GAIA
WATER IS EVERYTHING
An AQUADEI Company

Large Scale, Proven Oxygen Efficiency for Open-Water Farms.

Oxygen stability drives survival rates, feed conversion, and cost — yet most systems lose efficiency exactly when demand peaks.
Backed by extensive marine trials and real operational data, we help farms turn oxygen into predictable performance — cutting waste and cost while meeting environmental and investor expectations.

The Challenge with Open Systems

- ⚠ **Low DO at depth, stratified fjords:** Mid- and deep-water layers remain oxygen-poor due to haloclines and limited mixing; replenishment is slow and uneven.
- ⚠ **Bio-load & temperature peaks:** Biomass and warm spells push demand up precisely when oxygen supply is weakest.
- ⚠ **Gas loss & inefficiency:** Conventional injectors form larger bubbles that rise and vent. Much of the oxygen you pay for never stays in the water long enough to help fish.
- ⚠ **Operational & ESG pressure:** Mortality events, treatments, and escapes drive costs and scrutiny; shareholders want evidence you run efficient, low-impact systems.
- ⚠ **Silent operation:** Noise free systems for safe underwater operation - unlike non-insulated mechanical systems that generate underwater noise and ultrasound linked to elevated cortisol and behavioral stress in salmon.

The Solution

The most efficient way to stabilize oxygen is to keep it dissolved longer and evenly distributed — not released as bubbles that quickly escape.
By creating stable oxygen suspensions under pressure, farms can deliver more usable oxygen to depth, cut gas and energy waste, and maintain calm, low-noise conditions for the fish.

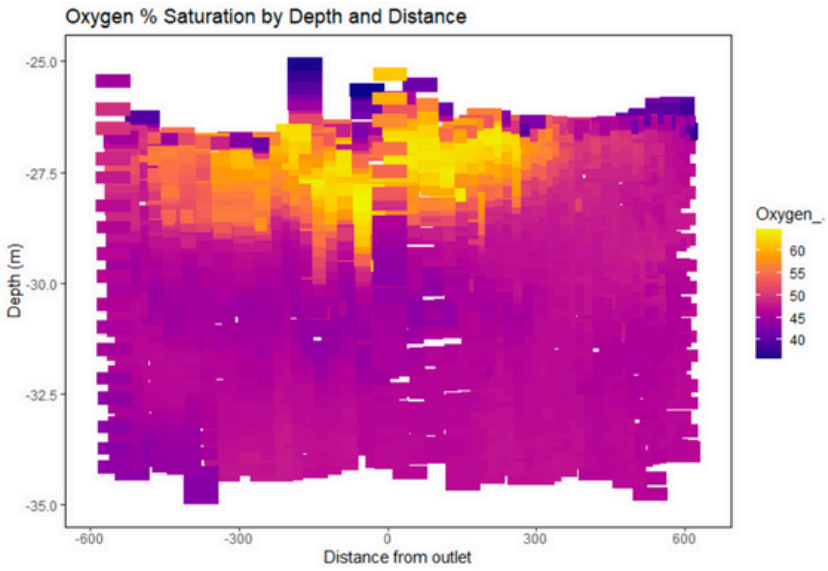
What we deliver ?

Gaia is a hydrodynamic-cavitation static mixer that creates a dense cloud of ultra-fine oxygen bubbles inline—stable, non-coalescing, and slow-rising—so oxygen stays dissolved and spreads before it can escape. No moving parts. Proven in realk marine conditions on a large scale.

How we deliver results ?

The technology was tested in Macquarie Harbour, Tasmania — a deep, low-oxygen marine basin supporting salmon farming, where poor circulation and stratification caused persistent oxygen deficits at depth.

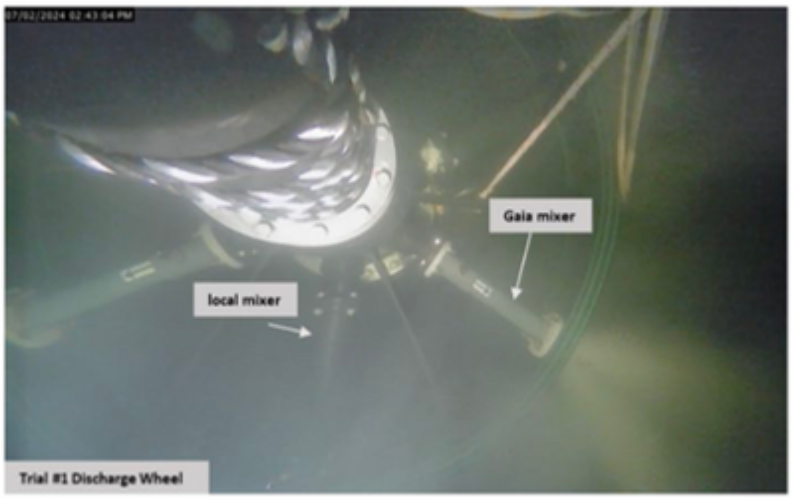
During the trial, dissolved oxygen increased within one hour, **spreading over 50 m** and reaching **more than 200 % saturation near the discharge.** Elevated levels **persisted 24 hours after injection** stopped, confirming strong gas retention and **no measurable impact on water chemistry, plankton, or benthic conditions.**

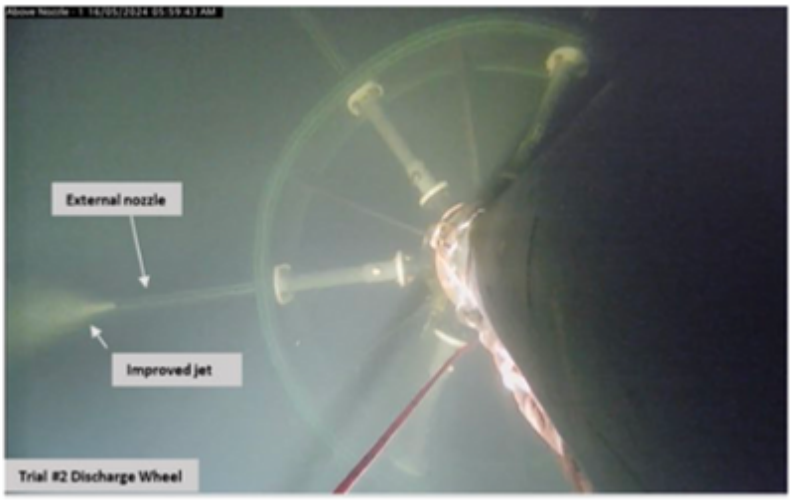


Source: Aquaculture Environmental Team (2024). Macquarie Harbour Oxygen Project – Progress Summary, October 2024.

Why We Delivered What We Delivered in Tasmania ?

- **Efficient oxygen transfer –** Hydrodynamic cavitation produces ultra-fine oxygen bubbles with high surface area, enabling rapid and complete dissolution.
- **Stable oxygen retention –** Ultra Fine Bubbles remain in solution even after pressure drops, keeping oxygen available longer and deeper.
- **Prevention of large-bubble formation –** Proven stable under high gas loads, eliminating coalescence and off-gassing seen in conventional injectors.
- **Low-noise operation –** Some hydrodynamic noise occurs, but levels are significantly lower than those from Venturi or pump-based systems, minimizing stress for fish.
- **Environmentally safe –** Field monitoring confirmed no measurable impact on nutrients, plankton, or benthic health.





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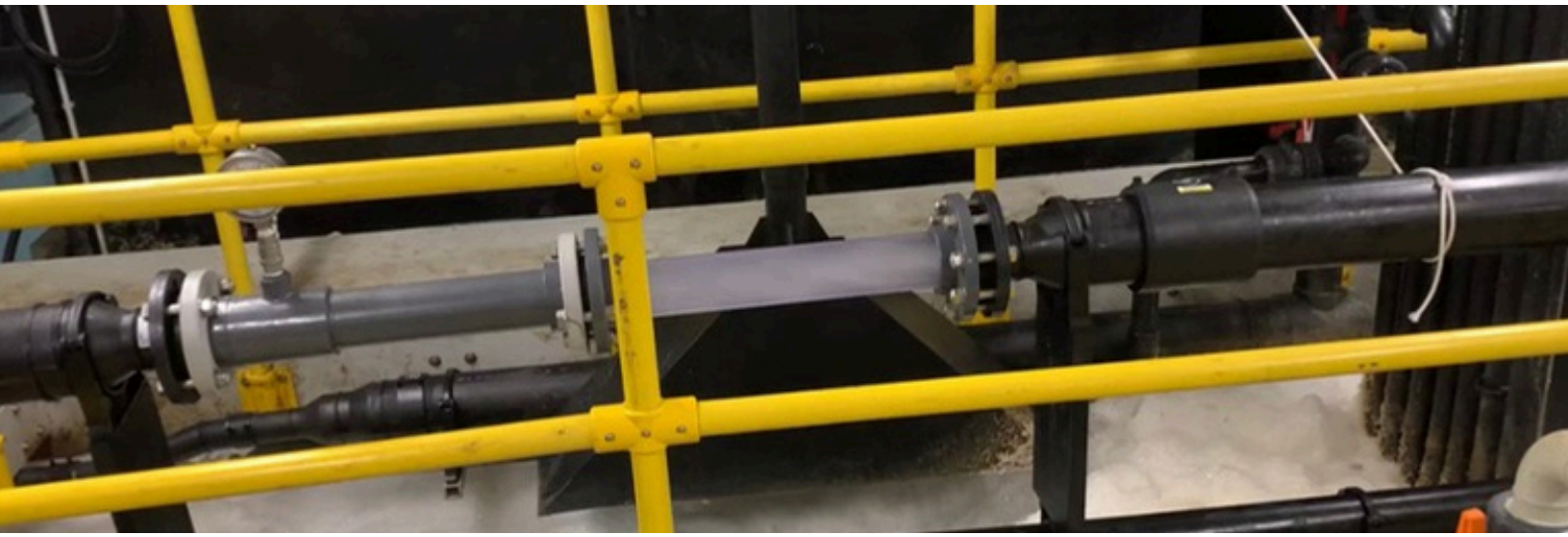
Results Summary

Challenge	Before (Conventional Systems)	After (Using Gaia UFB)
Low dissolved oxygen at depth	Oxygen levels remained critically low in deeper layers due to stratification and poor mixing.	Dissolved oxygen increased within 1 hour, spreading over 50 m horizontally and reaching >200% saturation near the discharge.
Rapid oxygen loss to the atmosphere	Large bubbles rose quickly and vented before oxygen could dissolve.	Formation of ultra-fine, stable bubbles kept oxygen in solution, maintaining elevated DO for 24 hours after shutdown.
High gas and energy demand	Efficiency dropped as load increased; more gas and power required for limited results.	Up to fivefold improvement in energy efficiency with lower gas use for the same DO outcome.
Environmental risk	Prior oxygenation attempts risked nutrient disturbance and localized stress.	Field monitoring confirmed no measurable change in nutrients, metals, plankton, or benthic conditions.
System complexity and noise	Mechanical injectors and submersible pumps added maintenance and underwater noise, stressing fish.	Static, low-noise system with no moving parts or diffuser fouling — simple, quiet, and reliable.

Why helical hydrodynamic cavitation matters ?



The true power of our mixer lies in its engineering design—harnessing helical hydrodynamic cavitation to unlock controlled, powerful transfer:

- **Extended Mixing Through Helical Swirl**
  A vortex with secondary flows maintains active contact zones multiple downstream diameters in length.
- **Progressive Diffusion Reducing Off-gas**
  Bubbles shrink and dissolve as they traverse the mixing zone, enhancing gas utilization.
- **Efficient Interface Renewal via Cavitation**
  Bubble fragmentation and disturbance of boundary layers increase mass transfer coefficients significantly over traditional injectors.
- **Micro-mixing with Oxygen Nanobubbles**
  Dissolved oxygen bubbles create localized mixing currents, preventing gas peaks and maintaining even distribution and transfer.

this design delivers faster reactions, reliable control, and minimization of unwanted by-products.

Your Benefits

Faster recovery of oxygen levels
Expect dissolved oxygen to increase within minutes of injection and stabilize quickly across the water column — keeping fish in their comfort zone even under high biomass or warm conditions.

More oxygen where fish actually live
The oxygen plume spreads evenly through deeper layers and maintains high concentration long after injection stops, ensuring consistent fish welfare and feeding behavior.

Lower gas and energy consumption
Field-proven performance showed up to fivefold improvement in energy efficiency and reduced oxygen use for the same DO outcome — directly cutting operational cost.

No risk of large bubbles or surface loss
The system maintains fine, stable oxygen dispersion even at high gas loads, preventing coalescence and off-gassing that waste oxygen and disturb fish.

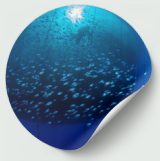
Environmentally safe operation
Proven safe in monitored marine conditions, with no measurable effect on water chemistry, plankton, or benthic habitats — ensuring regulatory confidence and sustainable operation.

Quiet, low-maintenance design
No diffusers, compressors, or moving parts. The system operates with minimal hydrodynamic noise and requires virtually no maintenance.

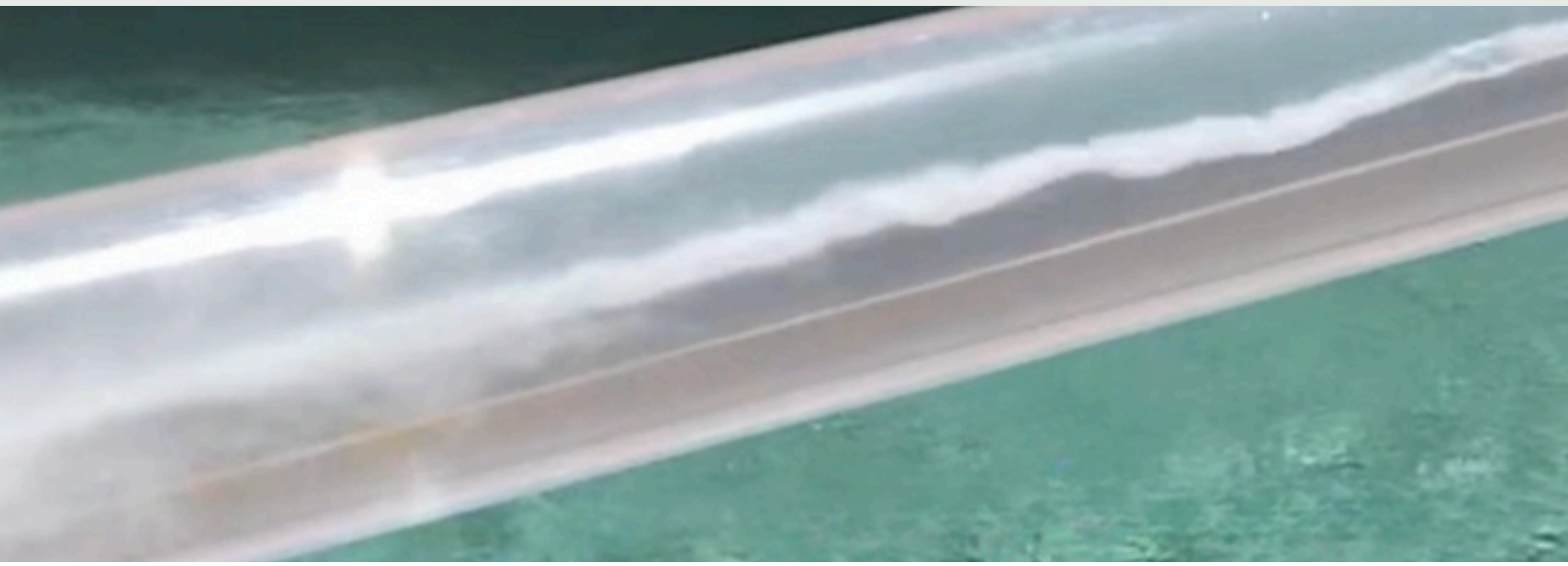
Where and how you install it ?

- **Placement:** Inline on each discharge/outlet you already use for oxygenated flows (side-stream or main).
- **Materials:** Marine-grade, graphene coated, poly-carbonate
- **Hydraulics:** Minimal added headloss; works with existing pumps/blowers.
- **Control:** Keep your current O_2 flow control; Gaia improves physical delivery, not your logic.
- **Service:** Visual checks; no moving parts, no diffuser pore cleaning.

FAQ



- **Will Gaia "fix" stratification?** No. It works with your hydraulics to keep oxygen in water longer so it can cross layers more effectively.
- **Is the >200% DO safe?** Local supersaturation near discharge is expected; design avoids persistent gas bubble disease by managing exposure—your monitoring plan governs limits.
- **What about currents and geometry?** We tune outlet size/number and mixer placement to your fjord flow and cage layout.
- **How do we know it pays off?** We track kg O_2 and kWh against DO improvement at depth - better retention shows up immediately in those ratios.



We are gas engineers and water chemistry experts.

Founded in 2015, Gaia Water is a team of specialists deeply involved in gas engineering, fluid mechanics, water chemistry, and process design, with more than 15 years of global innovation in advanced water treatment technologies.

We develop and deliver hydrodynamic systems for CO2 transfer, oxygenation and ozonation.

Based in the United States, Phoenix, we provide not just equipment but complete process solutions — from system design and commissioning to performance optimization and operational support. We have operations in US, EU, UAE, Singapore and Australia & New Zealand.

Our focus is to help clients achieve stable, efficient, and sustainable water processes through **proven, data-backed engineering.**

Contact us for more detailed information, engineering reports and case studies.

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