



# CVSan and Oro Loma 'Teamwork for the SF Bay'

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*Oro Loma Sanitary District*





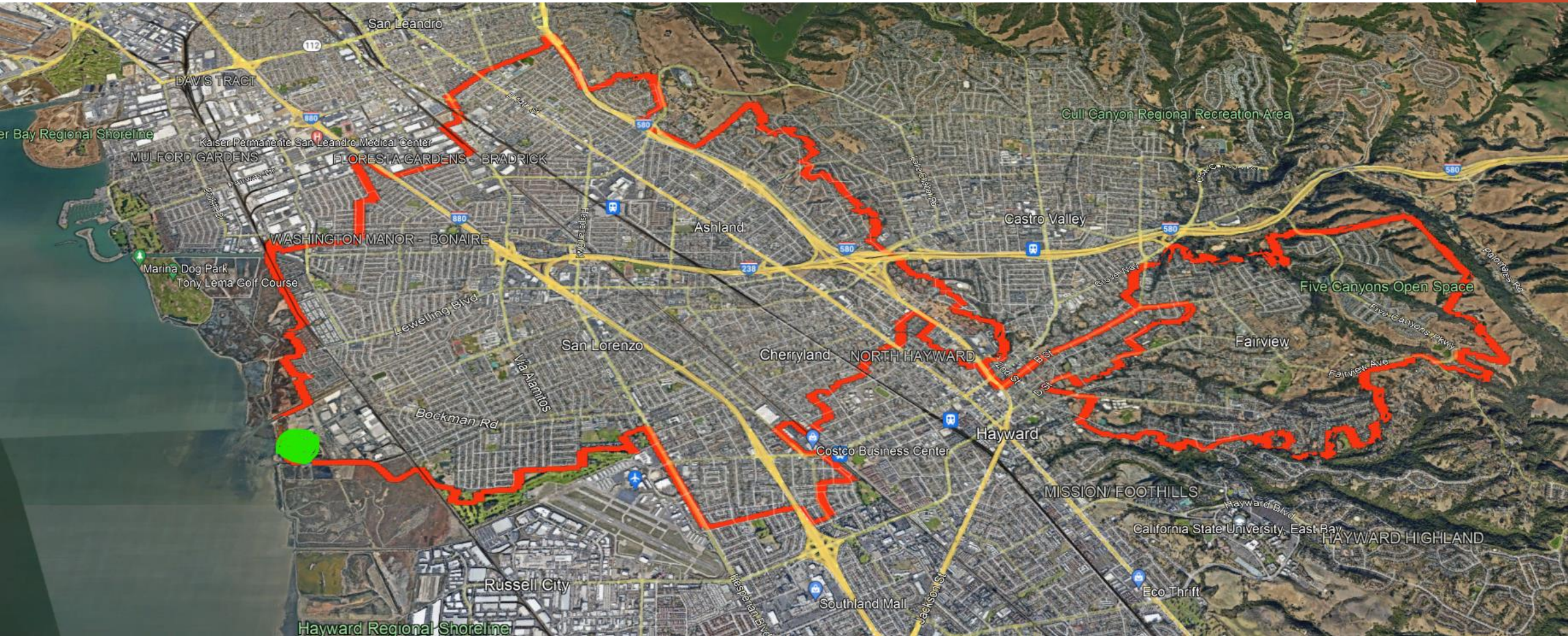
# How are CVSan and Oro Loma Connected?

- Partners for over 60 years to treat wastewater
- CVSan and Oro Loma share ownership of the treatment plant.
- Over the decades, we have worked cooperatively to respond to challenges at the plant and SF Bay.
- Today, we want to highlight two great examples:
  - Nutrient Treatment Upgrade
  - Horizontal Levee Demonstration





# Service Area Map





# Nutrients – They sound good, but...

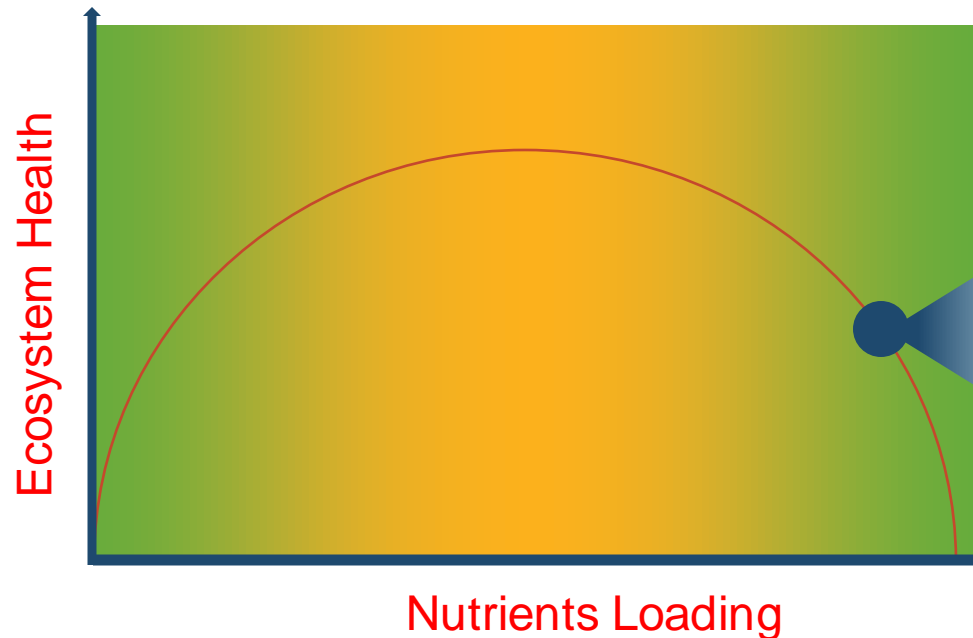
- Clean Water Act (1973) focused on suspended material and treated water's impact on oxygen levels in the receiving waters (SF Bay). Nutrients have historically passed through.
- There are growing concerns that nutrient loading into the Bay are reaching a tipping point.

# Nutrients and their Role in Ecosystem Health

- Nutrients are naturally present and essential for a properly functioning biological community
- Too much or too little can impact ecosystem health
- Are we reaching a tipping point?

## NUTRIENTS OF INTEREST

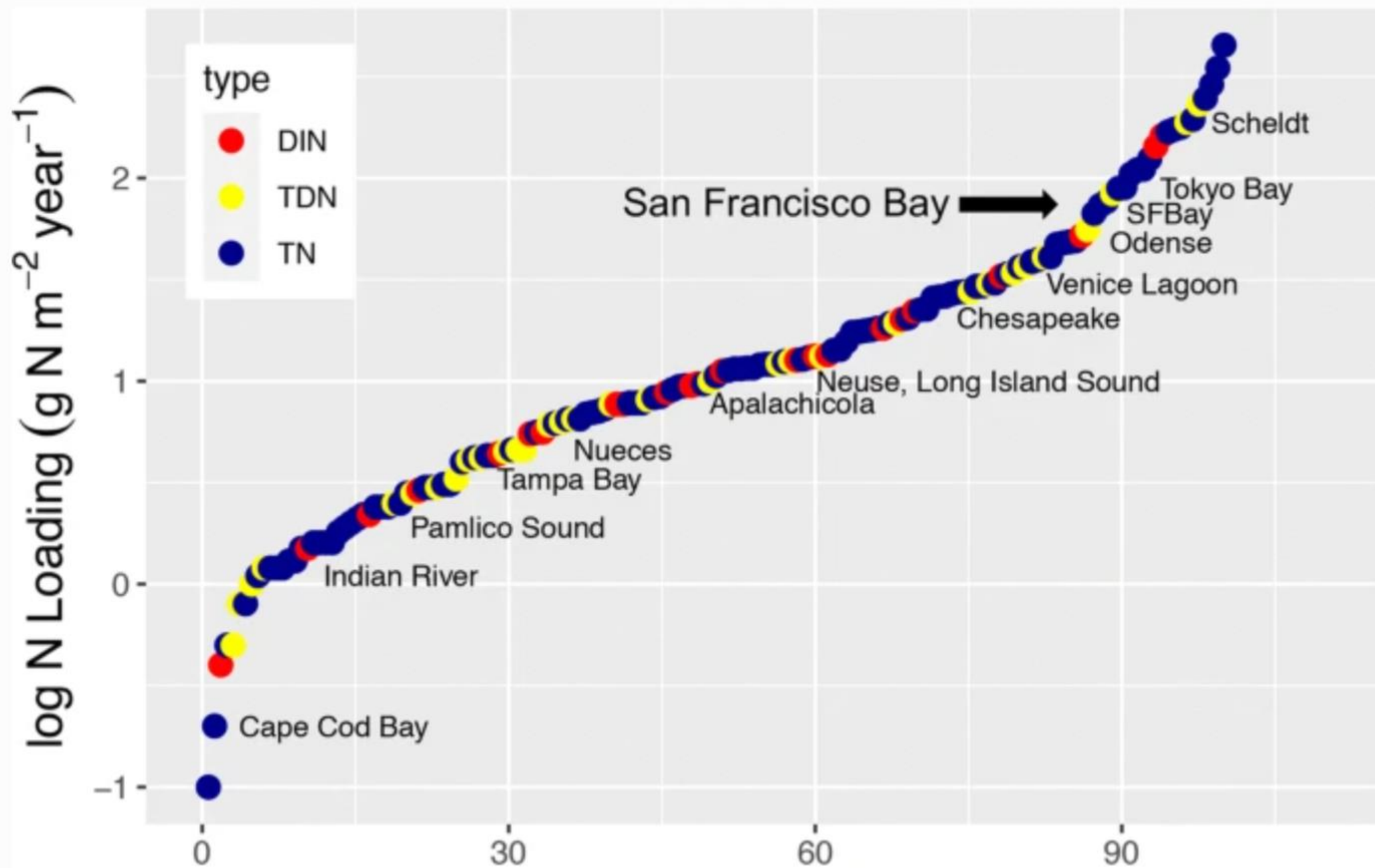
NITROGEN BASED	PHOSPHORUS BASED
Ammonia	Soluble Phosphorus
Total Nitrogen	Total Phosphorus



Under some conditions, too much can lead to:

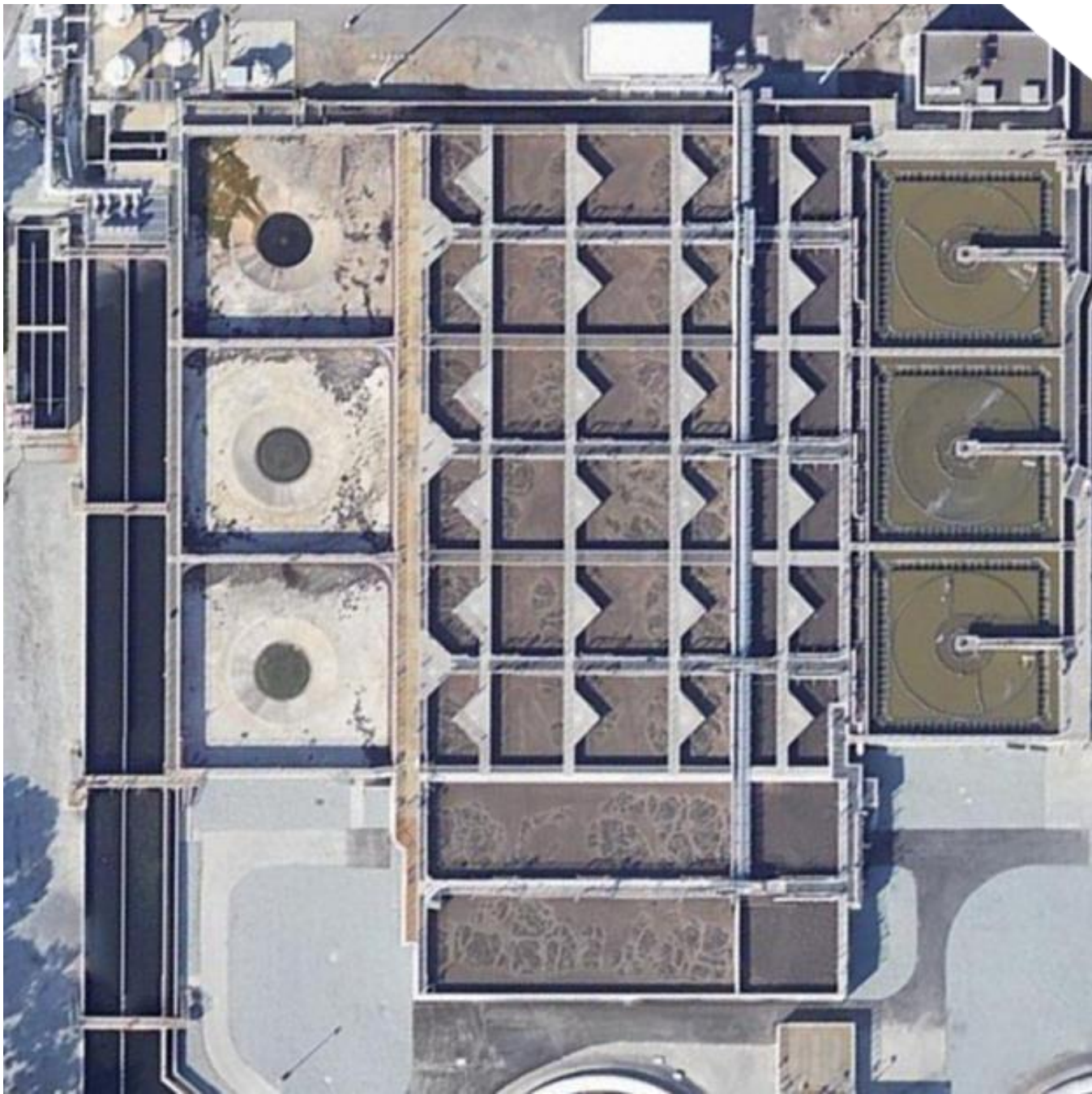
- Large algae blooms
- Low dissolved oxygen levels
- Harmful algae and toxins

Fig. 3



# Nutrient Decision – Take modest action now

- \$24.7M (CVSan - \$6.2 M) – Nutrient Optimization Project – What can we make the plant do?
- Completed four months early – July 2020
- Performance exceeding expectations – good for 20+ years.
- 3 of 37 plants in Bay Area treating nutrients.
- Awarded ‘Wastewater Project of the Year’ in California



*Oro Loma Sanitary District*















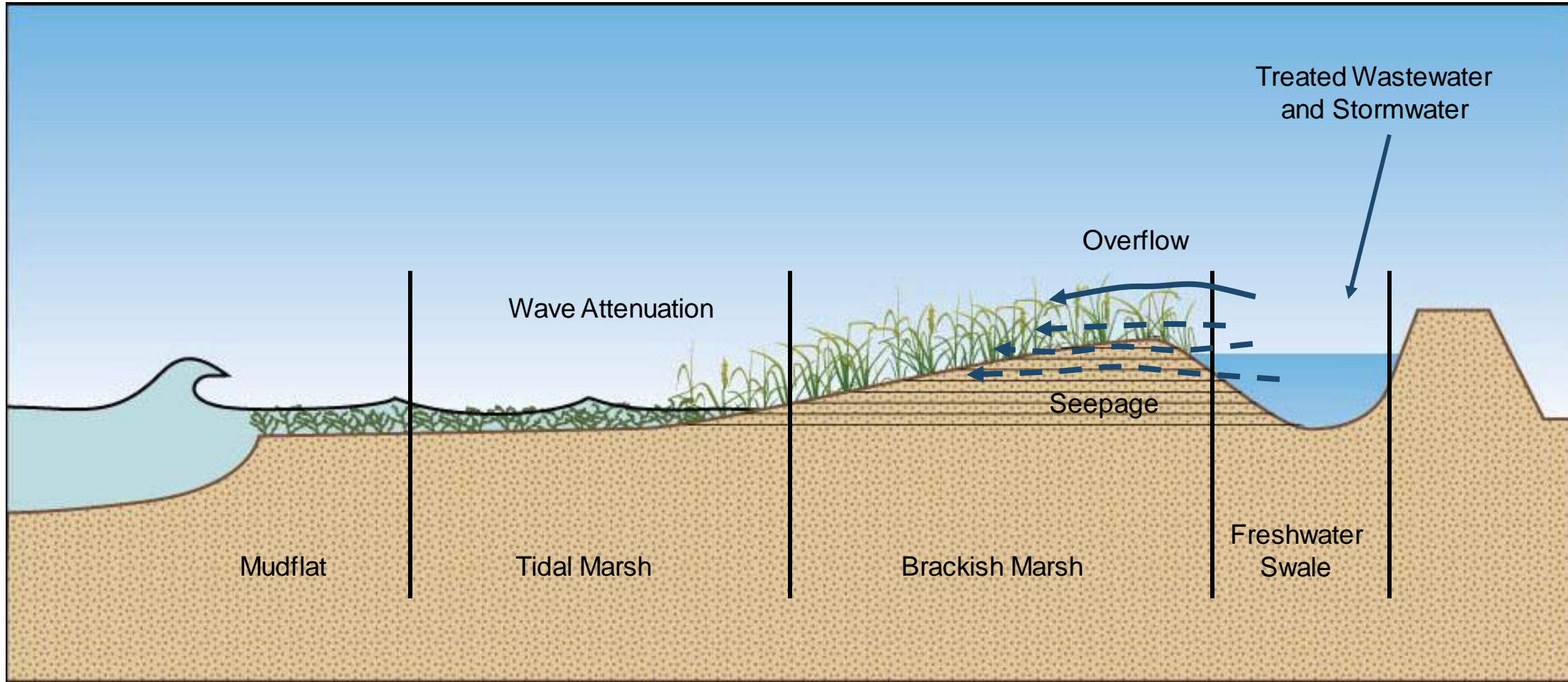




# Horizontal Levee Background

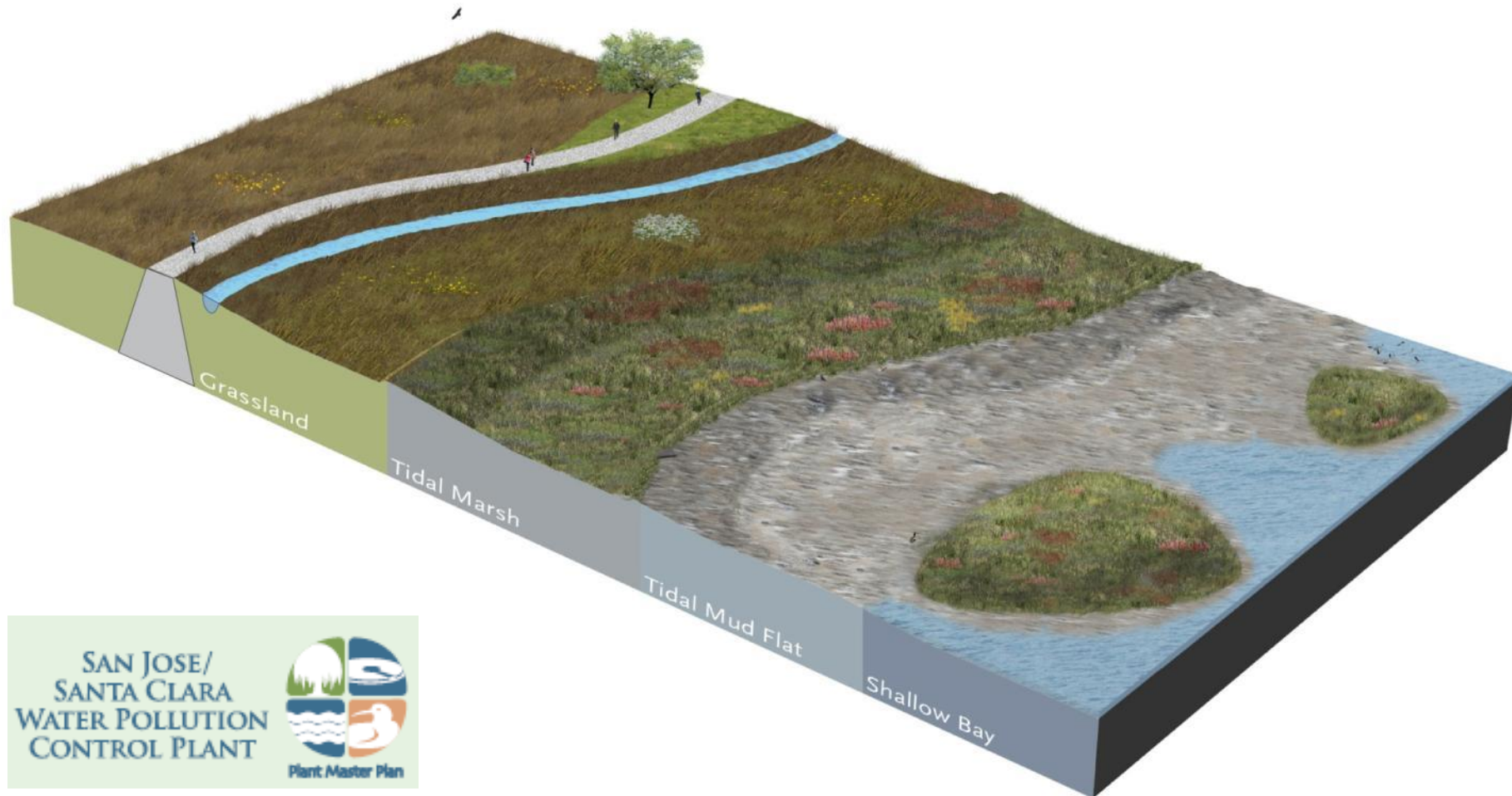
- The treatment plant and surrounding areas of the San Leandro and San Lorenzo Shoreline are at risk.
- Hayward Area Shoreline Planning Agency (HASPA) has been engaging the question of ‘What to do?’ for over 20 years (Hayward, EBRPD, HARD).
- Through HASPA – the idea of the Horizontal Levee emerged.
- In 2013, CVSan and Oro Loma offered to dedicate a portion of our site to build a demonstration.
- In 2017, the CVSan and Oro Loma Boards were awarded the SF Bay Institute’s ‘Bay Hero Award’ for their leadership and vision on the demonstration.

# So what is a Horizontal Levee?





# So What is a Horizontal Levee?





# Horizontal Levee









# Key Findings/Next Steps

- Water passed through natural system has been rigorously testing by UC Berkeley Researchers (Sedlak, et. al)
- Water quality is very high, but hydraulic capacity is modest/low.
- Potential use for recycled water concentrate (15% of total). Research underway.
- Project team is developing the 'First Mile' Project. Primary focus is to test hypothesis 'These projects are not permittable by regulatory agencies'.



# “First Mile” Project

## VISION of the FUTURE Regional Resilience and Benefits

Oro Loma's Horizontal Levee Demonstration project aims to display the feasibility of a water quality and flood protection improvement strategy with multiple benefits to shoreline communities. Areas adjacent to the treatment facility may benefit from a full-scale implementation of the Horizontal Levee Demonstration.

### ① Storage Basin / Freshwater Treatment

During storms, primary effluent will be stored in the holding basin to limit flow to downstream treatment facilities. During the balance of the year, the bottom of the storage basin will use a freshwater treatment wetland to further polish nitrified secondary effluent.

### ② Horizontal Levee Demonstration Project

The Demonstration Project serves to help the public visualize how this type of green infrastructure can be used to respond to sea rise. A team from UC Berkeley will perform research to measure the water quality benefits of the horizontal levee.

### ③ Native Plant Propagation Plot

The District has partnered with Save the Bay to host an on-site native plant nursery. Plants grown here vegetate the face of the Horizontal Levee. In the future, plants from the nursery will be used in marsh restoration throughout the SF Bay Area.

### ④ Solar Drying Facility

The District uses energy from the sun to further dry the residual biosolids separated during the treatment process.

### ⑤ Oro Loma Solar Array

The District's 468 kW Solar Array and biomethane based power plant makes the District self-sufficient for its electrical needs.

### ⑥ Horizontal Levee – At Full Scale

The illustration shows how the Horizontal Levee could be integrated into the existing landscape.

### ⑦ Flood Protection for our Communities

The widespread use of the Horizontal Levee may be a key method to protect our homes, airports, and parks from rising tides.

### ⑧ Increased Habitat along Bay Edge

As sea level increases, existing habitat along the edge of the Bay will be squeezed. The Horizontal Levee expands available habitat and provides an upland refuge during king tides and storm surges.

### ⑨ Restorable Baylands

Many parcels around the Bay Area can be restored using the Horizontal Levee – to provide flood protection, improved water quality, and increased habitat along the edge of the San Francisco Bay.



### PROOF OF CONCEPT

The Horizontal Levee Demonstration will be rigorously researched to quantify the water quality and flood protection benefits of the concept. The demonstration helps the public visualize what this type of infrastructure would look like along the shoreline.

### CONSTRUCTED IN LANDSCAPE

Based upon the lessons learned during the demonstration, various sites throughout the SF Bay Area are considering full-scale implementation of the Horizontal Levee.

### REGIONAL RESILIENCE

Widespread use of the Horizontal Levee will provide multiple benefits including improved water quality, increased habitat, and flood protection from rising seas.





First Mile  
Horizontal Levee  
Project is one of  
the first for  
implementation  
from  
Northern Alternate

