MARINE FARMING ASSOCIATION
To Promote & Nurture Sustainable Marine Farming

OCTOBER 2021 NEWSLETTER

CONTENTS

IMPORTANT DATES

MDC Smart & Connected Aquaculture meeting
10th November 2021
MFA Boardroom
MFA Conference & Awards Dinner
CANCELLED
Queen Charlotte Yacht Club
MFA Environmental Sub Committee meeting
12th November 2021
MFA Boardroom
MFA Board meeting
19th November 2021
MFA Boardroom
Smart & Connected Aquaculture Annual Update Forum
26th November 2021
Zoom only

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e info@marinefarming.co.nz | w www.marinefarming.co.nz

Presidents Comment

Covid continues to affect the industry with widespread impacts throughout. We are certainly experiencing challenging times with the recent lockdowns proving difficult for many. Despite shorter lockdowns for the South Island, we are still feeling the effect of Auckland's lockdown. The only light at the end of the tunnel seems to be vaccination and the prospect for getting back to normal, whatever that looks like!

Covid has again had an impact on the MFA conference. This year we had to make the difficult decision to cancel. Despite being within the rules to hold the conference, we felt it wasn't the responsible thing to do, especially with members and guest speakers coming from Auckland.

This season, Te Hiku spat has again proved challenging with low volumes landing before the quota season finished. This puts undue pressure on everybody, especially the collectors on the beach and highlights the need for the quota year to change. We are hopeful this will happen as soon as possible.

It was pleasing to see such a good turn out from industry's on water teams at the recent MFA environment workshops. All feedback so far has been great with people saying it was very worthwhile, especially the practical float tying and discussion.

It looks as though more people are converting to untying floats as opposed to cutting off. We look forward to this becoming the industry norm.

As you'll be aware, MFA has rolled out the new environment certification programme, congratulations to those who have already applied and been awarded a tier status. I encourage everybody to apply. Our goal is to have 100% of the industry in the programme.

Once again, Ned continues with the hard work of managing the MEP process. It is starting to get to the pointy end, gathering evidence and arranging expert witnesses with the hearings coming up very shortly. This is a critical time. I thank all those from Industry who are involved, and I encourage you all to continue supporting the process in any way you can. After all, it is your consent we are working to protect.

Spring is well and truly upon us! This includes the unsettled weather that keeps us on our toes! We've had a very wet late winter/early spring, which is different from last season, but as we know, we can only deal with what mother nature throws at us.

The rise in product condition in the sounds has been slow to date, although I look forward to it increasing as the waters warm up. It's exciting to see a good crop, coming out of Golden Bay in particular, which will result in some good crop going to market.

Cheers, Jono

Environmental Update

In September, after a slight delay due to Covid-19 and storms, we ran our Environmental workshop for members and their staff.

The 3 workshop events saw good attendance in both Havelock and Golden Bay, they were designed to be a mixture of interactive, hands on and listening acrivties.

The workshop covered a review of Industry Standard Operation Procedures, Industry Code of Practice, Biosecurity procedures & King Shag procedures through a Kahoot Quiz.

We followed on with an update to crews about why environmental performance is so important and what it might mean to them if we don't perform.

Darren, our Environmental mentor had a chat about the trends that he is seeing when out auditing farms and talking to vessel crews.

It finished with a practical session outside discussing float attachment techniques, float removal techniques and demonstrations of two new float designs that don't require lashing to the backbone.

I think everyone who attended got something out of the workshop, aside from lunch.

We will now be running these annually, instead of every two years.

Darren having a chat at one of the Havelock workshops

MFA Environmental Certification Update

With the old certification becoming obsolete at the end of 2021, we are seeing good uptake for the new programme.

We now have seven companies certified under the new programme, with two more currently being assessed.

CONGRATULATIONS!

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

	Kono NZ LP
	Maclab NZ
	Maclab Tasman

MFA Environmental App Update

The number of people signed up and using this app is steadily increasing. We are encouraging feedback with regards to improvements to the app to make it more user friendly.

Since the workshops, the following improvements are being worked on:

Screen jumping glitch to be fixed.

The ability to include photos with beach cleaning submissions.

The ability to tag a float as dead or alive.

The ability for the form to hold on to your company name so you don't have to enter it every time.

We are encouraging everyone to use this app whether you are part of the industry, a community group or an individual person doing beach cleans. If we get more information, we get a better picture of the challenges/ opportunities to make improvements and to do better.

If you have any more suggestions for improvements, you can either enter a feedback form through the app or contact Amber -

amber@marinefarming.co.nz / 027 255 2228

How to use the MFA Environment Reporting App...

The Marine Farming Association (MFA) App has been designed to make reporting easier, faster, and more accurate.

It focuses on environmental reporting, in the top of the south (NZ) and it allows our members and the wider community to report beach cleans and float retrievals in real time.

This information helps the MFA monitor environmental impact and to proactively put training programmes in place to mitigate any issues arising.

The Vessel & Farm check aspects of the App have been built in for our environmental mentors to report with ease when out auditing and training members on best practise.

The app can be used when offline, so it's perfect for use anywhere in the top of the south (NZ).

Step 1 - Sign up

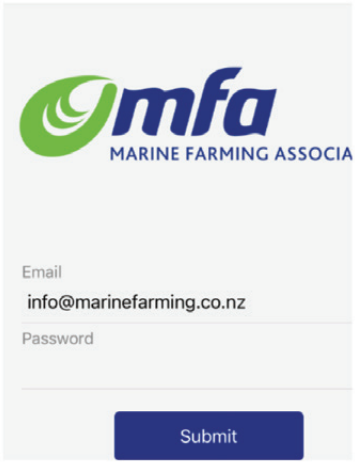
Email the following info to: admin@marinefarming.co.nz

Your first & last name *

The email you want to use for the app *

Your Ops Manager & the company you work for.

(If applicable)



Step 2 - Download app

Download the app from Apple store or Google Play Store.

Search: Marine Farming

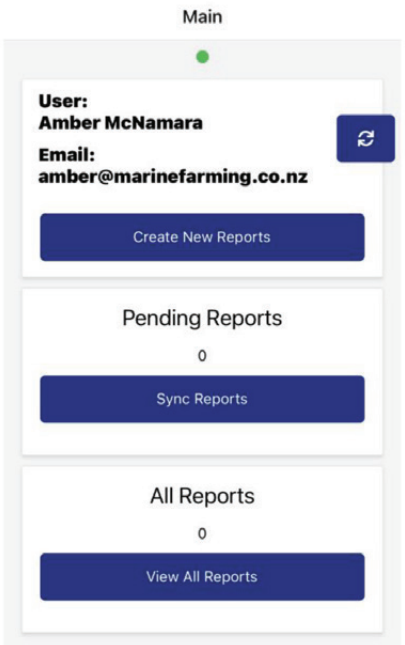
Step 3 - Log in

You will be emailed a log in & password.

When this happens, you will be able to log into the app.

Step 4 - Home screen

Once logged in, you will see the home screen options:



1. Create New Reports

This is where the data gets entered

2. Pending Reports

These are reports that you have entered offline so, if there are any reports sitting in this box, you will need to select "Sync Reports" when you are back in coverage.

3. All reports

Once reports are entered, they will sit in here.

Step 5 - Create new report

FARM AUDIT REPORT

Please don't use this form, for MFA Environment mentors only.

VESSEL AUDIT REPORT

Please don't use this form, for MFA Environment mentors only.

BEACH DEBRIS REPORT

This report should be used if you have done a beach clean and need to report your findings.

The MFA use this data in several ways so if we get lots of reports, the picture the data paints is much clearer.

- Select "Create new reports" from the home screen & you will see a drop-down menu.
- Tap in the blank box that says "Select an item"
- Select "Beach Debris Report" from the drop-down menu.
- Then press "Create report"
- Choose the bay you cleaned by typing it into the search area.
- If you can't find the bay, there are general options eg. Pelorus Sound_ Other, if you select a general area, please add the actual bay in the notes, then we can add it for the future.
- Enter "People Time" = Number of people x Number of hours cleaning. (To the nearest quarter hour eg: 1.25 hours).
- Enter "Vessel Time" = Number of hours steaming + downtime while beach cleaning. (To the nearest quarter hour eg: 1.25 hours).
- Enter " Aquaculture debris " from Marine Farming found = a rough guide for weight is a 9L bucket full is around 1.5kg.
- Select what types of rope you have found, if you know.
- Enter "Other debris" found, this is anything you have picked up that isn't Aquaculture debris from Marine Farming.
- Enter "Notes" - this can be anything else you feel we need to know. And where you enter the bay, you cleaned if you had to make a general selection above.

- Enter “Company” - this is the company you are cleaning for, if you are a member of the public, you can select “Casual Beach Cleaner”
- Enter “Contact phone number” - just in case we need more information.
- Once you are happy - “Press SUBMIT”

***Please note that if you have collected floats, these should now NOT be entered in the Beach Clean form, they should be entered in the Float Collection form.**

FLOAT COLLECTION REPORT

- Select “Create new reports” from the home screen & you will see a drop-down menu.
- Tap in the blank box that says “Select an item”
- Select “Float Collection Report” from the drop-down menu.
- Then press “Create report”
- Choose the bay you collected the float from by typing it into the search area.
- If you can’t find the bay, there are general options eg. Pelorus Sound_ Other, if you select a general area, please add the actual bay in the notes, then we can add it for the future.
- Enter “Number of floats” - you will need to fill in one report per float ID.
- Enter “Float ID” - if you can’t find the ID on the float or it’s not in the list, select “NO ID”, if you can find the ID but it’s not in the list, enter the ID into the notes and we will add it.
- Tell us where you took the floats - and if anything, further needs done about it
- Enter “Comments” - this can be anything else you feel we need to know.
- Enter “Company” - this is the company you are cleaning for, if you are a member of the public, you can select “Casual Beach Cleaner”
- Enter “Contact phone number” - just in case we need more information.
- Once you are happy - “Press SUBMIT”

FLOAT SPOTTER REPORT

If you spot rogue floats but can’t get to them to pick them up for some reason (this could be because your vessel can’t access the area).

Please complete the “Float Spotter” form in the app, that way the MFA can get someone in the area to collect the floats asap before they float off again.

****We highly recommend all vessels carrying a dingy so all can get onto tricky beaches to retrieve lost floats****

FEEDBACK REPORT

This report exists for feedback & complaints – good, bad, or otherwise.

You may also have a great idea or suggestion for us, we know that the best ideas come from the cold face, so this is a great place to put your ideas forward.

PLEASE NOTE

The app will run offline, however, to set it up and log in for the first time you will need to be in coverage. It wont log in if you have no coverage.

The app will stay logged in but if you want to log out for any reason.

On your device screen, swipe your finger from left to right and it will open a "logout" option.

Any problems, queries, or concerns...

Contact us:

info@marinefarming.co.nz

Ph: 03 578 5044

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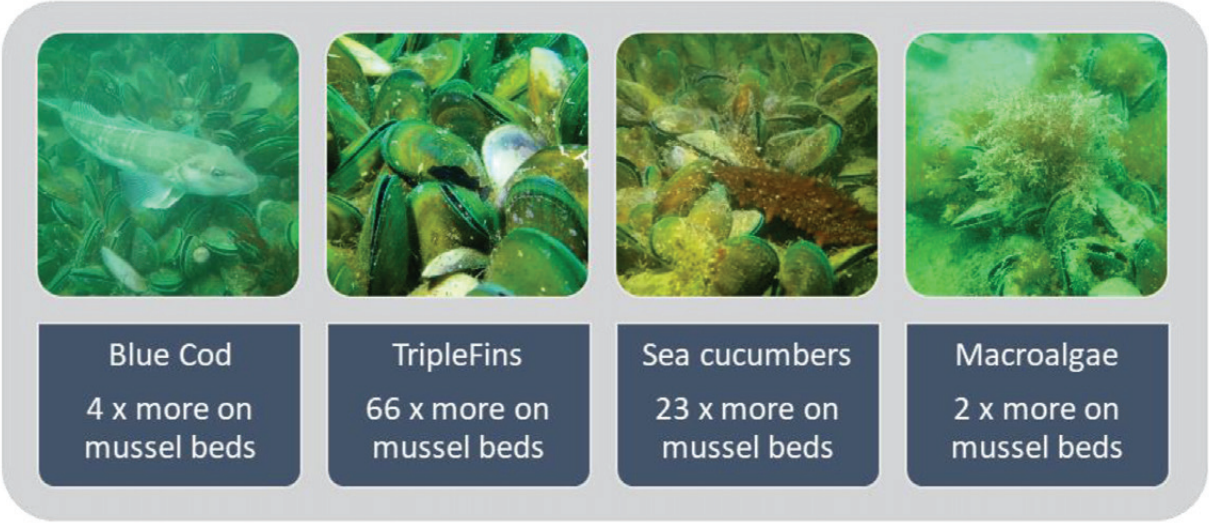
Mussel Restoration Project for the Marlborough Sounds – October 2021

Biodiversity assessment on small mussel plots

For our first mussel deployment we placed down four tonnes of mussels into five locations in January 2020. We performed two biodiversity assessments on four of the five locations after the mussels had been on the seafloor for five months and after one year. Among other results the assessments showed that blue cod were observed four times more often on the mussel beds when compared to areas 20 m away and triplefin fish were observed 66 times more on the mussel plots. Sea cucumbers were 23 times more abundant on mussel plots then on adjacent control plots, while macroalgae were two times more abundant on the mussel plots.



These results show that by restoring mussels in Pelorus Sound we can restore habitats for many other animals and help to restore overall ecosystem health. Mussels provide many services to the ecosystems they are found in including habitat generation, and this study emphasizes that mussels can provide these benefits even when the beds are small. These results are encouraging for mussel restoration and the benefits it can have on important species.

Community Day

We have decided to postpone the community event due to covid uncertainty until after the new year.

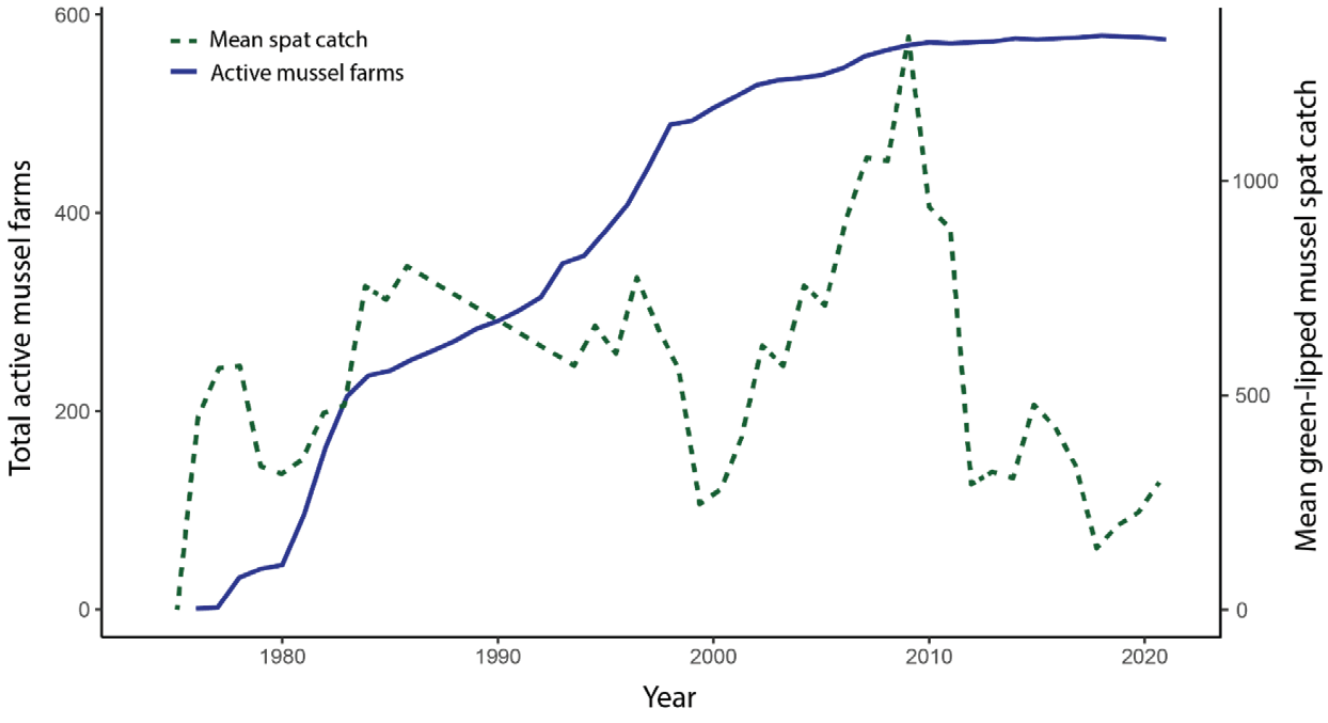
As always, if you have any questions or comments on this project, please feel free to reach out to Emilee Benjamin via email at

egol669@aucklanduni.ac.nz.

Mussel Farms and Spat Decline

When mussel farming first started in Pelorus Sound around 50 years ago it relied heavily on local spat caught on lines. However, in recent years commercial spat catching in Pelorus has almost completely stopped due to low spat catches. Determining the cause of these low catches may help us reverse the recent decline and return to using local spat on farms.

A close look at the green-lipped mussel spat catch data collected by the Marine Farming Association since 1974 confirms the recent decline in spat catches in the past decade. For example, the average spat catch in 2010 was over five times higher than in 2020. The cause of this decline in spat abundance is not clear. One popular theory is that the expansion of mussel farming activity in Pelorus has impacted the spat supply, possibly by the adult mussels on farms consuming the larvae or using up the food in the water column that is critical to spat. To investigate this theory, we looked at the timing of the expansion of mussel farming in Pelorus to see if it coincides with the decline in spat catches from 2010. However, we found the area covered by mussel farms in the Sounds expanded dramatically from 1975 to 2000 but has remained fairly constant since then. This timeline indicates that mussel farms were widespread not only during low spat catch years but also during the relatively high spat catch years from 2001 to 2010 (the decade with the highest average spat catch since the MFA began collecting data).



Active mussel farms (solid line) and three-year rolling average annual spat catch (dashed line). Note that spat catch was not monitored from 1986-1992.

Analysing the spat catches on a more localised scale within Pelorus also confirms that the presence of mussel farms is not related to reduced spat catches in those locations. For example, spat catching locations with up to 65 mussel farms within a 5 km radius have on average reported similar spat catches as locations with no nearby mussel farms. Overall, we could find no evidence of a relationship between average spat catches in a location and the number of active nearby marine farms or the total area covered by those farms. The results of this fine scale analyses support the larger scale trend for Pelorus, i.e., that the increased numbers of marine farms over the last five decades are not consistent with the timing in the decline in spat catches.

This lack of correlation between increasing numbers of marine farms and spat catches is surprising considering the vast quantities of farmed mussels in the Sounds, of which a large number will also breed each year. We're still piecing this puzzle together, but what is clear from these preliminary results is that spat supply is complex and the arrival of mussel farms alone cannot explain the variability in local spat catches or their recent decline. Reach out to me at ttoo112@aucklanduni.ac.nz for more information or with any comments.

By Trevyn Toone

Crews hold industry's future in their hands

"At the end of the day it really comes down to the person holding the knife."

That was one of the key messages that came across at the MFA Environmental workshop held in Havelock in late September. This workshop was the third in the series and was attended by 35 staff from various mussel and oyster companies from across the top of the south.

MFA GM Ned Wells opened the workshop telling participants that environmental awareness was accelerating across the planet and marine farming could no longer depend solely on its economic contribution to the top of the South.

"We start in a good place, but we have a higher bar than other industries because we operate in public space."

Ned said marine farm workers probably don't spend much time thinking about the resource consents for a farm, but renewals and new consents rely on a good environmental record.

MFA Environmental Mentor Darren Clarke thanked workers for the improvements he has seen lately, particularly with regards to clean backbones post-harvest, this is important because if ties are left on the backbone after harvesting, they inevitably fall in the water and wash up on the beaches. This was fantastic feedback for everyone to hear.

He said areas including Croiselles Harbour were seeing reduced marine farm debris while other areas still had some way to go.

Darren told crews environmental performance was improving

Darren acknowledged that a lot of the debris now collected in industry beach cleans in locations such as Manaroa and Crail Bay was historic.

"You think you are on top of it and there's another big sea and it's back," he said.

Amber McNamara who manages the Environmental Certification programme for the MFA, said the new certification programme worked as continuous improvement model built around beach clean ups, environmental audits, staff training, vessel & plant improvements and participation in MFA environmental events and meetings.

The old MFA Environmental certification programme, which is now 10 years old, has been replaced by a programme where members need to annually apply for certification and achieve a performance-based level (much like Site Wise).

The hope is that all participating companies will strive to improve their performance year on year and as a result our performance as an industry will keep improving.

With the launch of the new Environmental Certification came the perfect opportunity to relaunch the beach cleaning programme.

The new beach cleaning programme has been created around need and will be ever changing, the MFA will rely on feedback to make these adjustments.

- Clean areas are standardised to 5kms per clean
- Clean frequency of an area has been dictated by need
- Participating companies have been given beach cleaning targets based on the size of their marine farming operation.

As well as the ongoing beach cleans, the MFA is still organising its Big Month Out in December which allows the industry to focus on particularly troublesome areas such as Manaroa. Amber will be providing companies with the details of Big Month Out shortly.

The MFA have created and recently launched an Environmental reporting app allowing marine farmers and the public to easily record beach cleans, float collections and feedback.

You hold the knife - Ned and Amber at the MFA workshop

Those attending the workshop were given demonstrations on the two new float designs which both have different fixing mechanisms to connect floats to a backbone and reduce the amount of rope needed.

Clearwater Farm Manager Brian Godsiff also provided a demo of what some might call the "Godsiff knot". He says the knot unties easily meaning there is only 1 cut to start when other methods could otherwise see 5 cuts and a dozen pieces of rope emerging, including three smalls.

1 cut not 5 - Brian Godsiff shows the "Godsiff" knot

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Golden Bay

<u>soundsrestoration.org.nz</u>
Marlborough

The sky's the limit - Career Navigator Graduation

Congratulations to all the 2021 Career Navigator graduates!

Recently the Career Navigator students from the class of 2021 celebrated their graduation. Despite all the challenges 2021 threw at them - they did it!

Graduation is always a special occasion - where everyone gets to hear from all the students what they have got out of their time in the programme, and what their plans are now. We know you will go far and can't wait to hear all about it!

Congratulations to the following students who graduated the programme!

Aidan Flanagan
Asuka Clark
Boston Mitchell
Brianna Pereyra
Casey Evans
Connor Van Dijk
Gianna Thomson
Giovanna Burtenshaw
Jack Wilkes
Jacob Clark
Jessica Tripe
Lakshay Negi
Livvy Procter
Meg Cuddon-Corlet
Paige Jackson
Samara Williams
Teah Stephenson
Teri Schwass-Smith
Tyla Harding
Thom Hall

Career Navigator

"What are you going to do when you leave school?"

Career Navigator helps our young people find a meaningful answer to that question!

Career Navigator is a free programme for local Year 12 and 13 students run by the Graeme Dingle Foundation Marlborough.

Career Navigator helps our senior college students figure out what they want to do when they leave school and map out a career pathway that's right for them. It doesn't matter whether they are looking to go into the workforce, university, or apprenticeships – or have absolutely no idea what next!

This programme helps students navigate their way through the endless career opportunities presented to them – and open up their eyes to options they may never have heard of!

Here are just a couple of things they shared on the night:

- "It was pretty obvious I was very lost and had no idea what I was doing. Coming out of the programme I'm confident in the path I wish to take next year."
- "It allowed me to see what careers I was interested in were actually like!"
- "I gained work experience and offers of work after uni"
- "I was surprised at the reality compared to what I assumed"
- "I got insights I never would have known otherwise"
- "It inspired me to get out there and not think twice about taking opportunities!"
- "It opened my eyes to what careers are out there – and how to find them"
- "It gave me a lot more confidence"

Get in now for 2022!

Applications for Career Navigator 2022 are now open! (All Marlborough students who will be in Year 12 and 13 in 2022 are eligible to apply).

Who do you know that could benefit from this?

Go to https://bit.ly/CareerNavigatorInfo to sign up or find out more

The Career Navigator Class of 2021!
Marlborough students with their mentors - including Amber McNamara (Marine Farming Association) and Grant Boyd (Sanford)

havelock mussel and seafood festival'22

CELEBRATE SEAFOOD!

SATURDAY 12TH MARCH 2022

It's a vital part of Marlborough's summer and its back for its 18th year, Saturday the 12th of March 2022 at the Havelock Domain.

Carrying on from an incredibly successful event earlier this year, we are excited to be putting together another great day for attendees. One of New Zealand's top Celebrity Chefs, *a master in the field,* is booked **AND** were excited to bring some incredible kiwi entertainment to Havelock. Attendees can prepare for another stunning day, enjoying nothing but fresh seafood at the source and dancing the day away to some good ol' kiwi music.

WHATS NEW IN 2022!

Ocean inspired cocktail bar

Twilight Mussel Cruise*

Private cooking classes by our Celebrity Chef*

**Not included in festival entry ticket. Limited tickets available.*

TICKETS ON SALE NOV 1

WWW.HAVELOCKMUSSELFESTIVAL.CO.NZ

OUR SUPPORT

The Havelock Mussel & Seafood Festival has been embedded in Havelock's local community for 18 years and has been contributing all the proceeds back to the local community since 2004, that's about **$300,000**.

Over the years, the festival has received incredible support from the local Seafood Industry, businesses and community, without them the festival would not be where it is today. Some sponsors have been on board since the beginning and are committed to ensuring the event is a success. In today's day and age, that's almost unheard of and pretty incredible!

We are so grateful and appreciative for all of the contributions we receive from sponsors not only towards the event, but also the local community.

If you are interested in being involved and supporting the festival in 2022, please do get in touch.

2022 SPONSORS

A big thank you to our Cornerstone Partners and Platinum Sponsors for their significant contributions towards the upcoming festival. Check out the extensive list of sponsors on our website.

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Re-imagining open ocean aquaculture

Investment and R&D in open ocean aquaculture is expanding rapidly around the world. Aotearoa New Zealand, like other countries, has limited inshore space for aquaculture. However, our exclusive economic zone means we have an enormous ocean space. Expanding into open ocean aquaculture could enable us to increase fish and shellfish production significantly.

Current open ocean aquaculture systems repurpose technology developed for inshore aquaculture, fortifying it to make it robust enough to withstand the rougher conditions and increasing it in size to expand production significantly. An alternative and emerging approach is roaming systems or pens, the next generation for open ocean aquaculture.

Re-imagining Aquaculture is a Plant & Food Research project, funded by the Ministry of Business, Innovation and Employment (MBIE). The project is exploring the potential around mobile open ocean aquaculture systems. "The goal is to work with the environment, rather than trying to build a system that can withstand it," says Dr Suzy Black, who is leading the research.

Plant & Food Research scientists have a "fish-centric" approach. This means designing the mobile system to meet the needs of the fish. "Each fish species is unique so we need to understand the physiology and behaviour to create an environment that's optimal for them to thrive," says Dr Black.

While it is too early to determine what the entire mobile system might look like, the goal is to create an uncrewed vessel to support a fish enclosure. The open ocean aquaculture industry globally is trying to develop un-crewed and remotely operated technologies. "We want to be able move the system around so we can optimise things like water temperatures, currents and water quality for the fish," says Dr Gerard Janssen, Leader of the Aquatic Design and Bioengineering Team. "And, given the harsh environment in the open ocean, we need to be able to automate these systems as much as possible."

Being able to move the aquaculture system would also provide resilience against climate change and warming waters, as well as offer the potential for rearing diverse finfish species. "Some fish prefer a certain range of temperatures to grow at their best," Dr Black says. "With inshore aquaculture the pen stays at a given location so the fish have to experience the temperature range there. With a mobile system we could

potentially make sure the conditions are perfect year round."

Plant & Food Research scientists have been working on breeding taonga species tamure/snapper and araare/trevally. A mobile system offers the potential to rear these fish in our ocean waters and create a new aquaculture market for finfish.

The Re-imagining Aquaculture research is part of a larger Plant & Food Research Nga Tai Hohonu/Open Ocean Aquaculture research direction. Plant & Food Research are working with Maori as part of the Governance and Maori Co-Innovation Group as partners to the programme to grow with Maori aquaculture development in New Zealand.

The Nga Tai Hohonu/Open Ocean Aquaculture direction includes research programmes on a range of supporting science; from breeding taonga species, assessing ecosystem impacts to developing new aquafeeds, and remote monitoring technology. The research programme involves extensive collaboration with science organisations overseas and in Aotearoa, including SINTEF Ocean (Norway), Wageningen University and Research (The Netherlands), Cawthron Institute and the Universities of Auckland and Otago.

The research team working on the mobile technology are building on their history with fish-centric R&D, wild fish harvesting and alternative production systems. However, there are still many science challenges to resolve before the technology becomes a commercial reality in Aotearoa and worldwide. "In addition to making sure the system is robust enough to survive in the ocean and operate remotely, there is obviously a lot of supporting science needed for it to succeed," says Dr Black.

The ocean is central to our culture and economy, and developing this kind of mobile technology would ensure it continues to play an integral role in our future. Not only could this kind of technology deliver jobs and business opportunities, it could usher in a new sector. Aotearoa could even become a leader in providing technologies for open ocean aquaculture globally.

Algae based local anaesthetic

MEDIA RELEASE

18 October 2021

An algae-based pain medication that could improve the care of patients undergoing surgery is now closer to reality thanks to a collaboration between Cawthron Institute and medical researchers at Boston Children's Hospital (a Harvard Medical School teaching hospital) and Chilean biotech company Proteus.

Cawthron Institute has announced they have developed a reliable and commercially scalable method for producing neosaxitoxin, a potent toxin from the paralytic shellfish toxin family, that can be combined with existing local anaesthetics for use as a local anaesthetic during and after surgery in post-operative patients.

All the local anaesthetics currently on the market are of two chemical classes, amino-amides and amino-esters, and they have changed very little over the past 50 years. Neosaxitoxin is the first member of the class of molecules called site 1 sodium channel blockers to be used in human clinical trials as a local anaesthetic.

Dr Johan Svenson, Cawthron Institute's Science Leader for Algae and Bioactives research, says this is a globally significant scientific innovation that demonstrates Cawthron Institute's world leading expertise in algal biotechnology and bioactive compound extraction and purification.

"Cawthron Institute has decades of experience producing compounds from algae for a range of scientific purposes. When we began our collaboration with researchers at Boston Children's Hospital on the development of a neosaxitoxin-based pain medication, we were confident we could develop a reliable method of production of a high-purity product, even though no other research institute before us had achieved this feat," Dr Svenson says.

"Producing commercial quantities of algae is a complex business – figuring out how to grow it is challenging enough, but then you still need the capability to extract and purify the bioactive compound, and in the case of neosaxitoxin, there was a chemical conversion step that we have developed and patented to achieve the level of purity required."

Dr Charles Berde, co-founder of the Pain Treatment Center in the Department of Anesthesiology, Critical Care and Pain Medicine at Boston Children's Hospital and Professor of Anaesthesia at Harvard Medical School, has been co-leading the development of a neosaxitoxin-based local anaesthetic for over two decades alongside his colleague Dr Daniel

Kohane. Dr. Kohane is Director of the Laboratory for Biomaterials and Drug Delivery and Vice Chair for Research in the Department of Anesthesiology, Critical Care and Pain Medicine at Boston Children's Hospital and Professor of Anaesthesia at Harvard Medical School.

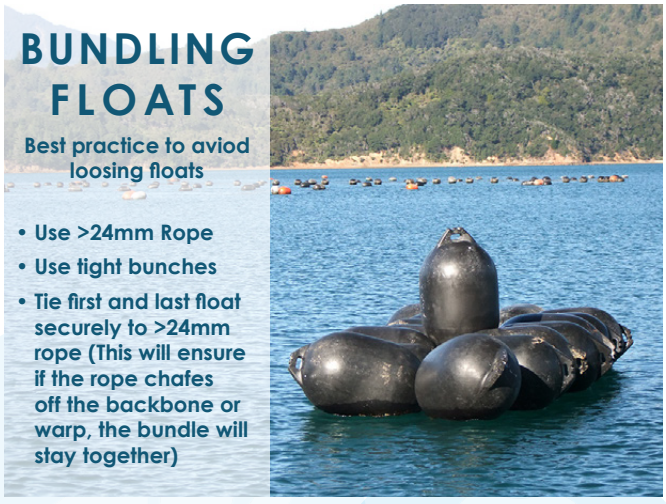
"Our motivation to develop this drug was to provide more effective pain relief for both children and adults following surgery. Opioid analgesics produce side-effects and can be addictive, so there is a great interest in developing better non-opioid approaches to pain relief," Dr. Berde says.

Phase 1 clinical trials have been completed in the U.S. and Europe and showed very good safety and effectiveness in achieving more prolonged duration of local anaesthesia for infiltration and nerve blocks compared to the traditional local anesthetic, bupivacaine.

"The next steps are to take this drug through Phase 2 clinical trials, and although there is always uncertainty during the FDA approval process, we are optimistic about the prospects of neosaxitoxin and hope to see it approved and on the market in the coming years."

Dr Berde is the keynote speaker at Cawthron Institute's virtual Annual Thomas Cawthron Memorial Lecture on Tuesday 19 October. His address is open to the public and will live-stream via www.cawthron.live from 5.30pm on Tuesday 19 October.

"I'm very much looking forward to sharing this exciting research with a global audience, particularly those in New Zealand and Australia, and joining Cawthron researchers to talk about our collaboration during the live Q&A session with the audience."



Good retention of wild spat at low seeding density

Carrie Reyden1, Rodney Roberts2, Andy Day2, Mike Mandeno3, Dave Aguirre1

1Massey University; 2 SPATnz; 3 Sanford Ltd

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Most Greenshell™ mussel farmers would be happy with 20% retention and 2,000 seed per metre at intermediate seeding. In this article we suggest that low seeding densities may help make the most of wild spat.

Supply of spat has become limiting. If a greater proportion of spat were retained, then we could produce more crop. We know from our results with hatchery spat that retention doesn't need to be poor, but we've done little work with wild spat. Wild Te Hiku spat from Te Oneroa-a-Tohe (90 Mile Beach) is often seeded at very high densities of 50,000 to 100,000 per metre. By the time the mussels are ready to inter-seed at say 15 mm, the rope can only hold a few thousand mussels, so the % retention is going to be low.

Would the % retention of Te Hiku spat be higher if we started with a lower density? Carrie Reyden from Massey University teamed up with SPATnz and Sanford to look at this question, with support from an MFA Andy Ritchie scholarship and Seafood Innovations Ltd. The Te Hiku spat that turned up on the designated dates had a pretty good spat size (1.13 mm average) and low spat density (156,000 per kg of weed). It was seeded out at 150, 300 and 600 m per 10 kg bag giving seeding densities of ~2,600 to 10,300 per m.

What did we find?

Retention of ~12 mm seed was 20-24% and spat count per m was about 2,000 per m at the highest seeding density. Both are very respectable stats and the 2000 per m represents close to holding capacity at this size, with about 20 mussels per each cm of rope.

The good retention was observed with commercially relevant methods. We used farms in south-western Forsyth Bay in spring of 2019. We used multiple 16 m loops of rope at 0.5 m spacing, surrounded by commercial seed. The seed came through the normal commercial channels and was seeded using commercial methods.

With the weed we received, we only got to play at the low end of the seed density range. Higher seed densities were tested in the Coromandel

work reported by Brad Skelton in the MFA Newsletter, June 2019. There, a seed density of around 10,000 seed per m gave much higher retention at 2 mo (6-7 mm) than higher densities of 17,000 and 60,000 per m. Average spat length was 1.24 mm – similar to our study, and not too small.

Where to from here?

So a couple of small scale studies suggest higher retention of wild spat at low seeding densities. In combination these studies suggest a starting density of around 10,000 spat per m may give the best compromise between practicality and retention. If industry remains motivated to maximize retention, then this could be tested repeatedly at commercial scale on a wider range of farms. Implementation requires estimates of the average density of spat on weed, and ability to adjust seeding rate to target seed per metre, rather than just metres per bag. If the density is high, and the weed too coarse, then some method of breaking weed into smaller fragments could be required to spread it thinly enough. Seed size may also need to be taken into consideration.

Wild spat retention probably averages around 5% or less. If this could be lifted to 10 or 20% that would make a significant difference to seed supply and the ability of the industry to expand. SPATnz's hatchery mussels have been exceeding those retention levels for some years, so it is not an impossible goal.

Acknowledgements: Thanks to MFA for your support of Carrie's MSc through an Andy Ritchie Scholarship, and to Seafood Innovations Ltd for its support of this research.

Succession Planning

I decided to write this article because I see examples of people who have undertaken no succession planning and potentially leave behind an unintended mess for others to clean up. I thought it might be useful to share my experience.

In my late 50's I attended a birthday party and sat alongside a person in their early 70's who was living life to the fullest. I asked him the reason for success and his response was to "keep everything simple", the KISS principle.

So, the next day I sat down and wrote out a list of all the things in my life that over time had become complex, and that I should simplify. The list was surprisingly extensive. I dabbled in a range of businesses, sat on the boards of several not-for-profit organisations, and realised I should plan my extraction over a period of time. It was time for the younger generation to be given the opportunity to step-up into these roles.

Living the dream, a cycle ride the length of the South island on and off road 2018.

I had tried my best to establish a long-term saving plan for my more mature years. I left the run a little late but with a large family there were always other options to spend your money. I sought financial advice and started saving. Wills require updating, memorandum of wishes require composing, etc. I was determined that I would not leave behind a mess for my family. Strangely, the garage took the first hit and it felt good!

I have been fortunate that I have had good jobs, so I had choices.

In my early 60's, I heard a young doctor describe the 60-70 age bracket as like walking down 'sniper alley'. At any moment, you can get 'taken out' by an accident, disease or failing health. The sniper does not care who they target, they just strike. The sniper especially loves 60-year-olds on mountain bikes. Bugger!

She was correct, I have seen many of my family, friends and colleagues struck, often unfairly, with a health issue or accident. I plan to live an active 60's and 70's if possible and avoid the sniper for as long as possible. I therefore required another plan! I enjoy my work, my work colleagues, and the aquaculture industry. But I should plan my exit and prepare the business for the next generation.

Succession planning takes time and careful consideration. Again, I sought expert advice and decided on a way forward. I changed my role within the business, to give me more time to partake in my outdoor adventures, but there is an end date. To get where I want to by that end date I need to actively plan, let go of some things and facilitate the next generation to move up.

I have no plans to slow down, just change priorities. I'm working to balance out the time I have left to concentrate on the best bits. I may have left my run too late, but I am currently picking off parts of the South Island Te Araroa Trail, as work allows, and I find that incredibly satisfying.

So, without plans, the years and opportunities race past us, and I don't want to leave the world with regrets. Food for thought for an industry that has been built on a generation of pioneers.

By Bruce Cardwell

Upcoming SMART courses

Sustainable Marine Mammal Actions in Recreation & Tourism

Working together to minimise potential impacts of vessels on marine mammals

For: Tourism skippers/business owners/guides/agency skippers & crew

Fiordland
28th October 2021
1.00pm – 5.30pm
Venue TBC

Picton
3rd November 2021
8.00am – 12.30pm
Venue: Port Marlborough

Abel Tasman
16th November 2021
1.00pm – 5.30pm
Venue TBC

Akaroa
30th November 2021
8.00am – 12.30pm
Venue TBC

Kaikoura
7th December 2021
1.00pm – 5.30pm
Venue TBC

Auckland - TBC
March/April 2022

How will this course benefit me?

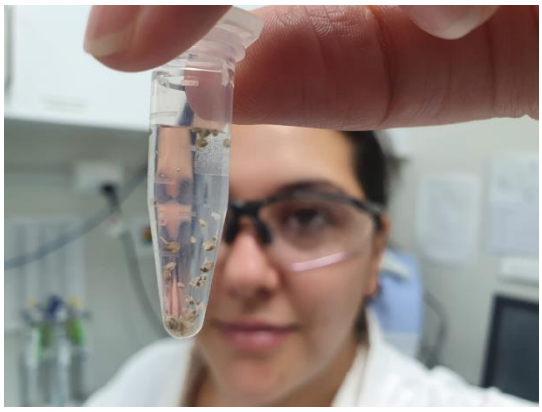
- DOC recognised certification
- Valid for 3 years (renewable via online course)
- Learn about legislation concerning marine mammal interactions
- Build your knowledge about seals, dolphins and whales
- Learn more about marine mammal behaviours, identification and local info
- **Free to attend**

To register please email Amy Healey ahealey@doc.govt.nz

*Dates & times may change, please RSVP to make sure you receive any updates

Glow-in-the-dark spat

Viewing mussel spat quality through a different lens



Mussel spat quality has been identified as a critical step to reach the aspirational goal of a $3 billion aquaculture industry by the year 2035, according to the latest New Zealand GreenshellTM mussel spat strategy.

However, currently determining spat quality is challenging and complicated, especially if it needs to be done at sea or, indeed any location outside of a dedicated laboratory.

Many factors can interact, such as nutritional condition, whole spat viability, and cellular stress levels, among others.

Many of the techniques to evaluate quality require expensive equipment run by specialist staff or technicians. Cawthron, in collaboration with experts from the Malaghan Institute for Medical Research, University of Otago and Oregon State University, are developing a suite of techniques to measure spat quality that can be applied in the field. The aim is to develop techniques that allow farmers and researchers to determine spat quality using technology that can be used alongside a smartphone. The main objective is to assess stress levels and other factors in small, translucent mussel spat. A staining protocol to localise and quantify oxidative stress in spat has been developed and optimised, and now efforts will lean towards extending this protocol for use in the field. Cawthron's initial objective is to modify a prototype that was developed by Dr George Waldbusser from Oregon State University to detect healthy/unhealthy oyster spat using the fluorescent dyes Calcein and Nile Red which show shell calcification and nutritional status. The field deployable technology uses specific lights and filters that allow for the detection of the fluorescent signal emitted by specific dyes then, through a photograph taken with a smartphone, image analysis generates a quantitative measure of health.

At Cawthron, we are now expanding this idea to include molecular dyes that can also detect oxidative stress levels in spat. Oxidative stress is the result of the accumulation of free radicals or reactive oxygen species (ROS) produced within the cells. Under normal, non-stressful conditions, the cells produce a small number of free radicals which can be neutralised by the action of the antioxidants naturally occurring in the organism. However, during stressful conditions, the action of antioxidants is overwhelmed, and free radicals accumulate, resulting in cell damage and potentially shellfish

death. Assessing and managing the levels of oxidative stress in mussel spat may become a critical step to improve seeding. Assessing stress and quality in larger juveniles, e.g., at interseed size, is also crucial and a key focus within the Cawthron shellfish team.

Overall, this project brings together experts in the fields of aquaculture, oxidative stress, physiology, engineering, and technology, from national and international institutions to support industry. Our goal is to produce an optimised field device that can detect and quantify fluorescent signals to measure different parameters that relate to spat quality, placing powerful assessment tools directly into farmers' hands.

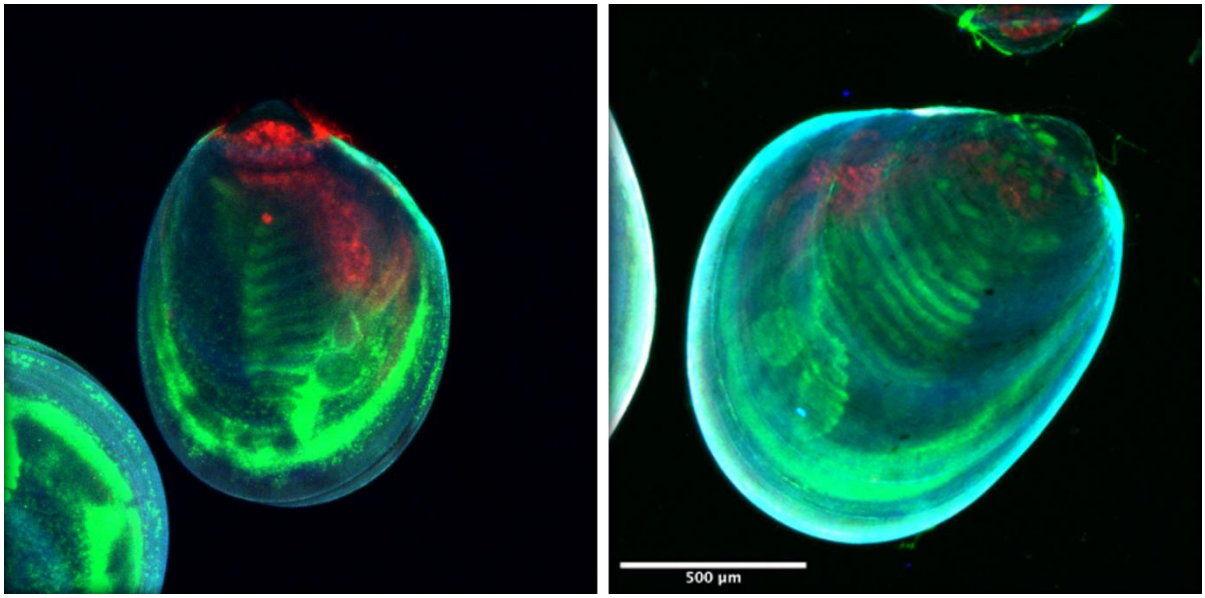


Figure 1. Photograph of stained mussel juvenile (Perna canaliculus) showing fluorescent signal of reactive oxygen species (ROS; green) and autofluorescence signal of the gut (red).

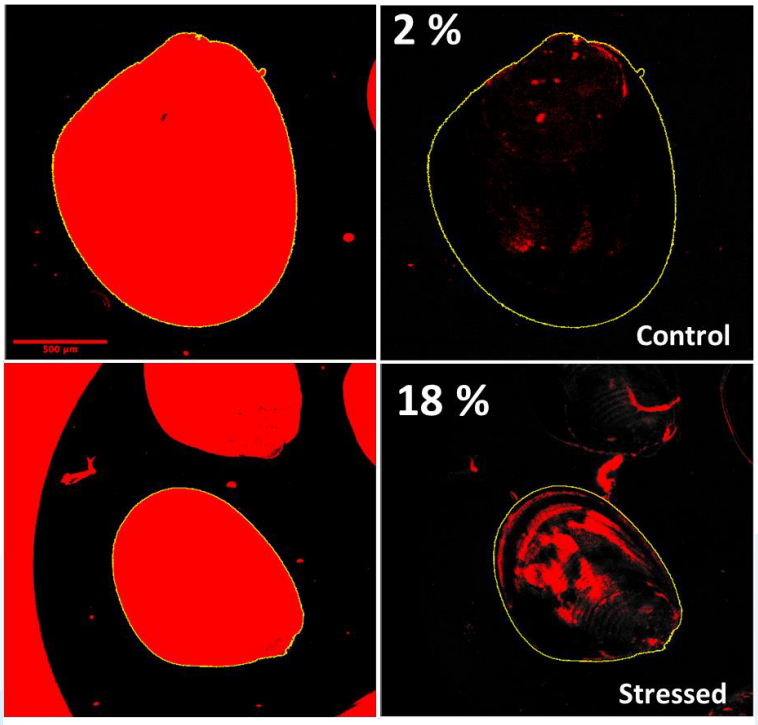


Figure 2. Image analysis showing the area covered by ROS in relation to the shell size for control and stressed (emersed for 20h) mussels.

Figure 3. GreenshellTM mussel juvenile (Perna canaliculus).

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Bobs got one foot out the door

Bob Nicolle is quietly retiring, in more ways than one. After decades of service on the MFA Executive, he advised that he would not be seeking re-election to the Board. He is also beginning to pull back from his day-to-day involvement in the industry that he has given his life to, since picking Greenshell™ mussels from beaches in the Kenepuru Sounds during the 1970s.

2004 Merit Award, presented to Bob Nicolle by NZMFA President, Rob Pooley

It was an accidental start for the former Cantabrian who first came to Marlborough in 1974, attracted by what the Sounds and environs offered for recreational scuba diving.

A positive outcome from the beach mussel picking exercise was that he met marine farming pioneer Jim Jenkins, who's enthusiasm convinced him this was the way of the future. This resulted in Bob and his father submitting in applications for two 3ha farm sites in Kauauroa Bay. It took years for the licences – numbers 12 and 13 – to emerge out of Wellington. In the interim, Bob started fishing, initially around Marlborough and then out of Westport,

principally he spent his time fishing for cray. It was while he was there, he met Julie, whom he would later marry in 1979.

"When the licences finally came through in 1976 we had 2 years to activate them or we would lose them. So, my father and myself, along with a good friend from Westport set up a small company and jumped into mussel farming knowing little or nothing about it."

In 1978 Bob re-located to a cabin at Te Rawa in the Pelorus Sound to set up his first longlines in Kauauroa Bay. The primary anchoring system at that time was 100kg Danforth anchor, which meant they needed resetting each time they were dragged by tide and weather. By this time, Bob and Julie were married. Julie joined Bob in the Pelorus, where they moved into a vacant farmhouse in Wilson's Bay, something of a huge step for Julie with no road access or mains power.

"Despite the lack of knowledge and steep learning curve things looked really rosy for the first year or so," Bob recalls, "with steady demand for the domestic fresh market supply as well as a new market for powder to the United States." This ran into difficulties when the Food and Drug Administration rejected the Seatone product's cure claims and banned sales. "Then the arse dropped out of everything. With everything having to go to domestic sales (no half shell then) we were getting next to nothing in sales, and what we were getting usually only covered harvesting costs."

To earn a weekly pay packet, he took a variety of casual jobs such as working on harvesters and helping South East Bay identity Dick Codd with wharf and bridge building. Dick was an avid home brewer which required sampling on a regular basis!

In 1982 Bob and Julie shifted to their own home just out of Havelock, along with their relatively new son, Ryan. A couple of years later saw the arrival of their daughter, Taryn. The shift opened up other earning opportunities which resulted in many hours working, and learning, with Johnson's Barge Service. Small contract jobs on mussel farms were also untaken with good friend Graham Hood.

"Anything really to make a dollar to pay the mortgage. The farms took second place with farm work done on off days or weekends while the market re-established itself. It was during this period we had to sell one of our farms to maintain liquidity."

"During the second half of the '80s it finally began to pick up."

Initially the work was very manual. There were no cranes on barges. Harvested mussels were either in 20-25kg bags and then stacked on pallets set out on the barge or boat. When the now common bulk bag was first trialled, the sides of the bag were folded down and the mussels relayed to them manually by fish bin.

"Similarly, seeding single droppers presented the same challenges, load the table by hand, use gravity and hands to control load and speed, and repeat all day."

"The guys now produce in a morning what we did in a week or more. They wouldn't do what we did – they'd probably go on strike."

He says there's been great advances in vessels, equipment and technology which are welcome.

"We'd never want to turn back that clock on technology, but fundamental farming principles remain constant and easier is not always, necessarily better."

"We've all made many mistakes over the years, that's how we've learnt, the key is not to keep repeating the mistake. I often hear we should do this or that, but we had often experienced those stuff ups 20 or 25 years ago and I don't see the need to repeat that error again."

Bob was first a member of the NZMFA Executive (now the MFA) in the 80s and says there were a lot of good characters active in the industry at this time. People such as Don Mitchell, the Yealands family, John Young, Jim Jenkins, Rob Pooley, Jim Goulding and Jim Jessep to name a few. He's made some life-long friends. MFA AGMs were initially held at various locations including the Havelock Town Hall. As the industry and MFA grew these morphed into the legendary three-day marathons at The Portage Hotel. "There was never a dull moment from the time you arrived Friday until you left Sunday. There was more life in the party than there is now, we want to go to bed too early these days."

"There has been lots of very frank & healthy debate at industry meetings through some difficult times and it shows the strength of the MFA's founding principles such as "one identity, one vote" and "working for the whole not the individual" that has given and will continue to give the MFA its longevity," says Bob.

"I feel very privileged to have been on the MFA executive and been able meet and work with all the colleagues and staff over 30 odd years."

In 1987 Bob was introduced to United Fisheries founder Kypros Kotzikas through a colleague and fellow farmer Neil Perkins. The three formed a company as equal shareholders, initially with three farms. By the 1990s, United was looking to expand further and did so outside the original joint venture. Initially they continued to manage these interests, but by the mid 90's, the decision was made to devolve the structure, and for United Fisheries to manage all of the marine farm interests with Bob appointed as Aquaculture Manager. Over the next decade Bob released his personal investments in the farms and focused solely on developing United.

He has now started to pull back on this role, moving away from operational & farm management to the oversight of resource consents, the

Marlborough Environment Plan and development opportunities. "I've got one foot out the door now."

Bob turns 70 next birthday and says it's time to step back.

Despite the challenges ahead, he still sees a huge future for the mussel industry. He acknowledges the contribution the MFA has made, not least in recent years, by defending farmers rights through the development of MEP and bringing a new focus on issues like improved environmental management and training.

Though new water space opportunities in the Marlborough Sounds are pretty well exhausted, he believes the opportunity to embed MEP, with its proposed modifications should see an era of stability that provides the base for investment into science, technology and diversity as opposed to litigation. This will see the Marlborough region remain the leading light in the sustainable operation of marine farming for the benefit of all.

Bob is watching less sheltered offshore sites with some interest. "I know how difficult it can be in the Sounds and in the semi-enclosed Golden Bay (Ring Roads) site at times, so those more open water sites present some serious challenges."

He says if the technology can be found, success on these sites can only be good for other local communities and the country.

"I don't think we could calculate the individual or collective time, energy or resources that have been put into establishing the industry." As an example, the Tasman Plan commenced developing around 1993 and first lines as result of that plan (on the Ring Road sites) never went into the water until 2008 – 15 years later. "I find these processes very frustrating and the hugely extended and exhausting process a waste of resources."

"You've got to live a long time to see the end of it."

"As with most things in life, we can only gain these experiences and successes with the support of your home base. Many a birthday and anniversary has been forgotten because of a meeting or work commitments without too much fuss, so it should be noted that the love and support from my family has allowed all these things to happen."

After 43 years in an industry he loves, Bob Nicolle has helped a lot of good things come to pass within the marine farming industry. Even as he begins to wind back, he'll continue to take an interest in our industry's progress, in his quietly retiring way.

Ambitions Continue to Grow Following a Lifetime on the Water

Mick Norton has spent a lifetime on the water, and still, it's not quite enough.

At 82 years old, Mick continues to explore the abundant uses for kelp Macrocystis Pyrifera, or Giant Kelp, which is endemic to New Zealand.

Giant Kelp, on farm.

Mick sees huge potential for the species, which he has been working with for two decades, particularly in the food and pharmaceutical industries.

"Macrocystis is full of goodness, offering benefits for a range of industries, including food, pharmaceuticals, medicine and agriculture," Mick says.

"Seaweed is a true superfood, and I enjoy exploring the potential avenues for which we can provide real value for people across the world with our kelp grown here in Tory Channel."

Until now, Mick's work has largely focused on foliar sprays for Marlborough's grape industry, however his organic product, Natural Kelp Tea, has been used on vineyards, farms, and gardens right throughout the country.

While he continues to work on and improve his foliar sprays, he is turning his attention now to the different ways his seaweed can be processed and

passed on to producers of a wide array of products.

A key focus is to perfect a method that preserves as much of the naturally occurring properties of the kelp as possible.

“Seaweed is an up-and-coming industry in New Zealand, as its potential to replace synthetic, and often harmful products is explored for a range of settings, not least the farming industry,” Mick says.

Mick is in talks with scientists across New Zealand who are providing valuable insights into what exactly they need to produce such products.

He is also in the process of establishing six long lines on his farm for the exclusive purpose of growing Macrocystis.

“It’s an exciting time for kelp farmers in New Zealand, as the potential of this wonderful plant is being realised”

“We need to capitalise on the many benefits of kelp, particularly when it comes to reducing damage to our environment,” Mick says.

Mick has worked in the Marlborough Sounds for much of his life, initially as a fisherman after leaving school at 14, and later a paua diver.

He and his wife, Mary, applied for a marine farm license at Hitaua Bay, Tory Channel, in 1977, which has since been used to farm paua, paua pearls, kina and mussels, the latter still a part of the farm today.

Mick with brown kelp concentrate

The farm's potential for growing seaweed was an incidental finding, after a forest of Giant Kelp 'attacked' it in the 1980s.

After initially cutting the kelp away, Mick's mind got ticking and he began his research into potential uses for the sea plant.

Following many experiments and seaweed prototype products, Mick had a breakthrough with his seaweed foliar spray; his cold process maximising the goodness from the seaweed and providing the ultimate food for plants and soils.

"Around 2006 I began producing the foliar spray, Natural Kelp Tea, on a commercial scale and had my products certified organic by BioGro, later changing my certification to AsureQuality, who we are still certified organic with today," Mick says.

Tory Channel Kelp Products now produces around 40,000 litres of Natural Kelp Tea each Spring, which is delivered to vineyards across the Marlborough region to order, from Spring through to Summer each year.

The work doesn't stop come Autumn, though, as Mick continues to work on potential new products year-round.

"I'm very much looking forward to seeing where the kelp journey will take me and have no plans to stop experimenting yet!"

For further information - https://www.naturalkelp.co.nz/

NIWA dives deep on summer sea temperature forecasts

NIWA climate scientists Ben Noll, Tristan Meyers and Neelesh Rampal have been comparing climate model predictions of sea surface temperatures to see what the coming summer might bring.

Forecasting sea surface temperatures several months in advance is challenging. A multi-model ensemble (which combines predictions from several models) usually outperforms even the best individual model. Based on predictions from eight different climate models from institutes around the world, we expect that sea surface temperatures around the New Zealand coast will be warmer than usual this summer – particularly in January. Compared to a 1993-2016 baseline period, summer sea surface temperatures are predicted to be above the 90th percentile. This suggests an elevated chance of marine heatwave conditions in some areas this coming summer.

The sea surface temperature anomaly (the difference relative to normal temperatures at that time of year, based on 1993-2016 data) is predicted to reach +1.0°C to +1.5°C above average in some locations (see figure 1). These are month-long average values and higher temperatures could occur during some parts of the month.

Focusing in on water near the Pelorus Sound, where nearly half of NZ aquaculture occurs, the ensemble average temperature anomaly in Cook Strait near the Pelorus Sound entrance increases from October through to January, with a most likely range of about +0.8 to +1.0˚C in January when the most unusually warm seas are forecast (see figure 2). Computer models capable of forecasting several months in advance have a low spatial resolution (1° of latitude by 1° of longitude or about 110x110 km)—they can resolve temperatures in Cook Strait not within the Marlborough Sounds. NIWA coastal scientists David Plew and Niall Broekhuizen are comparing sea surface temperatures measured at many locations within the Sounds with those in the wider Cook Strait region, to generate localised or 'downscaled' forecasts.

Long range forecasts become less and less certain further into the future, so we will be keeping an eye on the predictions as summer develops. Look out for an updated forecast next month.

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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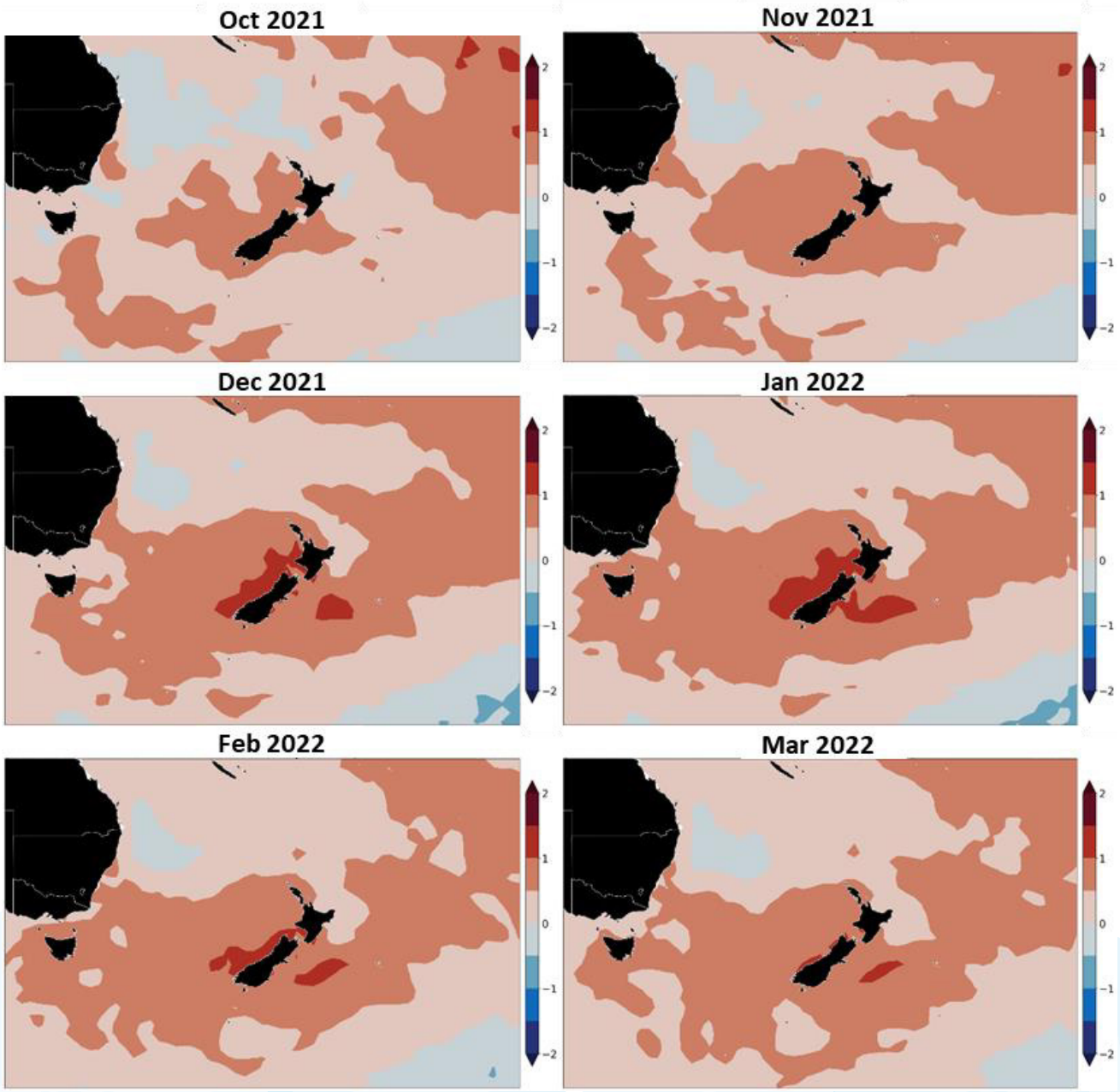

Figure 1 Maps of monthly averaged Sea Surface Temperature anomaly forecasts for October 2021 to March 2022. These maps are created by combining results from 8 different climate models. Regions coloured in red-brown tones are predicted to be warmer than usual. Those in blue tones are predicted to be cooler than usual.

Forecast Pelorus Sound SST anomalies (℃) over the next 6 months

Month	25th percentile	50th percentile	75th percentile
2021-10	0.34	0.45	0.48
2021-11	0.43	0.54	0.60
2021-12	0.70	0.89	0.90
2022-01	0.82	0.97	0.98
2022-02	0.70	0.86	0.95
2022-03	0.61	0.83	0.87

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

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.

The due date for articles is the 20th eg: for something to appear in the February edition we will need it before 20 February.

Marine Farming Industry - thanks for your support!

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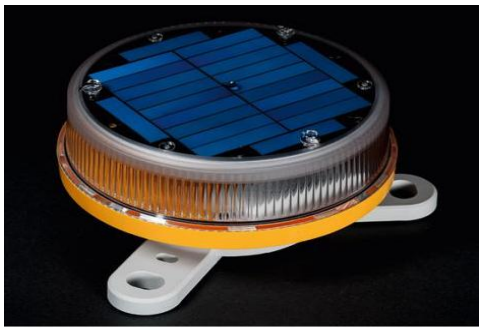
Carmanah M550 1-3 NM Lantern

This Solar LED Marine Lantern is ideal for Aquaculture applications.

- **Fully Self-contained, Programmable, IP68, up to 3 NMs**
- **Weighs just 400gms. Direct swap for M502**
- **3x NiMH AA batteries - 5 Yr life. $30.00/set to replace.**
- **Over 1,500 sold in NZ since 2014. Avail ex Stock.**

M660 – World's lightest 4 NM Cardinal Mark Lantern



- **Fully Self-contained, Weighs 800gms, IP68, up to 4 NMs**
- **Bluetooth Programming using Smartphone up to 50 Mtrs away**
- **7 Yr battery. All colours. Bird Spikes incl as standard**
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