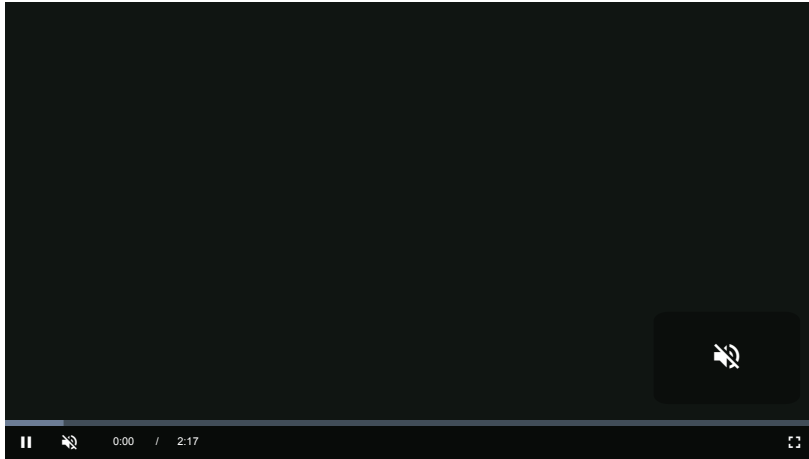


Salmon farmers seek cooler waters as climate changes

Marc Daalder of Newsroom · 16:57, Jul 04 2022



PETER MEECHAM

This year in the Rakaia – which has one of the earliest spawning seasons – as many as 1800 fish have been counted in a single flight.

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When the ocean heats up, like it does during a marine heatwave, [cold-blooded salmon](#) move to cooler waters. That could be a simple descent in the same location or a longer migration to someplace else.

Farmed salmon, however, have no such option. And fish farmers can't easily move pens when [temperatures are higher than expected](#).

At 14 degrees, salmon thrive.

At 16 degrees, they survive.

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At 18 degrees, the enzymes that help them digest food start to die off. If water temperatures are at 18 degrees for a few weeks, the salmon's immune system breaks down. They get sick. They die.

At higher temperatures, for prolonged periods of time, the heat alone can kill them.

That's what happened this summer, when a marine heatwave left about two in every five salmon in New Zealand King Salmon's Marlborough Sounds farms dead. More than 1000 tonnes of fish waste were sent to landfill.

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CHLOE RANFORD/LDR

New Zealand King Salmon's Te Pangu Bay farm.

"It was one of the hottest ones we've seen. It started early and it finished later. It was often a degree and a half warmer than normal," NZ King Salmon's CEO Grant Rosewarne told Newsroom. "There was a very extended period over 18 degrees in the Pelorus Sound and in the Queen Charlotte as well."

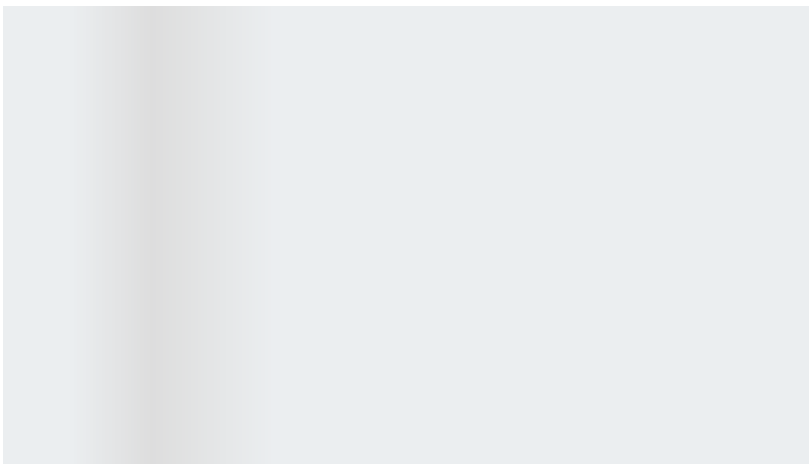
The company reported a \$73 million loss for the year ending in January and is closing most of its farms in the Marlborough Sounds.

Climate hits farms

Marine heatwave conditions - when ocean temperatures are above the 90th percentile for at least five days - were common over summer, boosted by the La Niña phenomenon.

"What we're starting to see is that we do have a changing environment and unfortunately New Zealand King Salmon is bearing some of the consequences of that," Serean Adams, the aquaculture group manager at the Cawthron Institute, said.

This isn't the first time climate change has hit New Zealand's fish farms. Ocean temperatures have been rising for decades, although the pace has sped up more recently.



KIRK HARGREAVES/STUFF

Salmon being farmed in the Mackenzie Country.

"You're hearing Niwa and others talk about marine heatwaves. For the first seven years of my job, I never heard the term marine heatwave and now it's every second year. And it looks like we're going to have three La Niñas in a row now, which again is pretty unheard of as well," Rosewarne said.

Other salmon farmers and fishing companies say they're seeing the impacts of climate change as well, though NZ King Salmon's losses this year are unique in their scale.

That's driven a flurry of research into ways to boost resilience through relocating to cooler waters or switching species.

Maren Wellenreuther is an evolutionary ecologist at the University of Auckland and a seafood scientist at Plant and Food Research in Nelson. The top of the South Island may soon be inhospitable to salmon, but other fish could replace them, she said.



SUPPLIED/STUFF

A High Country salmon farm near Twizel.

"It's quite an interesting area because a lot of species show their most southern extent here, like snapper. For them, if you think of climate change, they are increasing their range in New Zealand, whereas other species, like salmon, that are found as far north as Nelson and the Marlborough Sounds, they are struggling."

Wellenreuther has worked on a project to breed snapper and make them ready for aquaculture.

"Just looking at the Marlborough Sounds, suddenly this becomes an area where we may wish to farm species like snapper. If you think ahead, it's something that is only going to accelerate. In 10 years, you would stop farming salmon in the Marlborough Sounds altogether. What are we going to do with that space? With climate change, you're always thinking of winners and losers."

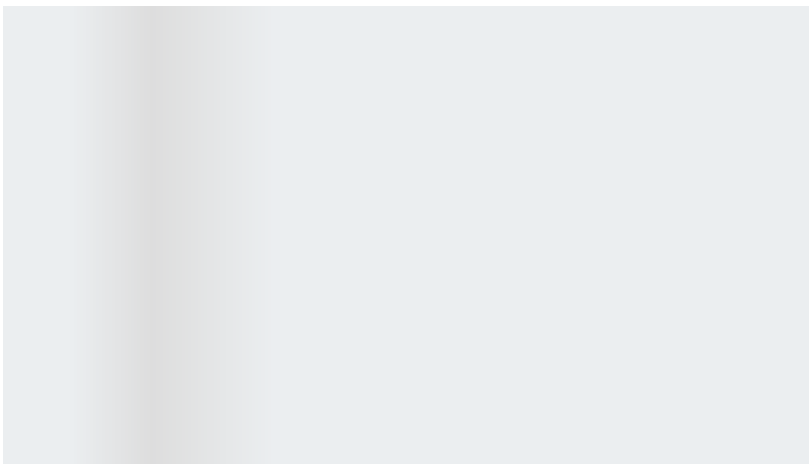
That doesn't mean a wholesale end to salmon farming in New Zealand. Other companies farm the species farther south and NZ King Salmon is still the single largest producer of the king salmon species globally.

Open ocean

In recent years, the focus has therefore shifted to open ocean aquaculture, which could unlock a new scale of fish farming while also boosting climate resilience.

Climate change, Rosewarne said, is "the major reason" his company is looking into open ocean farms. In 2019, NZ King Salmon applied for a consent to build a 12 hectare farm in the Cook Strait, called Blue Endeavour. A decision on that application is expected later this year.

"We think it will lead to less stressed fish because the temperature will be cooler. Also, out at that site, there's something called a thermocline where it gets cooler and cooler as you get closer to the bottom. We don't see that in the sounds," he said.



Sanford's salmon farm in Big Glory Bay Stewart Island.

"We can obviously grow to a larger scale but also we can possibly increase our unit value. We can grow larger, more valuable fish out there. We think we can get a great environmental outcome - we think we can possibly get an increase in natural biodiversity associated with the farm, rather than a decrease you might see in most farming methods. It's got a massive number of benefits."

Wellenreuther said next-generation open ocean technology could allow pens to be moved as a matter of course, year round, tracking the optimal temperatures for the farmed species. That would also limit environmental impacts because the farm wouldn't be concentrated over a single space.

At least three other open ocean salmon farms are being explored. Fishing company Sanford, which also runs a few salmon farms, lodged a consent application for an open ocean farm in Southland in 2020. Ngāi Tahu also has plans for its own open ocean salmon farm in Southland, called Hananui Aquaculture. That programme has been referred to the Government's fast-tracked Covid-19 consenting process, according to documents released to Newsroom under the Official Information Act.

A report commissioned by Fisheries New Zealand last year found the Government's most valuable intervention would be a new consenting process that grants more certainty, more quickly.

"Feedback from applicants and others on the resource consent application process and outcomes was almost unanimous - it is fraught with risks and uncertainty that have real impacts on development timetables, costs and operating flexibility. These impacts are in addition to what many suggest are the high costs typically incurred to obtain a consent; costs that could be more productively spent on the work needed to prove viability in the case of open ocean farms."

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Rosewarne agreed and said that, if enabled, open ocean farming will play a critical role in meeting the Government's target of a \$3 billion aquaculture industry by 2035. It will also help with the country's climate goals, allowing us to supplement high-emitting dairy and meat production with a low-emissions, large-scale source of protein. One hectare of surface space can produce \$30 million in revenue in an open ocean farm, compared to about \$11,000 on a dairy farm.

"We're firmly of the belief that open ocean aquaculture could become New Zealand's most valuable industry bar none. At the same time, it could be the greenest primary sector that we've got," he said.

"The Norwegian salmon industry is roughly equal to our dairy industry now, depending on where those two commodities are in their pricing cycle. There's not another new primary producing industry that could be set up, could deliver such huge value from a relatively small amount of space and with an environmental footprint that's very acceptable."

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