

***The Southern Indian Ocean Fisheries Agreement (SIOFA) 6th
Meeting of the Parties***

01-05 July 2019

Pearle Beach Resort & Spa conference centre, Flic en Flac, Mauritius

MoP6-INFO-01

**Analysis of Bycatch by Cook Island Flagged Vessels Operating
in the SIOFA Area, 2017-2019**

Relates to agenda items: 11,7,12 &13

Proposal ☐ *Working Document* ☐ ***Information Paper*** ☒ *Other Document* ☐

Delegation of

***Southern Indian Ocean Deepsea Fishers
Association (SIODFA)***

Abstract

Records by scientific observers of sedentary benthos recovered by SIODFA factory trawlers from 20 voyages made during the last seven years have been analysed to determine the nature and frequency of benthic animals and coral rubble in the trawl bycatch. Bottom fishing (i.e. benthic-pelagic trawling) during these voyages targeted orange roughy and alfonsino. A total of 1067 kg of the taxa proposed as evidence of vulnerable marine ecosystems were measured from the bycatch of 4334 tows, i.e. an average of 246 grams/tow. Of the SIOFA area between 700 and 1500 m depth – the usual fishing depth - 0.27% the bottom area is estimated to have been potentially impacted by trawling. It is concluded that no benthic ecosystems were rendered vulnerable by the fishing activities of SIODFA vessels.



Analysis of Bycatch by Cook Island Flagged Vessels Operating in the SIOFA Area, 2012-2019

Southern Indian Ocean Deepsea Fishers Association

www.siodfa.org

June 2019

1. INTRODUCTION

Three vessels operated by SIODFA members have been active in recent years in the trawl fishery targeting primarily alfonsino and (one vessel) orange roughy in the SIOFA area. A fourth member's vessel has undertaken a minor number of tows. A small range of other deepwater species may be targeted when they are available in commercial abundance. Depth of fishing is in the range 700 – 1200 m. This report focuses on the two vessels flagged in the Cook Islands.

The SIOFA Conservation and Management Measure "*Conservation and Management Measure for the Interim Management of Bottom Fishing in the Agreement Area (Interim Management of Bottom Fishing)*", CMM 2018/01, defines the type of fishing by these vessels as: "'bottom fishing', which means fishing using any gear type likely¹ to come in contact with the seafloor or benthic organisms during the normal course of operations".

A major objective of this CMM, as outlined in its preamble and in the subsequent articles, is '*the protection of fragile sessile benthos*', which the CMM refers to as "*vulnerable marine ecosystems*". If/when a vessel's trawl encounters such benthic animals, it is assumed that some of them will be retained in the trawl as bycatch.

The bottom fishing by one of SIODFA's vessel is more conventionally (and accurately) known as mid-water trawling as the net never contacts the sea floor. There is no record of bycatch of benthos in this vessel's trawl catch. The data relating to the operations of this vessel are not included in this analysis.

The other vessels undertake what is more accurately referred to as benthic-pelagic trawling, which involves locating concentrations of fish and setting the net on them. In the fishing process the footrope of the trawl, about 25 m in length, may come in contact with the sea floor. This is more common when targeting orange roughy and occurs only

¹ There is no definition for the term '*likely*'

rarely when targeting alfonso. In both cases, when contact is made by the foot rope with the seafloor the time of contact is usually a duration of a few minutes. Skippers usually are successful in ensuring that the pelagic-style trawl doors they use do not contact the seafloor.

2. THE VESSEL OBSERVER PROGRAMME

Vessels flagged to the Cook Islands and authorized to fish in SIOFA area have been required to carry scientific observers (100% coverage) since June 2018. Prior to this the two Cook Islands flagged factory trawlers carried an observer managed by the Ministry of Marine Resources (MMR), Cook Island on every second trip.

All observers have been trained and several are highly experienced. Their results are used in this analysis. The Ministry of Marine Resources, Rarotonga, Cook Islands, archive the observers' reports: summary copies are provided to the vessel operators. Most trips with observers have been within the last two years but the first voyage with an independent observer whose recorded data were used in this analysis was in 2012.

3. IDENTIFICATION OF BENTHIC SPECIES

The Cook Island observers are not benthic taxonomists however they do have an understanding and familiarity with the benthic animals they encounter. It is exceedingly rare that a species of animal present in the bycatch cannot be identified to a useful taxonomic level. Certainly, species that have been proposed as providing evidence of the presence of a "*vulnerable marine ecosystem*" are reliably identified. Usually they are corals (cnidarians).

The common types of coral that may be encountered usually include:

- Stone/white corals (*Scleractina*)*
- brain corals (*Lobophyllia* spp.)
- black corals (*Antipatharia*)*
- cup corals (*Caryophyllidae*)
- bubblegum corals (*Paragorgiidae*)
- bamboo corals (*Isididae*)
- sea Fans (*Gorgonidae*)*
- sea pens (*Pennatulacea*)

(* Examples of species groups that often display characteristics consistent with possible VMEs.)

Other invertebrate groups also occur such as jelly fish, starfish and anenomes. Despite the availability of several well-prepared guides (FAO, CCAMLR, New Zealand and Australian Governments and NAFO) confident and rapid identification of benthic taxa to higher levels (certainly species and genus) is often beyond the ability of even highly experienced benthic zoologists.

Cook Island observers record all benthic material retrieved by the trawl: (a) rock and coral rubble; (b) coral and sponge species – aka as VME taxa; and (c), other (usually) sedentary benthic species. Observers have not distinguished living from dead taxa in their data record. This is primarily a problem for scleractinians – stone corals.

Rubble or Precious Habitat?

It is a common view that coral rubble, usually that of stone corals, is not indicative of a vulnerable marine ecosystem, nor that species characterizing such vulnerable ecosystems would be commonly taken in association with coral rubble.

This coral rubble is often black, it is reported because of a manganese salt layer deposited over hundreds, if not thousands, of years. As with any material on the seafloor that offers habitat protection, mobile and at times sedentary benthos may be found on such rubble. Despite this, it can be considered that such material does not constitute evidence of, or indeed, a vulnerable ecosystem, population, community or guild.

4. OBSERVER RESULTS

The below table summarises data that has been collected from 20 observed trips in the SIOFA area.

Summary Results

1	Number of trips carrying an MMR observer	20
2	Number of tows	4,334
3	Total benthic bycatch reported	2,610.472 kg
4	Volcanic rock, recorded as rock or coral rubble	1,510 kg
5	¹ Weight of "VME indicator" recorded	1,067.002 kg
6	Weight of non "VME" benthos recorded	33.470 kg
7	Average weight of "VME indicator" taxa per tow (grams)	246 g
8	Number of these tows (row 3) where benthos was reported present	210
9	Percentage of tows with no record of any benthic bycatch	94.7%
10	Percentage of tows with benthos recorded that consisted only of rock/rubble	57.8%
11	Percentage of recorded benthos consisting of "VME" taxa	40.9%
12	Thus percentage of tows with records of "VME" taxa	2.2%
13	Average weight/tow of "VME" taxa when it was reported:	11.4 kg

¹ Three significant digits are given as this repeats what was recorded by the observers.

5. AREAL IMPACT

The 2008 *International Guidelines for the Management of Deep-sea Fisheries in the High Seas* sensibly notes in its Article 18, when determining the scale and significance of an impact, among the factors that should be considered is:

18 (ii) "the spatial extent of the impact relative to the availability of the habitat type affected."

If only a relatively small fraction of the expected habitat of the ecosystem of concern is potentially affected by benthic-pelagic trawling, then axiomatically, the ecosystem is not vulnerable to harms or threats of the type listed in paragraph 17:

- i. Impairment of the ability of the population to replace itself;
- ii. Degradation of the long-term natural productivity of the habitats; and/or
- iii. Significant loss of species richness, habitat of community types.

Likewise, by the same logic, alteration to ecosystem function will be negligible.

The amount of benthic bycatch recorded and presented in the table above should be considered in the context of the size of the estimated fishable area that might be potentially impacted by “bottom fishing”. Summary data are provided in the 2017 document, Bottom Fishing Assessment – Cook Islands, SC-03-06.2(04), Section 4.2, Table 4 “Fished Area”, p25 and which informs on this factor. Table 5 from that document is repeated below.

Table 5 (SC-03-06.2(04, p28))
Fished Habitat Area, SIOFA by Cook Islands vessels 1997 – 2016

The fished area is estimated based on the measure of a 25 m foot rope (it may be less because of curvature of the foot rope in fishing) and alternatively, a 160 m distance if the distance between the trawl doors was to be used and the time the trawl was recorded as being on the bottom, i.e. from when the trawl was at the fishing depth (though not necessarily on the bottom) to when its haul back begun..

	Area between 701 and 1500 m depth (km ²)	Fished Area (km ²)	25 m
Southwest Indian Ridge	9 534	74.63	0.78%
Walters Shoal	42 802	68.37	0.16%
Total area	52 336	143	0.27%

6. DISCUSSION

With all of the above in mind there are several reasons for concluding that bycatch of ‘VME’ taxa by these Cook Is vessels does not result in significant adverse impacts to fragile sedentary benthic fauna and thus “VMEs” are not a management issue. There are three major reasons for this perspective.

- i. The results presented here are the results of examining 20 voyages. Two SIOFA vessels undertaking benthic-pelagic, i.e. “Bottom Fishing” of para 3 (b), CMM 2018/1, undertake between them approximately six trips a year. Thus, the results presented here (rows 4 and 5 of table) represent the sessile benthic bycatch of over six years fishing;

- II. For reasons of fishing tactics, i.e. no desire to lose the gear, fishing is done along highly defined tow lanes that do not change from one year to another. It is noted that the trawl may drift off the tow line due to currents, in which case an elevated bycatch would be expected – instances where this has occurred have been captured in the observer data. More generally, it is not expected that there will be future additional impacts on the sea floor from sustainable fishing operations by this fishery; and
- III. Using quantitative estimates, it is possible to show that the fraction of the habitat in which the benthic species described as being vulnerable to benthopelagic trawling fishing and so comprising an ecosystem, is minor, so small it is difficult to conceive that fishing could render the ecosystems of which these benthic animals are part, as vulnerable. There would be no 'significant adverse impacts' to the 'vulnerable marine ecosystems' as defined in the FAO International Guidelines on for the Management of Deep-sea Fisheries in the High Seas.

The results presented above show that conservation of "VME" taxa is, in reality, not a concern, at least in terms of threat from benthopelagic 'bottom' trawl fisheries. SIODFA is of the view that no benthic ecosystems were rendered vulnerable by the 'bottom' trawl fishing by the SIODFA fleet.