



Nutrients in SF Bay: Update on Watershed Permit Negotiations

Presentation to DSRSD Board

October 3, 2023



- Background on nutrients in the Bay
- 2022 Algal Bloom - What happened and what does it mean?
- Next steps for managing nutrients in the Bay – update on Watershed Permit negotiations

Nutrient discharges are of concern all over the world



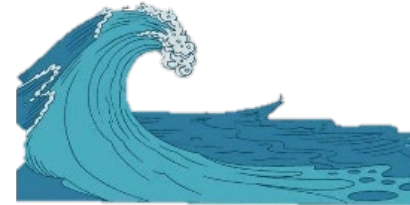
- Nutrients of concern in water bodies are nitrogen and phosphorus
 - In San Francisco Bay, nitrogen is the element that controls growth
- Two mechanisms of concern:
 - Eutrophication - Nutrient over-abundance is linked to phytoplankton (algae) over-growth, leading to low dissolved oxygen in water bodies, which suffocates wildlife
 - Harmful Algal Blooms (HABs) - Some phytoplankton species can generate harmful chemicals that are toxic to wildlife, humans, or pets

Why has San Francisco Bay been resilient to nutrients?

1. High turbidity blocks the light phytoplankton needs to grow



2. Strong tidal mixing reduces nutrient concentrations



3. Filter-feeding clams reduces phytoplankton concentrations



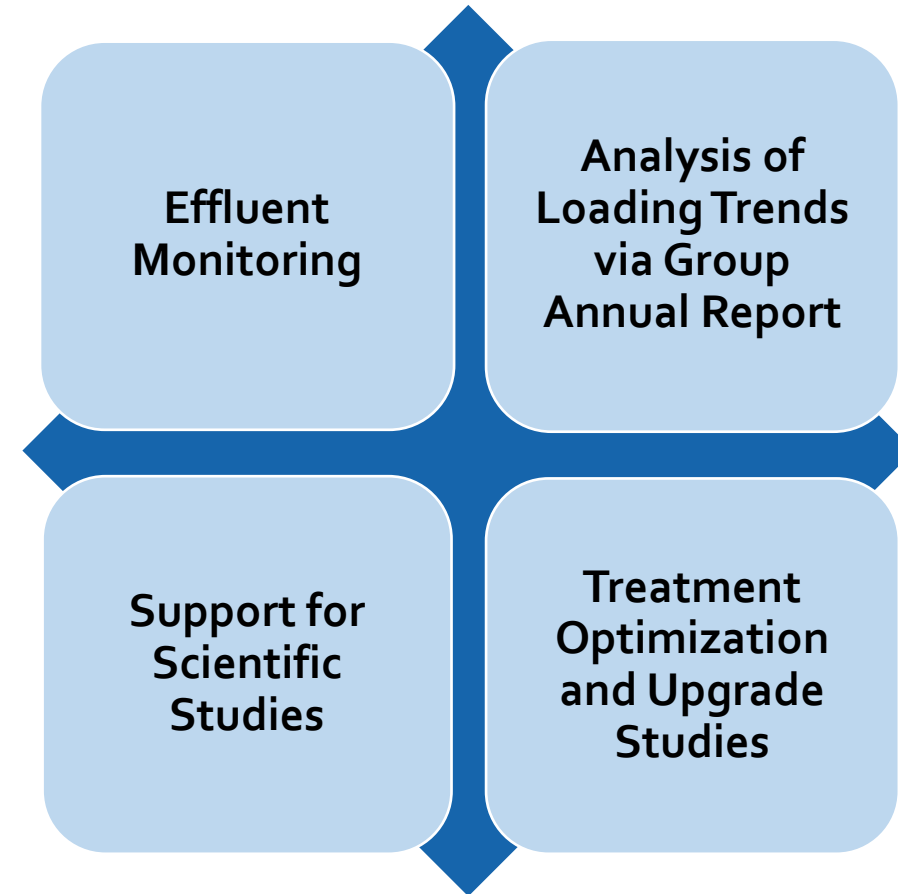
However, increased chlorophyll concentrations in the 2000's led to BACWA and regulators taking a closer look



Nutrient Watershed Permit

Watershed Permit 1: 2014 – 2019

Regional management of nutrients



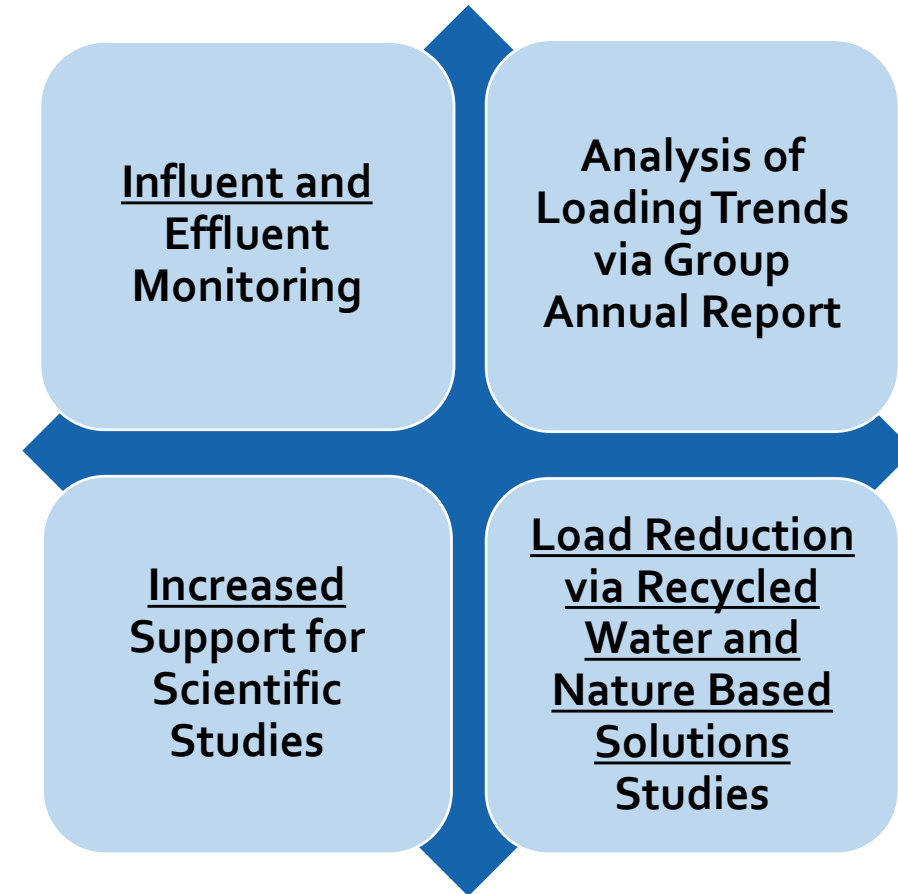


Nutrient Watershed Permit

Watershed Permit 2: 2019 – 2024

Regional management of nutrients

- Included targets for performance-based caps to be implemented in Watershed Permit 3
- Stated that “early actors” will likely not be required to make further nutrient reductions until after others have upgraded



The "Game-Changer"

< Home

San Francisco Chronicle

e-Edition

Account

CLIMATE

Poop and pee fueled the huge algae bloom in San Francisco Bay. Fixing the problem could cost \$14 billion



Noah Berger/Special to The Chronicle



TARA DUGGAN Sep. 5, 2022 | Updated: Sep. 5, 2022 4:10 p.m.



After an unprecedented harmful algae bloom first turned San Francisco Bay a murky brown color and then littered its shores with dead fish, many

What Happened?

- Major Harmful Algal Bloom (HAB) event in August 2022
 - Highest phytoplankton biomass levels on record
 - Low oxygen levels throughout South Bay
 - Fish mortality
- High nutrient loads resulted in more severe impacts (biomass, extent, duration)
 - Something else triggered the event, but nutrients were the fuel
 - Potential triggers include low suspended sediment concentrations, many sunny days, windows of calm winds?
- 2023 Bloom – Same organism but less severe

➤ *Political and regulatory pressure to reduce nutrients more and faster*

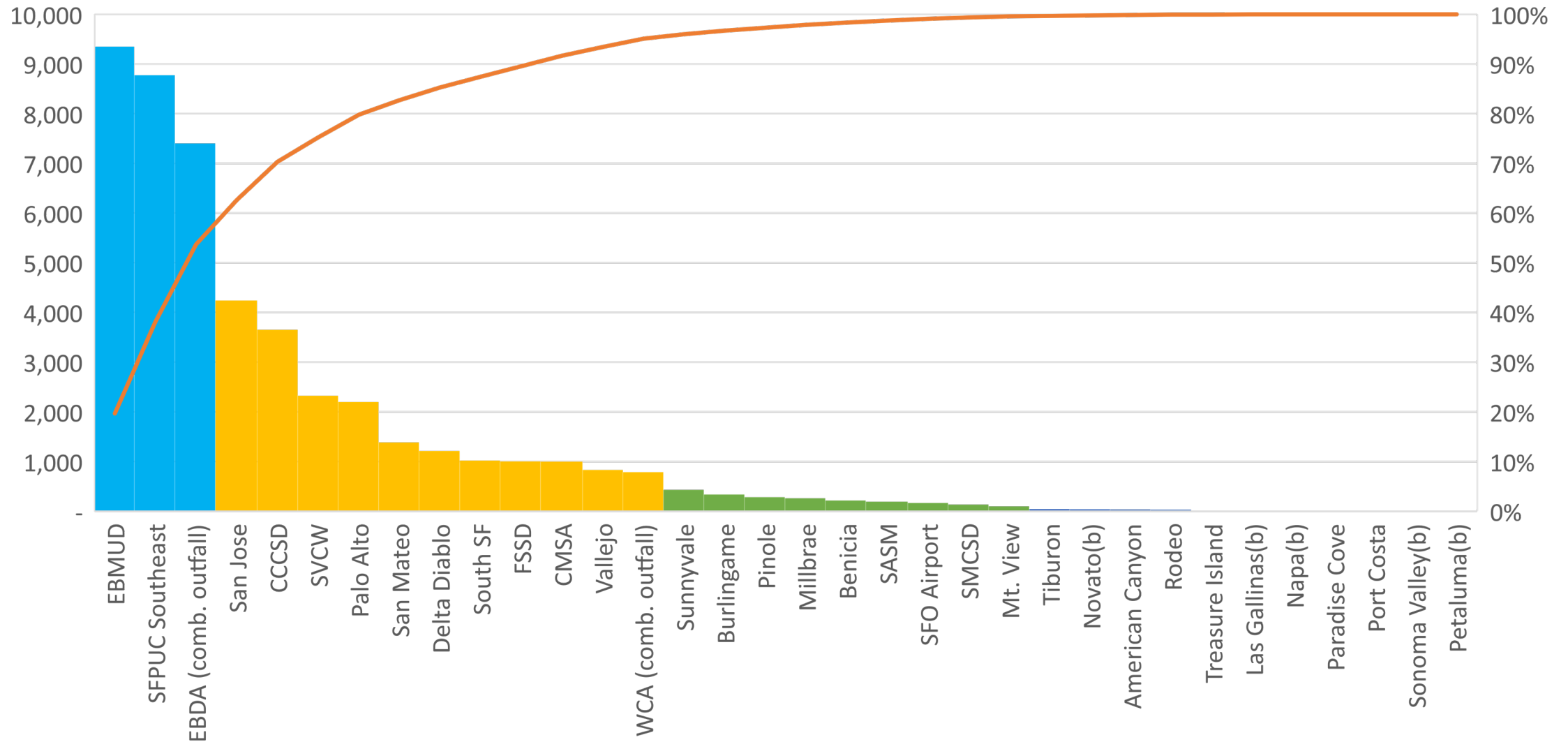


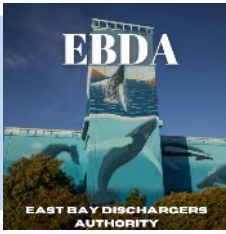
July 31, 2023 (Beth LaBerge/KQED)



Nutrient reduction will be a regional effort

Cumulative Contribution of TIN Loading (Based on 2013-2022 Averages)





What are the EBDA and LAVWMA Agencies Doing?

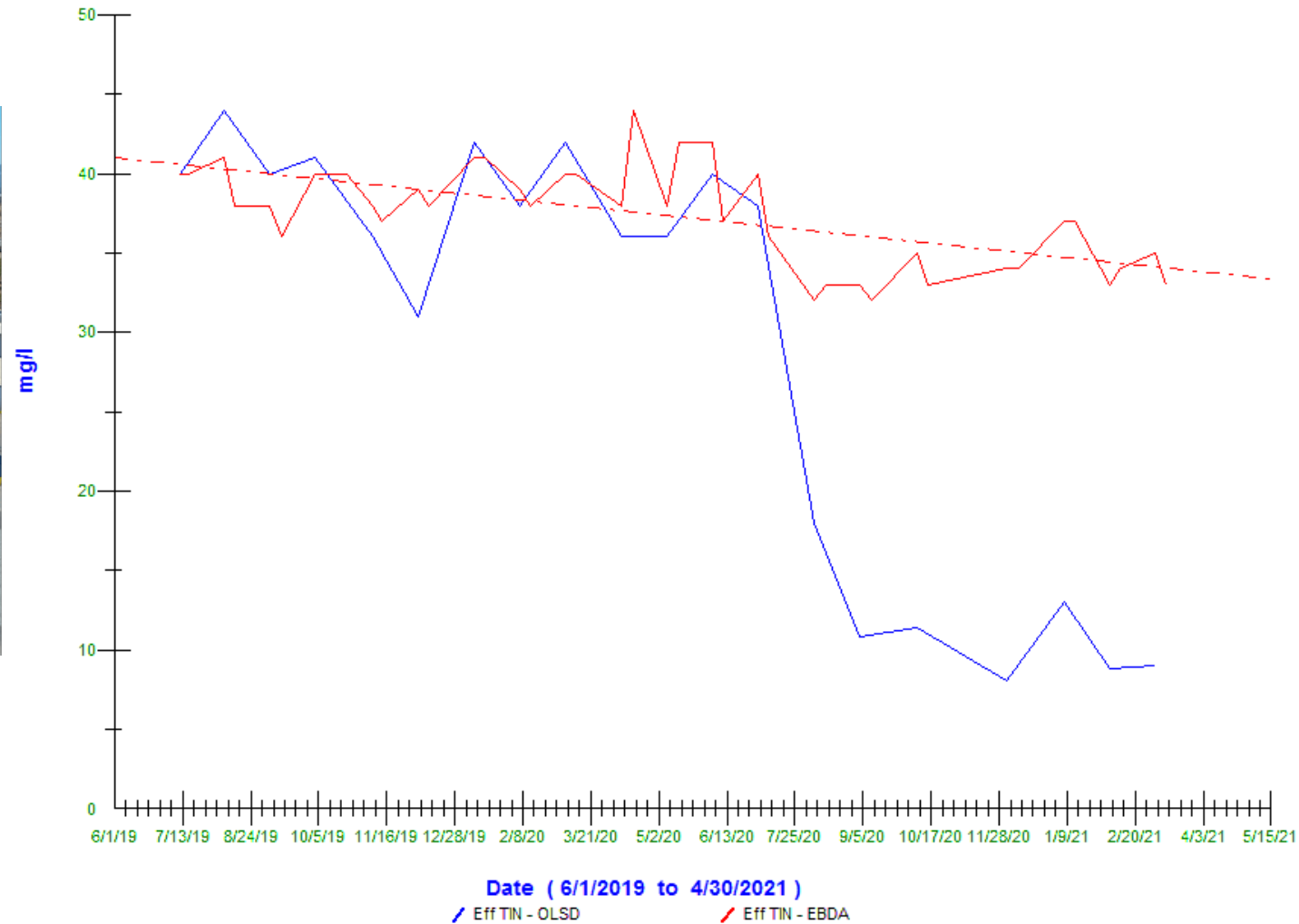


Oro Loma/Castro Valley Wastewater Treatment Plant Nutrient Optimization Project

Implemented in 2020

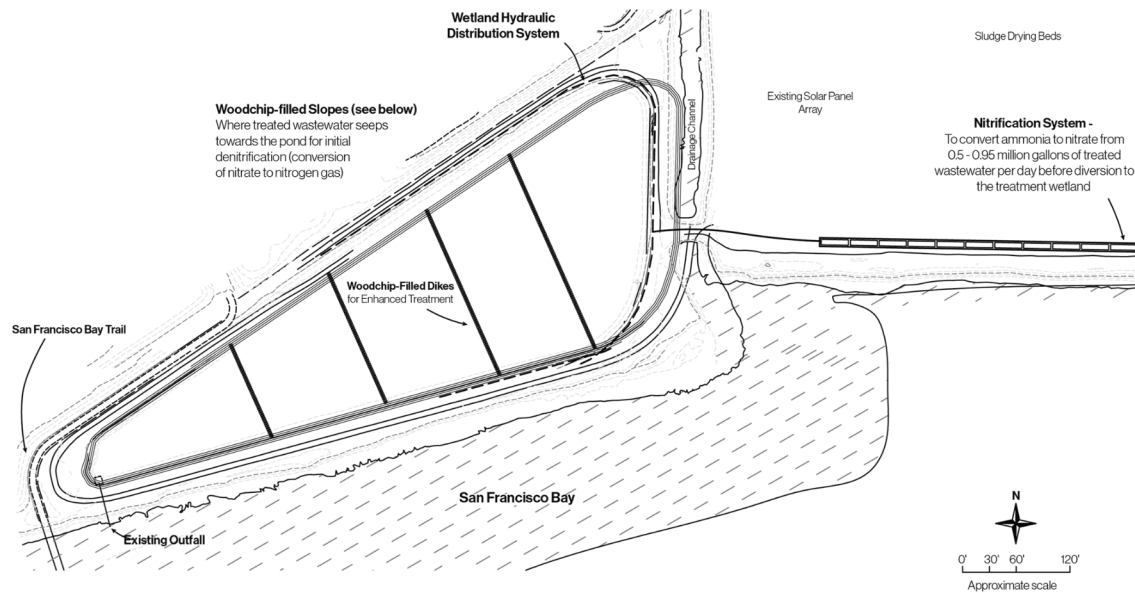


<https://oroloma.org/oro-loma-receives-award-of-excellence-from-california-association-of-sanitation-agencies-casa-for-outstanding-capital-project/>



San Leandro Treatment Wetland

Treatment Wetland Project Overview

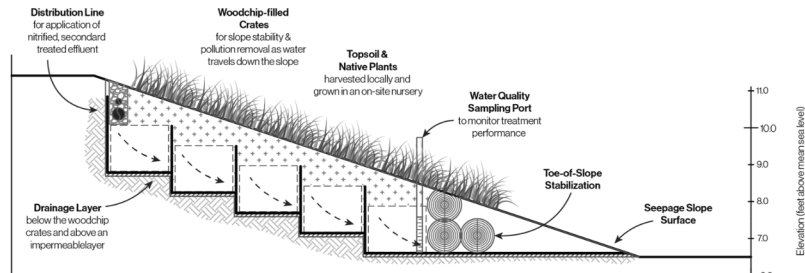


Seepage Slope Detail

Treated wastewater is nitrified between the Water Pollution Control Plant and the treatment wetland to convert ammonia (NH_3) to nitrate (NO_3^-). Nitrate is a form of nitrogen that is more rapidly converted to nitrogen gas (N_2) under the right set of conditions, in a process known as denitrification.

Woodchip-filled porous containers serve to stabilize the slope and provide a carbon-rich anoxic zone suitable for denitrification.

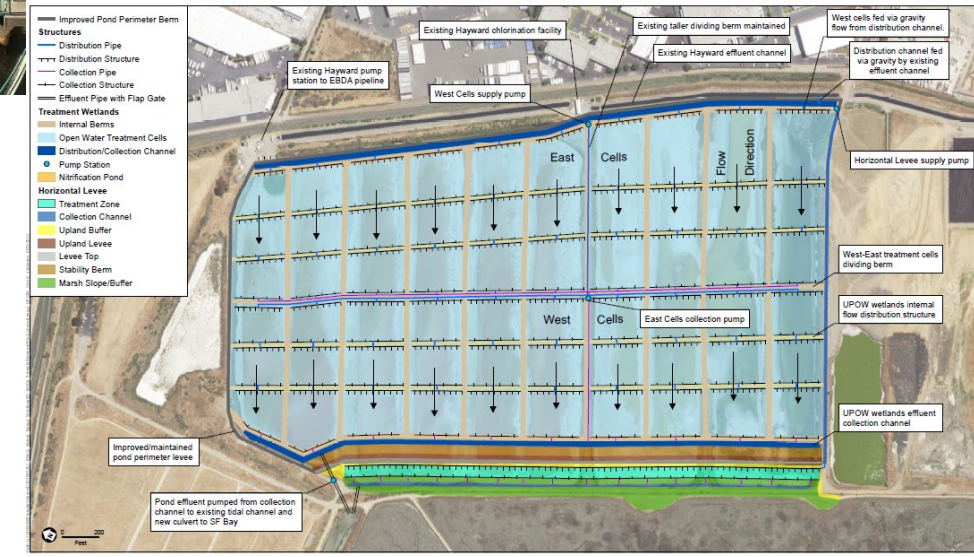
After flowing through the 'seepage slopes' water enters the open water pond where additional denitrification occurs. Sunlight exposure in the shallow pond also breaks down organic contaminants like pharmaceuticals and pesticides.



<https://www.sanleandro.org/647/San-Leandro-Treatment-Wetland>

Hayward Water Pollution Control Plant Upgrade

- New Biological Nitrogen Removal process currently in design
 - Expect 30-50% nitrogen reduction
- Future opportunity for nature-based solutions at former oxidation ponds



https://stories.opengov.com/haywardca/published/9_WFgU9kZ

Union Sanitary District Enhanced Treatment & Site Upgrade Project (ETSU)



Phase 1A
Aeration Basin
Modifications

Phase 1C
Plant Equalization
Storage

Phase 1B
Secondary Clarifiers and
Effluent Facility

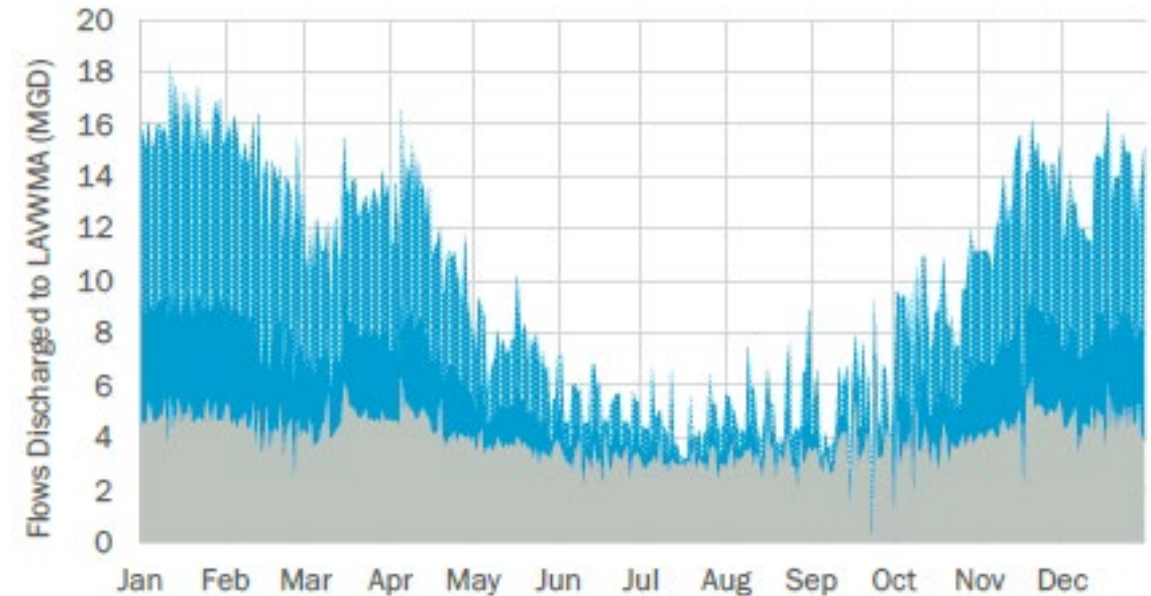
Phase 1A
Campus Building

Expect 50% nitrogen reduction

<https://www.unionsanitary.com/about-us/etsu>

Livermore-Amador Valley Water Management Agency (LAVWMA) – DSRSD and Livermore

Recycled water program supports a healthy San Francisco Bay



DSRSD: 60 – 80% nitrogen reduction during dry weather



Nutrient Watershed Permit

Watershed Permit 3: 2024 – 2029 Regional nutrient reductions

Similar funding level

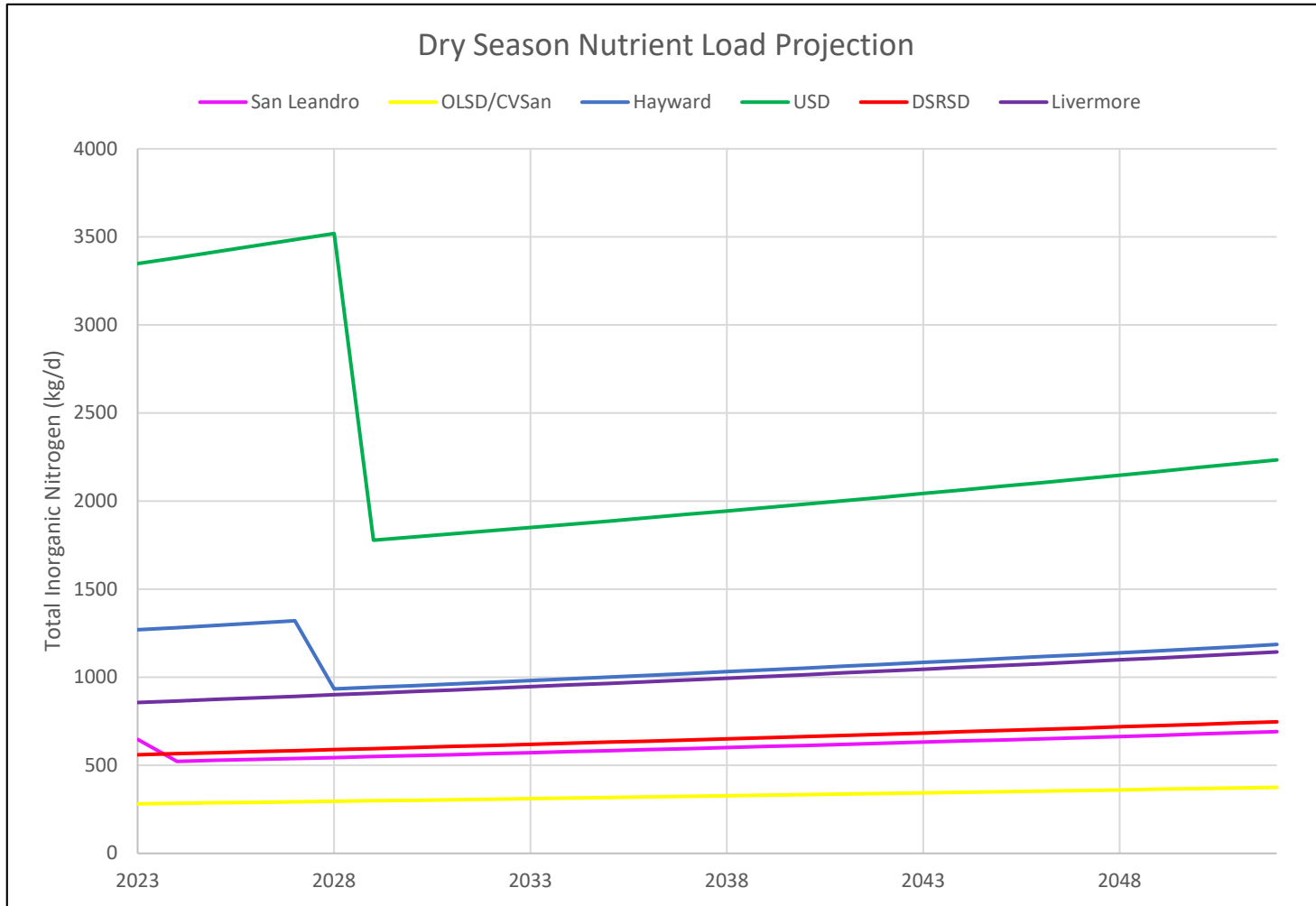
Improved project management and communications

Implementation
of Load
Reduction
Projects to meet
Final Effluent
Limits

Report also to include progress on nutrient reduction projects

Will include list of projects and form basis for trading program

EBDA's Expected Loads



Agency	Year Completed	Expected TIN Load Reduction %
OLSD/CVSan	2020	NA
San Leandro	2024	20%
Hayward	2028	30%
Union	2029	50%

Assumes 1% annual growth

Questions for Negotiation

- What Baywide load reductions will be required?
- How will individual final limits be calculated?
- How can trading be incentivized?
- How can multi-benefit projects such as water recycling and nature-based solutions be incentivized?
- How will early actors, including EBDA and LAVWMA's members, be protected?

Permit Schedule

- Permit drafting is underway
- Admin Draft in late 2023/early 2024
- Tentative Order March 2024
- Adoption June 2024

Questions and Discussion

