

IMPROVING WATER QUALITY IN HIGH-DENSITY POST-SMOLT RAS

HOW A SALMON PRODUCER USED MOLEAER NANOBUBBLE TECHNOLOGY TO REDUCE SUSPENDED SOLIDS, SULFIDE AND TURBIDITY



Location:	Application:	Unit:	Key Results:
Pargua, Puerto Montt, Chile	Post-Smolt Recirculating Aquaculture System (RAS)	Freya Nanobubble Generator	>70% reduction in TSS >50% reduction in Sulfide >50% reduction in turbidity

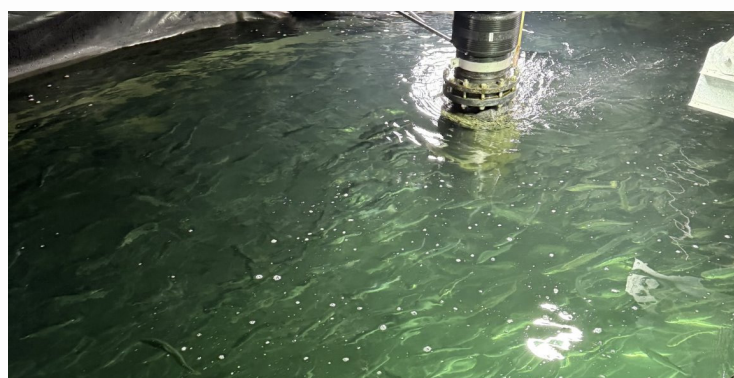
Maintaining Water Quality in a 98% Recirculating System

A salmon producer uses recirculating aquaculture systems to raise Atlantic salmon smolts and post-smolts. Its high-density post-smolt system recirculates approximately 98% of process water, making effective management of water quality and accumulated material critical to system performance.

The system operates at high recirculation rates and culture densities, making effective management of suspended solids, biofilm and other accumulated material especially important.

The producer integrated Moleaer's Freya submersible nanobubble generator into the system's main feeder channel to improve water quality and complement its existing treatment and filtration processes. Water quality was monitored at multiple locations throughout the system, including the post-smolt tanks, rotary pre-filter, pump well and post-degasifier.

For the producer, improving water quality was also an important part of maintaining optimal culture conditions and supporting fish welfare within the high-density post-smolt system.



Improving Removal of Accumulated Material

During the first few days of operation, TSS temporarily increased as accumulated biofilm, particulate matter and organic material were released into the water column.

The released material was captured and removed through the existing rotary filtration system. As accumulated material was removed from the system, water quality improved across monitored parameters.

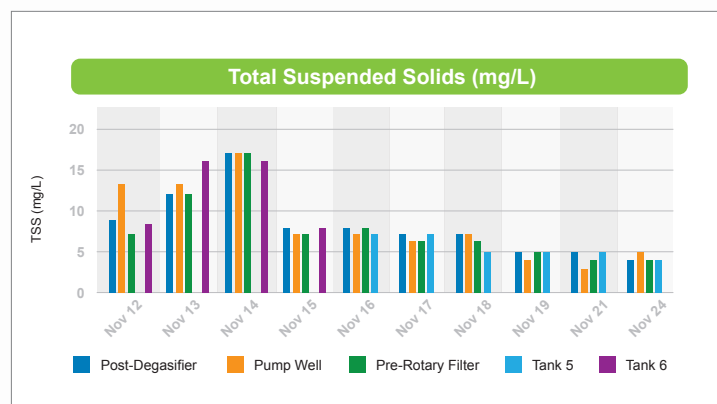


Figure 1. TSS initially increased as accumulated material was released into the water column, then declined as the material was captured and removed through existing filtration.

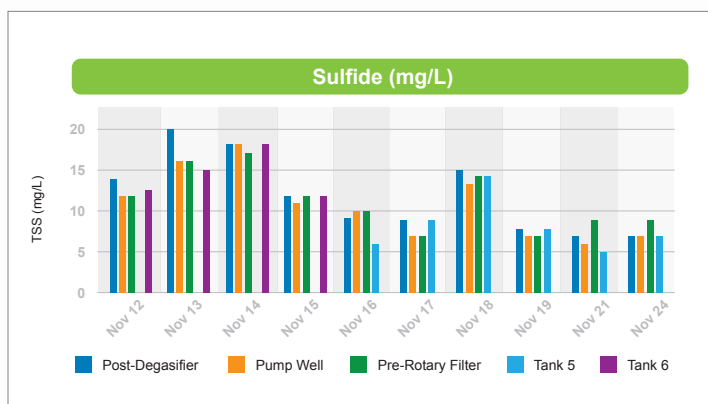


Figure 2. Sulfide concentrations declined across monitored locations following the initial treatment period.



IMPROVING WATER QUALITY IN HIGH-DENSITY POST-SMOLT RAS HOW A SALMON PRODUCER USED MOLEAER NANOBUBBLE TECHNOLOGY TO REDUCE SUSPENDED SOLIDS, SULFIDE AND TURBIDITY



Moleaer nanobubble technology helped release accumulated biofilm, solids and organic material for removal through existing filtration, improving water quality across the highly recirculated system.

Within the first 12 days of operation:

- **TSS decreased more than 70%**, from approximately 17 mg/L to <5 mg/L
- **Sulfide decreased more than 50%**, from approximately 20 mg/L to <10 mg/L
- **Turbidity decreased more than 50%**, from approximately 4 mg/L to <2 mg/L

The results show how Moleaer nanobubbles can complement existing RAS treatment and filtration processes, supporting the removal of accumulated material while improving recirculating water quality.

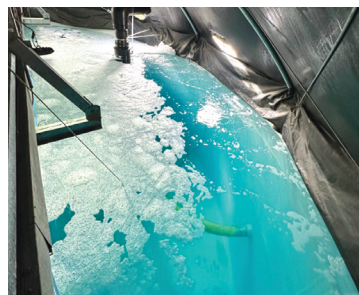
Biofilm Management and Tank Sanitation

Freya was also incorporated into its tank sanitation process alongside ozone treatment.

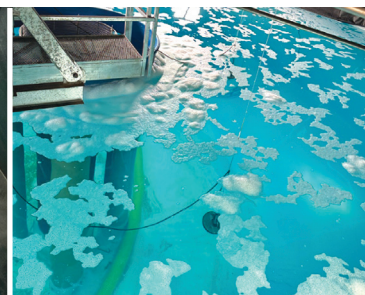
During cleaning, operators observed that biofilm released more readily from tank surfaces, allowing the sanitation process to be completed more quickly. Dense foam containing flocculated organic matter and suspended solids was also observed at the water surface as accumulated material was removed.



Post-smolt RAS at the start of operation with Freya (November 11) and following the monitoring period (December 5, 2025).



Foam containing organic matter and suspended solids observed during tank sanitation with Moleaer nanobubble technology.



Enhancing RAS Performance with Nanobubbles

The results show how Moleaer nanobubble technology can complement existing RAS treatment processes to improve water quality and support the removal of accumulated organic material.

By integrating Freya with its existing treatment and filtration infrastructure, the producer improved the removal of accumulated material from a highly recirculated production system. The improvements in water quality help maintain optimal culture conditions and support fish welfare, an important consideration as producers operate at higher densities and recirculation rates.



Get Connected with a Moleaer Aquaculture Expert

Learn how Moleaer nanobubble technology can help improve water quality, manage biofilm and enhance RAS performance.

The information and data contained herein are deemed to be accurate and reliable and are offered in good faith, but without guarantee of performance. Moleaer assumes no liability for results obtained or damages incurred through the application of the information contained herein. Customer is responsible for determining whether the products and information presented herein are appropriate for the customer's use and for ensuring that customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Specifications subject to change without notice. Copyright © 2026 Moleaer. All trademarks stated herein are the property of their respective company. All rights reserved. This document is confidential and contains proprietary information of Moleaer Inc. Neither this document nor any of the information contained herein may be reproduced, redistributed or disclosed under any circumstances without the express written permission of Moleaer Inc. Rev. 10-26-26 R5 EN