SPRFMO
South Pacific Regional Fisheries Management Organisation

8th MEETING OF THE SCIENTIFIC COMMITTEE

New Zealand, 3 to 8 October 2020

SC8-Doc25

Cook Islands Annual Report

Cook Islands

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Ministry *of* Marine Resources

GOVERNMENT OF THE COOK ISLANDS

SOUTH PACIFIC REGIONAL FISHERIES MANAGEMENT ORGANISATION

Cook Islands Annual Report in the SPRFMO Convention Area for 2019

September 2020

Prepared by Offshore Fisheries Division

Contents

1 Description of Fisheries

The Cook Islands has operated in the SPRFMO Convention Area since 2018 under an exploratory fishery limited to an allocated area southeast of French Polynesia (Table 1).

Table 1. Positions of box permitted for Cook Islands exploratory fishing.

Exploratory area	Latitude	Longitude
Foundation Seamount chain	31’00S	100’00W
	40’000S	134’00W

The three year exploratory trap fishing commenced in 2019 in line with CMM 14b-2018, superseded by CMM14b-2019. Only one Cook Islands vessel actively fished (Table 2), completing three trips in 2019 and one in 2020. The first two trips occurred from March to July, the third trip occurred from October to December 2019 and the fourth trip occurred from March to May 2020. Activities were carried out in line with the Fisheries Operations Plan ((MMR, 2019) and relevant CMMs.

Table 2. Fleet composition of Cook Island flagged vessels operating in the SPRFMO area for most recent 5 years.

Vessel GRT	2015	2016	2017	2018	2019
0-200	-	-	-	-	0
201-500	-	-	-	-	0
500+	-	-	-	-	1
Total	**N/A**	**N/A**	**N/A**	**N/A**	**1**

All three trips in 2019 targeted *Jasus sp.*, however for trip four in 2020 *Chaceon sp.* was recorded as the target species.

In this annual report, all activities are reported for 2019 and the first trip in 2020. All 2020 data and activities in this report are considered provisional.

2 Catch, Effort and CPUE Summaries

As there is no historical data available for comparison, in-depth analysis of catch, effort and CPUE of all four fishing trips is contained in the working paper SC8-DW02 (Brouwer, et al., 2020b).

A total 169.76t was landed from the four trips, with *Jasus sp.* recorded as the target species for trips 1-3, but changed to *Chaceon sp.* in trip 4. Catch composition consisted of 168.28t of target species (99.13%), including 146.62t (86.37%) of *J. caveorum* and 21.65t (12.75%) of *Chaceon sp.* In addition, a small amount of bycatch (1.48t - 0.87%) was landed. (Table 3)

Table 3: Catch by species in tonnes for potting fishery. *2020 catch is considered provisional.

Year	*J. Caveorum* (t)	*Chaceon sp.* (t)	Others (t)	Total
2015	-	-	-	-
2016	-	-	-	-
2017	-	-	-	-
2018	-	-	-	-
2019	145.21	7.7	1.11	154.02
2020*	1.41	13.95	0.37	15.73
Total	**146.62**	**21.65**	**1.48**	**169.76**

Most of the effort and resulting catch came from the Kopernik seamount (148t) (Table 4). The catch by set information for Kopernik, Galilei, Humboldt, Linne B and MM seamounts are shown in Figure 1, to Figure to 5. While Kopernik was dominated by *J. caveorum* the remaining seamounts had high catch of *Chaceon sp.* The catch by depth information (Figure 6 and Figure 7) shows that the *J. caveorum* and *Chaceon sp.* seem to have different depth preferences. *J. caveorum* catch and CPUE was higher in shallower water (130-300m), while *Chaceon sp.* are caught in deeper waters (deeper than 300m). (Brouwer, et al., 2020b).

Table 4. Overall catches on each seamount from trips 1 to 4.

Seamount	*J. Caveorum* (t)	*Chaceon sp.* (t)	Total catch	Traps Set
MM	0.00	4.72	4.72	2742
Mendel	0.00	7.63	7.63	2489
Kopernik	146.57	1.31	147.88	18177
Linne b	0.00	2.09	2.09	682
GB	0.00	0.35	0.35	98
Mendeleiev	0.00	0.40	0.40	96
Jenner	0.05	0.10	0.15	142
Darwin A	0.01	0.16	0.16	369
Mercator	0.00	1.52	1.52	520
Buffon	0.00	1.01	1.01	467
Galilei	0.00	0.98	0.98	755
Humboldt	0.00	1.38	1.38	430

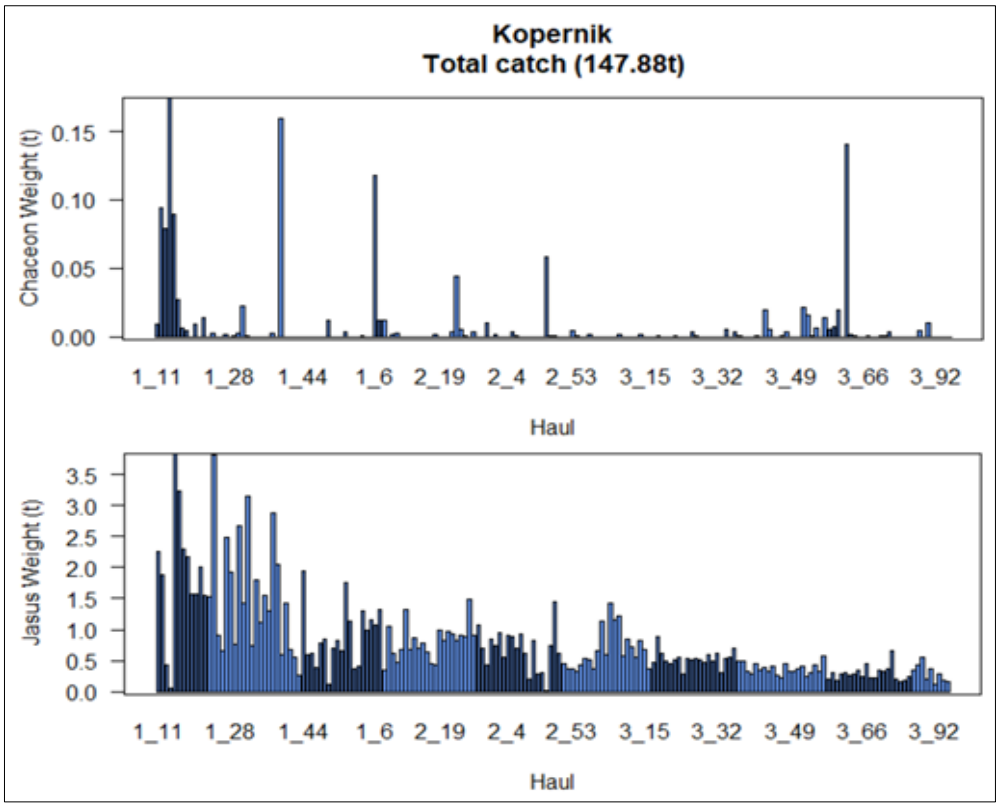

Figure 1. Total weight of crabs (upper panel) and lobsters (lower panel) from each haul in Kopernik seamount from all trips.

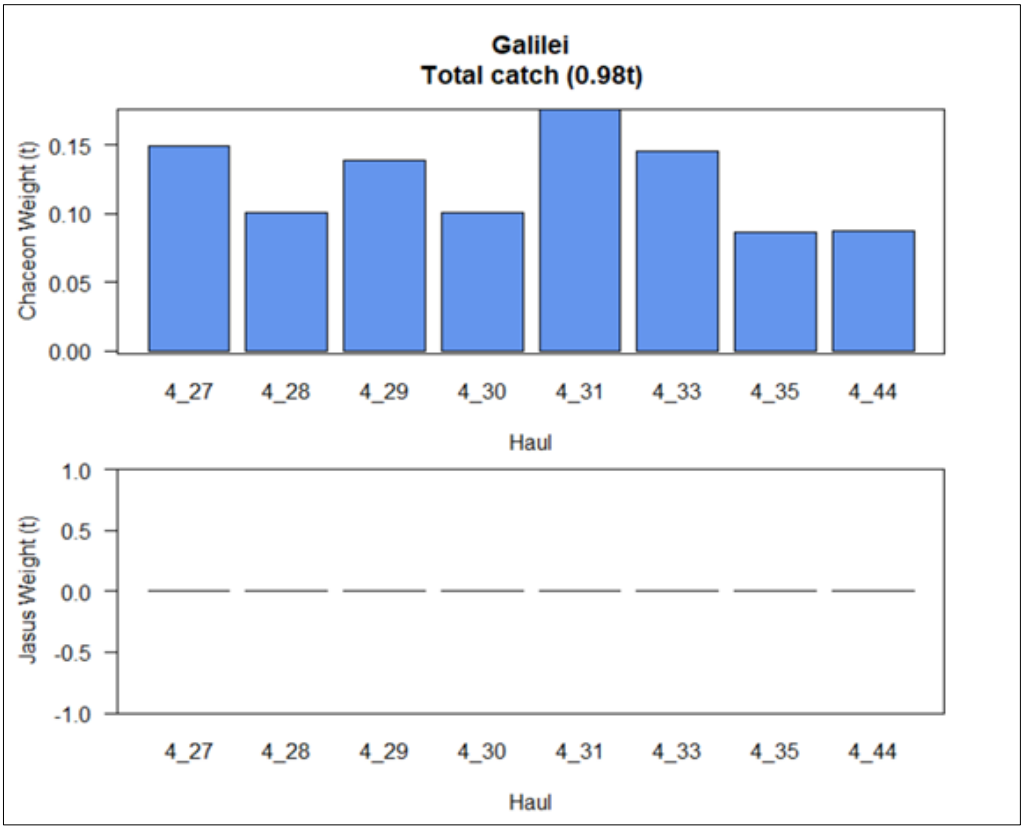

Figure 2. Total weight of crabs (upper panel) and lobsters (lower panel) from each haul from Galilei seamount from all trips.

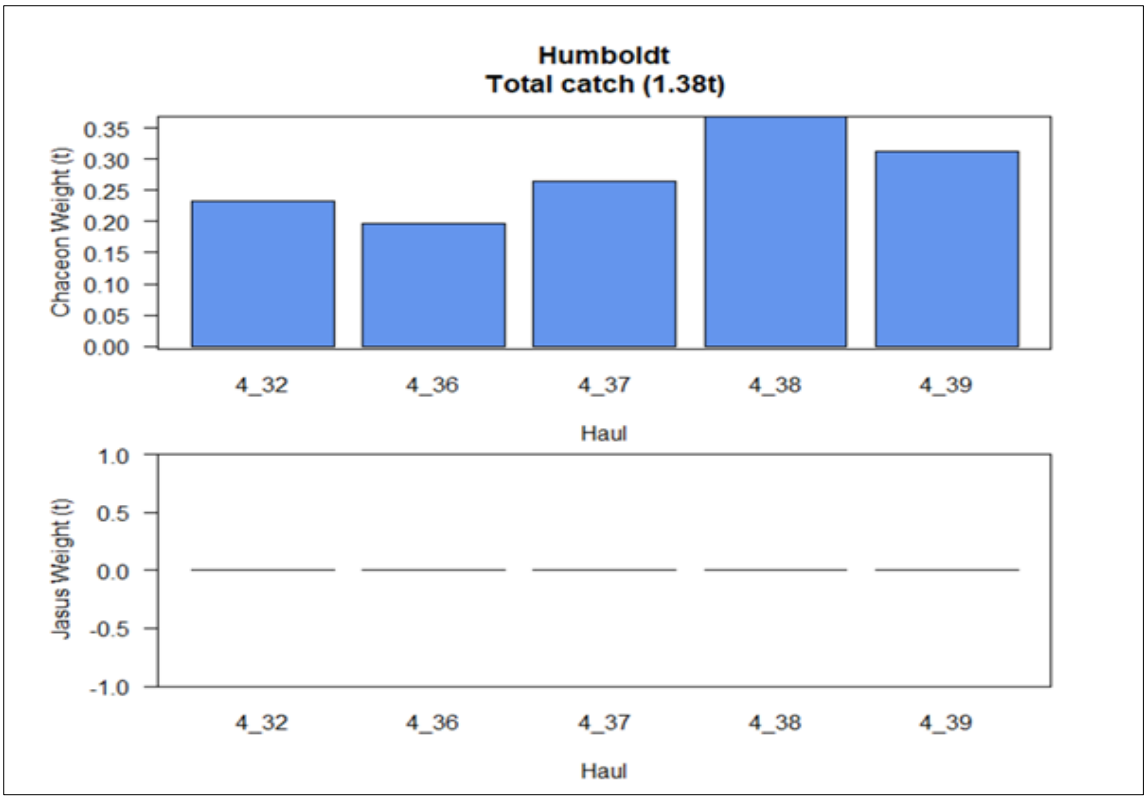

Figure 3. Total weight of crabs (upper panel) and lobsters (lower panel) from each haul from Humboldt seamount from all trips.

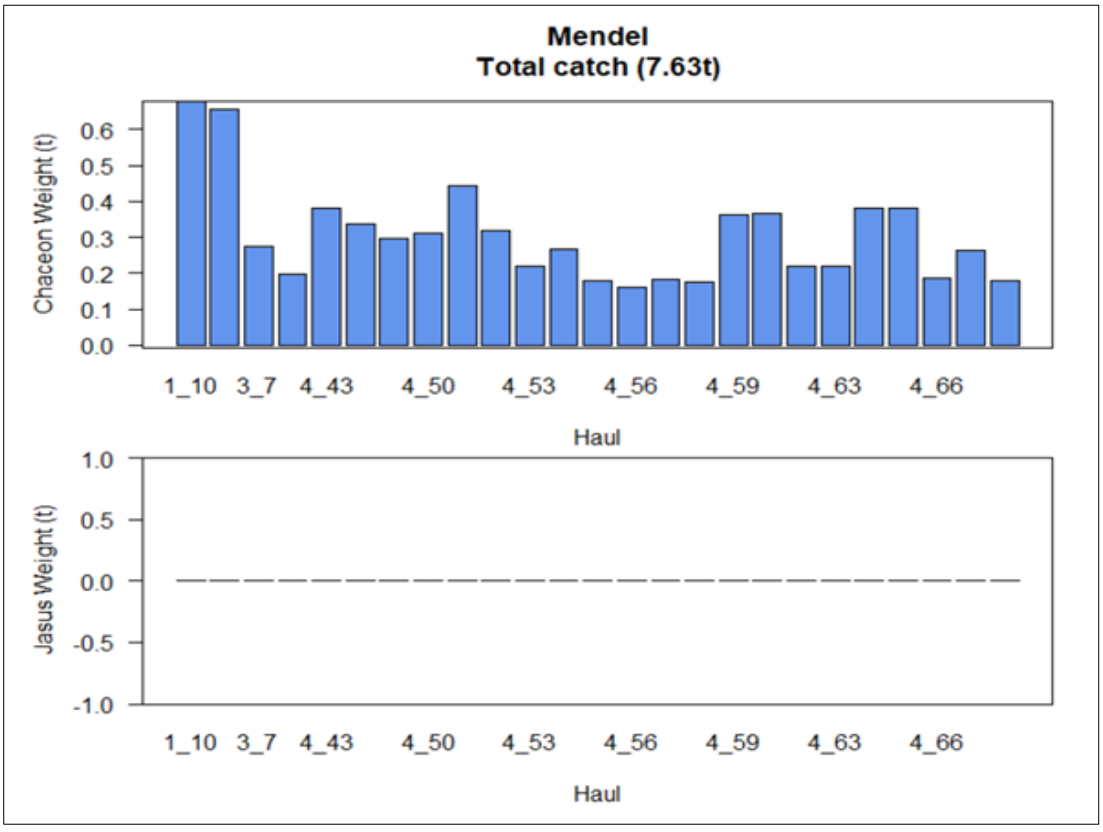

Figure 4. Total weight of crabs (upper panel) and lobsters (lower panel) from each haul from Mendel seamount from all trips.

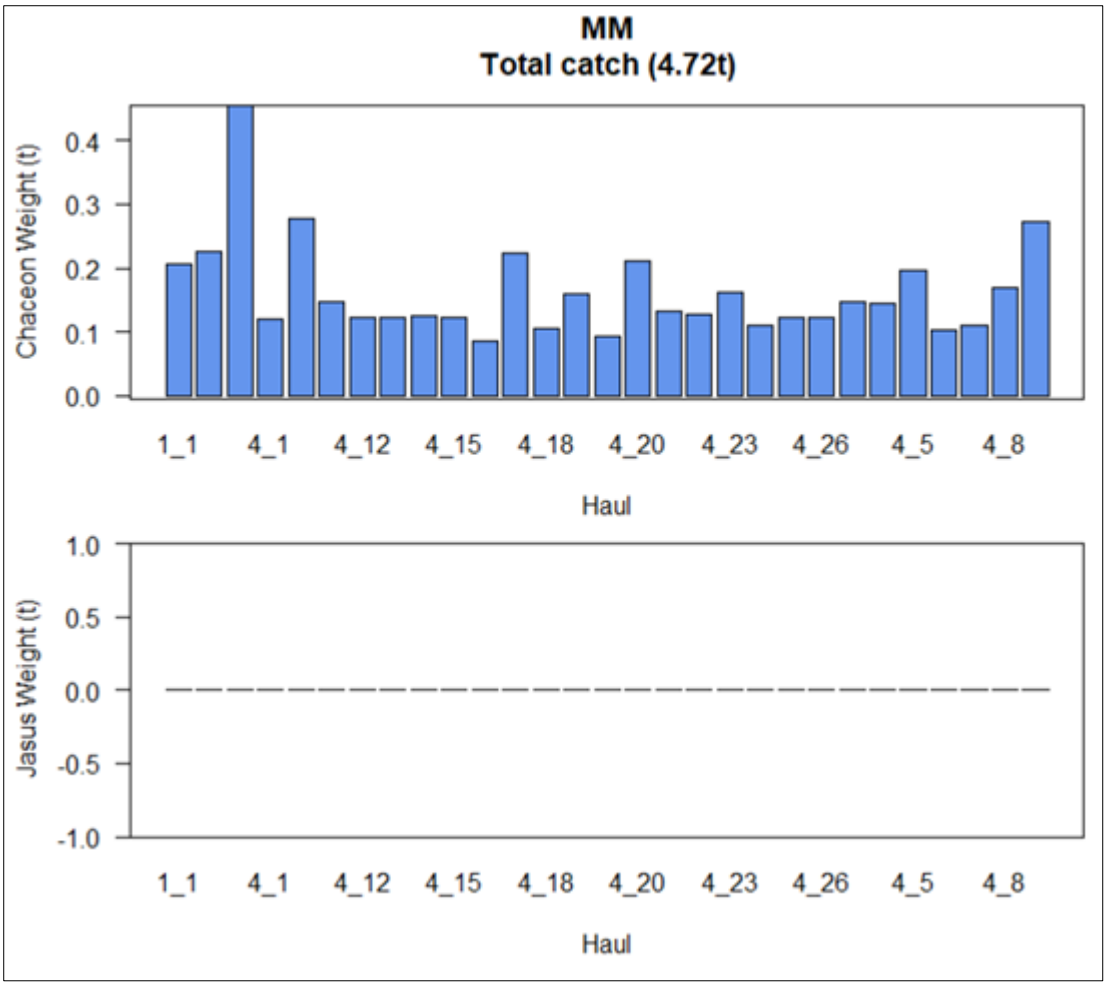

Figure 5. Total weight of crabs (upper panel) and lobsters (lower panel) from each haul from MM seamount from all trips.

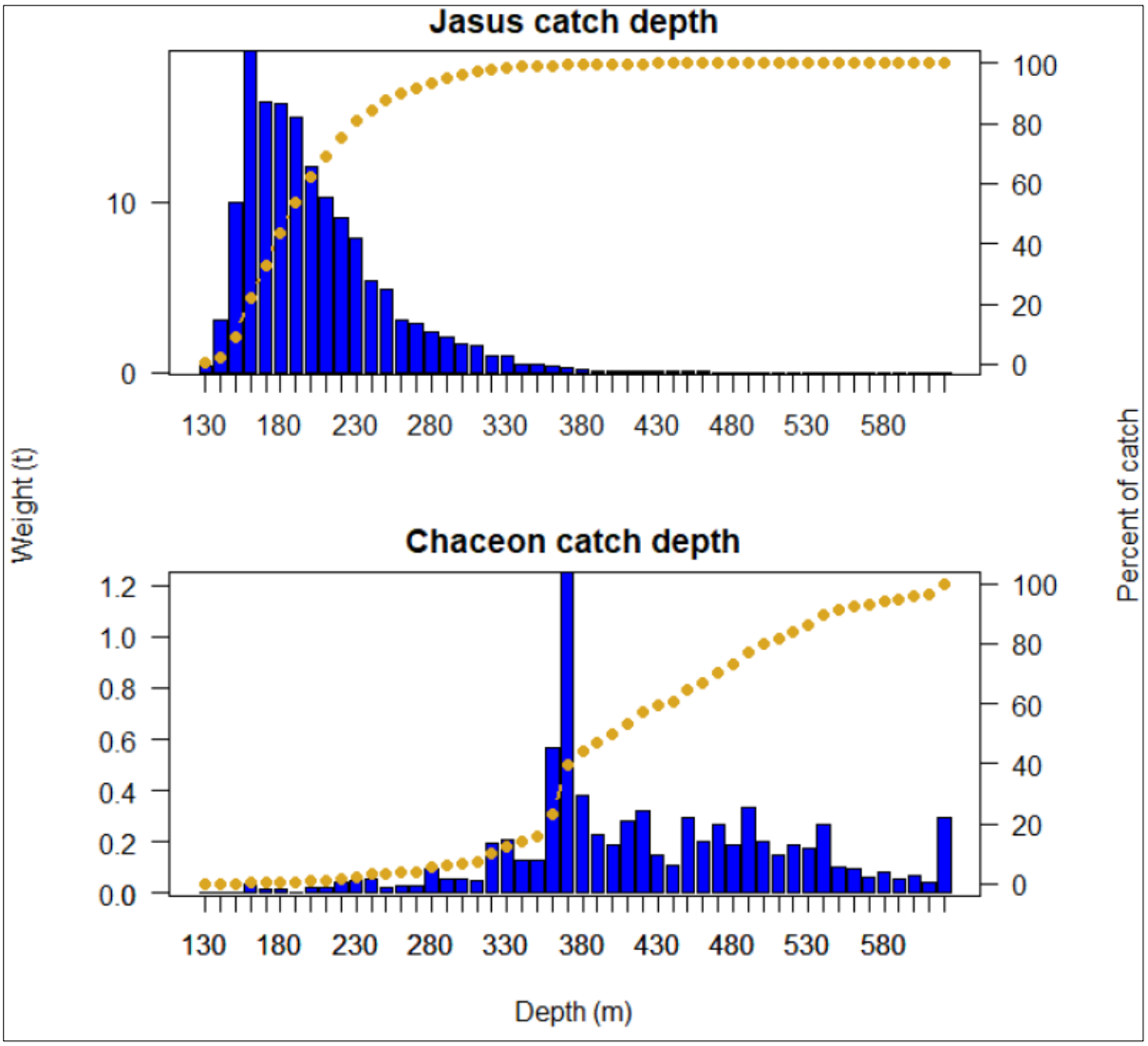

Figure 6. Total weight of lobsters (upper panel) and crabs (lower panel) by depth from all seamounts and all trips. Blue bars are the catch by depth bin and gold dotted line is the cumulative proportion of the catch. Depth was estimated for each through interpolation depending on its position relative to the start, middle or end of the set where depth recordings were made.

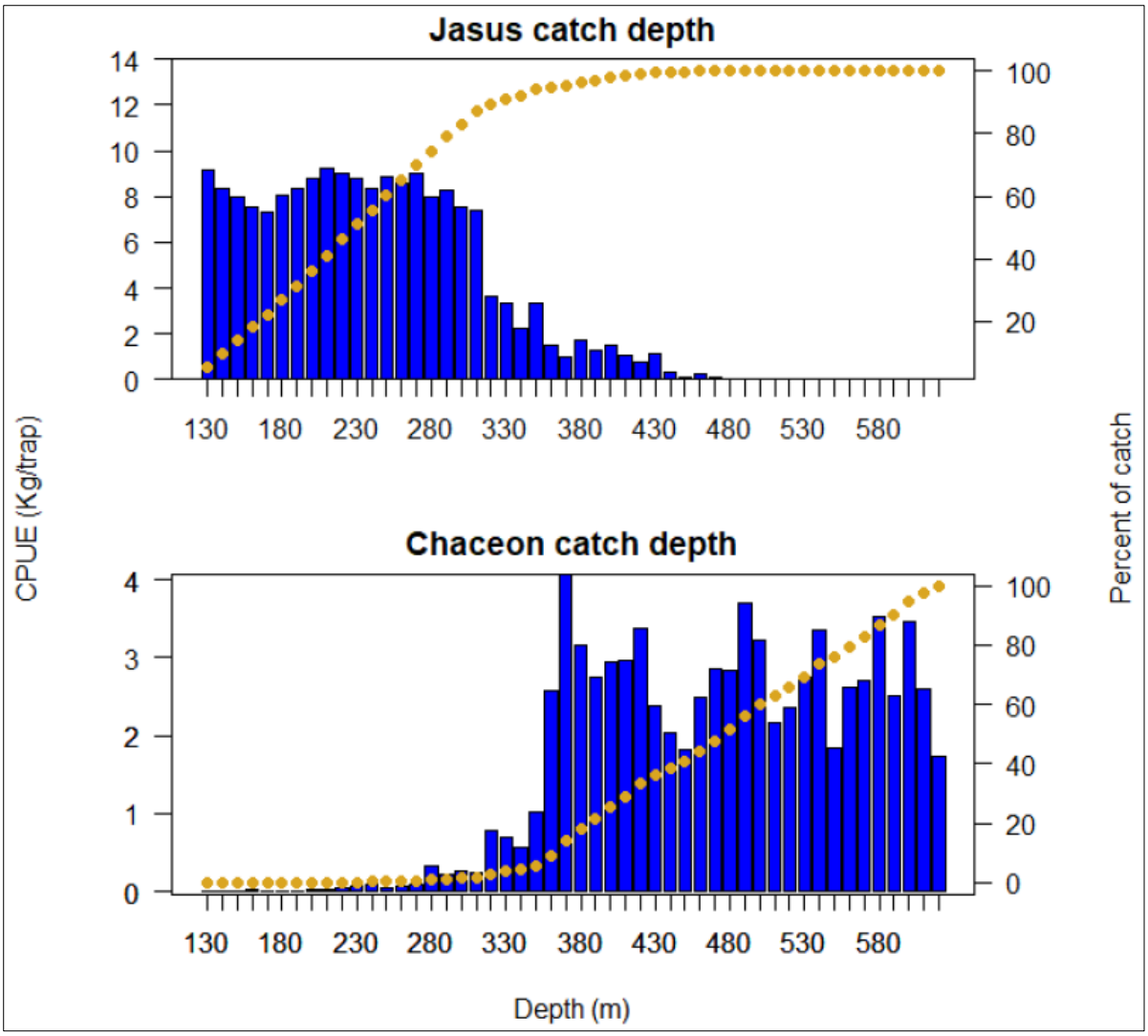

Figure 7. Catch per trap lobsters (upper panel) and crabs (lower panel) by depth from all seamounts all trips. Blue bars are the caych by depth bin and the gold dotted line is the cumulative proportion of the catch. Depth was estimated for each trap through interpolation depending on its position relative to the start, middle or end of the set where depth recordings were made.

When reviewing the catch data in Figure 1 there appears to be some decline in *J. caveorum* catch as the trips progressed, the catch rate data showed similar trends (Figure 8).

Soak time can also influence lobster catch; as lobsters are used to living in complex habitats they can escape traps once the bait is finished. While the first 22 sets of trip 1 had high set times (Figure 9) and low lobster catch (Figure 1) the remaining sets were relatively constant at about 24h soak time. Overall shorter set times (around 24h) had higher *J. caveorum* catch per set and longer sets had slightly higher catch per set for *Chaceon sp.* (Figure 10).

The high catch at the start of the trip and lower catch rates at the end of the trips (Figure 8) could indicate serial depletion on certain seamounts, this is reviewed in more detail in the working paper SC8-DW04 (Brouwer & Wichman, 2020).

CPUE (kg/trap) on Kopernik Seamount declined from trip 1 to 3 (Figure 8) leading MMR to close Kopernik to lobster fishing at the start of 2020 (Trip 4) with additional analysis to be conducted.

The Cook Islands have set a CPUE limit and mesh size limits are being explored to reduce female lobster interactions on the Kopernik seamount. The Cook Islands is also proposing feature specific TAC and TAE in the 2020 Fisheries Operational Plan.

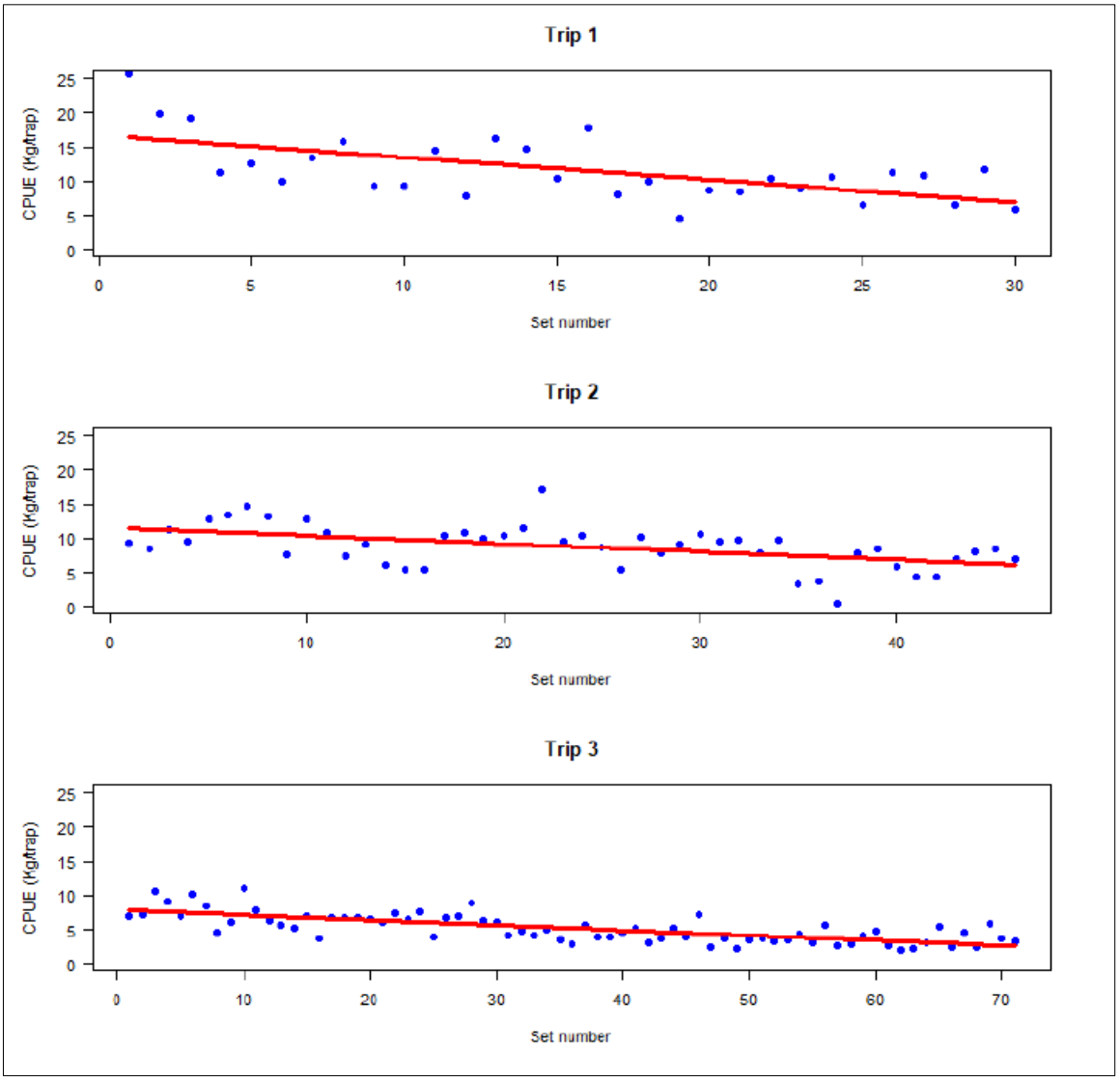

Figure 8. CPUE of lobsters by trip from each haul from Kopernik seamount. The red line indicates the trend and the slops indicate the overall change in CPUE from the start to end of each trip.

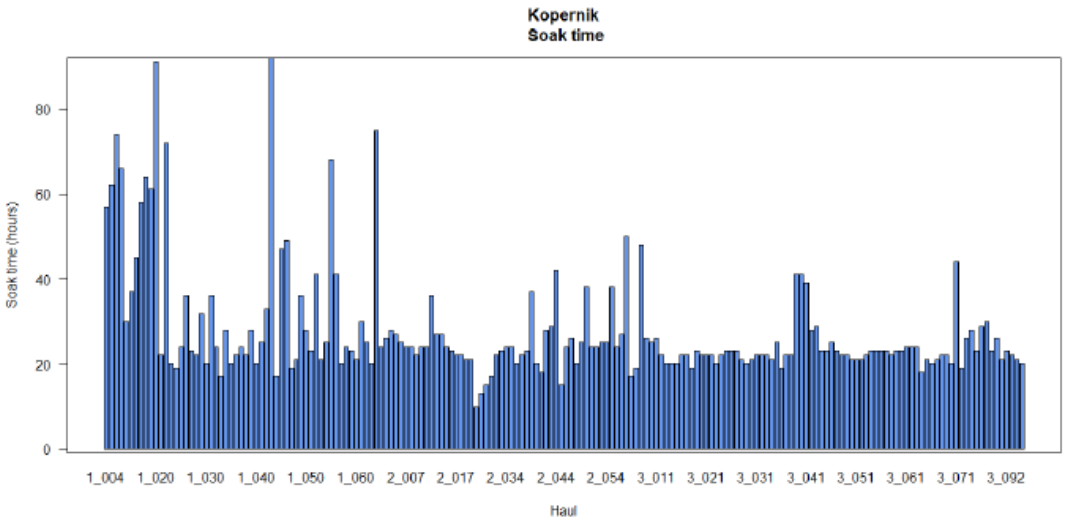

Figure 9. Trap soak time for sets on the Kopernik seamount for trip 1 to 3.

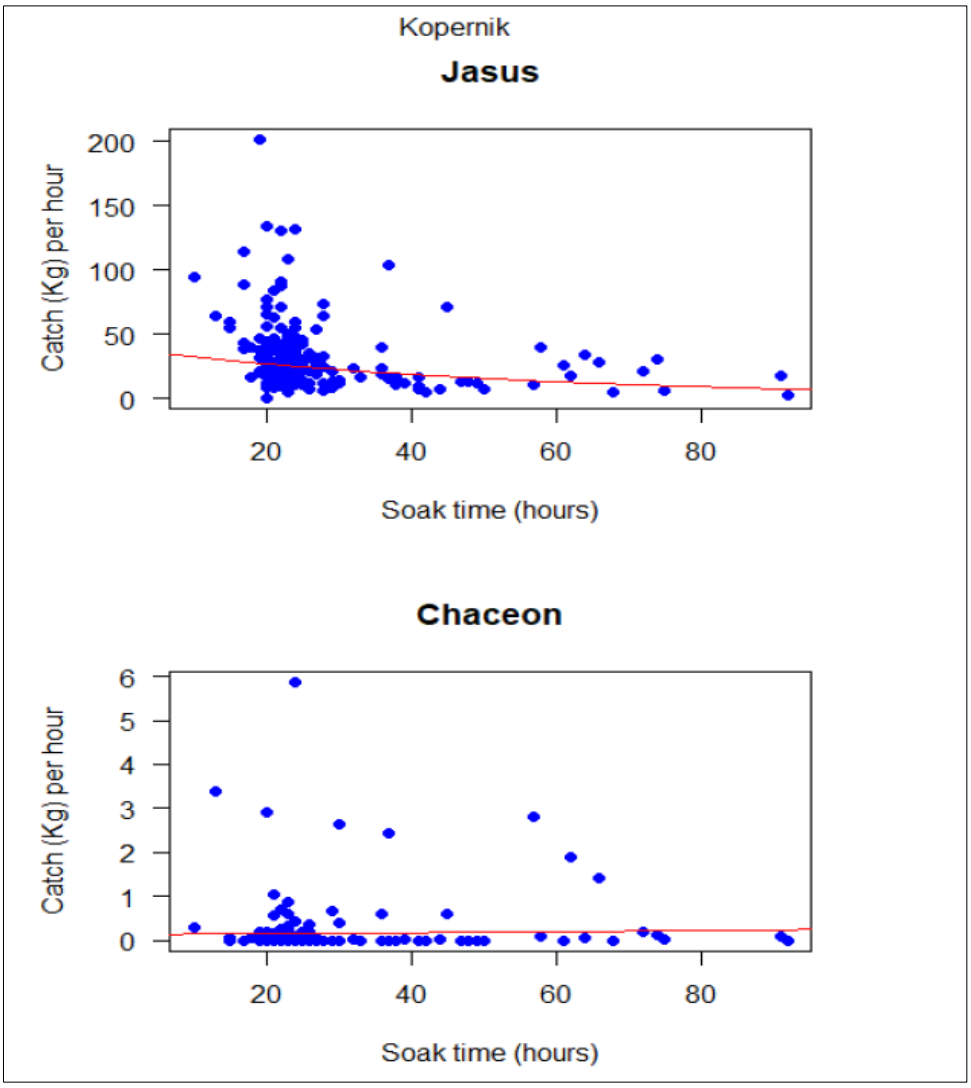

Figure 10. Catch vs. soak time for crabs and lobsters on the Kopernik seamount for sets on trip 1 to 3.

3 Fisheries Data Collection and Research Activities

3.1 Data Collection system

Data collection programs are aimed at catch and effort reporting, monitoring operational activities, bycatch interactions, identification of any VMEs, biological data from target species, target species biomass estimation and distribution (MMR, 2019).

Operational data was collected in accordance with CMM 02-2017 (superseded by CMM 02-2020) using two daily logs:

a. Daily Effort, Catch and Production (SPRFMO Fishing Activity Report) captured operational information on a string-by-string basis. Lost gear was also recorded on a trap by trap basis.
b. Daily Environmental Log to record discards and waste management, wildlife abundance and interactions and mitigation measures. Prior to each exploratory pot fishing trip, an assessment was made to determine whether the area might be a Vulnerable Marine Ecosystem (VME). To date no area was identified.

3.2 Scientific Analyses and Research Activities

In 2020 the Cook Islands undertook a number of analyses of the fishery operations that are provided in three working papers submitted to SC8.

The first paper *Cook Islands Exploratory Potting in the SPRFMO Area – Trips 1-4* (Brouwer, et al., 2020b) (SC8-DW02) provides a summary of activities across the four fishing trips.

From the four trips carried out, new biological information has been collected on *Jasus caveorum* and *Chaceon sp.* The key findings are that the fishery caught primarily lobster, *J. caveorum*, most of which were male (~60%), and that most females were not carrying eggs (in berry). The trips provided information on populations present, target stocks and marine ecosystems. These data are being used to evaluate the effectiveness of existing mitigation measures, to ensure that the bottom trap fishery is developed through a precautionary and gradual process, in accordance with the best available scientific information. The Cook Islands will continue to analyse all data collected as some information is yet to be processed. In addition, to maximise the value of future data collection for both the Cook Islands and the fishing company, we need to improve our understanding of the distribution, dynamics and stock status of *Jasus caveorum* and *Chaceon sp.*

In the second paper *Cook Islands 2020 Kopernik Seamount lobster biomass estimation* (Brouwer & Wichman, 2020) (SC8-DW03), this analysis used a series of experimental trap lines to estimate the effective fishing area of a trap, then selected a fishing lines from a commercial exploratory operation on Kopernik Seamount that were set on “virgin ground" to estimate biomass from transects lines within a number of depth class over the course of the fishery.

The experimental lines resulted in an estimated effective fishing area of a trap to have a 30m radius. However, the high variability in the results suggests that a range of estimates be used for biomass estimation. The plausible range total biomass was estimated to be 3,161t - 790t. The shallow areas of Kopernik Seamount (150-260m depth) have the highest biomass and below 260m biomass declined rapidly. Estimated biomass declines relatively rapidly from initial through Trips 1 to 3. Assessing the biomass weekly through the course of the fishery shows considerable variability in weekly mean

biomass estimates but also a steep decline. Management considerations for any future fishery ideally should be carried out across a number of seamounts each with a specific small TAC, along with other measures such as mesh size limits to protect the female population and closed seasons to avoid disrupting spawning and impacting females carrying eggs.

The third paper *Cook Islands VME and benthic footprint from the Cook Islands Exploratory lobster and crab trap fishery in the SPRFMO Area* (Brouwer, et al., 2020a) (SC8-DW04) attempted to assess encounters with Vulnerable Marine Ecosystems (VMEs) situated on Kopernik Seamount. Generally, trap fisheries are assumed to cause little physical damage to the benthic environment, largely due to their small size and the immobile nature of the fishing operation when compared to trawl gear. Nevertheless, delicate organisms present in area where trap fisheries occur could be damaged when they come into contact with traps.

The information presented here shows that potentially sensitive habitats are distributed across Kopernik Seamount, but also that they are distributed unevenly. More VME indicator taxa were encountered in the center and to the central east of the seamount, and in particular in the valley between the two Kopernik hills. This analysis provides a first glance at the potential impact of this fishery on the benthic environment on the Foundation Seamount Chain. Additional work is still required to gain a more complete picture of the total impact.

All biological sampling was done on board the vessel. Observers sampled on average 10% of traps per line for biological information such as length, batch weight per species, sex, maturity stage and shell condition for the target species *J. caveorum* and *Chaceon sp.* Bycatch was sampled for species, length, weight, condition (dead/alive/broken or whole) and location caught on the trap. (Brouwer, et al., 2020b).

4 Biological Sampling and Length/Age Composition of Catches

Overall the target of 10% sampling coverage was reached for traps and *J. caveorum* sampled, but *Chaceon sp.* were frequently over or under sampled particularly on trip 1. Samples tend to be over sampled from very small hauls and under sampled from very big hauls where the catch in the first five traps is large. This sampling method only had slight impacts on achieving the target of 10% of pots per set sampled and still resulted in the overall biological sampling target being met. (Brouwer, et al., 2020b)

5 Ecosystem Approach considerations

In line with CMM14b-2020, the following mitigation measures were applied by Cook Islands flagged vessels during operations:

a) No dumping of offal while lines are being set or while lines are being hauled;
b) any offal or discards shall be macerated by machine prior to discarding;
c) discarding shall take place only at the end of a haul or while steaming; and no biological material shall be discarded for at least 30 minutes before the start of any set or during any set;
d) discarding may only take place from the opposite side of the vessel from the hauling position.

Table 5: Summary of observed seabird sightings grouped by seamounts from Trips 1-4.

SEAMOUNT	WANDERING ALBATROSS	BLACK-BROWED ALBATROSS	GREY-HEADED ALBATROSS	GREY PETREL	SOOTY SHEARWATER	GIANT PETREL	BULLER'S ALBATROSS	PINTADO PETREL	WHITE CHIN PETREL	BLACK PETREL	UN ID BIRD
Buffon	7	1			1						
Darwin		19						1			3
Galilei	1			6						1	
Humboldt	1			23							
Jenner		3	2								1
Kopernik	213	146	100	245	259	60	1	50	224		264
Linne B	1		1	11	3	1				2	
Mendel	16	13		16	2				2	12	7
Mendeleiev			1	2	4						
Mercator	1				4	1	1	3	1		4
MM	8			2						12	
Total	**248**	**182**	**104**	**305**	**273**	**62**	**2**	**54**	**227**	**27**	**279**

In 2019, and the first trip in 2020, there were only two observations of species of special interest (SSIs). They were two separate observations of West Indo-Pacific Bottlenose Dolphin (*Tursiops aduncus*) and in both instances the dolphins were 30-50m away from the vessel temporarily surfacing before departing.

There were a total of 1,763 seabird observations in 2019 and the first trip in 2020 (Table 5). The highest observations of seabirds, except for the black petrel, occurred at Kopernik. This was the seamount where the majority of fishing took place in 2019. Grey petrel seabird was most commonly sighted (305), followed by sooty shearwater (273) and wandering albatross (248). A significant number of seabirds were identified as unknown (279).

During all trips there was no seabird or marine mammal interactions with gear and/or mortalities observed. All documented seabird or marine mammal observations were sightings at or near the fishing vessel.

5.1 VME Encounter and State Processes

As Kopernik was the seamount where majority of the fishing occurred in 2019, analysis was carried out to present an initial picture of potentially sensitive habitats distributed across Kopernik Seamount. During trips 1-4 there were very low encounter rates with an overall 88 individuals encountered on 66 traps from over 18,000 traps set on Kopernik Seamount. Further detailed discussions of estimating encounter rates of VME indicator species on Kopernik Seamount is contained in Brouwer, et al., 2020.

Generally, trap fisheries are assumed to cause little physical damage to the benthic environment, largely due to their small size and the immobile nature of the fishing operation when compared to trawl gear. Nevertheless, delicate organisms present in the fishery could be affected when they come into contact with traps, and as such MMR may close fishing in certain areas from time to time.

5.2 Information relating to ALDFG

Table 6. Number of pots set and reported as Abandoned, Lost, Discarded or Retrieved Fishing Gear (ALDFG) per trip and percentage of pots lost per trip.

Trip	Number of pots set	Number of pots lost	% of lost pots
Trip 1	8,426	214	2.5
Trip 2	5,038	61	1.2
Trip 3	7,861	40	0.5
Trip 4	7,160	40	0.5
Total	**28,485**	**355**	**1.3**

Of the 28,455 pots set in 2019 and the first trip in 2020, 355 were observed to have been lost during hauling accounting for 1.3% of overall gear classified as Abandoned, Lost, Discarded or Retrieved Fishing Gear (ALDFG) under CMM-17 (Table 6). Trip 1 lost the highest number of pots when one of the sets lost almost half its pots, accounting for 50% of pots lost in trip 1.

6 Observer Implementation Reports (refer CMM 02 and CMM 16).

The Cook Islands National Observer Programme trained one observer shortly after being authorized to fish in the SPRFMO Convention Area in 2018, and one other in March of 2019. Plans are being developed to increase this to a pool of five observers. The training framework is evolving over time as this is still a relatively new gear type for the Cook Islands, and experiences and examples are being taken from other similar fisheries. Training is tailored to capture data to meet CMM 14b-2020 requirements. The two observers completed sessions that covered the following:

- Observer Programme Policy and code of conduct
- Health and safety
- Communication/key vessel person/MMR contact person
- Bottom Potting General Information Form
- Set and Haul Information
- Compliance Form
- Deep-Water Crustacean sampling
- Reconciliation form
- Journal writing
- VME encounter
- Trip Summary
- Cruise Details
- Fishing Operations
- Catch Details
- Biological Data Sampling
- Biological Data Summary

6.1 Programme Design and Coverage levels

The Cook Islands National Observer Programme (CINOP) was established in 2002, based in the Offshore Fisheries Division at the Ministry of Marine Resources. CINOP provides observer services to flagged vessels fishing in the South Pacific Regional Fisherie Management Organisation-Convetion Area (SPRFMO-CA) (Figure 11) with the aims to achieve the coverage requirement of 100%. Observers collect a wide range of data to inform fisheries management decisions including both scientific and compliance related data. CINOP makes provisions to ensure that observers collect and report data as described in CMM 02-2020 (Data Standards). Additionally, observers achieved the target of observing 10% of pots hauled for marine mammal, seabirds and other SSIs. The logistics and course material for the training program has been put on hold since early 2020 due to Covid-19 restrictions.

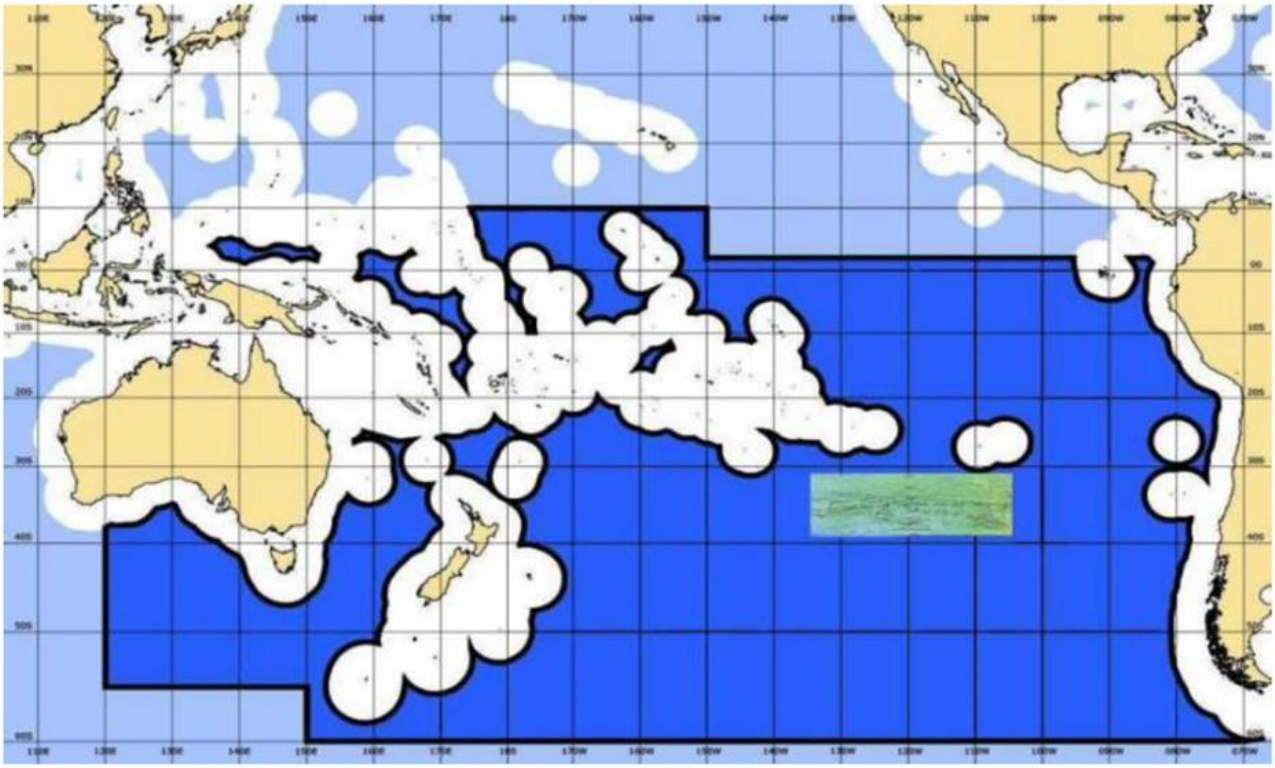

Figure 11: SPRFMO-CA and the Cook Islands exploratory fishing area southeast of French Polynesia.

7 References

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