

Water boarding on the modern fish farm

UNSEEN: What impacts does in-tank stability have upon fish performance and welfare? Blue Unit helps address these questions. Photo: Blue Unit

How do you know if your fish are inadvertently being throttled by rapidly deteriorating water quality?

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Fish swim, feed, excrete and play... all in their watery home.

On a modern fish farm, all these processes significantly impact upon tank water quality. The modern fish farm typically can inject sufficient oxygen to maintain a stable oxygen level in the fish tank. But what about all the other water parameters? Blue Unit water quality measurement on fish farms has revealed that many critical parameters DO NOT maintain a steady state during a busy production day.

What does in-tank instability look like? How can in-tank stability be improved? What effect does in-tank stability have upon fish performance and welfare? Blue Unit addresses these questions using innovative technology and many years of experience.

Unstable in-tank water quality: What does it look like? The pH change across the fish tank is nearly as important as oxygen. However, it is rarely clo-

The Blue Unit Lab Station: A unique centralized water monitoring system

Measurements are made on water samples that are drawn from up to 12 separate locations on a fish farm. The Lab Station measures water quality 24 / 7. This means a precise picture of complex water quality trends across the fish farm can be developed. The measurements include: oxygen, salinity, redox, temperature, pH, free carbon dioxide, bicarbonate buffer capacity, and turbidity.

Why benchmark?

When you accurately compare water samples across a tank, biofilter or degasser you can real-time monitor:

- Alkalinity, pH or oxygen changes indicating biofilter malfunction
- Alkalinity or CO₂ change over degasser
- Turbidity change caused by aeration of a filter
- CO₂ or oxygen spike across the fish tank

BLUE UNIT
stable water quality

sely monitored. A pH change across the fish tank changes the chemical equilibrium of many compounds found in the fish tank.

Toxic free carbon dioxide can increase 2-3 times due to a typical pH drop.

Toxic hydrogen sulfide can suddenly form with a small pH drop, while toxic ammonia can

spike with a sudden pH increase.

The graph (above right) illustrates the large pH swings that can occur across fish tanks, even in systems with strong base dosing regulation (left hand side of graph). But when dosing of strong bases is combined with buffer capacity management the daily pH drop across fish tanks can be significantly reduced

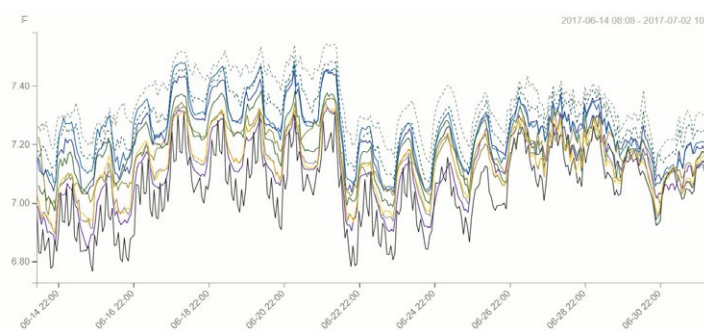


FIGURE: pH changes across a fish tank. The dashed line is water entering the fish tank, the solid line is water leaving the fish tank. Graph: Blue Unit

(right hand side of graph). This plays a large role in stabilizing all the other chemical parameters.

Managing stable water quality: How does Blue Unit help?

Blue Unit provides accurate water quality measurements across the entire fish farm. As the same sensor is used across all locations, an accurate benchmark between locations can be made.

Blue Unit also measures new parameters, such as bicarbonate buffering capacity. By measuring buffering capacity, the production manager can quickly manage in-tank pH stability.

Data measured across the fish farm is value added by the Blue Unit database converting, for instance, a time series of data into a 24 hour profile.

This helps in developing a precise picture of complex water quality trends that occur across

the fish farm. Blue Unit then communicates practical management advice to reverse negative trends that would otherwise never be seen.

Documenting stable water quality

Unfortunately, water quality is often only scrutinized on the modern fish farm following a large fish kill. Experience, however, warns that water quality needs to be measured, analysed and documented at all phases of production, from biofilter start-up to fish harvest.

With Blue Unit, professional support assisting farm managers on a regular basis, a significantly more stable water quality has been managed consistently on the fish farm. Blue Unit has documented a faster fish growth of up to 80 percent, with a 25 percent reduced feed conversion under more stable in-tank water qualities.