Quantification of Nitrogen Removal under Recycled Water Ponds

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Nitrogen Removal Study

- When the new nitrogen limits were established in the Santa Ana Region, EMWD had two groundwater management zones (GMZs) where the water quality objectives would have limited the ability to store recycled water.
- In 2006/2007, Daniel B. Stephens & Associates, Inc. was hired to evaluate the ability of the soils beneath the recycled water storage ponds located in Perris North GMZ and San Jacinto Upper Pressure GMZ to remove nitrogen through assimilation. Ponds investigated were:
  - Moreno Valley Regional Water Reclamation Facility Ponds
  - Alessandro Ponds associated with San Jacinto Regional Water Reclamation Facility
- The study included the following tasks:
  - Collection and Review of Existing Data
  - Sampling and Analysis Plan
  - Lysimeter and Monitoring Well Installations and Sampling
  - Report Preparation and Project Management

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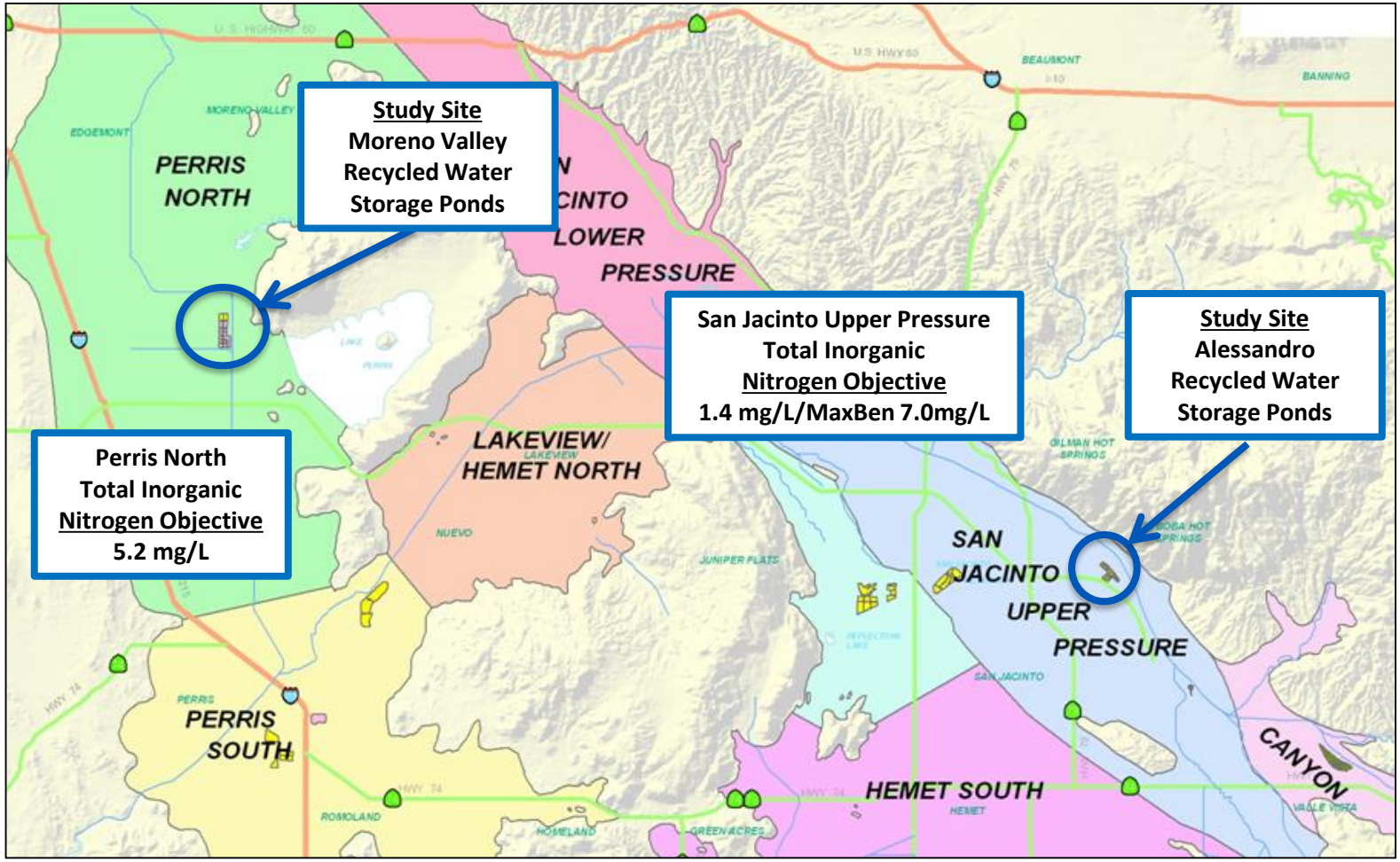
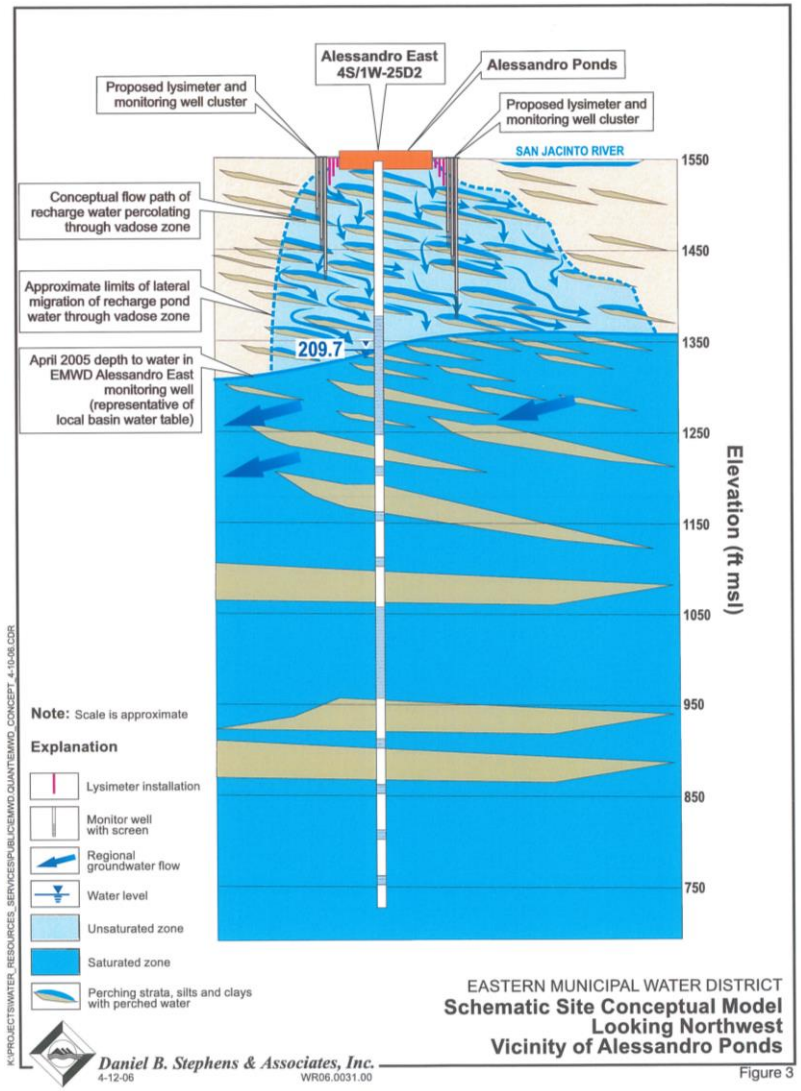
Study Location Map



Site Conceptual Model

Study Approach

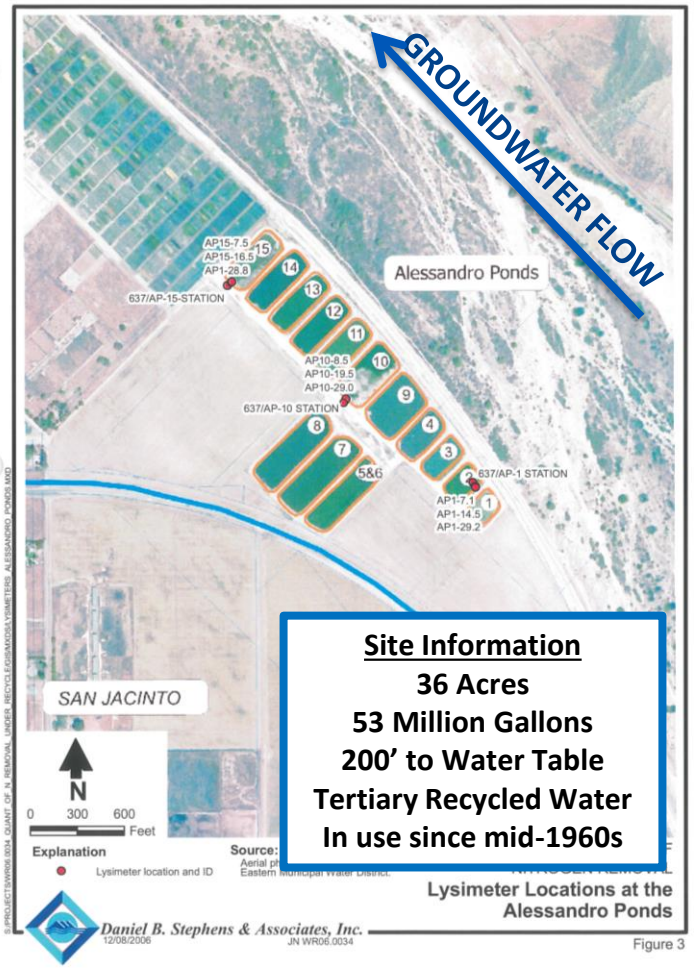
- Lysimeter clusters will measure the water flow and quality in the unsaturated zone at various depths
- Monitoring wells will measure the water quality in the saturated zone
- Samples will be analyzed for leachable concentrations using the WET with deionized water.
- Analyze: General mineral/physical, TDS, ammonia, nitrate, nitrite, organic nitrogen, Total Kjeldahl nitrogen and TOC



Site Maps

Moreno Valley Ponds

Alessandro Ponds



N_Loss Findings

Moreno Valley Ponds

Hydraulic Conductivities:

- Pond 14: 0.00052 cm/s
- Pond 19: 0.000028 cm/s
- Pond 22: 0.000052 cm/s

Pond Water Quality (TN):

- Pond 14: 8 to 20 mg/L (13.4)*
- Pond 19: 6 to 20 mg/L (12.3)*
- Pond 22: 1 to 20 mg/L (10.9)*

Travel Time to Water Table:

- 130 days to 173 days

Alessandro Ponds

Hydraulic Conductivities:

- Pond 1: 0.00347 cm/s
- Pond 10: 0.00357 cm/s
- Pond 15: 0.00111 cm/s

Pond Water Quality (TN):

- Pond 1: 3 to 23 mg/L (11.7)*
- Pond 10: 3 to 19 mg/L (9.5)*
- Pond 15: 1 to 13 mg/L (7.1)*

Travel Time to Water Table:

- 7 days to 23 days

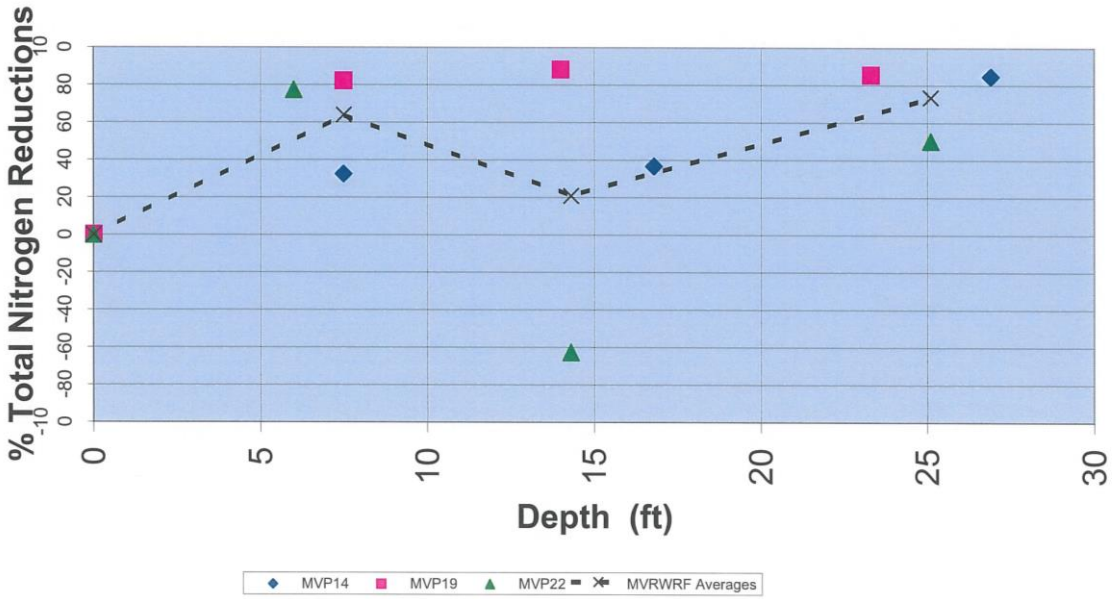
** Average TN concentration in parenthesis.*

N_Loss Results

Moreno Valley Ponds

Well Depth (Average %N Loss)

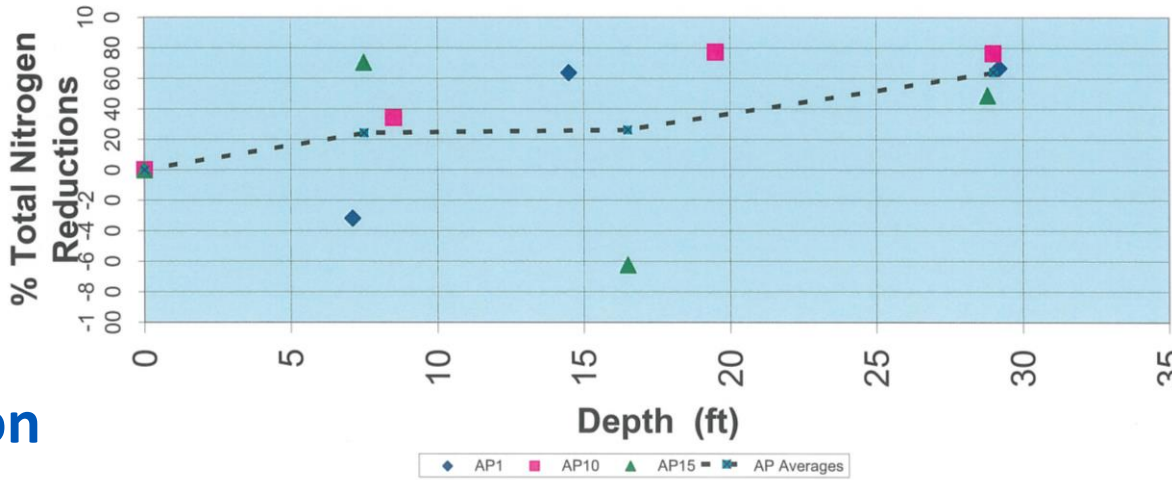
- Shallow (64%)
- Intermediate (20.8%)
- Deep (73.5%)



Alessandro Ponds

Well Depth (Average %N Loss)

- Shallow (24.2%)
- Intermediate (26.2%)
- Deep (64%)



EMWD uses 60% reduction

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Contact Information

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