Received: 17 August 2015

Historical catches of Marlins caught by sports fishers in the Kenyan waters

Ndegwa Stephen[1] and Benson Macharia Kirathe[1]

1. **State Department of Fisheries, P.O. Box 90423, Mombasa, Kenya**

Abstract

Black marlin (*Makaira indica*), Blue marlin (*Makaira nigricans*) and Striped marlins (*Tetrapturus audax*) are among the billfishes caught by sports fishers in Kenyan waters. Recreational fishery data consisting of retained, tag and release data of marlins obtained from sports fishers' clubs between 1987 and 2012 were used to investigate historical trend of three species of marlins through time. A total of 2,926 fish were caught. Black marlins were the majority with 1,221 recorded closely followed by Striped marlins at 1,132 while only 209 blue marlins were reported. Temporal distribution of the Striped marlins and Blue marlin show a peak in January with most of the catches appearing between December and March. Black marlins have two main seasons with the first occurring between January and March with a peak in February while the second season occurs between July and September with the peak in September. Although the annual catches of Striped marlin and Black marlins are usually below 50, between 2009 and 2010, the catches of striped marlins were 113 and 233 respectively while the peak catches of Black marlin were experienced between 2006 and 2010 ranging between 63 and 148. The black marlins recorded the highest average weight among the species weighing 86.2 ± 43.0 kgs with a most fish recorded weighing between 61 and 70 kgs. Blue marlins and Striped marlins weighed 83.1 ± 49.6 kgs with most fish weighing between 41 and 50 kgs and 51.7 ± 11.0 kgs with most fish weighing between 51 and 55 kgs respectively.

Introduction

Marlins like other billfishes are high trophic level predators (Pepperell *et al.,* 2011), large, relatively rare, highly mobile predators and are sparsely distributed over an extensive geographical range (Knight *et al.,* 2006; Ortiz *et al.,* 2003). Although the focus of this paper is on catches of Marlins caught by sports fishers, it is imperative to appreciate that Marlins are considered as by-catch in drift gill nets and longlines operated to target large pelagics such as tuna and sharks (Ganga *et al.,* 2008). This portends over-exploitation of Marlins and it is sufficient to indicate that it may lead to lack of actual data on harvested Marlins.

Tourism is an important sector in Kenya contributing enormously in socio-economic advancement of many both directly and indirectly (Messerli *et al.,* 2010). Sport fishing in Kenya has been in existence since 1950s where capital investment in the industry was observed to be about US$560,000 in 1960 and $840,000 in 1964 (Williams, 1970). In 2009, it was estimated that tourism directly contributed about US$ 1.5 billion to Kenya's GDP; which is approximately 3.7 % of Kenya's total GDP (Messerli *et al.,* 2010). Sport fishing which forms a strong segment of Kenya's tourism products is bolstered by a mosaic of billfishes which constituents the most sought-after big game-fish (IGFA, 2001).

The aim of the study is to investigate historical trend of three species of marlins i.e. Black marlin (*Makaira indica*), Blue marlin (*Makaira nigricans*) and Striped marlins (*Tetrapturus audax*) through time (1987 - 2012) at Malindi-northern Kenya banks where the concentration

of recreational fishing activities occurs highly. This is information is crucial as it assist fisheries stakeholders appreciate the status of the fishery with time thus enabling proper planning and adoption of appropriate management measures to mitigate the risk of over-exploiting the fishery resource. Furthermore, historical studies and publications on Marlins catch in Kenyan waters is scantly available needless to mention the paucity of the same in recreational/sport fishing industry.

The general objective of the study is to investigate historical catches trend of Marlins caught by sports fishers in the Kenyan waters while the specific objectives is: 1) to investigate temporal trend (yearly and monthly) on three Marlins species caught by sports fishers over the period under focus 2) to investigate weight frequency distribution of three Marlins species over the period under focus 3) investigate application of tagging as a tool for data collection and management of fisheries resources

Material and methods

Data used in the study was obtained from State Department of Fisheries and sport fishing clubs located in Malindi on the Northern part of Kenyan coastline (figure 1). Malindi is a very important tourist destination area and has a plethora of sports fishing activities occasioned by availability of sea mounts and the proximity to the Somali current upwelling zone (Ndegwa & Kiilu, 2013). Data from 1987 to 2012 were available although data for 1988 and 1989 could not be traced.

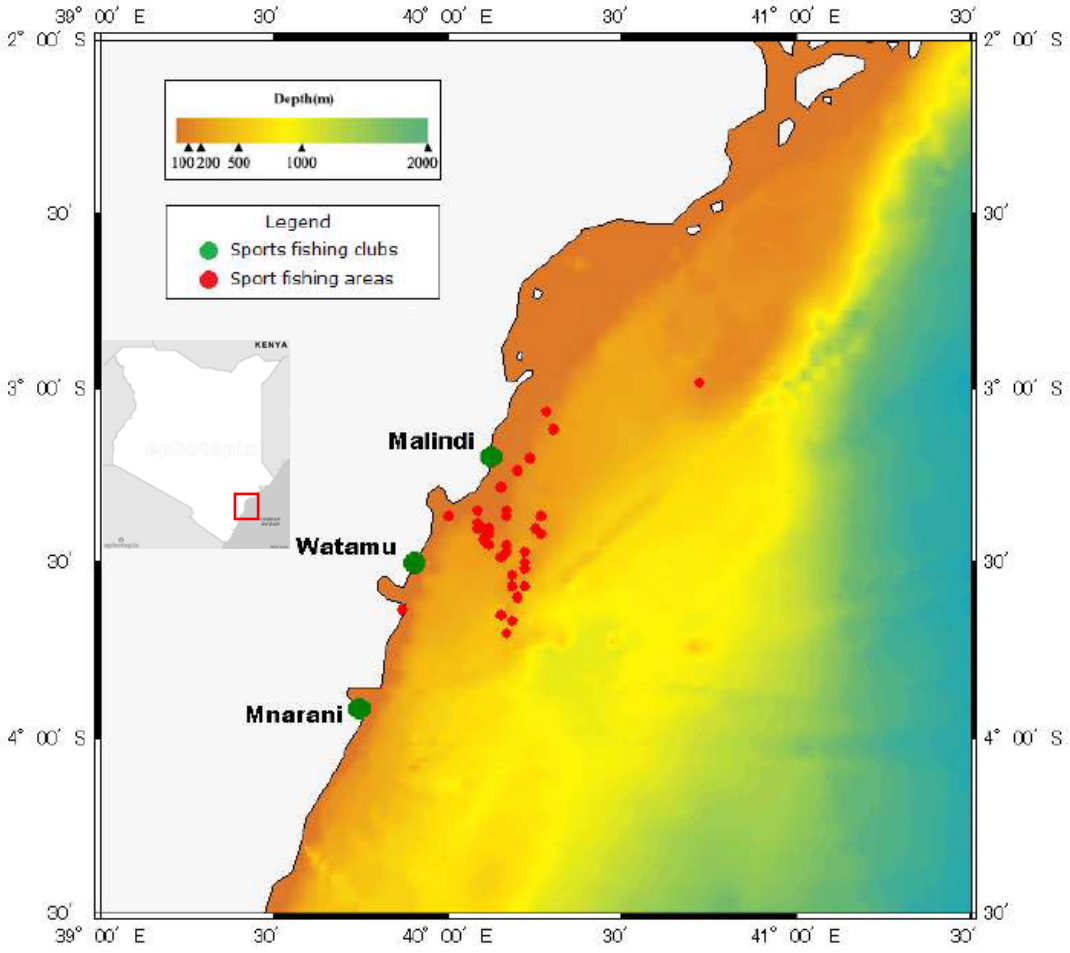

Figure 1: Fishing grounds used by the sports fishers in Malindi (Ndegwa & Kiilu, 2013). Overview map was sourced from Google images.

Records of Marlins caught during sport fishing are taken and maintained in the boat's logbook and subsequently archived by respective Sport Fishing Club. The information recorded is then availed to the State Department of Fisheries. Records of important data such as the date of capture, weight (actual or estimated), boat name, fishing area, species caught and general remark i.e. whether fish was tagged, released or retained are obtained and recorded in the boat's logbook.

Results

Between 1990 and 2012, a total of 2,926 fish were caught. Black marlins were the majority with 1,221 recorded closely followed by Striped marlins at 1,132 while only 209 Blue marlins were reported. Black and Striped marlins were recorded all through between 1987 and 2012 except in the year 2003. The peak catches for Black marlin were observed between 2006 and 2010 with the number of individuals caught ranging between 63 and 148 (figure 2). The peak catches for Striped marlins were observed in 2010 where a total of 233 individuals were caught (figure 2). Generally the number of Blue marlin recorded was smaller compared to Black and Striped marlins. Furthermore, no Blue marlin was recorded between 1995 – 1997 and 2002 – 2003 thus ensuing gaps observed in figure 2 below.

The Striped and Blue Marlins demonstrates more or less similar temporal pattern where an increase in catches occur in September culminating to a peak in January and subsequently a slump with either zero or minimal catches recorded between April and August (figure 3). Additionally, temporal distribution of Striped and Blue marlin has most of the catches appearing between December and March (figure 3). Black marlins have two main seasons with the first occurring between January and March with a peak in February while the second season occurs between July and September with the peak in September (figure 3).

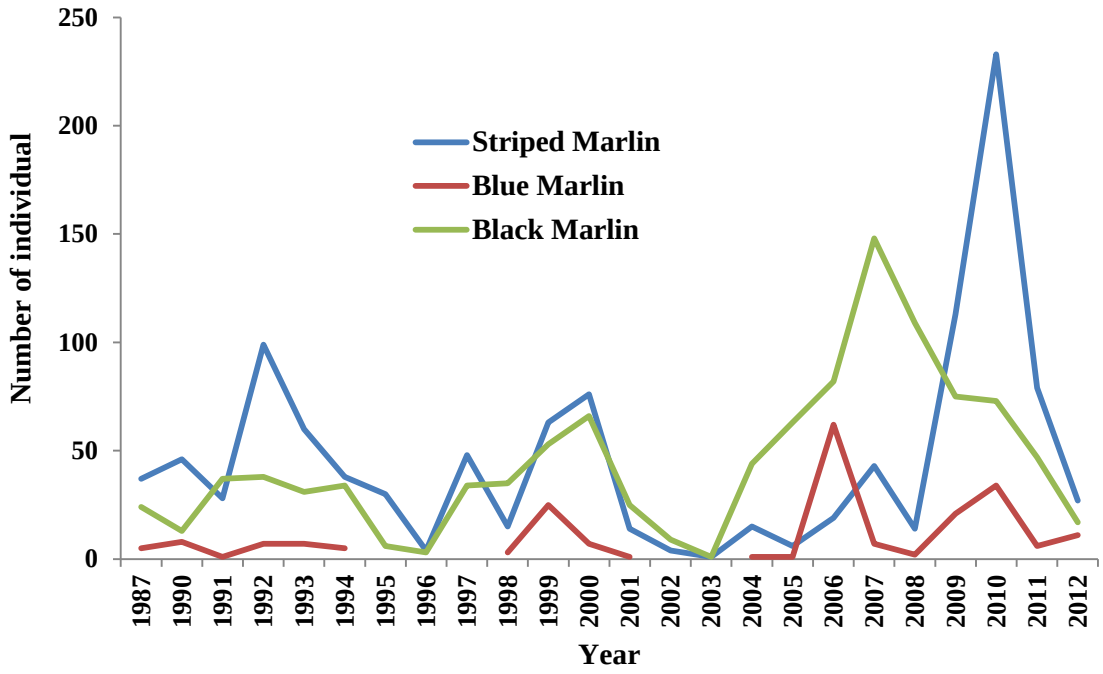

Figure 2: Historical catches of Black Marlin, Striped Marlin and Blue Marlin caught by sports fishers in the Kenyan waters between 1987 and 2012

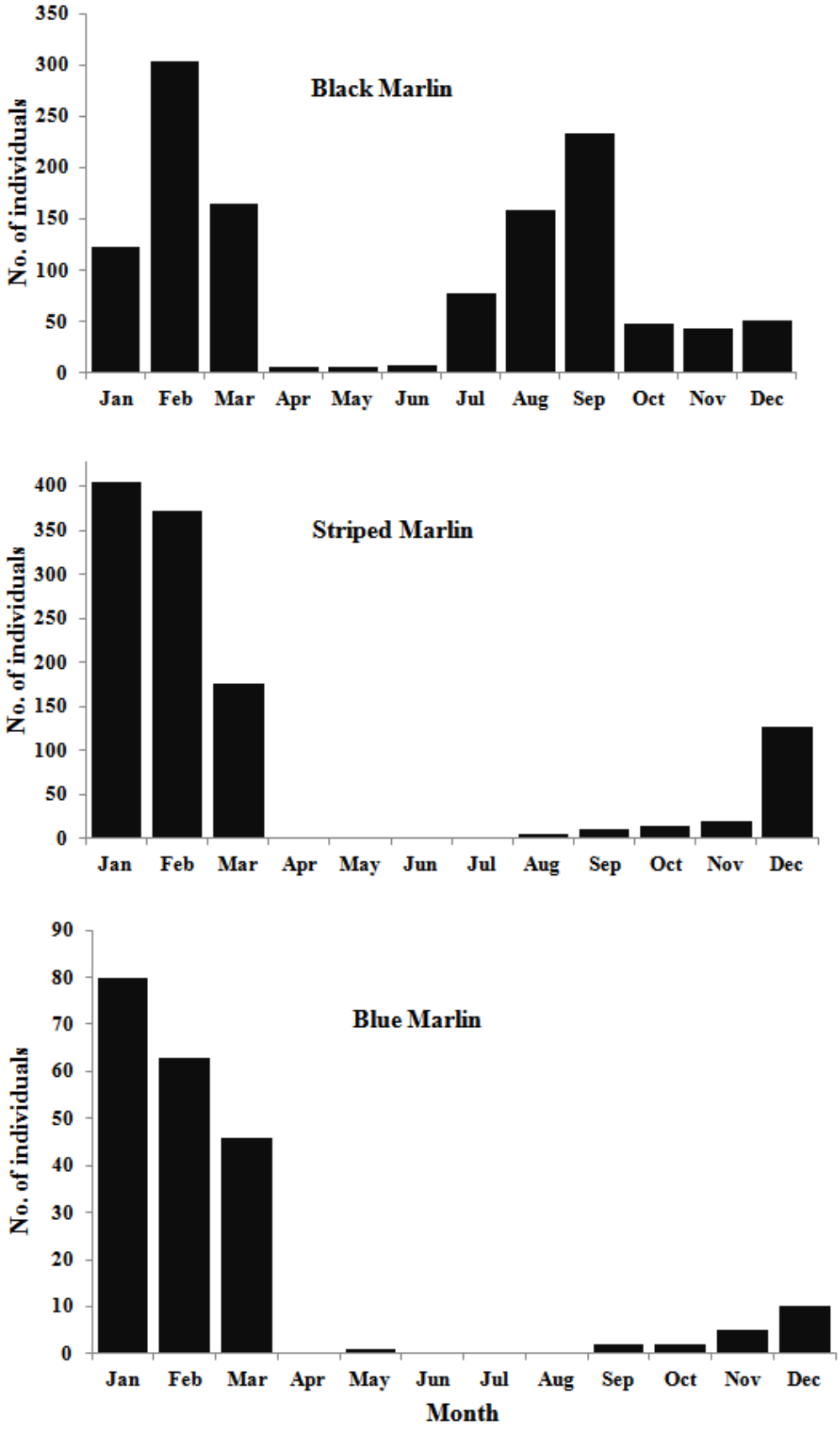

Figure 3: Temporal distribution of the number of individual Black Marlins, Striped marlins and Blue marlins caught by sports fishers in the Kenyan waters between 1987 and 2012

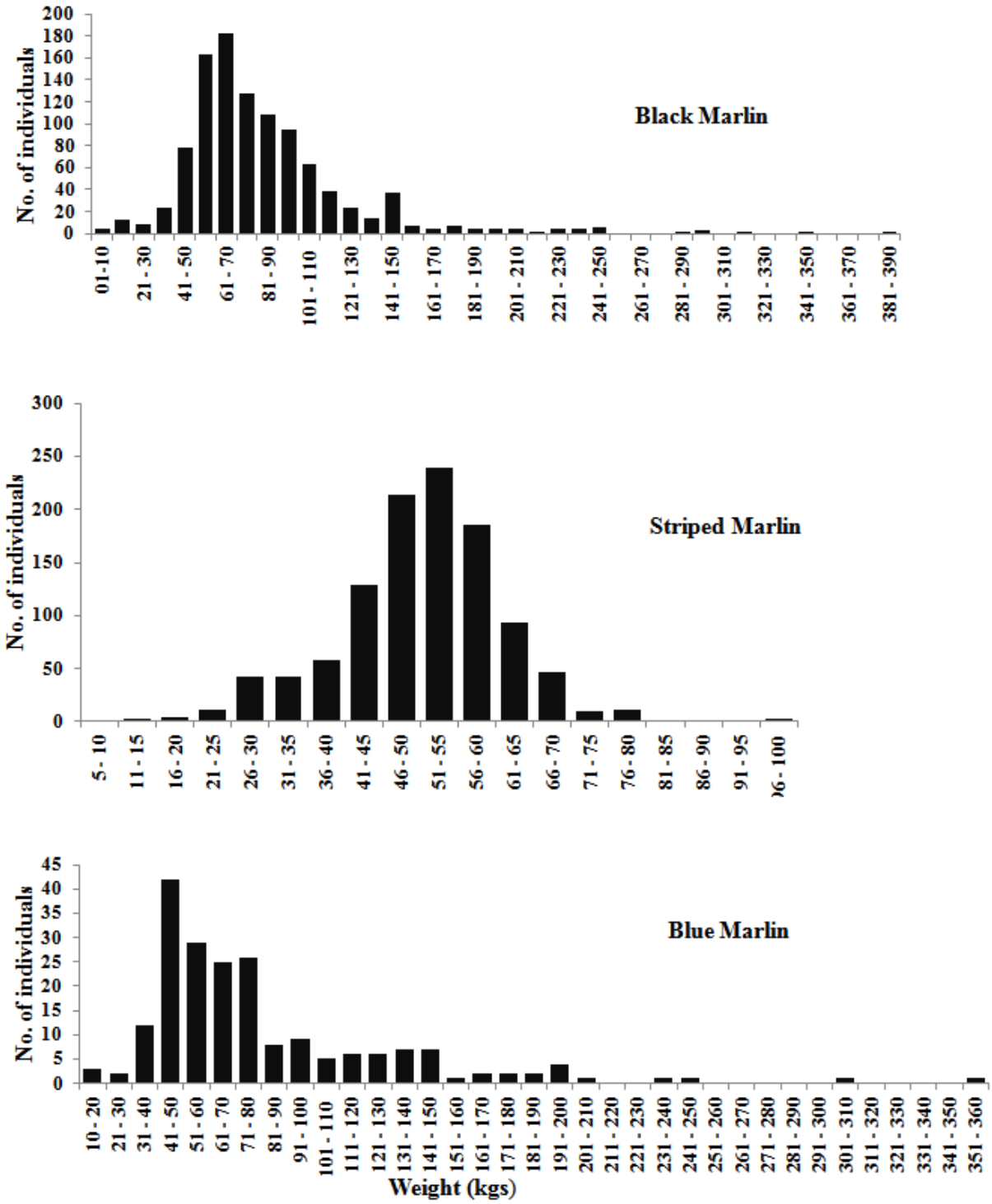

Figure 4: The weight-frequency distribution for Black Marlins, Striped marlins and Blue marlins caught by sports fishers in the Kenyan waters between 1987 and 2012

The weights (kg) of fish caught are usually recorded by anglers and figure 4 shows the weight distribution for Black, Striped and Blue marlins caught by sports fishers in the Kenyan waters between 1987 and 2012. The figure lucidly demonstrates the difference in weights of different marlin species over time. The Black Marlins recorded the highest average weight among the species weighing 86.2 ± 43.0 kgs with a most fish recorded weighing between 61 and 70 kgs (figure 4). Blue marlins and Striped Marlins weighed 83.1 ± 49.6 kgs with most

fish weighing between 41 and 50 kgs and 51.7 ± 11.0 kgs with most fish weighing between 51 and 55 kgs respectively (figure 4).

Tagging of Marlins in the Kenyan coast of Malindi was first recorded in 1991. Generally, tagging of Marlins has been on an increase trajectory with time, an increase characterised with three phases of steady increase occurring between 1997 and 1999, 2003 – 2007 and 2008 – 2010 (figure 5). The peak was realised in 2010, however, a sharp slump was recorded between 2011 and 2012. The number of Marlins released back to the ocean was observed to increase between 2003 and 2010 with an interesting occurrence happening between 2007 and 2009 where an increase in the number of Marlins released back to the ocean coincided with a decrease in the number of Marlins retained (figure 5).

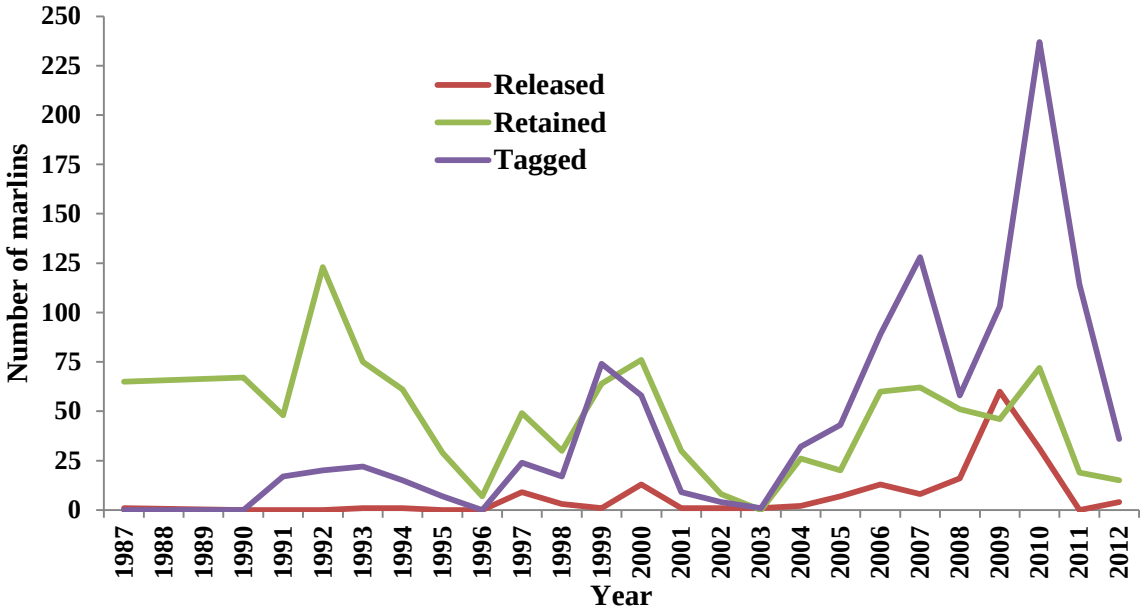

Figure 5: Total number of marlin tagged, released and retained by sports fishers each year

Discussion

Black, Striped and Blue marlins clearly demonstrated seasonality. Seasonality of Marlins varied with species. It is important to note that although some Black Marlins were caught in every month of the year, Black marlins were found to be characterised by two clear seasons in a year. These two seasons have enhanced catches where one season corresponded with North-East Monsoon season while the other coincided with the end of South-East Monsoon period. Striped and Blue marlins were characterised by one major season which coincided with North-East Monsoon period. The peak season for all three marlins species during North-East Monsoon period could be attributed to the peak season for coastal tourism in Kenya which happens between October and March. Furthermore, this is reinforced by a fact that sport fishing which is also a recreational industry is firmly driven foreign tourism. Sport fishing between October and March is made possible during North-East Monsoon season because the season is characterised by less cloud cover, reduced rains and wind energy, increased temperatures and light (McClanahan, 1988). Interestingly, both Striped and Blue marlins have months during South-East Monsoon period where zero or low catches were

recorded. This could be attributed to low season for tourism during South East Monsoon period which have dissimilar characteristic to North East Monsoon period discussed above in this chapter. As a result the weather and the ocean conditions are not conducive for sport fishing and when coupled with low number tourist it translates to low effort which ultimately is reflected on the catch recorded.

The weight frequency distribution (figure 4) shows that most Black marlins caught were heavier followed by Striped and Blue marlins respectively for the period under review. It is important that small marlins: Black marlin <15 kgs (Peter Speare, Australian Institute of Marine Science), Striped marlin <15 kgs (Bromhead et al, 2003) and Blue marlin <15 kgs (wikipedia) were recorded (figure 4) as these individuals could be juveniles thus indicating good recruitment years to the population.

Of the three species of marlins caught at Malindi in North of Kenyan waters, Black marlins had the highest number of individual caught and recorded by sport fishers, followed by Striped and Blue marlins respectively.

Tagging of marlins has been in an upward trajectory in Kenya (figure 5) and it signifies crucial role sport fishing clubs can play in the study of marlins. It is noteworthy that the release of marlins back to the ocean after capture was increasing especially between 2003 and 2010 before a slump (figure 5). The release of marlins back to the ocean after capture is a good management and conservation practise inculcated in sport fishing clubs and by extension to sport fishers, a practise that should be encouraged and rewarded.

Historical studies are invariably fraught with challenges when handling and analysing data. For instance, sport fishers in Kenya do not capture the length measurement of marlins' caught and this may portend a shortcoming on the quality of the data obtained and used. Even though capturing marlin fishes' lengths may pose a challenge especially to sport fishers and their handlers as to what points to consider when measuring lengths, a way should be devised to inculcate the practise of taking length measurements. Data on length measurement is important in biological studies of diverse aspects and therefore capturing this information should be introduced in sport fishing clubs. The shortcoming/error ensuing from species misidentification by sport fishers and their handlers could have equally undermined the quality of the dataset. Proper archiving of data is of uttermost importance if solid and factual studies are to be undertaken. In this study, data for the year 1988 and 1989 could not be traced and data gaps for Blue marlin for the period of 1994 – 1998 and 2001 – 2004 are conspicuously noticeable (figure 2).

Conclusion and recommendation

Suffice to indicate that this work probably being the first attempt to focus critically on historical data on abundance and seasonality of marlins in Kenya, analysing the existing data on historical catches stretching about 20 years has enabled some important insight into the status of marlins in Kenyan waters. Efforts should not be spared in building on this work to study other relevant areas of interest targeting marlin fishes. This study is preliminary in nature and an in-depth scientific study deploying proven models is of necessity to assess stock status of marlins and other billfishes, relative abundance with respect to historic environmental cues, behavioural movements of marlins, growth rate and reproduction in Kenyan waters. Tourism is the main driver of sport fishing sector in Kenya and the

importance of a well structured and organised fishing clubs cannot be overemphasized. Strong partnership and close collaboration between the State Department of Fisheries and sport fishing clubs is of necessity in order to make positive strides forward in the study, management and conservation of marlins and other billfishes. State Department of Fisheries in close collaboration with sport fishing clubs should work together to improve data being collected in order to enhance data quality.

References

Bromhead, D., Pepperell, J., Wise, B. and Findlay, J. (2004). Striped marlin: biology and fisheries. Bureau of Rural Sciences. Canberra.

Ganga, U., Pillai, N. G. K. and Elayathu, M. N. K. (2008). Billfish fishery along the Indian coast with special reference to the Indo-Pacific sailfish Istiophorus platypterus (Shaw and Nodder 1792). J. Mar. Biol. Ass. India, 50 (2) : 166 – 171.

IGFA (2001). 'World Record Game Fishes.' (International Game Fish Assoiation, Fishing Hall of Fame and Museum: Dania Beah, FL.)

Knight, E., Park, T., Bromhead, D., Ward, P., Barry, S. and Summerson, R. (2006) Analyses of interactions between longline and recreational gamefish fisheries taking or tagging striped marlin off New South Wales. Bureau of Rural Sciences. Canberra.

McClanahan, T. R. (1988). Seasonality in East Africa's coastal waters. Mar. Eol. Prog. Ser. Vol. 44:197-199.

Messerli, H., Christie, I., Konishi, Y. and Glenn Surabian, G (2010). Kenya's Tourism: Polishing the Jewel, World Bank Report

Ndegwa, S. and Kiilu, B. K. (2013). Seasonality, morphometrics and feeding behaviour of sailfish (*Istiophorus platypterus*) caught by sports fishers in the Kenyan waters. IOTC–2013–WPB11–29

Williams, F. (1970). The sport fishery for sailfish at Malindi, Kenya, 1958–1968, with some biological notes. Bulletin of Marine Science 20(4): 830–852.