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Joss Birss, Pāua Expert at Moana New Zealand.

## Moana Saves Pāua using Temperature Control

With over 14,000 kilometres of coastline, New Zealand has the perfect setting to nurture its thriving aquaculture industry. Moana New Zealand is the largest Māori owned fisheries company in New Zealand and their operations include a pāua farm located within NIWA's Bream Bay Aquaculture Park. The farm has been developed as a sustainable option to provide pāua (known internationally as blue abalone) direct to a range of international markets.

Moana's pāua farm is supplied with some of the highest quality ocean seawater in the world through a natural deep-water intake. The subtle taste and firm texture of their pāua reflects the superior quality of the water supply, rich in natural nutrients.

# Pāua Health Prompts Innovation

The farm at Bream Bay has a capacity to produce over two million pāua (120 tonne) per annum. At up to \$100 USD per kilo the pāua are a valuable commodity to protect and the farm is a valuable asset for Moana to advance and maintain.

Pāua require seawater temperatures between 17.5-18°C to grow well, although they can tolerate colder temperatures, they become stressed in temperatures of 20°C or higher. In summer of 2016 Moana's Bream Bay farm suffered from higher water temperatures attributed to a heat wave. Paul Beardsell, Asset Manager for Moana New Zealand looked for solutions to control the temperature of the fresh seawater used in the pāua farm. In particular, he wanted to protect their breeding stock from uncomfortable temperature fluctuations.

Paul contacted Hot Water Heat Pumps Ltd, who they had used previously and who were also recommended by NIWA, to assist them to control the temperature of the seawater at their farm. Hot Water Heat Pumps Ltd was able to tailor a solution to meet Moana's needs. They recommended a variable capacity 7GP65HC-3 heat and chill unit with some special features built in.

## Collaboration Advances Technology

The farm continually introduces new seawater from the ocean into the pāua tanks, then discharges the seawater back to the ocean. Because of this, any fluctuations in temperature have an immediate effect. Moana needed a heat and chill unit that would get the water to the correct temperature before entering the pāua tanks. Hot Water Heat Pumps Ltd used a Copeland Scroll™ Digital Compressor to provide variable capacity on the heat and chill unit, catering to the tight outlet temperature control required. This compressor increases system efficiency and provides more energy savings by precisely matching compressor output to heating or cooling needs.

Remote monitoring was another enhancement built into the unit. It allows performance to be monitored, and targeted maintenance to be carried out before breakdowns occur reducing potential downtime that may otherwise cause changes in temperature. Hot Water Heat Pumps Ltd engaged Motiv Industrial IoT Solutions to design and implement a Sigfox-RS485 Din transceiver that connects directly to the unit's control circuitry. The latest controller technology was installed to provide the advanced control demanded by the technology for remote monitoring.

This new technology uses the New Zealand wide "Internet of Things" (IoT) network made available by ThinXtra utilising Sigfox technology. IoT is an ultra-low power, low cost and long range network that is particularly good for transmitting small amounts of information. "Before now, we had no easy way of providing simple connectivity for our units once they left the factory," says Kevin Trigg, Sales and Marketing Manager at Hot Water Heat Pumps Ltd.

Moana is happy with the results and continues to fine tune the system with the help of Hot Water Heat Pumps Ltd and the information provided by remote monitoring. According to Joss Birss, Pāua expert at Moana New Zealand, "Since the Performance Plus heat and chill unit was installed we have not lost any of our breeding stock, and we are seeing increased rates of growth which will only increase productivity."



### SHOWCASE AT A GLANCE

<b>Fishery</b>	<a href="#">Moana New Zealand</a>
<b>Site</b>	<a href="#">NIWA - Bream Bay Aquaculture Park</a>
<b>Remote Connection</b>	<a href="#">Motiv / ThinXtra / Sigfox</a>
<b>Heat and Chill Unit</b>	<a href="#">Hot Water Heat Pumps Ltd</a>
<b>Equipment</b>	
<b>Heat &amp; Chill model</b>	<a href="#">Performance Plus 7GP65HC-3</a>
<b>Compressor</b>	<a href="#">Copeland Scroll™ Digital Compressor</a>