



# Metagenomics Proved Low DO Community Can Save Big \$

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## What was the value proposition?

The estimated capital costs of a BNR system was reduced by \$35 million. \$490 thousand was saved in annual operating expenses.

## Details of the demo / pilot:

Trinity River Authority, Dallas, Texas USA  
 Application - Biological Nutrient Removal  
 Rated Capacity - 162 MGD

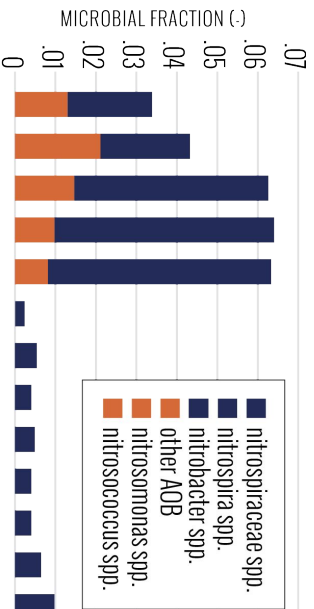


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**Hypothesis:** As we adopt lower aeration operation, ecology will shift and nutrient removal capacity will not be decreased.

**Action:** Gradually progressed from 2.0 mg/l to 0.2 mg/l dissolved oxygen (DO) operating conditions over 5 years in 4 aeration basins.

**Result:** Metagenomic testing confirmed the hypothesis to be true. Commamox (CMX) bacteria emerged and became the primary “workhorse” delivering an improvement in nutrient removal at a super low DO setpoint.



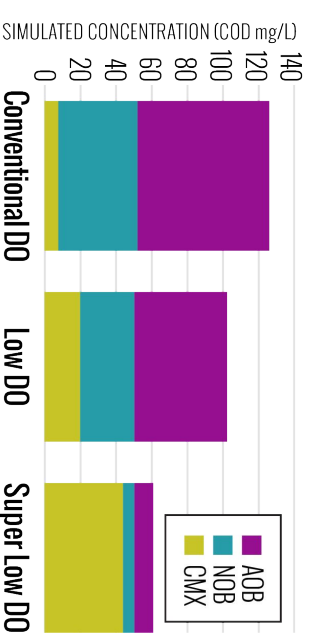
- **Basin Design Savings:** \$35 million
  - Pre-study \$50 million estimated
  - Post-study \$15 million actual cost
- **Operating Savings:** \$490,000/year
  - \$350,000/year aeration savings
  - \$140,000/year chlorine savings
- **Operator Confidence:** Quantification of ecology shift educated operators

## What problem did this solve?

Nutrient pollution is one of the world's most widespread, costly and challenging environmental problems, and is caused by excess nitrogen and phosphorus in the air and water. Wastewater is a primary source.

## TRA Objectives:

- Optimize process efficiency while not decreasing nutrient removal capacity.
- Provide operator confidence that low DO conditions selects for a different ecology that provides same nitrification capacity as high DO.



## What this means for the future?

BNR optimized by metagenomic analysis can drive transformative gains in design and operational costs, and smaller footprint.