
December 2025

# CONTENTS





## IMPORTANT DATES

**Q1 Light audit due**
31 January 2025

**Havelock Mussel Festival**
14 March 2026

The MFA team would like to wish everyone a safe and enjoyable holiday season.

We look forward to seeing you all next year!

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# GM's comment

It's December already, marking the end of another trip around the sun. Reflecting on the year, it's clear the primary sector rollercoaster is in full swing, with volatility the only constant. The mussel industry, for instance, is currently flush with spat and supported by a favourable exchange rate for exports, yet the same 12 months have brought costly harvest closures and softening demand in some key markets. This theme of ups and downs is equally applicable to salmon and oyster production.

On the upside, it has been encouraging to see New Zealand King Salmon commence development of the Blue Endeavour site and announce a new processing facility in Marlborough. The outstanding performance of Pacific oysters in the upper Kenepuru also deserves special recognition. Finally, our humble mussels merit a mention for holding condition deep into winter/spring this year, with some companies harvesting right through the traditional 'shutdown period'.

Now, everybody knows how fond marine farmers are of weather and climate chat, so here we go. Despite moderate La Niña conditions persisting in the tropical Pacific, Te Tau Ihu has experienced its fair share of nor' westers in recent months. I've even heard some of the industry stalwarts say it's like a return to the conditions of the good ol' days. Hopefully this flows through into production/productivity. Forecasts indicate that ENSO-neutral conditions are likely to return by late summer, bringing a mixed bag of westerly and easterly flows.

In what increasingly looks like the 'new normal', sea surface temperatures are elevated, and the probability of marine heatwave conditions developing over summer in the coastal waters of Te Tau Ihu sits somewhere between 20% and 50%, depending on location. In Pelorus Sound and Golden Bay specifically, sea temperatures are tracking around 0.5 – 1.0˚C above long-term averages.

On the housekeeping front, please make sure that all farms, ramps and wharves are tidy and compliant heading into the break. The hordes of trailer boats, yachts and launches will be plucking snapper out of the farms in no time. I'd also like to encourage all members to get involved with the MFA Big Month Out and get some pre-Christmas beach cleans in.

This is the 7th year I have attempted to pen something worth reading in the lead-up to Christmas – how time flies! And, in all likelihood, it will be the last time you have to suffer through it as I have given notice and the recruitment process is well underway. MFA is an incredible Association that, in my view, consistently punches well above its weight. When you combine a long, proud history with such widespread member engagement and support, it's amazing what can be achieved. I can't thank the MFA Board and membership enough for all of the support over the years. I'm not really going anywhere, I just need a bit more bandwidth to focus on my young family and Aquaculture Direct (and yes, I know, consultants are just cockroaches with laptops…).

On behalf of the MFA Team and Board, I'd like to wish you and your families a very Merry Christmas and a Happy New Year. Catch you on the rollercoaster in 2026!

All the best,

Ned.

# Marine Farm Compliance Audit Programme

**Declarations are Due**

**31st January 2026**

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) |
| August, September, October | (4) |

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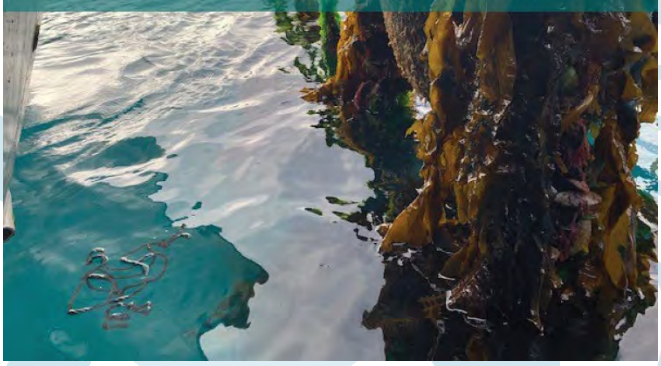

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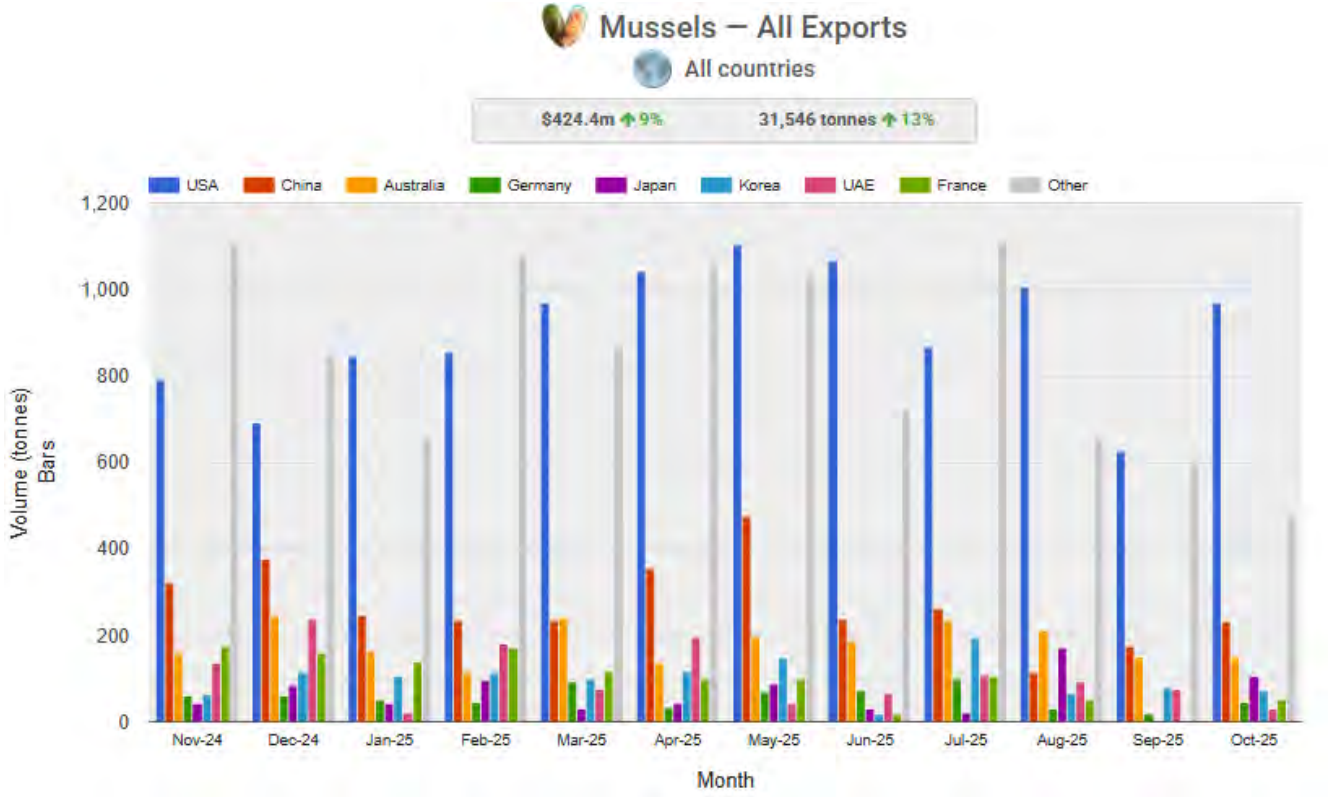


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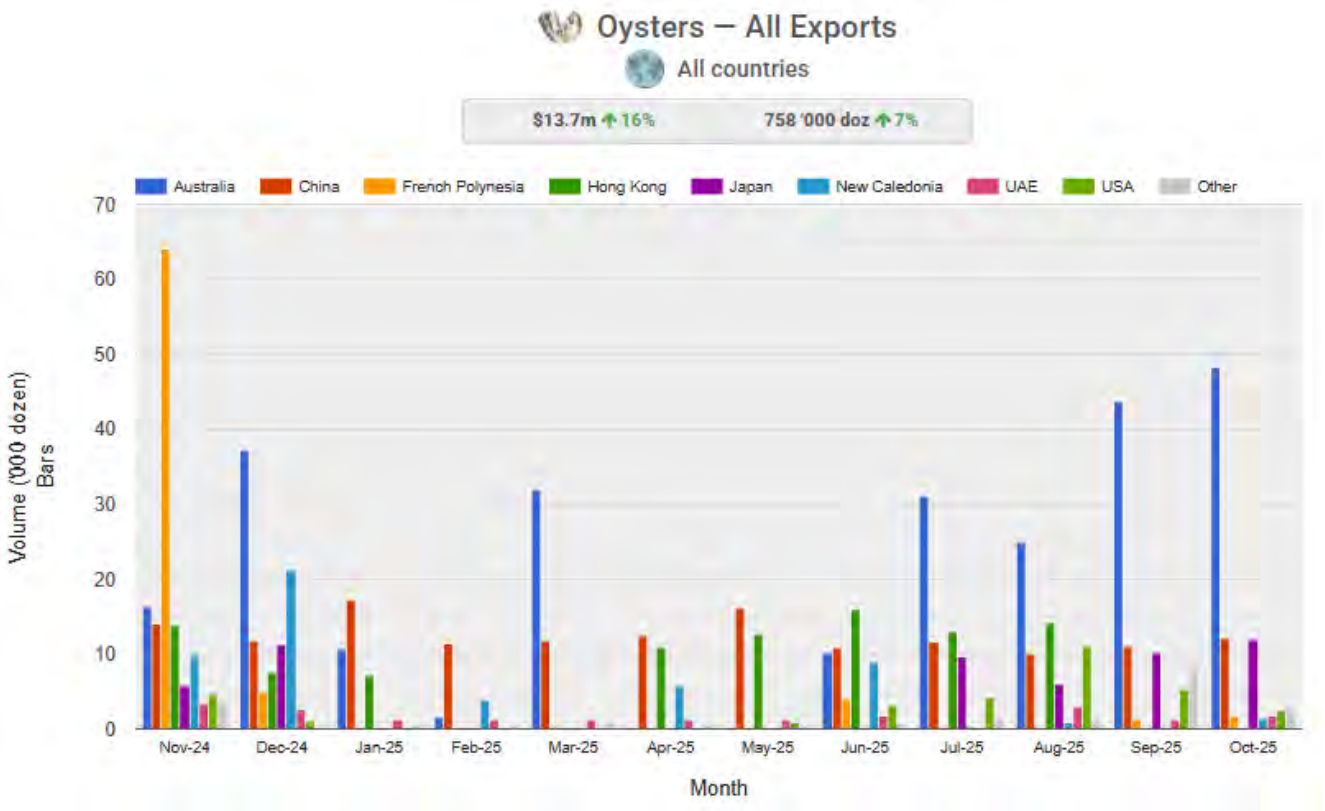


# Seafood, Shanties & Shapeshifter: Havelock Festival Set to Thrill in 2026

The 2026 Havelock Seafood & Mussel Festival is shaping up to be a standout on the calendar, with an entertainment line-up that brings something fresh while still keeping the familiar festival vibe we enjoy year after year.

This year's headline act, Shapeshifter, is expected to draw a big crowd. Their high-energy live shows are a favourite across the country and seeing them on the festival stage will be a real highlight. Joining them are the ever-brilliant Wellington Sea Shanty Society, whose salty harmonies and rollicking maritime charm make them the perfect fit for the day. There will also be performances from local cultural groups, local singer Ellie Brooke as well as Tom Knowles & The Full Noise Boys.

Alongside the music, the festival will again showcase the usual mix of food and fun; fans of *Eat Well for Less* will recognise the festival's celebrity chef duo Mike and Ganesh, who will be on site sharing cooking tips and demonstrations throughout the day.

Join us for a relaxed day out, with plenty of chances to catch up with familiar faces, enjoy good seafood, and soak up the festival atmosphere.

Tickets are moving quickly, so don't wait for gate sales - it's worth securing your spot early!!

# Whekenui arrives in Marlborough: A milestone for Blue Endeavour Pilot

New Zealand King Salmon's (NZKS) new service vessel – MV Whekenui – has arrived in Picton and will soon commence work at Blue Endeavour, the country's first open ocean salmon farm.

On Friday, leaders from across the Marlborough region were given an exclusive tour of Whekenui while berthed in Picton, led by NZKS' Project Manager Zane Charman.

Guests included Deputy Mayor of Marlborough David Croad, Marlborough District Council (MDC) Chief Executive John Boswell, Port Marlborough Chief Executive Rhys Wellbourn, as well as senior Councillors and industry representatives.

"It was a privilege to share Whekenui with Marlborough leaders last week," says NZKS Chief Executive Carl Carrington. "This vessel is a critical piece of infrastructure for our Blue Endeavour pilot and signals another step in our journey out to open ocean aquaculture.

"New Zealand King Salmon is an ambitious company on an exciting growth trajectory, and we are grateful for the opportunity to connect with local leaders who share a passion for Marlborough and want to hear our plans to continue to contribute to the region.

"It is important to share this vessel, and its role in our farming operations, with the wider Marlborough community, who will likely see Whekenui out and about in the Marlborough Sounds. Hopefully, they feel a sense of connection and pride that a project of Blue Endeavour's significance is underway in their backyard."

Whekenui was built in Vietnam by Southern Ocean Solutions and arrived via a 186-metre-long lift-ship to Port Nelson in mid-October. The name Whekenui was gifted to New Zealand King Salmon by Te Rūnanga o Ngāti Kuia, and a special ceremony – 'Te Whakamānutanga o te waka' – was held on October 22nd.

At 220 tonnes and measuring just under 24 metres long by 9.2 metres wide, Whekenui has self-contained accommodation for five people and the capacity to carry more than 100 tonnes of cargo. As a dedicated service vessel, Whekenui will fulfil a number of important functions, including transporting and discharging feed to the Blue Endeavour site; providing a power supply, including for winching of the farm nets; retrieving monitoring and photographic data from the site; and transporting personnel.

NZKS, in partnership with MDC, collaborated to bring leaders together for Friday's event. As well as giving an update on the Blue Endeavour pilot, NZKS representatives shared the company's ambitious growth plans, including the purchase of a commercial site at the Cloudy Bay Business Park in Blenheim and the current Westshore Warehouse feed storage project with Port Marlborough.

"I am very pleased to welcome MV Whekenui to the Marlborough Sounds, home of aquaculture in New Zealand", says Marlborough Mayor Nadine Taylor.

"Marlborough District Council acknowledges New Zealand King Salmon's significant investment in this specialist new service vessel designed to support the new open ocean salmon farm, Blue Endeavour. We wish Whekenui and New Zealand King Salmon well."

*New Zealand King Salmon welcomed Marlborough Councillors and leaders aboard the company's new Blue Endeavour service vessel, Whekenui. Credit: Jim Tannock.*

Having launched two pilot pens into the water for the first time back in April, NZKS is finalising the remaining infrastructure for the Blue Endeavour site, before pilot-scale operations begin in the coming months. As well as Whekenui, this includes installation of a comprehensive mooring grid which is currently underway.

Once the mooring grid is complete, the salmon will be relocated from the inshore 'nursery' to their new home in the open ocean at the Blue Endeavour site, seven kilometres off the coast of Cape Lambert outside the Marlborough Sounds.

The progress to date represents important milestones for the 'Future Farming' programme – a significant, multi-year partnership with the New Zealand Government. Across its five-year duration, the 'Future Farming' programme will pilot the technologies that will provide the 'blueprint' for substantive and sustainable salmon farming growth in New Zealand, especially within new open ocean environments.

NZKS acknowledges the co-funding of this project by the Ministry for Primary Industries' Sustainable Food and Fibre Futures fund (recently changed to the Primary Sector Growth Fund).

**About Blue Endeavour:**

Blue Endeavour will be New Zealand's first open ocean salmon farm. It will also be the world's first farm of its type for the valuable King salmon (Chinook) fish species. Open ocean salmon aquaculture is the farming of salmon in enclosed fish pens, anchored in place to the seabed, in exposed marine environments.

When fully operational, the farm will comprise two blocks of ten circular pens; the total farm area will be less than 12 surface hectares in size. Blue Endeavour will have the capacity to produce ~10,000 metric tonnes of King salmon, with an anticipated annual revenue of ~$350 million per annum.

Watch the video here of NZKS' progress on the Blue Endeavour pilot to date – including the pen build at Port Marlborough, and tow to the pens' temporary home at Waihinau Bay.

**Further information:**
To request a media pack, including images of the Whekenui event and our Blue Endeavour project to date, please contact Chantelle Te Haara, NZKS Corporate Communications Specialist, chantelle.tehaara@kingsalmon.co.nz.

# From shell to shelter: juvenile and small reef fish move into restored plots

Small reef fish love mussels almost as much as we do, but for a different reason, mussel habitats make great shelter. And not just live mussels, shell material alone can build important habitat. PhD student Altan Ní Mhurchú has been leading a study to understand how shell material, a by-product from mussel processing, can be used to build habitat for juvenile and small reef fish, such as triplefin.

After one year on the seafloor, Altan found that fish abundance was five times higher on plots with mussels and shell, and twice as high on plots with shells alone, compared to adjacent muddy seabed, regardless of shell height. Across the habitats there were jack mackerel, spotties, leatherjackets, and three types of triplefin fish (Figure 1). This study adds to our growing body of scientific literature showing the importance of shell in the marine environment and the use of shell by-products as a practical and scalable tool for seabed restoration.

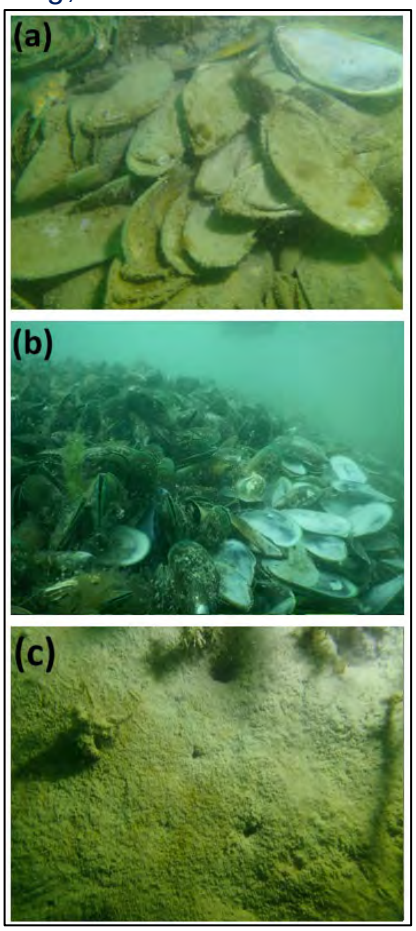



*Figure 1*

**Figure 1.** The three habitat types tested (a) shell alone, (b) live mussels on top of shells, and (c) adjacent muddy seafloor. To sample the larval and small reef fish community, Altan used standard monitoring units for the recruitment of fish (SMURFs)

**Figure 2.** Fish species observed across the study.

**Figure 3.** An illustration of the standard monitoring units for the recruitment of fish (SMURFs) *a common method for detecting early fish recruitment into new habitats.*

Please get in touch with any questions:
Altan Ní Mhurchú: anim823@aucklanduni.ac.nz
Emilee Benjamin: emilee.benjamin@auckland.ac.nz

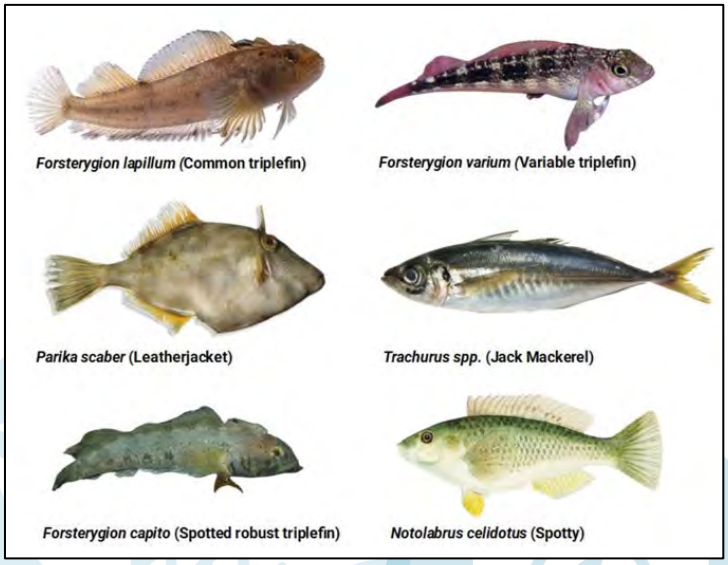



*Figure 2*

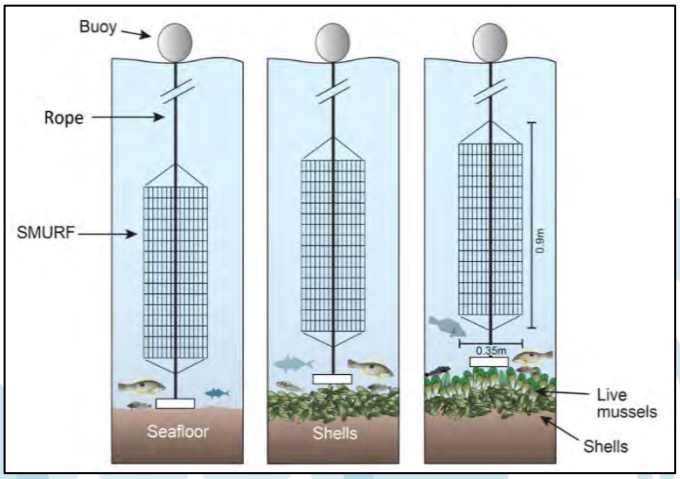



*Figure 3*

# Ocean Shipping: The Backbone of Seafood Exports

Greetings from our world to yours! This article comes to you from the Mission to seafarers in Port Nelson. We may not often cross paths, but we are deeply connected, each of us depending on the other in ways we rarely see.

Ocean shipping remains the most cost-effective and scalable way to move bulk seafood across long distances, especially to Asia, North America, and Europe. Kia moana destined for global markets travel on container ships in reefers, refrigerated shipping containers, ensuring freshness from sea to plate. Much of the produce grown in our waters has a global destination, and shipping is the bridge that connects your hard work to international markets.

Exporting seafood is a complex choreography of cold chain management, regulatory compliance, and international coordination. But behind every container is a crew of seafarers, who make this trade possible. Just as you care for your product from sea to plate, we care for the people who transport it.

My role as a *ship visitor* means boarding and supporting foreign ships while they are in Port Nelson, I am one person, covering one port but we have a network of ship visitors and crew welfare workers across the globe. Last month, I stepped aboard a vessel carrying something very familiar to your industry—a smaller ship inside its hold.

That smaller ship was NZ King Salmon's new service vessel, *Whekenui*, destined for its open ocean farm. It was a powerful reminder that your innovations and growth ripple out across the globe, and every increase in exports means more ships, more crews, and greater need for seafarer support.

At Port Nelson, Mission to Seafarers plays a quiet yet crucial role in this supply chain. We provide pastoral care, practical support, trips to town or local sights in our community and all important Wi-Fi units for every ship in port, ensuring crews can stay in touch with loved ones while far from home.

Supporting foreign ships and their seafarers while in port reinforces New Zealand's reputation not only for premium seafood but also for ethical, responsible trade. As exports surge, your success directly increases the demand for the Mission's services.

With Christmas fast approaching, we are preparing **Seafarer Christmas Cheer Packs**—small gifts, food, and essentials to bring joy to those spending the festive season far from family and friends, while working tirelessly to deliver our products to the world. We welcome donations of any kind: food items, kiwi themed trinkets keyrings, fridge magnets, or funds / cash to help us purchase goods for seafarers.

**How to Help:**

📧 Email: **nelsonmts2024@gmail.com**

📱 Text or WhatsApp: **022 560 4761**

Every contribution makes a difference to those who keep your product moving across the oceans.

Thank you for the opportunity to shed light on the Mission to Seafarers and its place in your world as growers, harvesters, processors, and exporters of premium kia moana.



# Beach Clean-Up Brings Industry Together

On 14 November ten companies joined forces for a coordinated convoy into Clova and Crail Bay for a full day of beach cleaning. Staff from the Marine Farming Association, Clearwater Mussels, Waimana Marine, Channel Marine, United Fisheries, Talley's, Maclab, Aroma Aquaculture, Sanford and New Zealand King Salmon formed a 40-strong team covering areas from Otatara Bay through to Manaroa, Wet Inlet and Elie Bay.

MFA Environmental Mentor Darren Clarke said it was encouraging to see such a strong turnout. "It was good to see so many companies coming together to set an example for the rest of the industry."

He noted that while these collaborative clean-up days always make a meaningful difference, particularly in spring when winds, swell and tides move debris of all kinds around the Sounds, the most effective way to protect the environment is through strong preventative practices.

Getting out on the beaches highlights the impact that both industry and recreational activities can have and reinforces why good habits matter every day.

MFA were on hand to help out and provide a few treats along the way. The day also brought some lighter moments, including the discovery of a set of false teeth by the Clearwater crew and an enthusiastic clean-up effort that left one vessel high and dry when the tide receded. The upside to the delay leaving was that they found another pocket of debris while waiting for the water to return.

MFA extends its thanks to everyone who took the time to be involved and contribute to a successful day.

# Expanding Scottish horizons – fishing to mussel farming to salmon farm servicing

*Notes from a meeting with Douglas Wilson of Inverlussa, Isle of Mull*

"We're like guests in the sea," says Douglas Wilson, the owner and director of Inverlussa, a family mussel farming business on the Isle of Mull, just off the west coast of Scotland. It's just an hour's ferry ride from the picturesque seaside town of Oban.

Like New Zealand, Scottish mussel farming is concentrated into a few areas. Nearly 90% of the 11,700 tonnes of mussels grown annually in Scotland come from the Shetland Islands to the far north. Almost all of the remainder are grown on the west coast of the Scottish mainland, where Inverlussa is based.

The mussel farm was started by Douglas 40 years ago. Inverlussa now produces 600 tonnes in a good year with up to 5 staff in the sheltered waters of Loch Spelve in the Isle of Mull. The 45 double backbone conventional continuous rope longlines are typically 220 m long and spaced at 17 to 40 metres apart. Droppers are typically spaced 600 mm apart on growout lines.

The grow-out time from common mussel (Mytilus spp.) larvae to sale is from two years. That's a bit quicker than our typical experience in Marlborough but the harvest size is smaller. The target size is 72 pieces per kg, which is roughly 50 to 60mm shell length.

Mussel spat are caught on site, coiling the seed ropes in the top two metres of the water column. This avoids the sea squirt larvae which dominate lower parts of the water column. The coils are then released to give 8 to 10m droppers, typically after three months.

Inverlussa have learned over the years to minimise handling of growing mussels. Mussels are allowed to self-thin, with minimal interseeding.

The farm gate price is slightly over one UK pound per kilogram. That's 30% above New Zealand nominal farm-gate prices at current exchange rates. "Irish and Chilean mussel farmers have lower production costs, but consumers prefer the Scottish product" comments Douglas.

Along with other independent Scottish mussel producers, Inverlussa sells through a mutually-owned co-operative, the Scottish Shellfish Marketing Group (SSMG), which sells under the *Scottish Shellfish* brand. The cooperative was formed in 1992 by mussel farmers who combined resources to supply the market with Scottish rope-grown mussels and oysters.

The co-op acts as a central supplier to all the supermarket brands in the UK, also restaurants, and other food outlets, to ensure a consistent supply of produce. In later years the SSMG has expanded its offerings to include other shellfish like scallops and crab, as well as processing mussels into ready-made meals for retailers.

Douglas' wife, Helen, is a director of Inverlussa and looks after credit control and sales to restaurants and outlets on the island. Harvests for local sale take place twice a week, at the same time as the main harvests for the co-op.


*Inverlussa mussel farming shore base at Loch Spelve, Isle of Mull. Service vessel HQ background right.*

The main harvest is dispatched by refrigerated truck to the co-op in bulk bags. Douglas and Cameron McLean (Inverlussa Marine Farm Manager) picked up the idea of bulk bags from a visit to New Zealand in 2007. Much credit in the sharing of the New Zealand system must go to John Pickering and Peter Large, who also came over to visit on two occasions.

Douglas also mentions great support from Joe Franklin at Quality Equipment and Dave Hockey and Murray Connor at Ansco. At first there was a lot of resistance to New Zealand methods of continuous longline farming, but now it's the standard way in Scotland.

The Inverlussa operation is multi-generational. Douglas and Helen's daughter helps with special projects, while their son, Ben, is the Managing Director of Inverlussa. A large part of his role is managing over 140 staff servicing salmon farms.

The workboats are a major point of difference. Inverlussa has an enviable fleet of twenty-three powerful vessels ranging from 15m to 60m in length. The vessels are contracted to provide support services to salmon farming operations, often on a one-year term.
In contrast to the mussel-growing part of the business, which would not look out of place for a family-scale business in Marlborough, the vessel contracting business operates out of a new office building across the road.
A display map continuously updated from AIS signals, shows the real time data locations of each vessel. It looks like the nerve centre of a major fleet operation, which is exactly what it is.

Back to reality, the gear on the 17 metre long mussel barge looked familiar, including Ansco screens, declumper and conveyor and Quality Equipment ropes. The floating walkway to the barge dock looked surprisingly generous. It turned out to be economical too, having been scrapped by one of the many salmon farms that dot the Scottish lochs.

Inverlussa is responsible for its own water quality monitoring. There is no equivalent of the Marlborough Shellfish Quality Programme (MSQP), though the government Food Standards Agency conducts official control monitoring.

However the agency can report many days after the mussels have been eaten.

So Inverlussa tests water samples at least twice weekly, identifying and counting the main toxic plankton types by microscope including; Pseudo-nitzschia, Dinophysis and Alexandrium.


*Douglas Wilson pointing out the locations of Inverlussa's salmon farm servicing fleet above a model of one of the vessels*

For flesh tests Inverlussa uses an AquaBC system of aptamer-based test kits, akin to Covid tests, except the test strips are placed on a special "reader" to check directly for levels of Paralytic Shellfish Poisoning (PSP), Diarrhetic Shellfish Poisoning (DSP) and Amnesic Shellfish Poisoning (ASP).

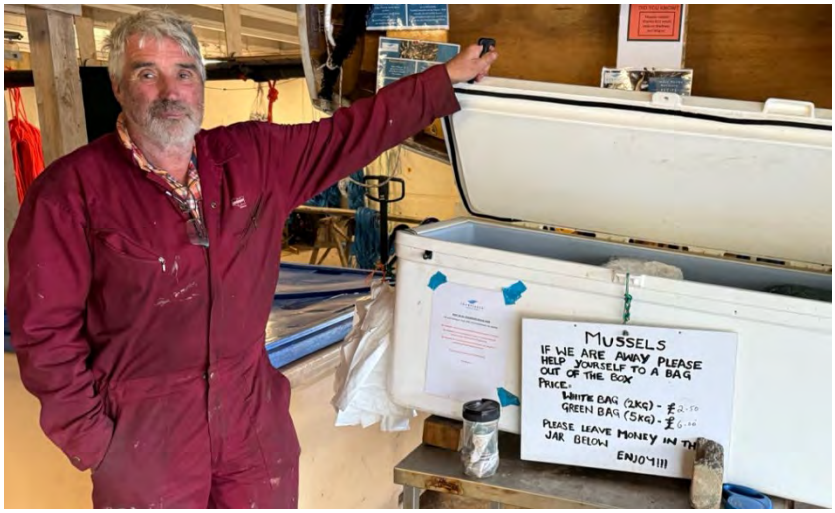
*Inverlussa Marine Farm Manager, Cameron McLean, shows the equipment aboard the Inverlussa mussel barge.*

If the regular in-house water testing shows elevated levels of potentially toxic phytoplankton, Cameron will ask Seumas, the farm's part time technician to do the rapid flesh quality tests on the day of harvest if possible, or on occasions the evening before harvest.


Some comparison tests against standard laboratory methods commissioned by Inverlussa found that the DSP test is

consistent with lab results. The system used is produced by AquaBC and is endorsed by the Scottish Shellfish co-op. More recently a second rapid test kit supplier Sensoreal has entered the market.

A charming aspect of the business is the roadside mussel stall. People driving past the shore base can pull into the yard and pick up mussels from a chilled box, paying via an honesty jar.




*Douglas Wilson shows honesty box system for local sales*

The mussels sold this way are a small fraction of the commercial harvests, so this is not about directly generating commercial revenue. It's a reflection of Douglas' observations of farming practices in Normandy, France where such stalls are more common. It seems like a great way to build social support.

In terms of environmental challenges, the problems sounded familiar, only with the species names changed. Pests include invasive Japanese skeleton shrimps which were once rampant and still hamper seed collection, starfish, sea squirts, barnacles and tube worms. And then there's the diving Eider-ducks who can quickly strip mussel lines bare.

Douglas has a practical bent. We found him in maroon overalls down by the water in the mussel sheds, dismantling a hydraulic crane. He also seems to have a soft spot for his roots. He has a very good knowledge of the mussel business, despite owning a large charter fleet of salmon service vessels. He told us with quiet pride that he still has the fishing boat where it all started.

Thanks to Douglas and Cameron for their hospitality and to Joe Franklin of Quality Equipment who kindly introduced us.

- *Kevin & Lynette Oldham*

## MFA Newsletter Stories

Do you have a story you would like to see published in our newsletter?
For consideration, please forward it to:
office@marinefarming.co.nz

Our newsletter is released quarterly – March, June, September, and December

# Getting a grip on mussel organs

Can you tell retractors from adductors or a mantle from a labial palp? Where on a mussel's digestive track is its heart and which organ creates the hydraulic force that delivers micro algal foods to the Greenshell mussel's mouth?

As an aid to answering these questions, and many others, Cawthron Institute has developed an over-sized mussel model with realistic-to-touch organs made from silicone rubber inside two 3D printed shells.

Successfully trialed with junior and senior school groups around Nelson, at the recent NMIT open day and the Marine Farmers Association and Aquaculture New Zealand conferences, the models, together with identifying labels and display board, help young and not so young get to grips (literally) with mussel anatomy and biology.

The models can also help aquaculture professionals unpack the intricacies of mussel growth, disease, and parasites. As a novel addition a 3D printed Pea Crab is included and can be found hiding amongst the organs.

The mussel is the first of a suite of supersized silicone and 3D printed shellfish models being developed at Cawthron through the national Shellfish Aquaculture Platform (ShARP), with Flat Oyster and Paua in development and Pacific Oyster and Scallop models to follow. The models will be available for rental or purchase.

The shellfish model initiative grew out of the difficulties of offering hands-on learning around mussel biology using fresh or cooked mussels, said Craig Prichard, Cawthron's shellfish model developer.

'Most of the time we ended up with a goopy mess. Cooked mussels make better organ identification subjects, but the more fragile organs, gills and labial palps, are a challenge to work with.

'Oversized, soft and elastic silicone make for an ideal simulation even though some students found the feel of the silicone a too much like actual flesh and model's foot, a little too phallic', he said.

The model's silicone organs can be used as a hands-on identification activity to discuss respiration, digestion


*Nelson College for Girls Year 13 Biology students doing the mussel model organ identification game as part of their aquaculture studies.*

and reproduction or as a game to understand the relationship between organs. In a speed test one group of Nelson College for Girls senior students correctly assembled the organs in the shell in just 14 seconds.

Senior school students are pretty good at working out how mussel organs fit together, but I've been surprised at how many aquaculture professionals struggle to assemble the organs in the correct order inside the shell. Perhaps mussel organs are something of a 'black box' for many, he said.

*Nelson MP and Opposition Oceans and Fisheries spokesperson Rachel Boyack tackling the g task of identifying mussel model organs at the recent Aquaculture New Zealand conference.*

For further details contact:
Craig Prichard at craig.prichard@cawthron.org.nz or phone 021 672199.

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# Spat Supply for the World's Biggest Mussel Aquaculture Industry

For a long time Spain has been the world's largest producer of farmed mussels.
A series of river inlets or Rías Baixas along Spain's western coast is blessed with a perfect combination of sheltered waters and a massive supply of mussel food from upwelling in the Atlantic Ocean. They farm the fast-growing Mediterranean blue mussel, the same species which is a pest on many New Zealand farms.

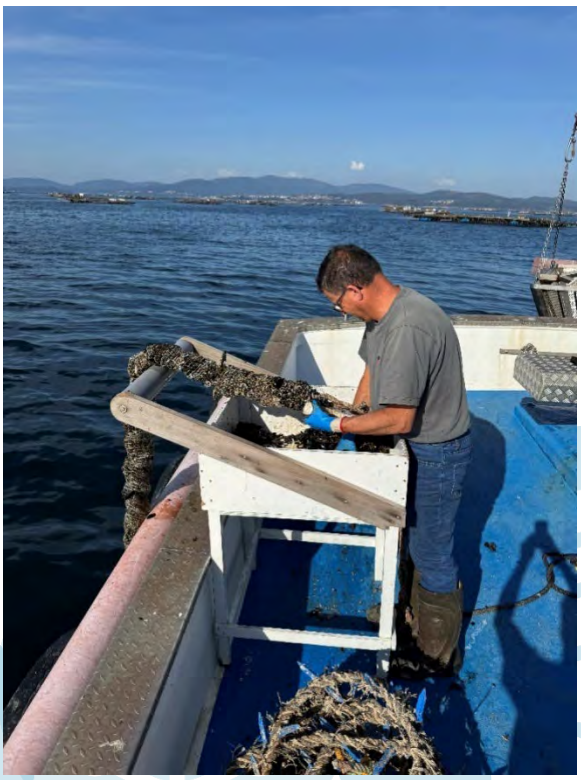
*Hand stripping of spat catching rope ready for reseeding dropper lines.*

In the past, spat has been easily caught within the Rías on spat catching droppers suspended from the same floating rafts that are used to grow out the mussels. Where more spat was required, it was scavenged out of the plentiful mussel beds which line the rocky shores in much of the Rías.

However, in recent years climatic changes in the region have impacted the timing and quantity of the settling spat able to be collected on farms. Compounding the spat shortage, has been a shift in European mussel markets, demanding smaller mussels, meaning faster turnover of stock on mussel farms and requiring more spat and at different times of the year.

Spat is being imported into the region from as far away as France, raising concerns about biosecurity. Shorelines in the Rías have been stripped of mussels to try to fill the shortfall. Even the most dangerous wave pounded coasts are being stripped of mussels, bringing mussel farmers into conflict with commercial fishers who harvest the extremely valuable goose barnacles (a local delicacy) from the same coast.

There is talk of building hatcheries, but it seems unlikely as there is considerable resistance to modernisation in this industry



*Hand seeding of grow out line with spat where the spat is hand wrapped with a strip of elasticated mussock.*

which consists of dozens of individual artisanal farmers each with one or two mussel rafts and a service boat.

Visiting these mussel farms made me realise how far the New Zealand mussel industry has come since its initial raft culture efforts in the Marlborough Sounds in the 1970's.

- *Andrew Jeffs – University of Auckland*

*Spat catching rope – note the plastic spikes on the lines to help prevent dense mussel spat sloughing off the lines in rough seas.*

# Breeding Greenshell™ mussels to tolerate the heat – a 2025 update on what we know so far

## A breeding foundation for resilient mussels

Warming waters around New Zealand's coastline are a concern, especially for Greenshell™ mussel (GSM) farmers in the upper North Island. Until the early 2000s, the GSM industry relied entirely on wild-collected spat, leaving farmers with little control over growth, survival, or seasonality.

Because supply depended on unpredictable beach-cast events, farm performance was inconsistent and mussels were vulnerable to climatic stressors.

To build resilience, Cawthron Institute, in partnership with industry and government, established Aotearoa's first structured mussel breeding programme in 2002. Working with SPATnz, BreedCo, and other partners, the programme created the scientific and operational foundation for long-term genetic improvement. With this platform in place and hundreds of selectively bred families developed, we can now research heat tolerance to support breeding for climate resilience and deliver future-ready broodstock.

The Cawthron Shellfish Aquaculture Research Platform (ShARP) has an established research programme investigating the effects of ocean warming and marine heatwaves on GSM. With access to GSM 'family' lines, ShARP scientists can investigate the genetic basis of heat tolerance.

We have developed a chronic heat challenge (exposing mussels to elevated seawater temperatures for several weeks) to test the heritability of heat tolerance. Such tests are widely used in aquaculture around the world. This tool allows us to identify GSM families that are more heat tolerant, enabling farmers to breed from these lines to build resilience.

## Testing the genetic basis of heat tolerance

Pilot lab trials showed that for our GSM species, 26°C is the best chronic heat-challenge to tease apart differences in family survival: at 24–25°C mussels can survive for months (making trials lengthy and expensive), while at 27°C mortality is rapid and simultaneous, preventing comparisons between families.

The maximum sea surface temperature routinely recorded in Northern New Zealand's coastal waters is 26°C, and is also the temperature threshold where we see an increase in GSM mortalities in land-based facilities (if ponds are not temperature-controlled).

Our protocol raises seawater by 1°C per day from ambient to 26°C, holds it there until all mussels die, and uses "time to death" (unresponsive gaping) as the performance measure. Careful definition of the unresponsive endpoint, recording of individual mussel size, and strict tank hygiene are essential.

We have run four trials with two generations of mussel families from SPATnz and Te Huata. Results show strong family-level differences: some mussels die within six days, others last nearly a month.

In the field, Coromandel mussel farmers have observed local populations that have endured heatwaves and still continue to produce spat. Thanks to proactive support from Coromandel farmer Peter James, we've been able to introduce some of these naturally-selected mussels into our trials. These mussels did well, initially surviving longer than the Marlborough Sounds-derived families, but the selectively-bred families ultimately proved more resilient.

How heritable is heat tolerance in GSM?

In each survival trial we calculate heritability to determine what proportion of the variation in survival in the tested population is due to genetics, and what proportion is due to other factors (e.g. environmental factors). Results show genetics play a very significant role in GSM heat tolerance ($h^2$ = ranging from 0.26–0.54), meaning selective breeding should improve tolerance over time. For context, heat tolerance in GSM is substantially more heritable than milk production in dairy cows.

After testing adult families (>60 mm shell length), we used survival data and family information to select and breed the next generation with varying levels of heat tolerance. This new generation were tested as juveniles (average shell length 15mm). These juveniles also showed strong genetic differences, but their heat tolerance did not always match what we expected from their adult relatives. Their biology and priorities differ at this stage, meaning heat tolerance in juveniles and adults could be considered different traits. To unpack this further, we will test the same families again once they reach adult size to see if their heat tolerance aligns better with their adult-tested relatives.

Key questions for future research:

- Can we use simple DNA tests (like a blood sample) to quickly identify mussel families that are naturally more heat tolerant?
- Do mussels carry specific genes that are linked to important traits at different ages, and can we use these genes to guide breeding?
- Is heat tolerance in young mussels the same as in adults, or are they different traits that need to be bred for separately?
- How does heat tolerance correlate with other traditional breeding traits e.g. growth?
- Is a heat tolerant mussel also more resilient to stressors like ocean acidification, low salinity, or disease?

The path forward: farmer-scientist partnerships for climate resilience

This industry-science partnership has generated novel and valuable insights into breeding for heat tolerance in GSM, highlighting the strong potential of this species for climate-resilience breeding. While growth traits in shellfish often improve 10–20% per generation, resilience traits like heat tolerance tend to respond more slowly, requiring multiple generations.

Focused effort and greater investment would accelerate progress and equip the GSM industry to stay ahead of ocean warming. This requires strong farmer-scientist

partnerships and solid collaboration with government, to safeguard our treasured industry feeding Aotearoa and the world.

For further information contact: jess.ericson@cawthron.org.nz

- *Jess Ericson and Megan Scholtens (Cawthron Institute)*

Shellfish Aquaculture Research Platform | PROUDLY HOSTED BY CAWTHRON

# MARLBOROUGH SOUNDS ICONIC KING SHAG

## HOW TO IDENTIFY THEM – HOW TO HELP PROTECT THEM

| | Description | How to identify which species |
|---|---|---|
|  | **KING SHAGS**<br>King Shags are a rare seabird, which is endemic to Marlborough they are generally located in the Outer Sounds. Colonies nest on rocky outcrop and roost on other rocky points & on mussel floats. The King Shag does not nest or roost in trees, they are very wary & rarely seen in close proximity to boats. | • Black & white plumage which is browner in juvenile birds<br>• White wing patch, especially noticeable when in flight<br>• Black feathers on head reaching below bill giving the appearance of a darker head compared to a Pied Shag<br>• Pink legs & feet<br>• Tends to swim away from you flicking its head from side to side |
|  | **PIED SHAG**<br>Pied Shags are found throughout the sounds. Their nesting colonies are typically found in trees close to or overhanging the sea. The Pied Shag roosts in other trees or on rocky points & on mussel floats. They are relatively approachable. Birds readily follow boats especially when fishing or harvesting mussels. | • Black & white plumage, brown in juvenile birds<br>• No white wing-patch<br>• Back completely black or brown<br>• Black feathers only on upper head making birds appear more pale-headed than King Shag<br>• Black legs & feet |
|  | **SPOTTED SHAG**<br>Spotted Shags are found throughout the Sounds. Higher numbers are found in the Outer Sounds. The Spotted Shag nests in small colonies and in small pockets & caves in the steep cliffs.<br>Quiet & approachable bird. Does not usually approach boats. | • Grey plumage<br>• Yellow legs & feet |
|  | **LITTLE SHAG**<br>Small Shags are found throughout the Sounds in small numbers. Little Shags nest in trees, often in Colonies with Pied Shags. Relatively flighty, and does not usually approach boats. Commonly seen within mussel farms. | • Small Size<br>• Variable amount of white on breast of birds, ranging from birds with full white breast to those with just a white chin<br>• Short yellow bill<br>• Black legs & feet |
|  | **BLACK SHAG**<br>The Black Shags are found throughout the Sounds in small numbers, they are common in the Inner Sounds & around the harbours of D'Urville Island. The Black Shag nests in small colonies in trees. Often in lagoons or lakes back from the sea. | • Large size (Similar size to King & Pied Shag)<br>• Fully black plumage<br>• Browner in Juvenile birds<br>• Black legs & feet |

**IF YOU ARE APPROACHING A KING SHAG OR A KING SHAG COLONY – YOU SHOULD**

***REDUCE SPEED, REDUCE NOISE & KEEP YOUR DISTANCE*** **(at least 200 metres)**

# Minister for Oceans and Fisheries Award Winner

This award recognises an individual or group who has made consistent and regular contributions to increasing the sustainability and innovation of Aotearoa New Zealand's seafood sector over time.


*John Young, Clearwater Mussels, with Hon. Shane Jones*

For more than 5 decades, John Young, a pioneering mussel farmer, has been at the forefront of innovation in New Zealand's mussel industry.

In the 1970s, John worked with the Ministry of Fisheries and was involved in the work which ultimately led to the discovery of spat-encrusted seaweed at 90 Mile Beach (Te-Oneroa-a-Tōhē) significantly improving spat supply, a key enabler of the industry.

Working with others, he introduced the first longline mussel farm in the Marlborough Sounds – an advancement in technology that led to the industry-wide shift away from raft-based farming systems, making mussel aquaculture efficient and sustainable.

Under John's leadership, Clearwater Mussels continues to make a significant contribution to the design and manufacture of machinery used in the farming process and pursue innovations that enhance operational efficiency and sustainability. Recent developments include spat and culture rope development to significantly improve retention and float attachment systems for both enclosed and open turbulent water conditions and the design and manufacture of a revolutionary shock-absorbing float for open water farming.

The company also applies various resource management practices aimed at reducing environmental impact, including recycling and refurbishing mussel farming equipment such as floats and ropes, as well as manufacturing biodegradable cotton stockings used during the seeding process.

John contributes to workforce development through staff mentorship and collaboration with iwi on marine resource initiatives.

He believes that aquaculture offers plenty of opportunity for future generations.

*The Minister for Oceans and Fisheries, Hon Shane Jones, Parliamentary Under-Secretary to the Minister for Oceans and Fisheries, Jenny Marcroft MP, MPI Director-General, Ray Smith, and Deputy Director-General Fisheries New Zealand, Dan Bolger, with all the finalists and winners for 2025*

*This year's New Zealand Seafood Sustainability and Innovation Awards were announced at Parliament in Wellington on 11 September 2025.*

# From laptop to tidepool: Always be Naturing with new ways to safeguard marine life

There may be more than 695 billion living things in Aotearoa, but some of the rarest need our help. DOC is calling on New Zealanders to "Always be Naturing" with two powerful new citizen science tools that make marine conservation easy, wherever you are.

SeaSpotter and Spyfish Aotearoa apps are fun, simple ways to turn everyday moments, whether at the beach, in the office, or at home, into action for nature.

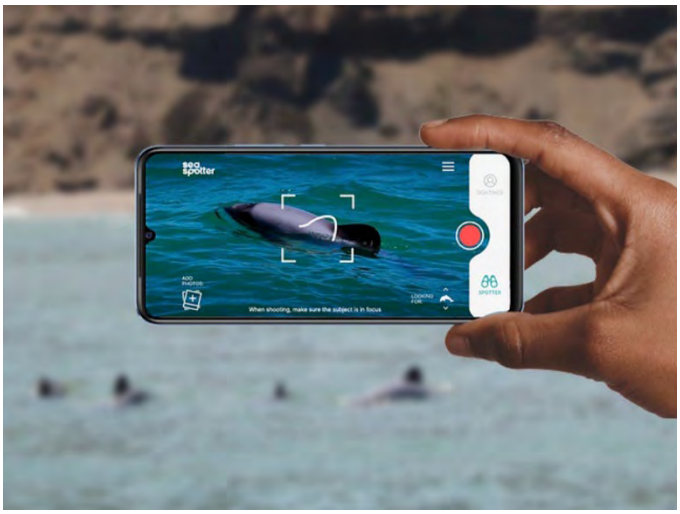
Department of Conservation Marine Technical Advisor Hannah Hendriks says everyone can contribute. "From identifying fish at your desk, to snapping photos of seals on the beach or spotting Māui dolphins while you surf, you can be taking action for nature. It's about finding those small moments in daily life to connect with and care for the environment."

Citizen science app SeaSpotter makes it easy to upload photos and videos of marine mammals such as whales, dolphins and seals. Sightings contribute to an open-source platform directly supporting research and conservation efforts for marine mammals.

The application was developed by conservation technology not-for-profit MAUI63, with DOC, WWF-New Zealand (https://wwf.org.nz/), MPI, and others.

Co-Founder and CEO of MAUI63 Charitable Trust, Tane van der Boon, says the trust is passionate about using technology to help everyone better understand and protect marine animals.

"We're super excited about SeaSpotter and how it will turn everyday kiwis into citizen scientists."



Tane says the app gives the community a chance to get involved.

"Collecting data will help scientists and researchers track and protect marine mammals like the threatened southern right whale. The more people involved, the better the data and the greater impact it will have.''

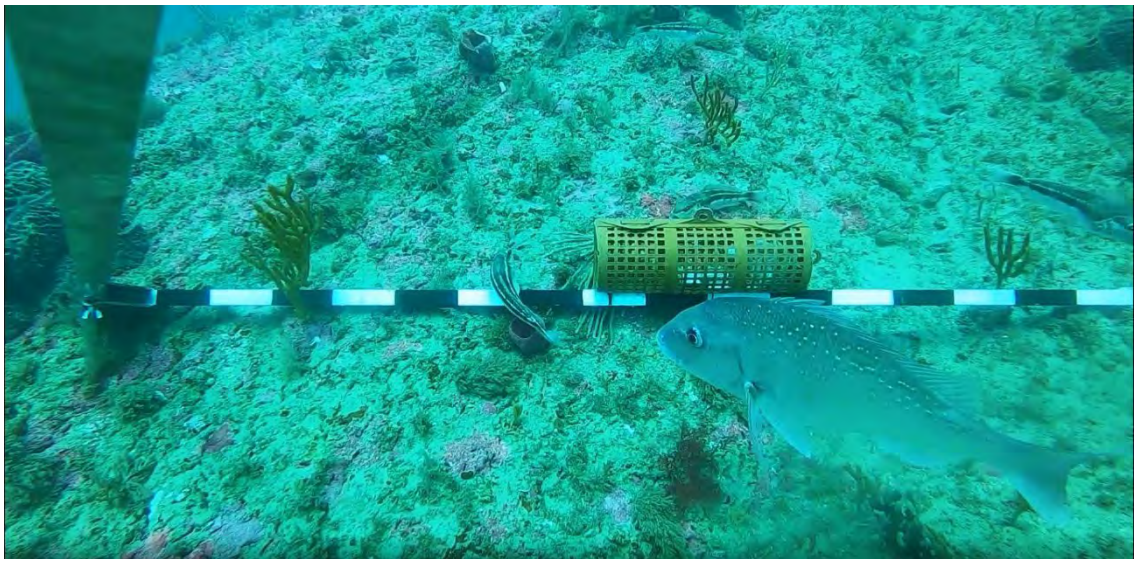
Marine mammals in New Zealand waters range from permanent residents, like Hector's and Māui dolphins, to migratory visitors that travel thousands of kilometres to feed or breed here.

Hannah says New Zealanders have the opportunity to make their beach culture count for nature. "We love to visit the coast – and we have the privilege of sharing it with dolphins, whales, and seals in their natural environments," says Hannah.

"Every sighting helps us better understand where rare species live and how to protect them. With 695 billion reasons to care, SeaSpotter turns everyday encounters into conservation action."

For days when the coast is a wistful memory, the Spyfish Aotearoa project is designed to bring marine life into offices, homes, and classrooms.

Launched in partnership with Wildlife.AI via the Zooniverse platform, Spyfish Aotearoa invites people to watch short clips of underwater footage from New Zealand marine reserves and identify fish species. Outputs contribute directly to real scientific research - helping scientists focus their time on trend analysis and conservation planning.



“Spending five minutes of a meeting counting fish together is a calming, collaborative activity which just happens to help nature. You don’t need to be a scientist. You just need a few minutes, a screen, and some curiosity and it’s surprisingly relaxing,” says Dr. Monique Ladds, DOC Marine Ecosystems Senior Technical Advisor.

Both apps are part of a growing movement to use citizen science for marine protection. Whether in the office or out on the water, Hannah says there's a role for everyone in caring for the oceans.

“When thousands of people take small actions - from logging a dolphin sighting, to identifying a blue cod on screen, we create a powerful wave of support for the future of our marine ecosystems,” says Hannah.

“Always be Naturing is about exactly that: making nature part of everyday life, and taking those small, meaningful actions that add up to big change.”

**Get involved:**

- **Download SeaSpotter** from the App Store, Google Play or by visiting www.seaspotter.nz and start logging marine mammal sightings today.
- **Join Spyfish Aotearoa** at Spyfish Aotearoa | Zooniverse - People-powered research and try it with your team.

Department of Conservation
*Te Papa Atawhai*

# Simple rules for boaties when interacting with whales and dolphins

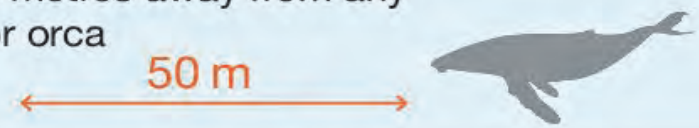
Don't travel faster than idle or 'no wake' speed within 300 metres


No more than 3 vessels within 300 metres

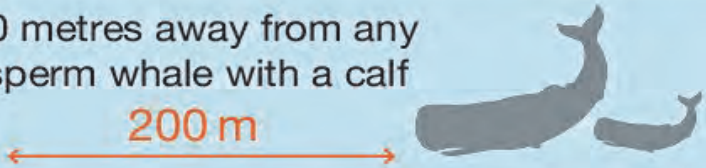

Do not obstruct their path. Approach from a parallel/ slightly rear direction

Do not swim with dolphin pods containing juveniles

Stay 50 metres away from any whale or orca




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




Do not swim with whales or orca

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# Women of Aquaculture Aotearoa – AQNZ conference

Building on the success of last year, AQNZ hosted second Women of Aquaculture Aotearoa event the evening before the 2025 Aquaculture Conference.

The evening kicked off with mingling and networking and an opportunity to catch up in person. The women linked into the industry through many different pathways including CEO's, scientists, famers, business owners and support roles like accounts and administration - the group represented it all.

The evening kicked off with drinks and seafood platters featuring some of the industry's finest, a highlight of which was tasting NZ's first ever farmed trevally from Bioeconomy Science Institute.

WoAA co-founder Caroline Gilbertson introduced Karen Olver to kick off the evening to talk about the ambitions of Women in Seafood Australasia (WISA) for NZ wāhine of the seafood sector.

Followed by an inspirational talk from the wonderful Dame Sophie Pascoe about her career as a high-performance athlete and the challenges she has faced along the way. Sophie answered questions alongside WoAA's other co-founder Aine O'Neill and even bought an Olympic gold medal which was passed around the group.

Finally, the night ended with the recognition and celebration for this year's nominees for the inaugural WoAA Awards. Which saw an impressive 29 nominations for the two new awards, WoAA Outstanding Service Award (which went to Jane Symonds) and the WoAA Excellence Award (which was awarded to Kirsty Colquhoun).

To keep up to date with future events visit www.woaaotearoa.org/events

Thanks to this year's sponsors who made the event possible

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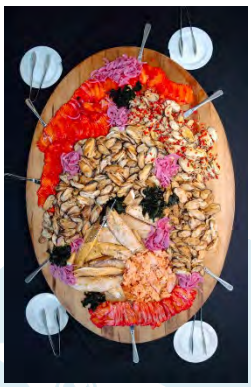

*Credit:*
*Richard Briggs*
*Photography*

# AQNZ 2025 Emerging Leaders

Congratulations also to our 2025 Emerging Leaders. This award recognises those at the beginning of their leadership journey and celebrates rising changemakers driving innovation, impact, and growth. These are the voices shaping the future of aquaculture.

These four individuals have been matched with experienced mentors for a year of growth, learning, and leadership development - culminating in their invitation to the next Evolving Leaders Hui. Past participants rave about the confidence and skills they've gained through this powerful programme.

Thank you to our Emerging Leaders sponsors: Waimana Marine, MFA, Aquaculture Direct, Great South - Southland Regional Development Agency, Skipper Training NZ and Ocean Beach.

Alongside our fantastic whānau of sponsors, this programme also wouldn't be possible without the amazing mentors who have stepped up, put themselves forward and generously agreed to share their time, experience and knowledge to support these new leaders of our industry. Thank you to our following mentors: Jon Bailey, Ben Divett, Jess Gould and Áine O'Neill.

- *Aquaculture NZ – Between the Lines*


*From left: Sean Pennells (Sanford), Will Evans (Clevedon Coast Oysters), Tee Hale Pennington (AQNZ - CEO), Teremoana Hamblin (Talley's) and Hiroki Wada (Sanford)*

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**- Jo, 2023 SRL Graduate**


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# From Niche to Noticed: ANZSA Summit 2025 Delivers Industry Momentum

More than 150 delegates from Aotearoa New Zealand and Australia gathered at Nelson's Rutherford Hotel on Friday 10 October for the 2025 ANZSA Seaweed Summit. Centred on the theme *From Niche to Noticed: Building the Value Chain for our Seaweed Economy*, the event highlighted a sector rapidly shifting from research focus to commercial momentum.

ANZSA Chair Michael Lakeman opened the Summit by noting the sector's progress since 2022, including growing attendance, increased market activity and significant scientific output. From 2018 to 2024, government investment of 22 million dollars in seaweed research, matched by 15 million dollars from industry, has supported developments ranging from biostimulants and health products to new processing infrastructure and workforce training. With New Zealand's Aquaculture Development Plan targeting three billion dollars in annual revenue by 2035, Lakeman said seaweed is positioned to play a meaningful role in achieving that goal.

Under Secretary for Fisheries and Oceans Jenny Marcroft reinforced government interest in the sector's growth and shared insights from her visits to seaweed operations around the country, including the forthcoming opening of AgriSea's nanocellulose facility.

Presentations throughout the Summit explored three themes: how New Zealand can differentiate in global markets through provenance and quality; how the sector is adapting to challenges such as invasive species and scaling from pilot to commercial operations; and how companies can thrive by building resilient and profitable business models. International context was provided by Professor Catriona Macleod, who outlined the rapid expansion of global seaweed production, while Dr Shea Cameron described the scaling challenges faced by emerging companies and the potential of new revenue streams such as nitrogen credits.

A number of New Zealand organisations shared updates on their innovations including Greenwave Aotearoa's expansion plans, AgriSea's research partnerships and large scale product potential, and CH4 Global's development of the Asparagopsis value chain aimed at reducing livestock methane. The Summit also highlighted Māori leadership with Nicola MacDonald describing Ngāti Manuhiri's successful eradication of invasive Caulerpa at Omaha Cove, and Biosecurity New Zealand's John Walsh outlining future options for managing Undaria.

Student researchers were recognised through the Jill Bradley Memorial Award, won by Janet Reid for her work on nanocellulose applications, with Kizzie Amore and Arthur Sun also presenting notable findings. ANZSA acknowledged the support of its sponsors and the mix of participants from government, iwi, research, industry and investment circles, all contributing to an engaged atmosphere of collaboration.


Feedback from attendees described the 2025 Summit as the most successful to date, citing the value of networking, the diversity of topics and the focus on practical pathways for sector growth. Following the event, members met for a strategic discussion at Melrose House, recommending a market cluster model to guide the next decade of development, emphasising the importance of iwi partnerships, unified sector leadership and coordinated opportunities in food, bioproducts, materials and ecosystem services.

The whakataukī *Nāku te rourou, nāu te rourou, ka ora ai te iwi* captured the tone of the Summit. The seaweed sector is steadily moving from niche to noticed, charting a clear path toward becoming a cornerstone of Aotearoa's regenerative blue economy.

# Preparing your vessel for the summer

Hull fouling is the build-up of marine organisms such as algae, barnacles, and seaweed on a boat's underwater surface; and it is by far the biggest risk for transferring marine pests throughout New Zealand's marine environment.

A dirty hull could also ruin your holiday plans, as there are strict marine biosecurity rules in place for the Marlborough, Nelson and Tasman regions.

Fouling on your vessel's hull and niche areas must not exceed 'light fouling' where macrofouling (such as barnacles, seaweed, or algae) is present in small patches, isolated individuals, or small colonies, covering 1–5% of the submerged surface area of a vessel, unless:

- You're entering for a haul-out, which must happen within 24 hours.
- There's an emergency affecting the safety of the craft or the people on board.
- There's a declared state of emergency.

This rule does not apply if:

- Your craft has met New Zealand's Craft Risk Management Standard - Vessels for Bio-fouling.
- Your craft is usually moored in the Tasman-Nelson region and leaves for no more than three days before returning.

Marinas and ports can also impose requirements on visiting vessels and may refuse service if these are not met. Many marinas implement the "6 or 1" rule, requiring visiting boats to provide evidence that they have been anti-fouled in the last six months, or have been hauled out and cleaned in the last month after leaving an area infected by marine pests.

Vessel inspections will be carried out across the region throughout the summer to ensure boaties are adhering to these rules. Make use of the winter period to prepare your vessel and play your part in protecting New Zealand's waters.

We recommend that you:

1. Haul out at least annually, and anytime there is a build-up of fouling. Using an approved haul-out facility means that any bio-fouling and anti-fouling chemicals are captured and disposed of without harm to the environment.

2. Apply anti-fouling to your vessel. Anti-fouling coatings are the best weapon against marine pests. An anti-fouled boat that is clean and well-maintained will also have improved performance and fuel efficiency.

- Check niche areas such as the keel, intakes and outlets, propellers and shafts, rudders and casings. These are prime locations for harbouring pests as they are not applied with antifoul products.

We advise booking space at your preferred haul-out ahead of the busy summer season.
A list of facilities is available at www.marinepests.nz/hauling-out.

- *Top of the South Biosecurity Partnership*

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## HAVELOCK, MARLBOROUGH

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