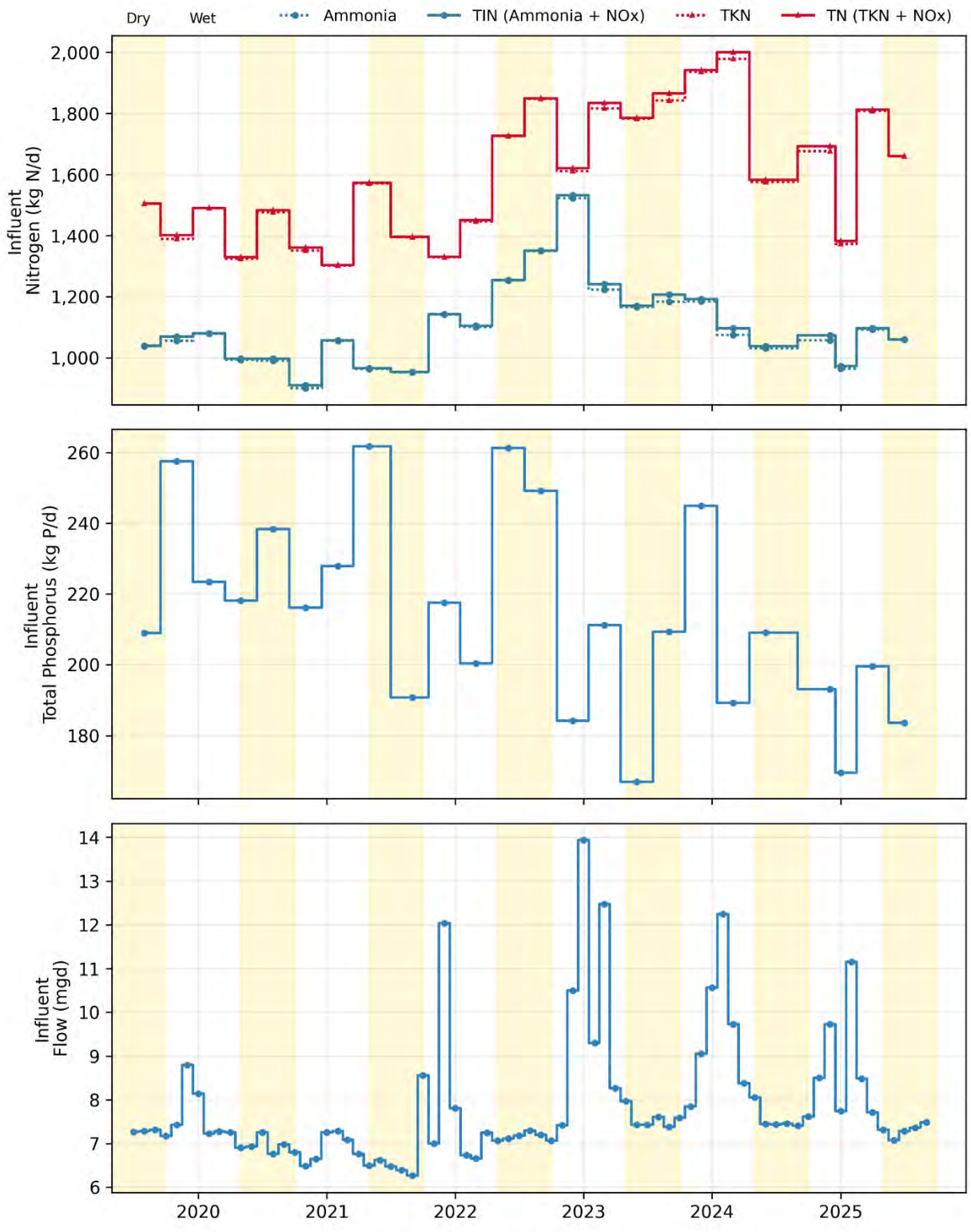


Figure 25-1. Influent: South SF-San Bruno Monthly Flows and Loads

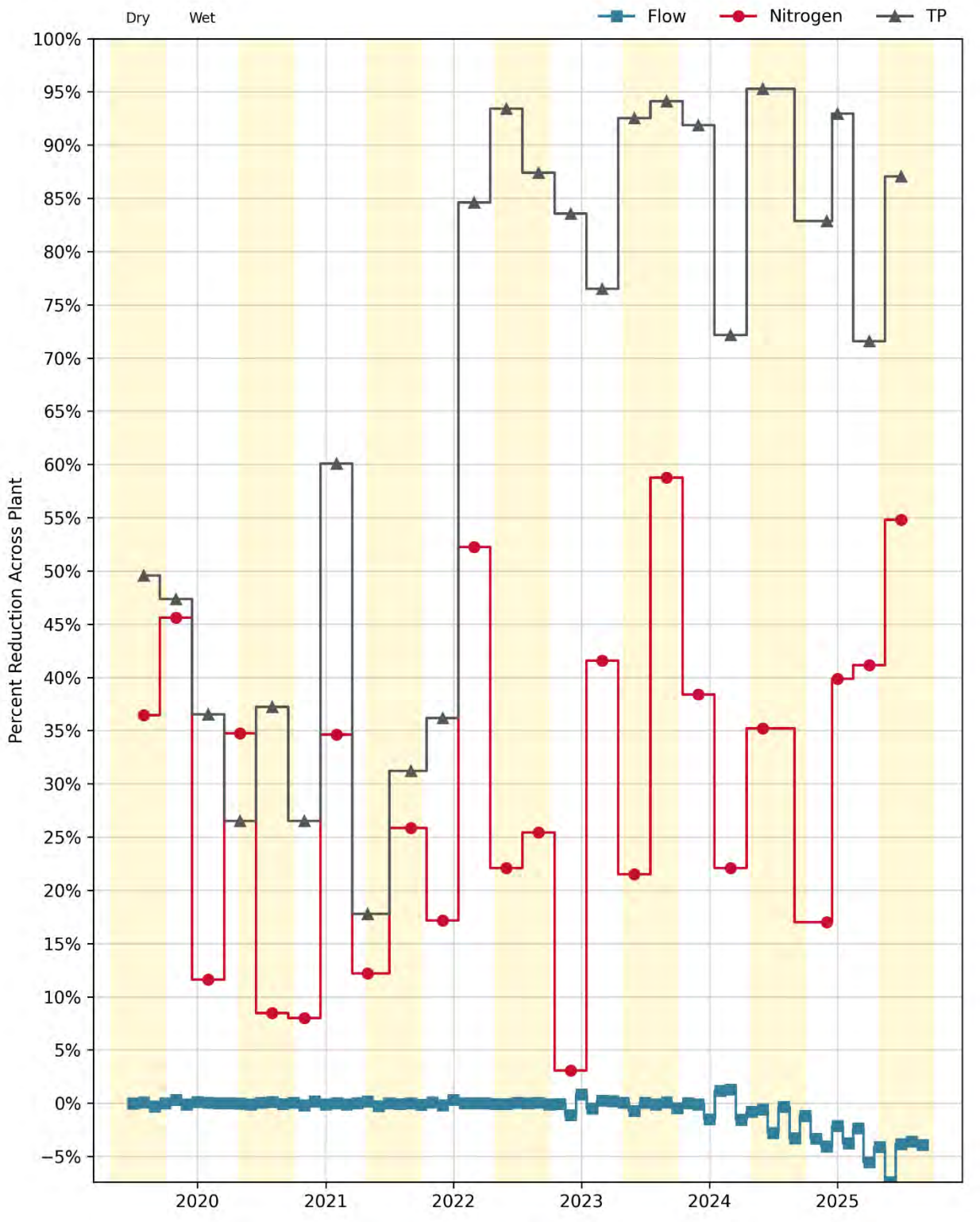


Figure 25-2. Influent: South SF-San Bruno Monthly Reductions Across the Plant*

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 25-1. Influent: South SF-San Bruno Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	7.27	1,040	--	--	--	--	--
Aug-19	7.29	1,040	1.11	1,070	1,500	1,510	209
Sep-19	7.32	994	--	--	--	--	--
Oct-19	7.17	971	--	--	--	--	--
Nov-19	7.43	1,060	13.3	984	1,390	1,400	257
Dec-19	8.80	1,120	--	--	--	--	--
Jan-20	8.14	1,050	--	--	--	--	--
Feb-20	7.23	1,080	1.10	1,070	1,490	1,490	223
Mar-20	7.28	1,040	--	--	--	--	--
Apr-20	7.26	1,060	--	--	--	--	--
May-20	6.91	992	4.41	972	1,320	1,330	218
Jun-20	6.93	1,020	--	--	--	--	--
Jul-20	7.26	938	--	--	--	--	--
Aug-20	6.76	990	7.09	1,010	1,480	1,480	238
Sep-20	6.98	995	--	--	--	--	--
Oct-20	6.80	1,040	--	--	--	--	--
Nov-20	6.49	901	8.92	936	1,350	1,360	216
Dec-20	6.65	1,010	--	--	--	--	--
Jan-21	7.25	964	--	--	--	--	--
Feb-21	7.29	1,060	1.09	868	1,300	1,300	228
Mar-21	7.08	1,060	--	--	--	--	--
Apr-21	6.76	1,080	--	--	--	--	--
May-21	6.49	963	2.88	1,200	1,570	1,570	262
Jun-21	6.62	872	--	--	--	--	--
Jul-21	6.48	842	--	--	--	--	--
Aug-21	6.39	915	--	--	--	--	--
Sep-21	6.26	952	2.03	1,090	1,390	1,400	191
Oct-21	8.56	1,000	--	--	--	--	--
Nov-21	7.00	998	--	--	--	--	--
Dec-21	12.0	1,140	1.36	1,230	1,330	1,330	218
Jan-22	7.81	1,070	--	--	--	--	--
Feb-22	6.73	925	--	--	--	--	--
Mar-22	6.66	1,100	4.31	1,040	1,450	1,450	200
Apr-22	7.25	1,220	--	--	--	--	--
May-22	7.06	1,440	--	--	--	--	--
Jun-22	7.11	1,250	1.83	1,220	1,720	1,730	261

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-22	7.18	1,230	--	--	--	--	--
Aug-22	7.30	1,290	--	--	--	--	--
Sep-22	7.20	1,350	2.04	1,150	1,850	1,850	249
Oct-22	7.07	1,320	--	--	--	--	--
Nov-22	7.42	1,430	--	--	--	--	--
Dec-22	10.5	1,520	8.92	1,510	1,610	1,620	184
Jan-23	13.9	1,310	--	--	--	--	--
Feb-23	9.30	1,330	--	--	--	--	--
Mar-23	12.5	1,220	17.3	1,480	1,820	1,830	211
Apr-23	8.26	1,530	--	--	--	--	--
May-23	7.97	1,290	--	--	--	--	--
Jun-23	7.43	1,170	2.77	1,180	1,780	1,780	167
Jul-23	7.43	1,140	--	--	--	--	--
Aug-23	7.60	1,170	--	--	--	--	--
Sep-23	7.38	1,180	22.8	1,220	1,840	1,870	209
Oct-23	7.59	--	--	--	--	--	--
Nov-23	7.85	--	--	--	--	--	--
Dec-23	9.06	1,190	6.32	1,190	1,940	1,940	245
Jan-24	10.6	--	--	--	--	--	--
Feb-24	12.2	--	--	--	--	--	--
Mar-24	9.73	1,080	21.1	1,100	1,980	2,000	189
Apr-24	8.38	--	--	--	--	--	--
May-24	8.05	--	--	--	--	--	--
Jun-24	7.45	1,030	7.45	1,040	1,580	1,580	209
Jul-24	7.43	--	--	--	--	--	--
Aug-24	7.46	--	--	--	--	--	--
Sep-24	7.41	--	--	--	--	--	--
Oct-24	7.62	--	--	--	--	--	--
Nov-24	8.50	--	--	--	--	--	--
Dec-24	9.73	1,060	16.4	1,070	1,680	1,690	193
Jan-25	7.75	964	8.47	973	1,370	1,380	169
Feb-25	11.1	--	--	--	--	--	--
Mar-25	8.48	--	--	--	--	--	--
Apr-25	7.71	1,090	4.90	1,100	1,810	1,810	200
May-25	7.32	--	--	--	--	--	--
Jun-25	7.08	--	--	--	--	--	--
Jul-25	7.28	1,060	0	1,060	1,660	1,660	184

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-25	7.37	--	--	--	--	--	--
Sep-25	7.48	--	--	--	--	--	--
Dry Season Average	**7.18**	**1,090**	**4.95**	**1,110**	**1,610**	**1,610**	**218**
Wet Season Average	**8.40**	**1,120**	**8.73**	**1,120**	**1,580**	**1,580**	**210**
Annual Average	**7.86**	**1,110**	**7.00**	**1,120**	**1,590**	**1,600**	**214**

* South SF-San Bruno typically samples more than the required influent ammonia quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

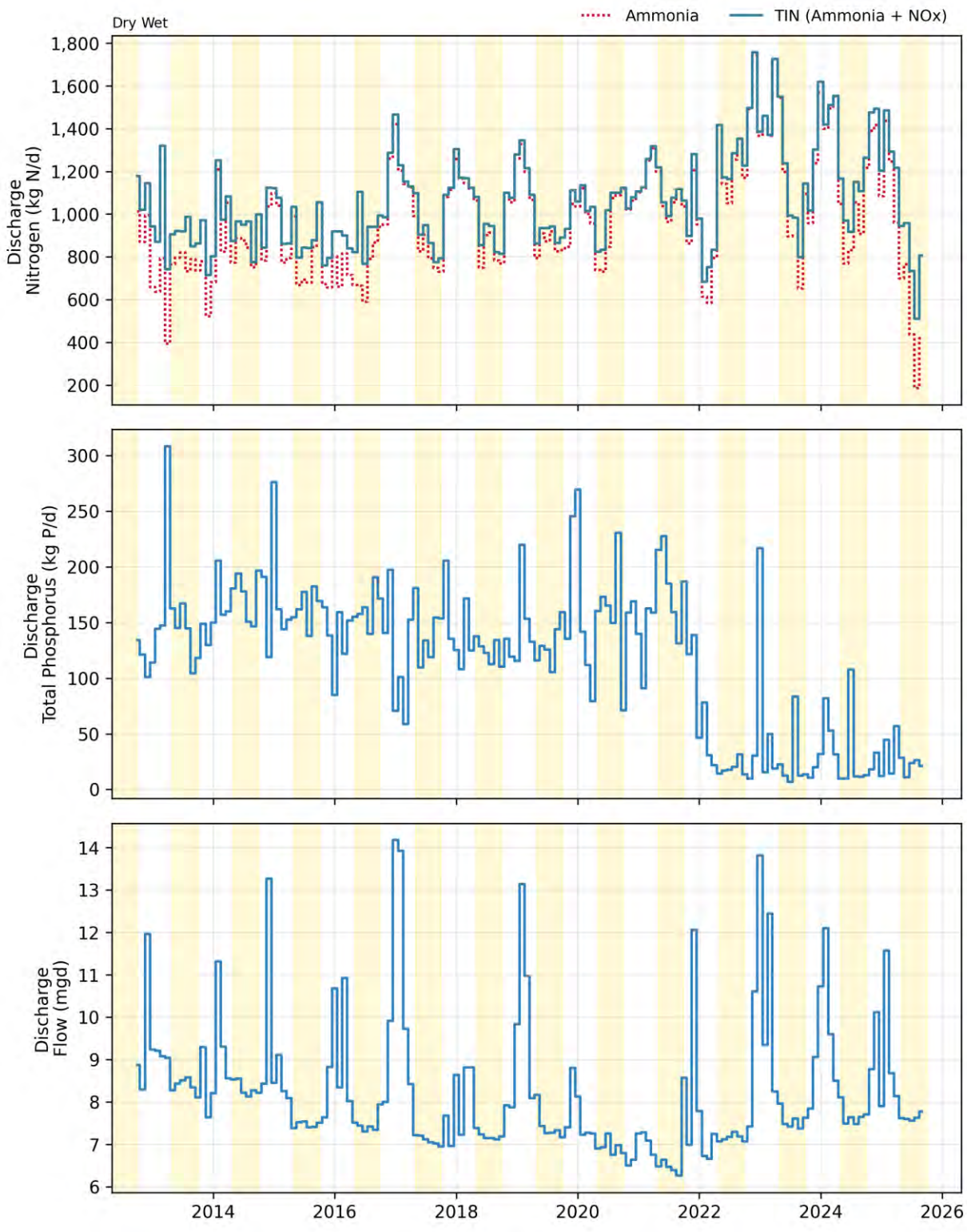


Figure 25-3. Discharge: South SF-San Bruno Monthly Flows and Loads

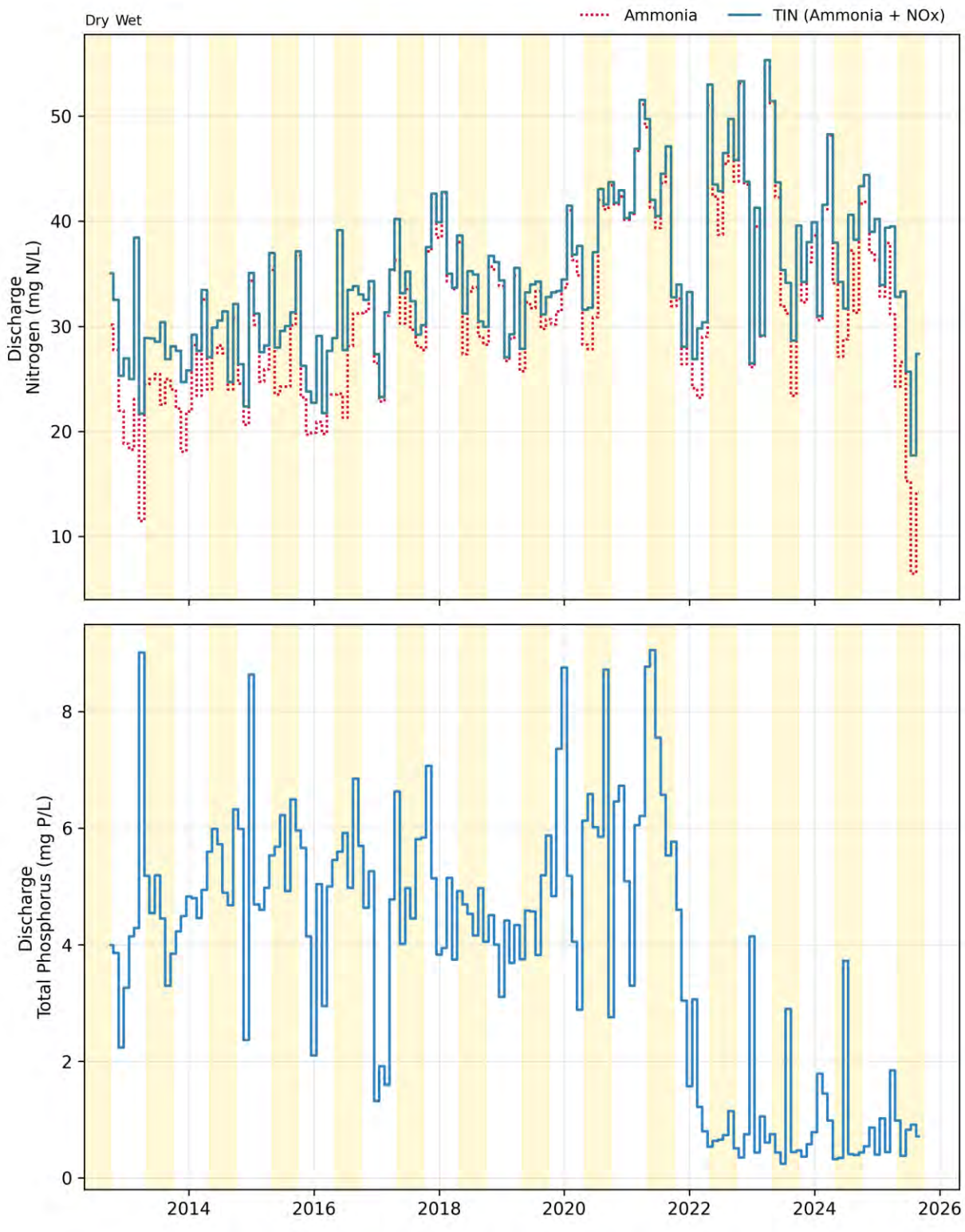


Figure 25-4. Discharge: South SF-San Bruno Monthly Concentrations

Table 25-2. Discharge: South SF-San Bruno Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	8.88	1,010	164	1,180	134
Nov-12	8.30	870	151	1,020	121
Dec-12	12.0	995	149	1,140	101
Jan-13	9.24	658	284	942	114
Feb-13	9.21	637	233	870	144
Mar-13	9.08	793	527	1,320	147
Apr-13	9.04	393	349	742	308
May-13	8.28	766	139	905	162
Jun-13	8.43	797	124	920	145
Jul-13	8.51	820	99.6	919	167
Aug-13	8.58	733	254	986	144
Sep-13	8.35	789	59.9	849	104
Oct-13	8.11	736	127	862	118
Nov-13	9.29	779	193	972	149
Dec-13	7.65	523	191	714	130
Jan-14	8.21	681	121	802	150
Feb-14	11.3	1,210	42.7	1,250	206
Mar-14	9.31	824	150	975	157
Apr-14	8.56	1,050	29.4	1,080	160
May-14	8.53	774	100	874	181
Jun-14	8.55	889	77.4	966	194
Jul-14	8.22	876	74.4	950	178
Aug-14	8.13	844	122	966	151
Sep-14	8.28	752	22.8	774	147
Oct-14	8.22	960	39.2	999	197
Nov-14	8.43	783	59.7	843	191
Dec-14	13.3	1,040	87.7	1,120	119
Jan-15	8.45	1,100	23.5	1,120	276
Feb-15	9.11	1,040	36.8	1,080	162
Mar-15	8.26	774	88.0	861	144
Apr-15	8.09	794	68.5	863	152
May-15	7.39	989	45.2	1,030	155
Jun-15	7.52	669	127	796	162
Jul-15	7.54	693	150	843	178
Aug-15	7.41	680	161	842	138
Sep-15	7.42	845	34.1	879	182

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	7.52	1,050	10.9	1,060	169
Nov-15	7.64	673	86.8	759	164
Dec-15	8.83	657	137	794	138
Jan-16	10.7	803	115	919	85.0
Feb-16	8.35	661	258	919	159
Mar-16	10.9	817	82.8	899	122
Apr-16	8.02	714	125	839	152
May-16	7.51	668	153	822	155
Jun-16	7.44	665	438	1,100	158
Jul-16	7.31	590	178	768	164
Aug-16	7.42	791	149	940	140
Sep-16	7.35	868	73.0	940	191
Oct-16	7.95	940	53.3	993	171
Nov-16	8.01	951	34.1	986	140
Dec-16	9.92	1,260	25.5	1,290	197
Jan-17	14.2	1,420	44.9	1,470	70.8
Feb-17	13.9	1,200	24.9	1,230	101
Mar-17	9.73	1,140	11.9	1,150	58.9
Apr-17	8.43	1,130	2.79	1,130	152
May-17	7.22	990	108	1,100	181
Jun-17	7.21	826	78.7	904	110
Jul-17	7.12	904	44.6	949	134
Aug-17	7.06	793	72.4	865	119
Sep-17	7.02	748	28.4	776	154
Oct-17	6.96	730	62.2	792	154
Nov-17	7.68	1,080	10.9	1,090	205
Dec-17	6.96	1,110	10.1	1,120	135
Jan-18	8.64	1,260	48.2	1,310	125
Feb-18	7.23	1,170	3.93	1,170	108
Mar-18	8.81	1,140	23.5	1,170	172
Apr-18	8.82	1,120	3.25	1,120	125
May-18	7.39	1,060	17.7	1,080	138
Jun-18	7.24	749	105	855	129
Jul-18	7.15	901	51.9	1,000	122
Aug-18	7.15	913	31.7	1,020	113
Sep-18	7.12	783	39.0	1,020	134
Oct-18	7.19	769	45.7	794	110

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	7.92	1,070	30.6	1,370	135
Dec-18	7.88	1,060	20.7	1,140	119
Jan-19	9.84	1,260	20.0	1,270	116
Feb-19	13.1	1,330	17.4	2,860	220
Mar-19	11.0	1,200	18.0	1,920	153
Apr-19	8.10	1,070	23.3	1,240	133
May-19	8.17	795	66.4	987	116
Jun-19	7.44	909	26.8	969	129
Jul-19	7.27	873	61.1	1,080	126
Aug-19	7.28	919	24.5	957	105
Sep-19	7.34	826	38.3	1,110	144
Oct-19	7.17	832	57.7	1,050	159
Nov-19	7.41	846	84.4	762	135
Dec-19	8.81	1,050	63.9	1,350	245
Jan-20	8.13	1,040	23.4	1,220	269
Feb-20	7.23	1,120	11.8	1,320	142
Mar-20	7.28	1,000	13.9	1,010	112
Apr-20	7.26	957	77.0	1,000	79.3
May-20	6.91	738	86.7	867	160
Jun-20	6.94	730	104	1,100	173
Jul-20	7.26	848	170	1,330	165
Aug-20	6.75	1,070	26.2	1,360	150
Sep-20	6.99	1,090	12.3	1,600	230
Oct-20	6.80	1,120	8.23	1,060	70.9
Nov-20	6.50	1,020	4.31	1,250	159
Dec-20	6.64	1,060	14.7	1,000	169
Jan-21	7.26	1,100	3.65	1,220	140
Feb-21	7.28	1,120	3.49	852	90.9
Mar-21	7.09	1,250	5.67	1,270	162
Apr-21	6.76	1,310	11.5	1,210	159
May-21	6.48	1,200	19.6	1,380	215
Jun-21	6.64	1,040	18.9	1,310	228
Jul-21	6.48	965	27.3	1,060	185
Aug-21	6.39	1,050	21.9	1,320	159
Sep-21	6.26	1,090	22.3	1,040	131
Oct-21	8.57	1,030	27.9	1,030	187
Nov-21	6.99	864	34.6	922	122

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	12.1	1,200	76.1	1,100	139
Jan-22	7.79	952	27.9	993	46.3
Feb-22	6.73	614	70.0	733	78.1
Mar-22	6.66	585	167	693	30.8
Apr-22	7.25	796	38.0	792	21.8
May-22	7.07	1,370	52.7	1,210	14.3
Jun-22	7.12	1,140	30.7	1,350	17.2
Jul-22	7.18	1,050	112	1,030	17.8
Aug-22	7.30	1,260	29.1	1,140	20.4
Sep-22	7.19	1,350	2.78	1,380	31.4
Oct-22	7.07	1,170	55.0	1,180	13.5
Nov-22	7.42	1,490	6.34	1,360	9.85
Dec-22	10.6	1,750	11.1	1,570	30.2
Jan-23	13.8	1,370	18.9	2,000	217
Feb-23	9.35	1,400	63.8	1,370	15.6
Mar-23	12.4	1,370	4.11	1,070	49.6
Apr-23	8.25	1,720	3.11	2,100	19.0
May-23	7.96	1,540	5.98	1,700	22.6
Jun-23	7.48	1,200	40.6	1,400	12.5
Jul-23	7.43	895	97.7	1,010	6.90
Aug-23	7.61	899	84.2	1,270	83.4
Sep-23	7.38	653	147	769	12.3
Oct-23	7.63	1,100	47.4	1,100	13.6
Nov-23	7.85	959	57.2	1,130	10.8
Dec-23	9.07	1,240	64.2	1,200	19.9
Jan-24	10.7	1,570	51.9	1,390	31.9
Feb-24	12.1	1,400	18.9	1,540	81.8
Mar-24	9.60	1,490	15.3	1,560	52.7
Apr-24	8.51	1,550	4.21	1,580	31.7
May-24	8.11	1,050	118	1,250	9.99
Jun-24	7.49	769	201	1,030	9.83
Jul-24	7.64	832	84.7	926	108
Aug-24	7.49	1,050	95.7	1,020	11.6
Sep-24	7.66	907	201	983	11.5
Oct-24	7.71	1,220	47.9	1,050	12.8
Nov-24	8.78	1,390	84.7	1,680	18.1
Dec-24	10.1	1,420	74.8	1,400	33.1

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	7.91	1,090	119	831	12.0
Feb-25	11.6	1,440	48.1	1,060	44.7
Mar-25	8.68	1,250	47.4	1,090	14.5
Apr-25	8.14	959	257	1,070	56.8
May-25	7.62	700	245	810	28.4
Jun-25	7.60	765	193	834	11.0
Jul-25	7.56	437	299	750	23.8
Aug-25	7.63	187	325	348	26.3
Sep-25	7.77	419	387	526	21.0
Dry Season Average	**7.46**	**874**	**102**	**1,010**	**115**
Wet Season Average	**8.80**	**1,050**	**70.2**	**1,140**	**118**
Annual Average	**8.24**	**977**	**83.5**	**1,090**	**117**

Recycled Water

No recycled water was produced or distributed this past year.

26 City of Sunnyvale

Sunnyvale discharges to a tributary of the Lower South Bay. It has approximately 28,300 service connections with a permitted average dry weather flow (ADWF) capacity of 29.5 mgd and a peak wet weather flow capacity of 40 mgd. The permitted ADWF capacity will be reduced to 19.5 mgd as part of the ongoing plant upgrades design. This past dry season average discharge flow was approximately 10.5 mgd. The plant currently nitrifies using oxidation ponds followed by nitrifying trickling filters and filtration. Significant denitrification occurs in the oxidation ponds primarily during the dry season.

The following observations are made based upon the figures and table in the subsequent pages:

- Influent/Reduction across the Plant
  - The flow reduction across the plant can be upwards of 50 percent. The reduction is attributed to a combination of, recycled water production, temporary storage in the oxidation ponds, and/or evaporation from the oxidation ponds.
  - The nitrogen load reduction values across the plant is seasonal with values from 0 to 95 percent. This load reduction is attributed primarily to biological assimilation, biosolids management, load reduction in the oxidation ponds, and load diversion with recycled water.
  - The phosphorus load reduction across the plant is less seasonal than nitrogen with values from 0 to 75 percent. This load reduction is attributed primarily to biological assimilation, biosolids management, chemical precipitation, and load diversion associated with recycled water.
- Discharge
  - Nitrogen species and total phosphorus loads typically increase with flow during wet weather events and are typically greater and more variable than the dry season loads.
  - The nitrifying trickling filters typically experience a decline in nitrification performance during colder months as evidenced by higher ammonia levels in the discharge and occasional ammonia spikes. This is a common phenomenon for nitrifying trickling filters exacerbated by occasional cold temperatures in the oxidation ponds.
  - The plant has seasonal denitrification as evidenced by ADWF TIN values that typically range from 10 to 30 mg N/L as compared with the 40 to 60 mg TN-N/L measured in the influent. Denitrification occurs in the oxidation ponds during the summer months.
  - NOx is the majority of the nitrogen species discharged, regardless of season. This is expected since this plant nitrifies year-round (with reduced nitrification in the oxidation ponds and the trickling filters as noted).
  - Total P concentrations are wide ranging (from approximately 1.8 to >12 mg P/L.)
- Recycled Water
  - No water was recycled in 2023 or 2024 due to the growth of “picoalgae” in the oxidation ponds that could not be completely removed in downstream treatment processes, resulting in elevated turbidity levels that exceeded the 2 NTU turbidity limit for recycled

water. Historical recycle uses have included golf course irrigation, landscape irrigation, and industrial application. This problem is expected to be remedied when the new activated sludge system comes online in 2028.

Influent

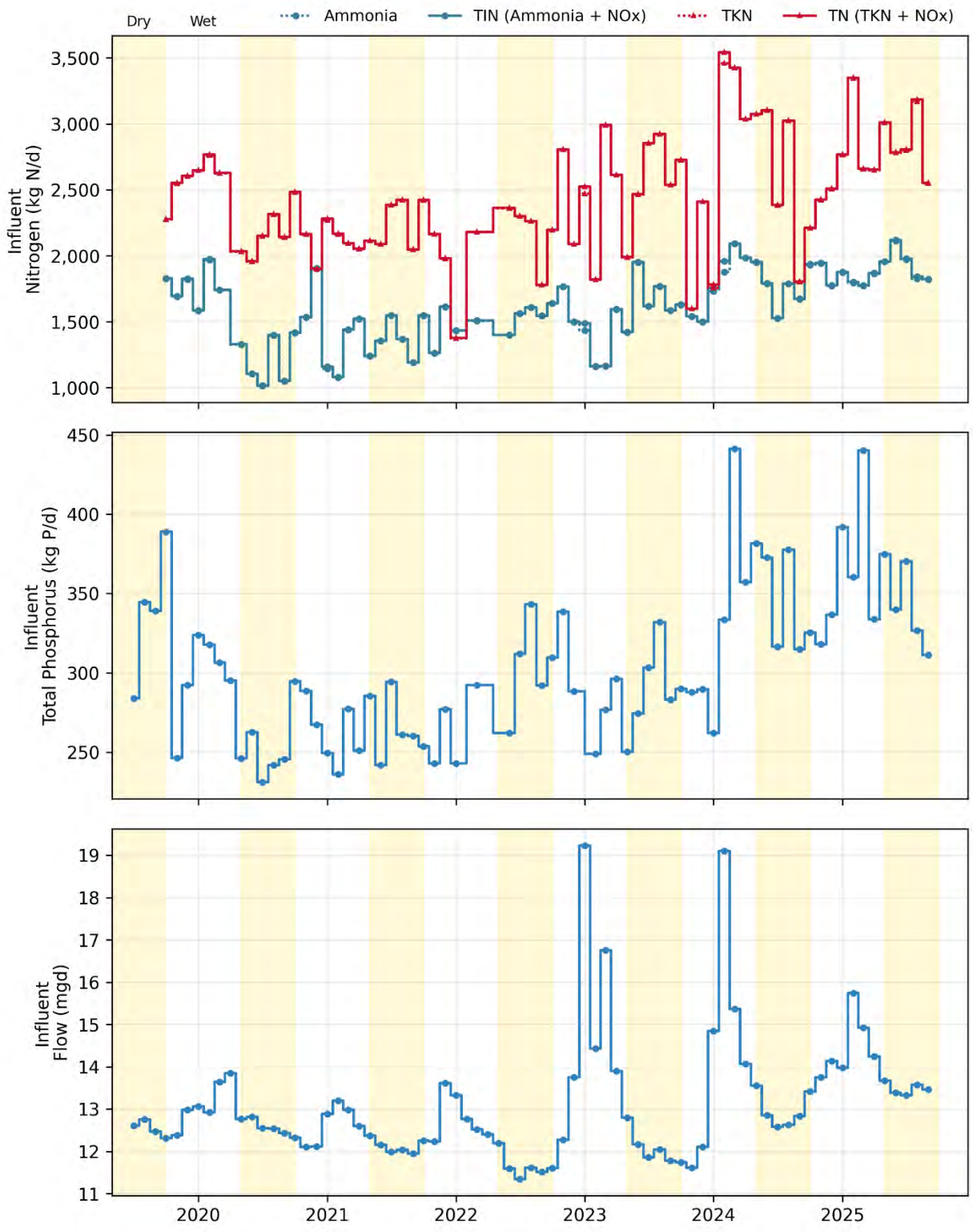


Figure 26-1. Influent: Sunnyvale Monthly Flows and Loads

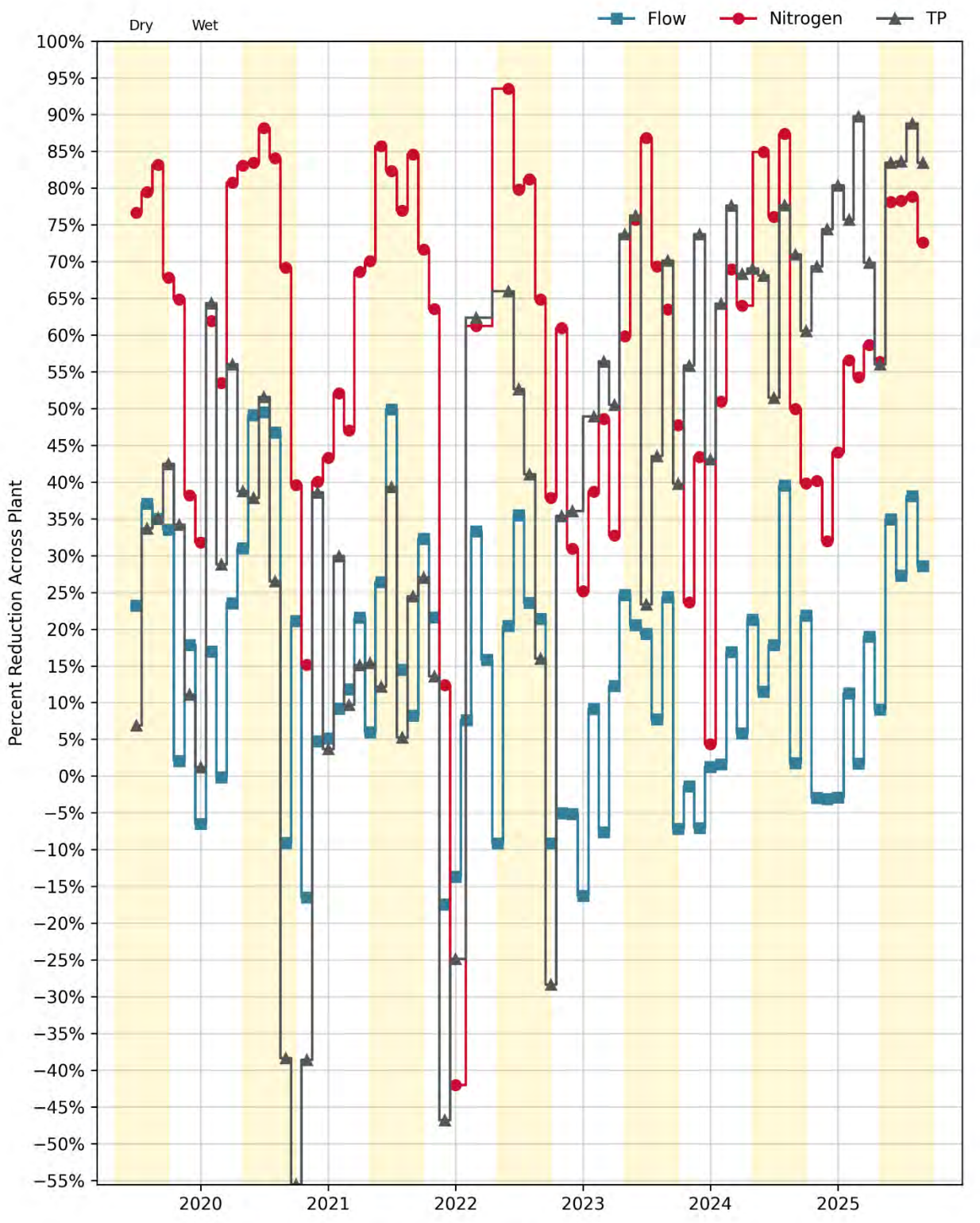


Figure 26-2. Influent: Sunnyvale Monthly Reductions Across the Plant*

* The reductions across the plant are occasionally negative. This may be due to return of water from the oxidation ponds.

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 26-1. Influent: Sunnyvale Monthly Flows and Loads[1,*]

Month, Year	Flow	Ammonia*	Nitrate + Nitrite*	TIN*,**	TKN*	Total N*,**	Total P*
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	12.6	1,700	--	1,700	2,840	2,840	284
Aug-19	12.8	1,820	--	1,820	2,710	2,710	344
Sep-19	12.5	1,940	--	1,940	2,910	2,910	339
Oct-19	12.3	1,830	1.70	1,830	2,280	2,280	389
Nov-19	12.4	1,690	4.22	1,690	2,550	2,550	246
Dec-19	13.0	1,820	4.43	1,830	2,600	2,610	292
Jan-20	13.1	1,580	1.23	1,590	2,650	2,650	324
Feb-20	12.9	1,970	4.96	1,970	2,760	2,770	318
Mar-20	13.6	1,740	0.394	1,740	2,630	2,630	307
Apr-20	13.9	1,520	--	1,520	2,300	2,300	295
May-20	12.8	1,330	4.29	1,330	2,030	2,040	246
Jun-20	12.8	1,100	0.388	1,110	1,960	1,960	263
Jul-20	12.6	1,010	3.29	1,020	2,150	2,150	231
Aug-20	12.5	1,400	3.50	1,400	2,310	2,320	242
Sep-20	12.4	1,050	3.22	1,050	2,140	2,140	246
Oct-20	12.3	1,420	3.54	1,420	2,480	2,480	295
Nov-20	12.1	1,530	2.77	1,540	2,160	2,160	289
Dec-20	12.1	1,900	3.60	1,910	1,900	1,900	267
Jan-21	12.9	1,150	14.8	1,160	2,270	2,280	249
Feb-21	13.2	1,080	5.43	1,080	2,160	2,170	236
Mar-21	13.0	1,440	0.400	1,440	2,090	2,090	277
Apr-21	12.6	1,520	3.19	1,520	2,050	2,050	251
May-21	12.4	1,240	0.568	1,240	2,110	2,120	285
Jun-21	12.2	1,360	0.366	1,360	2,090	2,090	242
Jul-21	12.0	1,550	0.183	1,550	2,390	2,390	294
Aug-21	12.0	1,370	0.462	1,370	2,420	2,420	261
Sep-21	11.9	1,190	0.454	1,190	2,050	2,050	260
Oct-21	12.3	1,550	3.07	1,550	2,420	2,420	254
Nov-21	12.2	1,260	2.79	1,260	2,160	2,170	243
Dec-21	13.6	1,610	2.70	1,610	1,980	1,980	277
Jan-22	13.3	1,430	2.40	1,430	1,370	1,380	243
Feb-22	12.8	--	--	--	--	--	--
Mar-22	12.5	1,510	1.40	1,510	2,180	2,180	292
Apr-22	12.4	--	--	--	--	--	--
May-22	12.2	--	--	--	--	--	--
Jun-22	11.6	1,400	1.54	1,400	2,360	2,360	262

Month, Year	Flow	Ammonia*	Nitrate + Nitrite*	TIN*,**	TKN*	Total N*,**	Total P*
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-22	11.3	1,560	1.29	1,560	2,300	2,300	312
Aug-22	11.6	1,610	1.58	1,610	2,260	2,260	343
Sep-22	11.5	1,540	1.21	1,550	1,780	1,780	292
Oct-22	11.6	1,640	1.06	1,640	2,200	2,200	310
Nov-22	12.3	1,770	1.71	1,770	2,810	2,810	339
Dec-22	13.7	1,500	1.10	1,500	2,090	2,090	288
Jan-23	19.2	1,440	53.1	1,490	2,470	2,520	--
Feb-23	14.4	1,160	2.27	1,160	1,820	1,820	249
Mar-23	16.8	1,160	3.30	1,170	2,990	2,990	277
Apr-23	13.9	1,590	2.70	1,600	2,610	2,610	296
May-23	12.8	1,420	1.76	1,420	1,990	1,990	250
Jun-23	12.2	1,950	2.79	1,950	2,460	2,470	274
Jul-23	11.9	1,620	1.73	1,620	2,850	2,850	303
Aug-23	12.0	1,770	1.79	1,770	2,920	2,920	332
Sep-23	11.8	1,580	1.60	1,590	2,540	2,540	283
Oct-23	11.7	1,630	0.919	1,620	2,730	2,730	290
Nov-23	11.6	1,540	0.904	1,500	1,600	1,600	288
Dec-23	12.1	1,500	1.80	1,650	2,410	2,410	290
Jan-24	14.8	1,730	25.4	1,660	1,760	1,760	262
Feb-24	19.1	1,880	80.7	2,010	3,460	3,540	334
Mar-24	15.4	2,090	1.18	2,300	3,420	3,430	441
Apr-24	14.1	1,980	1.11	2,050	3,040	3,040	357
May-24	13.5	1,950	1.06	1,860	3,070	--	382
Jun-24	12.9	1,790	1.01	1,830	3,100	3,100	373
Jul-24	12.6	1,530	0.985	1,480	2,380	2,380	316
Aug-24	12.6	1,790	0.982	2,000	3,020	3,020	378
Sep-24	12.8	1,670	3.26	1,770	1,800	1,800	315
Oct-24	13.4	1,930	3.59	1,740	2,210	2,210	325
Nov-24	13.8	1,940	4.69	1,950	2,420	2,430	318
Dec-24	14.1	1,770	4.35	1,840	2,500	2,510	337
Jan-25	14.0	1,870	3.91	1,990	2,770	2,770	392
Feb-25	15.7	1,800	4.25	1,950	3,350	3,350	360
Mar-25	14.9	1,770	4.14	1,800	2,660	2,660	440
Apr-25	14.2	1,860	5.50	1,860	2,650	2,660	334
May-25	13.7	1,950	2.04	1,990	3,010	3,010	375
Jun-25	13.4	2,110	5.05	2,250	2,780	2,780	340
Jul-25	13.3	1,970	5.87	2,060	2,800	2,810	370

Month, Year	Flow	Ammonia*	Nitrate + Nitrite*	TIN*,**	TKN*	Total N*,**	Total P*
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-25	13.6	1,830	16.9	1,840	3,170	3,190	327
Sep-25	13.5	1,820	3.61	1,660	2,550	2,560	311
Dry Season Average	**12.5**	**1,590**	**2.51**	**1,600**	**2,480**	**2,460**	**302**
Wet Season Average	**13.6**	**1,630**	**6.92**	**1,650**	**2,420**	**2,430**	**304**
Average Annual	**13.1**	**1,610**	**5.04**	**1,630**	**2,450**	**2,440**	**303**

1 For non-detects after October 1, 2023, 1/2 of the method detection limit was used to quantify values. Prior to October 1, 2023, non-detect values used the provided method detection limit.

* Sunnyvale typically samples more than the required influent quarterly nutrient sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

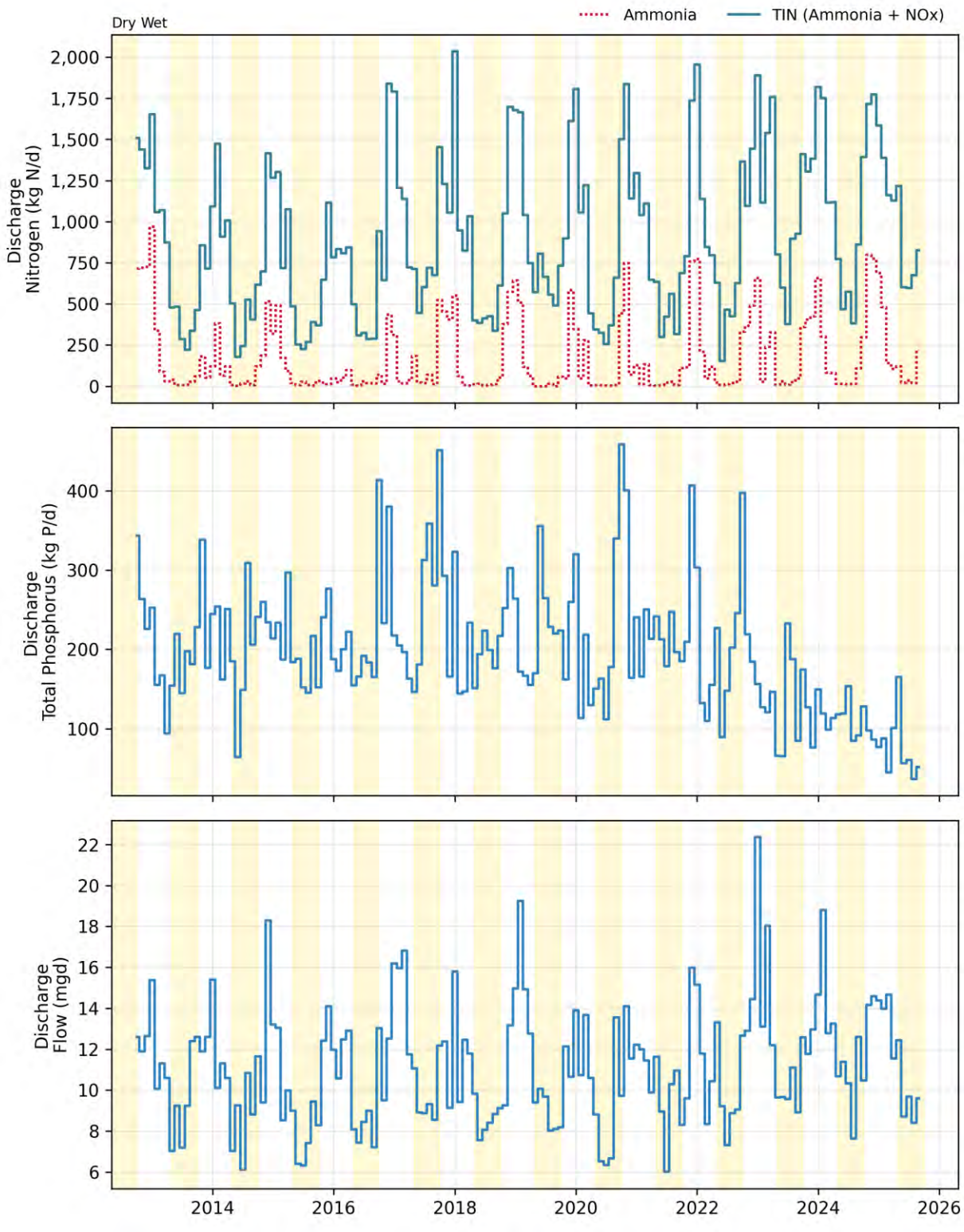


Figure 26-3. Discharge: Sunnyvale Monthly Flows and Loads

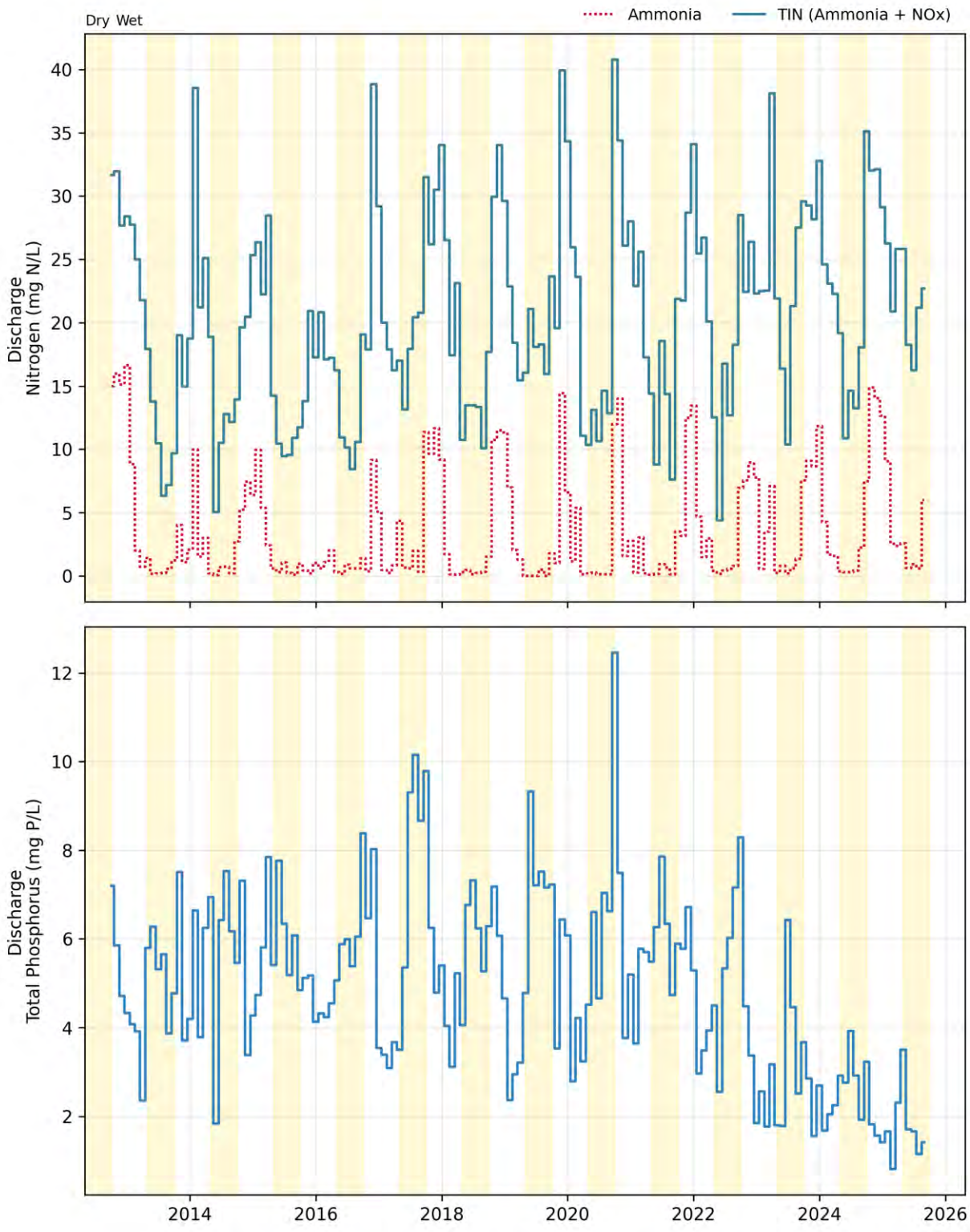


Figure 26-4. Discharge: Sunnyvale Monthly Concentrations

Table 26-2. Discharge: Sunnyvale Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	12.6	714	795	1,510	343
Nov-12	11.9	719	718	1,440	263
Dec-12	12.6	724	600	1,320	226
Jan-13	15.4	968	685	1,650	252
Feb-13	10.1	336	720	1,060	155
Mar-13	11.3	86.3	983	1,070	167
Apr-13	10.6	28.8	844	872	94.3
May-13	7.04	37.9	439	477	154
Jun-13	9.25	5.51	477	482	220
Jul-13	7.19	5.62	279	285	145
Aug-13	9.23	8.30	212	220	198
Sep-13	12.4	26.7	310	337	181
Oct-13	12.6	58.5	404	463	228
Nov-13	11.9	181	675	856	338
Dec-13	12.6	52.4	661	714	177
Jan-14	15.4	121	971	1,090	244
Feb-14	10.1	382	1,090	1,470	254
Mar-14	11.3	64.7	843	908	162
Apr-14	10.6	120	887	1,010	251
May-14	7.04	5.24	498	503	185
Jun-14	9.25	1.91	175	177	64.4
Jul-14	6.12	16.2	228	244	149
Aug-14	10.8	29.5	495	524	309
Sep-14	8.81	6.36	399	405	206
Oct-14	11.7	120	495	615	241
Nov-14	9.40	186	512	698	260
Dec-14	18.3	515	901	1,420	234
Jan-15	13.2	319	948	1,270	214
Feb-15	13.1	491	811	1,300	234
Mar-15	8.52	173	544	717	187
Apr-15	9.99	91.1	985	1,080	297
May-15	8.99	19.9	465	485	184
Jun-15	6.40	7.57	246	253	188
Jul-15	6.33	25.5	201	227	152
Aug-15	7.41	6.27	262	268	145
Sep-15	9.43	3.37	386	390	217

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	8.29	30.5	338	368	152
Nov-15	12.4	21.0	627	648	241
Dec-15	14.1	10.9	1,110	1,120	276
Jan-16	12.0	45.8	737	783	188
Feb-16	10.6	23.8	810	834	173
Mar-16	12.5	51.5	756	808	200
Apr-16	12.9	97.9	744	842	222
May-16	8.08	9.09	488	497	155
Jun-16	7.44	4.69	303	308	166
Jul-16	8.45	28.3	296	324	192
Aug-16	8.99	20.0	267	287	183
Sep-16	7.22	16.0	273	289	165
Oct-16	13.0	68.1	872	940	413
Nov-16	9.51	13.2	631	644	233
Dec-16	12.5	434	1,400	1,840	380
Jan-17	16.2	310	1,480	1,790	217
Feb-17	16.0	29.0	1,180	1,210	205
Mar-17	16.8	15.8	1,120	1,140	196
Apr-17	11.7	36.4	685	721	163
May-17	11.1	182	530	711	146
Jun-17	8.91	22.4	421	444	181
Jul-17	8.87	19.7	582	602	312
Aug-17	9.33	69.8	651	721	359
Sep-17	8.55	10.7	663	673	281
Oct-17	12.2	524	928	1,450	451
Nov-17	12.4	453	774	1,230	293
Dec-17	9.15	404	652	1,060	166
Jan-18	15.8	550	1,480	2,030	323
Feb-18	9.43	61.5	885	946	144
Mar-18	12.5	7.03	816	823	147
Apr-18	11.8	4.99	1,030	1,030	233
May-18	9.82	11.0	388	399	151
Jun-18	7.57	13.2	372	385	194
Jul-18	8.07	4.20	408	412	224
Aug-18	8.42	7.67	417	425	199
Sep-18	8.83	11.1	326	337	176
Oct-18	9.12	52.2	559	611	217

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	9.27	377	673	1,050	252
Dec-18	13.2	574	1,120	1,700	303
Jan-19	15.0	641	1,040	1,680	264
Feb-19	19.2	509	1,160	1,660	172
Mar-19	14.9	116	924	1,040	167
Apr-19	12.8	62.1	685	747	155
May-19	9.39	0	571	571	170
Jun-19	10.1	0	804	804	356
Jul-19	9.68	0	663	663	264
Aug-19	8.03	14.9	541	556	228
Sep-19	8.11	0	490	490	220
Oct-19	8.19	55.6	678	733	224
Nov-19	12.1	46.3	852	898	162
Dec-19	10.7	582	1,030	1,610	260
Jan-20	13.9	348	1,460	1,810	320
Feb-20	10.7	47.4	1,010	1,050	113
Mar-20	13.7	278	944	1,220	218
Apr-20	10.6	4.76	438	443	130
May-20	8.81	6.90	338	345	151
Jun-20	6.52	6.84	317	324	163
Jul-20	6.34	2.93	252	255	112
Aug-20	6.67	3.39	366	370	178
Sep-20	13.6	6.86	653	660	340
Oct-20	9.72	441	1,060	1,500	458
Nov-20	14.1	747	1,090	1,840	400
Dec-20	11.5	69.1	1,070	1,140	164
Jan-21	12.2	128	1,170	1,290	240
Feb-21	12.0	12.1	1,030	1,040	165
Mar-21	11.4	131	978	1,110	250
Apr-21	9.88	7.57	638	645	213
May-21	11.6	4.40	629	633	241
Jun-21	8.95	5.63	293	299	212
Jul-21	6.01	20.7	401	422	179
Aug-21	10.3	25.4	534	560	247
Sep-21	11.0	6.17	310	316	196
Oct-21	8.30	110	577	687	185
Nov-21	9.60	115	674	789	210

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	16.0	757	980	1,740	407
Jan-22	15.1	771	1,180	1,950	303
Feb-22	11.8	208	929	1,150	132
Mar-22	8.35	46.4	798	845	110
Apr-22	10.4	117	677	691	155
May-22	13.3	20.3	610	633	227
Jun-22	9.23	5.28	148	153	89.2
Jul-22	7.32	12.1	453	465	148
Aug-22	8.87	18.5	407	426	202
Sep-22	9.05	27.4	598	625	245
Oct-22	12.7	333	1,030	1,370	397
Nov-22	12.9	368	728	1,100	219
Dec-22	14.5	490	953	1,440	184
Jan-23	22.4	657	1,230	1,890	156
Feb-23	13.1	27.5	1,090	1,120	127
Mar-23	18.0	237	1,300	1,540	121
Apr-23	12.2	327	1,430	1,760	147
May-23	9.64	8.89	791	800	65.7
Jun-23	9.66	28.9	570	599	65.2
Jul-23	9.56	7.66	368	376	233
Aug-23	11.1	25.2	871	896	187
Sep-23	8.91	46.2	881	927	84.6
Oct-23	12.6	360	1,050	1,420	175
Nov-23	11.8	405	899	1,220	127
Dec-23	13.0	425	957	1,360	76.1
Jan-24	14.7	657	1,160	1,680	149
Feb-24	18.8	302	1,450	1,740	119
Mar-24	12.8	82.1	1,030	1,060	98.8
Apr-24	13.3	79.8	1,040	1,090	113
May-24	10.7	14.6	759	782	118
Jun-24	11.4	13.4	454	468	119
Jul-24	10.3	11.2	561	570	154
Aug-24	7.64	12.7	370	382	84.5
Sep-24	12.6	107	754	902	91.5
Oct-24	10.5	296	1,100	1,330	128
Nov-24	14.2	798	918	1,460	97.6
Dec-24	14.6	775	998	1,710	86.2

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	14.4	688	897	1,550	76.9
Feb-25	14.0	479	910	1,450	87.6
Mar-25	14.7	141	1,020	1,220	45.1
Apr-25	11.5	104	1,020	1,100	101
May-25	12.4	120	1,100	1,310	165
Jun-25	8.71	20.7	581	610	56.3
Jul-25	9.69	34.0	562	609	60.7
Aug-25	8.40	19.3	654	674	36.5
Sep-25	9.61	218	609	700	51.6
Dry Season Average	**9.05**	**23.2**	**473**	**496**	**177**
Wet Season Average	**12.6**	**275**	**909**	**1,180**	**209**
Average Annual	**11.1**	**170**	**727**	**893**	**196**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 26-3. Recycled Water: City of Sunnyvale Yearly Recycled Water Flows Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	121 (0.11)	156 (0.14)	0 (0)	9 (0.01)	0 (0)	0 (0)	0 (0)	286 (0.26)
2020	111 (0.10)	219 (0.20)	0 (0)	10 (0.01)	0 (0)	0 (0)	0 (0)	340 (0.31)
2021	114 (0.10)	209 (0.19)	0 (0)	5 (<0.01)	0 (0)	0 (0)	0 (0)	328 (0.29)
2022	40 (0.04)	63 (0.06)	0 (0)	2 (<0.01)	0 (0)	0 (0)	0 (0)	105 (0.10)
2023	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2024	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Average	**64 (0.06)**	**108 (0.10)**	**0 (0)**	**4 (<0.01)**	**0 (0)**	**0 (0)**	**0 (0)**	**177 (0.16)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 26-4. Recycled Water: City of Sunnyvale Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	2	2	0	0.1	0	0	0	4
2020	2	3	0	0.1	0	0	0	5
2021	1	2	0	<1	0	0	0	3
2022	1	1	0	<1	0	0	0	2
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**1**	**1**	**0**	**<1**	**0**	**0**	**0**	**2**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 26-5. Recycled Water: City of Sunnyvale Yearly Recycled Water TIN Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	9	12	0	1	0	0	0	22
2020	9	17	0	1	0	0	0	27
2021	7	14	0	<1	0	0	0	22
2022	3	5	0	<1	0	0	0	8
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**5**	**8**	**0**	**<1**	**0**	**0**	**0**	**13**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 26-6. Recycled Water: City of Sunnyvale Yearly Recycled Water Total Phosphorus Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	2	3	0	<1	0	0	0	5
2020	2	4	0	<1	0	0	0	7
2021	2	4	0	<1	0	0	0	6
2022	1	1	0	<1	0	0	0	2
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
Average	**1**	**2**	**0**	**<1**	**0**	**0**	**0**	**3**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

27 Silicon Valley Clean Water (SVCW)

SVCW discharges to the South Bay. The plant services a population of approximately 200,000 and has a permitted ADWF capacity of 29 mgd. The average dry season discharge flow this past year was approximately 12.7 mgd. The plant performs tertiary treatment using a trickling filter complemented with an activated sludge system followed by mono-media or dual-media filtration.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent
  - The nitrogen load reduction across the plant is upwards of 20 percent. This load reduction is attributed to biological assimilation, biosolids management, and recycled water.
  - The phosphorus load reduction across the plant is upwards of 40 percent. This load reduction is attributed to chemical precipitation and biological assimilation.
- Discharge
  - Nitrogen species loads typically increases with flow during wet weather events. Furthermore, nitrogen species wet season loads are typically greater and more variable than the dry season loads.
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This is expected since this plant does not nitrify.
  - Total phosphorus concentrations range from approximately 1.6 to 5.9 mg P/L.
- Recycled Water
  - Based on Table 1-2, the plant averaged 0.5 mgd of recycled water from 2019-2024. Uses include landscape irrigation, industrial application, and other non-potable uses such as on-site plumbing.
  - Based on Table 22-3 through Table 22-5, the plant diverted on average 95 kg ammonia-N/day, 98 kg TIN-N/day, and 9 kg P/day away from the Bay from 2019-2024.

Influent

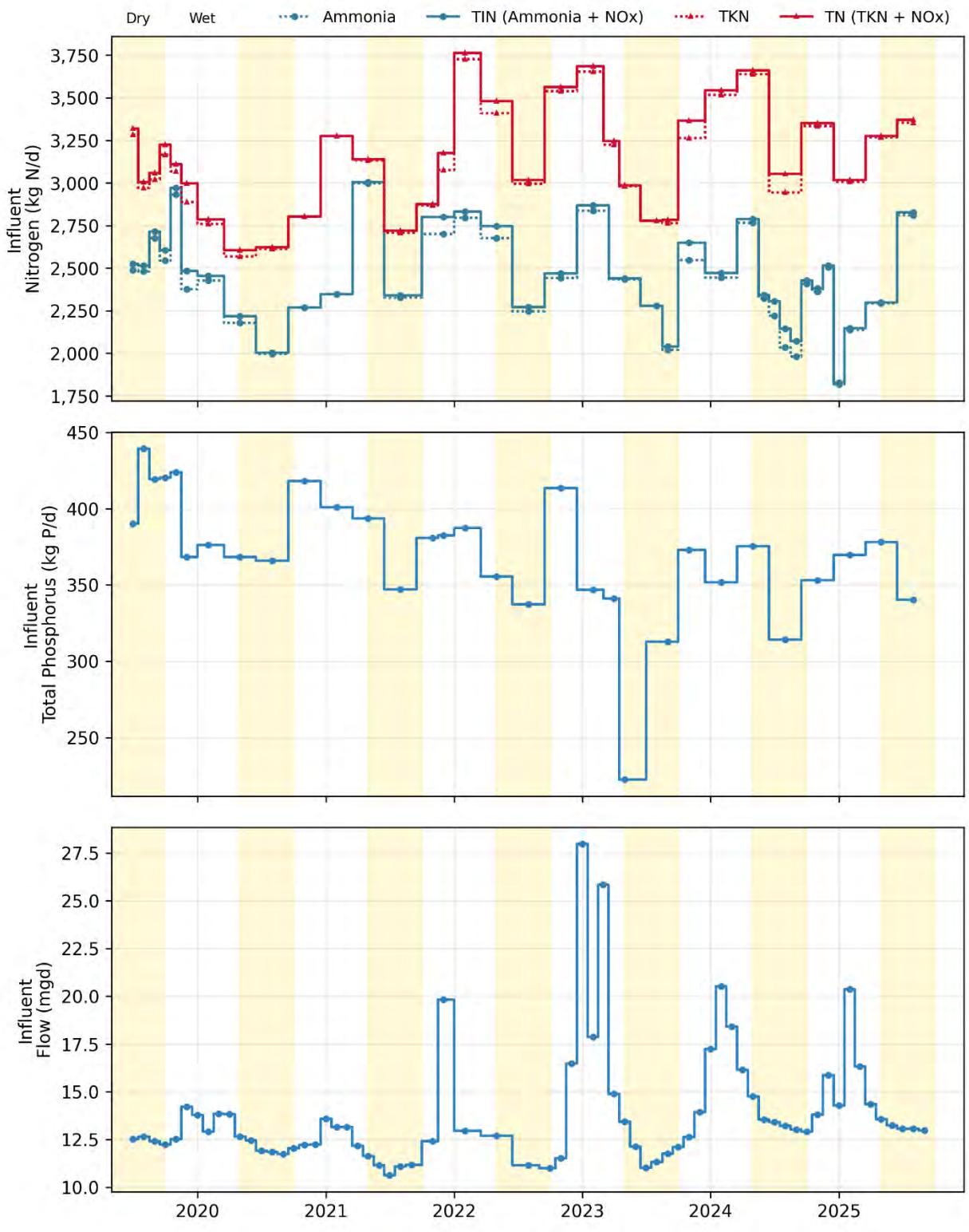


Figure 27-1. Influent: SVCW Monthly Flows and Loads

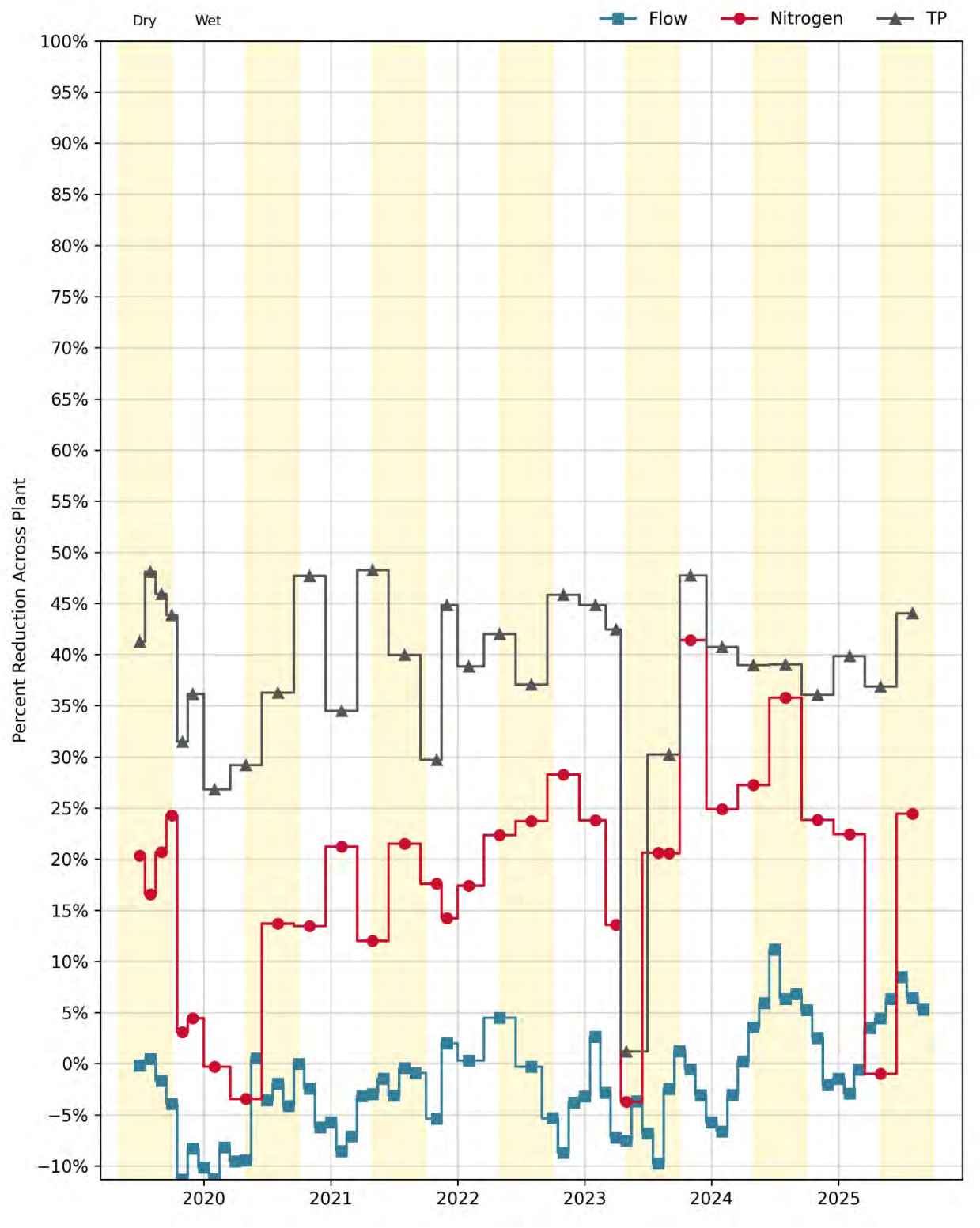


Figure 27-2. Influent: SVCW Monthly Reductions Across the Plant

Note: Influent TN was compared against Discharge TIN for calculating nitrogen load reduction.

Table 27-1. Influent: SVCW Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N **	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	12.5	2,490	36.1	2,520	3,280	3,320	390
Aug-19	12.6	2,480	34.7	2,520	2,970	3,010	439
Sep-19	12.4	2,680	40.3	2,720	3,020	3,060	419
Oct-19	12.2	2,540	59.8	2,600	3,170	3,230	420
Nov-19	12.5	2,930	40.9	2,970	3,070	3,110	424
Dec-19	14.2	2,380	109	2,480	2,890	3,000	368
Jan-20	13.8	--	--	--	--	--	--
Feb-20	12.9	2,430	27.4	2,450	2,760	2,790	376
Mar-20	13.9	--	--	--	--	--	--
Apr-20	13.8	--	--	--	--	--	--
May-20	12.6	2,180	37.2	2,220	2,570	2,600	368
Jun-20	12.4	--	--	--	--	--	--
Jul-20	11.9	--	--	--	--	--	--
Aug-20	11.9	2,000	7.80	2,000	2,610	2,620	366
Sep-20	11.7	--	--	--	--	--	--
Oct-20	12.1	--	--	--	--	--	--
Nov-20	12.2	2,270	0	2,270	2,800	2,800	418
Dec-20	12.2	--	--	--	--	--	--
Jan-21	13.6	--	--	--	--	--	--
Feb-21	13.2	2,350	0	2,350	3,280	3,280	401
Mar-21	13.1	--	--	--	--	--	--
Apr-21	12.2	--	--	--	--	--	--
May-21	11.6	3,000	7.74	3,010	3,130	3,140	394
Jun-21	11.1	--	--	--	--	--	--
Jul-21	10.6	--	--	--	--	--	--
Aug-21	11.1	2,330	12.1	2,340	2,710	2,720	347
Sep-21	11.2	--	--	--	--	--	--
Oct-21	--	--	--	--	--	--	--
Nov-21	12.4	--	7.52	--	2,870	2,880	381
Dec-21	19.8	2,700	99.8	2,800	3,080	3,180	383
Jan-22	--	--	--	--	--	--	--
Feb-22	13.0	2,790	37.4	2,830	3,730	3,760	387
Mar-22	--	--	--	--	--	--	--
Apr-22	--	--	--	--	--	--	--
May-22	12.7	2,680	71.1	2,750	3,410	3,480	355
Jun-22	--	--	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N **	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-22	--	--	--	--	--	--	--
Aug-22	11.1	2,250	23.7	2,270	2,990	3,020	337
Sep-22	--	--	--	--	--	--	--
Oct-22	11.0	--	--	--	--	--	--
Nov-22	11.5	2,440	25.2	2,470	3,540	3,560	414
Dec-22	16.5	--	--	--	--	--	--
Jan-23	28.0	--	--	--	--	--	--
Feb-23	17.9	2,840	31.3	2,870	3,650	3,680	347
Mar-23	25.9	--	--	--	--	--	--
Apr-23	14.9	--	21.4	--	3,230	3,250	341
May-23	13.4	2,440	5.15	2,440	2,980	2,990	222
Jun-23	12.1	--	--	--	--	--	--
Jul-23	11.0	--	--	--	--	--	--
Aug-23	11.3	2,280	0.421	2,280	2,780	2,780	--
Sep-23	11.8	2,020	18.0	2,040	2,760	2,780	313
Oct-23	12.1	--	--	--	--	--	--
Nov-23	12.6	2,550	102	2,650	3,260	3,370	373
Dec-23	13.9	--	--	--	--	--	--
Jan-24	17.2	--	--	--	--	--	--
Feb-24	20.5	2,450	27.2	2,470	3,520	3,540	352
Mar-24	18.4	--	--	--	--	--	--
Apr-24	16.2	--	--	--	--	--	--
May-24	14.8	2,770	20.2	2,790	3,640	3,660	376
Jun-24	13.5	2,320	19.0	2,330	--	--	--
Jul-24	13.4	2,220	86.7	2,330	--	--	--
Aug-24	13.2	2,030	111	2,160	2,940	3,060	314
Sep-24	13.0	1,980	89.9	2,070	--	--	--
Oct-24	12.9	2,410	17.4	2,430	--	--	--
Nov-24	13.8	2,360	19.4	2,380	3,330	3,350	353
Dec-24	15.9	2,510	7.54	2,510	--	--	--
Jan-25	14.3	1,820	7.82	1,820	--	--	--
Feb-25	20.4	2,140	10.7	2,150	3,010	3,020	370
Mar-25	16.3	--	--	--	--	--	--
Apr-25	14.3	--	--	--	--	--	--
May-25	13.6	2,290	6.93	2,300	3,270	3,260	378
Jun-25	13.2	--	--	--	--	--	--
Jul-25	13.1	--	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN **	TKN	Total N **	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-25	13.1	2,810	17.7	2,830	3,350	3,370	340
Sep-25	13.0	--	--	--	3,970	--	--
Dry Season Average	**12.4**	**2,380**	**34.0**	**2,420**	**3,080**	**3,050**	**357**
Wet Season Average	**15.0**	**2,470**	**34.3**	**2,500**	**3,200**	**3,240**	**382**
Average Annual	**13.9**	**2,420**	**34.1**	**2,460**	**3,140**	**3,150**	**370**

* SVCW occasionally samples more than the required influent ammonia quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

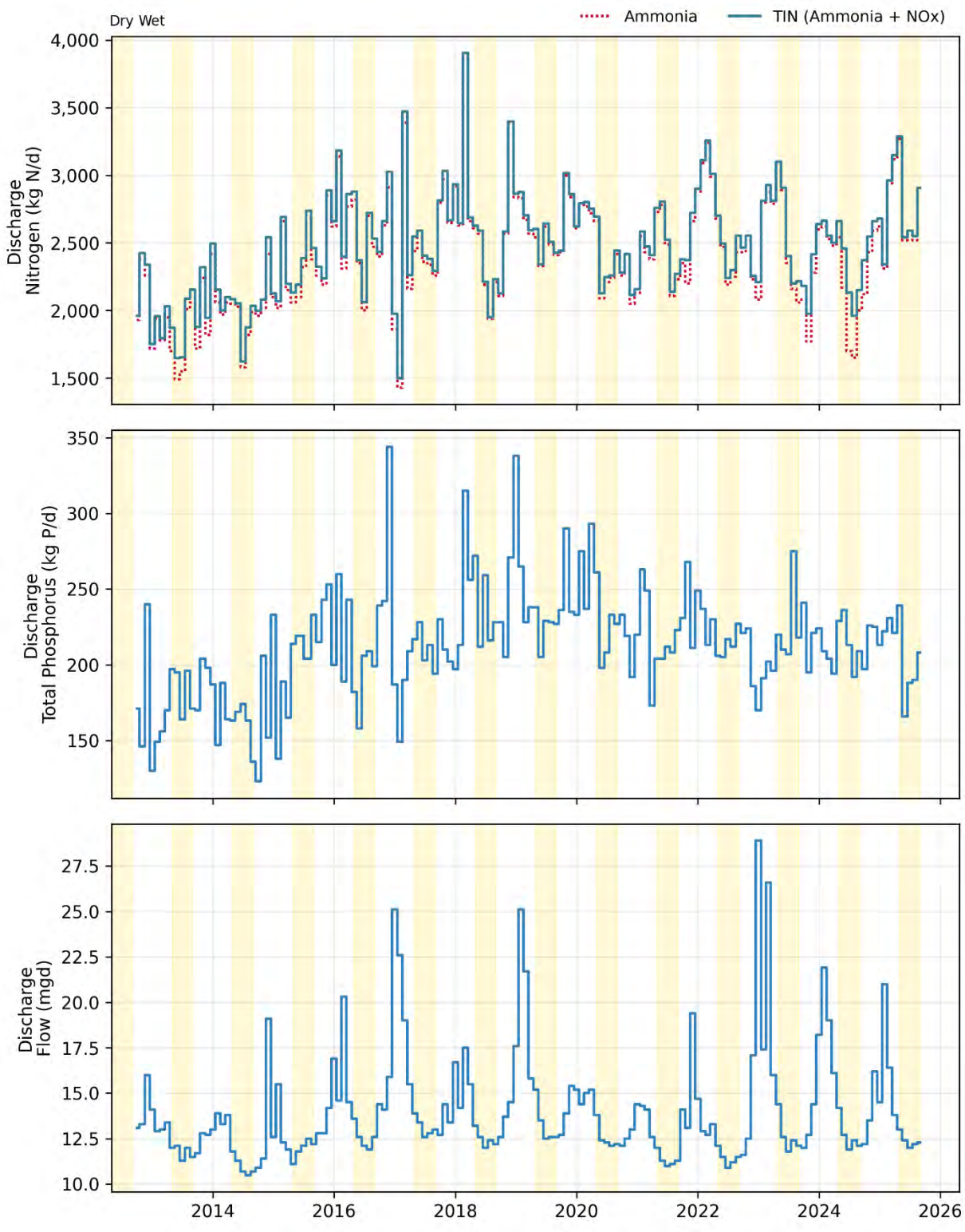


Figure 27-3. Discharge: SVCW Monthly Flows and Loads

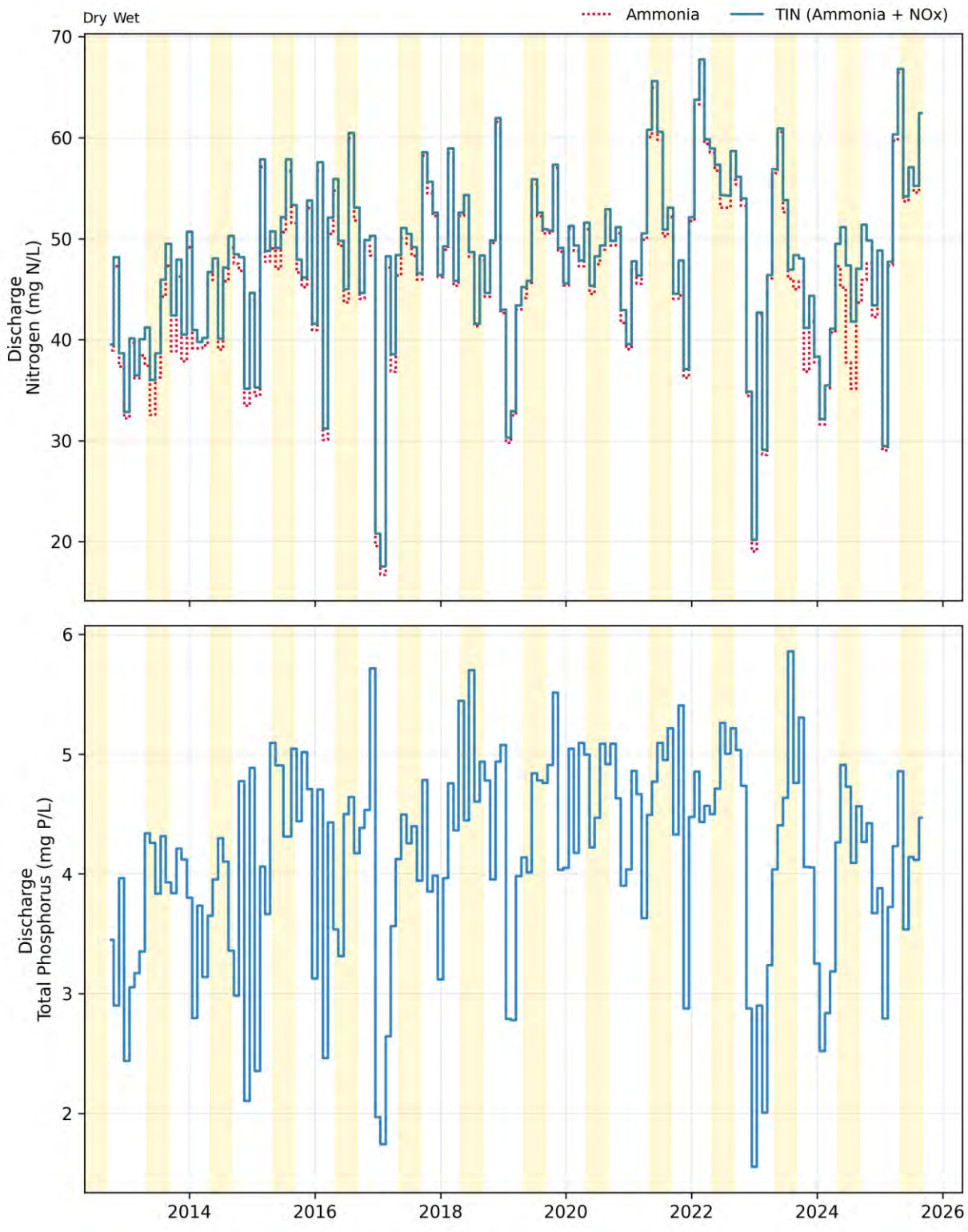


Figure 27-4. Discharge: SVCW Monthly Concentrations

Table 27-2. Discharge: SVCW Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	13.1	1,930	30.2	1,960	171
Nov-12	13.3	2,380	44.2	2,430	146
Dec-12	16.0	2,260	80.0	2,340	240
Jan-13	14.1	1,720	33.4	1,760	130
Feb-13	12.9	1,940	19.4	1,960	149
Mar-13	13.0	1,780	14.6	1,800	156
Apr-13	13.4	1,950	81.0	2,030	170
May-13	12.0	1,700	171	1,870	197
Jun-13	12.1	1,490	159	1,650	195
Jul-13	11.3	1,550	103	1,660	164
Aug-13	12.0	2,010	77.7	2,090	196
Sep-13	11.5	2,060	94.7	2,150	171
Oct-13	11.7	1,720	157	1,880	170
Nov-13	12.8	2,240	81.6	2,320	204
Dec-13	12.7	1,820	127	1,950	198
Jan-14	13.0	2,420	74.1	2,490	187
Feb-14	13.9	2,060	94.0	2,160	147
Mar-14	13.3	1,970	32.4	2,000	188
Apr-14	13.8	2,060	38.7	2,100	164
May-14	11.8	2,050	35.4	2,090	163
Jun-14	11.3	2,030	24.4	2,060	169
Jul-14	10.7	1,580	43.4	1,620	174
Aug-14	10.5	1,820	54.2	1,880	163
Sep-14	10.7	1,990	45.4	2,030	136
Oct-14	10.9	1,960	38.9	2,000	123
Nov-14	11.4	2,020	59.4	2,080	206
Dec-14	19.1	2,420	122	2,550	152
Jan-15	12.6	2,100	28.0	2,130	233
Feb-15	15.5	2,020	48.6	2,070	138
Mar-15	12.3	2,660	32.8	2,690	189
Apr-15	11.9	2,150	47.7	2,200	165
May-15	11.1	2,060	71.8	2,130	214
Jun-15	11.8	2,100	91.6	2,190	219
Jul-15	12.1	2,320	67.9	2,390	--
Aug-15	12.5	2,680	57.2	2,730	204
Sep-15	12.2	2,380	81.9	2,470	233

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	12.8	2,260	62.6	2,320	215
Nov-15	12.8	2,190	46.9	2,230	243
Dec-15	14.2	2,850	39.8	2,890	253
Jan-16	16.9	2,620	40.3	2,660	200
Feb-16	14.6	3,140	42.5	3,190	260
Mar-16	20.3	2,310	87.8	2,400	189
Apr-16	14.5	2,770	89.3	2,860	243
May-16	13.6	2,820	57.8	2,870	182
Jun-16	12.6	2,350	23.6	2,370	158
Jul-16	12.1	2,000	61.0	2,060	206
Aug-16	11.9	2,700	23.1	2,730	209
Sep-16	12.6	2,470	60.9	2,530	199
Oct-16	14.4	2,400	32.6	2,440	239
Nov-16	14.1	2,630	32.1	2,670	242
Dec-16	15.9	2,910	115	3,020	344
Jan-17	25.1	1,860	115	1,970	187
Feb-17	22.6	1,430	72.1	1,510	149
Mar-17	19.0	3,390	80.6	3,470	190
Apr-17	15.5	2,160	103	2,270	209
May-17	13.9	2,440	106	2,540	217
Jun-17	13.4	2,540	49.6	2,590	228
Jul-17	12.6	2,360	46.8	2,410	203
Aug-17	12.8	2,340	41.8	2,380	213
Sep-17	13.0	2,260	31.7	2,300	194
Oct-17	12.7	2,800	15.9	2,820	230
Nov-17	14.4	2,970	62.0	3,030	210
Dec-17	13.4	2,650	16.5	2,670	202
Jan-18	16.7	2,920	14.2	2,940	197
Feb-18	14.2	2,630	16.6	2,640	213
Mar-18**	17.5	3,870	33.7	3,900	315
Apr-18	15.5	2,660	29.2	2,690	256
May-18	13.2	2,610	16.7	2,630	272
Jun-18	12.6	2,570	20.0	2,590	212
Jul-18	12.0	2,190	21.4	2,210	259
Aug-18	12.4	1,940	12.3	1,950	216
Sep-18	12.2	2,210	21.5	2,230	228
Oct-18	12.6	2,110	17.6	2,130	228

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	13.7	2,570	13.8	2,580	205
Dec-18	14.5	3,380	18.8	3,400	271
Jan-19	17.6	2,840	24.4	2,870	338
Feb-19	25.1	2,830	46.9	2,870	265
Mar-19	21.7	2,670	32.9	2,700	228
Apr-19	15.8	2,570	23.7	2,590	238
May-19	15.2	2,540	61.4	2,600	238
Jun-19	13.5	2,330	11.8	2,340	205
Jul-19	12.5	2,620	23.2	2,640	229
Aug-19	12.6	2,490	17.5	2,510	228
Sep-19	12.6	2,410	19.0	2,430	227
Oct-19	12.7	2,430	12.4	2,440	236
Nov-19	13.9	3,000	15.8	3,010	290
Dec-19	15.4	2,840	20.1	2,860	235
Jan-20	15.2	2,610	10.9	2,620	233
Feb-20	14.4	2,780	13.5	2,790	275
Mar-20	15.0	2,770	31.0	2,800	237
Apr-20	15.2	2,720	32.7	2,750	293
May-20	13.8	2,660	34.2	2,690	261
Jun-20	12.4	2,090	37.7	2,120	198
Jul-20	12.3	2,210	36.5	2,250	208
Aug-20	12.1	2,240	19.2	2,260	233
Sep-20	12.2	2,420	23.1	2,440	227
Oct-20	12.1	2,260	19.4	2,280	233
Nov-20	12.5	2,390	29.6	2,420	219
Dec-20	13.0	2,050	63.2	2,110	192
Jan-21	14.4	2,130	26.2	2,150	220
Feb-21	14.3	2,550	35.3	2,580	263
Mar-21	14.1	2,430	44.1	2,480	249
Apr-21	12.6	2,380	30.1	2,410	173
May-21	12.0	2,730	30.7	2,760	204
Jun-21	11.3	2,780	26.2	2,810	204
Jul-21	11.0	2,490	32.3	2,520	212
Aug-21	11.1	2,110	28.9	2,140	208
Sep-21	11.3	2,230	40.7	2,270	223
Oct-21	14.1	2,350	27.4	2,380	231
Nov-21	13.1	2,200	173	2,370	268

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	19.4	2,660	63.1	2,720	211
Jan-22	14.7	2,880	20.0	2,900	249
Feb-22	12.9	3,090	23.6	3,110	237
Mar-22	12.7	3,240	17.5	3,260	213
Apr-22	13.3	2,990	21.9	3,020	230
May-22	12.1	2,680	19.7	2,700	206
Jun-22	11.5	2,470	24.6	2,490	205
Jul-22	10.9	2,190	51.2	2,240	217
Aug-22	11.2	2,250	49.9	2,300	212
Sep-22	11.5	2,430	125	2,560	227
Oct-22	11.6	2,430	33.5	2,470	221
Nov-22	12.5	2,520	34.2	2,560	224
Dec-22	17.1	2,230	24.9	2,250	186
Jan-23	28.9	2,080	129	2,210	170
Feb-23	17.4	2,800	11.8	2,810	191
Mar-23	26.6	2,880	46.7	2,930	202
Apr-23	16.0	2,790	20.9	2,810	196
May-23	14.4	3,080	20.6	3,100	220
Jun-23	12.6	2,890	15.8	2,910	210
Jul-23	11.8	2,350	54.2	2,400	207
Aug-23	12.4	2,160	42.0	2,210	275
Sep-23	12.1	2,060	155	2,210	218
Oct-23	12.0	2,080	102	2,180	241
Nov-23	12.7	1,770	208	1,970	195
Dec-23	14.4	2,280	136	2,410	221
Jan-24	18.2	2,600	39.5	2,640	224
Feb-24	21.9	2,620	44.6	2,660	209
Mar-24	19.0	2,530	22.5	2,560	204
Apr-24	16.1	2,480	23.0	2,500	194
May-24	14.2	2,540	121	2,660	229
Jun-24	12.7	2,170	288	2,460	236
Jul-24	11.9	1,700	433	2,130	213
Aug-24	12.4	1,650	311	1,960	192
Sep-24	12.1	2,000	153	2,190	209
Oct-24	12.2	2,120	252	2,370	197
Nov-24	13.5	2,430	116	2,550	226
Dec-24	16.2	2,590	69.7	2,660	225

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	14.5	2,620	59.2	2,680	213
Feb-25	21.0	2,310	32.1	2,340	222
Mar-25	16.4	2,940	23.3	2,960	231
Apr-25	13.8	3,120	30.4	3,150	221
May-25	13.0	3,270	18.0	3,290	239
Jun-25	12.4	2,520	22.6	2,540	166
Jul-25	12.0	2,560	31.7	2,590	188
Aug-25	12.2	2,520	29.6	2,550	190
Sep-25	12.3	2,870	36.5	2,910	208
Dry Season Average	**12.2**	**2,310**	**64.9**	**2,380**	**209**
Wet Season Average	**15.2**	**2,470**	**52.8**	**2,520**	**215**
Annual Average	**14.0**	**2,410**	**57.8**	**2,460**	**213**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

** One of the monthly nutrient sampling events (n=2) occurred during the maximum daily flow for that month. The loads are atypically high for this particular day due to a likely flushing phenomenon in the collection system.

Table 27-3. Recycled Water: SVCW Yearly Recycled Water Volume Diverted from the Bay

Year**	Flow Diverted*, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0 (0)	603 (0.54)	0 (0)	15 (0.01)	0 (0)	0 (0)	9 (0.01)	627 (0.56)
2020	0 (0)	450 (0.40)	0 (0)	7 (0.01)	0 (0)	0 (0)	2 (<0.01)	460 (0.41)
2021	0 (0)	714 (0.64)	0 (0)	9 (0.01)	0 (0)	0 (0)	12 (0.01)	735 (0.66)
2022	0 (0)	653 (0.58)	0 (0)	18 (0.02)	0 (0)	0 (0)	10 (0.01)	680 (0.61)
2023	0 (0)	539 (0.48)	0 (0)	16 (0.01)	0 (0)	0 (0)	9 (0.01)	564 (0.50)
2024	0 (0)	568 (0.51)	0 (0)	17 (0.02)	0 (0)	0 (0)	10 (0.01)	595 (0.53)
Average	**0 (0)**	**588 (0.53)**	**0 (0)**	**14 (0.01)**	**0 (0)**	**0 (0)**	**9 (0.01)**	**610 (0.55)**

* Assumes 100% of the recycled flow is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 27-4. Recycled Water: SVCW Yearly Recycled Water Ammonia Load Diverted from the Bay

Year**	Average Ammonia Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	90	0	2	0	0	2	94
2020	0	73	0	2	0	0	<1	75
2021	0	121	0	2	0	0	2	125
2022	0	118	0	4	0	0	2	124
2023	0	73	0	2	0	0	1	77
2024	0	77	0	2	0	0	1	81
Average	**0**	**92**	**0**	**2**	**0**	**0**	**1**	**95**

* Assumes 100% of the recycled load is diverted from the Bay

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 27-5. Recycled Water: SVCW Yearly Recycled Water TIN Load Diverted from the Bay

Year**	Average Total Inorganic Nitrogen Load Diverted*, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	91	0	2	0	0	2	95
2020	0	74	0	2	0	0	<1	75
2021	0	123	0	2	0	0	2	127
2022	0	120	0	4	0	0	2	126
2023	0	76	0	2	0	0	1	79
2024	0	82	0	2	0	0	1	86
Average	**0**	**94**	**0**	**2**	**0**	**0**	**1**	**98**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

Table 27-6. Recycled Water: SVCW Yearly Recycled Water Total P Load Diverted from the Bay

Year**	Average Total P Load Diverted*, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	8	0	<1	0	0	<1	9
2020	0	7	0	<1	0	0	<1	7
2021	0	11	0	<1	0	0	<1	11
2022	0	10	0	<1	0	0	<1	10
2023	0	6	0	<1	0	0	<1	7
2024	0	7	0	<1	0	0	<1	8
Average	**0**	**8**	**0**	**<1**	**0**	**0**	**<1**	**9**

* Assumes 100% of the recycled load is diverted for all recycled water applications

**** Calendar year as opposed to California's water year (October 1 through September 30)**

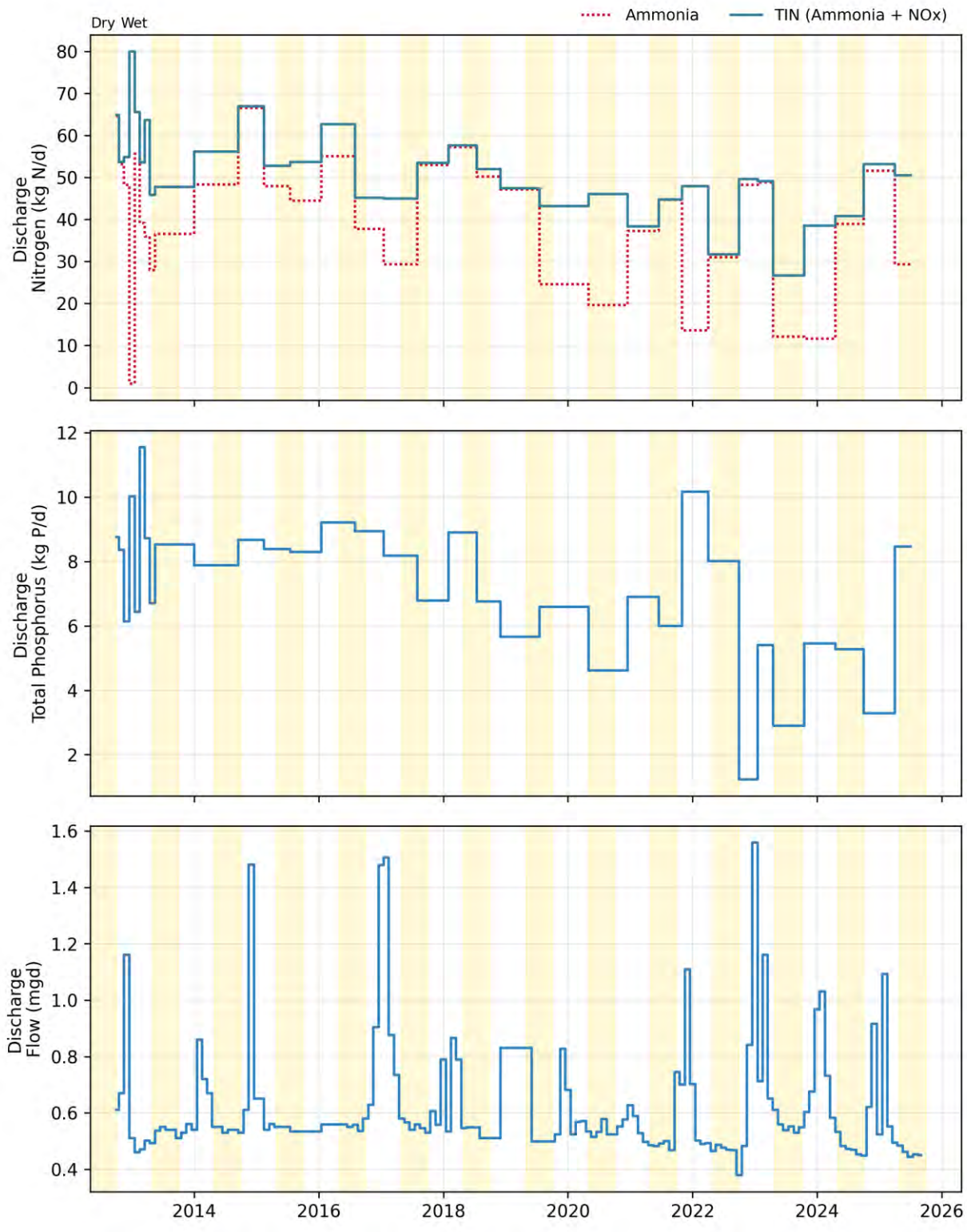
28 Sanitary District No. 5 of Marin County – Tiburon Treatment Plant

The Tiburon Treatment Plant discharges to the Central Bay. The service area has a population of approximately 8,400. The plant has a permitted ADWF capacity of 0.98 mgd and a peak wet weather capacity of 2.3 mgd. This past dry season had flows of approximately 0.46 mgd. The plant performs secondary treatment using an activated sludge treatment process.

The plant is classified as a minor discharger (<1 mgd permitted capacity) and thus not required to sample as frequently as the major dischargers (>1 mgd permitted capacity). The minor dischargers are required to sample twice per year under the Nutrient Watershed Permit. As a result, there are several months of nutrient data gaps.

The following observations are made based upon the figures and tables in the subsequent pages:

- Discharge:
  - Flow values are provided over the entire study period. The remaining nutrient species only have monthly sampling for the first year of sampling, followed by occasional sampling thereafter (e.g., ammonia samples are more frequent).
  - Ammonia is the majority of the nitrogen species discharged, regardless of season. This would be expected since this plant does not nitrify.
  - Total phosphorus concentrations are wide ranging from approximately <0.5 to 6.5 mg P/L and have been decreasing in recent years, indicating occasional phosphorus removal. Typical effluent TP concentrations range from 4 to 6 mg P/L.
- Recycled Water: No recycled water was produced or distributed this past year.



Figu-re 28-1. Discharge: Tiburon Monthly Flows and Loads

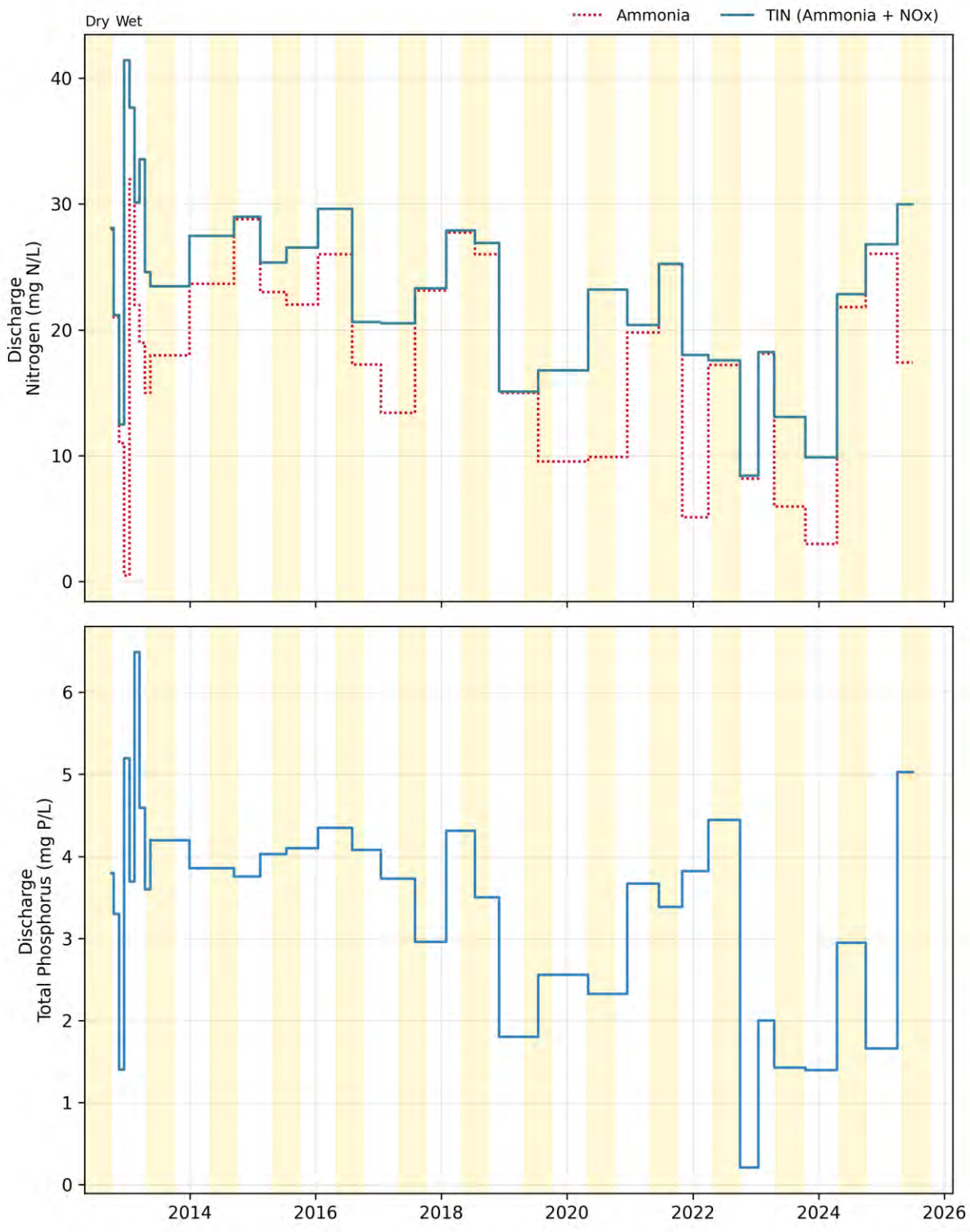


Figure 28-2. Discharge: Tiburon Monthly Concentrations

Table 28-1. Discharge: Tiburon Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.610	64.6	0.284	64.8	8.76
Nov-12	0.670	53.2	0.484	53.7	8.36
Dec-12	1.16	48.2	6.58	54.8	6.14
Jan-13	0.510	0.906	79.1	80.0	10.0
Feb-13	0.460	55.6	9.91	65.6	6.43
Mar-13	0.470	39.1	14.4	53.5	11.5
Apr-13	0.501	36.0	27.6	63.6	8.71
May-13	0.493	28.0	17.9	45.8	6.71
Jun-13	0.537	36.5	11.2	47.7	8.53
Jul-13	0.550	--	--	--	--
Aug-13	0.540	--	--	--	--
Sep-13	0.540	--	--	--	--
Oct-13	0.510	--	--	--	--
Nov-13	0.530	--	--	--	--
Dec-13	0.560	--	--	--	--
Jan-14	0.540	--	--	--	--
Feb-14	0.860	--	--	--	--
Mar-14	0.720	--	--	--	--
Apr-14	0.670	--	--	--	--
May-14	0.550	--	--	--	--
Jun-14	0.550	--	--	--	--
Jul-14	0.530	--	--	--	--
Aug-14	0.540	48.3	7.78	56.1	7.88
Sep-14	0.540	--	--	--	--
Oct-14	0.530	--	--	--	--
Nov-14	0.610	66.5	0.455	66.9	8.66
Dec-14	1.48	--	--	--	--
Jan-15	0.650	--	--	--	--
Feb-15	0.650	--	--	--	--
Mar-15	0.540	--	--	--	--
Apr-15	0.560	--	--	--	--
May-15	0.550	--	--	--	--
Jun-15	0.550	47.9	4.83	52.7	8.38
Jul-15	--	--	--	--	--
Aug-15	--	--	--	--	--
Sep-15	0.534	44.5	9.16	53.6	8.29

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	--	--	--	--	--
Nov-15	--	--	--	--	--
Dec-15	--	--	--	--	--
Jan-16	--	--	--	--	--
Feb-16	--	--	--	--	--
Mar-16	--	--	--	--	--
Apr-16	--	--	--	--	--
May-16	--	--	--	--	--
Jun-16	0.559	55.0	7.60	62.6	9.20
Jul-16	0.550	--	--	--	--
Aug-16	0.557	--	--	--	--
Sep-16	0.536	--	--	--	--
Oct-16	0.579	37.8	7.41	45.2	8.94
Nov-16	0.628	--	--	--	--
Dec-16	0.904	--	--	--	--
Jan-17	1.48	--	--	--	--
Feb-17	1.51	--	--	--	--
Mar-17	0.876	--	--	--	--
Apr-17	0.735	--	--	--	--
May-17	0.579	29.4	15.6	45.0	8.18
Jun-17	0.566	--	--	--	--
Jul-17	0.540	--	--	--	--
Aug-17	0.559	--	--	--	--
Sep-17	0.546	--	--	--	--
Oct-17	0.529	--	--	--	--
Nov-17	0.606	53.0	0.424	53.4	6.78
Dec-17	0.558	--	--	--	--
Jan-18	0.788	--	--	--	--
Feb-18	0.534	--	--	--	--
Mar-18	0.866	--	--	--	--
Apr-18	0.790	--	--	--	--
May-18	0.545	57.2	0.339	57.6	8.90
Jun-18	0.549	--	--	--	--
Jul-18	--	--	--	--	--
Aug-18	--	--	--	--	--
Sep-18	--	--	--	--	--
Oct-18	0.510	50.2	1.76	51.9	6.76

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	--	--	--	--	--
Dec-18	--	--	--	--	--
Jan-19	--	--	--	--	--
Feb-19	0.830	47.1	0.314	47.4	5.65
Mar-19	--	--	--	--	--
Apr-19	--	--	--	--	--
May-19	--	--	--	--	--
Jun-19	--	--	--	--	--
Jul-19	--	--	--	--	--
Aug-19	--	--	--	--	--
Sep-19	--	--	--	--	--
Oct-19	0.499	20.2	--	--	--
Nov-19	0.524	28.1	--	--	--
Dec-19	0.828	22.4	--	--	--
Jan-20	0.681	24.6	18.6	39.7	6.59
Feb-20	0.523	36.5	--	--	--
Mar-20	0.568	37.8	--	--	--
Apr-20	0.571	45.5	--	--	--
May-20	0.533	34.3	--	--	--
Jun-20	0.515	25.5	--	--	--
Jul-20	0.532	42.3	--	--	--
Aug-20	0.578	15.8	--	--	--
Sep-20	0.524	19.7	26.3	27.7	4.61
Oct-20	0.523	16.7	--	--	--
Nov-20	0.551	25.9	--	--	--
Dec-20	0.576	19.1	--	--	--
Jan-21	0.626	25.8	--	--	--
Feb-21	0.588	26.9	--	--	--
Mar-21	0.529	19.4	--	--	--
Apr-21	0.497	37.2	1.09	36.8	6.90
May-21	0.486	33.5	--	--	--
Jun-21	0.482	36.3	--	--	--
Jul-21	0.491	52.9	--	--	--
Aug-21	0.499	49.4	--	--	--
Sep-21	0.468	44.7	0.0727	45.5	6.00
Oct-21	0.745	42.2	--	--	--
Nov-21	0.701	38.9	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	1.11	29.2	--	--	--
Jan-22	0.703	13.6	34.3	66.8	10.2
Feb-22	0.501	18.4	--	--	--
Mar-22	0.490	50.0	--	--	--
Apr-22	0.492	23.9	--	--	--
May-22	0.465	13.3	--	--	--
Jun-22	0.487	54.6	--	--	--
Jul-22	0.476	31.0	0.681	46.7	8.01
Aug-22	0.470	24.2	--	--	--
Sep-22	0.468	42.8	--	--	--
Oct-22	0.379	24.1	--	--	--
Nov-22	0.482	49.1	--	--	--
Dec-22	0.840	48.5	--	--	--
Jan-23	1.56	48.2	1.38	51.6	1.23
Feb-23	0.713	48.8	0.310	49.6	5.40
Mar-23	1.16	46.8	--	--	--
Apr-23	0.650	26.9	--	--	--
May-23	0.610	10.7	--	--	--
Jun-23	0.559	23.4	--	--	--
Jul-23	0.538	12.1	14.5	43.5	2.90
Aug-23	0.551	35.8	--	--	--
Sep-23	0.530	24.7	--	--	--
Oct-23	0.548	54.4	--	--	--
Nov-23	0.603	21.7	--	--	--
Dec-23	0.676	7.12	--	--	--
Jan-24	0.967	44.1	--	--	--
Feb-24	1.03	11.6	26.9	30.9	5.45
Mar-24	0.731	23.6	--	--	--
Apr-24	0.583	35.5	--	--	--
May-24	0.533	46.1	--	--	--
Jun-24	0.482	29.0	--	--	--
Jul-24	0.472	38.9	1.82	41.8	5.27
Aug-24	0.468	37.4	--	--	--
Sep-24	0.453	32.5	--	--	--
Oct-24	0.449	40.9	--	--	--
Nov-24	0.620	59.5	--	--	--
Dec-24	0.916	34.1	--	--	--

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	0.524	51.6	1.50	53.1	3.29
Feb-25	1.09	34.7	--	--	--
Mar-25	0.552	24.1	--	--	--
Apr-25	0.494	47.2	--	--	--
May-25	0.484	31.3	--	--	--
Jun-25	0.462	34.8	--	--	--
Jul-25	0.445	29.3	21.2	50.5	8.46
Aug-25	0.452	36.6	--	--	--
Sep-25	0.450	13.1	--	--	--
Dry Season Average	**0.520**	**34.3**	**9.93**	**48.3**	**7.24**
Wet Season Average	**0.695**	**35.9**	**12.3**	**54.2**	**7.15**
Annual Average	**0.624**	**35.2**	**11.3**	**51.7**	**7.19**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

29 Treasure Island

Treasure Island discharges to the Central Bay. The plant has a permitted capacity of 2.0 mgd ADWF and a peak wet weather capacity of 4.4 mgd. It had a dry season (May 1 through September 30) flow of approximately 0.48 mgd this past dry season. The plant currently nitrifies using trickling filters.

The following observations are made based upon the figures and table in the subsequent pages:

- Discharge
  - Dry and wet weather monthly flows in 2025 were the highest since data collection began, reaching 0.97 mgd in February 2025. SFPUC staff are investigating the accuracy of this effluent flow data and it's impact on the load data calculated below.
  - NOx represents the majority of nitrogen species discharged as expected since this plant nitrifies.
  - TP discharge loads in 2025 include the highest since data collection began, reaching 18.4 kg P/d, several times greater than the historically typical discharge load of approximately 2 to 4 kg P/d.
  - TIN loads during the 2025 dry season were also the highest observed since data collection began.
  - The current Treasure Island plant is being replaced with a new facility with a membrane bioreactor tertiary treatment process and is expected to produce effluent with low nutrient concentrations. High quality effluent is expected from Treasure Island by the end of 2026.
- Recycled Water: No recycled water was produced or distributed this year.



Figure 29-1. Discharge: Treasure Island Monthly Flows and Loads

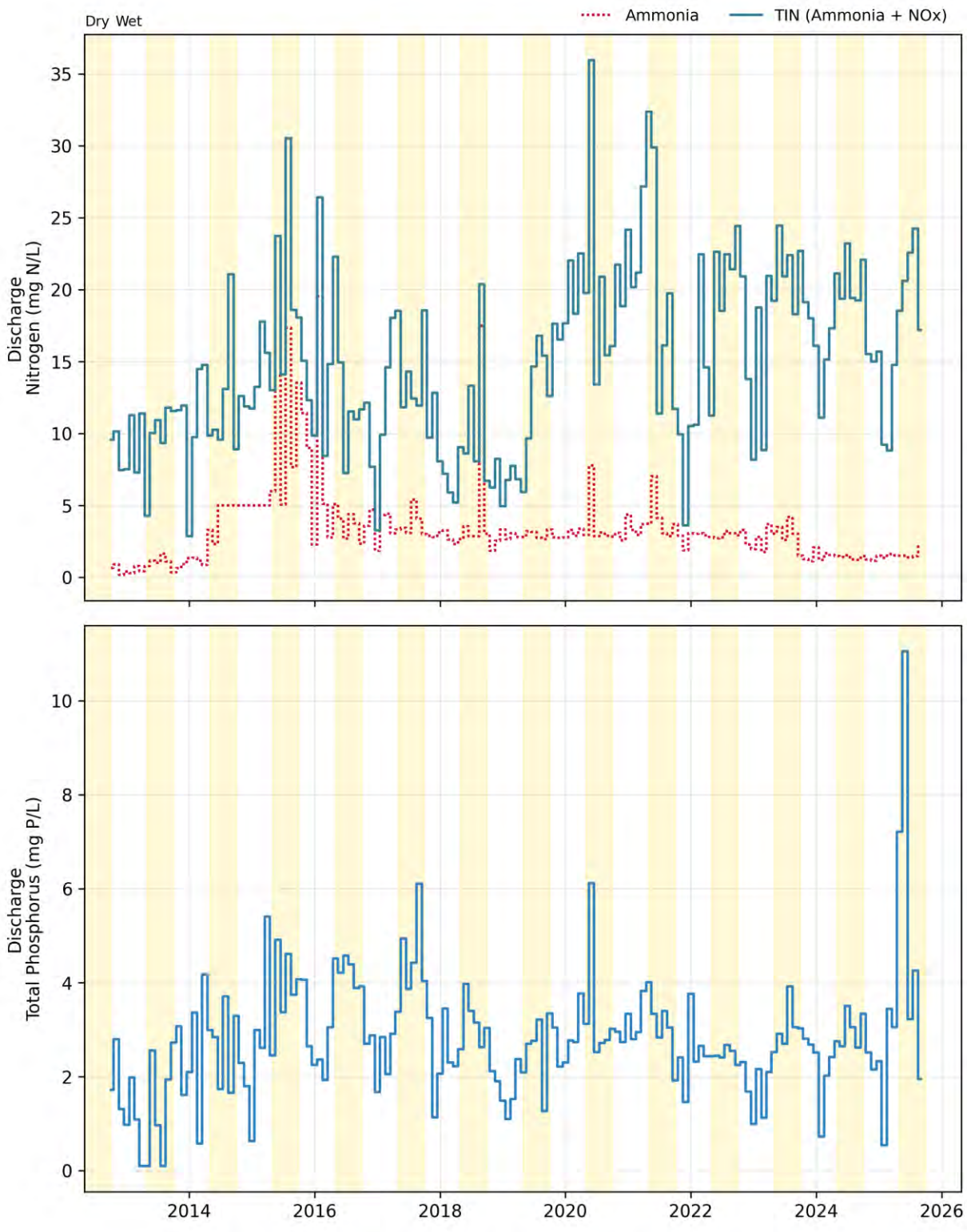


Figure 29-2. Discharge: Treasure Island Monthly Concentrations

Table 29-1. Treasure Island Monthly Flows and Loads[1]

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	0.299	0.757	10.1	10.8	1.94
Nov-12	0.295	1.00	10.3	11.3	3.12
Dec-12	0.437	0.297	12.0	12.3	2.16
Jan-13	0.391	0.602	10.5	11.1	1.44
Feb-13	0.330	0.387	13.7	14.1	2.48
Mar-13	0.287	0.872	7.04	7.91	1.18
Apr-13	0.299	0.509	12.4	12.9	0.113
May-13	0.272	0.802	3.59	4.40	0.103
Jun-13	0.314	1.40	10.5	11.9	3.04
Jul-13	0.226	0.863	8.49	9.35	0.829
Aug-13	0.283	1.79	8.23	10.0	0.107
Sep-13	0.312	1.32	12.6	13.9	2.29
Oct-13	0.299	0.411	12.7	13.1	3.09
Nov-13	0.295	0.713	12.3	13.0	3.43
Dec-13	0.437	1.55	18.2	19.7	2.67
Jan-14	0.391	1.99	2.25	4.25	3.10
Feb-14	0.330	1.69	10.5	12.2	4.20
Mar-14	0.287	1.27	14.5	15.7	0.630
Apr-14	0.299	0.976	15.7	16.7	4.73
May-14	0.272	3.39	6.77	10.2	3.08
Jun-14	0.314	2.75	9.43	12.2	3.38
Jul-14	0.286	5.40	4.94	10.3	1.88
Aug-14	0.278	5.26	8.53	13.8	3.91
Sep-14	0.314	5.94	19.1	25.1	1.97
Oct-14	0.311	5.87	4.60	10.5	3.87
Nov-14	0.299	5.66	8.62	14.3	2.60
Dec-14	0.591	11.2	15.4	26.6	4.02
Jan-15	0.352	6.66	9.01	15.7	0.840
Feb-15	0.356	6.72	11.1	17.8	4.03
Mar-15	0.317	6.00	15.4	21.4	3.14
Apr-15	0.292	5.52	11.7	17.2	5.97
May-15	0.271	6.14	7.22	13.4	2.52
Jun-15	0.282	15.0	10.3	25.3	5.24
Jul-15	0.271	5.20	9.30	14.5	3.47
Aug-15	0.285	18.7	14.2	33.0	4.98

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Sep-15	0.263	7.63	10.9	18.5	3.73
Oct-15	0.297	15.2	5.09	20.3	4.58
Nov-15	0.262	11.3	3.62	15.0	4.03
Dec-15	0.317	10.8	3.98	14.8	3.17
Jan-16	0.480	4.19	13.7	17.9	4.08
Feb-16	0.343	25.3	8.90	34.2	3.07
Mar-16	0.569	11.0	7.14	18.2	4.15
Apr-16	0.331	3.48	15.1	18.6	3.83
May-16	0.283	5.45	18.4	23.9	4.84
Jun-16	0.289	4.45	11.9	16.3	4.60
Jul-16	0.260	2.65	4.51	7.16	4.51
Aug-16	0.274	4.55	7.42	12.0	4.55
Sep-16	0.260	3.71	7.09	10.8	3.82
Oct-16	0.275	2.45	9.70	12.2	4.07
Nov-16	0.338	4.58	11.0	15.5	3.46
Dec-16	0.342	6.10	3.85	9.95	3.73
Jan-17	0.648	4.52	3.52	8.04	4.10
Feb-17	0.668	11.0	14.1	25.1	7.18
Mar-17	0.466	7.81	17.9	25.7	3.63
Apr-17	0.373	4.34	21.1	25.5	4.11
May-17	0.307	3.87	17.7	21.6	3.94
Jun-17	0.264	3.44	8.38	11.8	4.93
Jul-17	0.267	3.12	11.3	14.5	3.91
Aug-17	0.274	5.61	7.26	12.9	4.59
Sep-17	0.275	4.23	8.17	12.4	6.35
Oct-17	0.252	2.88	14.8	17.7	3.85
Nov-17	0.267	2.92	6.90	9.82	3.28
Dec-17	0.259	2.76	9.85	12.6	1.11
Jan-18	0.347	4.09	6.50	10.6	2.71
Feb-18	0.301	3.72	4.49	8.22	3.94
Mar-18	0.385	3.84	4.75	8.59	3.35
Apr-18	0.418	3.66	4.57	8.23	3.52
May-18	0.364	3.67	8.79	12.5	3.56
Jun-18	0.287	3.88	5.49	9.37	4.32
Jul-18	0.286	3.11	11.3	14.4	3.68
Aug-18	0.301	3.26	5.92	9.18	3.58

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Sep-18	0.292	19.3	3.21	22.5	2.91
Oct-18	0.283	3.26	3.92	--	3.25
Nov-18	0.442	3.13	7.32	10.5	3.54
Dec-18	0.416	--	--	--	--
Jan-19	0.541	6.85	3.27	10.1	3.06
Feb-19	0.723	7.27	11.3	18.6	3.00
Mar-19	0.599	6.98	10.6	17.6	3.45
Apr-19	0.405	4.31	6.19	11.3	3.64
May-19	0.351	3.75	4.12	7.87	2.77
Jun-19	0.329	4.02	8.01	12.0	3.36
Jul-19	0.288	3.45	12.5	16.0	3.01
Aug-19	0.288	3.00	15.3	18.3	3.50
Sep-19	0.278	2.82	13.4	16.2	1.33
Oct-19	0.264	3.32	9.25	12.6	3.34
Nov-19	0.281	2.96	15.8	18.8	3.24
Dec-19	0.352	3.64	18.3	22.0	2.94
Jan-20	0.361	3.82	20.3	24.2	3.15
Feb-20	0.319	3.99	22.6	26.6	3.35
Mar-20	0.309	3.38	18.0	21.4	3.20
Apr-20	0.271	3.46	19.6	23.1	3.87
May-20	0.267	3.00	17.0	20.0	3.16
Jun-20	0.267	7.88	28.5	36.4	6.19
Jul-20	0.241	2.62	9.62	12.2	2.30
Aug-20	0.256	3.03	17.2	20.2	2.63
Sep-20	0.231	2.53	11.0	13.5	2.43
Oct-20	0.233	2.50	11.7	14.2	2.66
Nov-20	0.216	2.53	15.2	17.7	2.41
Dec-20	0.234	2.27	14.4	16.7	2.42
Jan-21	0.232	3.83	17.4	21.2	2.93
Feb-21	0.247	3.10	15.7	18.8	2.62
Mar-21	0.227	2.54	15.7	18.2	2.53
Apr-21	0.230	3.22	20.4	23.6	3.33
May-21	0.211	2.99	22.9	25.9	3.21
Jun-21	0.236	6.27	20.4	26.6	2.97
Jul-21	0.235	3.68	6.48	10.2	2.53
Aug-21	0.255	2.95	12.6	15.5	3.28

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Sep-21	0.254	2.75	16.2	19.0	2.92
Oct-21	0.346	4.86	10.4	15.3	2.51
Nov-21	0.377	4.16	10.1	14.2	3.44
Dec-21	0.499	3.58	3.24	6.82	2.75
Jan-22	0.391	4.54	11.0	15.6	5.56
Feb-22	0.311	3.57	8.91	12.5	2.73
Mar-22	0.283	3.28	20.8	24.1	2.84
Apr-22	0.268	2.96	11.9	14.8	2.47
May-22	0.252	2.68	8.04	10.7	2.32
Jun-22	0.253	2.60	19.1	21.7	2.34
Jul-22	0.301	3.17	18.0	21.1	2.75
Aug-22	0.278	3.37	20.2	23.6	2.81
Sep-22	0.278	3.21	19.3	22.5	2.68
Oct-22	0.281	3.11	22.8	25.9	2.39
Nov-22	0.274	3.42	18.2	21.6	2.39
Dec-22	0.408	3.54	17.7	21.3	2.60
Jan-23	0.799	5.98	18.8	24.7	2.99
Feb-23	0.401	4.27	24.2	28.5	3.27
Mar-23	0.691	4.63	18.5	23.2	2.93
Apr-23	0.364	5.09	23.7	28.8	2.88
May-23	0.320	3.68	19.6	23.3	3.07
Jun-23	0.289	3.82	22.9	26.7	3.18
Jul-23	0.314	3.11	21.8	24.9	3.21
Aug-23	0.348	5.53	24.0	29.5	5.16
Sep-23	0.342	3.95	19.8	23.7	3.95
Oct-23	0.280	1.60	22.4	24.0	3.20
Nov-23	0.294	1.42	19.9	21.3	3.12
Dec-23	0.351	1.53	22.4	23.9	3.56
Jan-24	0.432	3.43	22.9	26.3	4.12
Feb-24	0.623	2.91	23.3	26.2	1.71
Mar-24	0.433	2.76	22.1	24.8	3.31
Apr-24	0.361	2.15	21.5	23.7	3.30
May-24	0.333	1.86	24.8	26.6	3.47
Jun-24	0.215	1.15	14.6	15.8	2.15
Jul-24	0.312	1.83	25.6	27.4	4.14
Aug-24	0.304	1.43	20.9	22.3	3.52

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Sep-24	0.317	1.48	21.7	23.1	3.15
Oct-24	0.428	2.38	33.4	35.8	5.40
Nov-24	0.483	2.30	26.1	28.4	4.60
Dec-24	0.605	2.64	31.7	34.3	4.93
Jan-25	0.541	3.11	29.0	32.1	4.77
Feb-25	0.966	5.01	28.7	33.8	1.97
Mar-25	0.653	3.99	17.8	21.8	8.50
Apr-25	0.481	2.78	24.1	26.9	5.56
May-25	0.451	2.57	29.1	31.7	12.3
Jun-25	0.441	2.52	31.9	34.4	18.4
Jul-25	0.439	2.29	35.2	37.5	5.35
Aug-25	0.407	2.29	35.1	37.4	6.56
Sep-25	0.669	5.68	37.9	43.5	4.92
Dry Season Average	**0.298**	**4.14**	**14.9**	**19.0**	**3.78**
Wet Season Average	**0.384**	**4.20**	**14.1**	**18.5**	**3.33**
Average Annual	**0.348**	**4.17**	**14.4**	**18.7**	**3.52**

1 Per Order R2-2024-0013 Table E-3 footnote [2], for non-detect results for samples on October 1, 2023 and after, half of the method detection limit was used to quantify estimated load values. Prior to October 1, 2023, non-detect values used the method detection limit.

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Recycled Water

No recycled water was produced or distributed this past year.

30 Vallejo Flood & Wastewater District

Vallejo discharges to San Pablo Bay and it has approximately 37,845 service connections. The plant has a permitted ADWF capacity of 15.5 mgd and a peak wet weather capacity of 60 mgd. The average dry season discharge flows this past year are approximately 8.93 mgd dry season. The plant performs secondary treatment using a trickling filter/solids contact process.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent and Reduction Across the Plant
  - The flow reduction across the plant is negligible.
  - The nitrogen load reduction values across the plant typically range from approximately 30 to 60 percent. This load reduction is attributed primarily to a combination of biological assimilation, biosolids management, and/or biological load reduction in the trickling filter/solids contact process.
  - The phosphorus load reduction across the plant ranges from less than 10 to approximately 75 percent, though often around 40 percent. The load reduction is attributed to a combination of chemical precipitation, biological assimilation, and/or biosolids management.
- Discharge
  - The average monthly dry season flow values for 2025 increased compared to 2024 (from 8.6 to 8.9 mgd).
  - Ammonia comprises the majority of the nitrogen species.
  - The phosphorus concentrations range from 1.1 to 5.3 mg P/L. A portion of the total P is removed across the plant as noted.
- Recycled Water: No recycled water was produced or distributed this past year.

Influent

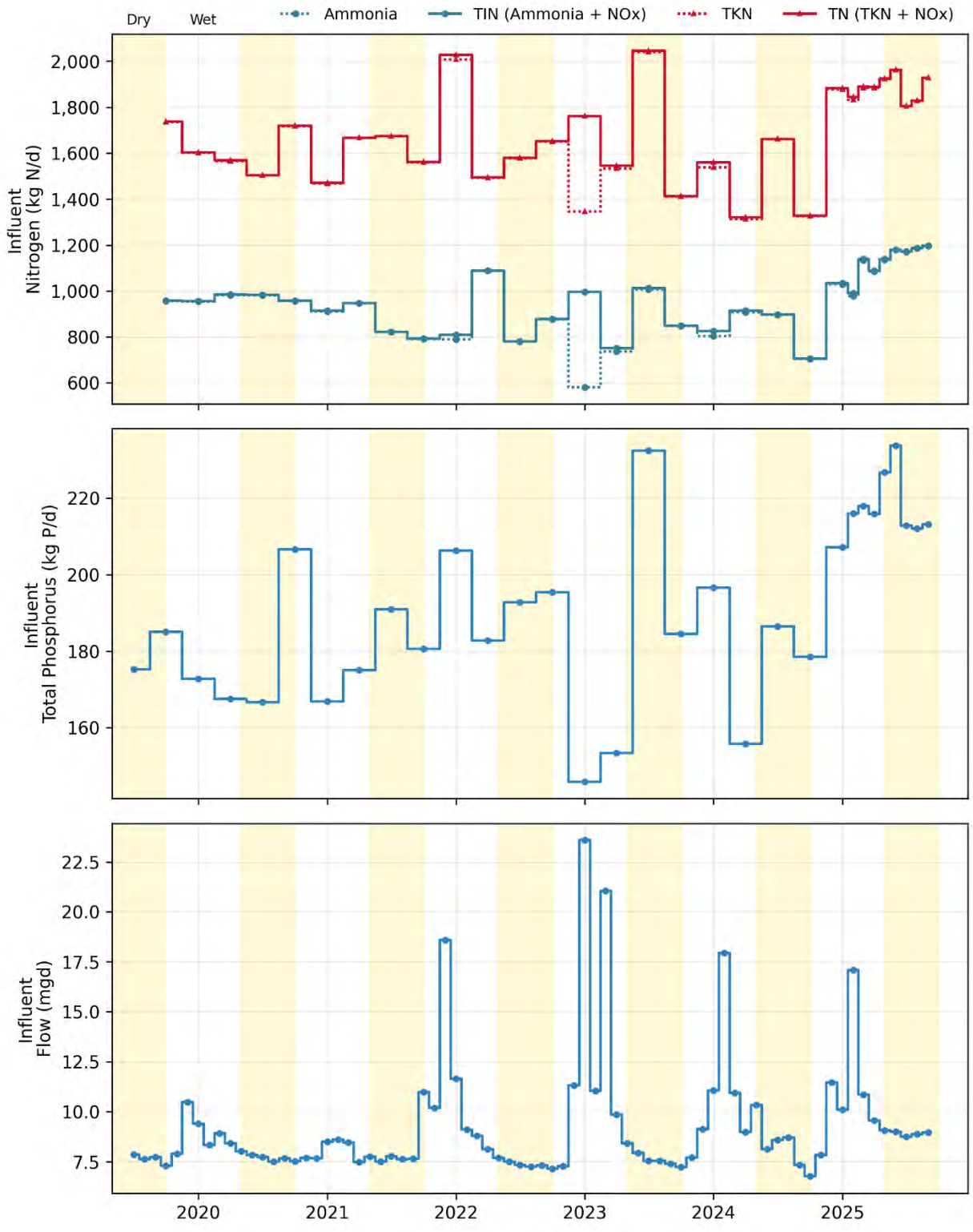


Figure 30-1. Influent: Vallejo Monthly Flows and Loads

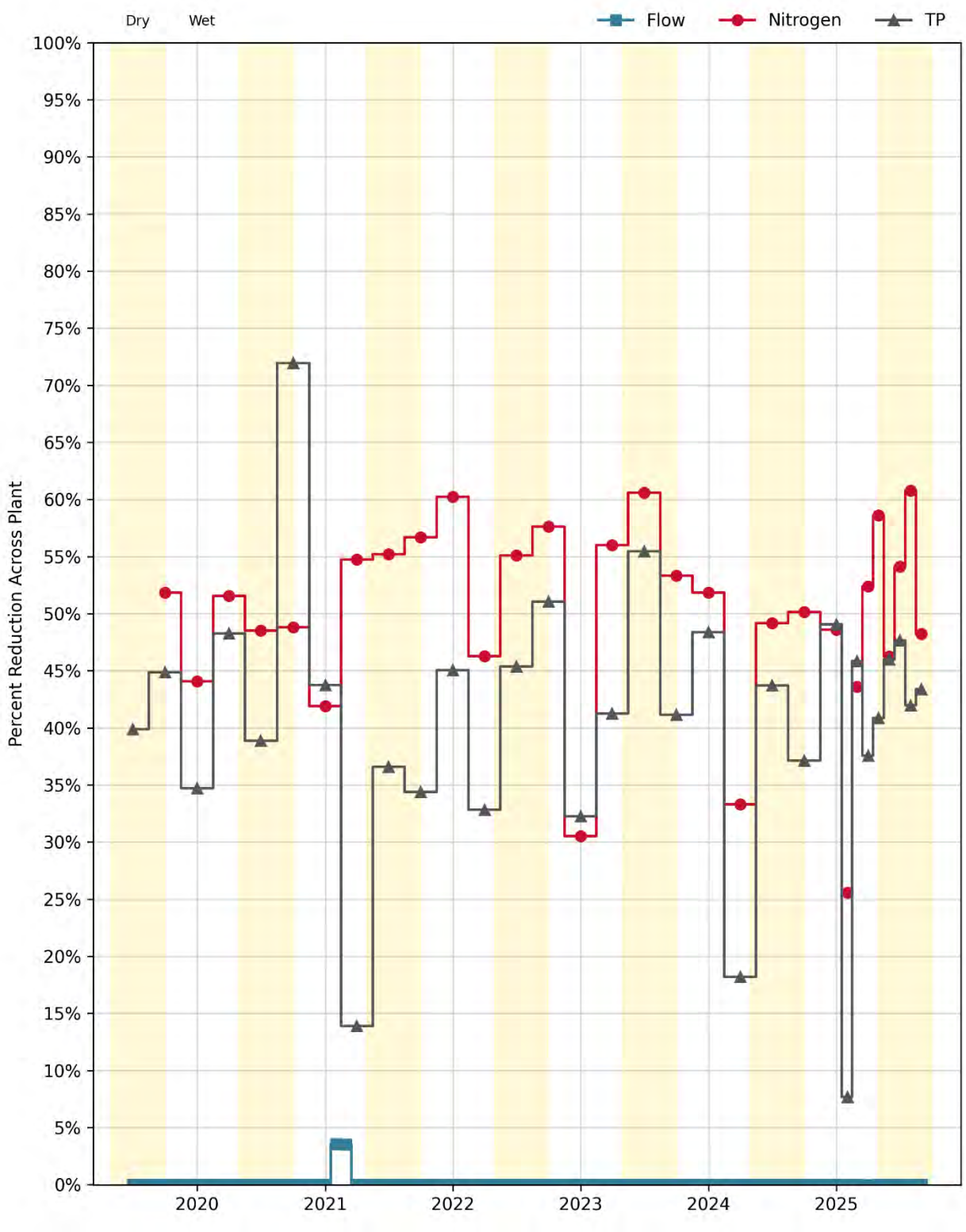


Figure 30-2. Influent: Vallejo Monthly Reductions Across the Plant

Note: Influent Total N was compared against Discharge TIN for calculating nitrogen load reduction.

Table 30-1. Influent: Vallejo Monthly Flows and Loads*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	7.86	1,040	Non-Detect	**	1,690	**	175
Aug-19	7.63	1,050	--	--	--	--	--
Sep-19	7.72	1,080	--	--	--	--	--
Oct-19	7.29	956	2.14	927	1,740	1,740	185
Nov-19	7.90	1,140	--	--	--	--	--
Dec-19	10.5	861	--	--	--	--	--
Jan-20	9.40	955	1.26	944	1,600	1,600	173
Feb-20	8.34	767	--	--	--	--	--
Mar-20	8.93	986	--	--	--	--	--
Apr-20	8.42	982	3.57	907	1,570	1,570	167
May-20	8.01	1,040	--	--	--	--	--
Jun-20	7.84	943	--	--	--	--	--
Jul-20	7.72	982	1.09	1,140	1,500	1,500	167
Aug-20	7.50	942	--	--	--	--	--
Sep-20	7.67	1,030	--	--	--	--	--
Oct-20	7.52	957	1.75	1,100	1,720	1,720	207
Nov-20	7.69	1,140	--	--	--	--	--
Dec-20	7.67	963	--	--	--	--	--
Jan-21	8.50	910	3.74	755	1,470	1,470	167
Feb-21	8.61	991	--	--	--	--	--
Mar-21	8.47	999	--	--	--	--	--
Apr-21	7.47	947	Non-Detect	856	1,670	1,670	175
May-21	7.75	1,040	--	--	--	--	--
Jun-21	7.51	806	--	--	--	--	--
Jul-21	7.78	822	Non-Detect	849	1,670	1,670	191
Aug-21	7.63	939	--	--	--	--	--
Sep-21	7.66	935	--	--	--	--	--
Oct-21	11.0	791	2.22	779	1,560	1,560	181
Nov-21	10.2	968	--	--	--	--	--
Dec-21	18.6	1,050	--	--	--	--	--
Jan-22	11.6	788	20.1	890	2,010	2,030	206
Feb-22	9.12	1,040	--	--	--	--	--
Mar-22	8.79	968	--	--	--	--	--
Apr-22	8.14	1,090	1.74	1,040	1,490	1,490	183
May-22	7.69	742	--	--	--	--	--
Jun-22	7.51	987	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-22	7.33	780	1.40	840	1,580	1,580	193
Aug-22	7.26	932	--	--	--	--	--
Sep-22	7.31	975	--	--	--	--	--
Oct-22	7.14	877	1.65	877	1,650	1,650	195
Nov-22	7.28	886	--	--	--	--	--
Dec-22	11.3	902	--	--	--	--	--
Jan-23	23.6	582	415	1,010	1,350	1,760	146
Feb-23	11.0	957	--	--	--	--	--
Mar-23	21.1	1,070	--	--	--	--	--
Apr-23	9.85	738	12.8	738	1,530	1,550	153
May-23	8.42	878	--	--	--	--	--
Jun-23	7.95	854	--	--	--	--	--
Jul-23	7.54	1,010	4.25	1,110	2,040	2,050	232
Aug-23	7.54	877	--	--	--	--	--
Sep-23	7.40	839	--	--	--	--	--
Oct-23	7.23	847	1.68	791	1,410	1,410	185
Nov-23	7.70	821	--	--	--	--	--
Dec-23	9.13	1,440	--	--	--	--	--
Jan-24	11.1	803	22.2	945	1,540	1,560	197
Feb-24	17.9	888	--	--	--	--	--
Mar-24	10.9	970	--	--	--	--	--
Apr-24	8.98	907	7.33	688	1,310	1,320	156
May-24	10.3	818	--	--	--	--	--
Jun-24	8.12	929	--	--	--	--	--
Jul-24	8.58	897	1.05	919	1,660	1,660	187
Aug-24	8.71	1,280	--	--	--	--	--
Sep-24	7.33	851	--	--	--	--	--
Oct-24	6.76	705	1.48	672	1,330	1,330	179
Nov-24	7.84	863	--	--	--	--	--
Dec-24	11.5	895	--	--	--	--	--
Jan-25	10.1	1,030	5.86	1,030	1,880	1,880	207
Feb-25	17.1	978	12.1	1,060	1,830	1,790	216
Mar-25	10.8	1,130	5.67	1,200	1,890	1,860	218
Apr-25	9.58	1,090	3.12	1,110	1,890	1,860	216
May-25	9.06	1,140	2.04	1,080	1,920	1,940	227
Jun-25	8.99	1,180	1.01	1,100	1,960	1,920	234
Jul-25	8.76	1,170	0.941	1,220	1,800	1,770	213

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-25	8.88	1,190	0.782	1,210	1,830	1,900	212
Sep-25	8.96	1,200	1.07	1,160	1,930	1,850	213
Dry Season Average	**8.00**	**975**	**1.51**	**1,060**	**1,780**	**1,780**	**204**
Wet Season Average	**10.3**	**944**	**27.7**	**916**	**1,620**	**1,640**	**186**
Annual Average	**9.28**	**957**	**19.3**	**965**	**1,680**	**1,690**	**192**

* Vallejo typically samples more than the required influent ammonia quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values for days when sampling occurred. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite” for days when sampling occurred. Note: the ammonia sampling is more frequent than the other nitrogen species which can lead to average monthly ammonia values being greater than average monthly TIN values.

Discharge

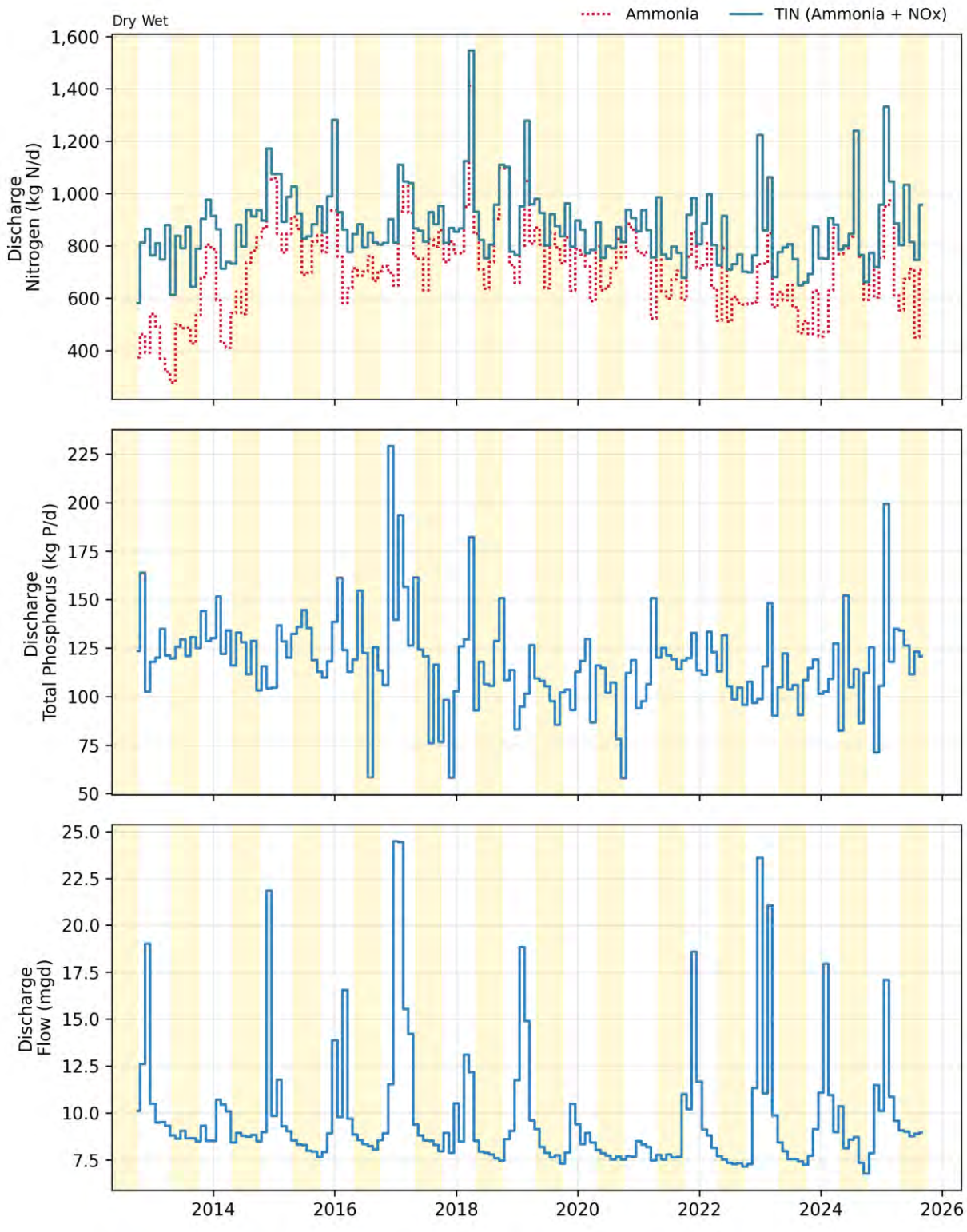


Figure 30-3. Discharge: Vallejo Monthly Flows and Loads

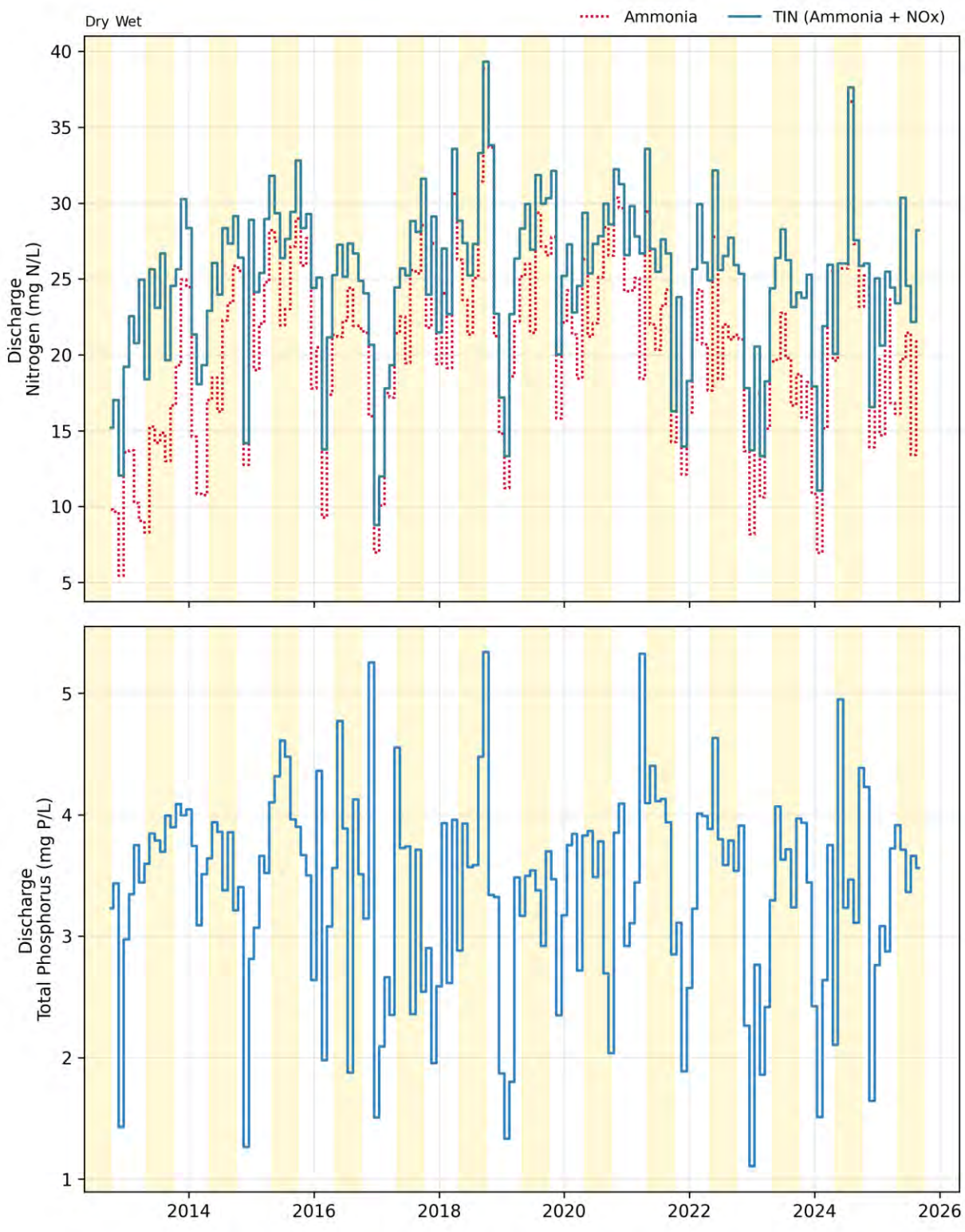


Figure 30-4. Discharge: Vallejo Monthly Concentrations

Table 30-2. Discharge: Vallejo Monthly Flows and Loads

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	10.1	374	206	580	123
Nov-12	12.6	461	352	813	164
Dec-12	19.0	391	474	865	103
Jan-13	10.5	539	224	762	118
Feb-13	9.48	492	317	809	120
Mar-13	9.51	368	379	747	135
Apr-13	9.30	318	561	879	121
May-13	8.80	276	336	612	120
Jun-13	8.63	499	338	837	126
Jul-13	9.04	486	304	790	130
Aug-13	8.65	486	387	873	121
Sep-13	8.65	426	218	643	131
Oct-13	8.49	535	253	788	125
Nov-13	9.31	681	222	903	144
Dec-13	8.52	804	171	975	129
Jan-14	8.51	788	126	913	130
Feb-14	10.7	592	272	864	152
Mar-14	10.4	428	285	713	122
Apr-14	10.1	410	327	738	134
May-14	8.43	542	188	731	116
Jun-14	8.92	624	256	880	133
Jul-14	8.77	540	256	796	128
Aug-14	8.73	736	201	937	112
Sep-14	8.81	781	131	912	129
Oct-14	8.49	831	105	936	103
Nov-14	8.97	867	30.4	897	116
Dec-14	21.8	1,050	118	1,170	104
Jan-15	9.83	1,060	15.9	1,080	105
Feb-15	11.8	846	229	1,070	137
Mar-15	9.28	775	117	892	129
Apr-15	9.01	846	142	987	120
May-15	8.53	911	115	1,030	132
Jun-15	8.32	865	58.6	924	136
Jul-15	8.28	688	138	826	144
Aug-15	7.99	696	140	836	135
Sep-15	7.93	815	68.0	883	119

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	7.65	839	111	950	113
Nov-15	7.92	776	74.3	850	110
Dec-15	8.92	935	52.9	988	118
Jan-16	13.9	934	348	1,280	138
Feb-16	9.77	758	170	928	161
Mar-16	16.6	580	281	862	124
Apr-16	9.69	637	139	776	113
May-16	8.84	713	131	844	119
Jun-16	8.56	686	197	883	155
Jul-16	8.32	701	91.8	793	122
Aug-16	8.23	760	91.1	851	58.4
Sep-16	8.04	667	145	812	126
Oct-16	8.55	703	102	805	114
Nov-16	8.90	722	88.4	811	106
Dec-16	11.5	696	205	901	229
Jan-17	24.5	646	166	812	140
Feb-17	24.4	931	178	1,110	193
Mar-17	15.5	1,030	16.8	1,050	157
Apr-17	14.2	924	114	1,040	126
May-17	9.37	760	107	867	161
Jun-17	8.81	751	106	856	124
Jul-17	8.54	629	187	815	121
Aug-17	8.51	824	104	928	76.0
Sep-17	8.30	797	86.0	883	117
Oct-17	7.95	860	91.7	951	76.5
Nov-17	8.94	737	73.7	811	98.2
Dec-17	7.87	815	53.5	868	58.2
Jan-18	10.5	771	82.3	853	103
Feb-18	8.46	771	94.5	865	126
Mar-18	13.1	948	176	1,120	130
Apr-18	12.2	1,410	136	1,550	182
May-18	8.51	846	83.4	930	92.8
Jun-18	7.94	709	113	822	118
Jul-18	7.87	636	116	734	106
Aug-18	7.78	738	66.6	805	106
Sep-18	7.59	903	54.0	863	129
Oct-18	7.45	1,100	12.7	1,070	151

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	8.60	1,100	6.07	1,100	109
Dec-18	9.05	727	50.6	725	114
Jan-19	11.8	659	106	691	83.1
Feb-19	18.8	800	150	817	94.9
Mar-19	14.9	1,050	230	1,280	101
Apr-19	9.61	807	151	958	127
May-19	9.13	870	109	979	109
Jun-19	8.17	804	122	926	108
Jul-19	7.86	638	163	801	105
Aug-19	7.63	848	72.1	920	97.5
Sep-19	7.72	793	82.6	876	85.3
Oct-19	7.29	733	104	837	102
Nov-19	7.90	831	130	961	104
Dec-19	10.5	628	168	796	93.2
Jan-20	9.40	787	110	897	113
Feb-20	8.34	766	95.9	862	118
Mar-20	8.93	721	49.6	857	130
Apr-20	8.42	588	195	761	86.6
May-20	8.01	798	92.6	915	116
Jun-20	7.84	629	124	728	115
Jul-20	7.72	646	153	774	102
Aug-20	7.50	713	76.9	862	107
Sep-20	7.67	825	45.5	828	78.2
Oct-20	7.52	755	58.6	880	58.0
Nov-20	7.69	883	54.7	927	112
Dec-20	7.67	861	45.9	907	119
Jan-21	8.50	778	76.5	855	93.9
Feb-21	8.30	762	174	936	97.6
Mar-21	8.17	775	84.9	860	106
Apr-21	7.47	521	233	755	151
May-21	7.75	864	121	986	120
Jun-21	7.51	625	141	766	125
Jul-21	7.78	599	152	750	121
Aug-21	7.63	671	127	797	119
Sep-21	7.66	704	69.0	773	114
Oct-21	11.0	593	84.0	677	119
Nov-21	10.2	759	159	918	120

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	18.6	852	129	982	133
Jan-22	11.6	714	91.9	806	113
Feb-22	9.12	724	161	885	111
Mar-22	8.79	808	187	996	133
Apr-22	8.14	637	166	803	123
May-22	7.69	514	211	725	113
Jun-22	7.51	790	125	914	132
Jul-22	7.33	511	199	709	105
Aug-22	7.26	604	125	729	98.5
Sep-22	7.31	581	186	767	105
Oct-22	7.14	576	124	701	95.6
Nov-22	7.28	579	119	698	108
Dec-22	11.3	585	178	763	96.9
Jan-23	23.6	729	495	1,220	98.8
Feb-23	11.0	732	127	859	116
Mar-23	21.1	847	216	1,060	148
Apr-23	9.85	564	116	681	90.1
May-23	8.42	623	153	776	105
Jun-23	7.95	592	202	794	122
Jul-23	7.54	650	157	806	104
Aug-23	7.54	565	184	749	106
Sep-23	7.40	467	181	648	90.6
Oct-23	7.23	512	148	659	109
Nov-23	7.70	463	229	692	115
Dec-23	9.13	628	245	873	119
Jan-24	11.1	454	298	751	101
Feb-24	17.9	471	280	751	103
Mar-24	10.9	628	279	907	109
Apr-24	8.98	868	12.7	881	127
May-24	10.3	768	17.4	785	82.4
Jun-24	8.12	790	9.66	800	152
Jul-24	8.58	834	10.9	845	105
Aug-24	8.71	1,210	30.5	1,240	114
Sep-24	7.33	758	6.79	765	86.3
Oct-24	6.76	594	68.5	662	112
Nov-24	7.84	749	23.4	772	125
Dec-24	11.5	603	116	719	71.3

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	10.1	754	203	968	106
Feb-25	17.1	951	381	1,330	199
Mar-25	10.8	972	74.0	1,050	118
Apr-25	9.58	610	276	886	135
May-25	9.06	553	250	802	134
Jun-25	8.99	672	362	1,030	126
Jul-25	8.76	711	103	813	111
Aug-25	8.88	451	295	745	123
Sep-25	8.96	708	249	957	121
Dry Season Average	**8.23**	**690**	**146**	**835**	**115**
Wet Season Average	**10.9**	**731**	**164**	**893**	**119**
Average Annual	**9.76**	**714**	**157**	**869**	**118**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values for days when sampling occurred. Note: the ammonia sampling is typically more frequent than the other nitrogen species which can lead to average monthly ammonia values being greater than average monthly TIN values.

Recycled Water

No recycled water was produced or distributed this past year.

31 West County Wastewater - City of Richmond Joint Outfall

West County Wastewater (WCW) and the City of Richmond (Richmond) share a common outfall and NPDES permit discharge point. The joint outfall discharges to the Central San Francisco Bay with a combined permitted capacity of 28.5 mgd ADWF (12.5 mgd ADWF for WCW and 16.0 mgd ADWF for the City of Richmond) and a combined wet weather capacity of 59 mgd (21 mgd for WCW and 38 mgd for Richmond). Note: Richmond's plant has wet weather capacity close to 40 mgd but is limited to 20 mgd by the secondary treatment system. Flows between 20 and 38 mgd receive full primary treatment and are blended with secondary effluent near the front of the chlorine contact basin, receiving disinfection and dechlorination before discharge to San Francisco Bay. Prior to the end of 2024, the joint outfall was owned and operated by the West County Agency, a Joint Powers Authority (JPA) which was dissolved at the direction of its Board, through a nearly three-year process ending on the final day of 2024. Upon dissolution, ownership of the outfall was ceded to the City of Richmond with WCW retaining the permanent right to use. Because of this history, and because the Permit establishes combined interim and final effluent limitations for WCW and Richmond, loads from the two agencies are tracked together in this Group Annual Report. The two individual agencies are jointly responsible for compliance.

While Richmond's plant provides conventional secondary treatment, WCW's plant was upgraded to a Modified Ludzack-Ettinger (MLE) activated sludge process circa 2017. It is noteworthy that the Richmond plant has completed substantial upgrades, including its secondary process. One major change was the conversion from mechanical mixing to fine bubble diffused air. Modifications include an anoxic area where primary effluent enters and is then distributed to the aeration basins. While Richmond's modified design is not intended to remove nutrients per se, there may be some incidental ammonia reduction and time will show to what extent, if any, that benefit is observed. The average dry season discharge flow this past year was approximately 5.53 mgd.

The following observations are made based upon the figures and tables in the subsequent pages:

- Influent (combined flows and loads for both treatment plants):
  - The flow reduction across the plants averages just below 50 percent. The primary contributor to such flow reductions are recycled water projects at the nearby Chevron Refinery which accepts WCW treatment plant effluent after polishing and distribution by the East Bay Municipal Utility District (EBMUD).
  - The nitrogen and phosphorus load reduction values across the plant are reliably above 70 percent (with the exception of total P in September 2022). This load reduction is attributed to a combination of recycled water to the Chevron Refinery, biological assimilation, biosolids management, and/or biological load reduction at both plants.
- Discharge (combined flows and loads for both treatment plants at the common outfall):
  - The Richmond Plant represents the majority of the discharge flow and loads (data not shown). The WCW Plant recycles a large portion of their year-round flows, with some dry weather months exceeding 90% and a total of 73% recycled for 2025 (calendar year).
  - Wet season nutrient loads are typically greater and more variable than dry season loads.

- Ammonia represents the majority of the nitrogen species discharged. This is expected as the Richmond Plant represents most of the discharge load and they do not nitrify. WCW's effluent ammonia level is typically less than 0.1 mg N/L and needs to be below 2.0 mg N/L for effective operation of EBMUD's two reclamation facilities (North Richmond Water Reclamation Plant and Richmond Advanced Recycle Expansion (RARE) Water Project.
- Total phosphorus concentrations vary between <0.5 to 9.3 mg P/L. The three largest values are from the 2022 and 2023 dry seasons. The basis for such values is unclear but there may be a connection to the Covid-19 pandemic. Changes to the influent profile could be a result of the transition in the residential and businesses sectors.

◈ Recycled Water:

- Based on Table 8-3, the plants have averaged 4.8 mgd of Recycled Water from 2019-2024 calendar years. The key user is Industrial (nearby Chevron facility).
- Based on Table 8-4 through Table 8-6, the plants have averaged the diversion of 3 kg ammonia-N/d, 120 kg TIN-N/d, and 28 kg P/d from the Bay through recycled water from 2019-2024 calendar years.

Influent

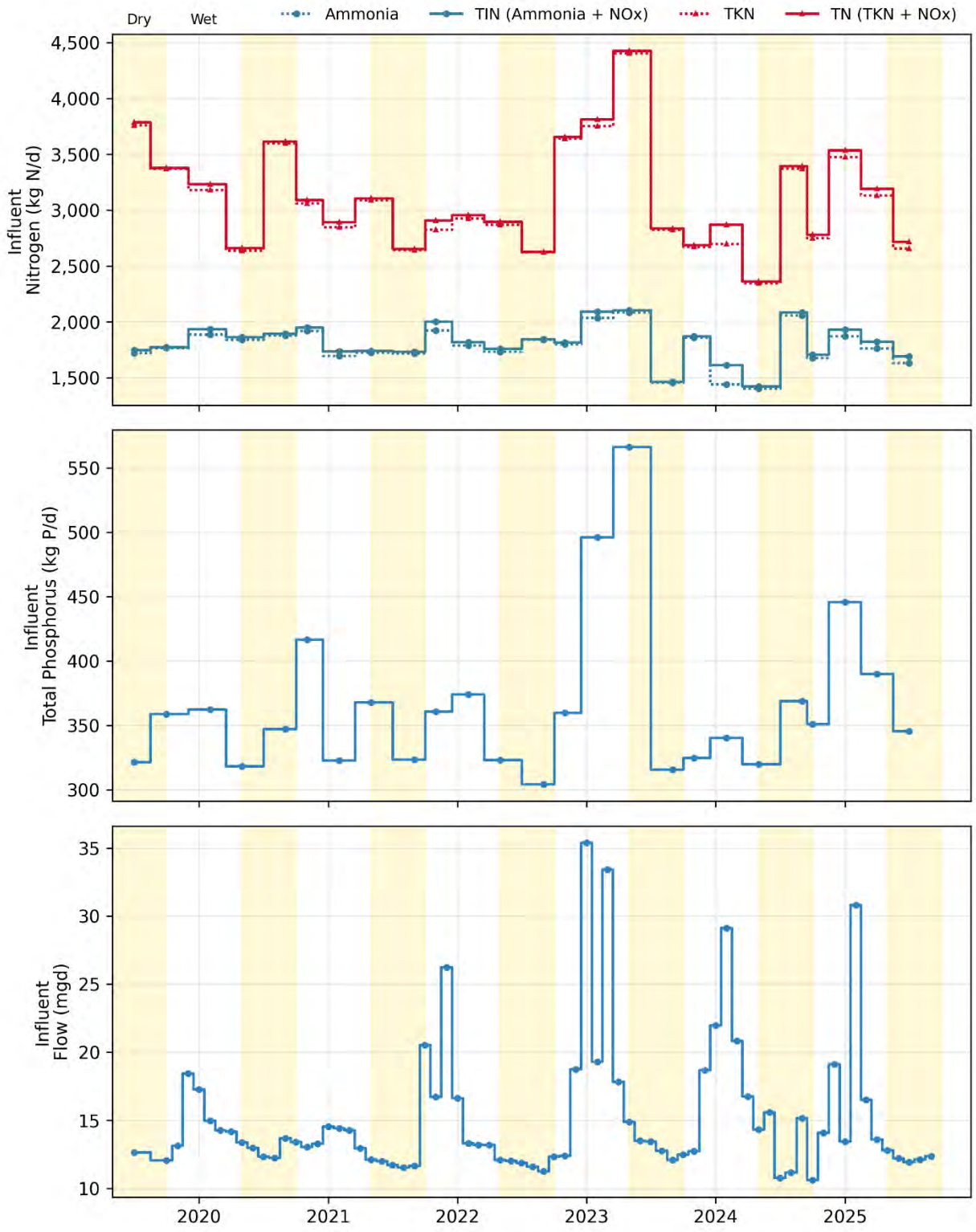


Figure 31-1. Influent: Monthly Flows and Loads for Both Treatment Plants

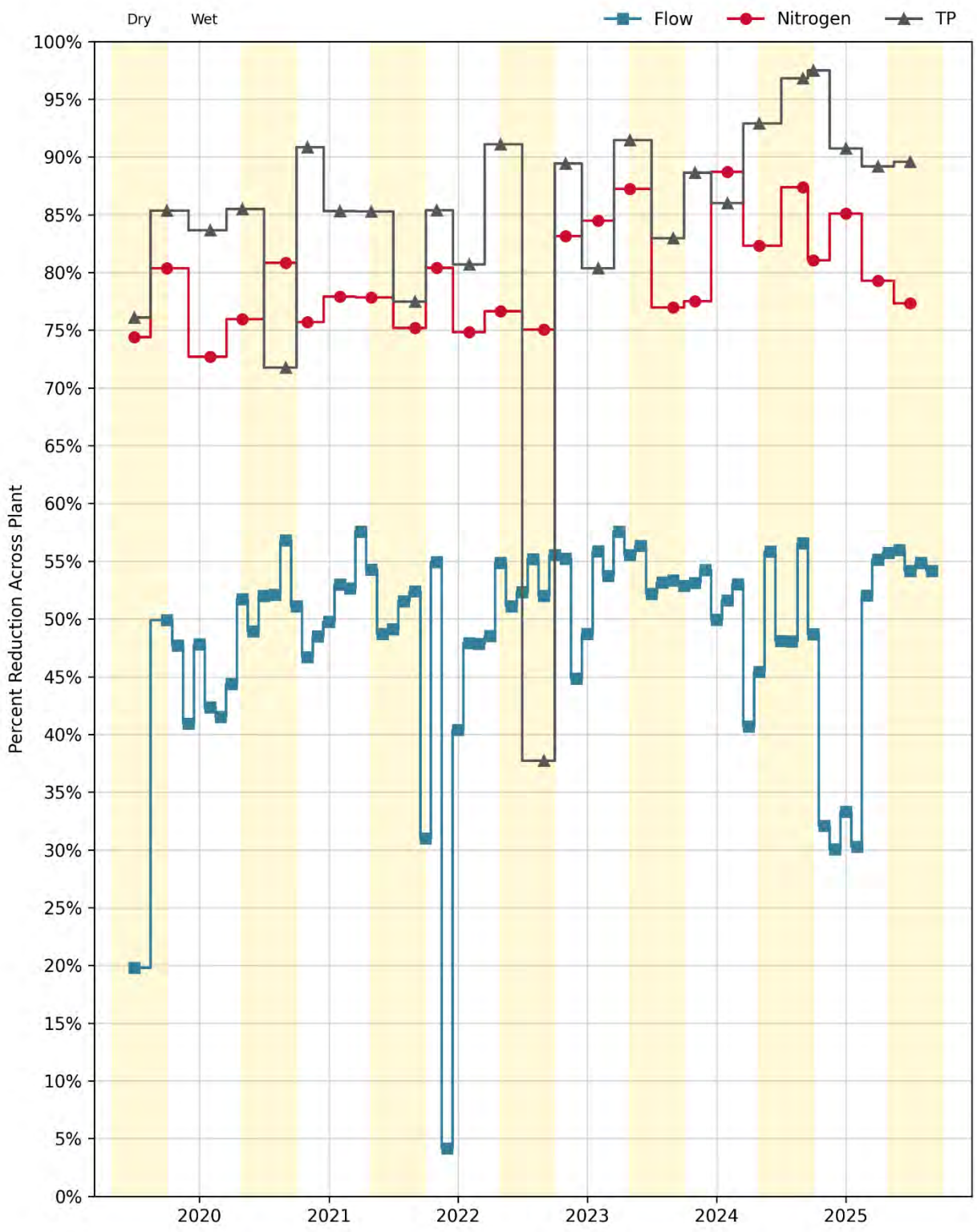


Figure 31-2. Influent: Monthly Reductions Across Both Treatment Plants

Note: Influent Total N was compared against Discharge TIN for calculating nitrogen load reduction.

Table 31-1. Influent: Monthly Flows and Loads for Both Treatment Plants*

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-19	12.6	1,720	25.2	1,900	3,760	3,790	321
Aug-19	--	--	--	--	--	--	--
Sep-19	--	--	--	--	--	--	--
Oct-19	12.1	1,770	8.27	1,800	3,370	3,380	359
Nov-19	13.1	1,950	--	--	--	--	--
Dec-19	18.5	1,720	--	--	--	--	--
Jan-20	17.3	2,470	--	--	--	--	--
Feb-20	15.0	1,880	50.0	2,060	3,180	3,230	362
Mar-20	14.3	1,780	--	--	--	--	--
Apr-20	14.2	1,900	--	--	--	--	--
May-20	13.4	1,840	22.0	1,690	2,640	2,660	318
Jun-20	13.0	1,840	--	--	--	--	--
Jul-20	12.3	1,680	--	--	--	--	--
Aug-20	12.2	1,530	--	--	--	--	--
Sep-20	13.7	1,880	14.5	2,120	3,600	3,610	347
Oct-20	13.4	--	--	--	--	--	--
Nov-20	13.0	1,920	31.9	1,950	3,060	3,090	416
Dec-20	13.3	--	--	--	--	--	--
Jan-21	14.6	--	--	--	--	--	--
Feb-21	14.4	1,690	44.5	1,740	2,850	2,890	323
Mar-21	14.3	--	--	--	--	--	--
Apr-21	12.9	--	--	--	--	--	--
May-21	12.1	1,720	14.5	1,740	3,090	3,100	368
Jun-21	12.0	--	--	--	--	--	--
Jul-21	11.7	--	--	--	--	--	--
Aug-21	11.5	--	--	--	--	--	--
Sep-21	11.7	1,720	11.9	1,960	2,640	2,940	323
Oct-21	20.5	--	--	--	--	--	--
Nov-21	16.7	1,920	79.2	2,000	2,830	2,900	361
Dec-21	26.2	--	--	--	--	--	--
Jan-22	16.6	--	--	--	--	--	--
Feb-22	13.3	1,790	30.8	1,820	2,930	2,960	374
Mar-22	13.2	--	--	--	--	--	--
Apr-22	13.2	--	--	--	--	--	--
May-22	12.1	1,730	24.0	1,760	2,870	2,890	323
Jun-22	12.0	--	--	--	--	--	--

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Jul-22	11.9	--	--	--	--	--	--
Aug-22	11.6	--	--	--	--	--	--
Sep-22	11.3	1,840	4.10	1,840	2,620	2,620	304
Oct-22	12.3	--	--	--	--	--	--
Nov-22	12.4	1,800	15.3	1,810	3,640	3,650	360
Dec-22	18.7	--	--	--	--	--	--
Jan-23	35.4	--	--	--	--	--	--
Feb-23	19.3	2,030	58.6	2,090	3,750	3,810	496
Mar-23	33.4	--	--	--	--	--	--
Apr-23	17.8	--	--	--	--	--	--
May-23	14.9	2,080	19.8	2,100	4,400	4,420	566
Jun-23	13.5	--	--	--	--	--	--
Jul-23	13.4	--	--	--	--	--	--
Aug-23	12.8	--	--	--	--	--	--
Sep-23	12.1	1,450	9.07	1,460	2,820	2,830	316
Oct-23	12.5	--	--	--	--	--	--
Nov-23	12.7	1,860	14.1	1,870	2,670	2,680	325
Dec-23	18.7	--	--	--	--	--	--
Jan-24	22.0	--	--	--	--	--	--
Feb-24	29.1	1,440	172	1,610	2,700	2,870	340
Mar-24	20.8	--	--	--	--	--	--
Apr-24	16.8	--	--	--	--	--	--
May-24	14.3	1,400	18.3	1,420	2,340	2,360	320
Jun-24	15.6	--	--	--	--	--	--
Jul-24	10.8	--	--	--	--	--	--
Aug-24	11.2	--	--	--	--	--	--
Sep-24	15.2	2,060	23.4	2,080	3,370	3,390	369
Oct-24	10.6	1,670	30.2	1,700	2,750	2,780	351
Nov-24	14.1	--	--	--	--	--	--
Dec-24	19.2	--	--	--	--	--	--
Jan-25	13.4	1,870	60.9	1,930	3,480	3,530	445
Feb-25	30.8	--	--	--	--	--	--
Mar-25	16.5	--	--	--	--	--	--
Apr-25	13.6	1,760	61.7	1,820	3,130	3,190	390
May-25	12.8	--	--	--	--	--	--
Jun-25	12.2	--	--	--	--	--	--
Jul-25	11.9	1,630	58.7	1,690	2,660	2,720	345

Month, Year	Flow	Ammonia*	Nitrate + Nitrite	TIN**	TKN	Total N**	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg N/d	kg N/d	kg P/day
Aug-25	12.1	--	--	--	--	--	--
Sep-25	12.4	--	--	--	--	--	--
Dry Season Average	**12.6**	**1,740**	**20.5**	**1,810**	**3,070**	**3,110**	**352**
Wet Season Average	**17.1**	**1,840**	**50.5**	**1,860**	**3,100**	**3,150**	**377**
Average Annual	**15.2**	**1,800**	**36.1**	**1,840**	**3,090**	**3,130**	**365**

* WCW typically samples more than the required influent nutrient quarterly sampling. This dataset includes this additional sampling.

** The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values. The Total Nitrogen value is calculated by adding “TKN” and “Nitrate + Nitrite”.

Discharge

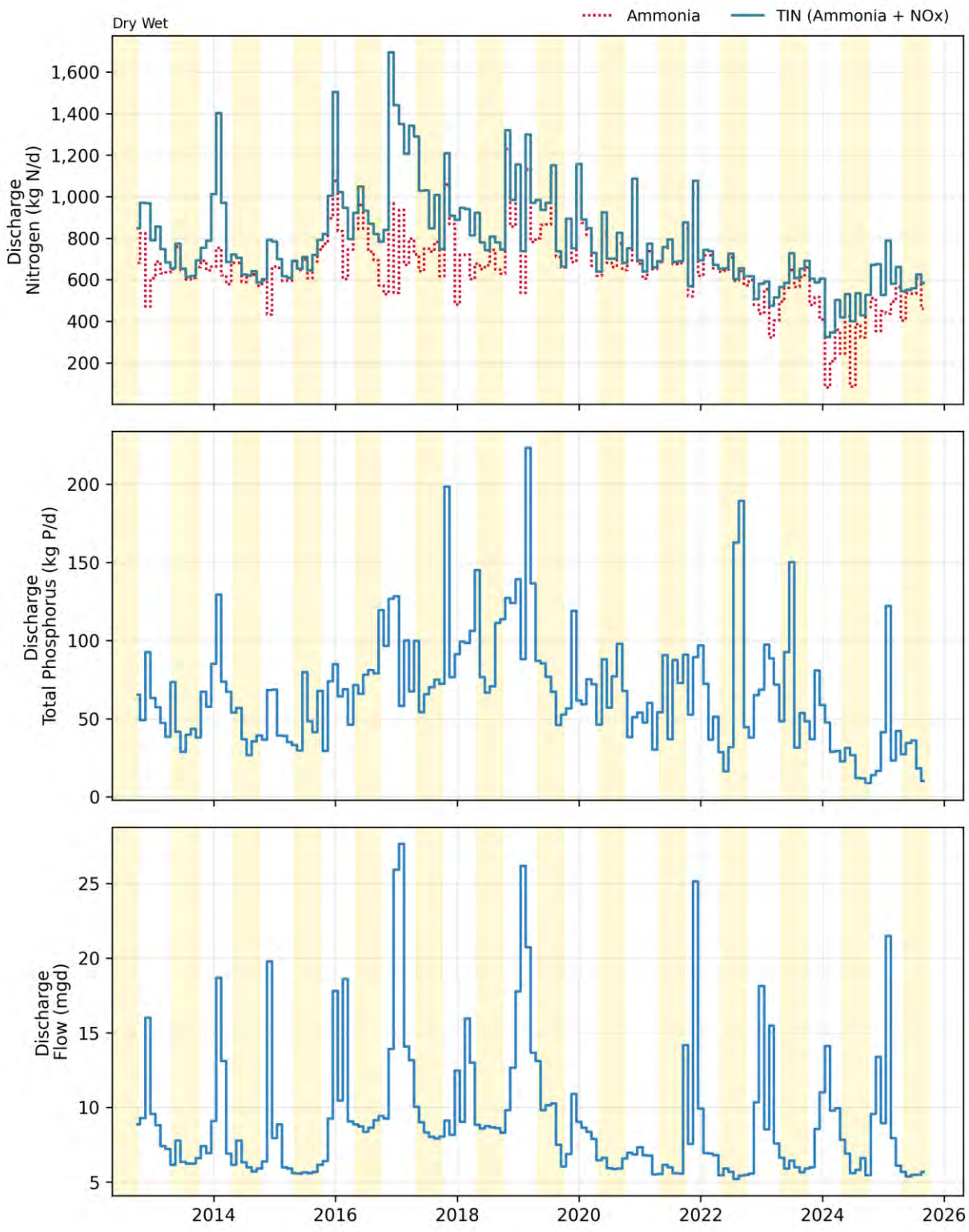


Figure 31-3. Discharge: Monthly Flows and Loads for Both Treatment Plants at the Common Outfall

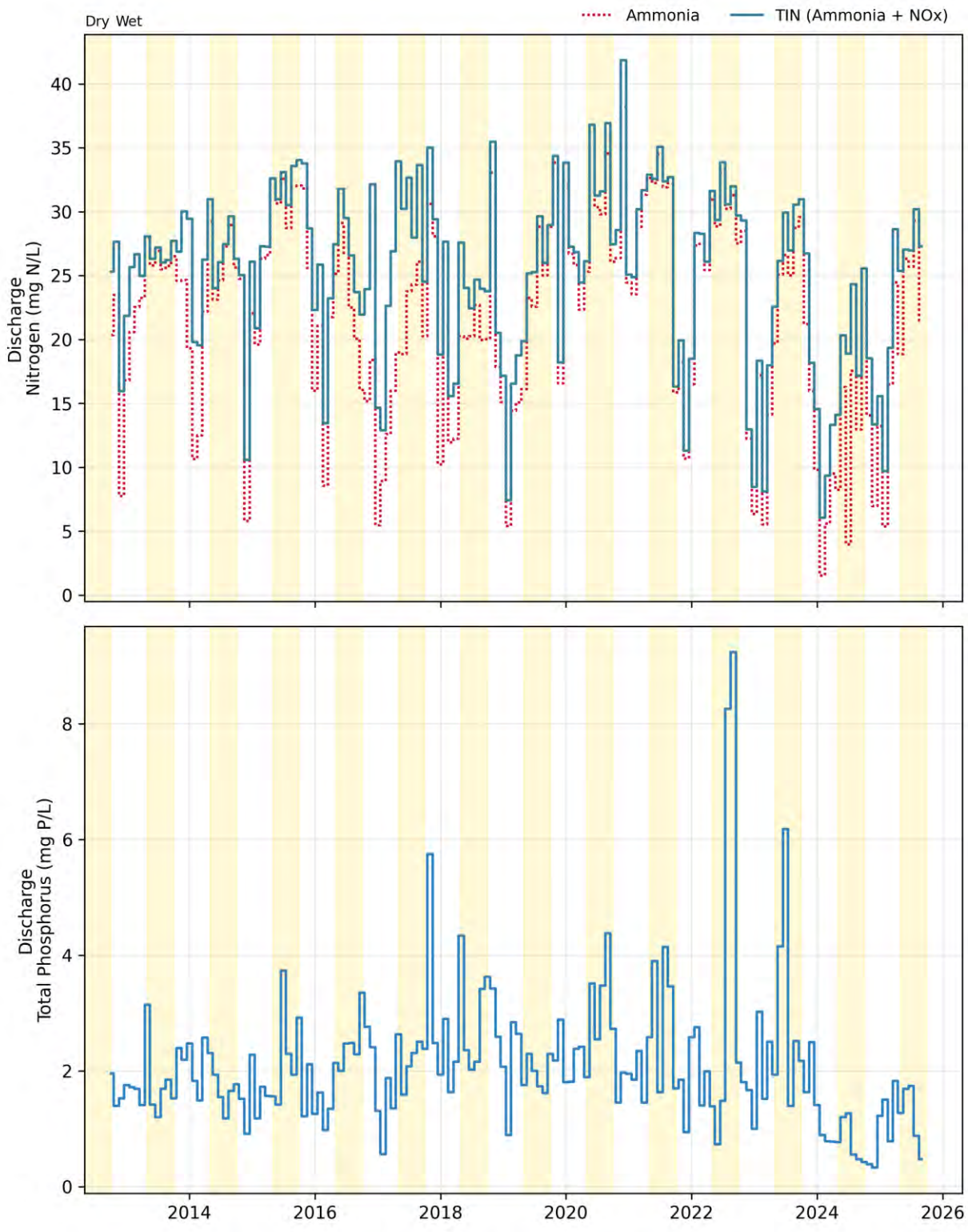


Figure 31-4. Discharge: Monthly Concentrations for Both Treatment Plants at the Common Outfall

Table 31-2. Discharge: Monthly Flows and Loads for Both Treatment Plants at the Common Outfall

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-12	8.85	682	166	848	65.5
Nov-12	9.27	824	147	971	49.0
Dec-12	16.0	470	497	967	92.6
Jan-13	9.55	607	182	789	63.4
Feb-13	8.81	686	169	856	57.4
Mar-13	7.40	631	116	747	47.3
Apr-13	7.22	635	47.0	682	38.5
May-13	6.16	652	3.26	655	73.4
Jun-13	7.77	758	15.3	773	41.7
Jul-13	6.36	648	6.13	654	28.8
Aug-13	6.23	601	12.7	613	39.8
Sep-13	6.24	608	10.4	618	43.6
Oct-13	6.60	662	30.3	692	38.0
Nov-13	7.42	690	63.6	754	67.3
Dec-13	6.93	646	141	787	57.6
Jan-14	9.09	664	348	1,010	85.2
Feb-14	18.7	753	647	1,400	129
Mar-14	13.1	620	349	969	73.7
Apr-14	6.89	579	106	685	67.3
May-14	6.16	681	40.4	722	53.9
Jun-14	7.77	680	25.6	706	56.9
Jul-14	6.33	590	34.5	624	37.0
Aug-14	5.98	618	3.84	622	26.8
Sep-14	5.71	626	15.0	641	35.7
Oct-14	5.88	571	15.0	586	39.4
Nov-14	6.37	596	7.47	604	36.5
Dec-14	19.8	433	358	791	68.3
Jan-15	7.93	662	121	783	68.5
Feb-15	8.85	656	43.2	700	39.4
Mar-15	5.98	596	21.9	617	39.0
Apr-15	5.91	595	14.7	610	35.1
May-15	5.60	689	1.51	691	33.1
Jun-15	5.57	646	6.68	653	29.8
Jul-15	5.66	697	11.6	709	79.9
Aug-15	5.58	606	38.2	645	48.4
Sep-15	5.66	686	32.9	719	41.5

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Oct-15	6.15	745	46.5	792	67.9
Nov-15	6.41	772	47.0	819	29.5
Dec-15	9.24	896	108	1,000	73.9
Jan-16	17.8	1,080	427	1,500	84.8
Feb-16	10.4	833	189	1,020	64.3
Mar-16	18.6	602	344	946	68.8
Apr-16	9.06	745	50.2	795	46.2
May-16	8.87	843	77.4	921	71.6
Jun-16	8.71	960	88.0	1,050	66.0
Jul-16	8.35	846	86.0	932	78.2
Aug-16	8.64	736	134	869	81.2
Sep-16	9.12	693	126	819	78.9
Oct-16	9.42	572	210	782	120
Nov-16	9.25	531	308	839	96.7
Dec-16	13.9	968	725	1,690	127
Jan-17	25.9	536	903	1,440	128
Feb-17	27.7	935	414	1,350	58.3
Mar-17	14.1	671	536	1,210	100
Apr-17	13.2	796	544	1,340	67.4
May-17	10.0	721	567	1,290	99.8
Jun-17	8.99	641	388	1,030	54.2
Jul-17	8.32	749	280	1,030	65.6
Aug-17	8.01	736	112	848	70.1
Sep-17	7.91	781	226	1,010	75.0
Oct-17	8.04	616	131	747	72.4
Nov-17	9.12	1,060	151	1,210	199
Dec-17	8.16	867	41.8	908	76.5
Jan-18	12.5	481	406	887	91.3
Feb-18	9.04	720	226	946	99.1
Mar-18	16.0	722	218	939	98.6
Apr-18	13.0	602	211	814	106
May-18	8.83	677	245	922	145
Jun-18	8.57	651	129	780	76.5
Jul-18	8.73	670	71.9	741	66.9
Aug-18	8.65	744	64.3	808	70.7
Sep-18	8.60	649	131	780	111
Oct-18	8.29	629	117	724	114

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Nov-18	9.82	1,230	89.8	1,320	127
Dec-18	12.7	855	128	983	124
Jan-19	17.8	1,020	139	1,150	139
Feb-19	26.2	536	201	736	88.1
Mar-19	20.7	1,130	167	1,300	223
Apr-19	13.7	780	190	970	137
May-19	13.1	799	186	984	86.9
Jun-19	9.82	864	71.7	935	85.3
Jul-19	10.1	866	104	969	76.8
Aug-19	10.3	1,120	32.0	1,150	67.3
Sep-19	7.49	709	28.1	737	45.9
Oct-19	6.05	659	3.30	663	52.6
Nov-19	6.87	880	12.9	893	56.7
Dec-19	10.9	684	67.0	751	119
Jan-20	9.03	1,090	61.8	1,160	61.8
Feb-20	8.63	873	17.6	881	59.2
Mar-20	8.35	816	32.2	864	75.2
Apr-20	7.88	666	63.0	729	72.1
May-20	6.46	619	19.8	639	46.2
Jun-20	6.63	827	96.6	923	88.1
Jul-20	5.92	680	20.4	701	57.1
Aug-20	5.86	661	39.7	701	77.1
Sep-20	5.91	773	53.3	693	98.0
Oct-20	6.56	647	34.1	681	67.8
Nov-20	6.95	694	57.3	751	38.2
Dec-20	6.85	991	94.9	1,090	51.1
Jan-21	7.31	677	16.5	694	53.9
Feb-21	6.79	605	34.5	639	47.4
Mar-21	6.76	738	34.8	945	60.0
Apr-21	5.49	651	7.58	667	30.2
May-21	5.54	684	5.38	688	54.2
Jun-21	6.15	751	7.37	721	90.7
Jul-21	5.97	779	13.3	785	36.9
Aug-21	5.59	676	9.12	747	87.7
Sep-21	5.56	678	10.1	729	72.9
Oct-21	14.2	850	24.4	1,130	91.1
Nov-21	7.54	520	48.6	569	52.6

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Dec-21	25.1	1,020	60.2	1,080	89.5
Jan-22	9.92	619	74.1	694	96.9
Feb-22	6.93	718	25.7	744	72.3
Mar-22	6.89	717	19.8	806	36.6
Apr-22	6.79	654	16.8	671	51.2
May-22	5.46	640	13.8	676	28.7
Jun-22	5.89	644	10.4	735	16.3
Jul-22	5.66	707	18.5	791	31.8
Aug-22	5.21	596	6.85	602	163
Sep-22	5.41	641	14.1	655	189
Oct-22	5.49	572	45.4	617	44.6
Nov-22	5.56	600	16.7	616	38.0
Dec-22	10.3	479	28.6	507	65.2
Jan-23	18.1	436	144	581	68.7
Feb-23	8.53	554	36.8	591	97.4
Mar-23	15.5	323	151	474	88.7
Apr-23	7.57	405	110	515	71.8
May-23	6.61	494	71.6	565	48.5
Jun-23	5.90	560	24.0	584	92.7
Jul-23	6.42	647	80.1	727	150
Aug-23	5.97	565	44.2	609	31.6
Sep-23	5.64	614	39.0	653	53.7
Oct-23	5.88	658	31.7	696	48.4
Nov-23	5.97	479	125	604	36.9
Dec-23	8.55	516	71.1	587	80.8
Jan-24	11.0	409	197	606	58.6
Feb-24	14.1	81.0	243	324	47.6
Mar-24	9.79	207	139	346	28.9
Apr-24	9.95	357	145	502	29.3
May-24	7.82	244	174	417	22.7
Jun-24	6.89	424	106	530	31.3
Jul-24	5.60	84.3	316	400	26.8
Aug-24	5.81	386	149	535	12.2
Sep-24	6.59	323	105	428	11.7
Oct-24	5.44	468	58.4	527	8.79
Nov-24	9.57	509	161	671	14.0
Dec-24	13.4	353	323	676	16.7

Month, Year	Flow	Ammonia	Nitrate + Nitrite	TIN*	Total P
	mgd	kg N/day	kg N/day	kg N/day	kg P/day
Jan-25	8.96	448	78.6	527	41.4
Feb-25	21.5	435	352	788	122
Mar-25	7.92	494	86.9	580	23.4
Apr-25	6.10	565	96.1	661	42.2
May-25	5.67	404	140	544	27.3
Jun-25	5.38	535	14.5	550	34.5
Jul-25	5.47	532	26.0	616	36.0
Aug-25	5.47	607	17.6	625	18.1
Sep-25	5.67	461	124	585	10.2
Dry Season Average	**6.95**	**653**	**79.6**	**735**	**61.4**
Wet Season Average	**10.6**	**663**	**157**	**825**	**71.4**
Average Annual	**9.08**	**659**	**125**	**788**	**67.2**

* The Total Inorganic Nitrogen value is calculated by adding the “Ammonia” and “Nitrate + Nitrite” values.

Table 31-3. Recycled Water: WCW Yearly Recycled Water Flows Diverted from the Bay*

Year**	Flow Diverted***, Acre-Feet (mgd)							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	5,160 (4.6)	0	0	0	5,160 (4.6)
2020	0	0	0	5,670 (5.1)	0	0	0	5,670 (5.1)
2021	0	0	0	5,870 (5.2)	0	0	0	5,870 (5.2)
2022	0	0	0	5,110 (4.6)	0	0	0	5,110 (4.6)
2023	0	0	0	4,980 (4.4)	0	0	0	4,980 (4.4)
2024	0	0	0	5,600 (5.0)	0	0	0	5,600 (5.0)
Average	**0**	**0**	**0**	**5,400 (4.8)**	**0**	**0**	**0**	**5,400 (4.8)**

***** **The loading values are based on water provided to both the RARE Project at the nearby Chevron Refinery and the North Richmond Water Reclamation Plant.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled load is diverted from the Bay**

Table 31-4. Recycled Water: WCW Yearly Recycled Water Ammonia Load Diverted from the Bay*

Year**	Average Ammonia Load Diverted***, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	3	0	0	0	3
2020	0	0	0	2	0	0	0	2
2021	0	0	0	4	0	0	0	4
2022	0	0	0	4	0	0	0	4
2023	0	0	0	1	0	0	0	1
2024	0	0	0	3	0	0	0	3
Average	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**

***** **The loading values are based on effluent values from the WCW Treatment Plant and its Wastewater Collection System as this represents the feed water to both the RARE Project at the nearby Chevron Refinery and the North Richmond Water Reclamation Plant.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled load is diverted from the Bay**

Table 31-5. Recycled Water: WCW Yearly Recycled Water Total Inorganic Nitrogen Load Diverted from the Bay*

Year**	Average Total Inorganic Nitrogen Load Diverted***, kg N/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	168	0	0	0	168
2020	0	0	0	145	0	0	0	145
2021	0	0	0	127	0	0	0	127
2022	0	0	0	94	0	0	0	94
2023	0	0	0	90	0	0	0	90
2024	0	0	0	92	0	0	0	92
Average	**0**	**0**	**0**	**120**	**0**	**0**	**0**	**120**

***** **The loading values are based on effluent values from the West County Wastewater District Treatment Plant and its Wastewater Collection System as this represents the feed water to both the RARE Project at the nearby Chevron Refinery and the North Richmond Water Reclamation Plant.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled load is diverted from the Bay**

Table 31-6. Recycled Water: WCW Yearly Recycled Water Total P Load Diverted from the Bay*

Year**	Average Total P Load Diverted***, kg P/d							
	Golf Course Irrigation	Landscape Irrigation	Commercial Application	Industrial Application	Agricultural Irrigation	Other Potable Uses	Other Non-Potable Uses	Total
2019	0	0	0	33	0	0	0	33
2020	0	0	0	44	0	0	0	44
2021	0	0	0	43	0	0	0	43
2022	0	0	0	24	0	0	0	24
2023	0	0	0	8	0	0	0	8
2024	0	0	0	16	0	0	0	16
Average	**0**	**0**	**0**	**28**	**0**	**0**	**0**	**28**

***** **The loading values are based on effluent values from the West County Wastewater District Treatment Plant and its Wastewater Collection System as this represents the feed water to both the RARE Project at the nearby Chevron Refinery and the North Richmond Water Reclamation Plant.**

****** **Calendar year as opposed to California's water year (October 1 through September 30)**

******* **Assumes 100% of the recycled load is diverted from the Bay**

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Attachment 2

Compliance Milestone Summary

Bay Area Clean Water Agencies

Nutrients Watershed Permit

NPDES Permit CA0038873

Order R2-2024-0013

April 1, 2026

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1 Introduction

The Nutrient Watershed Permit (Permit) adopted by the Regional Water Board in July 2024 (Order R2-2024-0013) establishes final effluent limitations for Total Inorganic Nitrogen (TIN) for specific municipal wastewater dischargers to San Francisco Bay. TIN represents the sum of ammonia, nitrite, and nitrate. The dischargers with final effluent limitations are listed in Table 4 of the Permit. The Permit also establishes a 10-year compliance schedule, such that the final effluent limitations are not effective until October 1, 2034.

Dischargers are required to submit information annually to demonstrate that they are making progress per the Permit's compliance schedule, with specific milestones listed in Table 5 of the Permit. This attachment to the Group Annual Report summarizes that annual progress, as required by Provision 6.3.3 of the Permit.

BACWA collected the information in this report via an online questionnaire. A flow diagram illustrating the questions asked of Dischargers is presented in Figure 1. Multiple response pathways are available to Dischargers depending on their status. Dischargers may have a portfolio of strategies to meet final effluent limits for TIN. Section 2 of this attachment contains text, graphics, and a table that summarize the survey results for year 2025. Section 3 of this attachment contains the detailed responses provided by each discharger.

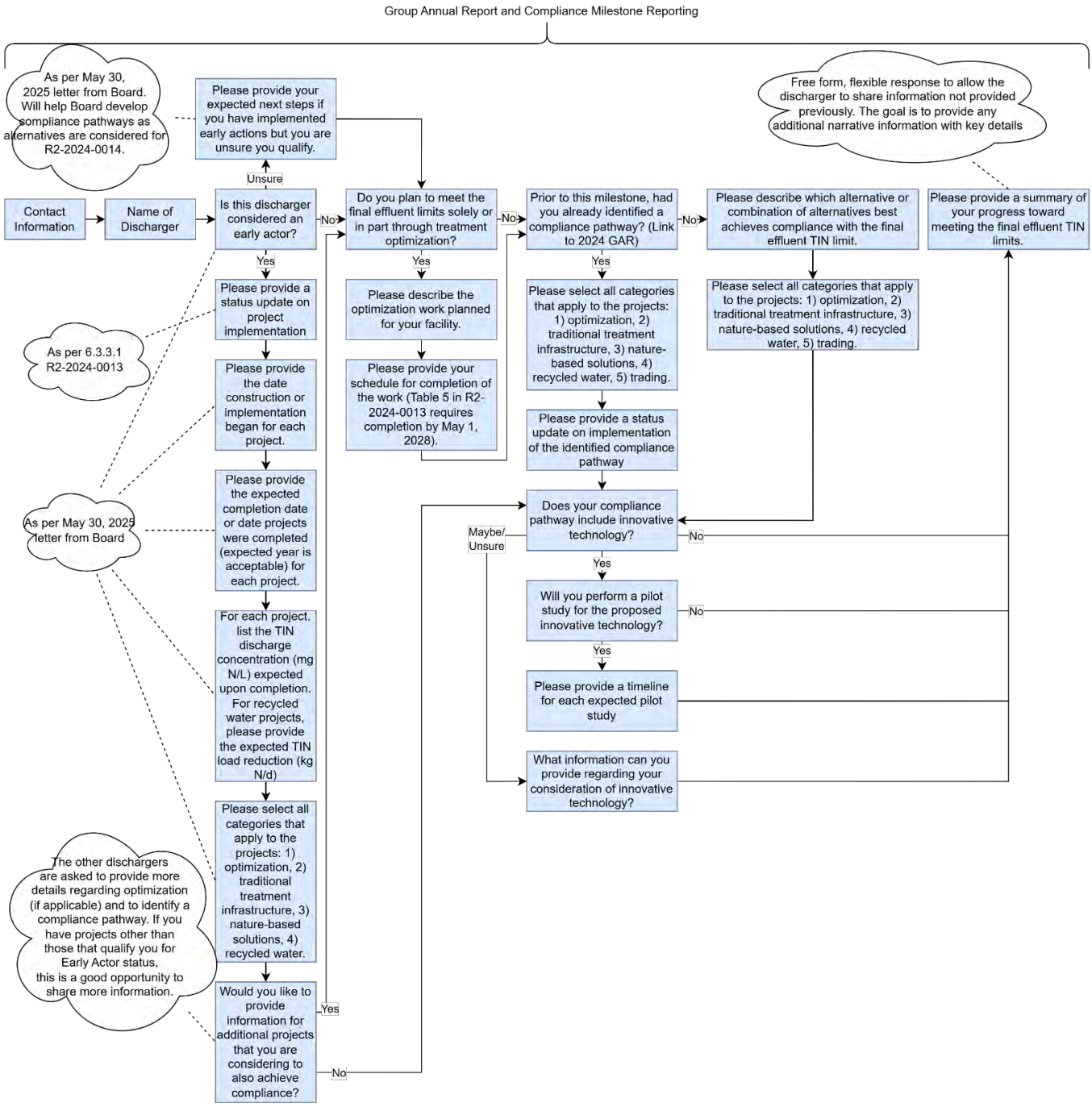


Figure 1. Questionnaire Provided to Dischargers

2 Overview of Results

A tabular summary of the survey results is given in Table 1. Figure 2 shows the distribution of the types of planned, in-progress, or completed projects. Traditional treatment infrastructure is the most common type of project, followed by optimization, recycled water, nutrient credit trading, and nature-based solutions.

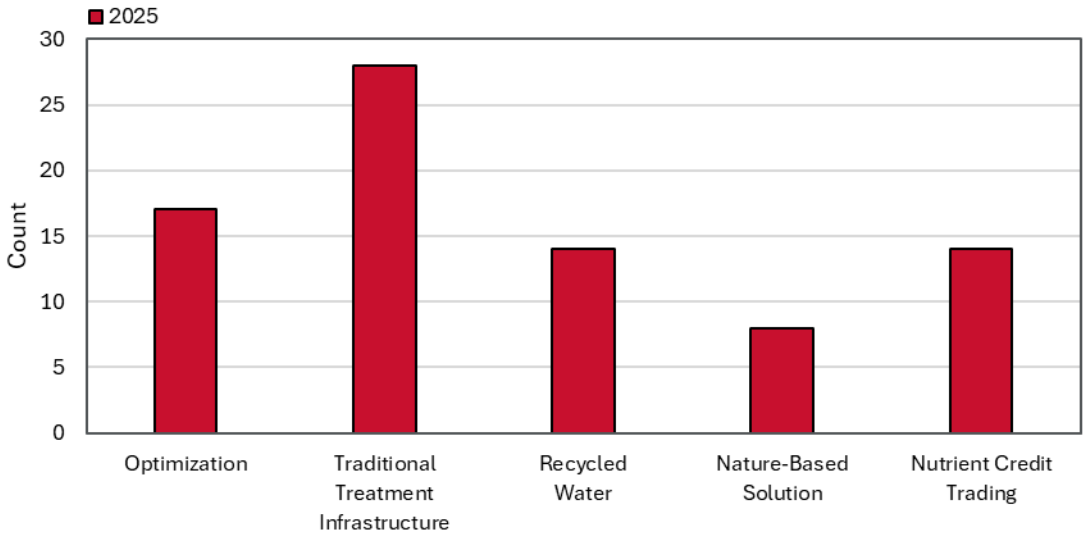


Figure 2. Distribution of Project Types

Figure 3 shows the currently available information on projected TIN reductions for each discharger based on their planning status. Dischargers in the "Pilot/Optimization In-Progress" group include those that have undertaken optimization and pilot efforts but have not yet made a final selection of a specific technology to achieve compliance with the final limit. Dischargers in the "Plan Identified" group include those that have identified a compliance pathway but may still be evaluating alternatives and/or did not provide any details regarding timeline or TIN concentration. **These two groups represent 45% of the 2022 dry season TIN discharge loads.**

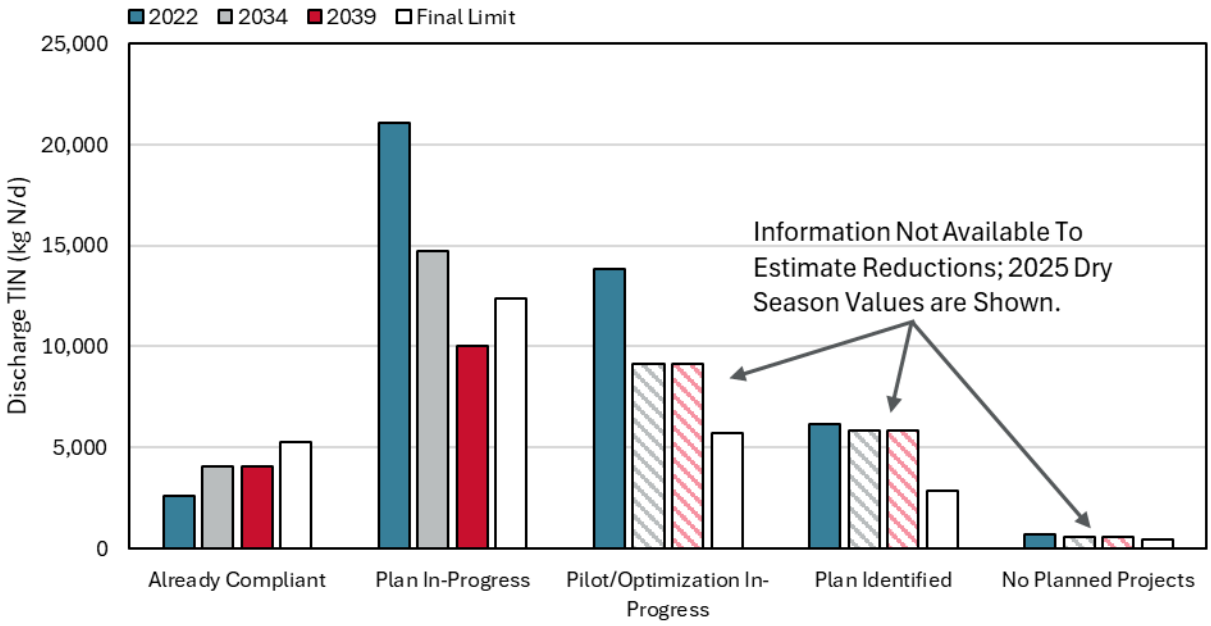


Figure 3. Currently Available Information Regarding TIN Reductions for Dischargers Grouped by Planning Status

Note: "Pilot/Optimization In-Progress" includes those that have undertaken optimization and pilot efforts but have not yet made a final selection of a specific technology to achieve compliance with the final limit. "Plan Identified" includes those that have identified a compliance pathway but may still be evaluating alternatives and/or did not provide any details regarding timeline or TIN concentration.

Figure 4 shows the estimated timelines for projects that have been completed or are in-progress or planned. Some dischargers began and/or completed projects that reduced TIN discharge long before the first Nutrients Watershed Permit was adopted (e.g., Livermore and DSRSD that discharge to the EBDA common outfall).

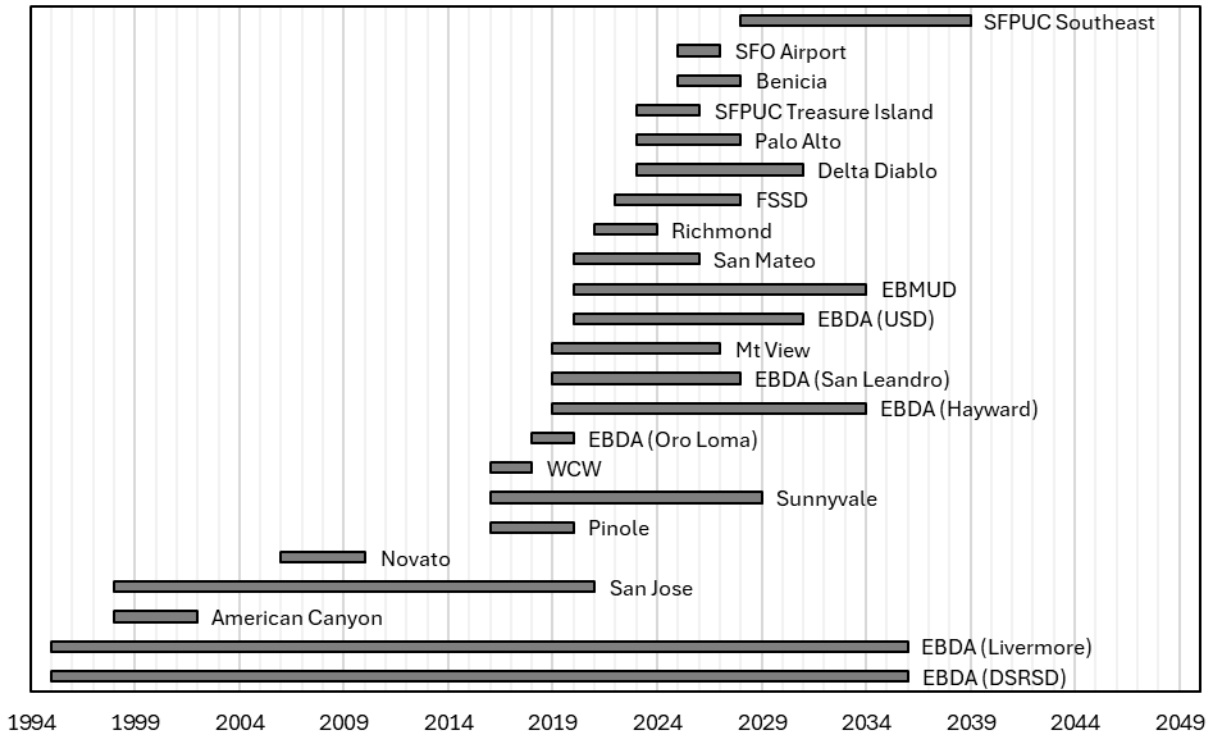


Figure 4. Estimated Timelines for Completed, In-Progress, and Planned Projects

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Table 1. Summary of Questionnaire Results

Discharger	Early Actor	Compliance Pathway[1,2]	Estimated Project(s) Start[3]	Estimated Project(s) End	Optimization	Innovative Technology	Pilot Study	Planning Status[4]	Schedule Summary
American Canyon	Yes	TTI*; RW*	1998	2002	No	No	-	Already Compliant	Already compliant with final limits.
Benicia	No	OP; TTI; NCT	2025	2028	Yes	Maybe/Unsure	-	Pilot/Optimization In-Progress	Performing optimization with promising results. Alternatives analysis will begin in 2026.
Burlingame	No	OP; TTI; RW; NCT	-	-	Yes	No	Yes	Plan In-Progress	Alternatives evaluation completed. May pilot densification starting in late 2027.
Central San	No	TTI; NbS; RW; NCT	-	-	No	Yes	Yes	Pilot/Optimization In-Progress	MABR pilot summer of 2026. Densification pilot summer of 2027.
CMSA	No	OP; TTI; NCT	-	-	Yes	Maybe/Unsure	-	Pathway Selected	Selection of final alternative by summer 2026.
Delta Diablo	No	TTI	2023	2031	No	Yes	No	Plan In-Progress	Currently in detailed design for nutrient removal upgrades. Construction estimated to be completed in 2031.
EBDA (DSRSD)	Yes	RW*	1995	2036	-	No	-	Plan In-Progress	Recycled water expansion project estimated complete by 2036.
EBDA (Hayward)	Yes	TTI*; NbS; RW	2019	2034	No	Maybe/Unsure	-	Plan In-Progress	Design is complete, currently waiting on financing to bid the project.
EBDA (Livermore)	Yes	OP; TTI; RW*; NCT	1995	2036	Yes	Yes	No	Plan In-Progress	Has selected step-feed MLE. Plans to expand recycled water.
EBDA (Oro Loma)	Yes	OP*	2018	2020	-	Maybe/Unsure	-	Plan In-Progress	Already produces effluent TIN less than 10 mg/L.
EBDA (San Leandro)	Yes	OP; TTI; NbS*	2019	2028	Yes	Yes	Yes	Plan In-Progress	Began construction in September 2025 on an innovative NbS solution. An additional project will begin design in 2026. Likely to perform sidestream treatment pilot.
EBDA (USD)	Yes	TTI*	2020	2031	-	No	-	Plan In-Progress	Construction projects are underway. Estimated completion by 2031.
EBMUD	Yes	OP*; TTI; NCT	2020	2034	Yes	Maybe/Unsure	-	Pilot/Optimization In-Progress	Currently seeing good results from optimizing existing system. Currently evaluating alternatives for further reductions.
FSSD	Yes	TTI*; RW	2022	2028	No	Maybe/Unsure	-	Plan In-Progress	Phase I estimated to be complete by 2028, Phase II by 2034.
Millbrae	No	RW; NCT	-	-	No	No	-	Pathway Selected	No TIN treatment strategies have been evaluated. Focus has been on expanding recycled water and nutrient credit trading.
Mt View	Yes	NbS*	2019	2027	-	No	-	Already Compliant	Optimization expected to be completed by 2027.
Novato	Yes	TTI*; OP*; NbS*; RW*	2006	2010	Yes	No	-	Already Compliant	Although already compliant, Novato continues to evaluate OP, NbS, and RW projects.
Palo Alto	Yes	TTI*	2023	2028	-	Yes	No	Plan In-Progress	Construction started in 2023 and is expected to be complete by 2028.
Pinole	Yes	OP; TTI*;	2016	2020	Yes	Maybe/Unsure	-	Plan In-Progress	Construction was completed in 2020. Estimated completion of optimization by May 1, 2028, and construction planned for 2027/2028.
Richmond	Yes	OP*; TTI*	2021	2024	Yes	No	-	No Projects Planned	Completed a diffuser upgrade in 2024. No planned projects. Richmond is jointly responsible for compliance of the West County Joint Outfall shared with WCW.
Rodeo	No	OP; TTI; NCT	-	-	Yes	Maybe/Unsure	-	Pathway Selected	Currently in design for aeration system upgrade.
San Jose	Yes	OP*	1998	2021	Yes	Yes	-	Already Compliant	Optimization completed in 2021. Ongoing evaluations of additional OP, TTI, NbS, and RW projects for implementation over next 15-20 years.
San Mateo	Yes	TTI*	2020	2026	-	Yes	-	Plan In-Progress	Startup of new treatment facility in 2026.
SASM	No	OP; TTI; NbS; NCT	-	-	Yes	Yes	Yes	Pathway Selected	Currently performing alternatives analysis.
SFO Airport	No[5]	TTI; RW; NCT	2025	2027	-	Yes	Yes	Plan In-Progress	New treatment plant will be operational in 2027.

Discharger	Early Actor	Compliance Pathway[1,2]	Estimated Project(s) Start[3]	Estimated Project(s) End	Optimization	Innovative Technology	Pilot Study	Planning Status[4]	Schedule Summary
SFPUC Southeast	Yes	TTI*	2028	2039	-	Maybe/Unsure	-	Plan In-Progress	Completion of the nutrient reduction project is anticipated by 2039. Anticipated design start in 2028.
SFPUC Treasure Island	Yes	TTI*; RW*	2023	2026	-	No	-	Plan In-Progress	New treatment facility to completed by the end of 2026.
SMCSD	No	TTI; NCT	-	-	No	No	-	Pathway Selected	Design is planned to begin in 2026 and be put out for bid in spring 2027.
South SF	No	TTI	-	-	No	Yes	Yes	Pathway Selected	Currently evaluating alternatives. Densification pilot planned (year unknown).
Sunnyvale	Yes	TTI*	2016	2029	-	Yes	No	Plan In-Progress	Expected completion of upgrades by 2029.
SVCW	No	OP; TTI; RW; NCT	-	-	Yes	Yes	Yes	Pathway Selected	Completed alternatives analysis. Negotiating agreement with SFPUC to allow an alternative to proceed.
Tiburon	No	OP; NCT	-	-	Yes	Maybe/Unsure	-	Plan In-Progress	Alternatives analysis completed. Process optimization pilot testing being investigated
Vallejo	No	TTI; NCT	-	-	No	Maybe/Unsure	Yes	Pathway Selected	Alternatives analysis has been completed and a potential treatment option has been identified.
WCW	Yes	OP*; TTI*; NbS*; RW*	2016	2018	Yes	No	-	No Projects Planned	WCW already produces <10 mg/L TIN. However, WCW is jointly responsible for compliance of the West County Joint Outfall shared with Richmond.

1. OP = Optimization, TTI = Traditional Treatment Infrastructure, RW = Recycled Water, NbS = Nature-Based Solution, NCT = Nutrient Credit Trading.
2. An asterisk (*) indicates the project is an Early Actor project. Not all projects listed for Early Actors are necessarily the project(s) that qualified the discharger as an Early Actor.
3. The types of project start dates among different agencies may represent different project steps, but the date generally represents when the agency committed implementation of a specific strategy.
4. “Pilot/Optimization In-Progress” includes those that have undertaken optimization and pilot efforts but have not yet selected a specific technology. “Pathway Selected” includes those that did not provide any details regarding timeline or TIN concentration and/or are in varying stages of planning.
5. SFO Airport will have a new treatment plant operational by 2027 but elected to not identify as an Early Actor.

3 Detailed Responses

Detailed responses provided by the Dischargers are provided in Table 2.

Table 2. Detailed Responses Provided by Dischargers (Sorted Alphabetically); White = Early Actor, Light Grey = Other)

Discharger	Detailed Response
American Canyon	The City of American Canyon built a membrane bioreactor (MBR) plant that nitrifies and denitrifies. The City also has a robust recycled water program that will divert loads to irrigation. We continue to expand our recycled water infrastructure throughout the city. We already meet our final effluent TIN limits. We will continue to meet those limits with our recycled water program. American Canyon in 2025 (dry season) discharged TIN at an average of 8.5 mg/L.
Benicia	**Progress:** The Benicia WWTP embarked on an effort to find in-house optimization options to decrease the amount of TIN discharged from the facility in September of 2025. With the most successful optimization strategies in place so far, the treatment plant achieved 151 kg/d of TIN loading in September 2025 and 131 kg/d in December, down from the treatment plant's typical 230-250 kg/d in previous months. Benicia plans to continue testing in-house optimization to see how close to the final limit of 120 kg/d we can get and may also pursue other optimization strategies while working with the chosen consultant to review TIN reduction alternatives. Along with the city's in-house treatment plant optimization efforts, Benicia WWTP staff took advice from current consultants to run a sampling study to gather data that would be useful to a consulting firm in determining current existing treatment plant loading and performance during the compliance period. This sampling and analyses were performed by Benicia Water Quality staff with analysis performed by a third-party laboratory. The data gathered will be shared with the selected consulting firm for the 2026 TIN reduction alternatives analysis. Sampling and analyses were performed 8/19-8/25/2025. An RFP was issued by Benicia on 10/20/2025 to secure a consulting team to help with the analysis of TIN reduction alternatives and to ultimately help the city determine the best alternative or combination of alternatives to meet the final TIN loading limit in the Nutrient Watershed Permit with all city needs

Discharger	Detailed Response
	and concerns considered. On 3/3/2026, the Benicia City Council approved a contract for the selected consulting team. Work will begin on the alternatives analysis as early as possible in 2026. **Optimization:** The Benicia WWTP embarked on an effort to find in-house optimization options to decrease the amount of TIN discharged from the facility in September of 2025. Treatment plant staff decided it would be best to manipulate the WWTP to nitrify, though it is designed for reduction of carbon BOD only. This effort has presented challenges, especially regarding consistency of treatment. Staff began by calculating and setting an optimal F/M ratio for the Activated Sludge process to reduce ammonia. A few other operational strategies were tested but did not yield reliable results as F/M did. To continue optimization, a study was performed to generate a ratio between in-plant measured COD and contract laboratory generated BOD that is to be re-checked quarterly. Using COD to calculate a theoretical BOD based on the determined ratio and measuring this value each week on the effluent flow from the Primary Treatment process gives the operations team the data needed to make continuous small adjustments to the process to bring about more consistent performance. Around this time, the operations team also began timing the Rotating Biological Contactor (RBC) seeding operation that is run for winter months with the running of the Belt Filter Press for mechanical sludge dewatering, which helps to bring about some indirect reduction of that side stream, and even out nutrient loading to the Activated Sludge process. Another detail that led to uneven operation was that the RAS rate would hydraulically overwhelm the process at high flows and return too little during low flows, leading operators to have to switch between running a fixed rate and running a flow paced PID for RAS operation. This was corrected by programming a minimum and maximum rate that the RAS pumps can run in flow paced operation. The next set of operational changes to bring about more consistent operation was development of an exact schedule for operators to follow regarding the times throughout the day that operational tasks are performed to further even out the distribution of in-plant-generated loadings, especially sludge dewatering, and RBC seeding. With these operational strategies in place, the treatment plant achieved 151 kg/d of TIN loading in September 2025 and 131 kg/d in December, down from the treatment plant's typical 230-250 kg/d in previous months. It has also been found that nitrate and nitrite levels are being reduced along with ammonia, suggesting that partial denitrification is happening in the plant, though where that is happening has not yet been determined. Benicia will continue with testing this in-house optimization through

Discharger	Detailed Response
	nitrification and denitrification to see how close to the final limit of 120 kg/d can be achieved and may also pursue other optimization strategies while working with the consultant who has been chosen through an RFP process to review TIN reduction alternatives. Benicia will complete its optimization work by 5/1/2028.
Burlingame	**Progress:** Completed alternatives evaluation. Will proceed with the design of selected treatment alternatives. Yet to finalize the alternative. **Optimization:** Considering densification as a treatment option. If selected, piloting of densification may begin in late 2027. The city will make every reasonable effort to complete optimization efforts by May 1, 2028. However, the schedule is contingent upon several factors, including procurement timelines, pilot performance, and securing necessary funding. In particular, the availability of external funding sources, including grants, will be critical to timely project implementation. Accordingly, the overall schedule will depend on the progression of these efforts.
Central San	**Progress:** Several capital projects have been completed or are in progress at the treatment plant, with future nutrient removal considerations incorporated during the planning and design phases. These projects address key factors such as aging infrastructure and establish a solid foundation for Central San's compliance with nutrient limits. A selection of these projects is listed below. 1) Aeration Basins Diffuser Replacement - Phase 1, DP 100019 (Completion expected Spring 2026) Diffuser replacement and seismic upgrades to two of the four existing aeration tanks. Installing structural elements and support systems for the upcoming MABR demonstration. Upgraded equipment will be essential for nutrient removal. 2) Membrane Aerated Biofilm Reactor (MABR) Pilot Project (Completed November 2024) Successfully demonstrated that MABR can remove TIN while being fed continuously with mixed liquor from Central San's treatment plant operating with a short solids retention time (1.2- to 1.3-day SRT). Pilot was fed from various locations in existing treatment plant to identify best location for full-scale testing. 3) Secondary Clarifier and Channel Improvements, DP 100047 A smaller project phase has been designed and bid with construction expected to be complete by Fall 2026. This project addresses

Discharger	Detailed Response
	immediate rehabilitation concerns and will perform critical infrastructure inspection for the main Secondary Clarifier and Channel Improvement project. The main project is in design, with construction expected to begin Spring of 2027. Rehabilitate existing clarifiers and distribution channel concrete and coatings. Replace drain gates and other miscellaneous items. Optimize clarifier performance and hydraulic capacity, while ensuring improvements would remain effective for future nutrients removal operation. 4) UV Disinfection Replacement, DP 100012 (In Final Design) The new UV Disinfection facilities will accept secondary effluent from any new secondary treatment facilities and allow the existing UV tank area to be repurposed for secondary treatment. This project is expected to bid by the end of 2026, with site work potentially beginning in 2028. 5) Under the Nutrient Management Project, DP 100078, Central San is identifying viable nutrient mitigation alternatives to assist Central San in selecting an optimal solution, including a large-scale demonstration project of potential nutrient removal technologies, such as MABR and densification. This project will also evaluate various potential recycled water opportunities, maximize the value of existing assets, and develop an optimal project phasing, schedule and delivery plan. An overarching goal is to comply with regulatory requirements on schedule, while minimizing impact on Central San's rate payers and integrating nutrient removal with multi-benefit projects. Purchase of MABR equipment for the demonstration has been completed and released for fabrication. The full-scale MABR demonstration project is expected to install the MABR units in the Summer 2026 and conclude data collection Fall 2026. A densification pilot is currently planned to be conducted in the Summer of 2027. 6) Planning work has begun on assessing other nutrient treatment technology alternatives in the event MABR is not successful. **Innovative Technology:** Central San is evaluating the suitability of the MABR technology for Central San at a demonstration scale (i.e., 1 of 4 aeration tanks; approximately $20M demonstration). The innovative MABR technology is attractive for Central San given the inherent challenges to increase the suspended growth sludge-age, the incinerator scrubber water laden with cyanide, and footprint constraints. This demonstration builds upon the 2024 MABR pilot (<5 gpm) that while successful had several unanswered questions. The

Discharger	Detailed Response
	demonstration results will inform Central San's long-term nutrient management decision-making. **Pilot Testing:** Central San completed a small-scale MABR pilot in 2025. Full-scale demonstration pilot is planned for summer 2026. Densification pilot is planned for summer 2027.
CMSA	**Progress:** CMSA began a Nutrient Removal Alternatives Evaluation in 2024, has completed a significant amount of work tasks since then, and is currently evaluating three final alternatives (including several variations thereof). Alternative 1 is located in a parking lot area, Alternative 2 is located in the footprint of the current biotower area, and Alternative 3 would repurpose CMSA's existing primary clarifiers 6&7. All three final alternatives include biological nutrient removal. Variations of each alternative include addition of innovative intensification technologies such as MABR, Densified Activated Sludge, likely a separate side stream treatment system, and some alternatives include a first phase of optimizing CMSA's existing biotower/aeration system to remove some TIN, to be combined with a second, later phase elsewhere on CMSA's site to remove the remaining TIN. Capital and life cycle cost information for each alternative has been developed and CMSA expects to select a final alternative by Summer 2026. Major work tasks completed include: issuance of RFP and selection of consultants, extensive wastewater characterization sampling, secondary clarifier stress testing, development of project design screening and evaluation criteria, installation of nutrient related sensors throughout the facility, development of a process model, evaluation of interim nutrient removal optimization options, evaluation of funding opportunities, evaluation of the impacts of nutrient removal on CMSA's solids processing and energy systems, evaluation of CMSA's existing aeration blower system, development of layout drawings and detailed capital and life-cycle costs for each alternative and variations thereof. **Optimization:** An alternative being considered is optimizing existing biotowers and aeration systems to remove TIN. Completed by May 1, 2028, if the alternative involving optimization moves forward. **Innovative Technology:** Variations of each final alternative being considered include addition of innovative intensification technologies such as MABR, Densified Activated Sludge and likely a separate side stream treatment system. CMSA may

Discharger	Detailed Response
	elect to include such innovative technologies in the final selected alternative. If not, CMSA would include flexibility in the project design for the addition of such innovative intensification technologies in the future.
Delta Diablo	**Progress**: The District selected a design consultant and detailed design began in November 2023. The District is proceeding with the design of new treatment facilities for nutrient removal. The Secondary Process Improvements Project (Project) began detailed design in November 2023. Detailed design is underway and is expected to be completed in June 2026. Initially, the Project was designed for a phased approach to nutrient removal. In 2025, the District modified the design criteria such that nutrient removal is now part of the first implementation phase. An innovative technology (densified activated sludge with step-feed biological nitrogen removal) will be implemented. The District intends to advertise the Project in June 2026. Construction is anticipated to be completed in 2031. If bids far exceed the Engineer's estimate, the District may modify the Project design and instead implement a phased approach to nutrient removal, which would be completed in the 2034/2035 timeframe. The anticipated TIN discharge concentration during the dry weather season is projected to be less than 15 mg-N/L, but it is dependent on the available carbon within the influent wastewater.
EBDA	**Progress:** EBDA is a combined outfall system that discharges effluent for six treatment plants. The status of each plant's nutrient reduction efforts is summarized below. Because several of the major upgrades described herein were designed prior to development of the effluent limits in the current permit, EBDA anticipates that additional time will likely be needed to achieve compliance, consistent with permit provision 6.3.6. As outlined below, the EBDA agencies are already working to identify additional projects. <u>City of Hayward</u> The City of Hayward has received the final design of the nutrient project. We are waiting for financing before bidding the project. Construction is planned to begin 4th Quarter 2026 and has an estimated completion date of 2031.This project will include: • Installation of a new pair of 1.5-million-gallon equalization/diurnal flow basins (3-million gallons total storage) to free up the site where the new biological nutrient removal (BNR) basins are going to be installed. • Installation of 5-1-million-gallon basins to operate with Anoxic selectors and a step feed BNR process. This will include constructing anoxic and aeration zones with surface wasting operations. A new blower building and an alkalinity control facility

Discharger	Detailed Response
	will also be constructed as well as a new return activated sludge (RAS) chlorination injection system for foaming control. • Installation of 1 new secondary clarifier with return-activated sludge pump station. • Retrofitting and upgrading two existing secondary clarifier structures and mechanisms. • Demolition and removal of the West Trickling filter, which will open the required area for a new grit facility in order to allow the new BNR basins to operate as efficiently and effectively as possible. In parallel with this major upgrade, Hayward is also working on the following future projects: • The City is currently developing a conceptual (30%) design for converting the former oxidation ponds into a free water surface wetland with horizontal levee to further treat/polish the secondary treated effluent. • The City is also in the process of developing a Recycled Water Master Plan. The Master Plan includes identifying potential customers, evaluating the current recycled water treatment system quality and quantity to meet potential customer demands, and expansion goals and opportunities, which would lead to further nitrogen reductions through diversion. The TIN discharge concentration at completion of these projects is anticipated to be 20 mg/L. <u>City of Livermore</u> Since the 1960s, the City has been producing recycled water for irrigation. During the last decade on average, the City recycled 1/3 of the effluent that could have been discharged to the Bay, with an even higher proportion during the dry months covered by the Permit. In addition to its existing recycled water diversion, the City is considering the following nutrient reduction measures: • The City has decided to proceed with the design of a step-feed MLE process with a design goal of 12 mg/L TIN. • The City will expand recycled water use in the existing service area to accommodate future population growth. The demand increase is ongoing as more development is constructed. The City will also investigate the possibility of selling additional recycled water to neighboring agencies. • The City will explore trading options within the EBDA system and as part of regional efforts. The TIN load reduction associated with recycled water is approximately 137 kg/d. <u>City of San Leandro</u> San Leandro has been working on converting a disused treatment basin into a treatment wetland since 2018. This project will include an MABR

Discharger	Detailed Response
	nitrification system followed by distribution to a woodchip and vegetation seepage slope and then an open water pond system. The project has been awarded grants from Measure AA through the San Francisco Bay Restoration Authority and the US EPA through the San Francisco Bay Water Quality Improvement Fund. The current design of the treatment wetland includes 15 containerized MABR units manufactured by Fluence. We have leased one of these units from Fluence to operate and test it before installing the remaining 14 of the units. The goals of the pilot are: • Confirm treatment efficacy and capability to meet the NPDES permit limits. • Inform final design of the MABR system to help reduce future operational problems or change orders during construction. The unit started operation 3/9/2026 and is still in the startup phase. We will summarize the test results in September 2026 such that the units can be ordered in the fall, assuming it works as expected. The treatment wetland project is innovative for the following reasons: • It includes pre-manufactured units, saving on construction costs and no external tanks • It will be processing secondary effluent to remove nitrogen only. Separating the nitrogen removal process from the BOD removal is not a common practice. The project started construction in September 2025. The first phase of the project involves grading and preparing the site. Construction of Phase II of the project is expected to start in 2027, with completion expected in 2028.The treatment wetland will treat approximately 20 percent of San Leandro's dry weather flow and remove about 95 percent of the nitrogen from that flow. In addition to the treatment wetland, in 2024, the City contracted with HDR to model the San Leandro Water Pollution Control Plant and recommend optimization pathways to comply with the permit. This project revealed that constructing facilities to allow the aeration basins to series and reaerating the return activated sludge (RAS) will provide a 40-50% reduction in TIN. Pending finalization of the report, this project is expected to start the design phase in late 2026. Additional reduction may include sidestream treatment. Alternatives analysis and sidestream pilot testing is expected to start in 2027. The expected TIN reduction from the treatment wetland project is estimated to be 140 kg/d. <u>Dublin San Ramon Services District</u> In 1995, DSRSD and East Bay Municipal Utility District (EBMUD) formed a partnership called the DSRSD-EBMUD Recycled Water Authority

Discharger	Detailed Response
	(DERWA) to produce recycled water from DSRSD's wastewater treatment plant. DERWA recycled 1,396 million gallons in 2025, thereby reducing the percentage of effluent discharged into San Francisco Bay 34.3%. During the dry month of May through September, DERWA recycled 1,115 gallons, reducing effluent flows by 70.1% and reducing the effluent TIN load by 68.8%. In 2022, DERWA formalized a moratorium for new recycled water connections in response to low supply. Currently a small set of customers are approved to connect. In 2025, DERWA connected 4 new customers from DSRSD's service area and is planning to connect 2 more customers from DSRSD in 2026. In 2025, DERWA has been working on a long-term agreement with Central San on diversion of their wastewater to the Regional Wastewater Treatment Plant. The previous 3-year agreement (short term agreement) with Central Contra Costa Sanitation District (Central San) was extended twice (two years) with no more extensions allowed, ended in January 2026. A Memorandum of Agreement (MOA) is currently being negotiated, with the goal to be executed in the next few months, will allow diversions for up to one year (one-year with possible two-year extension). Once executed, the MOA will allow diversions, while CCCSD, DSRSD, EBMUD conduct technical studies on the diversion structure and impacts to CCCSD and DSRSD. Current infrastructure allows a gravity flow of 0.7 MGD to DSRSD, the technical study will look at the capital improvements needed to connect additional 2.0 MGD flow to DSRSD with such details as method of transfer, gravity, or pump along with an updated supply and demand study. Before the MOA has ended a long-term (50-year) agreement will be reached. At this time, the date of completion of the recycled water expansion project is not known but it will take longer than 10 years to complete due to the complexity of interagency coordination and recycled water expansion. To lift the recycled water connection moratorium DERWA is working to secure more supply with Central San via long-term supplemental supply agreement. Future recycled water system expansion projects will be planned after the connection moratorium is lifted. DSRSD also began working on a Wastewater Treatment and Biosolids Master Plan in 2025 with Carollo Engineering. DSRSD anticipates CIPs coming out of the effort that may diversify DSRSD's nutrient reduction strategy. The Master plan is scheduled for completion in September of 2026. Additionally, DSRSD is applying for grant funding from EPA's San Francisco Bay Program to pilot membrane aerated bioreactor (MABR) technology to incrementally reduce nutrient discharges without requiring significant expansion of the treatment plant. The pilot would focus on quantifying nutrient reductions, benchmarking energy use, assessing improvements to recycled water treatment and quality, and validate a siting strategy.

Discharger	Detailed Response
	The anticipated TIN discharge load at completion of these projects is estimated to be 176 kg/d. <u>Oro Loma Sanitary District</u> Plant upgrades that resulted in nitrogen load reduction were completed in year 2019. The project involved the addition of additional activated sludge tankage, as well as modification of existing tankage to facilitate nitrogen removal. The new tankage and modified tankage offers the ability to operate in a continuous or step-feed aerobic-anoxic configuration. The discharge TIN concentration resulting from the project is approximately 10 mg/L. <u>Union Sanitary District</u> Implementation of USD's Enhanced Treatment and Site Upgrade (ETSU) Program is on-going: • Phase 1A – Aeration Basin Mods: Modifications of 3 out of 8 tanks are nearing completion with another 2 anticipated to be completed by spring 2026. Site utility infrastructure improvements are delayed due to the local power utility company (PG&E). Construction for this phase is anticipated to continue through 2027 excluding any further delays from PG&E. • Phase 1A – Campus: Campus construction is nearing completion with occupancy anticipated to occur by spring 2026. Once occupancy has occurred, major construction activities can commence for Phase 1B. • Phase 1B – Secondary Clarifiers & Effluent Facilities: Construction for this phase commenced January 2026. Construction is anticipated to be completed by 2031. • Phase 1C – Primary Effluent Equalization: Design is anticipated to be completed by 2028. Construction is anticipated to be completed by 2031. The resulting concentration after completion of these projects is anticipated to be approximately 23 mg/L TIN. USD is also working in partnership with the South Bay Salt Pond Restoration Project to identify, develop, and pilot a multi-benefit nature-based solution. <u>EBDA First Mile Horizontal Levee Project</u> In addition to the plant-specific nitrogen reduction projects outlined above, since 2018, EBDA has been championing a multi-benefit shoreline resilience project called the First Mile Horizontal Levee, along with East Bay Regional Park District, Alameda County Flood Control and Water Conservation District, and other partners. The project would provide flood protection, sea level rise resilience, and habitat enhancement, as well as water quality improvement through a subsurface treatment layer in the levee designed to remove nitrogen and emerging contaminants. The levee

Discharger	Detailed Response
	would be located at Oro Loma Marsh, just south of the Oro Loma treatment plant, and it would treat Hayward and USD effluent diverted from EBDA's force main. EBDA estimates that the levee could remove up to 1200 kg/d of TIN in the dry season. The team is currently working on the 60% design and permit pre-application process through the Bay Restoration Regulatory Integration Team (BRRIT), and is seeking additional funding to allow completion of design and permitting in 2027. Construction would follow soon after, pending additional grant funding.
EBMUD	**Optimization:** The EBMUD demonstration project to adapt the high purity oxygen activated sludge (HPOAS) secondary treatment system to biological nitrogen removal (BNR) continues. In 2025, 50% or more of the secondary treatment system performed BNR during the dry season. The seasonal average total inorganic nitrogen (TIN) discharged in 2025 was 6,000 kg N/day, which is a significant drop over prior years. One key advancement in the efforts in 2025 was maintaining the BNR bacterial population during the wet season. By adjusting solids inventory before rain, the demonstration project kept part of the bacterial population while handling peak flows, speeding up startup and optimizing BNR at the dry season's start. The project to implement BNR in the secondary treatment system began in 2020 as a pilot using 25% of the secondary treatment system during the dry season. Full-scale testing has been needed to characterize BNR startup and operations using existing infrastructure, which was not designed for nutrient removal. In 2023, BNR operations scaled to 50%, which has allowed for significant load reductions in TIN discharge. Process development continues each year to improve reliability and operability. The BNR demonstration project is an operational change using existing infrastructure. One indicator of completion is when 100% of the secondary treatment system is optimized for BNR performance. Process improvements, evaluated in the Nutrients Master Plan Update project described below, may be needed to reliably operate at 100% BNR. The District plans to complete any required improvements by 2034. EBMUD's testing and conversion of the HPOAS system to BNR is an adaptive optimization process. While a significant portion of the optimization work will be complete by 2028, it will extend past that time. Two planned optimization activities over the next two years are noted below.

Discharger	Detailed Response
	1. Evaluation of higher horsepower surface aerator on BNR demonstration reactor performance by April 2027 2. Installation of additional sensors for improved process monitoring and control by April 2028 The optimized secondary treatment system is expected to achieve 25-35 mg N/L upon completion, based on current TIN influent loading. When EBMUD began its BNR pilot project to optimize secondary treatment in 2020, the final effluent limits were not defined. The intent of this project has always been to remove as much nitrogen as possible using existing HPOAS infrastructure. Results from the demonstration project suggest that supplemental work will be needed to reliably achieve 20 mg N/L concentration. **Progress:** EBMUD is currently evaluating alternatives as part of a master planning project called the Nutrients Master Plan Update. The combination of alternatives that best achieves compliance with the final effluent TIN limit will be identified by November 2026. Preliminary alternatives have been identified and include potential projects to implement secondary treatment upgrades, deammonification sidestream treatment, and/or tertiary denitrification. Secondary treatment upgrades under consideration include enhancements to the District's existing high HPOAS BNR configuration (the demonstration project described previously) to include internal mixed liquor recycle (IMLR), step-feed piping, surface wasting, and biological selector zone improvements. Secondary upgrades will also evaluate three major treatment configurations: HPOAS BNR expansion (addition of similar tanks), split-stream treatment with addition of membrane bioreactor (MBR), and addition of an integrated, flexible BNR zone. Additional enhancements under evaluation include densification, supplemental carbon addition, integrated fixed-film activated sludge (IFAS) in flexible BNR zone, and membrane aerated biofilm reactor (MABR) in flexible BNR zone. EBMUD will evaluate all alternatives considering both high purity oxygen and atmospheric air for oxygen supply. Overall secondary treatment upgrades will likely be a combination of enhancements for a specific configuration. The timing of sidestream and/or tertiary treatment implementation will be evaluated in coordination with secondary treatment upgrades before determining the combination of alternatives that best achieves compliance with the final effluent TIN limit. The evaluation will be based on a triple bottom line (TBL) approach, which may incorporate nutrient credit trading into the economic evaluation.

<table>
<tr><th>Discharger</th><th>Detailed Response</th></tr>
<tr><td></td><td>The data below summarizes the TIN season dry weather discharge from 2021 to present. The progress made since 2022 as the BNR demonstration project advanced is evident. The first year that 50% of the secondary system was used in the demonstration project was 2023. A 40% reduction occurred in the current year (2025) when compared to the 2022 seasonal average.

<table>
<tr><th>Dry Season</th><th>TIN Discharge (kg/d)</th></tr>
<tr><td>2021</td><td>8,400</td></tr>
<tr><td>2022</td><td>10,000</td></tr>
<tr><td>2023</td><td>6,900</td></tr>
<tr><td>2024</td><td>7,700</td></tr>
<tr><td>2025</td><td>6,000</td></tr>
</table>
Innovative Technology:

EBMUD is considering alternatives that include densification (via hydrocyclone-based wasting) and membrane aerated biofilm reactors (MABR). Both of these alternatives are emerging technologies that have been implemented at scale but are not necessarily considered “conventional” in their adoption. EBMUD is also considering a tertiary partial denitrification anammox (PdNA) alternative, which would be considered an innovative technology.</td></tr>
<tr><td>FSSD</td><td>FSSD's Nitrogen Removal Project is split into two phases. Phase 1 includes the addition of anoxic zones, mixing equipment, and electrical upgrades to two aeration basins and is modeled to produce an effluent load of 892 kg/d during the dry season. Phase 2 was added during the design process and includes the installation of mixed liquor return functionality to further reduce the TIN concentration. Phase 2 would allow the District to achieve the final effluent limit of 880 kg/d in the then-draft Nutrient Watershed Permit. The project was split into phases to spread costs over several years, and to provide flexibility should future watershed permits reduce the TIN limit further. Phase 1 is currently under construction with an anticipated completion date of early 2028.

The implementation of FSSD's Nitrogen Removal Phase 1 (Project) was initiated in the end of 2022 with the following milestones: 1) Board approval of the FY 2023-24 Budget and Long-Term Financial Plan Report (May 2023), 2) Board approval of the pre-design contract (July 2023), 3) Board approval of the full design contract (May 2024), and 4) Board award of the construction contract (June 2025).</td></tr>
</table>

Discharger	Detailed Response
	Construction of Phase 1 is underway, and the contractor has proposed an accelerated schedule that would put project completion in early 2027. If half of the basins cannot be completed by July 16, 2026, the remaining basins will not be released for construction until the dry season of 2027, pushing the estimated project completion to early 2028. Phase 1 was modeled to produce an effluent TIN concentration of 19 mg/L. Phase 2 was modeled to produce an effluent TIN concentration of 11.5 mg/L. The District is also proceeding with a Recycled Water Master Plan and is working with SFEI to better understand the impacts of our nutrient load on Suisun Marsh. Specific projects are not fully identified or funded, but FSSD is trying to understand options available should further reductions be needed. **Innovative Technologies:** After Phase 1 is completed, the District will be able to fine-tune the process to determine the reliably achievable nutrient reduction. The results will inform the design of Phase 2, which could include alternatives to the original recommendations in the Phase 1 design, including innovative technologies.
Millbrae	**Progress**: The City continues to work on advancing its recycled water project towards implementation. The City is seeking funding support to advance the preparation of the basis of design and pre-design of its project in 2026. Regarding nutrient credit trading, the City is awaiting development of the program by others, so no additional progress has been made on this by City of Millbrae beyond attending an informational webinar by The Freshwater Trust.
Mt View	**Progress:** Floating treatment islands installed in Moorhen Marsh as a nature-based solution. Installation of 32 islands completed in 2019. Pursuing grant funding to implement new project to optimize nutrient uptake by island root mass. The project to optimize existing floating islands is expected to be complete in 2027. Total discharge of TIN from Mt. View is anticipated to be 50 kg/d on average, which is equivalent to 13.5 mg/L.

Discharger	Detailed Response
Novato	**Progress:** No change from 2025. 1) Optimization Operational optimization of the existing Ludzack Ettinger Process to improve removal of TIN. 2) Nature-based Solutions – These projects are not directly in the control of NSD. (Although these projects would not be for meeting the limits, there are other beneficial reasons to consider the projects.) Bel Marin Keys Unit V: The California State Coastal Conservancy is restoring the Bel Marin Keys Unit V property to various habitat types. NSD is coordinating with the restoration, and the new outfall will be set back in conjunction with the restoration to provide treated effluent to the site, supporting the development of brackish marsh habitat. https://www.scc.ca.gov/webmaster/project_sites/belmarin/grr-seir_intro.html Deer Island Basin Restoration: Marin County Flood Control District is in the process of restoring the Deer Island Basin (which is adjacent to the treatment plant) to tidal marsh. The conceptual basis for this project also describes incorporating wastewater discharge into future horizontal levees. https://www.sfei.org/documents/novato-creek-baylands-vision-integrating-ecological-functions-and-flood-protection-within https://flooddistrict.marincounty.gov/novato-creek-baylands-strategy-plan/ 3) Recycled water NSD is currently able to produce and supply NMWD with 1.7 MGD of Title 22 recycled water for their purple pipes, which is approximately half of the dry weather flow. The current usage is approximately 1.3 MGD during the dry weather months so there is room for expansion/increased usage. The current and future demand of recycled water is in the hands of NMWD, not NSD. Although we expect to be able to comply with the interim and final TIN limits we are still evaluating the additional projects. In the 2025 dry season, Novato discharged TIN at an average concentration of 16.4 mg/L (based on reported data available on CIWQS).

Discharger	Detailed Response
Palo Alto	**Progress:** The Palo Alto Regional Water Quality Control Plant (RWQCP) continues construction of its Secondary Treatment Upgrades project which is reconfiguring existing aeration basins to contain alternating nitrification and denitrification zones with eventual installation of membrane aerated biofilm (MABR) reactors to enhance nitrogen removal. During this reporting period, the RWQCP completed renovations on another aeration basin. As of this writing, a total of two out of the four aeration basins have been reconfigured and brought back online. Construction is ongoing. Implementation began in 2023 and is expected to conclude in 2028, with a resulting effluent TIN concentration of 15 mg/L. Palo Alto Regional Water Quality Control Plant is anticipating meeting its final TIN effluent limit once the Secondary Treatment Upgrades Project is completed in 2028
Pinole	**Progress:** A plant upgrade has been completed but the WWTP is not currently operating in nutrient removal mode. The project was started on May 11, 2016, and was completed on January 14, 2020. The treatment process is likely capable of producing 15 mg/L TIN but the WWTP's ability to operate in Nit/Denite MLE mode remains unproven. A carbon source may be required to operate in the Nit/Denite MLE mode. Planned improvements and optimization activities include sidestream treatment for solids processing, flow equalization, and optimization of our internal recycle system. Other optimizations are still being considered. Goal is to be completed by May 1, 2028. Project design work will start in 2026, and construction is planned for 2027/2028.
Richmond	**Progress:** In April 2024, the City completed an aeration basin upgrade from mechanical mixing to fine bubble diffusion. This project helped the City achieve lower TIN concentrations because it provided reliable dissolved oxygen (DO) and allowed creation of an anoxic zone in the treatment system. The aeration basin upgrade represents significant progress in reducing TIN loading to the SF Bay. Previously, the plant used mechanical surface aeration, which is an inferior technology in terms of oxygen transfer efficiency. Prior to the 2024 upgrades, ammonia was an almost monthly exceedance for the facility as the ability to remove any form of nitrogen was almost non-existent. After the upgrades, the plant has a demonstrated ability to remove nitrogen. For example, in the 2024 dry season, TIN concentrations were reduced to an average value of 22 mg/L, which is attributed to the upgrades. Based on this performance, the TIN

Discharger	Detailed Response
	concentration expected due to the City's early actions is in the range of 20-25 mg/L. The City was not able to maintain this level of nitrogen removal throughout the 2025 dry season due to Primary Sedimentation tank issues that elevated loading rates to the secondary treatment systems and temporarily impacted treatment capabilities. The City of Richmond and Veolia are currently working on an updated Master Plan for the plant, which will include a Nutrient Management Strategy Plan.
Rodeo	**Progress**: RSD has restored the 29 12-foot by 4-foot fine bubble membrane panels. This was completed in June 2025. During this first nutrient season, RSD was barely able to meet the 2034 TIN limits and could easily meet the interim TIN limits. However, the ability to meet 2034 TIN limits came at the cost of excess chemical use and seemed unstable. RSD is in design of an aeration system upgrade that will meet the 2034 TIN limit with room to spare. RSD is not sure this is the most cost-effective solution. The design will be completed in 2026. RSD will also update the District's Comprehensive Wastewater Master Plan, which in part, will aide in determining the most cost-effective strategy to meet the 2034 TIN limit. Nutrient trading is also an option to be considered in the Master Plan study.
San Jose	**Progress:** Optimization of existing BNR process: The process has been removing approximately 40% of influent TIN since 1998. In 2019, we began a comprehensive evaluation of the process to determine how best to optimize it for additional TIN removal. By adjusting aeration mixing rates, extending residence time, lowering DO set points, and adjusting the ratio of primary effluent feed to different basins, we were able to achieve up to a 20% reduction in final effluent TIN loads. Advanced secondary process was converted from a series process (conventional secondary followed by nitrification) to a parallel 4-stage step-feed BNR process in 1998. This process was optimized beginning in 2019 in a portion of the basins with all basins optimized by 2021. Optimization was completed in 2021 and remains in place. Pre-optimization TIN discharge concentration was approximately 16 mg/L. Post optimization is consistently at 12 to 13 mg/L on average with lows in the single digits. Optimization: complete. Traditional treatment infrastructure: the upgrade technology for the BNR process has been selected through

Discharger	Detailed Response
	comprehensive process upgrade capital planning and will be implemented in phases over the next 15 to 20 years. Phase 1 is in early stages and will be delivered via design-build project delivery model. Procurement and selection of an owner's advisor is nearing completion. The treatment process upgrades to BNR described above are a foundational piece to meeting the final effluent TIN limits but will need to be implemented in phases over the next 15 to 20 years to maintain operational function and capacity. In addition, we are always pursuing expansion of our non-potable recycled water deliveries. Currently we recycle an average of 17 mgd in the dry season, which results in a 900 kg/d diversion of TIN from the Bay. Our goal is to double the non-potable recycled water deliveries over the next 20 years. In addition, we are evaluating the potential for utilizing a nature-based solution (NbS) to treat existing and future reverse osmosis concentrate that could be generated from a direct potable reuse facility owned and operated by Valley Water. With Valley Water, UC Berkeley, and SFEP, we are pursuing EPA grant funding to conduct a feasibility study for an NbS (horizontal levee) to treat ROC and potentially other high TIN waste streams. **Innovative Technology:** We will reconfigure aeration basins to utilize simultaneous nitrification/denitrification (SND) process with inDense hydrocyclones to improve activated sludge selection and quality.
San Mateo	**Progress:** We are currently in startup of our new BNR/MBR facility. Construction began in 2020 and startup is expected to be complete by 2026. Effluent TIN is expected to be 15 mg/L.
SASM	**Progress**: We are currently in contract with Black & Veatch to do an alternative analysis study to select a preferred nutrient removal option to meet final TIN limit. We are also considering Nature-Based Solutions (NbS) as one of the alternatives to meet final TIN limit. We are also going to do a more detailed feasibility study on different NbS alternatives once the current alternatives evaluation study is completed. We are considering also innovative technologies as options to meet final TIN limit. Two innovative technologies have been considered currently: running our existing Dynasand filter in the winter time as a pilot, when not utilized for recycle water, as Partial Denitrification Anammox (PdNA) filter to achieve TIN removal. In addition, we are considering piloting the integration of an anoxic selector with MBBR to the trickling filters system with additional nitrate recycles to achieve TIN removal. Pilots, if required, could be implemented as early as 2027.

Discharger	Detailed Response
	SASM is a trickling filter plant. Our consultant is looking at options to optimize the operation of the trickling filters to potentially remove 5-10% of influent TIN through the existing secondary process. However, that will not be sufficient to meet final TIN permit. We will start implementing the optimizations in the summer of 2026, with final optimization measures expected to be completed by early spring 2028. Note that optimization will support subsequent TTI measures and will not be a significant source of TIN reduction on its own, due to the fact that the plant has no ability to denitrify in its current process flow.
SFO Airport	**Progress:** Advanced Water Treatment with reverse osmosis and granular activated sludge. Construction work on the new advanced water treatment plant began in 2025. Work on the new plant should be done sometime in 2027 **Innovative Technology:** A pilot study was performed in 2019-20 with the granular activated sludge.
SFPUC Southeast	**Progress:** On February 10, the SFPUC awarded a progressive design-build contract to design and construct the SEP Nutrient Reduction Project (Project). Construction has not begun. Project planning is underway; the Needs Assessment Report (NAR) was completed in early 2026 and work on the Alternatives Analysis Report (AAR) is scheduled to begin in 2026 for anticipated completion by the end of the 2027. Project completion is expected in 2039. The Project's target dry season effluent TIN concentration is 15 mg/L as N. The SFPUC considers itself an early actor because of its construction of the new Treasure Island Water Resource Recovery Facility (TIF). The funding, contracting resources, and staff resources to implement improvements at Treasure Island and the Southeast Plant (SEP) are the same and rely on the same rate-payer base. See table entry below for information about nutrient removal at TIF.
SMCSD	**Progress:** Currently investigating side stream options to reduce TIN load. Design for sidestream is planned to begin in 2026. This project would be publicly bid in the spring of 2027.
South SF	**Progress:** In July 2024, the Cities of South San Francisco–San Bruno Water Quality Control Plant (WQCP) executed a contract with Hazen to evaluate

Discharger	Detailed Response
	compliance pathways for meeting the final effluent TIN limits. In September 2024, Hazen coordinated the collection of operational and monitoring data and used the BioWin model to evaluate potential compliance alternatives. Based on the modeling results Hazen recommends completing a feasibility alternative analysis. WQCP has concurred with this recommendation and will look for short-term pilot study opportunities to further test existing treatment systems to support the alternatives analysis. WQCP plans to conduct an innovative technology pilot study using densified activated sludge technology (DAS). WQCP is collaborating with Hazen and Carollo and joined with BACWA to apply for an EPA grant to partially fund the study. If the grant proposal is successful, the pilot testing would occur from mid-2027 to 2028, with a final evaluation complete by 2029. Hazen conducted data collection on the secondary clarifiers under stressed operating conditions in September 2025 to evaluate their capacity to handle higher solids loading. WQCP will review the CFD modeling results and use the findings to guide future planning efforts.
Sunnyvale	**Progress:** Sunnyvale currently removes an annual average of approximately 60% of influent TIN in the existing secondary treatment system (oxidation ponds, fixed-growth reactor nitrification, and dissolved air flotation). As part of the Sunnyvale Cleanwater Program, Sunnyvale is replacing its existing secondary treatment system in two phases. Phase I known as CAS-1 will construct a new MLE configured Conventional Activated Sludge system, consisting of two aeration basins, four secondary clarifiers, and associated appurtenances. The system will operate in parallel with the existing secondary treatment system after 2029. Approximately two-thirds of primary-treated flow will be treated by the Phase I system, and the remaining one-third of the flow will be treated by the existing system. In addition, a future Phase II will replace the existing system by 2035. Once the Phase 1 project is complete, the expected TIN concentration is 8.6 mg/L (This includes Sunnyvale's Pond System and new CAS-1 System). **Innovative Technology:** Sunnyvale is implementing innovative treatment with its DEMON side stream treatment. The DEMON is a sustainable, alternative to conventional wastewater treatment. By utilizing deammonification, a form of anaerobic ammonium oxidation (or Anammox), it provides high-efficiency nitrogen removal from sludge reject water while reducing energy, chemical, and sludge production requirements.

Discharger	Detailed Response
SVCW	**Progress:** SVCW completed the design of a side stream treatment project that would decrease nutrient loads by an estimated 525 kg-N/day, offsetting the additional nutrient loading from our proposed food waste project/program. We are currently seeking funding to construct the project. SVCW is evaluating a split plant configuration in which a new MBR facility would treat up to 75% of dry weather flow, while the existing treatment plant would handle the remaining dry weather flow and all wet weather flows. This approach would meet regulatory requirements and produce higher quality effluent to support the Pure Water Peninsula Project currently under discussion with SFPUC. Advancing this option requires formal institutional agreements between SVCW and SFPUC. The two agencies are still defining roles and responsibilities. If those agreements cannot be reached, an alternative would be to convert the existing aeration basins and secondary clarifiers to a BNR process and construct new secondary clarifiers. Advanced primary treatment pilot was completed. Pilots are planned for Q1-Q4 of 2027 for BNR MBR and Indirect Potable Reuse and/or Direct Potable Reuse. SVCW has completed modeling and alternatives evaluation, bringing the two aforementioned alternatives forward into the programming and sequencing phase.
Tiburon	**Progress:** Carollo performed an evaluation of nitrogen removal alternatives in August 2025. In the summer of 2026, we will perform a pilot test of hydrocyclones and running the existing facility in nitrogen removal mode. If the results of the pilot test are insufficient, we are leaning toward implementation of Alternative 1 (summarized below). Alternative 1 is modification of aeration basin no. 2 into a LE or MLE process for nitrogen removal during dry-weather periods only. This requires installing a timber or fiberglass reinforced plastic (FRP) baffle wall in the aeration basin to establish a pre-anoxic zone. This strategy would not require any major structural retrofit, avoiding the need to perform a seismic analysis. In a LE configuration, primary effluent (PE) and RAS is combined in the pre-anoxic zone and then flows through the aerobic zone before solids separation in the secondar clarifiers. NH3 is oxidized to nitrate (i.e., nitrification) in the aerobic zone, and a portion of the nitrate is returned to the pre-anoxic zone where it is reduced to nitrogen gas (i.e., denitrified). The amount of denitrification that can be achieved depends on a number of factors including the RAS flow rate, carbon availability

Discharger	Detailed Response
	(required for denitrification), and size of the pre-anoxic zone. An MLE configuration increases the nitrate return load and amount of denitrification that can be achieved with the addition of an internal mixed liquor recirculation (IMLR) loop, which returns flow from the end of the aerobic zone back to the pre-anoxic zone. The effluent TIN load for Alternative 1 is estimated to be 33 to 35 kg N/d, which is equivalent to 17.5 to 18.6 mg N/L.
Treasure Island	**Progress:** The construction notice-to-proceed of the new Treasure Island Water Resource Recovery Facility (TIF) was issued in August 2023 -- prior to the 3rd Watershed Permit effective date -- which meets the permit definition of an early actor. TIF will include biological nutrient removal (traditional treatment infrastructure) with membrane bioreactors; its target TIN concentration is < 8 mg/L as N. SFPUC plans to complete the new TIF by the end of 2026. Anticipated TIF dry season effluent TIN is <8 mg/L as N. Recycled water distribution is planned, but the expected TIN load reduction from recycled water distribution is uncertain at this time.
Vallejo	**Progress:** The District is planning to implement nutrient removal upgrades at the plant. VFWD evaluated concepts for nutrient removal in a wastewater treatment plant master plan, developed an alternatives analysis to evaluate potential nutrient removal options, and completed an additional study to further evaluate the recommended alternative. From these studies, a preferred nutrients treatment option was identified (additional activated sludge tankage configured for A2O). The District has hired a consultant to act as an owner's advisor (OA) to help guide staff through a collaborative project delivery. We will also be re-evaluating the selected nutrient treatment option with the OA as we continue developing the roadmap. Based on this analysis, we will either proceed with the current project or design and construct an alternative nutrients treatment process. We do not have a timeline for pilot studies yet, but are considering piloting technologies, including densification.
West County Wastewater	**Progress:** West County Wastewater District currently produces effluent TIN below 10 mg/L.

3.1 Dischargers Prohibited from Dry Season Discharge

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

3.2 Port Costa and Paradise Cove

Crockett Community Services District (Port Costa Wastewater Treatment Facility) and Sanitary District Number 5 of Marin County (Paradise Cove Treatment Plant) currently discharge TIN loads that are already lower than the Permit's Table 4 final effluent limitations and are thus not currently planning or investigating alternatives for additional TIN load reductions. These treatment plants are minor dischargers (less than 1 MGD) and their final effluent limits were developed differently from other dischargers, as described on page F-26 of the Permit. Their combined contribution is less than 0.02% of the aggregate dry season TIN load to San Francisco Bay.

4 Next Steps

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