



# Aquaculture

Automated Water Quality Monitoring and Control Systems

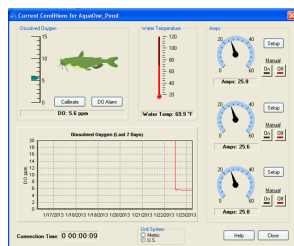


Campbell Scientific designs and builds automated monitoring and control systems used in aquaculture applications. This includes pre-packaged turn-key systems that are designed for the open-pond type culture (typically catfish and shrimp ponds); custom designed systems

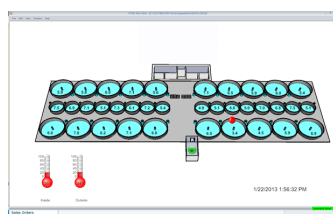
that allow the operators to program the monitoring, control, and alarming features to meet their unique needs; and component-level products that are available for integration of third-party systems.

## MAJOR SYSTEMS

### AquaCommand Automated Aquaculture System



### Custom Aquaculture System



	Measurements	Software	Communication	Alarm	Control
AquaCommand	Dissolved Oxygen, Water Temperature, Amps	AquaView	Spread Spectrum RF	Email PC Audio/Visual	Aerator
Custom	Dissolved Oxygen, ORP, Water Temperature, Amps, Pressure, pH, Conductivity, Turbidity, Salinity, Ammonia	RTMC	Spread Spectrum RF, Cellular Phone, Ethernet	Email, Text, Voice, PC Audio/Visual	AC/DC Relay, Variable V, mA

## AquaCommand Description

Our AquaCommand System was designed to meet the common needs of open pond catfish and shrimp culture. This system continuously monitors dissolved oxygen, water temperature, and aerator amperage. Aerators are controlled and alarms are triggered based upon the user-selected dissolved oxygen and motor amperage set-points.

This system communicates with a local PC via spread-spectrum radios. Although the system communicates with the PC, it is not dependent on the PC. Unlike other monitoring and control systems, the AquaCommand continues to operate even if the PC doesn't.

## Subsystems

Depending on the size and layout of a farm, AquaCommand consists of two to four of the following subsystems.

### AquaCenter

AquaCenter is the base station for the AquaCommand system, providing all the necessary radio and software to enable the PC to communicate with the field devices.



### AquaOne

AquaOne monitors the dissolved oxygen and water temperature in a single pond, controls up to three aerators, and measures the amps of each aerator. Sensors can be connected to the station via hard-wire cable or wirelessly.

### AquaFour

AquaFour monitors the dissolved oxygen and water temperature in up to four ponds, controls up to 12 aerators, and measures the amps of each aerator. Sensors can be connected to the station via wired cable or wirelessly.

### AquaHub

Where wireless communication is weakened because of obstructions or distance between the AquaOne, AquaFour, and the AquaCenter, the AquaHub provides a repeater to increase the transmission distance.

### AquaBuoy

When either the AquaOne or AquaFour connect to a sensor wirelessly, the AquaBuoy is required. This buoy measures both dissolved oxygen and water temperature and transmits the data back to the AquaOne or AquaFour.

## AquaCommand Software

### AquaView

AquaView is the software that operates on the base PC. This software provides the human interface with the pond monitoring equipment. In addition to allowing control of the system, AquaView provides a visual presentation of the ponds and their current conditions, as well as status lights to alarm when trigger conditions have been met.

## Custom System Description

Many aquaculture operations are unique and require a custom design to meet their specific needs. Our applications engineers can assess the needs of the operation and can provide a system designed specifically to meet those needs. They will construct a system that contains the monitoring and communications equipment, sensors, and programming best suited for your application.

Like the AquaCommand system, all of our monitoring control equipment communicates with the PC, but does not require the PC for operation. Campbell Scientific provides custom software screens using our RTMC real-time monitoring and control software, which is bundled with our LoggerNet software package.

## Aquaculture Case Studies

Our aquaculture systems have helped a variety of organizations reach their goals. The following are just a few of these:

Campbell system monitors and controls water flow to the Pequest Trout Hatchery in New Jersey.

[www.campbellsci.com/new-jersey-hatchery](http://www.campbellsci.com/new-jersey-hatchery)

A Campbell automated monitoring and control system maintains optimal dissolved oxygen levels on Lee's multiple-pond catfish farm in Macon, Mississippi.

[www.campbellsci.com/macon-mississippi](http://www.campbellsci.com/macon-mississippi)

Instrumentation Services A/S (ITAS), a Norwegian company uses Campbell Scientific equipment to monitor oxygen levels for the fish farming industry.

[www.campbellsci.com/norway-water-oxygen](http://www.campbellsci.com/norway-water-oxygen)

Stolt Sea Farms installed a Campbell Scientific monitoring and control system at its recirculating facility in Laguna, California. The system constantly monitors the water quality of tanks used to grow sturgeon, and consequently produce caviar.

[www.campbellsci.com/california-stolt-sea-farms](http://www.campbellsci.com/california-stolt-sea-farms)



For Lee's catfish farm in Mississippi, our equipment eliminated the need to manually check dissolved oxygen concentrations.

