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Bottom Fishing Impact Assessment – French Territory

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

Delegation of French Territory

Abstract

This paper presents the Bottom Fishing Impact Assessment of French Territory.

Recommendations

SC are invited to consider this paper

February 2018

PRELIMINARY ASSESSMENT OF BOTTOM FISHING IMPACT FOR THE FRENCH FISHERIES IN THE SIOFA CA

SIOFA REPORT : 2018-47

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PRELIMINARY ASSESSMENT OF BOTTOM FISHING IMPACT FOR THE FRENCH TERRITORY FISHERIES IN THE SIOFA AREA

Introduction

Following the adoption of UNGA Resolution 61/105 in 2006, 64/72 in 2009 and 66/68 in 2013 on deep-sea fisheries, the management of bottom fisheries and protection of deep-sea ecosystems on the high seas has been a priority for the international community.

Measures to implement these UNGA Resolutions have been put in place by a number of States and through RFMOs, including those active in high seas bottom fisheries in the Southern Ocean, North East Atlantic, North West Atlantic and South East Atlantic Oceans.

UNGA Resolution 61/105 calls on high seas fishing nations and RFMOs to take urgent action to protect vulnerable marine ecosystems (VMEs) from destructive fishing practices. In particular, Resolution 61/105 calls on States to:

• Conduct impact assessments to determine whether bottom fishing activities would have significant adverse impacts on VMEs, and ensure effective management to prevent such impacts, or else prohibit the activity;

• Close areas of the high seas to bottom fishing where VMEs are known or likely to occur unless fishing in these areas can be managed to prevent significant adverse impacts to such ecosystems; and

• Establish and implement protocols requiring vessels to cease fishing in areas where an encounter with VMEs occurs and to report the encounter so that appropriate measures can be adopted in respect of the site.

The CMM 2017/01 identifies that BFIAs shall be prepared, to the extent possible, in accordance with the FAO Guidelines and meets the standards of the SIOFA BFIAS. The BFIAS, therefore, seeks to be consistent with the FAO Guidelines.

This BFIA is the result of the data analyses provided by the French Observers program from 2013 to 2017 after that the Southern Indian Ocean Fisheries Agreement (SIOFA) applied to June 2012

Area of Application

Description of the Proposed Fishing Activities

Details of the vessels to be used, providing all vessel data required in terms of the SIOFA

The Southern French Territory fishing fleet is composed with seven to eight longliners and one trawler/potter. The size of longliner boats is from 55 to 60 meters and trawler/potter vessel is 80 m

long. The gross tonnage is from 1300 to 2100 UMS for the longliners and 2300 UMS for the trawler/potter vessel (Annex I).

The port of registration is Port-aux-Français (Kerguelen Islands, French Austral and Antarctic Territory).

Data Standards for vessel data

Fishing activities are subject to a fishing authorization delivered by the French administration (*Arrêté du 6 février 2017 transposant la recommandation CMM 2016-01 de l'Accord relatif aux pêches dans le sud de l'océan Indien*).

The administration established 7 areas based on the footprint of the French fleet. In the 7 established fishing zones, the fishing industry shall submit a request specifying, in accordance with the administration regulation Annex II, the fishing zone, the fishing period, the species or species targeted as well as relevant information on the environment protection procedure. Applications for fishing activities must be submitted to the French administration, Direction des Pêches Maritime et de l'Aquaculture (DPMA, Ministère de L'Agriculture et de l'Alimentation) no later than five days before the deadline set by the SIOFA Secretariat. The Director of Maritime Fisheries and Aquaculture submits these applications, if they comply with the rules set by SIOFA, to the SIOFA Secretariat.

No more than 9 authorizations are delivered per year. Only bottom longline and pot fishing techniques are allowed. Any other gear or fishing technique is submitted for advice to the Museum national d'Histoire naturelle (MNHN), which assesses the risks with regard to the protection of the environment and the SIOFA rules.

The data standards for vessel data are provided within the annex II of this document. The French national legal framework includes a series of requirements about the data to be collected on board, regarding the quality and the types of collected information. Electronic logbooks are used by on board by scientific observers.

Detailed description of fishing methods

From 2013 to 2017 6 vessels obtain authorization for their fishing activities using longline or pot gear (Table 1). The rattings of benthic habitat and by-catch impacts for each gear class are : :

Longline-demersal :	Physical 2	Biological 2
Pots and traps :	Physical 3	Biological 2

Considering that the ratings scale is from 1 (very low) to 5 (very high) (Sources: impact ratings were by Chuenpagdee et al. (2003) with rating considerations proposed by (Williams et al. 2011b), who only assessed and proposed considerations for gear types used by the Australian fishing fleet in the SPRFMO area).

TABLE 1: FRENCH TERRITORY AUTHORIZED VESSEL FROM 2013 TO 2017

Gear type	Characteristic	No. authorized vessel	Active vessel				
			2013	2014	2015	2016	2017
Longliner	55 to 65 (thousand hooks/line)	7	2	2	2	0	2

Potter	X pots / line	1	0	0	0	1	0

Longline gear

The longliners use automatic longline MUSTAD (12mm IWL) (Figure 1: Automatic longline). The hooks are MUSTAD or FISKEVEGN n°14/ 0 and setting capacity is 55 000 to 65 000.

In the SIOFA area the longline length is an average of 6112 hooks per line (from 1904 to 10 500 hooks) (Figure 2).

FIGURE 1: AUTOMATIC LONGLINE

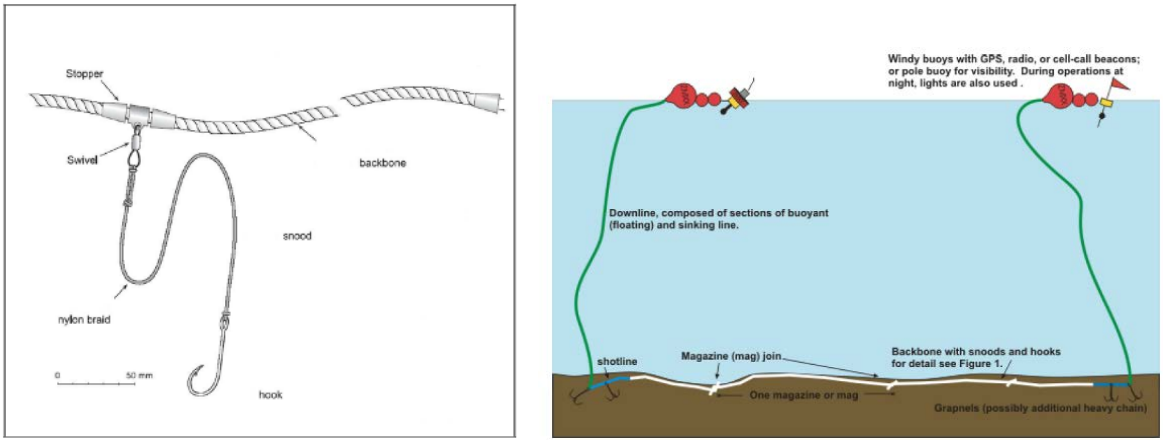

FIGURE 2: LONGLINE SCHEME (FROM WG-FSA-08/60)

A birds scaring system (streamer lines) is used during all the setting fishing activities (Figure 3: birds scaring system). The system follows the specifications required by CCAMLR. Streamers touch the surface of the water in the absence of wind and swell. During the fishing operation, everything is done to limit the light emitted by the ship with curtains in the bridge, a curtain at the level of the stroller, a reduced lighting at the level of the stroller, the portholes are closed, and the rear deck light is off.

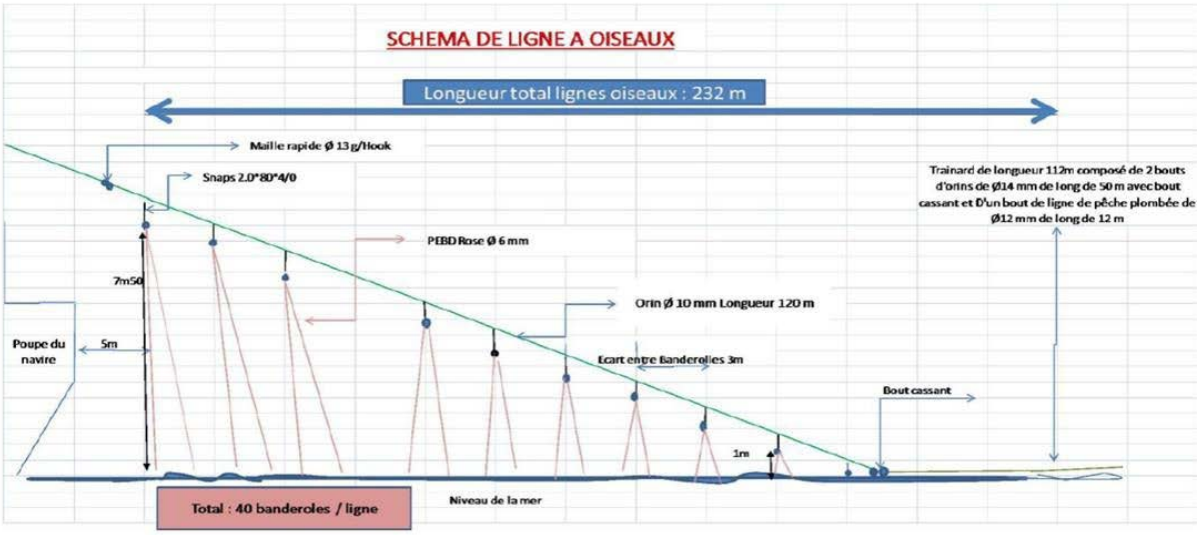

FIGURE 3: BIRDS SCARING SYSTEM

Additionally, another scaring system (the Brickle curtain) is set up at the line place (Figure 4) when hauling.

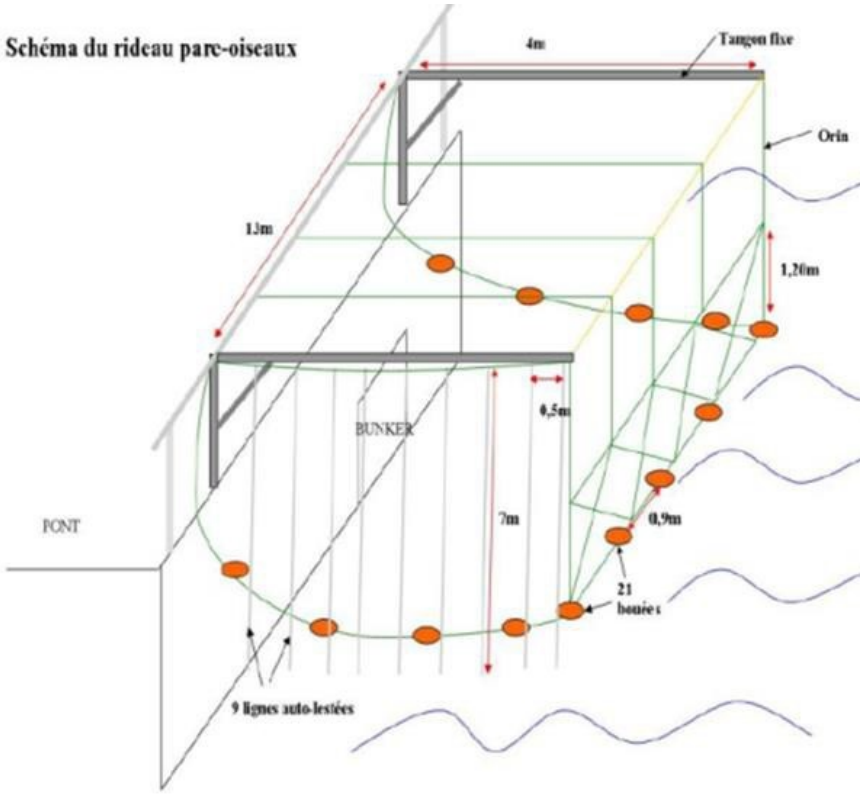

FIGURE 4: BRICKLE CURTAIN DEVICE

Pot gear

The pot fishing activities are conducted from the mother ship (trawler/potter) or usingher 2 small boats of 8,20m of length, pulling 1,30m (Figure 5: pot gear).

FIGURE 5: POT GEAR

Other gear

Vertical longline can be deployed from the trawler/potter or longline vessels .

Seabed depth range to be fished.

According to the 2017 French fishing activity and considering rounded values, depth range should be from -1160 meters to -1590 meters depth in sub-Antarctic areas (zone 1a and zone 1b), and from -580 meters to -1300 meters in subtropical and tropical areas (Tab. 2)

TABLE 2: SEABED DEPTH RANGE TO BE FISHED BY FRENCH SUB-AREA

French sub-area	Depth range	
	min	Max
Zone 1a – 1b	1160	1590
Zone 2-3-4-5-6	580	1300

Target species, and likely or potential by-catch species

Target species

The main target species (Table 3) for the southern area is the Patagonian Toothfish (TOP). TOP and Macrourrids. In the northern part, the target species are *Jasus paulensis* and fishes (*Polyprion oxygeneios*, *Hyperoglyphe antarctica*, *Latris lineata* ….).

TABLE 3: TARGET SPECIES LIST

Species	FAO code	Longline	Pot	Others
Dissostichus eleginoides	TOP	X		
Macrourus carinatus	MCC	X		
Polyprion oxygeneios	WHA	X		X
Hyperoglyphe antarctica	BWA	X		X
Latris lineata	LRL	X		X
Nemadactylus monodactylus	TDL			X

Seriola lalandi	YTC			X
Jasus paulensis	JSP		X	

Potential by-catch species

The potential by catch are listed in Table 4.

TABLE 4 : BY-CATCH SPECIES LIST

Species	FAO code	Longline	Pot	Others
Antimora rostrata	ANT	X		
Amblyraja taaf	RFA	X		
Etmopterus sp.	ETF	X		
Centroscymnus sp.		X		
Bassanago sp.				X
Diastobranchus capensis	SDC	X		
Hydrolagus sp.		X		
Lepidion schmidti		X		
Pseudotriakis microdon	PTM	X		
Squalus sp.		X		
Mora moro	RIB	X		
Zameus squamulosus		X		
Helicolenus sp.				X

Intended period and duration of fishing

Activity can occur from the 1st of September to the 31st of August of the following year in the authorized established fishing areas. Fishing activity cannot exceed 15 days for each vessel in the whole area, and 8 days in the subantarctic fishing areas 1a and 1b as defined in "*Arrêté du 6 février 2017 transposant la recommandation CMM 2016-01 de l'Accord relatif aux pêches dans le sud de l'océan Indien".*

Vessels may exchange or transfer unused days of fishing by informing the regional operational center Reunion Island and the Directorate of Maritime Fisheries and Aquaculture (DPMA) in advance. A vessel may not trade or transmit more than the maximum effort she possesses, ie 15 days for all fishing areas and 8 days for zones 1a and 1b. In the event that authorizations have not been granted on 30 April of the current year, the corresponding days of effort shall be shared equitably amongst the licensed vessels, which may use them or transmit them to the end of the campaign.

Effort indices

7 vessels are expected, 9 maximum

TABLE 5: FRENCH 2013-2017 FISHING ACTIVITY IN SUBANTARCTIC AREAS (ZONE 1A AND ZONE 1B), INCLUDING NUMBER OF VESSELS, NUMBER OF OPERATIONS, NUMBER OF HOOKS AND LENGTH OF LONGLINES

ASD_CODE	Year	Vessels Number	Fishing operations	mean Hook size	hook min per operation	hook max per operation	total hooks used	Line length min per operation	Line length max per operation	Total Line length
517	2013	2	126	75	3000	8308	731883	3600	9969	878230
517	2014	2	103	76	2011	8208	634682	2413	9849	761501
517	2015	2	66	74	3000	8405	443492	4320	10800	551447

517	2017	2	26	75	5000	6000	135000	6000	7200	162000

TABLE 6: FRENCH 2013-2017 FISHING ACTIVITY IN SUBTROPICAL AND TROPICAL AREAS (ZONE 2 TO 6), INCLUDING NUMBER OF VESSELS, NUMBER OF OPERATIONS, NUMBER OF HOOKS AND LENGTH OF LONGLINES

ASD_CODE	Year	Vessels Number	Fishing operations	mean Hook size	hook min per operation	hook max per operation	total hooks used	Line length min per operation	Line length max per operation	Total Line length
573	2013	2	0	0	0	0	0	0	0	0
573	2014	2	0	0	0	0	0	0	0	0
573	2015	2	0	0	0	0	0	0	0	0
573	2017	2	7	76	2250	2250	15750	2700	2700	18900

Estimated total catch and discard quantities by target and bycatch species

The main targeted catch in the south of the SIOFA area by the French longliners is the Patagonian toothfish, *Dissostichus eleginoides* (TOP). Primary by-catch species from the longline fishery are the macrourid *Macrourus spp.* (GRV), rajid skates (*Bathyraja spp.*) (BHY) and blue antimora (*Antimora rostrata*) (ANT). The latter species is fully discarded, while the others are partly or totally retained. *The TOP's annual catches vary between 11 and 22 tonnes.*

Mapping and Description of Proposed Fishing Areas

Maps of the proposed fishing areas in relation to available information on VMEs and seabed bathymetry should be presented including:

The Austral French Territory fleet is used to occur in several areas. The French Fishery Administration decided to consider the historical footprint to propose 7 Fishing Area where fishermen had already prospected during the past (Figure 6). Fishing authorizations are restricted to these areas.

Two areas (1a and 1b) in the southern part are regularly exploited. The other areas (2 to 6) are occasionally fished.

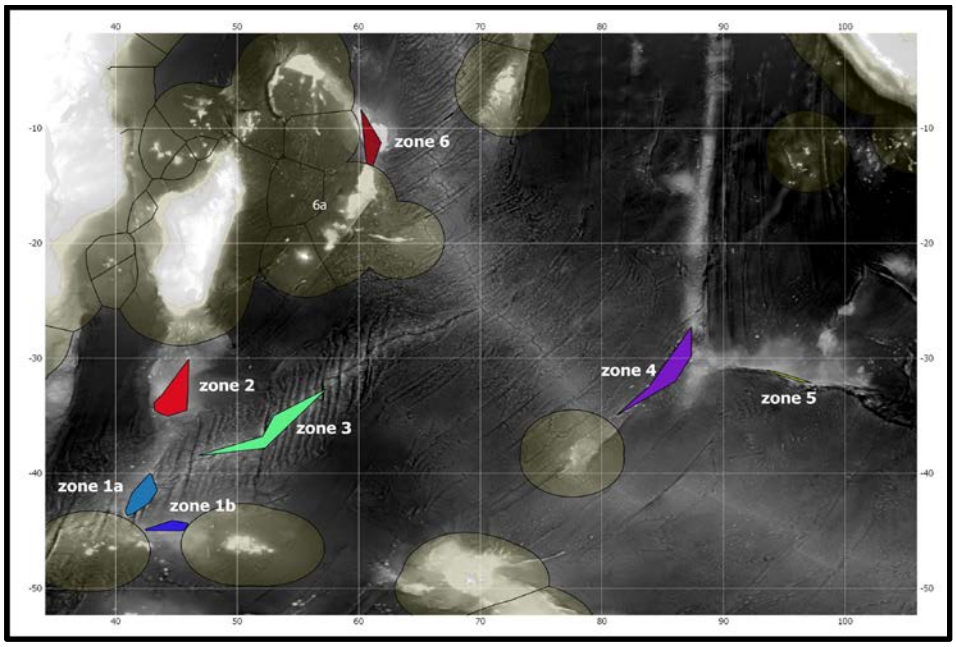

FIGURE 6: MAP OF THE PROPOSED FISHING AREA

Impact Assessment

The BFIA is evaluated using both a spatial analysis approach and the fishing effort data available for French fleet within the period 2013-2017.

Spatial analysis

Firstly, the surface of the different bathomes in the whole SIOFA area is considered (Table 5). Secondary, the area of each bathome within each French fishing zone (Table 6) and the area of the fishable bathomes in the whole French fishing zones (Table 7) are calculated. We have considered the limit of 500 meters, upper depth where longline fishing is not allowed. Finally, **a French theoretical fishing footprint is obtained (Table 8) which corresponds to the maximum area potentially impacted**. Furthermore, the percentage of each bathome of French fishing zones in the SIOFA area is provided.

The French theoretical fishing footprint comparing to the whole SIOFA area is 0.22% (Table 8). However, the French theoretical fishing footprint can reach up to 56% when considering the bathomes separately (for example the bathome 701-1000 m, **Table 8**).

Real footprint in the 2013-2017 period

The real footprint of the French fleet is calculated for the 2013-2017 period. The data available for the bottom longline operations is used. All the operations are plotted using a GIS software. The whole area covered by the longlines represents a surface of **2679 km² and 0.0099 % of the SIOFA area**, which corresponds to the French cumulative impact in recent years (Table 8).

TABLE 7: SURFACE OF THE DIFFERENT BATHOMES IN THE WHOLE SIOFA AREA SOURCE MODIFIED FROM LAST ET AL., 2010 CITED BY WILLIAM ET AL., 2011

	Bathome (m)	Name	Area (km²)
Fishable area	0-200	Continental shelf	37402
	201-700	Shallow upper Continental slope	32101
	701-1000	Deeper upper Continental slope	25133
	1001-1500	Shallow mid Continental slope	110781
	1501-2000	Deep mid Continental slope	260633
		Subtotal of fishable area (A)	**466050**
Unfishable area (B) >2000 m			**26414597**
Total SIOFA area (A + B)			**26880647**

TABLE 8: AREAS (KM²) OF FISHING ZONES CALCULATED PER BATHOME (M)

		Area (km²) per bathome (m) per zone						
	Zones	0-200	201-700	701-1000	1001-1500	1501-2000	>2000	Total area (km²) per zone
subantarctic	1a	53	399	532	2379	6673	33111	43151
	1b	0	0	115	4114	9460	4312	18003
subtropical and tropical	2	164	1149	10407	22380	26475	17396	77973
	3	22	267	273	2212	11954	74737	89467
	4	0	127	464	1235	1907	87428	91163
	5	0	17	855	3920	976	635	6405
	6	20136	14162	1455	3858	4643	3600	47856

TABLE 9: AREAS (KM²) OF FISHING ZONES CALCULATED FOR FISHABLE BATHOMES (-500 TO -2000 M) AND NON-FISHABLE BATHOMES

	Zones	Area (km²) in fishable bathomes (501-2000 m)	Area (km²) in non fishable bathomes
subantarctic	1a	**4898**	**38253**
	1b	**6845**	**11158**
subtropical and tropical	2	**30090**	**47881**
	3	**7286**	**82179**
	4	**1845**	**89318**

	5	2885	3520
	6	5456	42333

TABLE 10: FRENCH THEORETICAL MAXIMUM FISHING FOOTPRINT AND REAL FOOTPRINT IN THE 2013-2017 PERIOD IN SIOFA AREA

Bathomes (m)	0-200	201-700	701-1000	1001-1500	1501-2000	>2000	Total
Area (km²) per bathome of zones	20376	16124	14103	40102	62091	221221	374020
Percentage per bathome of zones in SIOFA	**54,47 %**	**50,23 %**	**56,12 %**	**36,20 %**	**23,82 %**	**0,82 %**	**1,39 %**
French fishable areas (500-2000 m): **59305 km²**							
French theoretical fishing footprint comparing to SIOFA area: **0,22 %**							
French fished area in the 2013-2017 period: **2679 km²**							
French real footprint in the 2013-2017 period: **0.0099 %**							

Risk Assessment

No specific Evaluation Risk Assessment (ERA) has been conducted for this fishery due to data gaps and the low fishing effort. All the historical data have been provided to the WG ERA conducted by the Australian delegation.

Interactions with VME

No Vulnerable Marine Ecosystem (VME) has been detected during the French fishing operations. A single specimen belonging to a VME bioindicator taxa (*Demospongiae, Porifera*) has been caught in 2017 on a longline.

Information on Status of the Deep-sea Stocks to be Fished

For Patagonian toothfish, French bottom longline fishing operations are monitored, catches and fishing effort are recorded. This information could be useful in the case of a "CPUE by seabed area" analysis, that stock assessment methodology is used to define catch limits in CCAMLR data-poor areas. Nevertheless, no tagging-recapture program that would allow for a more reliable estimate of the stock is in force at this time. However, collected biological data may be used in the future for stock assessments. Some recaptured fishes from CCAMLR fisheries can be used to provide information of Toothfish stocks structures. As agreed by the SIOFA, stock assessments for Patagonian toothfish will be referred to those conducted in CCAMLR, collection of the fishing data from French fishing boats in

this area is similar to that undertaken in the French fisheries in the CCAMLR area, where stock status are evaluated by integrated stock assessments.

List of the intended target and likely by-catch species

The main target species in the south of the SIOFA area by the French longliners is the Patagonian toothfish, *Dissostichus eleginoides* (TOP). Reported catches are presented in Table 11, catches for the period 2000 to 2009 were not recorded. Main by-catch species from the longline fishery are the macrourid *Macrourus sp.* (GRV), rajid skates *Amblyraja taaf* (RFA) and blue antimora *Antimora rostrata* (ANT). The latter species is fully discarded, while the others are partly or totally retained. The TOP's annual catches vary between 13 and 17 tonnes.

TABLE 11 : CATCH REPORT (IN TONNES) IN THE SIOFA AREA FROM 2013 TO 2017 BY LONGLINERS.

Year	TOP retained	TOP discarded	GRV retained	GRV discarded	RFA retained	RFA discarded	ANT retained	ANT discarded
2013	16	0	13	6	0	5	0	44
2014	14	0	8	4	0	4	0	38
2015	17	0	12	7	0	0,4	0	34
2017	8	0	5	3	0	0,4	0	10

Historic catches

The Southern French Territories fleet is mainly composed with seven to eight longliners and one trawler. From 2000 to 2009 three longliners from the French territory worked in the SIOFA Area. One trawler occurred in the area during this period in 2002 (Table 12).

Since no more bottom trawling activities from the Southern French Territories fleet occurs in the SIOFA area.

TABLE 12: LONGLINERS AND TRAWLERS EFFORTS IN THE SIOFA AREA FROM 2000 TO 2010

	2002	2006	2007	2008	2009
Longliners		1	1	2	3
Trawler	1				

Catch, effort and CPUE summaries

From 2013 to 2017, six longliners from the French territory worked in the SIOFA Area, in the Northern SW Indian Ridge sub-area 3. They stay from 13 to 40 days per year and have done 41 to more than one hundred stations (Table 13).

TABLE 13: LONGLINERS EFFORTS IN THE SIOFA AREA FROM 2010 TO 2017 DAYS, HAULS AND HOOKS NUMBER PER YEAR AND AREA.

ASD_CODE	Year	Sets	hooks
517	2010	41	314886
517	2011	80	509414
517	2012	89	503478
517	2013	126	731883
517	2014	103	634682
517	2015	66	443492
517	2017	26	135000
573	2017	7	15750

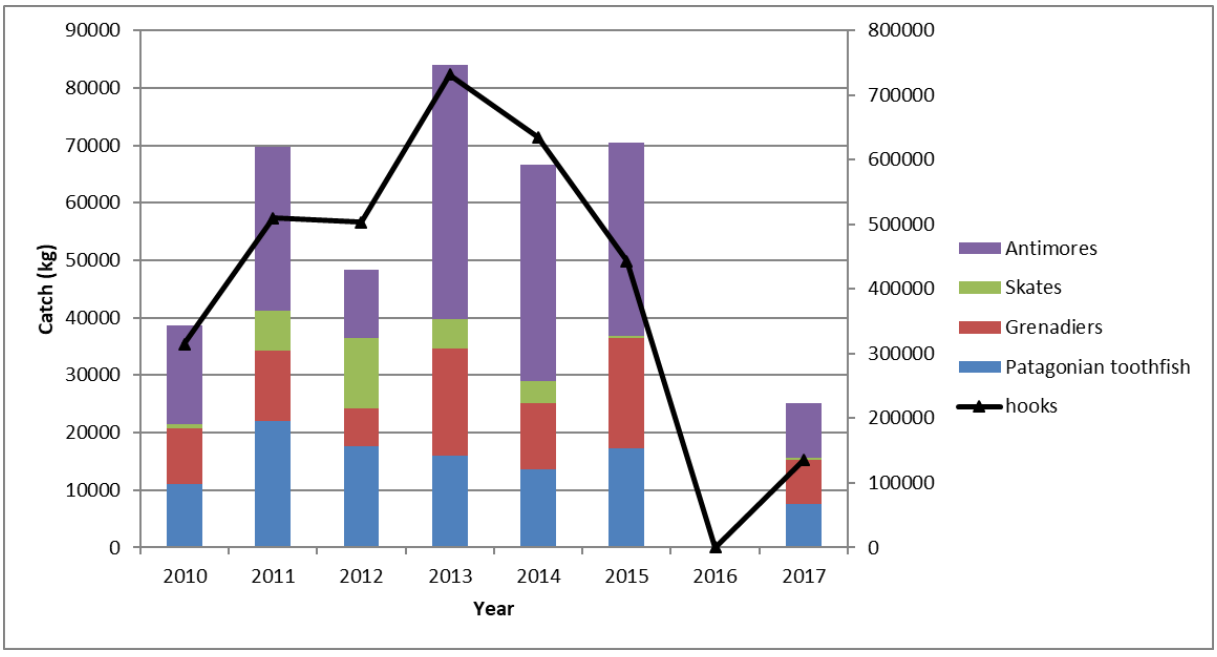

FIGURE 7 : HISTORICAL EFFORT AND CATCHES OF TARGET (PATAGONIAN TOOTHFISH) AND BY-CATCH SPECIES OF FRENCH LONGLINERS FROM 2010 TO 2017 IN THE SUBANTARCTIC SIOFA AREA

EMV Monitoring, Management and Mitigation Measures

VMS positional information

All the French Territories licensed fishing vessels use a VMS data system. VMS positional information should be collected in accordance with the SIOFA Data Standards.

Details of catch and effort data collection systems

All the licensed French Territories boats are obliged to embark a fishing observer to cover 100% of the fishing activities. The data collection occurs at two different levels (Figure 8):

- skipper level: they are asked to collect all detailed information on fishing events and catches
- Observer level: Independently, fishery observer (covering 100% of vessel deployment) collect data on a fourth of the hauling to monitor catches (retained and discarded).

The skipper is in charge to collected and computerize the following information:

- Start and end of setting gear with latitude and longitude, depth, date and time, hooks set, bait …
- Start and end of hauling with latitude and longitude, depth, date and time, hooks hauled
- Environmental conditions during hauling
- Details by set and by species of catches, including: number, weight (unless cut off), fate (processed, discarded etc…)

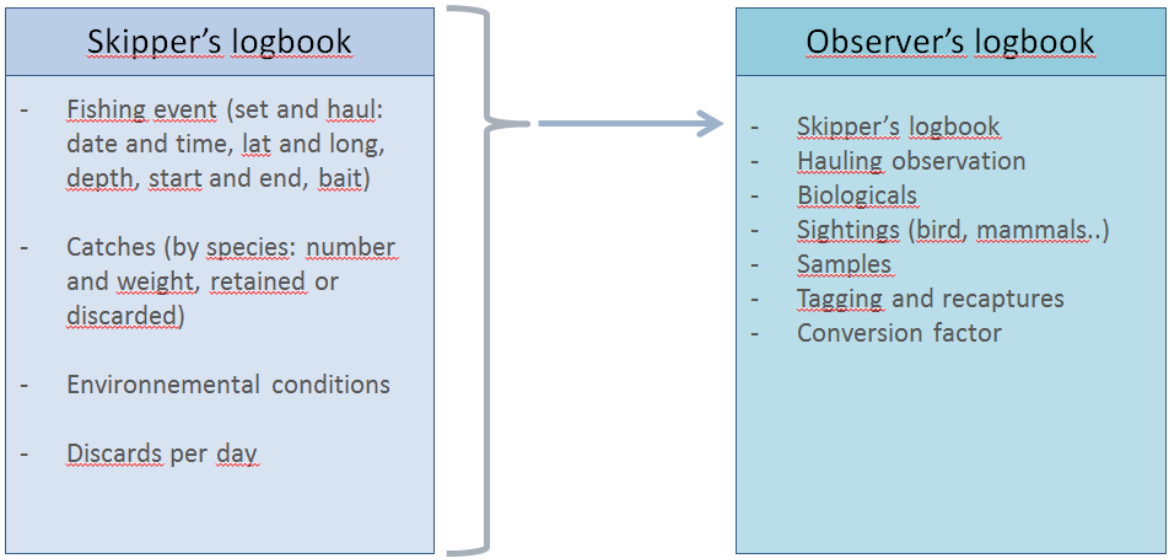

FIGURE 8: DATA ENTRY VERSUS SKIPPER'S AND OBSERVERS LOGBOOK

Skipper's data are entered in an electronic logbook which is then provided to the observer on a daily basis for the observer to synchronise with it's observer's logbook and thus to compare and crosscheck data that were collected (see figure below). This observer's logbook is descry bed in details in annex (please see page Annex 123 to page Annex 256, noting that this document describes the entire logbook used on french vessels while only the bottom longline / fish trap technique will be used in SIOFA) along with references lists used. Those data are sent every Monday to the MNHN for checking, monitoring and to create back-ups.

Observer's are provided with a comprehensive tool box in order to check the entire data set's consistency on a daily basis allowing them to correct errors in real times at sea rather than after vessel's return which is far more difficult. On top of this, a checking routine is run by the MNHN on the entire data set received on a weekly basis.

Observer's logbook (electronic version as well as hard copies) are returned to the MNHN for perennial storage. Hard copies are referenced and stored in the MNHN's official archives and electronic versions are validated and then uploaded into a secured server linked to several external synchronised copies. Data security is thus met and data can be queried.

Reporting systems to record VME

In 2015, the MNHN has started to develop a new data acquisition protocol for benthos bycatch in the French fisheries of the Southern Ocean (statistical areas 58.5.1, 58.6, 58.4.3a, 58.4.4b, 58.4.2). This protocol aims at producing presence and abundance data of the benthic macro-invertebrates collected by the fishing gears. The main objective is to increase knowledge on the benthic ecosystems impacted by the French fishing activities, in a context marked by the CCAMLR conservation measures for Vulnerable Marine Ecosystems (VME) protection and the Marine Protected Areas (MPA) development and in the short term to decrease this impact. The protocol, now applied also for French fishing zones in the SIOFA, area is based on collecting, weighing and photographic sampling of the benthic macro-invertebrate specimens. Furthermore, the VME conservation rules from the CCAMLR are applied in the French fishing zones of the SIOFA through the French national legal framework.

Conservation rules:

For the French fleet operating in the SIOFA area, the CCAMLR rules about VME data recording and VME protection are applied. The contents of the CCAMLR Conservation Measure 22-06 and the CCAMLR Conservation Measure 22-07 about VME are thus implemented in the French national legal framework for SIOFA area.

As defined by the CCAMLR in the Conservation Mesures, the catching of VME units forces the vessel:

- to record and report the impact when 5 caught units of VME are detected in one of the randomly monitored segments of the longline, each of them corresponding to 1000 hooks,
- **to stop fishing in a circle of 1 nautical mile area around the mid-point of the segment when 10 caught units of VME are detected.**

Furthermore, **to protect the benthic habitats, fishing is forbidden in from 0 to -500 meters depth**, according to the French national legal framework for SIOFA area.

VME data collection framework:

Specimen sampling is based on an effort towards conservation of the benthic invertebrates collected by the fishing gears. It aims at producing qualitative data about the presence of the taxa within the different fishery areas, in accordance with the goal of contributing to their inventory.

In the SIOFA areas, all the specimens caught on the longlines are collected. In these poorly known areas, any benthic invertebrates presence data needs to be produced. Thus, exhaustive sampling is a unique opportunity to realize an inventory, which is the first condition to build the knowledge background needed for upcoming assessment approaches.

The collected specimens are conserved in alcohol during the cruise with proper packaging and labelling, including date, position and identification of the gear.

At the end of the cruise, the specimens are sent to the MNHN (Paris, France) to be studied and integrated in the national natural history collections. After this process, they are submitted first to taxonomists to be precisely identified, using both molecular and anatomical approaches. The MNHN's taxonomists and experts from the international community are mobilized through different networks.

The scientific observers can also record a photographic sampling during the hauling observation, according to the time available. For photographic sampling of benthos, all the invertebrates caught on the longline during the hauling observation are collected. If the scientific observer is not positioned in the factory of the vessel during the hauling observation, crew collaboration is needed to collect the organisms.

At the end of the hauling, all the collected organisms are:

- weighted together (Figure 9),
- spread out and photographed together with a scale,

Depending of the observers or the scientist availability:

- the organisms can be sorted and weighted by phyla,
- the organisms can be spread out and photographed separately, by colony or by individual, with a scale.

Photographed organisms are discarded. The weights are recorded in the electronic fishing log. The pictures are stored and identified with file naming rules allowing matching them with the data of the fishing process: date, geographical position, type of gear, part and/or length of the observed line.

At the end of the cruise, the data and the pictures are sent to MNHN to be treated and analysed. To treat the pictures a complete specific pipeline of data treatment (Figure 10), with semi-automated process including different components based on various software, has been developed.

Associated to the taxonomic identification of the photographed organisms, the pipeline allows us to extract information about:

- size of the organisms,
- quantity of organisms per taxonomic group.

FIGURE 9: WEIGHING OF A SET OF BENTHOS BYCATCH SPECIMENS COLLECTED DURING THE HAULING OBSERVATION OF A LONGLINE IN KERGUELEN; PICTURE BY FISHERY OBSERVER HUGUES VERMANDE (2015)

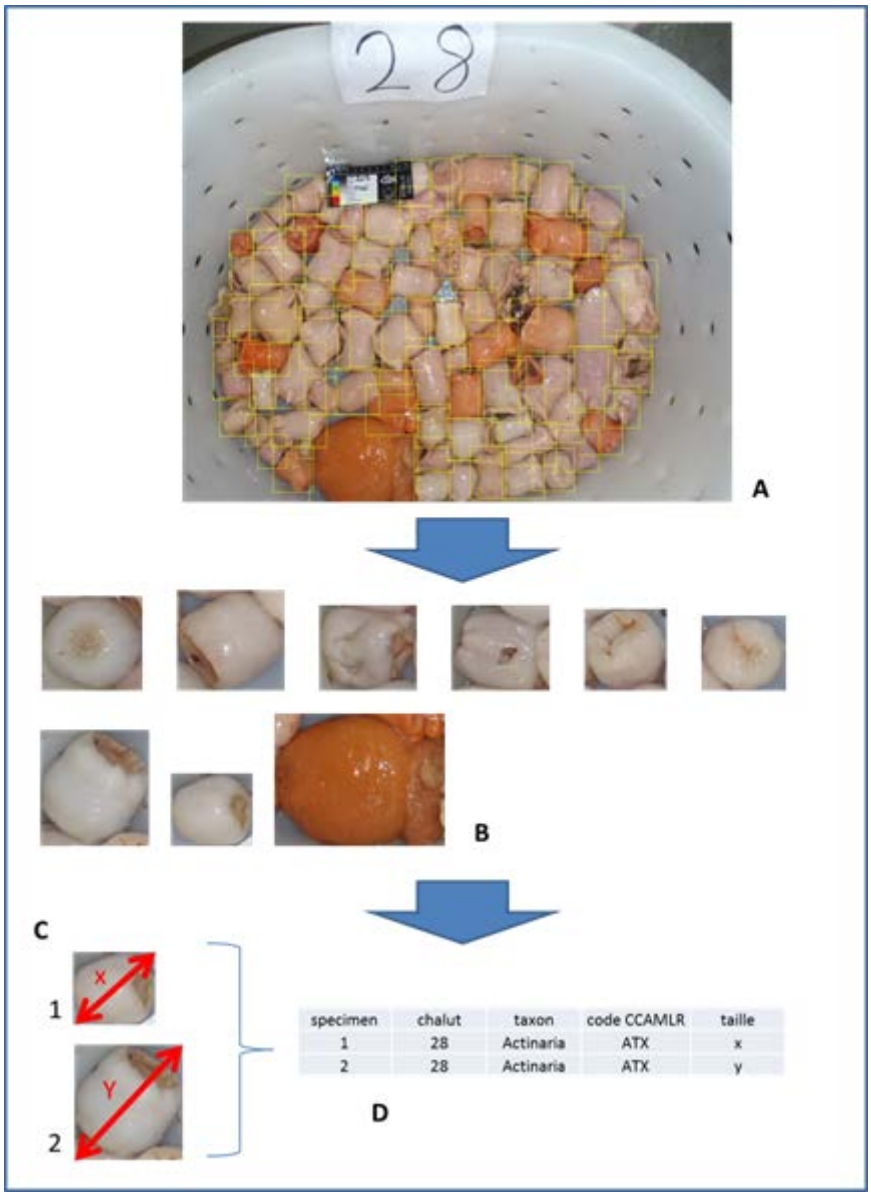

FIGURE 10: PICTURE ANALYSES PROTOCOL DESCRIPTION OF THE PICTURES TREATMENT PIPELINE: COUNT AND IDENTIFICATION OF THE ORGANISMS (A), EXTRACTION OF THE CROPPED PICTURES OF EACH ORGANISM (B), MEASUREMENT (C), STORAGE INTO A DATABASE (D) READY TO BE EXTRACTED FOR ANALYSIS AND STATISTICS; RAW PICTURE BY SCIENTIFIC TEAM PARTICIPANT MÉLYNE HAUTECOEUR (PIGE 2015)

The new data acquisition protocol for benthos bycatch in Southern Ocean French fisheries provided significant results in CCAMLR areas, regarding to the amount and the quality of the data produced. The preliminary results show that benthos bycatch survey and VME conservation issues may be taken into account in a near future in the French fisheries management.

The present protocol will improve with the constitution of a reference collection of well identified organisms and a better correlation between these specimens and the photographed ones. A dedicated international collaborative network and development of automated identification tools are obvious avenues that need to be explored.

The main objective of this new protocol is to contribute to the knowledge of marine habitat used by fisheries and to detect any Vulnerable Marine Ecosystems that need to be protected in the future. It also helps policy makers to design marine protected areas. In SIOFA areas, this new data collection framework will allow:

- habitat modelling and mapping of benthic ecosystems,
- VME mapping,
- taxa distribution and niche modelling.

Annex I: Boat description

	Boat 1	Boat 2	Boat 3	Boat 4	Boat 5	Boat 6
Type	Longliner	Longliner	Longliner	Longliner	Longliner	Trawl/Pot
Capacité d'hébergement	31	33	33	33	33	54
Cabine observateur /Contrôleur	OUI	OUI	OUI	OUI	OUI	Oui
Infirmerie	OUI	OUI	OUI	OUI	OUI	Oui
Autonomie	74 days	80 days	80 days	80 days	74 days	70 days
Longueur HT	59,45 m	55, 49 m	55, 49 m	55, 49 m	55, 49 m	76.60 m
Longueur entre PP	52.50 m	51 m	51 m	51 m	51 m	69.00 m
Largeur	12,80 m	11 m	11 m	11 m	11 m	14.62 m
Creux au pont principal		5 m	5, 00 m	5 m	5 m	6.10 m
Creux au pont supérieur		7.60 m	7.60 m	7.60 m	7.60 m	8.75 m
Capacité combustible		425 m3	425 m3	425 m3	370 m3	634 m3
Capacité eau douce		53,6 m3	53.60 m3	53,6 m3	40 m3	49.50 m3
Volume des cales		696 m3	693 m3	696 m3	733 m3	1142.50 m3
Fluide Frigorigène		NH3	NH3	NH3	R404	RS 45
Tonnage brut (GT)	2097 UMS	1295 UMS	1295 UMS	1295 UMS	1295 UMS	2343 UMS
Tonnage net	629 UMS	388 UMS	388 UMS	388 UMS	388 UMS	702 UMS
Poids lège		804,36T	804.36 T	804,36T	818T	2087.30 t
Poids lourd		677,85T	677.66 T	677,85T	542T	
Déplacement	2468 T	1482,21T	1482.02 T	1482,21T	1360T	3878.62 t
Tirant d'eau AR maxi		5,00M	5 M	5,00 M	5,00 M	6.00 m
Puissance du MP	1370 Kw (X	1840KW	1840KW	1840KW	2450KW	1740 kW +
Puissance GE		320 KW	320 KW	320 KW	250 KW	500 kva
Puissance GE secours		125 KW	125 KW	125 KW	100 KW	42 kva
Puissance alternateurs attelés		500 KW	500 KW	500 KW	2 x 500 KW	2 x 800 kva
Puissance administrative		3120 KW	3120 KW	3120 KW		4052 kW
Vitesse économique		10,0 noeuds	10,0 nœuds	10,0 nœuds	10,0 nœuds	
Vitesse du navire		14,0 noeuds	14,0 nœuds	14,0 nœuds	13,0 nœuds	14 nœuds

Annex II: Data Standards for vessel data

Mentions à préciser dans la demande de licence de pêche

Zone de pêche* :

Période de pêche* :

Espèces ciblées* :

Demandeur* :

- Nom :
- Adresse :
- Raison sociale :
- Statut juridique de la personne morale (SA, SARL…) :
- Acte de propriété ou contrat d'affrètement du navire** :
- Nom et nationalité du/des capitaines :

Navire :

- Nom :
- Photos couleurs** :
- N° d'immatriculation :
- Certificat de nationalité :
- N° OMI :
- Nom(s) précédent(s) :
- Marques extérieures** :
- Port d'enregistrement :
- Ancien pavillon :
- Date de construction :
- Lieu de construction :
- Fiche matricule 304A (et annexe 1 si affrètement)** :
- Indicatif d'appel radio :
- N° MMSI :
- Détails relatifs à la mise en œuvre des dispositions visant à empêcher la manipulation frauduleuse du VMS installé à bord** :
- Enregistrement sanitaire :

Caractéristiques du navire :

- Type :
- Capacité d'hébergement :
- Cabine observateur/Contrôleur :
- Infirmerie :
- Autonomie :
- Longueur HT :
- Longueur entre PP :
- Largeur :
- Tonnage brut (GT) :
- Tonnage net :
- Déplacement :
- Puissance du MP :
- Puissance administrative :
- Appareils de détection et de navigation (agréés SMDSM) :
- N° de téléphone Iridium :
- N° de téléphone Inmarsat :
- N° de Fax :
- Adresse Internet :

Modes et équipements de pêche / caractéristiques des engins de pêche :

Palangre :

- Modèle lignes :
- Palangre automatique :
- Autres équipements :
- Hameçons (marque, n°) :
- Capacité de mise à l'eau (nombre d'hameçons) :
- Line shooter (marque) :
- Caractéristiques, schéma et dimensions des engins utilisés (si possible avec photos)** :

Contrôleur de pêche – Observateur de pêche :

- Engagement de l'armateur d'embarquement** :
- Cabine individuelle :
- Moyen de communication confidentiel :
- Adresse internet du contrôleur à bord :

Participation à des campagnes expérimentales** :

Mesures environnementales :

- Caractéristiques des dispositifs de traitement et/ou de stockage des déchets à bord :
- Mesures de lutte contre la mortalité aviaire, s'il y a lieu (joindre une photo ou un schéma)** :
- Mesures de limitation des captures accessoires (caractéristiques et photos des dispositifs de limitation de la pêche non ciblée)** :
- Méthode de lutte contre la déprédation, le cas échéant :
- Mesures prises pour le rejet vivant des prises accidentelles (requins-raies-tortues)
- Autres mesures :

Annex III: Proposed Fishing Areas

Zone 1a		
Point	Latitude	Longitude
A	43°42'11"S	41°30'47"E
B	43°53'56"S	41°13'49"E
C	43°52'54"S	40°52'8"E
D	43°40'42"S	40°43'8"E
E	43°18'54"S	40°34'14"E
F	41°37'18"S	41°9'49"E
G	39°49'47"S	42°42'33"E
H	39°50'48"S	42°59'6"E
I	39°54'45"S	43°50'54"E
J	41°33'7"S	43°39'27"E
K	42°47'40"S	42°49'58"E
L	43°42'11"S	41°30'47"E

Zone 1b		
Point	Latitude	Longitude
M	45°0'0"S	42°15'19"E
N	44°53'44"S	42°14'58"E
O	44°41'57"S	42°19'40"E
P	43°54'9"S	44°37'35"E
Q	44°10'32"S	46°58'23"E
R	44°20'31"S	46°9'15"E
S	44°49'34"S	45°46'52"E
T	45°0'0"S	45°41'46"E
U	45°0'0"S	42°15'19"E

Zone 2		
Point	Latitude	Longitude
AA	34°41'9"S	46°21'21"E
BB	35°15'15"S	44°11'32"E
CC	34°40'7"S	43°7'12"E
DD	33°46'23"S	42°58'45"E
EE	32°58'28"S	43°43'52"E
FF	32°48'32"S	46°8'49"E
GG	34°41'9"S	46°21'21"E

Zone 3		
Point	Latitude	Longitude
NN	38°6'40"S	52°21'51"E
OO	38°40'57"S	46°40'12"E
PP	38°32'37"S	46°32'24"E
QQ	38°19'39"S	46°33'44"E
RR	36°37'46"S	51°56'53"E
SS	34°50'60"S	52°51'24"E
TT	32°25'54"S	57°19'33"E
UU	32°34'19"S	57°30'60"E
VV	32°47'27"S	57°30'31"E
WW	38°6'40"S	52°21'51"E

Zone 4		
Point	Latitude	Longitude
AAA	32°10'18"S	86°10'55"E
BBB	32°40'42"S	83°48'46"E
CCC	32°27'10"S	83°37'49"E
DDD	27°7'41"S	87°12'28"E
EEE	27°52'9"S	87°22'7"E
FFF	27°11'33"S	87°33'9"E
GGG	29°50'43"S	87°32'19"E
HHH	32°10'18"S	86°10'55"E

Zone 5		
Point	Latitude	Longitude
III	31°58'6"S	97°22'23"E
JJJ	32°23'20"S	97°27'20"E
KKK	32°9'34"S	97°29'12"E
LLL	32°17'10"S	97°26'31"E
MMM	32°20'57"S	97°19'23"E
NNN	32°13'55"S	96°14'13"E
OOO	31°17'34"S	93°29'21"E
PPP	31°48'45"S	93°19'17"E
QQQ	30°57'19"S	93°20'44"E
RRR	30°49'45"S	93°25'59"E
SSS	30°50'40"S	93°43'31"E
TTT	31°6'23"S	94°44'46"E
UUU	31°58'6"S	97°22'23"E

Zone 6		
Point	Latitude	Longitude
A'	11°13'53"S	62°29'21"E
B'	13°22'23"S	61°20'36"E
C'	13°21'37"S	61°18'56"E
D'	13°21'35"S	61°18'51"E
E'	13°6'56"S	60°46'24"E
F'	13°12'43"S	60°24'41"E
G'	8°17'56"S	59°57'48"E
H'	8°10'8"S	60°20'17"E
I'	8°7'34"S	60°12'48"E
J'	8°14'28"S	60°20'25"E
K'	11°13'53"S	62°29'21"E