

Oceanmist Bioreactor

Description

The half acre Oceanmist bioreactor treats runoff from approximately 100 acres of farmland growing predominantly artichokes and brussel sprouts. The bioreactor receives and treats runoff from three agriculture drainage ditches that support extensive tile drain systems.

A sinuated channel was created to minimize bypass within the system and simulate plug flow conditions. The channel was excavated and lined with pond liner to create a containment basin, and then filled with woodchips from the local landfill. Woodchips provide a carbon source for denitrifying microbes, thus increasing the nitrogen removal rate.

The pumping rate into the bioreactor varies depending on water level in the drainage ditch collection point, which varies with field runoff and stormwater. The higher the flow rate into the bioreactor, the more nitrate load is removed; however concentration reduction is less at higher flow. The bioreactor discharges to the Seamist wetland restoration site, serving as a pre-treatment system to remove contaminants and clean up water prior to entry into the wetland habitat.

PROJECT LOCATION



Water is pumped into the bioreactor from a collection point of three agricultural drainage ditches. This water then flows passively through the bioreactor to the outlet where it gravity feeds into the Seamist wetland. From there water flows into the Moro Cojo Slough, before joining the Old Salinas River. The Old Salinas River flows out to the Pacific Ocean at Moss Landing Harbor, where it also meets and mixes with water entering Elkhorn Slough during incoming tides.

The Moro Cojo Slough is home to the endangered tidewater goby and is 303(d) listed for ammonia, sediment, and low dissolved oxygen. Old Salinas River water contributes to the hypoxic conditions found in Elkhorn Slough.

FOR MORE INFORMATION

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Nutrient Treatment

Load and concentration removal are estimates based on 2 months of monitoring. Estimates will be updated through time as the bioreactor microbial population matures and removal rates increase.

Area contributing runoff: 100 acres
Bioreactor land Area: 0.5 acres
Wetted treatment Area: 7500 ft²
Water Volume: 76,000 gallons
Capacity: 30,000-144,000 gal/day
HRT: 0.5–1.5 days
Nitrate Removal: 42%
Nitrate-N Load Reduction: 42%
Orthophosphate Removal: 29%
Orthophosphate Load Reduction: 29%

Ammonia Removal: Ammonia increased in the bioreactor, although outlet concentrations are well below EPA criteria limits. Steps are being taken to correct this issue.

The Department of Pesticide Regulations is planning field trials in 2017 to test pesticide reduction.

Partnerships

CCWG provided the conceptual design, coordination with the owners and contractors, obtained permits and oversaw the construction. The RCD of Monterey County provided the technical design. Oceanmist Farm provided the land, the inlet pump, and helped with the excavation of the basin. The project was funded by SWRCB grant # 12-414-553.

Prop 84 Grant Funding

State Water Resources Control Board's Proposition 84 Agricultural Water Quality grant paid for excavation, woodchips, pond liner, piping, project coordination and engineering. Oceanmist Farm provided the land and inlet pump. Monterey County Mosquito Abatement provided earth moving.

Construction: \$88,000
Land: \$5000
TOTAL: \$93,000

