

Transshipment of tuna at Port Louis and analysis of the catch of foreign tuna longliners licensed in Mauritius.

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Abstract

This paper depicts the transshipment activities of vessels involved in the tuna fishery at Port Louis over the last five years and an analysis of the longline tuna fishery carried out by foreign longliners holding a Mauritian fishing licence.

The transshipment of tuna at Port Louis in the last five years has more than tripled when compared to the period 2002 to 2007 where only 12 433 to 17667 tons were transshipped. This rise is mainly attributed to the continuous development of the port and the different services offered while its location in the Indian Ocean has always been one of the most advantageous feature Port Louis could offer as a port.

The increase in the number of licences (from 13 in 1995 to 169 in 2017) issued to foreign tuna longliners over the years has also played a role in a rise of the quantity of tuna being transshipped at Port Louis. Over the past five years (2013 to 2017), an average of 50 216 tons of tuna and tuna-like species were transshipped at Port Louis yearly. A higher percentage of Albacore was observed among the species being transshipped. It is worth noting however that the gap between the percentage of Albacore and yellowfin being transshipped has reduced when we compared the last five years to the period from 2008 to 2010. This tendency was observed since 2011. From 2008 to 2010, a difference of 40% to 57% was noted between the percentage of Albacore and Yellowfin that were transshipped while in 2011 and 2012, the difference between these two species decreased to 22% and 24% respectively.

In the last five years, a difference of 15% to 34% was noted between the two species. The smallest difference (15%) was observed in 2013. In 2016 and 2017, albacore seemed to take advantage again over the amount of yellowfin which was transshipped with 48% of albacore and only 15% to 17% of yellowfin. Apart from tuna, the catch comprised swordfish, sharks, marlins, sailfish and other miscellaneous fishes such as oilfish, dolphinfish and moonfish.

The foreign tuna longliners which were licensed to fish in the EEZ of Mauritius were mostly Asian except for some flying the Seychelles flag. The amount of tuna caught by the licensed longliners ranged between 4584 to 6350 tons (from 2013 to 2017) totalling an amount of 28 733 tons for these past five years. Albacore, Yellowfin and bigeye constitute 80% the catch with a predominance of Albacore representing 43% in the last five years compared to 37% for the three tropical tunas combined. The fishing areas extended across latitudes 0° to 39° S and longitudes 43° to 83° E. However, the fishing activities were concentrated in the Mauritian EEZ with 85% of the catches.

1. Introduction

The industrial longline fishery in the Indian Ocean dates back to the 1950's when the longliners from the Far East countries started their fishing operation. Since 1968, the Asian longliners have been using Port Louis to transship and unload part of their catches for the local market (P. Cayré *et al.* 1990). This was mainly due to the facilities offered at the port. In the late 1970's, the modernisation of the port has helped to maintain its importance as a transshipment base for the foreign longliners.

The decade 1990-2000 has witnessed the most important development of the harbour with the creation of the Freeport Sector, and 100 hectares of land at Mer Rouge as well as the New Container Terminal. More recently, the quay extension project has allowed Port Louis to place itself as a full-fledged transshipment hub.

Most of the vessels involved in the transshipment activities are Asian tuna longliners. Others vessels include EU purse seiners from Spain, Portugal, France and longliners from Seychelles and the United Kingdom. The vessels which called for transshipment also came for other ancillary activities such as bunkering, provisions, change of crew and repairs. The main species transshipped are tuna and tuna-like species. Most are the vessels are non-licensed while the rest are licensed to fish in the EEZ of Mauritius.

The issuing of fishing licences to foreign fishing vessels was introduced in 1995 as a management measure to control fishing activities in our EEZ. It also boosted returns from fisheries and increased the contribution of the fisheries sector to the Mauritian economy (Annual Report, 1995). The licenses are issued subject to a set of conditions for a better control and monitoring of the activities of the licensed vessels. In 1995, thirteen longliners

were licensed to fish in the Mauritian EEZ. In 2017, the number of licenses issued to foreign longliners to fish in the Mauritian EEZ amounted to 169. The number of vessels calling at Port Louis have also greatly increased over the years.

In this paper, we shall present the transshipment of tuna at Port Louis and the tuna longline fishery by foreign longliners licensed in Mauritius based on the activities carried out from 2013 to 2017.

2. Transshipment of tuna at Port Louis

The average volume of tuna transshipped at Port Louis in the last five years amounted to 50 216 tons yearly. No marked difference was noted between the transshipment figures from 2013 to 2015. The quantities transshipped in 2015 and 2016 were nearly the same (50 201 and 50 322 tons) while a slight decrease was noted in 2017 with 46 510 tons of fish transshipped.

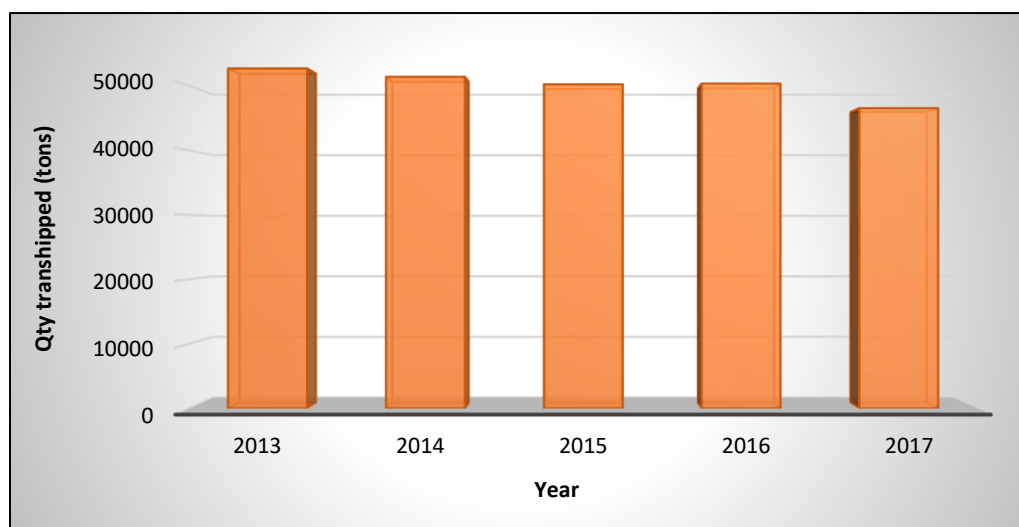


Figure 1: Quantity of fish transshipped in tons by year (2013 - 2017)

2.1 Species composition of fish transshipped

Most of the tuna transshipped are Albacore tuna which is the target species of Asian longliners. Prior to 2011, there was a marked difference between the quantity of albacore and yellowfin transshipped. For example, from 2008 to 2010, the difference in the percentage of albacore and yellowfin transshipped varied from 40% to 57%. From 2011 to 2013, there was a gradual decrease in the amount of albacore transshipped accompanied by an increase in the volume of yellowfin transshipped. The difference between the two species in terms of percentage ranged from 16% to 24%. In 2014, the quantity of albacore and yellowfin transshipped was nearly the same (13 219 tons of albacore and 12 811 tons of yellowfin). As from 2015 to 2017, a gradual decrease was noted in the amount of yellowfin transshipped representing 15% to 18% out of the total transshipment compared to 38 and 48% of albacore tuna. The percentage for the other two tropical tuna combined amounted to 13% while the remaining comprised species such as swordfish, sharks, marlins, sailfish, bluefin tuna and other miscellaneous fishes such as oilfish, dolphinfish and moonfish.

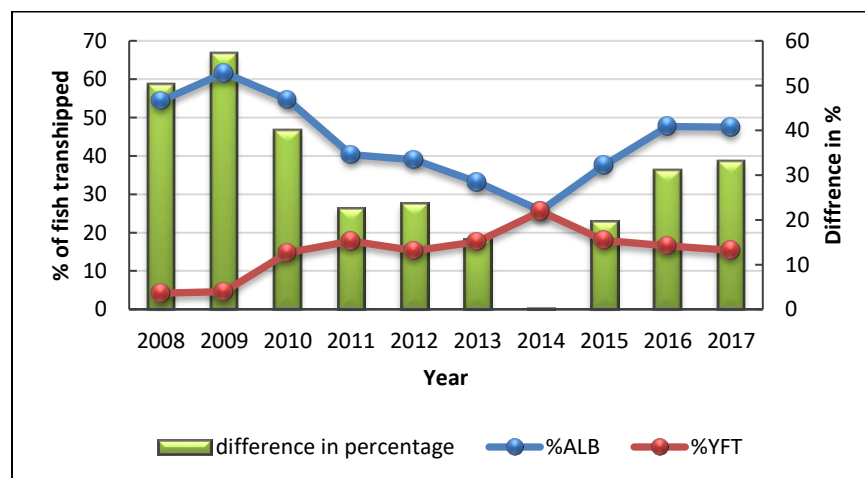


Figure 2: Trend in the volume of Yellowfin and Albacore transshipped

2.2 Transshipment activities (callings of tuna vessels by month)

The same monthly trend was observed in the number of vessels involved in transshipment activities during the past five years. The highest transshipment activities took place in September while the least recorded activity was observed in April.

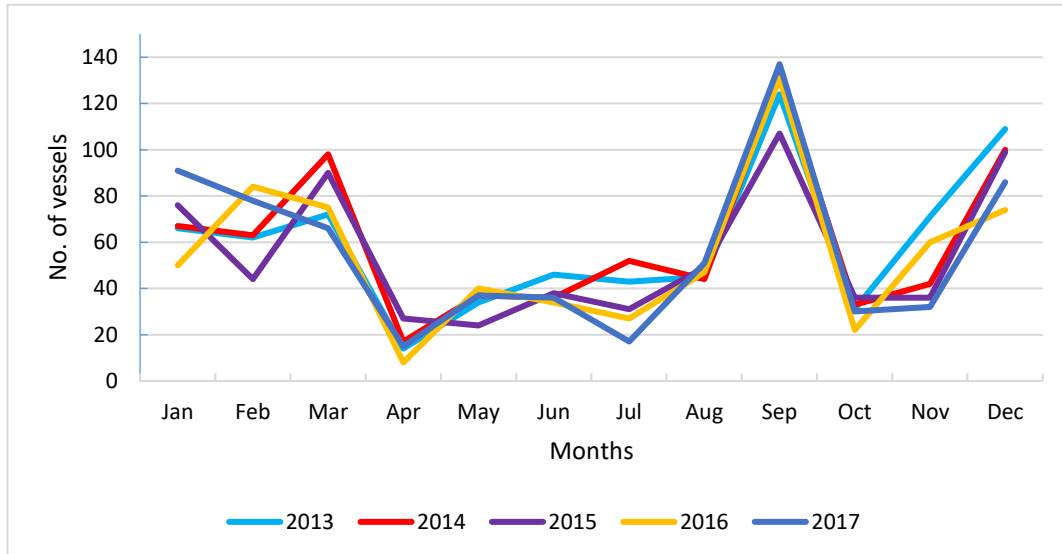


Figure 3: Transshipment activities (No. of vessels by year and by month)

September to March are the most active months with regard to the transshipment activities which are carried out at Port Louis. Seventy-five percent of tuna and tuna-like species are transhipped during that period. Figure 4 below shows the number of callings made by the total number of tuna vessels (licensed and non-licensed) which came to port for transshipment from 2013 to 2017.

It is to be noted that most of the vessels were unlicensed. For the past five years, thirty percent of the total number of vessels which came for transshipment held a Mauritian fishing licence while 70% were non-licensed vessels.

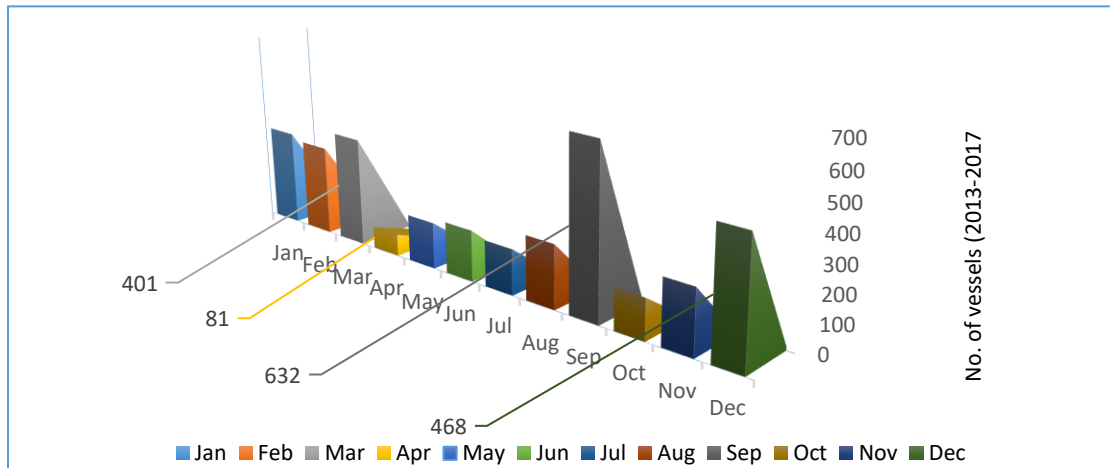


Figure 4: No. of calls made on a monthly basis by vessels involved in transshipment activities during 2013 to 2017.

3. The tuna longline fishery by foreign longliners licensed in Mauritius

3.1 Catch and effort of the foreign licensed longliners

During the past five years, the foreign licensed longliners landed an average of 5747 tons of tuna and tuna like species yearly. The lowest catch was recorded in 2015. From 2013 to 2015, the catch decreased from 6204 to 4584 tons. A corresponding increase was noted from 2015 to 2017 with a total catch of 6350 tons landed last year. The same trend was noted in the number of fishing days of the licensed longliners during the five years under review (Figure 5).

With regard to the Catch Per Unit Effort (CPUE), 0.4 kg/hook was recorded in 2013 and 2014 while a constant value of 0.3 kg/hook was obtained in the last three years.

A slight decrease was observed in the catch from 2013 to 2014. This may be attributed to a decrease in effort both in the number of fishing days and the number of hooks. Between 2014 and 2015, there was a marked decrease in the catch. It is to be noted that there was an increase in the number of hooks in 2015 but this was accompanied by a consequent decrease in the number of fishing days from 5939 to 5186. As a result, the CPUE decline to 0.3 kg/hook. From 2015 to 2017, the CPUE remained constant. In 2016, the increase in the catch by 1324 tons may be attributed to a noticeable increase of in the number of fishing days (1220) as well as the number of hooks used by the foreign licensed longliners. For the slight increase of 442 tons observed from 2016 to 2017, a corresponding rise was noted in the number of hooks and the number of fishing days too. 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 (2013 – 2017)

YEAR	Catch in tons	No. of trips	Fishing days	No. of hooks(x1000)	CPUE (kg/hook)
2013	6204.1	176	6075	15847	0.4
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

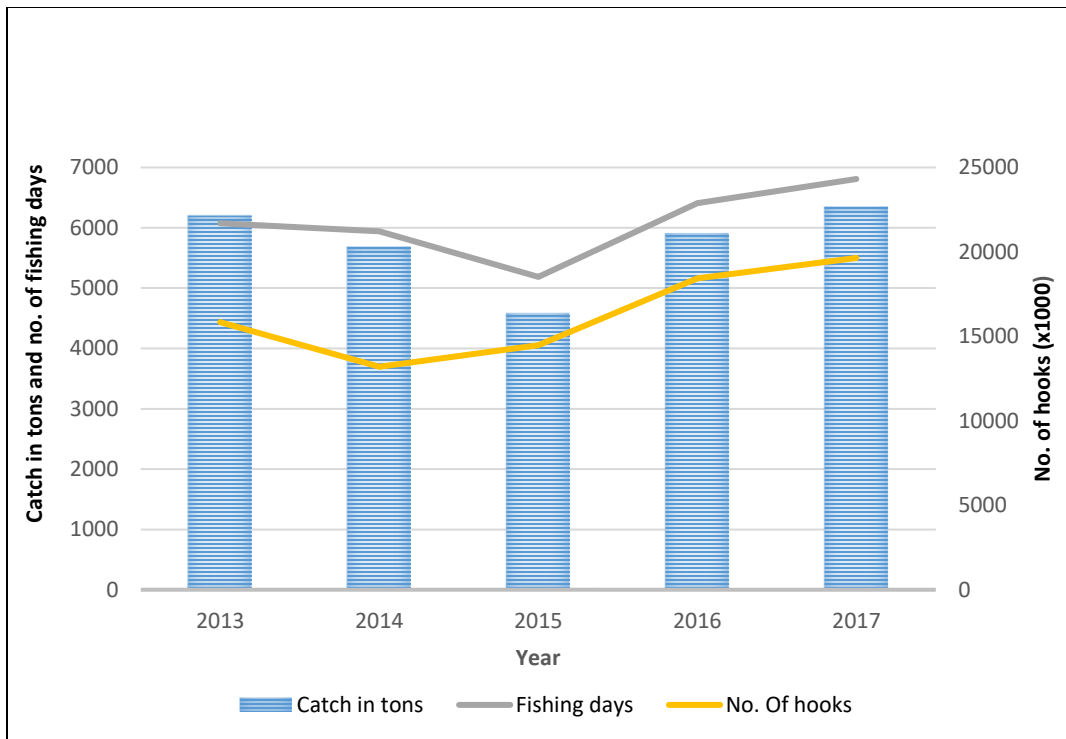


Figure 5: Catch trend and effort of foreign licensed longliners (2013-2017)

3.2 Species composition of the catch

A total of 28 733 tons were caught by the foreign tuna licensed longliners during the last five years. Yellowfin, bigeye and skipjack constitute 37% of the catch compared to albacore representing 43%.

Based on these five-years data, a difference of only 6% was noted between the catch of the tropical tuna versus albacore. The remaining 20% of the catch comprised 11% of associated species such as swordfish, marlin, sailfish, sharks and 9% of miscellaneous fishes consisting oilfish, wahoo, dorado, moonfish and angel fish.

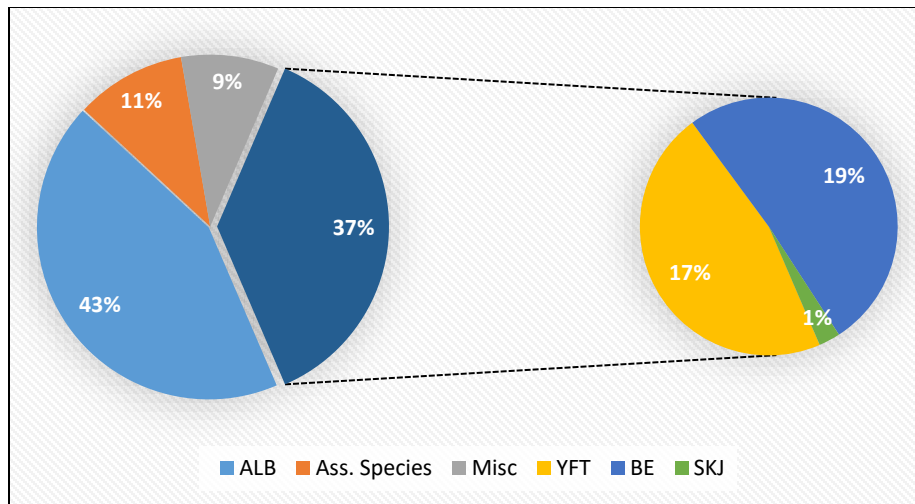


Figure 6: Species composition of the foreign licensed longliners based on five-year data (2013-2017)

Out of the three tropical tuna species, the catch of skipjack is very negligible (0.2% to 3.1%) as compared to yellowfin and bigeye. Over the five years, the percentage of bigeye represents a percentage of 18.9% while yellowfin constitutes 17.2% out of the total catch.

Table 2: Yearly catch by species of foreign licensed longliners (2013 – 2017)

Year	Yellowfin	Bigeye	Skipjack	Albacore	Southern Bluefin	Sword -fish	Marlin	Sail-fish	Shark	Others	Total by year
2013	1136.4	975.2	14.0	2997.9	9.3	130.8	339.3	12.3	29.2	559.7	6204.1
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
Total by species	4935.4	5434.3	273.6	12481.5	54.8	1013.6	1254.8	237.2	417.9	2629.7	28732.8

From 2013 to 2015, a downward trend was noted in the catch of bigeye which reached 13.6% in 2015. This was followed by a rise in 2016 and 2017 with a percentage of 24.7% recorded in 2017. On the other hand, a slight increase was observed in the catch of yellowfin in 2015 representing 21.3% of the total catch which then declined to 14.5% in 2017.

The catch of the three tropical tunas combined, reached a peak of 41.6% out of the total catch in 2016. In 2017, a slight difference was observed between the catch of albacore (41.1%) and the catch of yellowfin, bigeye and skipjack (39.9%). Among the two predominant ones that is, yellowfin and bigeye, the catch of yellowfin superseded that of bigeye in 2013 and 2015 while the reverse was observed in 2014 and the last two years. The biggest difference between the two species was recorded in 2017 where the catch of bigeye constituted 24.7% out of the total catch compared to 14.5% of yellowfin tuna. The figure below illustrates the above observations.

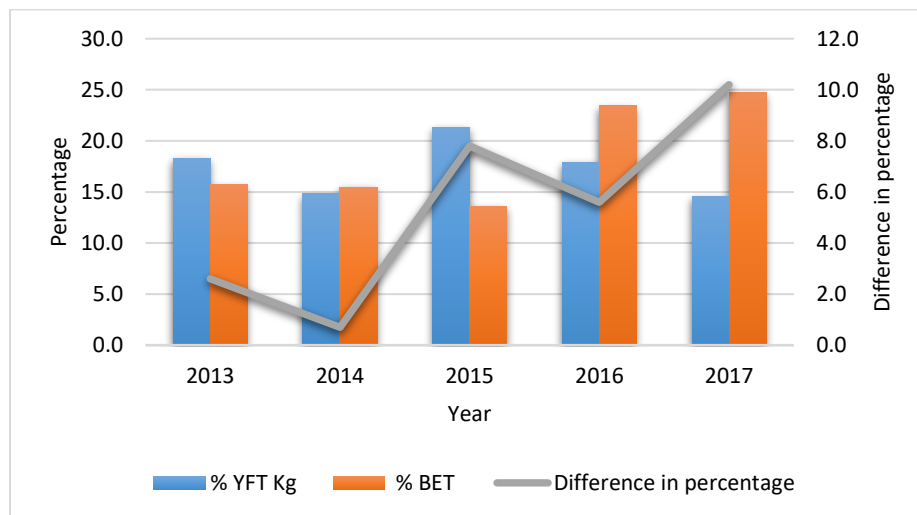


Figure 7: The catch trend of yellowfin and bigeye tuna caught by foreign licensed longliners (2013 – 2017)

4. Spatial distribution of the foreign licensed longliners

4.1 Spatial distribution by year

The fishing zones of the foreign licensed longliners from 2013 to 2017 were widespread over a large area comprising the EEZ of Mauritius, part of the EEZ of Seychelles and the high seas. However, the vessels were mostly active in the Mauritian waters. The catches showed that 85 % of the catch were made in the Mauritian EEZ.

Figure 8 shows the fishing zones of the licensed longliners by year and the red rectangles show the zones where fishing operations were more concentrated. It was observed that during 2013 and 2015, the fishing operations were concentrated in two main zones. In 2013, zone 1 was bounded by latitudes 7°S to 10°S and longitudes 51°E to 55°E and zone 2 by the latitudes 11°S to 21°S and longitudes 56°E to 62°E. No noticeable change was noted between the areas bounded by zone 2 in 2013 and 2015. With regard to zone 1, a slight movement to the east was noted in the longitudes; from 51°E to 55°E in 2013 to 55°E to 59°E in 2015.

In 2014, effort was concentrated over one large area extending from latitudes 8°S to 22°S and 56°E to 64°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 8d) extended from 18°S to 23°S and 57°E to 61°E in the south of the Mauritian waters.

In 2017, the licensed longliners concentrated their effort in two zones. However, unlike the two distinct zones observed in 2013 and 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 not exploited in the 2015 and 2016 and partly in 2013 and 2014.

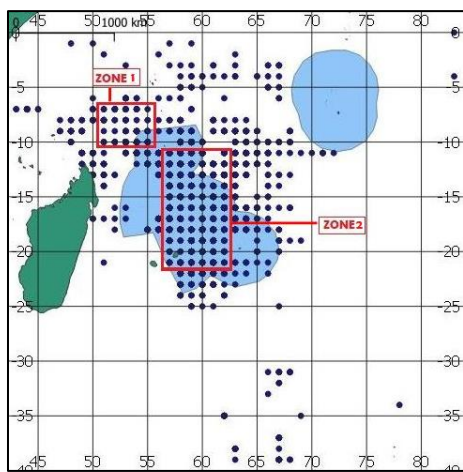


Figure 8a: Year 2013

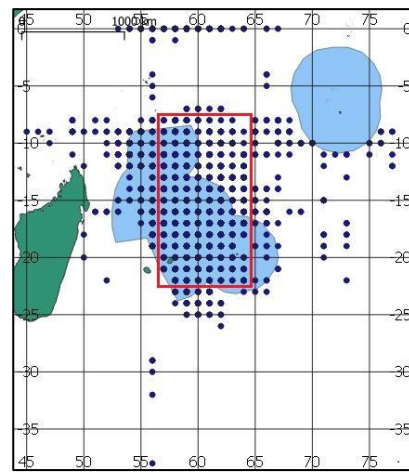


Figure 8b: Year 2014

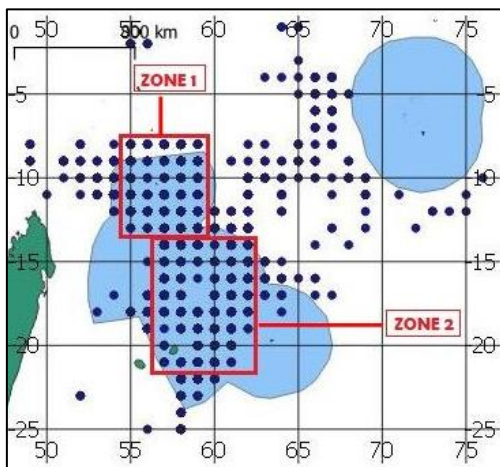


Figure 8c: Year 2015

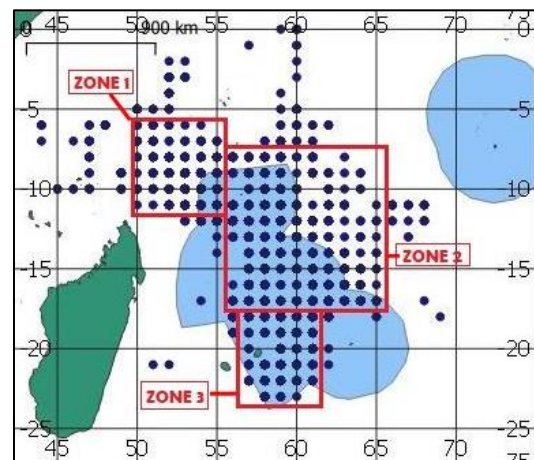


Figure 8d: Year 2016

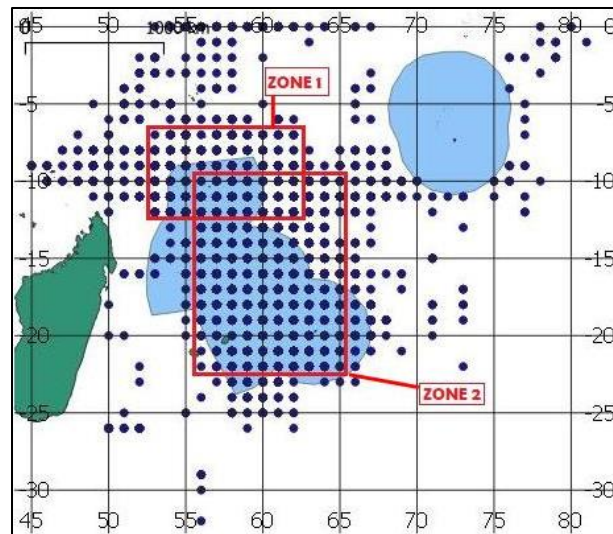


Figure 8e: Year 2017

Figure 8 (8a-8e): Spatial distribution of foreign licensed longliners by year (2013 – 2017)

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. The quarters 1 and 4 seem to be the periods where intense fishing activities were carried out. The foreign licensed vessels were also active in quarter 3 but to a lesser extent when compared to quarters 1 and 4. The plot for quarter 2 shows that there is almost no fishing activity during that period when compared to the other three quarters. It is to be noted that the same trend was observed in the transshipment activities in the port during that period of the year (see figure 3).

In quarter 1, the 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. In quarter 3, fishing activities were spread partly in the Mauritian EEZ, the Mauritius-Seychelles joint management area and Seychelles waters but to a lesser concentration in the Seychelles areas.

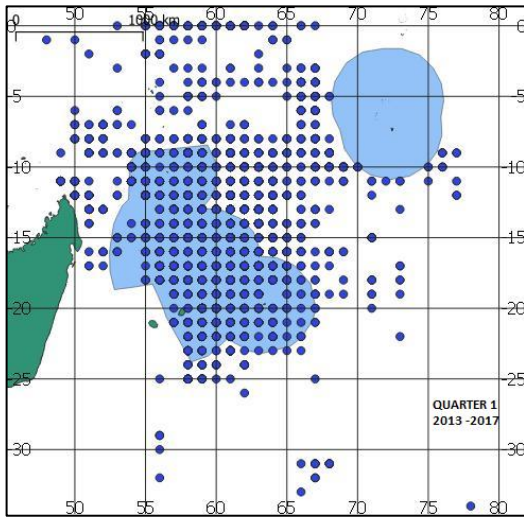


Figure 9a: Quarter 1

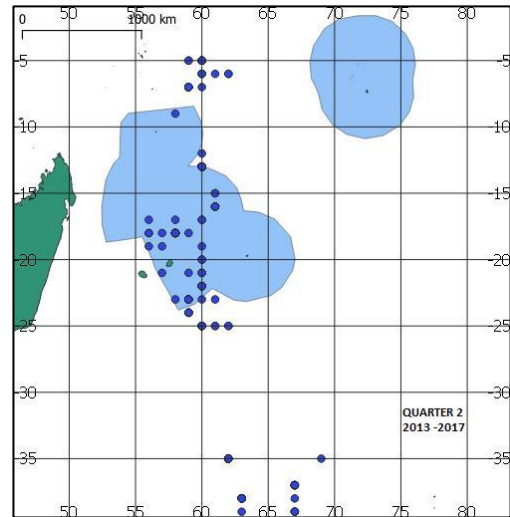


Figure 9b: Quarter 2

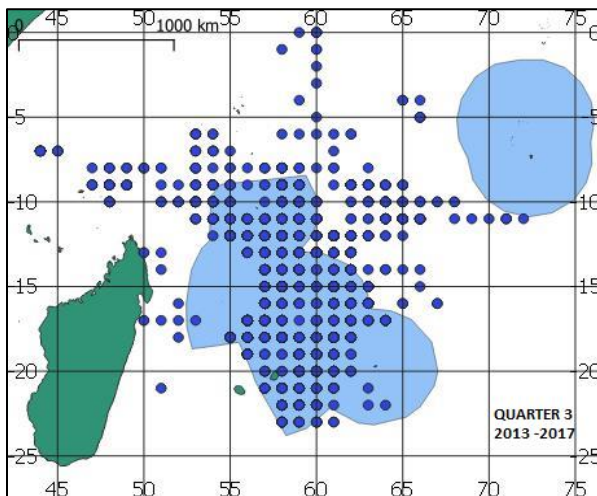


Figure 9c: Quarter 3

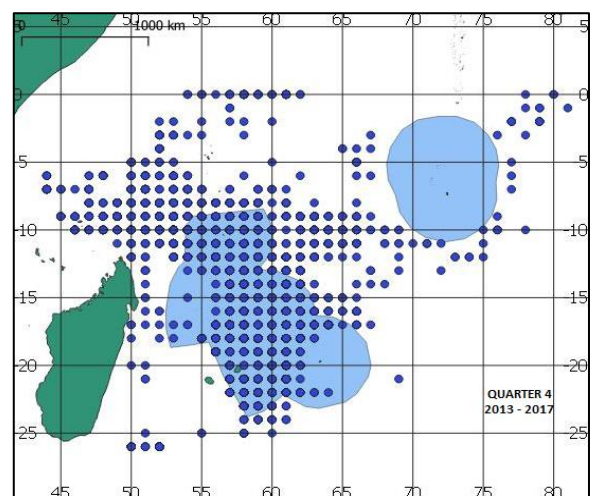


Figure 9d: Quarter 4

Figure 9 (9a to 9d): Spatial distribution of foreign licensed longliners by quarter (2013 – 2017)

5. Conclusion

Besides its strategic position in the Indian Ocean, the port has known important transformation over the past years. This has resulted in a constant increase in the calls of foreign tuna longliners which came mostly to transship their catches. Most of the transshipment activities take place from September to March. The quantity of fish transshipped has known a marked increase in the last fifteen years from 12 433 tons in 2002 to an average of 50 2016 in the last five years. With regard to the species being transshipped, prior to 2011, there was a marked difference between the quantity of albacore and yellowfin. This tendency was reversed afterwards and in 2014, the amount of yellowfin and albacore was nearly the same. However, in the last three years, a difference of 20% to 30% was observed between the two species with a higher percentage of albacore.

The number of foreign tuna longliners taking licences to fish in the EEZ of Mauritius has increased significantly over the years. From 2013 to 2017, a total amount of 28 733 tons were landed by the foreign licensed longliners. Yellowfin, bigeye and skipjack constitute 37% of the catch compared to 43% of albacore tuna. Among the tropical tuna, yellowfin and bigeye are the two predominant species in the catch.

Fishing is carried out principally in the EEZ of Mauritius with 85% of the catch while the EEZ of Seychelles as well as the Mauritius-Seychelles joint management area are also being exploited by the foreign licensed longliners. Fishing activities generally take place from January to March and July to December. The low season for the foreign licensed longliners is from April to June.

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