



MARINE FARMING ASSOCIATION
To Promote & Nurture Sustainable Marine Farming

DECEMBER 2021 NEWSLETTER

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IMPORTANT DATES

MFA Office Closes

23rd December 2021

MFA Office Opens

6th January 2022

Quarter 1 - Audits due (MFCAP)

31st January 2022

MFA Board meeting

11th February 2022

AQNZ Board Meeting

23rd March 2022

MFA ECSC Meeting

25th March 2022



GM's Comment

That's a wrap on 2021, a year that many will be pleased to see the back of I'm sure. Some crystal ball gazing suggests that 2022 is also going to be a challenging year; once again dominated by covid news, freight constraints, inflation, and labour shortages. 'Vaccine status' may even supersede 'pivot' in the unofficial word of the year rankings. Pressing pause on the pessimism for just a moment, there is hope that 2022 will see us learn to live with the virus and perhaps we will even see the emergence of less virulent strains.

On the markets front, despite all the uncertainty, there is a trend of increasing price and export volumes across most product formats. These improvements reflect a partial recovery of the international food service sector. Salmon exports have surged in 2021, with total volume up 58% on the previous 12 months. Oysters have also had a good year, with both price and volume increases featuring in the export data. Half shell mussels have not had such a good year, with price still well below pre-covid levels, and recovery taking longer than most would be hoping for. Overall, total mussel exports were up by 6%, and nutraceutical formats continue to perform well.

In November, the MEP Variation 1/1A process came to a head with hearings held over a two-week period. MFA/AQNZ ran a substantial case on behalf of the industry and our members – the Commissioners certainly have a lot to digest. I would like to thank our legal advisors, all our expert and lay witnesses, and the industry Core Group for the monumental effort that went into preparing submissions and giving evidence. Russell Silcock at Draughting Plus also deserves a special mention, having mapped more than 400 farms as part of the MFA evidence. The Panel now have as long as they need to deliberate, with a decision expected mid-2022.

The SIL co-funded King Shag Research Project is now its final year and continues to deliver some amazing results. Each year as we learn more about the birds, the field research becomes more efficient. The GPS tracking and dive data shows that king shags are regularly choosing to feed within farms, with foraging behavior now recorded within 95 mussel farms. To ensure that the research doesn't conclude before we have a good understanding of overall population dynamics, MFA has agreed to underwrite a further 3-years of banding and resighting work. The Friends of Nelson Haven will also be contributing to this ongoing work.

The Pelorus Mussel Restoration Project is also in the final year, with all the mussel deployments complete and only monitoring planned for 2022. This has been a great collaborative project and the results are looking

really promising, especially regarding habitat creation and improvements of species abundance and diversity at the trial sites. I hope to see more restoration activities kicking off in 2022.

The 'Big Day Out' beach clean event is running again this year and I know that a lot of companies/organizations have already signed up. This is a great opportunity to grab your staff/family/friends and make the most of the warmer weather at a beach near you, helping the environment is just an added benefit. This year the MFA team will be focusing our efforts on East Bay in the Queen Charlotte Sound.

Moving on to a bit of housekeeping, please ensure that all your farms have been checked/serviced prior to the break. It can be quite an 'energetic' time of year with regard to winds and tides, so make sure floats are secure and that any unnecessary bundles are removed.

Finally, thank you to the MFA Board for their time and guidance over the past year, it is much appreciated.

From the Team here at MFA - Merry Christmas and all the best for the festive season! We will see you in 2022.



We're interested in buying your mussel farm

Thinking of selling? If your mussel farm is located at the Top of the South we are interested in purchasing your farm at a very competitive price.

Contact Scott Gillanders / scott.gillanders@maclab.co.nz / 027 649 0239

MacLab

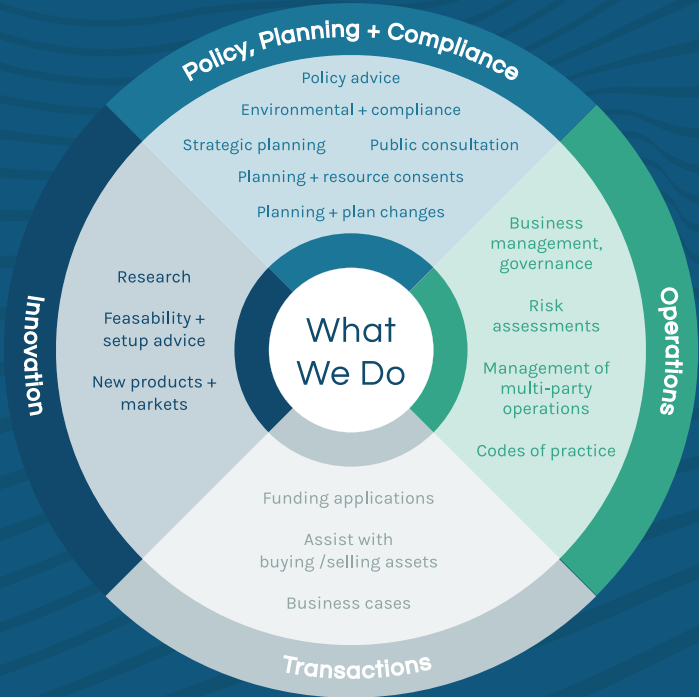


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Environmental Update

That's a wrap for 2021!

We recently held our final MFA Environment Committee meeting for the year. At the request of half the committee that live on the other side of the hill, we took the meeting on the road and held it at Maclab in Nelson.

As always, we had a great turn out with 12 in attendance representing various companies within the industry.

It always blows me away, this committee always show up and are totally engaged, so from the MFA – thank you! We know you're busy and it's nice to know this is a priority for you.

We had some great conversations around noise, beach debris, floats, and innovation.

Lots of great R&D ideas came up and it was suggested that those people apply to the MFA's Contestable fund to get their ideas off the ground and into field trials.

We talked about ways to improve the Environmental Certification programme for next year by adding in metrics such as percentage of contractors a company has in the programme.

We hope with this metric that companies who employ contractors will encourage them to be part of the MFA Environmental Certification programme.

Some companies have already written into their contracts that contractors need to be Environmentally Certified to a certain level before they are engaged and that they need to maintain at least that level throughout the duration of their contract.

We discussed Big Month Out, formally Big Day Out. In December every year, companies are asked to focus on beach cleaning more than normal to ensure the beaches are clean and tidy for holiday makers when they arrive.

These cleans, as always, focus on all debris found on the beach – aquaculture and non-aquaculture debris.

The MFA create a roster for this every year, so if you want to get involved let us know and we can let you know what areas might need attention.

The MFA recently held Environmental workshops for our members and their staff in Havelock & Golden Bay, historically these are held every two years, but a request was made that we offer them throughout the year and add Picton into the roster.

Part of the workshops was a discussion around beach cleaning, as we all know not all beach cleaners are equal and they range from those who just wander down the beach to those who get down and dirty digging in the mud and driftwood for debris.

We talked about addressing this, so vessels may find that Darren Clarke (MFA Environmental Mentor) pops up and grabs someone off a vessel to take them to a beach to do a clean with him.

Darren will only take one at a time so as not to impact the work happening on the vessel. He will do some one-on-one training and just point out what needs to be done when beach cleaning.

He will also do his normal thing whilst on the vessel and encourage best practice around how to stop debris from ending up in the water. He'll also be pointing out things he has been noticing on the farms and beaches as he has travels around.

CONGRATULATIONS!

At the meeting, the companies who achieved Environmental Certification were awarded their certificates. Unfortunately, it was a little anticlimactic, we had planned to do this at the now cancelled, MFA Conference.

We would like to say a huge congratulations to the following companies who have become certified under the new programme since the last newsletter.



Aroma Aquaculture

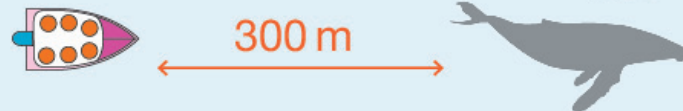
We have three further companies with applications in that are pending assessment.

Just a reminder to those companies who haven't applied yet, if you have an existing MFA Environmental Certification, it will be obsolete as of 31 December 2021.

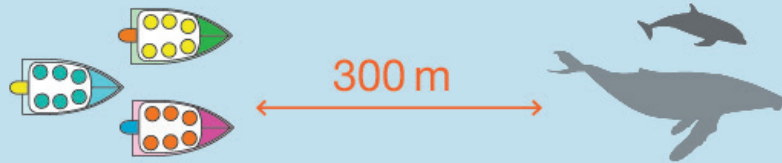
To apply for the new Certification – access the application form through the members website. If you need a hand with this, please let us know.

Simple rules for boaties when interacting with whales and dolphins

Don't travel faster than idle or 'no wake' speed within 300 metres



No more than 3 vessels within 300 metres



Do not obstruct their path. Approach from a parallel/ slightly rear direction



Do not swim with dolphin pods containing juveniles



Stay 50 metres away from any whale or orca



Stay 200 metres away from any baleen/sperm whale with a calf



Do not swim with whales or orca



www.doc.govt.nz

New Zealand Government



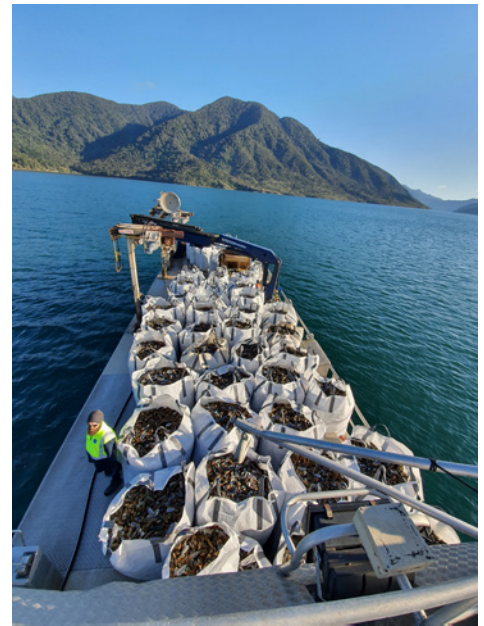
Department of
Conservation
Te Papa Atawhai

Mussel Restoration Project for the Marlborough Sounds

A year in review 2021

Wow - 2021 has been a year full of surprises, but with extensive teamwork the mussel restoration project has had a very successful second full year. Here are some highlights!

January: 20 tonnes of mussels were restored in January across ~ 400 m², testing the benefits of utilizing recycled industry mussel shell put on the seafloor to aid in mussel restoration.



March: The project was on international news! Here is the link if you're interested in watching it: https://youtu.be/ncNqCctRa_o

We undertook spat sampling to look for recruitment around our mussel beds and onto natural surfaces in the Sounds, finding some unique patterns of spat settlement.



April: The restoration project won the marine category award at the Cawthron Marlborough Environment Awards.



May: The MFA took students to snorkel the mussel beds and teach them about restoration.



June: 5 tonnes of mussels were restored in June across ~ 75 m², split between the subtidal and the intertidal for our first effort restoring mussels in shallow waters of the Sounds.



July: 30 tonnes of mussels were deployed in July across ~ 500 m², testing the use of subadult mussels for restoration and the ideal density of intertidal subadults.



October: Finished a comprehensive biodiversity assessment on our initial restored mussel plots, here are some of the findings.



Blue Cod
4 x more on
mussel beds



TripleFins
66 x more on
mussel beds



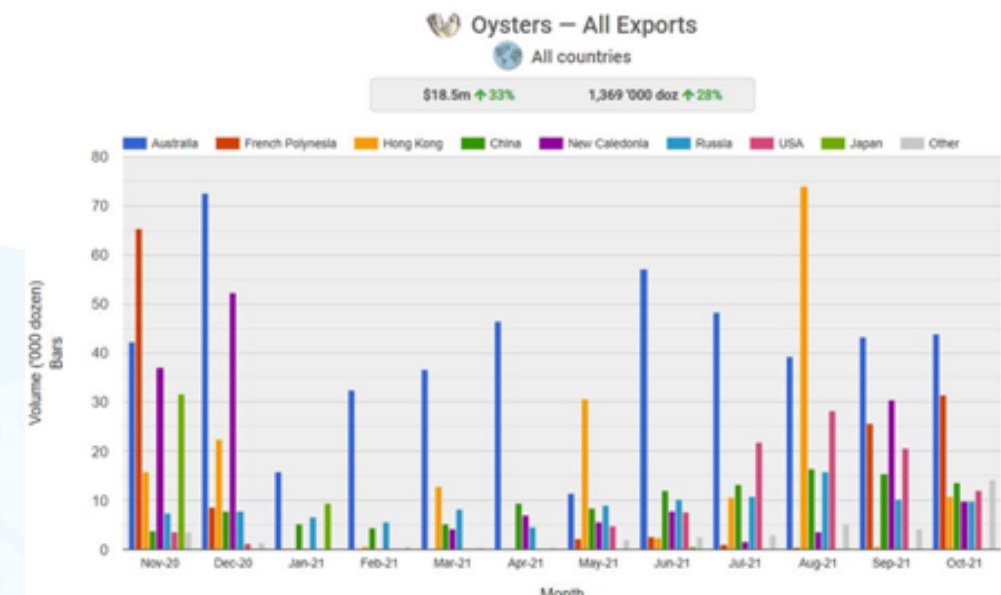
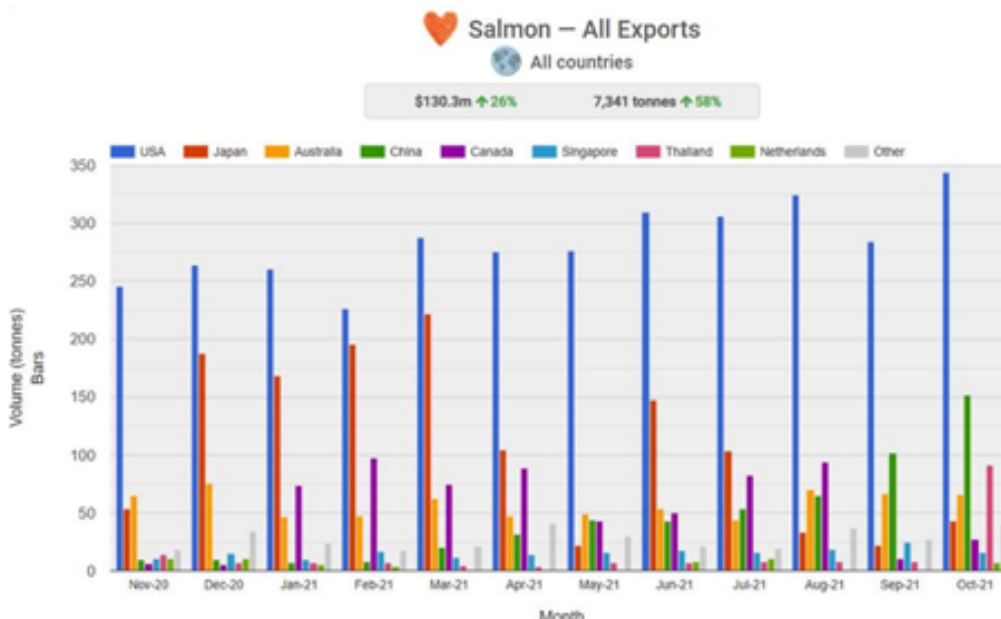
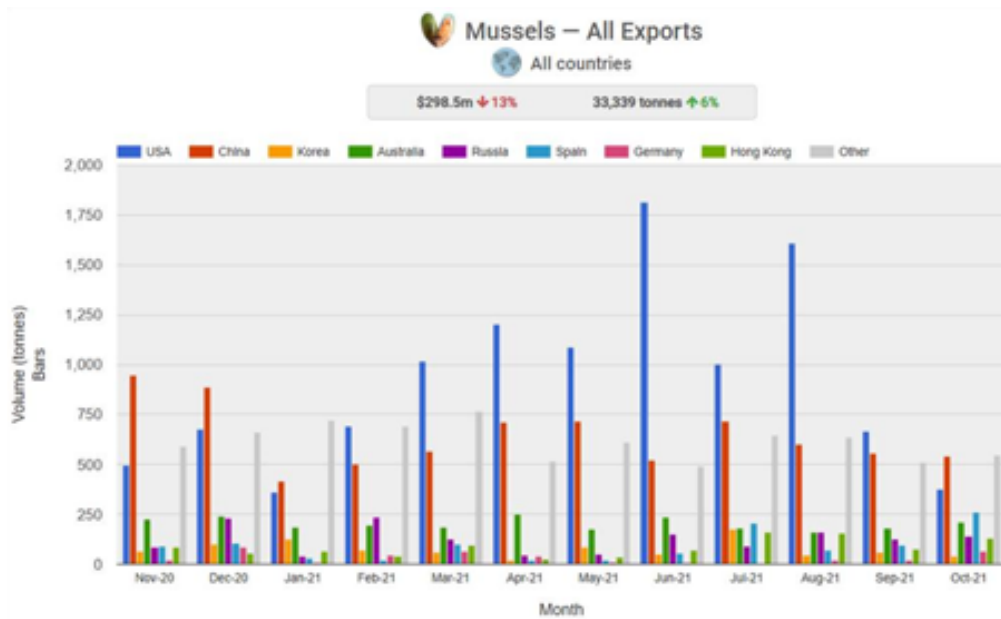
Sea cucumbers
23 x more on
mussel beds



Macroalgae
2 x more on
mussel beds

As always, if you have any questions or comments on this project, please feel free to reach out to Emilee Benjamin via email at egol669@aucklanduni.ac.nz or Trevyn Toone at ttoo112@aucklanduni.ac.nz.

AQNZ Statistics



The Ministry for Primary Industries

The Ministry for Primary Industries (MPI) is investing in research to advance treatment options for invasive marine pests and support growth of New Zealand's aquaculture industry.

Biosecurity New Zealand recently commissioned the Cawthron Institute to review the global state of knowledge on treatments that can be used on marine pests. Unsurprisingly, this work identified some considerable gaps, with very few treatments known to be effective for use at the scale of a port or marina.

Following this review, a multidisciplinary team from across MPI are pleased to announce that a research programme of work has been approved to address some of these gaps. \$650,000 is available over the next 4 years to deliver treatment options to improve marine pest management.

A particular focus of the research will be developing treatments for use when a new invasive marine weed or pest is detected, to enable successful control and eradication efforts. Managing incursions of non-indigenous species in marine environments has most commonly been done using hand removal by divers, which can be an effective, but expensive option. Diving also has many safety limitations, including depth and dive duration, and search efficacy is highly dependent on water and weather conditions.

"We're really excited to be initiating this work, as the lack of effective, efficient and practical marine pest treatments has always limited how we deal with marine pests" says Tim Riding, MPI's project lead. "By testing promising treatments in real-world situations, at the hectare scale for incursion responses, and at the tonne scale for managing pests of aquaculture, we are confident we can make solid improvements in the management of marine pests"

"This research will complement traditional diver-based approaches, and we are expecting the treatments developed will help us immensely when faced with new incursions of marine pests"

The second focus of the research will be finding treatments to help shellfish farms deal with hitchhiker pests, while maintaining the good health of their stock. This has traditionally been challenging, as the effective treatment of any pests attached to the shellfish needs to not damage the shellfish themselves.

As a key partner, Aquaculture New Zealand will be closely involved with this research. "We recognise how important biosecurity is to support the

aquaculture industry to grow and enhance the sustainable production of New Zealand seafood, so we're highly supportive of this project," says Aquaculture New Zealand's Technical Director, Dave Taylor. "We will be working with BNZ, the researchers and shellfish farmers to ensure the outputs of the research are effective against pests, and most importantly, practical and implementable at the farm scale"

A 'request for proposals' to undertake the research has recently been released onto the government procurement website GETS | Ministry for Primary Industries - Marine Biosecurity Pathways Management: Efficacy of treatments for shellfish movements and incursion response. Appropriately qualified researchers are encouraged to apply for this funding, with applications closing on the 10th of Feb 2022. MPI are hoping to have a research provider appointed and starting the work in March 2022.

The literature review outlining the current knowledge of marine biosecurity treatment options is also available from the MPI website <https://www.mpi.govt.nz/dmsdocument/48580>.

If you are interested in being updated with the outputs of the research, please email tim.riding@mpi.govt.nz and we will keep you in the loop as we progress through this exciting piece of work.



The ties that bind

Brian Godsiff has been working on mussel boats for nearly 40 years – and he's only 47.



He started helping his father – industry legend Ivan Godsiff – when he was barely 9 years of age.

“I used to go out with him on Sundays. That’s really how I got to know him.”

Back in those days of the early-mid 1980s, Ivan was spending almost all his time at sea, working for Rob Pooley and family relation Chris Godsiff who jointly ran New Zealand Shellfish Holdings.

Chris promised Brian a job when he left Marlborough Boys College, so at age 16 he rocked up to the company, only to be told by Chris that it’d been sold to Sanford.

The promise was honoured however and although most new entrants had to start their days in the processing factory, Brian’s early-learned boat skills got him a job as a deckhand on the San Pelorus.

By 18, he was ready to be tested for his skipper’s ticket. “I sat that before I went to Australia.”

Brian ended up doing four seasons crayfishing in West Australia, returning in the off-season to skipper the Muscat for PBA – Pickering Brownlee Antonovich, which later became PBT when Talley’s bought the Antonovich shareholding in the early 2000s.

Brian says he had many good days with Robbie eating big breakfasts. Around this time, he got married to Annie (nee Aston) who’d grown up



Brian (on right) and Robbie Brownlee on Muscat, March 2001 doing final seeding.

at French Pass, cementing his Sounds links. When Talley's bought the remaining PBT shareholdings and created Clearwater Mussels in 2007, Brian started skippering the Sounds Legend.

In 2013, John Young approached him and asked if he'd be prepared to relocate to Golden Bay where Clearwater had developing mussel farm interests.

"I said I'd go for a couple of years – and I'm still here. I'd spent a lot of time in the Sounds and Golden Bay was still fairly new territory."

While there was already established spat catching in the Bay, there was very limited mussel production.

"I knew there were challenges ahead and that appealed." Chief among these was operating in the open waters of Golden Bay after the relatively benign conditions of the Marlborough Sounds.

"It's a tougher environment here. We are still learning how to do and not do things."

Spat catching is still something he enjoys even if it's got harder over the years, though the last couple of years have been surprisingly good.

"Mother Nature – she still rules the roost and we have to go along with what she throws at us."

One of the highlights of recent years was being involved in the design of



the Clearwater Resolution, which Brian now skippers out of its Port Taranaki base, though it also works in the Sounds. The 27m craft, launched in 2017, was the first new vessel purpose-built for mussel farming in many years.

At the recent MFA Environment Programme workshop, Brian demonstrated the rope tie-knot which sometimes carries his name. This only requires one cut as opposed to up to a dozen with other tying techniques.

"If anyone deserves to have it named after them it would be Peter Large. It was the way I was shown how to tie and I've stuck with it." After nearly 40 years as a marine farming man and boy, you can be sure Brian Godsiff is a long way off from tying up.



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Marlborough

DRYING, SQUEEZING AND CONCENTRATING – ALL IN THE NAME OF BETTER KNEES

Blenheim is about to become a hub of activity associated with getting the best active ingredients out of Greenshell mussels, thanks to a Marine Extracts Centre being built by Sanford.

If you happened to be looking for a team of marine scientists in Blenheim right now, you can find them, but maybe not where you'd expect. Try moving away from the sea and into a semi-industrial area out the back of town, where, between the wine makers, there is a fairly non-descript building, not much more than a port-a-cabin. It might look humble, but it's where Sanford personnel are producing world-class marine extracts for a global market estimated to be worth \$780 billion by 2035.

The team need space to expand, and they're getting it very soon. Sanford recently received the green light to build a \$20 million centre for marine extracts production, research and innovation. Marine extracts like Greenshell mussel powder, mussel oil and collagen are already in high demand, according to the man in charge of Sanford's bioactives venture, GM of Innovation, Andrew Stanley.



Andrew Stanley at the new site

“It's an area of science and nutrition that's growing so rapidly. We already see incredibly strong demand for our mussel powder which is known to have anti-inflammatory properties. Having a brand-new base for our work will enable us to grow to meet that demand and to think about creating other new marine products which can help with human and animal health and nutrition.”

Sanford already has a partnership with a large player in the animal nutrition market in Europe and it also sells its mussel powder to manufacturers of supplements aimed at athletes or ordinary folk suffering from joint or mobility issues.

Mussel powder has been the focus of considerable scientific research by Sanford over the last five years and its new research lab will support further study into the potential and benefits of mussel powder, mussel oil and collagen. Andrew Stanley is supporting development in this space.

“Through our collaborations with leading science providers we are demonstrating through novel clinical research, the effectiveness of our mussel powder. Publications are due out next year but the preliminary results look amazing.”

Clinical trials at Massey University and Plant & Food Research are exploring the effects of Greenshell mussel intake on early signs of osteoarthritis and other health outcomes such as exercise-induced joint and muscle pain and inflammation. Sanford works closely with local research organisations and has a number of projects on the go. Other studies include Callaghan Innovation looking into innovative mussel extracts and Plant & Food Research further exploring the potential and benefits of New Zealand marine collagen.

The marine extracts hub at Riverlands Estate in Blenheim, expected to be completed late next year, will have a lab, offices and a processing facility. It is a cutting-edge upgrade from the existing centre, ENZAQ, which currently employs around 20 staff and two dryers. The new site will have capacity for up to 48 staff, from process workers to qualified scientists. Sanford is also expanding its drying capacity with up to eight dryers, as part of the development to support growth in demand for its premium mussel powder.



Architectural render of Sanford's new marine extracts centre.

A Supercritical CO2 extractor, one of the most technically advanced pieces of equipment Sanford has invested in, will enable the extraction of mussel oil, worth as much as 600 times the value of fish oils. Mussel oil delivers a super-concentrated form of the anti-inflammatory benefits found in mussels and mussel powder.

“Greenshell mussels are just one opportunity in marine extracts,” says Andrew. “There are so many things the sea can give us which are incredibly beneficial to human health and wellbeing. As a team, we are really looking forward to moving to a bigger space where we can continue to explore some of these emerging opportunities. Having the new centre will support our drive to utilise the natural resources in the most efficient and high values ways possible.

“There’s a lot of potential to create new value and knowledge economy jobs too. People I talk to in the science field and industry are really looking forward to the new marine extracts hub and what the future holds”.



Greenshell mussels are recognised for their bioactive properties - mussels and mussel powder have anti-inflammatory benefits including managing joint aches and pains.

BUNDLING FLOATS

Best practice to avoid losing floats

- Use >24mm Rope
- Use tight bunches
- Tie first and last float securely to >24mm rope (This will ensure if the rope chafes off the backbone or warp, the bundle will stay together)



Marine farm holdings history of Te Atiawa o Te Waka-a-Maui

Following on from the previous story about the marine farm holdings history of Te Atiawa o Te Waka-a-Maui, published in the February MFA newsletter, this article looks at the recent growth and future plans in the aquaculture space for the Te Tau ihu iwi.

It took more than 30 years for the eight Te Tau Ihu iwi of the joint aquaculture venture Maara Moana to obtain the right to a 20 percent share of marine farming water space in Golden Bay, navigate through the resource consent process, and get lines in the water.

But the vision and hard work of the iwi and their commercial partners has finally come to fruition, with the first mussels harvested from the Maara Moana lines earlier this year.

Te Atiawa aquaculture operations manager Frank Burns says Te Atiawa has always had a conservative, long term approach to investment.

“When it comes to strategic planning, we think beyond our own lifetimes to ensure the decisions we make and the money we invest today will continue to sustain and benefit our whanau for generations to come,” he says.



Frank Burns, centre, last year helped host WK Senior Advisor Pat Bright to see Te Atiawa Marine with Harry Love, Te Atiawa Trustee

Frank joined the Te Atiawa Aquaculture team in 2016. With experience running his own mussel farms in the Marlborough Sounds, Frank's skills were ideal for helping Te Atiawa to consolidate and grow its commercial aquaculture interests.

He and five others comprise an aquaculture group that oversees the management of the group's marine farms, while looking for more opportunities to grow. The aquaculture group is overseen by the Trust Board that manages the Deed of Settlement on behalf of Te Atiawa.

Over the past five years, Te Atiawa has considerably increased its marine farm holdings across its Rohe (area) in the coastline around Te Tau Ihu.

Investments are only signed off once the Te Atiawa Commercial Advisory Board has given its tick of approval and the Trust Board, which represents iwi members, agrees that it fits with the financial and cultural values of the iwi.

"Part of the strategic plan of Te Atiawa is creating educational, cultural, spiritual and employment opportunities for iwi whanau in Te Tau Ihu," Frank says.



Marcella, Te Atiawa's recently purchased vessel

"Aquaculture fits the bill. With valuable guidance and encouragement from our CEO Richardt Prosch, we are well on the way to where Te Atiawa whanau are managing the day-to-day running of our marine farms through every aspect of the business both on and off the water."

The recent purchase of a 13-metre boat, which will be used for crop checking and float work on iwi owned mussel farms in Totaranui/Queen Charlotte Sound and Te Hoiere/Pelorus Sound independently rather than relying on contractors, is just one example of Te Atiawa creating a vertically integrated aquaculture company, Frank says.

While they've been looking to grow, the aquaculture industry has come under pressure in the past 18 months, due to the closure of international borders and restaurants around the world as the world has struggled to contain Covid-19.

New Zealand marine farmers, which relied heavily on thriving tourism and hospitality sectors around the world, have been forced to explore new markets and possibilities.

"The pandemic made us realise we can't depend only on the half shell market, we've got to find alternatives," Frank says.

The iwi is also looking at a range of species including oysters, sea cucumbers and seaweed.

"There is a lot of excitement around the potential of the native red seaweed *Asparagopsis armata* in reducing greenhouse gas emissions in livestock, and the ability of seagrass ecosystems to sequester significant amounts of carbon," he says.

"Te Atiawa has had a comprehensive list of seaweed species added to one of its consents with the view of investigating the opportunities around the commercial production of seaweed."

Studies have shown kelp farming has a positive effect on its local environment too, by helping to boost marine biodiversity, and as kaitiaki (guardians) of the land, sea and sky in Te Tau Ihu, kelp aquaculture could be a good fit for Te Atiawa, he says.

The iwi has also signed up to the Aquaculture New Zealand A+ Programme, a world leading sustainable aquaculture management framework, committed to improving environmental practices, while growing global demand for New Zealand seafood.

"Is the industry perfect? No we're not, but it's come a long way from where it was and is committed to keep improving, as Kaitiaki exercising Manawhanua status of the Marlborough Sounds and one of three Manawhanua iwi who reside in Tasman. Te Atiawa will always be advocating for a sustainable approach to coastal marine management," Frank says.

He is thankful for the foresight and tenacity of former iwi leaders who drove the establishment of commercial farming interests on behalf of Te Atiawa, creating a solid foundation in which to grow from - both culturally and financially.

"If I can leave our commercial aquaculture venture in a better position than when I started, I will be happy; and then the next generation can take it onto bigger and better places as well. That's my personal challenge," he says.

The Andy Ritchie Scholarship fund

Congratulations to Abbey Browne, the 2021/2022 recipient.

The Andy Ritchie Scholarship fund is a grant established following the passing of marine scientist Andy Ritchie. The purpose of the Scholarship Fund is to give a small financial boost to existing postgraduate students, whilst supporting research in New Zealand Aquaculture, enabling a better understanding of the environment we operate in, the species farmed, and any environmental impacts associated with marine farming. The grant is for \$5,000 and is awarded annually.

Abbey Browne is this year's recipient. Abbey is studying for a Postgraduate Diploma in Science at the University of Auckland. She is investigating using a Flupsy system and its impact in optimising flow rates for the nursery culture of mussel spat. Abbey will be working with former Andy Ritchie Scholarship fund recipient Brad Skelton and Professor Andrew Jeffs, both from the University of Auckland.

Applications are welcome from all New Zealand Postgraduates. Applications are through the MFA website. Details for anyone interested in future applications can be found at <https://www.marinefarming.co.nz/all-about-the-andy-ritchie-scholarship-fund/>

The staff at the Marine Farming Association would like to take this opportunity to wish you all a safe and happy holiday season.

The office will be closed on the 23rd of December 2021 and reopen on the 6th of January 2022.





havelock mussel and seafood festival'22



ENTERTAINMENT LINE-UP

A DAY NOT TO BE MISSED!

We have been working hard behind the scenes and we are so excited to announce the line-up for the festival in 2022!

Kiwi legends **Jordan Luck Band** will be headlining the upcoming festival. They will be joined by Christchurch's indie band **The Butlers**, and finally a DJ Set by **Lord Echo's Percussion People** on the **Gascoigne Wicks Stage**.

Celebrity Chef **Simon Gault** will be joining local chefs in the **NZ King Salmon Culinary Tent**. Well-known internationally and locally, Simon is one of New Zealand's most-respected food leaders and we can't wait to see him at the festival.

The festival wouldn't be complete without the **MFA Industry Tent**, **NIWA Kids Zone**, public mussel opening competitions and the famous intercompany mussel opening competition including the **Guinness World Record** attempt.

'TIS THE SEASON

Support local this festive season by gifting someone festival tickets!

Not only do all proceeds go back to the local community, but it also supports the local stallholders, businesses and sponsors which are involved with the festival.

#supportlocal

WE ARE GROWING!

In case you missed it earlier, this year we will have private cooking classes available with Simon Gault.

For the first time we are able to offer a Twilight Mussel Cruise, thanks to the team at the Marlborough Tour company. This will be the evening before the festival, Friday the 11th of March, 2022.

Sign up to the database to be the first to hear when these go on sale!

COVID-19

We know it's been a hard year for most and a lot of people will be looking forward to the break over the Christmas period. With the new Protection Framework in place, this does give us as Event Organisers some certainty that come March, the event will more than likely be able to proceed.

Like all Event Organisers, we are eagerly waiting to see how the new Protection Framework will be rolled out over summer. We will continue to monitor official advice provided for Event Organisers and will be adhering to the guidelines provided by the government at the time of the event.

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Move up the value chain and champion Sounds restoration



A need to focus on value, innovation and restoration were the strong themes emerging from the 5th annual Smart+Connected Aquaculture forum.

Held by Zoom due to Covid lockdown risks, it started with a presentation from Volker Kuntzsch, CEO of Cawthron Institute and previously of Sanford. He told the forum the New Zealand aquaculture sector was still too focused on volume with GSM producers fighting for a share of global markets.

“We are such a tiny player globally. We can make a big difference if we focus on value through collaboration.”

Volker says those producers who did not offer products with a unique difference will struggle. He'd just learned Russia was now self-sufficient in salmon, closing off another export market.

Volker started his career in seafood 35 years ago teaching illiterate fishermen on South African vessels about the importance of science in creating value (in their pockets) and continues to advocate for it.

New Zealand has vast ocean spaces; industry and science working collaboratively could move the seafood industry from a commodity focus to value-based products. He says there is a lot of Government funding available to help achieve this but industry needed to move from mere in-kind support to committing financially to R&D.

Professors Aisling O'Sullivan and Tom Cochrane from Canterbury University then presented on the use of GSM shells to remove metals and chemicals from waterways. Their team has developed the Storminator, a cartridge with shells inside which is inserted in roofing down-water pipes to remove 90% of metals. Now moving into treating nutrient runoff in farming areas, the university team is looking for partnerships to develop and commercialise its products.

Brad Skelton, a PhD student at Auckland University, then outlined how some 244 billion GSM spat are harvested each year from seaweed collected along 90 Mile Beach - but largely due to natural off-migration habits, only 1.5 billion make it to harvest. If this could be lifted to 25%, Brad says we would have 3m tonnes of GSM production (currently around 100,000+ tonnes), worth \$4b – 10x more.

He's been doing research off Coromandel using a modified oyster FLUPSY – a Floating Upwelling System - a paddle-wheel which draws up water and provides a better flow of nutrients to juvenile mussels. At the end of a six month trial, 38% of seeded spat had been retained. Brad is now looking to develop a new FLUPSY designed specifically for mussel spat.

MDC's Dorien Vermaas, who is a strong supporter of Smart+Connected Aquaculture through her work on economic development, presented on Council's emerging Economic Well-being strategy. Dorien says aquaculture is Marlborough's second biggest industry after wine and it is important that this is reflected in the new long-term strategy.

Labour issues will be a key consideration and Dorien confirmed Council is working alongside Marlborough's Regional Skills Leadership Group and will deliver its document in mid-2022 alongside the group's Workforce Development Strategy.

Cawthron's Kirsty Smith then presented on work involved in the Seafood Safety Platform which sees scientists partnering with industry to ensure farmed species are safe for consumption.

Recently, Cawthron has been testing an automated flow cytometer, borrowed from the University of California. This was trialled in Pelorus Sound near a NZ King Salmon farm, providing a live feed of water monitoring data. Next steps include the development of a business case to purchase one of the flow cytometers which could be co-funded through the NZ Food Safety Science & Research Centre and needs industry support.

MFA President Jonathan Large stressed the importance to industry of real-time data so harvesting from an area like the Sounds was not entirely closed off for any localised bio-toxin event.

Aquaculture NZ's Steph Hopkins told the forum that she's been working with aquaculture companies over the past year to help develop a skilled workforce for the industry. A survey mid-year had shown 550 vacancies across the industry, most in processing which was not assisted by generally having a September-June season.

A promotional initiative – Catch a Job – had generated several hundred inquiries but only seen 35 jobs filled. Steph says the industry faces an ageing workforce and that included those trying to hire younger staff.

"You've got Boomers recruiting Zoomers and that can be a challenge."

A workforce strategy is being developed which included new qualifications and a focus on more Maori involvement in aquacultural employment as part of a more diverse workforce.

Dave Taylor, Technical Director for AQNZ, then presented on what open ocean aquaculture will bring to New Zealand. The NZKS Blue Endeavour site in Cook Strait is estimated to add \$200m annually to our economy from its 8-10ha. A similar sum is projected from Ngai Tahu's farm off the northern

edge of Rakiura (Stewart Island). Dave says farms of this size generate a range of other economic activities. For example, Tasmania's salmon industry now had seven RAS (Recirculating Aquaculture System) hatcheries which could cost \$30m each and also several feed mills costing around \$38m each.

Neil Henry MDC's Economic Development Manager noted MDC is working with local science organisations on possible use of grape marc as an ingredient in a feed source.

Dave says salmon farms are currently constructed in three main types – circular, octagonal and ship-like structures. Whether these were built here or overseas, the farms would need vessels and ports to supply them.

MDC Coastal Scientist Oliver Wade was the last forum speaker on regeneration in the Marlborough Sounds and what it meant. He says with sea temperatures rising and pH dropping, the ecological effects are unclear. Red algae beds which had existed for decades in Arapawa's East Bay had recently disappeared. The scallop fishery had been closed for years but was not recovering.

Climate change was causing more significant storms. One of Marlborough's two major rain events in recent months had left a foot of silt deposited in the Mahikapawa Arm. Cumulatively, such impacts are stressing the ecology of the Sounds and required collaborative and innovative solutions.

MFA President Jonathan Large noted MFA was supporting projects like that restoring wild mussel beds in Pelorus Sound but such work was difficult until land impacts were sorted out. He suggested dealing with the copious amounts of silt entering the Sounds would provide the biggest ecological gains.

Oliver says sediment is a massive issue in Pelorus but in other parts of the Sounds there were still ecological shifts going on that are not caused by sedimentation.

MFA GM Ned Wells asked Oliver if he thought the current regulatory settings enabled restoration efforts, noting that the many years it takes to obtain consent could see opportunities lost.

Oliver acknowledged RMA processes could be slow but says there are always ways to do things differently such as working collaboratively.

NMIT's Craig Prichard asked if MDC favoured multitrophic farming. Oliver says MDC is not opposed but it wasn't for him to advocate for it and such projects would require assessments of effects. AQNZ's Dave Taylor noted a lot of mussel farms already had seaweed harvested as well.

Smart+Connected Aquaculture chairman Brendon Burns says while this year's forum did not have its usual workshops, the Zoom event had provided the group with a lot of potential issues – particularly around value

and restoration - to work through during the next year.

There was considerable positive feedback after the forum from some of the 45 people who attended, including from some easily able to attend because of the Zoom format.



You are welcome to tie up to a mussel farm if you want to fish **(many say its the best spot)**

When you're navigating near mussel farms you need to know the following:

- Always keep a good lookout
- Never exceed 5 knots when navigating around mussel farms
- Avoid entering mussel farms at night
- Orange floats mark the ends of each mussel line
- At night, mussel farms are marked with yellow flashing lights. The light sequence is a group of 5 flashes every 20 seconds. Fl (5) 20s
- Please loop a rope through the handle of a black or orange float (not lights / navigational aids.)
- Don't tie onto the backbone or growing ropes as you will chaff the ropes
- Don't fish through the lines between the floats
- Keep propellers well away from the lines, propellers are like knives

If you find a float - it's a marine farmers' property. Please call **0800 433 2747** to alert us.

This is also a number to call to report any concerns about our environmental performance.

Boaties using the coastal environment in the Top of the South - Please ensure your hull is free from unwanted organisms before entering Sounds waters.

If you have any concerns about environmental issues at a Marine Farm call the **Environmental Hotline** on **0800 433 2747**



FlipFarm takes international honours

MFA Board member Aaron Pannell is still basking in the glow of winning an international award for his FlipFarm semi-automated oyster farming system.



FlipFarm was among three finalists selected from a pool of 39 applicants from 24 countries in the Global Seafood Alliance's annual Global Aquaculture Innovation Award. Selected by voting, FlipFarm edged out the two other finalists: Ace Aquatec's seal-deterrent technology that causes no harm to the marine mammals and Nucleic Sensing Systems which can detect pathogens and other biological issues in aquaculture environments.

Presenting his company's technology at GSA's GOAL virtual event, Aaron won over attendees by illustrating how much his system – in which Hexcyl Pro baskets are connected to a backbone that rolls up on the side of a harvesting vessel – saves on the backbreaking labour associated with oyster aquaculture.

"We are honoured to be awarded the Global Seafood Alliance Innovation award," he says. "Considering the extremely high calibre of the finalists, we feel very privileged to win this award on behalf of our hard-working team. Debbie and I would like to recognize the many people who have been involved in developing and implementing the FlipFarm system. We look forward to continuing our mission to deliver world-class aquaculture



solutions to the most sustainable and exciting industry in the world!"

FlipFarm is already selling internationally and is now used by more than 70 farmers in 12 countries worldwide.

The innovative process helps provide an ideal environment for oyster growth and conditioning, as well as the ability to efficiently control fouling levels, pests and predators. The system is adaptable to diverse growing environments.

MFA President Jonathan Large says he's sure he speaks for everyone in the top of South industry in congratulating Aaron and Debbie.

"They've worked so hard on FlipFarm as well as contributing so much else to our region and industry. Aaron was the guy who drove the start of the Mussel and Seafood Festival, just as one example. This award is recognition for a lot of effort and applied technology, and we can only expect to see it increase demand world-wide for this home-grown innovation."

MFA Newsletter Stories

If you have a story that you would like to see published in our newsletter, please forward it to info@marinefarming.co.nz for consideration.

Our newsletter comes out every two months – February, April, June, August, October, and December.

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NIWA predicts warm waters this summer

David Plew, Ben Noll, Neelesh Rampal, Tristan Meyers, Niall Broekhuizen

Last month, NIWA forecast that the coming summer would be a warm one, with sea surface temperatures predicted to be +0.8°C to 1.0°C warmer than usual around the entrance to Pelorus Sound in January. So far, things are tracking as predicted – recent satellite observations show that sea temperatures are already warmer than normal around most of New Zealand (Figure 1).

NIWA climate scientists take predictions from eight different climate models run by institutes around the world and combine these to make long range forecasts for New Zealand. The latest forecasts suggest it could be even warmer than what was predicted last month, with sea surface temperatures at the entrance to Pelorus up to +1.2°C above normal (compared to an average over the years 1993-2016) through January and February 2022 (Figure 2).

Sea temperatures are likely to be warmer around most of New Zealand this summer (Figure 3), particularly through January and February, while looking to ease back closer to normal in autumn. The main driver for these warm conditions is La Niña, which brings more frequent anticyclonic conditions over southern New Zealand, and warm, sub-tropical north-easterly winds. When combined with the long-term tailwind of climate change, warm seas are even more likely. However, a wildcard factor could be ex-tropical cyclone activity, which would quickly stir up cooler subsurface waters.

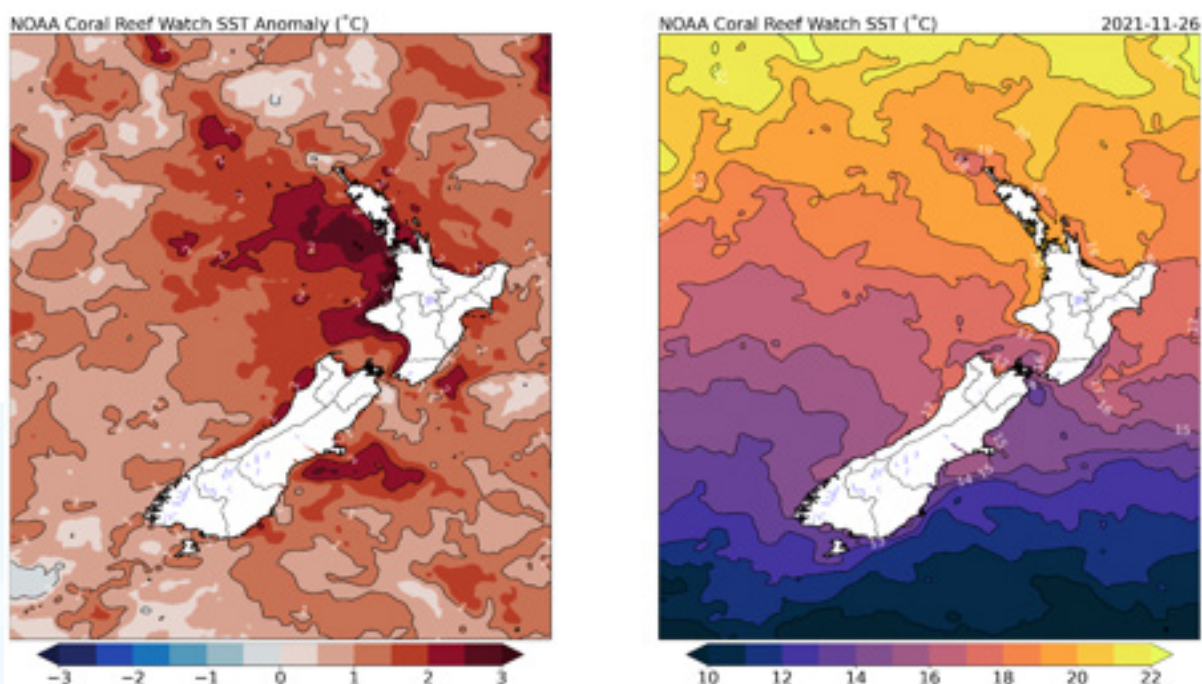
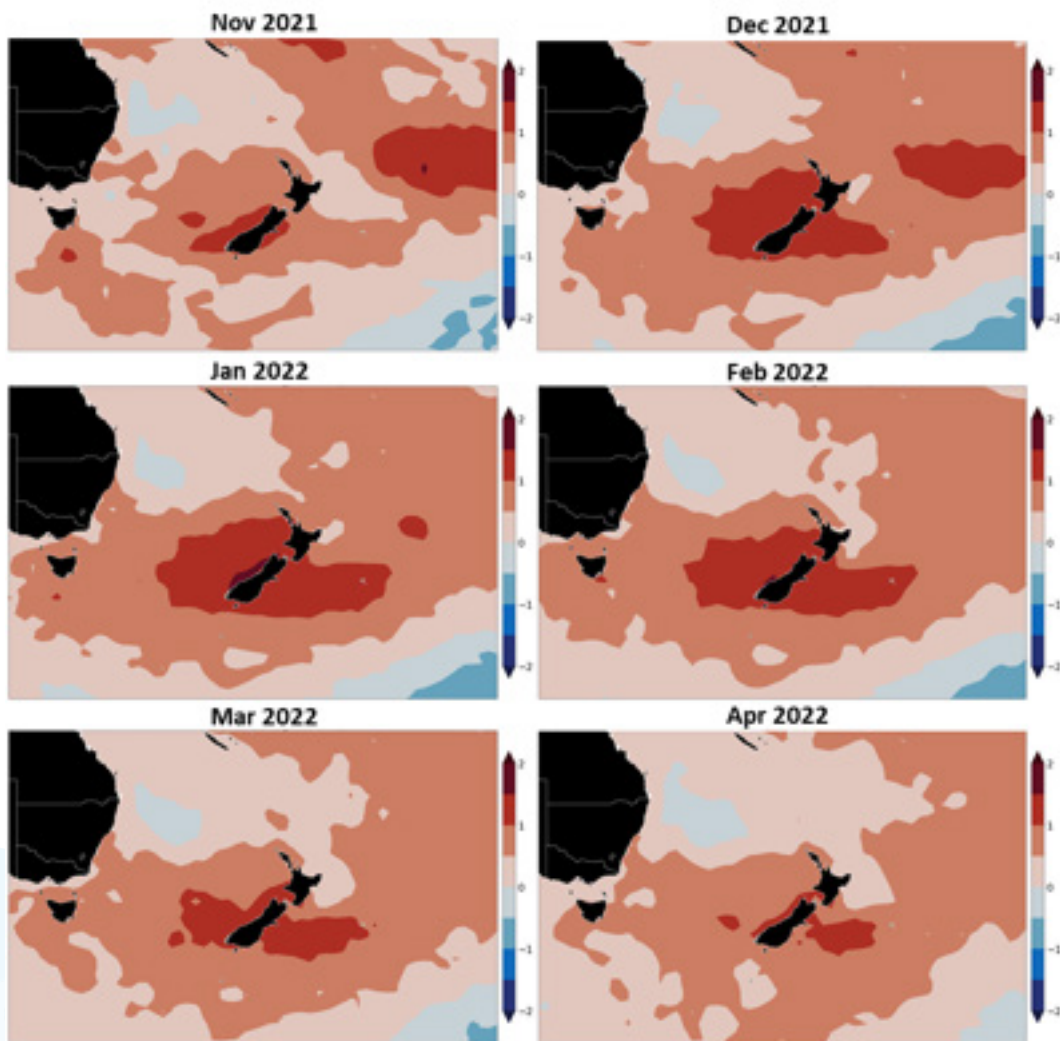


Figure 1 Satellite measurements of sea surface temperature anomalies (left) and sea surface temperature (right) around New Zealand on 26 Nov 2021

Forecast Cook Strait SST anomalies (°C) over the next 6 months

Month	25th percentile	50th percentile	75th percentile
2021-11	0.49	0.50	0.51
2021-12	0.70	0.72	0.82
2022-01	0.95	1.18	1.23
2022-02	0.85	1.17	1.17
2022-03	0.77	1.03	1.05
2022-04	0.77	0.89	0.91

Figure 2 Predicted sea surface temperature anomalies for the Cook Strait near the entrance to Pelorus Sound.



These plots show monthly averages. Day-to-day fluctuations, which can only be accurately forecasted a few days in advance, may be even more extreme.

Figure 3 Maps of predicted monthly averaged Sea Surface Temperature anomaly forecasts for November 2021 to April 2022. These maps are created by combining results from 8 different climate models. Regions coloured in red are predicted to be warmer than usual. Those in blue are predicted to be cooler than usual.

The sea surface temperature information and figures in this article were created using the Copernicus Climate Change Service (C3S) (<https://climate.copernicus.eu/>). NIWA retrieves the raw data and creates value-added products for the New Zealand region such as customised long-range climate outlooks. This work is funded through NIWA's Strategic Science Investment Fund from the Ministry for Business, Innovation and Employment.

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Developing better spat-management systems

Developing better spat-management systems: combining laboratory observations and energetics models to understand the determinants of spat growth and survival



Jeffrey Ren, Niall Broekhuizen, NIWA

Mussel growth rates are influenced by food supply, water temperature and pH. These can interact in complex and, sometimes, surprising manners. Dynamic Energy Budget (DEB) models can be used to understand how such factors are likely to influence realized organism growth rates. These models aim to describe how feeding and respiration rates are influenced by internal characteristics of the organism (body size, degree of starvation, etc.) and external ones such as water temperature, food abundance and (for filter-feeding shellfish, pH and suspended inorganic sediments). The DEB models include rules about how mussels choose between new structural growth, recovering after starvation, and investing in reproduction.

NIWA has developed DEB models for Greenshellä mussel and Pacific oyster. Both have been shown to accurately reproduce weight- and length- growth patterns of the crop shellfish. For example, Figure 1 illustrates both: (a) the observed pattern of growth from a sample of mussels grown in Beatrix Bay and (b) the growth pattern predicted by the DEB model when driven by real-world environmental conditions. Clearly, the model accurately reproduced the growth patterns of the real-world mussels.

We are undertaking trials to see how diet abundance and composition affects spat growth and retention. We have been undertaking laboratory incubations and have been exploring the laboratory data through the DEB model. Figure 2 shows some early results. In the first treatment, spat were fed on natural seawater drawn into the incubators through a large seawater intake pipe. In the other treatments (run in tandem with this first one), the natural seawater was augmented with differing quantities of additional phytoplankton.

Whilst the real-world spat barely grew in the natural seawater treatment, the extra food provided in the other treatments did enable the spat to grow well. Since the seston concentrations (as measured by chlorophyll, particulate carbon and nitrogen) in the water drawn from Bream Bay during the experiment were near the lower ends of the ranges that have been measured in Pelorus Sound, the incubation results provide indications that spat growth in Pelorus Sound is likely to be severely constrained by a lack of food on some occasions.

Our existing DEB model for Greenshell Mussel™ was developed with larger mussels in mind but has successfully reproduced the large differences of spat growth rates observed in our preliminary spat-growth experiment moderately well (Figure 2). Nonetheless, there are subtle residual deviations between the real-world and simulated growth trajectories within any one treatment. The discrepancies between observation and simulation suggest that either: (a) within the model, we have not, as yet fully characterised the food that the spat experienced, or (b) patterns of energy acquisition, allocation and expenditure of young spat are subtly different from those of older mussels. The discrepancies will help inform future incubation studies to: (i) identify practical means of efficiently raising spat to a larger size in commercial-scale nursery systems and, (ii) understand the drivers of spat performance on open-water nursery lines. Ultimately, we hope that it may be possible to combine real-time on-farm environmental monitoring data, environmental forecast products (temperature etc.) and biological simulation models to yield seasonal-scale forecasts of crop performance to aid with seed management and production-scheduling etc. We welcome feedback concerning the likely use of forecasts and observations which may help with future development of the tools.

Figure 1. Comparison of modelled and observed shell length and dry flesh weight of Greenshell™ mussel in a farm in Beatrix Bay.

Figure 2: Symbols: observed size (as shell-length) of a cohort of young spat growing within incubators at NIWA's Northern Marine Research centre over the course of about three weeks. Curve: corresponding pattern of growth predicted by the Dynamic Energy Budget model.

Acknowledgements

We thank SpatNZ for providing the spat which were used in the spat-growth trial described here.

Related Reading

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Winter warming – marine heatwaves affected most NZ waters this winter

By Malene Felsing, Joao de Souza (MetOcean Solutions/MetService), Jonathan Gardner (Victoria University of Wellington) and Andrew Jeffs (University of Auckland) from the Moana Project.

The ocean around New Zealand is getting warmer, and extreme warming events have become more frequent over the past years.

These marine heatwaves can impact marine life, including aquaculture and fisheries species. When they happen in summer, they usually receive a lot of attention. But marine heatwaves during winter, when the ocean is cooler, are often ignored.

To monitor marine heatwaves around New Zealand, we developed a marine heatwave forecast tool as part of the Moana Project, a large MBE-funded research project. The tool forecasts marine heatwave occurrence, intensity and duration for 13 areas defined in collaboration with the seafood industry.

When looking at the data from this past winter (June to August 2021), we found that most coastal areas around New Zealand were warmer than normal, as highlighted on Figure 1, a map showing the difference between winter 2021 average sea surface temperatures and the average temperatures for that time of year.

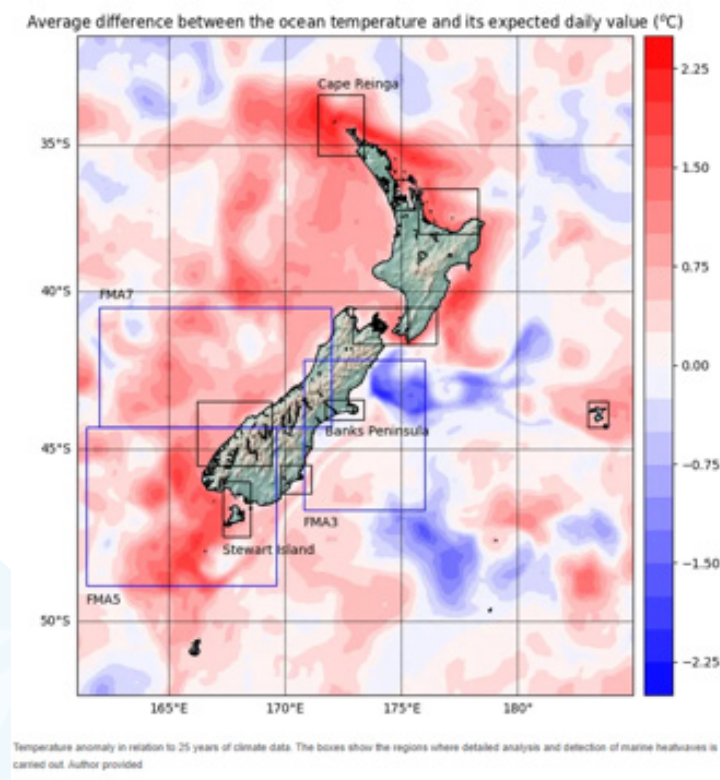


Figure 1: Last winter's temperatures compared to the 25-year seasonal average. The boxes show the regions where the Moana Project is providing detailed analysis for marine heatwaves. FMA: Fisheries Management Area.

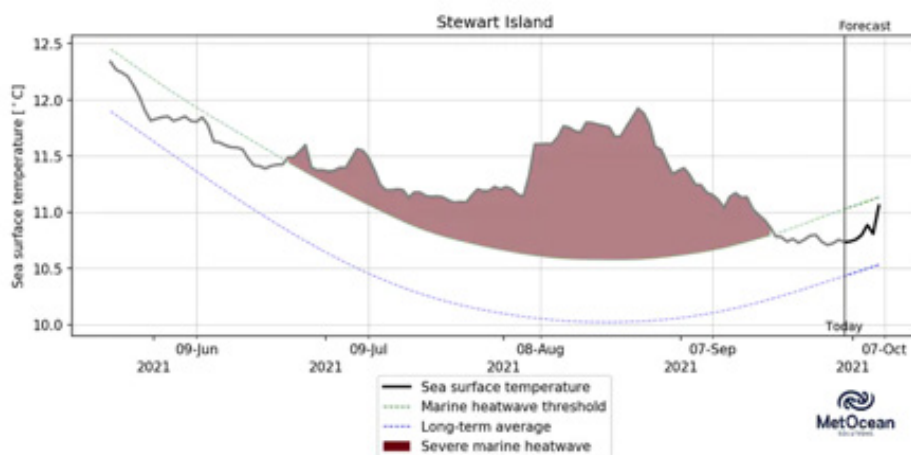
Winter warming

Marine heatwaves are defined as periods of five days or more of when ocean temperatures are higher than the top 10% of the average for that area for the time of year.

During the winter of 2021, surface waters around New Zealand were on average 0.3C (± 0.75) warmer than usual, with peaks occasionally reaching +4.2C. However, in a few areas, such as the Pegasus and Kaikoura canyons to the north-east of Banks Peninsula, we observed cooler than normal temperatures.

Of the 13 areas monitored (boxes in Figure 1) all but the Banks Peninsula and the FMA3 box to the east of the South Island experienced winter marine heatwaves during the winter.

The events varied in intensity and duration. Cape Reinga experienced a continuous moderate marine heatwave during the winter, and at Stewart Island a severe winter marine heatwave lasted 87 days, with maximum temperatures reaching 1.9C above long-term climate data (Figure 2).



Sea surface temperatures for Stewart Island. The blue line shows the daily mean temperatures and the green line the 10% highest temperatures, calculated from a period of 25 years. The shaded red area indicates a marine heatwave. Author provided

Figure 2: Sea surface temperatures for Stewart Island during the winter of 2021. The blue line shows the daily mean temperatures and the green line the 10% highest temperatures calculated from a period of 25 years. The shaded red area indicates a marine heatwave.

Both areas are particularly important since they feed into currents hugging (and now warming) the eastern coastline of New Zealand.

This warming is not restricted to the surface. Looking below the surface we can identify layers of intense warming and layers where some level of cooling occurred. For example, the FMA7 region shows the most intense warming occurred between 100 and 300 m depth, while cooler than usual waters were found between 1000 and 2000 m depth (Figure 3).

The identification of a severe winter marine heatwave around Stewart Island is of concern to the region's and the country's aquaculture industry. Stewart Island, as the country's most southerly region, is home to both king salmon and Greenshell™ mussel aquaculture farms.

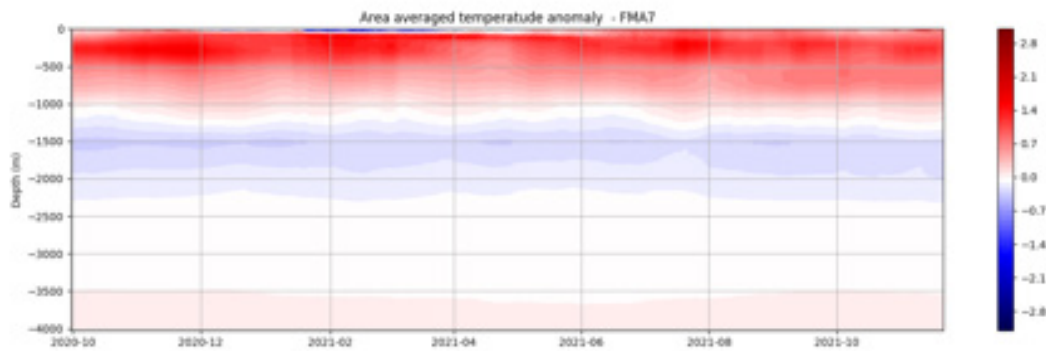


Figure 3: Vertical distribution of the differences of water temperatures from expected values for the time of year for the Fisheries Management 7 (FMA7) box in Figure 1.

We know that mussel production is negatively correlated with sea surface temperature (warmer seas lead to lower production) and we also know that Marlborough Sounds farms have experienced pronounced mortality levels of salmon during the summer when sea surface temperatures rise.

In addition, there are also unknown effects on the local dredge oyster fishery in Foveaux Strait. Ultimately, the aquaculture and fishing industries in New Zealand need to be aware of how marine heatwaves may impact their productivity and profitability.

Changes across the southwest Pacific affect New Zealand

We know ocean temperatures are warming faster during winter than summer around New Zealand and across the wider subtropical southwest Pacific Ocean. The warming has become particularly evident since 2010.

This ocean hotspot is centred northeast of New Zealand and has been linked to drought conditions in both South America and New Zealand.

The current rate of warming in our part of the Pacific is greater than we would expect from chance alone, indicating that climate change is the cause, and will be likely to continue to increase winter marine heatwaves around New Zealand.

As part of the Moana Project, we have now started research using advanced methods to forecast marine heatwaves, with the aim to develop seasonal marine heatwave forecasts looking months into the future. We anticipate that such information may be of value to the aquaculture and fishing industries by helping them to plan mitigation strategies and placement of farms, as well as to better understand how the distributions and abundances of target species may change over time. In the meantime, our daily updated short term forecasts are available on <https://www.moanaproject.org/marine-heatwave-forecast>. We welcome any feedback and suggestions for how to improve these forecasts: if you have any comments, please let us know at info@moanaproject.org.

This article is based on a recent publication we wrote for The Conversation <https://theconversation.com/marine-heatwaves-during-winter-could-have-dire-impacts-on-new-zealand-fisheries-and-herald-more-summer-storms-167967>

Mussel Shell as a weed suppressant

Using mussel shells as a weed suppressant in Marlborough vineyards might increase soil microorganism activities and the availability of nitrogen and phosphorus, due to the organic matter held in the waste product. However, it is likely the mussel shells also reduce arbuscular mycorrhizae fungi (AMF) in the soil, according to a research project undertaken by Bragato Research Institute (BRI) and the Nelson Marlborough Institute of Technology (NMIT), with help from student Xiuying (Ava) Liang.

Ava presented the findings of the trial - The effects of undervine mulching materials on weed suppression, soil health, vine performance, and wine quality in a fertile vineyard - to BRI in October, describing treatments in July 2020 that compared rows under mussel shells, weedmat and cultivation.

She says previous work from Dr Stewart Field, a lecturer at NMIT, showed the use of weedmat on stony soil could result in production of wines with equivalent yield and quality to those produced with the use of herbicide for weed control. "However, growers suggested that weedmat fails to suppress weeds in fertile soils where weed growth pressure is high," she says. "Therefore, Stewart and Dr Tanya Rutan from BRI set up this new weed mat and mussel shell trial to further evaluate

alternative mulches in high a vigour site in Marlborough." The trial was undertaken on the silt loam soil of the NMIT vineyard in Blenheim, which was previously under herbicide management. Ava says the greater uptake of nitrogen in mussel shell vines resulted in higher leaf blade nitrogen, greener leaves and higher yeast assimilable nitrogen (YAN). However, there was reduced AMF in the soil under mussel shells, she says, noting a strong negative correlation between the soil phosphorus content and AMF colonisation in the cultivation and shells treatments, which was not observed in the weedmat plot.

When it came to yields, there was no difference in fruit maturity under the three treatments, but a significantly higher average berry weight was observed in the mussel shells compared to weedmat, says Ava. "The total yield, average bunch weight, and bunch number per vine were similar at harvest among all three treatments."

After harvest, fruits from the same treatment were randomly divided into three triplicate wines at the BRI Research Winery neighbouring the vineyard, using standard BRI protocol. "Malic acid and YAN were significantly greater in mussel shells treatment than cultivation and weedmat," says Ava in her report, also noting faster fermentation in the mussel shell treatment wines. "However, pruning weight was increased under the mussel treatment."



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- 7 Yr battery. All colours. Bird Spikes incl as standard
- All Carmanah lanterns have 15 Yr design life & 3 Yr warranty. Made in USA

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Sabik Marine is world's largest supplier of Marine AToNs. Over 100 Yrs combined experience.



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