

# Success story

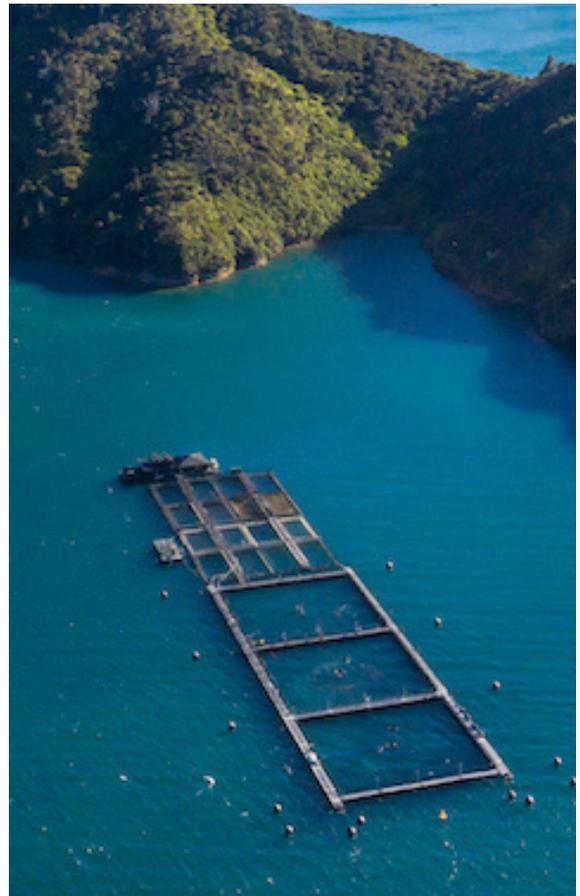
**Smart Water solutions to get the  
best quality mussels and salmon  
in New Zealand**

# Intro

## Smart Water solutions to get the best quality mussels and salmon in New Zealand

Since aquaculture took off in New Zealand in the 1980s, its development has grown from strength to strength. The main products are greenshell mussels, pacific oysters and king salmon. The industry exports to 81 countries with annual sales of around \$500 million. New Zealand aquaculture farms are proud to be one of the most [efficient and sustainable forms of food production on the planet.](#)

Adroit, distributor of Libelium technology in New Zealand, aids producers on the journey of continual efficiency and sustainability improvement, to achieve an [A+, in the world-leading sustainable aquaculture standards](#) program. Two of Adroit's most recent projects are helping both salmon and mussel producers to meet these standards of sustainability, quality and efficiency.



## IoT improves mussel production in the rainy season

Mussel farm operators are constantly needing to test the quality of the water and taking samples of their product. This is in order to meet compliance requirements for harvesting standards set by the [Ministry for Primary Industries.](#) These standards establish a minimum level of salinity for all harvesting.

To increase harvest times and maintain large mussel harvests, New Zealand farm [Westpac Mussels,](#) is using a new floating buoy designed by Adroit. The buoy features the [Libelium Smart Water board,](#) and sensors that monitor the salinity of the water in real-time.

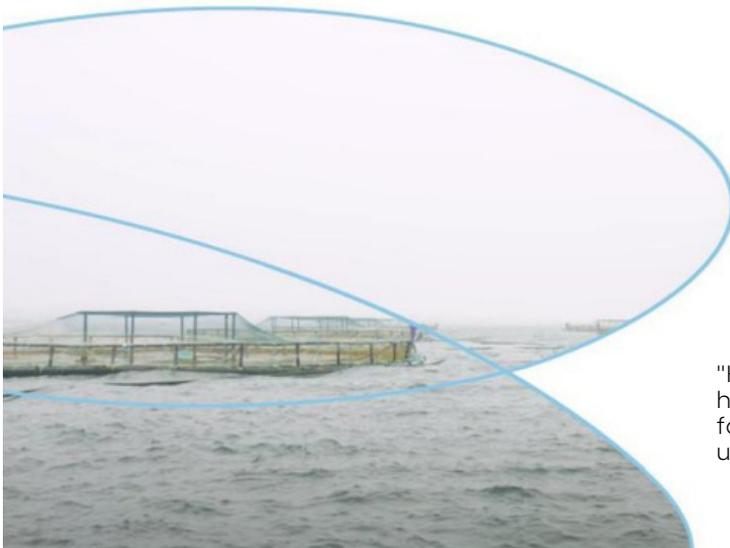
Real-time data for mussel harvest compliance

# The challenge

The closure notices are given by data taken on the coast, not offshore, where the water quality for mussel harvesting is still in compliance.

# The solution

1 Smart water Xtreme  
Parameters: Conductivity, Salinity and temperature

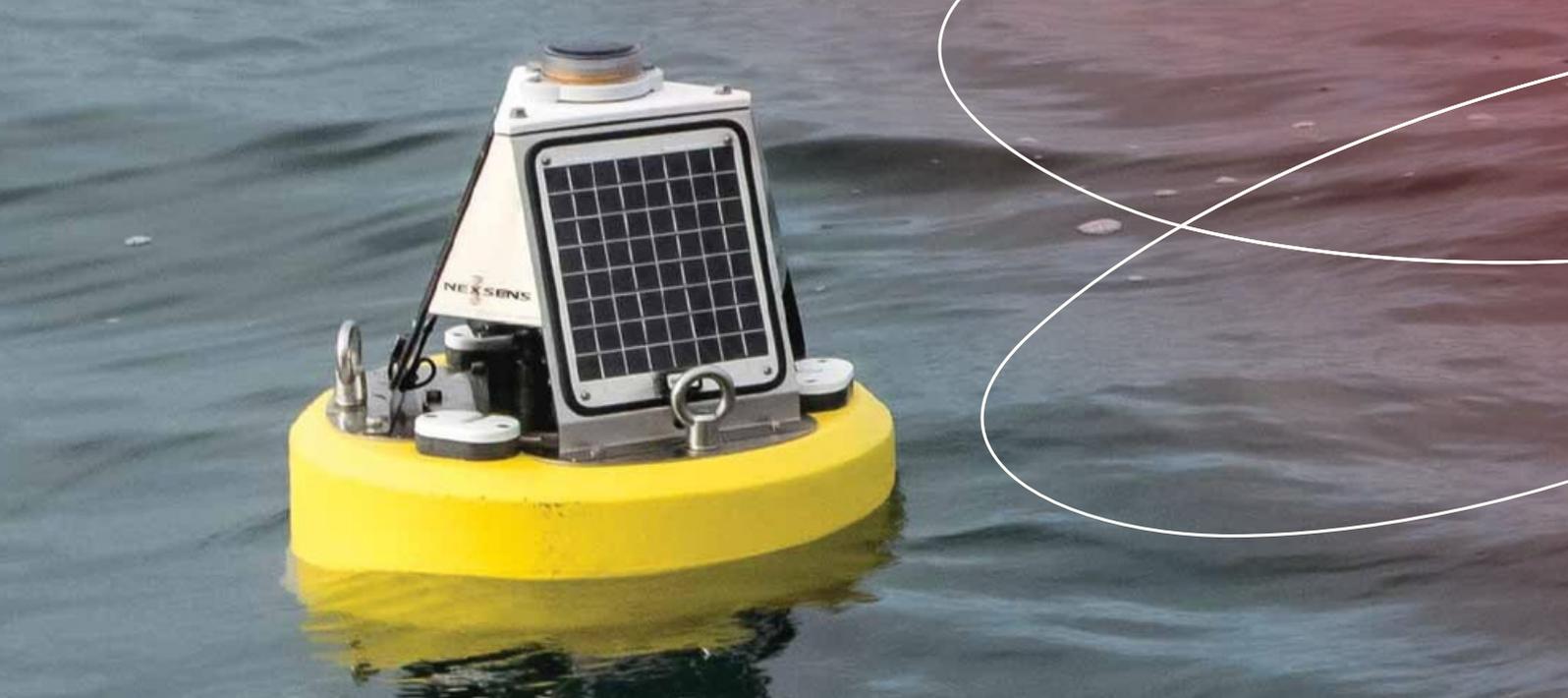


-  Firth of Thames, New Zealand
-  Smart Water, Aquaculture
-  Plug & Sense! Smart Water Xtreme
-  NB-IoT Cat-M

"Having that live data gives us real-time harvesting so the vessel can be out on the farm harvesting right up to closure so it gives us more time"

**Leon Antunovich**  
Director at Westpac Mussels

The rainy periods of weather in the surrounding areas of the farm affect the salinity of the sea. When it rains heavily, runoff reaches the ocean and finally, the aquaculture farm. Since mussels are filter feeders (they can filter about 20 liters of water per hour), they absorb everything in the water. Salinity included. When this reaches the maximum level set by the Ministry for Primary Industries (MPI), farmers must stop harvesting immediately, since the mussels are no longer fit for human consumption.



Currently, farmers rely on rain gauges to warn them of potential salinity level problems. However, these gauges are installed on the mainland, sometimes up to 50 kilometers away from the farm. So, if the salinity levels of the run-off are high in the area where the rain gauges are located, it can mean the closure of the farm, located offshore, for up to 5 days. This is a great waste of harvesting time and potential profit because the salinity has not yet changed on the farm (water changes take a few days to reach the deep sea depending on the tides). During this time, the mussel is still fit for consumption and can be harvested.

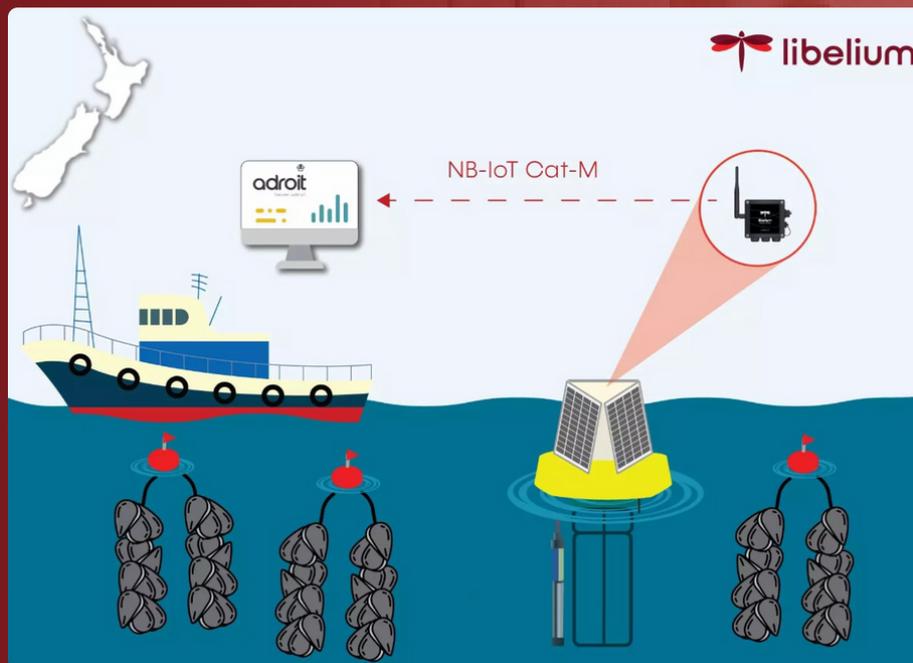
Therefore, Westpac Mussels sought to improve both the speed and accuracy of collecting meteorological information and salinity data, to avoid any unnecessary farm closures.

## Mussel producers technological demands

Mussel producers technological demands With all of this in mind, [Adroit](#) designed a buoy that met the farms key requirements:

- Real-time, accurate and reliable salinity data, viewable through a web browser and mobile app
- Alert data to notify farms when salinity falls below regulated levels
- The possibility for MPI to collect data through APIs to satisfy reporting requirements
- A robust industrial solution capable of withstanding marine conditions
- Less maintenance required for general antifouling and sensor cleaning and calibration

# Behind the change



Considering farms are often located in large remote areas, network connectivity can be a challenge.

The Adroit Data Buoy monitoring solution is a real-time monitoring buoy with a Libelium Smart Water board inside. Thanks to the versatility of Libelium's Smart Water solution, Adroit can integrate In-Situ sensors to measure temperature, conductivity, and salinity.

Each buoy has a Libelium board that transfers data over the Spark Cat-M1 network, (the wellknown and long-awaited NB-IoT connectivity) to the Adroit platform. Westpac Mussels can access this platform through a web browser or mobile application and create customizable dashboards, reports, and email alerts.

The data is exportable via a CSV file or APIs within existing business applications. It is through this API that the salinity levels at the farm site are communicated to the MPI to continue harvesting even though on the mainland, the rain gauges may warn of high salinity.

The result is a continuous and highly flexible solution for future changes and growth of the mussel farm.

## Improved King Salmon feeding times with Smart Aquaculture technology

## Salinity control for King Salmon farming

# The challenge

At the time of feeding, the salinity of the water drops considerably and it can affect the King Salmon quality.

# The solution

1 Smart water Xtreme  
Parameters: Conductivity, Salinity and temperature



-  Marlborough Sounds, New Zealand
-  Smart Water, Aquaculture
-  Plug & Sense! Smart Water Xtreme
-  NB-IoT Cat-M

"We can consult the history extract the data, and compare it over time. It is very valuable information for business intelligence."

**Kim Hooper**

King Salmon Business and Planning Analyst



Something similar happens with salmon. Salmon farming is an important asset of the New Zealand economy and is heavily regulated and protected, so any innovation applied to its cultivation is welcome, but also closely monitored. Farming began in the late '80s and today New Zealand produces 75% of the world's King Salmon (also known as Chinook Salmon). This is tiny on the world scale though, accounting for less than 1% of the global salmon supply.

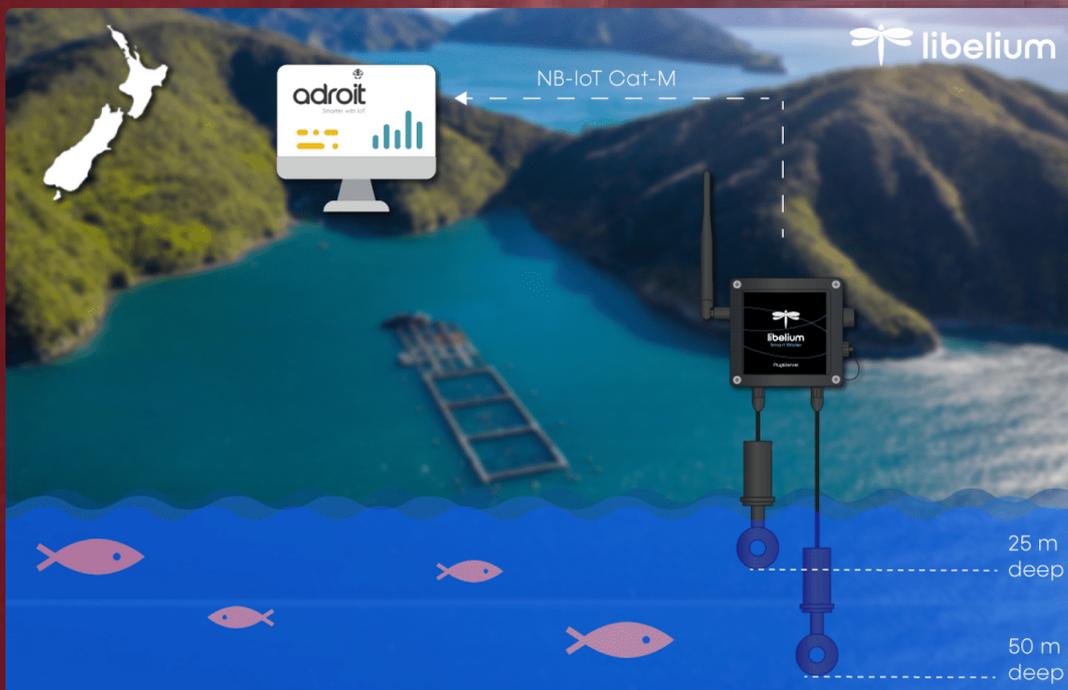
[New Zealand King Salmon](#) is the world's leading producer with over 30 years of experience growing and processing this unique breed of salmon. This super specialization has led them to be world leaders in the King Salmon market. On this farm they care for salmon throughout their life cycle in more than 61,000 hectares of the sea in the [Marlborough Sounds](#). This is to meet the high standards of the New Zealand food industry.

King salmon require a unique diet for optimal health and growth. The main components of the food are complex fats, quality proteins, carbohydrates, essential vitamins and minerals. Underwater cameras on New Zealand King Salmon farms closely monitor appetite and activity during each meal.

**In addition to controlling feed components and appetite, it is important to keep the salinity of the water stable within parameters when feeding salmon.**

# Behind the change

## Adroit's water quality control system



To do this, Adroit installed an advanced water quality control system that allows this salmon producer to have a complete picture of everything that happens on its farms, in real-time. For this solution, specifically designed to meet King Salmon's needs, Adroit used Aqualabo's dissolved oxygen and salinity sensors from Libelium's Smart Water Xtreme solution. The sensors are placed at two depths, 25 and 50 meters deep. This allows a better understanding of the environment in which the salmon is moving in.

At the time of feeding, the salinity of the water drops considerably. The King Salmon team receives an alarm at certain levels, as this drop could lead to a decrease in the quality of the fish.

These alerts travel from the Libelium sensor to the designed by Adroit dashboard via Vodafone's Cat-M connectivity.

# Discover more info:

- For technical details on Waspote Plug & Sense! Smart Water Xtreme: [Waspote Plug & Sense! Smart Water Technical Guide](#).
- Read more about Libelium sensor product lines in the [Waspote](#), [Waspote Plug & Sense! Sensor Platform](#) and [Meshium Gateway](#) websites.
- NB-IoT Networking Guide: [libelium.com](#)
- Smart Water Sensors to monitor water quality in rivers, lakes and the sea: [libelium.com](#)
- Protecting and conserving the beluga whale habitat in Alaska with Libelium's flexible sensor platform: [libelium.com](#)
- Preserving endangered freshwater mussels in the Ohio River with a Smart Water Project: [libelium.com](#)
- Smart Water technology provides safe and clean water to Indigenous communities in Canada: [libelium.com](#)



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