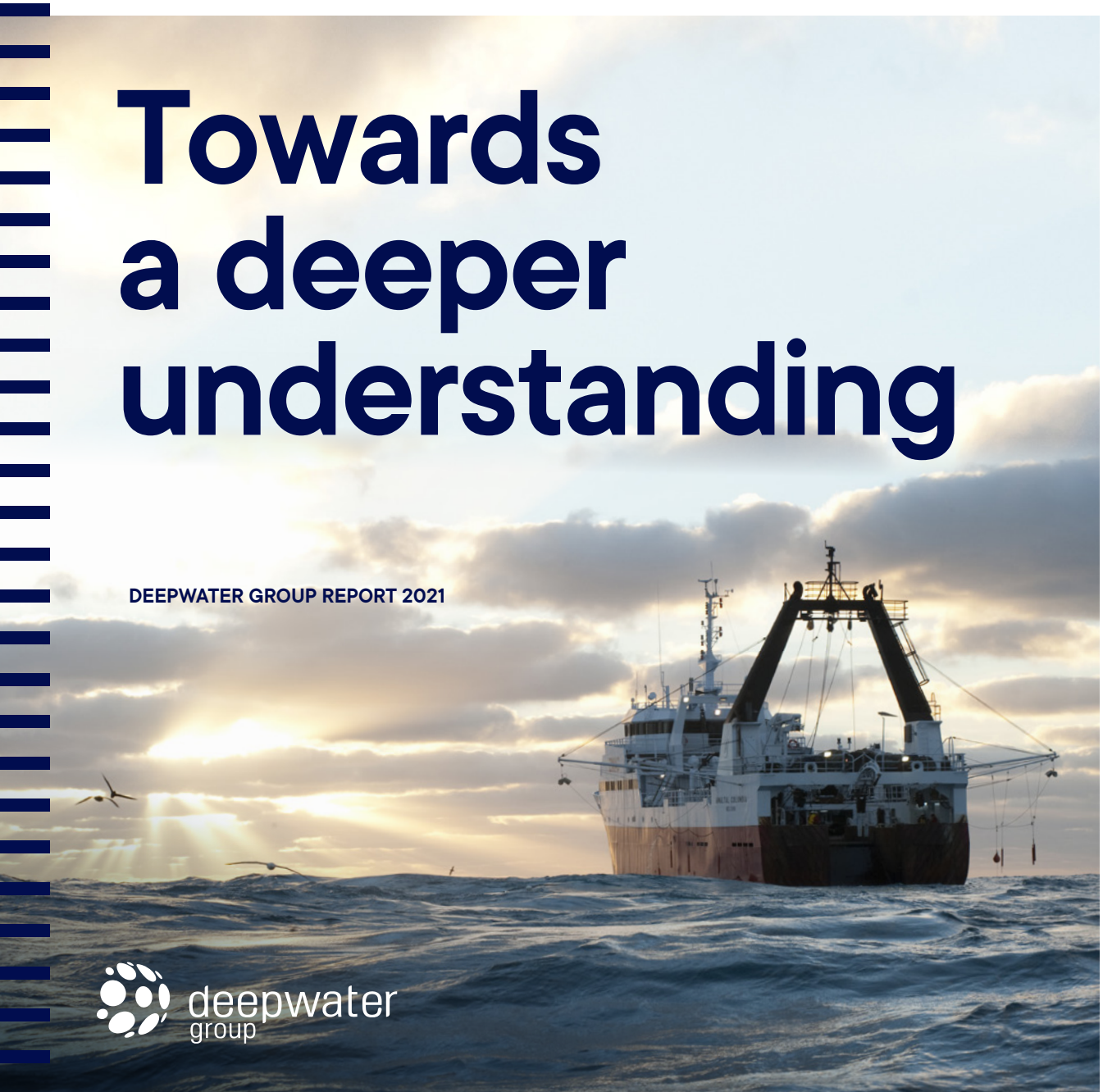
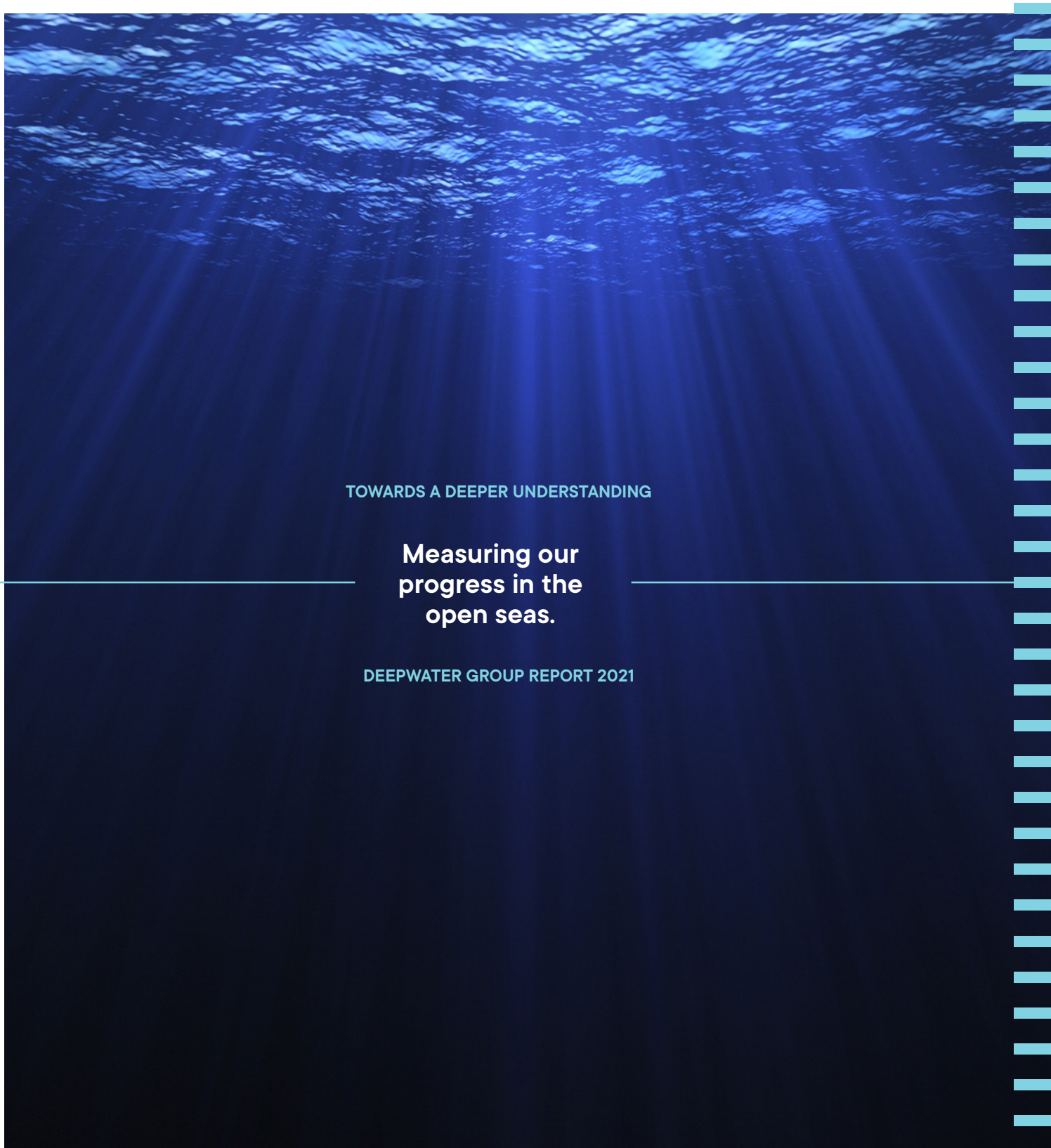
Towards a deeper understanding

DEEPWATER GROUP REPORT 2021



deepwater group

Cover Image: *Amaltal Columbia.*

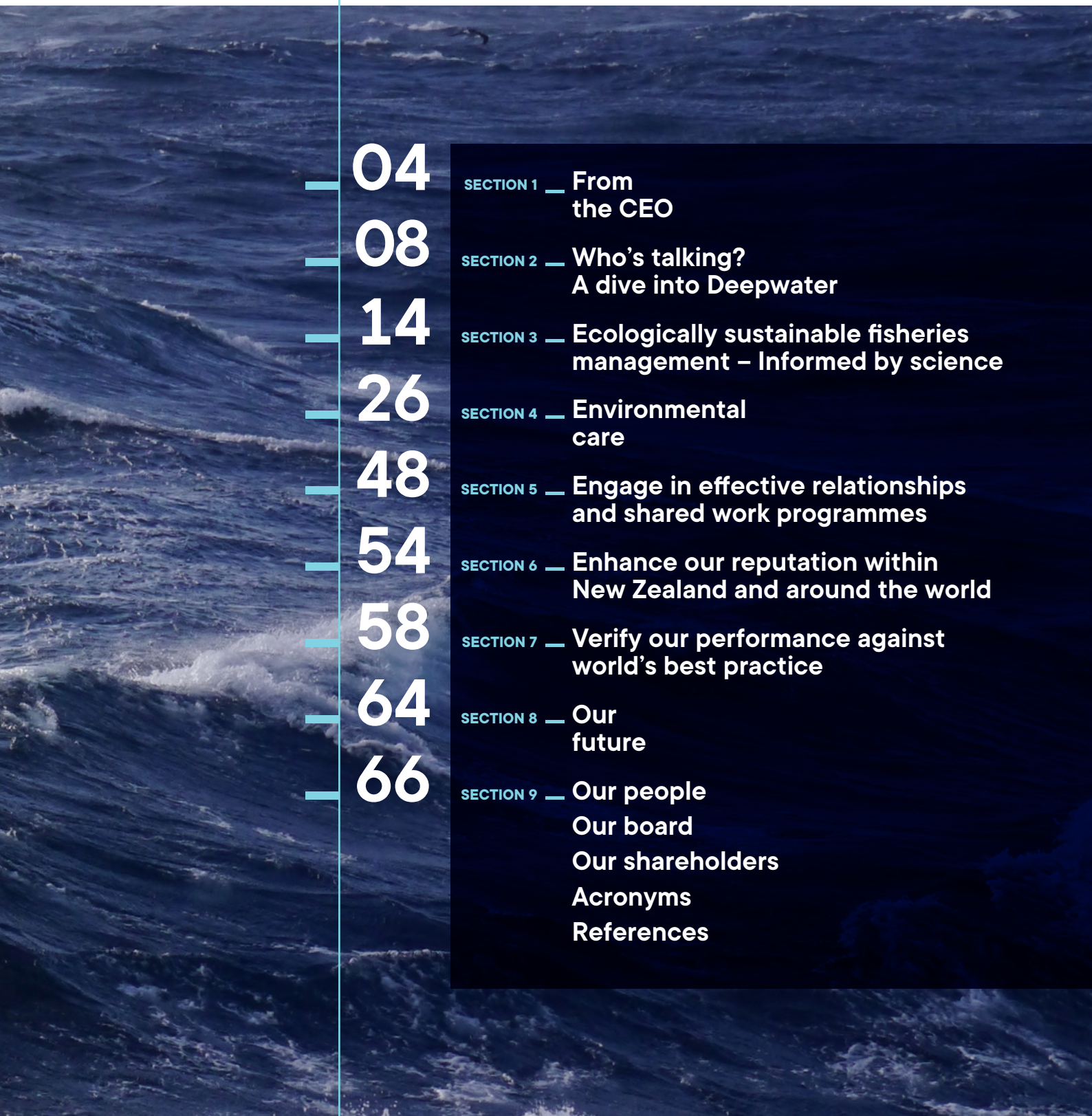


TOWARDS A DEEPER UNDERSTANDING

Measuring our progress in the open seas.

DEEPWATER GROUP REPORT 2021

Contents



From the CEO

The Deepwater Group has a well developed strategic plan[i] with a vision to be *"trusted as the best managed deepwater fisheries in the world"*.

A vision without action is just words. We've been head down working to realise our vision since the inception of the Deepwater Group in 2005. While actions speak louder than words, as we wrap up fifteen years of effort it's time to speak up.

Together, we have come a long way and there is much to celebrate, even though we're the first to acknowledge there will always be more work to do. However, as there is as much fiction as fact when it comes to fisheries, it is important that we balance the negative rhetoric with the science-based reality.

To independently validate our fisheries management performance, we have had New Zealand's deepwater fisheries for hake, hoki, ling, orange roughy, and southern blue whiting assessed against the high science based environmental standards set by the Marine Stewardship Council (MSC). These independent assessments demonstrate that New Zealand's ecosystem approach in the management of these deepwater fisheries ranks amongst the top 5% of the best managed fisheries in the world[1].

Around two thirds of the catch from New Zealand deepwater fisheries is now MSC certified. Other fisheries are 'works in progress'. MSC certification provides reassurance to our consumers in New Zealand and globally that our fisheries operate to the very highest standards of environmentally sustainable management.

MSC certification is not easily achieved and it is not permanent. Our shareholders are incentivised to continue to do what is right to ensure we are managing these fisheries for the future and can continue to meet these standards. One example is the agreement by hoki quota owners to reduce their catch by 20,000 tonnes (t) in 2019, in response to changing patterns being observed in three hoki fishing grounds. Quota owners have subsequently agreed to additional catch reductions of 35,000t to further improve hoki stock size.

As the environmental costs of land based protein production come under closer scrutiny, natural seafood stands out as having a comparably small environmental footprint[ii]. Natural seafood looks after itself – no feeding, fertilisers, pesticides, herbicides, drenches, or antibiotics are required – all we have to do is harvest it in an environmentally responsible way. Wild caught deepwater fish are truly a natural and healthy food source.

The fuel consumed during harvesting of deepwater fish is a significant component of our carbon footprint. We have progressively reduced this through more efficient vessels and fishing practices. Since 2005, the number of deepwater trawlers in New Zealand has decreased by 47% and the number of trawl tows has decreased by 38%, while the annual harvest has remained steady at 325,000t to 350,000t.

Over the past fifteen years, our shareholders have charted a course that has resulted in much needed sea change in both attitudes and performance with respect to fisheries. There is a strong unity among our 45 shareholders, who collectively own 91% of the quota for deepwater fisheries.

The seafood companies that jointly established and own Deepwater Group are all committed to honesty and transparency about their practices at sea. No other primary industry has its environmental performance and operational procedures so closely monitored and audited by government observers during harvesting and processing. In recent years, around half of the tows by the deepwater trawl fleet are being observed annually[iii], with up to 100% being observed in fisheries where there is a high likelihood of interactions with seabirds or marine mammals.

To reduce these interactions, Deepwater Group shareholders have developed and implemented vessel based best practice Vessel Management Plans (VMPs) and Operational Procedures (OPs). Our environmental performance in deepwater fisheries is audited against these agreed measures by Fisheries New Zealand and the results are publicly reported.

Through our 2006 Memorandum of Understanding[iv] with the New Zealand Government, we have established and maintained a constructive partnership with the Ministry for Primary Industries (MPI), and with their fisheries science, monitoring and management division, Fisheries New Zealand.

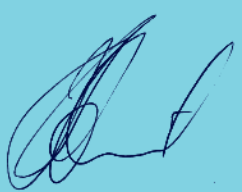
Together, Deepwater Group and Government share common goals and responsibilities to achieve healthy fish stocks and to minimise the impacts of deepwater fishing activities on the marine environment. These are set out in the National Fisheries Plan for Deepwater and Middle Depth Fisheries[v] (National Deepwater Plan). Industry's strategic plan aligns with these shared goals.

New Zealand has world leading technologies and procedures to protect the marine environment while we harvest its bounty. The Quota Management System (QMS) is world renown. Continuous improvements are being made to the QMS as science provides us with new information and our own experiences and observations identify opportunities for positive change. Since 2005, quota owners, along with the Government, have invested around $300m into science and monitoring to inform the management of our deepwater fisheries. We can have confidence that our practices and policies are soundly based on the best available science.

Annually, deepwater fisheries contribute some $1,800m to New Zealand's economy, employ around 6,000 people[vi] and traverse just 1.1%[vii] of the seabed in New Zealand's Exclusive Economic Zone (EEZ) to provide the world with an estimated 700m natural and nutritious servings of seafood. We have a light footprint and a weighty economic contribution.

The New Zealand seafood industry is dynamic, full of passionate inventive and resourceful people, who are natural problem solvers with an inherent conservation focus. By conservation we mean wise use that keeps our marine resources intact for future generations. We back ourselves, supported by New Zealanders, to perform like the very best sustainable seafood producers globally while keeping our marine ecosystems intact and healthy.

New Zealand's deepwater fisheries are truly sustainable, both economically and environmentally. This report charts our progress against our strategic goals over the first fifteen years and celebrates how far we have come. My thanks to all of our shareholders, to our government partners, to the independent auditors, and to all of the dedicated science collaborators for your expertise, encouragement and engagement. We greatly value these relationships. Long may they continue.



George Clement
CEO

1. Internationally, fewer than 5% of MSC-certified fisheries are certified without conditions.

Annually, deepwater fisheries contribute some

$1,800m

to New Zealand's economy and employ around 6,000 people[vi].

Although New Zealand's Exclusive Economic Zone (EEZ) is one of the largest in the world, covering about fifteen times the area of New Zealand's landmass, annually we traverse just

1.1%

of its seabed[vii].

We provide the world with an estimated

700m

natural and nutritious servings of seafood.

We have a light footprint and a weighty economic contribution.

We are owned by

45

seafood companies.

Who operate more than

100

vessels.

Together they harvest

81%

of New Zealand's natural seafood from deepwater fisheries.

The nine main species are:

- Hake
- Hoki
- Jack mackerel
- Ling
- Orange roughy
- Oreo
- Scampi
- Southern blue whiting
- Squid.

Figure 1
Average Annual Catch (GWT)
of 9 main Deepwater Species: 2015–20

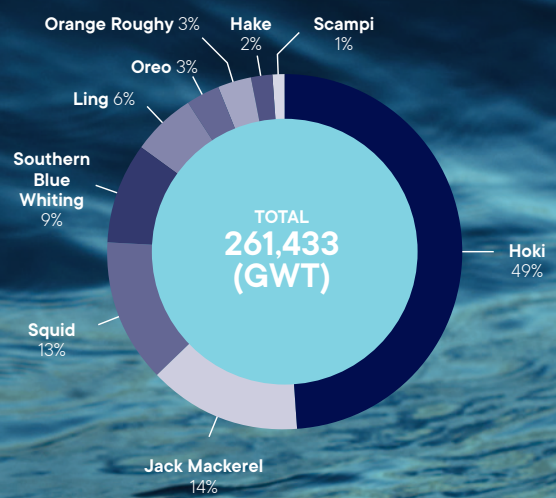


Figure 2
Average Annual Export Value (FOB NZD)
of 9 main Deepwater Species: 2015–20

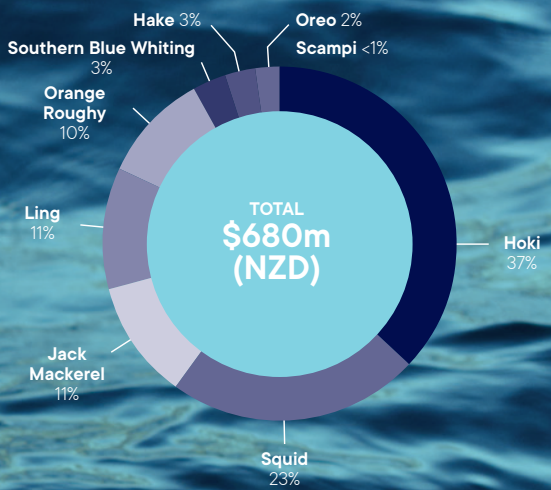
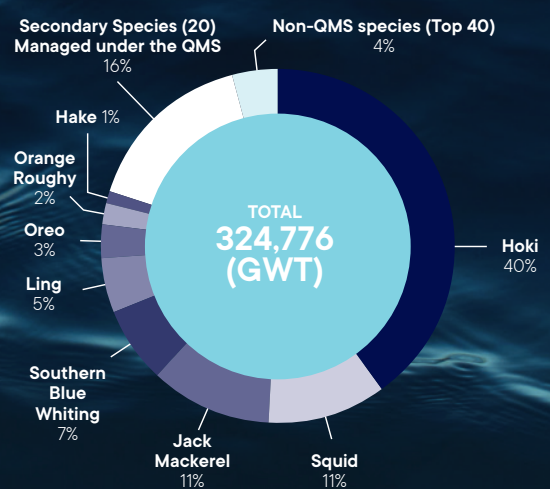
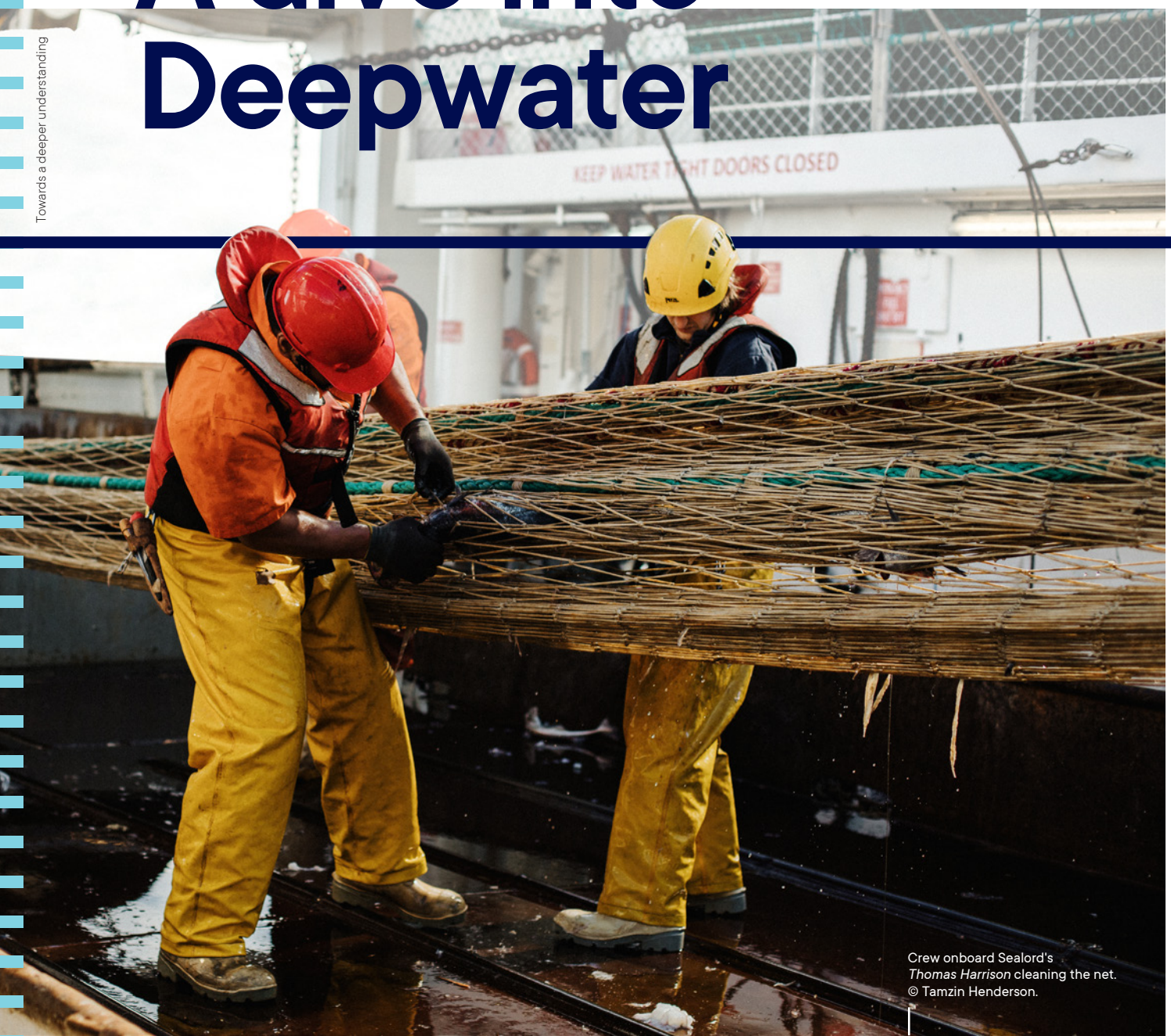


Figure 3
Average Annual Catch (GWT)
of All Deepwater Species: 2015–20



Access to this seafood resource is a privilege that we never take for granted. Nobody has more to lose should our activities impact on the health of our marine environment.

Who's talking? A dive into Deepwater



Crew onboard Sealord's *Thomas Harrison* cleaning the net. © Tamzin Henderson.

Deepwater Group is a non-profit organisation, formed to ensure New Zealand's deepwater fisheries are economic, sustainable, and are managed in an environmentally responsible way.

Our shareholders are the owners of 91% of the deepwater quota in New Zealand and collaborate on these shared goals, rather than working as individual companies.

For the past fifteen years, we have charted a course that navigates both regulation and collaboration to ensure the fisheries we depend on for our livelihoods are sustainably managed, based on the best available science. We have set our sights high, with our vision, to be trusted as the best managed deepwater fisheries in the world.

Since our inception, we have been open and honest about how we fish, our interactions with other marine species, and our observations about the health of New Zealand's fisheries. All of these are an essential parts of delivering our vision.

Harvesting food from the sea is very different from on land. Our vessels work up to 200 nautical miles (nm) offshore within New Zealand's huge Exclusive Economic Zone (EEZ), which covers an area fifteen times the size of our land area and is amongst the largest EEZs in the world. Most New Zealanders will never explore our EEZ or see deepwater vessels in action. Even so, it would be a mistake to claim that out of sight means out of control.

Commercial fishing skippers are legally obligated to report their catches. Electronic monitoring of our at sea trawling activities by satellite 24/7 has been in place since 1994. Catches by large trawlers have been electronically reported to Fisheries New Zealand since 2010 (these were enhanced to daily reports in 2017), and we have very high government observer coverage.

In deepwater fisheries, at sea observers verify our catch reports and verify that catches are correctly converted from green weight (i.e. whole weight of natural fish) to product weight (i.e. the weight of landed products after processing at sea). Observers undertake routine biological sampling of our catches to inform science based management.

Since 2005–06, industry has encouraged Government to increase observer coverage on deepwater trawlers. The annual proportion of tows observed has trebled from 16% to around 48%, with up to 100% being observed in fisheries where there is a high likelihood of interactions with seabirds or marine mammals. As fishing activities change, monitoring requirements are amended as required. All of these measures are used to verify our self reporting, which ensures the conservation of marine resources, and provides reassurance to our customers.

The annual proportion of tows observed has trebled from 16% to around

48%

Another day at the office on *Amaltal Atlantis*. © Talley's.

Guided by values

Our mission is to optimise the long-term sustainable yields from New Zealand's deepwater fisheries resources.

The deepwater industry is also guided by our agreed values and beliefs:

- We believe the best foods are natural and that the food we eat and the environment from which it is harvested require our utmost care and respect
- We believe in supporting our local communities and our workforce as both are important to our future
- We believe in creative thinking and challenging the norms so that we can lead and set new standards of excellence
- We believe in the power of collaboration, integrity, accountability, and transparency in all that we do.

It is one thing to talk about a commitment to the sustainability of New Zealand's deepwater fisheries, but quite another to make it happen. We've worked hard to develop a positive long-term partnership with MPI and their fisheries science, monitoring, and management divisions within Fisheries New Zealand.

This began with a formal agreement in 2006, which recognises that we share common goals and responsibilities for fisheries sustainability and that we are more efficient and effective when we work together.

Sharing common goals with the Government

How we work together is laid out in the National Deepwater Plan. Administered by Fisheries New Zealand, this has been developed and implemented in collaboration with Deepwater Group and other stakeholders. It sets out objectives to achieve healthy fish stocks and to minimise the effects of deepwater fishing activities on the marine environment.

The strength of this partnership is the open dialogue through which we continue to ensure work programmes are fit for purpose, incorporate real life experiences, and progress the National Deepwater Plan's objectives.

Factors for the partnership's success include:

Great view from the wheelhouse of *Thomas Harrison*. © Tamzin Henderson.

Shared work programmes and planning

Fisheries New Zealand's Fisheries Plan Advisory Group consults with the Department of Conservation (DOC), Deepwater Group, Iwi, scientists, and environmental groups on the performance of deepwater fisheries as a basis for planning work programmes. Combining resources, sharing and integrating work programmes is more effective than independent initiatives.

Co-operative compliance

We meet regularly with MPI officials and vessel operators to constructively raise and respond to compliance matters. This approach aligns with MPI's Voluntary, Assisted, Directed, and Enforced (VADE) compliance model, which delivers high levels of compliance through education, information, and co-operation, backed up by enforcement action where required and an impartial and effective judicial system.

Dual science delivery

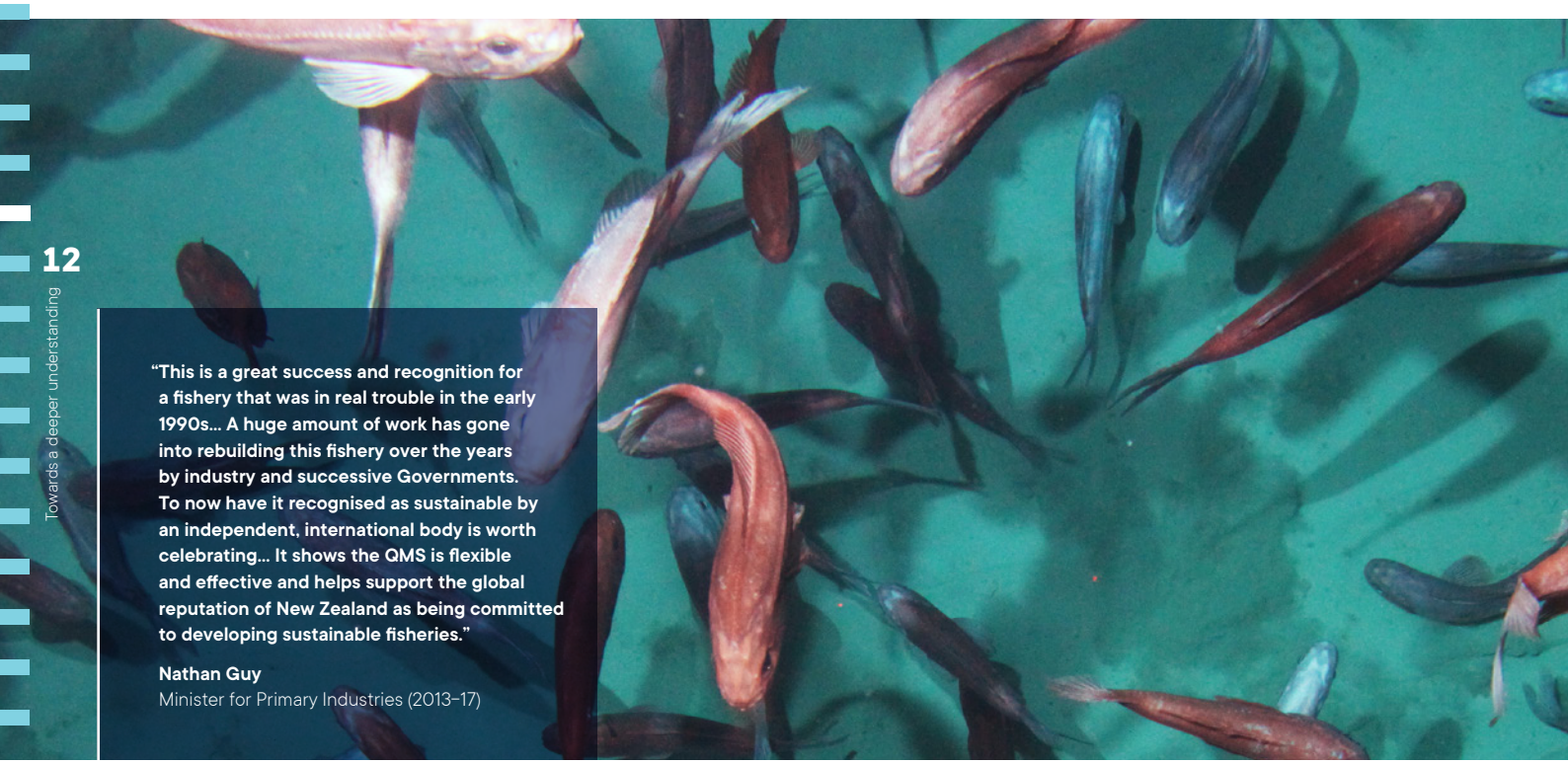
Science is the cornerstone of sustainable management. Alongside Fisheries New Zealand, Deepwater Group commissions scientific monitoring and research projects to assess the health of fish stocks and the marine environment. All results meet or exceed the Research and Science Information Standard for New Zealand Fisheries[ix] (the Science Standard) so that they can be confidently used to inform management decisions. Dual delivery of science enables innovations and efficiencies in the supply of the best available scientific information.

Effective non-regulatory approaches to environmental care

Deepwater Group has developed agreed Operational Procedures (OPs) and Vessel Management Plans (VMPs), which are implemented by our shareholders. These non-regulatory management measures have proven to be effective in reducing the impacts of fishing on the marine environment and are accepted by the Minister as part of the agreed measures to ensure our deepwater fishing activities are monitored and are sustainable. Performance of vessel operators against these agreed measures is audited by the Government.

Active monitoring, auditing, and feedback loops

These include at sea monitoring of performance against fisheries regulations and industry agreed non-regulatory measures through Fisheries New Zealand's at sea Observer Programme. Observers are placed onboard vessels to independently collect information on fishing activities, on our interactions with the marine environment (including incidental captures of protected species), and our adherence to both regulatory and non-regulatory measures.



"This is a great success and recognition for a fishery that was in real trouble in the early 1990s... A huge amount of work has gone into rebuilding this fishery over the years by industry and successive Governments. To now have it recognised as sustainable by an independent, international body is worth celebrating... It shows the QMS is flexible and effective and helps support the global reputation of New Zealand as being committed to developing sustainable fisheries."

Nathan Guy
Minister for Primary Industries (2013–17)

Sustainable harvesting of orange roughy now involves catching less than

5%

of the stock in any given year.

Orange roughy at 1,000m depth. © CSIRO.

CASE STUDY: ORANGE ROUGHY

A cautionary fish tale

> **“No other fish has sparked such controversy or has had such an influence on the New Zealand fishing industry than orange roughy. When this strange unprepossessing fish was first hauled from the depths by New Zealand trawlers in 1980 it was an immediate success. The stocks appeared to be huge, spawning in unimaginably large numbers, and easily caught.”** Tim Pankhurst

A history of orange roughy fishing, recounted by former Seafood New Zealand CEO Tim Pankhurst in his book ‘Roughy on the Rise’[x], charts the boom and bust created by unsustainable fishing practices which saw the catch limits set by the Government peaking at 62,474t, and a peak catch of 50,900t in 1989.

The depletion of these resources resulted from a combination of short-term economic incentives and a lack of scientific knowledge. Pankhurst records “*there were so many fish, worth so much money, it was like scooping up twenty dollar bills*” with skippers stuffing their holds with orange roughy as fast as they could lay down their nets. However, as there was very little known about orange roughy biology at the time, their productivity was over-estimated by scientists and their catch limits were set too high by Government. Consequently, some stocks were depleted below management targets.

Reversing the damage and restoring these fisheries to sustainable levels required improved science to monitor and assess the stocks. New acoustic techniques were developed from the late 1990s to survey orange roughy stocks and to provide more accurate biomass estimates. New stock assessment models were developed in the early 2000s. These scientific advances enabled fisheries management decisions to be made and implemented with greater levels of confidence, reducing the catch limits to a low of 6,941t, and a total catch of 5,324t in 2013.

Orange roughy catch limits have since been progressively increased to 12,161t in 2020–21 as their stocks are assessed to progressively have recovered in size.

Sustainable harvesting of orange roughy now involves catching less than 5% of the stock in any given year. In the early years catches were at times more than three times this level. In practical terms, fewer than five in every 100 adult orange roughy are now allowed to be caught.

Since 1998, quota owners have commissioned over 36 orange roughy biomass surveys costing over $20m as well as stock assessments and science projects costing an additional $2m. More are scheduled for future years. These investments in science are in addition to the $22m cost recovery by Government from orange roughy quota owners for their purchase of science projects.

The three largest New Zealand orange roughy fisheries, representing 73% of New Zealand’s orange roughy harvests, are independently certified as sustainable by the Marine Stewardship Council. More are underway.

Ecologically sustainable fisheries management – Informed by science

Amaltal Enterprise off the coast of Otago. © Talley's.

Around

40%

of quota for deepwater fisheries are owned by Māori interests.

New Zealand's Ecosystem Approach to Fisheries Management (EAFM)

An ecosystem approach is embedded within the Fisheries Act 1996[xi] (the Act), requiring the Government, fisheries managers and industry to provide for the utilisation of fisheries resources while ensuring sustainability.

Ensuring sustainability means:

- *"maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations"*; and
- *"avoiding, remedying, or mitigating any adverse effects on the aquatic environment"*.

The Act recognises that fishing will result in impacts on the marine environment and allows for these where they do not affect sustainability. However, where impacts collectively cause adverse effects on the sustainability of populations, then management measures are required.

The Act also requires that both Government and industry ensure associated or dependent species are maintained above levels that provide for their long-term viability, maintain biological diversity of the marine environment, and protect habitats of particular significance for fisheries management.

Combined, all of these requirements serve to deliver New Zealand's EAFM approach.

This holistic approach is reflected in Deepwater Group's strategic and operational plans and in the National Fisheries Plan for Deepwater and Middle Depth Fisheries[xii] (National Deepwater Plan) which set out the objectives to achieve healthy fish stocks and to minimise any adverse effects of deepwater harvesting on the wider marine environment.

The National Deepwater Plan is administered by Fisheries New Zealand and is developed and implemented in collaboration with Deepwater Group, Te Ohu Kaimoana and other interest groups. It provides the direction for sustainable and optimal fisheries management, builds this sustainability into governance, systems, and procedures, and includes monitoring along with performance reviews and checks so that progress can be measured.

Owners of quota for deepwater fisheries, alongside Fisheries New Zealand, are committed to maintaining and enhancing this ecosystem approach and we will continue to make further improvements across all deepwater fisheries.

In addition to the legislative requirements, guardianship for the marine environment is shared and enhanced by Māori. Around 40% of quota for deepwater fisheries are owned by Māori interests. Te Ohu Kaimoana is a Māori organisation protecting Māori fisheries rights, grounded in the Treaty of Waitangi (1840), and confirmed by the Deed of Settlement (1992). The concept of "Te hā o Tangaroa kia ora ai tāua" (the breath of Tangaroa, god of the sea, sustains us all) underpins the work of Te Ohu Kaimoana. This recognises that Iwi have the obligation and responsibility to care for their tupuna (ancestor) Tangaroa, so that he may continue to care and provide for the peoples of New Zealand.

"Without doubt New Zealand produces the best seafood in the world and I'll challenge anyone to show me better."

Sir John Key
(Prime Minister 2008–2016)

Deepwater Group recognises the interdependent relationships between all things and the ongoing cycle of life. We work closely with Iwi, industry, Government, and others to manage fisheries in a way that respects this.

Each year Fisheries New Zealand produces an Annual Operational Plan[xiii] outlining the tasks being undertaken to support the National Deepwater Plan, and an Annual Review Report[iii] summarising key deliverables and outcomes.

Just as fisheries are dynamic, we all apply the same dynamism while working to keep the National Deepwater Plan responsive to advances in scientific knowledge, growing our understanding of marine resources, of their ecology, and the commercial opportunities for New Zealand that arise from sustainably managed resources.

Our track record supports our commitment to constructive collaboration to ensure our fisheries' activities are not having any adverse effects on the marine environment.

The industry's proposal for Benthic Protection Areas (BPAs) in 2006 is a good example. In 2007 this resulted in the Minister of Fisheries agreeing to close a third of New Zealand's EEZ to bottom trawling and dredging. Further details on BPAs can be found in the next section.

Deepwater Group supports and continues to contribute to a wide range of effective initiatives to ensure the ongoing conservation of the marine environment. These include:

- Seabird population studies and assessments of risks due to fishing
- Development and implementation of effective mitigation measures, reducing interactions with seabirds, sea lions, and common dolphins
- National plans of action for seabirds and sharks
- Population assessments and mitigation measures for New Zealand Sea Lions
- Monitoring and assessment of deepwater trawl footprint and the impact of this footprint on cold water coral species.
- Verification of EAFM performance using independent sustainability standards and third party certification.

MSC certification independently establishes New Zealand's QMS, alongside New Zealand's EAFM, as maintaining the management performance of these fisheries to be amongst the top 5% of the best managed fisheries in the world.

Deepwater Group has achieved and maintains certification with MSC's science based eco label for hake, hoki, ling, orange roughy, and southern blue whiting. In recent years, catches from these fisheries comprise 69% of the catch of main deepwater species.

To provide additional transparency on our fisheries management practices, Deepwater Group has led the development of an online information portal OpenSeas[3]. Designed primarily as a business to business tool, OpenSeas enables our customers to assess our seafood against their sourcing policies, Further details on OpenSeas can be found in Section 7.

3. openseas.org.nz

"Adopting this best practice approach helps ensure New Zealand's fisheries management keeps its place at the forefront of fisheries management internationally."

Jim Anderton
Minister for Fisheries (2005–08)

New Zealand's Ecosystem Approach to Fisheries Management (EAFM)

There are many approaches to EAFM. The approach provided for in the Fisheries Act (Sections 8, 9 & 10) closely aligns with that described by WWF[xiv]:

"In addition to fishing, target species are affected by non-fishing issues such as climate change, coastal development, pollution, and the loss of habitats by reclamation. Hence the need for a broader approach that attempts to manage fish stocks as components of marine ecosystems. The response to this is an Ecosystem-Based Approach to Fisheries Management. It was a strategy established in early 2003 by the Food and Agriculture Organisation (FAO) Committee on Fisheries and is now gradually being adopted ..... in managing offshore fisheries.

The ultimate objective of EAFM is to ensure that ecosystems are healthy, fish stocks are sustainable, and that the well-being of the communities and stakeholders depending on them is safeguarded. This covers five components:

1. *Target species*
2. *Non-target species*
3. *The ecosystem*
4. *Community outcomes*
5. *Fishery administration*

The EAFM process involves four stages:

1. *Developing a clear description of what is to be managed and/or assessed*
2. *Identifying all the issues that need to be assessed across all five components*
3. *Determining, using risk analysis, which of these issues needs to be managed directly*
4. *Establishing the levels of measures that are acceptable, the management arrangements that will be used to achieve these levels, and the review processes needed to assess measures for those issues requiring management."*

Buller's albatross. © Tamzin Henderson.

Chilli Salt & Szechuan Pepper Squid
- visit deepwatergroup.org for the recipe.

Maintaining fish stocks at sustainable levels is the essence of our strategic plan.

It has to be, because if we fail here, we fail to protect the natural resources which underpin our businesses, we fail to protect the jobs of around 6,000 New Zealanders, and we will fail to annually produce an estimated 700m natural and nutritious servings of seafood.

New Zealand's fisheries management framework is based on the Quota Management System (QMS), requiring stocks to be maintained at or above the biomass that can produce the Maximum Sustainable Yield (MSY). MSY is the largest average long-term annual catch that can be taken sustainably from a stock. Most of New Zealand's main deepwater fisheries have management targets that maintain stock sizes above the level that can produce the MSY.

New Zealand's internationally respected QMS and the associated environmental obligations anchor our enduring sustainable fisheries management. Within the QMS, each fish stock has a Total Allowable Commercial Catch (TACC) that sets the total amount of fish quota owners may catch that year. Management decisions are made by the Minister for Fisheries, guided by the best available scientific information and feedback from the community. Each year, new scientific assessments are used to review selected TACCs and other management measures to ensure the ongoing sustainability of fisheries.

In 2008, the QMS policy was further refined through the introduction of the Harvest Strategy Standard for New Zealand Fisheries (HSS)[xv]. The default management target is to maintain the stock at a size of around 40% of what it would be if it remained unfished. This has been deliberately set well above the biomass level that will produce the MSY. For each of the main deepwater fisheries, customised harvest strategies are being developed to account for unique biological characteristics. These have been implemented for hoki and orange roughy.

"I expect adoption of the Harvest Strategy Standard to have positive benefits for New Zealand's efforts to gain environmental certification for its fisheries."

Jim Anderton
Minister for Fisheries (2005–08)

In deepwater fisheries, quota owners act collaboratively to implement further management measures, where these are agreed to be necessary. For example, short-term catch reductions are often used to increase the rate of stock size rebuilding. To implement these catch reductions, each quota owner agrees to set aside (or to 'shelve') a proportion of their Annual Catch Entitlement for that fish stock; meaning that this shelved catch will not be taken for the period the 'shelving' has been agreed.

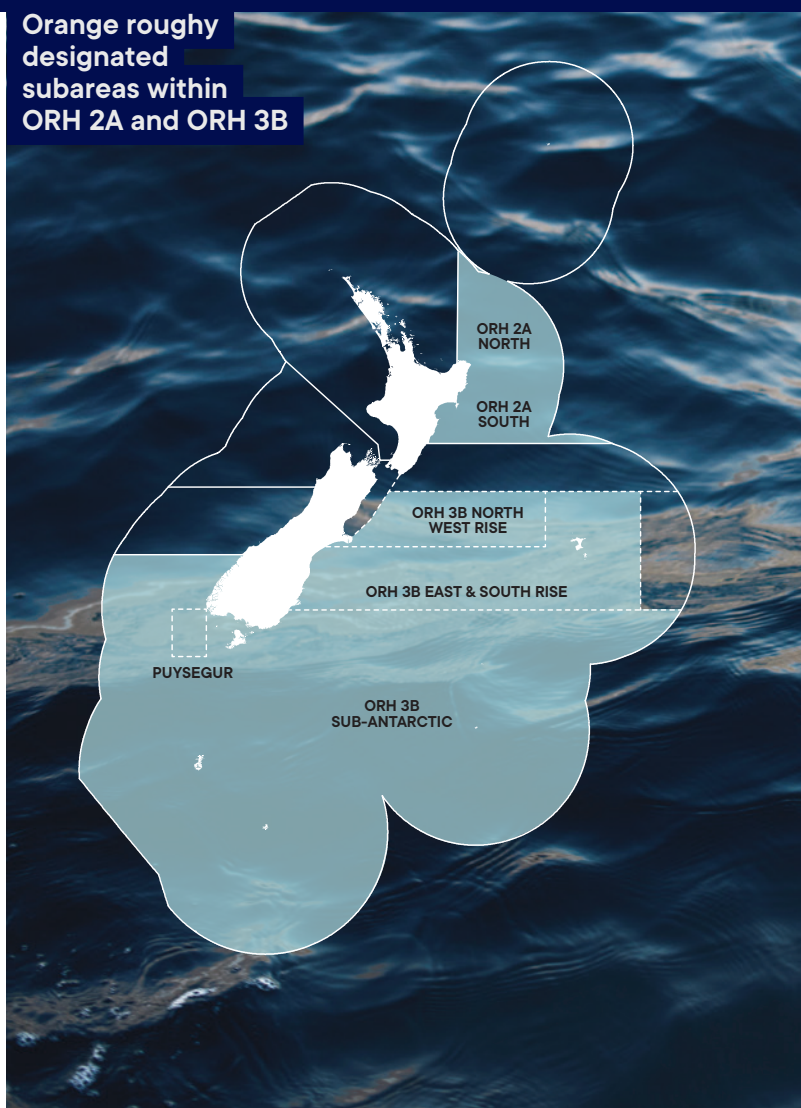
Another example of industry collaboration is industry's management of 'subarea' catch limits within a TACC, in fisheries where it has proved to be helpful to manage catches from separate stocks within a single Quota Management Area (QMA). In the case of hoki, there is a single QMA, a single TACC, and two stocks, each of which has an agreed catch limit. Similarly, for the largest orange roughy fishery, ORH 3B, industry manages catches within four agreed limits under a single QMA and TACC. The Minister is reliant upon these agreed industry measures to ensure sustainable outcomes.

The default management target is to maintain the stock at a size of around

40%

of what it would be if it remained unfished.

Orange roughy designated subareas within ORH 2A and ORH 3B



Of stocks with known status

94%

of the catch (88% of the value) comes from sustainable stocks.

For the deepwater stocks with known status

98%

of the catch (97% of the value) comes from stocks that are assessed to be sustainable.

Sustainable fisheries management - Informed by science

In 2020, Fisheries New Zealand reported by far the majority of New Zealand's fish stocks are performing well.

Of New Zealand's fish stocks with known status, 94% of the catch (88% of the value) comes from sustainable stocks, and 92% of the catch is from stocks assessed to be above their management targets[xvi].

For the deepwater stocks with known status, 98% of the catch (97% of the value) comes from stocks that are assessed to be sustainable[xvi], and 88% of the catch (90% of the value) is from stocks assessed to be above their management targets.

The Quota Management System is integral to the safeguarding of sustainable fish stocks.

Quota shares are freely traded and are allocated in perpetuity, providing the owners with a right to harvest a proportion of the sustainable yield. In return, quota owners in deepwater fisheries are levied by Government for the science and management costs for each fishery.

Each year, quota owners get an Annual Catch Entitlement (ACE) based on the quota shares they own for each fish stock. ACE grants the right to catch a certain amount of a fish stock during the fishing year. This amount varies, depending on the amount set for the Total Allowable Commercial Catch (TACC). ACE can be freely traded.

Quota may only be owned by New Zealand citizens, or by companies with not less than 75.1% of their shares owned by New Zealand citizens.

The deepwater industry has contracted over 36 biomass surveys and other science projects, a direct investment of over

$20m

Entrance to the Tory Channel.
© Tamzin Henderson.

Science at the helm

Effective fisheries management decisions rely upon science-based information about each fish stock along with assessments of the effects of fishing on the broader marine environment.

This information is obtained from fisheries independent surveys, biological catch sampling, commercial catch reports, at-sea observers, and scientific modelling and assessments. Scientific assessments are used to estimate the status and yields for each key fish stock along with the status and assessment of the risks that fishing impacts pose on protected species and the marine environment.

As part of the Fisheries New Zealand - Deepwater Group collaboration, both parties invest in the required and agreed science and monitoring projects. Since 2005, Deepwater Group has contracted over 36 biomass surveys and other science projects, a direct investment of over $20m. This investment has been in addition to the Government levies from quota owners, that are annually around $16m, to cover the costs for their deepwater science monitoring projects and compliance services.

The results of all science projects are rigorously peer-reviewed by Fisheries New Zealand's science working group processes. All scientific results must comply with the Fisheries New Zealand's Research and Science Information Standard[ix] before they can be used to inform management decisions. The Science Standard ensures that the quality of scientific results meet criteria for relevance, integrity, objectivity and reliability.

These peer-review processes are open and robust to ensure that all information used in decision making is transparent, consistent, of high quality and is fit for purpose.

A risk-based approach is used to prioritise data collection to inform our understanding of the status of deepwater stocks and of the environmental interactions that result from deepwater fishing activities. Data collection is prioritised to inform areas with the highest risks and uncertainties.

Deepwater Group collaborates with Fisheries New Zealand on joint work programmes to ensure ongoing effective fisheries science and management measures.

All fisheries management decisions, while based on the scientific assessments of individual target and bycatch species, are also informed by information on marine ecosystems. Every year, for each fishery under management review, Fisheries New Zealand carefully collates and considers the impacts of any changes to fishing on the associated marine ecosystem, and on the populations of protected species in particular. This ecosystem approach in their management advice, which is open to public consultation prior to the Minister making any decisions, ensures that New Zealand's deepweter commercial fisheries are managed with consideration of the marine ecosystem, based on the best available science.

New Zealand Hoki. © Wreford Hann Photography Ltd.

Since 2018 hoki quota owners agreed to reduce their catch by

55,000t

to rebuild the hoki resources

Cooperative management – by agreement and legislation

Sustainable fisheries management and the science behind it do far more than inform the rules that we abide by. They influence everything, from the long-term investment decisions made by quota owners to how each vessel operates day to day.

For example, in addition to Government Fisheries Regulations, quota owners have implemented agreed Operational Procedures (OPs), which provide directions and guidance for the harvesting of specific species, deepwater trawl and scampi vessel management, reporting protocols, along with recommended procedures to mitigate harm to, or incidental captures of, protected species (such as sharks, marine mammals, and seabirds). The OPs are supplemented by our "Ten Commandments", quick guides which summarise the operational requirements for activities such as saving seabirds or protected species reporting.

The OPs and Ten Commandments are available to crew, shore staff and the public on our website[4] and via the DWG OP mobile phone app.

Scan the QR code to download our DWG OP mobile phone app.

All industry agreed management procedures are regularly reviewed to ensure that they align with management changes in each fishery.

The management of hoki is a good example. In 2018 hoki quota owners agreed to shelve 20,000t of their Annual Catch Entitlement (ACE), to close some grounds to allow undisturbed spawning at peak times and to closely monitor catches of juvenile hoki. In 2019 industry supported the Minister's decision to reduce the hoki catch by a further 15,000t, and in 2020, agreed to shelve an additional 20,000t of hoki ACE to increase the rate of stock size rebuild – catch reductions that total 55,000t.

As a result of these three industry-led changes the catch limit for both hoki stocks has been reduced from 150,000t to 95,000t over three years. Quota owners understand that the current lower stock sizes have resulted from natural fluctuations in annual recruitment and that, given every chance to breed and grow, further years of good recruitment will rebuild these stocks in size again.

These industry initiatives and agreements provide confidence to the Minister, to the Government, to our customers and to our broader stakeholders that industry is responsive, proactive, innovative, and that we have robust procedures in place which are regularly reviewed and improved to ensure that we continue to do our jobs well.

4. www.deepwatergroup.org/newsresources/op-manual/

© Emma Barley

Improved harvesting efficiencies – reduced environmental footprint

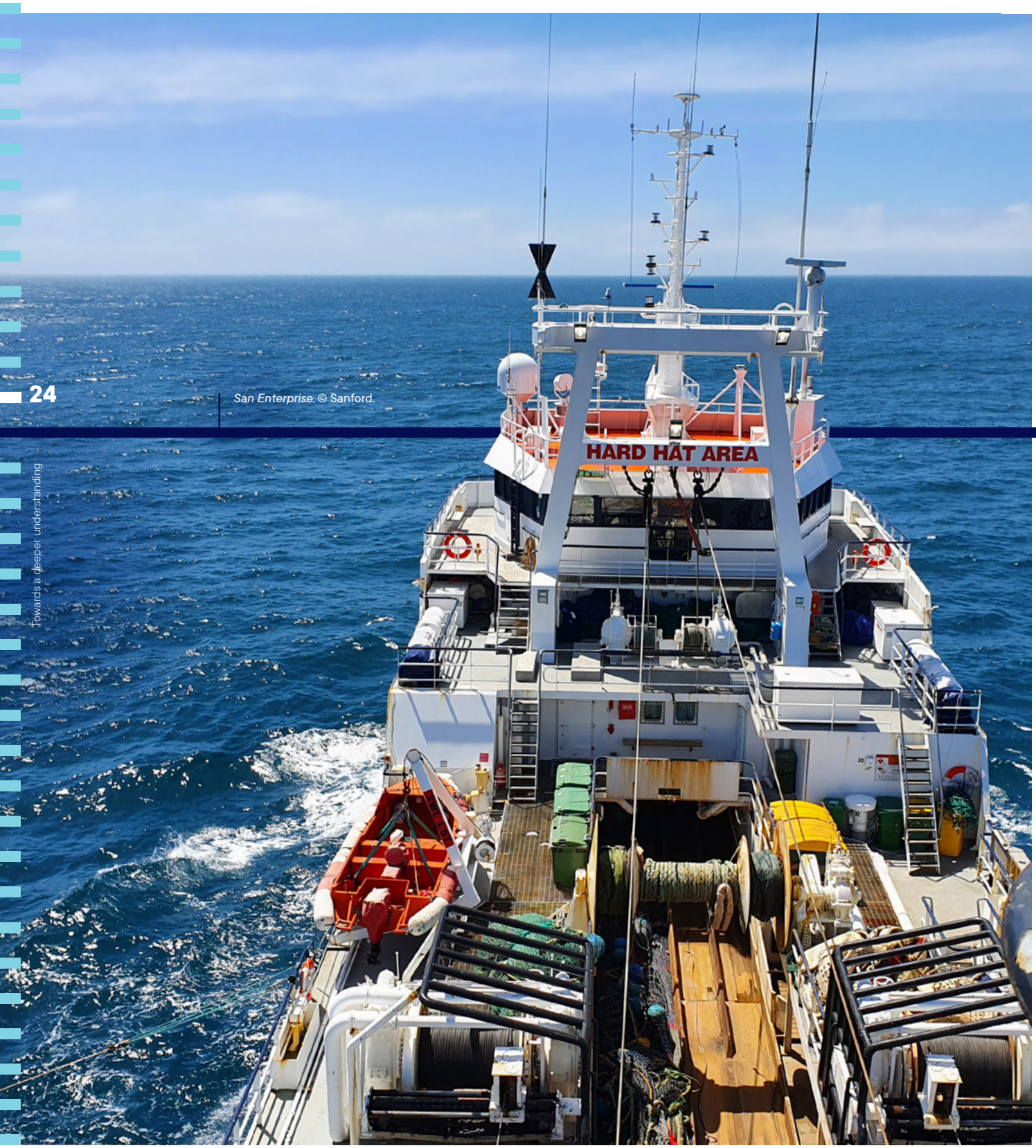
New Zealand has a rich diversity of marine habitats stretching from subtropical to subantarctic waters, containing over 15,000 known marine species.

This is a rich renewable resource and we want to keep it that way. One way we do this is to minimise incidental catches through selective harvesting. Selective harvesting enables more than 95% of our deepwater catch to be retained and to be fully utilised leading to a wide range of seafood products, marine collagens, nutraceutical health extracts, fish meal, and fish oils.

Much of our deepwater catch is harvested by bottom trawl. Between 2004–05 and 2019–20 we have greatly improved our harvesting efficiencies by fishing on the same known fishing grounds year-on-year, by using more efficient methods to reduce our fishing effort and by having fewer vessels to take much the same amount of catch.

It is worth noting that during this period while the total annual catch of deepwater species has remained around 325,000 to 350,000 green weight tonnes (GWT), the annual export value has increased by 76% (from $484m to $850m), the number of deepwater trawlers has decreased by 47% (from 60 to 32), and the annual number of trawl tows has decreased by 38% (from 45,139 – 28,144 tows for the main deepwater species).

These improved efficiencies all serve to minimise our impacts on the wider marine environment.



San Enterprise. © Sanford.

Free-swimming alfonsino within a PSH net.
© Plant and Food Research.

Breakthrough technologies, developed by industry, are helping to further improve efficiencies and minimise unwanted environmental impacts. After years of research and testing, Precision Seafood Harvesting (PSH) is now being deployed. PSH is a modular harvesting system providing a unique technology that catches and lands fish alive within a trawl net. This fishing method is used to target specific fish species and sizes, enabling the catches to be landed in better condition than with traditional trawling methods.

PSH nets maintain a low flow environment where fish can swim freely for as long as necessary and allows small and unwanted fish to escape alive and unharmed. This innovation is of huge interest to both New Zealand and the wider international fishing industry. It has the potential to revolutionise commercial trawling (see www.tiaki.com).

PSH gear was approved for use in the hoki, hake, and ling target fisheries in 2018. In recent years, an increasing proportion of the hoki catch has been taken in trawls using PSH. A case study on PSH can be found in Section 5.

Breakthrough technologies, developed by industry, are helping to further improve efficiencies and minimise unwanted environmental impacts.

SECTION 4

Environmental care

Minimising the environmental effects of deepwater fisheries is a key component of the QMS requirements, the National Deepwater Plan, Deepwater Group's strategic plan as well as being embedded in our vision.

We aim to reduce our impacts to the lowest levels possible to ensure that we are not causing any adverse effects on the marine environment. Under the Fisheries Act 1996, the obligation is to avoid, remedy, or mitigate any adverse effects of fishing on the aquatic environment. While this obligation is on a species level, mitigation activities in deepwater fisheries strive to minimise our impacts on individuals.

Like all human activities, fishing interacts with nature and in New Zealand waters many of the marine species are protected. In New Zealand, all seabird species, marine mammals, and many species of corals and sharks are protected by law. While incidental interactions with protected species by commercial fishing are not unlawful, the regulations require all captures to be reported and for any adverse effects on their populations to be avoided, mitigated, or remedied. Deepwater Group has been active in developing and successful in deploying mitigation measures to reduce our interactions with and harm to protected species, actively focusing on sea lions, fur seals and seabirds.

Salvin's albatross.
© Tamzin Henderson.

Much of the marine environment in which we operate is also protected. Within New Zealand's EEZ, a third of the area has been set aside by law in Marine Protected Areas to protect seabed biodiversity. These large BPAs and the Seamount Closures safeguard a representative range of large and mostly untouched seabed habitats.

Members of the Deepwater Group all work hard to safeguard the marine environment and to reduce the risks of interacting with non-target marine life. New Zealand has developed effective, world leading technologies and procedures to minimise these interactions along with tools to identify and assess the risks.

We collaborate with MPI and DOC to develop and implement practicable, clear, and affordable strategies to assess risks and to monitor, manage, and mitigate environmental interactions. Effective reporting, monitoring, and mitigating practices are built into our VMPs and OPs, and our crews and skippers show a real commitment to looking after the marine environment.

New Zealand sea lion on Snares Island.
© Tamzin Henderson.

Our phased approach to environmental care for New Zealand's deepwater fisheries

The environmental care programme for New Zealand's deepwater fisheries is embedded into our everyday operations. Its success is reflected in the reductions of our interactions with protected species and the risks imposed on their populations. It is driven by several important factors:

- We adopt scientifically-proven, practical, and cost-effective mitigation measures
- We undertake collaborative research into the development and testing of new or improved mitigation measures
- We educate and inform our crews, providing good communication, training, and monitoring
- We work alongside Government agencies to collect, share, and use data to continually improve the effectiveness of mitigation measures.

Our environmental care programme has four key components:

1. Risk minimisation

We minimise risk by identifying those deepwater fishing activities that interact with protected species. Risk assessments are undertaken by Fisheries New Zealand, DOC, fisheries managers, fisheries scientists, and environmental groups to understand both the likelihood and consequence of these interactions. Measures to avoid or to mitigate interactions are developed, implemented, improved, and monitored.

Risk reduction measures are incorporated into our OPs and VMPs, which the deepwater fishing fleet follows when at sea. These can be accessed on our website[4]. These OPs and VMPs are recognised internationally and our performance against these agreed measures is audited by Fisheries New Zealand as part of their Annual Operational Plans and Annual Review Reports.

4. www.deepwatergroup.org/newsresources/op-manual/

Salvin's albatross.
© Peter Marriot, NIWA .

2. Training and quality assurance

Deepwater Group has a full-time Environmental Liaison Officer (ELO) whose role is to educate crew, audit their performances, monitor, and support interaction mitigation in real-time, support new developments, and encourage continuous improvement in all matters relating to mitigation of our environmental interactions.

The ELO ensures all VMPs and OPs are in place, monitors adherence to these, advises on risk mitigation, provides training to skippers and crews, monitors, and responds to incidental capture events and liaises with government bodies.

The ELO also responds in real-time to provide support to vessels operating at sea, particularly when agreed trigger points are reached. Trigger points are set at captures within 24 hours of three or more large seabirds, five or more small seabirds or any marine mammal. These actions are audited by Fisheries New Zealand.

During 2019–20, 70 vessels were visited by the ELO, accounting for 81% of the deepwater trawlers and longlines. Because of Covid–19 travel restrictions, this number is lower than the usual 90%. Last year, observers undertook 157 VMP and OP audits, eighteen of which required follow up action before closeout.

3. Independent audits and continuous improvement

Our performance against agreed environmental standards is audited by Fisheries New Zealand. VMPs and OPs are not static documents. Ongoing monitoring and auditing systems identify and inform opportunities for improvement. Many effective mitigation ideas have come from Fisheries New Zealand observers, the ELO, and feedback from vessel crew.

Interactions between our fishing activities and seabirds or marine mammals are very dynamic, changing between species, seasons, locations, and years, requiring constant monitoring and prompt attention.

Seabirds and marine mammals are also fast learners, following our vessels to opportunistically forage near the stern of trawlers, on the catch as our nets are brought to the surface, or on baited longlines.

Our challenge is to stay one step ahead of them, to continually remove or minimise potential hazards that may cause them harm while they are feeding near our vessels or fishing gear. This has led to many innovative and successful mitigation responses.

Chatham Island mollymawk chick on flowerpot nest. © Chatham Island Taiko Trust.

4. Targeted conservation projects

Deepwater Group partners with a range of organisations on projects to conserve the biodiversity of our marine environment.

Southern Seabird Solutions Trust

Southern Seabird Solutions Trust (SSST)[5] provides a forum for industry, environmental, and Government bodies the organisations to work together to protect seabirds. It has facilitated several projects over the years to raise awareness and change behaviours. Deepwater Group has been an active member of the management committee for over a decade.

Sea lion conservation

Department of Conservation (DOC) monitors New Zealand sea lion populations and has identified early pup mortality death as the major risk to maintaining healthy sea lion populations. Between 40% and 60% of pups at the Campbell Island rookery are estimated to die in their first few months of life.

In 2017, Deepwater Group partnered with DOC[6] to monitor Campbell Island pups and investigate options to reduce their high mortality, the first time such detailed information has been gathered here.

Drowning in creeks and mud holes is a significant cause of pup deaths. Options to prevent this are being trialled, such as filling in mud holes and installing barriers and ramps to prevent pups from getting into holes or assisting them to get out.

Disease is also a significant risk to pup survival and studies to measure the extent to which the bacteria *Klebsiella pneumoniae* is present and to what extent it is causing sea lion pup deaths in rookeries on the Auckland and Campbell Islands have shown this to be a chronic issue.

Through our partnership, we aim to reduce identified risks to pup survival, including drowning and disease, to improve survival and the health of the colony.

Chatham Island Taiko Trust

In 2018 Deepwater Group partnered with Chatham Island Taiko Trust[7] to undertake conservation work on the endemic Chatham Island mollymawk, which breeds only on The Pyramid, a small islet in the Chatham Islands.

As all their eggs are 'in one basket' (or islet), this species is vulnerable to future change, which is why Taiko Trust has transferred chicks to Gap Sanctuary on the main island to establish a new colony.

Southern Coast Charitable Trust

Deepwater Group sponsors the regular programme by Southern Coast Charitable Trust (SCCT)[8] to clean up Stewart Island beaches. Stewart Island appears to naturally collect rubbish with the currents and tides. The waste collected includes lost fishing gear and everyday household items such as discarded plastic bottles, containers and other debris. In 2018, 130 fish bins were collected including some from companies in Australia and Argentina. In addition to supporting these cleanup efforts, our members have improved onboard practices to reduce any losses of rubbish or fishing gear at sea.

Population study of Southern Buller's Albatross on Snares Islands

The Snares Islands lie about 70NM south of Stewart Island. This island group is the breeding place of most Southern Buller's Albatross, a population that has been studied since 1969. Study results estimate some two-thirds of the food regurgitated to chicks was squid offal, the nesting population has doubled in size since 1969 and has stabilised since 2005–06. In 2014 Deepwater Group, DOC, MPI and NIWA worked closely together to resource another full census count of nesting birds. Deepwater Group supports ongoing studies of this unique albatross.

5. catchfishnotbirds.nz
6. blog.doc.govt.nz/2017/12/22/sea-lion-pups-falling-into-holes
7. taiko.org.nz
8. southerncoastal.org.nz

Richard Wells on Snares Island for the 2014 Southern Buller's Albatross population study. © Tamar Wells.

Deepwater Group's Fisheries Specialist, Richard Wells, has achieved recognition for his conservation work, being awarded the Minister of Fisheries' Kaitiakitanga and Supreme Sustainability Awards in 2020.

The awards were in recognition of his longstanding commitment to sustainability, successfully working to reduce our interactions with protected species in deepwater fisheries.

"It reflects the work the commercial fishing sector has undertaken in the last fifteen years... they've made real progress and the recognition of that has been fantastic."
- Richard Wells

Richard and his colleague and Environmental Liaison Officer John Cleal both have extensive experience in managing fishing vessels and fleets. This has supported them in the development and implementation of the deepwater Protected Species Risk Management Liaison Programme, OPs, VMPs, and tools and methods to mitigate interactions with seabirds, sea lions, fur seals and common dolphins, in particular. Their consistent and persistent approach over fifteen years supported by Deepwater Group has paid real dividends.

Common dolphins in Cook Strait. ©Tamzin Henderson.

Environmental care in action

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Reducing harm to seabirds

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Salvin's albatross.

CASE STUDY: ONE

Reducing harm to seabirds

The risks

Seabirds are attracted to trawlers and longliners at sea in the same way that seagulls are attracted to families sharing fish and chips at the beach. Simply put, these birds are after an easy meal.

There is no one-size-fits-all solution to reduce the risk of harm to seabirds. Seabird species differ in their biological characteristics and foraging behaviours showing differences in diving ability, in sense of smell, and in 'boldness'. Some species are very bold and will forage close to our vessels and fishing gear. Others maintain safer distances. These behavioural differences influence the levels of risk each seabird unwittingly faces when foraging opportunistically close to our fishing vessels.

Our role is to identify the situations that pose risks to foraging seabirds and to do all that we can to reduce these risks, thus reducing the likelihood of harm. As seabirds learn and modify their feeding patterns, fishermen have had to become close observers of nature to stay one step ahead and keep these foraging birds from harm's way.

Managing the risks

We support and work within the National Plan of Action (NPOA) – Seabirds[xvii] to reduce risks to seabirds in New Zealand fisheries. This NPOA provides high-level policy and structure to approaches for risk reduction measures across the seabird species impacted. Risk assessments have been carried out by Fisheries New Zealand and DOC for most seabird species. Management plans are in place for some species and fisheries assessed to be high risk to certain seabirds.

Our deepwater trawl and longline vessels have invested heavily in effective seabird risk reduction practices set out in their VMPs and OPs. Tactics include using bird deterrent devices, converting fish waste to fish meal or mince, holding processing waste on board while trawling, and using tori lines and bafflers to deter birds from coming close to trawl wires or longlines at the stern of a vessel.

The outcomes

Between 2004–05 and 2017–18, the estimated number of seabirds (from observer records) captured each year by deepwater trawlers has been reduced by 61% (from 1,985 to 774). Deepwater Group's primary focus has been to reduce harm to albatross species while they are foraging in the 'danger zone', close to the stern of our trawlers and ahead of the trawl wires. The estimated annual number of albatross captured by deepwater trawlers since 2004–05 has been reduced by 74% (from 1,186 to 307 birds).

Not all seabird 'captures' result in harm or death. In recent years, due to improved care and handling, up to 55% of observed captured seabirds were released alive.

Purpose-designed bafflers deter birds from coming close to trawl wires.

Salvin's albatross, Campbell albatross and giant petrels squabble over a feed. © Tamzin Henderson.

We remain actively engaged to further reduce our interactions with these seabirds.

The most recent seabird risk assessment by Fisheries New Zealand and DOC[xviii] estimates six seabird species are likely to be at risk from New Zealand fisheries (both inshore and deepwater). Only one of these species, black petrel, is assessed to be at a level of risk that could lead to a reduction in population size. Black petrels are at risk from inshore fisheries, not from deepwater fisheries.

Deepwater fisheries are known to interact with three of these species considered to be at risk from fishing - Salvin's albatross, southern Buller's albatross, and Westland petrel. Our seabird mitigation programmes on trawlers and longliners are aimed at reducing the risk of harm to all seabird species including these three.

CASE STUDY: TWO

Reducing harm to New Zealand fur seals

The risks

In some areas, the feeding grounds of New Zealand fur seals overlap with our deepwater fishing grounds. Foraging fur seals have learned that fish in our trawl nets provide them with an easy source of food, putting them at risk of getting caught in the fishing gear. Most interactions occur near the surface when the nets are being retrieved full of fish. The risk of incidental captures is highest in certain seasonal fisheries - hoki fisheries in Cook Strait, on the West Coast of the South Island, and the southern blue whiting fishery near the Bounty Islands.

Managing the risks

Deepwater Group works closely with the fleet to implement the agreed fur seal risk reduction practices in the Marine Mammals OPs.

Risk reduction practices are set out in our other OPs and Fisheries New Zealand's Operational Plans for the Auckland Islands squid fishery (SQU 6T) and the Campbell Island southern blue whiting fishery (SBW 6I).

Although fur seal captures occur less frequently than in the past, mitigation still requires constant attention and directed action in certain fisheries.

Performance is audited by the ELO and Fisheries New Zealand's observers.

The outcomes

Since 2005 the estimated number of fur seals (from observer records) captured annually by deepwater trawlers has been reduced by more than 90% (from 1,010 to around 100).

Not all fur seal 'captures' result in harm or death. In recent years, due to improved care and handling, around 15% of observed fur seal captures were released alive. Work is ongoing to further reduce these interactions.

Fishing interactions are considered to be unlikely to be causing any adverse effects to New Zealand fur seals and their population is understood to be increasing in size.

Since 2005 the estimated number of fur seals (from observer records) captured annually by deepwater trawlers has been reduced by more than

90%

Marine mammal risk reduction practices integrated into VMPs and OPs required on all deepwater vessels:

- Remove fish meshed in the net before redeployment
- Deploy and retrieve the net as quickly as possible
- Avoid turning the vessel while towing the net
- If turning, haul the net to close the mouth, or keep the net deeper than 50 m below the sea surface
- In the event of a net deployment failure, quickly haul the net on board or keep it deeper than 50 m below the surface
- Ensure fish waste management practices are used
- Ensure use of certified Sea Lion Exclusion Devices (SLEDs) where required
- Ensure use of Dolphin Dissuasive Devices (DDDs) where required
- Report to DWG immediately if capture event thresholds are reached.

Deepwater Group's ELO undertakes crew training, performance reviews against our OPs, and provides immediate support and review of any events that trigger capture thresholds.

Fisheries New Zealand monitor these activities and their observers undertake at sea audits of performance against Deepwater Group's OPs.

Fur Seal – Moeraki, New Zealand.

CASE STUDY: THREE

Reducing harm to New Zealand sea lions

The risks

The foraging ranges of sea lions overlap with the fishing grounds for seasonal trawl fisheries for squid, southern blue whiting, and scampi, in the Southern Ocean. Foraging sea lions have learned that fish in our trawl nets provide an easy source of food, putting them at risk of getting caught in the fishing gear. Underwater footage shows sea lions in attendance with our nets, often pulling fish from them, or swarming around nets when these are at the surface being retrieved full of fish.

New Zealand industry has gone to great expense to reduce our interactions with sea lions, including the successful development of Sea Lion Exclusion Devices (SLEDs) deployed in our trawl nets.

Managing the risks

New Zealand sea lions are endemic and mostly live in sub-Antarctic waters, although their range is slowly expanding northwards. The largest breeding colonies are on the Auckland and Campbell Islands. Colonies at Stewart Island and in the south of the South Island are growing in size.

In 2014 following the third lowest pup count on record, Fisheries New Zealand and DOC developed a New Zealand sea lion Threat Management Plan (TMP), the first of which was released in 2017.

The TMP recognises the multiple risks faced by New Zealand sea lions. Disease in breeding colonies on the Auckland Islands is assessed to be the single greatest threat. Other identified threats include incidental capture by fishing, unsuitable breeding habitats (e.g. pups drowning in mud holes), concerns that climate change may be affecting food abundance, and land-based human interference in South Island colonies.

Deepwater Group's focus has been on mitigating interactions in fisheries with the highest risk of interaction with sea lions – the trawl fisheries for squid and southern blue whiting in the Southern Ocean. Industry has developed and tested SLEDs, which allow sea lions to escape alive and unharmed from trawl nets. All trawl nets in these two fisheries are fitted with approved and certified SLEDs. Both fisheries have fishery specific management plans to further minimise risks to sea lions. The ELO briefs vessel operators before each season on the risk factors[xix, xx] (area, depth, time of day) relating to incidental captures of New Zealand sea lions. We stay in regular contact with the operators throughout the season to ensure the fleet remains vigilant.

To verify our recording of all interactions with sea lions, between 90 - 100% of the fishing effort in the Auckland Islands squid fishery and the Campbell Island southern blue whiting fishery is monitored by Fisheries New Zealand and DOC observers.

Since 2005 the estimated number of sea lions (from observer records) captured annually by deepwater trawlers has been reduced by around

80%

New Zealand sea lions on Enderby Island.
© Tamzin Henderson.

The outcomes

Since 2005, the estimated number of sea lions (from observer records) captured annually by deepwater trawlers has been reduced by around 80% (from 45 to 9 sea lions or fewer in recent years). Work is ongoing to further reduce these interactions.

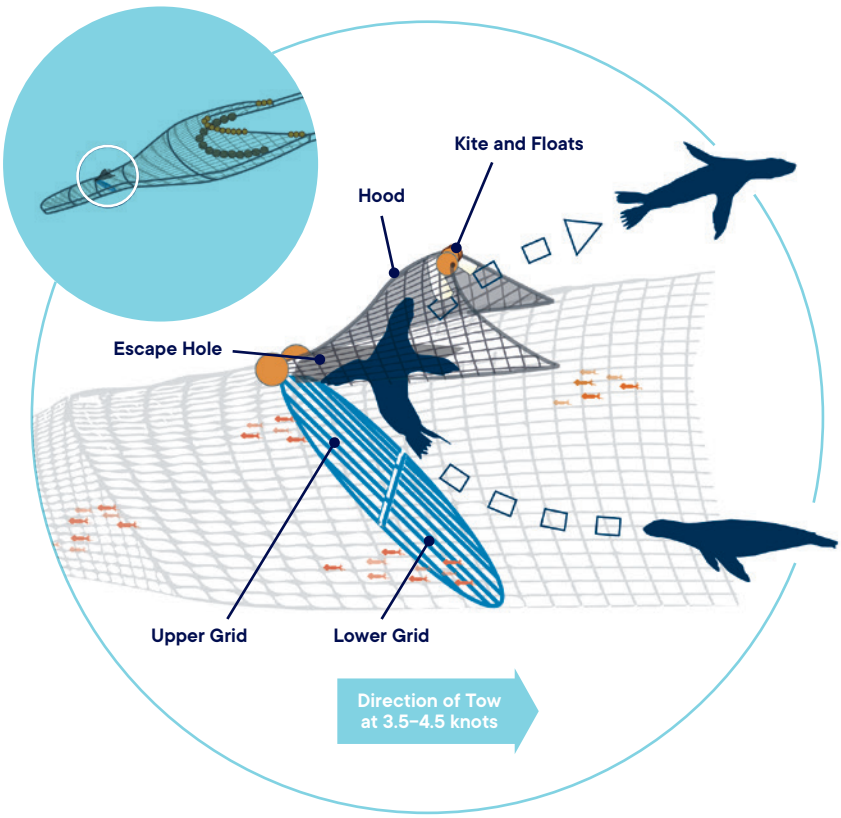
The New Zealand sea lion threat status has reduced from "Nationally Critical" to "Nationally Vulnerable" as their breeding populations are now considered to be stable or to be increasing in size at most of the main breeding locations[xxi].

Fisheries interactions are no longer considered to be the primary impact on New Zealand sea lion population survival[xxii, xxiii].

"...Fishers are keen to do the right thing and avoid catching sea lions so the population can continue to flourish and that's why they use SLEDs in key fisheries that overlap with sea lion foraging"

Nathan Guy
Minister for Primary Industries (2013–17) on funding for sea lion Threat Management Plan (May 2017)

Sea Lion Exclusion Device - SLED



CASE STUDY: FOUR

Reducing harm to common dolphins

The risks

The risk of common dolphin captures is highest in the jack mackerel fishery, offshore of the west coast of the North Island at depths of 60–200m. The risk of capture is highest when the net is near the surface.

Common dolphins should not be confused with Māui or Hector's dolphins[9], both of which live in shallow inshore waters, not in the deepwater. There is no risk to these small endemic inshore dolphins from deepwater fleets.

Managing the risks

Deepwater Group's Environmental Liaison Officer (ELO) briefs vessel operators before each jack mackerel season on the factors (i.e. area, depth, time of day) which pose the highest risk of incidental captures of common dolphins. We stay in regular contact with vessel operators throughout the season to ensure those in the fleet remain vigilant.

Risk reduction practices for common dolphins, along with other dolphin species, are specified in Deepwater Group's Marine Mammals OPs. Skippers undertake visual checks to ensure there are no dolphins around the vessel before shooting the fishing gear.

Trawling is not undertaken during the early hours of the morning when the risk of dolphin capture is highest. When trawling takes place, shooting and hauling the fishing gear is achieved as quickly as possible, to minimise the capture of dolphins.

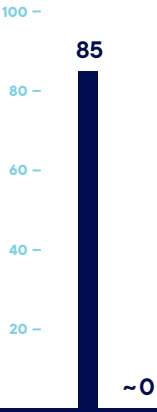
Dolphin Dissuasive Devices (DDD) are used to discourage common dolphins to forage near our trawl nets. These devices produce random high-frequency ultrasound signals modulated in length and frequency, which dolphins find unpleasant resulting in them moving away from the source. The signals do not cause any harm to mammals. Fish are insensitive to the range of frequencies emitted. All jack mackerel trawlers in the deepwater fleet use these devices.

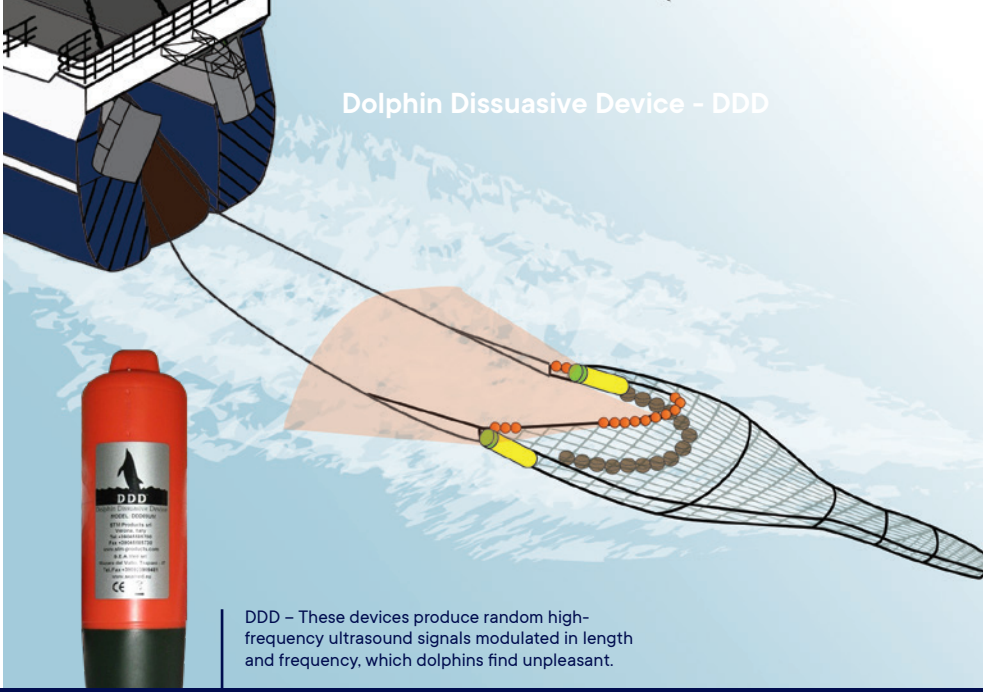
9. doc.govt.nz/nature/native-animals/marine-mammals/dolphins/hectors-dolphin/

Since 2004–05, the estimated number of common dolphins captured annually by deepwater trawlers has been reduced by more than

99%

(from 85 to ~0)



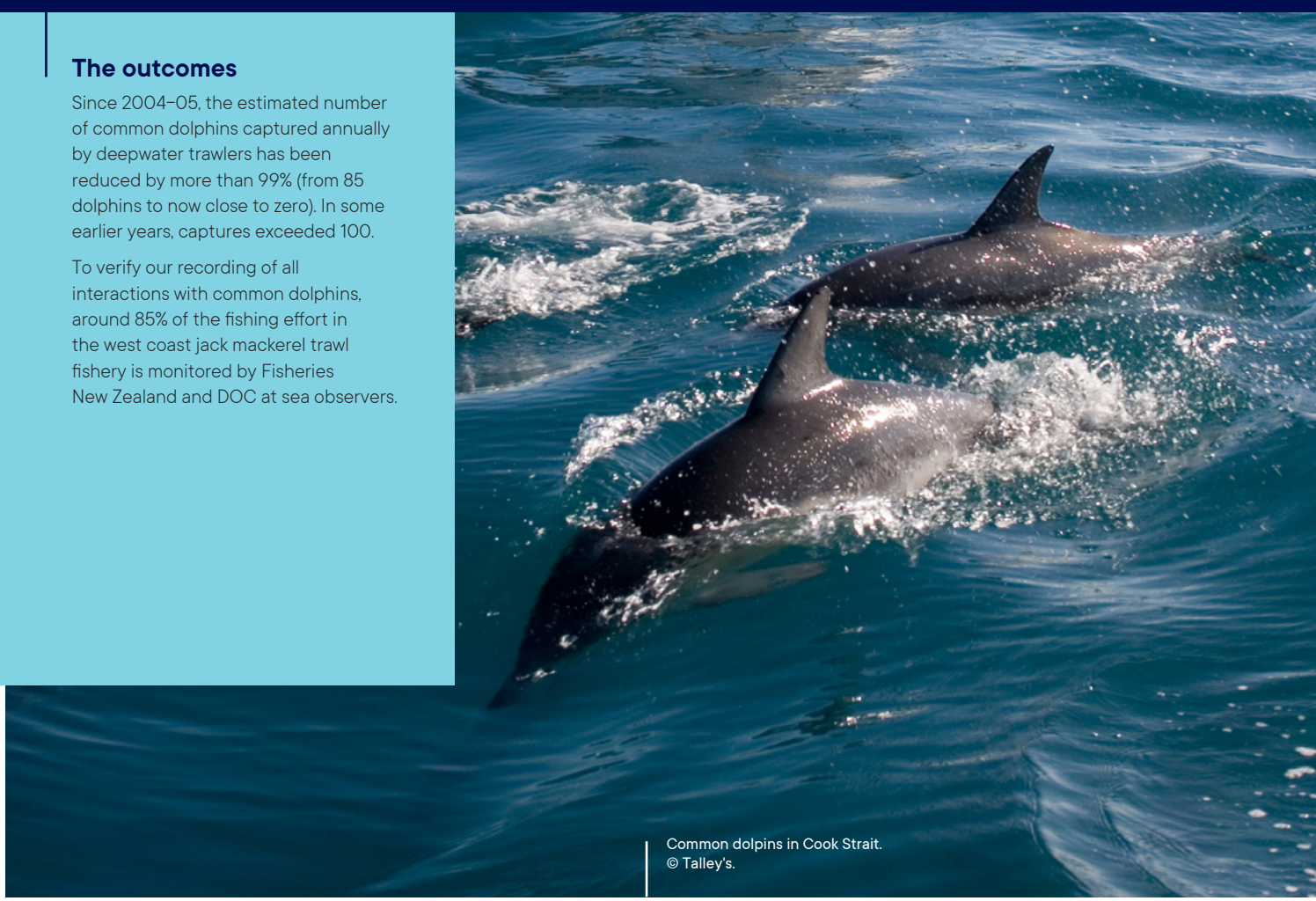


DDD – These devices produce random high-frequency ultrasound signals modulated in length and frequency, which dolphins find unpleasant.

The outcomes

Since 2004–05, the estimated number of common dolphins captured annually by deepwater trawlers has been reduced by more than 99% (from 85 dolphins to now close to zero). In some earlier years, captures exceeded 100.

To verify our recording of all interactions with common dolphins, around 85% of the fishing effort in the west coast jack mackerel trawl fishery is monitored by Fisheries New Zealand and DOC at sea observers.



Common dolphins in Cook Strait.
© Talley's.

CASE STUDY: FIVE

Reducing incidental shark captures

The risks

New Zealand waters are home to at least 113 species of shark (including rays, skates, chimaeras, and other members of the class *Chondrichthyes*.)

Some species such as school shark and rig support significant coastal commercial fisheries and are managed within the QMS. Other shark species are managed under the Fisheries Act. Five species of sharks (basking sharks, deepwater nurse sharks, white pointer sharks, oceanic whitetip sharks and whale sharks) are protected in New Zealand waters under the Wildlife Act 1953. It is an offence to hunt, harass or harm any of these protected species. Incidental catches of protected shark species by commercial fishermen are not unlawful, but all captures are required by law to be reported to Fisheries New Zealand.

There are challenges, limited options and certainly no one-size-fits-all solution to reduce the risk of catching unwanted sharks. Different shark species have different biological characteristics, behaviours and distributions and may be encountered in almost every marine habitat across our EEZ.

Managing the risks

Deepwater Group fully supports and contributes to the past and current work underway within the National Plan of Action (NPOA) – Sharks[xxiv], which proposes to *"maintain the biodiversity and the long-term viability of all New Zealand shark populations by recognising their role in marine ecosystems, ensuring that any utilisation of sharks is sustainable, and that New Zealand receives positive recognition internationally for its efforts in shark conservation and management."*

To support the NPOA-Sharks where a risk-based approach to prioritising management actions is used, Fisheries New Zealand assessed the risks posed by commercial fishing to all New Zealand sharks, rays, skates and chimaeras[xxv]. This risk assessment[xxvi], which was updated in 2018, considered risks on a national scale and scored intensity and consequence of a fishery on shark species.

Although the risk assessment found *"no consequence score greater than 4.5 (out of a maximum possible of 6) because available information did not suggest that commercial fishing is currently causing, or in the near future could cause, serious unsustainable impacts,"* it helped prioritise management for shark taxa, noting that protected species were also given priority under the NPOA–Sharks.

The NPOA–Sharks contains a requirement to conduct a review of its achievements. To inform that review, there is a need to identify, collate, analyse and summarise the actions carried out under the umbrella of the NPOA (these have been carried out periodically since 2008). This is currently being undertaken as part of the review of the NPOA in 2021 and a report will be made available within this year.

Great white shark.
© Clinton Duffy, DOC.

New Zealand waters are home to at least 113 species of shark.

Every two years research trawl surveys by NIWA estimate relative abundance indices for a range of deepwater species within the New Zealand EEZ (off the South Island's West Coast, in the sub-Antarctic, and on the Chatham Rise). These surveys provide indices of relative abundance of species, and fishery independent data on the population structures of deepwater species, including sharks. It must be noted however that catches are infrequent for some sharks (notably deepwater species) due to their natural abundance and widespread distribution in waters outside those surveyed.

In addition to survey data, further information that underpins the management of sharks is gathered by observers present on deepwater fishing vessels as well as from catch reports provided by the industry.

The outcomes

Goal six of the NPOA-Sharks asks for the continuous improvement of the information available from New Zealand vessels and fishers to conserve sharks and manage fisheries that impact on sharks, with prioritisation guided by a risk assessment framework.

NPOA-Sharks reviews indicate that observer coverage and other forms of at-sea monitoring are sufficient to verify catch information, collect scientific data for all New Zealand commercial fisheries that take sharks, and monitor progress towards achieving the objectives of the NPOA-Sharks. It is agreed that catch reporting and the compilation of historical catch information for shark species is of a standard to inform shark management objectives, and that catch information for incidental (unwanted) shark catch, is increasingly robust.

Historically, there has been some concern that catch reporting with respect to sharks lacked an appropriate level of detail, with reliance being placed on the use of generic reporting codes (where species are bundled into a catch-all reporting code).

Deepwater Group with support of Fisheries New Zealand through ELO education programmes, has succeeded in reducing the use of generic reporting codes, to use only when it is not possible to identify a shark to species level[xxiv].

Deepwater Group's OPs are another tool used across a range of protected species (e.g. marine mammals and seabirds) to reduce risk and improve conservation outcomes. For sharks these were developed in 2014 (and regularly updated), not only to assist fishers by providing information on shark identification, but to better manage their fishing operations and catches for the conservation of shark populations. They provide information on regulatory frameworks and policies including protected sharks, finning regulations and CITES listings, and include instructions on how to release sharks safely and humanely. Further, the OPs require that trigger event reports for basking shark captures are provided to the ELO so that responses can be considered in communication with the vessel and operator.

CASE STUDY: SIX

Reducing harm to seabed habitats

The risks

There is concern that deepwater bottom trawling may be causing adverse effects on benthic (seabed) habitats and their biodiversity.

Most of our deepwater catch is taken by midwater or bottom trawling. When bottom trawls contact the seabed there is a risk that benthic biodiversity may be impacted. Most of the seabed we trawl over is mud or sand and we have trawled over the same grounds and trawl paths for decades, often many times each year, without discernible changes in productivity. At times sessile deepwater benthic species such as corals may be encountered.

Managing the risks

Deepwater Group shares that concern and has worked to ensure that any such impacts by trawling do not result in adverse effects on benthic (seabed) habitats. We have adopted three main approaches:

- Minimising our trawl footprint
- Closely monitoring the areas that are trawled (through analyses of trawl locations and using underwater video to assess seabed habitats)
- Permanently closing large representative oceanic areas to bottom trawling.

Industry has established an annual assessment of the locations where bottom trawls contact the seabed. This monitoring is now undertaken by Fisheries New Zealand. They closely monitor the location and frequency of seabed contacted by bottom trawls, confirming there is very little exploratory fishing over new grounds.

Our trawl footprint is very light, annually contacting only 1.1% of the seabed in New Zealand's EEZ[xxvii] in recent years. Most of these areas have been productively fished for decades. Since records began, around 10% of the seabed in the EEZ has been contacted once or more by bottom trawls, leaving some 90% untouched.

As our harvesting efficiencies progressively improve, the number of trawl tows has been reduced further mitigating impacts on benthic habitats. During the period 2004–05 to 2019–20, the number of deepwater trawlers has decreased by 47% (from 60 to 32) and the annual number of trawl tows has decreased by 38% (from 45,139 to 28,144 tows). The annual deepwater trawl footprint peaked in 2001–02 at an estimated 81,000km^2.

Annually, deepwater bottom trawls now contact an estimated 44,000km^2 of the seabed or 2.7% of the EEZ shallower than 1,600m (i.e. depths accessible to current trawling capabilities).

By way of comparison, 1,204,750km^2 of seabed in the EEZ is closed by law to bottom trawling – an area 25 times larger than the area that we annually contact by bottom trawl.

BPAs and Seamount Closures collectively protect:

71
Underwater Seamounts.
50% of total within New Zealand's EEZ.
Features with elevations of 1,000m or more.

93
Smaller Underwater Topographic Features.
28% of total within New Zealand's EEZ.
Known as hills and knolls.

23
Hydrothermal Vents.
88% of total within New Zealand's EEZ.

When first implemented, these large BPAs constituted
24%
of the total area managed under Marine Protected Areas in the world.

Mindful of our small footprint, that around 90% of seabed in the EEZ remains pristine, and of the Government's desire to have 10% of New Zealand waters under marine protection, in 2006 Deepwater Group proposed to the Government that they should close a third of the EEZ to bottom trawling and dredging. At that time, the Government had closed to trawling around 12 underwater hills and knolls and 13 seamounts (the Seamount Closures), totalling 81,091km^2 – covering nearly twice the area that we currently trawl annually.

Industry's proposal added to this by setting aside and preserving the benthic habitats in 17 large and representative Marine Protected Areas (MPAs) totalling 1,134,089km^2, within which almost all of the seabed is untouched by human activities. The Government accepted our proposal in 2007 and these new closures took effect in the same year.

The selection of these BPAs was based on the best available scientific knowledge (the Ministry for the Environment's Marine Environment Classification[xxviii]), alongside industry and scientific knowledge of where corals, sponges, and underwater features of interest occur.

Within BPAs, the regulations prohibit trawling closer than 100m from the seabed. Midwater trawling is allowed above that level but is subject to strict conditions including onboard Fisheries New Zealand observers.

Technology also helps to mitigate risks. Navigation of fishing activities is guided by onboard computers and GPS. Deepwater fishing companies use electronic geo-fences surrounding fisheries management areas with alerts triggered when a vessel is nearby the boundary of a closed or restricted area. Any incursions are also monitored by MPI in real-time. Ministry for Primary Industries' investigations reveal if the incursion was accidental and addressed by the skipper or resulted in trawling. As a conviction results in vessel forfeiture and large fines, all skippers and crew are aware of the regulations and the consequences of any breaches.

Some benthic organisms, such as deepwater corals, are vulnerable to deepwater trawling. In New Zealand waters, black corals, gorgonian corals, stony corals, and hydrocorals are protected under the Wildlife Act 1953. While these corals are widespread throughout New Zealand and adjacent waters, at times they are infrequently encountered in small quantities in fewer than 2% of deepwater trawls. Reports of coral captures do not always distinguish between whether these were live corals or dead coral rubble. Vessel skippers and observers each report captures of deepwater corals.

In orange roughy fisheries, corals may be occasionally captured. The auditors, when assessing our performance against MSC's standards, sought information that demonstrated these interactions do not pose unacceptable impacts to the populations of protected coral species. Fisheries New Zealand and Deepwater Group were able to satisfy these requirements.

Gorgonian coral.
© Peter Marriott, NIWA.

31%
of New Zealand's seabed closed to trawling.

The outcomes

Close to one-third of New Zealand's EEZ is now closed to bottom trawling within 30[11] Marine Protected Areas[xxix] These closures protect 1,204,750km^2 of the seafloor, a marine conservation area 4.5 times larger than New Zealand's landmass. By way of comparison, deepwater trawling annually covers only 44,000km^2 or 1.1% of the EEZ and 2.7% of the EEZ that is less than 1,600m deep and accessible to current bottom trawling technology.

By these measures, any impacts that we may be having due to bottom trawling are highly unlikely to constitute adverse effects on marine benthic biodiversity. Further scientific assessments are being undertaken by Fisheries New Zealand and DOC to determine the nature, extent and locations of key benthic organisms which can be used to inform future management actions.

Audits of orange roughy fisheries on the Chatham Rise have determined that they are highly unlikely to create unacceptable impacts to the populations of protected coral species, which are widespread in their occurrences throughout the EEZ and global oceans.

11. 17 BPAs and 17 seamount closures, with four seamount closures occurring within a BPA

1.2 million km^2
of the seafloor is protected.

92%
of New Zealand's seabed is untouched and has never been trawled.[xxx]

4.5
times the size of New Zealand.

1.1%
of the seabed in New Zealand's EEZ is trawled each year with fishers returning to the same fishing grounds, using fewer trawl tows to catch the same amount each year.


New Zealand Benthic Protection Areas & Seamount Closures
Land
EEZ Boundary
Seamount Closures
Benthic Protection Areas

SECTION 5

Engage in effective relationships and shared work programmes

Nineteen of the New Zealand deepwater fisheries for hake, hoki, ling, orange roughy and southern blue whiting fisheries have been independently audited against the Marine Stewardship Council science based eco-label programme without any conditions.

This places these fisheries in the top 5% of the best managed fisheries in the world and is a testament that the ecosystem approach to fisheries management in New Zealand is working and is amongst the world's best.

Delivery of this outcome has required effective, functioning relationships with multiple parties including – industry, Iwi, politicians, Government managers, scientists, and compliance officers, and with NGOs. MSC certification is hard-won. MSC holds the 'gold standard' for science based eco-labels in fisheries management. They have based this on FAO codes and guidelines for responsibly managed fisheries and certification is influenced by FAO eco-labelling guidelines. Assessments against MSC's standards are made by independent certification bodies, each of whom is accredited by Accreditation Services International. Each fishery contracts auditors, who between them have expertise in fisheries science, fisheries impacts on ecosystems, and fisheries governance. The auditors score each fisheries' performance against 28 indicators across three principles (sustainable fish stocks, minimal impacts on the environment, effective fisheries management) with decisions based on scientific and technical evidence.

San Discovery. © Sanford.

MSC assessments are public and the findings are open to challenge. Several of the assessments for New Zealand fisheries have been challenged, including by international conservation organisations including WWF. All objections are given careful consideration by the auditors and then by an Independent Adjudicator. That is as it should be. We believe that, if our fisheries cannot withstand detailed scrutiny, then we don't deserve certification – how else can our customers have confidence that these fisheries are indeed sustainable?

Decisions on fisheries management and their certification are based on the best available science. The better this knowledge is, the better informed the management decisions will be. Our approach is to build effective relationships and shared work programmes that ensure this science is not only available but also reflects the growing body of knowledge informed by independent research.

We work in partnership with Fisheries New Zealand and DOC, as well as with a number of science service providers within New Zealand and internationally. We often directly invest in our scientific research programmes with providers who can meet Fisheries New Zealand's required standards for data and analysis.

The auditors score each fisheries' performance against

28

indicators across three principles:

1. Sustainable fish stocks
2. Minimal impacts on the environment
3. Effective fisheries management.

New Zealand orange roughy.
© Wreford Hann Photography Ltd.

Investing in science-based management

Each year deepwater quota owners invest between $15m and $22m toward the costs of management, science, monitoring and compliance. Some of this is cost recovered by the Government and some is directly invested by quota owners.

For example, when quota owners first agreed to obtain MSC certification for orange roughy, there was insufficient science to meet MSC's standards. Since 1998 quota owners have directly invested more than $20m to fund additional scientific work on orange roughy. Most of this investment has been to develop and prove new acoustic survey methods and a new stock assessment approach. The results from this new science have been used by Fisheries New Zealand to inform fisheries management decisions.

Industry's ongoing costs for the direct purchase of the science necessary to support the continued sustainable management of orange roughy fisheries are forecast to be around $11m over the next five years.

As healthy, sustainable fisheries are always in quota owners' best interests Deepwater Group leads the continued innovation and development of science for deepwater fisheries.

Since 1998 we have worked with the Commonwealth Scientific Industrial Research Organisation (CSIRO) of Australia, the only scientific institute in the world with 25 years' experience in acoustic surveys of orange roughy biomass. Since 1998, industry has directly purchased and delivered 32 acoustic biomass surveys for orange roughy stocks in New Zealand, in addition to the four surveys delivered under contract to Fisheries New Zealand. Research directly funded by industry has developed new stock assessment approaches, improving the accuracy and quality of information used to inform management decisions.

CASE STUDY: PRECISION SEAFOOD HARVESTING

Collaborative science – challenging the status quo

Industry, Government and scientists combine to catch fish alive and unharmed.

When some clever marine scientists in Plant and Food Research asked if there was a better way to catch fish and improve the quality of the seafood, a challenge to the status quo was born. Through a Primary Growth Partnership (PGP) between MPI, Sealord, Moana New Zealand and Sanford, Precision Seafood Harvesting (PSH) was developed and successfully commercialised.

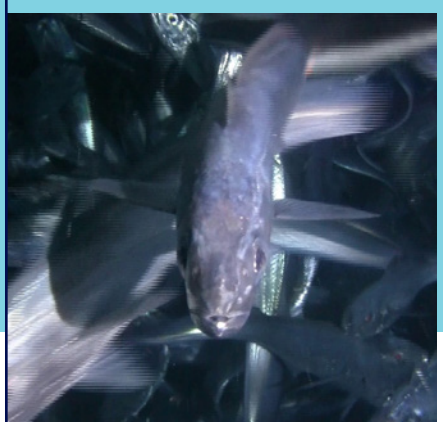
PSH steps trawling to a new level, using a carefully designed 'cod end' made from flexible, lightweight, and very strong materials dotted with escape portals. The low velocity environment created by PSH prevents stress or injuries to the fish and enables the catch to be free swimming while inside the net and to be alive when brought aboard.

Using PSH, fishing companies can better target selected species, bring them aboard alive, and increase the probability of juvenile fish being released alive. Marketed under the name Tiaki, PSH produces premium quality seafood products from a trawl catch.

The seven-year, $44m programme saw this new methodology to be developed, tested, and to be commercially proven. PSH technology is now formally approved for hoki, hake and ling fisheries along with its use in several inshore fisheries.

In 2019 the assessment of this PGP programme concluded that, among other positives, it had demonstrated how innovation, collaboration and culture change could break the mould of entrenched thinking and increase product quality, cascades, landed values and yields.

Free-swimming hoki within PSH net.



CSIRO scientists working on AOS.

NIWA's *Tangaroa* research vessel. © Stu Mackay.

Research by quota owners

Deepwater Group shareholders are part of the research community too, contributing also individually to the wider deepwater sustainable fisheries cause.

Talley's has been operating deepwater fishing vessels since the 1980s and has been contracted to provide research vessels by MPI and Fisheries New Zealand for fisheries research in New Zealand, by CSIRO and National Oceanic and Atmospheric Administration (NOAA) for oceanographic and earthquake research in the Southern Ocean, by the Australian Antarctic Division for research on blue whales in Antarctic waters, and in support of international scientists for research to collect toothfish eggs and larvae in Antarctic waters.

Sanford has also been contracted historically by MPI and Fisheries New Zealand for hull-mounted acoustic biomass surveys in orange roughy and oreo fisheries, and trawl surveys in the scampi fisheries. Sanford has been one of the cornerstone shareholders in the development of the Precision Seafood Harvesting system.

Sealord owns and operates the only acoustic optical system (AOS) in New Zealand that has been proven for orange roughy biomass surveys. They have successfully operated their AOS in orange roughy biomass surveys in New Zealand waters, in SPRFMO waters in the Tasman Sea, and SIOFA waters in the Indian Ocean.

Meeting demands for rigour

While some claim industry funding science is akin to the fox guarding the chicken coop, there is no comparison.

Research funded by the seafood industry focuses on the sustainability of the resource and advances in harvesting and processing, not on any distortion of the facts. Robust science is needed to support good, long-term decisions. Apart from the reputation of the independent service providers we contract, which include both NIWA and CSIRO, Fisheries New Zealand's Science Standard demands rigour in the results.

The Fisheries Act requires all fish stocks to be managed at or above the level that will provide their maximum sustainable yields. This is defined as the largest long-term average catch or yield that can be taken from a stock under prevailing ecological and environmental conditions without impairing its renewability through natural growth and reproduction. Without accurate science, Total Allowable Commercial Catches (TACC) could be set too low – impacting returns from fisheries, or too high – pushing stocks towards overfishing. Either way, our quota owners would be harmed by any lack of independent and quality science.

Hoki in Cook Strait.
© NIWA.

Industry-imposed catch restrictions

Our commitment to science ensures that as guardians, we are protecting our important fisheries from overfishing.

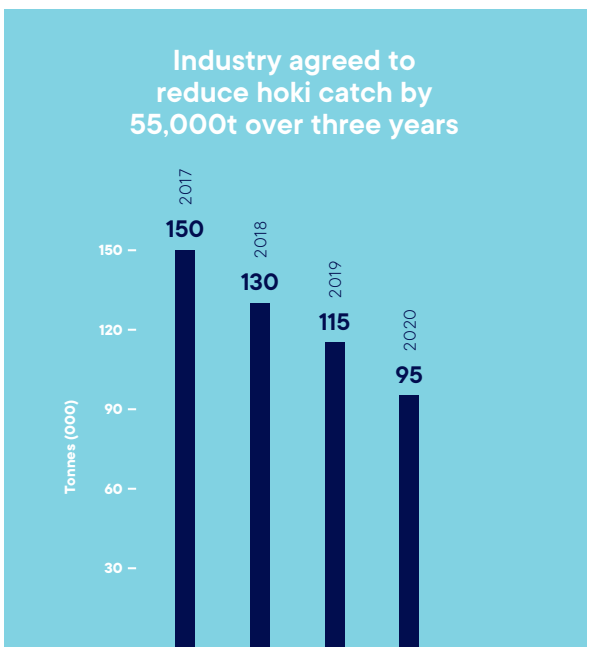
The hoki stock assessment is a good example. Fish stocks are influenced by a range of environmental factors, in the same way as farm production. Good soil moisture over summer, adequate feed for ewes through mating and gestation, and a mild winter will result in higher lambing percentages. Favourable environmental and husbandry practices will result in more productive lambing and farm productivity. It is the same for seafood production.

With hoki, a couple of good spawning seasons pave the way for good fish stocks in two to three years. Hoki is a relatively short-lived, fast-growing, and widely distributed fish, but our quota owners know to keep a close eye on shifts in productivity, which can vary greatly between years due to variable environmental conditions.

In 2017 concerns by quota owners that there were fewer hoki than expected on some fishing grounds, suggested that the scientific assessments may be overestimating the stock status. In 2018 hoki quota owners collectively agreed to reduce their catch from the West Coast by 20,000t, in response to changing patterns observed in one of the four fishing grounds. This was followed by a second agreed reduction of 15,000t in 2019 and a third of 20,000t in 2020 – reducing the catch limit for hoki from 150,000t to 95,000t over three years.

Deepwater Group is working closely with Fisheries New Zealand and their team of scientists to review the stock assessment modelling for hoki as it is in our long-term interests to get the science right to ensure we have a long-term future in this sustainably managed fishery.

One of the large unknowns for hoki is the actual stock structure. Scientists assume there are two stocks but there is little empirical evidence to support this assumption. In 2020 Deepwater Group commissioned Plant and Food Research to employ new genetic analytical techniques to assess the stock structure of hoki. This $400,000 research programme, jointly funded by Deepwater Group and Seafood Innovations Ltd, aims to have information about stock structure by early 2021, in time to inform the new stock assessment.



SECTION 6

Enhance our reputation within New Zealand and around the world

Kāore te kumara e kōrero ana mo tōna ake reka.

The kumara does not brag about its own sweetness.

Independent's *Mainstream* heading out of Lyttelton Harbour to catch southern blue whiting. © Jared Waddams.

89%

of New Zealanders want to be confident that they are buying fish that are sustainably managed.

Deepwater fisherman can be a lot of things; tough, gruff, and tremendously respectful of the sea and the marvels of the marine environment. They'd be the first to agree with the whakataukī "The kumara does not brag about its own sweetness."

In this era of misinformation, it's important to protect your reputation, especially when losing it can also mean lost markets for our seafood, lost faith from consumers and lost trust from regulators.

That's why enhancing our reputation in New Zealand and around the world is an important pillar in our strategy. It's not about sweet talking, it's about straight talking. We let the facts speak for themselves.

Deepwater Group was a proud supporter of the Inaugural Sustainable Seafood Day, celebrated in 2018 by the Marine Stewardship Council. With its theme "Forever Wild" it not only celebrated New Zealand's commitment to sustainably managed fisheries, but also the MSC certified status of 23 fisheries involving eight species – hoki, hake, ling, southern blue whiting, albacore tuna, orange roughy, skipjack tuna and Antarctic toothfish.

The event has since grown, with the first full week of sustainable seafood celebration marked in October 2020. The celebration is justified. The Marine Stewardship Council confirmed that around half of all of New Zealand's marine wild catch is certified as meeting its sustainability standards – compared with 15% of the global catch.

Research commissioned by MSC showed 89% of New Zealanders want to be confident that they are buying fish that are sustainably managed. It's important to us that we provide all New Zealanders with accurate information and reassurance.

Our activities demonstrate they can have this confidence for deepwater fisheries.

Panfried orange roughy with citrus cauliflower salad - visit deepwatergroup.org for the recipe.

Check before you buy and fry

Consumers have a right to know their seafood is sustainable, but it can be difficult to sort out the facts from the fables. Orange roughy is a good example. The fisheries enjoyed a boom in the 1980s, but several became dramatically overfished and required remedial management intervention to rebuild stocks. Several orange roughy fisheries are now not only sustainable but are certified as such. Many consumers though still hold the misconception that orange roughy are "overfished".

We actively encourage consumers to make use of Seafood New Zealand's Best Fish Guide[12], an accurate, science based, comprehensive, and current compendium of the main commercial species, where they are found and how to cook them.

Showing how it's done

There's nothing quite like a fisherman to tell a good fishing story. Television producer and 'Gone Fishin" host, Graeme Sinclair, is a great storyteller and a keen man with a rod and reel. His documentary series, 'Ocean Bounty'[13], is now in its fourth season, giving genuine, independent insights into commercial fishing. We are among the series' sponsors.

The show has taken viewers from Antarctica to the Chatham Islands, highlighting innovations such as Precision Seafood Harvesting, sustainability initiatives, marine animal protection, and the Quota Management System. It tells a successful and popular story about changing attitudes to seafood as a resource, with the QMS as the cornerstone of our MSC-certified sustainable harvests. It is an accurate insight into all of our fisheries, including deepwater, told by a documentary maker who is known for his fishing credentials.

Since 2005, quota owners, along with Government, have invested

$300m

into science and monitoring to inform the management of our deepwater fisheries. We can all have confidence that deepwater fishing practices and policies are soundly based.

12. bestfishguide.co.nz
13. threenow.co.nz/shows/ocean-bounty/S1247-430

Birds at the stern of the *Otakou*. © Sealord.

Collaboration and co-operation

The old proverb "A man is known by the company he keeps", is often true.

In our case, we've made a genuine commitment to co–operate and collaborate with people and organisations who share our interest in sustainable deepwater fisheries and the protection of marine resources and ecosystems.

Since our Memorandum of Understanding with the Government back in 2006, we have maintained positive partnerships with Fisheries New Zealand, with DOC, with scientists, with Iwi and with a wide range of NGO organisations, including Sustainable Fisheries Partnership, The Prince of Wales' International Sustainability Unit, Southern Seabird Solution Trust, Chatham Islands Taiko Trust, Southern Coast Charitable Trust. This is essential to ensure wide community understanding and support to sustain New Zealand's deepwater fisheries resources and the other inhabitants of our oceans.

Always part of the solution

The seafood industry is dynamic, inventive, resourceful and many fishers are natural problem solvers. We must continue to provide real world solutions that ensure our fisheries do not adversely impact the marine environment. Collaboratively working towards shared goals is our preferred path.

A good example is the updated NPOA-Seabirds 2020, which is the result of three years of discussions between industry, NGOs, Fisheries New Zealand and DOC. NPOA-Seabirds has an aspirational vision of New Zealand working towards zero fishing related seabird mortalities. Recognising achievement of this is beyond current capabilities, the NPOA-Seabirds is an excellent collaborative start, one that has already given rise to innovations which will form part of the solutions.

The Underwater Bait Setter[14], designed by Leigh fisherman Dave Kellian, has resulted from a collaboration between industry, Fisheries New Zealand, DOC, the Auckland Zoo Charitable Trust and SSST. This innovation has undergone promising trials. The device enables the longline to be set through a capsule which is hydraulically submerged, to ensure the baited hooks are released deep enough to restrict seabirds from accessing the bait. It is an impressive operation and was developed to production by Skadia Technologies.

The Hookpod[15] is another example. This device shields hooks in plastic pods until they are 20 metres underwater and well away from diving birds before it releases the bait. Trialling these devices is an industry and Government collaboration.

14. skadiatech.com
15. hookpod.com/&page=2

SECTION 7

Verify our performance against world's best practice

A delicious meal of New Zealand fish & chips.

From global consumer brands to the Kiwi family enjoying a picnic of fish and chips at the beach, our customers and consumers expect that the fish they source from deepwater fisheries is sustainable as well as delicious.

We stand by our word, but it takes more than 'crossing your heart and hoping to die' to win that level of confidence. From the outset, we have worked to secure Marine Stewardship Council certification of our most important fisheries. More are being progressed. Certification provides another layer of reassurance that we're doing what's right. MSC certification complements the oversight by quota owners, by Fisheries New Zealand and by New Zealand's review and reporting frameworks.

The UK-based Marine Stewardship Council sets the highest independent science-based international seafood sustainability standards, covering three broad principles:

1. **Sustainable fish stocks** – fishing must be at a level that sustains the fish population indefinitely
2. **Minimal impacts on the environment** – fishing must have no adverse effects on the marine ecosystem
3. **Effective fisheries management** – fishing must be well managed and comply with relevant laws.

As our timeline shows, both the Government and Deepwater Group have made steady progress since 2001 in securing certification for New Zealand fisheries. This work is not yet completed. Our aspirational goal is to have all of our main deepwater fisheries managed at a level that will meet MSC certification requirements.

Certification is a very exacting process requiring significant resourcing. MSC certification lasts for five years, requiring annual audits to ensure that each fishery maintains performance to MSC's standards, along with a full new reassessment every five years. Deepwater Group has focused on certifying the major high-volume and high-value fisheries first. Currently, 19 deepwater fisheries are certified. Together these comprise five of the nine main deepwater fish species, two-thirds of the deepwater catch and close to half of New Zealand's production of natural seafood (not including aquaculture).

Our current focus is to maintain the performance of certified fisheries, while we investigate the value proposition of certifying squid and other deepwater fisheries.

How can I be sure I am buying sustainable fish?

Seafood from certified fisheries can carry the MSC blue tick (label), if chain of custody certification is also in place. Certification is a rigorous process underpinned by a science based standard. A blue tick is not awarded for life. It is constantly reviewed to ensure fisheries rated as sustainable remain sustainable. You can check on the current status of fish stocks by going to openseas.org.nz/fish-finder/.

CERTIFIED SUSTAINABLE SEAFOOD MSC www.msc.org

Certification timeline

FUTURE Maintain performance of certified fisheries and investigate value of certifying squid, scampi, oreo and jack mackerel.

2020 Orange roughy fisheries pass annual audit and close all conditions. All fisheries are now certified without conditions and meet the 80% level or higher for all MSC criteria – confirming they are amongst the top performing fisheries in the world.

2019 MSC introduces labour criteria and DWG reports for the first time on measures to prevent forced and child labour. Hake, hoki, ling and southern blue whiting pass annual audit.

2018 Hake, hoki, ling and southern blue whiting recertified and two of four orange roughy conditions closed.

2016 Three orange roughy fisheries certified with four conditions.

2014 Hake and ling certified.

2012 Southern blue whiting certified, hoki recertified.

2007 Hoki recertified.

2005 DWG formed.

2001 Pre-DWG – Hoki certified.

Certified sustainable

19
Deepwater fisheries certified as ecologically sustainable by Marine Stewardship Council.

69%
of the deepwater catch.

2 Hake fisheries.

2 Hoki fisheries.

10 Ling fisheries.

3 Orange roughy fisheries.

2 Southern blue whiting fisheries.

Processing fresh fish at Sanford's Timaru facility. © Sanford.

Hoki's a hero

New Zealand's hoki fishery was the first large white fish fishery to be certified by MSC in 2001. It has since been recertified three times, the last in 2018 without any conditions. Hoki is one of New Zealand's most commercially important deepwater fisheries, providing natural seafood products that are in demand internationally.

The hoki fishery operates in four main regions:

- Chatham Rise
- Sub-Antarctic
- South Island West Coast
- Cook Strait

Hoki resources are managed as two separate stocks; the eastern stock, and the western stock. Scientific research and assessments are routinely carried out on each stock.

Hoki resources are managed under the QMS by Fisheries New Zealand in partnership with Deepwater Group. Together, industry and Government have developed a single joint management framework with agreed strategic and operational priorities and work plans. The partnership is focused on determining the maximum sustainable yields from New Zealand's deepwater fisheries by setting catch limits that maximise returns over the long-term within the constraints of ecological sustainability. A mix of agreed regulatory and non-regulatory management controls are used. For example, hoki catches from each of the two stocks are managed under separate catch limits by industry, within a single TACC.

Industry also has in place additional management measures to reduce the fishing effort on juvenile hoki, to allow spawning hoki a period without disturbance by fishing and to set in place lower catch limits by industry agreement.

Why choose MSC certification?

Deepwater Group members sell their natural seafood products around the world as well as around New Zealand. It is important that all our customers and consumers can continue to buy hoki with the reassurance this has met the most internationally recognised benchmark for seafood sustainability. In many cases, our customers who require an internationally credible certification, rely on our Marine Stewardship Council certification to support their own sustainability credentials.

MSC runs the only science-based certification and eco-label programme for wild-capture fisheries that is consistent with international requirements, including the International Social and Environmental Accreditation and Labelling Alliance (ISEAL) Code of Good Practice for Setting Social and Environmental Standards and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries. MSC's blue tick is also the first global seafood certification to achieve Global Sustainable Seafood Initiative recognition.

New Zealand's hoki fishery was the first large white fish fishery to be certified by MSC, in

2001

and has been re-certified three times since

What is the process to achieve and maintain MSC certification?

Pre-assessments of each fishery are often used to identify gaps in information and performance and may then form the basis of a work programme to prepare a fishery for a full assessment. In New Zealand, deepwater fisheries were all pre-assessed in 2009. The routine work programmes of industry and Fisheries New Zealand are aligned to provide such information.

Full assessments against the MSC Fisheries Certification Requirements (FCR) may take 12 months or more. These audits are undertaken by an accredited third-party certifier who engages international experts, stakeholder input and peer reviews.

A full assessment against MSC's FCR examines the fishery against 28 performance indicators across three principles:

1. **Sustainable fish stocks**
2. **Minimal impacts on the environment**
3. **Effective fisheries management.**

Scores allocated under each of the performance indicators must be backed up by evidence and data.

The FCR requires a fishery to achieve a score of at least 80% for each performance indicator. Where the score is between 60% and 80%, the auditors set conditions to improve performance to the 80% level within the five year certification period. Should any of the performance indicators score less than 60%, the fishery fails to meet the requirements and cannot be certified.

Certification is valid for five years, but it is not a set and forget accreditation. Annual audits are undertaken and, if required, improvements must be made. Every year Deepwater Group and Fisheries New Zealand supply the independent auditors with a comprehensive set of information and reports to inform these audits.

As part of the certification requirements, we also provide a public declaration on how we ensure[xxxi] responsible labour practices across all our deepwater fisheries.

Blue tick or blue wash?

From time to time, environmental groups make claims that consumers cannot trust the MSC certification.

They allege that MSC is no more than greenwash. We could not disagree more. The facts speak for themselves in two independent studies undertaken in 2019.

In 2019 the UK Government's Environmental Audit Committee[xxxii] concluded a year-long review into the Marine Stewardship Council as part of its Sustainable Seas Enquiry[xxxiii]. Their report concluded the MSC standard was the market leader and the most rigorous certification in the seafood sector. It also recognised MSC's work in promoting and informing positive change around improvement in fishing practices and the maintenance of sustainable fish stocks.

In 2019 a benchmarking study[xxxiv] by Milieu Centraal, a Dutch environmental information and education foundation, on behalf of the Dutch Ministry of Agriculture, Nature and Food Quality awarded MSC with the title "top keurmerk" (top eco-label) giving it full marks for credibility and transparency. The MSC was one of only ten out of 100 eco-labels to receive this recognition.

We stand by our certification and we have full confidence in it. But don't take our word for it. You can find out more about New Zealand's sustainable fisheries and the management practices within them from Fisheries New Zealand[xxxv].

OpenSeas, open book

Deepwater Group has led the seafood industry's initiative to demonstrate our ongoing commitment to supply traceable, responsibly sourced, sustainable seafood to customers worldwide.

We're an island nation, so it's not surprising the sea is special to all New Zealanders. It's within relatively easy reach of everyone and has given rise to a nation of fishers, swimmers, sailors, lifesavers, and other water sports enthusiasts – not to mention a nation of seafood enthusiasts.

We all want to know the oceans are being looked after, but there are a lot of different opinions about what "looked after" looks like. Some are based on science, some on ideology and sentiment. The seafood industry depends on science and real world experience. We have developed a single, accurate open source of information. Called OpenSeas, it outlines our environmental, social and production credentials and the commitments we make as quota owners to supply responsibly sourced seafood to customers and consumers. OpenSeas is complementary to MSC certification and provides provenance of the management of fisheries that are not yet certified.

Key information is all there in bite sized (but not battered) chunks of fish facts. Primarily designed to enable our business customers to make informed and confident choices aligned with their sourcing policies, OpenSeas provides anyone interested with consistent, quality information which meets tests for transparency, credibility, relevance, accuracy, and usability. Available for download is a full suite of reports and supplementary documents, including reference material on science, management, standards, certificates, guidance, and legislation.

George Clement discussing environmental management with HRH Prince Charles.

"The story today need no longer be one of doom and gloom and inevitable decline, but one that harbours the possibility of generating more value from a strongly performing natural asset. This potential can only be tapped if we manage it well."

Prince Charles
Prince of Wales' International Sustainability Unit (Marine Programme)

Supporting global sustainability

OpenSeas is owned and funded by industry, and currently covers the management of the main twenty commercial species. All information is sourced from external parties, including five Government agencies involved in reviewing the species and section reports and third party risk assessment services, to ensure site users can be confident that it all accurately reflects the performance of the industry, including science, management, traceability of product, food safety, and governance of New Zealand fisheries management.

OpenSeas has ISO 9001 certification as assessed by SGS New Zealand. That means our customers can have confidence that all the systems used to generate the information have been verified to meet the highest quality international management standards.

While Deepwater Group's main concern is the sustainability of New Zealand's deepwater fisheries, we have extended our commitment to include partnerships beyond the economic zone we call home.

Deepwater Group contributed to the work of the Prince of Wales' International Sustainability Unit (ISU) through our CEO George Clement as a fisheries advisor, utilising his 45 years of experience and scientific knowledge in fisheries internationally.

This involvement recognises the importance of the ISU's work in supporting the sustainability of fisheries across the world, given the millions of people who depend on them for income and food security. With many fisheries at risk of damage and over exploitation, we contribute to the effort to encourage best practice, drawing on our own experiences with New Zealand fisheries, including our worst-case scenario with orange roughy and the effort needed to rebuild the fishery to an MSC certified resource.

Deepwater Group was a founding member and continues to contribute to the work of the Association for Sustainable Fisheries. This global body comprises 27 companies and associations that collectively account for more than 100 fisheries around the globe that are either MSC certified or in assessment, and who collectively represent 75% of MSC certified seafood production.

To provide additional transparency on our fisheries management practices, Deepwater Group has led the development of an online information portal OpenSeas: www.openseas.org.nz

SECTION 8

Our future

The seascape for commercial fishing is ever changing and we will continue to be responsive to new challenges as they arise. COVID–19 is a real and present reminder of this and also of the essential service that seafood provides to New Zealand's wellbeing and economy.

Amaltal Columbia. © Talley's.

Deepwater Group will continue to deliver on our vision to be **trusted as the best managed deepwater fisheries in the world.**

We continue to seek improvements within our expanding work programmes to investigate future risks and opportunities. We will continue to add value to the deepwater sector through innovation, based on world class scientific and technical knowledge, and through further enhancing economic resilience, by attracting highly skilled and productive people to our sector.

Maintaining the trust of our customers and our regulators will continue to be essential to sustaining long-term value. To maintain and enhance this trust, we will continue being open and transparent and demonstrating how we are fishing sustainably.

Colmar Brunton's Better Futures 2020[xxxvi] report highlights opportunities for our seafood. If we listen to consumers' needs and communicate how we are meeting these, we will further enhance our reputation and value.

Colmar Brunton's Better Futures 2020 report found that:

- **Climate change remains a real concern for at least half the population and has raised awareness about the need to eat more sustainably – 49% of Kiwis recognise a change in diet may impact the environment**
- **Brands that demonstrate clear sustainable benefits are winning consumers over – 48% of Kiwis have deliberately switched to a brand or service provider which is more sustainable**
- **72% of young Kiwis say it's important their future employer is socially and environmentally responsible – workplaces with these values in the seafood industry are more likely to attract talent.**

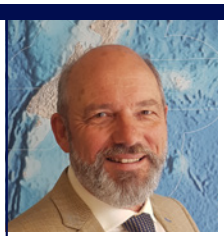
The business case for sustainability is clear and we have long ago adopted this in our production of deepwater seafood. Our seafood offers a natural, low-impact source of nutritious protein that appeals to both health-conscious and environmentally conscious consumers, providing New Zealand with a competitive advantage in world markets.

> **Kiwis need to be optimistic and not to be concerned about our ability as a nation to sustainably manage our oceans and to produce world-class seafood for generations to come.**

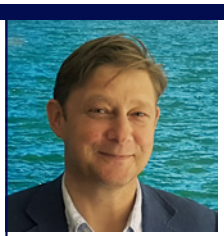
SECTION 9

Our people

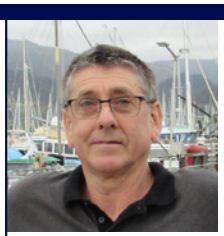
Tom Birdsall
Chairman



George Clement
Chief Executive



Aaron Irving
Deputy Chief Executive



Richard Wells
Fisheries Specialist

Rob Tilney
Programme Manager

John Cleal
Environmental Liaison Officer

Inge Wisselink
Business Manager

SECTION 9

Our board

Tom Birdsall – Chair
Andre Kotzikas
Andrew Talley
Anita Vela
Charles Hufflett
Colin Williams
Craig Ellison
Darryn Shaw
Doug Loder
Geoff Burgess
Geoff Clark
Greg Johansson
Kim Drummond
Kristie Penwarden
Mark Allison
Mark Ngata
Maru Samuels
Nathan Reid
Paul Hufflett
Rui Ventura
Sam Penwarden
Stephen Bishop
Tim Law
Tony Hazlett

Salvin's albatross.
© Cameron Long.

SECTION 9

Our shareholders

Aotearoa Fisheries Ltd
Ati Awa Ki Whakarongotai Holdings Ltd
Barine Developments Ltd
Chatham Islands Quota Holdings Ltd
Christopher John Robinson
Gisborne Fisheries 1955 Ltd
Independent Fisheries Holdings Ltd
Intersea Ltd
John Palmer Cantrick
KPF Investments Ltd
Maruha (NZ) Corporation Ltd
McDonald & Brown Ltd
NZ Japan Tuna Co Ltd
Ngāi Tahu Fisheries Settlement Ltd
Ngāi Tahu Seafood Resources Ltd
Ngāi Te Rangi Fisheries AHC Ltd
Ngāti Manawa Tokowaru AHC Ltd
Ngāti Maru (Taranaki) Fishing Ltd
Ngāti Mutunga O Wharekauri AHC Ltd
Ngāti Porou Seafoods Ltd
Ngāti Ranginui Fisheries Holding Company Ltd
Ngāti Rarua AHC Ltd
Ngāti Tuwharetoa Fisheries Holdings Ltd
Ngāti Ruanui Fishing Ltd
Ngāti Whare Holdings Ltd
Northland Deepwater Ltd Partnership
NZLL Quota Company Ltd
Ocean Fisheries Quota Holding Company Ltd
Ocean Products Ltd
Pupuri Taonga Ltd
Richard & Caroline Kibblewhite, Margaret Severinsen
Robert Bruce Odey, Thomas MacGregor Simpson
Rongowhakaata Iwi AHC Ltd
Sanford Investments Ltd, Sanford Ltd
Sealord Holdings Ltd
Solander Maritime Ltd
Southfish Ltd
Star Fish Supply Ltd
Talley's Group Management Ltd
Te Aitanga A Māhaki Trust AHC Ltd
Te Arawa Fisheries Holding Company Ltd
Te Ohu Kai Moana Trustee Ltd
Vela Quota Number One Ltd
Whaingaroa Fisheries Company Ltd
Whakatōhea Fisheries Asset Holding Company Ltd

SECTION 9

Acronyms

ACE	Annual Catch Entitlement
Act	New Zealand Fisheries Act 1996
AOP	Annual Operational Plan for Deepwater Fisheries
ARR	Annual Review Report for Deepwater Fisheries
BPA	Benthic Protection Area
CSIRO	Commonwealth Scientific Industrial Research Organisation
DDD	Dolphin Dissuasive Device
DOC	Department of Conservation
EAFM	Ecosystem Approach to Fisheries Management
ELO	Environmental Liaison Officer
EEZ	Exclusive Economic Zone between 12–200 nautical miles offshore
FAO	United Nations Food and Agriculture Organisation
HSS	Harvest Strategy Standard for New Zealand Fisheries
Main Deepwater Species	The fisheries for hake, hoki, jack mackerel, ling, oreo, orange roughy, scampi, squid, and southern blue whiting
MPI	Ministry for Primary Industries
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
National Deepwater Plan	National Fisheries Plan for Deepwater and Middle-depth Fisheries 2019
NPOA -Seabirds	National Plan of Action - Seabirds 2020
NPOA -Sharks	National Plan of Action for the Conservation and Management of Sharks 2013
OP	Operational Procedures
PSH	Precision Seafood Harvesting
QMA	Quota Management Area
QMS	Quota Management System
SLED	Sea Lion Exclusion Device
SSST	Southern Seabird Solutions Trust
Science Standard	Research and Science Information Standard for New Zealand Fisheries 2011
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
TMP	Threat Management Plan
VADE	Voluntary, Assisted, Directed, and Enforced compliance regime
VMP	Vessel Management Plan

SECTION 9

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Jack from AIMEX Nelson having FnC.
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Dig in!

Back cover: On board *Tangaroa*, NIWA conduct work that's proving how science and commercial outcomes go hand-in-hand. © Dave Allen, NIWA.