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An Overview of Longline Fisheries targeting albacore tuna in Mauritius

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Abstract

Due to its ideal geographical position, conducive port infrastructures and dry-docking facilities Mauritius is a regional hub for fishing vessels operating in the South West Indian Ocean. Tuna fishing longliners mainly targeting temperate tunas regularly call at the Port Louis harbour with an approximate of 600 calls yearly for unloading and transhipment of tuna. In 2015, 93 foreign fishing licenses were issued to tuna longliners to fish in its Exclusive Economic Zone.

The licensed foreign longline vessels are monitored through the Vessel Monitoring System (VMS). All vessels calling at Port Louis are monitored through Port State Control Measures as per the FAO model. Logbooks are collected from vessels licensed to fish in the EEZ of Mauritius and port sampling exercises for length frequency are carried out on the catch of these vessels. Logbook and length-frequency data are processed for the estimation of catch and effort and for the generation of spatial distribution maps. Moreover, transhipment activities carried out by longline vessels are also monitored. During the year 2015, 52 586 tonnes of tuna was transhipped at Port Louis harbor, out of which 40% is represented by albacore tuna.

Albacore represents a small percentage of the total catch obtained from the semi-industrial fishery of Mauritius which targets mainly swordfish. The catch trend of albacore tuna in the local semi-industrial longline fishery shows some variation over the last 5 years with the lowest percentage recorded in 2015 (6.2%) and the highest percentage of 15.4% in 2012.

This paper gives an overview of the length frequency, spatial distribution and catch/effort data of albacore from licensed longliners for the past five years. It also provides information on transshipment of albacore by foreign longliners calling at Port Louis.

1.0 Introduction

Mauritius has an Exclusive Economic Zone (EEZ) of approximately 1.9 million km^2 extending from the coasts of the islands of Mauritius, Rodrigues, St Brandon (Cargados Carajos Shoals), Agaléga, Tromelin and the Chagos Archipelago, as shown in Figure 1. The fisheries sector contributes up to 1.3% of the GDP of Mauritius, of which processed tuna for the export market is the main contributor. The majority of the tuna and tuna-like species fishing in the EEZ of Mauritius is carried out by distant water fishing fleets from Europe (purse seiners) and countries of the East and South East Asia (longliners). All vessels licensed to fish in the EEZ of Mauritius are required to land their catch in Port-Louis harbour, and the masters of the vessel are requested to submit duly filled logbooks prior to unloading. Albacore tuna (*Thunnus alalunga*) are caught as target species mainly by Asian longliners and as bycatch by local-flagged longliners targeting swordfish (*Xiphias gladius*) and bigeye tuna (*Thunnus obesus*). Moreover, a large number of foreign longliners that operate in the South West Indian Ocean region use Port-Louis harbour as a transhipment base, making Mauritius a major transshipment centre for tuna. Mauritius has thus developed logistic facilities in Port-Louis harbour, including cold storage and fish processing facilities. Albacore tuna is the most common species transhipped in Mauritius. The frozen albacore tuna caught by longliners are mainly exported to the Far East countries. Mauritius, being a member to the Indian Ocean Tuna Commission (IOTC), is committed to providing catch and effort statistical data and information on licensed fishing vessels to the Commission. This paper gives an overview of the spatial distribution, catch and effort data collected on albacore tuna, landed in the port of Mauritius by licensed foreign and local-flagged vessels as well as transshipment information over the past five years. Length-frequency data of albacore tuna caught by foreign longliners for the last five years is also presented.

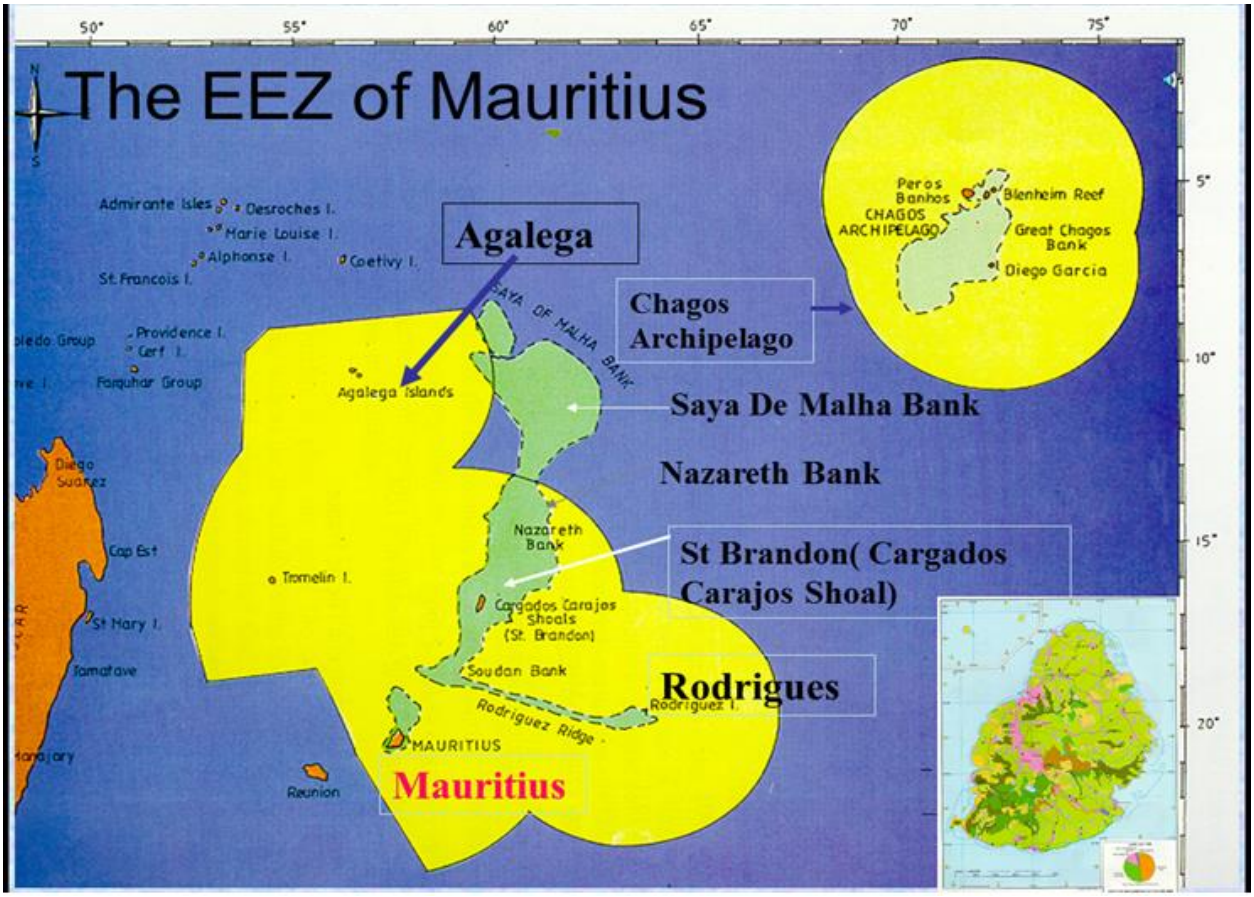


Figure 1: The Exclusive Economic Zone (EEZ) of Mauritius

2.0 Data collection from albacore targeting fleet

The main data source for the data collection system for Mauritius is from the logbooks of the fishing vessels. The catch, effort and fishing positions are recorded in logbooks by both foreign and local fishing vessels and submitted to the Port State Control Unit (PSCU) prior to unloading. The logbook submitted contain detailed information on individual fishing operations, including fishing grounds, type and duration of operation, catch by species and other types of data relating to weather and sea conditions. As per license condition submission of logbook is mandatory and failure to submit logbook or submission of inaccurate or incomplete logbooks may entail penalties such as payment of a fine or the vessel may become ineligible for any future license.

The logbook data are compiled using excel spreadsheet and reports are prepared as per national and international data submission requirements using ARCGIS and SPSS softwares. The ARCGIS software imports data (fishing positions) from excel spreadsheets and plots these data on the Mauritius EEZ map. The grouping of variables (fishing position) is done through SPSS software, an important step during the processing of statistical report for 5° latitude by 5° longitude rectangles.

3.0 The Semi-Industrial Chilled Fish Fishery (local longline fleet)

3.1 Fishing operations

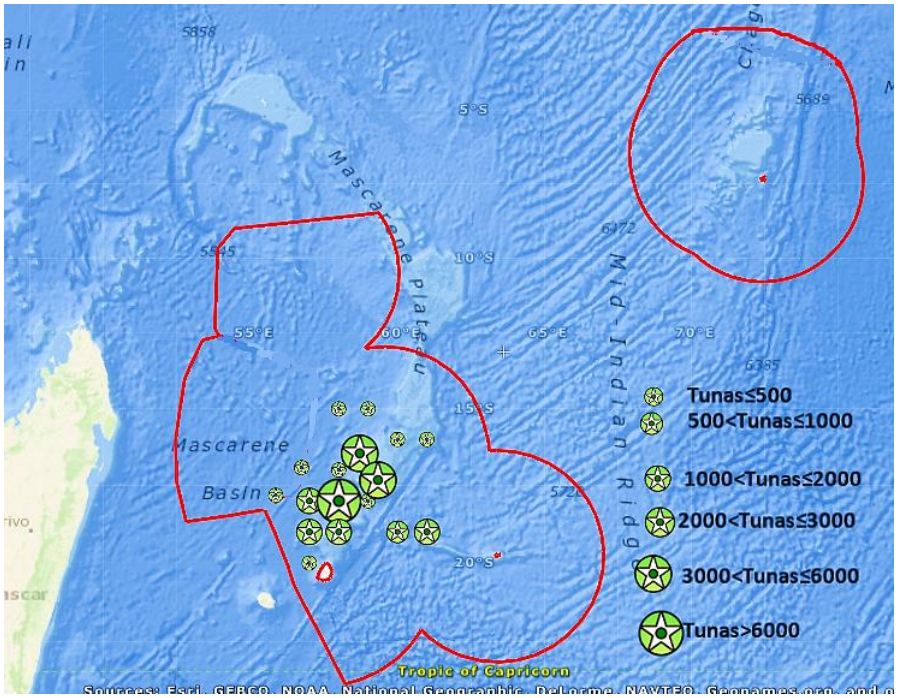


Figure 2: Main fishing zones and catch (kg) of local licensed longliners (<24m)

The local longline fleet comprises boats less than 24 that operate exclusively in the EEZ of Mauritius between latitudes 15° - 20°S and longitudes 55° - 61°E (Figure 2). The duration of the fishing operations is quite small varying between 5 to 10 days. Figure 3 provides information on the number of trips undertaken during the five year period (2011-2015)

amounting to a total of 216 trips. It can be seen that the catch levels for 2015 has increased (103t) despite a lower number of trips (45) undertaken as compared in 2011 where a lower catch was recorded (91t) for a higher number of trips (65) undertaken.

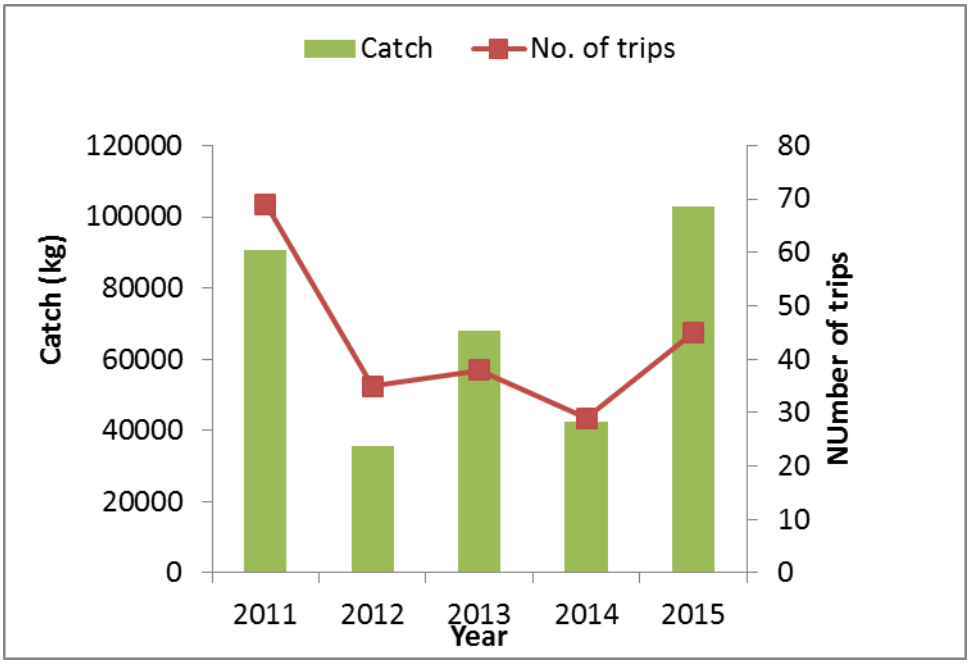


Figure 3: Catch and numbers of trips of local-flagged longliners (2011-2015)

3.2 Catch composition

The vessels target swordfish which are mainly exported to foreign countries. However, a considerable amount of tunas are also simultaneously obtained namely yellowfin tuna, bigeye tuna and albacore tuna as shown in Table 1.

Table 1: Catch composition of local longliners (kg)

Year	Yellow fin	Bigeye	Albacore	Sword fish	Marlin	Sailfish	Shark	Others	Total
2011	16671	10826	8455	44844	3006	655	740	5437	**90634**
2012	5595	3000	5695	16560	1365	365	455	2706	**35741**
2013	11265	17185	6215	28320	1963	90	680	2255	**67973**
2014	11265	7955	6451	14015	945	110	90	1789	**42620**
2015	28270	13284	12075	42175	3650	235	485	2695	**102869**

The proportion of albacore tuna in the total catch has varied over the years with a highest percentage recorded in 2012 and 2014 (16% of the total catch) compared to 9% recorded in 2011 and 2013. In 2015, the catch of albacore reached 12075 kg accounting for 12% of the total catch.

The catch per unit effort was in the range of 0.20kg/hooks to 0.53kg /hooks with a peak in 2015 and the lowest CPUE recorded in 2012 as shown in Fig 4.

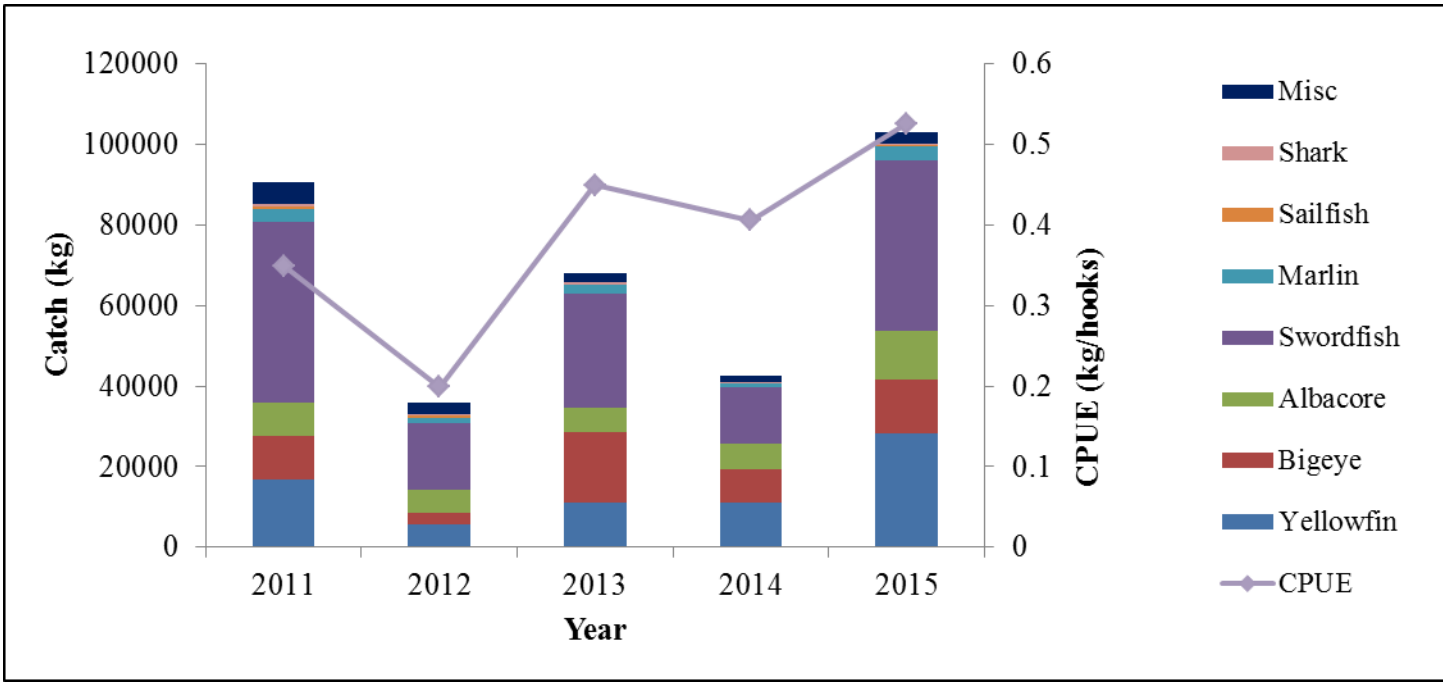


Figure 4: Catch & Effort of local-flagged longliners (2011-2015)

3.3 Seasonal Patterns of albacore for local longliners fishing in the Mauritius EEZ

The catch trend of the albacore species during specific months over the last five years is given in Figure 5. It can be observed that a significant catch of this species is generally obtained in the month of November. The semi-industrial fishing vessels operate more frequently in summer than in winter, explaining the low catches of albacore during the winter period.

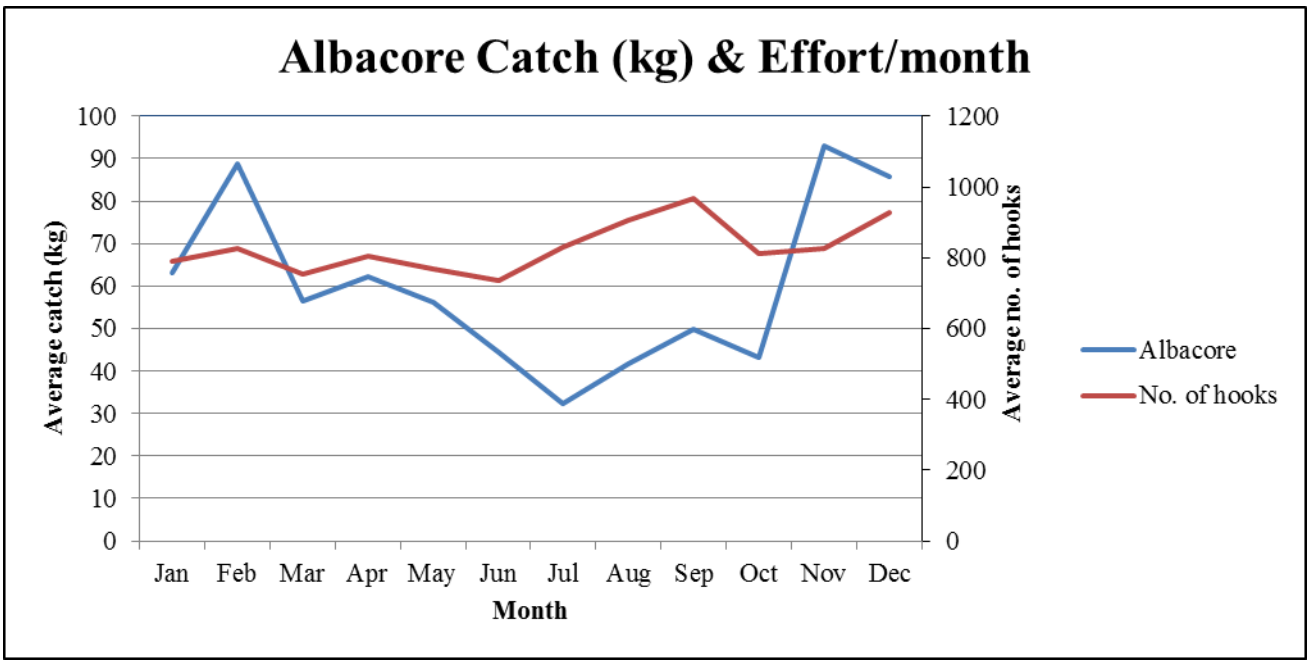


Figure 5: Catch & Effort of Albacore/month (2011-2015)

3.4 Variation between logbook catch and landed catch

Fig 6: Landed catch and logbook catch of local longliners for the period 2011-2015

Figure 6 provides the variations between the logbook catch and the landed catch of the albacore species by the local-flagged longliners over the last five years. It can be seen that there is no

significant difference for 2012, 2013, 2014 and 2015. However, the difference of 7303 kg recorded in the year 2011 can be explained by the fact that not all logbooks were received.

4.0 The Licensed Foreign-Flagged Longliners

4.1 Fishing operations

Longliners from distant fishing nations mainly from Asian countries carry out fishing operations in the Mauritius EEZ upon the issuance of valid fishing authorizations. In 2015, a total of 93 fishing licenses have been issued to foreign-flagged longliners to operate in the EEZ of Mauritius with a majority of 90 % issued to Asian longliners targeting albacore tuna. This percentage of vessels targeting albacore tuna has increased over the years due to a change in the target species of the longliners. As from 2009, fleets that were targeting other species has been replaced by those targeting albacore tuna thereby explaining the high levels of albacore tuna landed in the port of Mauritius (Dhurmeea *et al*. 2012, IOTC-2012-WPTmT04-12).

Table 2: No. of licences issued to foreign longliners (2011-2015)

No. of Licenses issued/year

Nationality	2011	2012	2013	2014	2015 (including extensions)
Belize	2	2	0	0	0
EU	0	0	0	0	16
France	0	0	0	16	0
Indonesia	7	0	6	6	0
Japan	0	1	2	2	1
Korea	0	0	2	0	0
Malaysia	5	0	0	5	0
Oman	1	0	1		0
People's Republic of China	0	0	0	0	2
Taiwan (Province of China)	83	43	82	74	70
Thailand	0	0	0	0	2
Seychelles	0	2	5	1	2
Total	**98**	**48**	**98**	**104**	**93**

Fishing operations start from the month of September and extend till February. The fishing zones of the foreign longliners are widely spread between latitudes 0º - 35º S and longitudes 48º E - 77º E.

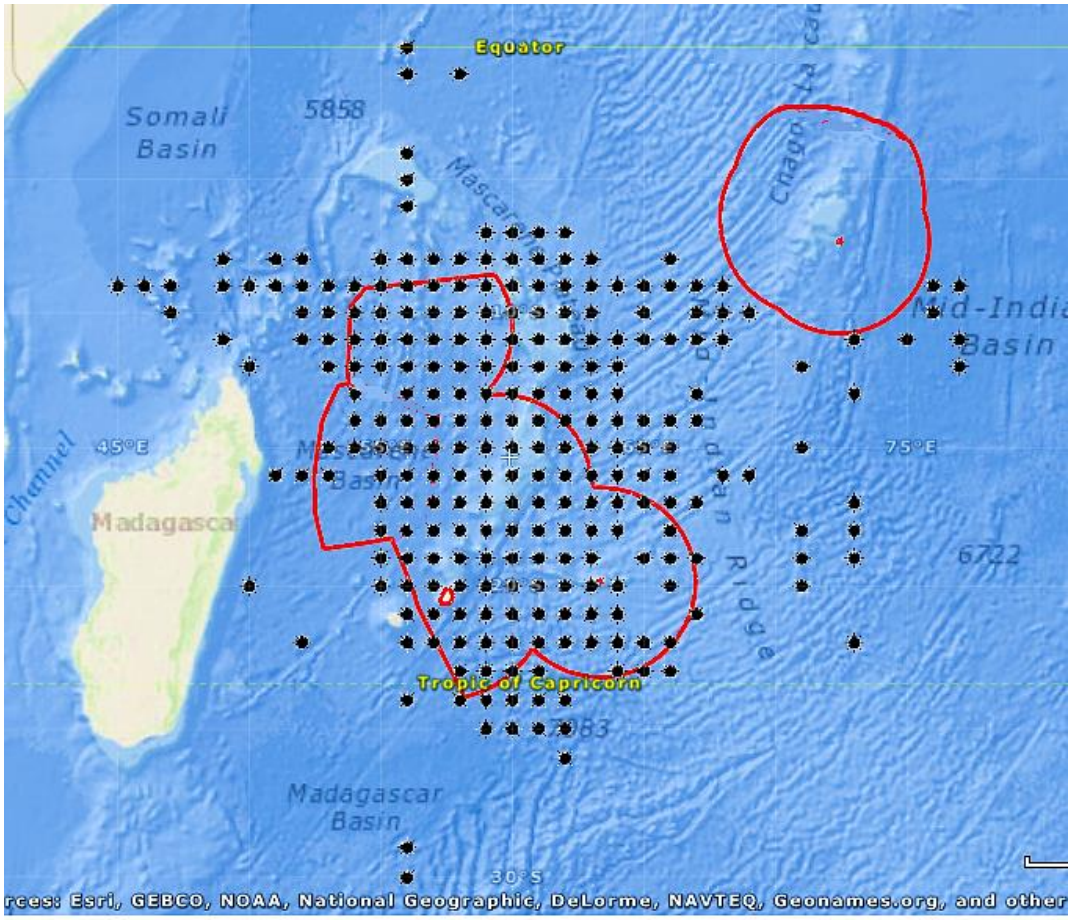


Figure 7: Spatial distribution of the catch of- licensed foreign longliners

4.2 Catch composition of licensed longliners

There has been no significant fluctuation in the catch of albacore tuna landed for the past five years except for the year 2011 where the catch was 59% as compared to other years when the catch remained stable between the range 48.5%-51.3%. The high percentage of albacore landed in 2011 can be attributed to the shift in effort by foreign longline vessels from the Northern Indian Ocean to the Southern Indian Ocean (IOTC-SC14, 2011). The Asian longliners also land yellowfin tuna (16.6%), bigeye tuna (10.3%), and billfish (8.6%) as shown in Figure 8.

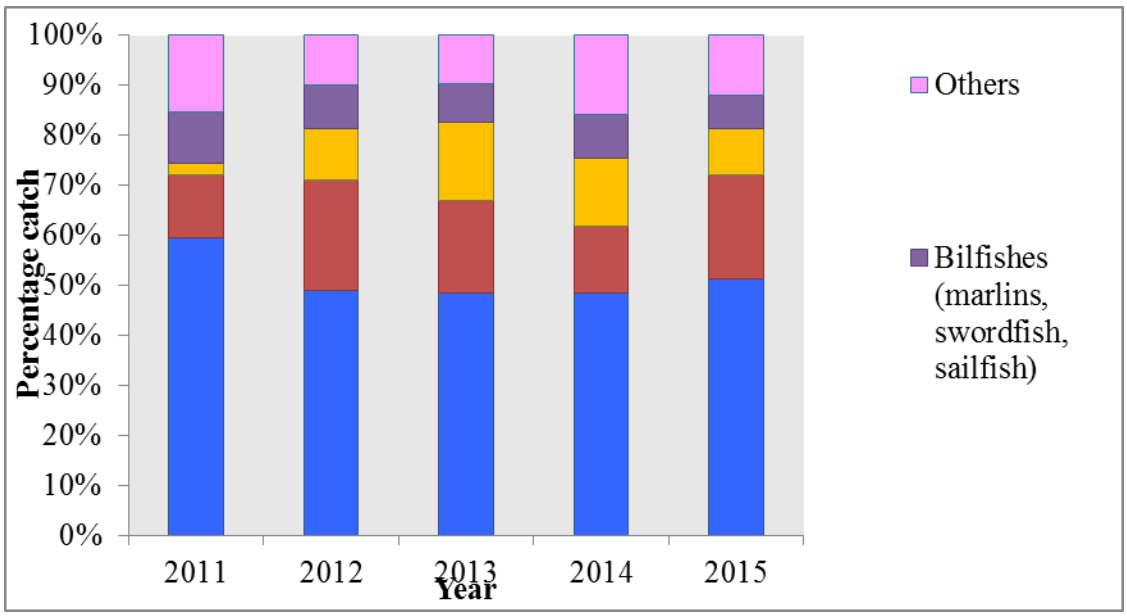


Figure 8: Percentage catch composition of foreign licensed longliners (2011-2015)

4.3 Catch and Effort of licensed longliners

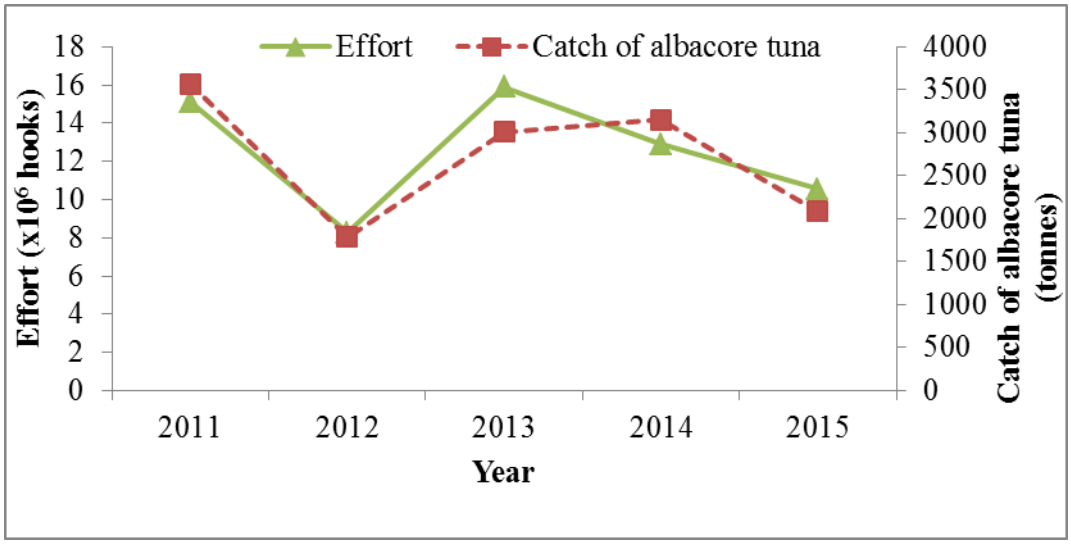


Figure 9: Catch and Effort of Albacore tuna (2011-2015) from licensed foreign longliners

The catch trend of albacore over the past five years shows a positive correlation with the fishing effort dispensed. Figure 9 shows that as the fishing effort is increased, the catch of albacore tuna increases as well and when the number of hooks is decreased, the catch is shown to decrease as well.

4.4 Seasonal Patterns of albacore from Foreign longliners fishing in the Mauritius EEZ

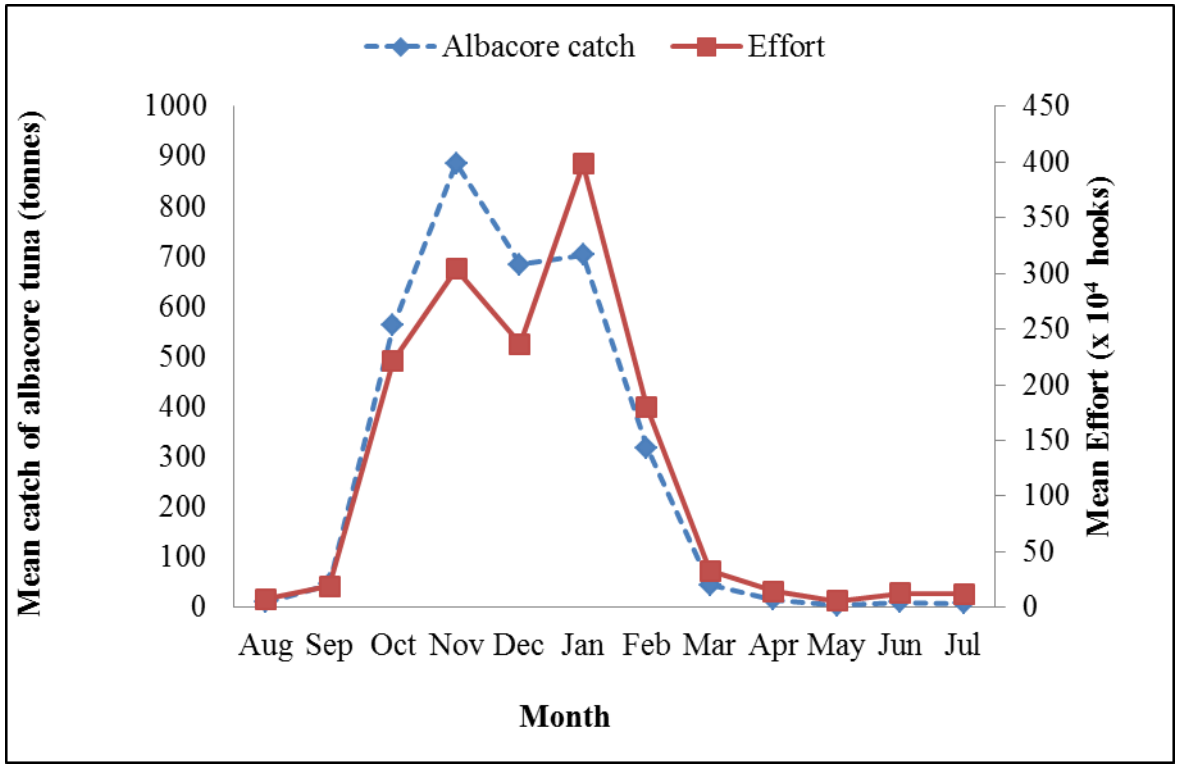
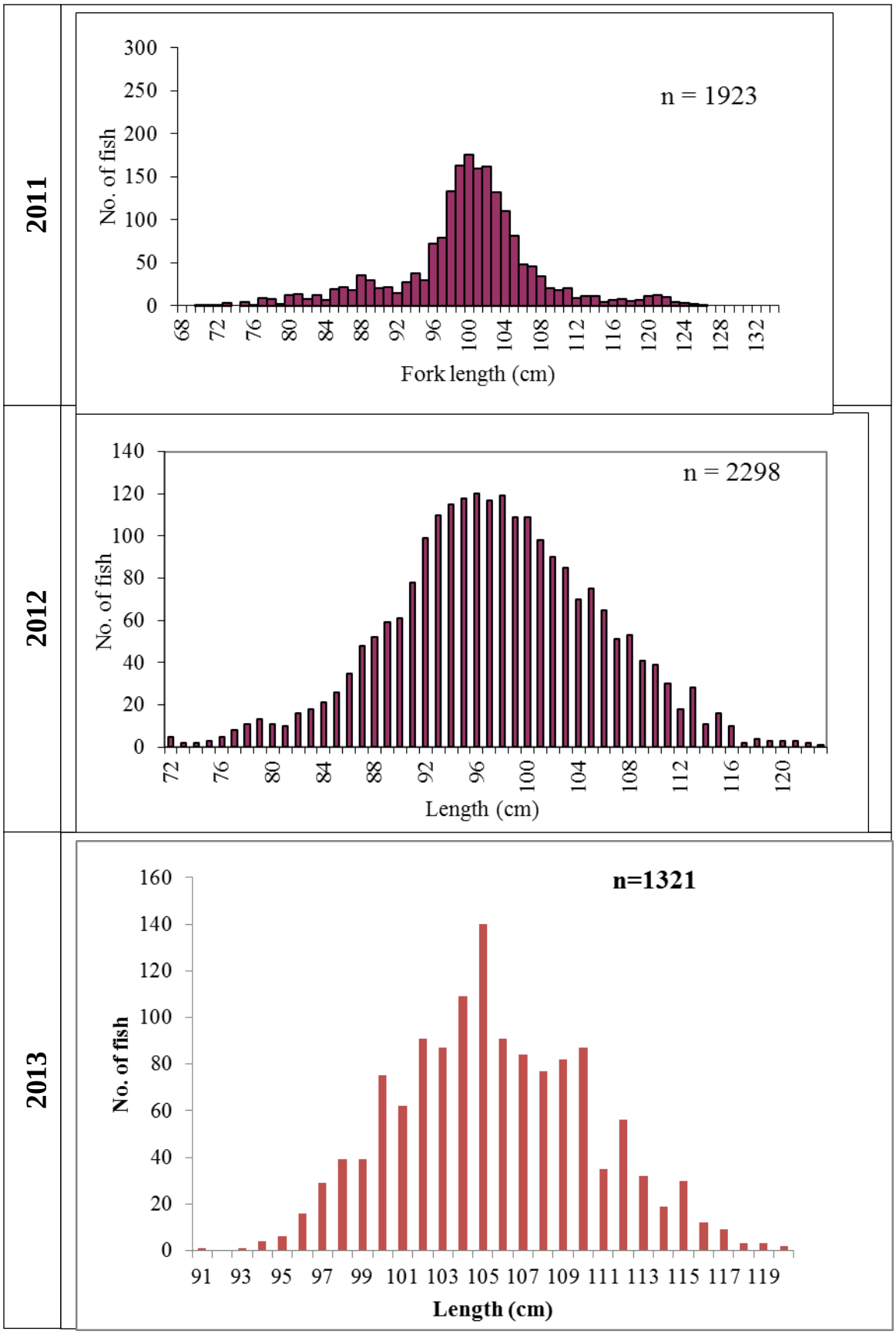


Figure 10: Mean Catch and Effort of Albacore tuna per month (2011-2015) from licensed foreign longliners

The catch of albacore tuna is seasonal, rising steadily as from September, as foreign longliners start fishing in the Mauritian waters, and peaks from October to February (Figure 10). Only a few longliners, particularly those not targeting albacore tuna, may operate out of season.

5.0 Sampling & Length Frequency



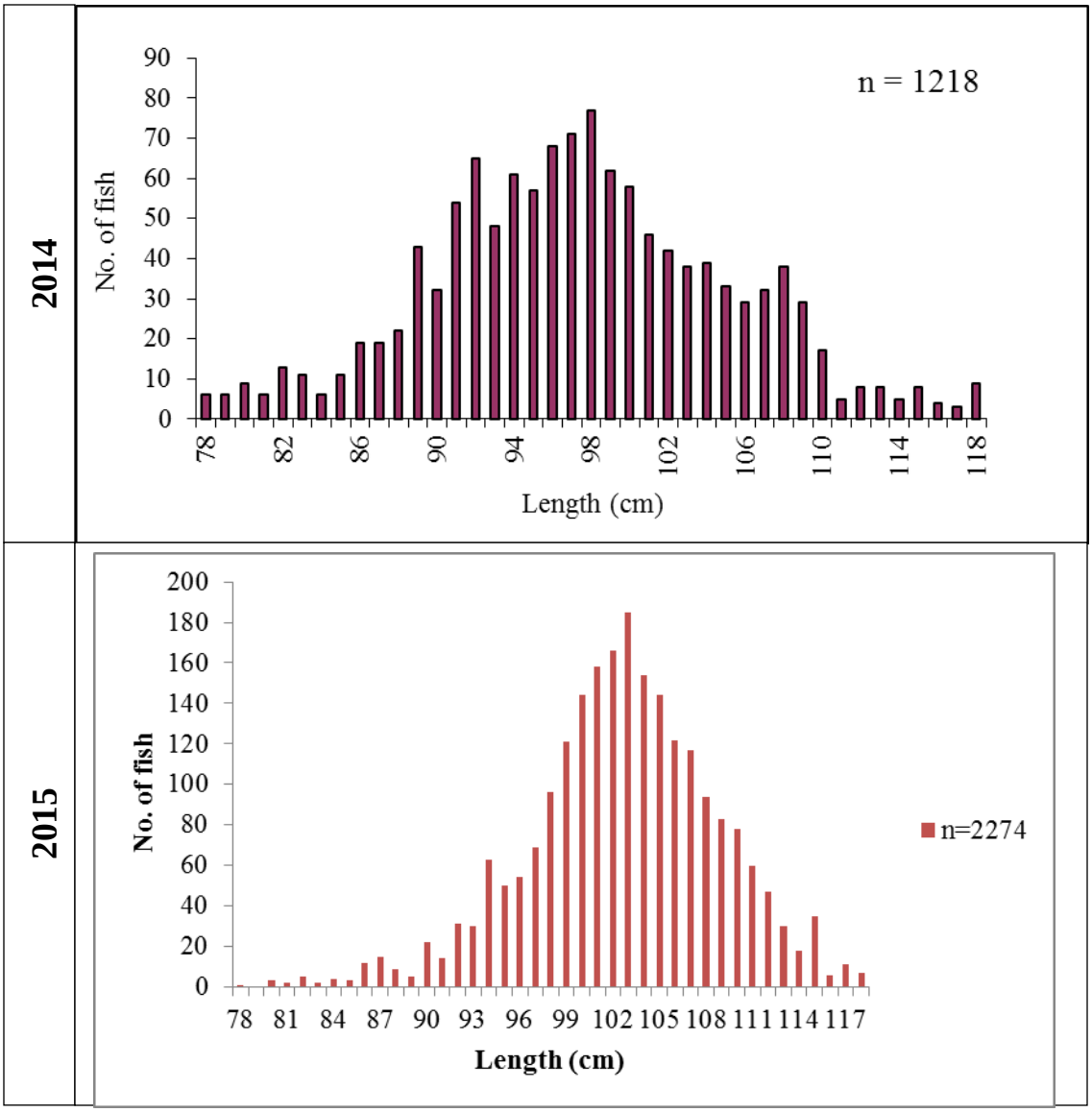


Figure 11: Length (cm) of albacore tuna sampled (2011-2015)

Albacore tuna caught by licensed longliners targeting the species are sampled regularly throughout the year. On average, 1807 fish were sampled yearly from 2011 to 2015. Fork length was measured to the nearest whole cm, rounded up.

During that five-year period, a total of 9034 fish were sampled. Figure 11 shows the length frequency distributions of albacore tuna, by year, along with the number of fish sampled.

6.0 Transhipment of albacore tuna

Mauritius holds a very strategic geographical position in the Indian Ocean which provides avenues in port development. Such avenues have been appropriately explored and major development in port infrastructures have occurred in recent years thereby attracting a large number of vessels for transhipment, bunkering, repairs and provisions.

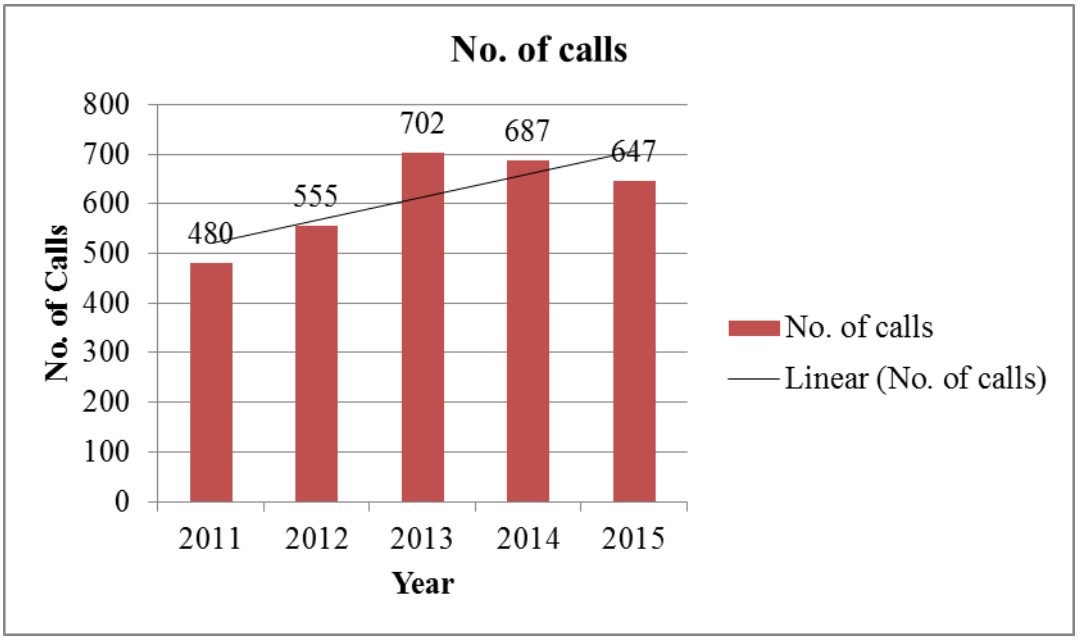


Figure 11: No. of calls of Foreign longliners (2011-2015)

A total of 50 200 tons of tuna and tuna associated species were transshipped by longliners and purse seiners at Port Louis in 2015. The amount of albacore tuna transshipped is increasing over the years as shown in table 3. Moreover, albacore remains the predominant species being transshipped by licensed and non-licensed longliners with an average of 40% the total fish transshipped by longliners over the last three years (Figure 12).

Table 3: Catch of tuna and tuna associated species transshipped by longliners and purse seiners

Year	Albacore	Yellow fin	Bigeye	Skipjack	Bluefin	Billfish	Shark	Others (oilfish, dolphin fish, Moonfish)	Total
2011	17220	7165	1979	4993	155	1112	3420	3969	40013
2012	15671	8045	3345	2397	532	4386	2318	3527	40221
2013	17457	9063	6490	2668	411	7161	2607	6811	52668
2014	13219	12811	6021	570	398	6443	3396	3520	51378
2015	18865	9024	5191	1379	420	6945	3343	5033	50200

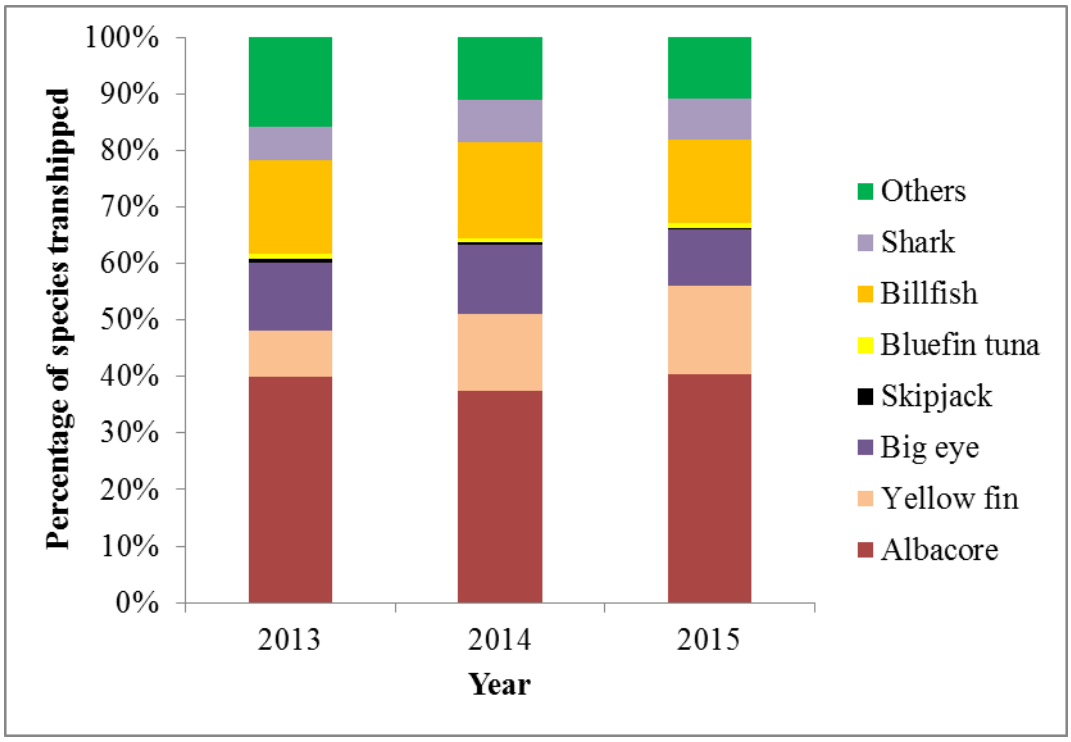


Figure 12: Catch of tuna and tuna associated species transshipped by longliners

7.0 References

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