

DOCS OF SEAFOOD

NEW ZEALAND

The impression seafood can leave

New Zealand Seafood for a new generation

Cyclone impacts: The science beneath the surface



FirstMate Adverse Event Navigators

FirstMate Adverse Event Navigators: Supporting Our Fishing and Marine Farming Communities

At FirstMate, we deeply value our fishing and marine farming communities. We understand that unexpected events, like adverse weather conditions, can have a significant and lasting impact on mental health and wellbeing.

That's why we're here to offer a helping hand.

We've now got a team of dedicated FirstMate Adverse Event Navigators in the regions hit hard by weather events in early 2023, providing on-the-ground support for fishers and marine farmers from July 2023 to December 2023.

Connecting with you and your communities

These Navigators are deeply involved in your community. Join them at gatherings and BBQs, being held to connect our fishing and marine farming communities.

They'll learn from you, find out what you need and will be developing business continuity resources to enhance community resilience. Keep an eye on firstmate.org.nz for updates and more resources.

They'll be working with other organisations in the seafood sector, such as the Inshore Council, and other supporters such as the Rural Support Trust, to help address challenges impacting on you and the sector.

You can contact us anytime

Thanks to the North Island Weather Event Fund, established by the Ministry for Primary Industries (MPI), for supporting our Navigators.

FirstMate is committed to providing a strong support network for our fishing and marine farming communities, and our Adverse Event Navigators are here to ensure that you have the assistance and resources you need during challenging times.



**Adverse
Event
Navigators**

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EDITORIALS

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From the Chief Executive

As sea-going people, I would suggest we are more aware of our horizons than others may be. On our immediate horizon as I write this message, is the general election on October 14th which will bring change, no matter what the electorate decides.

Seafood people are used to change. It is part of what makes us resilient (although it is possible to have too much of a good thing). However, in the category of welcome changes, I would refer you to the Industry Transformation Plan (Fisheries ITP) which was published in early August and will be a guide to any future Minister of Oceans and Fisheries, as much as it is to all of us. You can find a good summary of key takeaways from the ITP in this magazine. It spells out a future for seafood where we can move forward on strengthening our environmental performance, improving profitability and productivity and supporting people and communities.

These matters were on the minds of all at the Seafood New Zealand conference in Wellington in August. You will also find coverage of that conference in this issue of the magazine. I felt the conference reflected a shift in tone in the industry. It was reflected in the theme: seafood for a new generation. That new generation was visible at conference, and it has also arrived in the offices of Seafood New Zealand. As you'll see in the pages of this magazine, we have some new faces in three of our critical roles at Seafood NZ and we welcome them and their new approaches and ideas.

Reflecting on new approaches, we asked a number of people from across our industry to share their thoughts on the future as we start a new fishing year (The Horizon Line, page 14). Their views might surprise you or challenge you. Be ready to be challenged because that's the nature of change. And be ready to hear about collaboration, meet new people and feel their passion for seafood, all brought to you in this New Year edition of the magazine. Best New Fishing Year wishes to you, wherever in seafood you may be. All the best for the change and challenge ahead – we are ready for it.

Dr Jeremy Helson
Chief Executive

Introducing Greg Gent, Seafood New Zealand Chair



I write this to introduce myself as your recently appointed Chair of Seafood New Zealand.

Other than a banking stint early in my working life I have been a dairy farmer and a professional director for most of my career.

Home for me is Ruawai, a very small town, two hours north west of Auckland. Our farmland borders the Kaipara harbour. My wife Ann and I are predominantly dairy farmers, although we do have a beef fattening operation which is synergistic with the dairy farms. Recreational fishing in our 6m tinny is a favourite pastime.

My governance career began in my early thirties when I was elected Chair of Northland Co-op Dairy. That subsequently merged with Kiwi Dairies (Taranaki) and I was appointed Chair of the merged entity. From there it was negotiating with the Government of the day (with Helen Clark as Prime Minister) the formation of Fonterra. I was a board member at Fonterra for its first ten years, stepping down in 2011.

After Fonterra I have had a number of governance roles, including Deputy Chair Plant & Food Research, Chair FMG rural insurer, Deputy Chair Equestrian Sports NZ, Chair Southern Cross Healthcare Group.

Today I am Chair of Ashburton based Dairy Holdings, director of Cooperative Business NZ and an advisor to the board of two NZ based Chinese companies.

The process around being appointed to a board usually starts with a call from a recruiter as happened

with this one. The role interested me from a number of angles, it was the very early days of the merger which has most seafood represented by one organisation, it was a very successful primary industry and largely regionally based. Probably the overriding consideration was that Seafood is a very solid export earner for our country, a long established business and one that is facing some headwinds around change.

Frankly, New Zealand needs every export dollar it can get and we have a big job to do to convince the public that our operating reality and the perception of that are two quite different things. We are not the only primary industry facing that challenge. So put all that together and I am very excited by the opportunity but equally a little daunted around how much I need to learn. You have a very capable experienced board and I hope as the independent Chair I can add value to that.

Jeremy (our CEO) and his team have put together a very comprehensive induction programme for me. I hope to meet many of you as that unfolds. It is also the board's intention to hold its meeting regionally whenever possible. The thinking is to invite those in the region to come together the evening before the meeting so that we can hear directly from you about the issues you are facing and also to hear from us around the initiatives that we have in play.

I want to thank you in advance for your contribution. I look forward to helping the Board and all of us, as we chart our future.

New arrivals: Seafood NZ welcomes fresh faces

Tamar Wells, Principal Policy Manager, Tiff Bock, GM Inshore and Fiona MacMillan, GM Communications and Marketing have arrived at Seafood New Zealand in the last few weeks. Not new to the world of seafood, but new to the offices of Seafood New Zealand, these three new team members tell us why they're here.

Tiff

I came to New Zealand in 2005 from California where I used to live in a city called Stockton. What it's famous for is having a huge inland port and I grew up sailing on the delta, so I guess the ocean got in my blood that way. After moving to Aotearoa and completing my masters in Marine Biology at Victoria University, I became a science officer at the Ministry of Fisheries. From there I went to deepwater management for thirteen years. I got to go out on a deepwater boat, including spending two days on the Amaltal Enterprise.

I'm very happy to be at Seafood New Zealand, even though some people might consider that a surprising move from the Ministry. I really want to get things done and I think we have so many opportunities. One of our biggest opportunities is around communication. Because people have not been able to see what actually goes on in our industry, it's been easy for some people to say that things are bad. That's why I see things like cameras as an opportunity.

I have a lot to learn in inshore and I'm really looking forward to it and am ready to go.

Tamar

I grew up in Nelson, never far from the sea or fishing. I fished as a kid for blue cod in the Marlborough Sounds

or gathered mussels. We were always rock pooling and doing that sort of thing outside as kids.

I was a chef for 12 years which got me through my teens and my university study of marine biology and ecology at Victoria University. I'd always been science obsessed and had that curiosity for the natural world, so I wanted to study something I was super passionate about.

Then I managed to get a role at Te Ohu Kaimoana as a graduate analyst. I spent six years there in various roles. During that time I worked alongside many of the people now at Seafood New Zealand, especially on protected species and finfish management.

When I started I didn't know what the word policy meant! And I knew b*gger all about fisheries. But that all changed really quickly. Then people and rights and interests and resource management became my passion and I can't imagine being in another space that would be quite this interesting and dynamic. I think I might be obsessed with fisheries management!

Fiona

I love this industry, way more than I expected to seven-odd years ago when I joined Sanford. I still remember the first time I went out on a fishing boat. It was the Ana, a smallish inshore vessel and it was one of the best things I have ever done. I don't think I've ever felt more peaceful and I've very rarely felt so happy. Who knew commercial fishing was so magical.

The ocean is incredible, but it's the people that impress me the most. Decent people. People I'm proud to talk about. While there are plenty of good people in communications doing their best to tell our stories, we haven't had enough resource to counter the negative stories coming from the people who often don't know much about how commercial fishing actually works.

Before I was at Sanford, I was in broadcast news for around 20 years (yes, I am quite old). So I know how the media works and I understand how little time they have to really get inside an issue and reflect all the details in any given story. That's another factor making it tough for us to get our stories across.

There's a fantastic new team at Seafood New Zealand. We're fresh faced and keen to work hard. We're going to get our stories out there and do so proudly.



Tiff Bock, Tamar Wells, and Fiona MacMillan.

VESSEL UNDER 400 GT?

The environmental emission standards that apply to commercial vessels, including those under 400 GT, are now in effect. Find out more at maritimenz.govt.nz/airpollution

Whānau, air and ocean. Together, let's protect them.



Kia Mataara

Sealord announces purchase of Independent Fisheries



Independent Fisheries vessel *Irvinga*.

Deepwater fishing company Sealord has entered into an agreement to acquire privately-owned Independent Fisheries - the largest financial transaction in the seafood sector since the Sealord deal in 1992, which was part of the Māori Treaty Settlement. This transaction will make Sealord New Zealand's biggest seafood business.

Subject to satisfying a number of conditions, including clearance from the Commerce Commission and consent from the Overseas Investment Office, Sealord will acquire the Christchurch-based Independent Fisheries business, which includes approximately 46,000 metric tonne of quota, two owned and one chartered deepwater factory fishing vessels, 500 plus vessel crew and staff, and a cold storage facility. The date of settlement will be dependent on when the various conditions and approvals are met.

Sealord Board Chair Jamie Tuuta said Sealord is an inter-generational fishing company and the purchase

of Independent Fisheries further cements this position for the long-term.

"Our investment in Independent Fisheries is based on a strong belief in the business, the long-term sustainability of the commercial fishing sector in New Zealand and the ability to deliver increased returns to Sealord's shareholders, half of whom are iwi.

"Māori have a strong affinity with the moana, kaimoana and fishing. The fisheries settlement allocating iwi ownership of quota, including through the purchase of 50% of Sealord, underpins that cultural value system. This transaction grows iwi quota ownership, enhancing our strong connection with the moana in Aotearoa."

Sealord CEO Doug Paulin says ownership of the Independent Fisheries business is an "incredibly unique" opportunity as acquisitions of this type and quality rarely come along in deepwater fishing.

"The business is an excellent fit for Sealord both operationally and culturally. Independent Fisheries

has a strong family-based culture built over many years by the late Charles Shadbolt, who had a passion for looking after his people and the wider community, and I am confident that Sealord can continue this proud tradition. We look forward to welcoming Independent Fisheries employees to the Sealord whānau," he says.

Independent Fisheries Managing Director Mark Allison says the decision made by the Board of Directors and the owners will enhance the future growth of the company.

"This is a proud moment for our business and for its founding family, who have built it from its humble beginnings to the successful company it is today. There are immediate synergies that Independent Fisheries and the Sealord Group of companies can utilise both internally and externally that will provide excellent opportunities for the existing staff, customers, and suppliers to grow with the Sealord Group. In practical terms this means streamlining catch plans, logistics and innovation, with an emphasis on loyal customer service, which has been the backbone of Independent Fisheries business since its establishment."

Independent Fisheries was founded by Howard Shadbolt and had its beginnings as a small fish and chip shop in the Christchurch suburb of Linwood in



Doug Paulin, Sealord chief executive.

1956. Since that time and under the management of the late Charles Shadbolt (Howard's son) and Mark Allison, Independent Fisheries has grown into one of New Zealand's major privately-owned fishing businesses, with the fourth largest deepwater quota package in New Zealand. Within the Sealord Group, Independent Fisheries will continue to be operated by its current employees.

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Our practice is one of the country's pre-eminent advisers in this specialist field.

We look forward to serving you in the future.



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Commerce Commission ticks Sanford/Moana deal

Iwi-owned fishing company Moana New Zealand has been given Commerce Commission approval to acquire Sanford's Annual Catch Entitlement (ACE) for much of its quota of North Island inshore species through a new long-term agreement. This will make Moana the largest inshore fisheries company in Aotearoa.

The transaction is subject to one remaining commercial condition, and Moana is working with Sanford to promptly satisfy this condition now that it has the required regulatory approval.

Under the transaction, Moana will take over the catching, processing and selling of fish utilising this ACE. Inshore fisheries are those out to 12 nautical miles from the New Zealand coast, and the transaction is for a minimum term of approximately 10 years.

Moana CEO Steve Tarrant says, "Not only is the decision today an incredible milestone for our kaimahi, but for all Iwi who hold ownership stakes in Moana.

"This additional capacity provides opportunities for Māori beyond just fishing. It brings scale which will enable investment in innovation and science that align with our values of kaitiakitanga and manaakitanga.

"This is an exciting time to be in the kaimoana and kai ora industry, and I want to acknowledge the Commerce Commission, and the teams at Moana and Sanford, respectively, who have worked tirelessly over the past few months to get us to this point."

Sanford Acting CEO Craig Ellison says Sanford is very pleased that the Commerce Commission has approved the transaction between Sanford and Moana.

"We're pleased we can continue the mahi with Sanford to complete this transaction, which offers more certainty for those affected by the transition."



Steve Tarrant, Moana New Zealand chief executive.

"We acknowledge the process with the Commission was extensive and detailed and we thank them for their approval.

"Our mind now move forward to ensuring satisfaction of the other condition and smooth execution of the detail necessary to complete the transaction. This will involve consideration for the future of some of our staff and some of our inshore processing assets.

"We look forward to working with Moana and working through the detail of what is a complex, but very exciting opportunity for both companies."

Moana CEO Steve Tarrant says, "Moana is exceptionally well placed to take on the additional catch and processing volumes with a proven track record of success in inshore operations, perishable goods supply chain management, with upgraded facilities built with growth in mind.

"We're pleased we can continue the mahi with Sanford to complete this transaction, which offers more certainty for those affected by the transition.

"Moana are working through a recruitment process, and we look forward to welcoming some of the Sanford staff to our Moana whānau."

Seas Matter: Have fish for dinner, help the environment



Seas Matter campaign at Wellington Station.

Sealord has recently launched Seas Matter, an initiative that is educating Kiwis about the sustainability and nutritional value of wild-caught New Zealand fish.

As part of the initiative, Dr. Ray Hilborn and the Sustainable Fisheries team at the University of Washington compared the nutritional value of New Zealand Hoki to the carbon emissions associated with its harvesting and ranked that score against other meats.



Dr. Ray Hilborn.

Their 'Sustainable Nutrition Score' revealed that wild-caught New Zealand fish offers 20 times more essential nutrients per unit of

CO2 emissions than beef or lamb and boasts one of the best protein and nutrient profiles.

Dr. Hilborn said the research confirms that New Zealand's commercial fishing is among the world's top five most sustainable fisheries and will be able to supply people with fish for generations to come.

Armed with this research, Seas Matter surveyed people's knowledge of commercial fishing and sustainability. It found that only a third of

"The Seas Matter project tells people that if you want to reduce the carbon footprint of the meat you eat, choosing wild-caught New Zealand fish is best. It's got a lower overall environmental impact than any farmed meat."

NEWS

New Zealanders are aware that fish is the most sustainable meat, while three in ten are uncertain about which meat emits the lowest greenhouse gas emissions.

Seas Matter aims to dispel misconceptions surrounding the sustainability of wild-caught New Zealand fish, aligning with the growing priority among New Zealanders when choosing their food.

Doug Paulin, Sealord’s Chief Executive, says Seas Matter will give Kiwis confidence that the

fish they’re eating is both healthy and the most sustainable meat protein you can buy.

“The Seas Matter project tells people that if you want to reduce the carbon footprint of the meat you eat, choosing wild-caught New Zealand fish is best. It’s got a lower overall environmental impact than any farmed meat.”

Seas Matter reached out to 1500 hospitality venues using an EDM campaign. We shared tailored content, including videos by Dr. Ray Hilborn,

research summaries, and facts for staff and customers. Hundreds of venues took up an offer for posters and flyers, and Seas Matter representatives visited locations in the greater Wellington to brief owners and staff and provide materials.

When you’re next out for a meal, keep an eye out for the bright blue poster that’s changing the way Kiwis view their fish.

Protein Emissions Scorecard



Lighter shade shows emissions from agriculture; darker shade shows emissions from land-use change.
Source: Gerdagh-WRI model developed by CIRAD, Princeton University, INRA, and WRI (COWI Data)



seasmatter.co.nz

SEAS
MATTER.



This graph shows how fish compares to other protein emissions.

Seas Matter restaurant poster.

NZ wild-caught fish: the perfect protein

Comes from one of the world's top five best managed fisheries. ^{1/3}

1 serving of fish provides 20 times more key nutrients per unit of CO₂ than a serving of beef or lamb. ²

One of the best combinations of proteins and nutrients, including n-3 fatty acids and micronutrients such as vitamin D, vitamin B12, iron, and zinc. ²

Uses no pesticides, fertilizer or antibiotics and almost no freshwater. ¹

The lowest greenhouse gas emissions of any meat protein. ¹

Lower overall environmental impact than any farmed meat, and the fifth lowest impact of ALL food groups. ¹

Has 10 times more key nutrients per unit of CO₂ emissions than pork. ³

7 times more than chicken. ³

22 times more than beef. ³

¹ Sustainable fisheries: Marine Stewardship Council: <https://www.msc.org/en-au/Overall-environmental-burden-of-food>; <https://ourworldindata.org/environmental-impacts-of-food> and <https://sustainablefisheries-uw.org/seafood-101/food-or-food/>

² High nutrition: Fish proteins and nutrients: <https://www.nature.com/articles/5432475-022-00586-4#Sec2> and <https://opscience.ido.org/article/10.3388/1748-9326/wc3554>

³ Sustainable nutrition score: Calculated by dividing the nutrient-to-weight ratio by the CO₂ emissions from production: www.seasmatter.org/sea/Science. New Zealand's hoki fish species was used to represent wild-caught fish. See also: <https://www.wri.org/data/protein-scorecard>



seasmatter.co.nz

**SEAS
MATTER.**

The many benefits of NZ wild-caught fish.

The Horizon Line



As a new fishing year starts, where do we find ourselves and where do we want to be as an industry? Fiona MacMillan hears from a variety of voices in seafood about what matters and what should happen next.

Life is getting harder. So says Dana Carver, who surprised the majority of attendees at the Seafood New Zealand conference in August with that information. When asked to vote on three options, most thought life is actually easier now. It's not, says Carver, wellbeing programme leader and coach, because life is more complicated and more complex: we live in a world of over stimulation, facing an increased rate of change,

with high expectations of ourselves and others and where we are disconnected from the things that can help us like church groups and family.

On a personal and domestic level, we have more to cope with. And seafood as an industry has also faced an increased rate of change, high expectations and over stimulation.

Every year brings

more change. But not every year needs to bring more bad news than good. In the fishing year ahead, what does our industry want for itself?

Tiffany Bock, new GM for Inshore at Seafood New Zealand has a three part wish for the new fishing year. "My New Year's wish would be for there to be plentiful fish, continued innovation in ways to stop catching unwanted species, and for us to work collaboratively wherever possible to take advantage of opportunities to make things better."

Paul Turnbull, Acting EGM of Wildcatch at Sanford also wants plentiful fish and specifically more squid, but more particularly he wants to see more good people in our business. "I hope it's a good year for recruiting people who are passionate and want to stay. Externally I would like to see commercial fishing seen in a positive light and viewed for the great contributing industry we are."

On a similar note, Executive Officer of Otago Rock Lobster Industry Association and Southern Inshore Fisheries director Chanel Gardner says "It's time for action. I wish for the seafood sector to be led proactively with confidence into the new fishing year. And sometimes the best defence is an offence."

When asked what we need to stop as an industry in



Paul Turnbull, acting EGM of Wildcatch at Sanford.

order to move forward, Gardner's answer was equally direct. She says we need to stop "viewing ourselves solely through a "high value export" lens. That is one of the things that we do but we also feed the nation... fish is food; feed your people, teach them to be caretakers and give them the ability to feed themselves."

Bock is also taking a direct approach, saying we need to stop "fishing in ways that are not acceptable by any standard. And also refusing to acknowledge some change is required."

On a longer horizon, what does the industry want for the next decade? Where should we be in ten year's time?

Turnbull says he would like the industry to be "rejuvenated with a more modern fleet and sought out as an employer of choice. Globally recognised as a leader in fisheries management and sustainable business practices and a main contributor to New Zealand GDP."

Tiff takes a similar approach, focusing on the economic benefits. "I want profitable fisheries providing local fish to New Zealanders who are proud of our industry and its commitment to sustainable fishing."

But for Gardner, there's a dual focus. "I want our wild-caught (along with our aquaculture friends of course) seafood to be the premium protein that goes out of New Zealand. It ought to be celebrated by our governments and our fishermen, respected as the expert caretakers that they are. For the inshore fleet, I would hope that there are the same number of vessels on the water in ten years as now. That will be a real challenge for some operators and I don't think New Zealand realises the impact that will have on supply."

The Industry Transformation Plan (summarised elsewhere in this month's magazine) has three priority areas for the future of fishing. They are to strengthen environmental performance, improving profitability and productivity and supporting people and communities.



Chanel Gardner Executive Officer of Otago Rock Lobster Industry Association and Southern Inshore Fisheries.

Laudable and, possibly, uncontroversial goals. The test will be in delivery and there are barriers to be overcome according to Turnbull.

"It's a good and positive plan that recognises the importance of the industry for New Zealand... [but] our two main challenges are New Zealand's aging infrastructure (fleet and land-based

infrastructure) and attracting, and retaining, great people. The plan covers this well and makes some bold commitments to support the Fishing industry in a variety of ways. I cannot see anything I disagree with, although the cynic in me has some concerns when the time comes for real action. It's therefore down to us to make it happen and call our collaborators to account."

Tiff agrees the industry will need to do the work, but we are not alone. "My main takeaways from the ITP are that the industry is under pressure and the ITP provides a vehicle for us to work with (and be supported by) government to navigate that. I'm encouraged by the idea of working with others to re-establish and grow the transparency (and mana) of the New Zealand fishing industry in the eyes of the public (and consumers). I think there will always be differences in views on what action is needed and where the priorities should be, but there are big gains to be had in simply having those conversations."

The ITP and the future are on the mind of Dan Bolger, the Deputy Director General, Fisheries and MPI. "New Zealand produces great seafood which is enjoyed both at home and overseas. Seafood export revenue is forecast to rise 8% to \$2.1 billion for the year to 30 June 2023 and the sector employs around 12,000 people both on the water and onshore.

"Looking ahead, the long-term outlook for the seafood industry is favourable, with revenue forecast to be driven by increasing demand and prices. Fisheries New Zealand looks forward to working with the sector as it continues to innovate towards more selective fishing practices and makes better use of integrated data."

Gardner says "the ITP leadership team along with the Ministry super women did well to refine a complex matrix of fisheries issues and give it aspirational as well as grounded proposals." But she says we have broader issues that need to be sorted around how we are perceived "there seems to be a never ending convo about marketing and comms in this industry. It's like we've been in a toxic relationship trying to get everyone to love us and failing."

And Gardner believes we should be loved "along with the other primary industries, we are the backbone of this country."

Bock similarly feels the love for seafood, which is why she recently joined Seafood New Zealand. She was drawn in by "the passion of the people about what they do and the environment in which they do it."

And as for Paul, what does he tell people in the pub when they ask why he works in seafood? "I tell them that the fishing industry is best sector I've worked in, as there is so much variety and you work with some real characters."

MSC's Fisheries Standard version 3.0: A deep dive into key changes and Implications for New Zealand

On the 15th of August, the Marine Stewardship Council (MSC) held a workshop to discuss the new Fisheries Standard version 3.0, which is a result of the most comprehensive overhaul in the Standard's history. This was facilitated by the Seafood New Zealand Deepwater Council, given that over 60 per cent of all deepwater catch is certified sustainable against the comprehensive, science-based MSC Fisheries Standard.

The Standard is a global certification scheme that highlights sustainable and environmentally responsible fishing. It reflects the most up-to-date, internationally accepted fisheries science and management, with the MSC reviewing the scientific relevance of the Standard with scientists, the seafood industry, and conservation groups. Each fishery is independently assessed on sustainable fish stocks, efforts to minimise environmental impacts, and effective fisheries management.

Achieving MSC certification places fisheries like the New Zealand hoki fishery within the top 5 per cent of the best-managed fisheries in the world.

This workshop was focussed on better understanding the significant changes incorporated into the new version 3.0 of the MSC Standard and looking at what is needed for New Zealand fisheries

to meet the updated Standard. In reviewing and updating the Standard MSC set out to meet several objectives:

1. Enhanced Scientific Rigour and Management

The goal was to infuse the Standard with the latest scientific understanding and fishery management practices.

2. Clarity

A paramount objective was to make the Standard more comprehensible for those employing it in fishery assessments.

3. Simplicity

By reducing complexity and eliminating barriers, MSC aimed to facilitate the participation and retention of fisheries in its program.

4. Global Accessibility

The aspiration was to render the Standard more accessible to fisheries in the Global South and adaptable to high-priority species and ecosystems.

5. Data-Driven Decision-Making

Improving data collection and fostering evidence-based decision-making was pivotal in this evolution.



The MSC label shows customers their fish comes from a sustainable source.

"The MSC Fisheries Standard underpins a global sustainability certification scheme, and to advance



New Zealand hoki fillets on sale in French supermarket Carrefour. Image Margaux Favret MSC.



MSC certified New Zealand hoki.

the certification scheme, MSC is obliged to regularly review it, to improve consistency and maintain uniformity," says Aaron Irving, General Manager at Seafood New Zealand's Deepwater Council.

"However, the risk for us is that sometimes in adjusting a global standard like the MSC Standard, the adjustment which may resolve an issue in one location may also have an adverse effect somewhere else. We must understand how these changes will influence New Zealand's fisheries and mitigate the impact of these changes as necessary."

Navigating the Changes

One of the key changes is MSC's endeavours to address inconsistencies between different jurisdictions by requiring assessors to review all species interacting with the MSC-certified deepwater fisheries. This aligns with the paramount objective to make the Standard more comprehensible for those employing it in fishery assessments.

Irving notes that while this is understandable and in itself is not necessarily an issue, what is unknown is what additional time and resources will be needed to achieve this.

"Our members have shown that we meet the gold standard of fisheries management and currently

invest heavily to demonstrate this. We need to show that our members can preserve the benefits associated with MSC certification cost-effectively," says Irving.

Increased Flexibility

The outcomes of the version 3.0 review have led to the removal of specific requirements related to Vulnerable Marine Ecosystems (VME) and 'move on' rules.

"These changes represent an acknowledgment from MSC that numerous strategies exist to address habitat concerns and providing flexibility for management solutions will still meet MSC requirements," says Irving. "Over the years New Zealand has demonstrated leadership by implementing innovative management initiatives like seamount closed areas and Benthic Protection Areas (BPAs) which saw the protection of over 30 per cent of representative benthic habitats within our EEZ from bottom trawling."

Enhanced Scientific Rigour and Management

To support increased scientific rigour, MSC is introducing a new evidence requirements framework to guide assessors systematically and maintain consistency across assessments.

The framework should address the paradox where an abundance of data has led to more questions and potentially harsher scoring compared to less data-rich Units of Assessment (UoAs).

"On the face of it, this is a positive development. But as is often the case, the devil is in the detail. The potential challenge lies in how auditors interpret and implement these changes. Fisheries science inherently carries biases, which, when accounted for, aren't concerning, and the existence of biases without context shouldn't necessarily impact scoring," says Irving.

"However, the real issue emerges with the 'unknown unknowns.' For instance, this might be acceptable for certain Bayesian-based stock assessments, but it could pose a problem for fisheries relying on less rigorous Catch-Per-Unit-Effort (CPUE) based assessments."

Prescriptive approaches to managing shark bycatch

One of the more problematic changes to the MSC Standard for New Zealand fisheries relates to changes to shark finning. The issue here does not relate to MSC's intent to stand against shark finning - shark finning is not lawful and as such does not occur in New Zealand - the issue for New Zealand is the prescriptive nature of the approach.

The MSC Fisheries Standard review underscores its unwavering commitment to combat shark finning—a practice deemed both wasteful and morally unacceptable – by strictly prohibiting shark finning within its certified fisheries. The new prescriptive approach does not recognise or acknowledge New Zealand's recognised management approach to sharks.

This change could potentially impact all shark species within New Zealand. For Quota

"MSC's phrasing inadvertently blurs the line between lost gear and ghost fishing. It is essential that the distinction between the two is not lost."



New Zealand's hoki fishery was the first large white fishery to be certified MSC in 2001 and has been re-certified three times since.

Management System (QMS) species, it will oblige fishers to either land sharks as FNA-compliant or seek exemptions for release. Whilst for non-QMS species, the option to return them to the sea instead of using them on board could become more common," says Irving. "The irony in the new approach being required by MSC, conceived to deter finning, is that it will incentivise wasteful practices which are explicitly not sought by MSC."

Prescriptive approaches to managing ghost gear

MSC Fisheries Standard version 3.0 includes robust requirements to explicitly consider the impacts of ghost gear as part of the broader framework obliging certified fisheries to minimise operational waste and assess the impact of lost gear on habitats and ecosystems.

Ben Steele-Mortimer, SNZ Deepwater Council's Environment Programme Manager, supports the intent of the new Standard and notes that gear loss isn't expected to be a big thing for New Zealand's MSC fisheries, however, he is concerned about the conflation of terminology associated with gear loss and ghost gear.

"MSC's phrasing inadvertently blurs the line between lost gear and ghost fishing. It is essential that the distinction between the two is not lost," says Steele-Mortimer.

The challenge with this change is not the intent but rather the risk the current wording in MSC documents could be inappropriately used or interpreted based on assuming all lost gear equates to 'ghost gear.'

Concerns were raised about how Certification Assessment Bodies (CABs) are expected to assess vulnerability to ghost gear when the vulnerability of species affected by active fishing gear differs from that of ghost gear like trawl nets.

"... independent sustainability certification like MSC certification is a handy tool in demonstrating our credentials and ensuring our customers that they can enjoy seafood products that conform to some of the highest benchmarks of sustainability management in the world."

Steele-Mortimer recognises collaborative efforts with MSC are needed to refine definitions and assessment criteria that will help ensure responsible and effective ghost gear management in MSC-certified fisheries. Requests at the workshop were made for MSC to update their documentation to provide clear definitions to mitigate the risk of incorrect assumptions regarding the relationship between gear loss and ghost fishing. A clear distinction between gear loss and ghost gear is essential.

In Conclusion

In essence, MSC's revisions reflect a nuanced review approach. Some changes recognise the realities of fishing practices and the need for flexibility within governance structures. However, in other instances, the Standard leans towards greater prescription, potentially overlooking effective fisheries management. These concerns were voiced during the workshop, and ongoing dialogues are poised to address misinterpretation and provide greater certainty.

"New Zealand's fisheries management system is second to none, with our sustainability management well known and regarded around the world," says Irving. "But independent sustainability certification like MSC certification is a handy tool in demonstrating our credentials and ensuring our customers that they can enjoy seafood products that conform to some of the highest benchmarks of sustainability management in the world."

New Zealand hoki, was the first whitefish fishery in the world to be certified against the MSC fisheries standard in 2001. Twenty-two years later New Zealand's deepwater fisheries continue to be committed to our MSC certification journey, with 19 hake, hoki, ling, orange roughy and southern blue whiting fisheries certified sustainable against the Standard.

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New Zealand Seafood for a new generation



“Everything we think about and do should be for those who come after us.”

This straightforward but meaningful statement was put to delegates at this year’s industry conference in August, by Seafood New Zealand (Seafood NZ) CEO Dr Jeremy Helson in his welcoming address.

The conference theme was ‘Seafood for a New Generation’, with the sentiment also carrying through to the sector’s way of working, Helson said.

“We want the delegates of the 2123 conference to continue to say, as we do now, that our industry has a proud history – we have a stunning, healthy product, and we work hard to maintain a healthy ocean environment.”

But, despite the industry’s strengths, there are challenges. “Over the last few years as an industry we have been fractured. This has watered-down our effectiveness and negatively impacted our relationships with consumers and decision-makers, and each other. We weren’t representing more than 12,400 people working in the sector to the best of our ability. To overcome these challenges, we knew we needed to change.”

To shift the dial, and lead by positive example,

Seafood New Zealand, Fisheries Inshore New Zealand and Deepwater Group amalgamated on 31 January, to give the industry one strong voice.

A new vision, for a new generation

At the conference, Helson outlined the new Seafood New Zealand’s vision:

Leading a thriving seafood industry that creates value for all New Zealanders from a healthy marine environment.

The four priorities to help realise this vision are:

- 1. refining Seafood NZ’s identity**
- 2. uniting stakeholders**
- 3. meaningfully engaging in the political arena**
- 4. enabling the future by supporting the Fisheries Industry Transformation Plan.**

Activating these priorities started at this year's conference. The new organisation's structure and purpose were articulated. With the first day themed "Let's listen" key stakeholders, politicians, customers and young seafood industry workers shared their views, for the industry to hear and meaningfully consider.

Customers spoke of the industry's unique story of quality, sustainability, species and people, and the desire to know more. Seven young seafood champions impressed delegates with their passion and ideas for improvements.

Minister of Oceans and Fisheries Rachel Brooking spoke of the importance of the sector as a source of food, income and jobs. It was as if the Minister had read the industry's strategy, as she showcased examples of innovation, of the need for more collaboration, and how the Industry Transformation Plan is a key way forward for all.

Addressing misunderstanding and finding common ground

The rub comes when talking about bottom trawling. Politicians described their opposition to it, and for the NGOs invited to the conference podium, it was one of their main sticking points when asked to describe what a successful seafood industry looks like.

But the industry knew this already. In responding to the NGOs and politicians, industry leaders drew attention to specific areas of misunderstanding about bottom trawling. The discussions between industry and NGOs about bottom trawling continued post-conference.

As well as getting to the bottom of trawling, the

conference programme gave ample opportunity for presenters and delegates to find and describe where the industry is aligned with others and where, when working together, positive differences can be made for the future.

There is great strength in common interests, and the conference discussions revealed the following shared views:

- The sector is important for food production.
- A healthy marine environment is a priority for everyone.
- Sustainability of the industry's people is key.

Agreement was also made about the need to increase sector research funding (by a lot), better capture recreational fishing data, reduce land-use impacts on waterways and oceans, agree a common language and facts e.g., for terminology as such as 'sustainability' and the size of the bottom trawling footprint and tell the seafood story better. The latter was a key point made by Forest & Bird's Geoff Keey, who attended both days of the conference, to better understand where the sector can work with this important NGO.

Delegates and visitors also agreed that ongoing transformation is needed.

Wayne McNee, the chair of the Industry Transformation Plan (ITP) panel spoke one week after its launch by Minister Brooking.

McNee acknowledged the important role of fishing in Aotearoa New Zealand's economy and outlined the ITP's 22 actions that build on existing strengths and will enable the industry's transformation to a low-emission, high productivity sector. See more about the ITP on page 23.



NGO panalists, facilitated by Barry Soper (seated, centre) discuss their views on fishing.

Leading from the front

The good news is that the industry's transformation is not starting from scratch, and not being done in isolation. For example, positive and mature relationships with Australia were highlighted on the stage and in separate meetings during conference week. Australia and New Zealand share many issues, so it makes sense to work together.

On day two of the conference, called "Let's lead", industry stars were celebrated and projects underway or on the horizon were showcased, demonstrating how the goals of the ITP will be realised.

Industry's proactivity is key to the success of the ITP. The oceans, commercial fishing sector and country can ill-afford a plan that sits in the bottom drawer. Thus an ITP implementation group was quickly established and its first meeting held soon after the conference. Chaired by Wayne McNee, leaders tasked with overseeing change happen include Jeremy Helson, Craig Ellison, Steve Tarrant, Rosa Edwards, Dan Bolger, George Hollingworth, Bubba Cook and Lisa Te Heuheu.

How well did it go down - inviting 'challenging' voices into the conference? A mixed, but mostly positive response. Reaction included: "Phew, that was different", "Well done on having the NGOs speak at your conference", "That was not easy to listen to", "Great to hear from the young people, what stars!", "We have more in common than I realised." When it comes to a conference programme, having any response at all can be a win, so we'll take the impassioned chatter at the break times of the 2023 conference.

Overall, the industry vision and plan resonated with

Young Fish's Ben Pierce shares the aspirations of young seafood leaders

- Sustainability and conservation ranks high. When we retire, we still want to be catching fish.
- Let's bash down the barriers to entry into the sector.
- Succession planning is key, now.
- Mental health and wellbeing of workers must be prioritised.
- We have an opportunity to be the best in the world through our operational excellence
- Education and engagement. We need to engage with schools, students and the general public to create a better understanding of the industry and to attract new talent.

delegates. The strategy is alive. It focuses on the next three years but is purposefully dynamic, enabling Seafood NZ to remain relevant to challenges, and effective in overcoming these challenges.

Seafood NZ is looking to lead from the front, provide a line of sight to where the industry is going, and be the change-makers for the future.

The future is why everyone should get up in the morning – to work on behalf of the new generation of seafood consumer and industry champions, and enjoy it along the way.



Wayne McNee, ITP Chair.



Dr Jeremy Helson, Seafood NZ CEO and Minister Rachel Brooking.

The future of the ITP – key industry action points



Seafood New Zealand CEO Dr Jeremy Helson being interviewed by local media at the launch of the Fisheries ITP.

As Seafood New Zealand looks to the start of a new fishing year, the Fisheries Industry Transformation Plan (ITP) factors prominently in its strategic approach.

Since the final ITP launched on 7 August in Nelson, the industry has had a lot to digest – both the plan's many positives, and its challenges.

Following a robust panel discussion at the 2023 Seafood Conference with several members of the ITP development Leadership Group and Fisheries New Zealand, Seafood New Zealand is now in the process of incorporating the ITP into its 2024 work and action plan.

In his speech at the ITP launch, Seafood New Zealand CEO Dr Jeremy Helson said the plan's timing was opportune for Seafood NZ, having come after the organisation's amalgamation with inshore and deepwater fishery organisations in January. The newly unified organisation is keen to

lead the industry through implementation of the plan's strategic vision and overarching themes for improvement:

1. Strengthening environmental performance
2. Improving profitability and productivity
3. Supporting people and communities

"We cannot have 21st-century, and world-leading fisheries, without all three of these components. We cannot advance one at the expense of the others," Dr Helson said.

"The ITP is both validation of the fishing industry's commitment to sustainable fishing and in our ability – through partnership – to keep making improvements to our environmental performance."



From left: Dr Jeremy Helson, ITP Leadership Group Independent Chair Wayne McNee, Nelson MP Rachel Boyack, and Minister for Oceans and Fisheries Rachel Brooking at the launch of the Fisheries ITP.

Here are a few of the 22 actions proposed in the ITP Seafood NZ is keen to focus on over the coming year:

Fishing with care and precision to support healthy ocean ecosystems (actions 1.1–1.3)

Specifically:

- 1.1** Invest in an innovation programme to accelerate selective fishing and further reduce benthic impacts and protected species interactions.

The industry and government will establish and resource an innovation programme to accelerate research into reducing environmental impacts, including bottom trawl and other fishing gear impacts and protected species interactions.

- 1.1.1** Establish a joint industry/government project to source and develop technology that minimises adverse impact on the ocean floor to the maximum extent practicable.

Industry and government will establish a priority project with international collaboration to source and develop new fishing gear and methods to reduce adverse impacts on the ocean floor to the maximum extent practicable.

In the first year, a survey will be completed on available fishing technology and methods that minimise adverse impact on the ocean floor.

Utilising data to fish selectively, efficiently and to enhance the transparency of fishing activity (action 1.4)

Industry will develop and adopt data tools for efficient and selective fishing.

Government will review the Guidelines for the

Release of Fisheries Information and the classification of fisheries data in relation to the Public Records Act 2005, the Official Information Act 1982 and the Privacy Act 2020. The review will aim to allow significantly more data to be regularly available without compromising privacy or commercial sensitivity.

Increasing exports of high value seafood and bioproducts to discerning international consumers (action 2.1)

Industry and government will work together to promote the sustainability, transparency and traceability of Aotearoa New Zealand's seafood to international markets.

Supporting communities to access local seafood and connect with fisheries (action 3.6)

Industry will promote consumption of the wide range of seafood available in Aotearoa New Zealand and look to inform consumers about what's caught locally so that product can be purchased more easily.

Advice will be provided to fishers who wish to develop business models enabling the local purchase of fish, including sharing examples of fishers who successfully sell fish to their local community.

Each of these priority areas and actions feed into Seafood NZ's new vision and strategy.

"Actioning the ITP is our opportunity to showcase to Aotearoa New Zealand, and to the rest of the world, the quality of our product and the care with which we treat it and the marine environment," says Dr Helson.

"The steps we take today will ensure we have a thriving seafood industry to hand down to the next generations."

WISA welcomes independent director from New Zealand

Women in Seafood Australasia (WISA) is pleased to announce the appointment of Karen Olver as an independent director. WISA is the only organisation representing women working in the seafood industry in Australasia. The appointment of an independent director in New Zealand is an important step in expanding its reach into New Zealand.



Karen Olver.

Karen's experience includes five years as a Fisheries Compliance Officer and Fisheries Private Secretary to Hon John Luxton. For the past 15 years Karen has worked for Seafood New Zealand, and is now the General Manager Business Operations and Service Delivery.

"I have worked in the industry in New Zealand for over 35 years and have a real passion for the sector. I would love to see more diversity in the sector at community at all levels – from the water to the boardroom. Women are a significant contributor, but there is potential for so much more.

"WISA is well established in Australia. As our closest neighbours, we have so much in common and lots that we can learn from each other. I am excited to be part of the WISA team and look forward to the opportunities that might bring here in New Zealand."

WISA President Heidi Mumme said "Karen's appointment will strengthen WISA's ability to provide opportunities for capacity building and leadership development for New Zealand women in seafood and will grow a larger support network for our WISA members."



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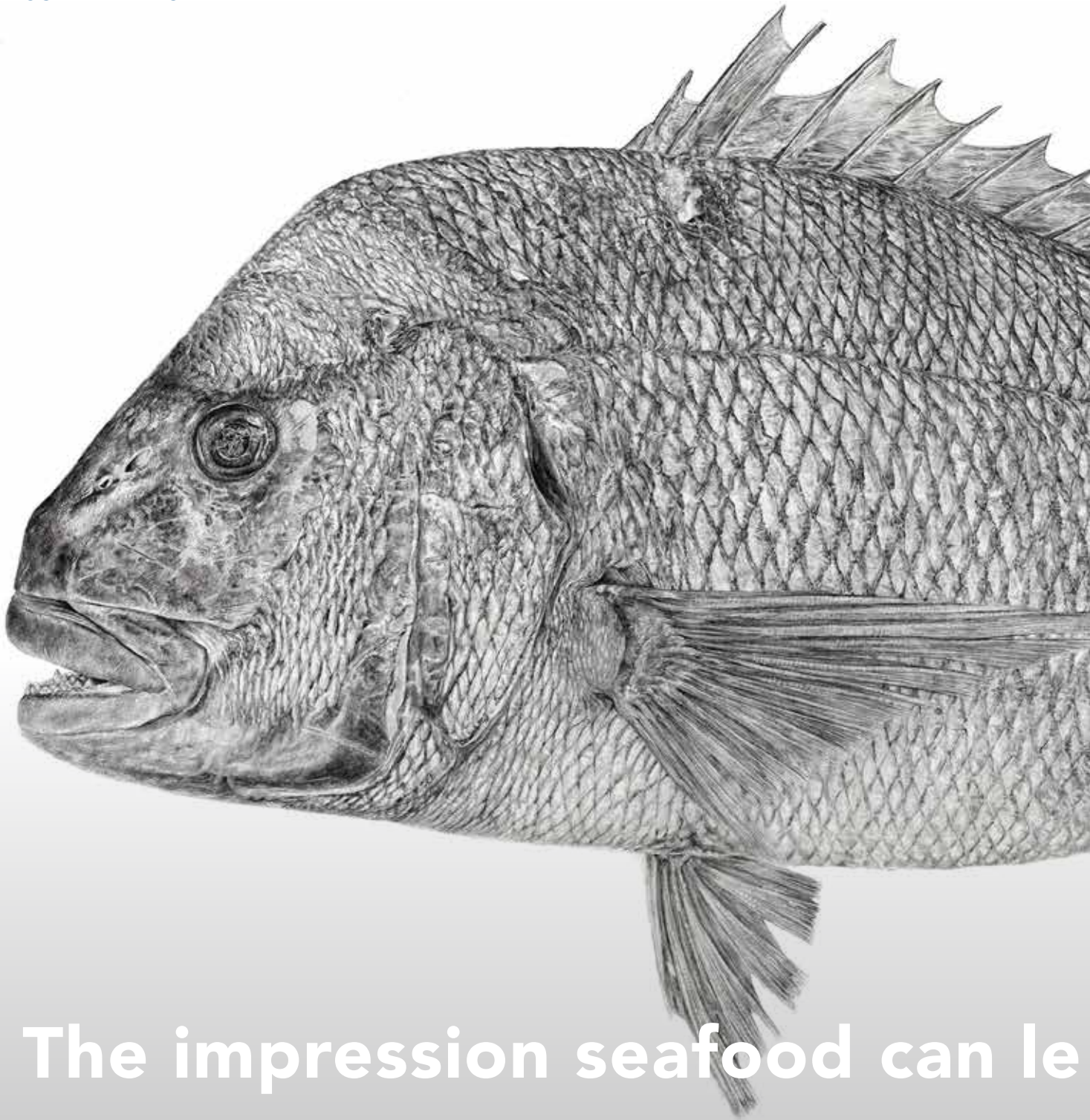
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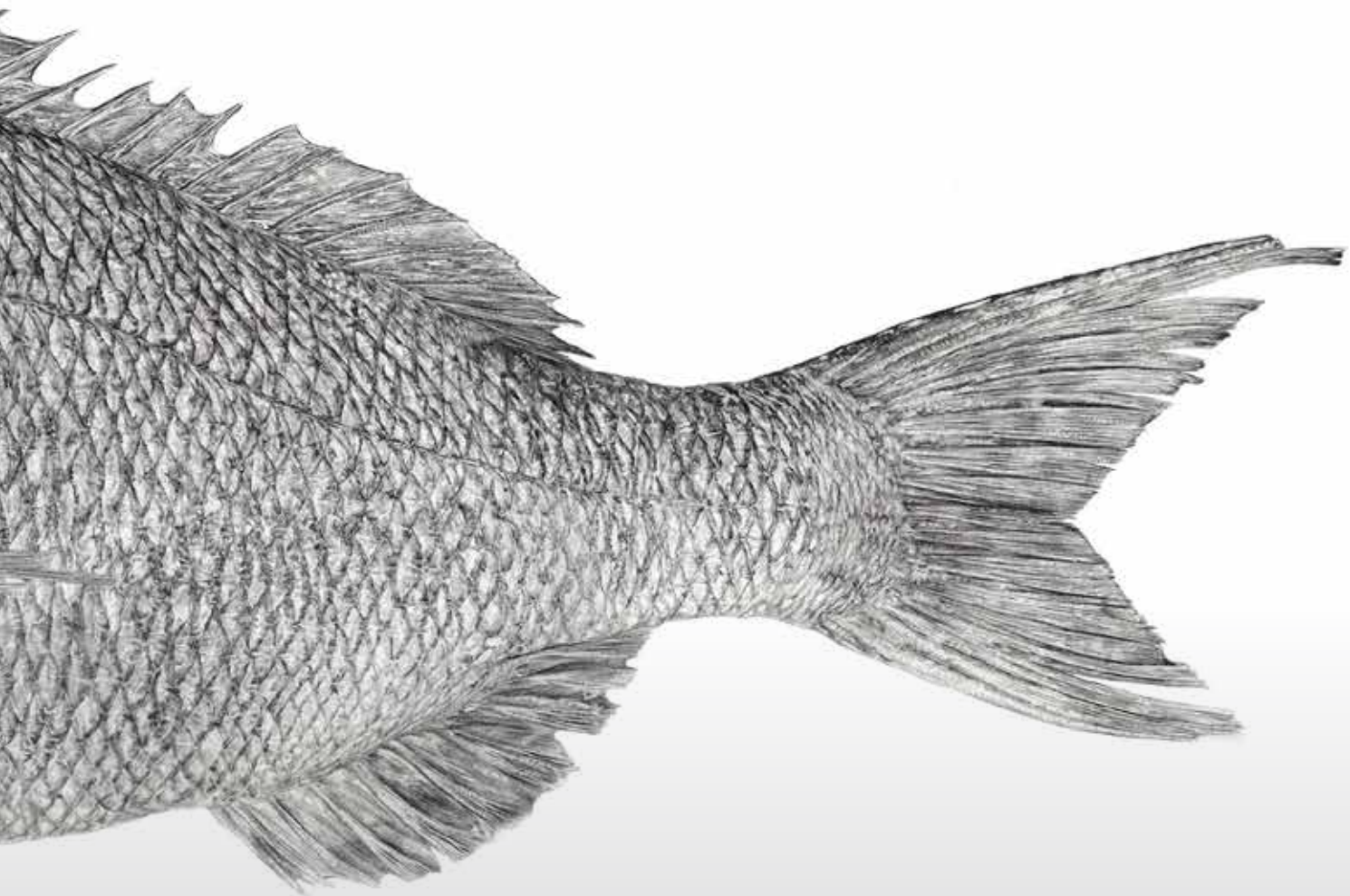
V E S S E L W O R K S

TAURANGA



The impression seafood can le

Tim Li, 37, is a Wellington-based artist specialising in photorealistic graphite drawings and Japanese gyotaku prints of many of Aotearoa New Zealand's best-known marine species. He exhibited some of his works at the Seafood Conference in August, and opens up to Seafood about his fascination with fish and why his creative process encourages him to slow down.



ave

One of Tim Li's fine-art prints of a tāpure (snapper).



Painting a fish with ink for gyotaku.

"I'm trying to encourage people to have more of an awareness about what they're harvesting, and acknowledge and appreciate how amazing and beautiful nature is."

Have you always had a deep connection to kaimoana?

I grew up in Taupō, Central North Island. My parents owned a fish and chip shop for about 30-odd years, and I grew up in that environment. Just like a lot of Kiwi kids, we all obsessed over that commercial fishing species poster. My parents always had big stacks of the Seafood New Zealand magazines and at the back were these brief stories on different commercial fish species. I used to be fascinated by those articles.

Did you always want to become an artist?

I always drew as a kid from New Zealand fishing news magazines. Every time I go back to my parents' with my kids, we go through all our old stuff and I found early drawings of all these fish! I drew all through college, and I studied design and a bit of fine art at university. But all of my working experience early on was cheffing for quite a few years. Then I went and did teacher training,

because I wanted to put my degrees to use and did about 10 years of secondary school teaching in the art side of things, but also in hospitality.

I started drawing again, properly, for myself about five or six years ago – I took the mentality that if I was going to be teaching high school kids how to how to draw and paint and photograph and do design and all the different facets of the art curriculum, I needed to practice what I preach. At that time, because I was diving so much, my obsession was the ocean. So I just put two and two together and just started drawing fish. Not necessarily thinking about what I was doing as a kid, but just drawing what I got enjoyment out of. I made the call two years ago to pull the pin on teaching and just pursue a full-time art career.

What's your artistic process?

I take good reference photos of actual fish. Then I do a quick freehand sketch. And then I just slowly invest weeks and months bringing the draw into



Tim Li pressing cotton over an inked fish.

life. Everything is fluid and freehand – there’s no tracing, there’s no predicting; everything’s done off the cuff. Sometimes I can get lost in the flow and crank out five hours.

How do you choose what fish to draw?

At the beginning, I wanted to draw the crazy species that New Zealand waters had and all the things that interested me. It started with a lot of the stuff that I was spearing myself. So I’d shoot a fish, and then I’d photograph it and have high-quality reference images on hand. I started wanting to draw all of the lesser-known species, but I was always limited to what I could access myself. So I started trying to nurture some relationships with fishmongers around the country, and fishing companies, and slowly started to accumulate a really good, diverse network of contacts who could supply me with fish for photographing. Recently I got a moonfish.

And you’re also known for your gyotaku prints. What’s that?

Traditionally it’s printing fish with sumi ink on rice paper. I managed to get some paper, but it

was pretty expensive and I’ve burned through a lot very quickly, just having failure after failure. But I found out you can do it on cotton, so I thought I would give it a proper crack now, because I was starting to get some more results with the fabric. I started with India ink because India ink is a carbon-based ink as well. But now I use a print-making ink, which is a non-toxic, water-based ink you just have to dilute down so you can control how viscous it is. And now I’m getting to the point where I’m returning to paper to try and master that approach.

Gyotaku for me is a side project that helps me keep a bit more balanced, and absolutely tick off some of those species I’ve always wanted to draw, but just don’t have the time to do. Plus, when I’m diving in the thick of summer and spring, I’m harvesting fish for myself and my family. I can do a few prints to help refine my process and my technique, but also get more out of what I’m taking from the ocean – having those commemorative artworks for special fish that I’ll always remember, but also as a way of honouring what I’m taking and being able to slow down and appreciate the qualities and intricacies of the fish.



The results of a gyo-taku print.

So it becomes a meditative process?

I want to really emphasise is trying to get people to slow down and think about how much time it takes to grow for a pāua or a crayfish to get to legal size. My drawings might take four or five months to complete. And people are blown away by that length of time. But that's nothing compared to how long something like a crayfish takes to grow.

And then we'll just go and dive and take a crayfish and chuck it in a pot and eat it, and it's gone. I'm trying to encourage people to have more

of an awareness about what they're harvesting, and acknowledge and appreciate how amazing and beautiful nature is.

When I started to get really into my art and started to slow down and observe all those intricacies and patterns and details, I looked at what I was taking versus what I take now. And I take in a much more selective way. In a much more humble way.

And with gyo-taku you can still use the whole fish?

Yeah, absolutely. That's another thing I want to try and encourage. I printed a 24-pound snapper this guy up in Northland speared. He reached out to me because his partner wouldn't let him get it mounted, and it had been in his freezer for six months. By the time we got to me, it was in pretty poor nick. We should be primarily harvesting for sustenance – so you can get that trophy image out of it via a photo or an artwork, and then still be able to fully utilise that fish. That's the perfect outcome for me.



The painstaking process of drawing a life-sized, photorealistic fish.

For more information about Tim and his art, go to timliart.com.

"catch fish...not cables"

There are a number of international submarine cables which come ashore in the Auckland area. These cables supply international communications for both New Zealand and Australia to the rest of the world.

New Zealand is a very isolated nation and as such is extremely reliant upon global communication via submarine cables. Here in New Zealand over 98% of all international communication is carried via submarine fibre optic cables. These cables are a key component of New Zealand's infrastructure and play a significant role in our everyday lives, the general economy and future growth of New Zealand.

These cables are laid in three submarine cable corridors in the greater Auckland area where anchoring and fishing is prohibited under the Submarine Cables & Pipelines Protection Act.

These areas are:

- **Muriwai Beach** out to the 12 mile territorial limit where both anchoring and fishing is prohibited.
- **Scott Point to Island Bay** in the upper Waitemata Harbour where anchoring is prohibited.
- **Takapuna Beach** this runs from Takapuna Beach in the south to just north of the Hen & Chicken Island (opposite Taiharuru Head) where anchoring and fishing is prohibited.

Note: These protected areas are monitored by sea and air patrols.



Symbols Relating To Submarine Cables

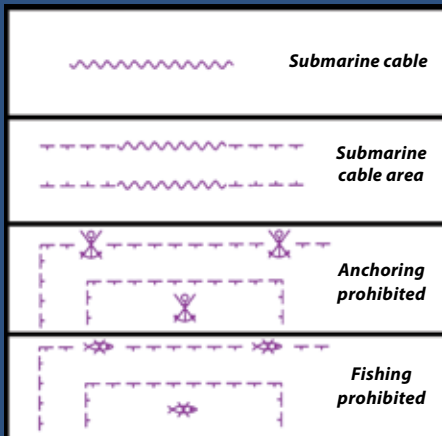


Figure 1.

These are some of the penalties

- A maximum fine of \$20,000 for a non-commercial vessel.
- A maximum fine of \$100,000 for a commercial vessel.
- A maximum fine of \$250,000 for damaging a submarine cable.

In addition to the fine for damage, the cable owners would inevitably pursue the recovery of costs associated with repairs, this could be up to \$100,000 plus a day; a typical repair can take up to two weeks.

Be Aware

These international submarine cables carry up to 10,000 volts to power the system repeaters along the cable.

For more detail refer to appropriate marine charts.



What should you do?

- If you are going into any of these areas, be sure to check your marine charts and/or GPS plotter so you know the exact locations of the prohibited zones. The relevant charts are NZ53, NZ5322, NZ532, NZ522, NZ52, NZ42 and NZ43. The symbols used to mark the zones are detailed in Figure 1.
- If you suspect you have snagged your anchor or fishing gear on a submarine cable in one of these areas, don't try to free it. Note your position, abandon your gear, then call 0800 782 627.

What happens outside the prohibited areas?

These cables are covered by the Submarine Cables and Pipelines Protection Act regardless of whether they are inside or outside a prohibited area. Beyond the confines of the "anchoring and fishing prohibited" areas, the cables are clearly marked on the appropriate marine charts.

Considering possible positioning inaccuracies and repaired cable section deviations, fishermen are advised to keep a minimum distance of one nautical mile from either side of charted cables.

Note this number:

For any queries regarding submarine cables call: **0800 782 627**



Moana Project celebrates multiple successes



Key drivers of the Moana Project team overlooking the Ōpōtiki harbour development. (From left), MetService chief executive Stephen Hunt, data lead Julie Jakoboski, science lead Joao de Souza, manager Malene Felsing, general manager research and innovation hub Brett Beamsley.

The five-year Moana Project wrapped up with a celebratory hui in Whakatōhea's Bay of Plenty rohe, although the ongoing ocean temperature sensor programme aims to continue. Tim Pankhurst reports.

It was a bittersweet gathering at the final hui of the Moana Project last month to review significant gains made in understanding our complex ocean systems.

An international group of scientists met over two days at the Whakatōhea iwi's remote Omarumutu marae east of Ōpōtiki overlooking the eastern Bay of Plenty.

Whakatōhea's open ocean mussel farm lies 8.5km offshore and its development has been a key focus of the project that had an initial hui here at its inception.

The Moana Project, driven by MetService, has also attracted worldwide attention for its unique ground breaking ocean temperature sensor programme in conjunction with the commercial seafood industry.

The Moana Project was awarded \$11.5 million over five years in 2018 by the Ministry of Business, Innovation and Employment with the aim of supporting a sustainable seafood sector by advancing understanding of ocean circulation, connectivity and risks from marine extremes, notably ocean warming.

The project encompassed multiple strands and disciplines across diverse seafood sectors.

Aotearoa New Zealand's oceanic Exclusive Economic Zone is the world's fourth largest, about 15 times larger than the country's land area.

However, relatively little is known about our seas extending out to 200 nautical miles. The Moana Project set out to change this, to support our blue economy by providing accurate ocean observations, models and data products to better understand and predict ocean processes.

Its successes include:

- Deployment of over 300 Mangōpare temperature sensors designed by Nelson firm ZebraTech on commercial fishing vessels, generating 20 million plus observations to date and adding more than a million every month. Citizen science initiatives included deploying the sensors with waka ama clubs, the

Spirit of Adventure sailing training vessel, Seaworks hydrographic survey vessels and on NIWA and University of Otago vessels.

- Identifying the source of green-lipped mussel/kuku spat on Ninety Mile Beach/Te Oneroa-a-Tōhe, which is the source of 80 percent of spat collected and grown by the aquaculture industry.
- Finding the source of Bay of Plenty greenlipped mussels, using shell microchemistry and genetics to identify the movement of patterns of early mussel life stages and settlement locations for the spat arriving at the Whakatōhea offshore mussel farm.
- Climate change scenario impacts on mussels, pāua and scampi were finalised. Downscaling results combined with species tolerance (an upper limit of 24C for mussels) shows concerning thermic stress will likely affect these species by the end of the century.
- A 28-year marine hindcast is assisting studies into water quality, pollution and contaminants, offshore activity including wind energy, fish stocks, geochemistry and climate change.
- Developing New Zealand marine science capability, including two Māori Masters students and two PhDs from a total of nine and a postdoctoral researcher.
- Demonstrating the limited effect of the 2016 Kaikoura earthquake on pāua populations using ocean models and genetics.
- Establishing that the New Zealand and Australian rock lobster populations are genetically different.
- Enhanced marine heatwave forecasting through the assimilation of the sensor data assisting marine industries.

The sensors installed on commercial fishing gear have a fully automatic data pathway, with no intervention required from the fisher, and are providing the world's most closely detailed ocean temperature monitoring.

While the gear is submerged, the sensor records temperature and depth – the deepest at 1795 metres – with great accuracy, and when it surfaces, the data is automatically sent to the cloud via a solar powered deck unit.

From there the data is quality checked and emailed back to the fisher within three hours and is available for incorporating into the Moana ocean models in near real time.

The adoption of fishing vessels as mobile ocean observing platforms has been fully backed by key sector groups Seafood New Zealand, Southern Inshore Fisheries, the NZ Rock Lobster Industry Council and the Pāua Industry Council.



The rugged Mangōpare sensor attaches to commercial fishing gear.

Since the Moana Project's commencement, all New Zealand's marine heatwave records have been broken. In the Bay of Plenty, a marine heatwave lasted longer than one year, up to November 2022 – the longest continuous event recorded in New Zealand waters so far.

Marine heatwaves are classified as moderate, strong, severe or extreme and last summer extreme conditions occurred for the first time.

Such warming, where ocean temperatures soared more than 5 degrees C above the long-term average, occurred around the Otago peninsula and Stewart Island.

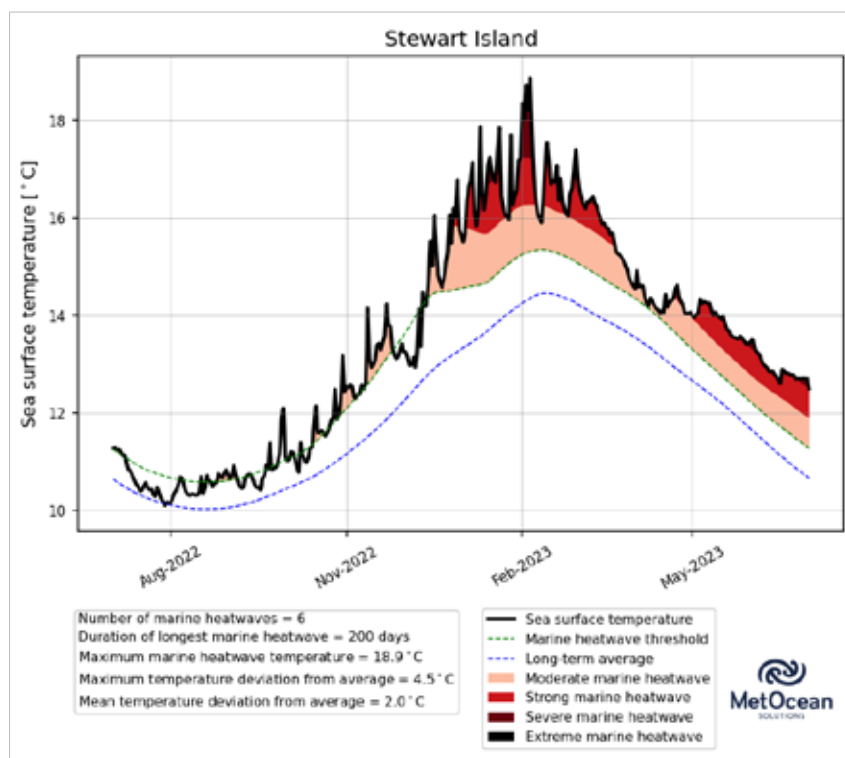
These unusually warm waters have been linked to widespread bleaching of marine sponges in Fiordland and similar impacts in the Hauraki Gulf in the previous summer of 2021-22.

The project also looks back. Using hindcast temperature data as a baseline, it determines how much present ocean temperatures differ from the 28-year average for each location and time of year, identifies when marine heatwave conditions occur, and helps understand their underlying causes.

Since 2020 the project has been providing New Zealand's first marine heatwave forecast as well as marine heatwave conditions over the past year, allowing stakeholders to anticipate and prepare for events that



Modelling the dispersal of green-lipped mussel spat from wild beds.



A recent extreme marine heatwave around Stewart Island reached temperatures more than 4 degrees C above the long-term average during summer 2022/23 and remains ongoing.

may occur in the following week and note how long increased temperatures have been ongoing in their local area.

The Mangōpare sensor programme leader Julie Jakoboski paid tribute to the commercial fishing industry for its support.

Terra Moana partner and former pāua manager Tony Craig said the Moana Project had “cracked it” with commercial fishers, who had previously spent years providing information that was used against them.

He said an analysis of seven key locations with 528 graphs covering sea surface, midwater and bottom temperatures and current flow had found no obvious correlation between fishing performance and environmental indicators.

However, ocean warming would have implications for quota holders and there would be winners and losers if fish populations moved, and total allowable commercial catches were adjusted accordingly.

“There has been a huge amount of volunteer time and the data pipeline is so robust,” Jakoboski said. “Without commercial fishers we would not be able to do this.

“We don’t have ongoing funding. We need to find it in the next three months.

“We have global eyes on us. We have a lot of pressure to continue this programme.

“We are looking internationally, commercial and

philanthropic and to bringing together institutions in New Zealand like Cawthron and NIWA.

“It is the end of one chapter and hopefully the start of a new one.”

Brett Beamsley, MetService general manager research and innovation hub, said a lot of work had gone into finding backers to continue to sensor programme.

“The cost to the country is comparatively miniscule,” he said.

“Getting research funding in New Zealand is increasingly difficult and risky.

“There is a success rate of about nine percent. It took two years to put the Moana programme together.”

Another key aspect of the Moana Project is partnership with Māori and the blending of Western science with indigenous knowledge. It has proved a particular boon for Whakatōhea.

The Ōpōtiki-based iwi has a history of loss and sadness but is now building a future around aquaculture, boosted by a Deed of

Settlement signed with the Crown in May this year.

The settlement was driven by tragic events 158 years ago and the savage retribution that followed.

In 1861 German-born missionary Carl Volkner was welcomed to Ōpōtiki by Te Whakatōhea, who built a church and a school for the mission station.

But in the Land Wars of the early 1860s, Volkner came to be viewed as a spy for Governor Grey’s Government and he was advised to stay away from Ōpōtiki.

He ignored the warning and in March 1865 was seized when he landed and hanged at his church.

Reprisals were swift. Arrests, executions and large-scale land confiscations followed – a total of 143,870 acres (58,200 ha). The surviving Whakatōhea people were consigned to a reservation. Their land was distributed to soldiers and settlers.

“From the depths of despair, we are clawing our way back,” Whakatōhea Trust Board chief executive Dickie Farrar told the hui.

“All the work you’ve done informs us on how to manage this water space.”

Mussel larvae spend up to six weeks in the water column, where they are carried by ocean currents. This means they can potentially be transported hundreds of kilometres before settling on seaweed, the seabed or a spat collection rope.

Using ocean models and advanced genetic



Moana Project members gathered at Whakatohea's Omarumutu marae in eastern Bay of Plenty.

techniques, the movement of larvae has now been tracked around the country.

It has been found that Ohiwa harbour mouth is the source of 80 percent of the Bay of Plenty's spat, meaning protection of those waters is vital.

The Whakatōhea settlement signed on May 27, the anniversary of the tribe's signing of the Treaty of Waitangi at Ōpōtiki in 1840, provides extensive redress.

It includes a Crown apology, \$100 million plus interest compensation, cultural redress including the vesting of 33 sites of significance, commercial redress including the transfer of 18 Crown properties, and the reservation of 5000 hectares of marine space for aquaculture.

The Government also committed to a \$100m Ōpōtiki harbour development, which includes dredging of a new deeper entrance channel allowing mussel barges direct access to the Ōpōtiki processing factory, rather than having to land and truck 44km from Whakatane.

MetService chief executive Stephen Hunt echoed the sentiment around a project that had achieved much and had potential to deliver more.

"It is a bittersweet feeling," he said. "There is a huge amount of work gone in, but I am not sure where it will go, we simply don't have an answer."

"We need to hold this knowledge that has been acquired, to turn it into real value that is enduring, that is sustainable.

"We need to switch from research mode more to research collection mode."

The MetService itself has a clouded future with a review under way of its function and also that of NIWA in weather forecasting where there is an apparent blurring of roles.

The future of ocean research is also unclear.

Funding for the Moana sensor programme runs out at the end of March next year.

A key to its continuation is making the data collected publicly available.

New agreements are being sought with participating fishers to enable this.

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The science beneath the surface



Debris hauled up from fishers on the East Coast.

In the wake of Cyclone Gabrielle, New Zealand's scientists set off to Hawke's Bay and Tairāwhiti to establish how the weather event had impacted the seabed and commercial fisheries. Just over half a year later, fishers are still navigating sediment and debris in the water. Seafood talks to the Ministry for Primary Industries, the SNZ Inshore Council and FirstMate to find out what's been discovered.

When severe weather pummels a region, any damage wrought on land is readily apparent – toppled trees, blocked roads, debris damaging bridges, culverts and power lines. Out at sea, things appear comparatively calm on the surface – but the real fallout is hidden beneath the waves, where in the case of Cyclone Gabrielle, millions of tonnes of sediment were washed from river estuaries into Hawke Bay.

In April 2023, two months after the devastating Cyclone Gabrielle swept across the North Island, the

National Institute of Water and Atmospheric Research (NIWA) mobilised the *RV Ikatere* to begin mapping approximately 200 square kilometres of coastal seafloor in Hawke Bay using a multibeam echo sounder. This was followed by a trip in June 2023 on the *RV Kaharoa* that proposed mapping of some of the key fishing grounds. This second voyage, which was funded via the North Island Weather Event (NIWE) Time-Critical Primary Industries Recovery Fund, was a partnership between the Ministry for Primary Industries (MPI) and NIWA.

All of this is helping MPI understand the ongoing impacts of Cyclone Gabrielle on coastal ecosystems and fisheries, and to provide a critical new baseline for scientists and industry to reference should another natural disaster strike.

Establishing a baseline

Between 1–20 June, the *RV Kaharoa* completed multibeam sonar mapping, CoastCam visual assessments, sediment multicorer samplings and select beam trawls in key areas off the Hawke's Bay and Tairāwhiti coast. It was the first project financed by the NIWE fund.

MPI's Fisheries New Zealand (FNZ) Director Science and Information, Simon Lawrence, said that as an organisation responsible for the primary sector, it was keenly aware of land-based impacts on the marine environment.

"Getting this work done quickly gives us information that can be used to manage local fish stocks sustainably, both in the aftermath of the cyclone and into the longer term," he says.

FNZ worked with local stakeholders in the affected regions, including fishers, on the proposed areas the *Kaharoa* would survey. The final areas included priority areas previously identified on the April *Ikaterere* voyage, to ascertain change in the environment over time, as well as target areas across depth and likely sediment deposition gradients.

Rosa Edwards, Seafood New Zealand Inshore Council Fisheries Manager, says establishing a baseline understanding of impacts of increased sediment flow into commercial fishing grounds means we can begin to monitor the scale of impact over 10, 20 or even 30 years' time.

"This research is amazing in terms of fisheries management – in particular for this region, which has already been dealing with the negative impacts of increasing sediment or debris flow from land for a long time. We want to better understand the potential impacts of such events to biodiversity and productivity of the region's marine ecosystems including how long the impacts persist," she says.

Though impacted by rough weather, the *Kaharoa* was able to complete data collection in several key marine areas. MPI Principal Advisor Ian Tuck says quantitative analysis is ongoing, but MPI could offer some initial observations. "Multibeam gives you a picture of the seabed. There was some seabed erosion and some sedimentation deposition depending on the area. Visibility was poor, especially in shallow areas. In deeper water there didn't seem to be any impact – the 100–150-metre depth range looked pristine."

A big part of fisheries management is to understand

"To understand any potential implications to fish stocks from adverse weather events we need this baseline monitoring information. We can then pair it with changes in catch volume and spatial changes in fishing effort and think hard about what that might do to our fish stock monitoring tools."

what the impact to fish stocks might be. MPI resurveys priority areas with voyages like the *Kaharoa* to understand the impact to important habitats in those areas over time.

"MPI does stock assessment modelling and growth analysis based on data inputs. The ability of stock to recruit – to transition from a very young fish to reproductive age – is important. Habitats areas like Wairoa Hard are important to juvenile recruitment. Research voyages like this let us understand potential impacts to important habitats and run new models to assess impact on stocks 3–5 years out and make decisions today.

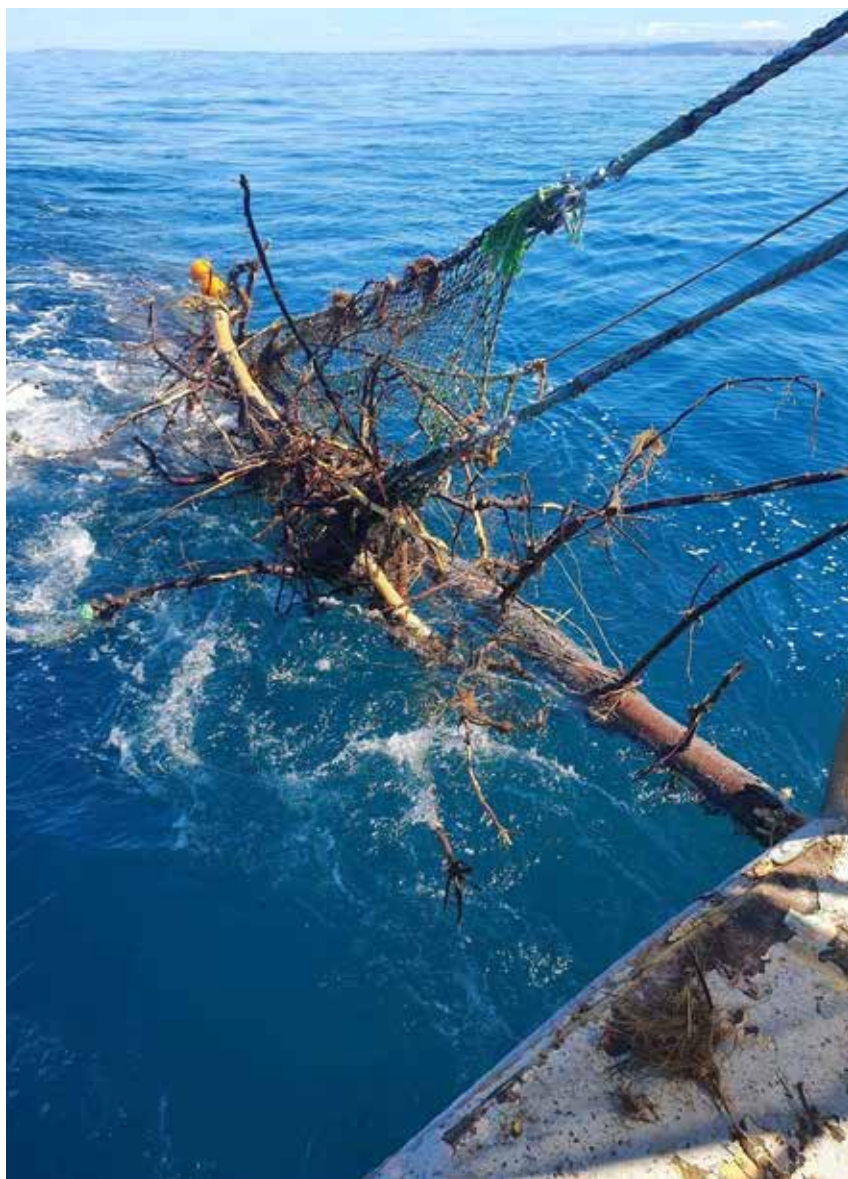
"It's quite possible there was a lot of initial deposition, but if it's cleared [several months later], then it might be en route to recovery," Tuck says.

On 21 September, MPI made an announcement on its April sustainability round for gemfish (SKI1 and SKI2) and trevally (TRE2), noting total allowable catch increases for both.

But in the short-term, Edwards notes there is anecdotal evidence of species 'shift' after a weather event like a cyclone, which puts pressure on local fishers.

"To understand any potential implications to fish stocks from adverse weather events we need this baseline monitoring information. We can then pair it with changes in catch volume and spatial changes in fishing effort and think hard about what that might do to our fish stock monitoring tools.

"Our catch per unit effort (CPUE) is a two-dimensional scenario which doesn't incorporate spatial movement well. For a fisheries manager if the CPUE goes down, that is a red flag because you think, 'Oh, is the abundance of stock going down?' But in reality, it may be that some of the more mobile fish have simply moved away from that highly impacted area, or that the debris present means fishers cannot fish there to the same extent anymore."



Debris hauled up from fishers on the East Coast.

Hazard mapping

For fishers with Annual Catch Entitlement (ACE) in the Hawke's Bay area, even if the science is encouraging, the on-the-water reality is they haven't been able to properly fish for months due to dangerous logs and slash lurking beneath the surface, not to mention the dearth of fish in their fishing grounds.

The financial and wellbeing impact of the cyclone has been immense, says Darren Guard, who supports FirstMate Navigators in the region.

"There's just too much debris. Close to the beach, where they used to fish for snapper and gurnard, they can't safely tow there anymore without losing lots of gear.

"The problem is if you catch a log or debris then

you've got to stop. And you just losing money through fuel and damage to fishing gear rather than actually catching fish and making money."

Edwards said fishers who couldn't afford not to fish ended up doing "suicide tows" because they had no idea if they'd catch fish or logs – and they'd still have to pay for any unsellable fish damaged by logs in their nets and pay for gear repairs. To provide these fishers with assured income, while getting reliable data about the distribution and shift in seafloor hazards, SNZ Inshore is working with MPI on a potential project to gather data on the location and extent of any debris.

The data collected as part of the proposed project will be plotted on a hazard map and circulated weekly to fishers, the Hawke's Bay Regional Council and other marine stakeholders in the region.

"For this work, the number one goal is to bring some certainty and positivity into the region. And number two is to put some money back into the involved fishers' pockets, and also for other fishers through knowledge of safe fishing zones," Edwards says.

"Now it's just a matter of trying to execute the project and make sure that we can actually get them back on the water and identify safe fishing areas and others where

significant debris remains.

"If a fisher finds significant debris fields, then we've got a little bit of budget to go and map those areas, which will add to the bigger picture NIWA is providing from their surveys."

Guard confirms the mapping project has lifted spirits in the region.

"Fishers are inspired again, because they know there's this project coming up. Because at the moment they're scared – they actually don't know where to fish safely. The perfect outcome for that project is that they get some revenue, and they get a chart where they can see, 'Okay, we'll stay away from all that crap, but we can actually catch fish safely in these areas.' So I've got hope, and the outcome of this project is quite important."

Doing it tough after the weather events...

FirstMate on-the-ground to help you: meet our new Adverse Event Navigators

FirstMate care deeply about our fishing and marine farming communities, and we know that when the unexpected happens, such as adverse weather events, it can have a profound and long-lasting impact on your mental health and wellbeing.

In early 2023, a series of weather events across the North Island, including Cyclone Gabrielle that caused unprecedented flooding and damage, hit three of our seafood regions hard.

Our Navigators journeyed to these areas to be on the ground to support our fisher and marine farmers, who's businesses had been impacted and, in some cases, destroyed.

In the following months, we worked closely with government, explaining the hidden impacts of these weather events on our seafood sector. What was so visible on land in terms of decimated paddocks and silt and debris deposits, was hidden from eye when it reached the sea.

FirstMate successfully applied to the North Island Weather Event Fund (MPI), which supports the recovery of rural communities and primary industries affected by the North Island weather events.

Through this funding we were able to recruit three dedicated FirstMate Adverse Event Navigators to the end of December 2023 in three regions recently badly impacted by weather events; Northland, Tairāwhiti (Zak) and Hawke's Bay/ Gisborne (Vicky based in Hastings and Dave in Napier). They are on-the-ground to support our

fishers and marine farmers and to raise the awareness of the impacts and key stressors in the seafood industry.

They'll be holding community BBQs through September, October and November and will be developing business continuity resources to help you out. Meet Zak, Vicky and Dave.



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Haere mai new fishing year

Caroline Read, CE FishServe

It is topical that this month's issue of Seafood Magazine coincides with the start of the new fishing year and all the planning and coordination that comes with this. The last few weeks have seen our team busy supporting our clients' needs, helping complete necessary paperwork for the year that has been, while updating our systems for the year to come.

This brings with it a sense of a restart, and a process of putting in place plans to support a new set of priorities for the year ahead.

At Fishserve we are especially looking forward to what the new year brings. Our status as the Approved Service Delivery Agency was recently gazetted for a further 5 years from 1 October. This is a real stamp of approval for the role we have played over the last 24 years in administering the Quota Management System. We are grateful to have this role confirmed and take the responsibilities that go along with it seriously.

The end of the year also heralded the end of our subsidiary, FINNZ, which amalgamated into

Fishserve on 1 October. This significant change removes some administrative overheads from our business and enables us to focus with precision on delivering value into fisheries.

In ending the year as we mean to continue, we also recently visited our colleagues on Wharekauri Chatham Islands. It was wonderful to be able to spend the week sharing knowledge and eating some of Aotearoa New Zealand's best kai moana. Our heartfelt thanks go to those who took time out of their busy schedule and with a shortage of fuel to learn about our Fishserve system and to share their experiences and thoughts on fisheries. It really hit home to me how only together will we come up with the ideas on how to make the system work best for everyone. We will be looking for more opportunities where the industry AGM's bring people together to be there.

Over the last few months, we have sadly farewelled some long-serving members of our team and have also welcomed new faces. The appointments of Lara Stewart as our GM Business Development, and Mark Simpson as our CTO means we are back to a full senior management team. With both Lara and Mark bringing a wealth of knowledge and experience to the delivery of robust products and services we are well positioned to implement our strategy, in particular leveraging opportunities to use technology advancements to improve the way we deliver services to continually add value to the sector.

When we moved into our refurbished offices late last year it was with the intent of creating a useful working space for the whole sector to use and access. So at the end of this year, it was fulfilling to see this reach a new level of integration with the arrival of Te Ohu Kaimoana in August.

Our sponsorship of the recent Seafood New Zealand conference and hosting the 'We're on our way to transformation' felt like an appropriate way to bookend such an eventful year of change.

It was especially motivating to hear from those already leading transformational change. As we look to the year ahead it is with a new impetus to continue our work to innovate for fishers to enable successful, sustainable fisheries through smart information services into the future.

Whāia te iti kahurangi ki te tūohu koe me he maunga teitei.



Caroline Read.

It's all action for on-board cameras

Marie Fitzpatrick, Director Digital Monitoring – Fisheries New Zealand

On 1 August 2023, we celebrated a remarkable milestone with the new on-board cameras system going live on the first group of 23 vessels. This is a huge step forward for New Zealand's seafood sector and something we can all be proud of.

Combined with the 12 Proof-of-Concept vessels that have been operating an older model since 2019, we now have 35 inshore vessels providing us with footage of their fishing activity on the West Coast of the North Island.

The roll out of cameras across the inshore fishing fleet brings a new era of accountability and sustainability that will continue drive demand for New Zealand's high-quality seafood products, at home and overseas. Customers are increasingly demanding transparency in the seafood supply chain and responsibly-sourced seafood. On-board cameras, fitted to film in-scope fishing activities, provide the evidence needed to ensure that fish products are sustainably sourced and harvested legally, ultimately protecting marine ecosystems and ensuring the long-term health of our fish stocks. This is a significant step towards more sustainable practices, supporting the conservation of protected species using the power of technology.

In a world-first, the footage captured can be matched with the electronic reporting data submitted by fishers to verify the type, size and quantity of fish caught, fishing gear used and by-catch mitigation measures adopted. We'll also be able to use this important data to make more informed fisheries management decisions, contributing to the long-term viability of the industry.



Marie Fitzpatrick.

I am happy to report that the initial feedback from fishing vessel operators has been positive. They appreciate the ease of use of the camera system and the footage review from our end has gone extremely well.

Spark Business Group was appointed the prime supplier of this ambitious project, combining on-board cameras with the power of artificial intelligence, machine learning, cloud computing, and analytics.

By the end of this year, there will be 70 more cameras installed on inshore vessels fishing off the south, east, and north coasts of the South Island - an area important to Hector's dolphins and hoiho/ yellow-eyed penguin. The goal is to have up to 300 inshore vessels, using in-scope fishing methods, equipped with this innovative technology by early 2025. The in-scope methods are:

- trawl vessels (less than or equal to 32 metres in length, except those targeting scampi),
- set net vessels (greater than or equal to 8 metres in length),
- surface longline,
- bottom longline,
- purse seine, and
- Danish seine.

This is an important achievement for the industry, and Fisheries New Zealand is excited about the prospect of continuing our collaborative efforts across the sector as we strive to realise our vision of becoming the global leader in sustainable, top-quality fisheries products.

Find out more about the programme and the upcoming rollout dates on:



New 'ecosystem footprint' research a big step toward collective action for healthy seas

Healthy marine ecosystems require an understanding of how ecosystems respond to stress. With this understanding, marine managers, coastal communities, kaitiaki, blue economy businesses, and industry can prioritise actions that reduce degradation and restore marine biodiversity, and the fish stocks it provides for us.

Until now, the focus on individual stressors has limited our capacity to manage. Now, a new footprint framework from researchers at the Sustainable Seas National Science Challenge provides a practical way to address cumulative effects and the interconnected ecosystem responses — essential to ecosystem-based management.

The ecosystem response footprint framework aims to help communities and environmental managers take a more holistic (ecosystem-based) approach to managing cumulative effects, and make effective decisions, even where detailed knowledge or data is not available.

Researcher Jasmine Low, based at the University of Auckland, says the framework is like a guideline or blueprint that aligns with ecosystem-based management and considers how whole ecosystems respond to the cumulative effects caused by multiple stressors.

"It gives us ecological things to think about, the right questions to ask, and suggests collective actions to take."

For example, marine managers, kaitiaki, and communities working to restore shellfish populations in a local estuary can use the framework to make informed decisions about the next steps to take.

This includes identifying if the estuary is a viable location for shellfish recovery, and whether that recovery can occur naturally in a time frame acceptable to the local community. Or, if shellfish stocks from elsewhere need to be brought in and cultivated to reestablish lost populations.

By knowing where and when to take different environmental management actions, marine managers, kaitiaki, and communities can actively reduce the risk of future degradation to coastal environments.

Restoring estuary shellfish— a case study

A community wants to restore shellfish beds in their estuary within the next 10 years. To do this, different groups of

people like kaitiaki, scientists, marine managers, and communities need to understand certain things — how the cumulative effects of multiple stressors are happening, what the present and future ecosystem response footprints may be, and how these response footprints can alter the outcomes of interventions and community aspirations.

The community first needs to understand the status of their estuary, the long-term effects of the impacts of past stressors, and how to identify viable locations for recovery and restoration.

Local management agencies have information on current and future stressors on the estuary. The community also gathers local and indigenous knowledge of the catchment and the health of the estuary alongside monitoring data to identify changes in stressors, shellfish stocks, and habitats in the estuary. This information allows them to map the present spatial extent of the ecosystem response footprints and the magnitude of degradation.

Using this knowledge, marine managers, kaitiaki, and communities identify stressors that are critical in setting the spatial extent of the response footprint, shellfish source populations, patchiness within the response footprint, and ecological connectivity across the estuary.

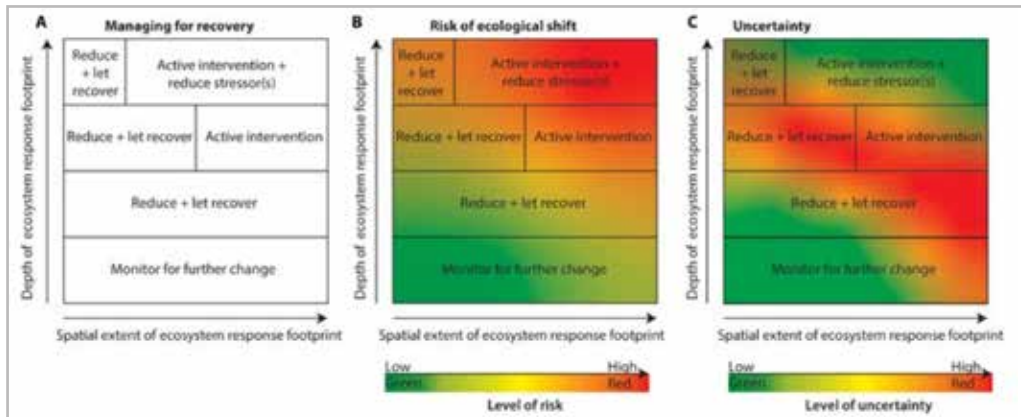
If the critical stressor, for example sediment inputs, can be reduced and the depth of response footprint (the time for natural recovery to happen) is less than 10 years, then people can leave the ecosystem alone to recover.

If the time for natural recovery is greater than 10 years, for example if there are no external populations nearby, then an active restoration process of sourcing shellfish from elsewhere would be needed to help kick start the system again.

If areas are not physically suitable for natural recovery, then new locations need to be assessed. If a new, unimpacted location can't be found, then the restoration process may need to involve manipulating habitats — this may be a human activity to create suitable environments.

The next stages in the process may include:

- monitoring the shellfish bed to identify progress
- spreading knowledge to other interested groups



- A Summary of management actions likely needed to manage different types of response footprints.
- B The level of risk of poor ecological outcomes (red is high risk and green is low risk).
- C The uncertainty surrounding this risk (red is high uncertainty and green is low uncertainty).

- holding discussions between the community and governing bodies on how to improve overall estuarine health, for example large-scale riparian and coastal planting to reduce sediment and nutrients inputs from the area
- prioritising estuary health and connectivity when consenting for new activities.

This process of collaboration and co-development is likely to result in shared aspirations and goals that are more focused on improving the health of the estuary.

Information gathered by the community on the status of the estuary can be used to explore areas for natural recovery or active rehabilitation.

Footprints tell a story

An ecosystem-response footprint is a way of thinking about how an ecosystem responds over space and time to something that happens to it. Just as the different stressors on a shellfish population can combine and reach tipping points, the way the ecosystem responds to restorative actions is also multi-faceted and connected. One size doesn't fit all.

How an ecosystem responds and recovers from multiple stressors is like a footprint. It can be in one or more places, be a different length, width, and depth, and remain for different periods of time.

"We take this ecological information we already have and try and build a picture of how some stressors and their specific characteristics can affect the ecosystem — to generate different types of ecosystem responses."

To define the size and depth of response footprints, researchers used the ecological principles of:

- legacy effects of stressors
- disturbance-recovery dynamics
- ecosystem interaction networks
- spatial and temporal scales of stressor regimes and ecosystem responses.

Thinking about ecosystem response in this way, can help people make good decisions about marine management and use restorative resources in the most effective way. It can help reconcile the different elements and targets of different management agencies.

"We can't just base the way we manage marine environments on limit-setting approaches because the same thing doesn't happen everywhere or at the same time," Low says.

"For ecological recovery and resilience, we need a way of understanding all of the impact to a particular marine ecosystem and the best management actions to take."

Each response footprint calls for a different management and conservation approach. For example, in situations when the response footprint is shallow (a shorter time for natural recovery to happen), reducing the source of the stress can allow natural recovery to take place. But a deeper and larger footprint, might call for more active intervention in the recovery process for example, adding key ecosystem elements to assist natural recovery.

Opportunities for industry to work together

Low says the research has implications for industry and suggests working together to solve issues is the way forward — a cumulative fix for cumulative effects.

"It's about thinking about the entirety of the ecosystem, not just specific species and managing just for that. We all need to be thinking about how everything has been impacted and not blaming one industry or expecting one industry to solve the problem itself. It's about working out what people need to do together.

"We need to involve everyone on the entirety of the ecosystem to get habitats back to health. It's something that we all need to work towards fixing together."

Clear footprints for next steps in research

This research complements other work of the Sustainable Seas Science Challenge because it helps marine managers, kaitiaki, and communities act in a rapidly changing marine environment when people have to make decisions involving risk, uncertainty, and different ways of looking at the world.

Other projects will offer tools for people to understand and communicate different perceptions of risk and uncertainty and how to use this understanding in decision-making. The ecosystem response footprint framework fits comfortably here and in the wider context of ecosystem-based management for healthy seas.



RECIPE

Crispy skin john dory

Bursting with colour and flavour, this beautiful dish is perfect for entertaining guests all year round.

Ingredients

SAFFRON ORZO

- 3 cups vegetable stock
- 20g butter
- 1 tablespoon olive oil
- 1 red onion, finely diced
- 3 cloves garlic, finely chopped
- ½ teaspoon chilli flakes
- 1 generous pinch of saffron
- 1 cup orzo pasta
- 2 tablespoons finely chop parsley
- ½ teaspoon lemon zest
- 1 tablespoon lemon juice

CRISPY SKIN JOHN DORY

- 6 x 150g john dory fillets
- 3 tablespoons olive oil

PARSLEY AND PINE NUT SAUCE

- 40g pine nuts, toasted
- 3 tablespoons parsley
- 1 clove garlic
- ½ cup olive oil
- 1 teaspoon lemon juice

TO SERVE

- sea salt
- cracked pepper
- lemon wedges

Method

1. In a pot, bring vegetable stock to a simmer then set aside.
2. Heat butter and oil in a large nonstick sauté pan over a moderate heat. Add the diced onion and gently fry until soft and translucent then add the garlic and chilli flakes and fry briefly until aromatic.
3. Add in the saffron, orzo and vegetable stock and bring to a simmer. Cook for 10-12 minutes or until orzo is cooked and stock has been completely absorbed and season generously with sea salt and cracked pepper.
4. Remove the orzo from the heat and stir through the parsley, lemon zest and juice.
5. Season john dory fillets with sea salt and

cracked pepper. Place oil and fillets, skin side down, in a cold, nonstick pan. Place on a medium/high heat and fry until golden and crispy and mostly cooked through. Turn the fillets over and briefly cook the flesh side.

6. Finely chop pine nuts, parsley and garlic and place in a small bowl with olive oil and lemon juice. Season with sea salt and cracked pepper and mix well to combine.

To serve

Spread the saffron orzo on a serving dish or individual plates, top with crispy john dory fillets and drizzle generously with parsley sauce. Pop on a few lemon wedges for extra zing.

Chef's tip

To guarantee a gorgeous crispy skin on your john dory fillets, cook in batches to prevent overcrowding the pan.

Recipe supplied by Sanford Ltd.



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QUOTA SHARES FOR SALE

FLA3 PAU5A PAU3B	2 tonne 1 tonne 1/2 tonne	Offers Offers Offers
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BOAT FOR SALE

16.86m x 4.85m fibreglass, 700HP Iveco, 7500 hrs, 2,200L fuel, charter and fishing survey

\$430,000+GST



DOMINIC PREECE
Managing Director

PHONE (03) 383 7282 | MOBILE 027 406 0419 | quotabroker@extra.co.nz | www.aotearoaquota.com
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2023-2024

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Full parcel only

kevinjamesprendergast@hotmail.com

+61 41 0549824



5417 POTTER/LINER. MAKE GOOD TUNA BOAT

LOA 13.2m x B 4.2m x D 1.7m
Doosan 165hp new 2014 on 3.4:1 gearbox
Onan/Cummins 7KVA gen-set. Invertor
5 Tonnes Ice Hold. 2 station steering.
Fuel 4,000 litres Water 600 litres
7 Berths. Diesel stove + LPG cooker
Toilet/shower H/W. Good electronics
Coastal survey expiry July 2024

\$150,000



5380 DANISH SEINER
READY TO FISH- Built 1982
Cummins KT19 273kW
Aux - Sea Wasp & Cummins
Fuel 16,000 litres
20 LPH trawling
Ice hold 12 tonnes
4 berths. Galley, Shower/WC
Seine winches and gear
Survey to 30/09/2025
POSSIBLE FINANCE
CHIPPED TO **\$240,000**



COASTAL TRAWLER TROLLER
Built 1976 Sinclair Melbourne
L 14.46m x B 4.3m x D 2.2m
GM 6/71 175hp rebuilt 2018
Fuel 4,500 litres
Max 9 knots service 7.5 knots
Ice Hold 10 tonnes, 180 bins
2 berths. Toilet shower. HW
Split winches.
Good electronics
NEW SURVEY **\$135,000**



5373 MORGAN POTTER
14m Morgan timber
built 1979
Doosan 320hp 2:1 gear box
Fuel 2800 litres
Service speed 8.5 knots
50 case ice hold
Pot hauler - side and main
4 berths. Toilet/shower.
HW. Dickenson stove.
Good electronics

POA



5399 FRESH FISH TRAWLER
LOA 23.95 x B5.8m x D3.8m
Built 1989
Mitsubishi main 500kW
2 x generators
Fuel 9.2 tonnes
85m3 chiller fish hold
Capt Cabin + 2 crew cabins
Good galley saloon
Split winches. 100 miles
survey Expiry Sept 2023

KEEN SELLER - POA



5385 TRAWLER & NETTER
Roger Carey Built 1964
15.1m x 5m x 2.4m
Cummins NTB55 240hp
ZF box 3.4:1. Fuel 2,500 ltr
Split winches. Net roller
500m Dyncema. 2 x trawls.
Set net drum. 4 Berths
Good electronics
Fish hold 222 fish bins, 9 ts
New 5 yr Survey Coastal
March 2023 **\$180,000**



5328 TRAWLER & LINER
LOA 17.55m x 5m x 2.1m
Detroit 6V/92 TI DDec 291hp
Allison 4.5:1 gearbox
Fuel 3650L, Water 500 L
Fish hold squared for 400 bins
Winches 1,000m x 13mm
Good electronics
Accommodation for 3
Surface & bottom line drums
Offshore Survey 100 miles

POA

5305 NETTER & BOTTOM LINER - LING POTTER

LOA 21.2 x B 6.7m x D 2.6m
Iveco main 285hp. Genset 40kVA
Fish hold 27 tonnes. Fuel 8,000 litres
Galley in house. Toilet/shower. Hot water
Nets & bottom line gear + at least 3 sets ashore.
PROVEN LING POTS at a price to be agreed.
Gill net drum. Rope roller 28 kms rope
Survey Offshore Limits. Expiry 28/02/2027
Possible ACE package to approved buyers.

\$190,000



All prices indicated are plus GST unless otherwise stated.

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Ngā Taiohi o te Moana



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