SC-03-06.2(01)

3rd Meeting of the Southern Indian Ocean Fisheries Agreement (SIOFA) Scientific Committee

20-24 March 2017, Saint Denis, La Reunion

Provisional Bottom Fishing Impact Assessment for Japanese bottom trawl fisheries in SIOFA convention area

Relates to agenda item: 6.2   Working paper ☒ Info paper ☐

Delegation of Japan

Abstract

This document reports the provisional Bottom Fishing Impact Assessment for Japanese bottom trawl fishery in the SIOFA convention area (CA) in accordance with CMM 2017/01 para. 14 and SIOFA BFIAS (Annex I, SC2 Report). In SIOFA CA, only three exploratory research fishing cruises were conducted by Japanese bottom trawl vessels in 1977, 1978, and 2012. Based on best available information, Japan conducted the impact assessment on Japan's bottom trawl fishing operations.

At present, there is no schedule for bottom trawl operation by Japanese vessels in SIOFA area. This document reports impact assessment based on past operation records. In the future, when a Japanese vessel carries out bottom trawling operation in SIOFA area, the revised BFIA will prepared based on the operation plan.

Recommendations *(working papers only)*

There is no specific recommendation.

Provisional Bottom Fishing Impact Assessment for Japanese bottom trawl fisheries in SIOFA convention area

Delegation of Japan (edited by Takehiro Okuda and Tsutomu Nishida)

This document reports the provisional Bottom Fishing Impact Assessment for Japanese bottom trawl fishery in the SIOFA convention area (CA) in accordance with CMM 2017/01 para. 14 and SIOFA BFIAS (Annex I, SC2 Report). In SIOFA CA, only three exploratory research fishing cruises were conducted by Japanese bottom trawl vessels in 1977, 1978, and 2012. Based on best available information, Japan conducted the impact assessment on Japan's bottom trawl fishing operations.

At present, there is no schedule for bottom trawl operation by Japanese vessels in SIOFA area. This document reports impact assessment based on past operation records. In the future, when a Japanese vessel carries out bottom trawling operation in SIOFA area, the revised BFIA will prepared based on the operation plan.

1) Description of the Proposed Fishing Activities

1-1) Details of the vessels to be used

1-1a) Exploratory fishery in 1977 and 1978

- Vessel name: Ryuyo-maru No.2

- Flag state: Japan

- Vessel owner: Hokkaido Fishery Corporation

- Port of registration: Tokyo, Japan

- IMO number: Unreported

- Radio call sign: JGYV

- Vessel type: Commercial trawl fishing vessel

- Fishing gear type: Stern bottom otter trawls (OTB-2 in ISSCFG, FAO)

- Vessel length overall: 99.50 m

- Beam length: 15.5 m

- Vessel gross registered tonnage: 2961.07 tonnes

- Power of main engine: 2419.79 KW (3290 PS)

- Processing capacity: 40 tonnes/day

- Storage capacity: Unreported

- Equipment used for determining position: Satellite navigation device

Although the other bottom trawl fishing vessel also operated within SIOFA CA in 1977 and 1978, it was not possible to have details about the previous information about vessels and fishing gears used in SIOFA CA.

1-1b) Exploratory fishery in 2012

- Vessel name: Gyokuryu-maru

- Flag state: Japan

- Vessel owner: Sato Fishery Co., Ltd.

- Port of registration: Shiogama, Japan

- IMO number: 130124

- Radio call sign: JKNU

- Vessel type: Commercial trawl fishing vessel

- Fishing gear type: Stern bottom otter trawls (OTB-2 in ISSCFG, FAO)

- Vessel length overall: 52.00 m

- Beam length: 10.2 m

- Vessel gross registered tonnage: 884 tonnes

- Power of main engine: 1912 KW

- Processing capacity: 34.56 tonnes/day

- Storage capacity: Frozen hold capacity 583.64 m^3

- Equipment used for determining position: Furuno GP-150, GP-70MK2

1-2) Detailed description of fishing methods

1-2a) Exploratory fishery in 1977 and 1978

1-2a-1) Gear type I

- Trawl gear type: Stern bottom otter trawls (OTB-2 in ISSCFG, FAO)

- Head rope length: 46 m

- Ground rope length: 58.8 m

- Bobbin Diameter: 300 mm $\times$ 24, 366 mm $\times$ 24

- Otterboard to wing length: Unreported

- Horizontal net opening: 30 m

- Vertical net opening: 5 m

- Wing mesh size: Unreported

- Codend mesh size: 45 and 90 mm

- Codend circumference: Unreported

- Mesh type: Unreported

- Trawl net design: Single

- Trawl net material: Unreported

- Otterboard type: SF vertical type 4.5 m × 2.8 m

- Otterboard weight: 3300 kg (underwater weight)

- Range in fishing height off bottom: Contact with the seafloor during trawling

1-2a-2) Gear type II

- Trawl gear type: Stern bottom otter trawls (OTB-2 in ISSCFG, FAO)

- Head rope length: 66.6 m

- Ground rope length: 89.4 m

- Bobbin Diameter: 300 mm × 38, 360 mm × 20

- Otterboard to wing length: Unreported

- Horizontal net opening: 30 m

- Vertical net opening: 7 m

- Wing mesh size: Unreported

- Codend mesh size: 45 and 90 mm

- Codend circumference: Unreported

- Mesh type: Unreported

- Trawl net design: Single

- Trawl net material: Unreported

- Otterboard type: SF vertical type 4.5 m × 2.8 m

- Otterboard weight: 3,300 kg (underwater weight)

- Range in fishing height off bottom: Contact with the seafloor during trawling

1-2b) Exploratory fishery in 2012

- Trawl gear type: Stern bottom otter trawls (OTB-2 in ISSCFG, FAO)

- Head rope length: 14 m

- Ground rope length: 14 m

- Bobbin Diameter: Unreported

- Otterboard to wing length: Unreported

- Horizontal net opening: 7 m

- Vertical net opening: 11 m

- Wing mesh size: Unreported

- Codend mesh size: 120, 200, and 300 mm

- Codend circumference: Unreported

- Mesh type: Diamond

- Trawl net design: Single

- Trawl net material: Nylon multifilament

- Otterboard type: VFW 12.2 m^2

- Otterboard weight: Unreported

- Range in fishing height off bottom: Contact with the seafloor during trawling

1-3) Seabed depth range to be fished

The seabed depth ranged from 72 to 266 m, from 80 to 230 m, and from 365 to 794 m in 1977, 1978, and 2012 exploratory bottom trawl fisheries, respectively.

1-4) Target species, and likely or potential by-catch species

1-4-1) Target species

In 1977 and 1978 exploratory bottom trawl fisheries, target species of this exploratory research fishing were as follows.

- Lizard fish (*Saurida undosquamis*)

- Bigeye scad (*Selar crumenophthalmu*s)

- Scad (*Decapterus maruadsi*)

- Butterfly breem (*Nemipterus personii*)

- Porgies (*Dextex sp.*)

- Black cardinal fish (*Epigonus telescopus*)

In 2012 exploratory bottom trawl fishery, target species of this exploratory research fishing were as follows.

- Splendid alfonsino (*Beryx splendens*)

- Pelagic armourhead (*Pentaceros richardsoni*)

- Violet warehou (*Schedophilus velaini*)

- Bluenose warehou (*Hyperoglyphe antarctica*)

1-4-2) Likely or potential by-catch species

In 1977 and 1978 exploratory bottom trawl fisheries, major by-catch species were as follows.

- Sharks

- Barrocuda (*Sphyraena chrysotoenia*)

- Kingfish (*Carangoides* spp.)

- Sea basses (*Epinephelus* spp.)

- Snappers (*Pristipomoides* spp.)

In 2012 exploratory bottom trawl fishery, major by-catch species were as follows.

- Hapuku (*Polyprion oxygeneio*s)

- Wreckfish (*Polyprion americanus*)

- Blackbelly rockfish (*Helicolenus dactylopterus*)

- Alfonsino (*Beryx decadactylus*)

- Silver scabbardfish (*Lepidopus caudatus*)

- Black cardinal fish (*Epigonus telescopus*)

1-5) Intended period and duration of fishing

The exploratory bottom trawl fisheries were operated 23 days (5–27 October) in 1977, 36 days (26 November–31 December) in1978, and 27 days (4–30 December) in 2012.

1-6) Effort indices

Effort indices of exploratory bottom trawl fisheries are summarized in Table 1.

Table 1 Effort indices in Japanese exploratory bottom trawl fisheries.

Year	Vessels	Tows	Cumulative tow durations (minutes)
1977	2	380	62,950
1978	2	240	39,450
2012	1	34	7,520

1-7) Estimated total catch and discard quantities by target and bycatch species

In 1977 and 1978 exploratory bottom trawl fisheries, catch amount of main target species around Saya de Malha Bank were summarized in Table 2.

Table 2 Catch amount (kg) of main target species in Japanese exploratory bottom fishery around Saya de Malha Bank.

Species	Scientific name	1977	1978
Lizard fish	*Saurida undosquamis*	61,480	53,409
Bigeye scad	*Selar crumenophthalmus*	42,720	41,855
Scad	*Decapterus maruadsi*	45,340	188,298
Butterfly breem	*Nemipterus personii*	12,220	10,835
Porgies	*Dextex* sp.		32,813
Black cardinal fish	(*Epigonus telescopus*)		3,349

In 2012 exploratory bottom trawl fishery, total catch by each species was recorded as shown in Table 3. In the cruise report of exploratory bottom trawl fishery, there is no record about discard quantities.

Table 3 Annual catch (kg) of Japanese exploratory bottom fishery in the SIOFA area.

Species	Scientific name	2012
Splendid alfonsino	*Beryx splendens*	8,738
Pelagic armourhead	Pentaceros richardsoni	14,378
Violet warehou	Schedophilus velaini	1569
Bluenose warehou	*Hyperoglyphe antarctica*	52
Hapuku wreckfish	*Polyprion oxygeneio*s	906
Blackbelly rockfish	*Helicolenus dactylopterus*	153
Alfonsino	*Beryx decadactylus*	113
Silver scabbardfish	*Lepidopus caudatus*	26
Black cardinal fish	*Epigonus telescopus*	3,349

2) Mapping and Description of Proposed Fishing Areas

2-1) Maps of the intended fishing areas

Footprint of exploratory bottom fisheries are indicated in the Figure 1. The footprints in 1977 and 1978 (red squares) are represented as grid blocks of 30 minutes resolution according to spatial resolution of fishing log book as data sources. The foot prints in 2012 (yellow squares) are indicated as grid blocks of 20 minutes resolution as defined by CMM2017/01.
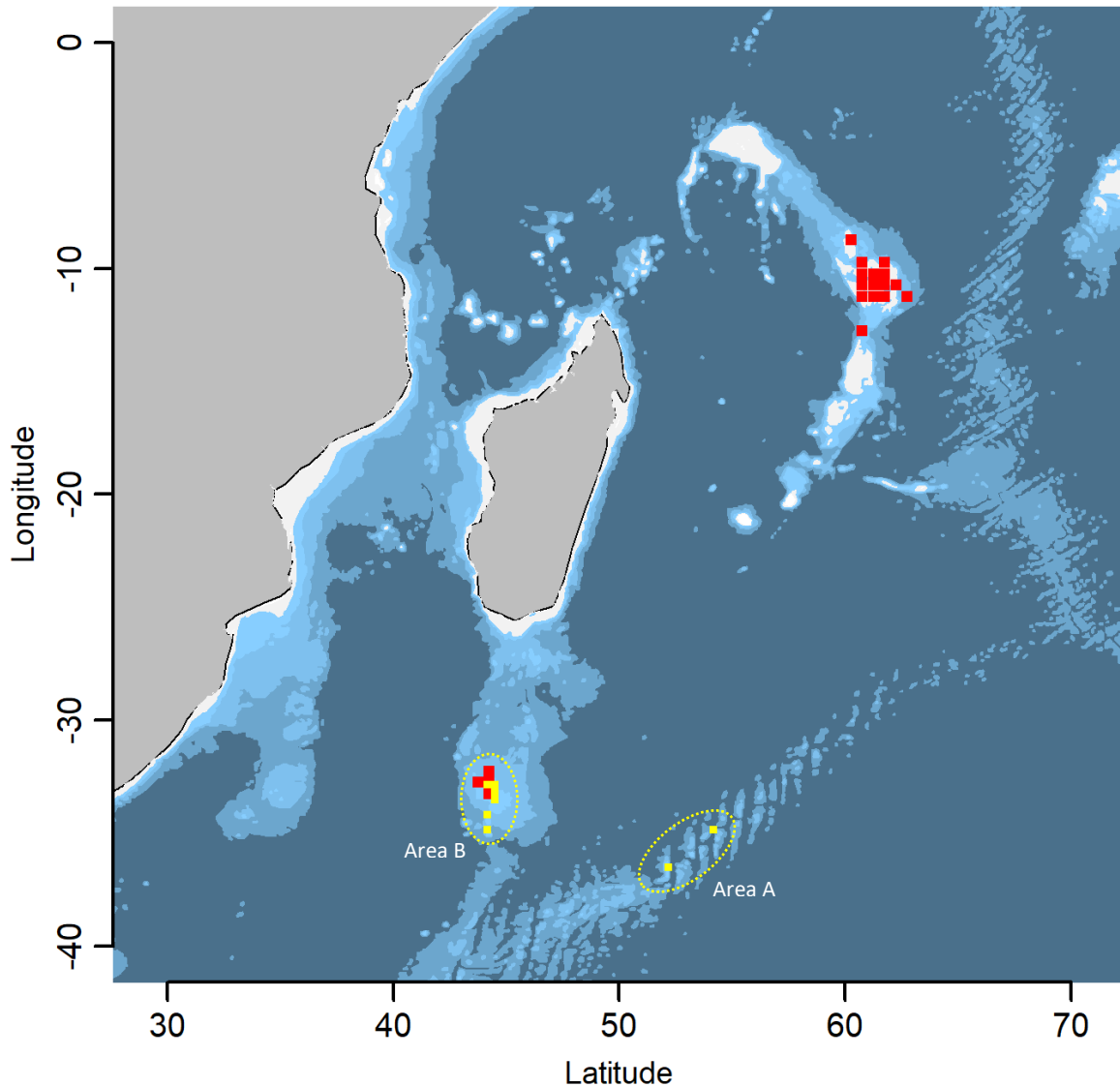

Fig. 1 The footprints of Japanese exploratory bottom trawl fisheries in 1977, 1978, and 2012. Red squares indicate the foot prints in 1977 and 1978 which are described as grid blocks of 30 minutes resolution according to spatial resolution of fishing log book as data sources. Yellow squares represent the foot prints in 2012 which are described as grid blocks of 20 minutes resolution.

2-2) Area, or topographic features likely to support VMEs

The cruise report of exploratory bottom trawl fisheries did not record any detailed information which support any VMEs management; e.g., detailed topography of the ocean floor to conducted habitat model analysis.

2-3) Mapping of all known VMEs, or evidence of VMEs, in the proposed fishing areas

In 2012 exploratory bottom trawl fishing cruise, eight hauls were conducted by-catch observation for taxon other than fishes. The by-catch of corals were observed in six hauls during these eight observations, but there is no by-catch of sponges. The coral by-catch weight range 0.01–1.68 kg (average 0.524 g). These corals were contained VME indicators in CCAMLR, *Gorgonacea* and *Antipatharia*. There is not enough information to evaluate that these benthic invertebrates forming VMEs.

2-4) Mapping of the results of predictive habitat modelling for VMEs in the SIOFA area

There are no available data about benthic invertebrates caught by the exploratory bottom trawl fisheries to conduct habitat modelling for VMEs in the SIOFA area.

2-5) Baseline data and description of the proposed fishing areas

In the cruise report of exploratory bottom trawl fishery there are brief descriptions about the substrata environment in fishing grounds. Seamounts ridge extending from the southwest to the northeast around 50–60°E (Area A), which were operated twice in the exploratory bottom trawl fishing (Fig. 1), have many sharp sea-mountains and steep valleys. The ocean plateau located around 35°S 45°E (Area B) have many relatively flat bottom substrata.

3) Impact assessment

3-1) Risk assessment

3-1-1) The level of risk posed by each activity

3-1-1-1) Intensity

Impacts on VME by the intensity of Japanese bottom trawl fishing in SIOFA CA are likely small because of only 3 years of exploratory fishing in the past.

In some management bodies, bottom trawl fishing has been considered to make high intensity or severity of the impact on the seabed ecosystems (Chuenpagdee et al., 2003; Williams et al., 2011).

3-1-1-2) Duration

Impacts on VME by the duration of Japanese bottom trawl fishing in SIOFA CA are likely small because of only 3 years of exploratory fishing in the past.

Generally, the impact of bottom trawling is thought to extend over a long period of time taking account that the high longevity of deep-sea bamboo coral is an indication that recovery from disturbance or removal may take decades to a century (Andrews et al., 2009).

3-1-1-3) Spatial extent

Impacts on VME by the spatial extent of Japanese bottom trawl exploratory fishing in SIOFA CA are likely small because of only 3 years of exploratory fishing in the past.

It is noted that the cruise report of exploratory bottom trawl fishery in 2012 has described that there are few topographies suitable for bottom trawl fishing operation and the bottom trawling by-catch amounts of VME indicators are not enormous on the seamount area in SIOFA CA.

3-1-1-4) Cumulative impact

Japanese bottom trawl exploratory fishing was conducted only three cruises in 1977, 1978, and 2012, thus cumulative impacts is considered as minimal.

3-1-2) Overall risk (Low/Medium/High)

Low: Because Japanese bottom trawl fishing was conducted as the exploratory basis by limited operations only in 3 years.

3-2) Interactions with VMEs

3-2-1) What impacts are likely to results from the fishing gears to be used?

In 2012 Japanese exploratory bottom trawling fishery, density of corals was roughly estimated as less than 1.0 kg / km^2 except for 2 hauls (5.8 kg / km^2 and 2.8 kg / km^2) by calculating from by-catch amount of corals including VME indicators and trawling areas.

3-2-2) What will the probability, likely extent (% of habitat targeted) and intensity of the interaction between the proposed fishing gear/targeting practices on the VMEs

There are very low probability of interactions between Japanese bottom trawl fisheries and VME due to exploratory nature fishing by limited operations only in 3 years.

3-2-3) What are the characteristics of the habitat and benthic communities which may be impacted?

There is no information collected by Japanese bottom trawl fisheries to evaluate what characteristics of habitat and benthic communities were impacted.

3-2-4) How diverse is the ecosystem in the proposed fishing areas, and will the fishing activity reduce this biodiversity?

There is no information collected by Japanese bottom trawl fisheries to evaluate diverse of the ecosystem and if reduction of fishing activity protected biodiversity.

3-2-5) What is the likely spatial scale and duration of the impacts?

Spatial scale and duration of the impacts are likely minimal because Japanese bottom trawl fishing was conducted as exploratory basis by limited operations only in 3 years.

3-2-6) Any other threats or issues: gear loss, ghost fishing, incidental bycatch discards, protected or endangered species mortalities, effects on ecosystem functioning.

Loss of bottom trawl fishing gear causing ghost fishing has been very rear because gears are expensive and the operation managers (e.g., fishing master) avoids the risk of lost fishing gear as much as possible. Thus, threats by gear loss and ghost fishing are nil.

There is no information collected by bottom trawl fisheries to evaluate any actual threats raised by incidental bycatch discards, protected or endangered species mortalities, effects on ecosystem functioning.

4) Information on status of the deep-sea stocks to be fished

4-1) A list of the intended target and likely by-catch species

See 1-4-1) and 1-4-2).

4-2) Tables of historic catches and catch trends of these species in the intended fishing area

See table 2 and 3 in 1-7).

4-3) Tables, figures of analyses of historic nominal and/or standardized CPUE trends in these species

Nominal CPUE (catch/trawling duration) of each species was shown in Table 4 and 5. It is noted that fishing season/grounds and fish school forming patterns are differ among cruises, thus CPUE of trawl fisheries does not necessarily reflect actual stock status of target fishes. For Japanese exploratory bottom trawl fisheries, there is not enough information and data to conduct standardizing CPUEs.

Table 4 Nominal CPUE (kg/trawling minutes) of Japanese exploratory bottom fishery in 1977 and 1978 within the SIOFA CA.

Species	Scientific name	1977	1978
Lizard fish	*Saurida undosquamis*	2.89	1.42
Bigeye scad	*Selar crumenophthalmus*	2.01	1.12
Scad	*Decapterus maruadsi*	2.13	5.02
Butterfly breem	*Nemipterus personii*	0.58	0.29
Porgies	*Dextex* sp.		0.87
Black cardinal fish	(*Epigonus telescopus*)		0.09

Table 5 Nominal CPUE (kg/trawling minutes) of Japanese exploratory bottom fishery in 2012 within the SIOFA CA

Species	Scientific name	2012
Splendid alfonsino	*Beryx splendens*	1.16
Pelagic armourhead	Pentaceros richardsoni	1.91
Violet warehou	Schedophilus velaini	0.21
Bluenose warehou	*Hyperoglyphe antarctica*	0.01
Hapuku wreckfish	*Polyprion oxygeneio*s	0.12
Blackbelly rockfish	*Helicolenus dactylopterus*	0.02
Alfonsino	*Beryx decadactylus*	0.02
Silver scabbardfish	*Lepidopus caudatus*	0.00
Black cardinal fish	*Epigonus telescopus*	0.45

4-4) Results of any surveys conducted on the stocks to be fished

There are no resource surveys by Japanese bottom trawl fisheries.

4-5) Results of the most recent stock assessments that have been conducted for the stocks to be fished

To now, there are no stock assessments for splendid alfonsino. SIOFA 2nd SAWG (Stock Assessments Working Group) in 2019 plans to conduct stock assessments for splendid alfonsino.

4-6) Any other information

There is no other information on status of the deep-sea stocks.

5) Monitoring, Management and Mitigation Measures

5-1) VMS positional information

Fisheries Agency of Japan verifies locations of vessels through the Vessel Monitoring System (VMS).

5-2) Details of catch and effort data collection systems

All fishing vessels for both commercial and exploratory fisheries have been collecting fisheries data for each operation including dates, locations, depth, catch/effort data and other relevant information. This information is recorded in logbooks and submitted to Fisheries Agency of Japan.

The exploratory bottom trawl fishing vessel also collects scientific data such as detail information of operations (haul-by-haul fishing effort, catch/bycatch by species) and biological information including size data.

5-3) Details of any scientific observer coverage

There is no scientific observer coverage for Japanese bottom trawl fishery because of no operations.

5-4) Description of the data that will be provided to the SIOFA secretariat for the fishing activity

If Japanese bottom trawl fishing operates at SIOFA CA, Japan will provide the fishing log and scientific observer data according to the conservation measure.

References

Andrews, A.H., R.P. Stone, C.C. Lundstrom, and A.P. DeVogelaere. 2009. Growth rate and age determination of bamboo corals from the northeastern Pacific Ocean using refined ^{210}Pb dating. *Mar. Ecol. Prog. Ser.*, 397: 173-185.

Chuenpagdee, R., L.E. Morgan, S.M. Maxwell, E.A. Norse, and D. Pauly. 2003. Shifting gears: assessing collateral impacts of fishing methods in US waters. *Front. Ecol. Environ.*, 1: 517-524.

Williams, A., F. Althaus, M. Fuller, N. Klaer, and B. Barker. 2011. Bottom fishery impact assessment: Australian report for the South Pacific Regional Fisheries Management Organisation (SPRFMO).Document *SWG-10-DW-01A*. SPRFMO, Vanuatu.