A review of the catches of albacore tuna by local and foreign licensed longliners and transshipment of albacore in Mauritius, 2014 -2018

C. Lim Shung and A. Sheikmamode

Albion Fisheries Research Centre - Mauritius

ABSTRACT

This paper focuses on the catches of albacore tuna made by the local and foreign licensed longliners and the transshipment of albacore over the last five years.

Majority of the foreign licensed longliners comes from the Asian countries namely Taiwan Province of China, Indonesia, Korea, People's Republic of China and Malaysia. In 2018, one hundred and ninety nine fishing licences were issued to the foreign tuna longliners. The catches increased from 5 686 tons in 2014 to 10 079 tons in 2018 while the percentage of albacore in the total catch varied between 37.6% and 49.1%. The highest percentage, 49.1% was recorded in 2015. Majority of the catch that is 87% is attributed to the Taiwan, Province of China fleet. The latter holds the highest number of fishing licences and is the most active among the foreign fleets operating in the EEZ of Mauritius. The fishing areas during the past five years (2014 to 2018), extended across latitudes 0^0 to 32^0 S and longitudes 44^0 to 81^0 E.

Albacore tuna are caught as by-catch by the Mauritian longline fleet comprising fishing boats of less than 24 meters in length. These vessels target swordfish and they operate inside the EEZs of Mauritius and Mozambique. It is to be noted that from 2014 to 2018, 4% to 15% of their caches comprised albacore tuna. In 2018, 13 boats were operational and their total catch amounted to 821 tons. For those operating in the EEZ of Mauritius, the spatial distribution extended from latitudes

10^0 to 21^0 S and longitudes 54^0 to 66^0 E while those operating in the EEZ of Mozambique, were active between latitudes 13^0 to 27^0 S and longitudes 34^0 to 42^0 E.

Albacore tuna are transshipped by both licensed and unlicensed fishing vessels mainly longliners calling at Port Louis. Over the past five years (2014 to 2018), an average of 49 800 tons of tuna and tuna-like species were transshipped yearly with a corresponding average of 45% of albacore tuna.

1. Introduction

The Far East countries have a long history of longline fishery in the Indian Ocean and since 1968, the Asian longliners have been using Port Louis to transship and unload part of their catches mainly due to the facilities offered at the port. Up to now, the port has known various development which has helped to maintain its importance as a transshipment base for the foreign longliners.

Nowadays, most of the vessels involved in the transshipment activities are Asian tuna longliners. Apart from transshipment activities, the vessels also call for other ancillary activities such as bunkering, provisions, change of crew and repairs. The main species transshipped are tuna and tuna-like species.

The issuing of fishing licences to foreign fishing vessels was introduced in 1995 as a management measure to control fishing activities in our EEZ. The licenses are issued subject to a set of conditions for a better control and monitoring of the activities of the licensed vessels. The number of licenses have increased over the years and in 2018, 199 licences were issued to foreign longliners.

The first small surface longliner started to operate in the EEZ of Mauritius in 1999. Since then, the local longline fleet has evolved and in 2018, the local longline fleet consisted of thirteen longliners of less than 24 meters. As from 2016, some longliners have started to fish outside the EEZ of Mauritius. Swordfish being the targeted species, albacore is caught as by-catch by these small longliners.

In this paper, we shall review the catches of albacore tuna by the Mauritian longliners and the licensed foreign longliners and the transshipment of albacore in Mauritius from 2014 to 2018.

2. The tuna longline fishery by foreign licensed longliners

2.1 Catch and effort of the foreign licensed longliners

During the past five years, the foreign licensed longliners landed an average of 6522 tons of tuna and tuna like species yearly. From 2014 to 2015, the catch decreased from 5686 to 4584 tons. This was the lowest catch recorded in the past five years. As from 2015, the catch showed a moderate increase up to 2017 followed by a sharp increase in 2018. A positive correlation between catch and effort (no. of hooks) was noted for all the years except in 2015 where a drop in the catch was noted despite an increase in effort. This may be attributed to various factors which can affect catch and effort including bait loss or hook spacing (Skud P. 1978). However, if we refer to Gulland's 1969 study (cited in Skud, 1978), effort in the longline fishery can be increased only by adding hooks but the total effort is the number of hooks multiplied by the fishing time. Accordingly, the decline in the catch of 2015 may be attributed to the total amount of effort. The trend in the catch and effort over the past five years is shown in Figure 1. The Catch Per Unit Effort (CPUE) varied between 0.3 to 0.4 kg/hook. The highest CPUE were recorded in both 2014 and 2018 while a constant CPUE of 0.3 kg/hook was noted in the remaining three years. The table below shows the catch and CPUE (kg/hook) of the foreign licensed longliners for the past five years.

Table 1: Catch and effort of foreign licensed longliners (2014 – 2018)

YEAR	Catch in tons	No. of trips	Fishing days	No. of hooks(x1000)	CPUE (kg/hook)
2014	5686.4	167	5939	13201	0.4
2015	4584.1	151	5186	14475	0.3
2016	5908.0	158	6406	18429	0.3
2017	6350.3	201	6809	19643	0.3
2018	10079.4	230	8621	26949	0.4

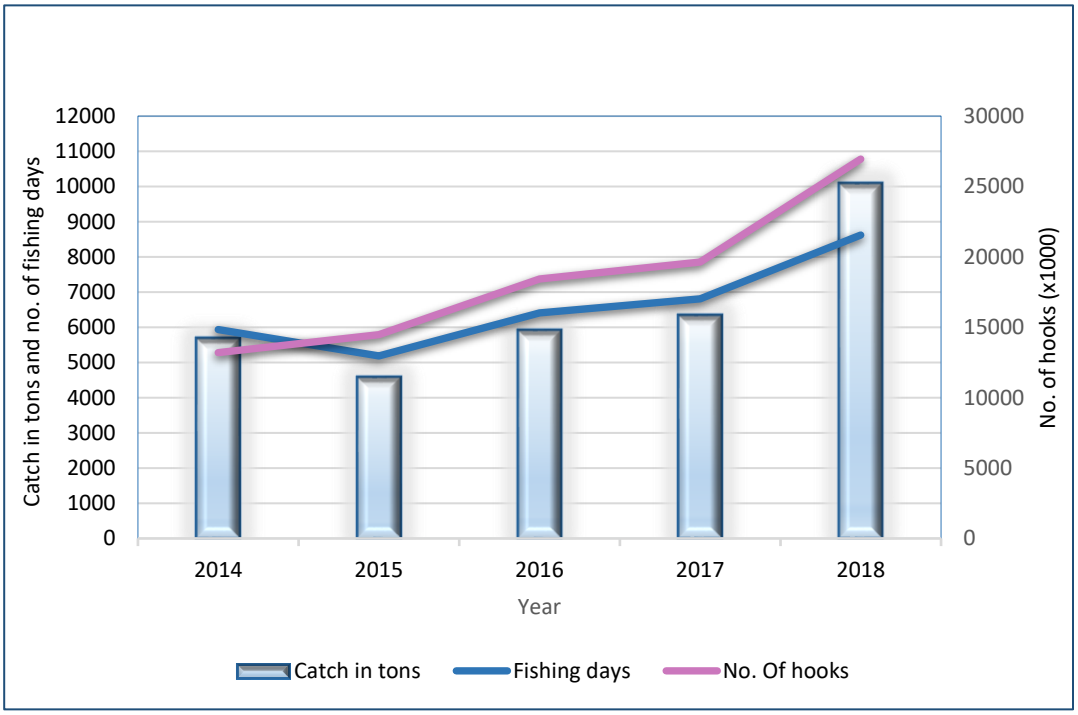

Figure 1: Catch trend and effort of foreign licensed longliners (2014-2018)

2.3 Species composition of the catch

A total of 32 608 tons of fish were caught by the licensed foreign tuna longliners during the last five years. The percentage of Albacore in the total catch ranged between 37% and 49%. The highest percentage was observed in 2015. This was followed by a drop to 37% in 2016. The catch of albacore increased in 2017 to reach 42% of the total catch made by the foreign licensed longliners. The same proportion of albacore in the catch was observed in 2018. Bigeye and yellowfin catches accounted for 21% and 18% out of the total catch respectively. The remaining catch comprised 11% of associated species such as swordfish, marlin, sailfish, sharks and 8% of miscellaneous fishes consisting of oilfish, wahoo, dorado, moonfish and angel fish. Figure 2 shows the species composition of the foreign licensed longliners between 2014 and 2018.

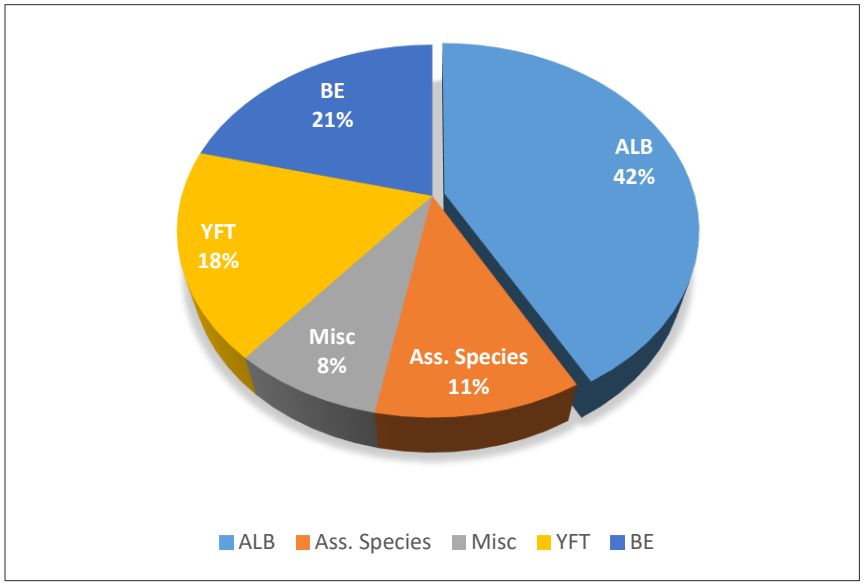

Figure 2: Species composition of the foreign licensed longliners based on five-year data (2014-2018)

Table 2: Catch by species of foreign licensed longliners (2014 – 2018)

Year	Yellowfin	Bigeye	Skipjack	Albacore	Southern Bluefin	Sword -fish	Marlin	Sail-fish	Shark	Others	Total by year
2014	842.1	880.0	178.9	2364.2	41.7	142.4	277.4	144.1	132.0	683.6	**5686.4**
2015	978.6	622.5	24.0	2250.3	0.1	190.9	21.3	15.9	62.6	417.9	**4584.1**
2016	1056.3	1385.7	16.3	2223.9	2.4	405.4	289.9	19.7	75.3	433.1	**5908.0**
2017	922.0	1570.9	40.4	2645.2	1.3	144.1	326.9	45.2	118.8	535.4	**6350.2**
2018	1967.0	2329.0	94.7	4188.9	14.6	181.6	388.9	34.3	66.6	813.5	**10079.1**
Total by species	5766.0	6788.1	354.3	13672.5	60.1	1064.4	1304.4	259.2	455.3	813.5	**32608.1**

2.4 Spatial distribution of the foreign licensed longliners

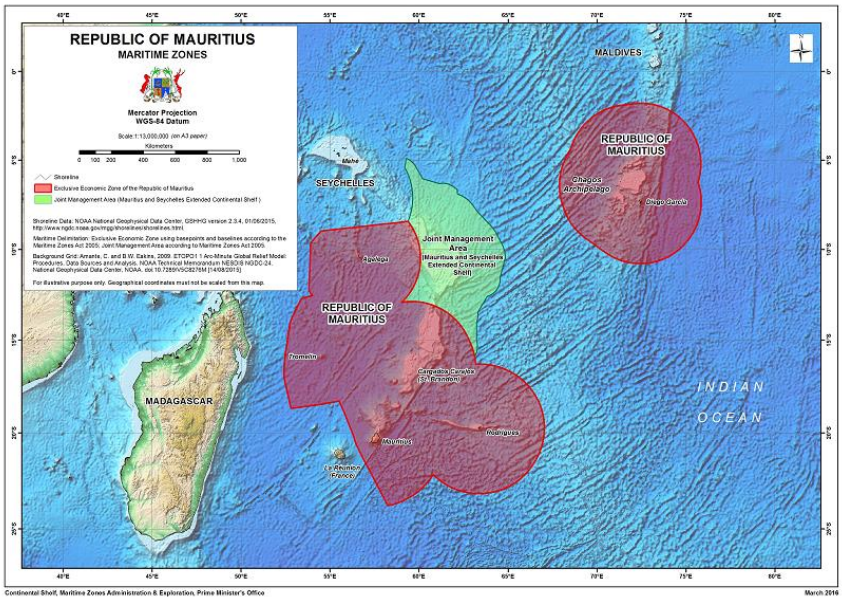

Figure 3: The maritime zone of Mauritius

2.4.1 Spatial distribution by year

The fishing zones of the foreign licensed longliners from 2014 to 2018 were widespread over a large area comprising the EEZ of Mauritius, part of the EEZ of Seychelles and

Madagascar as well as the high seas. However, the vessels were mostly active in the Mauritian waters. According to the figures, 87 % of the catch were made in the Mauritian EEZ.

In 2014, effort covered nearly the whole EEZ of Mauritius extending from latitudes 8°S to 22°S and 56°E to 64°E. In 2015, the fishing operations were restricted to two zones of the EEZ. Zone 1 was bounded by latitudes 7°S to 13°S and longitudes 55°E to 59°E and zone 2 by latitudes 14°S to 21°S and longitudes 56°E to 62°E . In 2016, there were three zones (1, 2, 3) where most of the fishing activities were carried out. First we had part of the Seychelles EEZ between latitudes 6°S to 11°S and 50°E to 55°E. The second part was in the north and central part of the Mauritian EEZ while the last fishing area labelled 'zone 3' (Fig 4c) extended from 18°S to 23°S and 57°E to 61°E in the south of the EEZ. In 2017, the licensed longliners concentrated their effort in two zones. However, unlike the two distinct zones observed in 2015, the two zones overlapped each other at 10°S to 12°S and 56°E to 62°E. Zone 1 extended from 7°S to 12°S and 53°E to 62°E while zone 2 covered the area between 10°S to 22°S and 56°E to 65°E. It was observed that part of the zone 2 between latitudes 18°S to 23°S and longitudes 62°S to 66°S was exploited only in 2017 and at a lesser extent in 2014. In 2018, the two fishing zones where fishing activities were concentrated were nearly the same as in 2015 with some noticeable effort in the EEZ of Madagascar (figure 4e).

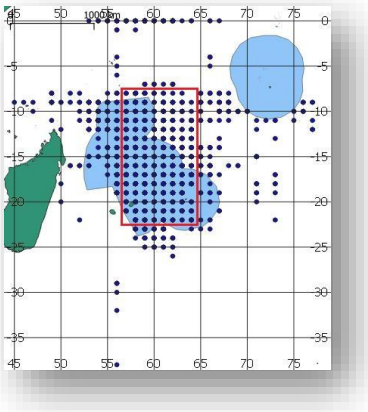

Figure 4a: Year 2014

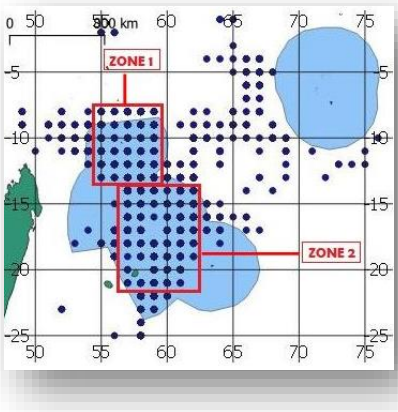

Figure 4b: Year 2015

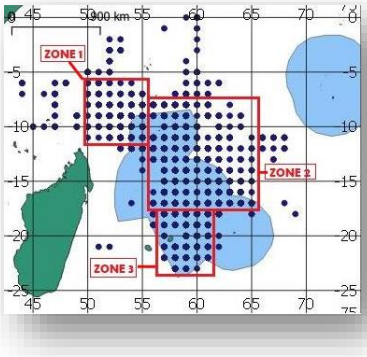

Figure 4c: Year 2016

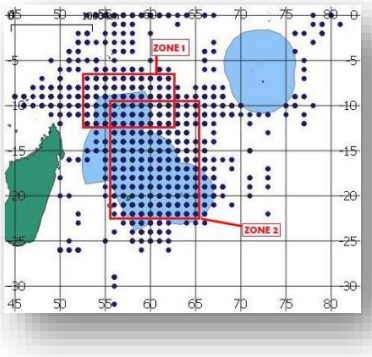

Figure 4d: Year 2017

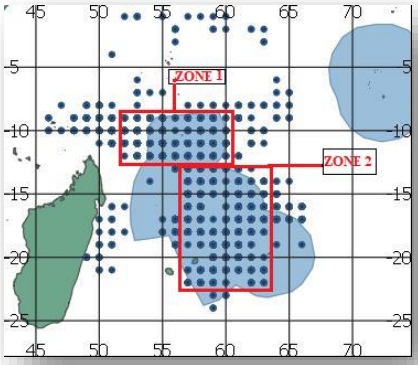

Figure 4e: Year 2018

Figure 4 (4a-4e): Spatial distribution of foreign licensed longliners by year (2014 – 2018)

2.4.2 Quarterly spatial distribution for the last five years

The fishing positions of the foreign licensed longliners for the past five years were plotted by quarter to show the seasonal pattern in the fishing activities. The maps show that quarters 1 and 4 were the periods during which the foreign licensed longliners were most active. In quarter 1, the fishing activities were mostly concentrated in the EEZ of Mauritius including the Mauritius-Seychelles joint management area. In quarter 4, in addition to the EEZ and the joint management area, the foreign licensed longliners also concentrated their activities in the EEZ of Seychelles with some noticeable effort in the EEZ of Madagascar. The vessels were less active in quarters 2 and 3 when compared to quarters 1 and 4. Figures 5a to 5d show the quarterly spatial distribution of the foreign licensed longliners for the combined years 2014 to 2018.

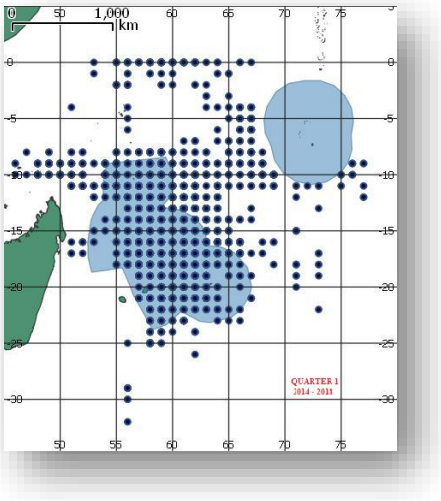

Figure 5a: Quarter 1

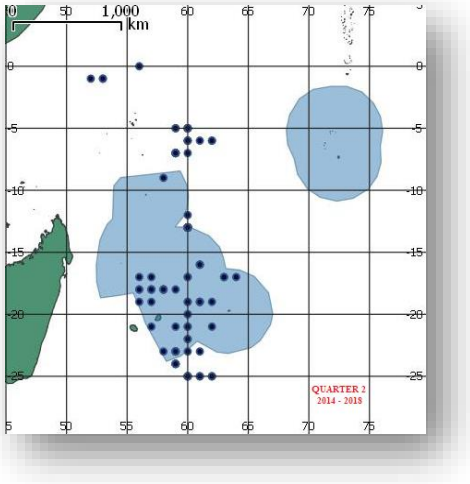

Figure 5b: Quarter 2

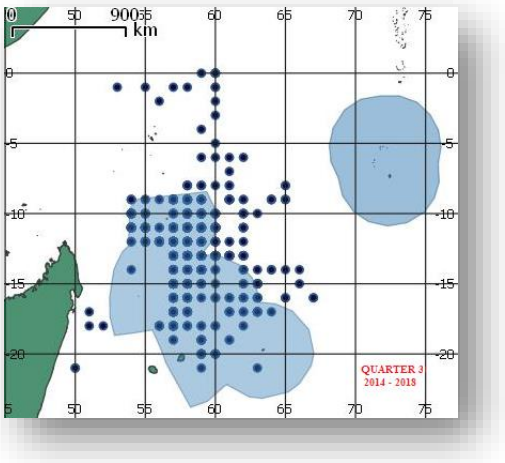

Figure 5C: Quarter 3

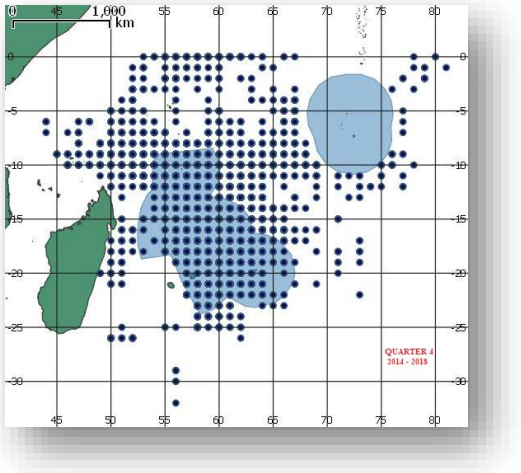

Figure 5d: Quarter 4

Figure 5 (5a to 5d): Spatial distribution of foreign licensed longliners by quarter (2014 – 2018)

3. The Mauritian longline fleet

The longline fleet consists of Mauritian vessels fishing both inside and outside the EEZ of Mauritius. The longliners that operate outside the EEZ, hold a fishing licence with Mozambique and they fish exclusively in the EEZ of Mozambique. All the vessels are under 24 meters and they target swordfish. Since 2014, the number of longliners involved in this fishery has known a gradual increase. In 2018, thirteen vessels were in operation. After each fishing trip, the fishing logbooks are collected and checked against the VMS data prior to input and processing of data. Both logbooks and landing data are processed and submitted to the IOTC in the forms of nominal and catch effort data.

3.1 Catch and Effort of the Mauritian longline fleet

Since 2014, there has been an increase in the catch made by all the longliners. This is mainly due to the development of the fleet from 5 to 13 vessels in 2018. Consequently, the catch has increased from 43 tons in 2014 to 821 tons in 2018 with a peak of 891 tons recorded in 2017. The decrease in the total catch in 2018 may be due to a decrease in the total effort. In 2014 and 2015, the longliners were operating only in the EEZ of Mauritius. Since 2016, 3 longliners started to operate in Mozambique. In 2016 and 2017, these vessels contributed to 58% of the total longline fleet. In 2018, their catch covered 60% of the catch of total fleet with 8 active longliners. The CPUE for the longliners fishing in Mozambique ranged from 0.6 to 0.8 kg/hook while those operating in the EEZ of Mauritius varied between 0.4 and 0.5 kg/hook. The CPUE for the longline fishery ranged from 0.4 to 0.6 kg/hook from 2014 to 2018. The lowest CPUE was noted in 2014 while the highest ones were recorded in 2016 and 2018. Figure 6 shows the evolution of the catch from 2014 to 2018 as well as the number of vessels involved in the fishery.

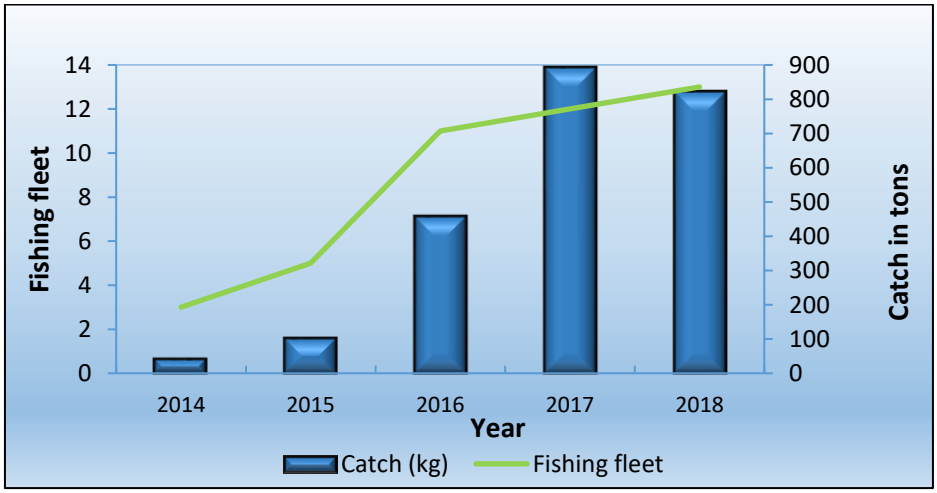

Figure 6: The no. of vessels and the catch of the Mauritian longline fleet (2014- 2018)

3.2 Species composition of the Mauritian longline fleet

The local longline fleet landed a total of 2315 tons during the past five years which included 130 tons of albacore. This constitutes 6% of the total catch. Swordfish which is the targeted species, represented 38% of the catch followed by yellowfin (29%) and bigeye (12%). The remaining 15% consisted of billfishes, sharks and dolphinfish. While the catch of albacore by the longline fleet has known a gradual increase over the past five years, the percentage out of the total catch has decreased from 15% in 2014 to 4% in 2017 with a slight increase in 2018 to 6%.

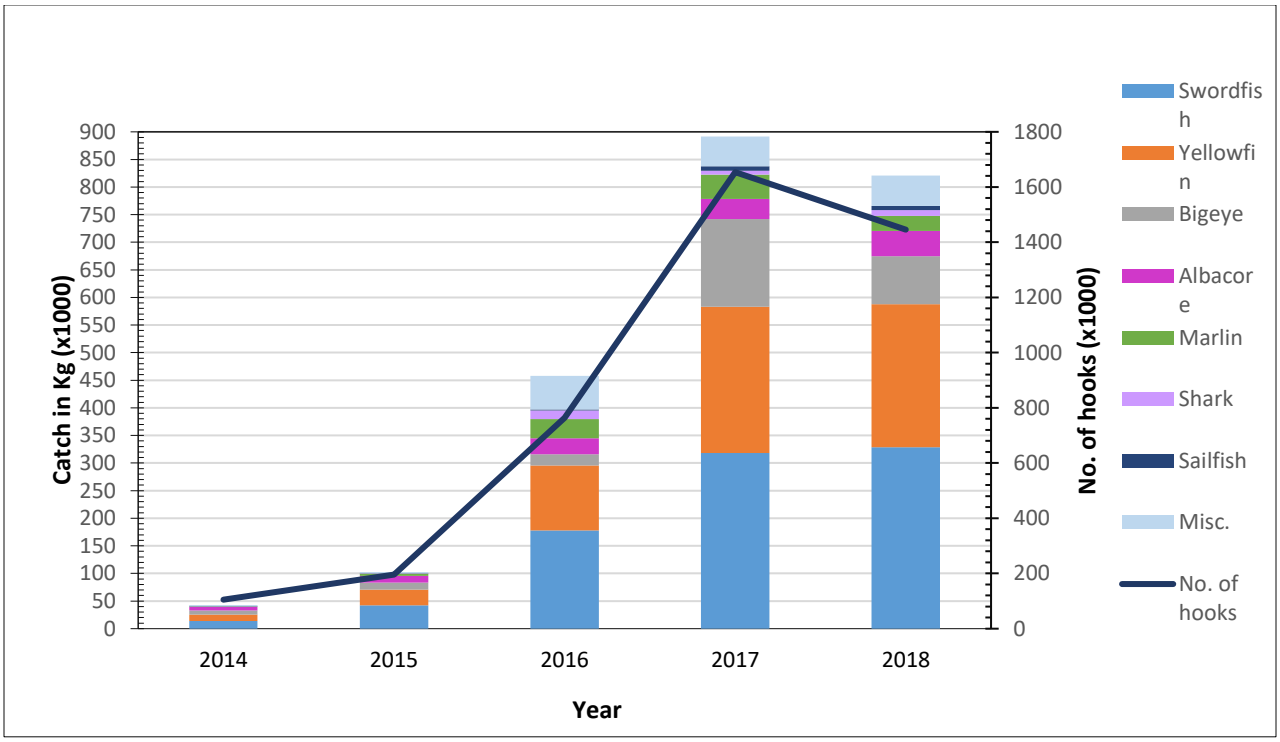

Figure 7: Catch and effort of the Mauritian longline fleet (2014 – 2018)

3.3 Spatial distribution of the Mauritian longline fleet

Figure 1 shows the spatial distribution of the Mauritian longliners from 2014 to 2018. There are two distinct areas of operations namely the EEZ Mauritius and Mozambique. During the five years under study (2014-2018), the spatial distribution of the longliners fishing in the EEZ of Mauritius was bounded by latitudes 10°S to 21°S and longitudes 54°E to 66°E. For the vessels operating in the EEZ of Mozambique, their fishing activities extended from latitudes 13°S to 27°S and longitudes 34°E to 42°E.

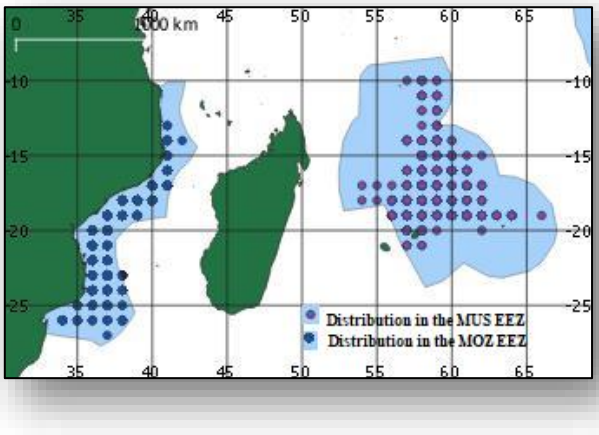

Figure 8: Spatial distribution of the Mauritian longliners (2014 – 2018)

4 Transshipment of tuna at Port Louis

The average volume of tuna transshipped at Port Louis in the last five years amounted to 49 800 tons yearly. A decrease was observed in the quantity transshipped from 2014 to 2017. In 2017, the quantity transshipped amounted to 46 510 tons. This was followed by an increase in 2018 up to 50 530 tons. Figure 9 shows the trend in the transshipment of tuna from 2014 to 2018.

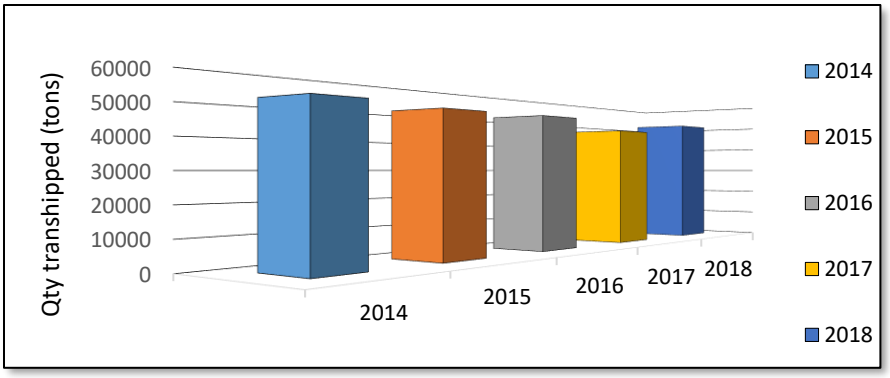

Figure 9: Quantity of fish transshipped in tons by year (2014 – 2018)

4.1 Species composition of fish transshipped

Most of the tuna transshipped are albacore which is the target species of Asian longliners. Since 2014, there has been a gradual increase in the quantity of albacore being transshipped. The percentage of albacore from 2014 to 2018 has increased from 26% to 45%. The highest percentage was noted in 2016 and 2017 with 48% of albacore tuna. The remaining species transshipped comprised yellowfin, bigeye, swordfish, skipjack, sharks, marlins and other miscellaneous fishes such as sailfish, dolphinfish and moonfish. Figure 10 shows the % of the different species of fish transshipped from 2014 to 2018.

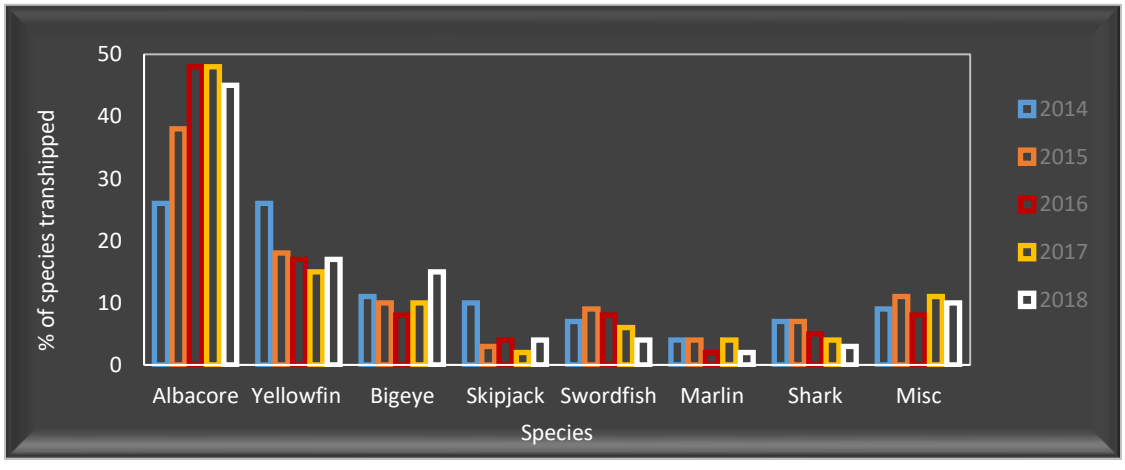

Figure 10: Percentage of fish transshipped by species yearly (2014 – 2018)

5 Conclusion

The albacore tuna seems to be the target species of the foreign licensed longliners with an average of 42% caught during the period 2014 to 2018. The total catches have known a marked increase since 2014 due to the increase in the number of licences issued and in the fishing effort. Most of the licensed vessels come from Taiwan, Republic of China. Fishing is mostly carried out in the EEZ of Mauritius. From 2014 to 2018, 87% of the catch were made in the EEZ of Mauritius. The EEZ of Seychelles and Madagascar as well as the Mauritius-Seychelles joint management area are also being exploited by the foreign licensed longliners. However, the intensity of fishing activities varies through the year. Intense fishing effort was observed from September to March when compared to the rest of the year.

Regarding the Mauritian longline fishery, 2321 tons of fish were caught over the past five years. Albacore is caught as a by-catch constituting 6% of the total catch from 2014 to 2018.

Mauritius remains a hub for tuna transshipment for both licensed and unlicensed tuna longliners. The percentage of albacore which has increased over the years up to 45% in 2018 confirms that albacore is the targeted species of the Asian longliners fishing in the South West Indian Ocean. The other species transshipped were mostly yellowfin and bigeye.

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