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New Zealand Exploratory Toothfish Fishing in SPRFMO: Interim Report for 2025

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New Zealand exploratory toothfish fishing in SPRFMO: Interim report for 2025

J. M. (Jack) Fenaughty
Silvifish Resources Ltd, Wellington, New Zealand

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Abstract

This interim report summarises New Zealand's 2025 exploratory bottom longline fishing for toothfish in the SPRFMO Convention Area, undertaken under CMM 14i-2025. The report covers survey and fishing activities by *Janas* and *San Aspiring*; however, in 2025, only *San Aspiring* conducted fishing.

Her fishing took place between 12 October and 5 November 2025 and comprised 14 sets in two exploratory areas: NZSWRB1 and Research Block A. A total of 31 toothfish were caught, comprising 30 Patagonian toothfish (*Dissostichus eleginoides*) and one Antarctic toothfish (*Dissostichus mawsoni*). Catch rates were low in NZSWRB1 but higher in Research Block A, where fewer but generally larger Patagonian toothfish were taken. All retained toothfish were measured and sampled, and five toothfish were tagged and released. Additional biological material was collected from bycatch species, with the bycatch numerically dominated by blue antimora (*Antimora rostrata*) and basketwork eel (*Diastobranchus capensis*). Vulnerable marine ecosystem (VME) indicator taxa were recorded in small quantities; no VME encounter thresholds were reached, and no seabird or marine mammal interactions were observed. A major outcome of the trip was the collection of additional bathymetric information, a key objective of CMM 14i-2025, which improved knowledge of the location and suitability of potentially fishable features in both research areas.

The results suggest that further development of these southern SPRFMO research areas, including locating fishable ground and building information on toothfish distribution, catch rates, and bathymetry, is likely to be gradual, with outcomes strongly influenced by seabed structure, weather, currents, and proximity to management boundaries.

They also indicate that continued exploratory work will need to balance the scientific value of the information collected against the operational costs borne by the companies undertaking it. In practice, this is likely to be most viable when exploratory work is combined with routine CCAMLR fishing activity, allowing vessel time and other overheads to be spread across both programmes.

Contents

1. Introduction

1.1. In September 2024, New Zealand outlined its plan for an exploratory bottom longline fishery targeting toothfish (*Dissostichus* spp.) in the southern South Pacific Regional Fisheries Management Organisation (SPRFMO) Convention Area (SC12-DW01_rev2). The proposal was considered and approved at the 12th meeting of the SPRFMO Scientific Committee in Lima, Peru. It continued New Zealand's SPRFMO toothfish fishery efforts, which began in 2016. The project aimed to conduct exploratory fishing over three years (2025–2027) in two main areas south of the New Zealand Exclusive Economic Zone (EEZ), using up to three specialised vessels. The key objectives were to assess whether the fishery is viable, define the habitat/fishable area, and collect the biological/tagging data needed for sustainable management. The plan featured strict catch limits, comprehensive data collection, tagging programmes, and adherence to international conservation standards, with the goal of informing the sustainable management of toothfish stocks in data-poor regions of the Convention Area.

1.2. *Janas*

In 2025, *Janas* undertook exploratory research surveys in SPRFMO research boxes F, G, H and B (Figure 1), including seabed-feature assessment and bathymetric exploration to identify potentially fishable ground. The vessel surveyed candidate seabed features in boxes F, G and H between 6 and 9 November 2025, but no features suitable for fishing were identified. Following the CCAMLR season, further exploratory work was planned in Box B during the return transit to New Zealand. Deteriorating weather restricted operations to bathymetric exploration between 9 and 11 February 2026, and no fishable features were identified before conditions required a more direct return. As no fishing took place, this concludes the vessel's report for the season.

1.3. *San Aspiring*

This report summarises the *San Aspiring* SPRFMO exploratory research trip conducted in October–November 2025. It outlines voyage timing and objectives, fishing effort, catch composition, biological sampling, seabed feature observations, operational conditions, and considerations for future research in NZSWRB1 and SPRFMO Research Block A, the two New Zealand exploratory areas shown in Figure 1. Across both areas, the distribution of fishing effort and catch reflected the exploratory nature of the voyage, with outcomes shaped by the availability of seabed features, bathymetric uncertainty, environmental conditions, and operational constraints associated with fishing near management boundaries.

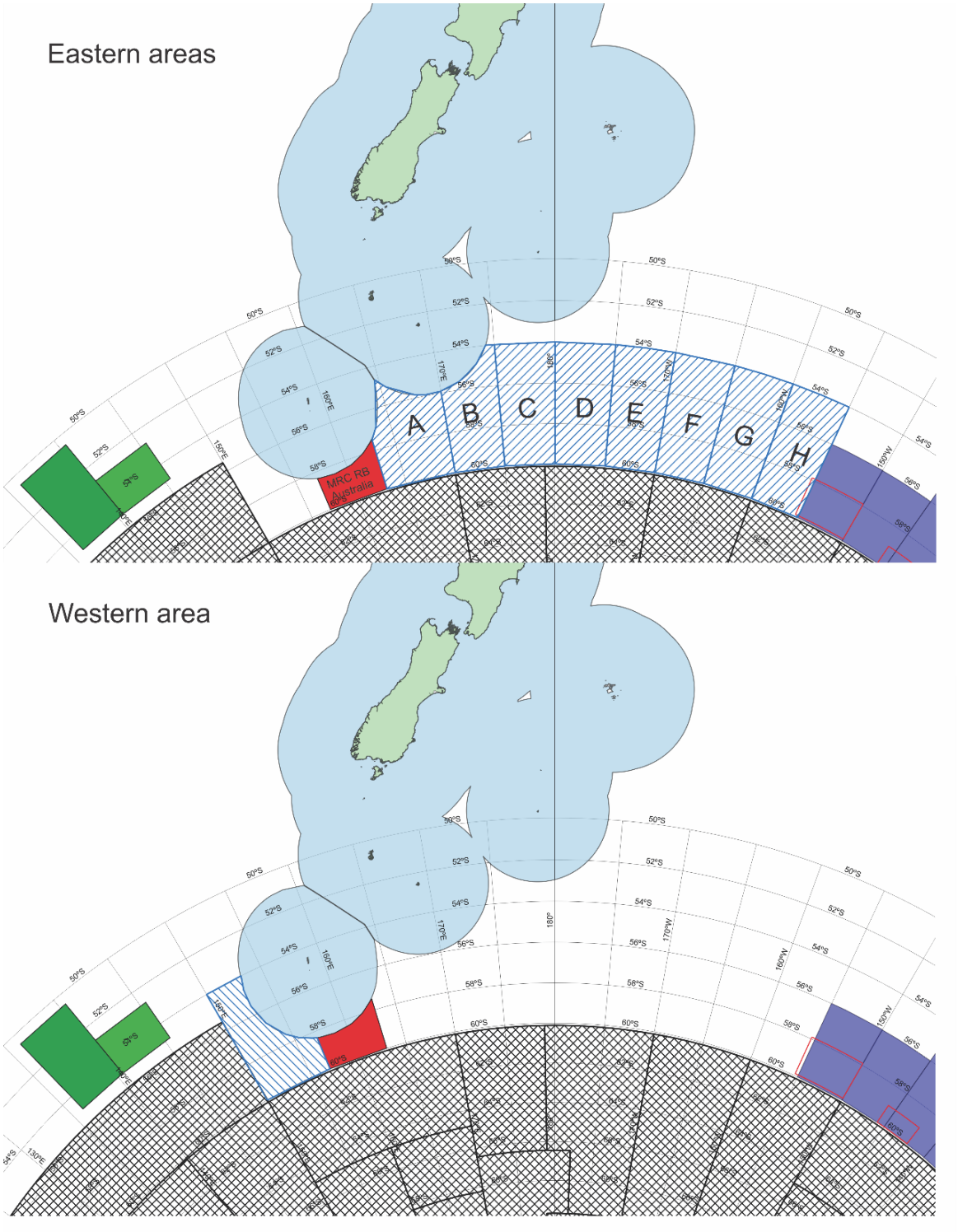

Figure 1. Agreed eastern and western exploratory toothfish research areas. Blue-hatched boxes show the two areas to be surveyed by New Zealand in 2025–2027; green boxes show the European Union exploratory toothfish area (CMM 14e-2024); the red box shows the Australian exploratory toothfish area (CMM 4f-2024); and purple boxes show part of New Zealand's previous exploratory toothfish area (CMM 14a-2019; CMM 14a-2022).

San Aspiring departed Timaru, New Zealand, on 12 October 2025 and returned on 5 November 2025. Fishing operations in SPRFMO waters were conducted between 19 and 31 October. The vessel carried 21 crew and one observer. The main objective of the voyage was to collect biological and operational data on toothfish in new research areas, particularly NZSWRB1, southwest of Macquarie Island, and SPRFMO Research Block A, including the Campbell Spur Ridge area. Survey effort was initially directed towards the most promising features due to a constrained voyage duration and the need to return in time to prepare for the Antarctic season.

A total of 14 demersal longline sets were deployed during the voyage, comprising nine in NZSWRB1 and five in Research Block A. Mean setting time was 28 minutes, and mean hauling time was 221 minutes. Average backbone length was 5,244 m, with approximately 3,612 hooks per set; about 85% of hooks were baited with New Zealand arrow squid *Nototodarus* spp., jumbo flying squid *Dosidicus gigas*, and English mackerel *Scomber australasicus*. Fishing locations were selected following an active survey of candidate seabed features, with effort concentrated on structures considered most likely to be fishable. In NZSWRB1, several mapped features aligned reasonably well with the available bathymetry, but one anticipated feature could not be located despite repeated searches over approximately 24 hours on two occasions. A southern bank near the boundary likewise showed no clear evidence of being present, as mapped. One ridge section was considered sufficiently extensive to accommodate two four-magazine lines, although only the shallower line yielded fish. Another hill on the 60-degree line rose to approximately 1,400 m but was considered too close to the boundary to be fished safely because of current, drift, and gear-handling constraints.

The catch was dominated by Patagonian toothfish. Reported catches comprised 12 Patagonian toothfish from NZSWRB1 and 18 from Block A, together with one Antarctic toothfish. Mean Patagonian toothfish weight was 10.9 kg in NZSWRB1 and 46.6 kg in SPRFMO A, indicating a marked difference in fish size between the two areas. On a shallower ridge line in NZSWRB1, eight fish were caught, whereas in the Campbell Spur Ridge area of Block A, the smallest four-magazine line was the most productive, yielding 638 kg green weight after what was considered the longest soak. Bycatch included Antarctic cod (VCO), South Deep cod (BEE), the cusk eel, *Spectrunculus* and other species. All target fish were processed to a dressed state and weighed electronically. All 30 Patagonian toothfish plus the single Antarctic toothfish were sampled for length, weight, sex, gonad stage, and tissue collection. Bycatch species were also examined, and samples, including muscle tissue, otoliths, fin clips, and eyeballs, were retained for Earth Sciences New Zealand (ESNZ, formerly NIWA), Auckland Museum, and Te Papa. Bycatch of vulnerable marine ecosystem (VME) indicator taxa was identified, weighed, and photographed, although recorded quantities were low relative to historical recoveries using this type of integrated-weight bottom longline gear. All lines were recovered and no gear was lost.

Fish losses were systematically recorded and primarily attributed to fish dislodging from hooks during hauling in poor sea conditions. Estimated losses of up to 74 kg of Patagonian toothfish were recorded in a single set, along with losses of some bycatch species. Observer coverage of fishing operations was high, with 73% of hauled hooks observed, aided by relatively small catches and efficient onboard processing.

2. Methods

As set out in CMM CMM 14i-2025, data collection during the Exploratory Fishery must be carried out in accordance with SC12-DW01_rev2, as well as satisfy any further data requested by the Scientific Committee for its annual evaluation and assessment.

SC12-DW01_rev2 contains a full description of the methods. The following provides a summary and outlines the specific methods for the 2025 SPRFMO activities.

2.1. Fishing gear

Fishing gear comprised standardised integrated-weight bottom longline gear consistent with the CCAMLR gear library.

The backbone contained 50 g/m of integrated lead core to expedite gear sinking rates. Other required mitigation measures for seabirds comprised tori lines during setting and a bird exclusion device during hauling, where conditions allowed. Offal discharge was prohibited during setting and hauling, and any discard discharge was controlled in accordance with SPRFMO seabird mitigation requirements (CMM 09-2026).

Each vessel was required to carry an observer, electronic monitoring of setting and hauling, video coverage of the hauling station, and automatic location communicators meeting SPRFMO's vessel monitoring systems (VMS) requirements. On *San Aspiring*, lines were configured in 1,200 m segments, with hooks spaced at 1.4 m intervals, for a total of 857 hooks per segment.

In this report, any single line (consisting of one or more segments) is referred to as a 'set'.

2.2. Sampling design

The Exploratory Fishery uses a managed cluster design. In combination with the precautionary catch limits, this approach is intended to spread fishing effort and minimise the risk of localised depletion. This approach is similar, but not identical, to that used for CCAMLR research fishing. Fishing was required to be undertaken as clustered sets, with no more than 20,700 hooks per cluster, a minimum spacing of 5 nautical miles between clusters, and no repeat fishing of a cluster within a calendar year. Sets were expected to be deployed at depths greater than 600 m.

Authorised vessels were required to deploy gear accurately within catch limits, with line length reduced as necessary to avoid catch overruns. Tagging equipment and a seawater tank for temporary holding of live fish were required to support the prescribed toothfish tagging programme.

The sampling design is described fully in SC12-DW01_rev2 and summarised in CMM 14i-2025. The requirements are listed below for reference:

- Hooks per cluster: no more than 20,700 hooks may be set in a cluster.
- Sets within a cluster: clusters of bottom longline sets are allowed, with no minimum separation required between sets within a cluster.
- Distance between clusters: clusters may be no closer than 5 nautical miles apart, measured from the mid-point of the nearest lines in each cluster, in any calendar year.
- Fishing frequency per cluster: a cluster may only be fished once in any calendar year by any of the authorised vessels.
- Clusters per research block: operators should aim to fish at least 3 clusters in each research block surveyed, subject to fishable ground, sea ice and operating conditions.
- Research blocks surveyed: a minimum of 3 research blocks should be surveyed.
- Minimum fishing depth: 600 m.
- Deeper sets: some sets may be made deeper than 2,200 m, depending on ice, operating conditions and snag risk.

2.3. Fishing information

Fisheries-related data were collected for each set in accordance with CMM 02-2026 (see Annex 3) and reported using the CCAMLR C2 form. Specifically, the following were collected:

- Gear configuration and hook size
- Bait type
- Date, time, location and depth of setting (start and end points)
- Date, time and location of hauling (start and end points)
- Length of autoline and number of hooks (set and hauled)
- Midpoint location and depth of each line segment (for recording benthic invertebrate catches – see Section 3.6)

2.4. Catch identification

Catch was recorded to species level wherever possible, using both FAO and CCAMLR species codes for reporting to SPRFMO and CCAMLR. Catch of on-target species, including sharks, skates, rays and other species of concern, was also identified as accurately as possible, with photographs or retained specimens used where needed to confirm identification.

For VME indicator taxa, see Section 3.6; for incidental captures of species of concern, see Sections 3.4 and 3.6.

2.5. Catch weight

The green weight of all catches, including target and bycatch species, was recorded.

For the target species, *San Aspiring* routine catch processing involved recording the product weight of each individual toothfish (headed and gutted) on an electronic, motion-compensated scale interfaced with INNOVA Food Processing Software. The green weight of the catch was calculated from the processed weight of each fish by applying the annual conversion factors issued by the New Zealand Ministry for Primary Industries. The green weight of all bycatch species during the *San Aspiring* SPRFMO trip was determined by the observer with assistance from the crew, as needed (see Section 3.4).

2.6. Biological sampling

Target species

Biological sampling of the target species, toothfish, was undertaken systematically during the trip to obtain representative information on species composition, size, sex, maturity, and distribution. Standard biological data were collected from sampled fish, including length, weight, sex, and gonad maturity stage, together with tissue, otolith, stomach, and other specimens as required for age, genetic, trophic, and reproductive analyses.

For this trip, standard biological data were collected as follows:

- Total length: mouth closed, caudal fin relaxed (not fanned out), to the nearest cm below
- Total weight, using a hanging salter scale for larger fish
- Sex, assessed macroscopically
- Maturity stage, assessed macroscopically (see Appendix 1 of SC9-DW04 for details)
- Gonad weight, using an electronic sea-compensated scale, to the nearest 10 g
- Stomach content, examined *in situ*

All 30 Patagonian toothfish plus the single Antarctic toothfish were sampled for length, weight, sex, gonad stage, and tissue collection. Bycatch species were also examined, and samples including muscle tissue, otoliths, fin clips, and eyeballs were retained for Earth Sciences New Zealand (ESNZ, formerly known as NIWA), Auckland Museum, and Te Papa. There were no tag-recoveries (hauled toothfish with tags) captured on this trip.

2.7. Bycatch

Standard biological data were collected from key bycatch species when present. For each set, up to ten specimens of each macrourid species were to be sampled, along with up to ten specimens of other common bycatch species (length, weight, sex, gonad stage, gonad weight, otoliths). Full biological data were also to be collected for any captured sharks and skates.

For the 2025 trip, various institutions requested that all skates, rays and sharks be retained for research purposes, and that one or two specimens of each bycatch species be collected whole for the Museum of New Zealand - Te Papa Tongarewa.

2.8. Tagging

As set out in CMM 14i-2025, the tagging requirements specify that vessels must tag toothfish at a minimum rate of three fish per greenweight tonne retained for Patagonian toothfish and one fish per greenweight tonne for Antarctic toothfish, consistent with CCAMLR practice. Once 30 fish of a species have been successfully tagged and released, the minimum size–overlap statistic for that species must be 60%, so the size range of tagged fish broadly matches the size composition of fish sampled biologically by the observer. The overlap is calculated using the current CCAMLR tag-overlap calculator, which must be carried on board. As catch limits are approached, tagging rates may be increased. Vessels must maintain a seawater tank so that live fish in good condition can be held, tagged, and where necessary, returned alive. Tagged fish released alive do not count against the annual catch limit.

A total of 5 toothfish were tagged and released during the trip. Tagging was conducted across 4 hauls (hauls 1, 6, 9, and 12), and all fish were successfully released.

Patagonian Toothfish (*Dissostichus eleginoides*, TOP) accounted for 4 tagged individuals, with total lengths ranging from 75 cm to 167 cm. These were released at various locations between approximately 55°S and 59°S. A single Antarctic Toothfish (*Dissostichus mawsoni*, TOA) measuring 145 cm was tagged during haul 6.

All specimens were double-tagged using white T-bar tags with the wording "Rtn CCAMLR", applied by crew members under observer supervision. Tag numbers ranged from A660301 to A660312, with two tags (A660307 and A660309) noted as broken during the tagging process in haul 9 and therefore not used.

All five tagging events were recorded as successful releases. No skates were tagged during this trip.

All toothfish were carefully checked for tags as they were hauled aboard, but no tags were found.

2.9. Benthic (VME) sampling

VME indicator sampling of benthic invertebrate bycatch was undertaken at the level of a magazine, consistent with CCAMLR Conservation Measure 22-07, which defines the standard line-segment unit used for recording VME indicator taxa during bottom fishing. Benthic material recovered during hauling was sorted by the observer, identified to the lowest practicable taxonomic level, and classified using the SPRFMO *Classification Guide for Potentially Vulnerable Invertebrate Taxa in the SPRFMO Area* and the CCAMLR *VME Taxa Classification Guide 2023*. This provided a consistent basis for documenting the occurrence and quantity of benthic invertebrate bycatch and VME indicator taxa encountered during fishing operations in 2025.

For reporting of both VME material and catches, records were compiled using the CCAMLR C2 form, and FAO/CCAMLR codes were used where applicable.

Benthic material was collected systematically by line segment, identified, weighed, and photographed. No VME encounter thresholds or trigger points were reached during the trip.

2.10. Observations

The observer was required to undertake seabird and marine mammal abundance counts, where practicable, during the setting of each line. The observer was also expected to record opportunistic observations, including photographic records and identification of marine mammals in collaboration with the crew, and to observe a minimum target of 10% of hooks hauled for captures or interactions involving marine mammals, seabirds, and turtles.

Seabird observations were conducted daily during both setting and hauling operations. Observed seabird presence was consistently low, with species including Campbell albatross, Cape petrel, Antarctic fulmar, black-browed albatross, and giant petrel recorded depending on location. Birds were observed circling the vessel on 13 fishing days, but were not seen feeding on bait, offal, or catch. No seabird captures or gear interactions occurred, and no trigger thresholds were approached. A small number of Adélie penguins (*Pygoscelis adeliae*) were observed during transit. No marine mammals or turtles were observed during the voyage.

2.11. Video monitoring of hauling

The Electronic Monitoring (EM) requirements were met through a multi-camera electronic monitoring system that recorded both setting and hauling operations, together with a dedicated video monitoring and recording system positioned over the hauling station to ensure that all hauled lines and hooks were observed or recorded.

2.12. Bathymetry

The voyage contributed to the objective of improving understanding of the bathymetry of fishable areas shallower than approximately 2,500 m. Depth information was recorded as part of routine fishing data collection, alongside position and timing for each set and haul. These data, in combination with vessel soundings used to locate and assess seabed features prior to setting, provided additional information on the distribution and structure of seamounts and ridge systems within the explored areas.

2.13. Depth-temperature profiles

In addition to the sampling requirements set out in CMM 14i-2025, depth–temperature profiles were obtained during the 2025 trip using a “Mangōpare” sensor, as part of the Moana Project. The Moana Project describes the Mangōpare sensor as “a robust and simple device that attaches to fishing gear and gets a ‘free ride’ for data collection”. The logger has a maximum depth tolerance of 1,000 m and was attached to the downline whenever practical, with a target depth of 800 m.

3. Results

3.1 Summary of fishing

The Sanford vessel *San Aspiring* undertook a 25-day exploratory bottom longline fishing voyage in SPRFMO waters between 12 October and 5 November 2025. The vessel departed Timaru on 12 October, exited the New Zealand Exclusive Economic Zone on 15 October, and arrived in NZSWRB1 on 18 October. Fishing operations commenced on 19 October and continued in NZSWRB1 until 26 October, comprising nine sets targeting *Dissostichus mawsoni* and *Dissostichus eleginoides*. NZSWRB1 is one of the two New Zealand exploratory areas identified for the 2025–2027 period (Figure 1). Fishing effort in this area focused on seamount and ridge features identified from pre-existing bathymetric data, with the vessel undertaking both survey and fishing activities to locate suitable ground. Several anticipated features were either absent or less well-defined than expected, and only limited sections of the seabed were suitable for setting gear. As a result, catches in NZSWRB1 were low, with a total of 13 toothfish recorded (12 *D. eleginoides* and one *D. mawsoni*). Voyage timing is summarised in Table 1 and set-level fishing information is summarised in Table 2.

Following completion of fishing in NZSWRB1, *San Aspiring* transited for approximately one and a half days to SPRFMO Area A, located along the Campbell Spur ridge system near the boundary of the New Zealand EEZ. Fishing in Area A took place between 29 and 31 October, during which five sets were completed and 18 *D. eleginoides* were caught. Area A is the second New Zealand exploratory area shown in Figure 1. Fishing activity in this area focused on ridge and seamount features close to the boundary, where operational conditions imposed additional constraints. Strong currents, weather conditions, and the risk of gear drift near the management boundary limited the ability to deploy multiple or longer lines, thereby restricting efforts to expand fishing coverage. The most productive fishing occurred on shorter lines set during favourable weather windows, highlighting the sensitivity of fishing success to environmental conditions in these marginal habitats. Catch retained by species is summarised in Table 3.

Table 1. Timeline of *San Aspiring* movements during the October/November 2025 SPRFMO Exploratory Fishery. All dates and times are in Coordinated Universal Time (UTC).

Movement Description	Date/Time (UTC)
Departure from Timaru	12/10/2025, 1605
Exit from NZ EEZ	15/10/2025, 2030
Arrival at Research Block	18/10/2025
Start of fishing	19/10/2025, 0027
End of fishing	31/10/2025, 2045
Docking at Timaru	05/11/2025, 0000

Table 2. Longline set summary for the *San Aspiring* 2025 SPRFMO exploratory fishing.

Research Area	Set	Start	End	Hooks	Hooks lost with line	Min Depth (m)	Max Depth (m)	Species and number retained	Weight (kg)
NZ Western Block	1	19-Oct-25	20-Oct-25	3,428	0	1,861	1,895	TOP/1	9.9
NZ Western Block	6	23-Oct-25	24-Oct-25	3,428	0	1,899	1,917	TOA/0	Tagged
NZ Western Block	7	23-Oct-25	24-Oct-25	3,428	0	1,819	1,929	TOP/3	33.6
NZ Western Block	9	25-Oct-25	26-Oct-25	3,428	0	1,623	1,714	TOA/1	51.0
NZ Western Block	9	25-Oct-25	26-Oct-25	3,428	0	1,623	1,714	TOP/8	87.5
Area A	11	29-Oct-25	30-Oct-25	4,285	0	1,580	1,655	TOP/5	185.0
Area A	12	29-Oct-25	31-Oct-25	3,428	0	1,615	1,636	TOP/11	540.0
Area A	13	30-Oct-25	31-Oct-25	4,285	0	1,589	1,594	TOP/1	33.0
Area A	14	30-Oct-25	31-Oct-25	4,285	0	1,550	1,707	TOP/1	77.0

Table 3. Catch summary for the *San Aspiring* 2025 SPRFMO exploratory fishing. Weights are given in kilograms and counts as individual fish. Toothfish counts exclude tagged and released fish and fish lost during hauling. The table reports catch retained aboard.

Common name	FAO Species code	Scientific name	Weight retained (kg)	Count retained (no tags)	Count retained (with tags)
Patagonian Toothfish	TOP	*Dissostichus eleginoides*	966.02	30	0
Bigeye grenadier	MCH	*Macrourus caml*	53.02	37	0
Antarctic Toothfish	TOA	*Dissostichus mawsoni*	51.00	1	0
Skates and rays	SRX	*Rajiformes*	34.86	3	0
Rat tails, Grenadiers	GRV	*Macrouridae*	28.96	34	0
Lucifer Shark	ETM	*Etmopterus lucifer*	7.34	31	0
Icefish	ICX	*Channichthyidae*	0.28	1	0
Crab spp.	KCX	*Lithodidae*	0.10	0	0
Blue Antimora	ANT	*Antimora rostrata*	0.00	0	0

3.2 Biological sampling

A total of 191 specimens from 8 species were sampled during the observation programme aboard the *San Aspiring*, commencing on 13 October 2025. Sampling was conducted across 14 hauls in SPRFMO waters, with biological measurements including length, weight, sex,

maturity stage, and gonad weight recorded where applicable. A summary of biological sampling by species is provided in Table 4.

Patagonian toothfish (*Dissostichus eleginoides*, TOP) accounted for 30 sampled specimens. These ranged considerably in size, with an average total length of 129.3 cm and a mean weight of 32.17 kg. The sex ratio was skewed towards females (22 females, 8 males). Maturity stages were diverse, with 10 immature individuals, 3 resting/developing, 2 gravid/ripe, and notably 15 spent individuals, indicating post-spawning condition. The average gonad weight was 478.3 g, reflecting the presence of mature individuals.

Blue antimora or violet cod (*Antimora rostrata*, ANT) was the most frequently sampled species, comprising 99 specimens. These were smaller fish, averaging 53.5 cm in length and 1.14 kg in weight. The population was predominantly female (88 individuals), with 10 males and one of unknown sex. Most were immature, with a smaller resting/developing component. The gonad measurements were consistent with the predominantly immature population structure observed.

Grenadier species (*Macrourus* spp., GRV) accounted for 16 specimens, all of which were retained whole for ESNZ research purposes. These fish averaged 55.3 cm in length and 0.83 kg in weight. Sex was recorded as unknown for all individuals, and no maturity staging was conducted, consistent with their retention as whole specimens for taxonomic and biological research.

Cusk-eels (*Ophidiidae***,** OPH) comprised 11 specimens averaging 101.3 cm and 7.25 kg. The sex ratio favoured males (6 male, 2 females, 3 unknown), with most individuals (6) classified as immature. Several specimens were retained whole for museum collections, including Auckland Museum, due to taxonomic uncertainty requiring specialist identification.

Basketwork eel (*Diastobranchus capensis*, SDC) was represented by 30 specimens, with a mean length of 86.3 cm and a mean weight of 0.76 kg. The sample comprised 20 females and 10 males. Maturity observations indicated 11 immature and 15 resting/developing individuals, with four specimens lacking maturity data.

Skates (*Amblyraja* spp., SRX) were represented by only 2 specimens, both male, with an average length of 93.5 cm and a mean weight of 5.05 kg. One was immature and one maturing/resting. Additional morphometric data (wingspan, pelvic length) were recorded for these elasmobranchs in accordance with standard protocols.

Antarctic toothfish (*Dissostichus mawsoni*, TOA**)** was represented by a single large female specimen measuring 152 cm and weighing 51 kg, in a developing condition with a substantial gonad weight of 2,100 g.

Moray cod (*Muraenolepis* spp., **MCH)**: there were 2 specimens, both of unknown sex, averaging 62.5 cm and 1.07 kg. Both were retained whole for ESNZ.

Table 4. Summary of biological sampling by species during the 2025 *San Aspiring* SPRFMO exploratory fishing trip.

Species Code	Common Name	Scientific Name	Count of Length	Average Length (cm)	Count of Weight	Total Weight (kg)	Number of Males	Number of Females	Number Unknown	Count of Maturity	Count of Gonad Weights
ANT	Blue antimora	*Antimora rostrata*	99	53.5	99	113.2	10	88	1	98	89
TOP	Patagonian toothfish	*Dissostichus eleginoides*	30	129.3	30	965.1	8	22	0	30	30
SDC	Basketwork eel	*Diastobranchus capensis*	30	86.3	30	22.8	10	20	0	26	0
GRV	Grenadier	*Macrourus spp.*	16	55.3	16	13.2	0	0	16	0	0
OPH	Cusk-eel	*Spectrunculus spp.*	11	101.3	11	79.7	6	2	3	8	6
MCH	Moray cod	*Muraenolepis spp.*	2	62.5	2	2.1	0	0	2	0	0
SRX	Skate	*Amblyraja spp.*	2	93.5	2	10.1	2	0	0	2	0
TOA	Antarctic toothfish	*Dissostichus mawsoni*	1	152.0	1	51.0	0	1	0	1	1

In addition to the standard biological sampling programme, samples for shoreside analysis were collected opportunistically from target and selected bycatch species where they had value for identification, taxonomic work, or later biological analysis. For toothfish, this included otoliths, fin clips and tissue samples, together with associated biological measurements. Samples were labelled, appropriately stored (frozen or preserved as required), and retained for delivery ashore to ESNZ or other designated research recipients.

Additional material was retained where it contributed to species identification or reference collections. This included whole specimens of non-target species, parasite samples, and other opportunistic material encountered during processing. Specimens were forwarded to ESNZ, Te Papa or Auckland Museum as appropriate. Vulnerable marine ecosystem material was collected separately by line segment, identified and photographed, with representative material retained where required.

A summary of additional biological and ancillary samples collected during the voyage is provided in Table 9.

3.3 Sex and maturity distribution of Patagonian toothfish

Biological sampling of Patagonian toothfish comprised 30 individuals, all of which were assessed for sex, maturity stage and gonad weight. The sample was dominated by females, accounting for 22 fish (73%), with males comprising the remaining 8 fish (27%). Gonad weights ranged from 10 to 1,260 g, with an overall mean of 478.3 g. Among females, eight were immature, four were resting/developing and ten were spent. Immature females were smaller, with a mean length of 75.6 cm, whereas spent females were markedly larger, averaging 167.5 cm. The four resting/developing females were intermediate in size, with a mean length of 138.0 cm. Given that Patagonian toothfish below about 100 cm total length are generally regarded as juveniles and are not considered reproductively active, the

immature females in this sample were consistent with a juvenile component of the population.

Male Patagonian toothfish showed a similar contrast among maturity stages, although sample sizes were smaller. Five males were classified as spent, two as gravid/ripe, and one as resting/developing. Spent males averaged 142.4 cm in length and had a mean gonad weight of 280.0 g, while gravid/ripe males were smaller on average at 117.5 cm but had relatively heavier gonads (mean 440.0 g), consistent with advanced reproductive condition. The single resting/developing male measured 100.0 cm and had a gonad weight of 40.0 g, placing it close to the approximate size threshold between juvenile and reproductively active fish. Overall, the predominance of spent females and spent males, together with the absence of gravid/ripe females, indicates that sampling was undertaken during or shortly after the spawning period. The strong size-related increase in female gonad weight further supports a clear relationship between body size and reproductive development in this sample.

Given the small sample size of Patagonian toothfish available from this voyage, no further analyses were undertaken for this interim report. The results presented here are therefore limited to a descriptive summary of size, sex, maturity stage and gonad weight, and should be interpreted as preliminary pending additional sampling in future trips. The sex and maturity composition is summarised in Table 5.

Table 5. Sex and maturity composition of Patagonian toothfish sampled during the 2025 *San Aspiring* SPRFMO exploratory fishing trip.

Sex	Maturity Stage	Count	Min Length (cm)	Max Length (cm)	Avg Length (cm)
Female	Immature	8	63	100	75.6
Female	Resting/Developing	4	123	159	138.0
Female	Spent	10	157	184	167.5
Male	Gravid/Ripe	2	99	136	117.5
Male	Resting/Developing	1	100	100	100.0
Male	Spent	5	123	158	142.4

3.4 Bycatch summary

Bycatch recorded during the voyage comprised 844 individuals from 13 non-target taxa (Table 6). Blue antimora (*Antimora rostrata*, ANT) dominated the bycatch, accounting for 493 individuals (58% of all bycatch), followed by basketwork eel (*Diastobranchus capensis*, SDC) with 193 individuals (23%) and giant hydrolagus (HYD) with 100 individuals (12%). All remaining taxa occurred in relatively low numbers, including grenadier (GRV, 32), moray cod (MCH, 16), cusk-eel (OPH, 13), eelpout (ETM, 6), lanternfish (LEV, 4), king crab (KCX, 3), sea cucumber (CUX, 2), skate (SRX, 2), Antarctic whitefish (CHW, 1) and icefish (ICX, 1).

Most bycatch was discarded dead, with 784 individuals (93%) recorded in this category. A further 60 individuals (7%) were retained, mainly grenadier, moray cod and giant hydrolagus, together with small numbers of cusk-eel, eelpout, sea cucumber, icefish and

skate. Nineteen individuals (2%) were recorded as lost at the surface during hauling, principally blue antimora, basketwork eel and giant hydrolagus. Only three bycatch individuals were released alive, all king crabs.

In summary, bycatch during the voyage was numerically dominated by a small number of taxa, particularly blue antimora and basketwork eel, with live release limited to king crabs.

Table 6. Summary of non-target species catch retained, discarded, released alive or lost during the 2025 *San Aspiring* SPRFMO exploratory fishing trip.

Common Name	FAO Species Code	Scientific Name	Weight Retained Without Tags	Number Discarded Dead	Number Released Alive	Number Lost at Surface
Blue antimora	ANT	*Antimora rostrata*	0	485	0	8
Basketwork eel	SDC	*Diastobranchus capensis*	0	188	0	5
Giant hydrolagus	CHM (HYD)	*Hydrolagus spp.*	2	94	0	4
Cusk-eel	OPH	*Spectrunculus spp.*	3	8	0	2
Lanternfish	LEV	*Myctophidae spp.*	0	4	0	0
Moray Cod	MCH	*Muraenolepis spp.*	13	3	0	0
Icefish	CHW	*Channichthyidae spp.*	1	1	0	0
Eelpout	ETM	*Zoarcidae spp.*	5	1	0	0
Grenadier	GRV	*Macrourus spp.*	32	0	0	0
Sea Cucumber	CUX	*Holothuroidea spp.*	2	0	0	0
King crab	KCX	*Lithodes spp.*	0	0	3	0
Skate	SRX	*Amblyraja spp.*	2	0	0	0

3.5 Tagging

A total of five toothfish were tagged and released during the voyage, all of which were recorded as successful releases, comprising four Patagonian toothfish (TOP) and one Antarctic toothfish (TOA). The tagging requirements specify a minimum of three Patagonian toothfish and one Antarctic toothfish tagged and released per greenweight tonne retained; on this trip a tagging rate of 4.1 fish per tonne was achieved for Patagonian toothfish, and one Antarctic toothfish was retained while another was tagged and released. Tagged fish ranged in total length from 75 to 167 cm. Tagging was undertaken during four hauls (1, 6, 9 and 12) across locations spanning approximately 55°S to 59°S and 151° to 165°E. Each fish was double-tagged using white T-bar tags marked “Rtn CCAMLR”. No toothfish were captured with existing tags, and no tag overlap statistic was calculated because of the low number of toothfish caught. In CCAMLR fisheries, the tag overlap statistic does not apply where the vessel has achieved the required tagging rate and fewer than 30 fish have been tagged, consistent with CM 41-01.

3.6 Benthic invertebrates, including VME indicator taxa

VME indicator taxa were recorded on all hauls during the voyage by line segment midpoint. For CCAMLR VME reporting, a line segment is defined as 1,000 hooks or 1,200 m of line, whichever is shorter, and benthic invertebrate records are assigned to the midpoint of each segment. No VME material was recorded in 7 of the 14 hauls (50%). Haul 12 had the greatest diversity, with four different taxa recorded, and also the highest total VME weight at 0.26 kg. The most frequently recorded taxon was DWR (*Dacrydium*), which occurred in four hauls. VME indicator taxa recorded by set are summarised in Table 7.

Table 7. VME indicator taxa recorded by set during the 2025 *San Aspiring* SPRFMO exploratory fishing trip, with total weight (kg) by taxon.

Set Number	VME Species Code	Scientific Name	Total Weight (kg)
1	BZN	*Bryozoa* (Moss animals)	0.01
1	ATX	*Actiniaria* (Sea anemones)	0.01
2	NTW	*Pennatulacea* (Sea pens)	0.01
4	ATX	*Actiniaria* (Sea anemones)	0.02
7	DWR	*Dacrydium* (Bivalve molluscs)	0.01
10	DWR	*Dacrydium* (Bivalve molluscs)	0.01
10	HXY	*Hexactinellida* (Glass sponges)	0.04
11	DWR	*Dacrydium* (Bivalve molluscs)	0.02
11	HQZ	*Hydrozoa* (Hydroids)	0.01
11	DMO	*Demospongiae* (Demosponges)	0.01
12	HXY	*Hexactinellida* (Glass sponges)	0.16
12	DWR	*Dacrydium* (Bivalve molluscs)	0.02
12	DMO	*Demospongiae* (Demosponges)	0.07
12	CSS	*Crinoidea* (Sea lilies)	0.01
TOTAL			**0.41**

3.7 Observations

Observer coverage during the voyage was high. Observations were made on all 14 sets and hauls, with direct monitoring of 73% of hauled hooks. This level of coverage was assisted by the relatively small catches, which allowed the observer to prioritise hauling operations and associated biological sampling while still undertaking setting observations where practicable.

3.8 Seabirds and Marine Mammals

Observed seabird abundance around the vessel was generally low throughout the voyage. Observations were made daily during fishing operations, primarily at the stern during setting and from above the hauling station during hauls, weather permitting. In NZSWRB1, the main species recorded were Campbell albatross, Cape petrel and Antarctic fulmar, while in Block A, black-browed albatross, Cape petrel and giant petrel were more commonly seen. Birds were observed circling the vessel on 13 fishing days but were not seen feeding on bait, offal or catch. A small number of Adélie penguins (*Pygoscelis adeliae*) were also observed during transit to the fishing grounds. No seabirds were caught or entangled in fishing gear, and no trigger points for mitigation action were reached. Mitigation measures, including a tori line, bird-exclusion curtain, bird cannon, and water deterrent, were deployed as required, with no operational issues noted.

No marine mammals were observed during the voyage, and there were no incidents of capture, entanglement or other interactions with fishing gear.

3.9 Bathymetry

Bathymetric data were collected during the trip to identify, verify, and assess underwater features within the SPRFMO research areas, particularly in NZSWRB1 and Research Block A, the two New Zealand exploratory areas shown in Figure 1. This is a key scientific objective of the exploratory fishery under CMM 14i-2025, which includes mapping the bathymetry of fishable areas shallower than about 2,500 m. Existing bathymetric information was used to identify likely features before the trip, and these were then checked by vessel sounding. The available information proved to be of mixed reliability. Some features matched the mapped information reasonably well, while others did not. One feature selected in advance as a likely target could not be located despite repeated searching over about 24 hours on two separate occasions, and another bank near the boundary also appeared not to exist as mapped.

The trip added to the information available on the location and form of potentially fishable ground and improved the bathymetric description of the area. Bathymetric information also affected fishing operations during the trip. Underwater features determined where gear could be set and how much line could be deployed. Sounding was used to identify ridges, banks, and pinnacles, assess their depth profiles, and determine whether they could be fished safely and effectively. In one case, a feature near the 60-degree line rose to about 1,400 m at its centre but dropped away steeply to the north, making it a high-risk fishing location because of current, drift and proximity to the management boundary. Overall, the bathymetric work helped clarify the position and shape of features in the area and supported both research planning and fishing operations.

3.10 Depth–temperature profiles

Seven depth–temperature casts were obtained from the Moana temperature sensor aboard the *San Aspiring* between 22 September and 24 October 2025, yielding 3,861 observations

over a latitudinal range of 47.9°S to 59.4°S and a longitudinal range of 152.0°E to 179.0°E. Temperatures ranged from -1.38°C to 9.20°C. Warmer temperatures were recorded at the more northerly stations, whereas the more southerly stations were consistently colder, indicating an increase in Antarctic influence with latitude. Maximum deployment depths ranged from 250 m to 710 m, with deeper casts generally obtained at the southern stations. Although the casts did not reach the seabed at all fishing locations, they describe upper and intermediate water-column conditions during the voyage and show clear spatial variation across the surveyed area. These observations complement the environmental information collected during the trip and provide context for the fishing and bathymetric work conducted in both research areas. A summary of the depth–temperature profiles is provided in Table 8.

Table 8. Summary of depth–temperature profiles collected during the 2025 *San Aspiring* SPRFMO exploratory fishing trip.

Deployment	Download Date	Latitude (°S)	Longitude (°E)	Observations	Min Temp (°C)	Max Temp (°C)	Temp Range (°C)	Mean Temp (°C)	Min Depth (m)	Max Depth (m)	Depth Range (m)
128	22/09/2025 10:10:55	48	179	365	6.78	9.20	2.42	8.12	0.9	364.9	364.0
129	23/09/2025 20:59:25	48	179	472	7.34	8.84	1.50	8.06	0.8	254.9	254.1
130	25/09/2025 01:00:29	48	179	558	7.46	9.04	1.58	8.01	1.3	252.7	251.4
131	25/09/2025 14:29:51	48	179	410	7.50	8.88	1.38	8.15	1.1	249.9	248.8
132	02/10/2025 11:57:28	49	172	575	7.45	8.25	0.80	7.88	-0.2	465.0	465.2
133	20/10/2025 06:10:50	59	152	819	-1.22	2.06	3.28	1.42	-0.7	505.4	506.1
134	24/10/2025 08:22:38	59	152	662	-1.38	1.92	3.30	1.01	0.9	709.6	708.7
OVERALL				**3861**	**-1.38**	**9.20**	**10.58**	**6.09**	**-0.7**	**709.6**	**710.3**

3.11 Biological sample collection for shoreside collections and analysis

In addition to the standard biological sampling programme, additional samples for shoreside analysis were collected opportunistically from both target and selected bycatch species where material was considered scientifically useful. Samples included biological material from toothfish (e.g. otoliths, fin clips and tissue samples) and whole or partial specimens of non-target species for research or identification purposes.

Samples were labelled, appropriately stored (frozen or preserved as required), and retained for delivery ashore to ESNZ or other designated research recipients. Vulnerable marine ecosystem material was collected separately by line segment, identified and photographed, and representative material was retained where required. The types of material collected and their intended use are summarised in Table 9.

Table 9. Summary of additional biological and ancillary samples collected for shoreside analysis during the 2025 *San Aspiring* SPRFMO exploratory fishing trip.

Date of collection	Set	Species or sample	Purpose	Destination
Trip total	Every set except set 2	Rat tails (*Macrouridae*)	Research	ESNZ
20/10/25	1	Sea cucumbers; Bryozoans; Sea anemones	Research	Auckland Museum (sea cucumbers); ESNZ (bryozoans, anemones)
20/10/25	2	Sea pens	Research	ESNZ
22–24/10/25	3–6	*Spectrunculus* (cusk-eel); Icefish	ID / Research	Te Papa, Auckland Museum
24/10/25	7	Bivalve molluscs (*Dacrydium*); Unidentified material	Research / ID	ESNZ
26/10/25	9	Lice; Antarctic toothfish (biological samples)	Research	Auckland Museum (lice); ESNZ
30/10/25	10	Bivalve molluscs (*Dacrydium*); Glass sponges; Hydrolagus (chimaeras); Skates; Lantern sharks	Research / ID & Research	ESNZ
30/10/25	11	Skates; Bivalve molluscs (*Dacrydium*); Hydroids; Demosponges	ID & Research / Research	ESNZ
31/10/25	12–14	Glass sponges; Crinoids (sea lilies); Lantern sharks	Research	ESNZ
Trip total	1, 7, 9, 11, 12, 13, 14	Patagonian toothfish (biological samples)	Research	ESNZ

4. Discussion

The 2025 trip added to the limited information available on fishable ground, catches, toothfish biology, and the operational constraints of working in these exploratory areas. Catches were modest, especially in NZSWRB1, but the trip still achieved its exploratory purpose by adding fishery, biological and environmental information from areas where very little is yet known. The results also show that progress in these areas depends on more than whether toothfish are present. It also depends on seabed structure, weather, current, and the operational constraints of working close to management boundaries. For the companies involved, that has a real cost in vessel time, fuel, staff time, gear and lost fishing opportunity. In practice, that cost must be balanced either by some return from the catch

taken during the trip or by a realistic prospect that the work will open up future fishing opportunities.

One of the main outcomes of the trip was the additional bathymetric information obtained for both NZSWRB1 and Research Block A, the two New Zealand exploratory areas shown in Figure 1. That is directly relevant to the objective of CMM 14i-2025 to map fishable areas shallower than about 2,500 m. Existing GEBCO and other information was of mixed value. Some features were more or less where expected and had the general form suggested by the available data, but others were absent, poorly defined, or not suitable for fishing when checked by vessel sounding. The trip therefore helped identify areas where further effort may be justified, and areas where additional fishing effort is less likely to be productive.

Catch results were clearly different between the two areas fished. NZSWRB1 produced very low catches despite repeated searching and fishing, while the smaller amount of fishing in Research Block A produced larger Patagonian toothfish and better catches on some short lines. Those differences may reflect local bathymetry, habitat suitability, fish distribution, and operating conditions, but they are based on a single trip and should be treated with caution. At this stage, they are better seen as an early indication of relative fishery potential than as a basis for strong comparison between areas.

The biological sampling was useful despite the small number of toothfish caught. All retained toothfish were measured and sampled, and material from both target and non-target species adds to the information now available on SPRFMO deepwater fauna. The Patagonian toothfish sample included both small fish and larger mature fish, with many of the larger fish in spent condition. That suggests sampling took place during or soon after the spawning period for at least part of the fish encountered. Even so, the sample size is still too small to say much more about stock structure, reproductive timing, or population composition. Those questions will need comparable data collected over several years and from a wider range of areas.

Additional opportunistic sampling undertaken outside the standard biological programme also contributed material for taxonomic, ecological and reference collections.

Bycatch and benthic interactions were limited and did not indicate any immediate concerns from this trip. Bycatch of non-target species was dominated by a small number of taxa, particularly blue antimora and basketwork eel. Bycatch of VME indicator taxa occurred only in small quantities, and no encounter thresholds were reached. Seabird observations were also consistent with low interaction risk, with no captures or gear interactions recorded.

For companies, the practical question is whether continued exploratory work can be justified alongside normal fishing operations. On its own, this level of exploratory activity is expensive in vessel time, mobilisation, staffing and lost fishing opportunity, particularly when catches are low and progress is slow. In practice, the most realistic approach is to combine SPRFMO exploratory work with routine CCAMLR fishing, so that operational overheads can be spread across both programmes. If the work is to continue, the main priorities should be to keep checking potentially fishable features, improve the bathymetric

picture of candidate grounds, and build the longer time series needed to support future evaluation and management advice.

5. Recommendations from this paper

It is recommended that the Scientific Committee:

- **Note** the low catch rates in NZSWRB1 and the higher catches of larger Patagonian toothfish in Research Block A during New Zealand's 2025 exploratory toothfish fishing.
- **Note** low bycatch of non-target fish, VME indicator taxa and other non-fish species and no seabird or marine mammal interactions were recorded.
- **Acknowledge** that continued industry participation depends on balancing the scientific value of the work with its substantial operational costs, and that combining exploratory activity with routine CCAMLR fishing offers the most practical basis for further research.
- **Recommend** that the exploratory work continues in 2026–2027, including bathymetric mapping, toothfish tagging and biological sampling, depth–temperature observations, and monitoring of non-target catch, vulnerable marine ecosystem indicator taxa, seabirds and marine mammals.

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