Real time monitoring of water quality in aquaculture systems

Complete visibility of process changes with a turnkey cloud-based solution

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is an Australian Government agency responsible for innovative science and technology.

CSIRO collaborate with leading global organisations and are recognised internationally for their quality research. They work across a broad range of topics, including aquaculture, which aims to boost the industry's value, competitiveness and sustainability.

Endress+Hauser DO, pH and salinity Memosens® probes immersed within pond for online water quality monitoring.

Challenge: Monitoring of water quality parameters such as dissolved oxygen (DO), pH, temperature and salinity are critical to ensure that the overall health of a prawn farm pond is maintained. Extreme changes to these parameters can have adverse effects during the grow-out period. At the very least, they can limit prawn growth and reduce the final yield of prawns harvested. In the worst case, they can cause total prawn mortality and significant costs. Typically, water quality data is recorded manually by handheld instruments at crucial time points . Manual sampling is labour intensive, and therefore, the frequency of reporting is limited. It may also be subject to human error, and there is often a time delay between recording and reporting of water quality data. An online, automated and cloud-based monitoring system can reduce this delay and provide more granular water quality data, enabling farm managers to make decisions earlier.

Process details: CSIRO operates an aquaculture research facility on Bribie Island, Australia. The facility has several large nursery and grow-out ponds for the production of prawns to harvest size . Paddle wheels and diffusion type aerators are installed in the ponds to provide a continuous supply of dissolved oxygen and water circulation. Water quality parameters such as DO, salinity and pH are taken manually via a handheld instrument twice a day (morning and evening). These parameters are used to assess the pond conditions. This

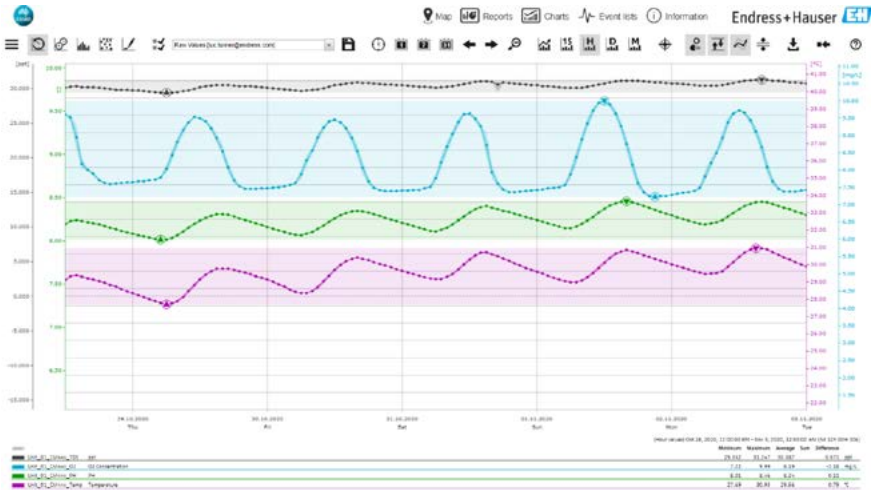
data is further manually processed to generate historical trends and make decisions to ensure the pond conditions are optimal for prawn production.

Our solution: Endress+Hauser supplied a complete turnkey solution for real-time monitoring of water quality parameters DO, pH, temperature and salinity. This included all analytical instrumentation, mounting assemblies, enclosure, and the customised Netilion Water Network Insights (NWNI) cloud-based data visualisation system. Memosens® digital probes provided non-contact digital data transmission to eliminate the influence of moisture and corrosion in the high salinity environment.

The NWNI dashboard allowed secure and instantaneous access to water quality parameters. Low and high range values for each parameter were easily set, providing a clear visual indication of when limits may be exceeded. The powerful graphical function allowed straightforward interpretation of all historical data, saving considerable time for operators. This provided insights to possible trends and a more efficient method of site opimisation.

Potential benefits of the NWNI cloud based system

- Operator time savings by automated collection of sensor data
- Increased data availability for forecasting and pattern recognition
- Increased ability for operators to react to pond condition changes thanks to the availability of real-time data
- Improved ease of data interpretation through the comprehensive data visualisation tools available via NWNI



Numerous data visualisation options are available via the NWNI dashboard.

Solution components

Cloud-based monitoring of water quality parameters:

- Netilion Water Network Insights (NWNI), fully configured for aquaculture monitoring

Memosens® liquid analysis sensors, transmitter and mounting accessories:

- Oxymax COS81D (DO), Orbisint CPS11D (pH), Memosens CLS82D (salinity) and Liquiline CM444 (transmitter), Flexidip CYA112/ CYH112 (assembly), complete enclosure

Want to find out more about the NWNI dashboard?
Scan the above QR code or click here to view an interactive demonstration.

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CS01706S/36/EN/01.21

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