












Aquaculture is our Business

xylem
 Let's Solve Water

Xylem Analytics

a leading manufacturer of premium field, portable, laboratory and online analytical instrumentation

Our comprehensive range includes meters, electrodes, titrators, spectrophotometers, colorimeters, polarimeters, viscometers, refractometers, temperature equipment and data loggers.



World-leading, robust analysis products for the measurement of pH, dissolved oxygen, conductivity, total dissolved solids and specific ions in environmental, water and wastewater applications.

SI Analytics

Manufacturer of SCHOTT® Instruments: technology for the measurement of pH, dissolved oxygen, conductivity meters, innovative electrodes and electrochemical measuring systems.



Monitoring and control instrumentation for water and wastewater.



Analytical instruments that detect, measure, analyze, and monitor chemicals in liquids, solids and gases and products used to digest, extract and separate components of chemical mixtures.



Oceanography



Flavor and
Fragrance



Wastewater



Chemistry



Food and
Beverage



Pharmaceutical



Chemical

A new force in analytical instrumentation

Xylem Analytics brings together globally recognized brands with commitment to long-term support

Environmental monitoring equipment for water and wastewater.



Temperature measurement and data logging technology for the measurement of temperature, pressure, humidity and other physical parameters.



Digital refractometer and polarimeter technology for food & beverage and industrial markets.



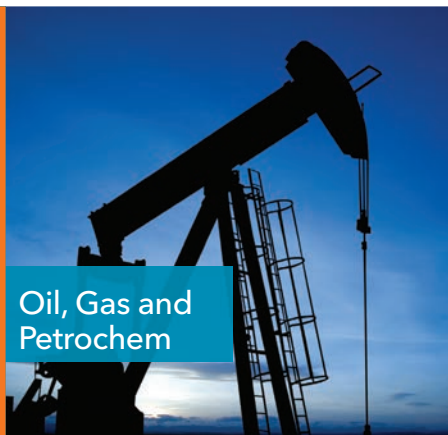
Sensors, instruments and systems for measuring and monitoring in demanding environments such as environmental research, oceanography and construction.



Water



Environment



Oil, Gas and Petrochem



Aquaculture



Manufacturing



Biotech



Medical

Xylem Analytics aquaculture monitoring systems:

Hatchery and smolt production

At the hatchery stage it is critical to measure, log and monitor the temperature correctly. When the eggs are hatched they will stay in the hatchery in a temperature controlled tank until the larvae are ready to start eating on their own. Our systems can be used in the production chain to collect data for reports and documentation.

When the eggs are hatched the smolt is transferred to grow tanks. It is important to control the oxygen, temperature levels and CO₂ levels. Xylem Analytics offers handheld systems for random measurements as well as self-contained systems for continuous monitoring. The monitoring systems are also able to log and report the conditions and can be fully integrated with the control systems. The sensors and solutions vary based on the different tank shapes and the different fish or shellfish species.

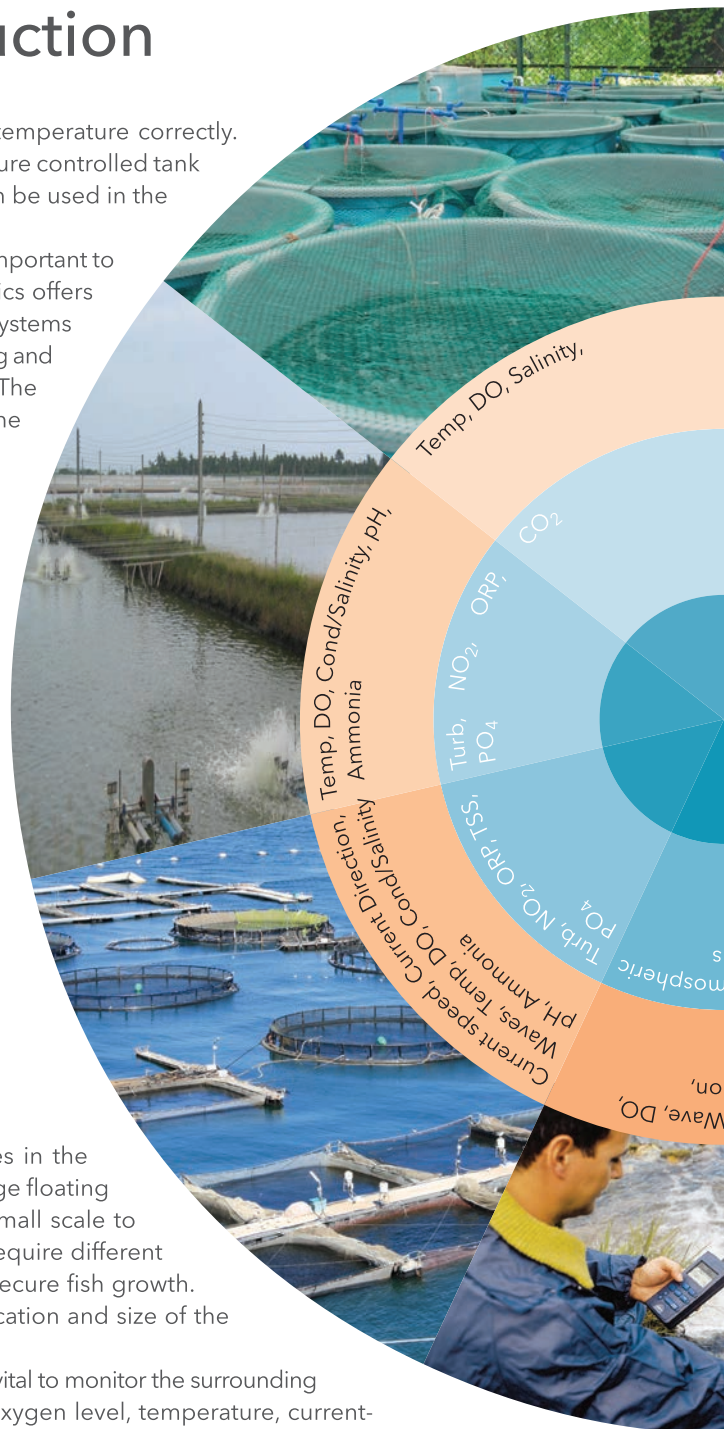
Fish farming on land and in ponds

Reliable sensors and systems are required when farming on land or in ponds. Farming on land requires accurate and stable measurements of oxygen, temperature and CO₂ levels. With correct environmental information, stress, disease, overfeeding and mortality of the fish can be avoided. Sensor values can be directly enter into the control systems of circulation pumps, CO₂ strippers or oxygen generators. With Analytics' reliable and long lasting sensors and systems, fish welfare and effective fish growth are maximized as is profit.

Fish farming in ocean

When the smolt reaches a certain size, it is moved into larger cages in the ocean for further growth. Farming in the ocean is normally done in large floating circular cages or smaller clusters. The size of the cage varies from small scale to > 100 000 m². The different farm methods and cage configurations require different measuring approaches in order to control the farming process and secure fish growth. It is also important to scale your instrumentation according to the location and size of the cage.

In order to control the growth process, and to secure the fish welfare, it is vital to monitor the surrounding environment, both inside and outside the cage. As a minimum the oxygen level, temperature, current-speed and direction should be monitored; oxygen is essential in all energy demanding processes for the fish. Sufficient oxygen is essential in the process of transforming feed into energy. Oxygen levels below fish welfare- and limit of tolerance will yield poor production results due to lower appetite and feeding utilization. Temperature is also an important physiological parameter for the fish, as they have the best appetite when the temperature conditions are optimal. Good current conditions will ensure a supply of fresh oxygen-rich seawater.



from hatchery to filet ...

Fish transport

Live smolt and full grown fish are transported in well boats or by trucks. Control of temperature, oxygen and CO₂ levels is vital in these environments. It is essential to keep the oxygen and CO₂ level stable. If the oxygen level is too low and CO₂ level is too high the fish may suffocate during transport. If the oxygen level is too high when the fish is transferred to a new environment, the shock may cause mortality.

At processing plant

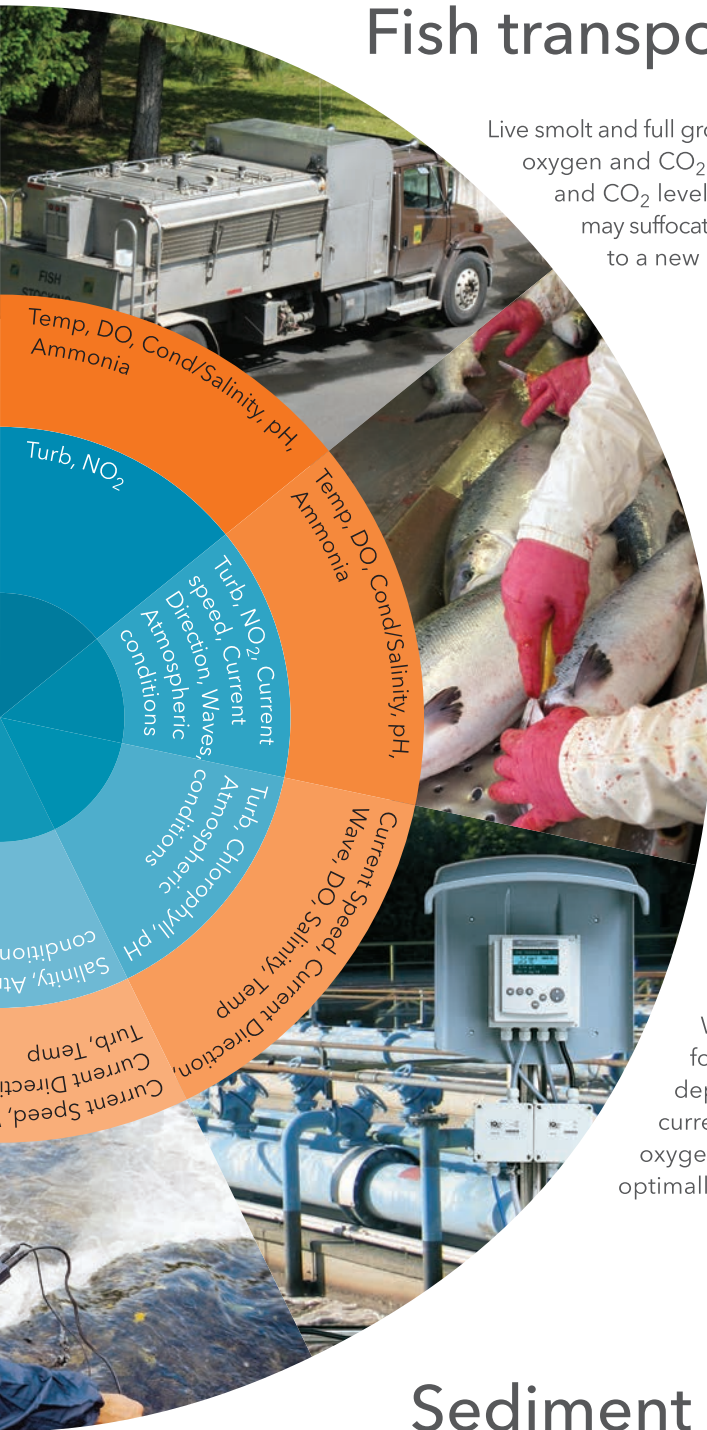
The harvesting stage is where the fish are most valuable. The processing plants has holding tanks on land and/or in the ocean. In order to ensure the highest quality, it is important that the fish are not stressed. Providing the fish with optimal temperature, oxygen levels and low pCO₂ levels to ensures quality and avoids mortality.

Site survey

When investing in an ocean farm it is critical to find an ideal location for your farm. Designing and optimizing a farm for maximum profitability depends on knowing the environmental conditions in detail. Knowing current speed/direction in 3D (horizontal and vertical), in combination with oxygen, temperature and wave condition allows you to design your farm optimally.

Sediment monitoring

Documenting the sedimentation from an ocean farm is important to achieve healthy and environmentally friendly farming. Suspended sediment measurements will help when documenting the bottom conditions under the farms. Knowing the sediment transport, oxygen levels and sediment buildup can promote healthy farming.





Hatchery and smolt production

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IQ SENSOR NET

- Single measuring point or sensor network
- Cost effective single point measurements with up to 4 sensors e.g. temperature, oxygen and salinity
- Network system for multi-measuring points



The optical oxygen sensor with integrated temperature, combines state-of-the-art technology with application applied benefits. The optical measuring principle offers several advantages:

- The calibration-free sensor offers maintenance-free deployment
- Insensitivity to air bubbles and fouling
- Two year warranty on sensor cap

The availability of accurate and timely measured values is an absolute necessity for process monitoring and dynamic process control. The use of innovative technologies, creative and continuous product development, and extensive application expertise have resulted in superior instruments and systems providing outstanding performance and reliability.





Portable field meters MultiLine 3400 series



- Rugged multi-parameter meters for pH, oxygen, salinity and temperature
- Up to 4 parameters can be combined
- Automatic electrode identification
- Data transmission to USB stick or PC/printer



The new MultiLine series with intelligent, digital sensors measure pH, dissolved oxygen and conductivity/salinity. This range of sensors is available for fish farming applications.

Additional parameters can be measured with pHotoFlex field photometer/turbidity meter.

For periodic measurements the ProfiLine analog or MultiLine digital portable meters offer great flexibility. Single parameters can be measured using the ProfiLine series or multiple parameters with digital technology MultiLine series.

Portable field photometer pHotoFlex® series



- Rugged portable photometer for field applications
- More than 160 methods including CO₂, ammonia, pH and turbidity measurements
- pH electrode input for standard pH measurement



Temp, Oxygen, Salinity

CO₂



Fish farming on land and in ponds

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With Analytics' reliable and long lasting sensors and systems, fish welfare and effective fish growth are maximized as is profit.

Portable field meters MultiLine 3400 series



- Rugged multi-parameter meters for pH, oxygen, salinity and temperature
- Field set with cable length up to 100 m
- Waterproof housing IP 67 protected with rubber armor



In addition to water quality instruments, Analytics also offers rugged and reliable weather instrumentation; from individual sensors such as wind speed and direction, barometric pressure, humidity, and temperature to a complete weather station with optional data loggers.

Oxygen and temperature data are needed in every pan/tank in order to control the growth environment. The water conditions can be shown in real time in the control room and the information can be delivered to a process control system simultaneously. Radio and satellite communication can be employed for remote locations. Many of our solutions can be supplied with environmentally friendly solar power systems.

Many sensors can be deployed over years with stable data output requiring only periodic maintenance.





Remote water quality station



- Monitor up to seven different 4-20 mA water quality sensors
- Portable server platforms for mobile data gathering
- Obtain data from multiple monitoring stations up to 15 miles (32 km) away
- Easy to use monitoring software included with system
- Central display system available



Several types of flow meters are available such as handheld meters using turbine, electromagnetic, and doppler technology. Water level sensors and recorders, water alarm sensors, pressure gauges, portable water samplers, data loggers, chemical metering pumps, and chart recorders are also offered. Sensors can be integrated to existing SCADA systems.

Whether using a recirculation aquaculture system (RAS), outside tanks, ponds, or cage systems, we provide effective and affordable solutions to meet the monitoring needs of the farm.

Temp, Oxygen,
Cond/Salinity, pH, Ammonia

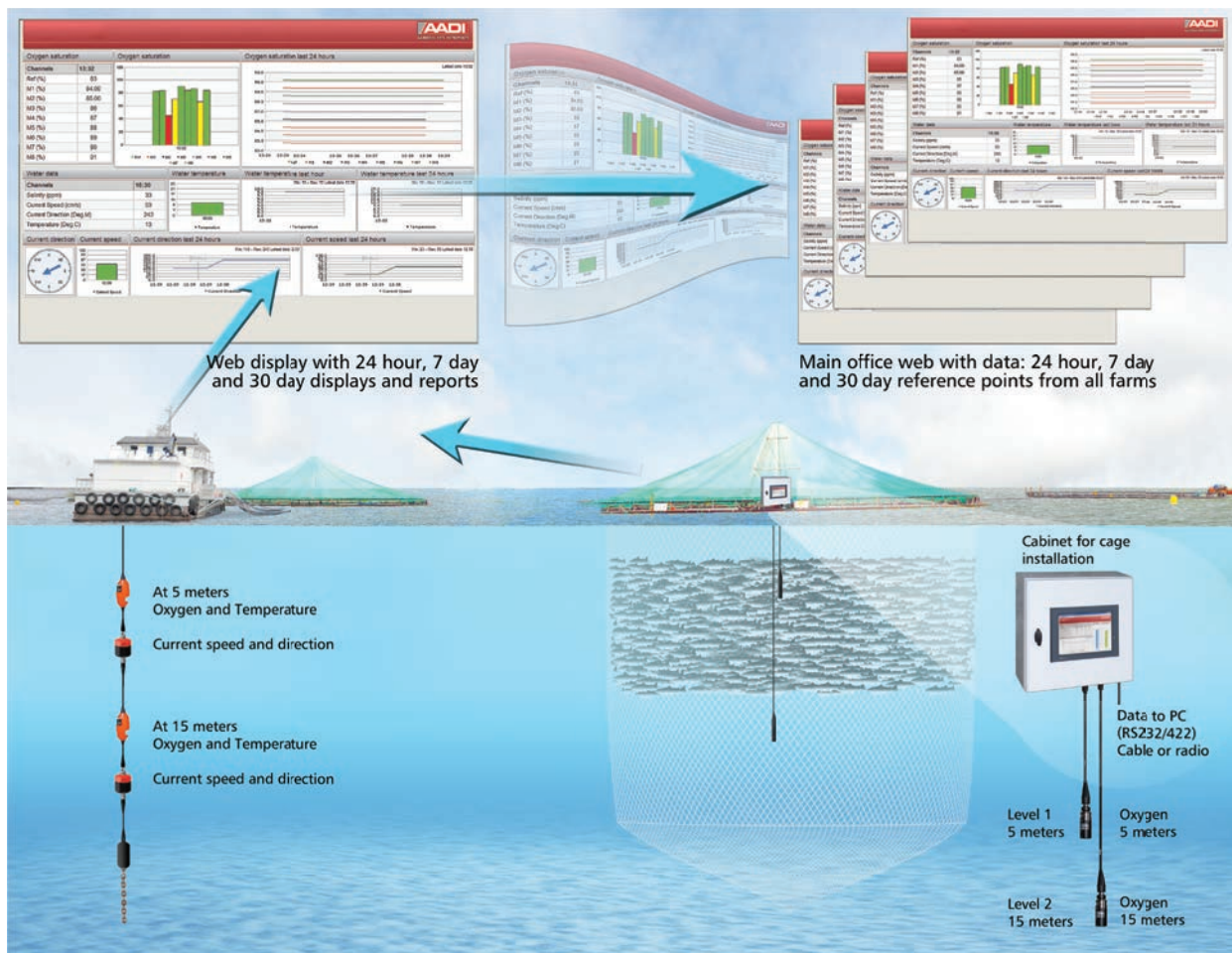
Turb, NO₂, ORP, TSS, PO₄, CO₂



Fish farming in the ocean

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The cage's flow-through capacity can be monitored by comparing the oxygen level inside and outside of the cage. This information may be used in planning maintenance and cleaning of the cage nets.

Additional parameters like salinity, pH, wave and tide are also parameters that could have an impact of the fish environment and can be included as part of the system.

A weather station or weather sensors may improve economic farming. As an example, wind- speed and direction should be monitored during the feeding process in order to avoid the spread of pellets outside of the cage.

Analytics offers a full range of instruments and sensors purpose built for monitoring the environment and living conditions for the fish when farming in ocean cages, including software systems for displaying collected data in real-time and collection of historical data.

The software systems allow companies having several farms to monitor the conditions at the different farms from a central location. Historical data from the individual farm locations can be compared in order to analyze differences in production results.

The sensors require a minimum of maintenance and no recalibration during a farming cycle.

Smart Sensors

AANDERAA™

- Monitor growth conditions
- Oxygen levels in fish cages
- Reference conditions inside cage vs. outside
- Monitor cage's flow-through capacity
- Integrate data with local control systems
- Central view of conditions at all farms



Weather Sensors

 **Global Water**

- High quality, rugged, industrial grade sensors for monitoring, alarming, and reporting
- Wind direction, wind speed, humidity, and temperature sensor (electronics fully encapsulated in marine grade epoxy)



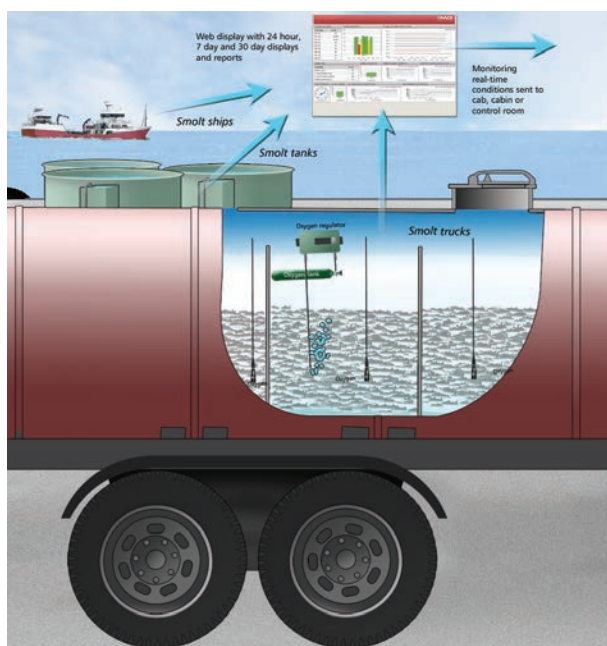
Current speed/direction,
Waves, Temp, Oxygen,
Cond/Salinity, pH, Ammonia,
Wind speed/direction

Turb, NO₂, ORP, TSS, PO₄



Fish transport

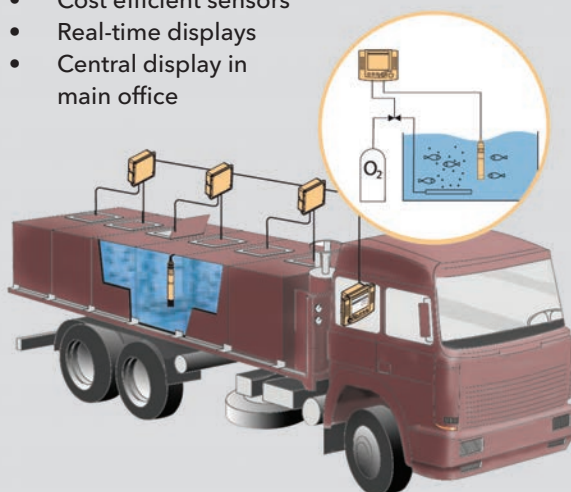
Live smolt and full grown fish are transported in well boats or by trucks. Control of temperature, oxygen and CO₂ levels is vital in these environments.



AANDERAA™

WTW

- Single-point measurement or sensor network
- Cost efficient sensors
- Real-time displays
- Central display in main office



It is essential to keep the oxygen and CO₂ level stable. If the oxygen level is too low and CO₂ level is too high the fish may suffocate during transport. If the oxygen level is too high when the fish is transferred to a new environment, the shock may cause mortality.

With stable conditions, stress, and the risk of mortality can be avoided. For quality control and reporting, all measured parameters are logged during the transport.

The living conditions for the fish can be monitored in real-time on the bridge of the ship or in the trucks cabin. If oxygen injection systems are present, the oxygen sensor can provide input to automatic injection system.

The sensor requires only periodic cleaning, providing precise information for years.

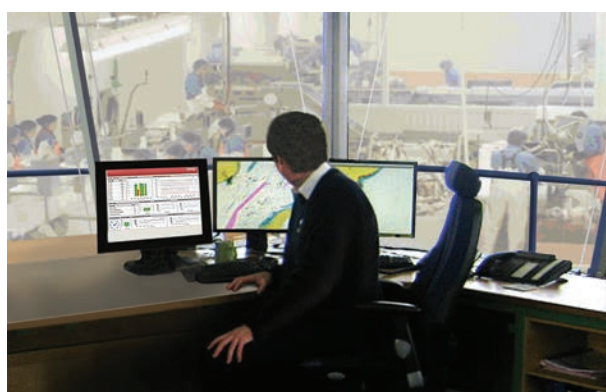
Temp, Oxygen,
Cond/Salinity, pH, Ammonia

Turb, NO₂



At processing plant

The harvesting stage is where the fish are most valuable. The processing plants has holding tanks on land and/ or in the ocean. In order to ensure the highest quality, it is important that the fish are not stressed. Providing the fish with optimal temperature, oxygen levels and low pCO₂ levels to ensures quality and avoids mortality.



Portable field meters MultiLine 3400 series



- Rugged multi-parameter meters for pH, oxygen, salinity and temperature
- High capacity data logger (10.000 records)
- Data transmission to USB stick or PC/printer



IQ SENSOR NET



- Digital modular multi-parameter system
- System for e.g. temperature, oxygen and salinity decentralized measuring points



cage, along with the oxygen measurement inside the cage, yielding oxygen consumption. Altogether the sensors, the communication systems and the display software give all the information needed to maximize profit through

- Lower stress
- Lower mortality
- Optimized use of fish feed, if applicable

The most important parameter is oxygen. Low oxygen levels stress fish and increase the chances of mortality. Fish quality can be monitored by combining the oxygen data from the water flowing through the

All information may be available in the control room or other central location. Companies having several processing plants can compare information from the different plants in order to optimize and better understand incidents like fish mortality or a difference in production quality.

For temperature control of the cooling chain for seafood (data loggers etc.) please refer to our brochure "Food & Beverage" or contact ebro at www.ebro.com.

-ebro-



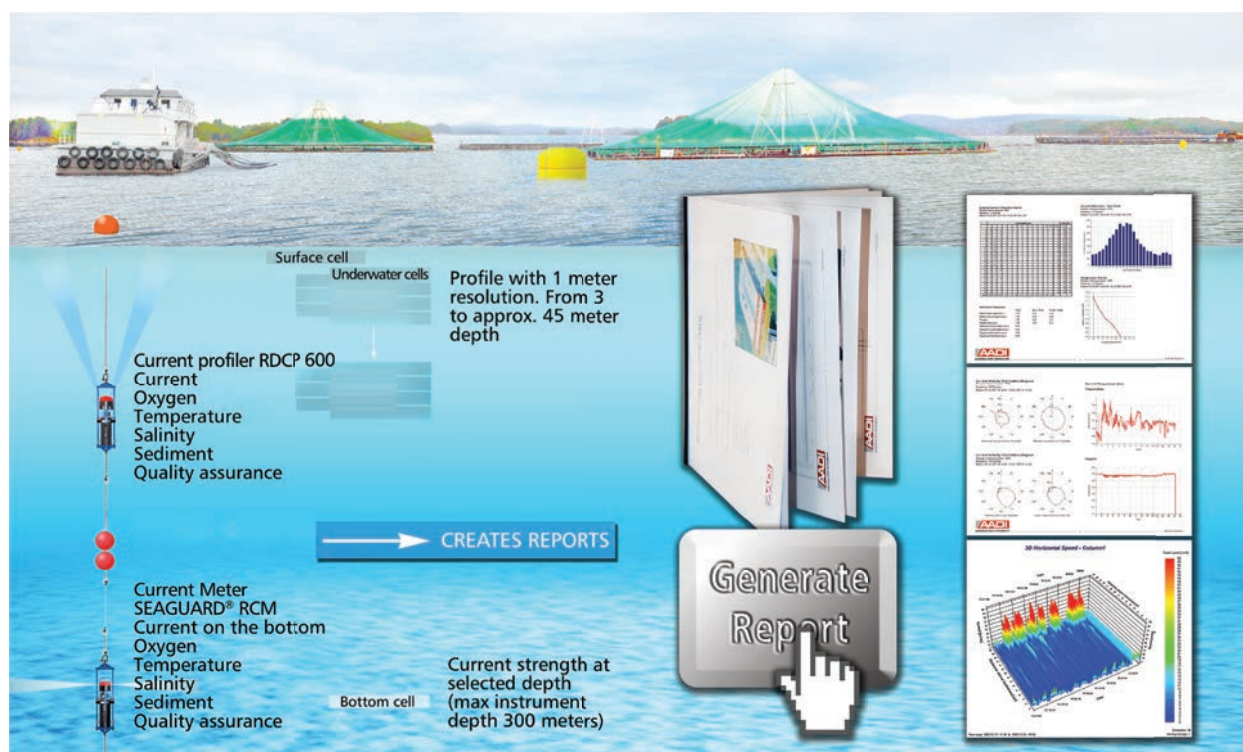
Temp, Oxygen, Cond/Salinity, pH, Ammonia

Turb, NO₂, Current Speed,
Current Direction, Waves,
Atmospheric Conditions



Site Survey

When investing in an ocean farm it is critical to find an ideal location for your farm. Designing and optimizing a farm for maximum profitability depends on knowing the environmental conditions in detail. Knowing current speed/direction in 3D (horizontal and vertical), in combination with oxygen, temperature and wave condition allows you to design your farm optimally.



Complete toolset for site criteria examination according to the new regulations.

Examination of site criteria made easy

- Quality data to dimension the installation cages correctly
- Evaluate profitable production using the measurement of current, oxygen, temperature and salinity

We deliver:

- Standard measurement systems with current data and water quality parameters
- Quality data required for reports
- Automatic reporting
- Training and counseling

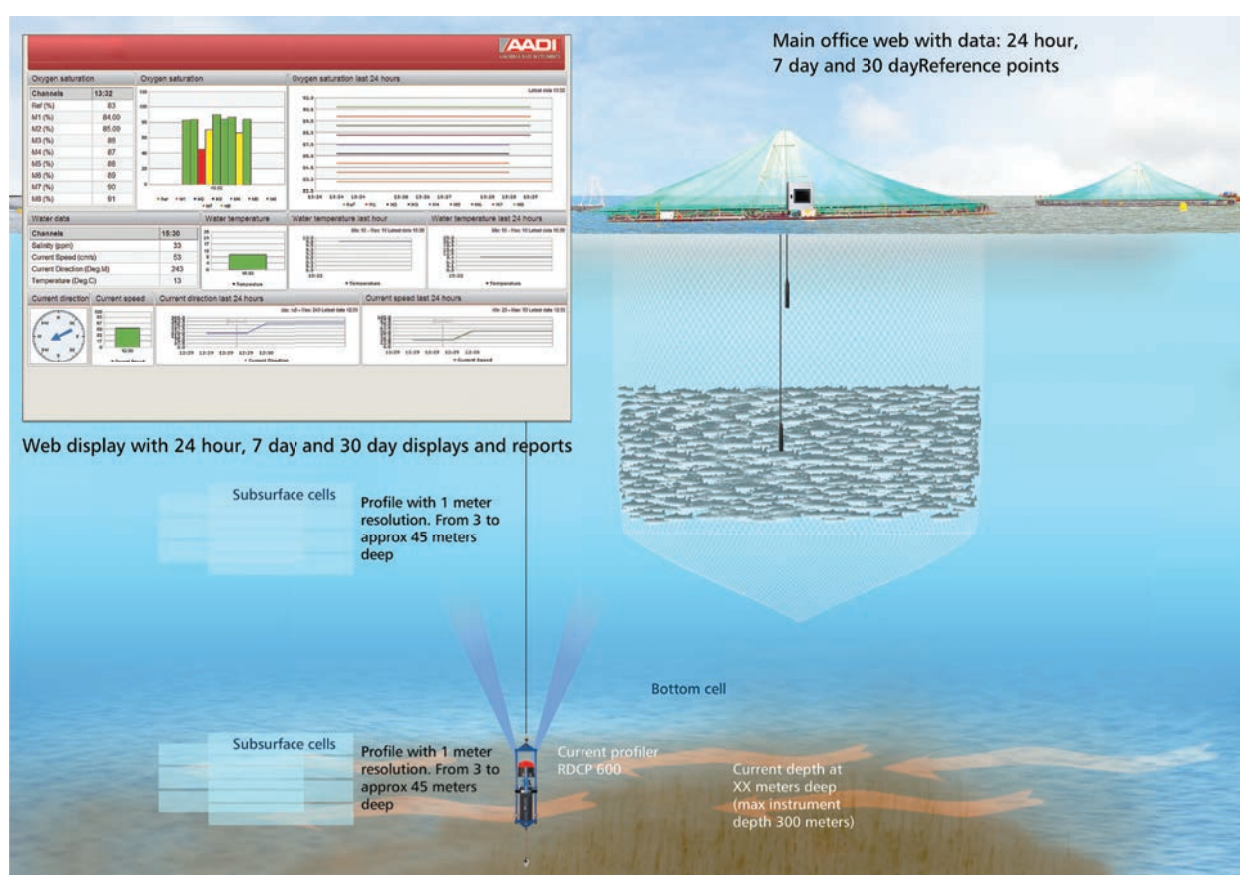
Temp, Oxygen,
Cond/Salinity, pH, Ammonia

Turb, NO₂



Sediment Monitoring

Documenting the sedimentation from an ocean farm is important to achieve healthy and environmentally friendly farming. Suspended sediment measurements will help when documenting the bottom conditions under the farms. Knowing the sediment transport, oxygen levels and sediment buildup can promote healthy farming.



Sediment monitoring is required when farming in the ocean in order to monitor the impact that the farm is having on the environment.

To monitor sediments being built up under the farm due to a slow breaking down process is mandatory in some countries. Regulations require that the farmers monitor the impact the farm is making on the environment.

Another issue is that sediments from the farm, when broken down, may cause a lack of oxygen (hypoxia) in the water layer near the bottom. In a situation when

upwelling of bottom water into the farm occurs serious oxygen depletion and consequently increase of fish mortality may occur.

Current, Oxygen, Temp, Cond Salinity, pH, Ammonia

Turb, NO₂, Current Speed,
Current Direction, Waves,
Atmospheric Conditions

Xylem Analytics



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For temperature
control of the
cooling chain
for seafood
(data loggers etc.)
please refer to our
brochure "Food
& Beverage" or
contact ebro at
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SI Analytics



Xylem Analytics is a leading manufacturer of premium field, portable, laboratory and online analytical instrumentation. Bringing together globally recognized brands with commitment to long-term support, Xylem Analytics is a name customers can rely on.

For further information on Xylem Analytics, please email us at analytics.info@xyleminc.com, or visit us at xylemanalytics.com.

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