

Aqua Unique

Innovative Norwegian Solutions



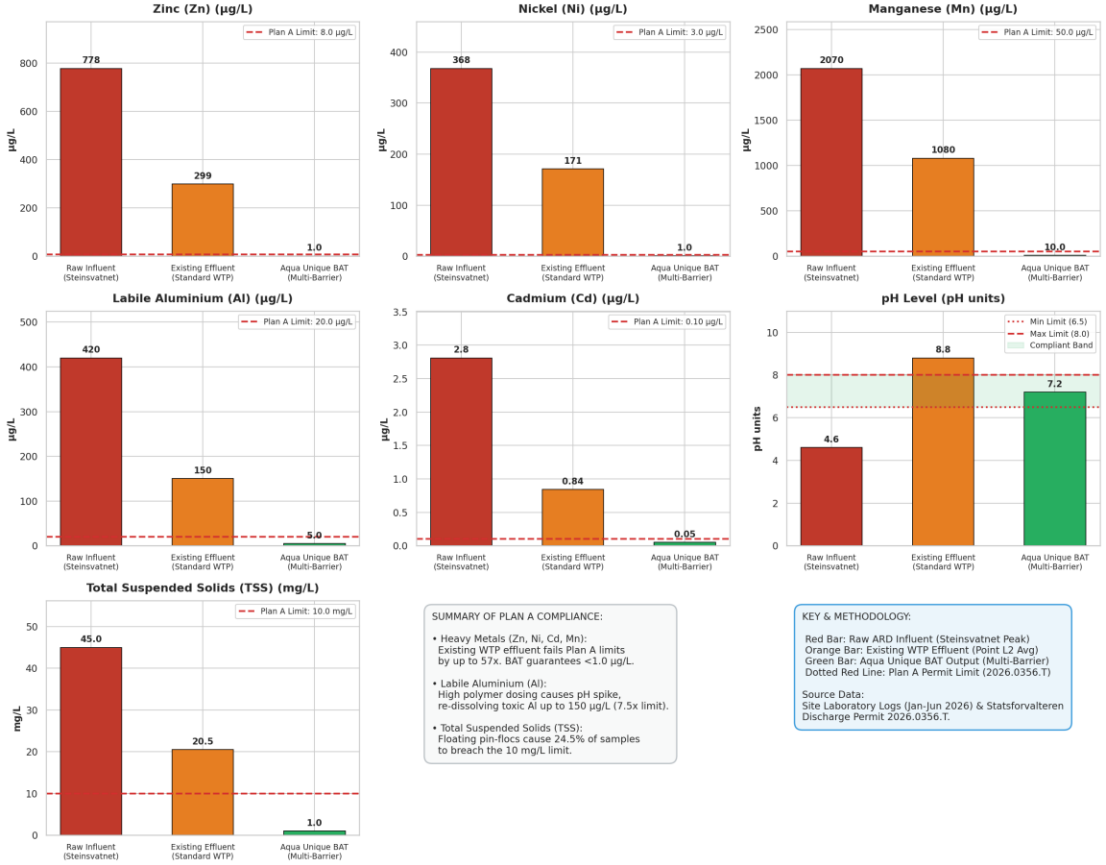
35+ Years of Expertise in Advanced Water Treatment for Critical Healthcare and Pharmaceutical Applications

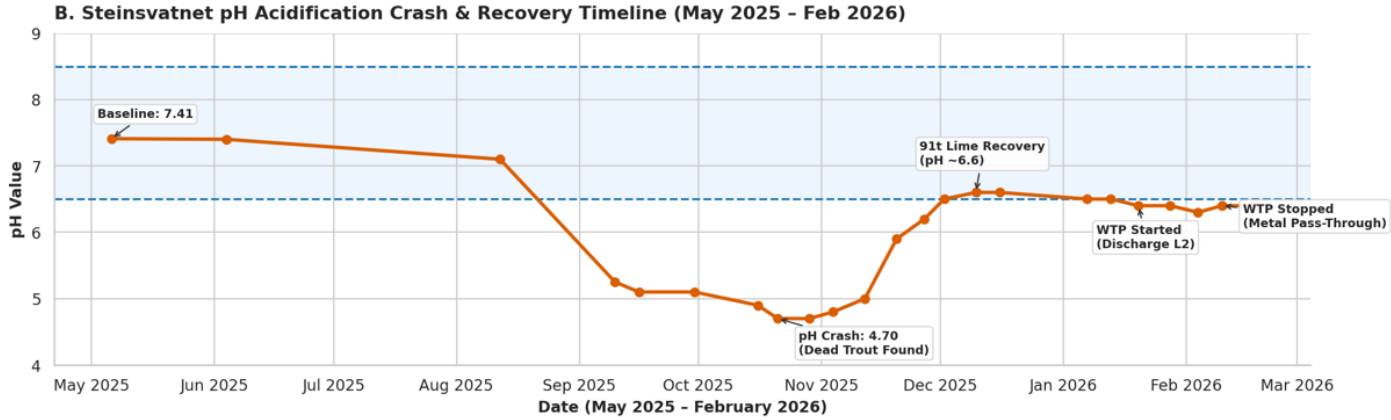


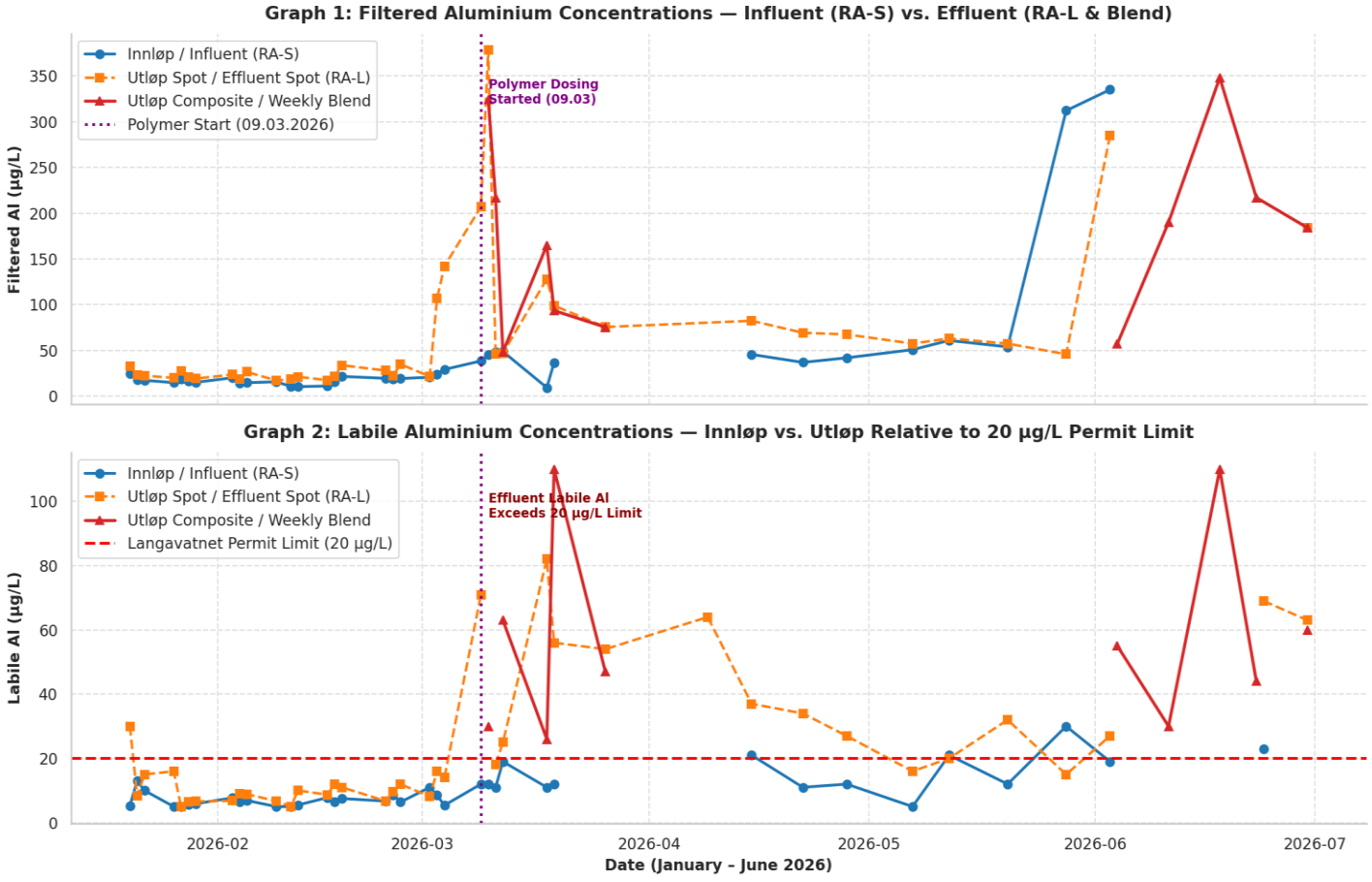


Clear Water ≠ Clean Water

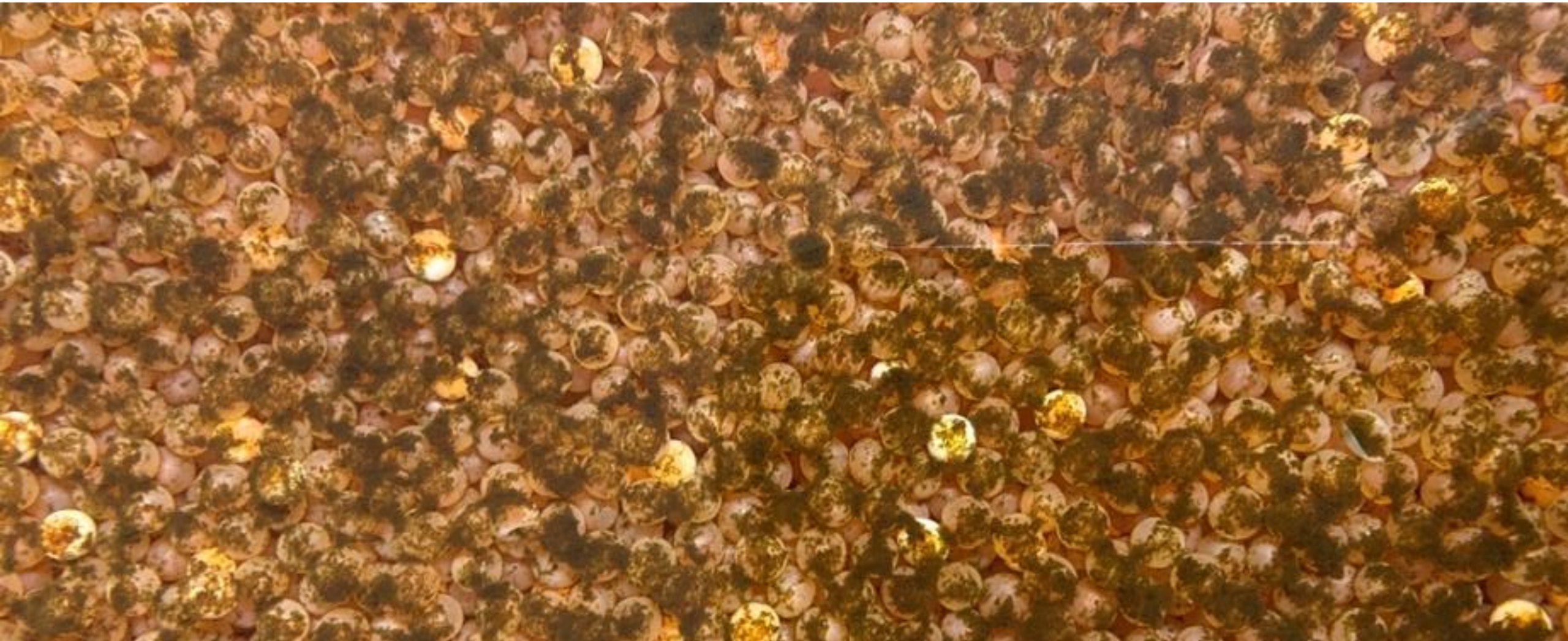
Water Analysis Reporting







When Fish Eggs Became Filter Media: One of the Problems That Brought Us into Aquaculture

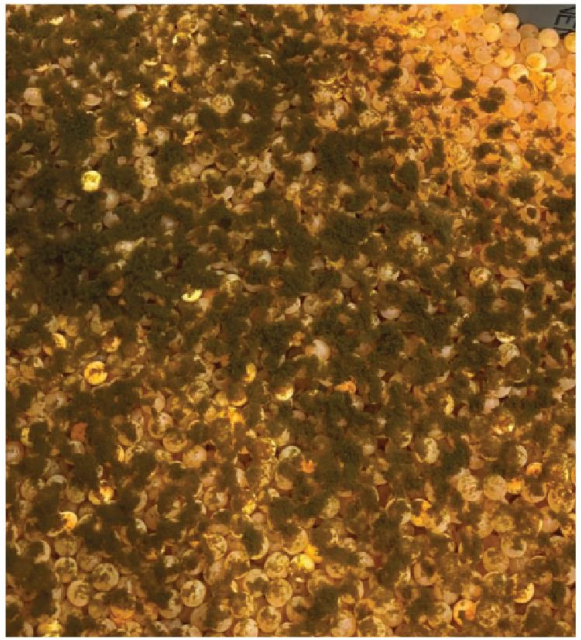












Across 50+ Farms, 2,500+ Research Papers Reviewed and Extensive Field Investigations Conducted



One Common Root Cause Emerged

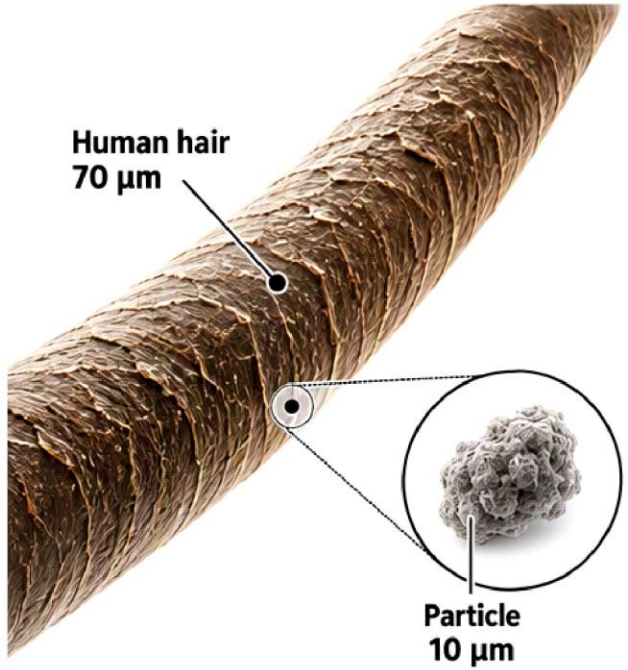
Particles

Everyday Size Comparison



Basketball	Tennis ball	Grain of rice	Sand grain	Human hair	Fine particle	Red blood cell	Bacteria	Virus	PFAS molecule
240 mm (0.24 m)	67 mm (0.067 m)	7 mm (7,000 µm)	500 µm	70 µm	10 µm	7 µm	0.5 – 5 µm	0.02 – 0.30 µm (20 – 300 nm)	~ 0.001 µm (1 nm)

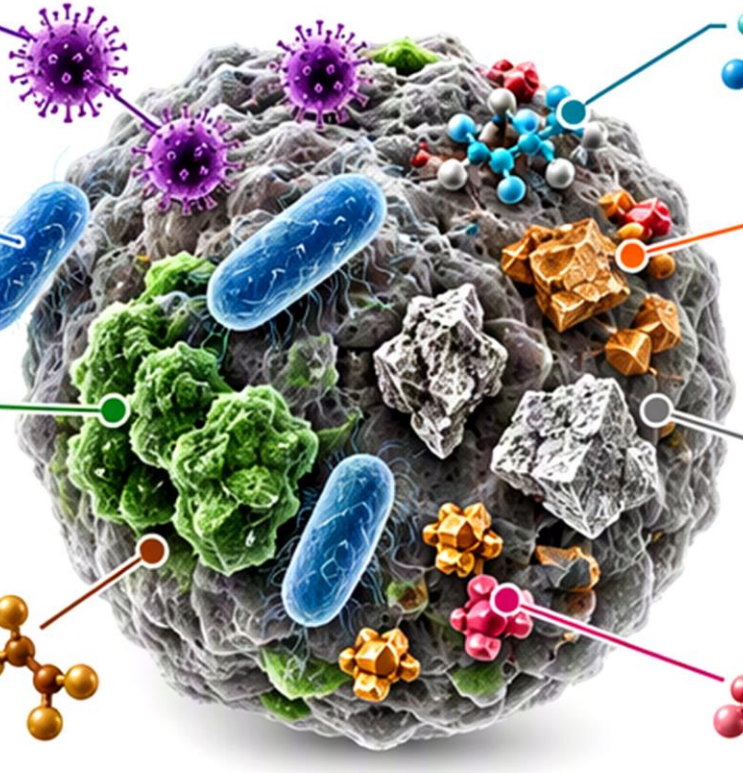
Visible to naked eye | Visible with a microscope | Only visible with an electron microscope



How Small Is a Particle?

A 10 µm particle is about 7 times smaller than a human hair, yet it can carry microorganisms, chemicals and other contaminamts.

A 10 µm PARTICLE
(1,000× magnified)



Viruses
(0.02 – 0.30 µm)
Can attach to particles and be transported in water.

Bacteria
(0.5 – 5 µm)
Can live on particles, forming biofilms.

Biofilm
(organic matter)
A layer of microorganisms and organic material that helps other contaminants stick.

Geosmin
(~ 0.001 – 0.01 µm)
Causes earthy/musty taste and odor. Can adsorb to particles and biofilm.

PFAS
(~ 0.001 µm)
"Forever chemicals" can adsorb to particle surfaces.

Heavy Metals
(e.g, Ni, Cu, Zn, Pb)
Can bind to particles, including:
- Nickel (Ni)
- Copper (Cu)
- Zinc (Zn)
- Lead (Pb)

Aluminum
(Al)
Often present as aluminum precipitates from treatment processes.

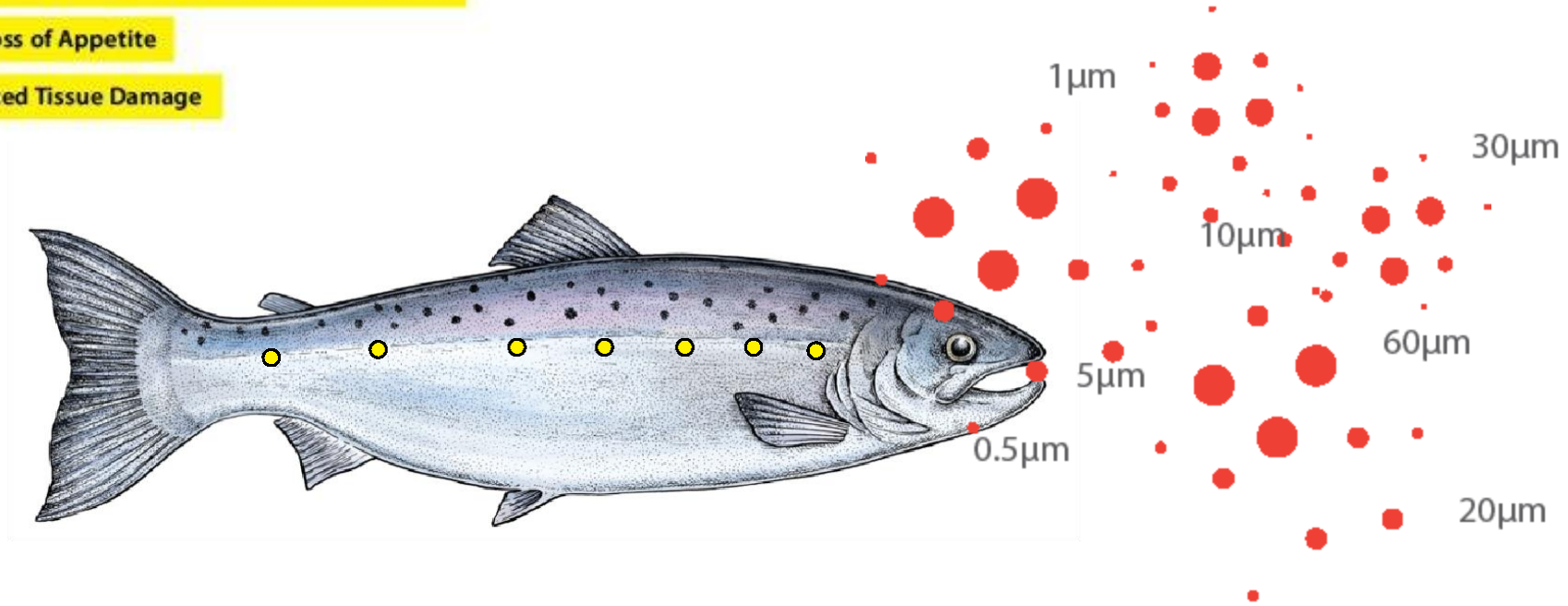
2-MIB (MIB2)
(~ 0.001 – 0.01 µm)
Causes musty taste and odor. Can adsorb to particles and biofilm.


Ichthyobodo spp.
7 µm
Yersinia ruckeri
1 – 3 µm
SGP-virus
0.3 µm
PRV (HSMB)
0.07 µm
ILA Virus
0.09 – 0.13 µm
Paramoeba perurans (AGD)
20 – 30 µm
Moritella viscosa
0,5 – 2.5 µm
IPN Virus
0.06 µm
Aeromonas salmonicida
0.05 –6 µm

Systematic impacts of suspended fine particulates on fish health

PATHOGEN GROWTH AND REDUCED VITALITY

- Stunted Growth and Increased Susceptibility to Disease
- Lethargy and Loss of Appetite
- Pathogen-Induced Tissue Damage



GILL FUNCTION AND OSMOTIC BALANCE

- Respiratory Distress and Osmotic Stress
- Osmoregulatory Collapse / Dehydration

KIDNEY DAMAGE FROM INGESTED PARTICLES

- Increased Risk of Nephrocalcinosis
- High Risk of Multi-Organ Failure

SENSORY SYSTEM IMPAIRMENT

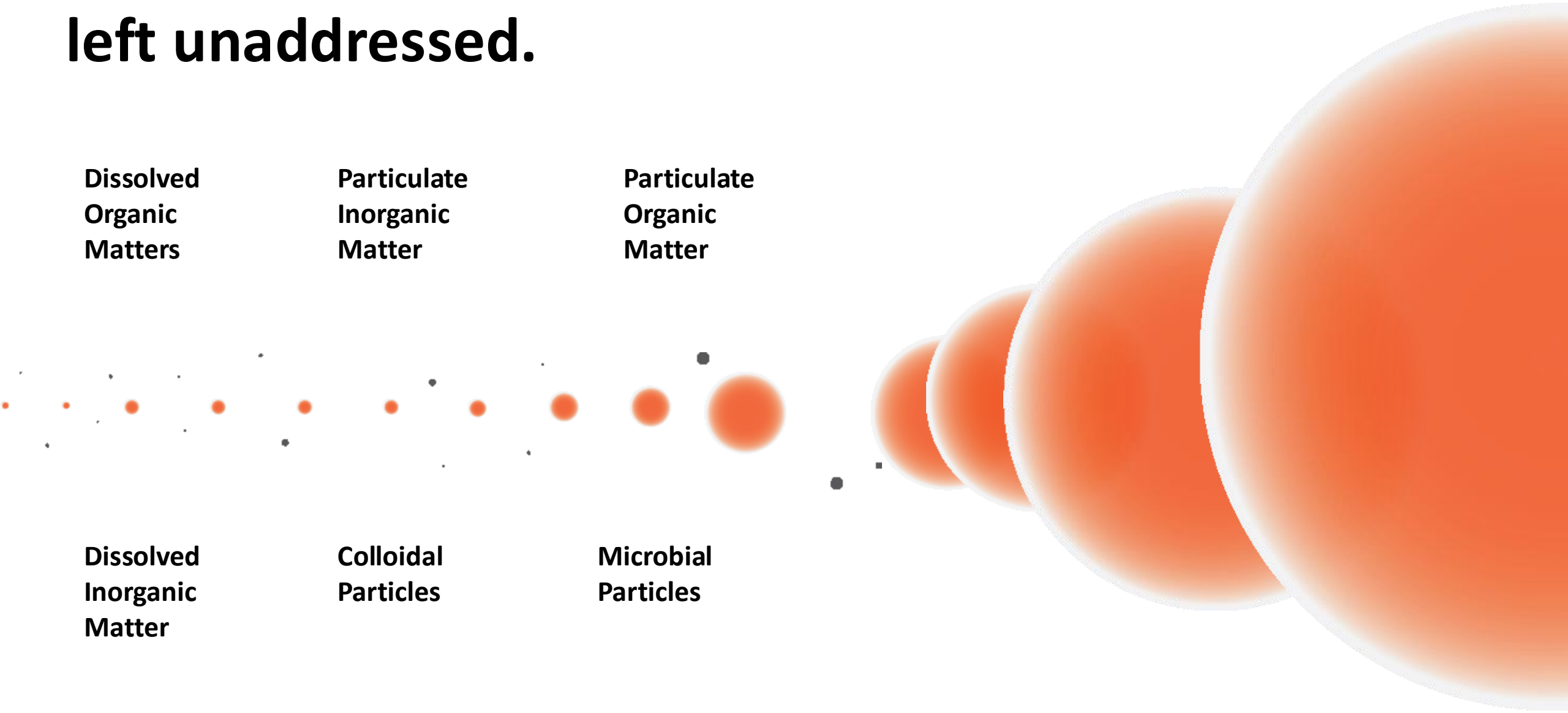
- Disorientation & Navigational Errors
- Elevated Stress Response

How small problems can become major crises when left unaddressed.

Dissolved Organic Matters

Particulate Inorganic Matter

Particulate Organic Matter



Dissolved Inorganic Matter

Colloidal Particles

Microbial Particles

How we help our clients

Intake Water

Providing the Highest Biosecurity

Producing Freshwater from Brackish Water and Seawater

RAS Water

Particle Removal with Side Stream Filtration (sRAS)

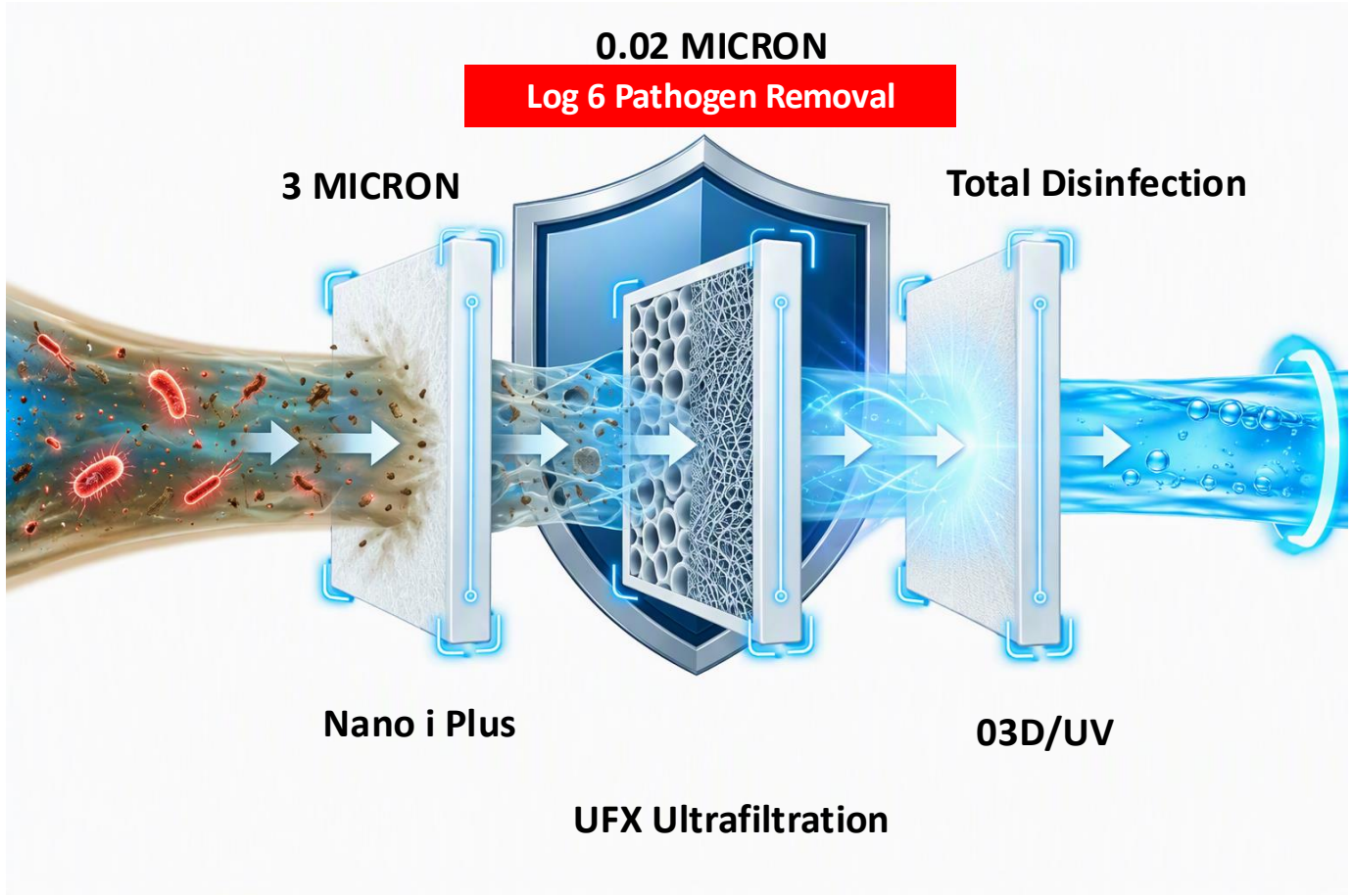
Ultra Clean Depuration Water Production

Discharge Water

Helping Farms Meet Compliance on Nutrient Discharge Limits and Biosecurity

Highest Biosecurity with a 3 Stage Multi Barrier Intake Solution

Unsafe Water



Water with Highest Biosecurity

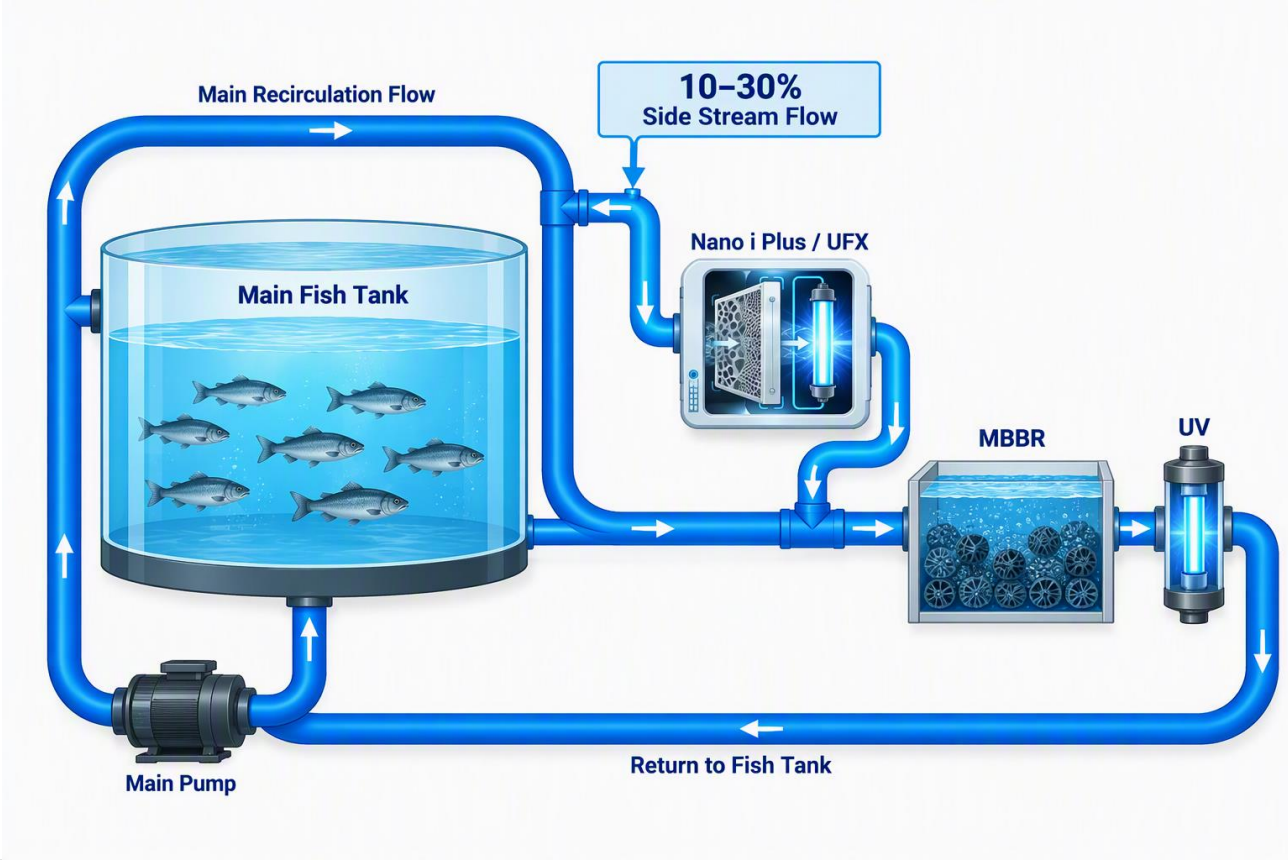
Log 6 Pathogen Removal: 99.9999% Reduction of Viruses, Bacteria, and Waterborne Pathogens

Containerized Advanced Intake Water Treatment Plant

3 Micron Filtration
240 m3/h









Containerized Advanced RAS Water Treatment Plant

Pilot Program

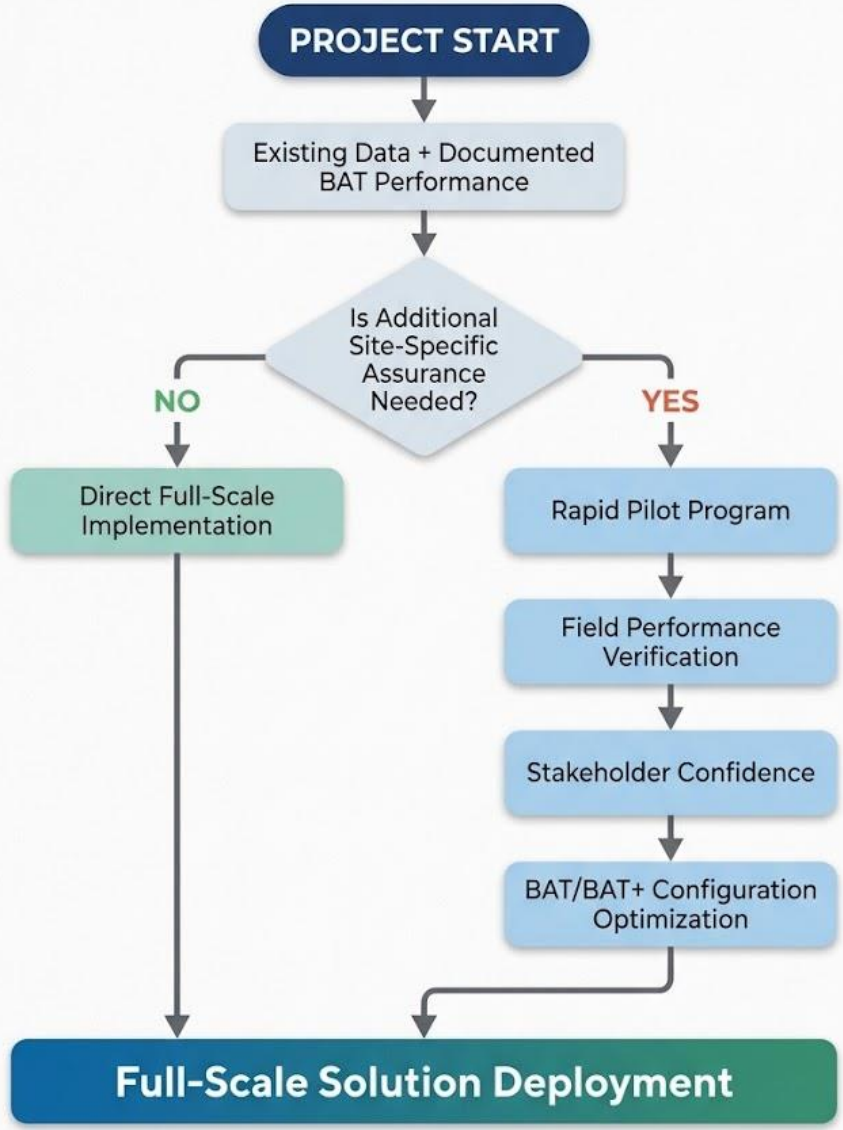
Operational Flexibility of 20 to 40 m3/h







PROJECT FLOW DECISION MATRIX





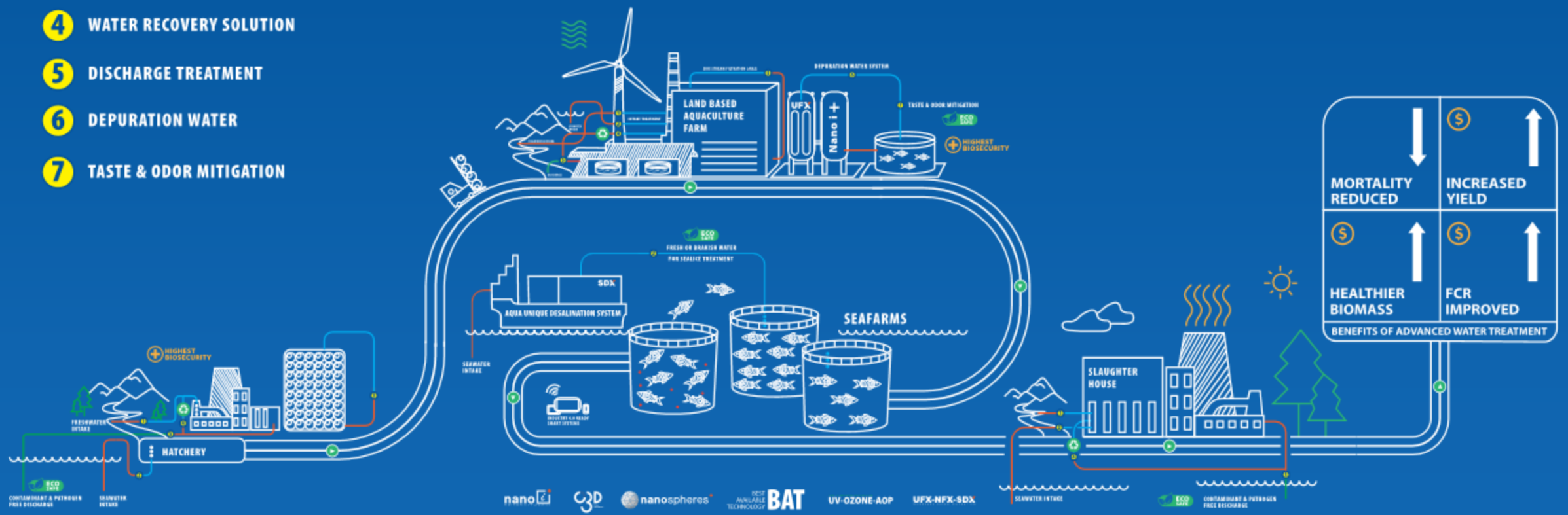
We are committed to demonstrating performance where it matters most.

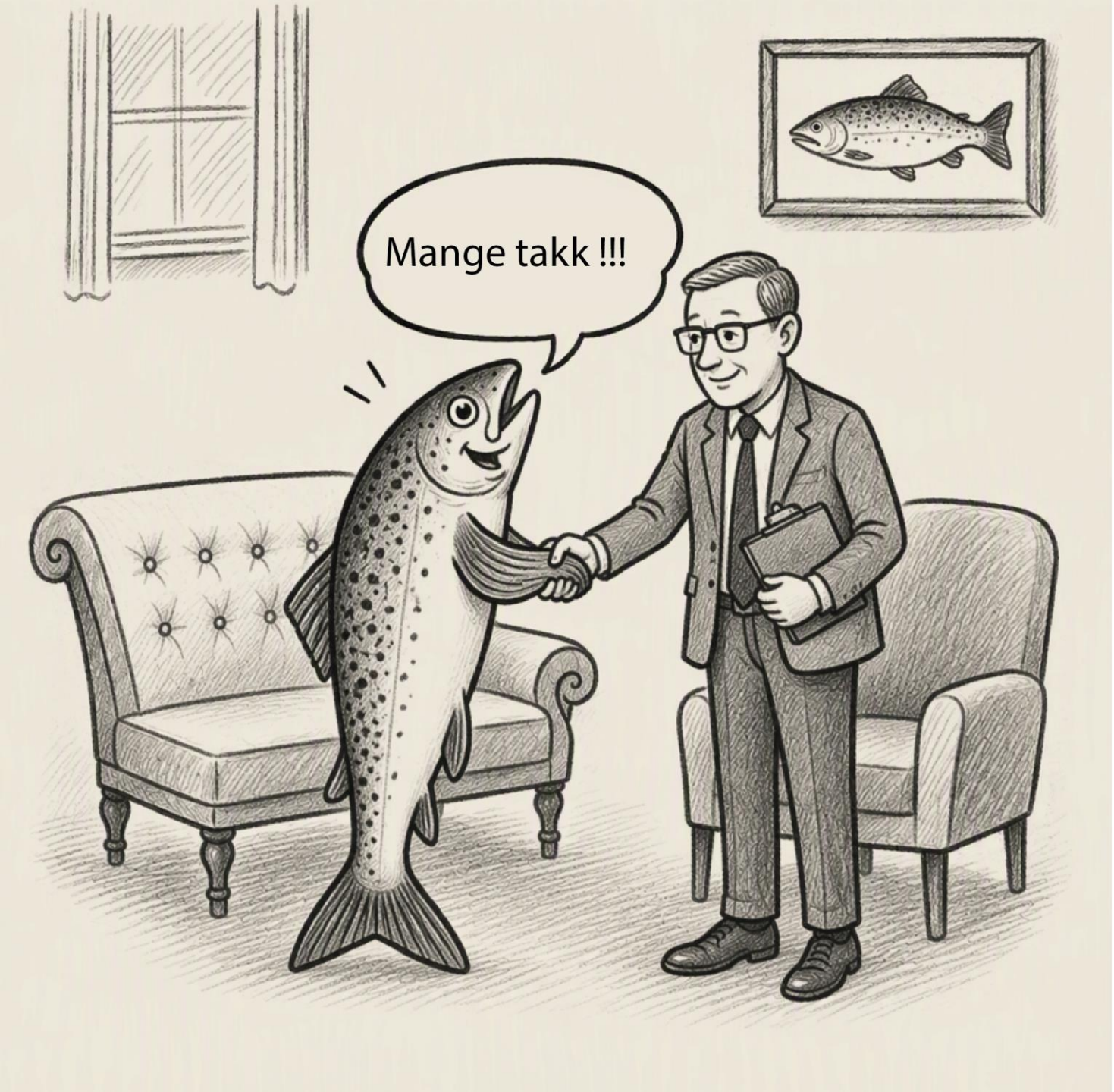
Under Actual Field Conditions Through Practical, Hands-On Testing and Verification

Key Takeaways

- Fine Particles Have Significant Impacts on Fish Health
- Small Water Quality Issues Can Rapidly Escalate into Major Operational Challenges
- Advanced Particle Removal Delivers Measurable Production Benefits
- Biosecurity Is Our Highest Priority: Log 6 Multi-Barrier Protection
- Aqua Unique Delivers Proven Field-Tested Solutions & Pilot Programs for Intake, RAS and Discharge Water Treatment

1. INTAKE WATER TREATMENT
2. SEAWATER DESALINATION
3. SIDE-STREAM RAS FILTRATION (sRAS)
4. WATER RECOVERY SOLUTION
5. DISCHARGE TREATMENT
6. DEPURATION WATER
7. TASTE & ODOR MITIGATION





Aqua Unique

Innovative Norwegian Solutions

project@aun.as

www.aun.as

Per Henriksen, Founder/CEO