



# Metagenomics Proved Low DO Community Can Save Big \$

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## What was the value proposition?

\$35 million in CAPEX savings and \$490 thousand in annual OPEX savings while improving nutrient removal capacity.

## Details of the demo / pilot:

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

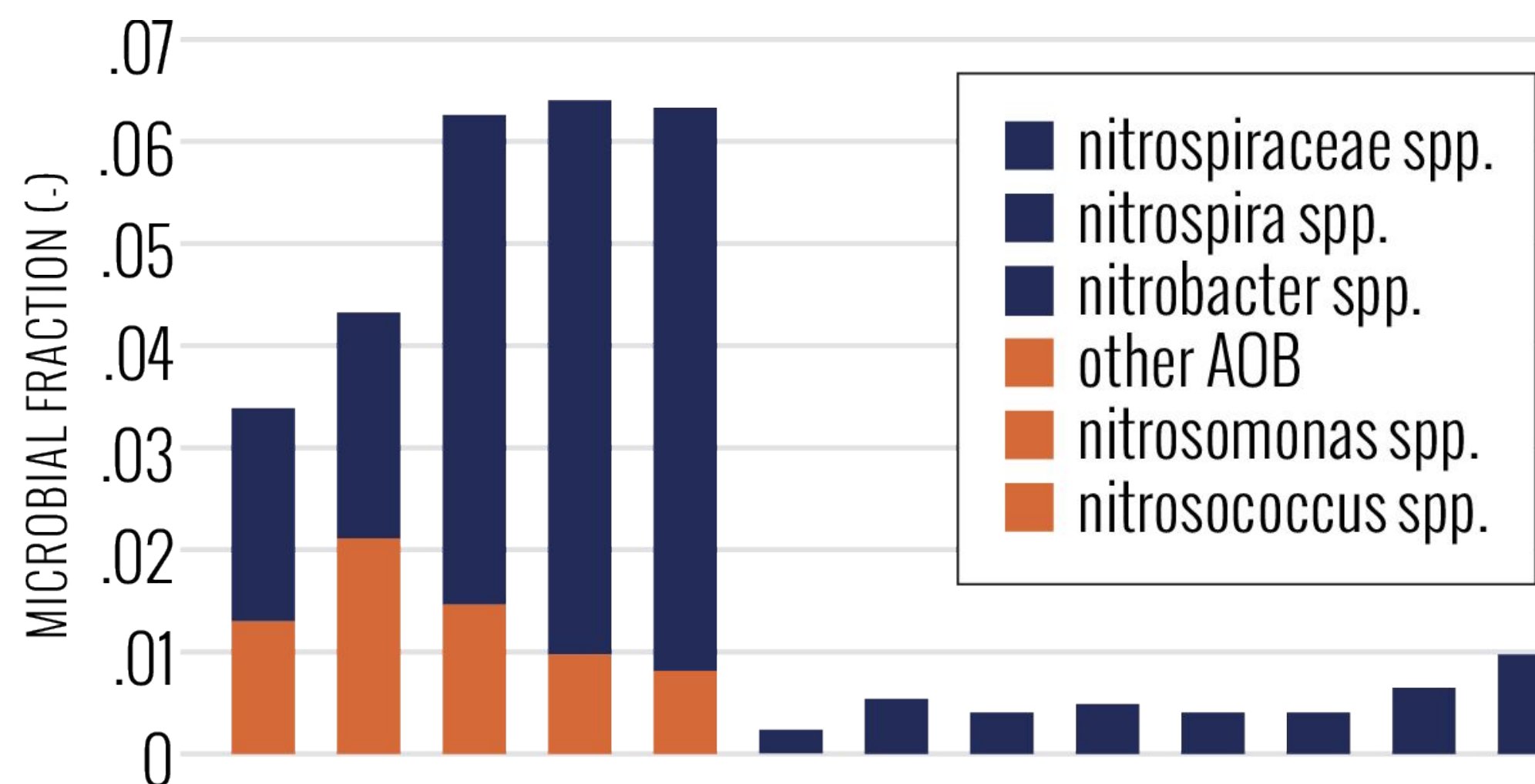


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**Hypothesis:** As we adopt lower aeration operation, ecology will shift and nutrient removal capacity will not be decreased.

**Action:** Measured and quantified system ecologies using Microbe Detectives metagenomic services. Gradually progressed from 2.0 mg/l to 0.2 mg/l dissolved oxygen (DO) operating conditions over 5 years in 4 aeration basins. Metagenomics data guided delicate and gradual operational changes.

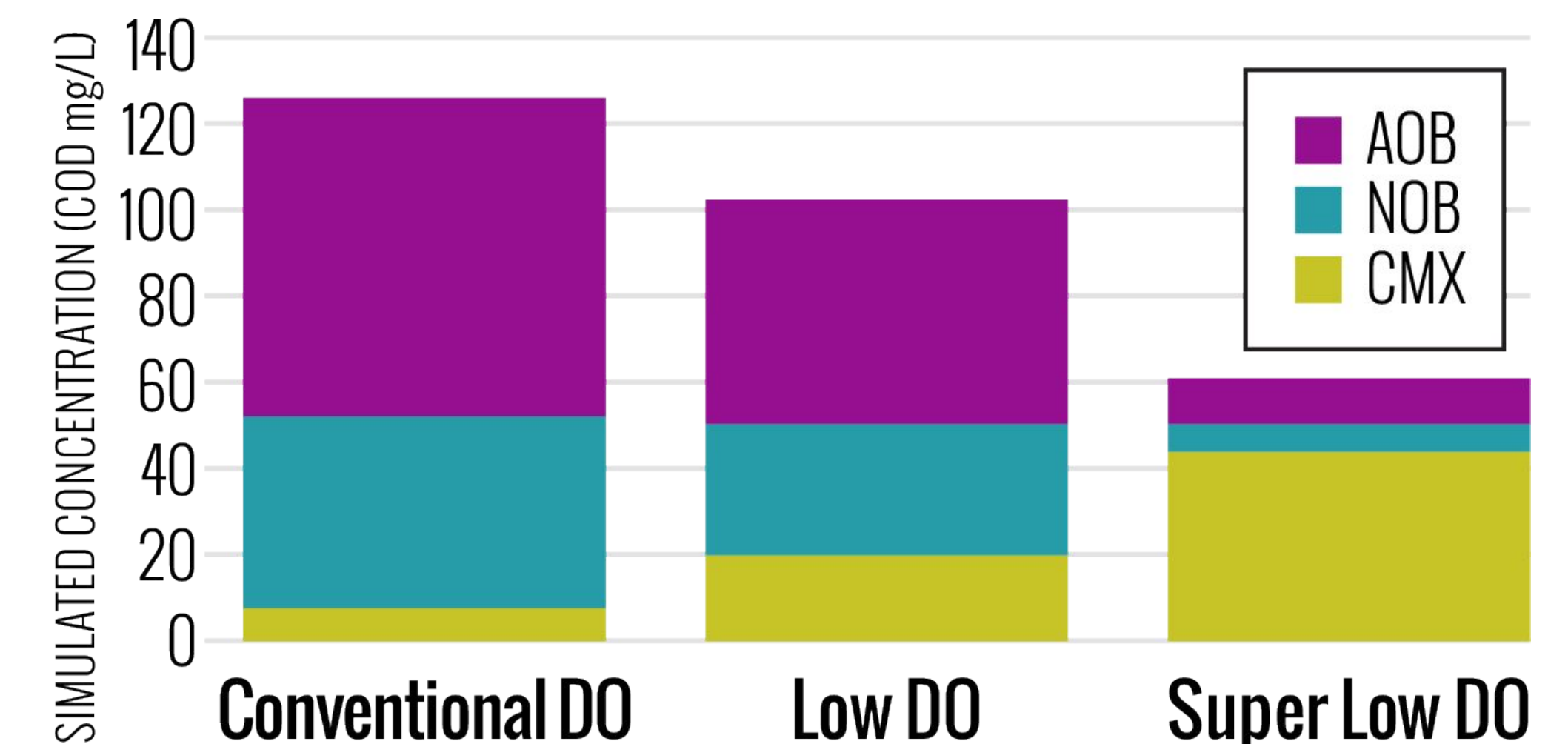
**Result:** Metagenomic testing confirmed the hypothesis to be true. Comammox (CMX) bacteria emerged and became the primary “workhorse” delivering an improvement in nutrient removal at a super low DO setpoint.



- **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?

TRA planned to construct a secondary basin to enable the second step of its nitrification process which was budgeted to cost \$35 million. This study proved that nitrification could be completed in one step at TRA by lowering the DO setpoint to 10% of its normal level. TRA was able to cancel its plan to construct the secondary basin. In addition, the plant saved \$490 thousand in OPEX by substantially reducing its aeration expense. It would not have been practical or responsible to conduct this study without Microbe Detectives metagenomic services. This provided essential measurements that quantified the shift in ecology and validated the hypothesis to be true.



## What this means for the future?

Industry guidelines for design, operations and treatment can and should be challenged using metagenomics as a new tool to measure and quantify results, discover new possibilities, and eliminate guesswork.