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Review of Yellowfin Tuna Fisheries in the Maldives

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Summary

Catches of yellowfin tuna (*Thunnus albacares*) in the Maldives used to be essentially from pole-and-line gear. Juveniles (<60 cm FL) are caught in mixed and conspecific schools, which represent about 15-20% of the pole-and-line component along with skipjack (*Katsuwonus pelamis*). Trolling and handline methods used to catch small numbers of surface-dwelling large yellowfin (> 80 cm FL) prior to late 1990s. A specific fishery targeting large yellowfin started in late 1990s growing rapidly into what is referred to as a "handline large yellowfin" fishery. The fishery is geared toward the lucrative fresh fish export market. Pole-and-line fishers operating in the north and central regions of the Maldives can switch to handline fishing opportunistically. Total catch and catch rates of yellowfin tuna have shown an increase in the recent years. Total catches of yellowfin in the Maldives stood around 45,000 – 50,000 MT during last three years (2012-2014), of which about 60% were from handline and the remaining from pole-and-line. Catches from longline (LL) and trolling (TR) are insignificant. The dominant sizes caught on pole-and-line are around 40-50 cm FL while in the handline fishery the dominant size is 120-150 cm FL. Catch data is considered to be reliable, but for the last 2-3 years although there are issues in separating pole-and-line and handline effort for trips where both gears are used. Aside from the size sampling, there is little biological sampling being conducted, although Maldives have been supporting the regional and ocean-wide studies of yellowfin that aims to understand population structure.

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Introduction

Yellowfin tuna (*Thunnus albacares*) is the second most important species caught in the Maldivian tuna fishery. Yellowfin used to be fished mainly from skipjack targeted livebait pole-and-line method, although small amounts are also caught by troll gear. Those catches are comprised of essentially all juveniles (<80 cm FL) caught in mixed schools (typically mostly skipjack tuna) or from conspecific schools.

Yellowfin tuna are exclusively targeted in the handline fishery that started in the late 1990s. The fishery targets surface-dwelling larger individuals (> 80-100 cm FL), primarily from dolphin-associated schools. Adam and Jauharee (2009) provided a description of the handline large yellowfin fishery and some analysis of its data collected by fishermen-field officers. The fishery continues to grow largely due to high demand by the exporters. Large yellowfin tuna are exported in various fresh forms to the lucrative markets of Europe and elsewhere.

Total recorded yellowfin catches registered an all-time record of approximately 50,000 MT in 2014, which represent about 40% of the total recorded tuna landings –some 60% of this catch is from the handline fishery only.

The objective of paper is to review fisheries targeting yellowfin tuna in the Maldives, including catch and effort trends and size distribution in different fisheries with notes on biology and movement around the Maldives.

Data and Methods

Catch and effort data are collected and compiled by Fisheries Division of the Ministry of Fisheries and Agriculture (MOFA). The data reported to MOFA are verified along with other sources of data in compiling national fishery statistics.

Maldives used to have a traditional system of data capture where catch and effort data were enumerated for the entire fishery. This was practical and possible in the earlier days since catches were small and vessels conduct single day trips returning to homeport daily. This method produced reliable and efficient means of collecting fisheries data for the traditional method of tuna landings in the Maldives (Anderson et al. 2003). However, as the fishery developed and with opportunities for disposing of catch at commercial collection facilities or collector vessels, the system became increasingly unreliable (Adam 2012).

Data collection process underwent a major change from 2010 following a switch from fishermen reporting through island and council offices to fishermen reporting directly to the Ministry via fishery logbooks. A considerable period of phasing out the traditional reporting method was necessary to maintain continuity of reporting. It was also a challenging period for the island communities following introduction to decentralized governance of the outer atolls in 2010. To this day, both systems of data reporting are maintained although data coming from the council / island offices are now negligible. Logbooks were revised in 2012. The current logbooks follow the IOTC Resolution on minimum data recordings of catch and effort.

In addition to logbook data, MOFA also receives commercial fish purchase data from processing facilities that are considered to be more reliable and reported on a timely basis. Export data from Maldives Customs are also acquired by MOFA and may be used to verify the fishermen reported catch data.

Size data used to be collected from Malé Fish Market by Marine Research Centre (MRC) staff. Fishermen-field officers taking part in regular fishing trips also record size data at-sea. More recently, port-samplers have been employed in key landings sites; Felivaru Tuna Processing Plant in the north, Maandhoo Fisheries Complex and Kooddoo Fisheries Complex in the south, and in major landing sites of large yellowfin tuna from the handline fishery.

Detailed fishery observer data were also available for 2014-2015.

Fisheries for Yellowfin tuna

For the purposes of stock assessment, Indian Ocean Tuna Commission (IOTC) treats yellowfin tuna as a unit stock and so the Maldives fishery is considered as a component of the Indian Ocean stock. Results of tag and release recoveries show movements and exchanges are extensive covering the entire range of the Indian Ocean fishery (IOTC-SC, 2014).

Two major types of fisheries target yellowfin in the Maldives: livebait pole-and-line and handline methods. Details for these methods are treated under separate headings. Yellowfin are also caught regularly, but in smaller quantities, by longlining and trolling. In the past, prior to the introduction of the targeted handline yellowfin fishery, yellowfin were also caught in small quantities by handline. These methods generally catch large sized yellowfin (>70-80 cm FL).

The longline fishing operations prior to the 2011 were foreign-flagged vessels operating in the Maldives EEZ under joint-venture licenses. In the early 1990s, around 20 vessels operated (Anderson et al. 2006), but during its peak around 2000 some 35-40 small longline vessels operated catching around 3,000 – 3,500 MT a year. These vessels targeted mainly bigeye (*Thunnus obesus*) and yellowfin tuna (Table 2). Records of these data are not compiled in detail or are not available.

A Maldivian-owned longline fishery is now in place that started operation in late 2011. The fishery currently catches around 200 MT of yellowfin tuna per year along with its main target of bigeye tuna (Table 2).

Small amounts of yellowfin are also caught from troll gear, which in recent years amounted to around 500 MT per year (Table 2, Figure 2). In the past, the troll fishery was an important component that operated in coastal areas and within the atolls. Those catches of tuna are targeted for local consumption. The decline in troll catch in the recent years appears to be a combined effect of under-reporting and general decline in importance of the troll fishery (Ahusan and Adam 2015).

Table 1: Catches of IOTC species of tuna in the Maldives and percent contribution of YFT. Separate data for BET is not available for the years 2004-2012. Source: MoFA – Fisheries Division.

Year	SKJ	YFT	BET	KAW	FRG	%YFT
2004	109,757	24,401	?	2,290	3,640	17.42
2005	131,998	24,553	?	2,703	5,056	14.94
2006	138,458	22,885	?	1,674	3,532	13.74
2007	97,342	24,349	?	2,791	3,810	18.98
2008	87,072	23,711	?	2,075	4,056	20.28
2009	66,189	20,615	?	3,042	5,201	21.69
2010	73,721	21,835	?	3,208	3,125	21.43
2011	57,672	35,575	?	2,422	1,696	36.54
2012	53,392	44,977	?	1,485	820	44.68
2013	74,422	45,626	1,520	1,005	566	37.05
2014	68,522	49,091	2,334	889	651	40.41

Table 2: Catches of yellowfin (In MT) by gear type: PL = pole-and-line, HL = handline, LL = longline, and TR = trolling. Source: MoFA – Fisheries Division

Year	PL	HL	LL	TR	Total
2004	15,423	349	2,541	6,088	24,401
2005	16,036	3,688	3,055	1,743	24,553
2006	13,586	5,336	3,121	840	22,885
2007	14,193	6,515	2,920	722	24,349
2008	16,766	4,785	1,177	983	23,711
2009	12,279	3,570	1,090	676	20,615
2010	11,679	9,003	0	1,153	21,835
2011	9,650	24,518	1	1,406	32,575
2012	10,896	32,969	113	999	44,977
2013	18,878	26,085	239	387	45,626
2014	18,481	30,246	183	181	49,091

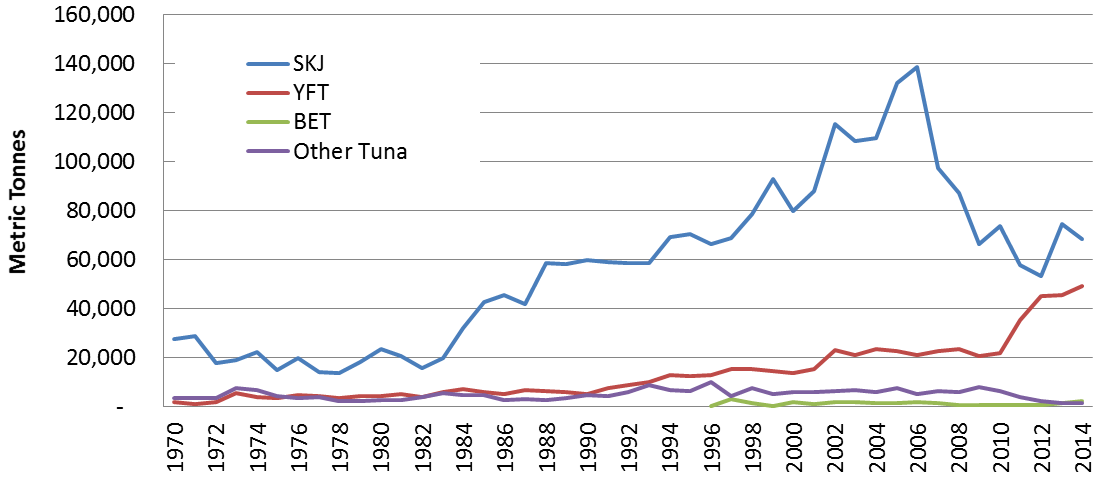

Figure 1: Catch by species – 1970-2014. Source: MoFA – Fisheries Division

The total recorded catches of yellowfin tuna are currently around 50,000 MT a year (Figure 1 and Figure 2), which amounts to about 40% of the total tuna landings in the Maldives (Table 1). Catches from pole-and-line and handline methods dominate yellowfin tuna catch in the Maldives (Figure 2).

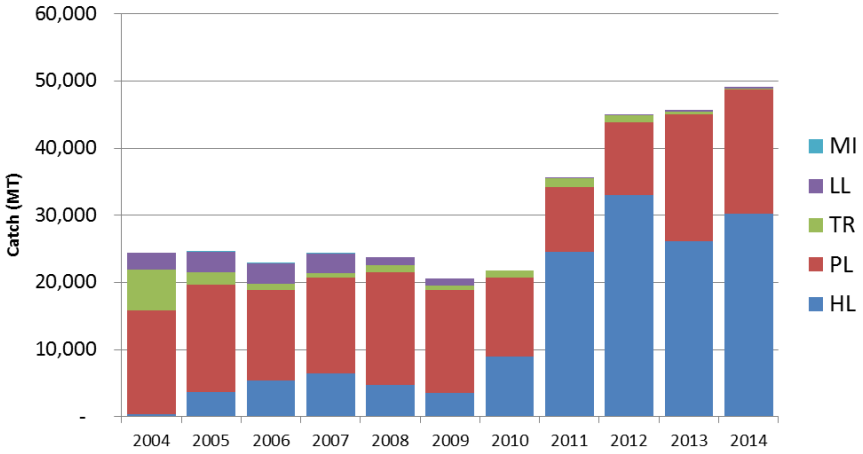

Figure 2: Catch of Yellowfin tuna by gear; 2004-2014, MI Miscellaneous, LL Longline, TR Trolling, PL Pole-and-line, HL Handline: Source: MoFA – Fisheries Division

Pole-and-line Fishery

Pole-and-line is still the most important method for catching yellowfin, which are caught in mixed schools along with skipjack. Yellowfin caught from pole-and-line are typically juveniles, with lengths of 30-60 cm FL. Small amounts of juvenile bigeye of the same sizes are also caught. Juvenile yellowfin and bigeye tuna can be difficult to identify and so in the past the bigeye tuna component have been reported mixed with yellowfin (Adam et al. 2014)

The composition of the yellowfin in the pole-and-line fishery have remained around 10-20% showing a slight increase in proportion in the recent years.

Most of the pole-and-line catch are landed at fish landing ports operated by companies. There are two companies – MIFCO and Horizon Fisheries – buying most of the pole-and-line catch landed in the Maldives, in which skipjack and juvenile yellowfin are sold together, but separated for processing. In addition small processors who are engaged in making dried tuna operating on several local islands also buy tuna, especially the tuna that is too small to be sold to the big companies. Male' fish market is another important landing site for the pole-and-line catch.

Larger yellowfin tunas may be opportunistically caught within the pole-and-line fishery by modifications of gear. Fishermen frequently work together to bring in large tuna by pole-and-line either by using two fishermen per pole or by attaching two poles together with a single line to allow four fishermen to land large fish.

Handline fishery

Small amount of large yellowfin were caught using handline fishing method. The fishery grew into a full-fledge targeted fishery in the late 1990s, thanks to the growing demand for export of fresh yellowfin to overseas markets. The fishery took off in the early 2000s by investments in the EU-standard packaging facilities near Malé.

Handlining does not require much change from traditional pole-and-line vessels or additional gear. The only distinct feature of the handline yellowfin vessel is the large ice-boxes (in pairs of 2, 4 or 6) kept on the deck rear of the vessel. Although a large section of the landing platform on the back deck is occupied with the ice-boxes, pole-and-line fishing can be done on these boats as well. They simply switch the mode of fishing only by switching the gear.

Adam and Jauharee (2009) provided a description of the fishery and some analysis of the field officer reported catches and size distributions. Similar to the pole-and-line method, the handline tuna fishing operation also starts with livebait fishing. Unlike pole-and-line bait, handline fishers use larger size bait such as scads. Bait fishing takes place within the atolls and once enough bait is stored in the boat the active search for yellowfin tuna begins. Fishers look for dolphins and large yellowfin tuna associated with the dolphin schools. According to Adam and Jauharee (2009) some 90% of the large yellowfin tuna schools are first sighted with help of dolphins. Also unlike pole-and-line, handlining is not permitted around anchored fish aggregating devices (FADs) so catches must come from free schools or drifting objects.

Fishing trips typically last 10-15 days and fish are stored on large ice boxes (1-2 MT capacity) kept on the deck at the stern of the vessel. The catch is disposed directly to fish processor or exporters at the landing sites. The fishing method is extremely selective and so there is virtually no bycatch.

Catch Trends

Yellowfin has been a minor species in overall tuna catch until 2000. However, with the development and rapid expansion of the targeted handline fishery since the late 1990s, reported catches gradually increased. Reported catches remained around 20,000 – 22,000 MT per year until 2010, following which catches increased quite rapidly to nearly 50,000 MT in 2014. This amount to over 40% of the IOTC tuna species landed in the Maldives.

Increases in recent years are directly related to the increase demand for large yellowfin tuna by the exporters and/or buyers. For instance, ex-vessel value of the large yellowfin increased from just under MVR 20.00[3] in January 2000- to over an average value of MVR 130 by middle of the May 2013 (unpublished data, MSPEA[4]) – over fivefold increase in three years. The current prices remain high, around the upper limit of this range.

[3] MVR – Maldivian Rufiyaa, 1 US$ = 15.42 MVR. The exchange rate of the US$ remained at same rate during the period.

[4] Maldives Seafood Processors and Exporters Association (MSPEA), also the client for MSC Certification of Maldivian tuna fishery

In the recent years, an increasing number of pole-and-line vessels are using handline gear on pole-and-line fishing trips, although the exact numbers are currently unknown. The best approximation is around 10% of the vessels use multi-gear during a single trip. This trend is especially common in the northern and central Maldives.

While skipjack catches have varied substantially, yellowfin tuna landings have shown consistent increases (Figure 3). The pole-and-line yellowfin catches remained around 10-20,000 MT during 2004-2014 but the handline catches soared from 5,000 to 35,000 MT during the last 3 years (Figure 4). In contrast, pole-and-line effort (days fished) shows a sharp declining trend while the handline effort hovered around 40,000 trips per year over the entire period (Figure 4).

Figure 3: Catch and effort trends of Pole-and-line (left panel) and Handline fisheries (right panel) in the Maldives from 2004-2014; Date source: MoFA – Fisheries Division

It is difficult to explain the large drop in pole-and-line effort while catch is maintained about the same level or increased. Increase in fishing efficiency or catchability may explain effort maintaining catch rates while declining fishing effort. This explanation may be supported by the general increase in vessel size and range and use of FADs.

The handline fishing effort was maintained around 30,000 – 40,000 trips a year and yet catch has increased 5-6 fold over the period (Figure 3). One possible reason for this discrepancy might be the way the effort is recorded. Handline vessels undertake trips lasting 10-15 days. Assuming the way fishing effort is recorded in the Maldives, fishermen should report the actual days out at sea and the total weight (or numbers) caught on the trip. Instead of recording number of days some captains might record the number of trips as unit of effort. Given the way logbooks are designed it is unlikely spurious reporting went undetected from 2011/2012.

It is interesting to note with this rapid decline in pole-and-line effort the catches of skipjack has also declined (cf. **Error! Reference source not found.**). A concomitant reduction in yellowfin catch by pole-and-line has not been seen. However skipjack and yellowfin catches have both increased for the last two years (Figure 3).

Catch Per Unit Effort (CPUE) Trends

Unstandardized catch rate (or catch per unit of effort – CPUE) for pole-and-line and handline fishery show variable increases (Figure 4). Over the period 2004-2009 catch rates for both fisheries remained flat and more or less the same. However, catch rates shows a large increase from 2009. The increase is more dramatic for the handline fishery.

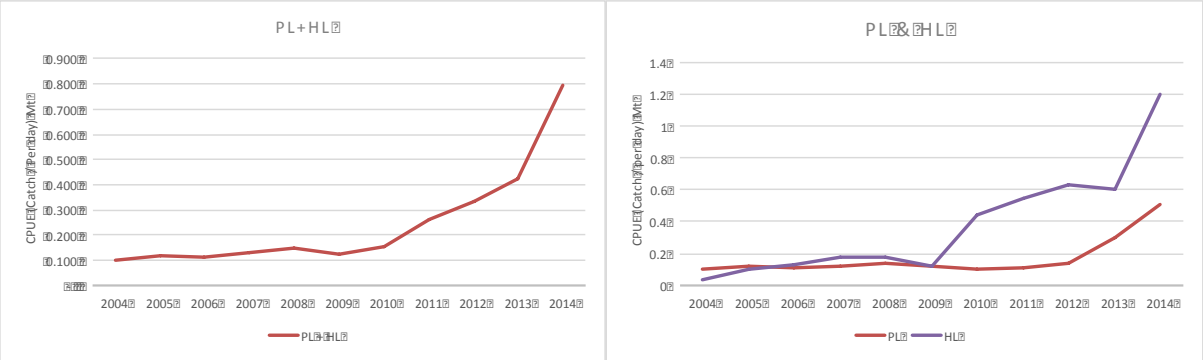

Figure 4: Catch rate as defined by days fished for Pole-and-line plus handline fishing (left panel) and pole-and-line and handline fishing (separately), Data: MoFA – Fisheries Division

Assuming data are accurate and that catch and effort data were recorded consistently in a standard way, these observed trends could be caused by either increased efficiency or increased catchability of yellowfin during the period.

While the methods of data reporting are much more appropriate for current landing practices, there are some areas to improve to ensure accurate data. Some of the areas for potential errors in the data are:

1. Vessel specific data collection started in 2004 (Adam 2012). For historical reasons Monthly Summary Form for vessel fishing activities are filled by vessel type[5], not by gear type. In cases where a vessel uses more than one type of gear (for instance PL and HL) in any given month there was no way of segregating the catch by gear on the form. Most often the gear type recorded during data compilation depends on a judgment made by the catch figures provided on the form. For example if large number of skipjack are present it will naturally be assumed pole-and-line gear.
2. A separate form specifically to record handline large yellowfin tuna catches was introduced in early 2000 (Anderson et al. 2003 – Appendix III, Form 4). However, only a few forms were returned to the MOFA. Combined with this, the difficulty of compiling the new data structure into the existing database makes it likely that the handline effort and catches were under-represented for the earlier years.
3. For pole-and-line vessels that also conduct handline fishing during a single month, it is currently very difficult to distinguish the fishing activities for the month. Catches

[5] Maldives pole-and-line fishery has long history spanning nearly 1000 years. Two distinct types of vessel fish for tuna; mas dhoni, literally “fish vessel” in Divehi, and vadhudhoni, literally “troll vessel”. Masdhonis are uniform in shape and size and the only type of fishing they did was pole-and-line. Similarly vadhudhoni did only troll. With mechanized the words ‘mechanized” and “sail” were pre-fixed to the vessel name and maintained that way ever since.

may be attributed to a single gear or not well segregated by gear type. It is likely that the tendency is to attribute the catch to pole-and-line, and therefore handline catch / effort would be under-represented.

The above issues are further compounded from around 2009 to until logbooks were introduced and until fishermen became familiar to reporting on logbooks. For these reasons it is likely that catch and effort of handline large yellowfin tuna would be under-represented in the earlier years. When the fuel were subsidized during 2010-2012, MOFA made it mandatory to complete and return logbooks to qualify for the fuel subsidy. This facilitated the fishermen getting accustomed to completing logbooks.

Although fishing techniques and method of location has remained the same, fishermen are becoming more experienced. Fishermen also work in teams in locating tuna schools and communicating over radio to their fellow fishermen would improve the efficiency of the fishing effort. These combined with the high demand for yellowfin would also create incentive to become more efficient. All these may have contributed to increased catch rates in the recent years.

Size Distributions

MRC has been employing fishermen field officers on contractual basis for size sampling work in the islands. Some of them also sample on handline large yellowfin tuna vessels. The largest number of yellowfin sampled and measured in a single year was 1994 where over 74,000 covering most of the fishery areas (Adam and Anderson 1996). The most common size range in the pole-and-line fishery was 38-50 cm in 1994.

The sampling program has been strengthened due to additional funding from the environmentalist non-government organization (eNGOs) partners. MRC has 2 samplers in each of major commercial collection centres; in the north (in Felivaru - MIFCO), in the south centre (in Maandhoo – Horizon Fisheries) and in the south (in Kooddoo - MIFCO). In addition, sampling is also done at Malé market and also in one of the key large yellowfin landing site on Hulhumalé Island.

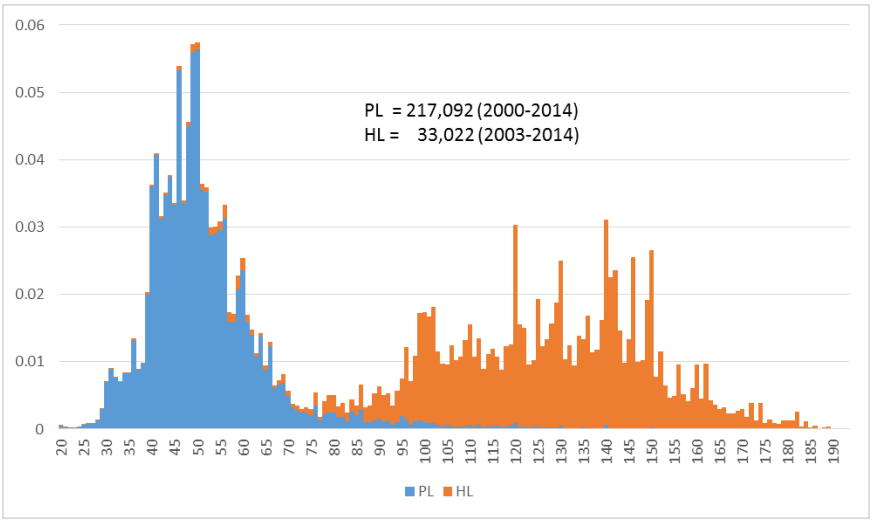

Figure 5: Size distribution of the YFT caught in pole-and-line (blue) and handline (orange) fisheries in the Maldives, 2000-2014: Source: MoFA – Fisheries Divison

The composite size distributions of MRC data holdings are shown in Figure 5. Although the amount of data on handline yellowfin is small relative to numbers measured in pole-and-line, the sizes being targeted in each fishery is very clear. The most common size range in the pole-and-line fishery was 45-50 cm FL from 2000-2014, virtually the same observed in 1994 by Anderson and Adam (1996). The commonest size in handline fishery was between 120-150 cm FL. The number of samples was too low to fully represent the handline fishery, or discern any seasonality and different size classes in the fishery. It is hoped that data acquired during 2015 should be able to allow such analysis.

Catch Around FADs and Free Schools

MRC in collaboration with the International Pole-and-Line Foundation (IPNLF) is undertaking bycatch sampling of pole-and-line tuna fishery. The work started in September 2014 where detailed data at the level of fished school[6] are being taken. The data presented below are for the 69 trips completed so far.

The size of yellowfin tuna from different school associations (e.g. free school, FADs, seamounts) during pole-and-line fishing appears to be quite similar. Tuna lengths were measured at-sea observation in 2014-2015 to provide confidence in school association (Figure 6). Freeschool tuna were slightly larger (41.8 cm ± 0.73 SE, n=255) than those found at anchored FADs (38.8 cm ± 0.24 SE, n=2064) or those associated with seamounts, drifting FADs, or other floating objects (36.8 ± 0.22 SE, n=1894). While there is some variation in size, almost all yellowfin caught by pole-and-line are below the size of average maturity, with few exceptions.

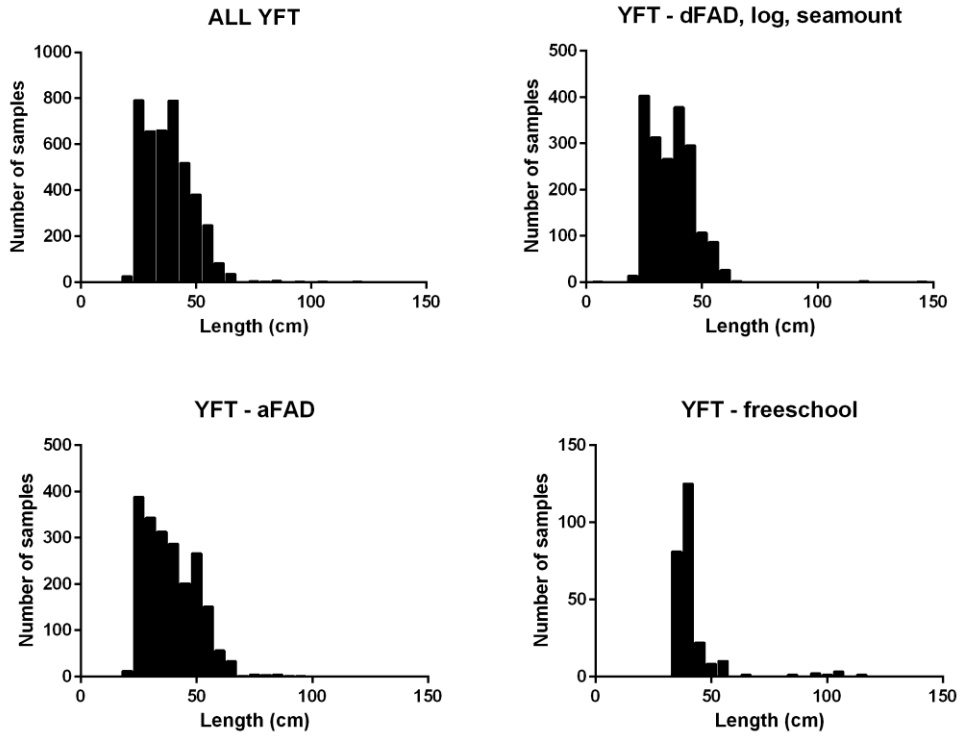

Figure 6: Length frequency of yellowfin tuna caught in different schools associations by pole-and-line gear in the Maldives (2014-2015 at sea-data collection).

[6] A fished school is defined as a fishing event or a group of fishing events that are less than 10 mins. apart.

Across different school associations, the species composition of the pole-and-line tuna catch varies greatly (data from 2014-2015 at-sea observations). Freeschools of tuna show the lowest proportion of yellowfin of 1.55% (skipjack 98.38%, bigeye 0.07%). Anchored FADs showed just over one-third yellowfin (35.23% yellowfin, 60.24% skipjack, 4.15% bigeye). All other schools (drifting FAD, log, floating object, and seamount associated) showed the highest proportion of yellowfin with 40.57% yellowfin (57.93% skipjack, 1.49% bigeye tuna).

Biological Information

Growth

There have been a number of tag release and recapture experiments in the Maldives that has provided information to estimate growth rates. The following data from the Maldives are available with the Secretariat (Table 3).

Table 3: Summary of tagging experiments conducted in the Maldives (1991 – 2007).

Tagging Period	No YFT Released	No YFT Reported	% Reported	Comments
1991 - 1992	1908	105	5.5%	
1994 - 1995	1303	23	1.8%	Release of juvenile YFT off west of Maldives (Baa Atoll)
2004 - 2007	5310	730	13.7%	As part of IOTTC-RTTP; Large number of releases to the aFADs.

Using the above data, Yesaki and Waheed (1992) estimated average growth rates of 2.4 cm / mo at 70 cm FL. Anderson (1988) estimated a linear growth rate of 2.9 ± 0.4 cm / mo between 30-70 cm FL (although growth at half this rate could not be discounted). The data for 2004-2007 has yet to be analyzed for the only Maldives area, but they have been used to estimate growth rates of yellowfin tuna for the Indian Ocean at large (Eveson et al. 2012).

Average weights

Anderson et al. (1995) calculated the following length weight relationship (cm-kg) for Maldivian yellowfin tuna landing with size range of 25-145 cm FL.

$W = 0.00002863\ FL^{2.897}$ (n = 875, r=0.990)

New data covering the full range of yellowfin tuna caught both PL and HL will be available by the end of 2015.

Movements

Tag release and recapture data provide information on movements that help understand interactions between various fisheries that are useful for the stock assessment and management. In the Maldives, tagging studies have repeatedly shown there is high affinity for tunas to stay around the Maldives area (Waheed and Anderson, 1994; Yesaki and Waheed, 1994; Anderson et al., 1996). Acoustic telemetry in the Maldives also has shown that tunas may spend some considerable time around the anchored FADs (Govinden et al.

2002). The explanation of this phenomenon is believed to be due to island mass effect[7] combined with the well-established anchored FAD network around the Maldives. FAD deployments in the Maldives started in the early 1980s and since 2000 some 50 anchored FADs are being maintained around the island chain some 12 nautical miles offshore.

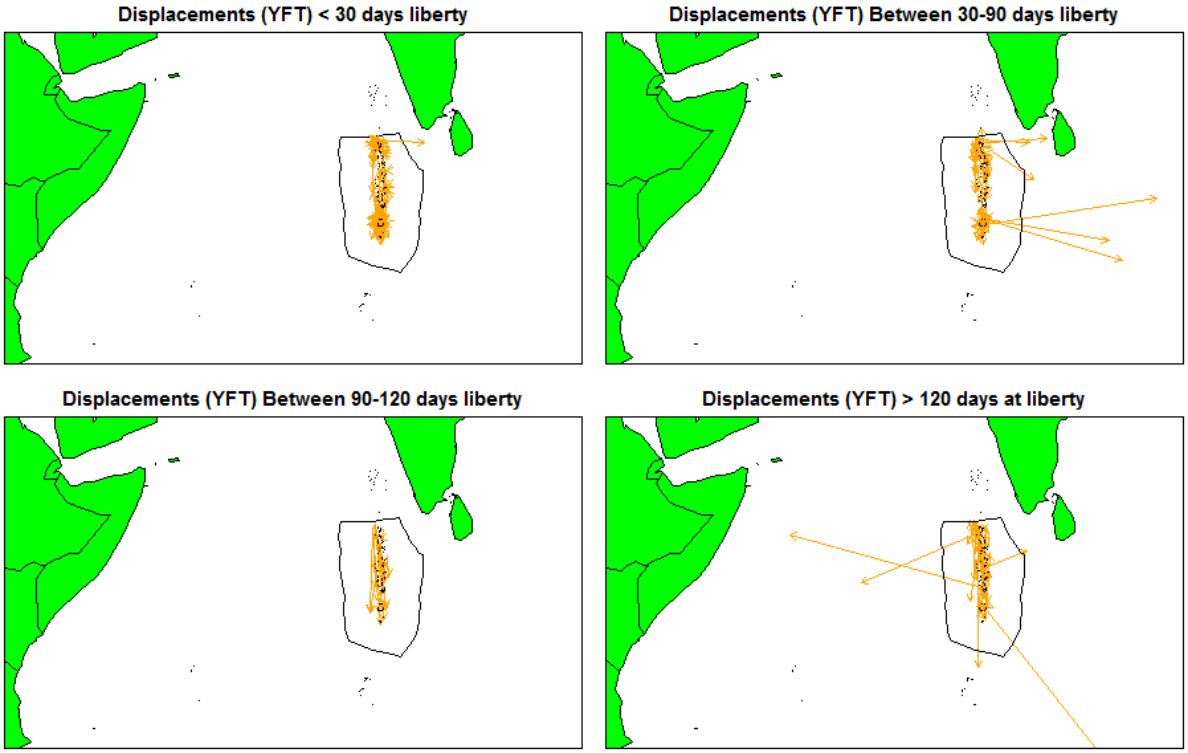

Figure 7: Linear displacement tagged yellowfin tuna in the Maldives tagged from 2004 through 2007 under IOTC's RTTP at different periods of liberty. Data Source: IOTC Tagging Database.

A common feature of release and recapture data from the Maldives is that a large proportion of recoveries are made during first month of release. Most of these recoveries are made at the point of release, typically around anchored FADs. Figure 7 shows linear displacement of yellowfin at different times-at-liberty intervals for most recent tagging data set (Table 3). Even after 120 days most of the recoveries were made very close to the point of release. The same result is seen in the attrition curve. By around 180 days at liberty most of them have been recovered (Figure 8). Recaptures with short-times at liberty around point of release, considered non-mixing of tagged population, has consequences for using useful movement information from tagging data in stock assessment modeling work (Langley and Million, 2012).

Anderson and Adam (1995) hypothesized that tuna in the Maldives tend to move with monsoon currents; during the southwest monsoon season when surface currents are from west to east tunas tend move from west to east. Similarly when currents move from east to west during northeast monsoon season, tunas tend to move in the same direction. Tag release season compared with recovery season indicate tunas follow monsoon currents (Figure 9). For example, nearly all recoveries of yellowfin released during the northeast monsoon were recovered on the western side. Conversely nearly half the recoveries of

[7] Island Mass Effect refers to the enhanced production that occurs around oceanic islands in comparison to the surrounding waters (e.g. Gilmartin and Revlante (1974), J. Exp. Mar. Biol. & Ecol., 16(2):181-204)

yellowfin released during the southwest monsoon were recovered on the eastern side of the Maldives.

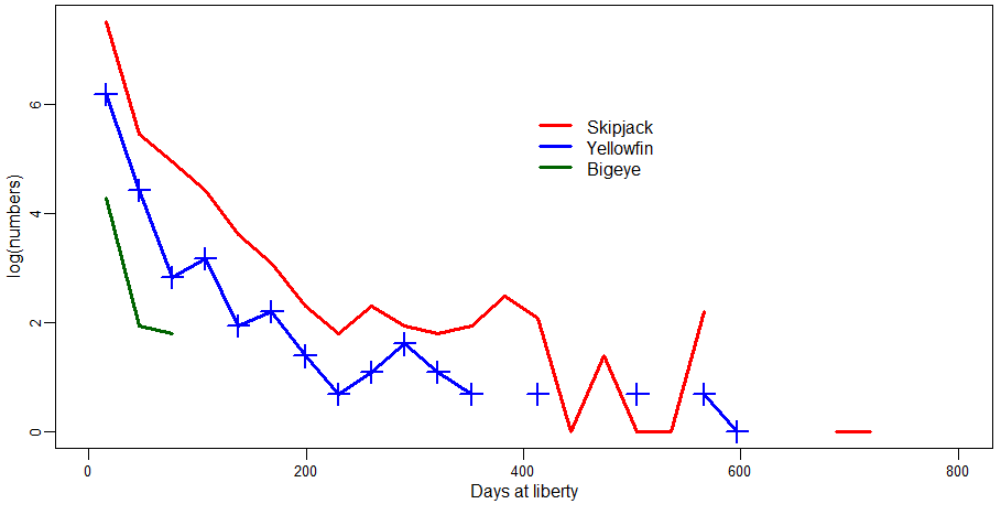

Figure 8: Tag attrition data from tagging experiments of tuna in the Maldives.

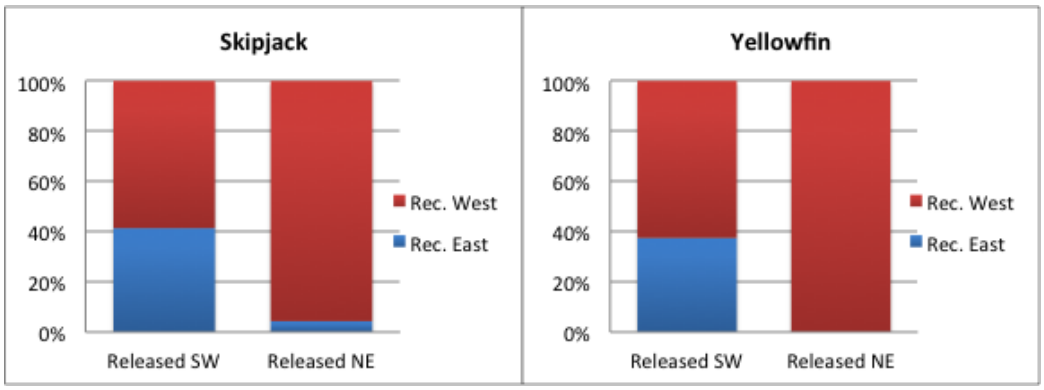

Figure 9: Percentage of recoveries of by season for recoveries of less than < 180 days at liberty. Source IOTC Tagging Databse.

Summary and Discussions

Yellowfin tuna in the Maldives are exploited from pole-and-line and hand line gear. The importance of handline caught large yellowfin (in terms of direct economic revenue) is now equal or slightly more than the pole-and-line skipjack tuna. Total yellowfin tuna catches are now close to 50,000 MT per year, which is now only slightly less than total skipjack production in the pole-and-line fishery.

Pole-and-line catches of yellowfin are made along with skipjack, although conspecific school may also be targeted. Nearly all catches of pole-and-line yellowfin are juveniles. In comparison, handline caught yellowfin are targeted mainly from dolphin associated schools and most of them are sub-adults or adults.

There is far less information on the handline yellowfin fishery compared to the pole-and-line skipjack fishery. Historically, this fishery was considered to be of lower importance. Catch and effort data for the earlier time period are considered to be less reliable due to confusion on gear type on the Monthly Summary Report forms, but also due to issues related to

compiling new information to the established fishery database system. However, with the logbooks now fully in place and with changes in the data compilation system, it is expected that data on handline yellowfin tuna fishery is now more reliable and complete.

With the current and improved sampling efforts at commercial landing sites (canneries, shore-based storage facilities) and yellowfin tuna packing facilities, more reliable information will provide a more complete picture of yellowfin fishery of the Maldives.

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