Assessing Subsurface Treatment of Reverse Osmosis in a Horizontal Levee

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First Came the Vision
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Then Came the Experiment
Establishing the Plant Community

2015

2017

2017

Subsurface Water Treatment

Nitrified Effluent

Rhizosphere

Org C

N\textsubscript{2}

N\textsubscript{2}O

CO\textsubscript{2}

Clay loam layer

Gravel sublayer

Biofilm

Org C

NO

Wood Chip Amendments

 Returns to Headworks

Mean Biomass kg/m\textsuperscript{2}

outliers removed

year

2017

2019

5

6

9/13/22
UC Berkeley Partnership With Valley Water

- Open Water Unit Process Wetland built at Silicon Valley Advanced Water Purification Plant in 2017
- Partial removal of nitrate and organics (2018-2019)
- Attempts to increase nitrate removal by wood chip addition failed

RO Concentrate Treatment: Nitrate

ROC arriving at Oro Loma

a) Water Type

- ROC 2021-2022
- Wastewater 2019

Nitrare (mM)

Distance (m)
RO Concentrate Treatment: Organics

Redesign

Improving System Performance
- Thicker treatment layer
- Lower slope
- Geomedia addition
Next Steps

• Assess the impact of slope and treatment layer thickness on system performance

• Evaluate fate of trace elements (e.g., Cu, Ni) and PFAS in the subsurface

• Identify approaches for increasing flow and reducing construction costs