White Paper

Sustainable seamount bottom trawling

Fishing can and must be sustainable for every location and method, so Sealord proposes to close 89% of seamounts to bottom trawling in New Zealand's EEZ. Fishing on 11% of seamounts provides enough catch to meet New Zealand and global demand for fish species that congregate over seamounts.

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Foreword

Respect for marine life can take heart from the data

The primary sector, like all good businesses, constantly reviews how it harvests food. Commercial fishing monitors, discusses and refines fishing practices such as bottom trawling, especially in the context of the quota management system.

We have been concerned about recent campaigning against trawling on seamounts. A well-funded campaign has been designed to make people feel uncomfortable – to guilt them into agreeing with the concept of a ban. The campaign pretends we can stop fishing, to ease our consciences without consequences.

This is not an illusion shared by most New Zealanders. There is no doubt about their respect for, and desire to conserve, marine life. They want to protect it, not just for future fishing, but for its own sake. We all do. But they also want fish to eat, and to sell fish overseas to maintain their standard of living.

The solution to such a dilemma is typically a balance. In the case of fishing, it is limited so the harvest can be sustained by the marine ecosystem. This principle underpins the quota management system.

Scientific evidence shows that New Zealand achieves a balance of food production to biodiversity conservation. One major worldwide

study calculated the effects of trawling on the benthic status (health of the seabed ecosystem) of various locations. New Zealand was in the top third of zones least affected by fishing, with trawled areas 90% unaffected, when compared with untrawled areas.

We're not surprised. Commercial fishing is one of the most tightly regulated and studied food production industries in New Zealand. The study proves that bottom trawling is also nowhere near as extensive as people have been led to believe.

New Zealand's marine conservation measures have been designed to ensure food production is balanced with environmental protection. We take an ecosystem approach to fisheries, which makes it possible to manage bottom trawling and conservation of our native flora and fauna on the seabed in our EEZ, just as we manage conservation and food production on land.

Sealord is totally committed to a balance that errs on the side of marine life. We think the percentage of seamounts that remain untouched by bottom trawling can be increased to 89% and whilst maintaining the volume of fish New Zealand needs to eat, export, and meet quota catch limits.

Respect for marine life is common to everyone involved in this debate, no matter their side. But treasuring marine life by protecting 100% of it is not a satisfactory solution. This paper outlines the background and science behind our proposal to balance human interests so that sea life on seamounts flourishes.

Doug Paulin
Sealord CEO

Sealord

Sealord is a leading Australasian seafood group and New Zealand's best known seafood brand. It has sustainable deep-sea fishing and aquaculture operations, which employ more than 1,000 people in New Zealand and 230 people overseas.

Sealord's people are passionate about New Zealand's world-class seafood, fishing and innovation. They are also focused on the wellbeing of each other and the environment through their values-based culture.

Established in 1961, Sealord is equally owned by Māori, through Moana New Zealand, and Nippon Suisan Kaisha Limited, a global seafood company. This special ownership structure embeds an intergenerational approach to the business, particularly in relation to the environment and its people.

Sealord also owns Petuna Aquaculture and Sealord King Reef in Australia.

Introduction

Sealord is interested in the Government-led industry review into seamount bottom trawling because 40% of seafood caught each year in New Zealand's Exclusive Economic Zone (EEZ) comes from bottom trawling.

The outcome of this review is being pressured by environmental NGOs that do not support fishing on seamounts. If this position is accepted, this would materially impact food supplies, export earnings, local economies, employment and more.

Fishing can and must be sustainable for every location and method, so Sealord proposes to close 89% of seamounts to bottom trawling in New Zealand's EEZ. Fishing on 11% of seamounts provides enough catch to meet New Zealand and global demand for fish species that congregate over seamounts.

Sealord cares deeply about the marine environment. We recognise that fishing has a measurable impact on our oceans, and therefore we invest heavily in its protection. The health of the marine environment has enormous importance to New Zealand and the livelihood of our business and staff.

We believe that natural food production and wildlife protections can co-exist in marine environments as they do on land. We know that with good management and adequate conservation, we can ensure the sustainability of our fisheries, marine life, and economy for generations to come.

Within this paper, we present our proposal to do just that.

Summary

New Zealand's deep-sea fisheries produce 700 million servings of fresh seafood every year. It is one of most productive fisheries in the world because of the location and size of our EEZ, and the high prevalence of seamounts in the volcanically active Pacific Ocean.

Seamounts are an essential part of New Zealand's marine ecosystem. They form one of the most fertile habitats for marine life. Their foundations provide support for deep-sea life to settle on and thrive. They shape vast ocean currents, directing nutrient-rich waters to the surface. They are as significant in the world's ecosystem as rainforests, deserts, and tundra.

Five of New Zealand's most popular deep-water fish species congregate near seamounts. They are caught by selectively trawling along the seabed, which has proven to be the most effective and efficient way of sustainably fishing within our quota.

Concerns about the effect of bottom trawling have been raised by different groups. There has been particular concern regarding the damage caused during the first trawl. This is because subsequent trawls do not cause as much damage by following existing tracks through seamount communities which results in less bycatch.

Many untouched seamounts are legally accessible to trawlers, and fishing on these sites could result in damage to corals and sponges that would take years to recover. At present, only 15 seamounts in New Zealand's EEZ have ever been bottom trawled.

To protect the biodiversity of all other seamounts beyond doubt, Sealord proposes to close 89% of seamounts to bottom trawling in New Zealand's EEZ. Fishing on 11% of seamounts provides enough catch to meet New Zealand and global demand for fish species that congregate over seamounts.

Our proposal is based on sustaining production while providing comprehensive protection to the environment. It amounts to an expansion of protections to Benthic Protection Areas (BPAs) and Seamount Closure Areas (SCAs) for 127 of the 142 known seamounts in New Zealand's EEZ. This represents every seamount which has never been trawled before, restricting all future trawling to historically trawled seamounts.

Our proposal is to balance food production and conservation. That balance can be set overwhelmingly in favour of conservation by preserving 89% of seamounts in their totally untouched state.

The proposal is unique in recognising the function of the Quota Management System (QMS) as independent from other conservation protections. The QMS supports sustainable fishing by enforcing total catch limits that protect fish stocks. Conservation protections function separately to protect deep-sea communities and benthos by eliminating the effects of bottom trawling from corals, sponges, and non-fish species outside of the QMS.

We fundamentally believe that we can sustainably bottom trawl into the future given the QMS and sufficient conservation protections. This proposal builds on the QMS and existing BPA and SCA conservation areas, to protect the diversity and prevalence of seamount benthos beyond doubt.

Situation

Early commercial fishing operations in New Zealand were largely confined inshore. Though international fleets trawled deep-water species from the 1960s, equipment costs made it prohibitive for smaller local companies to do the same. Despite the long journey, foreign trawlers continued to return to New Zealand in search of rich stocks of high value fish such as hoki and orange roughy right up to 1982.

In 1982, the United Nations established EEZs all over the world, granting New Zealand special rights over the use of marine resources within 200 miles of our coastline. This forced International trawlers to leave New Zealand companies to take over, leasing their vessels to serve the demand for deep water fish that had been generated.

New Zealand's EEZ is the fourth biggest in the world at over 4 million square kilometres. It has a higher-than-average prevalence of seamounts and hydrothermal vents due to the high level of tectonic activity. The scale, range of underwater features, and position of our EEZ globally, all contribute to the range and types of species which live here.

The need for sustainable fishing led to the QMS introduction in 1986. This set total allowable catch limits for nearly 100 different species, dramatically improving the sustainability of wild fish stocks in New Zealand. Stocks of all species are now regularly reported by Ministry of Primary Industries.

Non-target fish species and other wildlife are protected by conservation provisions outside of the QMS. This includes special provisions for vulnerable mammals such as dolphins and sealions, sharks, and sea birds. The Wildlife Act protects a range of corals from deliberate collection or

damage. But until more recently there had been no targeted conservation provisions for seamounts as unique habitats.

In 2001, the establishment of SCAs prohibited all trawling on and above 17 seamounts for the purpose of protecting benthic biodiversity. In 2007, the establishment of BPAs banned dredging and bottom trawling in 32% of the EEZ, encompassing an additional 54 seamounts. In total, 71 seamounts within the EEZ are entirely closed to bottom trawling.

Before the development of the BPA Regulations 2007, seamounts and hydrothermal vents were identified by the United Nations as unique habitats requiring targeted protection. The General Assembly observed sessile benthos, particularly stony corals, to be vulnerable to deep-sea trawling with potential community wide effects on fished seamounts. The extent of potential damage was evidenced by overseas 'boom and bust' bottom trawled fisheries which collapsed in as little as four years in the late 1990s. Of particular concern was the slow recolonisation of seamounts due to lower growth rates, lower rates of natural fish mortality, and sporadic reproduction.

Recognising limited research, the UNGA called for a precautionary approach and recommended the interim prohibition of bottom trawling and destructive fishing practices on some seamounts. By applying trawl bans to 32% of the EEZ, 52% of seamounts and 88% of hydrothermal vents were protected. These protections were promoted by industry in recognition of our dependency on the long-term viability of the fisheries and adopted by the government for absolute protection.

In the following 15 years, 56 unprotected seamounts have remained untouched. Commercial bottom trawling vessels have consistently and sustainably met their total allowable catch whilst returning to existing trawl tracks. Since the establishment of BPAs and SCAs, no 'exploratory trawling' has taken place on seamounts.

The Campaign

The long-running campaign against bottom trawling in New Zealand was reinvigorated by public petition in late 2020. The petition was presented to Hon David Parker, the Minister for Oceans and Fisheries, and Eugenie Sage, the Green Party conservation spokesperson, by the Deep-sea Conservation Coalition. It was co-signed by Greenpeace and a collection of environmental NGOs.

Collectively, the petitioners argue that seamounts are biodiversity hotspots which act as the foundation of underwater ecosystems. They say coral communities provide irreplaceable habitat and nursery to targeted fish species, existing on seamounts with an elevation over 1000m and 'seamount like features' with an elevation over 100m.

They argue that because too little is known about these communities, and as corals grow very slowly, their protection is an ethical and environmental imperative. Therefore, they say bottom trawling on seamounts must be banned entirely, to prevent habitat loss of targeted species and seamount destruction.

The industry and government are explicitly aware of the position held by the group. However, a range of misconceptions about the nature and effects of trawling underlie the campaign for a ban on seamount trawling. Recent research and events, outlined in the following section, reveal some of these misconceptions.

What is a seamount?

Seamounts have many definitions, with most including factors such as the height off the seafloor, conical shape, or the historical geological formation.

International concensus defines seamounts as underwater topographical features rising 1000m or more above the seabed. Smaller features are referred to as *hills* and *knolls*. This is the definition which defines the 142 known seamounts in our EEZ. That definition is shared by Sealord and Deepwater Group, representing the majority of deep-water quota holders.

In short, seamounts provide rocky substrate for the attachment of sessile benthic organisms because of the slope topography (epifauna). Colonies of these organisms, such as corals, sponges, and bryozoans, can create biogenic habitats for other species.

Ocean currents interacting with a significant vertical rise in the seabed cause water layer mixing and localised upwelling. The upwelling transfers nutrients from deep-water to the surface where it is available for photosynthetic organisms, thus enhancing local primary production. This increased productivity is the driver for increased abundance in benthic, mesopelagic, and pelagic ecosystems associated with seamounts.

Practical definitions for seamounts are limited in what they tell us about the structure, oceanography, or biology of any individual peak. A seamount rising from the abyssal plane far from continental shelves may be an island of biota with little connectivity to other features. It will have astounding biodiversity in comparison to the surrounding seabed

and may have a high degree of endemism. In contrast, a seamount on the continental shelf may have no more species richness than equivalent benthic areas nearby.

Conversely, seamounts in relative proximity may have highly different ecosystems. A lack of deep ocean current across the feature can result in a seamount without biogenic benthic communities. A seamount in the path of consistent surface or mid-water currents may have a rich benthic ecosystem on one side and barren rocky slopes on the other.

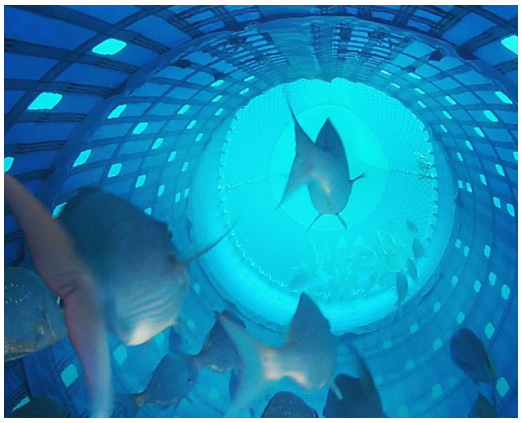
The distance between seamounts, or between the seamount and comparable benthic habitat on the continental shelf, will influence the level of similarity of two ecosystems. Other critical factors include the physical oceanography (including currents, temperature), habitat suitability, and what species characterise the benthic fauna. A high degree of connectivity will confer some resilience against impacts from fishing, while extra caution will be required for unconnected features where there may be a higher level of endemism.

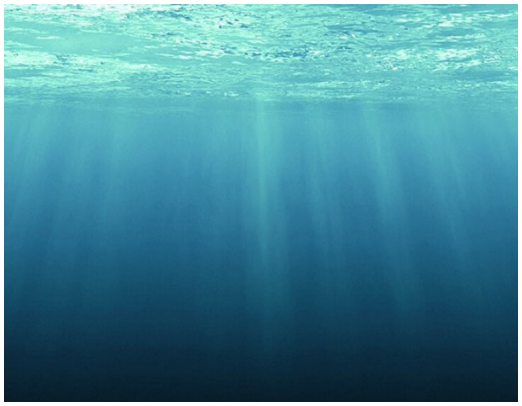
There are around 100,000 seamounts globally, only two thirds of which have been mapped. They are one of the most common marine ecosystems. Seamount research is a relatively new field. There is not a large database of previous studies, and it is difficult to conduct comparative analysis of species abundance. In addition, fieldwork on seamounts is hard: they are far offshore, deep, they are spatially separated, and it is very dark.

Traditionally, research on deep-water and seamount ecology has relied on information from fisheries, sample grabs or dropped/towed camera and light rigs. More recently, camera and drone technology has improved, increasing the ability to cover more ground, and new advances in environmental DNA (eDNA) sampling shows promise.

Many studies on seamount ecology cite a high likelihood of sampling biases:

- Endemism — the state of a species being found in a single defined geographic area. The claim that seamounts have a high degree of endemism is noted to be subject to sampling bias. It is common for seamounts to be the first, or only, location in a wider area to be scientifically sampled. Therefore, it is highly likely that new species will be found. It is also noted that the tops of seamounts have a greater sampling level than slopes or bases. Studies specifically examining claims of endemism have overturned previous findings and pointed to sampling bias as an explanation.
- Taxonomic bias — when organisms from a particular taxonomic group are researched disproportionately to others. Analysis tends to focus on the differences between the iconic macrofauna rather than the similarities between ecosystems.
- Density — relative organism density between seamounts and their surrounds can be a source of bias. Seamounts are generally more productive, which means that they are areas of greater density and growth potential. In areas of lower productivity (basal areas of the seamount and surrounds), the density of organisms can be too low that comparable sampling to determine presence/absence would need to cover a prohibitively large area.





Seamount benthic communities

In New Zealand, the fishery species that congregate above seamounts are orange roughy, oreos (smooth and black), cardinalfish and alfonsino. The habitat for these species is characterised as bentho-pelagic — they live in the water column but tend to stay near the bottom. When avoiding predation (or fishing), they dive toward the sea floor — they can only be caught by nets that are able to touch the bottom.

Benthic communities forming on seamounts are known to provide habitat and refuge for some deep-sea fish. It is not known if there are any links between the commercial species schooling above the seabed and the benthic communities formed by corals and bryozoans. It is known that the target fish species are not reliant on the seamount benthic ecosystem for food, nursery, refuge, or spawning.

- Juvenile orange roughy and oreo are not found on seamounts or caught anywhere in the commercial fishery. They are believed to either spend their early life in a mesopelagic phase or at low density in deep waters, or a combination of both.
- Orange roughy form dense spawning aggregations in winter, they can be associated with a seamount or on the flats with no discernible features nearby. They are known to travel large distances to spawn, but it is unknown what attracts them to these locations.
- Outside of the spawning season, adult fish can be found throughout their preferred depth ranges but tend to be at a higher density on seamounts and other underwater topological features (UTFs). It is reasonable to assume that their relative abundance is related to prey

availability, which is elevated in regions of higher primary productivity including seamounts.

The deep-water species fished on seamounts are opportunistic predators on a wide range of invertebrate and fish species – they will eat whatever prey they encounter. The diet of roughy is bentho-pelagic or mesopelagic prawns, fish and squid. There is some overlap with oreos which prey occasionally on similar species but mostly on salps. This may explain why oreos and orange roughy are sometimes found in mixed aggregations but often separate on adjacent UTFs. A slight difference in temperature preference has also been suggested as an explanation for this phenomenon.

No commercial species fished on New Zealand seamounts have a direct trophic relationship with species that would be associated with the seamount benthic communities.

Key myths:

- Seamount fisheries target deep-water species that are long lived, slow growing, with low fecundity.
    - This is not specific to seamounts and matters for all deep-water fisheries, to ensure that fish populations are not overexploited. In New Zealand, the QMS and stock assessment process accounts for these concerns.
- For fisheries management, first, stop fishing on seamounts.
    - This rule of thumb is appropriate in the absence of other management tools. In New Zealand, with a mature fishing industry that is not expanding, and with a high level of environmental research and fisheries management, we do not need such generalisations. We need nuanced and careful thinking on how to best protect the whole marine environment while ensuring long term sustainable commercial extraction.

- In fisheries management regions where catch and/or effort is unconstrained, or for exploratory fisheries, or where the fishery is expanding throughout the zone, it is sensible to focus on seamounts.
- Seamounts are statistically more likely than surrounding flats to have higher benthic abundance and species richness. They are also easier to find, describe and manage than comparable areas on the flats.

Conclusion & way forward

Sealord's proposal to extend conservation protections to 89% of seamounts in New Zealand's EEZ is designed to balance the importance of conservation and fishing.

The outcome of this policy is that while trawled seamounts will remain as they are now, any closed seamounts that have been impacted will regenerate over time and any untouched seamounts will be preserved into perpetuity, thus maintaining New Zealand's essential underwater habitats. The policy will also result in a significant increase to New Zealand's protected area.

This policy will also have a negligible effect on the operations of Sealord. While we source over 50% of our annual catch by bottom trawling, this self- directed limitation to 11% of seamounts will not materially impact our total annual catch.

Sealord believes that this policy can be introduced and policed in the following way:

- The fishing industry collectively agrees to close fishing in certain areas, particularly around seamounts. It is our expectation that this would be properly accounted for in subsequent legislation.
- The closed areas will be closely monitored by both industry and FNZ to ensure that there are no fishing breaches.
- The boundaries of the prohibited areas will be entered into chart plotters so that when a vessel approaches a boundary, alarms are triggered, and an automatic email is sent to managers.
- Every vessel will be monitored by FNZ in real time.

Bibliography:

- Malcolm R. Clark, Ashley A. Rowden, Thomas Schlacher, Alan Williams, Mireille Consalvey, Karen I. Stocks, Alex D. Rogers, Timothy D. O'Hara, Martin White, Timothy M. Shank, and Jason M. Hall-Spencer. 2010. The Ecology of Seamounts: Structure, Function, and Human Impacts. Annu. Rev. Mar. Sci. 2010. 2:253–78
- Clark MR, Schlacher TA, Rowden AA, Stocks KI, Consalvey M (2012) Science Priorities for Seamounts: Research Links to Conservation and Management. PLoS ONE 7(1): e29232. https://doi.org/10.1371/journal.pone.0029232
- Howell, K.L., Mowles, S.L. and Foggo, A. (2010), Mounting evidence: near-slope seamounts are faunally indistinct from an adjacent bank. Marine Ecology, 31: 52-62. https://doi.org/10.1111/j.1439-0485.2010.00368.x

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