

## AUGUST 2021 NEWSLETTER

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## IMPORTANT DATES

**MFA & MSQP AGM / Conference / Awards**  
12th November 2021  
Queen Charlotte Yacht Club **\*SOLD OUT\***



# GM's Comment

Well, I think most of us expected a return to Level 4 at some point in 2021. The familiarity did make entering lockdown easier this time around, but the continued impact on non-essential businesses and the anxiety associated with the delta variant still make for challenging times. Once again, aquaculture relied on its essential business classification and core business continued. Most companies proved well versed in the Level 4 protocols and managed to stand up the required controls and documentation very quickly. We were lucky in a sense that this lockdown coincided with winter shutdowns for many companies.

This outbreak was unarguably bad timing for conferences, with Seafood NZ, AQNZ and MFA all having to cancel or postpone the events planned for Quarter 3. Putting the events on hold was certainly the right decision, but my commiserations go to the teams behind the scenes that poured in countless hours of effort. We are long overdue a good catch-up as a sector - so I'm sure we will see some pretty special events in 2022.

In a similar vein to last year, the MFA AGM was held via Zoom. The biggest news emerging from the meeting was Bob Nicolle's decision not to run for the Executive Committee again after 30 years of service. Bob's steady hand and considerable governance experience will definitely be missed. I have certainly appreciated Bob's advice and guidance over the past few years. Thank you to the other Executive members who have all signed up for another tour.

With covid front of mind here in New Zealand, it is great to see that our export markets (especially the USA) are showing signs of emerging from the pandemic restrictions. The signs of recovery included a boost in both sales volume and price for most mussel formats; while salmon exports managed a new record for total volume and enjoyed strong average pricing. For oysters, volume continues to be an issue, but demand and pricing are holding well.

On the PMEP front, we are still waiting on a hearing notice for Variation 1 and 1A. We understand that MDC is committed to holding the hearings in November 2021, but we will have to wait and see whether the changing alert levels will have an impact on the Court's schedule. Behind the scenes, there is considerable effort going into the production of maps and preparation of evidence.

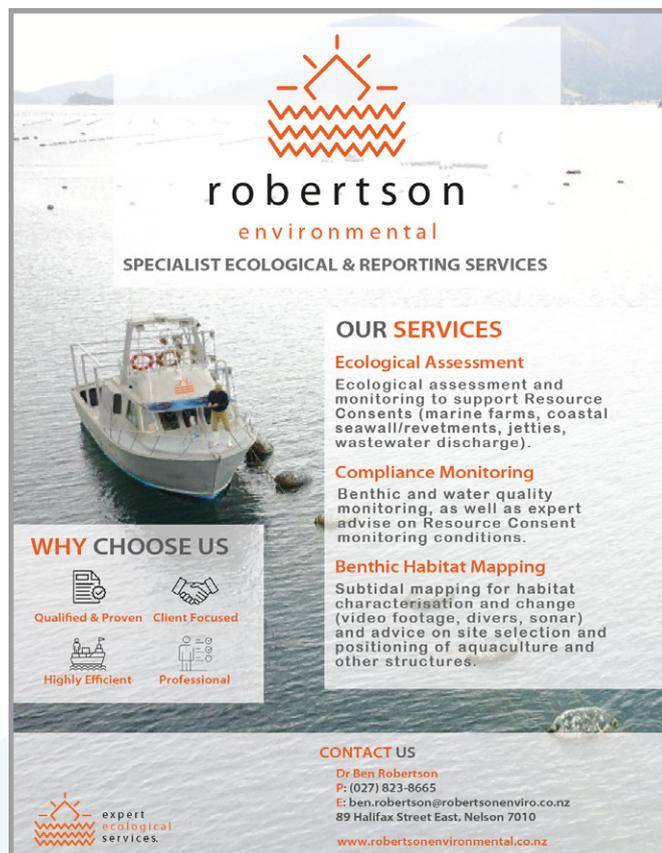
We are now in the final year of the SIL funded King Shag Research project. This year's banding and tracking is well underway, with data already collected from seven Pelorus birds and plans afoot to capture/track another twenty pre-Christmas. Beyond 2021, MFA has agreed to guarantee

another three years of banding and resighting effort. This work may not have the instant gratification associated with the GPS tracking, but it is critical to understanding population dynamics and the overall health of the species.

The new Environment Programme is now live, and Amber is accepting applications. So far, we have processed four companies who all attained either silver or gold status. This is a good result, as it shows that the assessment metrics are appropriate i.e. we are doing well, but there is certainly room for improvement. As we all know, environmental performance is key issue for all industries, and it remains a focus area for MFA.

Finally, as alluded to above, the MFA Conference was postponed and the revised date is Friday 12th November 2021. Please pencil in this date and cross your appendages for Level 1!

## Ned Wells



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# 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](mailto:scott.gillanders@maclab.co.nz) / 027 649 0239

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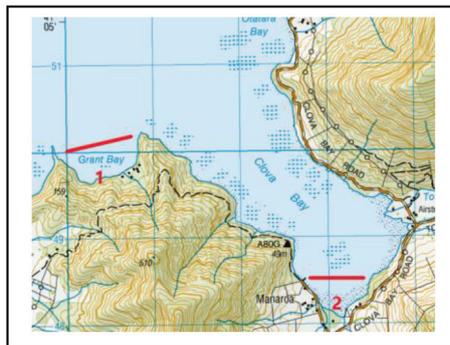
# Environmental Update

## Clova Bay and Crail Bay – Big Day Out

Originally scheduled for 28 July, this event had to be postponed due to the July storm event. The new date was 11 August, which bought us glorious weather but due to the change in date the tide wasn't ideal.

We headed into the areas shown on the maps below – there were 46 people, which equated to around 140 beach cleaning hours and we gathered just over 250kg of debris. It was a great day out and I look forward to the next one! A big thank you to those companies that provided staff and vessels.

As we all know, these areas are particularly at risk due to their orientation to the prevailing winds and currents. They remain a point of focus for all our operators.



# MFA Environmental Certification Programme

## NOW LIVE!

Applications are now being accepted.

Details and the application portal can be found on the MFA members website:

Under the Environmental tab

Click on Environmental Certification

Read all the information

Click the “Get Certified” button at the bottom of the page.

\*The old certification will be obsolete as of 31 December 2021.

\*\*Please read T&Cs around sticker removal & replacement.



## CONGRATULATIONS!

We would like to say a huge congratulations to the following companies who have already submitted their applications and have been awarded a certified level.

|   |                                       |  |                                    |
|---|---------------------------------------|--|------------------------------------|
|  | <b>Sanford Limited</b>                |  | <b>Just Mussels Limited</b>        |
|  | <b>Marine Farm Management Limited</b> |  | <b>Clearwater Mussels Limited.</b> |

## MFA Beach Cleaning Programme

### NOW LIVE!

The old beach cleaning programme is now obsolete.

Participating companies have been given cleaning targets based on the size of their operation (using total backbone metres across the Top of the South to derive this).

The beaches have been given cleaning frequencies based on their need.

This is now live and will see the industry beach cleaning effort double. The programme will be fluid and responsive to observations of debris accumulation.

Information about the new beach cleaning programme, the assigned cleaning areas and beach cleaning targets can be found on the MFA members website:

- Under the Environmental tab.
- Click on Beach Cleaning programme

## The MFA App

### NOW LIVE!

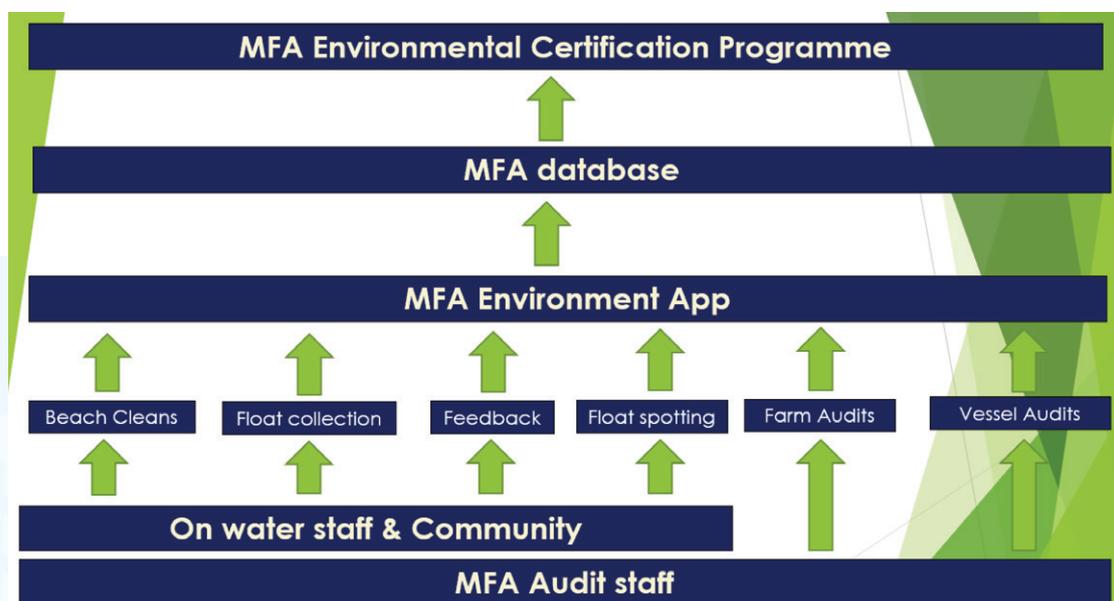
The App focuses on environmental data and allows our members and the wider community to report in real time.

This information helps MFA monitor environmental performance and to proactively put training programmes in place to mitigate any issues that arise.

The app can be used when offline, so it works anywhere in the Top of the South (NZ).

To start using the App, head to our website:

<https://www.marinefarming.co.nz/how-to-use-our-app/>



**Please note** this is an alternate way of reporting data to us, the other methods are still active & you are welcome to use them.

- Text, Email or Phone – Ph: 027 255 2228 or admin@marinefarming.co.nz
- Complete the paper form, scan it and email it to us – admin@marinefarming.co.nz
- Fill out the online form on our website - <https://www.marinefarming.co.nz/beach-clean/>

**The Marine Farming Association will provide training for the app, you just need to ask!**

## MFA Environmental Workshop

We have an Environmental Workshop coming up for all on water crews. It will focus on:

- Beach cleaning technique
- Float tying techniques and developments
- The new MFA Environmental Programmes
- MFA App use

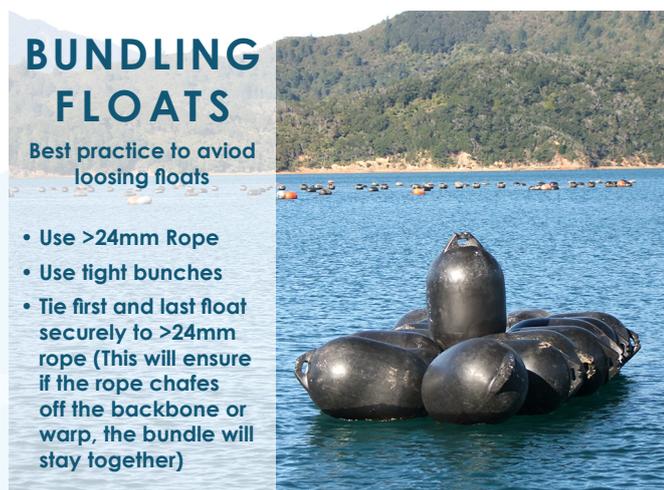
All areas of the workshop will be interactive and encourage discussion – pros, cons, what works, what doesn't, new ideas.

Followed by a BBQ, a couple of drinks and a yarn!

The workshop will be run multiple times to accommodate for shift variances.

### Dates & locations (Covid allowing):

| Date              | Location          | Timing        |
|-------------------|-------------------|---------------|
| 17 September 2021 | Pohara Boat Club  | Start 10.30am |
| 27 September 2021 | Havelock Pavilion | Start 11.30am |



# Mussel Restoration Project

## Mussel Restoration Project for the Marlborough Sounds – August 2021

### Subadult/Adult mussel experiment

In early July we placed 20 tonnes of subadult mussels, supplied by Sanford, and 10 tonnes of adult mussels, supplied by Jonathan Large, at two depths in Kenepuru Sound.

The aim of this experiment is to test the benefits of restoring adult mussels (90-100 mm in length) versus subadult mussels (50-60 mm), as subadult mussels are thought to be more adaptable, have stronger attachment threads, and provide more mussels per tonne than adults.



Figure 1: Left: The crew and Emilee on the Lady Marie after the deck was cleared of the 30 tonnes of mussels! Right: A bag of mussels preparing to be deployed onto the mussel plots.

### 18-month post-deployment monitoring on the first mussel deployment

In early August we performed an 18-month monitoring on our first mussel deployment.

Four of the locations (Maori Bay, Skiddaw, Te Mara, and Weka Point) had high survival (81-99%), but our mid-Pelorus site, Grant Bay, lost the fight with starfish.

Very few mussels remained at Grant Bay (~50 mussels in total) and the few that were left had high numbers of starfish on top eating the remaining mussels.

Grant Bay had experienced the highest numbers of large starfish arriving at the site over the last 18 months (80 per sampling event, mean=31 mm), while the Kenepuru sites have had less starfish that are smaller in size (8-26 per sampling event, mean=16 mm).

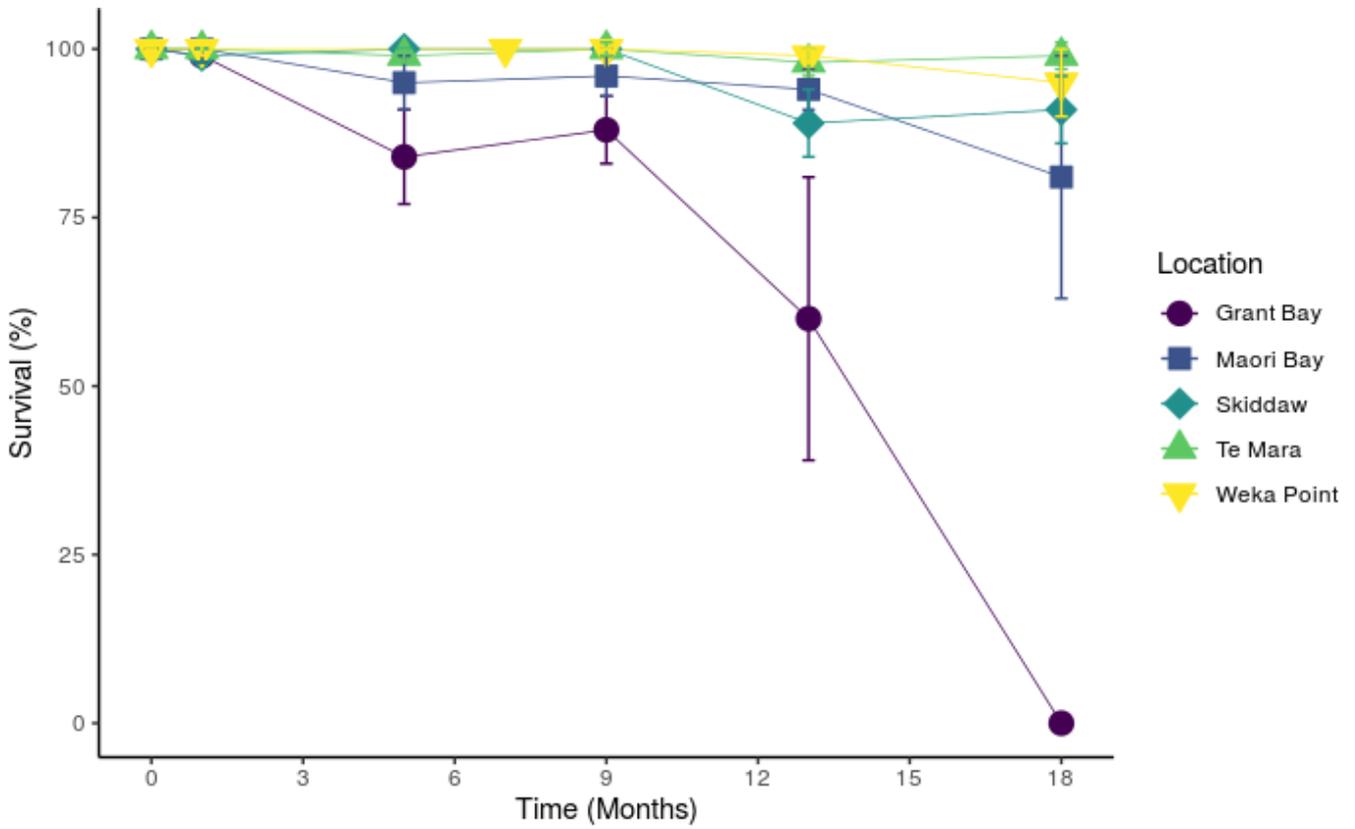


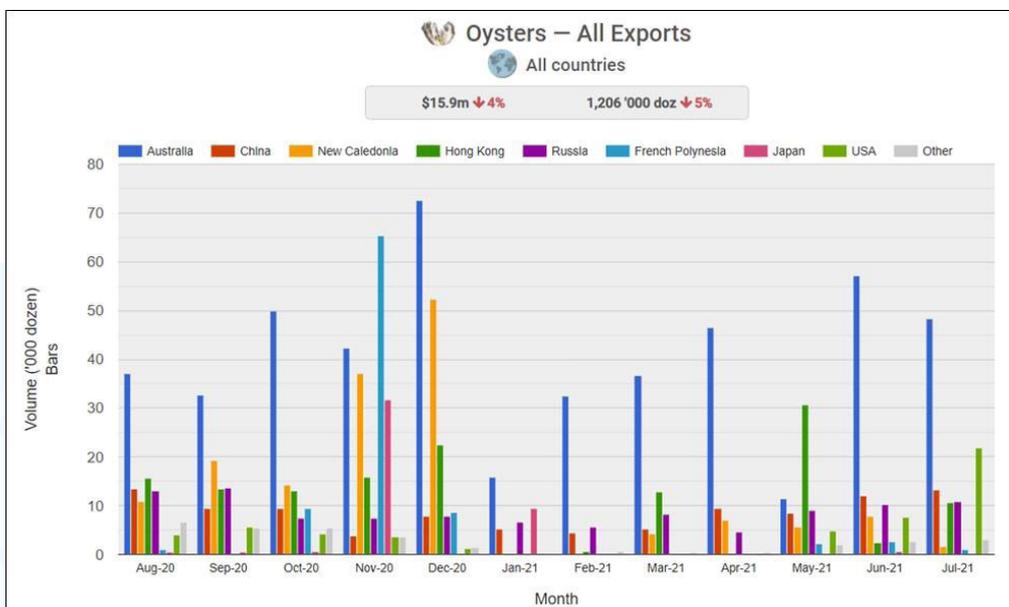
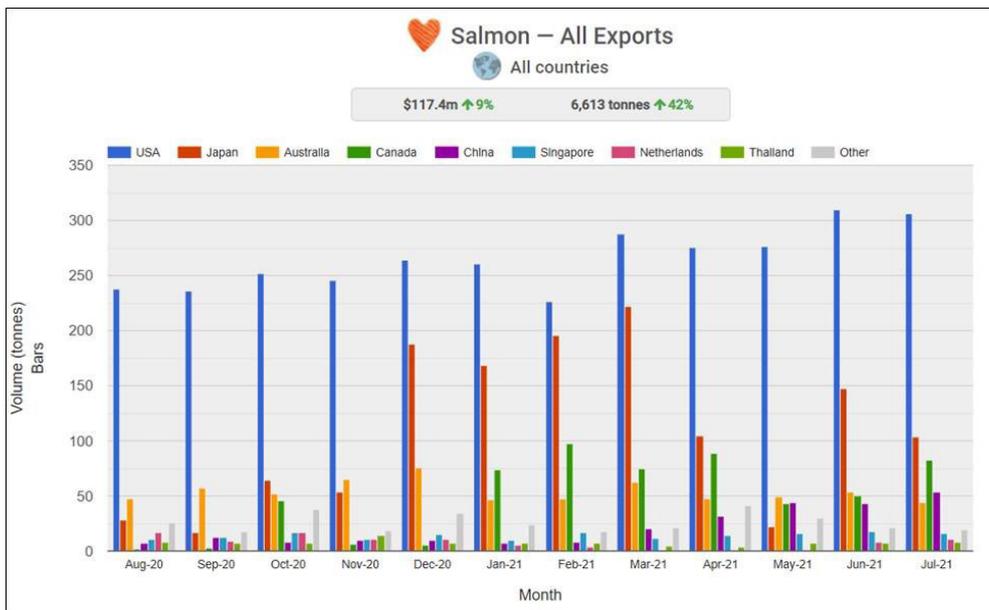
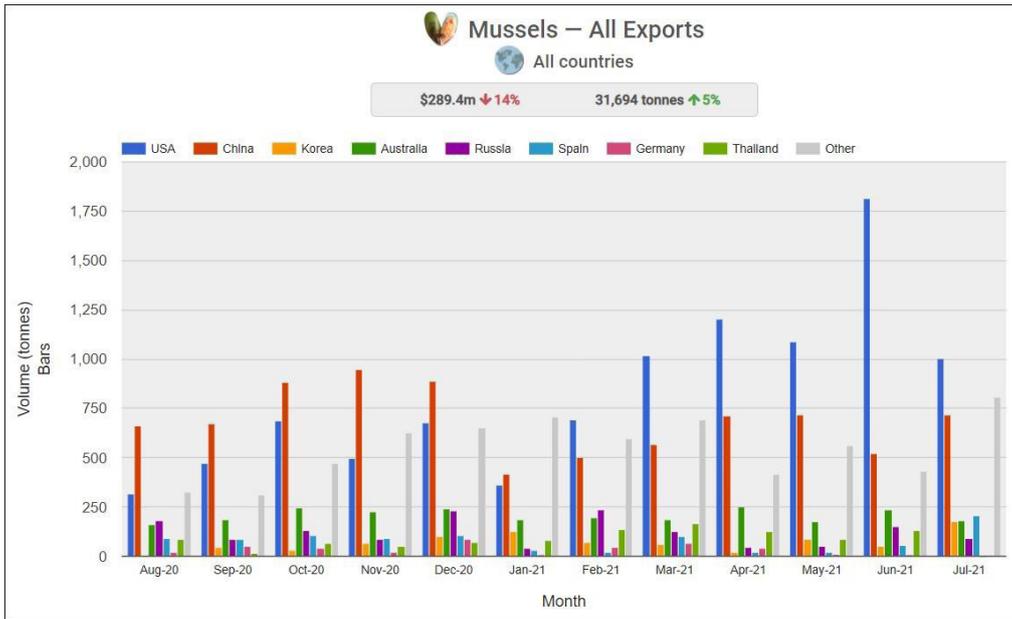
Figure 2: Mussel survival over time at the five sites.



Figure 3: 11-arm starfish sitting on the empty mussel shells at Grant Bay at the 18-month monitoring.

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](mailto:egol669@aucklanduni.ac.nz)

# AQNZ Export Statistics



# Smart + Connected Aquaculture Update

We are in an exciting new phase looking at projects around the theme of Opportunities for Restoration, even if we are having to do a fair bit of Zooming.

This comes about as the successful MFA-supported project to restore wild beds of greenshell mussels is drawing towards a close.

Ned suggested to the S+C Aquaculture group that there were other initiatives that might benefit from some of the roundtable discussion that brings industry, science, Council and community representatives together.

To start the discussion, on Ned's behalf, Anna Kleinmans from Sanford advised that if the process for deploying mussels was streamlined, the industry would likely support future restoration efforts. This would require shorter timeframes for biosecurity approvals and multi-year restoration consents.

Thanks to a move to screw anchors, industry could also supply and place anchor blocks to assist with the construction of artificial reefs.

MDC Coastal Scientist Oliver Wade said it was great to hear industry is so keen to contribute to restoration efforts. He pointed to a worldwide move towards restoration and said MDC/TDC/NCC are now collaborating on an Envirolink funded project in which NIWA's Sean Handley and others will identify technical options for restoration of the marine environment in the Top of the South.

There have been several stakeholder workshops with Sustainable Seas National Science Challenge to develop an Ecosystem Based-Management case study for the Marlborough marine area. A proposal focussed on shellfish restoration is currently being developed and it is hoped funding will be allocated for a 2 year project.

Oliver said resource consents are still required from MDC for any shell return but he has been working with Emilee Benjamin's wild beds project to make this as easy as possible. Oliver noted Biosecurity NZ/MPI had their own processes.

MPI's Rachel Somervell advised that Auckland Council had developed a long-term flexible consent over 35 years with basic areas identified, allowing approval for deployments a year in advance.

Sean Handley then presented on the history of Sounds degradation and noted a 320 tonne drop of scallop shells in Tasman Bay which helped stabilise sediment/improve biodiversity. He said climate change was now adding pressure as it was proving to be at the upper end of impacts

predicted and this would be part of the work with MDC/Envirolink project – looking at how coastal margins could still provide species habitat.

Emilee presented on Restoration through Collaboration. She noted Vaughan Ellis had got up great industry support and how many marine farmers were scientists in their own way. Collaboration was the only way to succeed, Emilee told us.

Another Phd student, Trevyn Toone, then outlined his baseline study, identifying that Kenepuru mussel stocks are at perhaps 3% of what was their before wild harvesting started. Trevyn made case for a project to determine why wild stocks had not returned.

NMIT's Craig Prichard then presented, supported by SS Float's Paul Smith. They outlined a case for using trawlers to process mussels, with selective shell drops to help support marine biodiversity. He is exploring funding avenues and has added to the group involved including support from the Tasman Bay Guardians.

Some comment was voiced at the S+C Aquaculture meeting about Havelock being too small a port for trawlers and biosecurity concerns on shell return needing careful management.

So, it was one heck of a meeting and we are not pausing. For our September meeting we will include a focus on opportunities for restoration with seaweed.

Presentations will include one from Paul South from Cawthron, which follows on from the report which Cawthron and other scientists have recently completed on the opportunities for a seaweed sector.

We are also hearing from Dr Heidi Alleway from Adelaide who's been involved in a Nature Conservancy report on restorative aquaculture.

And there's a presentation from NIWA's Drew Lohrer who is leading a Sustainable Seas project looking at how to build restorative economies in Aotearoa New Zealand's coastal and marine environment.

So, a lot happening in the Smart+Connected Aquaculture space.

## **Brendon Burns**

### **Chair**

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## Marine Farm Compliance Audit Programme

Declarations are Due  
**31st October 2021**

If you have not sent in your declaration for the 4th quarter, please do so as soon as possible



**ONE DECLARATION FORM PER SITE**  
DUE BY THE END OF EACH PERIOD

|                                   |            |
|-----------------------------------|------------|
| November, December, January       | (1)        |
| February, March, April            | (2)        |
| May, June, July                   | (3)        |
| <b>August, September, October</b> | <b>(4)</b> |



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# ‘Staying Ship Shape’: New resources on MarineSAFE

MarineSAFE now offers a range of resources – including a training module, tips, videos, and downloadable resources- to help those in the seafood sector understand more about wellbeing and provide coping strategies for when times get tough.

The resources have been provided by FirstMate New Zealand ([www.firstmate.org.nz](http://www.firstmate.org.nz)) – an initiative to provide those who work at sea or on marine farms with one-on-one support when they need it the most. Check out the Staying Ship Shape resources at [www.marinesafe.nz/staying-ship-shape](http://www.marinesafe.nz/staying-ship-shape).

If you’d like to get in touch with FirstMate to talk through what you need to stay on course, you can call them on 0800 ADRIFT (237 436) any day between 7am and 10pm.

MarineSAFE has a number of free training modules for the seafood industry with more to come. If you would like to know more about how MarineSAFE could support your sector, get in touch at [info@marinesafe.nz](mailto:info@marinesafe.nz) or contact us on 03 546 6770.



# MFA Conference & Awards dinner update

## Déjà vu!

Well, for the second year in a row the MFA have had to reschedule this event due to Covid restrictions.

Just a quick update, the MFA and MSQP Annual General meetings took place as planned on August 27th via Zoom. These were very successful meetings and saw around 30 participants.

The MFA conference and awards dinner have had to be postponed, the new date for this event is 12th of November 2021.

The programme will be the same as originally planned, all our speakers have confirmed that they can attend the new date. We will need to find an extra speaker to cover the section we had the AGM's planned for so there will now be a mystery speaker.

We have asked all those members & invited guests who had RSVP'd for the original event to reconfirm that they can make the new date. We were sold out on the original date so if you can now make the new date (12 November) please let us know asap and we will add you to the wait list.

Contact details for this event: Alex Henry – [admin@marinefarming.co.nz](mailto:admin@marinefarming.co.nz) | 03 578 5044

I wanted to take this opportunity to say a HUGE thank you to all our loyal sponsors who have stuck by us for the last two years as we have tried to run this event in very challenging times.



## 2021 Conference & Awards Dinner Programme

The Marine Farming Association will be holding their annual Conference & Awards dinner for members & invited guests in Picton at the Queen Charlotte Yacht Club on Friday 12<sup>th</sup> November 2021.

|                |  |
|----------------|--|
| <b>9.00am</b>  | <b>MORNING TEA</b>   |
| 9.30am         | Karakia to open.<br>Amai Thompson, Te Atiawa   |
| 9.40am         | Welcome & Housekeeping<br>Jonathan Large, Marine Farming Association   |
| 9.50am         | Mystery speaker - TBC  |
| 10.40am        | Panel discussion.<br>Scientific developments in the industry.  |
| 11.25am        | Quentin Davies - Marlborough Environment Plan (MEP) Update<br><a href="#">Gascoigne Wicks</a>                            |
| <b>12.10pm</b> | <b>LUNCH</b>   |
| 1.00pm         | Kelvin Watt – GDF and the Aquaculture Industry.<br><a href="#">Graeme Dingle Foundation Marlborough</a>                  |
| 1.10pm         | Chris Shaw – MCOG labour shortages and connection with schools.<br><a href="#">Marlborough Chamber of Commerce</a>       |
| 1.20pm         | Mike Hutcheson – Practical innovation & thinking differently.<br><a href="#">Auckland University of Technology/Hutch</a> |
| 2.05pm         | Steph Benseman – Mitigating risk when innovating & funding innovation.<br><a href="#">Icehouse Ventures</a>              |
| 2.50pm         | Amber McNamara - MFA Environment Programme 2021<br><a href="#">Marine Farming Association</a>                            |
| <b>3.00pm</b>  | <b>AFTERNOON TEA</b>   |
| 3.15pm         | Gary Hooper – Market update<br><a href="#">Aquaculture NZ</a>  |
| 4.00pm         | Karakia to close.<br>Amai Thompson, Te Atiawa  |
| <b>4.10pm</b>  | <b>CLOSING</b>   |
| 6.00pm         | Pre-dinner drinks & Canapes  |
| 6.30pm         | Welcome & Housekeeping<br>Mark Preece, QCYC Commodore  |
| 6.40pm         | Awards Ceremony  |
| <b>7.20pm</b>  | <b>DINNER</b>  |
| 8.20pm         | Tony Christiansen<br><a href="#">Motivational Speaker</a>  |
| <b>9.00pm</b>  | <b>DESSERT</b>   |

A HUGE THANK YOU TO OUR 2021 SPONSORS...

|                      |  |
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# A need to re-think equipment for open ocean farming

The scale of damage done to Tasman Bay mussel farms in the July storm is causing one major company to say there needs to be a re-think of whether technology and equipment designed for sheltered waters can cope with such events in more open seas.

MacLab's GM Aquaculture Scott Gillanders wasn't too worried when the July 18 storm hit. MacLab's 277ha farm off Motueka had come through the 4m swells of Cyclone Gita in February 2018 without much damage.

When the company's vessel Vanguard went out to check, he could not comprehend its report of the scale of devastation.

"So, I hired a fast boat to go and have a look. I was just shocked at what I saw."



The seas, which reached 8m according to the Port Nelson Fairway beacon, had pulled out anchors screwed deep into the seabed. Some 80 MacLab lines were damaged, many in tangled messes.

Other marine farms including those of Clearwater and Te Atiawa made up a total of 150 damaged lines in Tasman Bay. There were several more in Golden Bay although nowhere near as many. The storm had come from

due north, meaning no protection from any land mass. Cyclone Gita was a nor'easterly direction and had some buffer from D'Urville Island.

A repair effort swung into action. MacLab staff did beach cleans and business partners brought in vessels and crew to help. Simon Pooley's, Waimana Marine came with two vessels, a further two were provided by Jonathan Large's Marine Farm Management Ltd, MacLab's Vanguard was back out there and Bruce Lines Diving Services re-established screw anchors from its own boat the Pelorus.

Damage was such that screw anchors had to be re-sited. "We had to come up with a new farm design really quickly," says Scott. The race was on to get the lines straightened out and secured to mitigate crop losses.

Within three weeks, more than 100 new screw anchors were in place and all MacLab's lines were back in operation, though the true extent of crop loss is still being determined.



*Scott onboard the Vanguard in quieter times.*

Scott says MacLab and other industry players now want to learn as much as possible from the July storm.

He says the marine farming industry has grown up principally in the sheltered waters of the Marlborough Sounds. The technology developed for such waters was now increasingly being used in more exposed environments.

"This event has highlighted some significant weaknesses in our farm design and gear. If it happened again, it would make farming (in waters like Tasman Bay) very marginal."

MacLab also has 200ha of mussel farms in Golden Bay, the first stage of the

1,000ha SMW development. The Golden Bay farms suffered considerably less damage in July, but Scott says the storm highlights the risks faced as aquaculture expands into more open seas and moves towards achieving the \$3b by 2035 target set out in the Government's Aquaculture Strategy.

Working with the MFA, AQNZ, MPI, Te Atiawa and Clearwater Mussels, Cawthron Institute oceanographer Malcolm Smeaton has been engaged to work with ocean modellers Oceanum to replicate the July storm scenario in the Cawthron-developed mussel line simulation model.

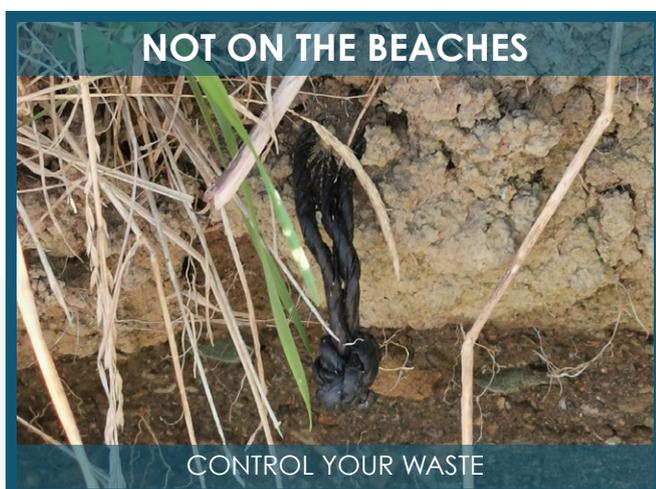
Cawthron will model 1 in 30, 50 and 100 year wave events and test the sensitivity of a range of inputs including:

- Backbone orientation and length
- Dropper spacing
- Warp ratio
- Buoyancy distribution
- Subsurface vs surface
- Fully submerged vs partially submerged
- Effects of weather directions/waves/tides

MFA GM Ned Wells said the results of the modelling would be presented at a dedicated symposium (date to be confirmed) open to all industry members.

“This will offer a great opportunity to collectively examine where existing systems failed and identify potential solutions”.

“We have got to start re-thinking this,” says Scott. “The potential is now clearly there for these kinds of events to happen to other farmers in other areas.”

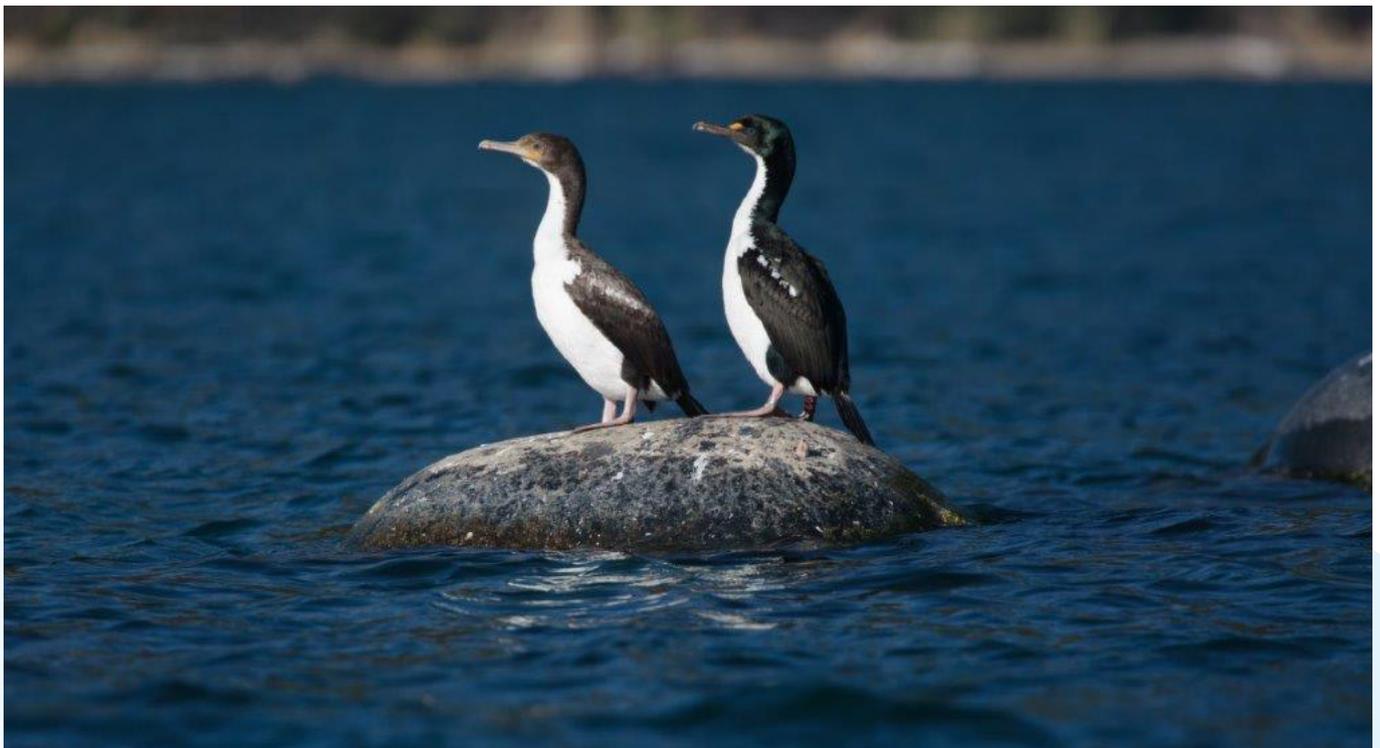


# King Shag research update

Over the winter months as part of King Shag breeding success monitoring, I spent considerable amount of time on the water looking for King Shags. Armed with a digital camera with a large zoom lens, I spent this time searching for banded birds, and this led to several new observations which is adding to our knowledge of this species.

Three banded adults from Duffer's Reef were sighted within the outer Pelorus Sound, all these birds were GPS tracked in 2019 or 2020 and as most King Shags do, had favoured foraging locations that they visited during that time. Interestingly, the sightings of these three birds were all from the area that birds were GPS tracked; this suggests that birds continue to forage within these favoured fishing grounds year after year. This has been seen in other related shag species, but yet has not been proven in King Shag.

Another interesting observation was of another banded adult female from Duffer's Reef, banded and GPS tracked in 2019. This bird successfully fledged one chick in the 2020 breeding season but didn't appear to be breeding this season. This bird was spotted, with presumably its one-year-old juvenile in tow, foraging within a Mussel Farm in Richmond Bay. The juvenile was in constant company with the adult, as if learning how to forage. The GPS tracking of this female showed that she did forage within Mussel Farms, and it appears that she is passing on this behaviour to her



*A banded adult female King Shag from the Duffer's Reef colony with her one-year-old offspring roosting on a mussel float after foraging within the mussel farm. Do adult King Shag hand down generations favoured foraging locations?*

offspring. This suggests that favoured foraging locations may be passed down generations and may be a learned behaviour.

One of the most interesting sightings during this time was one of the first chicks banded at Tawhitinui in 2018, and now a three-year-old bird. This bird was regularly seen at Tawhitinui until December 2019 when it disappeared; and was presumed dead. However, this bird suddenly appeared back at the colony in July 2021 and has been seen several times since (including foraging near Mussel Farms in Southeast Bay). The obvious question is where has this bird been for 18 months and suggests that at least some of young King Shags have a dispersal or exploratory phase of their adolescence where they depart the colony and move around.

Now that we have a reasonable number of individually banded birds in the population, it is possible to follow the fate and behaviour of individual birds. This is leading to new insights in King Shag behaviour and ecology. These observations continue to build on the knowledge we have of the species and prove the worth of the colour banding project.

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# Developing a Rimurimu / Seaweed sector

*A prosperous rimurimu/seaweed sector has massive potential to improve the health and well-being of Aotearoa New Zealand, research from the Sustainable Seas National Science Challenge shows.*

A new report, shows Aotearoa could reap economic, environmental, social, and cultural benefits – both nationally and locally.

“The potential for Aotearoa as a whole and for local communities is massive. Seaweed makes up almost a third of global aquaculture production volume. Seaweed production has tripled over the last 20 years with a growth rate of 7% per year on average over the last decade. Global value of seaweed aquaculture in 2019 was approximately US\$14 billion”, explains Project Leader Serean Adams, Aquaculture Group Manager at Cawthron Institute.

“Right now, New Zealand’s seaweed sector is in its infancy. There are pockets of product innovation happening at small scale. But the sector is constrained by regulation and supply – we have an under-developed local seaweed supply-chain”, Adams says.

“We need to identify what unique characteristics our native species have and develop these native species into high value products and services. We also need to remove barriers holding the sector back.”

To support development of this new blue economy sector in Aotearoa, the Sustainable Seas Challenge is working with industry and other stakeholders to co-develop a Seaweed Sector Framework for New Zealand.

Andy Elliot, from Wakatu Incorporation, is one of the report authors: “For Aotearoa to have a thriving, sustainable seaweed aquaculture sector, we need to take a collective systems approach. This includes strong leadership and engagement to influence fit for purpose regulations, and developing high value species, bio actives and ecosystem services. This can be achieved through science, processing and market connection, recognition, and respect for those who hold matauranga, and valuing our resources unique to us as communities and regions through relationships, provenance, and brand; and codesign and partnership from Government and aligned investors. This report sets out the challenge for this industry to achieve all this and become an exemplar primary sector — a seaweed sector we can all be proud of in twenty years’ time.”

A thriving seaweed sector will provide value to Aotearoa and local jobs. Developing the sector using a ‘blue economy’ approach would also lead to innovative products and services that improve the health of the moana and mitigate climate change.

Dave Taylor, from Aquaculture New Zealand says: “A blue economy-based seaweed aquaculture sector will provide value to Aotearoa, generate local jobs, and help us move to a low emissions economy. This report provides a solid foundation for a new sector focused on high value, low volume seaweed products that will be sought after globally. This focus fits with the values of our world-leading sustainable aquaculture sector. With their support and aligned research, we are well placed to develop innovative seaweed aquaculture methods and products that improve our health and the health of our environment.”

### **More to come**

This report is just part one of a comprehensive seaweed sector review by the Sustainable Seas Challenge. This report analyses the global market and the gaps and barriers for Aotearoa in developing its seaweed sector.

“In the next few months, we will release more reports that review the research and development of Aotearoa New Zealand’s key seaweed species and groups, Te Tiriti o Waitangi/Treaty of Waitangi considerations, and environmental effects associated with regenerative seaweed aquaculture. The impact of this sector on Aotearoa New Zealand’s economy and society, if we develop it right, could be a game changer for our country” Adams says.

The Sustainable Seas Challenge is using the findings and recommendations in the reports to co-develop the seaweed sector framework.

### **Infographics summarising some of the report findings**

[A snapshot of the global seaweed sector](#)

[What will enable Aotearoa New Zealand's seaweed sector?](#)



*Seaweed floating off the Kaikoura coast, CREDIT Leigh Tait NIWA*

# Flip Farm, Talleys & NZKS feature in Seafood Stars

Seafood NZ has recognised three aquaculture industry players in its Seafood Stars for 2021 – Flip Farm, Talley's for its new cardboard packaging and NZ King Salmon's Denver McGregor for his work on listeria.

Aaron and Debbie Pannell's FlipFarm won a Future Development Innovation Award, announced during lockdown after the Seafood New Zealand conference in Nelson was postponed. FlipFarm semi-automates almost all oyster farming tasks as well as providing an ideal growth environment, extremely efficient biofouling treatment, predator protection, and most importantly ease of use, all wrapped up in a system that is fun to use and hard to break.



Seafood New Zealand chief executive Jeremy Helson says the technology being used in the seafood industry in 2021 is mind blowing. Flip Farm can be used in a wide range of conditions from intertidal estuaries to deep water sites and it has been tested successfully in hurricanes, 100-year floods and under four feet of ice.

“In getting this system to market, the Pannell's have slogged through weather, biofouling, inconsistent meat quality, and some very hard, physical work to get this technology to work seamlessly. They are very deserving of the Future Development Innovation award.”

Aaron Pannell has over 25 years' experience in aquaculture, specialising in marine farming and the FlipFarm oyster growing system is the result of 10

years of challenges. Aaron says FlipFarm is the oyster version of a bottling plant. Instead of treating oyster growing baskets as individual containers to be handled multiple times, they are linked together using a patented, permanent, extremely robust attachment system which streamlines and mechanises the operation of growing oysters.

Talley's received the Future Development Innovation Award for their work with company Sealed Air to remove 180,000 polystyrene boxes from the landfill every year. They have replaced them with TempGuard, which allows fish to be transported without refrigeration. The new packaging, made from cardboard, is 100 percent recyclable and will protect perishable goods from deteriorating, without refrigeration, for 48 hours.



Jeremy Helson says the New Zealand seafood industry is fully committed to reducing its environmental impact and Talley's move to TempGuard is one of the many ways companies are putting that into action.

“Not having to use refrigerated vans to transport seafood is a huge leap forward and Talley's rightly deserve this award for pursuing a viable alternative.”

TempGuard not only has benefits to the environment, it has cost and waste savings. Made from 100 percent paper with a minimum of 80 percent recycled content, TempGuard is the only paper temperature assurance product in the New Zealand market that offers consumers a kerbside recyclable option. Its padded format absorbs pack condensation while also providing cushioning and protection of the product.

The cartons provide several benefits including avoiding food waste, reducing the risk of environmental contamination and minimising non-recyclables going to landfill and arrives flat-packed, lowering the carbon footprint by getting more cartons on a pallet.

Talley's says it is pleasing to see that other companies are now using this packaging as well.

Denver McGregor, who has worked for New Zealand King Salmon (NZKS) for 30 years, won a Longstanding Service recognition award.



Denver, now GM Food Safety & Quality has ensured NZKS and its products and processes were at the forefront of innovation and technology when it comes to food safety. In 2018, Denver was the first in the seafood industry to pioneer a Listeria Strategy Programme, to better understand Listeria monocytogenes, its occurrence within the NZKS manufacturing environment and find proven methods to control it. This programme has allowed Denver and his team to identify 19 different strains of Listeria. Denver has been sharing his knowledge and findings with the wider industry in the hope other organisations can still benefit from the tools he has developed.

**Well done to all the 2021 Seafood Stars!**

# Cawthron Institute investigates

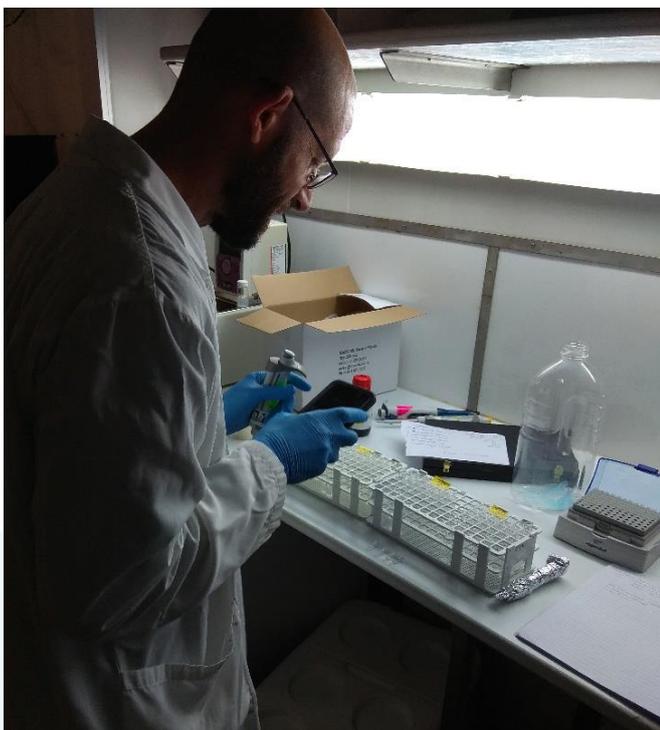
## Cawthron Institute investigates impact of chemical contaminants on young Greenshell™ mussels

Contamination of Aotearoa New Zealand's coastal waters by chemicals coming from natural or human-caused sources is a major concern for our Greenshell™ mussel (GSM) industry, particularly in the country's biggest aquaculture region, the Marlborough Sounds.

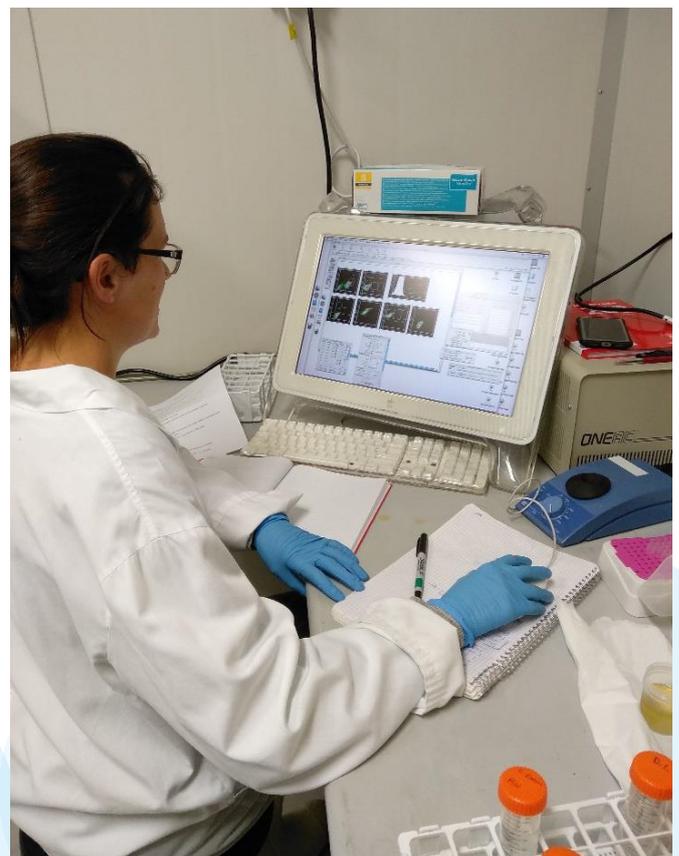
There has been a severe decline in GSM spat settlement recently reported in this area and this has had the flow on effect of constraining seed supply and limiting the industry's ability to expand and develop its newly consented space.

There are many possible causes to explain the lack of settling larvae, that are likely interactive and complex. Poor water quality - particularly the presence of heavy metals, pesticides, emerging organic contaminants or biotoxins alone or, in combination with other stressors - have been suggested as likely causes. These other stressors include warming waters, coastal acidification, or freshwater inputs and high sedimentation load associated with runoffs.

Cawthron Institute scientists have been researching this issue through the government-funded Shellfish Aquaculture Research Platform to understand these losses and prevent them both in the Sounds and in other significant regions like Northland, which supplies most of New Zealand's spat.



*Left: Dr Olivier Champeau dosing Triclosan during embryotoxicity assay*



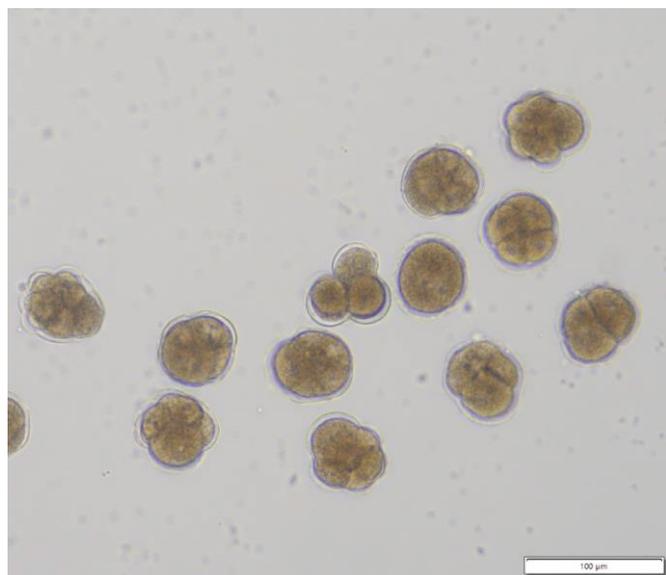
*Right: Dr Anne Rolton assessing quality of Triclosan-exposed mussel sperm on the Flow-cytometer.*

Lead researcher Dr Julien Vignier said the goal of their research has been to confirm whether techniques used to assess the effects of contaminants on blue mussels are also effective when used to study Greenshell™ mussels.

“Despite the commercial and ecological significance of Greenshell™ mussels, currently, in NZ, most studies that look at the effects of contaminants are carried out using embryos of the blue mussel, which may not respond in the same way as the Greenshell™ mussel embryos” Dr Vignier said.

“We know that early life stages of shellfish (sperm, embryos and larvae) are much more sensitive to pollutants compared to adult stages. Our hatchery research suggests that the developing embryos and larvae of Greenshell™ mussels may be particularly sensitive to changes in water chemistry. As such, we have focused on developing lab-based assays to study the toxicity of different contaminants on the early life stages (sperm, embryos and larvae) of Greenshell™ mussels and comparing its sensitivity with the NZ and international standard blue mussel.”

The study involved using Triclosan - an antimicrobial agent found in many consumer products such as soap, creams, and toothpaste - as the reference contaminant to compare effects between species (Fig. 1). The team found that:



*Left: GSM eggs fertilised with Triclosan-exposed sperm.*

*Right: GSM competent larvae before settlement*

Fertilisation success decreased when sperm of Greenshell™ mussels were exposed to 400 ppm (0.04%) Triclosan for only one hour (Fig. 2 & 3)

The number of Greenshell™ larvae obtained from fertilised eggs was halved when eggs were exposed continuously over the 2-day development period to 200 ppm (0.02%) Triclosan. Observations with fertilised blue mussel eggs were similar (100 ppm Triclosan).

“Overall, these findings mean that the endemic Greenshell™ mussels show similar sensitivity to Triclosan as blue mussels and that the early life stages of

Greenshell™ can be successfully used to assess the toxicity of chemicals.” “We have also been looking at the sensitivity of older Greenshell™ mussel larvae that are getting ready to metamorphose and settle (i.e. ~ 20 days old, Fig. 4) to Triclosan and have been developing a settlement assay in the lab”, Dr Vignier added. The method is still being optimised but has shown promise for future application to understanding how contaminants affect shellfish, particularly spat recruitment.

Meanwhile, their research into the impact of contaminants continues. In the coming weeks they will start a water quality monitoring effort using innovative sampling techniques. Several sites in the Pelorus Sound with contrasting Greenshell™ mussel spat settlement will be monitored throughout a year for the presence of heavy metals, pesticides and biotoxins. Contaminants of interest will then be tested in the lab on relevant life stages of Greenshell™ mussel, at environmentally realistic concentrations to determine their potential role in mortality events and spat recruitment failures observed in the Sounds. Watch this space.

For more information, contact Julien Vignier at Cawthron (Julien.vignier@cawthron.org.nz)



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# Mussel health and stress in a warming ocean

Mussel health and stress in a warming ocean: how do we secure our shellfish industries in a high CO<sub>2</sub> world?

Jess Ericson, Natali Delorme, Norman Ragg (Cawthron Institute)

New Zealand's aquaculture industry has been grappling with the threat posed by climate change for decades now, and the latest IPCC 6th Assessment Report on Climate Change 2021 makes for sobering reading. The science hasn't changed markedly since the previous report, but the messaging noticeably has, and the authors don't mince words. The report outlines a grim future, and the prospects of this future depend on the actions that we take now. Even under an emissions scenario where we stop emitting CO<sub>2</sub> altogether and remove swathes of CO<sub>2</sub> from the atmosphere, we are now already committed to at least 1.5°C of warming by the year 2100. 1.5°C of warming you say? Doesn't sound like much. But even under this best-case scenario described above (which requires widespread global uptake), we have already committed our oceans to more frequent marine heatwaves and increasingly warm summer sea-surface temperatures. You can view the IPCC report yourself and see what happens if we continue on with 'business as usual'... (The report is hard to digest in places, but a lot of easier-to-digest information can still be gained by skimming through the 'Summary for Policymakers' and viewing the infographics. You can find it at <https://www.ipcc.ch/report/ar6/wg1/#SPM.>)

Clearly no matter what we do in terms of global CO<sub>2</sub> emissions, we need a roadmap for the future to ensure that we have a climate-resilient aquaculture industry. Within the Cawthron Institute's Aquaculture Group, a major research focus has been to investigate thermotolerance of our precious Greenshell™ mussel (e.g. how tolerant they are to both short-term increases in seawater temperature (e.g. marine heatwaves) and longer-term increases (e.g. chronic exposure to elevated temperatures across months to years)).

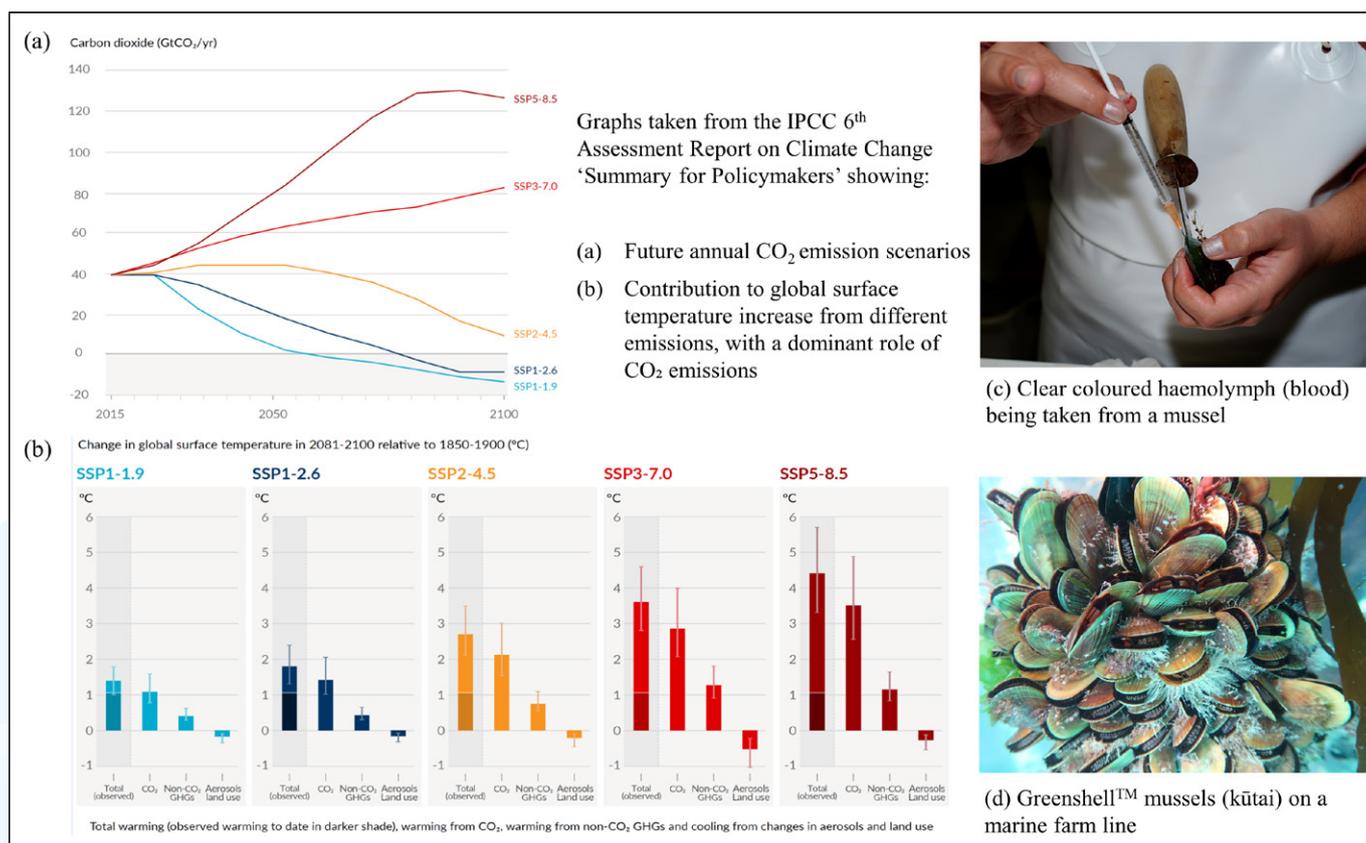
To do this, we're developing a range of tools that can be used to detect shellfish stress before mortality sets in – these tools are useful for scientists to evaluate which seawater temperatures are actually stressful for the mussels, but we're also focussing on portable, easy-to-use devices that could be used by marine farmers in hatchery and field settings. This thermotolerance research is being completed on a range of life stages (e.g. larvae, spat, juveniles and adults). Curiously, our adult mussel stress research often involves taking blood (termed 'haemolymph') from the

mussels (using the same types of syringes and needles that are becoming all too familiar on the evening news). The process is surprisingly easy in adult mussels and gives a range of indicators of the state of the immune system in mussels.

We're learning that an important tipping point temperature exists at approximately 26°C, and heavy adult mussel mortality sets in if this temperature is maintained for several days. However, a recent experiment has indicated that different selectively-bred 'families' (groups of mussels with known genetic history) respond quite differently to heat stress in terms of both survival and their immune response. Some families do better than others, and selective breeding for thermotolerance is likely to play an increasingly important role in securing our shellfish aquaculture industry. In general, however, adult mussels held at 24°C begin to die after four months and reproductive potential decreases to very low levels. Those held for more than four months at 21°C experience significant stress and reproductive performance is impacted, but most individuals can survive and breed.

**This indicates that warmer ocean temperatures are likely to affect both performance and reproduction of adult mussels, and this will have consequences for both farmed kaitiaki and our wild populations.**

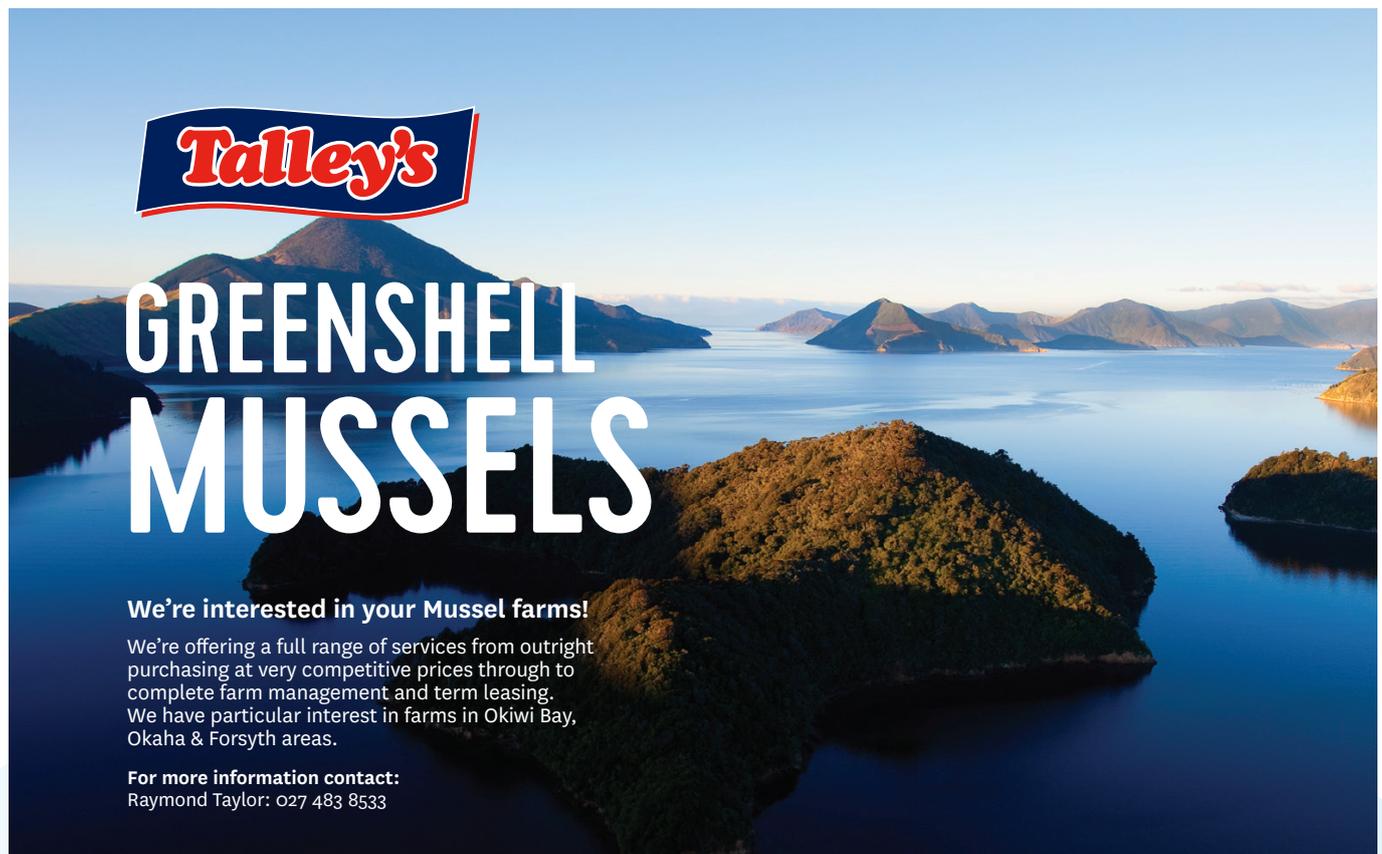
Climate change projections for NZ have indicated that seawater temperatures will increase by 1 - 3°C over the coming 80 years, which means that summer sea-surface temperatures may regularly exceed 24°C in some areas of NZ. We need to remember that many other factors



can also increase or decrease animal thermotolerance. Environmental stressors such as low food levels, ocean acidification, freshwater runoff and toxic algae may also interact to affect heat tolerance. It's possible that occasional short term heat stress may 'train' mussels to raise their thermotolerance, but prolonged heat stress is likely to weaken mussels and lower their tolerance to additional heat shocks.

Shellfish stress and survival now and in the future clearly depends on a complex interplay of many factors. New Zealand's target aquaculture species have innate resilience mechanisms that can be harnessed if effective research, husbandry and breeding strategies are applied, throwing down the gauntlet for scientists and industry to develop mitigation strategies that give us the best chance of securing our shellfish industries in an uncertain high CO2 future. What's certain, is that the best action we can take is to start reducing our CO2 emissions, now.

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# Nutritionally exhausted spat may not survive on mussel farms

**By Supono Supono & Andrew Jeffs, University of Auckland**

Wild spat has typically travelled on a long journey before being seeded onto mussel longlines on farms around New Zealand. Prior to collection from Ninety Mile Beach, the spat that are attached to masses of seaweed fragments drift along the seafloor and are tumbled in the surf zone, like they are in a washing machine. The spat are often in the surf zone for many days before they can be harvested, and it is unlikely they have much opportunity to filter feed during this time. After harvesting at the beach, their physiological condition is further compromised by the long journey out of water during their transportation to mussel farms around the country.

Our recent study investigated the biochemical profile of spat sampled from different sources, i.e., Kaitaia (Te Hiku) spat after transport to a farm over 36 hours after harvesting, hatchery spat (SpatNZ) after 8 hours transport to a farm, and spat reared in a Floating Upweller System (FLUPSY) over several weeks. Among these groups of spat, the wild spat demonstrated the lowest carbohydrate energy reserves, 73% lower than hatchery spat and 53-66% lower than spat of different sizes reared in a FLUPSY. Wild spat in this study appeared to be nutritionally exhausted following the harvest process and 36 h of transportation before being sampled. (Figure 1).

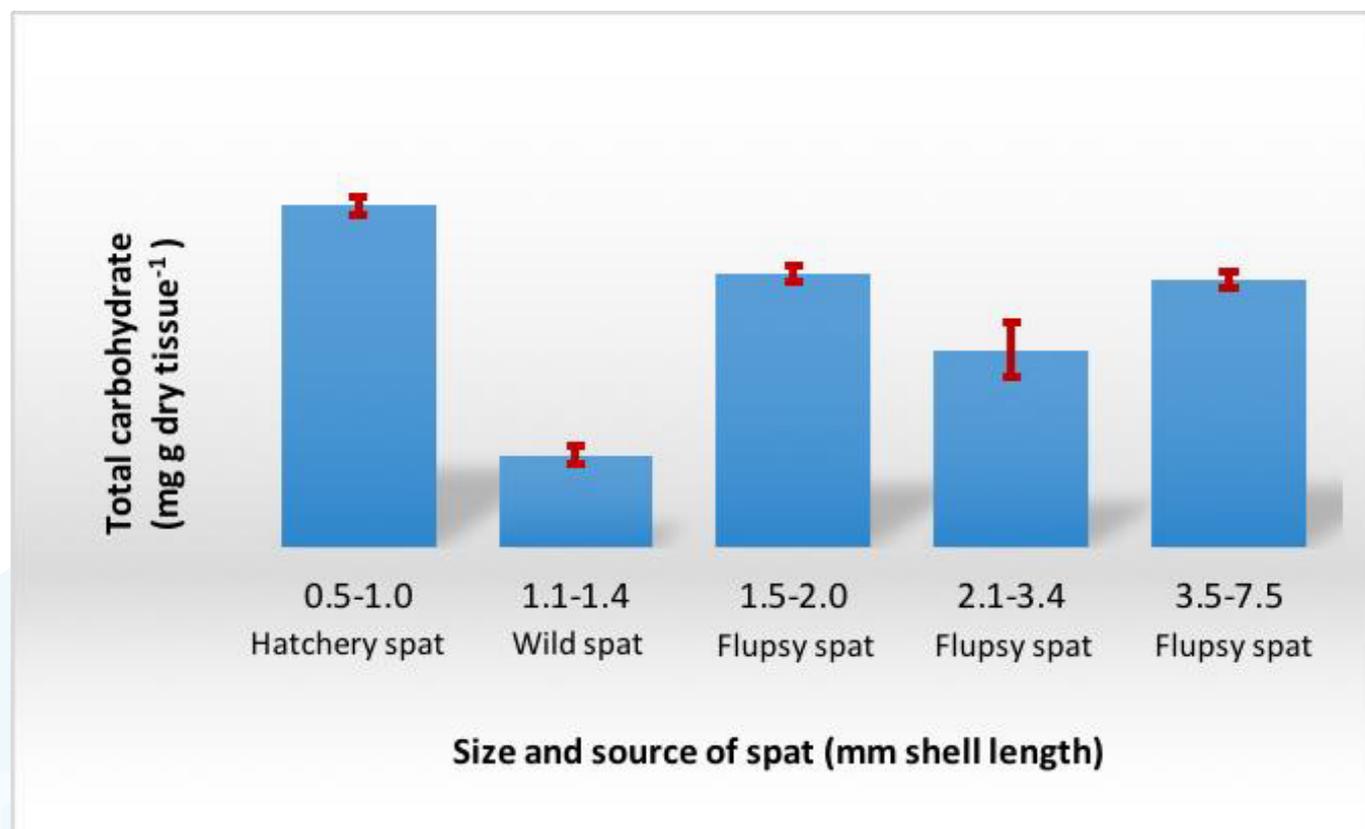


Figure 1. Carbohydrate content of spat from different sources and of different spat sizes.

Carbohydrate in the form of glycogen is one of the main energy reserves in many species of shellfish, including green-lipped mussels. One of the important roles of energy reserves is their availability for producing byssus threads, the anchor threads that mussels use to attach onto substrates including mussel longline structure. In other species of mussel, starved mussel produced fewer and weaker byssus thread, and are therefore have weaker attachment. Therefore, seeding spat with poor nutritional condition at the time of seeding may contribute to high spat loses shortly after seeding, which is common cases in the New Zealand green-lipped mussel industry.

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# Bob signs off at MFA AGM

Long-serving MFA Executive member Bob Nicolle stood down at the recent MFA AGM which took place via Zoom due to the Covid-19 lockdown which saw the conference and awards dinner postponed until 12 November 2021.

Both Jonathan Large (re-elected unopposed as MFA President) and former President Rob Pooley acknowledged Bob's huge contribution to the organisation over many years.

Jonathan says Bob had always been a source of advice to new Board members. Rob says Bob had decided to leave the Executive in his own time rather than risk any sense of doing a Tim Shadbolt.

There will be further acknowledgement of Bob's contribution at the conference.

The AGM saw all other serving Executive members re-elected unopposed – Jonathan Large, Gary Brown, Scott Gillanders, Kevin Oldham, Rob Pooley, Grant Boyd, Graeme Clarke, Dean Higgins, Aaron Pannell, and Mike Holland.

Constitutional remits were introduced by Kevin Oldham, including one which changes the MFA Executive into the MFA Board. Kevin said it reflected the growth of the organisation and the increased demands, requiring a Board now be in charge.

Another change was to move to more gender-neutral language such as Chair rather than Chairman and another which confirms the ability to use technology such as Zoom for AGM's and electronic voting. All remits were passed by the MFA AGM which was followed by the MSQP AGM.

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# CMEA Community Day



As part of the Cawthron Marlborough Environmental Awards the MFA will be hosting a community day on the 16th of October at the Havelock Bowling Club.

This event is an opportunity for the public to come and enjoy some lunch and learn more about the mussel restoration project currently underway in the Pelorus Sound.

We will be having a panel discussion around the collaboration that made this project possible, which will include members from industry, the Nature Conservancy, and the University of Auckland.

Please join us to learn more about this restoration initiative, along with an opportunity to ask questions and give community feedback on the project.

This will be a great networking opportunity and this project is a great starting point for restoring our beautiful backyard.

Look out for the registration details on the CMEA website and through our social media channels from the 20th of September



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## 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](mailto: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.

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