SIOFA | APSOI
Southern Indian Ocean Fisheries Agreement
Accord relatif aux Pêches dans le Sud de l'Océan Indien

2nd Extraordinary Meeting of the SIOFA Scientific Committee (SC-EXTRA2)
Virtual, 7 November 2024

SC-EXTRA2-01

SIOFA Bottom Fishing Impact Assessment (BFIA) of the Union of Comoros

Delegation of the Union of Comoros

Document type	working paper ✓ information paper ☐
Distribution	Public ✓ Restricted [1] ☐ Closed session document [2] ☐

Abstract

This document presents the updated Bottom Fishing Impact Assessment (BFIA) of the Union of Comoros, relevant to its trap fishery targeting lobster in the SIOFA area.

[1] Restricted documents may contain confidential information. Please do not distribute restricted documents in any form without the explicit permission of the SIOFA Secretariat and the data owner(s)/provider(s).
[2] Documents available only to members invited to closed sessions.

Recommendations

The SIOFA Scientific Committee is to:

- **Consider** the updated Bottom Fishing Impact Assessment (BFIA) of the Union of Comoros
- **Provide** relevant recommendations and advice to the MoP

Union of Comoros

SIOFA Bottom Fishing Impact Assessment

Contact Details

Mohamed Ali Mohamed,
Head Of Operations,
National Fishing Control and Surveillance Center
Cell.: (+269)325.64.22
Email: rachadmohamedali@gmail.com

Mahamoudou Abidina,
Legal Officer at the Directorate General of Halieutic Resources
Cell.: (+269) 368.21.95
Email: papa2wassiaan@gmail.com

Contents:

The Environment and Bathymetry of Seamount Chain

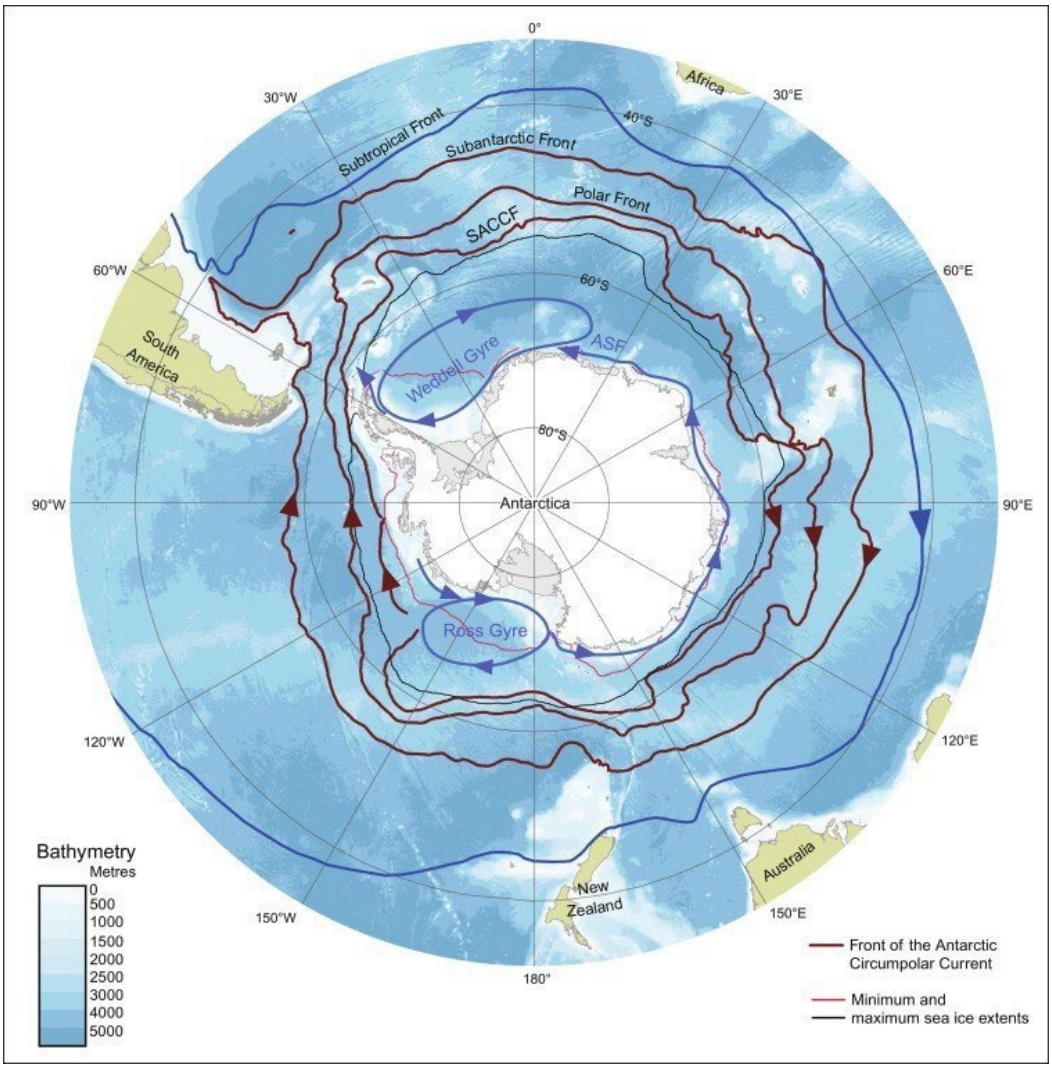

Figure 1: Map of currents: Sheppard, 2018

The Southwest Indian Ridge, due to its location, length and East/West orientation is subject to upwelling of nutrient-rich water from the Antarctic circumpolar current, driving the cold nutrient-rich waters north where a mixing of the Easterly sub-tropical current takes place. This flow travels largely parallel to and across the ridges and seamounts in the Seamount Chain, mixing the sub-tropical waters with the cold sub-Antarctic waters. The mixing extends from the sea surface to depths of 2000-4000 m and can be as wide as 400 km.

The cold flow is intensified by upwelling of deep water caused by the combined effects of the drag of surface winds of the Southeast Trades and the Earth's rotation. The upwelling brings abundant nutrients close to the surface, where the eddies are believed to be sufficiently strong to reverse the

direction of the surface currents in this area where shallow undercurrents exist, that flow in a direction counter to that at the surface. These along with the shallow depth of the seamounts create accessible habitats for crustaceans and densities high enough for potential commercial exploitation.

Description of the Proposed Fishing Activity

At the beginning of 2024 Union of Comoros has granted a fishing license to the f/v Rinascente 9 to operate in SIOFA waters targeting crustaceans with traps/pots. The operator of the vessel is Comores Anglers SARL incorporated under the laws of the Union of Comoros based in Moroni.

Vessel description:

Vessel name	Rinascente 9
Registration Number	1600050
Vessel length:	45.70 meters
Breadth	8.50 meters
Depth	3.65 meters
Gross tonnage	498 tons
Port of registry	Moroni, Union of Comoros
Vessel owner	Ebi Fishing Co., Ltd
IMO Number	8947412
Radio Call Sign	D6HD3
Vessel Type	Fishing Vessel
Fishing Gear Type	Traps/Pots
Power of Main Engine	870 KW
Material of Hull	Steel
Year Build	1998
Main Engine Maker	Hanshin Iron Works Co., Ltd.

Fishhold capacity	503,5 m3
Model of Engine	LH26RR
Place of build	Fong Kuo Shipbuilding, Taiwan
Equipment Used for Determining Position	VMS ; AIS

Table 1: Details of the vessel

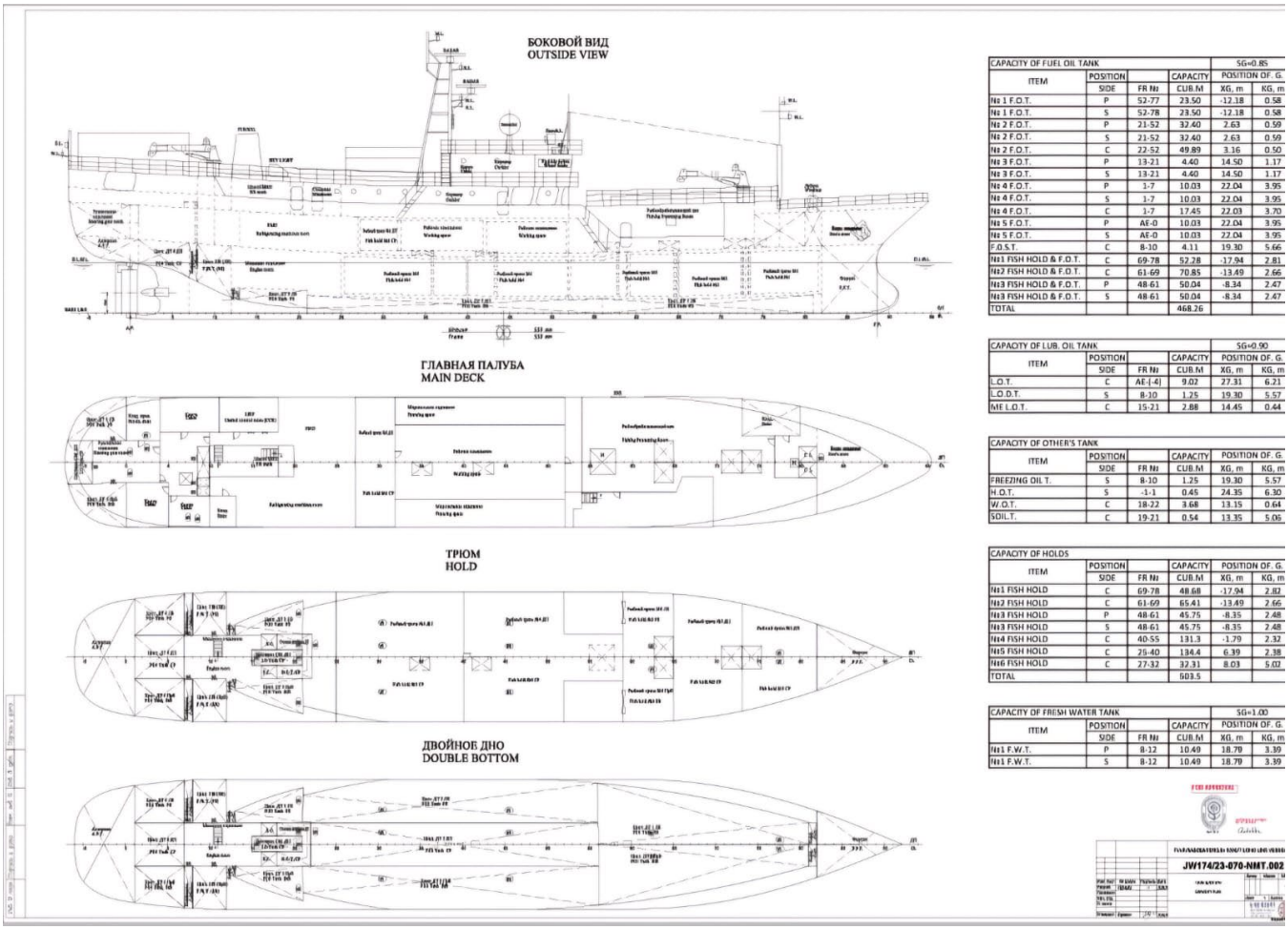

Figure 2: Capacity Plan of the f/v Rinascente 9

Currently it is the only vessel under the flag of the Union of Comoros, operating in the international waters of the Indian Ocean.

The f/v Rinascente 9 was added to the SIOFA record of authorised vessels on March 6, 2024. The authorization requires the flagged vessels to comply with all the Union of Comoros laws and regulations, and all SIOFA Conservation and Management Measures adopted by the Commission as well as operate to highest environmental standards. The Union of Comoros also ensures that the vessel fish in a sustainable manner for long term viability of potential lobster fishery.

Figure 3: Right side view of the vessel

Figure 4: Name of the vessel and port of registry

Figure 5: Left side view of the vessel

Fishing gear description

The f/v Rinascente 9 is planning to specialize in lobster fishery with traps/pots. The vessel is equipped with a hydraulic winch allowing it to fish at depths between 200 and 2500 meters. During its first trip the f/v Rinascente 9 was fishing with longline trap fishing method.

Traps had the following dimensions: 130 cm diameter at the base, 55 cm high and 65 cm diameter at the top. Traps have top entrance of 25 cm in diameter and the trap is covered with netting of 3.5 cm mesh. The main line for each string of traps is made of 32 mm polypropylene rope with each trap on each string spaced 30 meters apart. The length on main line is up to 1850 meters long. The maximum number of traps attached to each string is 55.

Figure 6: Hydraulic winch and transporter

Figure 7: Picture of a trap

Figure 8: Picture of a bait can

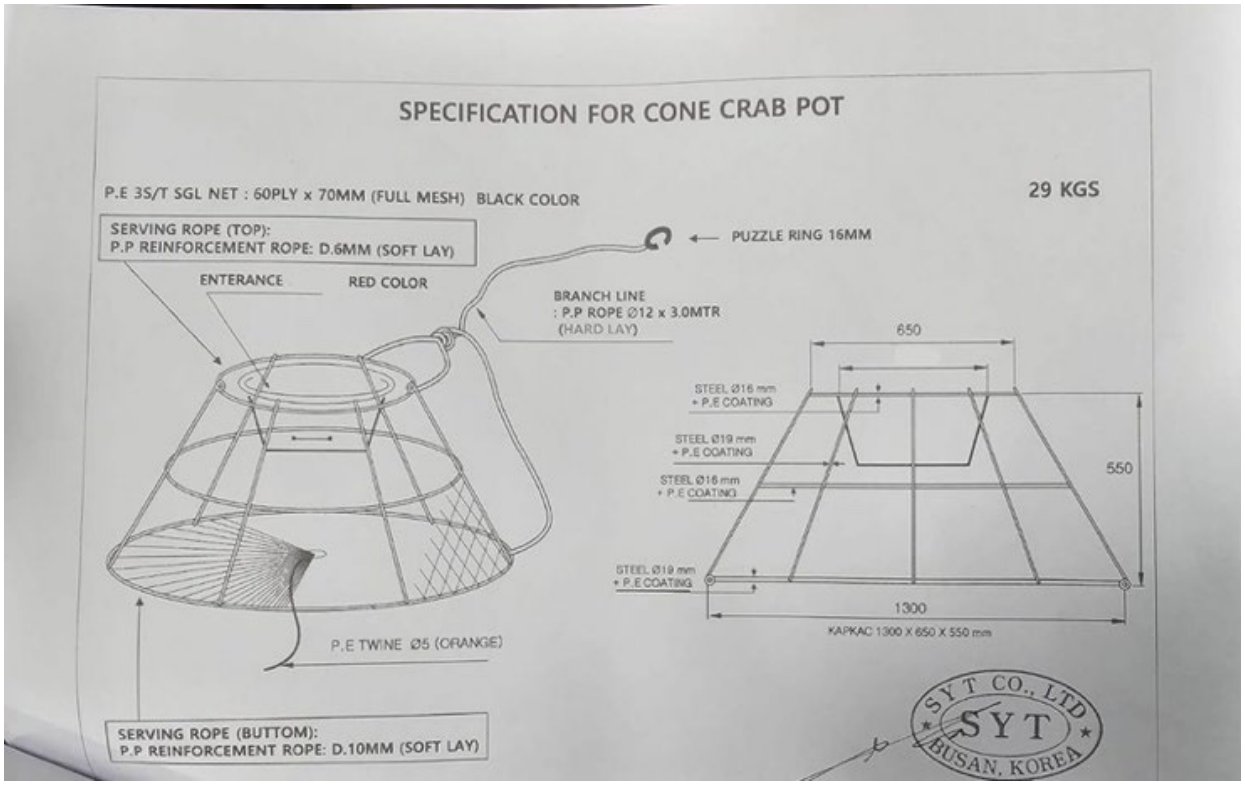

Figure 9: Dimensions of a trap

Another approach is to use single traps as they fit better for fishing on rocky bottoms and sea mountains as it allows to put them more precisely at intended locations. Traps are weighted at the bottom so when set, they land on the sea floor the correct way up. Traps are baited so lobster will be attracted to the scent of the bait and swim through the entrance. The traps are designed in a way so that lobster cannot escape once inside the trap. When set, traps are connected to a downline which is bridled at the end and attached to the trap at opposite ends. The downline is connected to a buoy on the surface which allows fishers to locate the traps. Traps have between one and three entrance. Rectangular traps intended to be used have the following dimensions: 150 cm X 120 cm x 70 cm with two side entrances. The line attached to the trap will have a diameter of 20 mm.

The length of the line will depend on the depth where the trap will be installed. Circle shape traps will have the following dimensions: 100 cm X 60 cm with two side entrances.

The reason for using two different shapes is to see what effect it would have on catch rate of lobster. The maximum number of single traps intended to be used is 150.

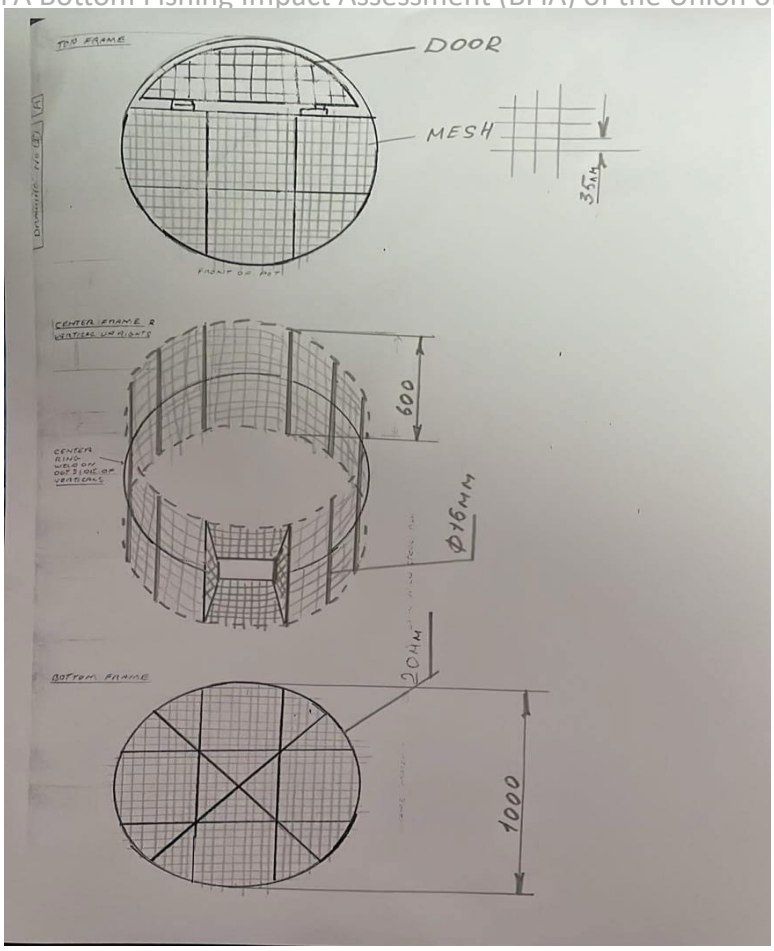

Figure 10: Dimensions of a trap

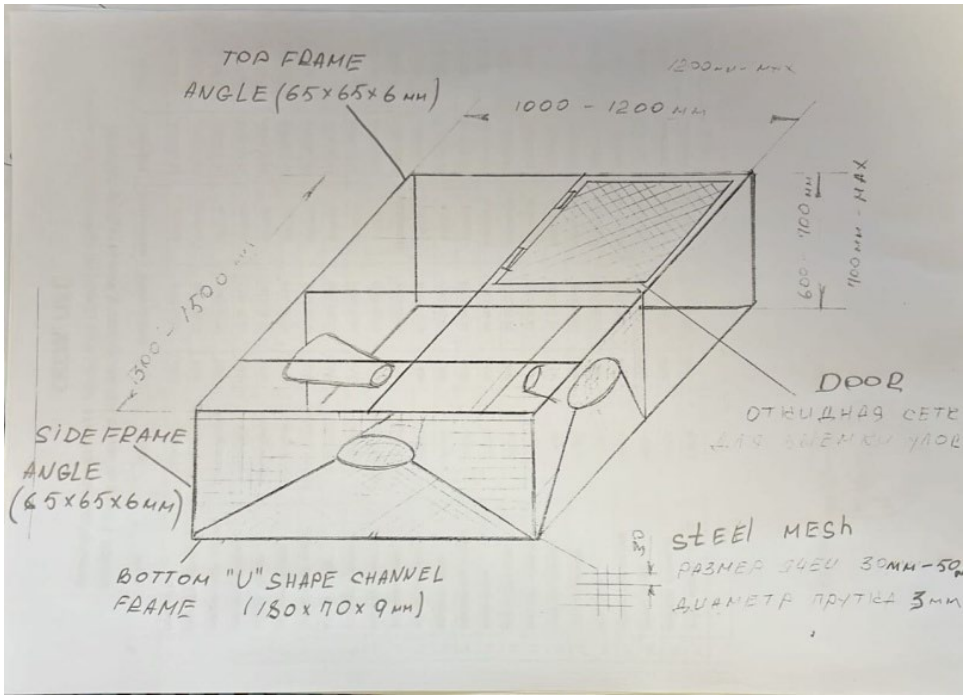

Figure 11: Dimensions of a trap

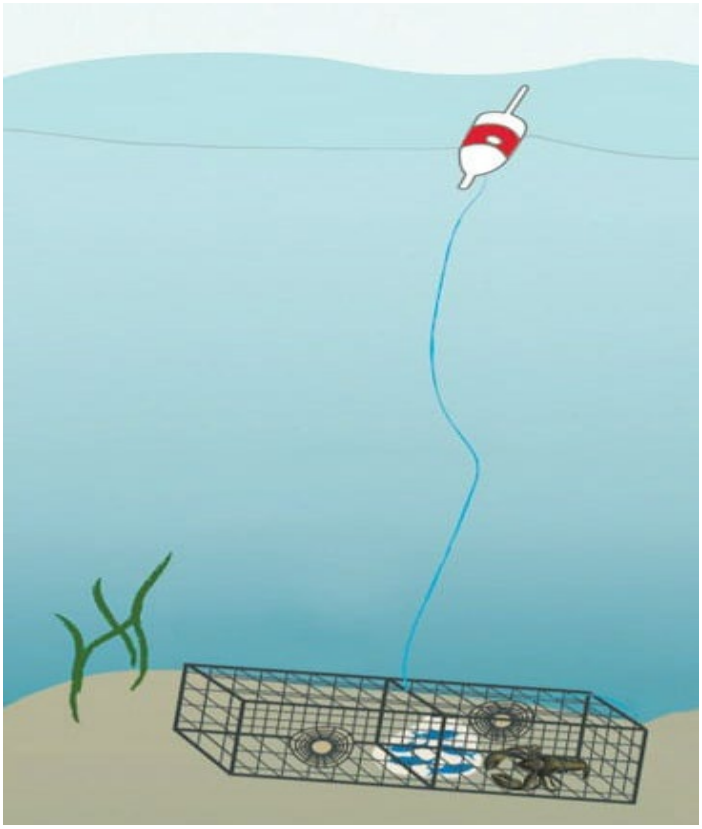

Figure 12: Illustration of how a single trap works

We believe that using traps is the best method to target lobster because it causes minimal impact on the marine environment for the following reasons:

A) it is highly selective,

B) allows NOT to harvest Juveniles and egg bearing females as they can be returned to sea immediately alive.

C) Comoros asks operator of the vessel to use a 80 mm carapace length minimum harvest size to ensure sustainability.

D) minimize the by-catch (fish and octopus) by allowing to release it back alive.

E) yields high quality product as lobster which have been caught in traps are alive and in good health when they reach the surface, which greatly increases post capture survivability.

Potential bycatch

Based on the seamounts fished on during our first trip, bycatch and non-target species catch was low (<5%). It is apparent that deeper sets encounter crabs. Small amounts of fish bycatch are expected comprising of yellow tailed king fish, leatherjacket fish, puffer fish and tarakihi. Because of low occurrence and highly selective nature of the gear, impact projections and risk assessment are not possible for these species at this time.

Figure 13: Picture of bycatch (Chaceon crab)

Figure 14: Picture of Target Specie (Projasus spp. together with bycatch (Chaceon Crab)

The Union of Comoros intends to persist with a selective approach deploying traps only in areas where there is a likelihood of high density of the target lobster species. The approach of using longline traps and single traps has proven to be successful considering low bycatch rate. The catch rates for the different trap designs will be evaluated and corrected factors applied to the alternative designs to ensure the continuity of the data series.

Target Species

The f/v Rinascente 9 targets *Jasus* and *Projasus* species on seamounts and ridges of the Southern Indian Ocean. During the first trip in 2024, individuals caught were from 1.5 kgs to 4.5 kgs and 350 gr to 550 gr for *Jasus* spp. and *Projasus* spp. respectively.

Figure 15: Picture of a weight of a target specie (Jasus spp.)

Figure 16: Picture of a weight of a target specie (Jasus spp.)

Figure 17: Picture of length of a target specie: Jasus spp.)

Figure 18: Picture of a target specie (Projasus spp)

The Union of Comoros prohibits catch of female lobsters carrying eggs. Based on the information provided to us by seamen who worked in the area between 1979 and 1986 lobster goes through a "berried" period between beginning of July and end of August. This information must be confirmed by an observer who will be working closely with the skipper and the crew. However, the vessel is expected not to operate during those months when female lobsters are carrying eggs to ensure the sustainability of the fishery.

Mapping and Description of Proposed Fishing Area

Based on the historical fishing data received from Soviet scientists and Australian fishermen who used to operate in the area, the f/v Rinascente 9 is targeting ridges and seamounts in SIOFA subareas: 2, 3a, 3b, 4 and 5

These areas are inside the SIOFA footprint area and fishing with traps and pots is allowed in these areas. Scientific observer will always be on board to monitor vessel's operation.

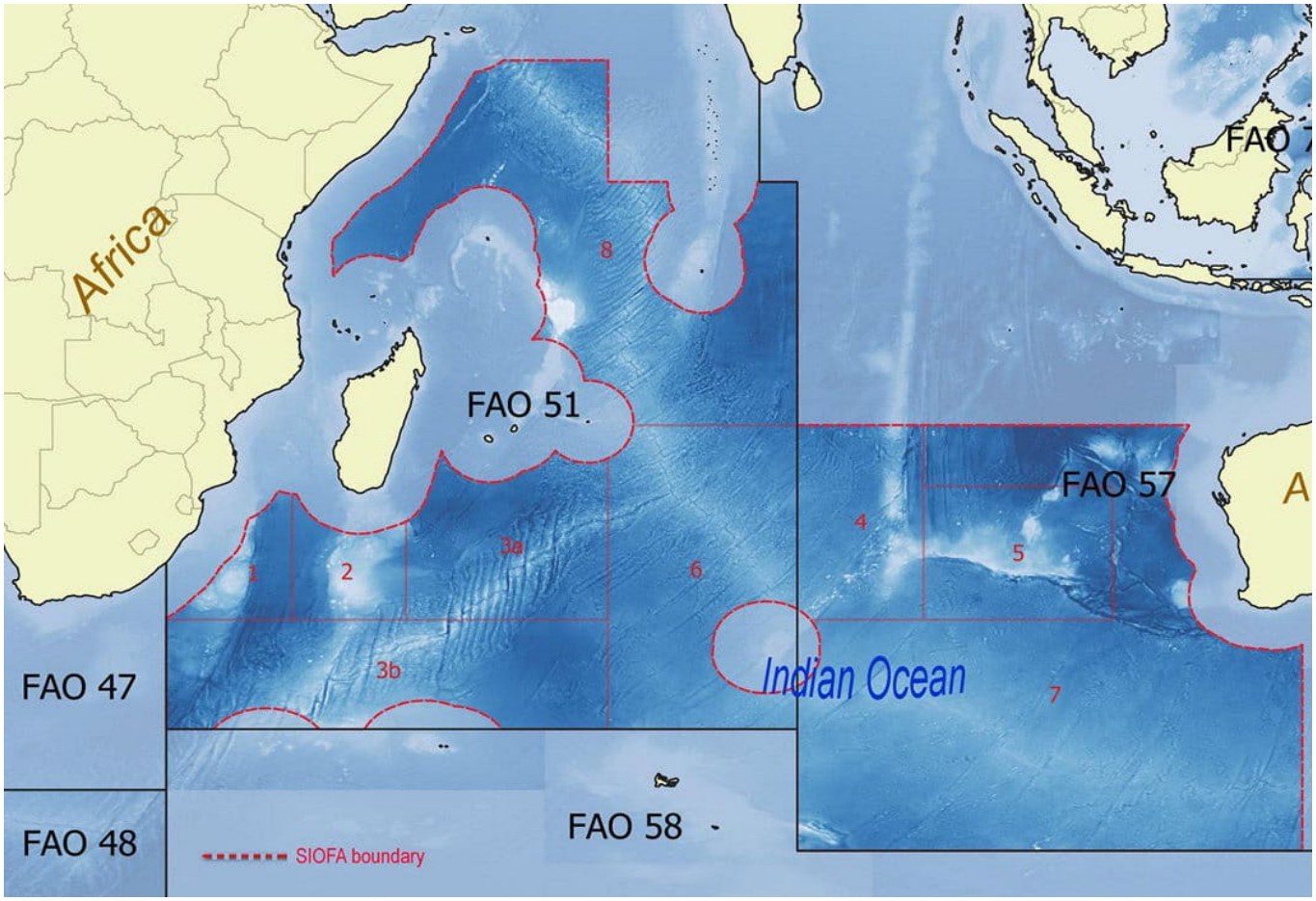

Figure 19: Picture of SIOFA subzones

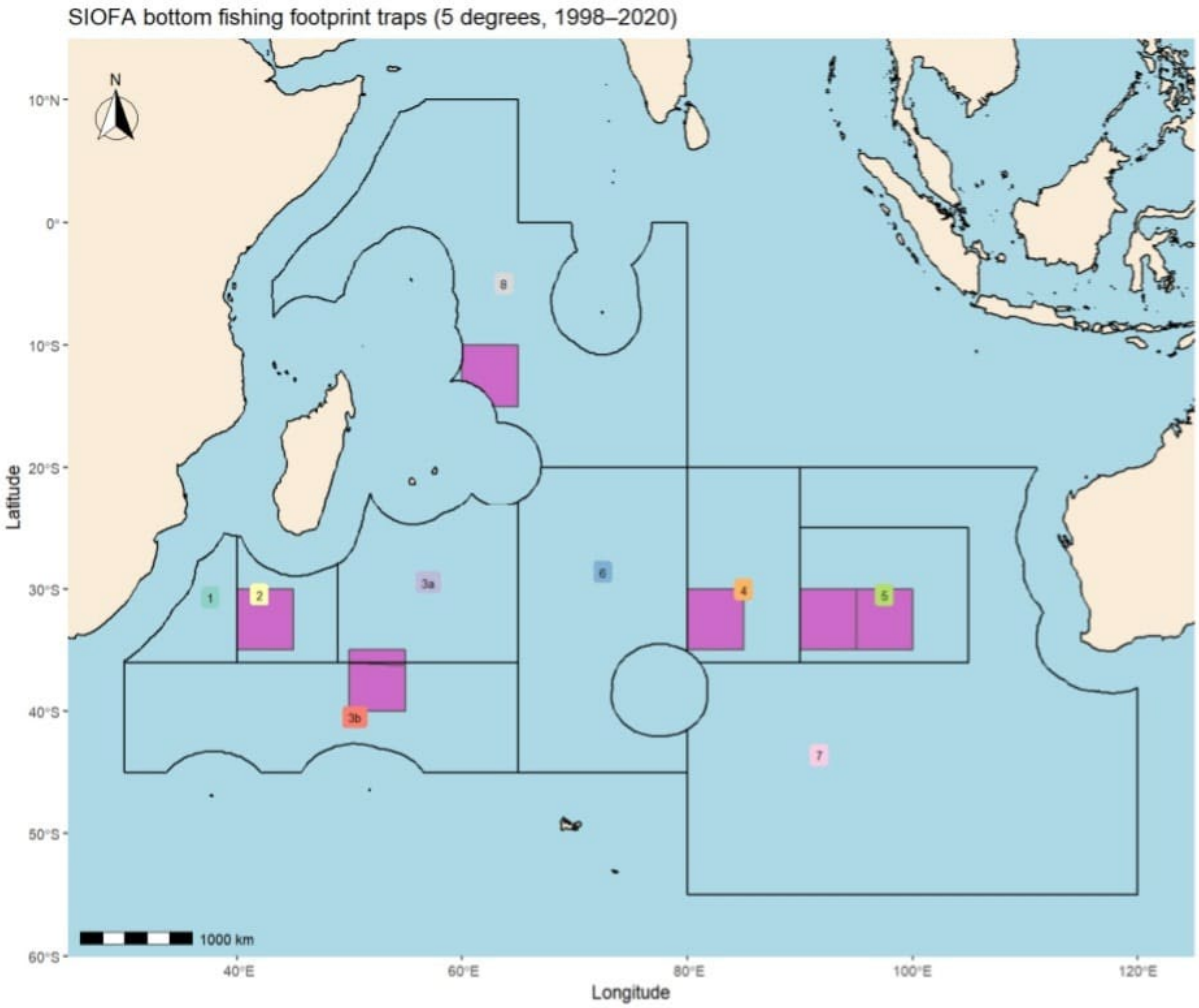

Figure 20: SIOFA bottom fishing footprint traps

The fishing logbook and scientific observer data collected during the first trip in 2024 of the f/v Rinascente 9 did not record any detailed information which support any VME management: e.g. detailed topography of the ocean floor to conduct habitat model analysis. No bycatch amount of VME indicators were observed during the fishing operation of the f/v Rinascente 9.

Impact Assessment

The Union of Comoros is very conscious of its obligation with regard to responding to any potential VMEs that might be encountered. While bottom trap fishing is relatively benign, in case of encounters with VME indicator species observers have been asked to report any indications of VME indicator species, volumes, weights and frequency of occurrence in accordance with the SIOFA rules. The observers on board the flagged vessel will register and map out the interactions with VMEs. It is imperative that the observer(s) work closely with the vessel skipper to track trap setting using the on-board sea-bottom tracking technology, and importantly, to relate this to location of traps on the lines as they are set and hauled. Comoros considers that the impact of this fishery will have low impact on the sea floor. However, Comoros will continue to take a precautionary approach where: As far as possible keep line sets on low profile ground where the likelihood of encountering a VME e.g. coral outcrop, is reduced.

If significant quantities of VME indicator taxa are found (SIOFA CMM 01 Annex 1) in or attached to traps more than 1% of the total lobster weight per trap, then the vessel will move on to the next fishing site 1 (one) nautical mile away. In the event VME areas are identified, the coordinates are recorded, and these areas are removed from fishable stations database. The trigger for "moving on" will occur if the flagged vessel encounters a VME interaction of more than 1% of lobster weight per pot. They will move-on to the next fishing site 1 (one) nautical mile away and will record the location as a potential VME area. The majority, if not all of the seamounts have not been commercially fished in the modern era and, as such, very little is known about the potential for VMEs to occur on these seamounts. Nevertheless, and as required by the BFIAS, if the vessel encounters VME indicator species volume of more than 1% of the total lobster weight landed by a trap, they will move-on to the next fishing site at least 1 (one) nautical mile away.

Risk Assessment

Teleost and cephalopod bycatch

Some teleost bycatch could be caught with this gear including any teleosts that are attracted to bait. This includes fish such as hapuka (*Polyprion oxygeneios*) trumpeter (*Latris lineata*) and Common mora (*Mora moro)* could be caught. Octopus also enter the traps and get caught from time to time. Given the relatively shallow depths of the gear some of these fish and octopus could be released alive. The table below can be more informatively updated after the first trip is complete and the data analysed.

Species	Spatial overlap	Catchability	Risk of mortality

Suprabenthic teleosts	High	Medium	Species dependant low to high
Octopus	High	Medium	Low
Mitigation			
Vessel required to carry release weights to release teleosts that suffer from barotrauma and which are not retained.			
Risk if released after mitigation			
Pelagic teleosts - low			
Suprabenthic teleosts - low			
Squid - low			

Table 2: Teleost and Cephalopod bycatch

Elasmobranch bycatch

So far, no elasmobranch bycatch such as sharks has been observed. Because of a small diameter of trap entrance, it is highly unlikely for any of elasmobranchs to enter the trap. If this happens, they are required to be released from all Comorian vessels.

Species	Spatial overlap	Catchability	Risk of mortality
Pelagic sharks	High	Low	Low
Benthic skarks	High	Low	Low
Skates	Low	Low	Low
Mitigation			
All vessels are required to release elasmobranchs that are inadvertently caught in the fishing gear. Given the shallow nature of the gear post-release survival is predicted to be high.			
Risk if released			
Pelagic sharks - low			
Benthic sharks - low			
Skates-low			

Table 3: Elasmobranch bycatch

Seabirds

The area where this fishery occurs is in the mid-latitudes and in lower latitudes than one would expect to regularly encounter most albatross species, but they are expected to be seen in the cooler months. Other seabirds could overlap with this fishery. Observers will note all the birds observed during setting and hauling operations of the related lobster fishery.

However, very few are expected to be seen around the vessel. In addition, offal is macerated before being dumped. No dumping of offal is conducted while lines are being set or hauled. Discharging of waste will only take place at the end of a haul or while steaming and no biological material will be discarded for at least 30 minutes before the start of any set. Overall birds tend not to get entangled in traps.

Species	Spatial overlap	Catchability	Risk of mortality
Albatross	Medium	Low	Low
Mitigation			
Offal will be macerated before being dumped. No dumping of offal will be conducted while traps are being set or hauled. Discharging of waste will only take place at the end of a haul or while steaming and no biological material will be discarded for at least 30 minutes before the start of any set.			
Risk after mitigation			
Albatross - low			

Table 4: Seabirds

Marine Mammals and Turtles

No marine turtles or whales have been observed during the lobster fishery and no marine mammals were sighted. None of these species are capable of entering the traps, but unintended entanglement of baleen or toothed whales with the float line is a rare possibility. Given the rare nature of encounters no physical mitigation is planned, however if pods of whales approach the vessel traps will not be deployed until they have moved out of sight of the vessel. To avoid the inadvertent plastic ingestion by or entanglement of marine mammals or turtles Comoros flagged vessels are prohibited from discarding any plastic from the vessel.

Species	Spatial overlap	Catchability	Risk of mortality
Whales	Medium	Low	Low
Dolphins	Medium	Low	Low
Turtles	Low	Low	Low
Mitigation			
If pods of dolphins or whales approach the vessel droplines will not deploy traps until they have moved out of sight of the vessel.			
Risk after mitigation			
Whales - Low			
Dolphins - Low			
Turtles - Low			

Table 5: Marine Mammals and Turtles

VME impacts from traps

The main potential impact on VMEs of this operating of likely to come from damage caused by the anchor of the float line and from the traps landing on the seabed. Therefore decision has been made by operators of the f/v Rinascente 9 not to use anchors in order to further reduce the impact on seafloor. Compared to other gear, such as bottom trawls and dredge the potential impact from pots and traps is smaller and VME encounters are not common (Brouwer et al. 2020). With traps and pots there is very limited impact footprint, due to the small area of the gear that touches the bottom.

Gear Class	Benthic Habitat	
	Physical	Biological
Gillnet –midwater	1	1
Hook and line	1	1
Longline – pelagic	1	1
Purse seine	1	1
Trawl – midwater	1	1
Longline – bottom	2	2
Gillnet – bottom	3	2
Pots and traps	3	2
Trawl – bottom[2]	5	5
Dredge	5	5

Table 6: Ratings of habitat impact for each gear class on scale from 1 (very low) to 5 (very high). Source: Chuenpagdee et al. (2003)

If the vessel encounters VME indicator species in volumes of more than 1% of the total weight of the target species landed by a trap, they will move-on to the next fishing site at least 1 (one) nautical mile away.

Species	Spatial overlap	Catchability	Risk of mortality
VME indicator taxa	Unknown	Low	Low
Mitigation			
Very limited impact footprint, due to the small area of the gear that touches the bottom. The VME indicator taxa threshold is 1% of the target species by line and if reached the vessel is required to move on to the next site.			
Risk after mitigation			
VME indiocator species - Low			

Tables 7: VME Impact from Traps

Overall, the risk to elasmobranchs, seabirds, marine turtles and VMEs is relatively low when compared to other fishing methods. Some teleost and octopus' bycatch is expected but live release of these species is possible.

Information on Status of the Deep-Sea Stock to be Fished

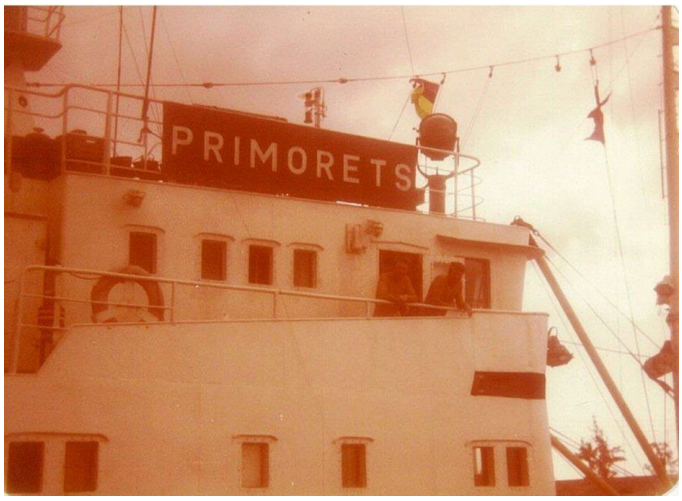

Figure 21: Picture of Primorets in Port Louis, Mauritius

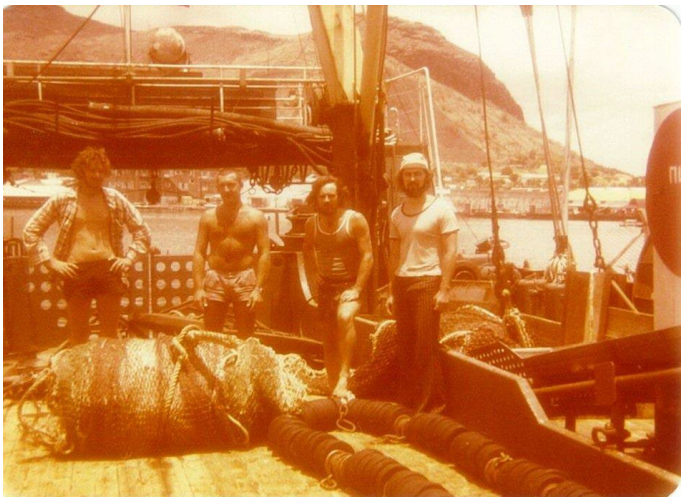

Figure 22: Picture of crew working on Primorets in 1980s

Figure 23: Picture of Primorets in Port Louis, Mauritius.

Figure 24: Picture of Primorets in Port Louis, Mauritius

There is not a lot of data available regarding lobster fishing in SIOFA area. In 1980s Soviet scientists on SRTM R.V. Sevastopolskij Rybak, SRTM R.V. Myslitel, SRTM R.V. Primorets, SRTMK R.V. Yunaya Smena, SRTM R.V. Slava Kerchi and others has conducted several trips to Seamounts 150, 251, 102, 260, 336, 358, 415, 462, 690 and Walter's Shoals to assess potentials of lobster fisheries in Southern Indian Ocean. Results of their survey can be seen below.

Results of lobster pot fisheries surveys at the Southwest Indian Ridge Seamounts by Soviet scientists between 1981 – 1986

Vessel name and class, Cruise No.	Period of which pots were fished (year, month)	Ridges, area	Seamount	Number of pot sets	An amount of set pots	Lobsters measured	Lobsters analyzed
Myslitel – 17th Cruise	2 Jan – 5 Feb 1981	Southwest Indian Ridge	105	8	20	148	-
Primorets – 15th Cruise	18 Jun – 25 Sept 1981	Southwest Indian Ridge	150, 251, 102	83	83	250	250
		Madagascar Ridge	Walters shoal				
Aelita – 16th Cruise	9 Dec 1981 – Feb 1982	Southwest Indian Ridge	150, 251, 102, 358	66	114	1017	1017
		Madagascar Ridge	Walters shoal	4	6		
Stepan Poshivalnikov – 19th Cruise	16 March – 4 June 1982	Southwest Indian Ridge	150,102,251, 360, 422, 415, 215, 350	24	105	545	-
		Madagascar Ridge	Walters shoal	3	15		
Kerchenskij Rabochij – 19th Cruise	May 1982	Mid-Indian Ridge	260	1	3		-
	March-April 1982	Ninety East Ridge	335	4	20		
Kerchenskij Rabochij – 20th Cruise	9 August – 7	Southwest Indian Ridge	150	195	600	857	733

https://www.fao.org/4/y4884e/y4884e0b.htm

Vessel name and class, Cruise No.	Period of which pots were fished (year, month)	Ridges, area	Seamount	Number of pot sets	An amount of set pots	Lobsters measured	Lobsters analyzed
	December 1982	Mid-Indian Ridge	260	0	0		
		Ninety East Ridge	335	3	12		
Stepan Poshivalnikov – 20th Cruise	15 August – 22 October 1982	Southwest Indian Ridge	150, 102, 251, 358	130	130	973	-
		Madagascar Ridge	Walters shoal	8	8		
Sevastopolskij Rybak-17th Cruise	10 February – 9 May 1983	Southwest Indian Ridge	150, 102, 251	217	430	1429	1429
		Madagascar Ridge	Walters shoal	30	30		
Myslitel – 18th Cruise	Ocotber 1982 – February 1983	Southwest Indian Ridge	150	255	256	386	135
		Mid-Indian Ridge	260	3	6		
Myslitel – 19th Cruise	1 May – 26 July 1983	Southwest Indian Ridge	150	18	84	215	165
		Mid-Indian Ridge	260, 462				
		Ninety East Ridge	336				
Primorets – 16th Cruise	22 July – 18 September 1983	Southwest Indian Ridge	150	24	78	160	-

https://www.fao.org/4/y4884e/y4884e0b.htm

Vessel name and class, Cruise No.	Period of which pots were fished (year, month)	Ridges, area	Seamount	Number of pot sets	An amount of set pots	Lobsters measured	Lobsters analyzed
Sevastopolskil Rybak - 18th Cruise	10 August – 7 October 1983	Southwest Indian Ridge	150, 251, 102	139	139	116	116
Myslitel – 20th Cruise	23 September - 25 December 1983	Southwest Indian Ridge	150,251,102	41	652	656	478
Primorets – 17th Cruise	6 February – 22 March 1984	Southwest Indian Ridge	150, 102	~ 150	315	1613	548
Primorets – 18th Cruise	24 August – 22 September 1984	Southwest Indian Ridge	150, 251, 102	18	36	-	130
Slava Kerchi – 22th Cruise	11 March – 30 April 1985	Southwest Indian Ridge	150, 360	13	~40	350	-
YunayaSmena – 2nd Cruise	29 January – 10 February 1986	Southwest Indian Ridge	150	31	103	97	-
Primorets – 19th Cruise	29 March – 03 April 1986	Southwest Indian Ridge	358	1	3	-	-
Primorets.- 20th Cruise	13 August – 09	Southwest Indian Ridge	150, 251	38	38	48	7

https://www.fao.org/4/y4884e/y4884e0b.htm

Vessel name and class, Cruise No.	Period of which pots were fished (year, month)	Ridges, area	Seamount	Number of pot sets	An amount of set pots	Lobsters measured	Lobsters analyzed
	December 1986	Madagascar Ridge	Walters shoal	3	3		

Table 8: Results of lobster pot fisheries survey at the Southwest Indian Ridge Seamount

Lobster pot fishing (Nikolaj N. Kukharev)

The Second Cruise of the SRTM *R.V. Geroevka* (September 1980 - March 1981)

The cruise resulted in the first record of rock lobsters on the Southwest Indian Ridge. Large rock lobsters were found on 16 January 1980 during the Soviet expedition of the 2nd cruise of the *Geroevka*.

The Seventeenth Cruise of the SRTM *R.V. Myslitel*, November 1980 - April 1981

In January 1981 during the 17th cruise of the SRTM *Myslitel* a large rock lobster was incidentally caught with a hook on a vertical line during line fishing for wreckfishes over Seamount 150. During the same expedition experiments were undertaken using pots to fish for lobster on Seamount 150 (Table 8). Fishing records describing the pot fisheries stated that the *Jasus lalandii* concentrations supported a fishery. The length (TL) of lobster that were caught varied from 32 to 61cm; their weight varied from 870 to 5 020g. Two length groups were predominant: 41 - 44cm and 49 - 54cm. The lobsters taken from the seamounts of the Southwest Indian Ridge were much longer, had a much larger body and inhabited much deeper waters than is the case for the southwestern coast of the South Africa.

https://www.fao.org/4/y4884e/y4884e0b.htm

The Fifteenth Cruise of the SRTMK *R.V. Primorets*, June - November 1981

During the cruise of the *Primorets*, which started in June 1981 (cruise 15) to the Southwest Indian Ridge and Madagascar Ridge, rock lobsters (*Jasus lalandii*) was found, besides Seamount 150, on top of other seamounts of the Southwest Indian Ridge and on the banks 102, 358, and 251. A description of cruise fishing operations (number of sets and areas of pot fishing) is given in Table 8. The lobsters caught at Seamounts 150 and 102 were identified according to R.N. Burukovsky's guidebook (1974); two species were found, the rock lobsters *Jasus lalandii* and *Palinurus gilchristi*. The length of the *P. gilchristi* taken from Seamounts 150 and 102 varied from 42 to 47cm and their weights varies from 1 740 to 3 050g. Unlike *Jasus lalandii, P. gilchristi* was not found in dense aggregations. In the Madagascar Ridge area on the top surface of Walters shoal lobsters of the *Palinurus* genera were found though it was not identified to species. However, it was assumed to be *Palinurus gilchristi*. The lengths of these lobsters were in the range 35 - 40cm and their weights 1 260 - 3 000g.

The Sixteenth Cruise of the SRTM *R.V. Aelita*, November 1981 - March 1982

The survey by this vessel also undertook lobster pot fishing operations, the details of which (number of sets and area of pot sets) are given in Table 8.

The Nineteenth Cruise of the SRTM *R.V. Stepan Poshivalnikov*, February - June 1982

The expedition undertook longline and lobster pot fishing operations, details of which are given in Table 8.

The Nineteenth Cruise of the SRTM *R.V. Kerchenskij Rabochij*, January - June 1982

The expedition undertook longline and lobster pot fishing operations, the details of which are described in Table 8. Fishing pots with dimensions of 1.50 × 0.75 × 0.60 m were used. The pots were set in groups of 3 - 5 pots with a separation of 25 m. No lobsters were taken at either of the seamounts that were surveyed.

https://www.fao.org/4/y4884e/y4884e0b.htm

The Twentieth Cruise of the SRTM *R.V. Kerchenskij Rabochij,* July - December 1982

This expedition undertook longline and lobster pot fishing as described in Table 8. The dimensions of the pots that were used were 1.60 × 0.80 × 0.60 m. The distance between pots was 10 - 15 m. Lobsters were only taken on the Southwest Indian Ridge seamounts.

The Twentieth Cruise of the SRTM *R.V. Stepan Poshivalnikov,* July - December 1982

This cruise undertook longline lobster pot fishing on Seamounts 150, 251, 102, 358, 415, 690 and on Walter's shoal. Details of the operations and areas fished are given in Table 8. The pots used had a parallelepiped shape and dimensions of 1.7 × 0.6 × 0.75 m with one inlet opening. Pots with two inlets were constructed by rigidly connecting two ordinary pots so that the resultant pot was 1.5 times bigger than usual. Rotten fish (Cape bonnetmouth, heads of wreckfishes, sharks) were used as bait. During this expedition to the Madagascar Ridge (Walters shoal) the only species encountered was tentatively identified as *Palinurus gilchristi*.

The Seventeenth Cruise of the SRTM *R.V. Sevastopolskij Rybak*, January - July 1983

This expedition undertook longline and lobster pot fishing on Seamounts 150, 251, 102 and Walter's shoal (see Table 8). The lobster pots used had dimensions of 150×75×55cm and two or three openings. The pots were set in groups of 2 - 4 pots and connected with nylon ("kapron") rope. Heads of wreckfishes and mackerel, Cape bonnetmouth and other small fish were used as bait. At Seamount 516 at the Madagascar Ridge small-sized deepwater lobster (not identified to species) was found in stomachs of wreckfishes.

The Eighteenth Cruise of the SRTM *R.V. Myslitel*, January - July 1983

The expedition undertook longline and lobster pot fishing at Seamount 150 on the Southwest Indian Ridge and pot fishing on Seamount 260 of the Mid-Indian Ridge (see Table 8). The pots used for lobster fishing had dimensions of 150 × 75 × 55 cm and two openings. the pots were set in groups of 4 - 5 connected with nylon ("kapron") rope.

https://www.fao.org/4/y4884e/y4884e0b.htm

The Nineteenth Cruise of the SRTM *R.V. Myslitel*, January - July 1983

This expedition undertook longline and lobster pot fishing on Seamount 150 of the Southwest Indian Ridge, Seamounts 260 and 462 of the Mid-Indian Ridge and Seamount 336 of the Ninety East Ridge (see Table 8 for details of areas fished and gear used). Lobsters were found at Seamount 150.

The Sixteenth Cruise of the SRTM *R.V. Primorets*, May - October 1983

This expedition undertook longline and lobster pot fishing but only Seamount 150 of the Southwest Indian Ridge was surveyed using pots. Details of fishing operations are given in Table 8. During this cruise identification of the lobster species inhabiting Seamount 150 was precise and the lobster species earlier identified as *Palinurus gilchristi,* was determined to be *Palinurus delagoae*. The identity of the lobster *Jasus lalandii* was confirmed.

The Eighteenth Cruise of the SRTM *R.V. Sevastopolskij Rybak*, July - December 1983

This expedition carried longline and lobster pot fishing on Seamounts 150, 251, 102. Details of fishing operations are given in Table 8. Lobsters were fished using pots with dimensions of 150 × 75 × 55cm having two or three openings. On Seamount 150 the pots were set in groups of three or four and on Seamount 251 in groups of 7 - 16, connected with nylon rope. Heads and guts of wreckfishes and mackerel were used as a bait. The expedition recorded the presence of *Palinurus delagoae* from Seamount 251.

The Twentieth Cruise of the SRTM *R.V. Myslitel*, September 1983 - January 1984

This expedition undertook long-line fishing and lobster pot fishing on Seamounts 150, 251 and 102. Details on the amount and area of pot fishing operations are given in Table 8. The pots were set in groups of 2 - 5 at the distance of 10 m of each other and connected with nylon rope. Wreckfishes and alfonsino were used as a bait.

The Seventeenth Cruise of the SRTMK *R.V. Primorets*, January - May 1984

This cruise undertook longline and lobster pot fishing on Seamounts 150, 102. The lobster pots. had dimensions of 150 × 75 × 55cm and one or two openings. The pots were set in groups of two

https://www.fao.org/4/y4884e/y4884e0b.htm

to four and were connected with by nylon rope. Details of the pot fishing operations are given in Table 8.

The Eighteen Cruise of the SRTMK *R.V. Primorets*, June - November 1984

The expedition carried out operations for long-line fisheries and lobster pot fisheries. Seamounts 150 and 102 were examined by means of pots. Pots were set as orders consisting of 2 - 4 pots and connected with nylon ("kapron") rope. The amount of operations for pot fisheries is given in Table 8.

The Twenty-Second Cruise of the SRTM *R.V. Slava Kerchi*, January - May 1985

This cruise undertook longline lobster pot fishing on Seamount 150 at the Southwest Indian Ridge. The pots were set in groups of three to four and were connected with nylon rope. Details on the amount of fishing operations are given in Table 8

The Nineteenth Cruise of the SRTMK *R.V. Primorets*, February - July 1986

This cruise undertook longline and lobster pot fishing on Seamounts 150 and 358 of the Southwest Indian Ridge. The pots were set in groups of two to four and were connected by nylon rope. Details of the fishing operations are in Table 8.

The Second Cruise of the SRTMK *R.V. Yunaya Smena*, October 1985 - February 1986

This cruise undertook trawl, long-line and lobster pot fishing operations on Seamount 150 of the Southwest Indian Ridge. The lobster pots were set in groups of two to four with a separation of 10 m. They were connected by nylon rope. Small squids, dentex and Cape bonnetmouth were used as bait. Details on the amount and area of the pot fishing are given in Table 8.

https://www.fao.org/4/y4884e/y4884e0b.htm

The Twentieth Cruise of the SRTMK *R.V. Primorets*, August - December 1986

This expedition undertook longline and lobster pot fishing on Seamounts 150, 251 of the Southwest Indian Ridge and Walters Shoal, the Madagascar Ridge. The pots were set in groups of two to four and were connected by rope. The nature of the pot fishing operations are given in Table 8.

In the expeditions undertaken after 1983 the lobster species *Jasus lalandii and Palinurusdelagoae* were taken at Seamounts 150 and 251 as well as other seamounts of the Southwest Indian Ridge. Rock lobster from the genus *Palinurus,* conventionally named *P. delagoae* were found in 1981 in the area of the Madagascar Ridge (Walters Shoal) as well though the species identity should be confirmed. The lobster *Jasus lalandii* predominated in the catches from all expeditions. During the expedition of the *Primorets* in 1986, the length of *J. lalandii* harvested from the Southwest Indian Ridge at Seamount 150 ranged from 33 to 61cm and their weights varied from 1 260 to 5 950g. Individuals of 39 - 54 cm length comprised the majority of the catch. The length of *P. delagoae* at the same seamount ranged from 36 to 54cm and from 1 940 to 4 200g in weight. Lobsters were not found at the seamounts surveyed in the Mid-Indian and Ninety East Ridges

Lobster pots

Lobster pots were set only from the vessels of the SRTM and SRTMK classes. Experimental lobster fisheries with pots were usually a part of a wider range of fisheries research activities that were undertaken during the expeditions. Sometimes pots were set in tandem with the accompanying operations or when vessels were proceeding to the other areas to undertake survey operations. Most pots were set on the seamounts of the Southwest Indian Ridge.

The lobster pots were constructed by the ship-owners through special orders. Usually, the pot consisted of a metal frame covered with a thick polyamide net or metal net with inlet openings for lobsters and with a metal sinker inside. Sometimes the pots were made of bamboo. Pots of parallelepiped, cylindrical, opera-house, conical and tetrahedron shape were used. The number of inlet openings varied from one to four. Pots of parallelepiped shape were used most often; their size was 150 × 75 × 50cm. They had one, two or three inlet openings. Fish, most often those species that inhabited the Southwest Indian Ridge seamounts (Cape bonnet mouth, butterfish, heads and guts of wreckfishes and sometimes baitfish specially harvested at Saya-de-Malha Bank: emperors and grunts) were used as a bait used.

https://www.fao.org/4/y4884e/y4884e0b.htm

Because the tops and the slopes of most of the seamounts had sharply cut and rough surfaces, it was impossible to simultaneously set a great number of pots (i.e. in the hundreds) as is the common practice in most crustacean pot fisheries. Therefore, only individual pots or sets of a few dozen pots were set simultaneously on the seamounts on the Southwest Indian Ridge. During the cruise various shapes and sizes of pots were deployed and their efficacy was examined. The optimal number of pots to be set was in the order of one. Optimal soak time of the pots was also examined. Attempts were also made to determine the optimal depth of pot settings, the affect of the covering mesh, the affect of composition of the bait and the soak time in relation to the catch success of the fishing operations. Techniques to deploy pots under conditions of great fishing depths, rough seafloor, high winds and rough seas were developed and the costs associated with these variables was also examined.

The biology of the lobsters was studied including the length-weight relationship, spawning periods, moulting periods and the distribution of lobsters by seasons. The area of pot fishing was approximately estimated.

At the same time between 1979 and 1982 Panama flagged fishing vessels with Australian crew were catching deep sea crabs and spiny lobsters in the Southern Indian Ocean. Based on their historical fishing data there are substantial amounts of deep-sea crabs (Chaceon spp.) as well as spiny lobster (Jasus spp. and Projasus spp. species) in the waters of the Southern Indian Ocean. Between 1979 and 1982, 26 voyages were made, each lasting on average 45 days and harvesting 120 tons of lobster. Catch was unloaded in Mauritius. In 1986 they made two more trips lasting 57 and 56 days ending up with 157 tons of lobster tails from 480 tons of whole lobster and 600 tons of live lobster and 172 tons of lobster tails respectively. The company used single pots both round and rectangular in shape

Figure 25: Picture of Previous Operations (1980s)

Figure 26: Picture of Previous Operations (1980s)

Figure 27: Picture of Previous Operations (1980s)

Figure 28: Picture of Previous Operations (1980s)

Figure 29: Picture of Previous Operations (1980s)

Figure 30: Picture of Previous Operations (1980s)

Figure 31: Picture of Previous Operations (1980s)

Monitoring, Management and Mitigation Measures

The vessel and its operators will report all vessel activities in the Management Areas in accordance with legal specifications and requirements. This will include, but is not limited to:

- Notification of: Entry and Exit from SIOFA waters;
- Adequate prior notice when planning a trip into SIOFA Convention waters;
- Adequate prior notice of date and port of arrival after a trip in SIOFA Convention waters;
- While at sea the vessel will report its location and current activity through VMS;
- While at sea, the Master will be responsible for the day-to-day operations of the vessel and ensuring compliance in accordance with Union of Comoros law and SIOFA CMMs
- Comoros will ensure that a scientific observer is always on board.
- Recording any bycatch or interactions with VMEs
- Providing logbook information and scientific observer data according to convention measures

Comoros has an established data collection programme and procedures. This data collection is consistent with a robust trap fishing operation including tracking and observations of bycatch on traps to confirm the existence of VMEs, biological data collection of the target species and a data collection reporting system to compile data sets necessary to evaluate biomass assessments and geographical distribution of the target species using traps.

During fishing activities, data will be collected daily: A Daily Effort regarding Catch data and Production Log will be collected to better understand the target species. The Daily Effort, Catch and Production Log will capture operational information on a set-by-set basis and will be described on this form. Lost gear is also recorded on a set-by-set basis or trap by trap basis. Comoros requires this logbook to be submitted at the end of each trip. Observers will record discards and waste management, wildlife abundance and interactions and mitigation measures.

The recording of lost gear and traps is a priority for the Comoros Islands as it is an indicator of the vessel's imprint in the SIOFA Convention area. Lost traps have potential negative impacts in the

environment and lead to ghost fishing. If any gear is lost; the Comoros flagged vessel will report the event in the daily logs during the fishing activities.

Sections of the traps nylon mesh will be cut with and then sewn back together with cotton string, in the event that traps are lost and not found. The cotton string will eventually decompose, and the traps will then remain opened, so ghost fishing is mitigated. The Comoros believes that its choice of gear, methods and prior knowledge of the type of area to be researched will result in a minimal imprint on the seafloor. It is worth mentioning that during the first trip of f/v Rinascente 9 NO fishing gears were lost.

Analysis from the initial trip showed that the soak time for the traps on the bottom varied but it became clear that shorter soak times produced higher catch rates. Soak times therefore were maintained at about 24 hours for the proceeding trip, with setting and retrieval of lines occurring within 24 hours, except for when weather and sea conditions did not permit.

The backbone line (ground line) used to attach the traps and float line used is buoyant polypropylene and, as such, the risk of entanglement and bottom damage is reduced. Floats for each longline string were appropriately marked to ensure easy identification.
The methodology of setting was as follows:

- The first float and float line were deployed behind the vessel from the stern and paid out in full, the length of the float line being 1.5 times the maximum bottom depth in the area;
- The backbone line which the traps are attached is then similarly paid out, while the vessel steams slowly ahead;
- The remaining float line and float are paid out from the opposite end of the longline string;
- No anchors are used; the traps themselves are sufficiently heavy to keep the gear in place on the bottom. This limits anchor damage to the seabed and benthos;
- The entire gear is “stretched” gently to minimize the risk of self-entanglement on the way to the bottom. The sink rate of these trap strings is observed to be less than 1 m/s, so a trap will take approximately 10 minutes to reach a depth of 500m.

Seabird interactions will be monitored by the observers. Deployment of the trap longline will be done directly off the stern of the vessel, the traps weight result with initial rapid sinking of the gear until the trap was fully submerged with line tension applied at depth. This would minimise potential impact with birds and mammals or other potential endangered, threatened and protected species. Bait jars will be filled with bait and tethered to the inside of the trap while the traps are

being staggered and attached to the ground line just before they are deployed off the stern of the vessel.

Typically, on pelagic and other longline type operations, seabird mortality is expected – this is not the case for trap setting where no bait is exposed, and line sink rates are high. The flagged vessel will be prepared for interactions with seabirds, reptiles or mammals during operations, although no bird or marine mammals have been entangled in the gear so far.

It will be one of the observer's designated tasks to record any interactions, take pictures of the encountered species and decide whether or not traps may be hauled and/or set in that location. If more than one marine mammal or turtle come into contact with the vessel or gear and suffered any potential injury or harassment during a fishing day, the fishing operation on any seamount would move to the next prescribed station outside a circle with a 5 nautical mile radius from the location of the encounter or move to the next scheduled seamount. Traps retrieved from the hauling station located mid-ship on the starboard side where the catch of the target species was weighed, and observers can undertake the required sampling. All bycatch from each set will be accumulated in a small, stackable, plastic deck container (tote) and weighed and counted at the end of the set.

It is common practice for *Jasus spp.* and other lobster commercial fisheries to avoid areas and seasons with the likelihood of high proportions of berried fish. The proportions of berried lobster were therefore closely monitored. Comoros will continue to monitor the number of berried females and avoid seasons when females are carrying eggs.

In cases where berried females are landed, the vessel will retain them onboard in a tank with flowing water and then return them to the sea at the end of the set by lowering a trap filled with these individuals, with an opening mechanism that ensures they reach their habitat. A sample from for each seamount will be retained which will be added to the subset group of lobsters selected for sampling in order to analyze its condition, berry cycle and general characteristics. Further, the distribution and seasonality of the *Jasus* spp. and *Projasus* spp. abundance in the designated seamounts will become clearer as the fishery progresses.

The Union of Comoros is a new player in SIOFA fisheries. At the same time fishing industry is extremely important for development of our economy. We plan to work closely with SIOFA as well as with operators and crew of the f/v Rinascente 9 to ensure the sustainability and development of lobster fisheries in the Indian Ocean.

Figures, Tables & References

Table 4	Seabirds
Table 5	Marine Mammals and Turtles
Table 6	Ratings of habitat impact for each gear class on scale from 1 (very low) to 5 (very high)
Table 7	VME Impacts from Traps
Table 8	Results of lobster pot fisheries surveys at the Southwest Indian Ridge Seamounts
Reference	Map of currents: Sheppard, 2018
Reference	https://www.fao.org/4/y4884e/y4884e0b.htm
Reference	SIOFA Ecosystem Summary 2023, figure 18, p.34
Reference	Ratings of habitat impact for each gear class on scale from 1 (very low) to 5 (very high). Source: Chuenpagdee et al. (2003)
Reference	SIOFA CMM 01 Annex 1, p. 12
Reference	Brouwer, S., Wichman, M., and Wragg, C. (2020).