SPRFMO

6th Meeting of the Scientific Committee

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SC6-DW02

European Union's Proposal for Exploratory Fishing within the SPRFMO Area

The European Union

European Union proposal for exploratory fishing within the SPRFMO area

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1 Purpose

The current paper contains the preliminary elements established by *CMM 13-2016 on the Management of New and Exploratory Fisheries in the SPRFMO Convention Area* for the submission of an application for exploratory fisheries for Patagonian toothfish (*Dissostichus eleginoides*) by the European Union (EU) to the SPRFMO Commission. Notably, the current paper develops the Fisheries Operation Plan, including area, target species, proposed fishing methods, fishing gear, period and a preliminary data collection plan for the exploratory fishing activities to be undertaken in 2019 in the area known as the South Tasman Rise, an area outside the Australian EEZ straddling FAO areas 57 and 81, and which falls under the SPRFMO jurisdiction. The current paper also identifies the relevant elements of *CMM 03-2017 on Bottom Fishing in the SPRFMO Convention Area,* notably an assessment of bottom fishing activities outside the established footprint.

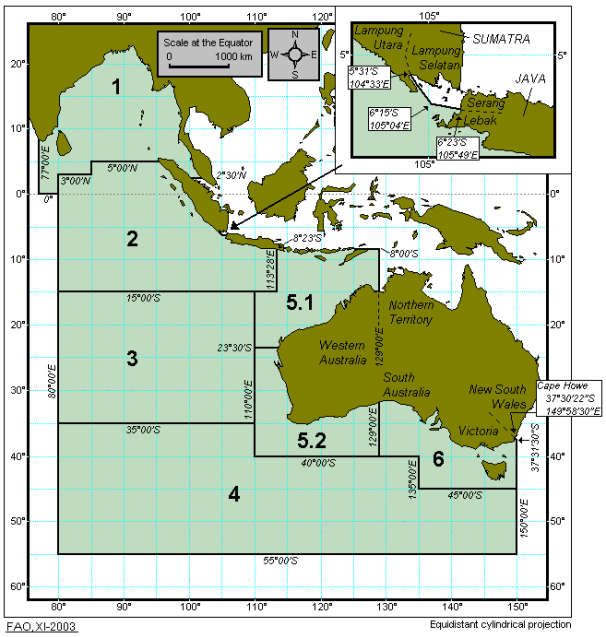

Figure 1: FAO area 57

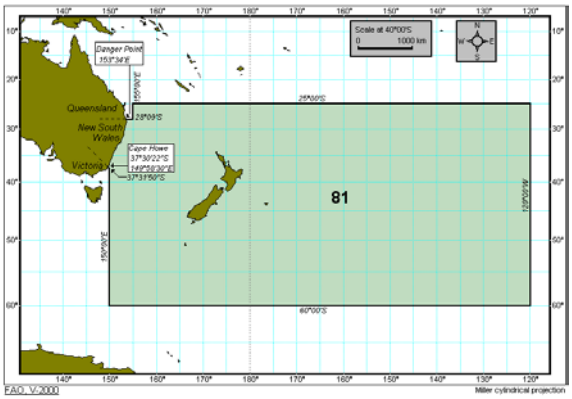

Figure 2: FAO Area 81

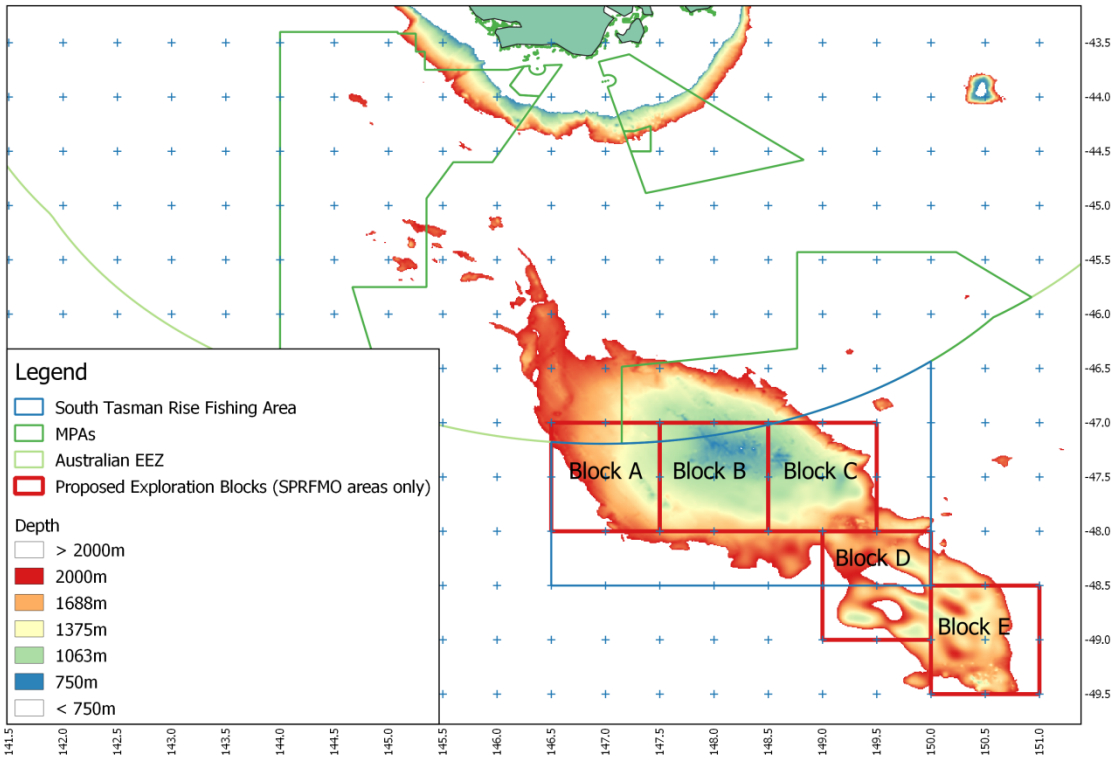

Figure 3: South Tasman Rise – highlighting proposed fishing depths and proposed reearch blocks

Table 1: Proposed location (corner coordinates) for the South Tasman Rise exploratory fishing total area (around 97,000 km^2) (not mapped).

Point	Latitude	Longitude	Distances
NW	47° 15' S	146° 30' E	415 km to NE
NE	47° 15' S	151° E	250 km to SE
SE	49° 30' S	151° E	360 km to SW
SW	49° 30' S	146° 30' E	250 km to NW

2 Introduction

The EU has to date not submitted any paper on Fisheries Operations Plans for exploratory fishing to the SPRFMO Scientific Committee. This paper is a proposal for an exploratory research fishing survey targeting toothfish (*Dissostichus spp.*) using the Spanish Bottom Longline System on the South Tasman Rise for a maximum period of 3 weeks on the fishing grounds.

To the best of our knowledge the available scientific literature (Science Direct and Google Scholar), AFMA documentation, and documents from SPRFMO, there has been no bottom longlining fishing in this area for Patagonian toothfish, or any other species. The northern part of the area of interest, and delineated as the "South Tasman Rise Fishing Area" in Figure 3, has had a bottom trawl fishery for Orange Roughy (*Hoplostethus atlanticus*) for a limited period (1997-2002), jointly managed by New Zealand and Australia, but this ceased in 2001-

02 following declining catches (SPRFMO SC5-DW13_rev1, https://www.sprfmo.int/assets/SC5-2017/SC5-DW13-rev1-Roux-Edwards-BDM-method-ORY.pdf and http://docs.niwa.co.nz/library/public/FAR2006-56.pdf), and was eventually closed in 2007. Because the geographical latitude, oceanography, depth ranges and bathymetry of the area of interest is similar to that of Patagonian toothfish fishing areas elsewhere, there is a likelihood that Patagonian toothfish may live in this area too. Despite searches through literature and Australian and new Zealand fisheries documents however (such as http://www.environment.gov.au/system/files/resources/7a110303-f9c7-44e4-b337-00cb2e4b9fbf/files/south-east-marine-region-profile.pdf), no presence of this species has been recorded.

3 Vessel specific details as required under paragraphs 2 and 3 of Annex 1 of CMM 05-2016 (Record of Vessels)

a) Current vessel flag (using the codes indicated in Annex 2);	SPAIN (ESP) EUROPEAN UNION (EU)
b) Name of vessel;	TRONIO
c) Registration number;	3GC-1-2-05
d) International radio call sign (if any);	ECJF
e) UVI (Unique Vessel Identifier)/IMO number (if issued)[2];	9361603
f) Previous Names (if known);	N/A
g) Port of registry;	CELEIRO
h) Previous flag (if any, and using the codes indicated in Annex 2);	UNITED KINGDOM (GBR)
i) Type of vessel (Use appropriate ISSCFV codes, Annex 10 of CMM 02-2018 (Data Standards));	BOTTOM LONGLINER (LL)
j) Type of fishing method(s) (Use appropriate ISSCFG codes, Annex 9 of CMM 02-2018 (Data Standards));	LLS 09.3.0
k) Length; l) Length type e.g. “LOA”, “LBP”;	55 mts LOA
m) Gross Tonnage – GT (to be provided as the preferred unit of tonnage);	1058 GT
n) Gross Register Tonnage – GRT (to be provided if GT not available; may also be provided in addition to GT);	
o) Power of main engine(s) (kW);	1378.70Kw
p) Hold capacity (m3);	632,3 m^3
q) Freezer type (if applicable);	TUNNEL
r) Number of freezers units (if applicable);	3
s) Freezing capacity (if applicable);	30Tn
t) Vessel communication types and numbers (INMARSAT A, B and C numbers);	Inmarsat C :422462320 Inmarsat FBB: +870773184117
u) VMS system details (brand, model, features and identification);	Satlink ELB 2014
v) Name of owner(s);	PESQUERÍAS GEORGIAS, S.L
w) Address of owner(s);	Muelle Sur, Almacén 21- Celeiro – Spain
x) Date of inclusion into the SPRFMO Record;	
y) Vessel authorisation end date;	
z) Flag Authorisation Start Date;	

aa) Good quality high resolution photographs of the vessel of appropriate brightness and contrast, no older than 5 years, which shall consist of:	
• one photograph not smaller than 12 x 7 cm showing the starboard side of the vessel displaying its full overall length and complete structural features;	See below Figure 4
• one photograph not smaller than 12 x 7 cm showing the port side of the vessel displaying its full overall length and complete structural features;	See below Figure 5
• one photograph not smaller than 12 x 7 cm showing the stern taken directly from astern.	See below Figure 6

The FV Tronio has Ice Class 1C

Figure 4: Tronio Starboard

Figure 5: Tronio Port side

Figure 6: Tronio astern

4 Fisheries Operation Plan

4.1 Description of the exploratory fishery

The main objective of the exploratory fisheries will be to establish whether there it is possible to develop a long-term sustainable fishery of Patagonian toothfish in the area and to provide the SPRFMO SC with increased information about the area through data collection about the fishing activity, a sampling design on targeted species, bycatch species, accidental catches and Vulnerable Marine Ecosystems (VMEs). Following mapping of the area, and collecting all relevant catch/by-catch and biological data (including tagging) as detailed below, a Patagonian toothfish stock hypotheses and connectivity analysis with other areas will be drafted.

The proposed area of the South Tasman Rise (with coordinates listed in Table 1), within fishing depths between 700 and 2000m, has been split up into a five research blocks (Figure 3), with 1^o x 1^o blocks A-E, each approximately 8,300$km^{2.}$ This partition has been made to facilitate a systematic approach for this first prospecting phase of the exploratory fishing survey and support subsequent spatial analyses of the fishing results.

It is proposed an effort limited survey, with a maximum of 20 sets in each block A-E (when possible). For consistency and to facilitate analyses, all sets will be lines of 5,000 hooks (8,000m). The minimum distance between the centre point of each sets is 3nm. 20 sets could be deployed outside the blocks A-E, if depths are available. It is expected that the maximum total catch of Patagonian Toothfish will be lower than 45t (green weight). This amount, given the spatial extent of the proposed area is considered to be a precautionary amount given the spatial extent of the area. Although the research block listed in Table 1 is calculated to amount to 97,000 km^2, the fishable area will most likely to be closer to half that, or 48,000km^2. Extracting a maximum of 45t of Patagonian toothfish from a region of this size, would equate to 0.9kg/km^2. For comparison, results from the NZ exploratory fishery period in their research blocks A (59,358km^2) and B (14,541km^2) suggest an extraction rate of 0.4kg/km^2 (see SPRFMO SC-04-DW-02). If the Tronio deploys 20,000 hooks per day for three weeks (i.e. 420,000 hooks), while remaining under the 45t threshold, the kg/100 hook rate should not exceed 11kg/100 hooks. By comparison, the NZ first year exploratory period yielded 80kg/100 hooks (28,961kg toothfish) on 35,994 hooks set.

If requested by the SPRFMO SC, an alternative approach could be agreed on whereby for example a maximum TAC of 7t is set for each individual research block (A-E as per Figure 4), and a maximum of 10t to be taken outside the blocks A-E

4.2 Fishing gear

The fishing gear to be used in the exploratory fishery is the Spanish Double Line Longline system (Figure 7), a well known gear configuration used in many toothfish longline fisheries. The total length of the line can vary by deploying more or less sections (or baskets) per set line ranging from 60-140 baskets (3,640-10,240 hooks). This translates into a variation of

length between 5,824 and 16,384 meters. Typically in exploratory areas, and following acoustic surveying of the area of interest, a shorter line of aproximately 5,000 hooks is set to first establish fish density. Normally, and depending on the fishing success of any initial lines, longer lines may be set to optimise efficiency.However, because of the exploratory nature of this proposal, only lines of approximately 5,000 hooks (8,000m) will be set.

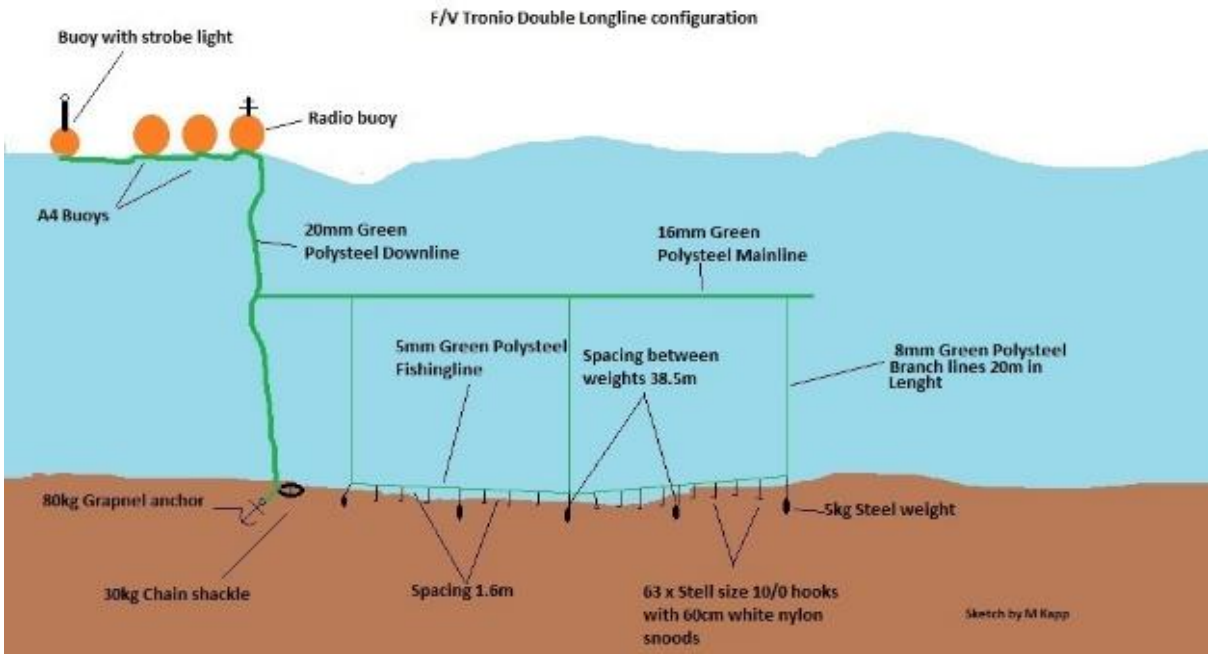

Figure 7: FV Tronio Spanish double Line system in 2017, but note that all steel weights since per November 2017 are now 6kg, and hence achieving a greater sink rate.

Figure 8 Hydrodynamic shaped steel line weights, 6kg.

4.3 Time period of the fisheries operation plan

The requested time period for the exploratory survey would be up to three weeks. The optimum period of year, bearing in mind operational considerations in which this survey can be conducted is in November, prior to the commencement of the Ross sea Fishery (1st December). Alternatively, a three-week period may be undertaken in austral winter, following all fishing operations in Antarctica.

4.4 Biological information on the target species

As stated elsewhere, due to the sparsity of information on this region, we have been unable to establish whether Patagonian toothfish has ever been caught on the South Tasman Rise, but one of the purposes of this exploratory trip is to establish exactly that. The assessment report of longline fishing in the Macquarie Island Toothfish fishery from 2010 (https://www.environment.gov.au/system/files/pages/4f27ef7d-bb8b-41ef-b8bf-ae4449de1d4d/files/afma-assessment.pdf), the closest Patagonian toothfish fishery, reported a mean fish weight of 9.5kg in the area called Macquarie ridge.

The life history of *D. eleginoides* is characterised by slow growth, low fecundity and late maturity. In CCAMLR Division 58.5.2, fish up to 175 cm long and older than 50 years of age have been found (Welsford et al., 2011; Welsford et al., 2015). *Dissostichus eleginoides* are widespread across the entire Kerguelen Plateau and are known to move long distances across the plateau associated with the different stages of the life cycle. On maturation they migrate to spawning locations, with tagging studies showing occasional migrations of more than 2 500 km to the deeper slopes around 1 400–1 800 m depth (Welsford et al., 2011).

Dissostichus eleginoides of Heard Island and McDonald Islands as well as Kerguelen, Crozet and Marion/Prince Edward Islands appear to be genetically homogenous (Appleyard et al., 2004) and distinctly different from those at more distant locations such as South Georgia and Macquarie Island (Appleyard et al., 2002).

Dissostichus eleginoides in CCAMLR Subarea 88.1 are clearly at the southern edge of their range, only extending into the northwest corner of Subarea 88.1 in significant numbers. The fishery catches very few small fish (<50 cm) and the origin of *D. eleginoides* in this area is unclear. It is possible that these fish may be part of the same population as *D. eleginoides* around Macquarie Island as one *D. eleginoides* tagged at Macquarie Island was caught in SSRU 881B in 2007.

4.5 Details on non-target and associated species

Based on previous catches in similar depths and areas, we anticipate the most common bycatch species group to be *Macrourus spp.* Other bycatch may include:

Channichthyidae
Muraenolepis spp.
Rajiformes
Antimora rostrata

The proposed research will maintain strict compliance with conservation measures regarding bycatch and the protection of seabirds and marine mammals (CMM 09-2017).

A move-on rule for fish bycatch followed in CCAMLR could be duplicated in SPRFMO for this proposal (CCAMLR, CM 41-03, 2017) namely, "The by-catch of finfish shall trigger a move-on rule if the catch of skates and rays exceeds 5% of the catch of *Dissostichus* spp. in any one haul or set, or if the catch of *Macrourus* spp. reaches 150 kg and exceeds 16% of the catch of *Dissostichus* spp. in any one haul or set. If the move-on rule is triggered, then the fishing vessel shall move to another location at least 5nm distant. The fishing vessel shall not return to any point within 5nm of the location where the move-on rule was triggered for a period of at least five days. The location where the move-on rule was triggered is defined as the path followed by the fishing vessel".

Additionally, pending approval from SPRFMO SC, simple precautionary bycatch limits will be stipulated. A 5t bycatch limit on any species other than the target will be adopted, with a total amount of all species combined not exceeding 20t. This would align with what occurs in the Macquarie Island fishery, where, for a 450t toothfish fishery, a combined bycatch limit of 200t is set with a 50t limit on any species.

4.6 Anticipated cummulative impact of the fishing activity
See also 4.8

Setting speed is between 7 and 8.5 knots. The average duration of the line setting operation is 1.3 hours, whereas that of line hauling is 7 hours. Usually there are between 3 and 4 lines simultaneously in the water.

The potential impact of the longline is considered to be low. The Spanish system minimise contact between main line and seabed due to its positive buoyancy. Contact may be increased by other factors such as longitudinal movement of the main line over the seabed or sidewise (sweeping) movements of the main line and hooks during fishing. Regarding the longitudinal movement of the fishing gear, drifting may occur in the presence of strong currents.

According to Sharp et al. (2009), longitudinal movement happens mainly during hauling. Research carried out by the UK (WG-EMM- 10/33) using video cameras attached to the gear shows that there is longitudinal movement of the line over the seabed during the first phase of hauling, estimated to be of between 7 and 193 m. These surveys have been carried out using an autoline, but in the case of Spanish longlines, both hauling and main line have positive buoyancy: only the anchor and weights (between 6 and 9 kg) joined to the hauling line are in direct contact with the seabed. Thus, there may be longitudinal movement of the gear during hauling, but its impact is expected to be smaller due to the 40 meter distance between two weights.

On the other hand, the same survey shows that there is an inverse relationship between gear depth and sidewise movement of the mainline and the hooks. The average depth at which Spanish vessels fish is 1 350 m, which would make this impact very small. Considering

the positive buoyancy of the lines, the sweeping effect is estimated to be negligible or non-existent.

Gear loss or of parts of it is very infrequent. We estimate that 1% to 2% of the total number of hooks is lost, but most are loose hooks without any line, hence they wouldn't have a negative impact on benthic organisms. On the other hand, line breakage doesn't usually involve gear loss because even if breakage occurs on one end, the gear can be hauled back from the other end since both ends are joined to the railings. In general, less than 1% of the gear set is estimated to be lost. Also, in places with a higher risk of line breakage or loss (for instance, near ice floe), the line set is usually shorter and the number of lines in the water is also smaller, therefore limiting gear loss. The rare occasions in which gear is lost are due to loss of the radio buoy, which makes recovery impossible.

The footprint index for the Spanish longline system needs a more nuanced evaluation since, the gear having positive buoyancy, most of the gear doesn't touch the sea bottom. The parts of the gear that may have a direct impact on the bottom are:

1. The weights used as ballast.
2. The anchors and chains used for anchoring both ends of the gear.

The impact of these two parts on the seabed is due to their weight: the benthic organisms are crushed by them. Lateral movement of the gear, also called sweeping, could, due to water currents, increase their impact area, but not the sidewise mowing effect, which is considered to be non-existent.

3. The probability that the impact would be bigger for hooks closer to the weights, because they are closer to the bottom. The rest of the hooks would tend to hang further away from the bottom.

During the development of exploratory fisheries in other areas within CCAMLR management no incidental catches of VME indicator species that would qualify as ‘encounters’ have been observed. As much as this fishing methods minimise contact between main line and seabed due to its positive buoyancy, and that this would minimise the potential impact of the sweeping/mowing movement upon sessile benthic organisms, no specific actions are contemplated with respect to mitigation measures in CCAMLR.

4.7 Information on other relevant fisheries

To the best of our knowledge there is no fishery for Patagonian Toothfish within the EEZ around the Australian continent. However, Australian Patagonian Toothfish fisheries occur in their territories such as the Heard and McDonald Island Fishery and the Macquarie island fishery of which the latter is the nearest: the Heard and McDonald Island EEZ is some 2800Nm to the WSW of the South Tasman Rise, whereas the Macquarie Island EEZ is some 600Nm to the SE of the South Tasman Rise. The Macquarie island Patagonian Toothfish fishery dates back to the mid 1990s, and has been a certfied MSC fishery since 2012 (https://fisheries.msc.org/en/fisheries/macquarie-island-mi-toothfish/@@view). The TAC

for this fishery has been 450t (http://www.afma.gov.au/fisheries/macquarie-island-fishery/). Given the distances involved between the South Tasman Rise and the two nearest regulated toothfish fisheries mentioned it is unlikely that there will be any impact on the toothfish stocks in either fisheries. However, the proposed collection of DNA samples may help establish any regional connectivity between populations.

4.8 Assessment of the impact of the fishing activities

There is very low likelihood of any impacts on dependent or related species. Toothfish are a higher trophic level predator and the only likely natural predators are elephant seals and sperm whales (Collins et al., 2010; Hanchet et al., 2015)

Generally, the FV Tronio can deploy and retrieve around 30km per 24-hour period (around 20,000 hooks). The footprint and impact of this activity has been reported on in the impact assessment report by the Spanish delegation to CCAMLR (for instance SC-CAMLR-XXXV/BG/05 for 2016-17 seasons).

Consistent with the assumptions described in the Report on Bottom Fisheries and Vulnerable Marine Ecosystems (SC-CCAMLR XXX, Annex 7, Appendix D) an estimated footprint index of 6.67 x 10^{-3} km^2 of seabed area per km of longline deployed can be applied.

Footprint index	Max Daily Footprint (est.)	Max Weekly Footprint (est.)
6.67 x 10^{-3} km^2	0.2001 km^2	1.4007 km^2

Consistent with the assumptions described in the Report on Bottom Fisheries and Vulnerable Marine Ecosystems (SC-CCAMLR XXX, Annex 7, Appendix D) an estimated impact index of 5.07 x 10^{-3} km^2 of seabed area per km of longline deployed can be applied.

Impact index	Max Daily Impact (est.)	Max Weekly Impact (est.)
5.07 x 10^{-3} km^2	0.1521 km^2	1.0647 km^2

If the fishable area is indeed as estimated (~48,000km^2), the maximum impact in a three-week exploratory period would amount to 3.1941 km^2, or 0.00222% of the fishable area.

Due to the short duration of the exploratory phase (2-3 weeks), and as shown above, it is expected that the impact of the fishing activity (longline method has a relatively low impact/footprint compared to trawling) for the duration of the exploratory survey will be low.

In the absence of a predictive study or data, the detail (such as depth, species, weight, benthic imagery) to be collected as part of the data collection program as proposed by the company will facilitate impact analyses of the various aspects that may be considered detrimental, such as the potential impact on any VME.

In the proposal for the exploratory survey for Toothfish recently (2016-17) conducted by New Zealand (SC-03-DW-01_rev2) reference is made to a low to medium impact of the fishing method, whereas in the 2009 New Zealand Ministry report on Bottom Fishing Activities by New Zealand Vessels Fishing in the High Seas in the SPRFMO Area in 2008 and 2009 (http://www.sprfmo.int/assets/Meetings/Meetings-before-2013/Scientific-Working-Group/SWG-06-2008/a-Miscellaneous-Documents/New-Zealand-Bottom-Fishery-Impact-Assessment-v1.3-2009-05-13.pdf), the bottom longline fishing method is listed as of low impact (a rank of 2 out of 5).

The F/V Tronio has a broad experience working in CCAMLR waters where different CMs are in place regarding VME potential encounters (CCAMLR, CMs 22-06 and 22-07).

The total benthos recovered will be registered for each daily period. To the extent possible, VME indicator units for each line segment and the midpoint of each line segment on all lines, including zero catches, should be reported in the fine-scale data.

Protocol for VME encounters

The EU (Spain), as established in paragraph 8 h) of CMM 03-2017, shall require vessels flying their flag to cease bottom fishing activities within five nautical miles of any location where evidence of a VME is encountered in the course of fishing activities, and to report the encounter, so that appropriate conservation measures can be adopted in respect of the relevant site.

The EU (Spain), until the SC has developed advice on SPRFMO threshold limits, shall require their vessel, if 10 or more VME indicator units are recovered in one line segment, to complete hauling any lines intersecting with the Risk Area without delay and not to set any further lines intersecting with the Risk Area. The vessel shall immediately communicate to the Flag State the location of the midpoint of the line segment from which those VME indicator units were recovered along with the number of VME indicator units recovered.

5 Data Collection Plan

For the Fisheries Operation Plan period, the data collection referred to below are proposed for collection in addition to other elements that the Scientific Committee might develop in accordance with paragraph 9 of CMM 13-2016.

The F/V Tronio will fulfil with the data to be collected detailed in CMM 02-2018, and specifically those included in Annex 3 and Annex 7:

A. Vessel & Observer Data to be Collected for Each Observer Trip
D. Catch & Effort Data to be Collected for Bottom Long Line Fishing Activity
E. Length-Frequency Data to Be Collected
F. Biological Sampling to be Conducted
G. Data to be Collected on Incidental Captures of seabirds, mammals, reptiles (turtles) and other species of concern
H. Detection of Fishing in Association with Vulnerable Marine Ecosystems and

I. Data to be collected for all Tag Recoveries.

Some of the tasks below will be conducted as part of the vessel operational routines, others by the company employed Compliance Officer-a professional Scientific Fisheries Observer from Capricorn Fisheries Monitoring CC (http://www.capfish.co.za/about.php)- and any other observer present at the time, such as a flag state appointed observer.

For all set and hauled lines (for which detailed start/end position, depths, date/time of start/end setting and start/end hauling, duration, bait type, etc. is recorded) the catch will be assessed for the following (responsible parties in brackets):

1. Identification of the entire catch (target and by-catch species of fish, invertebrates and VME species) by species to the lowest possible taxonomic level. (crew with assistance from CapFish Compliance Officer)

2. Weight and number of all specimens of all species. (crew as directed by the Compliance Officer)

3. Representative random biological sampling of each species detailing size, weight (sub-samples), sex, maturity. A suggested representative sampling rate of catches could be 50 toothfish and any by-catch species per line(Compliance officer and second observer, if present).

4. Tagging of toothfish at a rate of 5 fish per 1t. Acknowledging the MoU between SPRFMO and CCAMLR (SC-04-DW-01, “Collaboration between CCAMLR and SPRFMO in respect of Toothfish), CCAMLR tags will be obtained and used during this exploratory period (Compliance officer and second observer, if present).

5. Collection of representative samples for ageing and other requirements of the target species. (Compliance officer and second observer, if present)

6. Checking and confirmation of previously established Conversion Factors (to calculate green weight) already employed for Patagonian Toothfish (1.72 has been a commonly used CF in a number of the vessel’s toothfish fishery operations) and establishing of CFs for other commercially viable fish species. (crew/Compliance Officer)

7. Identification (to the most detailed taxonomic level possible) and quantification of any potential VME species adopting the same protocols as those in place within CCAMLR waters. Unless provided with alternative material by the SPRFMO SC, the company proposes to use CCAMLR VME identification guides. (Compliance Officer)

8. Regular (daily) deployment of underwater camera (Figure 9, Figure 10) with light system for recording of benthic habitat. (Compliance Officer)

9. Collection of representative samples (frozen or DNA samples or both) of VME species for interested parties such as a regional Natural History Museum. (Compliance Officer).

10. Representative collection of tissue samples for DNA analysis from Patagonian Toothfish, to allow for comparison with other Patagonian Toothfish stocks. (Compliance Officer)

Figure 9: Benthic Camera Plate

Figure 10: Benthic Camera and Light

5.1 Seabird Interactions and Mitigation

Taking note of CMM 09-2017, and particularly the specifications in Annex 1, the FV Tronio is able to comply fully with all aspects. The bird mitigation devices themselves are detailed below. Officers and crew in collaboration with onboard Compliance officers and Scientific Observers have refined some practical aspects of the devices to best suit the vessel. Figure 11 details the streamer line system deployed during each setting as in place on the vessel in 2017, and which it still uses currently. Figure 12 and Figure 13 show two types of towed devices. The device as shown in Figure 13 show some of the latest improvements. Note that CCAMLR specifies a single Bird Scaring line, whereas the Tronio deploys a Double BSL.

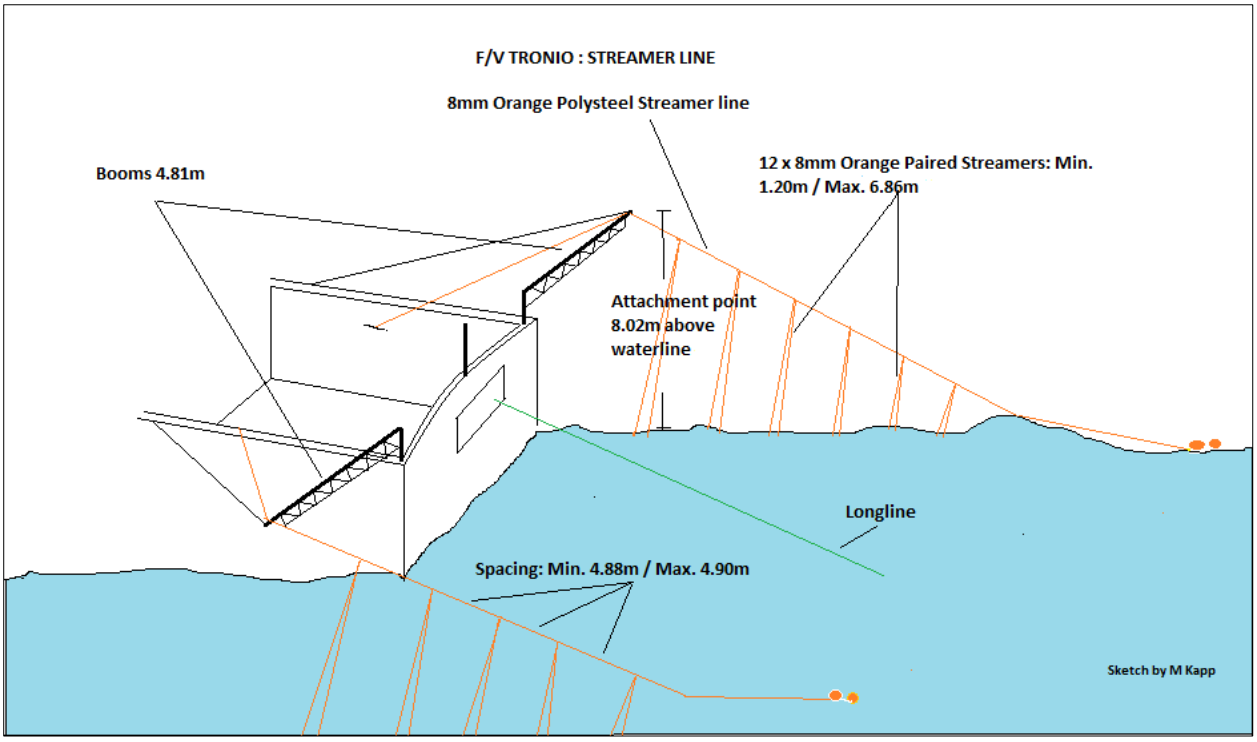

Figure 11 Streamer line alignment during setting.

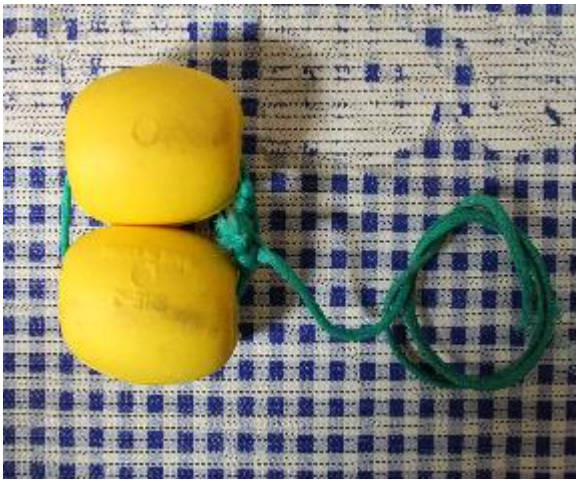

Figure 12 Towed device option 1

Figure 13 Towed devise option 2, providing additional drag

Seabird interactions during hauling are mitigated against in a number of ways. Firstly, the vessel always deploys a Bird Exclusion Device around the hauling bay to deter any seabird interaction with the line as shown in Figure 14 and in Figure 15. Secondly, discard of fish or offal does never occur on the same side of the hauling bay. Thirdly, discard species and processing waste can be retained on board for extended periods of time with discharge to sea only occurring when permitted. For instance, for operations in Antarctica, discharge is only permitted North of 60°S. Hook removal from by-catch and discard species is the standard practice on the vessel and has been for many years.

Figure 14 FV Tronio bird exclusion device (BED) around the hauling bay.

Figure 15 FV Tronio bird exclusion device (BED) around the hauling bay.

6 Anticipated Cumulative Impact of all fishing Activity

The FV Tronio is typically able to deploy/retrieve on average around 22,000 hooks per day. Survey length will of course very much depend on catches, but in any case, should the vessel operate for 3 weeks, it will be able to deploy/retrieve around 450,000 hooks. Lines, or sections thereof, can be lost.
During the last Antarctic fishing season (2017/18) that the Tronio conducted in FAO areas 88.1 and 58.4.1, a hook loss rate of 0.9% was recorded. If the area of the South Tasman Rise can indeed be regarded as comparable, it can be estimated that some 4050 hooks may be lost. This equates to 6,480m of fishing line, and would include some 168 6kg weights.

7 Reporting

The exploratory survey will be reported on by the company in collaboration with their environmental consultants (South Atlantic Environmental Research Institute (SAERI), www.south-atlantic-research.org, based in the Falkland Islands) in detail at the next Scientific Committee meeting following the initial survey, providing detail on the presence of the target species, by-catch species, as well as any encounters with VME species. Any fishing impact will be established through the data and imagery collected during this period, and this will be reported on. SAERI employs a benthic ecologist (Dr. Paul Brewin) whom will be involved in the analyses of results. The toothfish DNA samples will be sequenced at Otago University in Dunedin, New Zealand under contract with Dr. Haseeb Randhawa (https://www.researchgate.net/profile/Haseeb_Randhawa), currently an Honorary Lecturer

at Otago University. Otago University has first class facilities for this type of work, and the results will be published in a scientific journal.

8 References

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