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Report on the first year's fishing under New Zealand's exploratory fishery for toothfish within the SPRFMO Convention Area

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1. Purpose of paper

This paper is an update on exploratory fishing for toothfish by the New Zealand vessel *San Aspiring* pursuant to CMM 4.14, approved by the SPRFMO Commission in January 2016. This update is provided for the consideration of the Scientific Committee meeting in October 2016 such that it can advise the Commission meeting in early 2017 on progress with the exploratory fishery.

2. Introduction

New Zealand submitted a proposal to the SPRFMO Scientific Committee's 3rd meeting in 2015, SC3, to carry out a 2-year exploratory research fishing for toothfish (Patagonian toothfish, *Dissostichus eleginoides*, and Antarctic toothfish, *Dissostichus mawsoni*) using the method of bottom longline outside New Zealand's bottom longline footprint and in excess of toothfish catch for reference years (Cryer & Fenaughty 2015 SC-03-DW-01). The proposal was for an incremental research fishing operation to conform with Article 22 of the Convention (paragraphs 16 to 18 of CMM 2.03) and SPRFMO's Bottom Fishery Impact Assessment Standard (BFIAS). The Scientific Committee assessed New Zealand's proposal and:

- **confirmed** that the proposal was acceptable under Article 22 (CMM 2.03) and the BFIAS;
- **recognised** the cautious, exploratory nature of the proposal and the scientific benefits of the proposed data collection, including the understanding of the distribution, movement and stock structure of toothfishes;
- **emphasised** the importance of implementing stringent seabird mitigation measures throughout the surveys, including integrated weighted lines, bird scaring lines when setting gear and strict offal management;
- **suggested** that, in addition to being reviewed by New Zealand's domestic working group and the SPFRMO SC, data and analyses from the surveys should be shared with CCAMLR; and
- **stressed** that its evaluation did not indicate any commitment to extending this survey beyond 2017 or to extending New Zealand's footprint if a toothfish fishery is eventually proved in this area (these decisions being for the Commission).

The SPRFMO Compliance and Technical Committee and Commission considered the proposal in 2016 and approved a 2-year exploratory fishery with a retained catch limit of 30 tonnes of *Dissostichus* spp. (both species combined) each year (see CMM 4.14).

Preparatory and design work continued through late 2015 and 2016 and the first exploratory fishing, enabled through conditioning of Sanford Limited's High Seas Fishing Permit, was conducted by the New Zealand demersal longline vessel *San Aspiring* between 2 and 9 August 2016. Preliminary results have been presented to two of New Zealand's domestic working groups and are summarised here.

3. Objectives and scope of the exploratory fishing

The fishing, data collection, and tagging conducted during the first trip were structured to address the following key objectives of the exploratory fishing programme:

- To map the bathymetry of the fishable area within the two zones identified in CMM 4.14;
- To characterise the local toothfish populations, including life-cycle information;

- To document the relative abundance of Patagonian and Antarctic toothfish;
- To understand the stock structure and movement patterns of toothfish in the SPRFMO area and between SPRFMO, CCAMLR and other management areas;
- To tag toothfish for stock linkage studies, and, potentially, for biomass estimation; and
- To collect information on the distribution, relative abundance, and life history of bycatch species, including seabirds, marine mammals, reptiles, and other species of concern as appropriate.

Two blocks for the exploratory fishing are specified in CMM 4.14 (Table 1, Figure 1). These blocks had been identified using GEBCO satellite-derived estimates of bathymetry because no detailed ship track information was publicly available. The blocks straddle some of the northern extent of the Pacific Antarctic Ridge and combined are about 91 000 km² in total area. The available information (mostly from CCAMLR) suggests that further south on the Pacific Antarctic Ridge is characterised by small features such as seamounts, ridges and pinnacles and it was considered likely that any fishable habitat in the exploratory fishing blocks would be similar. Thus, finding fishable ground may be a major part of the work required. To that end, the exploratory fishing included time for the vessel to carry out a "prospecting" phase during the first year in order to identify potential fishable ground and collect relevant bathymetric information and, if possible, then collect information on toothfish and any associated fish and non-fish bycatch.

Table 1. : Corner positions for the two exploratory fishing blocks as detailed in CMM-4.14.

Exploratory fishing block	Latitude	Longitude
A	57˚ 54.0' S	155˚ 20.0' W
	59˚ 54.0' S	155˚ 20.0' W
	59˚ 54.0' S	150˚ 00.0' W
	57˚ 54.0' S	150˚ 00.0' W
B	59˚00.0' S	142˚ 10.0' W
	60˚ 00.0'S	142˚ 10.0' W
	60˚ 00.0'S	145˚ 50.0' W
	59˚ 00.0'S	145˚ 50.0' W

CMM 4.14 provides for a 2-year exploratory fishery constrained to a maximum catch of 30 tonnes of *Dissostichus* (both species combined) each year and specified that the fishing gear to be used for this work would be standardised and very similar fishing gear to existing research surveys carried out within the adjacent CCAMLR Convention Area. Full details are available in the revised proposal available in paper SC-03-DW-01. As specified, a New Zealand observer was carried throughout the trip and was assisted by a crew member experienced in similar survey fishing within the adjacent CCAMLR Area. A video camera over the hauling position was used to record the hauling of all lines.

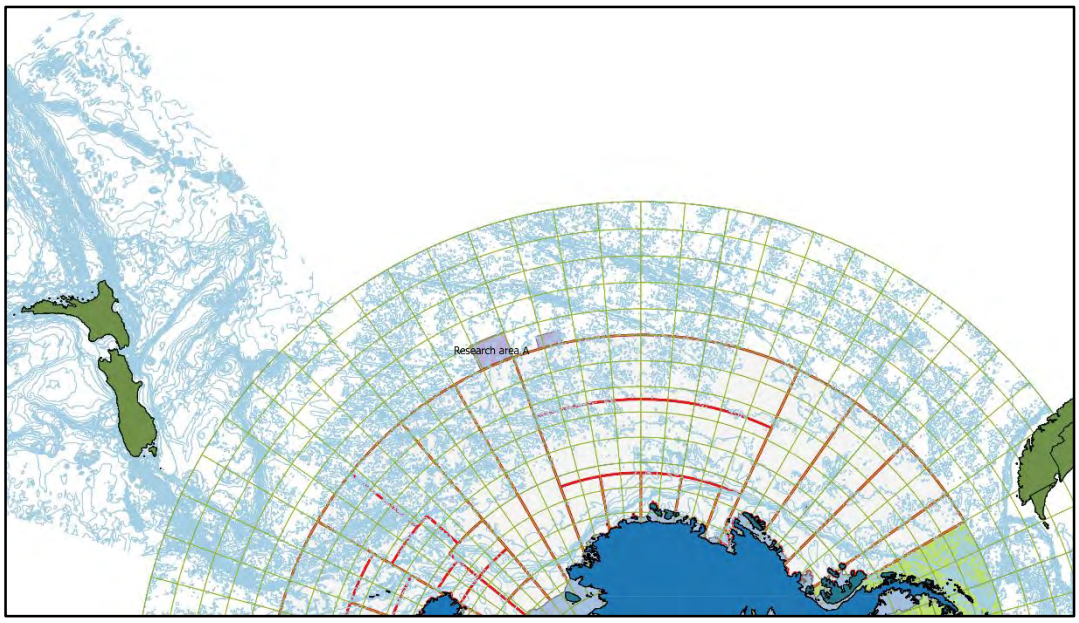

Figure 1: General location of the exploratory research fishing blocks.

4. Fishing operations

Following some initial exploratory bathymetric assessment, fishing started on 2 August 2016 and was restricted to the two research blocks specified in CMM 4.14. In total, seven sets of integrated weight line were made, four sets in Block A and three in Block B, in depths between 1000 and 2300 m. A total of 35 994 hooks were set, of which 30 424 were recovered; two broken lines led to the loss of 5 570 hooks on unrecoverable sections of longline.

Because this was a researched-focused exploratory fishing trip, substantially more information was collected by the observer and the on-board Sanford Ltd science liaison officer than would occur in a typical fishing trip:

- All fish caught were identified to species level, to the extent possible, and unidentified specimens were retained for expert identification;
- Toothfish were tagged at a rate of three fish of each *Dissostichus* species per greenweight tonne;
- All captured toothfish were carefully observed for the presence of tags;
- Samples of toothfish (of whatever species) were taken from each line and measured for total length, weight, sex, gonad size and stage, and stomachs were examined for diet studies with standardised qualitative measurements taken;
- To the extent possible, 5 pairs of otoliths were taken for each 5 cm length class of toothfish between 100 and 150 cm for each sex;
- All Macrourids, up to a maximum of 10 per set, were identified and sampled for length, weight, sex, and gonad weight (for each species).

- Catches (kg) of VME indicator taxa were recorded according to SPRFMO data standards (the standard CCAMLR method for demersal longline was used for this trip, which is compatible with SPRFMO data standards);
- Observations of seabirds, marine mammals, reptiles and other species of concern around the vessel were made.

5. Initial results

The total retained catch of toothfish from the seven sets was 28 961 kg (1070 fish). All toothfish caught were *Dissostichus mawsoni* (Antarctic toothfish) and 85% were males. The main bycatch was of rattails, *Macrourus* spp., but amounted to only 155 kg, ~0.5% of the total catch. Even smaller amounts of the morid cod *Antimora* (32.2 kg) and moray cod (*Muraenolepis*, < 1 kg) were taken.

A total of 104 toothfish were tagged using standard CCAMLR tags, largely in proportion to the catch. This compares with the minimum expectation of 87 toothfish tagged (three for each of 29 tonnes). Full biological records were made for 98 toothfish and 57 rattails of three species (noting one specimen is still to be identified and may be of a fourth species). Many of the toothfish gonads were found to be late-stage or spent.

The total amount of VME indicator material recovered from the seven sets was 3.34 kg, equivalent to 0.48 kg per set or 0.11 kg per 1000 hooks recovered.

The observer made 88 observations of seabirds, of which 42% were Cape petrels, 39% were snow petrels, 15% were Antarctic petrels, and 5% were giant petrels or southern giant petrels. Throughout all fishing operations, the vessel used standard CCAMLR protocols to minimise the risk of seabird interactions (these meet or exceed SPRMO requirements) and no seabirds were killed or injured. No marine mammals, reptiles, or other species of concern were observed.

6. Discussion and future work

The first phase of this 2-year programme was successfully carried out with fishing taking place on seabed features identified by preliminary bathymetric surveying. Important bathymetric and biological information has been collected on both the target toothfish species and the small amount of associated bycatch. The key findings at this stage are that only Antarctic toothfish, *Dissostichus mawsoni*, were caught, that these were mostly male (nearly 85%), and that most fish were in spawning condition or spent. This exploratory fishing programme has been designed to be directly comparable with other work carried out within the adjacent CCAMLR areas. In particular, this study extends and enhances the information coming from the midwinter survey carried out by the New Zealand vessel *Janas* recently. Both surveys provide information on the life history of Antarctic toothfish that is consistent with the initial New Zealand hypothesis on Antarctic toothfish growth and movement (Hanchet et al 2008) and will support ongoing research in this area.

It is anticipated that the second exploratory fishing trip pursuant to CMM 41.14 will occur between July and September of 2017. A more comprehensive analysis of the two trips will be considered by New Zealand's domestic working groups and provided for the consideration of the SPRFMO Scientific

Committee at SC5. Pending the agreement of the SC, data and information will be shared with CCAMLR and should contribute to the understanding of the distribution, dynamics and status of stocks of Antarctic toothfish, including in the adjacent CCAMLR areas.

7. Recommendations

It is recommended that the SPRFMO Scientific Committee:

- **notes** the New Zealand demersal longliner *San Aspiring* has completed the first trip of the 2-year exploratory fishing programme approved under CMM 4.14;
- **notes** that substantial bathymetric, operational, and biological information was collected;
- **notes** that the retained catch of 29 tonnes greenweight was under the 30 tonne annual limit;
- **notes** the tag and release of 104 Antarctic toothfish (*Dissostichus mawsoni*), more than the minimum requirement of three fish per greenweight tonne retained;
- **notes** that this paper has been provided to the CCAMLR working groups as an information paper to facilitate cooperation between the two organisations consistent with the MoU;
- **affirms** its suggestion made at SC3 that the full data and analyses from the trip should be shared with CCAMLR.

8. Acknowledgments

Thanks are due to the crew of the *San Aspiring* and to the MPI observer for collection of data, and to members of MPI's South Pacific Working Group for useful comments on early drafts.

9. References

Cryer, M.; Fenaughty, J.M. (2015) Proposal for exploratory bottom longlining for toothfish by New Zealand vessels outside the bottom lining footprint during 2016 and 2017: description of proposed activities and impact assessment. Paper SC-03-DW-01_rev2, 3rd Meeting of the Scientific Committee of the South Pacific Regional Fisheries Management Organisation. Port Vila, Vanuatu, September 2015.

Hanchet, S.M., Rickard, G.J., Fenaughty, J.M., Dunn, A., Williams, M.J. (2008). A hypothetical life cycle for Antarctic toothfish *Dissostichus mawsoni* in Antarctic waters of CCAMLR Statistical Area 88. CCAMLR Science 15: 35–54.