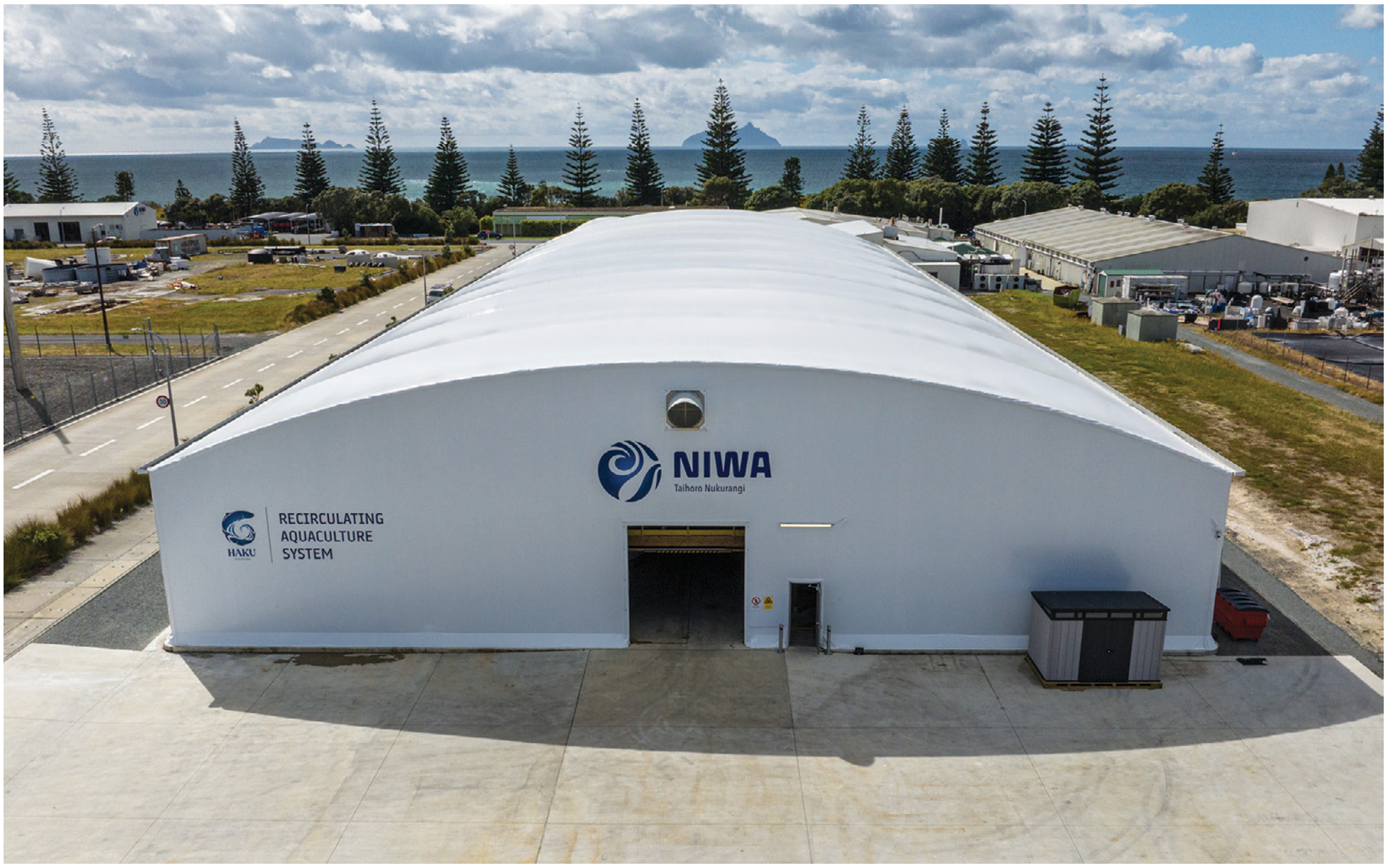

Kingfish farm showing huge promise

▶ **Karen Phelps**

NIWA and Northland Regional Council's land-based kingfish farm in Ruakaka is setting the stage for a new chapter in New Zealand's aquaculture industry, with the potential to create significant employment opportunities and establish a new high-value export market.

"It's very exciting and we are already getting a lot of domestic and international investment interest," says NIWA RAS manager Amanda Cleary.

The state-of-the-art recirculating aquaculture system (RAS) facility, which was officially opened in August last year, is a collaboration between NIWA and Northland Regional Council, and marks the culmination of over two decades of research and development at the site.

"Bringing the project on land has a number of benefits – we can control the water coming into the farm, and we can also capture most of the nutrients going out and use settling ponds to treat it."

The project has already achieved commercial production status, currently yielding around 230 tonnes of premium kingfish annually, with capacity to reach 600 tonnes.

"There are challenges with any new system, which we have been refining. We also don't want to flood the market. To keep a good price on the fish we need to create value and a brand," explains Amanda.

The facility features eight 350,000-litre tanks, each four metres deep, utilising advanced filtration and UV treatment systems to maintain optimal growing conditions. Amanda says the controlled environment of the RAS facility offers significant advantages over traditional sea-based farming methods.

"Bringing the project on land has a number of benefits – we can control the water coming into the farm, and we can also capture most of the nutrients going out and use settling ponds to treat it. Around 95-99% of water is being re-circulated through the system. Side projects are already underway to research potential uses for the waste products."

Several key industry partners have contributed to the facility's success. McKay completed the electrical fit-out, and Alta Consulting managed the project's construction.

GD Plumbing is delivering plumbing services for alterations after the original handover, and Air Liquide NZ provides and manages the liquid oxygen systems essential for maintaining optimal conditions in the tanks.

NIWA's research shows that kingfish can grow from a 1mm egg to a 3kg market-sized fish in less than 12 months.

The species, known as haku in te reo Māori, has proven particularly well-suited to land-based farming, with excellent flesh quality making it ideal for premium products such as sashimi.

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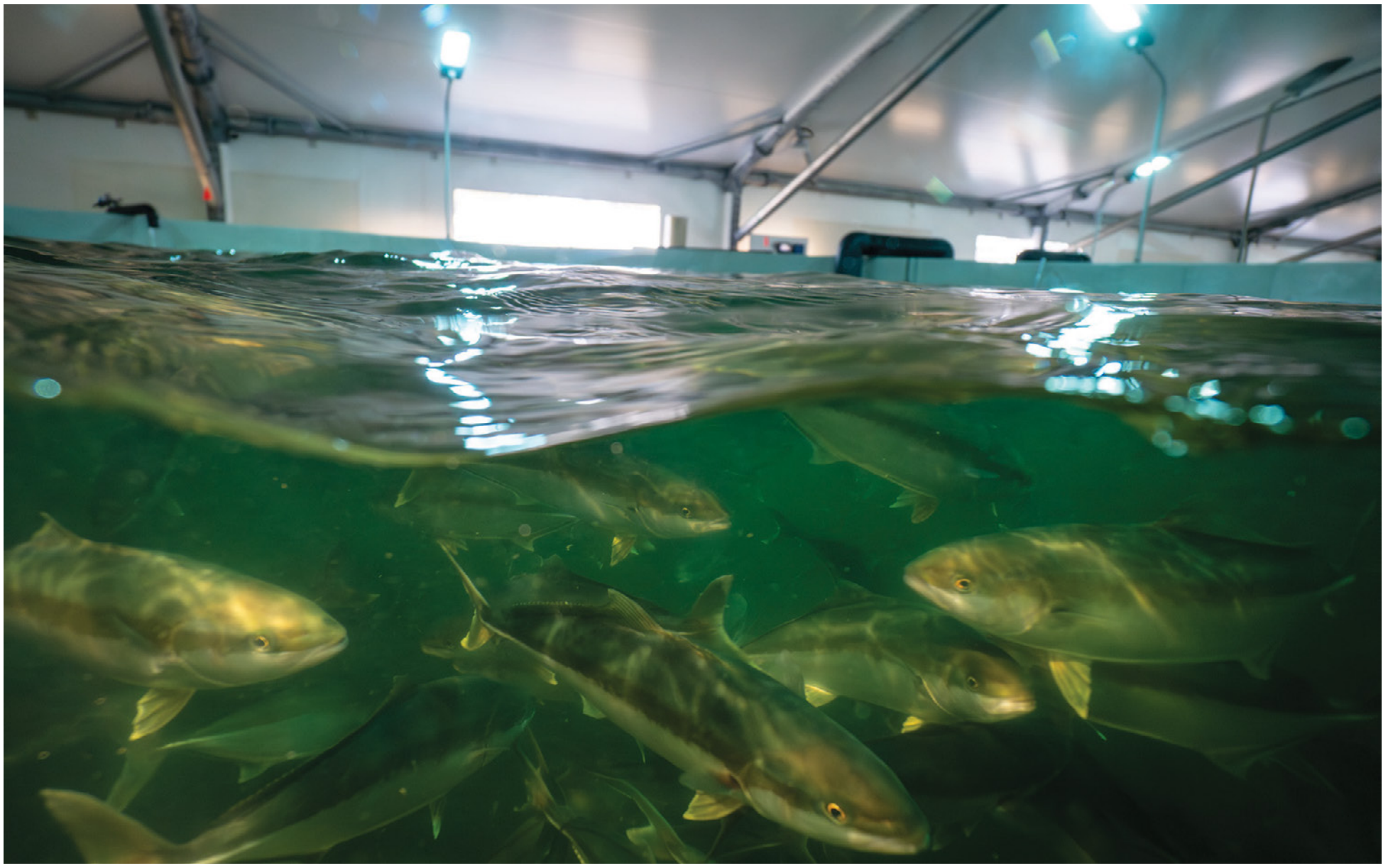

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Innovative Electrical Solutions for Every Project

McKay's diverse capabilities and innovative approach position it well to play an important role in shaping the country's electrical future. As one of New Zealand's largest privately owned electrical engineering and construction companies it is working across multiple sectors with its innovative approach to electrotechnology and renewable energy solutions.

"Our commitment to innovation extends far beyond our technology and services - it's a mindset that drives us to continuously improve and push the boundaries of what's possible," says Andrew Lancaster, Executive General Manager Strategy and Innovation at McKay.

Established in Northland in 1936, McKay has evolved from humble beginnings in Dargaville to become a significant player in the electrical industry, serving diverse sectors from marine and renewables to construction and infrastructure. Andrew says the company's vertically integrated capabilities set it apart in the market, offering comprehensive solutions from initial design through to ongoing maintenance. This end-to-end service model enables it to maintain strict quality control while delivering innovative solutions across various industries. Its team of experts are committed to providing exceptional service, using the latest electrotechnology to ensure that McKay meet and exceed client expectations.

“At McKay we are dedicated to excellence and equipped with extensive local resources to deliver complex electrical solutions for any project. We work closely with our clients to achieve the perfect balance of technology, innovation, cost, schedule and risk, ensuring successful outcomes for every unique project challenge.”

He says McKay's dedication to renewable energy is part of its focus on innovation. In 2019, it launched McKay Renewables, a dedicated division focusing on wind and solar power to support New Zealand's sustainable future. The company's commitment to sustainability is evident in its own operations, with its Whangarei head office achieving a 60 percent solar offset through rooftop arrays and its use of electric and hybrid vehicles across its fleet. He says the fact that McKay has achieved AS/NZS ISO 14001 standard acknowledges the robust environmental management systems in place throughout the company.

McKay's engineering capabilities are also an important aspect of its ability to deliver innovative solutions with its in-house team of electrical engineers collaborating with clients and other engineering contractors to develop conceptual electrical and control system designs. Andrew says this collaborative approach ensures seamless integration of electrical systems with other project elements.

Its work in the area of automation also reflects a focus on future-forward thinking. The company's automation expertise spans various industrial platforms, including SCADA programming and PLC systems, while its maintenance division provides 24/7 support and asset management solutions with real-time data reporting.

“Our engineers are well-versed in the latest technologies and methodologies, allowing us to deliver innovative and efficient automation solutions that optimise our clients’ operations,” explains Andrew. “At McKay we are proud to be at the forefront of innovation and we are confident that our continued emphasis on this core capability will continue to set us apart from the competition. Our commitment is not just to meet the current needs of our customers, but to anticipate their future needs as well. We are passionate about creating products and solutions that not only solve problems but also shape the future of our industry.”

Kingfish farm shows promise

▶ from page 4

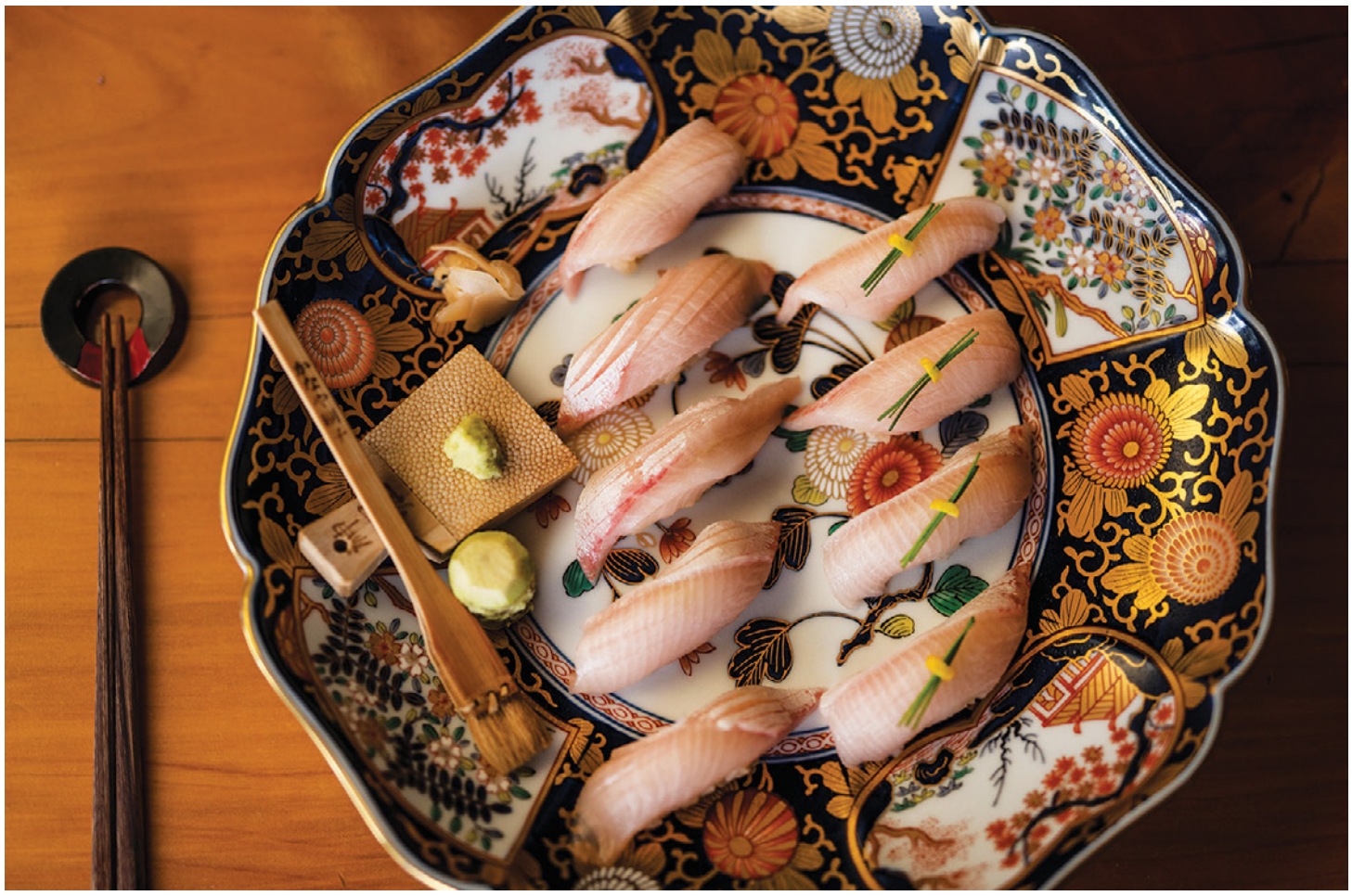
Distribution channels are already well-established, with Sanford handling domestic sales while Leigh Fish manages exports to the United States and Canada. Amanda says the success of these early forays into the market has validated the commercial potential of the operation.

She says NIWA's research indicates that the global market for premium seafood products continues to grow, with particular demand in the high-value segment.

The success of the prototype facility could pave the way for a full-scale 3000-tonne operation within five years, potentially creating around 75 new jobs for the region.

"The end goal is to produce an industry for New Zealand that creates jobs and another high-value species. This facility will also serve as a proof-of-concept for potential investors, including iwi groups."

She says the project also demonstrates the viability of land-based aquaculture for other species, opening up possibilities for diversification within the industry. This could be particularly significant for regions like Northland, where economic development opportunities have historically been limited.



The kingfish species, known as haku in te reo Māori, has proven particularly well-suited to land-based farming, with excellent flesh quality making it ideal for premium products such as sashimi.

"The facility's success builds on New Zealand's natural advantages, including abundant and genetically diverse wild stocks that have supported an advanced broodstock programme," Amanda says.

"This gives NIWA and New Zealand a distinct edge in the global market, as other countries scramble to expand their production capabilities.

"With the global demand for sustainable, high-quality seafood continuing to rise, the Ruakaka facility positions New Zealand at the forefront of land-based aquaculture innovation."

Air Liquide: Breathing New Life into Land-Based Aquaculture

Behind many successful fish farming operations stands Air Liquide, one of the world's leading industrial gas suppliers whose oxygen technology is revolutionising the aquaculture industry. Operating in over 60 countries, Air Liquide New Zealand brings more than three decades of specialist experience to the sector through its Air Liquide Technology Center (ALTEC), where technical specialists provide tailored advice and process innovations.

"We don't just sell gas," explains Air Liquide application specialist Alex Young. "We collaborate closely with the industry and our East Asia Pacific cluster fish farm expert, Tianyan Chen who is located in Japan, to provide customised solutions that address specific customer needs."

A prime example of this collaborative approach is Air Liquide's work with NIWA and Northland Regional Council on the pioneering land-based kingfish farm in Ruakaka. This project showcases how pure oxygen technology supports sustainable aquaculture in New Zealand, with Air Liquide's expertise proving invaluable in designing oxygen delivery systems tailored to kingfish cultivation.

At the heart of Air Liquide's offering are advanced oxygen dissolution systems that outperform conventional aeration methods. Its high-efficiency devices include the BICONE™ and CS Nozzle systems, alongside electricity-free solutions such as POROXAL and MESOXAL. These technologies maintain optimal dissolved oxygen concentrations at 120-140% saturation.

For modern recirculating aquaculture systems like the Ruakaka facility, Air Liquide's technology extends beyond fish respiration, with oxygen also producing ozone for water sterilisation. The company offers supply options from cylinders to on-site oxygen generators and has embraced digitalisation through monitoring applications that track oxygen levels and enable remote management.

While oxygen typically accounts for just 1-10% of total operational costs, Alex says its impact on productivity is substantial.

"Some customers have reported a 1.5-fold increase in production capacity. Pure oxygen allows for higher fish density while requiring less water, creating more sustainable operations."

The benefits extend to fish health and growth rates, with stable oxygen levels optimising metabolism. Some farmers report 20-30% increases in feed intake and improved feed conversion rates, directly reducing production costs that can exceed NZ$2,000 per tonne of fish. Pure oxygen also prevents nitrogen supersaturation, which can cause gas disease, and provides a safety buffer during power outages.

Air Liquide's systems are designed with energy efficiency in mind, consuming less electricity than conventional methods. As land-based aquaculture expands in New Zealand and globally, Air Liquide's experience, innovation and successful projects like the Ruakaka kingfish farm position the company as a vital partner in creating sustainable fish farming operations that help meet the world's growing demand for protein.