

A Regional Effort to Reduce Nutrients

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BAY AREA
CLEAN WATER
AGENCIES

RMP Annual Meeting- October 21, 2026

Question: Where do nutrients in wastewater come from?



Answer: All of us!



- Urine
- Cleaning supplies
- Food waste

Nitrogen comes from our homes and is treated at wastewater treatment plants prior to Bay discharge

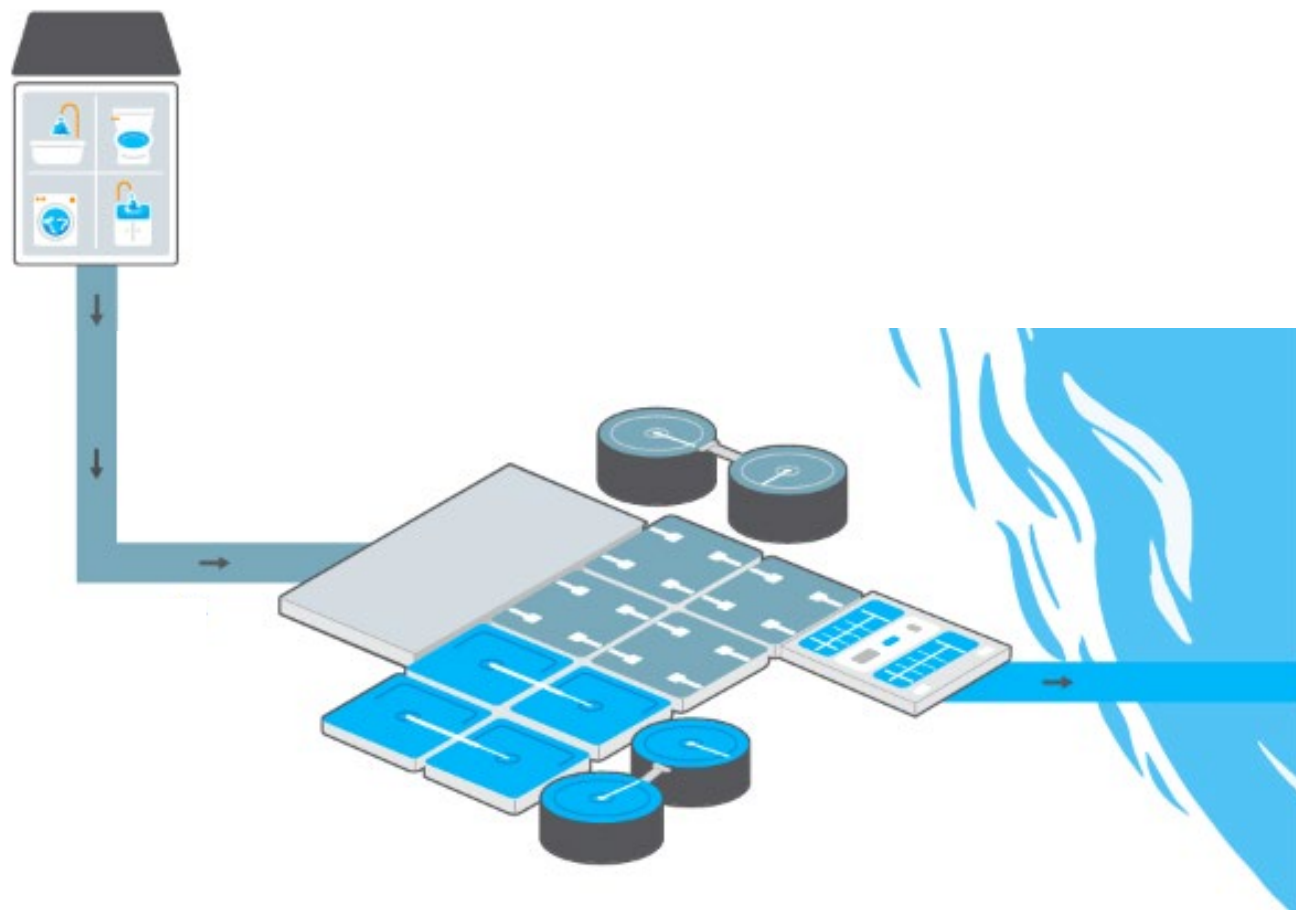


Image: Pulse of the Bay 2019

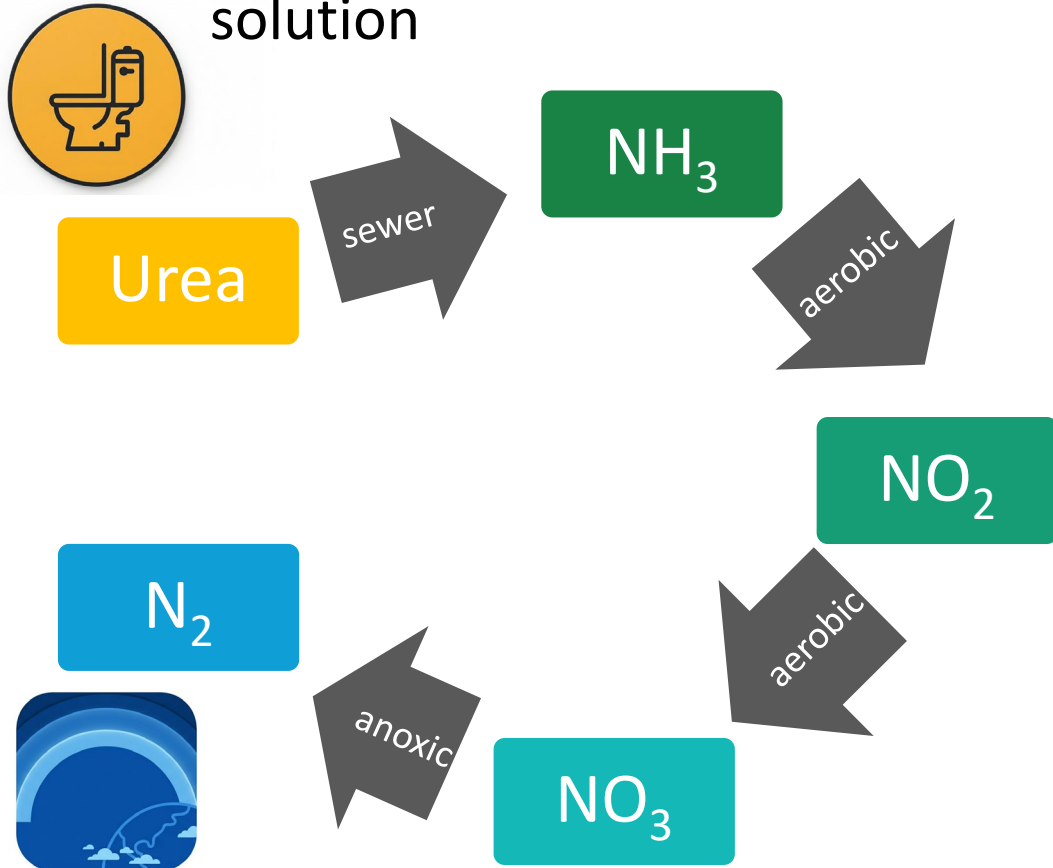
San Francisco Chronicle

Poop and pee cause algae blooms in S.F. Bay. Water agencies will spend \$11 billion to fix the problem



There are two ways to reduce nitrogen loading to the Bay

1. Nitrogen removal at a wastewater treatment plant or nature based-solution



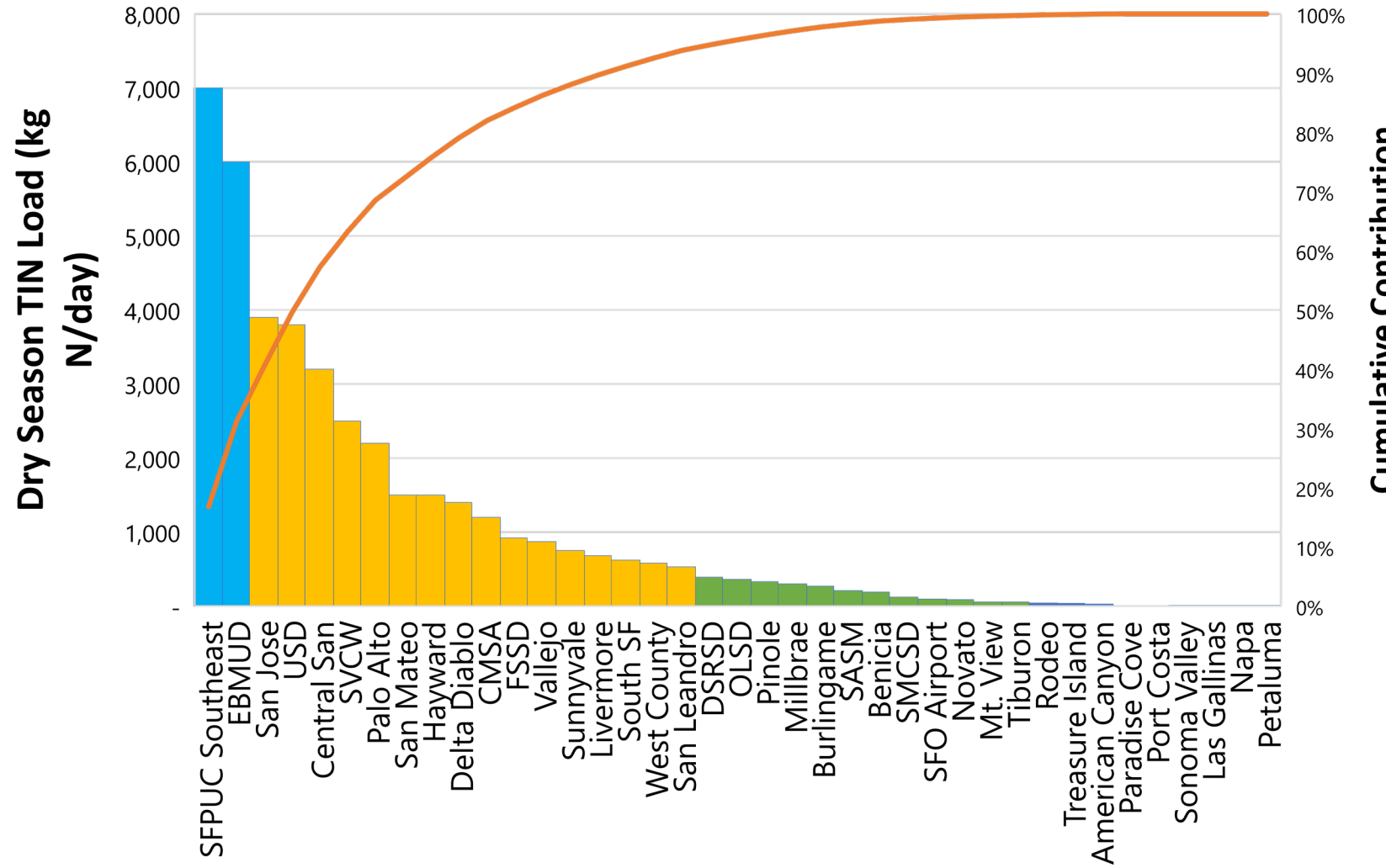
2. Diversion of nitrogen from the Bay via recycled water



40 POTWs discharge 86% of dry season nitrogen to SF Bay

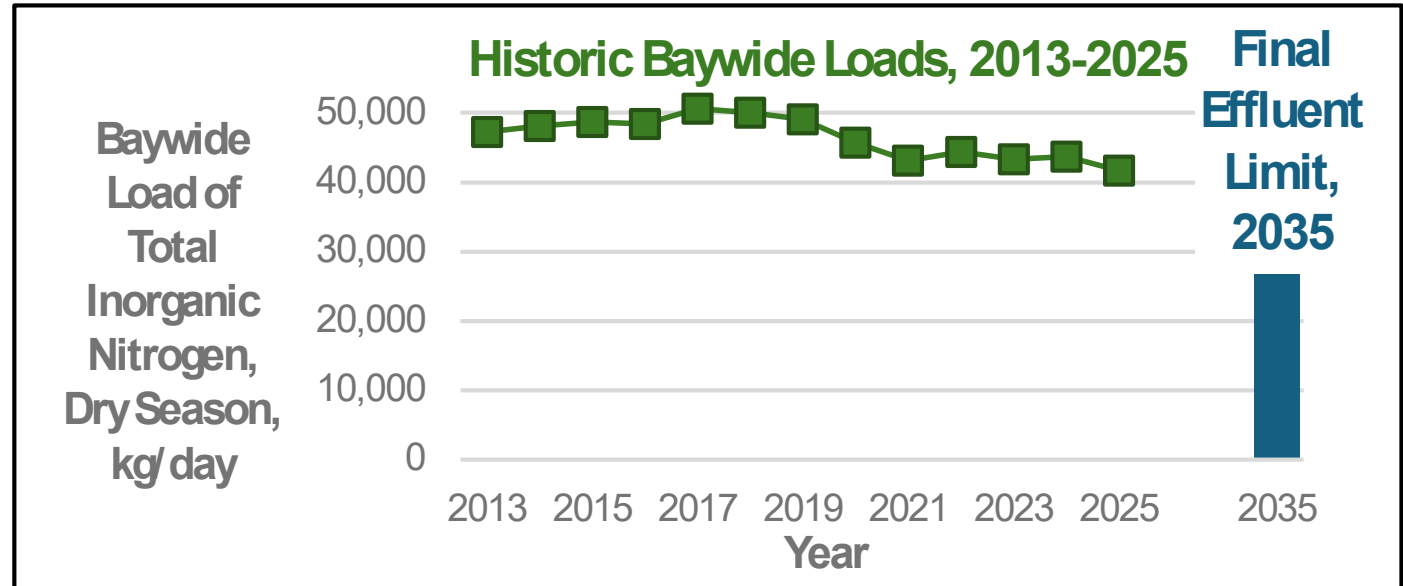


Cumulative Contribution of Total Inorganic Nitrogen Loading to SF Bay
Based on 2025 Dry Season TIN Loads



Current Watershed Permit adopted July, 2024

- Requires **40% aggregate dry season** load reduction
- Apportioned based on current performance – load limits calculated by multiplying effluent flow by **20.5 mg/L TIN**
- **10-year** compliance schedule
- Recognition that early actors, projects with multiple benefits and others will need more time
- Agencies report compliance plans in April 2027



Cost estimates for regional nutrient reduction from 1st Watershed Permit



Strategy	Total N Load Reduction to the Bay	Total Present Value for Total N Load Reduction to the Bay (\$ Mil in 2023)
Optimization	7%	\$200 M
Sidestream Treatment	19%	\$870 M
Upgrade Level 2 (15 mg N/L)	57%	\$10.8 B
Upgrade Level 3 (6 mg N/L)	82%	\$13.0 B

Options to reduce nitrogen loads – Case Studies

- Rebuild treatment plant/build new plant for nitrogen removal
- Use existing infrastructure in a new way to achieve nitrogen removal
 - “Process intensification”
 - Explore innovative technologies
- Recycled Water
- Nature Based Solutions
- Nutrient credit trading
 - Register for Oct 29 Workshop:



Union Sanitary District – Opportunistic Upgrade

- 3-phase Enhanced Treatment and Site Upgrade (ETSU) program kicked off in 2018 to address aging infrastructure, plant capacity, and nutrients
- Anticipate 50% reduction in nitrogen by 2031 completion
- Costs have escalated from \$348M in 2018 to \$670M in 2025



EBMUD – Optimizing Existing Infrastructure

- In 2020 began piloting a “split stream” treatment process by using excess dry weather tankage for nitrogen removal
- In 2024/2025 treated full stream
- Curtailed acceptance of high-nitrogen organic waste for co-digestion and energy production
- By 2025 dry season nitrogen load decreased by 40% compared to 2022



Central San – Testing Innovative Solutions

- In 2024, hosted successful Membrane Aerated Biofilm Reactor (MABR) pilot. MABR is a flexible approach that allows use of varying number of cassettes to meet limits and account for population growth
- Currently running demonstration-scale MABR test
- Planning to pilot Densified Activated Sludge in 2027

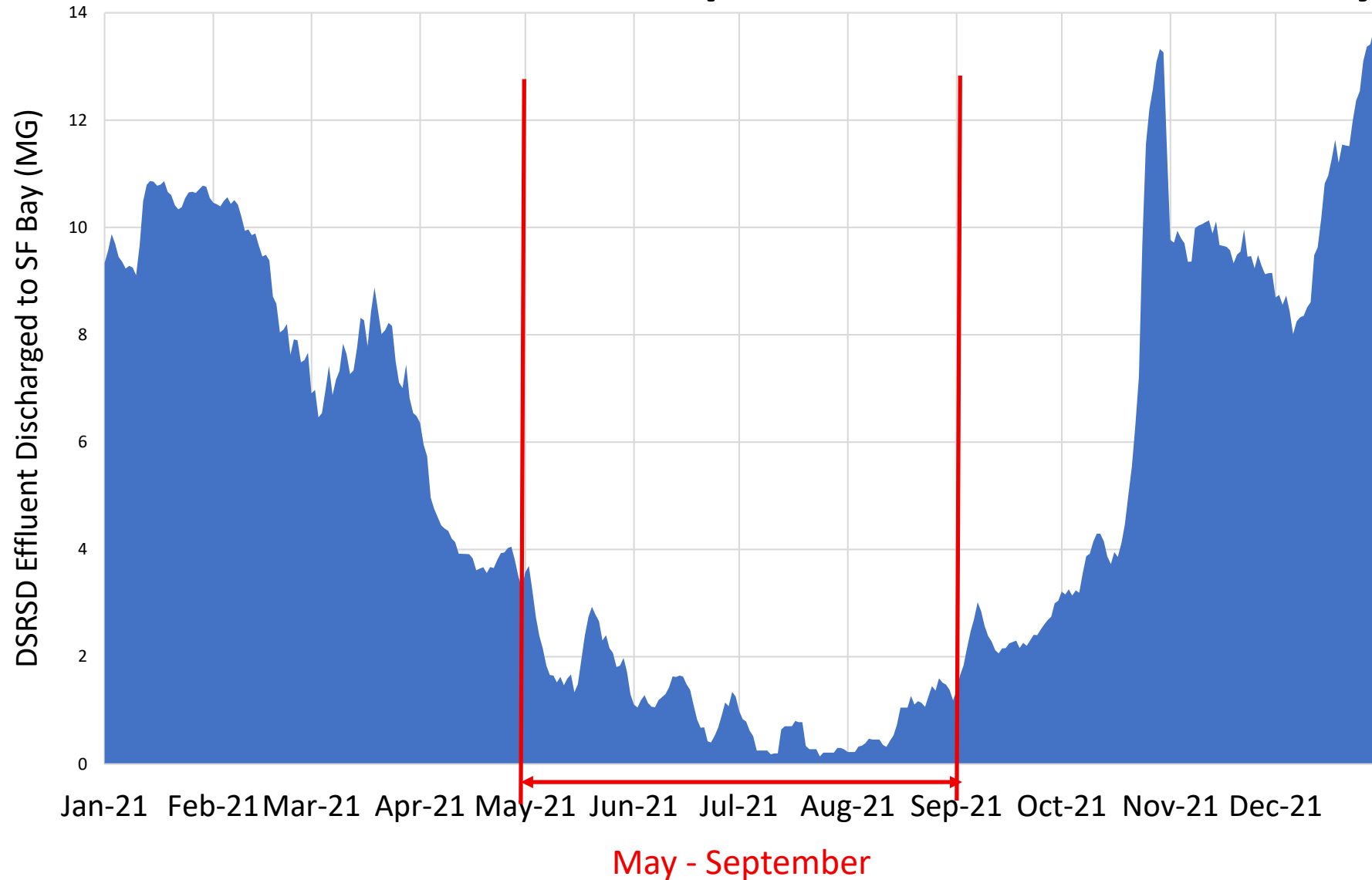


DSRSD – Maximizing Recycled Water

- DSRSD-EBMUD Recycled Water Authority (DERWA) has produced recycled water from DSRSD's treatment plant for irrigation customers since 1995
- During 2025 dry season, DERWA reduced DSRSD's effluent flows by 70% and effluent nitrogen load by 69%.
- Currently have a new connection moratorium due to low supply
- Increasing recycled water deliveries will mean acquiring more effluent – In negotiations with Central San to increase deliveries



Irrigation season lines up well with the dry season



EBDA – Making Use of Nature

- The First Mile Horizontal Levee Project planned for the eastern edge of Oro Loma Marsh on the Hayward shoreline
- Subsurface wetland will “polish” wastewater, protect shoreline from flooding, provide marsh habitat
- Estimated to remove ~1,000 kg/d nitrogen from Hayward/USD combined effluent



Imagery: Nate Kauffman

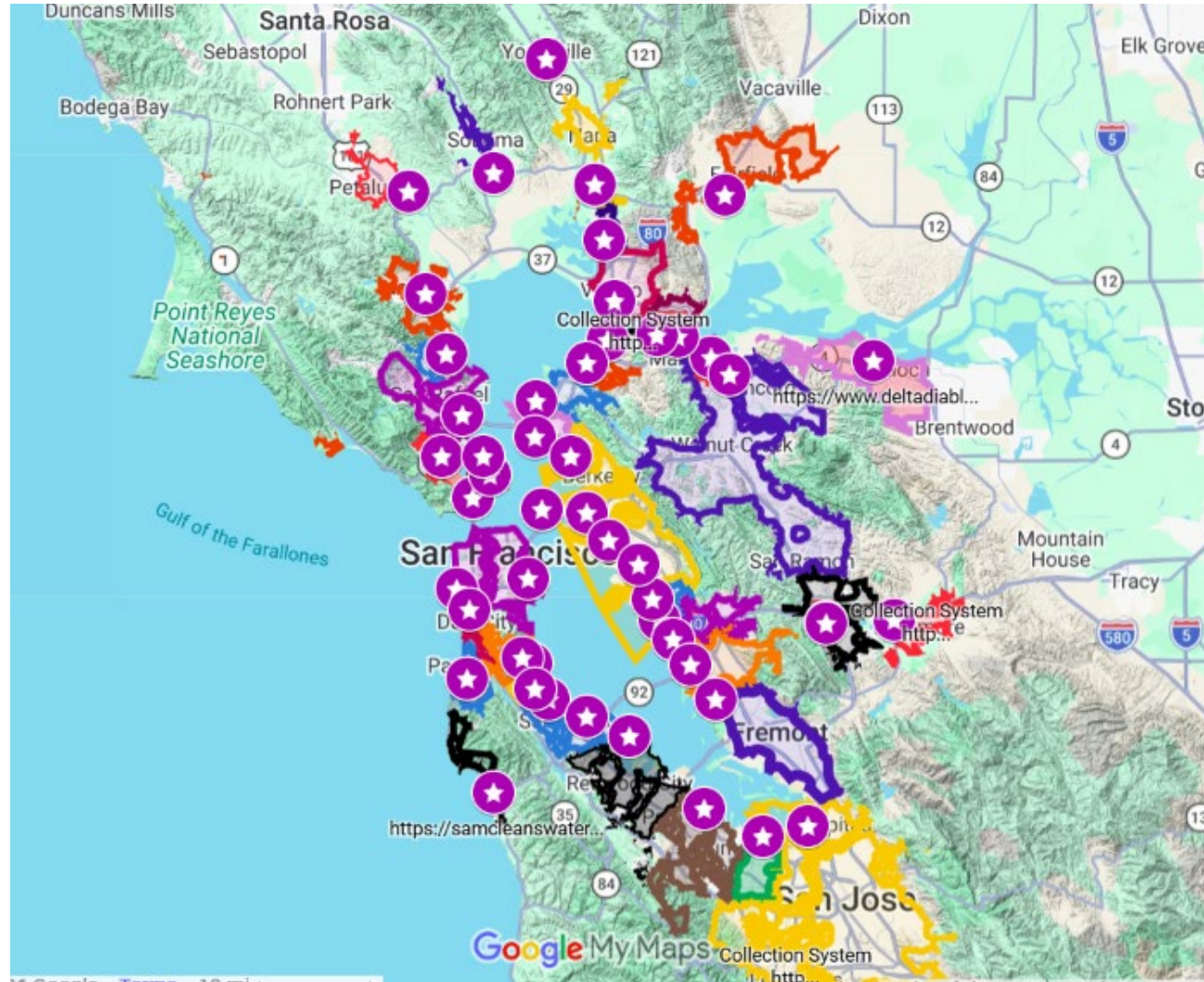
San Jose – Implementing a Mixed Portfolio

- Largest POTW and largest recycled water program in SF Bay region
- Has been removing nitrogen since 1998
- Changes in solids handling will increase nitrogen loading this year
- Initiated upgrades to aeration basins
- Planning recycled water program expansion – goal to double non-potable reuse, plus working with Valley Water on potable reuse
- Conducting feasibility assessment of nature-based solution



Where does your family's wastewater go?

Baywise.org



Questions?



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