2nd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee
13-17 March 2017, Saint Denis, La Reunion

SC -02 -04 [01]

National Report – Cook Islands

Relates to agenda item: 4 Working paper ☒ info paper ☐

Delegation of the Cook Islands

Abstract

This paper provides an overview of the trawl fishing activities within the high seas of the Southern Indian Ocean by Cook Islands vessels. It highlights activities during 2016 and takes the form of the Cook Islands National Report.

Aggregated catch and effort- by Cook Islands vessels for midwater and bottom trawl activities are presented here.

Recommendation

The meeting is invited to consider the Cook Islands National Report

Ministry *of* Marine Resources

GOVERNMENT OF THE COOK ISLANDS

SOUTHERN INDIAN OCEAN FISHERIES AGREEMENT

Cook Islands National Report

2016

Prepared by
Tim Costelloe[1] and Graham Patchell[2]

[1] Director Offshore, Ministry of Marine Resources, Cook Islands
[2] Resources Manager, Sealord Group Limited

This report provides an overview of the trawl fishing activities within the high seas of the Southern Indian Ocean by Cook Islands vessels, and highlights activities during 2016.

In 2016 the Cook Islands authorised two vessels to operate in the SIOFA Area, pursuant to High Seas fishing authorisations issued by the Ministry of Marine Resources (MMR). These vessels target deep-water finfish species, primarily *(Beryx splendens)* and Orange Roughy *(Hoplosthethus atlanticus)* using both bottom and midwater trawl fishing methods. A list of species is given in Appendix 1.

After recommendation by the First Scientific Committee to close Benthic Protected Areas, and the recommendation made by the Third Meeting of the Parties for all Contracting Parties to note this advice, Cook Islands vessels are not permitted to fish within the areas listed in Appendix 2 of this national report, and additionally do not fish on the Del Cano Rise.

Catch is unloaded in Mauritius and South Africa. Alfonsino are generally exported to Japan and Orange Roughy mainly to China or elsewhere in Asia for reprocessing and preparation for the USA markets. Some catch is sold in the local markets in Mauritius and South Africa.

1. CATCH DATA

In line with confidentiality restrictions that prevent the disclosure of fishing activity when only two vessels are active, catch data is not presented for Cook Islands operations in the SIOFA area as these data form part of the public record of SIOFA.

The three top species captured by weight in 2016 were: Alfonsino (64%), Orange Roughy (23%), and Cardinal (7%) (Table 1). These species comprised 87% of the total catch. Alfonsino is the species most commonly caught in this fishery since 2006 (

Figure **1**). Fishing effort peaked in 2010 at 621 days fished when there were 3 Cook Islands vessels in the fishery. Effort has remained steady over recent years. This table has been corrected from the 2015 report, which erroneously indicated increasing effort in the fishery over recent years.

Table 1 Summary table of catch composition and fishing effort from 2011 – 2016.

% of Total Catch	No. Shots	Days Fished	BYX	BNS	BOE	SSO	SOR	ORH	CDL	BBF	BOR	OTHER
2011	1899	590	55%	0.3%	0.1%	0.2%	2.4%	28.7%	4.9%	4.9%	3.5%	0.4%
2012	1781	490	76%	0.6%	0.1%	0.1%	1.6%	18.1%	2.2%	0.9%	0.6%	0.0%
2013	1601	524	61%	1.4%	0.1%	0.0%	1.2%	23.2%	3.7%	4.4%	4.5%	0.4%
2014	1971	523	66%	1.3%	0.1%	0.5%	2.1%	19.0%	6.7%	3.2%	0.8%	0.4%
2015	2729	501	63%	0.4%	0.0%	0.0%	0.0%	23.4%	5.7%	2.6%	2.0%	2.8%
2016	1999	455	64%	0.2%	0.1%	0.2%	0.0%	22.9%	7.1%	1.3%	2.8%	1.3%

2. EFFORT DATA

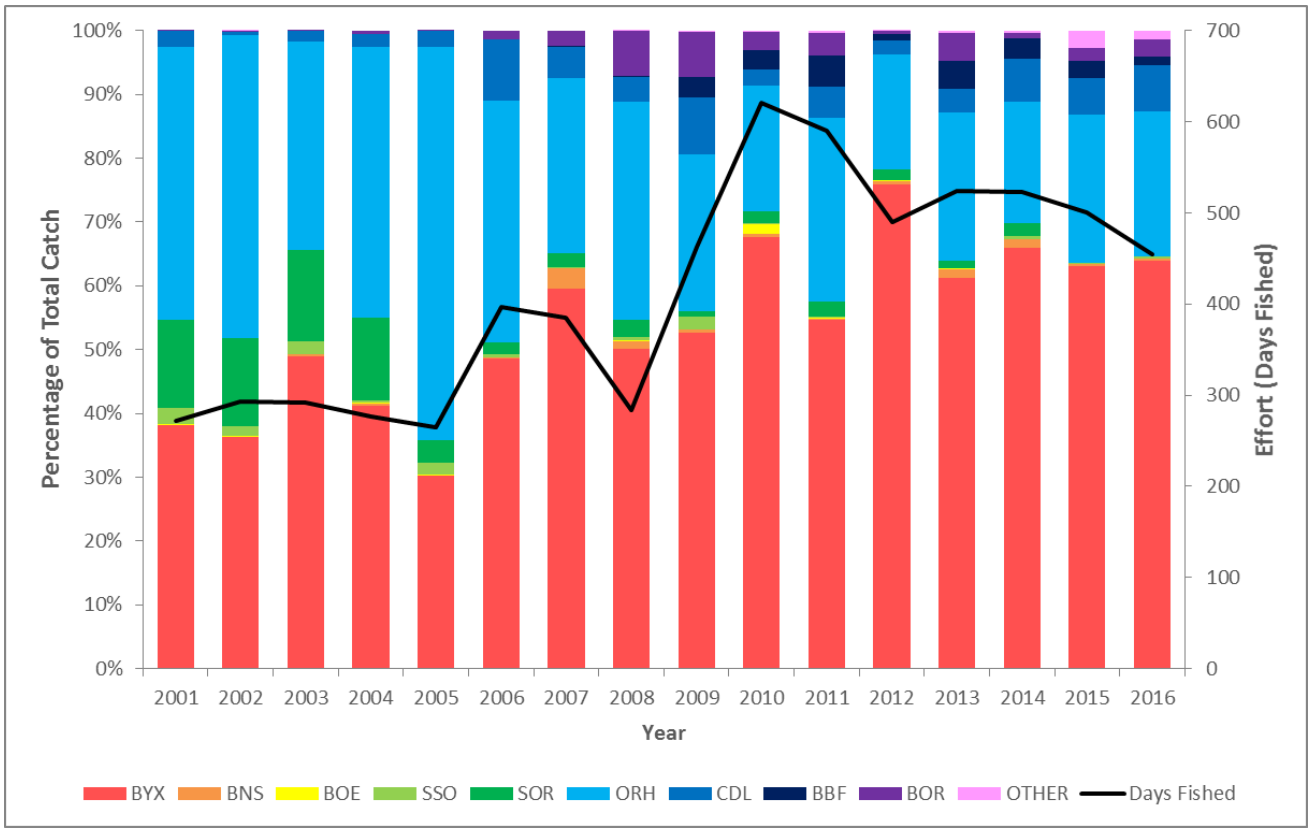
The split in effort between bottom trawl and midwater trawls (Table 2) varies between years, and is driven by changing markets and exchange rates. Both vessels actively fished throughout 2016, but the time needed for the five year maritime surveys for each vessel reduced the operational sea days. The number of midwater trawl shots for Alfonsino significantly increased from 2011 to 2016.

Table 2 Cook Islands Vessel Effort 2011-2016

Year	Total trawls	Midwater	Bottom	Days Fished	Days at sea
2011	1899	1088	728	590	664
2012	1781	1357	424	490	602
2013	1601	1118	483	524	636
2014	1971	1406	565	523	645
2015	2729	2050	679	501	604
2016	1999	1909	590	455	544

'Midwater trawl' is defined as fishing with a pelagic net designed for off-bottom fishing, but may include occasional contact with the sea floor.

Figure 1: Trawl catch by species and effort in the SIOFA Area from 2001 – 2016.



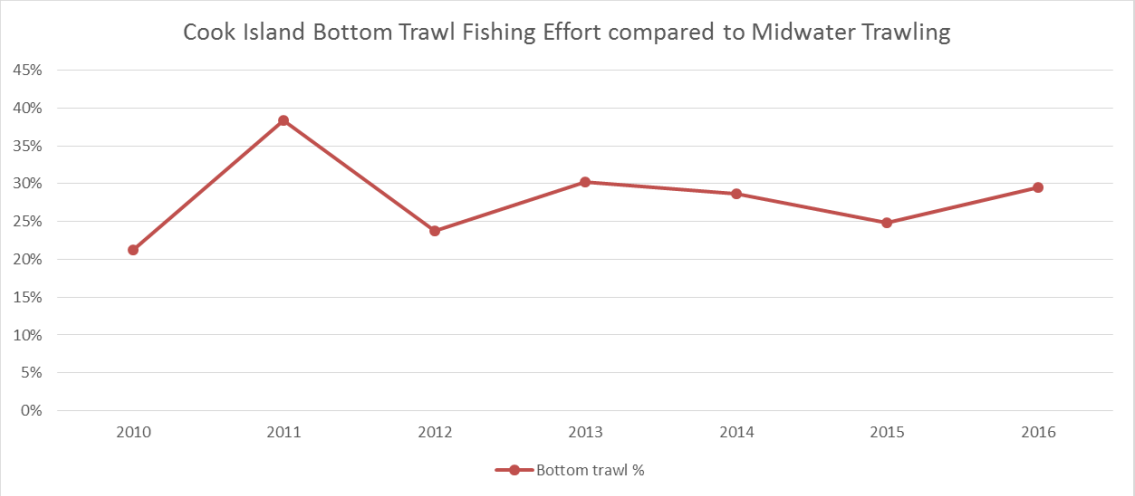
3. DESCRIPTION OF FISHERIES

In 2016, the Cook Islands authorised two vessels to operate in the SIOFA area. The two vessels have been the only Cook Islands vessels in the fishery since 2012. Prior to 2012 three additional vessels were authorised to operate in various years, however only limited data is available from these vessel operations. The two vessels are the FV Will Watch and the FV Nikko Maru No.1.

4. CATCH PER UNIT EFFORT (CPUE) SUMMARIES

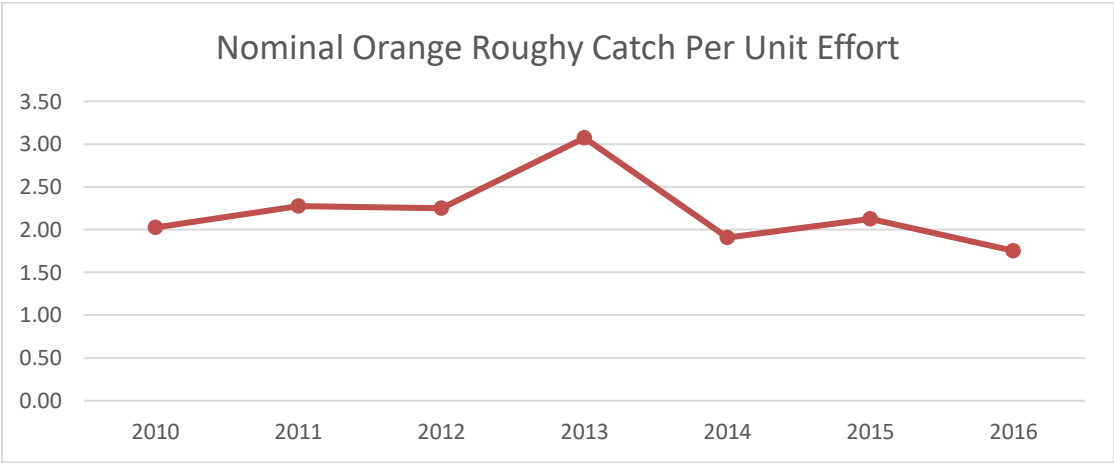
Bottom trawling comprised about 30% of the Cook Islands fishing footprint in the SIOFA area in 2016 (Figure 2). Midwater Trawling for Alfonsino remained the major target species in the fishery.

Figure 2: Cook Islands Bottom Trawl Effort 2010-2016



Orange Roughy CPUE (tonnes per hour fished) remained relatively constant in 2016 (Figure 2). However, the Cook Islands position is that CPUE, by itself, is not an appropriate index to establish the status of Orange Roughy fish stocks.

Figure 3: Orange Roughy Catch per Unit Effort 2010-2016

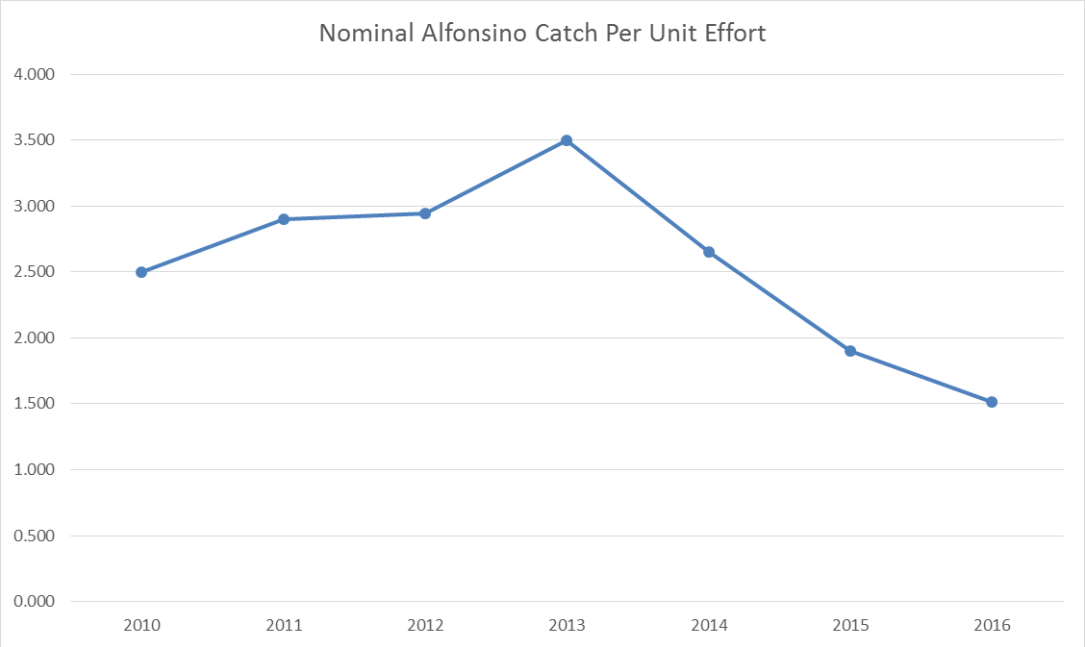


Interpreting catch per unit effort in targeted fisheries is complex and if not done appropriately can result in errors of interpretation. It can be useful to see how CPUE changes on an annual basis and, in the absence of other data, trends in CPUE provide the only indicator as to the state of a stock. However to increase fishing effort in any fishery where there is a decline in CPUE is not considered precautionary practice. Decline in CPUE therefore indicates that further management steps should be taken to assess the state of the fishery.

Alfonsino catch per unit effort (tonnes per hour fished) for the Cook Islands vessels has steadily reduced over recent years (Figure 4). The Cook Islands is concerned about the state of this fishery and

requests the Scientific Committee to establish a Working Group to develop management and harvest strategies for this fishery, to commence in 2017.

Figure 4: Alfonsino Catch per Unit Effort 2010-2016



5 FISHERIES DATA COLLECTION

Cook Islands vessels possess High Seas fishing authorisations that are valid for one year. These authorisations are issued in accordance with Section 21 and Section 35 of the Marine Resources Act 2005. Vessels also enter into access agreements with the Ministry of Marine Resources, valid for five years. This allows them to fish in areas beyond national jurisdiction.

Cook Islands legislation requires vessels carrying High Seas authorisations to record daily information on catch and effort, including position information. Original log sheets are sent to MMR where they are entered into a database. In 2016 the MMR did not monitor landings in port. Cook Islands vessels unloaded to either Mauritius or South Africa and were monitored by the port state fisheries agencies. Landing information was then sent to MMR for oversight and verification.

All vessels are required to carry automatic location communicators. Trawl vessels are prohibited from targeting sharks, but where sharks are caught in the normal operations of the vessel they are required to be handled in a manner that affords them the best chance of survival. In 2014 and 2015 Cook Islands staff and vessel crews were heavily involved in FAO Shark workshops in Mauritius to develop identification guides for the SIOFA region; and further in the development of live release techniques for deepwater sharks under the USA sponsored “Assembling the Tree of Life” program.

For many years Cook Islands vessels have maintained shark catch records from all trawl shots, and in 2016 the data from FV Will Watch was provided to the Australian Bureau of Agricultural and Resource Economics and Sciences Department of Agriculture and Water Resources for a Deepwater Shark Ecological Risk Assessment (ERA).

6 RESEARCH ACTIVITIES

All Cook Islands vessels follow the scientific data guidelines originally developed by the Southern Indian Ocean Deepsea Fisher's Association (SIODFA), as described in 2006 FAO Fisheries Circular 1020 (Management of Demersal Fisheries Resources of the Southern Indian Ocean – Shotton 2006), and updated in 2012 (FAO 2012). The 2012 document includes sampling methods for Alfonsino and recommendations on how to conduct acoustic surveys.

The FAO report was provided by Cook Islands to the 2016 Scientific Committee as a background paper with the aim of providing information to build the repository of scientific and technical papers for the Scientific Committee. The Cook Islands view is that this paper should be reviewed in 2017 as a working paper for the Scientific Committee.

Acoustics methods have become the standard approach to evaluate Orange Roughy and Alfonsino biomass in fisheries in New Zealand, Australia and Chile, using highly developed management procedures. In these countries, industry vessels have played an important support role to management, from passive acoustic data logging to full responsibility to undertake annual surveys. Catch per unit effort analyses, or meta-analysis techniques, are no longer acceptable for stock assessments by scientific working groups in both New Zealand and Australia.

A recommended acoustic methods approach was confirmed by an FAO workshop in 2016, as described in the draft review "Global Review of Orange Roughy (*Hoplostethus atlanticus*), Their Fisheries, Biology and Management". The Executive Summary therein notes:

"There are a number of considered published documents that discuss whether it is possible to have a sustainable Orange Roughy fishery (or other deepwater fishery for long-lived species). These views are born out of the common global experience of 'boom and bust' Orange Roughy fisheries that frequently left depleted fisheries and where there was little understanding about the timescale for recovery.

"The more recent experience, with improved technology, better approaches to modelling population dynamics in Orange Roughy, and a more considered and robust approach to setting up the management framework (harvest strategy, management strategy evaluation, appropriately estimated limit and target reference points or ranges, and harvest control rules) provides a different paradigm. Essentially, previous assumptions about the unmanageability of these fisheries are flawed and that provided appropriate steps are taken to set and deliver a low and appropriate level of fishing mortality, Orange Roughy fisheries can be both managed and sustainable.

"This review contrasts these two perspectives and, whilst it is early days, the message has clearly changed: sustainable Orange Roughy fisheries should be achievable."

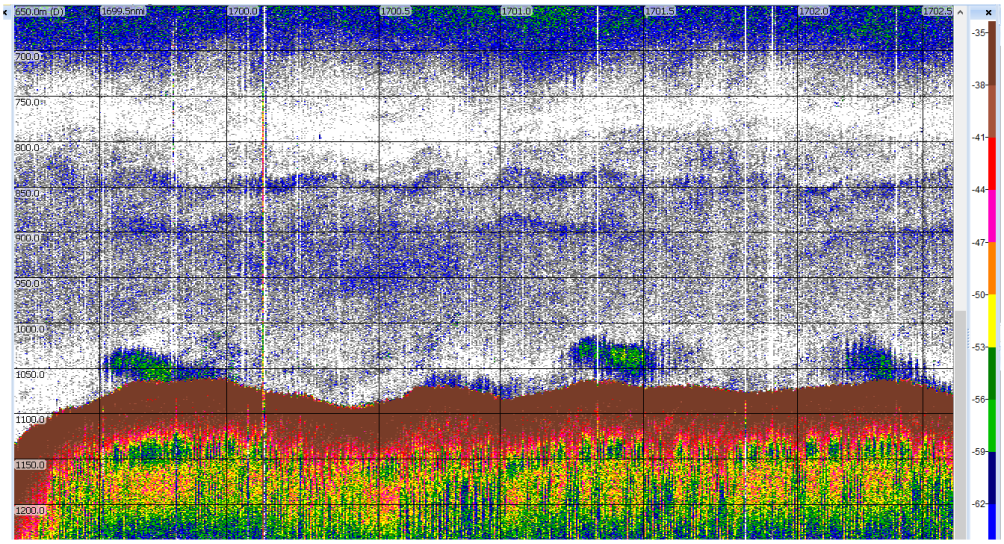
The Cook Islands notes that at the end of 2016, three major Orange Roughy fisheries in New Zealand were certified by the Marine Stewardship Council, a first for Orange Roughy stocks. A proposal to take Cook Islands vessels into an MSC pre-assessment is therefore proposed for 2017.

All Cook Islands vessels are required to undertake commercial fishing vessel surveys with calibrated echo-sounders, as recommended by the FAO Expert Consultations (FAO 2012) and the FAO Deepsea

Guidelines (FAO 2009). A number of acoustic surveys on Orange Roughy were carried out in 2016, including a full survey on a stock that was thought to be depleted in 2000-01. The survey transect in

Figure 5 shows an echogram of an aggregation of Orange Roughy schooling to over 50 metres high and covering an area of over 2 square miles. A quadrant failure in a new transducer was detected in the analysis of the data, which has reduced the quantitative value of this survey. A new survey will therefore be conducted in 2017.

Figure 5: Echogram showing survey of a rebuilding Orange Roughy aggregation



Ongoing acoustic surveys were carried out across the Southwest Indian Ocean on commercial fishing vessels, with trialling of a full wideband (Simrad EK80) acoustic system in late 2016, covering the 30-90 kHz range. These surveys are expected to return improved ground habitat discrimination and better discrimination of fish targets. Broadband acoustic technology should provide more robust biomass estimates of Alfonsino and other midwater species for use in stock assessments.

The collection of mesopelagic samples for CSIRO continued in 2016, and calibrated acoustic transect data was provided to the Australian Integrated Marine Observing System (IMOS) for use by scientists around the world (via the IMOS BASOOP data portal). This included a single broadband 30-90 kHz survey across the Indian Ocean from 60° E to 90° E in December 2016.

Development of real-time fibre-optic broadband cable capability for use in the Indian Ocean continued in 2016.This provided real time observations of the net from the vessel's bridge, and hence the ability to observe and react to VMEs in real time. A key pre-requisite was the successful development of full electronic control cable release from the trawl net achieved in July 2016.

Addenda: In January 2017, FAO convened a workshop under the ABNJ program to review the acoustic studies in the Indian Ocean that were presented at SC-01, which were then recommended for review by the Meeting of the Parties at SIOFA III. The workshop provided an opportunity for experts to review and recommend further work in 2017. The interim report of this workshop is included as a working paper to SC II, and outlines important advice for research activities in 2017.

7 VME THRESHOLDS FOR BOTTOM FISHING ACTIVITY

The Cook Islands has a policy for maintenance and protection of biodiversity, taking into account Resolution 61/105 adopted by UNGA at the 61st Plenary Meeting on 8 December 2006 and subsequent resolutions of the United Nations General Assembly (UNGA) that call on states to implement measures for the High Seas, in accordance with a precautionary approach and ecosystem approaches to fisheries management.

The Cook Islands notes that other RFMOs have progressed to spatial management as standardised conservation and management measure to minimise bottom fishing impacts, in preference to move-on rules. This development recognises holistic management values achieved via spatial management that are not possible within a move-on rule framework.

The Cook Islands fully supports the use of Benthic Protected Areas (BPA) conservation closures to meet the requirements of Resolution 61/105. Many areas in SIOFA are already identified and closed to Cook Islands vessels due to the potential for significant adverse impact on known VMEs by bottom trawling activity. Others were closed as a precautionary measure to maintain and protect biodiversity.

Findings by FAO and Observers on board who monitor benthic encounters indicate that there have been low encounter rates by Cook Islands vessels. MMR and Industry have together developed an advanced encounter protocol over a number of years to include holistic management approaches, either by moving off encounter areas, or more significantly by voluntary BPA fishing closures. The BPA closures were not generally implemented by the Meeting of the Parties in 2016, despite being recommended by the first Scientific Committee. The Cook Islands position is that the Scientific Committee should strongly reiterate this recommendation to generally close the BPAs in 2017; to be achieved by an amendment of CMM 2016/01 to include BPA conservation closures.

There are a large number of isolated seafloor features in the Indian Ocean. Strong and variable currents can affect target fishing. The Cook Island VME encounter protocol requires that for a trawl tow, the presence of more than 60 kg of live coral and/or 400 kg of live sponge indicates a VME encounter that must be reported to Cook Island Ministry of Marine Resources within 24 hours. If any subsequent trawl within 1nm of the encounter trawl contains more than 30 kg of live coral/and or 200 kg of live sponge the vessel must not fish within 5nm of that area until the Ministry of Marine Resources has completed an investigation. However, if the vessel deploys an underwater camera system on the trawl net, and the Cook Islands Observer verifies that no substantial VME structures (such as a Cold water reef community) are present, fishing can continue.

Because of the complex ridge and rocky benthic habitat and variable ocean currents in the Indian Ocean, the species targeted in SIOFA are often only accessible to fishing for short periods. The protocol is therefore designed to avoid a fishery being closed unnecessarily because of a trawl net being pushed significantly away from a known trawl lane by currents and causing an accidental encounter. Some regions of relatively flat deepwater habitat also have large numbers of 100kg – 5000 kg boulders that may be rolled into a bottom trawl which have, in the past, sometimes been declared as VMEs by Fisheries Observers. This classification is problematic in that granite or basalt rocks are not likely to be rare, endemic nor significant habitats.

Cook Islands vessels intending to transit any Benthic Protected Area shall:

a. Give at least 24 hours advance notice to MMR prior to entering or exiting any Benthic Protected Areas;
b. Ensure their vessel monitoring system polls once every hour while in the Benthic Protected Area; and
c. Require that fishing gear is properly stowed before entering, and in transit through, a Benthic Protected Area and not able to be deployed.

In 2016 there were 590 bottom trawl shots carried out by Cook Islands vessels. The VME indicator list from the FAO VME database accessed by the vessels includes 52 items, with 115 items observed caught. One trawl caught 60 kg of stony coral when a strong current pushed the trawl into an area known as "Suicide Drive". Subsequent trawls on this seamount did not hit the 30 kg trigger. This area is now under consideration by the Cook Islands as a potential "no bottom contact area", in line with the spatial management program recommended by the UNGA.

8. BIOLOGICAL SAMPLING AND LENGTH/AGE COMPOSITION OF CATCHES

A large set of biological data on the two major target species has been collected by Cook Islands vessels since 2004. The bulk of the data has been collected by vessel crews, with some also collected by Cook Islands Observers or scientists on specific voyages. Length frequency distributions of Orange Roughy vary significantly within the SIOFA area, as reported in 2016 (SC-01-INFO- 15). In total, 50,369 Orange Roughy were sampled for length, weight, sex and maturation from 522 target trawls shots between 2004 and 2015. In 2016 another 4878 samples were added to the database. In particular for the previously heavily fished aggregation shown in Figure 6 the size composition data are similar to that from nearby aggregations that have been lightly fished (Figure 7). Otoliths have been collected for both aggregations, but not yet aged. A time series of acoustic surveys is available that may assist in determining movement from one aggregation to another, and may be important for interpreting future stock assessments.

Figure 6: Length frequencies of Orange Roughy in a Walter's Shoal stock (Porky's)

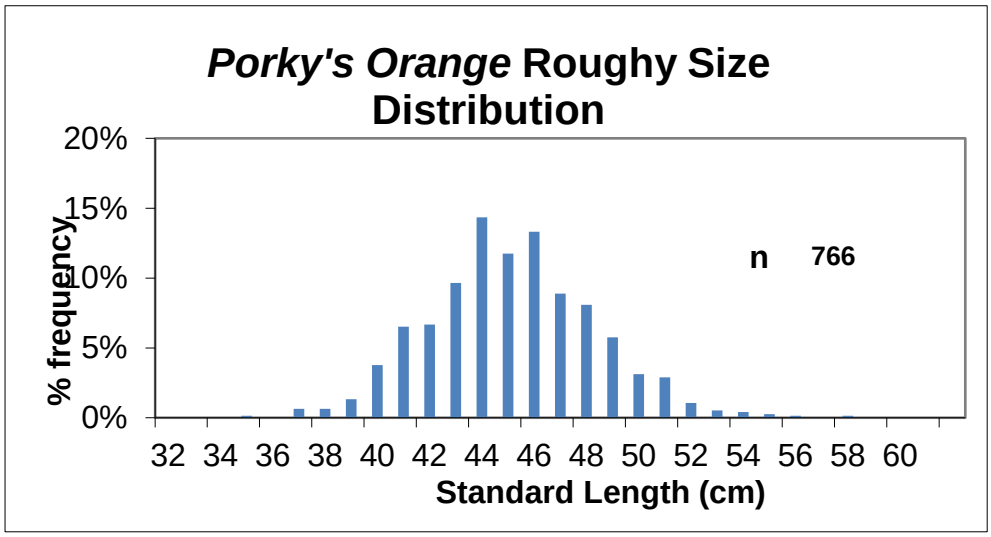
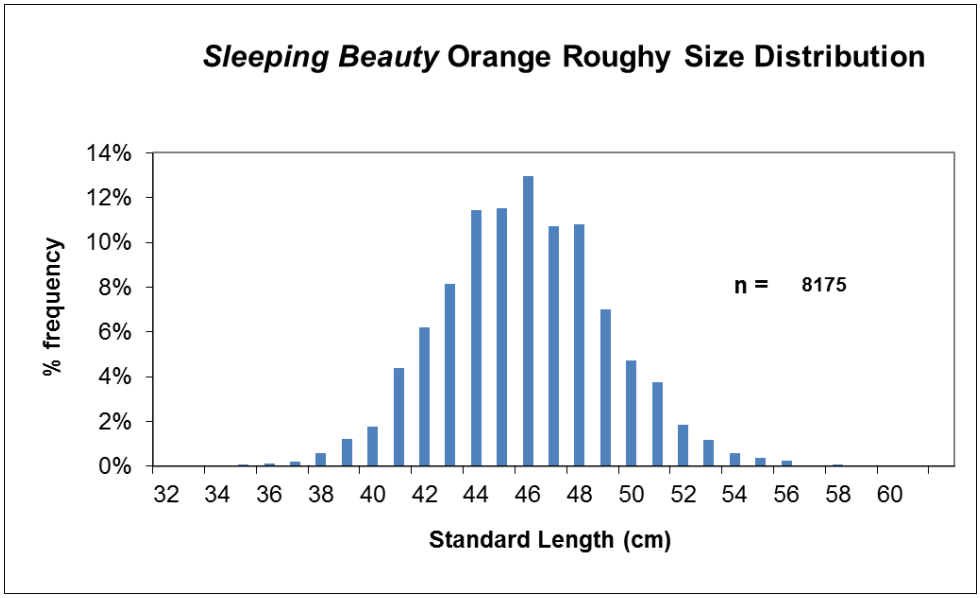


Figure 7: Length frequency of Orange Roughy in a Walter's Shoal stock



The size distribution of the target trawling by FV *Will Watch* for Alfonsino in 2015-2016 is shown in Figures 8 and 9. For the target fishery most fish were in the 36-45 cm range in both the Southwest Indian Ridge and Eastern Indian Ocean, and in the age range 7-15 years.

Figure 8: FV *Will Watch* Alfonsino Target Fishery Size Distribution 2016

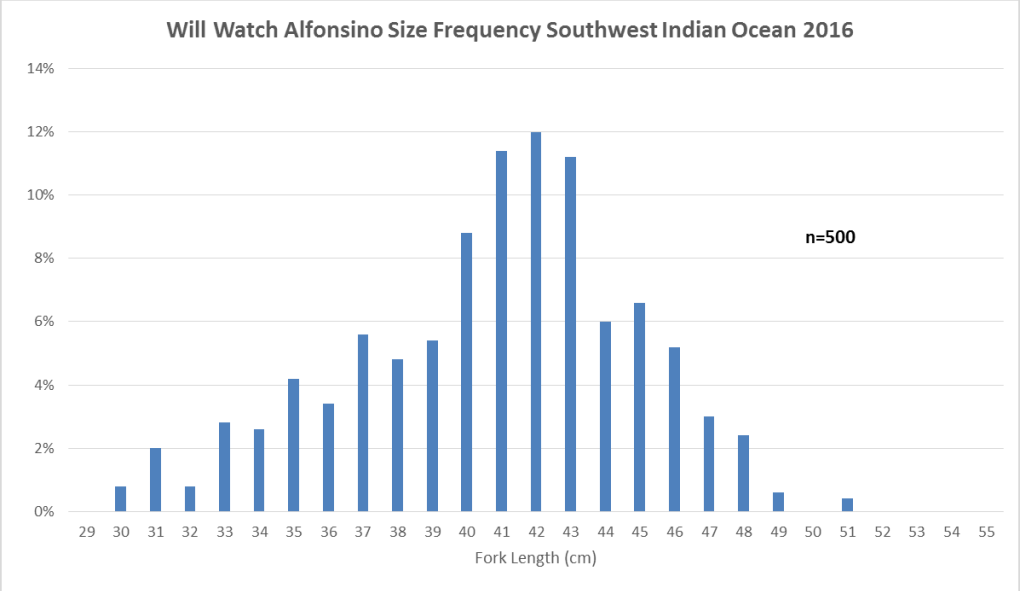
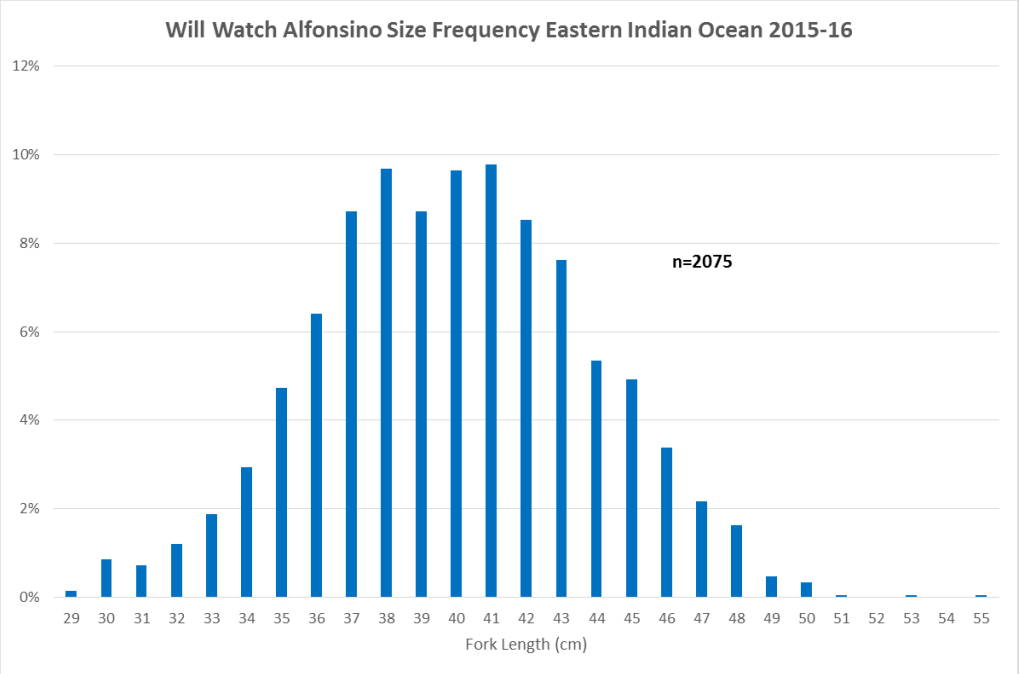


Figure 9: FV *Will Watch* Alfonsino Target Fishery Size Distribution Eastern Indian Ocean 2015-16



For FV Nikko Maru No. 1 the size distribution obtained in two voyages is shown in Figure 10. As a proportion of the adult stock, in 2016 evidence points to of a surfeit of 30-40 cm fish in the southwest Indian Ocean compared with the Eastern Indian Ocean (Figure 11).

Figure 10: *Nikko Maru No 1* Alfonsino Size Distribution Southwest Indian Ocean 2016

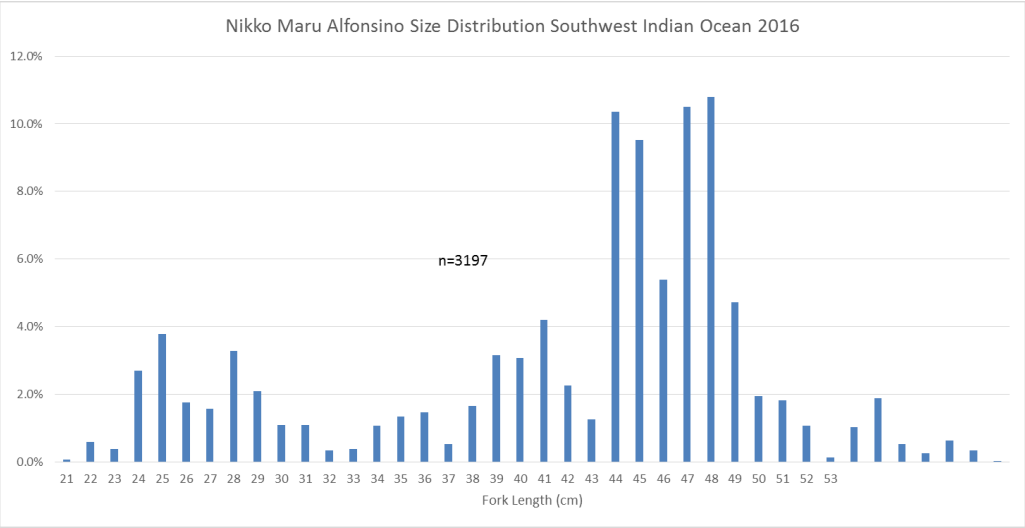
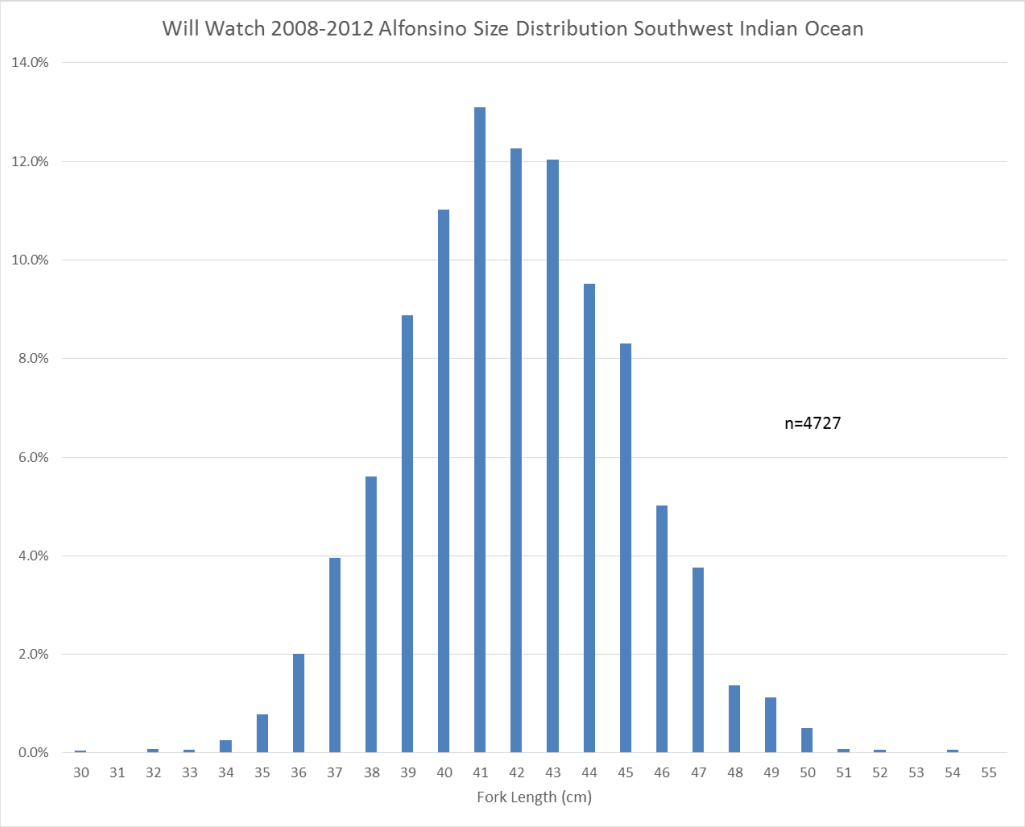


Figure 11: *Will Watch* Alfonsino Size Distribution Southwest Indian Ocean 2008-2012



9. OBSERVER PROGRAM

A Cook Islands observer program for SIOFA vessels began in 2015, with 33% coverage on vessel trips. Prior to 2015, an arrangement existed between FAO, the companies and MMR where coverage was established. Reports from these projects are available.

The Cook Islands is currently planning trawl observer training for observers in accordance with CMM2016/01. The Cook Islands Head of Delegation at SIOFA III did clearly state that 100% coverage on Cook Islands vessels may not be achievable until at least 2018, but the Cook Islands has planned to build toward 100% coverage during 2017.

10. PORT SAMPLING PROGRAM

The Cook Islands do not currently have a port sampling program for its trawl vessels operating in the SIOFA area, but vessels are monitored by the port landing state.

FV *Nikko Maru No. 1* typically discharges in Cape Town, South Africa. A "Permit to Enter the Exclusive Economic Zone and to be in Possession of Fishing Gear" issued by the South African Department of Agriculture Forestry and Fisheries is required, stipulating the quantities of marine resources to be discharged. These permits must be issued at least 24 hours in advance and are good for one vessel entry. Various conditions apply to the issue of the permit such as the following:

> "The skipper of the foreign vessel is required to accurately report the weight of the catch on board by species. Any fish exceeding the 15% tolerance limit by species shall be considered to be deliberately misreported and may be confiscated. The skipper may also be liable to pay a fine in this regard. These matters may also be brought to the attention of the relevant Regional Fisheries Management Organizations and flag states"; and,

> "When offloading is being monitored by the Fishery Control Officer or Monitor, all fish must be offloaded in a manner which will allow the total weight of each species to be determined."

FV *Will Watch* discharges in Port Louis, Mauritius. Landings in Mauritius are governed by the Government Notice No. 27 of 2012 Fisheries and Marine Resources Act Regulations under section 74 of the Fisheries and Marine Resources Act.

> "On arrival of the consignment, the registered person or his agent shall – (a) notify the authorized officer of the date of arrival of the consignment at least 48 hours in advance; (b) submit relevant import documents for verification; (c) request for an inspection at the port of entry; and (d) make arrangement for inspection of the consignment at the port of entry. (3) The importer shall ensure that the consignment of fish, or fish product, is not removed from the port before it is inspected and approved by an authorized officer. (4) Any consignment of fish or fish product, landed at the port of entry, shall be inspected in the presence of the importer or his agent."

11. SOCIAL AND ECONOMIC INFORMATION

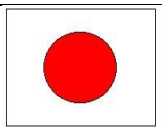
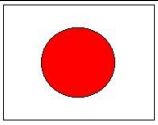
Cook Islands vessels in SIOFA are based in Port Louis, Mauritius and Capetown, South Africa.

Services obtained from operational bases in the two countries are:

- Support for the vessels, victualling, bunkering and supply of other vessel operations;
- Support for vessel maintenance including dry-dock, vessel repairs and maintenance;
- Service facilities for shore movements for crews, officers and management;
- Stevedoring for product discharge and cold store services;
- Product export services, including health and sanitation certifications, and;
- Local vessel agents

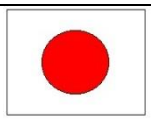
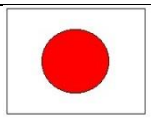
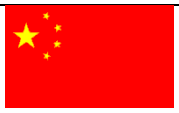
The economic activity associated with the operations of the vessels primarily accrues to the countries of operation in a risk free manner.

Table 3: National Origin of the Beneficial Owners

Vessel	State of Beneficial Owners		
F.V. *Nikko Maru No. 1*	 Japan	 South Africa	Japanese – South African ownership
F.V. *Will Watch*	 Japan	 New Zealand	Japanese – New Zealand ownership

Each operator has developed a marketing strategy that is appropriate for the mix of species landed, reflecting the historical and current area of operations of each joint-venture partner. In general, higher value species and high grade product are sold in Japan and the United States, but also to China. Some product is sold on the South African and Mauritian domestic markets.

Table 4: Principal Market States of Cook Island Operators 2008

Vessel	Market State			
F.V. Nikko Maru No. 1	 Japan	 South Africa		
F.V. Will Watch	 Japan	 USA	 China	 Mauritius

Vessel crews are mostly contracted from either Indonesia or the Philippines. Officers and Engineers are generally from New Zealand. Around 85% of crew are from developing countries.

Table 5: Composition of Crew Nationalities of Cook Islands Vessels

	 New Zealand	 South Africa	 Philippines	 Namibia	 Indonesia	 Australia	 Japan	 Fiji	**Total**
F.V. Nikko Maru No. 1 ***2008***	5 6.25%	26 32.5%		24 30.0%	22 27.5%	1 1.25%	2 2.5%		80
F.V. Nikko Maru No. 1 ***2017***	4 6.90%	6 10.34 %6		14 24.14 %	31 53.45%		3 5.17 %		58
F.V. Will Watch ***2008***	16 24.2%		50 75.8%						66
F.V. Will Watch ***2017***	6 14.6%		34 82.3%					1 2.4%	41
Totals 2008 2017	21 10	26 6	50 34	24 14	22 31	1 -	2 3	- 1	146 99

Data collected shows that for many crew the fishery has afforded long-term stable continuity of employment, which is a strong indication of the social conditions of employment. Table 6 shows the distribution of length of employment in the fishery.

Table 6: Distribution of Periods of Number of Years of Employment

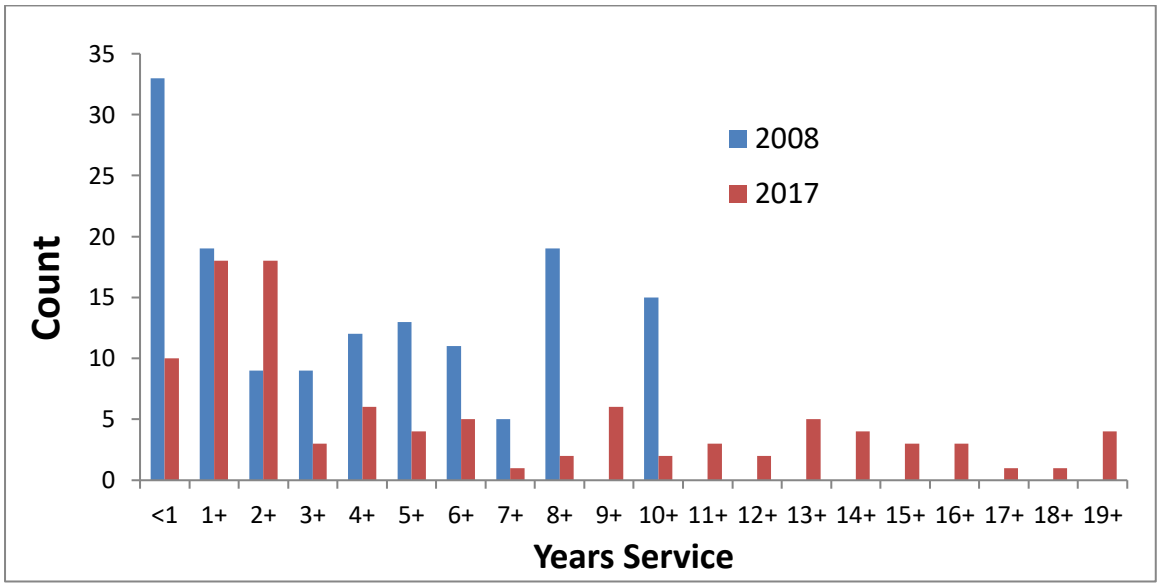


Figure 12 shows that many crew employed in 2008 have continued in employment through to 2017, indicating employment conditions on the vessel meet long-term job satisfaction expectations.

Figure 12: The cumulative count of crew numbers as a function of years of service.

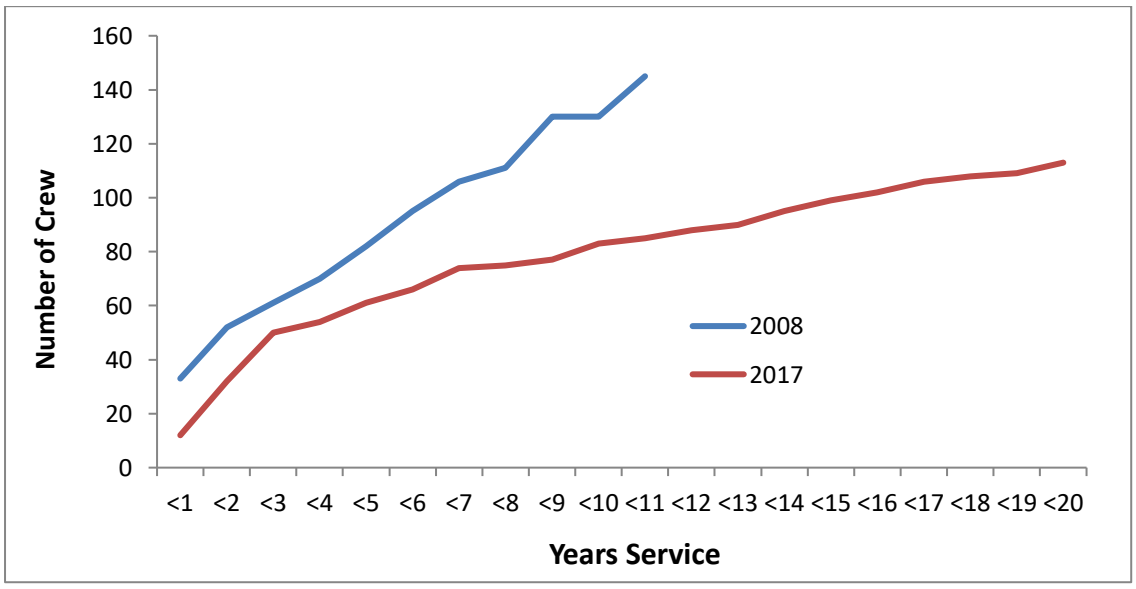


Table 7 below shows the total number of dependents of crew. Direct dependents here are defined as those living in the same residence as the crew member. Indirect dependents are those not living at home but receiving regular financial assistance on which they are dependent.

Table 7: Characteristics of Dependents of SIODFA Crew Members

Vessel	Total Number of Dependents	Survey and estimate	
		direct dependents	indirect dependents
2007 – 146 staff	409	199	210
2017 – 122 staff	619	333	286

741 employees and dependents are currently directly supported by the operation of these two Cook Islands vessels. In addition there are socio-economic benefits created in the region by the vessel support and product handling services in Port Louis and Capetown.

Table 8 shows staff promotions aboard vessels. Some crew have been promoted more than once, but this is not reflected in the table.

Table 8: Staff Promotions on Cook Islands Vessels

Vessel	Number of crew receiving promotions	Total Crew
F.V. *Nikko Maru No. 1*	20 (34.5%)	58
F.V. *Will Watch*	23 (56.1%)	41

Length of service, ability to provide for dependents and frequency of staff promotion, taken together, all indicate a positive workplace environment aboard Cook Islands vessels.

Appendix 1

List of common and scientific names.

FAO Code	Common Name	Scientific Name
BYX	Alfonsino	*Beryx splendens*
BOE	Black Oreo	*Allocyttus niger*
BBF	Black Butter Fish	*Hyperoglyphe moselii*
BNS	Blue nose	*Hyperoglyphe antarctica*
BOR	Boarfish	*Pentaceros richardsoni*
CDL	Cardinal fish	Family Apogonidae
ORY	Orange Roughy	*Hoplostethus atlanticus*
SSO	Smooth Oreo Dory	*Pseudocyttus maculatus*
SOR	Spiky Oreo Dory	*Neocyttus rhomboidalis*

Appendix 2

Benthic Protected Areas.

	Area	Coordinates			
		Lat (S)	Long (E)	Lat (S)	Long (E)
1	*Gulden Draak*	28° 00'	98° 00'	29° 00'	99° 00'
2	*Rusky*	31° 20'	94° 55'	31° 30'	95° 00'
3	*Fools Flat*	31° 30'	94° 40'	31° 40'	95° 00'
4	*East Broken Ridge*	32° 50'	100° 50'	33° 25'	101° 40'
5	*Mid-Indian Ridge*	13° 00'	64° 00'	15° 50'	68° 00'
6	*Atlantis Bank*	32° 00'	57° 00'	32° 50'	58° 00'
7	*Bridle*	38° 03'	49° 00'	38° 45'	50° 00'
8	*Walters Shoal*	33° 00'	43° 10'	33° 20'	44° 10'
9	*Coral*	41° 00'	42° 00'	41° 40'	44° 00'
10	*South Indian Ridge* (North/South) *this region abuts the CCAMLR-managed one to the south and lies between the South African EEZ around Prince Edward and Marion Islands to the west and the French EEZ surrounding Crozet Island to the east. The estimated points of contact wi1h the EEZ areas are: 44°S. 40.878° E: 44°S. 46.544° E: 45°S, 42.124° E: 45°S, 45.711°E.*	44° 00' 45° 00'	40.878° 00' 42.124° 00'	44° 00' 45° 00'	46.544° 00' 45.711° 00'
11	*Banana*	30° 20'	45° 40'	30° 30'	46° 00'
12	*Middle of What (MoW)*	37° 54'	50° 23'	37° 56.5. 5'	50° 27'

References

FAO 2009. International Guidelines for the Management of Deep-sea Fisheries in the High Seas. Rome, FAO. 2009. 73p.

FAO 2012. Fishing vessel execution of acoustic surveys of deep-sea species: main issues and way forward. FAO Fisheries and Aquaculture Circular. No. 1059. Rome. 91 pp.

Shotton, R. (Comp.) 2006. Management of Demersal Fisheries Resources of the Southern Indian Ocean. Report of the fourth and fifth Ad Hoc Meetings on Potential Management Initiatives of Deepwater Fisheries Operators in the Southern Indian Ocean (Kameeldrift East, South Africa, 12 – 19 February 2006 and Albion, Petitie Revière, Mauritius 26-28 April 2006) including specification of benthic protected areas and a 2006 programme of fisheries research. FAO Fish. Circ. 1020. 90pp.