Received: 16 & 20 June 2014

Investigations on the change in catch and effort data collection as a cause of decline in reported neritic catches from 2009 – 2012

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Abstract

The Ministry of Fisheries and Agriculture introduced logbooks to the tuna fishermen in an effort to strengthen the catch and effort data collection system of the Maldives. As a result of several measures to encourage reporting, the amount of logbook data reported increased through 2010 – 2012. However, this period saw a decline in catch of 84% for frigate tuna and 51% for kawakawa, compared to 2009. The observed trend needs investigation as it coincided with the increased reporting of logbooks. It was assumed that the decline in reported catch of neritic species was somehow due to the use of logbooks to report catch. Fishermen's reliance on purchase receipts issued by tuna exporting companies as the basis of logbook information would further add to the non-reporting, as the companies do not export neritic species. Investigations of effort and catch from pole-and-line, handline and trolling gear from 2004 – 2012 revealed that the drop in neritic catches was most probably due to decline in effort from pole and line and trolling gear. Increased effort from handline gear suggests a trend where more pole-and-line fishermen are entering the handline large yellowfin tuna fishery. High prices received by yellowfin tuna is probably the main reason for the change. As the importance of neritic tunas decrease, collection of catch and effort and scientific data is becoming more challenging. Implementation of the observer scheme and education pole-and-line fishermen on complete and proper logbook reporting would alleviate the shortcomings to some degree.

Introduction

Collection of catch data on the Maldivian tuna fishery date as far back as 1959 (Anderson 1986). Fishermen reported their catch to the island offices (which later became the council offices) who reported the data to the atoll offices (later the atoll councils). The data are then compiled at the atoll level and sent to Male'. The Ministry of Fisheries and Agriculture (MoFA) uses this data to publish the annual catch statistics for the country. This catch reporting system fulfilled the needs of the time. However, changes in the fishery, requirements from management organizations and overseas markets necessitated the introduction of logbooks to the fishermen in 2010. Since then, several measures have been taken to promote reporting of catch and effort data through the logbooks. As a result, the amount of fishery information reported through logbooks increased steadily, allowing the Ministry to switch over from a 100% island office reported catch in 2009 to a combination of logbook, island office reports and purchase data reported from the tuna exporting companies (in order of priority) in 2013. Coincidentally, the transition years (2009 – 2012), has seen substantial declines in reported catches of

neritic tunas. This paper aims to discuss the change in nominal catch of frigate and kawakawa in light of the change in catch and effort reporting system.

Trends in nominal catch of neritic tunas

Despite inter-annual fluctuations, nominal catch of neritic tunas has seen a general rise from 1970 – 2009 (Figure 1). Historical variations in catch maybe be attributed to factors such as (i) initiation of frozen fish export scheme (1972), (ii) mechanization of the fishing fleet (1974), iii) slow and eventual decline of trolling vessels (iv) installation of fish aggregating devices (beginning from 1981), and other developments in the fishery which increased the importance oceanic species. For example, mechanization of the fishing fleet from 1974 onwards increased the fishing power leading to increased pole-and-line effort which contributes the majority of neritic catches. It also led to the decline and eventual collapse of the sailing trolling fleet, which contributed second most to neritic landings at the time. Installation of Fish Aggregating Devices (FADs) around the country decreased search time, allowing for more skipjack and yellowfin catch. Beginning of the frozen fish export scheme would have increased targeting of skipjack and yellowfin tunas. In addition, environmental and oceanographic conditions such as El Nino Southern Oscillation (ENSO) related conditions have been shown to increase CPUE and catch of neritic species during El Nino years (e.g. 1982-83, 1992-94, in Anderson et. al., in MRS, 1996).

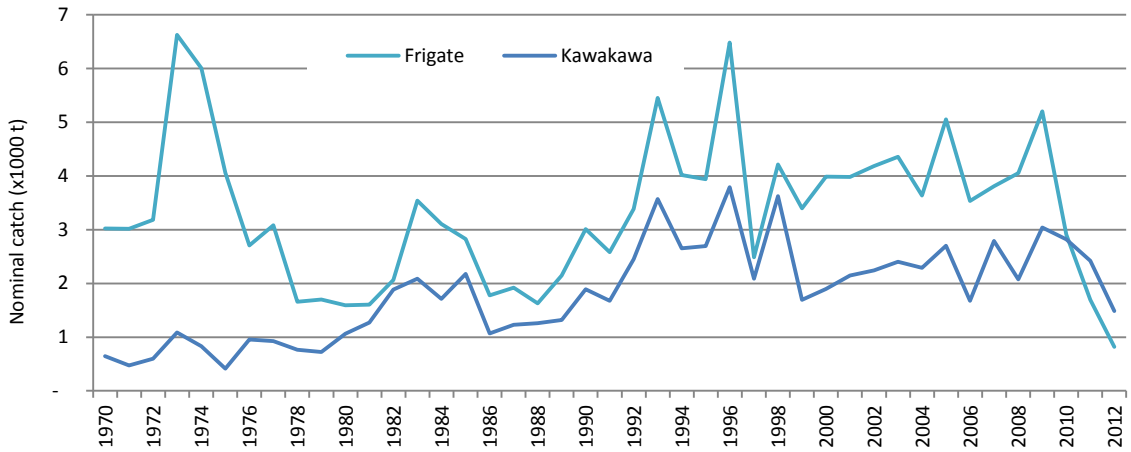


Figure 1. Nominal catch of frigate and kawakawa (1970-2012)

Recent catch (2009-2012)

Maldives recorded a combined catch of 8,200t of neritic tunas (5,200t of frigate and 3,042t of kawakawa) in 2009. Through the course of 2010 - 2012, Maldivian tuna landings observed an 84% and 51% decline in frigate and kawakawa catches respectively, from that reported in 2009. As previously stated, this significant decline coincides with the efforts by the Ministry of Fisheries and Agriculture to strengthen the logbook reporting scheme and switch to the fishermen reported logbook as the primary source of catch and effort data. While this in general is positive, the impact of transition to a 100% logbook reported data may have implications on the reported catch of neritic species, unless investigated and rectified.

Trends in effort and catch by gear

Pole and line has always been the dominant gear for tunas in the Maldives; therefore, this gear contributes highest to the landings of neritic tunas. Hence, any change in nominal catch or reporting of pole-and-line catch will have significant impacts on the nominal catch or reporting of catch for neritic tunas, respectively.

A declining trend in effort from pole-and-line and trolling gear (Figure 2), and consequently their catches of neritic tunas (Figure 3) were observed for the recent past. The period, 2009 – 2012 recorded a 36% decline in pole-and-line effort. In contrast, a 79% rise in handline gear was observed, indicating a shift from pole-and-line to handline fishery. Assuming other factors remained similar; the observed decline in catch of neritic species was possibly due to reduced effort of pole-and-line gear over the years.

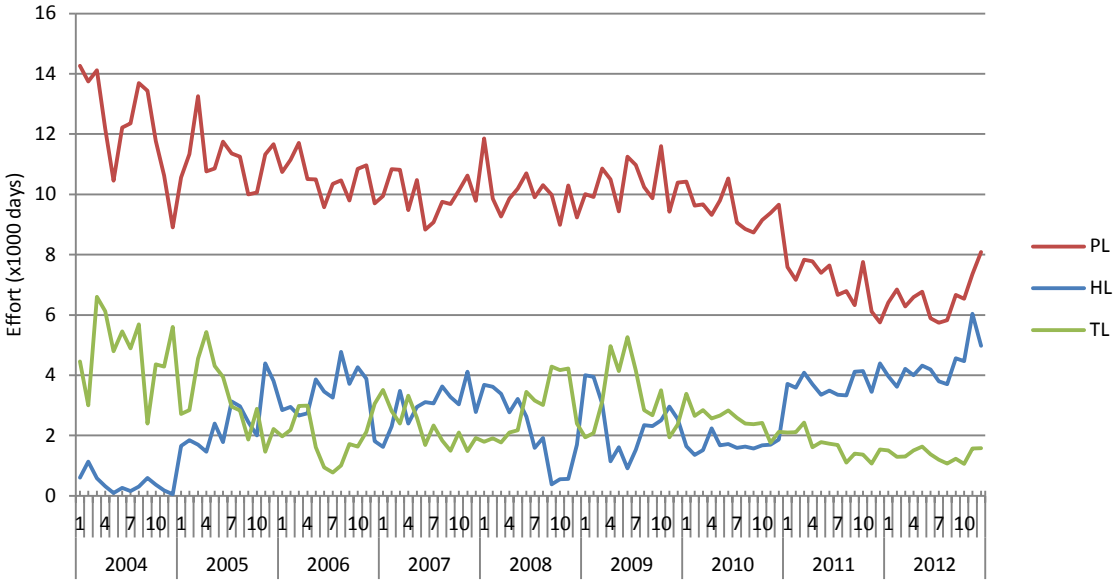
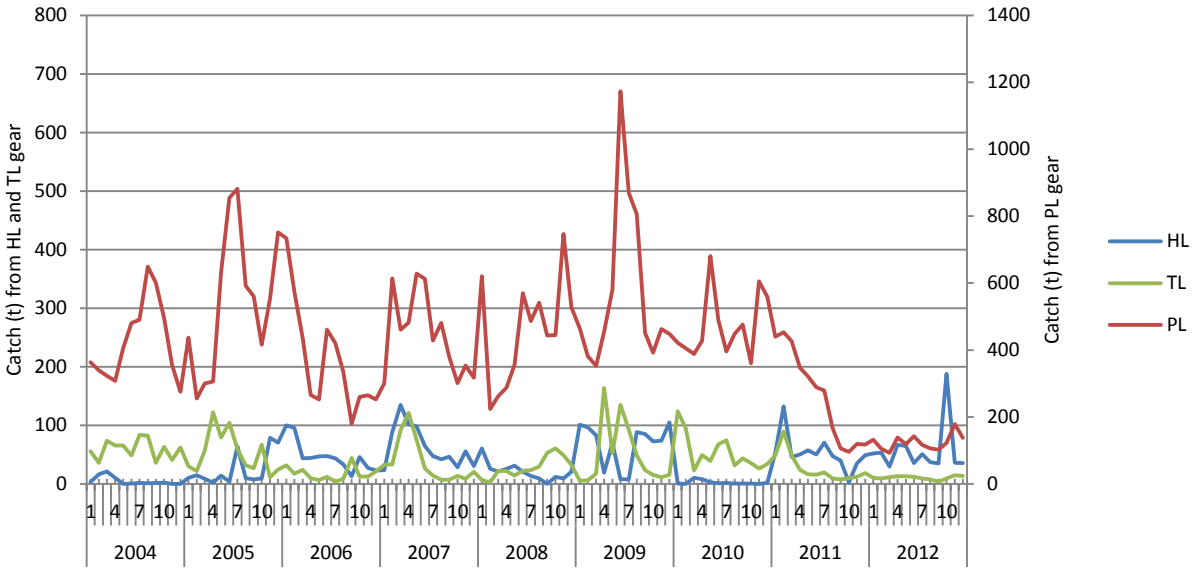


Figure 2. Effort (number of days) from pole-and-line (PL), handline (HL) and trolling (TL) gear, 2004 - 2012.



Importance of neritic tunas

The Maldivian tuna fishery has seen significant changes over the years due to efforts from the government and the private sector. These developments (mechanization, FAD's, increased vessel size, beginning of large yellowfin tuna fishery) all combined to elevate the importance of skipjack and yellowfin tuna while diminishing importance of neritic species (Figure 4). Geographically, neritic tunas have been more important in the central and northern region of the country where it is commoner than in the south (Anderson, et. al., 1998). Lower presence of tuna exporters in the regions is also a contributing factor for the low catches in the respective regions.

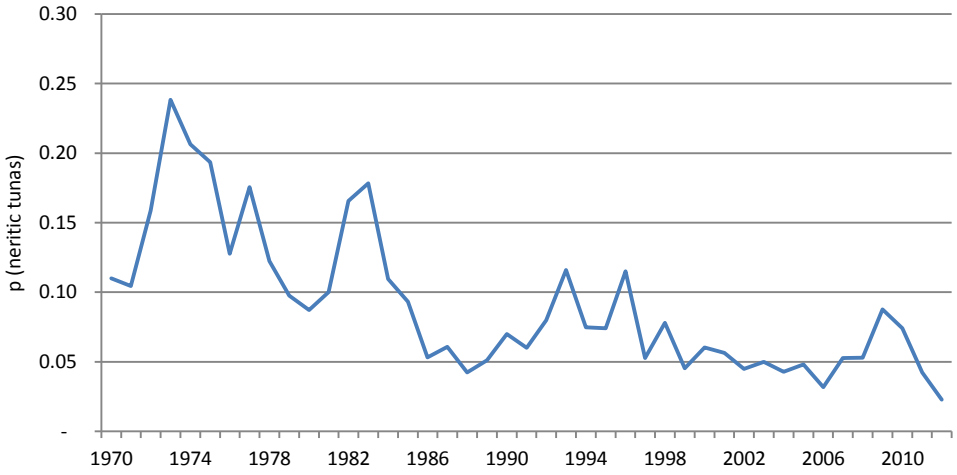


Figure 3. Proportion of neritic tunas (frigate and kawakawa) in the total tuna landings (skipjack, yellowfin, frigate and kawakawa), (1970-2012)

Challenges in data collection

Developments in skipjack and yellowfin tuna fishery continue to decrease the importance of neritic tunas in the Maldives. Coupled with the change in catch and effort data collection system, this has resulted in challenges to collection of catch and other fishery related scientific data for neritic tunas. For example, catch and effort data for the said species could be under-reported as reliance on the logbooks increase, on the assumption that some fishermen use purchase receipts from their sale of catch for export (where neritic species as are not purchased).

Collection of size data of neritic species is increasingly becoming a challenge as fishermen target skipjack and yellowfin tunas; neritic species are simply not caught or caught in minute numbers in the commercial tuna fishery. Size samplers based at landing ports do not get access to neritic species as there are almost no landings of these species. As for fisherman samplers contracted by MRC, their preference for skipjack and yellowfin tuna results in almost no neritic species being targeted. The challenges in obtaining size data on neritic species are evident in the sampled numbers over the recent years (Table 1).

Table 1. Numbers of fish (neritic tunas) sampled in the tuna size sampling program, 1997 - 2012

Year	KAW	FRI
1997	3753	11390
1998	1545	6814
1999	401	1967
2000	299	2582
2001	0	405
2002	11	1424
2003	264	5543
2004	11	9059
2005	845	5956
2006	237	2941
2007	4685	13843
2008	603	9260
2009	3318	5537
2010	259	556
2011	545	321
2012	199	0

Conclusion

Declines in effort of pole-and-line gear with consequent drop in catch of small tunas, and rise in effort and catch from handline gear reflect the change in the tuna fishery of Maldives. The variations in effort coupled with a possible under-reporting and non-reporting is possibly the cause of the observed decline in neritic catch of Maldives in general and more importantly in the period 2009 – 2012. The declining trend in importance of neritic tunas is expected to continue into the future. Higher prices paid for skipjack and yellowfin, rising operational costs, difficulty in finding crew and expansion of other investment and employment opportunities is expected to contribute this decline

The possible under-reporting of catch and effort and biological data on neritic tunas could be alleviated to some degree by implementing a fishery observer scheme. Educating fishermen on proper reporting of logbooks is equally important as an observer scheme would only cover a portion of the trips.

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