

17th Working Party on Tropical Tuna (WPTT17) Montpellier, France**A review of the catch of tropical tunas from longline and purse seine vessels licensed in Mauritius****A. Sheik Mamode, T. Sooklall and M. Curpen-Mahadoo****Abstract**

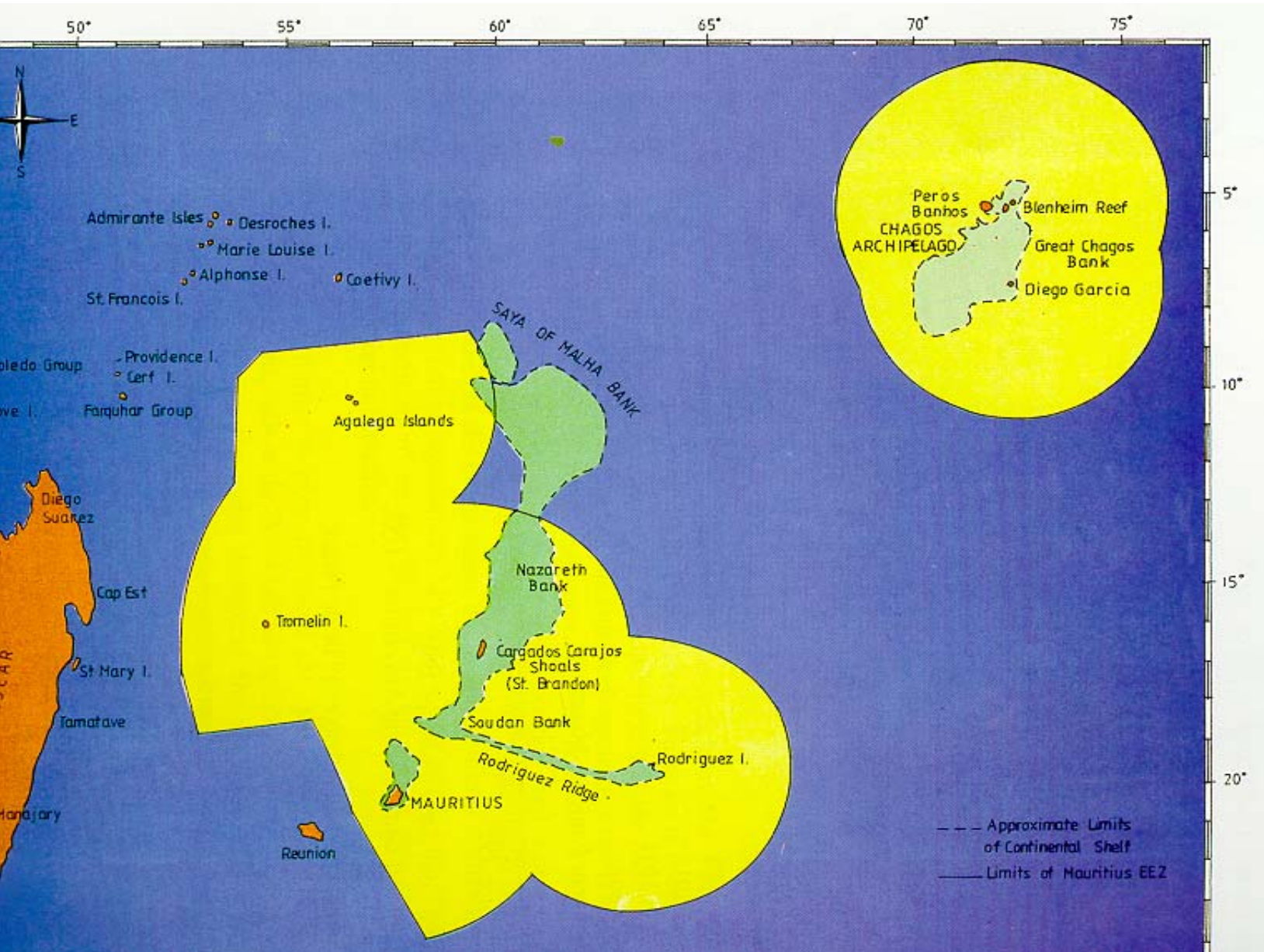
This paper provides a review of the tropical tuna fisheries as recorded by Mauritius, for the national vessels and foreign vessels that were licensed to fish in the Mauritius EEZ. Annual trends show an increase in the proportion of yellowfin and bigeye in the total catch from the national longliners vessels over the past four years from 14% in 2010 to 45% in 2014. Moreover, it is observed that at the height of winter in the month of July, the catch for both the species is quite low, but that during the summer months, there is a peak for bigeye in September whereas yellowfin peaks in December. Length frequency distribution of bigeye tuna revealed a distribution range from 81cm to 166cm with a majority (90.7%) of the catch consisting of large size fish measuring more than 100cm fork length. The fork length of yellowfin tuna ranged from 76cm to 171cm with most of the fish (77.7%) in the 100-134 cm range. As for licensed foreign longliners operating from Port Louis, they target temperate tuna, but their catch also consists of a reasonable amount of tropical tunas. From the year 2010 to 2014 the combined catch of yellowfin and bigeye tuna varied from 15% to 35% of the total catch. Mauritius-flagged vessels re-entered the purse seine fishery in 2013. The catch composition of Mauritian purse seiners showed a majority of the catch was yellowfin (52%). Most of the catches were made from log associated fishery (58.8% in 2014) where 77.8% of the log associated catch were derived from artificial logs (drifting FADs) and 22.2 % from natural logs. The catch composition of licensed foreign purse seiners shows a gradual increase in the catch of yellowfin tuna over the years from 40% of the catch in 2010 to 56% of the catch in 2014. In addition, most of the catches were from log associated schools (66.1%-83.9%) except for 2012 when 58.3% of total catch was from free school.

1. INTRODUCTION

The island of the Republic of Mauritius located in the South West Indian Ocean (*Latitudes 19°58.8' and 20°31.7' South and Longitudes 57°18.0' and 57°46.5' East*) is endowed with an Exclusive Economic Zone (EEZ) of 1.9 million square kilometres. Due to its geographical position, conducive port infrastructures and dry-docking facilities Mauritius is a regional hub for maritime traffic. Tuna fishing longliners regularly call at the Port Louis harbour with around 800 calls yearly for unloading and transshipment of tuna. The amount of tuna transshipped at Port Louis has seen a constant increase from 43 723t in 2010 to 51 378t in 2014. Tuna fishing in the waters of Mauritius are mainly practiced by foreign longliners (mostly Asian) and purse-seiners (European) operating under fishing licence against payment of a licence fee. Licensed vessels are required to land their catch in Mauritius and submit duly filled logbooks to obtain authorisation for unloading. Catch data used in this presentation are derived from the logbooks submitted by the licensed vessels. In 2014, The fishing area for foreign licensed longliners were between latitudes 00° N - 35° S and longitudes 48° E - 77° E. The total catch obtained from the EEZ of Mauritius by the licensed longliners in 2014 was 4944 tonnes. For the Asian longliners, the major part of the catch (41.8%) was composed of albacore tuna which is the target species, followed by bigeye tuna (15.4%) and yellowfin tuna (14.7%). As per logbooks received from licensed purse seiners for the year 2014, the catch were mostly distributed between latitude 01°N- 14°S and longitudes 49°E – 67°E with 45 % of the total catch obtained from free school which implies that a considerable amount of fishing effort was concentrated on free school. The free school fishing technique accounts for the predominance of yellowfin tuna (56%) in the total catch.

In 2014, the National longline fleet consisted of three boats of less than 24m LOA, targeting swordfish but which also landed tuna species. These semi-industrial longline fishing vessels operate inside the EEZ of Mauritius. In 2014, there were seven Mauritius-flagged purse seiners in operation. The catch obtained from licensed foreign purse seiners were mostly distributed between 01°N- 14°S and longitudes 49°E – 69°E. The catch data of the purse seine and longline fishery is monitored through the collection, processing and analysis of fishing data obtained through logbooks from the local and foreign licensed vessels.

This paper provides an overview on the catch data collected on yellowfin, skipjack and bigeye tuna, landed in Mauritius by licensed purse seiners and longliners for the period 2010-2014. All catch data used in this presentation are derived from the logbooks submitted by the licensed vessels,



THE MAURITIUS EEZ

2. Landings from local longliners

The Mauritius longline fleet comprises of vessels less than 24 Metres. In 2014, there were only three semi-industrial vessels less than 24m in length in operation. The fishing positions of the vessels were mainly concentrated between latitudes 15° - 20° S and longitudes 55° - 61° E and figure 1 shows that the vessels operated exclusively in the EEZ of Mauritius .

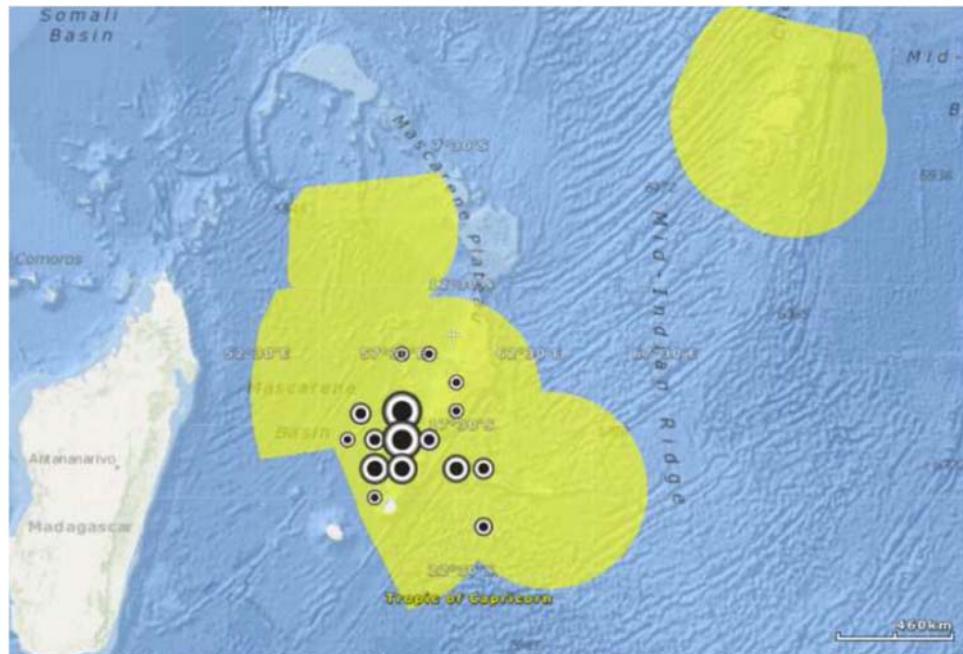
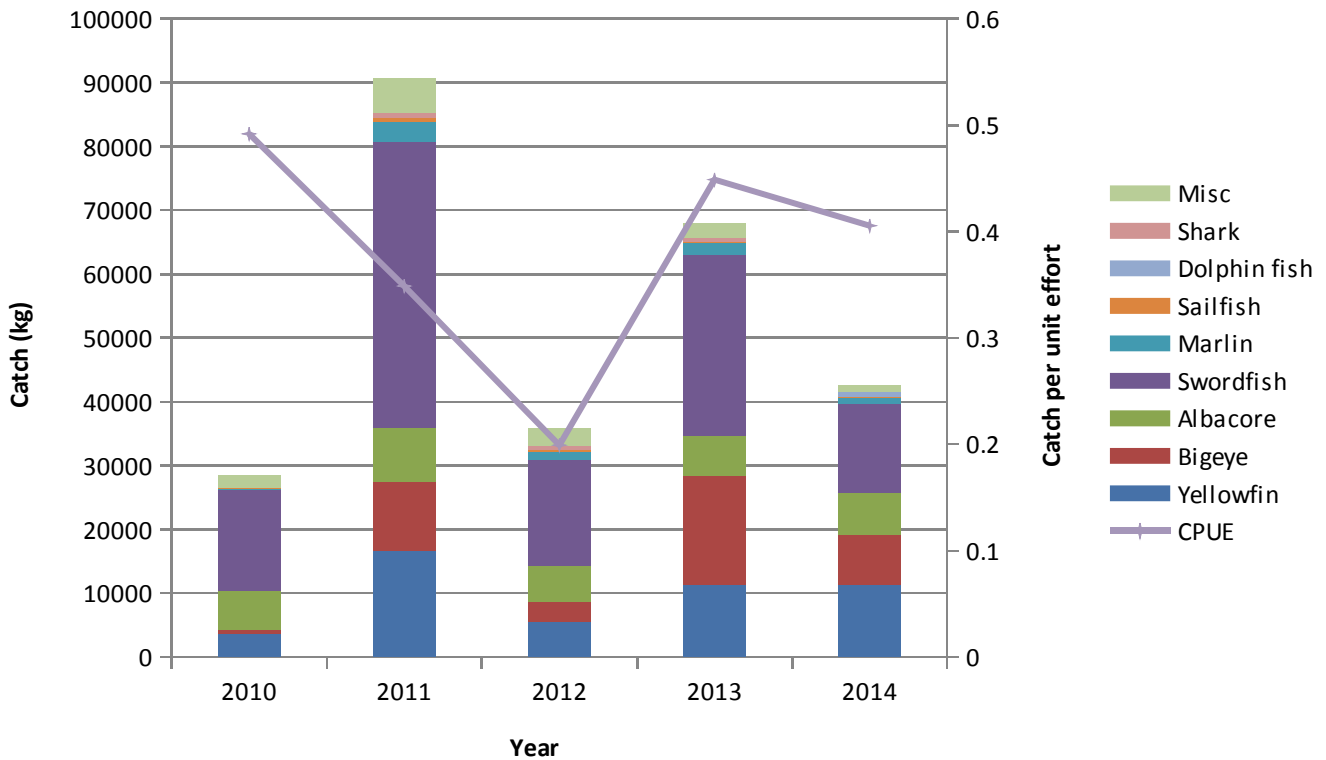


Fig 1: Fishing positions of licensed local longliners (<24m)

These vessels target mainly swordfish but the proportion of the yellowfin and bigeye tunas has seen constant increases rising from 14% of the total catch in 2010 to 45% of the total catch in 2014 (fig 2). In the year 2012, there was a sharp decrease in the in the catch with a low CPUE of 0.19 kg/hook as compared to the other years where the CPUE ranged from 0.34kg/hook to 0.49kg/hook.

Fig 2 Catch composition of the national semi-industrial surface longline fishery from 2010 to 2014



2.1 Seasonal Patterns for local longliners fishing in the Mauritius EEZ

The average monthly catch of local longliners for the last five years is shown in fig. 3. It is observed that there is a peak for both yellow fin and bigeye in the month of May, that is, towards the end of summer. Catch rates are lowest during the winter months of June-July, The catch of bigeye tuna peaks in the month of September whereas yellowfin peaks in the month of December. At the height of winter in June and July, the catch is quite low for both species.

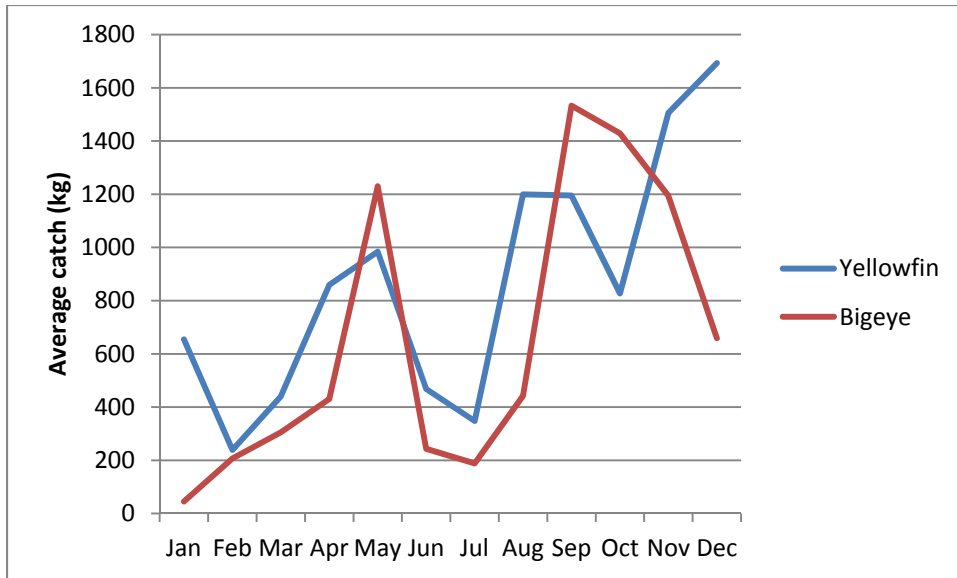


Fig 3 Average monthly catch of yellowfin and bigeye for local longliners

2.2 Length Frequency frequency distribution of yellowfin tuna in the local semi-industrial fishery

570 yellowfin tuna from the local semi-industrial fishery were sampled. The fork length ranged from 76cm to 171cm with most of the fish (77.7%) in the 100-134 cm range (Fig 4) and the weight ranged from 6.4 kg to 71 kg.

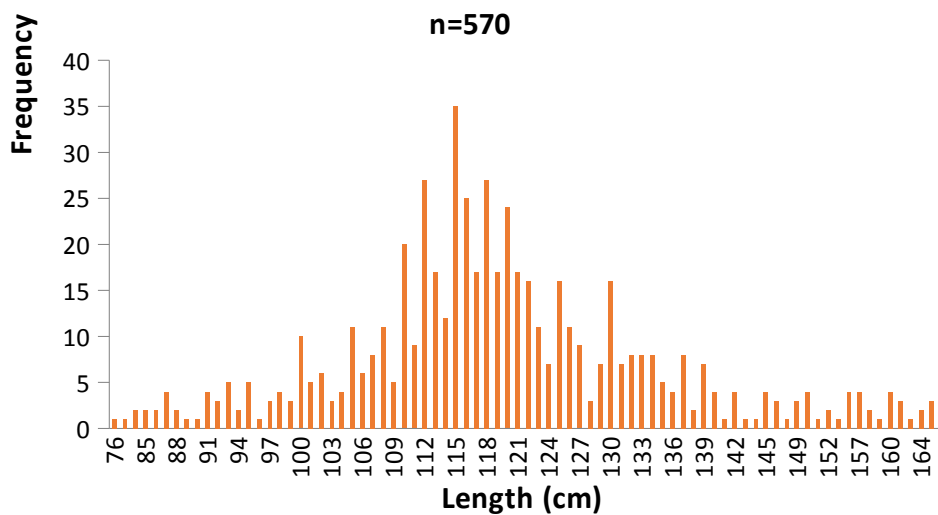


Fig 4. Length frequency distribution of of Yellowfin tuna

2.3 Length Frequency frequency distribution of bigeye tuna in the local semi-industrial fishery

606 fishes were sampled over the last five years. Length frequency distribution of bigeye tuna revealed a distribution range from 81cm to 166cm with a majority (90.7%) of the catch consisting of large size fish measuring more than 100cm fork length (fig 5)

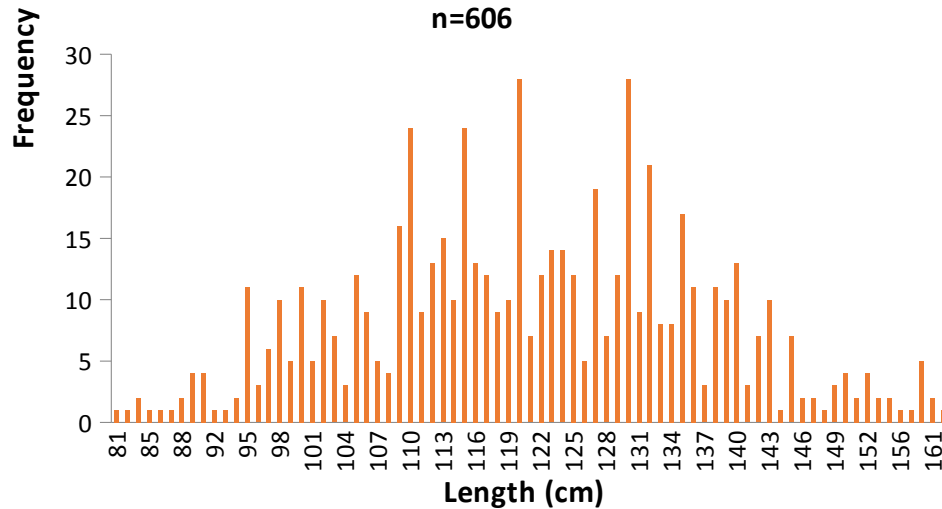


Fig 5. Length frequency distribution of of Bigeye tuna

3. Landings from Foreign licensed longliners

The total catch recorded for the foreign licensed longliners for the year 2014 was 5686t out of which 4944t were caught in the Mauritius EEZ. The dominant species for licensed longliners is the Albacore tuna which makes up the highest proportion of tunas landed in Mauritius.. This is followed yellowfin and bigeye tuna. Figure 6 shows, the landing trend during the last five years. Whilst the percentage of Albacore tunas in the total catch of licenced longliners varied from 42% to 59%, the percentage of combined yellowfin and Bigeye tuna catches varied from 15% to 35%.

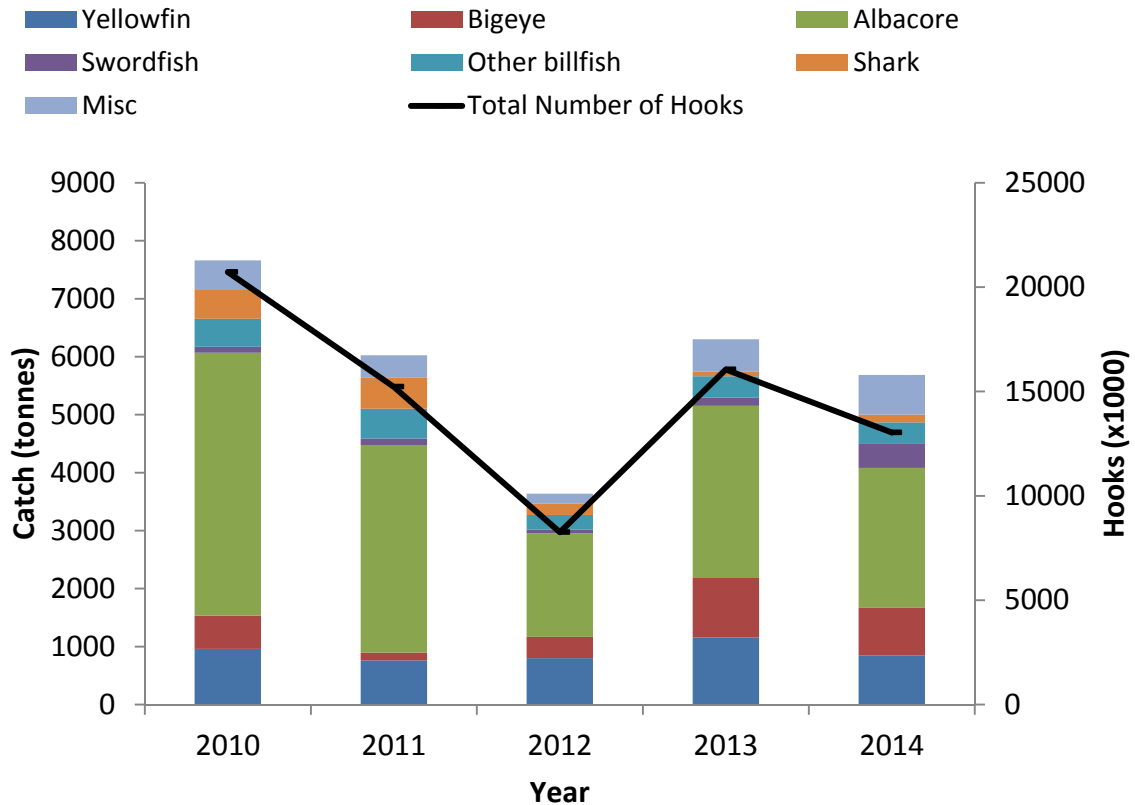


Fig 6. Species composition of Foreign Licensed Longliners

3.1 Seasonal abundance of yellowfin and bigeye tunas as observed from the catch of licensed longliners

Data from logbooks of licensed longliners for the last five years were compiled and the average catch for each month for that period was calculated for each of these two species. For vessels having fished both inside and outside the EEZ, the catch trends for these two species show a similar pattern with a peak in the months of October-November and similar catch rates for the two species throughout the year. (fig 7). It is to be noted that a great majority of foreign longliners do not take up Mauritian licences in the winter months, hence practically no catch is recorded for the winter months.

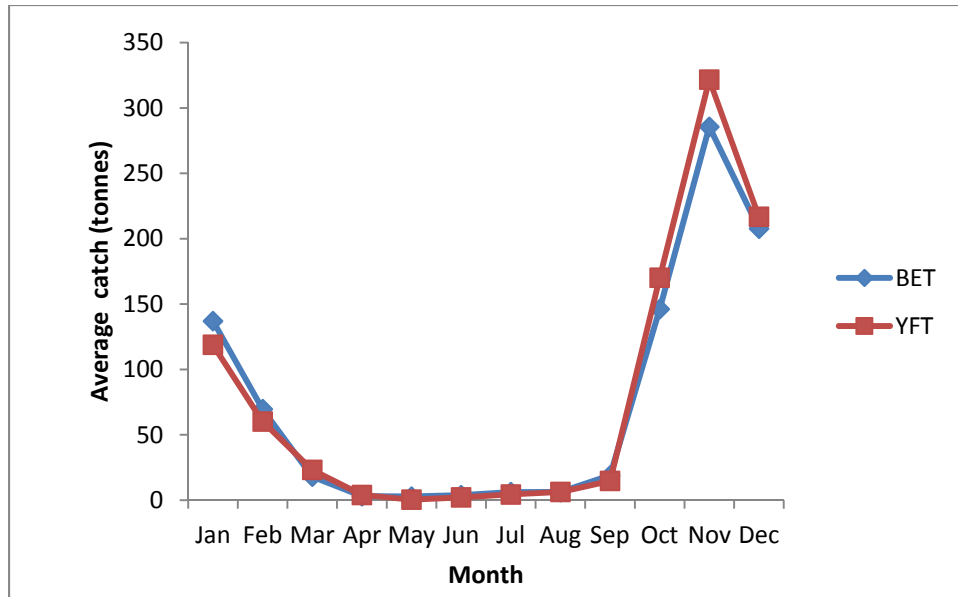


Fig 7. Yellow fin and Bigeye catches by foreign licensed longline fishing vessels

Inside the EEZ of Mauritius also the catch trends shows a peak for the two species in the months of October-November. However, in the Mauritius EEZ, the catch rate for the two species differ with a higher proportion yellowfin caught as compared to bigeye (fig. 8). The foreign longliners operate in the EEZ during the summer months only, hence no catch is recorded for the winter months.

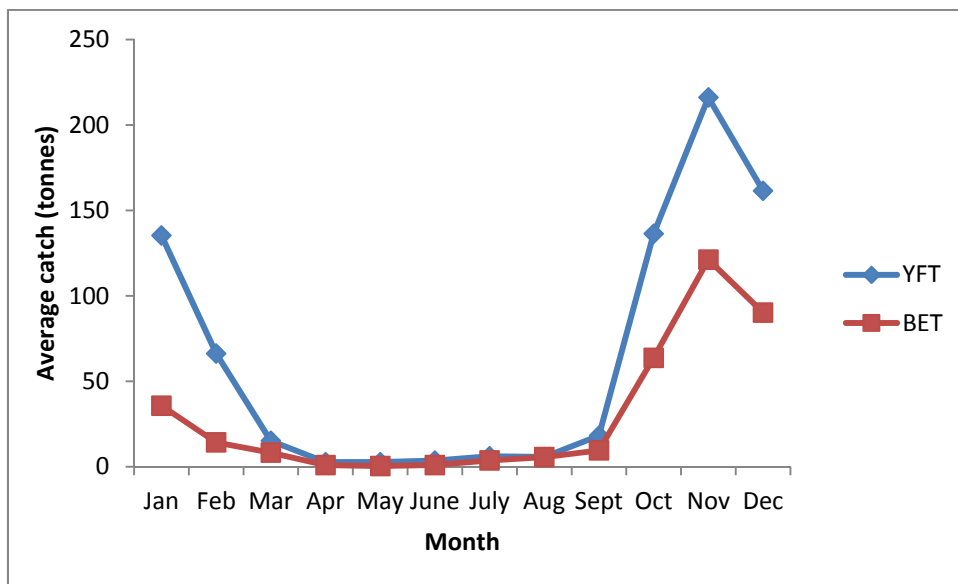


Fig 8. Yellowfin and Bigeye catches by foreign licenced longliners inside the Mauritius EEZ

4. Purse seine fishery

4.1 Catch of Local Purse seiners

Mauritius-flagged vessels have not been operating in the purse seine fishery since the year 2000. However, in October 2013, one Mauritius-flagged purse started operating and in 2014 there were seven Mauritius-flagged purse seiners in operation. The fishing zones of the Mauritian licensed purse seiners were distributed between latitudes 01°N- 14°S and longitudes 49°E - 69°E (Figure 9).

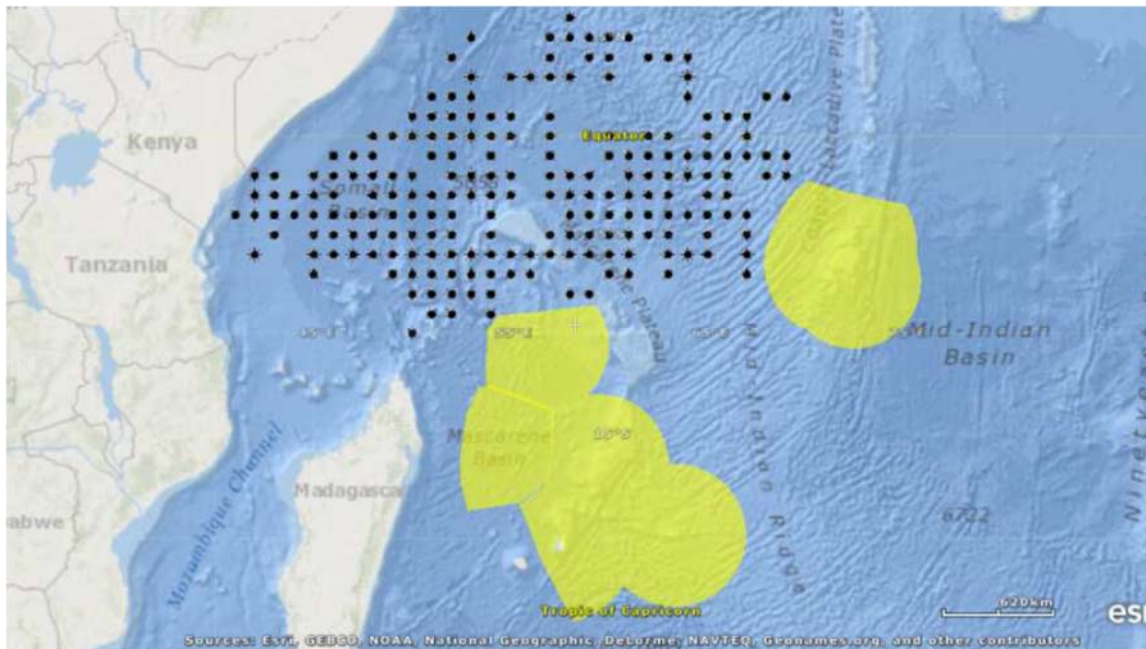


Figure 9: Fishing positions of licensed local purse seiners for the year 2014

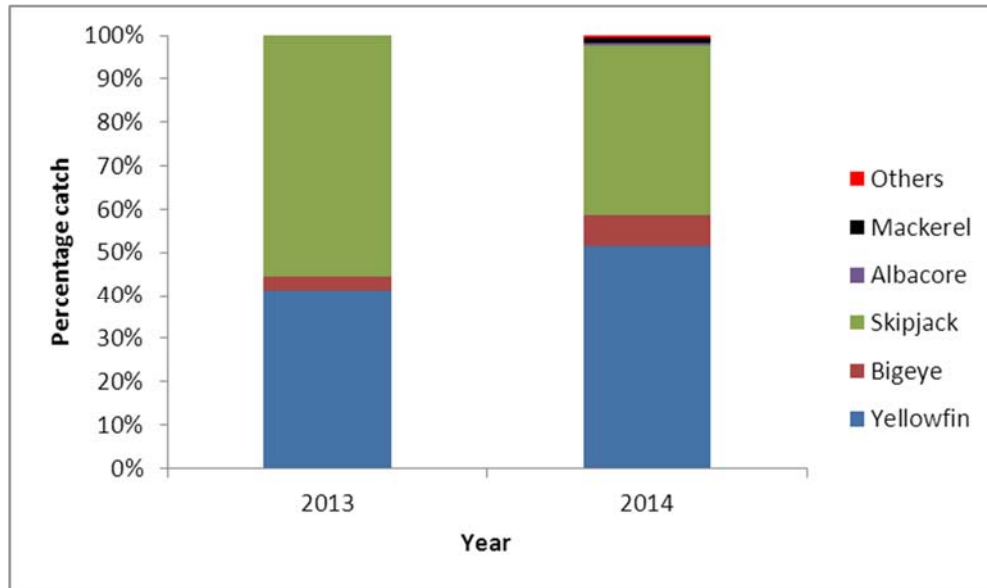


Fig 10. Catch composition of the Mauritius-flagged purse seiners

For the year 2013 when only one local purse seiner was active for only part of the year as from October, there was a greater proportion of skipjack tuna (51%) followed by Yellowfin tuna (41%) and Bigeye tuna (3%). However in the year 2014, seven purse seiners were operational and the catch composition showed that yellowfin was the dominant species making up the majority of the catch. The percentage of yellowfin was caught (51.7%), followed by Skipjack (39%), Bigeye (7%). The other species caught included Mackerel scads (*Decapterus spp*) 1.2%, Albacore (0.58%) and others (Marlins, Sailfish, etc 0.61%).

4.2 Catch composition of foreign licensed purse seiners

From the year 2010 to 2014, the catch composition of licensed foreign purse seiners showed a gradual increase in the catch of yellowfin tuna from 40% of the catch in 2010 to 56% in 2014. There was a corresponding decrease in the catch of skipjack tuna from 51% in 2010 to 31% in 2012 and a slight rise in 2014 to 34% of the catch. The percentage of Bigeye tuna varied between 5 to 10% of the total catch over the five years. The amount of the other species such as albacore remains insignificant. The increasing trend in the catch of yellowfin tuna may be attributed to both large yellowfin obtained from free school and small yellowfin from log school fishing. It has been observed during sampling exercises that the majority of small tuna that were unloaded by the vessels in 2014 constituted a large proportion of yellowfin tuna as compared to 2010 where the majority of small tuna was skipjack tuna.

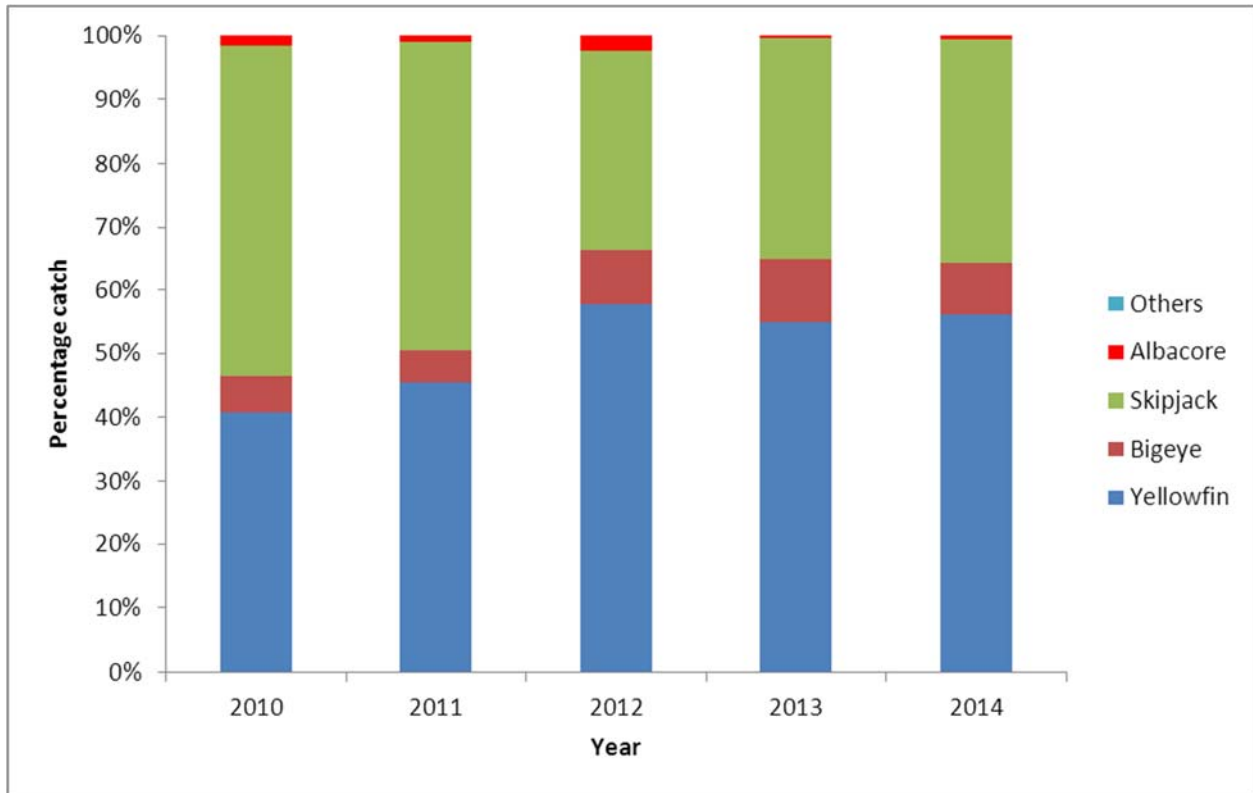


Fig 11. Catch composition of foreign-flagged purse seiners

4.3 Total catch and CPUE of local purse seiners

The total catch of the one purse seiner that operated in 2013 was 855 tonnes. The CPUE for the local purse seiner which operated only on FADs in 2013 was 16t/set. However, in the year 2014, there were seven local purse seine vessels in operation. Fishing was carried out both on FADs and on free schools. The total catch for the year 2014 was 7784.2 tonnes out of which there were 4025t of Yellowfin tuna, 3032t of Skipjack tuna and 540t of Bigeye tuna. The CPUE was 28t/set. (fig 12.)

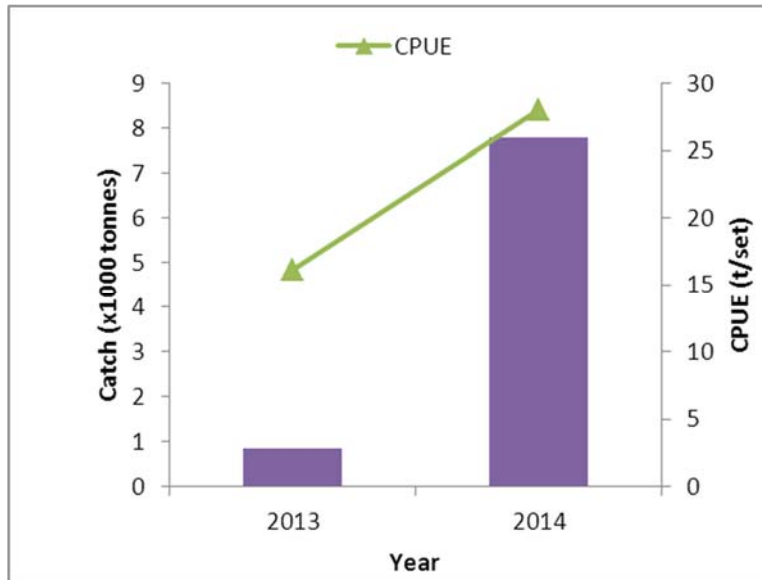


Fig 12. Total catch and CPUE of local purse seiners

4.4 Total catch and CPUE of foreign licensed purse seiners

The catch recorded as per logbooks received for the last five years from licensed foreign purse seiners varied from 10,979t in 2010 to 20,661t in 2014. The CPUE for the foreign licensed purse seiners over the last five years varied from a peak of 29 t/set in 2010 to a low of 19t/set in 2013 and to 24t/set in 2014 (fig13).

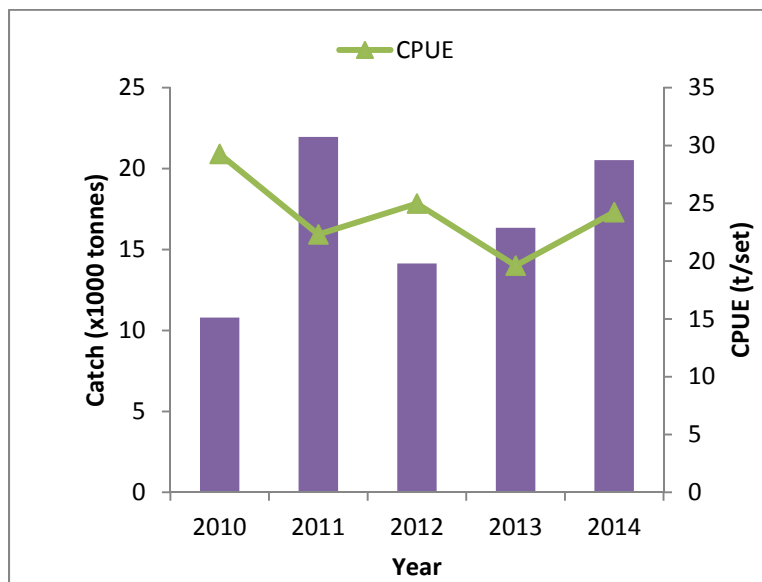


Fig 13 Total catch and CPUE for licensed foreign purse seiners

4.5 Catch rates on log and free school for local purse seiners

For the year 2013 when fishing was on log associated school only, the catch rate was 16t/set whereas in 2014 when fishing was both on log associated and free schools, the catch rate for log associated school was 19t/set and on free schools it was 27t/set. (fig.14)

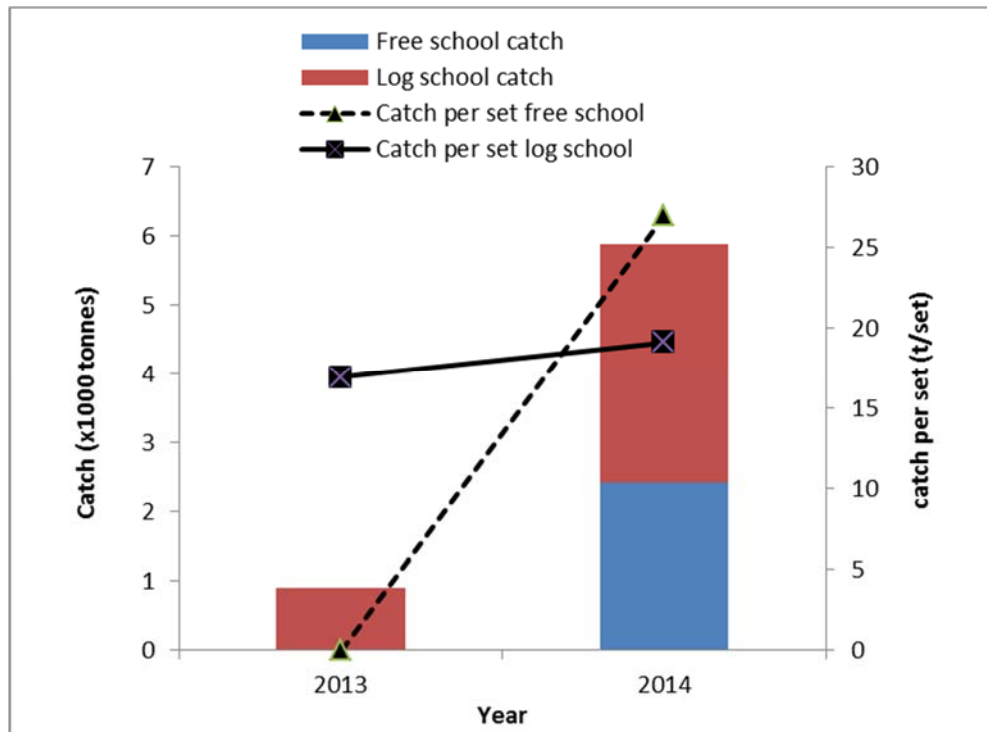


Fig 14. Catch rates on log associated and free schools for the local purse seiners

4.6 Catch rates on log and free school for foreign licensed purse seiners

For foreign licensed purse seiners there is a downward trend for the catch rate on log school with a catch rate of 32t/set in 2010 to 20t/set in 2014. On the other hand, there is an increase in the catch per set on free school from 17t/set in 2011 to 26t/set in 2014 (fig 15). This could be attributed to the larger size of tuna obtained on free school.

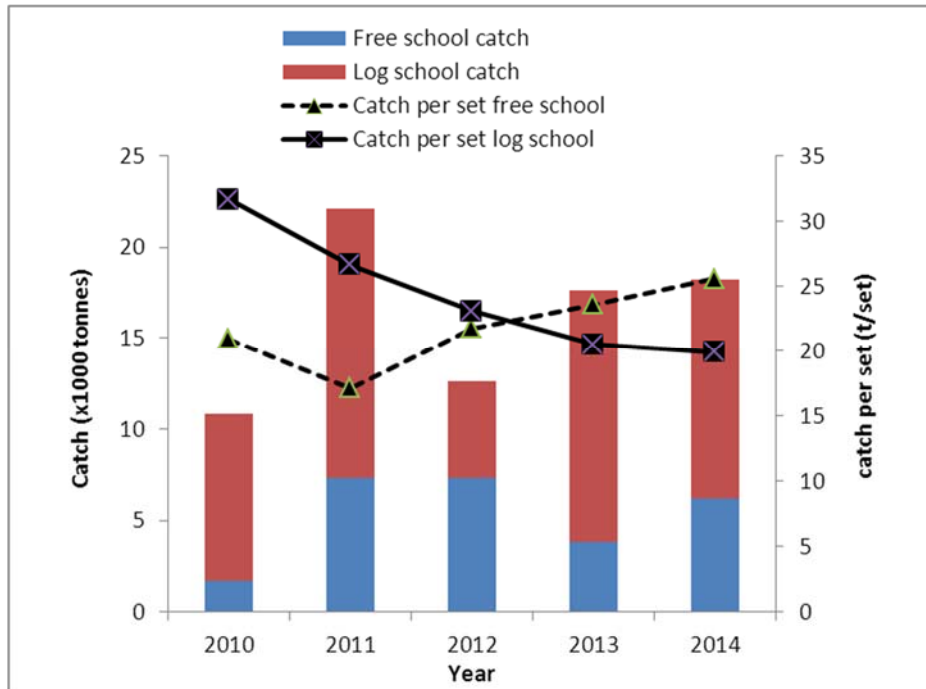


Fig 15. Catch rates on log associated and free schools for foreign licensed purse seiners

4.7 Percentage of Positive and Negative sets by local purse seiners

For the local purse seiners the percentage of positive sets for both years are almost similar with 83% in 2013 and 81% in 2014. Similarly, the amount of negative sets for the two years are almost the same with 17% in 2013 and 19% in 2014 (fig 16)

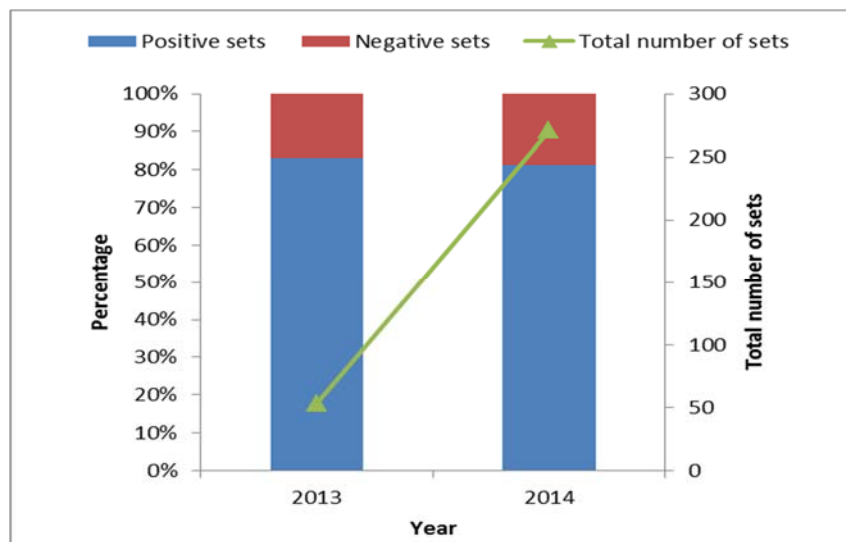


Fig 16. Percentage of Positive and Negative sets by local purse seiners

4.8 Percentage of Positive and Negative sets by foreign licensed purse seiners

For the foreign licensed purse seiners, the percentage of positive and negative sets varied over the years with the highest percentage of positive sets in 2010 (85%) and the highest percentage of negative sets in 2014 (33%).

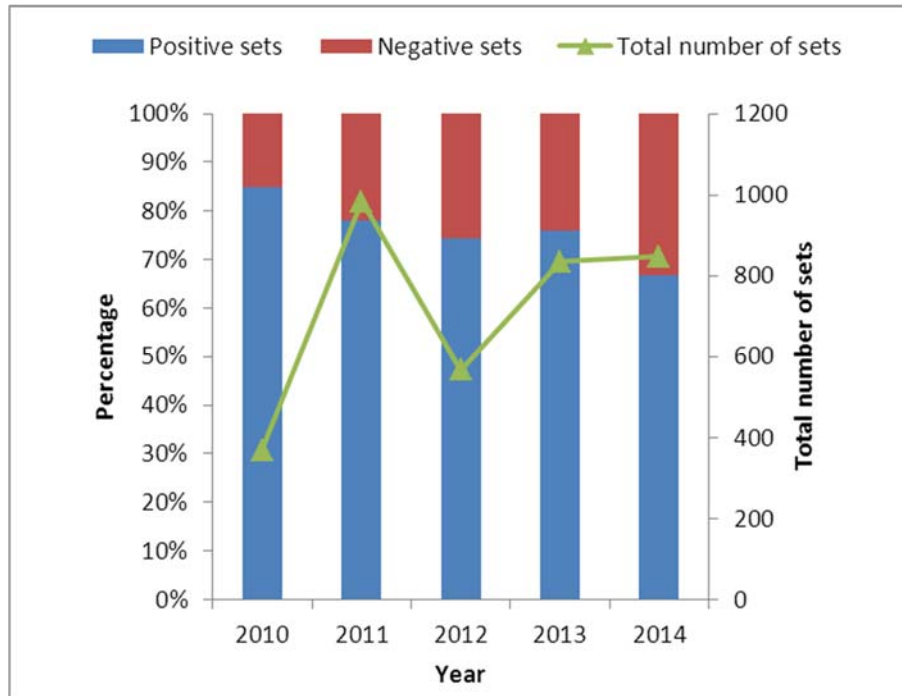


Fig 17. Percentage of Positive and Negative sets by foreign licensed purse seiners

4.9 Percentage catch per school type and corresponding number of successful sets for local purse seiners

For the local purse seiners, in 2013 fishing was only on log schools involving 44 successful sets. The catch of tropical tunas on log schools predominated throughout year 2014 as well with 59 % of the catch recorded compared to 41% of the catch from the free school. This higher catch rate may be explained by the larger number of successful sets made on the log school (204) in contrast to only 60 sets made on the free school.

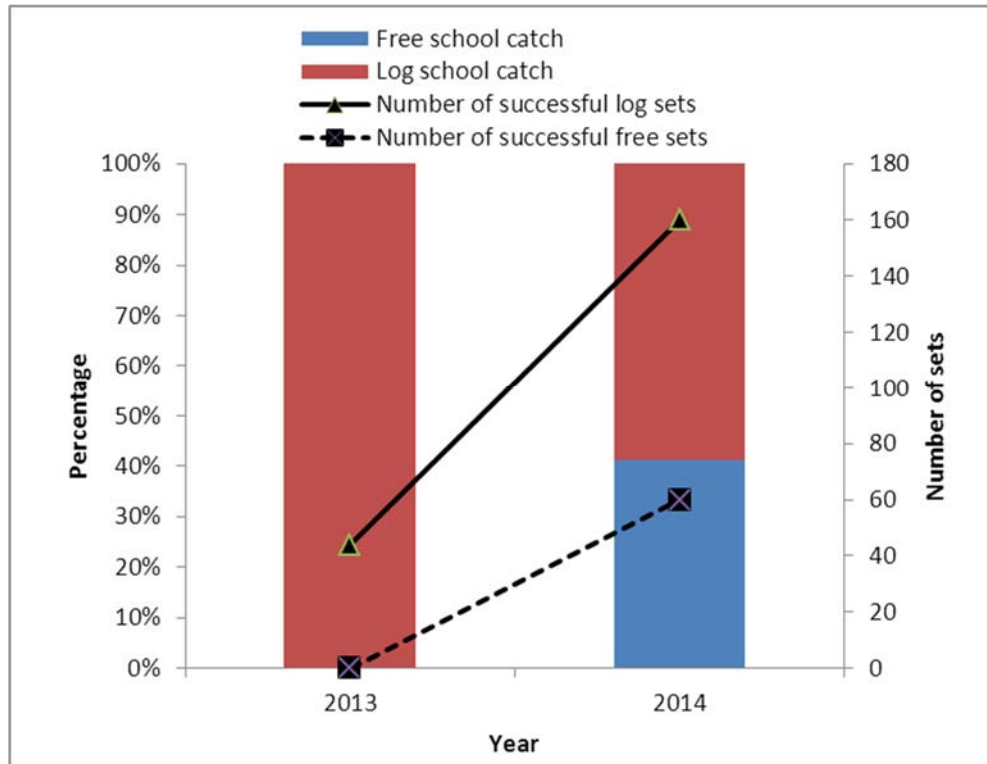


Fig 18. Percentage catch per school type and number of successful sets for local purse seiners

4.10 Percentage catch per school type and corresponding number of successful sets for foreign licensed purse seiners

Foreign purse seiners recorded a higher catch rate on log school than on free school; except for the year 2012 whereby a relatively higher tonnage was caught on the free school; this may be due to the fact that more sets were aimed on the free school (338) compared to the log school (228) for that particular year.

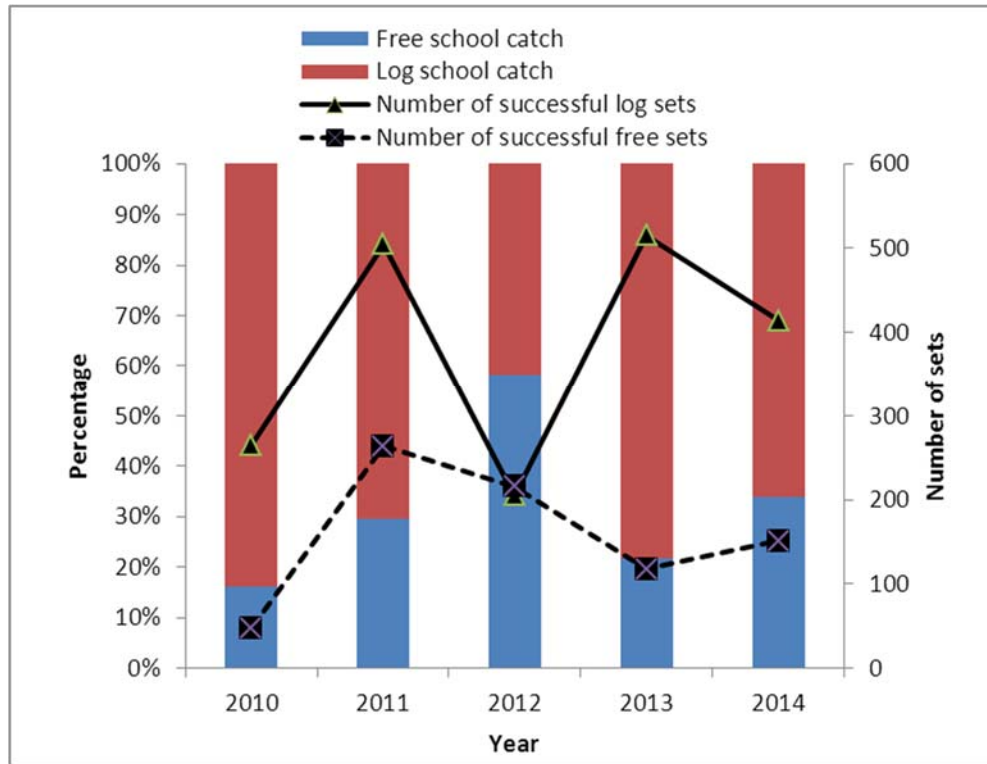


Fig 19. Percentage catch per school type and number of successful sets for foreign purse seiners

4.11 Percentage catch on natural and artificial logs for local purse seiners

In 2013, when all catches were made on logs, 90% of the catch was made on artificial logs (FADs) whereas in 2014, 78 % of the catches were made on artificial FADs and the remaining 22% of the catch were made on natural logs.

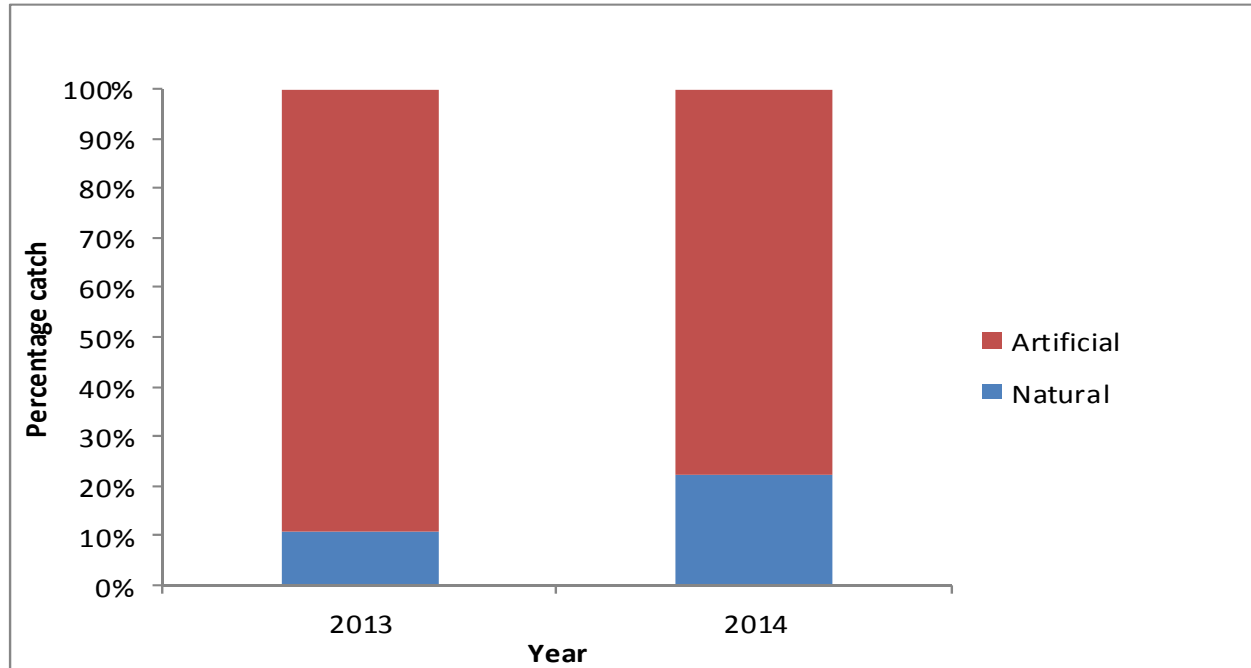


Fig 20: Percentage catch on natural and artificial logs by the local purse seiners

4.12 Percentage catch on natural and artificial logs for foreign licensed purse seiners

The catch distribution between natural logs and artificial logs has remained fairly constant for the years 2010, 2011 and 2014, with major part of the catch (75%) being obtained on artificial logs. Year 2012 and 2013 show similar trend in the type of log school associated fishing with around 65% of the catch obtained exclusively from artificial FADS. Figure 21 indicates that the catch of the purse seiners were mostly obtained on artificial logs and possibly indicating that either the fishing effort was mostly geared towards FADS or the fishing operations were carried out in zones consisting of an abundant amount of artificial logs. An analysis of the fishing positions showed that most of the purses seiners under review operated in zones between latitude 2°N and 8°S and since artificial logs are more abundant in the northern part (north of 7°S) of the Indian Ocean (Thomas et al, 2009), it can be assumed that fishing operations were carried out in zones consisting of an abundant amount of artificial logs.

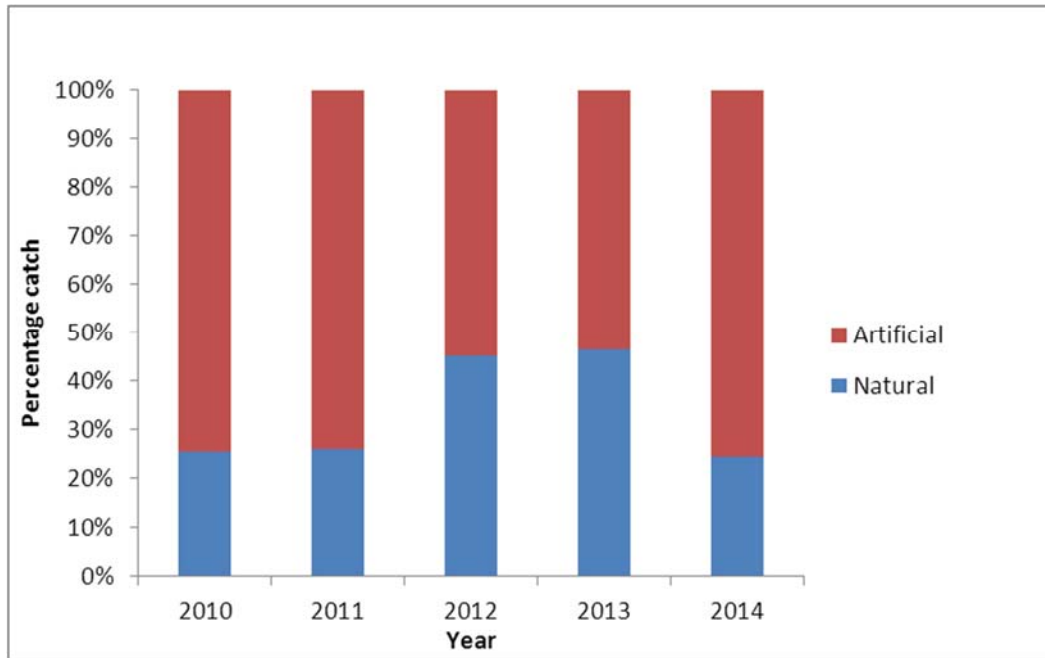


Fig 21. Percentage catch on natural and artificial logs by licensed foreign purse seiners

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