



Bycatch of Corals, Sponges and Related Benthos An update of SIODFA Technical Report 07/01

R. Shotton
SIODFA Secretariat
February 2016

1. INTRODUCTION

In 2007 SIODFA produced its first Technical Report (SIODFA 2007), which was an analysis of coral bycatch by vessels operated by members of SIODFA. The data used in this analysis was taken from vessel operation logs. These contained data collected by observers, where the vessel carried an observer; otherwise the data was recorded by vessel crew, usually either the factory manager or someone under his supervision. As a consequence of this analysis, a standard SIODFA form for collection of coral bycatch was introduced that vessel operators could use. A modified version of this form is attached together with a simplified updated version (Appendix 1).

This report the provision of four reports to the SIODFA Secretariat by an observer who had been contracted by the Government of the Cook Islands to report on the operations of the *F.V. Nikko Maru No. 1* and the *F.V. Will Watch*, both of which operate under the Cook Islands flag. In addition, coral bycatch reports have been provided to the SIODFA Secretariat by the operators of the *Tomi Maru No. 58*, first while it was operated by Kanai Fisheries Co., Kushiro-Shi, Hokkaido, Japan and then by Kato Gyogyo Co., Myagi, Japan. These reports were for the period when these companies were either probationary members or full members of SIODFA.

2. OBSERVER REPORTS FROM THE *F.V. NIKKO MARU NO. 1* AND THE *F.V. WILL WATCH* - 2015

The data provided by the observer was obtained from four trips. This information is summarized in Table 1 below. Coral rubble/dead coral have not been included though this is recorded by the observer when it occurs. Two of the voyages recorded a zero bycatch of benthos. For the other two voyages, a total of 26.7 and 52.55 kg of benthos bycatch was recorded from 303 and 226 tows respectively that were observed. This gave an average of 88.1 and 232.5 g/tow for the tow voyages in which benthic bycatch was recorded. During these trips fishing for orange roughy and alfonsino was undertaken. For tows targeting orange roughy bottom contact by the gear is more likely. If a simple-mined grand average is estimated for the data contained in the four observer reports, i.e. total bycatch divided by total number of observed tows, the result is 68.2 g/tow.

The single observer on board is unable to observe all tows, though usually he only misses relatively few shots. When this happens, the factory manager keeps appropriate records and the observer then adds them to his various log tallies when he comes on watch.

3. REPORTS FROM THE *F.V. TOMI MARU NO. 58*: 2012 - 2015

The two companies who have operated the *F.V. Tomi Maru No. 58* while it has been associated with SIODFA have provided records of their coral bycatch observations (along with other data) to the SIODFA Secretariat. This vessel has a licence that only permits operations in Midwater and the fishing closer

than 50 m to the bottom is not permitted. On average, this vessel completes around 220 tows per fishing season in the Southern Indian Ocean. During the fishing seasons of 2012, 2013, 2014 and 2015 no bycatch of benthos is recorded as ever taken from an estimated 880 tows.

Table 1
Recorded Benthic Bycatch (kg)
NM: F.V. Nikko Maru No. 1, WW: F.V. Will Watch

Vessel/Trip	NM59 Sep/Nov 2015	WW Jun/Jul 2009	WW Jun/Aug 2012	WW52 Nov/Feb 2012/13	WW54 Jun/Aug 2013	WW56 Nov/Jan 2013/14
Bamboo Coral	2.6		174.0		1.8	
Black	9.4				0.5	
Bubble gum	3.9					
Sea pens	0.9					
Bushy Hard coral					5.0	
Golden coral					0.05	
Spiny white coral					1.0	
Stony coral					42.6	
Sponges	2.5		5.8			
Floppy tubular sponge					1.0	
Airy finger sponge					.3	
Sea Urchins	7				0.2	
Hydroids	3		1.5		0.1	
Other			14.6			
Floppy tubular sponge					1.0	
Airy finger sponge					.3	
Measured Total (kg)	26.7	1.1	195.9	0	52.55	0
No. of tows	303	179	208	387	226	246
Tows covered	196	179	137 ¹	286	132	243
Estimated Total (kg)	41.3	1.1	297.4	0	90.0	0
Average/tow (g)	136.2	6.1	941.8	0	398.1	0

¹Weights recorded here are for all tows, observed and unobserved.

4. DISCUSSION

It is useful to compare these results with those provided in SIODFA 2007. For that analysis, detailed information on a tow-by-tow basis was available and it was possible to determine the fraction of tows that had no coral bycatch. This information exists for the 2015 data but was not available when this noted was written. It can be obtained if there would be benefits in so doing.

SIODFA (2007) notes that the average coral bycatch was 111.1 grams for each bottom tow (compare 371.4 g/tow - 2015) and 28.2 grams/tow (compare 114.8 g/tow - 2015) when averaged over all tows, both bottom and mid-water, for vessels fishing in the study area for the data set that was examined. These results were based on the bycatch records of 678 bottom tows and 2002 mid-water trawls. For the 2015 data the corresponding totals are 744 and 699. No distinction is made in the analysis between coral rubble and living coral in the trawl bycatch. In the 2015 analysis coral rubble has not been included.

The results from the 2015 data from the *F.V. Nikko Maru No. 1* and the *F.V. Will Watch* are higher than those reported in 2007. In 2007 the analysis was based on the bycatch of 2680 tows of which 2002 were Midwater tows, or 74.7%. For the 2015 data of the total tows, 226 were bottom shots and the rest Midwater, i.e. 80.5% were Midwater shots and 19.5% were bottom shots. Thus, there is not a huge difference between the 2007 data and that for 2016 in the nature of the tows – bottom versus midwater. Perhaps the reason for the difference in the reported benthic bycatch is that far more attention is now given to recording this bycatch, rather than a fundamental change in the actual bycatch dynamics. Among other possible explanations is that there has been a recovery of benthos biomass following the heavy fishing pressure in 2000/200 and/or fishing is now being undertaken in different areas with different benthos characteristics.

The results of from the *F.V. Tomi Maru No. 58* are of interest in that this vessel's operations would be described as deepwater fishing as it usually fishes at depths of 500 – 800 m. As noted, in the four years the operators of this vessel have been associated with SIODFA, and so have provided data, there has never been any record of bycatch of benthos.

Time on the bottom of the fishing gear

Catch per tow of benthic bycatch is a coarse measure of bycatch as a function of fishing effort. The length of time a trawl may be in contact with the bottom varies depending on several factors and in aimed benthic-pelagic trawling varies from around two minutes to twenty minutes. A tow that results in a bycatch of benthos where a move-on rule is in effect may be in contact with the bottom for four times as long as a tow that returns a bycatch that is just subthreshold. In this case the density of benthos, and depending on how it is defined¹, and thus biodiversity in the latter case may be higher even though the shorter tows do not trigger a threshold level so that fishing can continue in that area. Clearly, in evaluating the effect of fishing on benthos, and appropriate benthos move-on trigger level measure (kg/m²?), should be standardized by the time the gear is in contact with the bottom.

5. LITERATURE CITED

SIODFA 2007. Analysis of Coral Bycatch by SIODFA Vessels in the Southern Indian Ocean, 2006- 2007. Southern Indian Ocean Deepsea Fishers" Association Tech. Rep. 07/01. 14 pp.

¹ If at all!



Southern Indian Ocean
 Deepsea Fishers Association

Appendix I
SIODFA Coral Bycatch Collection Forms

Vessel: _____ Captain's Signature _____ Factory Manager Observer's Signature _____

Date	Tow No.	Feature Code	Time net		Depth (m)		Coral Bycatch (kgs)					Comments on corals Tree-like, branching, spiral, whip-like, cup-like. Indicate colour, especially for octocorals.
			On bottom	Off bottom	Start	Finish	Black	Stony (branching & cup)	Sea Fan (Octocorals e.g. bubblegum, bamboo)	Soft / Sea Pen / anemones	Other invertebrates ²	

² sponges, ?sea firs, sea pen, crabs/lobsters, snails, clams, sea stars, sea urchins, sea cucumbers. With stony corals indicate if these are branching reef-building corals and solitary cup corals. Sea pens, which are corals, are to be included the soft corals.

Coral Bycatch Record (Revised Form)

Date mm/dd	Tow No.	Feature/ Area Code	Kg									Comments
			bamboo	Black	Bubble- gum	Sea Pen	Sponge	Hydroids	Urchin		Other invertebrates ³	

³ Crabs/lobsters, snails, clams, sea stars. With stony corals indicate if these are branching reef-building corals and solitary cup corals.

