

# Kenyan sports fishing Kawakawa and Frigate Tuna CPUE

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## ABSTRACT

This report presents the CPUE for frigate tuna (*Auxis thazard*) and kawakawa (*Euthynnus affinis*), caught by the sports fishers in Malindi sport fishing club. The catch data is for 18 years from 1987 to 2006 with over 22,000 trips recorded. The years 1988 and 1999 are not included as the data was missing. The CPUE for Kawakawa was on average 1.6 fish per trip except in 1995 to 1999 when the catches increased reaching a peak of 3.4 in 1998. The frigate tuna CPUE averaged at 0.4 fish per trip except in 2002 and 2004 when the catches recorded 1.5 and 1.7 fish per trip respectively. The temporal distribution of the catches shows that kawakawa were caught more during the first quarter of the year (Jan to March) and also in the fourth quarter (Oct to Dec) with 46% and 31% of the catches respectively. The frigate tuna on the other hand are more abundant in the first quarter with 70% of the total catch recorded during this period. The average weight of frigate tuna was 1.1 kgs whereas the Kawakawa had two periods of 2.1 and 1.5 Kgs per fish caught. The use of sport fishing catches as an indicator of stocks abundance should be encouraged.

## 1. INTRODUCTION

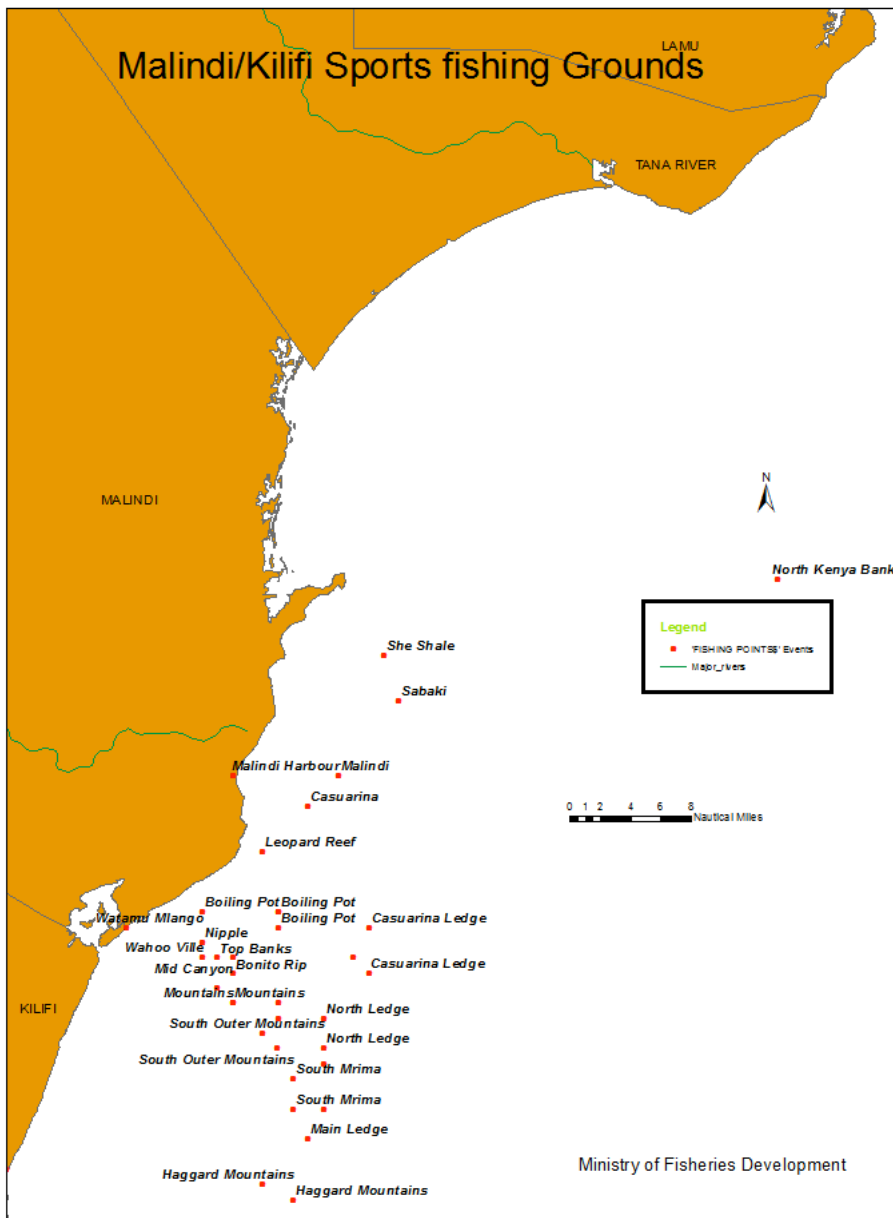
### 1.1. Background information on the data

Fisheries Department had been collecting data on sport fishing since 1940, but the data had not been computerised. In February 2006, the Indian Ocean Tuna Commission and the Overseas Fishery Cooperation Foundation (IOTC-OFCE) embarked on a fact-finding mission in Kenya. They found historical sport fishing data in Malindi and Watamu and implemented a project for computerization of historical data from sport fishing clubs, as a component of activities under the Cooperation project for enhancing the data collection and processing systems for the Tuna resources in the Indian Ocean.

A sport-fishing database was developed from this project and was useful in providing useful analytical details for the Fisheries Department. Previously unreported data, for example, on catch effort and weight/length frequency for specific species can now be derived from the database. Much emphasis, however, needs to be placed on improving the sport fishing clubs' data recording procedures and updating the database. It will be necessary for the Fisheries Department to provide the technical support required for this task.

## 1.2. Description of the fishery

The Kenyan coastline spreads for a distance of 640 km from the northern Kenya border with Somalia (1° 45' South of the Equator) to the Tanzanian boarder (5° South of the Equator). Most of the sports fishing activities take place in Malindi and Watamu although other areas such as Lamu and Shimoni do have considerable activities. The Pemba Channel off Shimoni in south coast Kenya is 40 km wide and 100 km long. On either side the bottom drops to about 1000 metres and is an ideal fishing ground.



Map 1: Sports Fishing Grounds

Literally, there are two sport-fishing seasons per calendar year. The first and most intense season runs through the last two quarters of the year i.e. July to December, while the second runs through the first quarter, January to March. However, fishing seasons could be divided into two with regard to calmness or roughness of the sea. The two seasons are *Kusi* (Southeast monsoon winds) and *Kaskazi* (Northeast monsoon winds). *Kusi* is characterized by rough sea, which at its worst fishing is suspended until it is calm. This season is between the months of April to September, whereas *Kaskazi* season is experienced between the months of October and March. During the months of May to July, there is little or no fishing at all as the sea is stormy and considered dangerous to the anglers and the crews. The table below shows the average catches per month for 18 years.

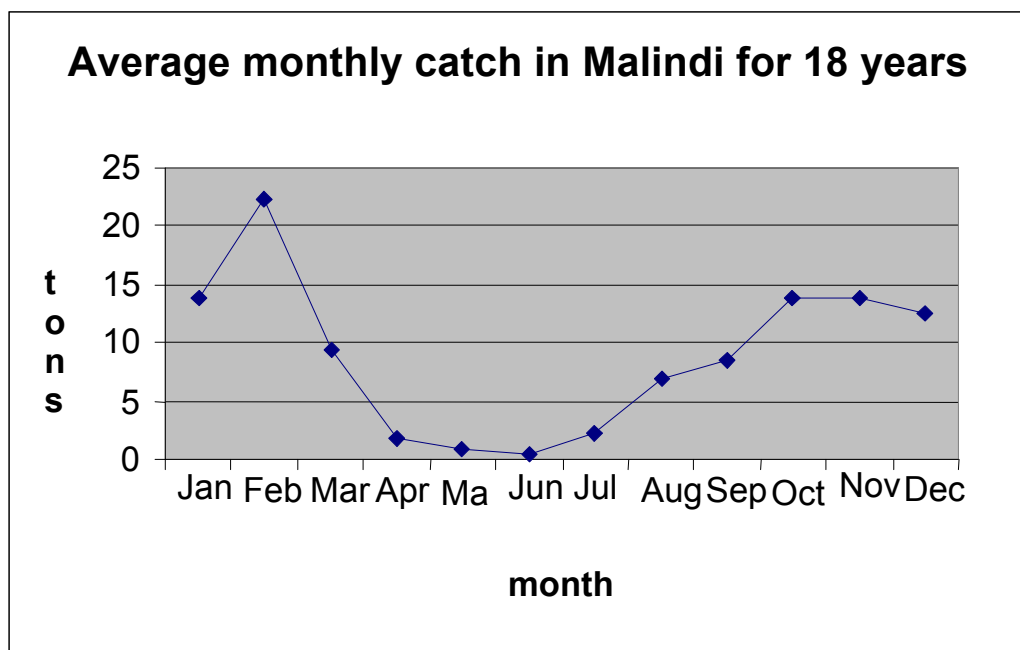


Figure 1: Monthly catches from Malindi sports-fishing club

Sport fishing as a recreational activity has been taking place all along the Kenyan Coast within the confines of various registered clubs and at times on individual basis. Different species are caught at different seasons of the year. The best months for billfish (Blue Marlin (*Makaira nigricans*), Black Marlin (*Makaira indica*), Stripped Marlin (*Tetrapturus audax*), Broadbill Swordfish (*Xiphias gladius*) and Sailfish (*Istiophorus platypterus*)), however, run from October through to April during the time the Northeast Monsoon blows and the sea is rather calm. Many large marlins are often landed in the months of July to August but the sea normally becomes pretty rough during the period due to the strong Southeast monsoon winds. Black Marlin can be encountered almost any time but again numbers increase January through March (Duncan McKenzie). Tagging mainly targets the sailfish and the marlins with all tagged fish released back to the waters. Other catches include the Tuna (Big eye tuna (*Thunnus obesus*), Long tail tuna (*Thunnus tonggol*), Skipjack tuna (*Katsuwonus pelamis*) and Yellowfin tuna (*Thunnus albacares*)), Kawakawa (*Euthynnus affinis*), Frigate tuna (*Auxis thazard*) Wahoo (*Acanthocybium solandri*), Barracuda (*Sphyraena spp.*), Cobia (*Rachycentron canadum*), Dolphin fish

(*Coryphaena hippurus*), Kingfish (*Scomberomorus commerson*), Sharks (Hammerhead (*Sphyrna spp*), Mako shark (*Isurus oxyrinchus.*), Silvertip shark (*Carcharhinus albimarginatus*) and Tiger shark(*Galeocerdo cuvieri*), Trevallies (*Caranx spp.*) and Rainbow Runner (*Elagatis bipinnulata*).

### 1.3. Data recording

Malindi Sea Fishing Club is one of the major recreational fishing clubs in north coast. Data is recorded on a daily basis in a hard cover note book. The data recorded contains the date, name of boat, species of fish caught; number caught total weight per species, and remarks on whether tagged, released, or retained. On average, 9 boats were noted to be in the ocean per day.



Photo 1: Sports fishing boats

## 2. Results and Discussion

### 2.1. Fishing Effort

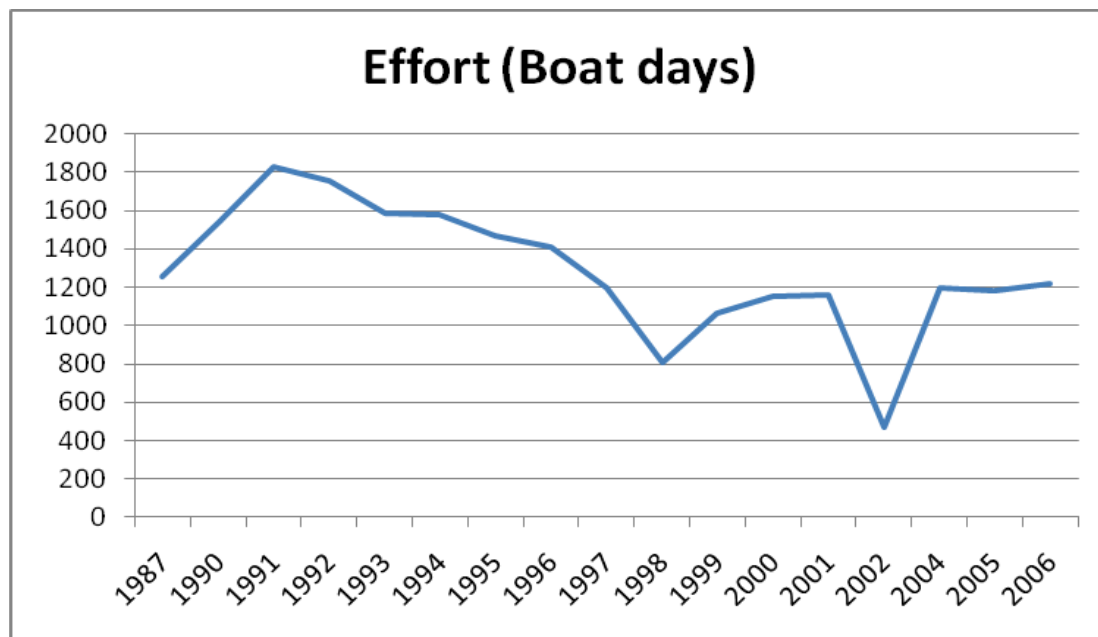
From the data recorded for 18 years provided by the club, more than 170 boats were recorded which made more than 22, 000 fishing trips. The table below summarizes the data recorded for the 18 years by Malindi sports-fishing club. In the year 2002,

the data available was for 6 months while 2003 had only one month's data. Due to this, both years have the lowest figures.

Year	Data available	No. of trips	Catch in No.	Weight in Kgs.
1987	Jan- Dec	1,259	7,918	71,865
1990	Jan- Dec	1,536	10,317	75,002
1991	Jan- Dec	1,827	12,753	120,222
1992	Jan- Dec	1,755	13,358	123,502
1993	Jan- Dec	1,585	10,696	123,231
1994	Jan- Dec	1,581	12,742	129,991
1995	Jan- Dec	1,468	12,404	110,764
1996	Jan- Dec	1,408	11,979	105,745
1997	Jan- Dec	1,198	8,459	81,174
1998	Jan- Dec	808	7,712	57,891
1999	Jan- Dec	1,061	9,936	84,922
2000	Jan- Dec	1,153	8,978	94,137
2001	Jan- Dec	1,161	8,384	99,491
2002	Jan- Jun	471	4,191	33,528
2003	Dec	157	1,452	23,213
2004	Jan- Dec	1,195	10,353	108,982
2005	Jan- Dec	1,182	10,553	94,680
2006	Jan- Dec	1,218	8,331	95,314

**Table 1: Malindi sports fishing effort from 1987 to 2006**

The catches for the year 2003 were thereby excluded from this analysis to avoid bias.



**Figure 2: Fishing effort for the Malindi sports fishing club**

The average fishing effort has reduced from the level of 1600 in the early 90s to 1200 trips yearly. This level has been maintained to date. During the year 2002 and 2003, there is a missing gap from the records and hence this is not the true reflection of the total fishing effort. In the year 1998, the number of trips reduced drastically due to the *el nino* rains that continued from January to March thus reducing the number of fishing trips.

## 2.2. Catch per unit effort

From the reported catch over the 18 years period, the Catch in numbers per day for each species was used to come up with the CPUE indices for each species. The reported Nerritic tuna in the sports fishing are Kingfish, Kawakawa and frigate tuna. There are various species of the Kingfish that are reported together and so this report will not detail on them as they are not reported at species level. The total catch in number of each species showed variation and the results for kawakawa and frigate tuna species are reported below.

### 2.2.1. Frigate tuna

The catches of frigate tuna throughout the 18 years period generally fluctuated between 0.2 to 0.6 fish per day with an average of 0.4 fish per day being reported. The only exceptions were the years 2002 and 2005 when catches of 1.5 and 1.7 fish per trip respectively were reported.

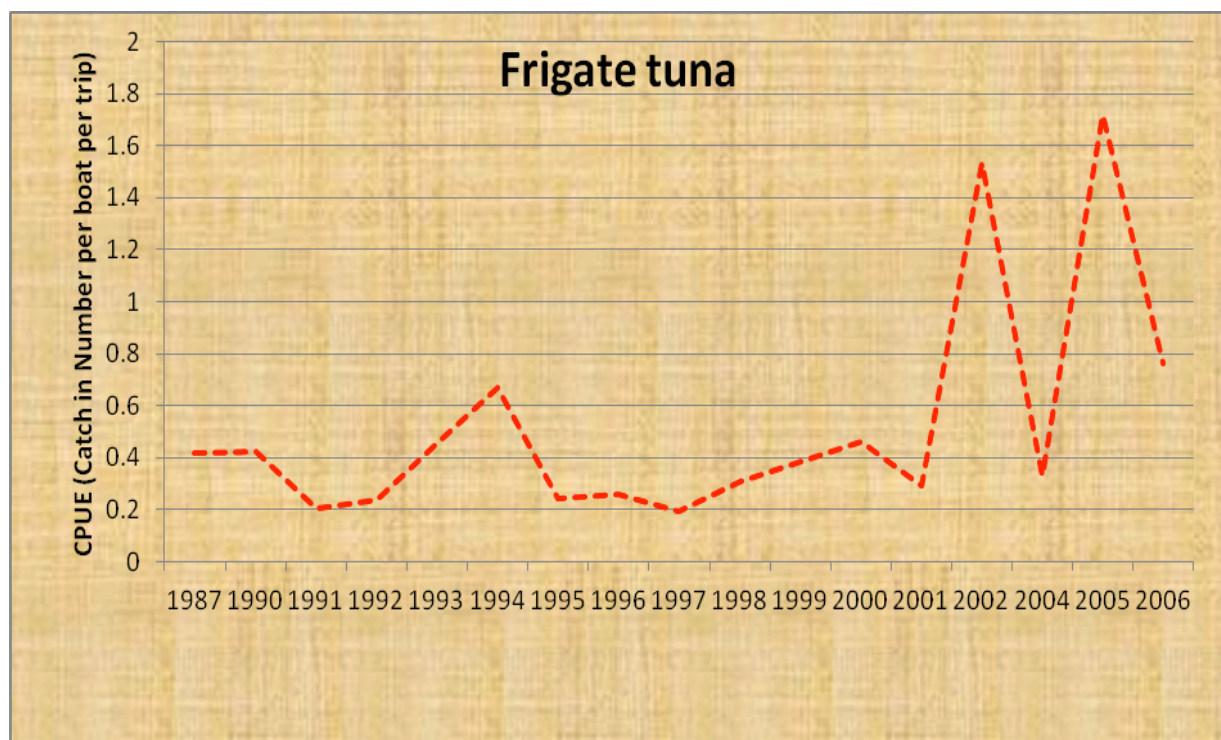


Figure 3: Frigate tuna CPUE

### 2.2.2. Kawakawa

Of the three neritic tuna species caught in the Kenyan waters, Kawakawa are the most abundant. Over the 18 years period, the catches of kawakawa can be grouped into three time periods based on the number of catches. The first period can be taken from 1987 to 1994 when the catches averaged at around 1.1 fish per trip. The second period is between 1995 and 2000 where the CPUE went up to about 2.4 fish per trip. The third period is from 2001 to 2006 when the catches went back to the post 1995 level of 1.1 fish per trip. During this period, the year 1998 had the highest CPUE at 3.4 fish per trip while the year 1991 had the lowest CPUE at 0.5 fish per trip. As well illustrated in figure 5, the catches of kawakawa varied a lot between the years and were not like those of frigate tuna that were relatively constant.

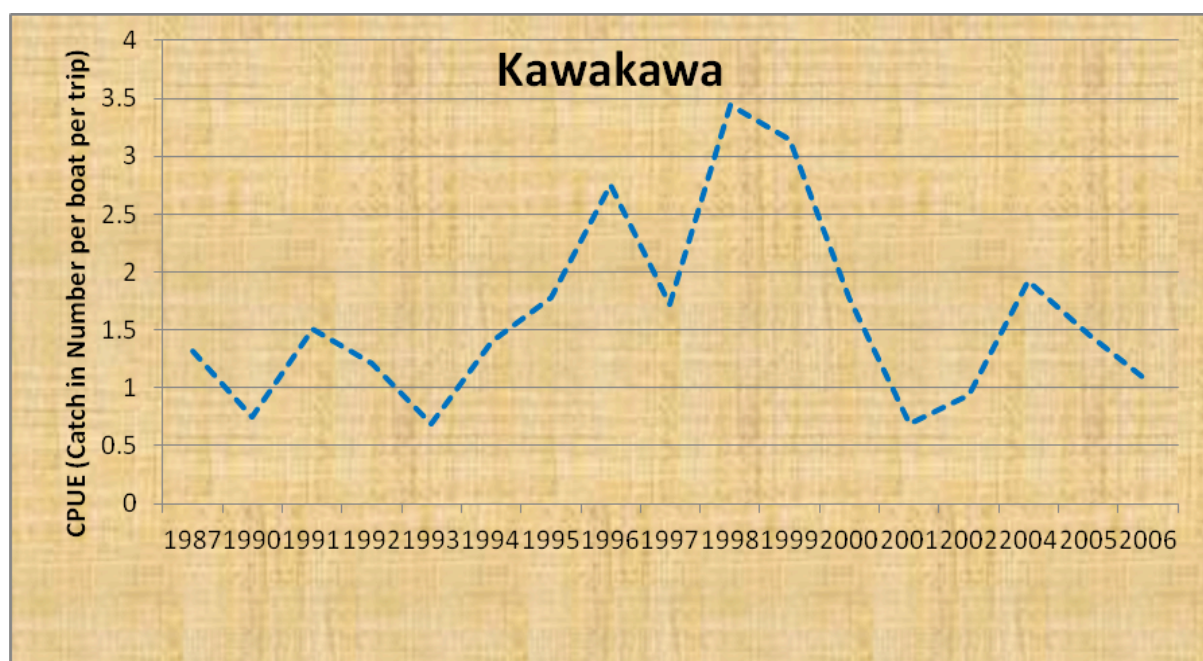


Figure 4: Kawakawa CPUE

### 2.3. Average Weight

As shown in figure 5, the average weight of individual frigate tuna remained relatively the same throughout the period at 1.1 Kgs. The weight however fluctuated for the kawakawa during this period. The weight showed a similar trend to the catch in numbers which had three distinct periods. During the years 1987 to 1994, the average individual weight of kawakawa was 2.1 Kgs. The years between 1995 and 2000 were a period when the average individual weight of kawakawa went down to 1.5 Kgs. This period also happened to be having higher catches of kawakawa than the previous and later periods of the fishery. The average weight for individual fish caught increased to the pre 1995 level of 2.1 Kgs per fish between 2001 and 2006.

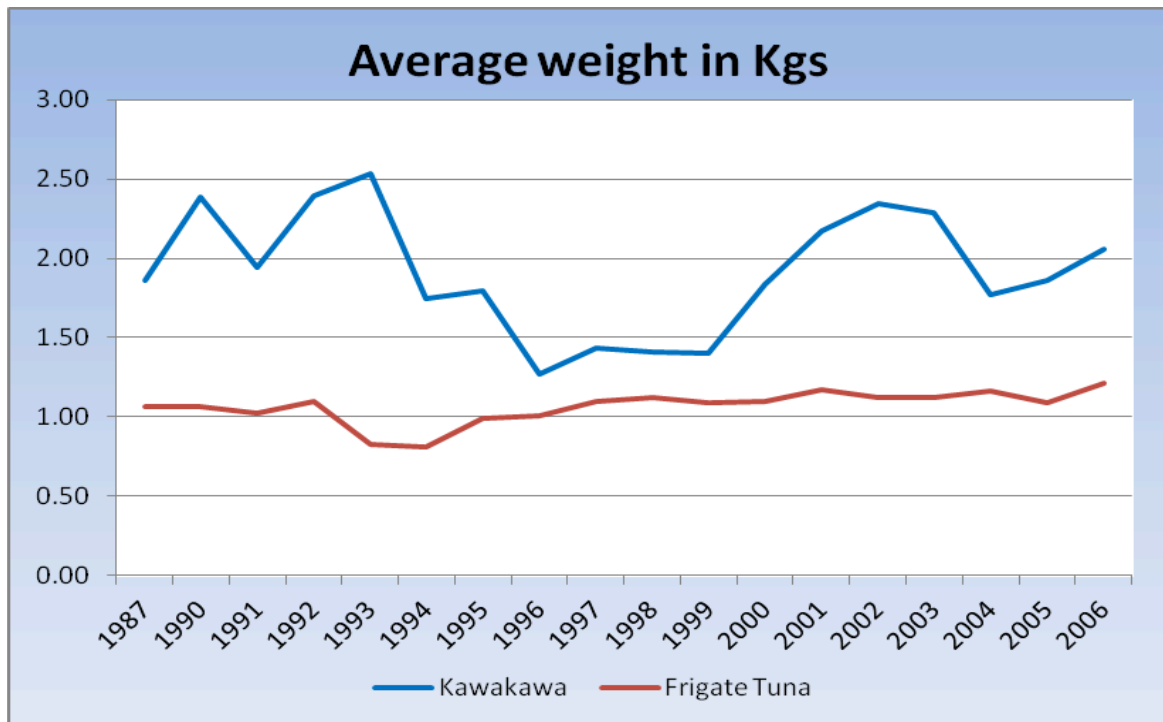


Figure 5: Average Catch in Kgs for Frigate and Kawakawa

## 2.4. Temporal distribution

### 2.4.1. Kawakawa

The monthly catches throughout the period was analysed and a quarterly distribution of the catches arrived at. From the distribution, the kawawa were found to be more during the first quarter of the year, starting in January to March. The period contributed to 46% of the total kawakawa catches. This means that nearly half of the total catches of kawakawa can be traced to the first quarter of the year. The fourth quarter of the year also had the second highest catch representing 31% of the total catch. The rest of the period accounts for roughly a quarter of the total catch.



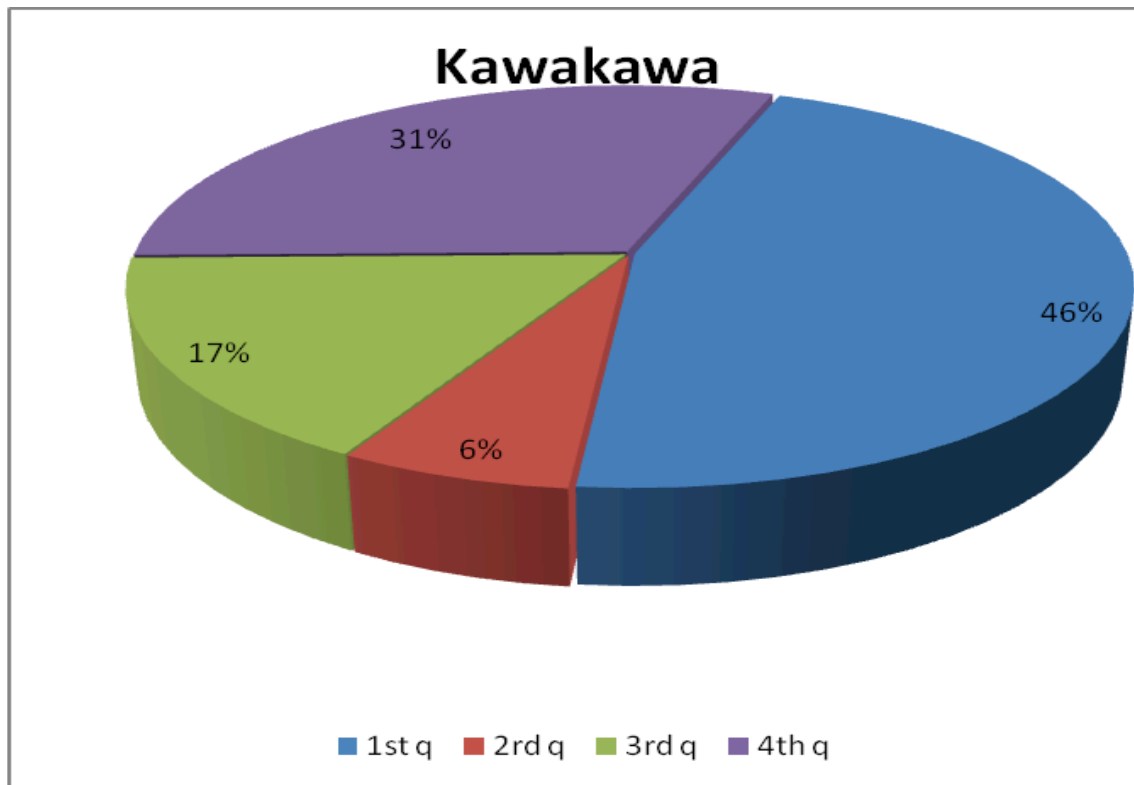


Figure 6: Temporal Distribution of Kawakawa

#### 2.4.2. Frigate tuna

The catches of frigate tuna were almost entirely realized during the first quarter of the year. This period accounts for 70% of the total catches during the 18 years period. The other seasons account for only 30% of the total catch. The period of January to March is the most ideal for targeting frigate tunas in the Kenyan waters.

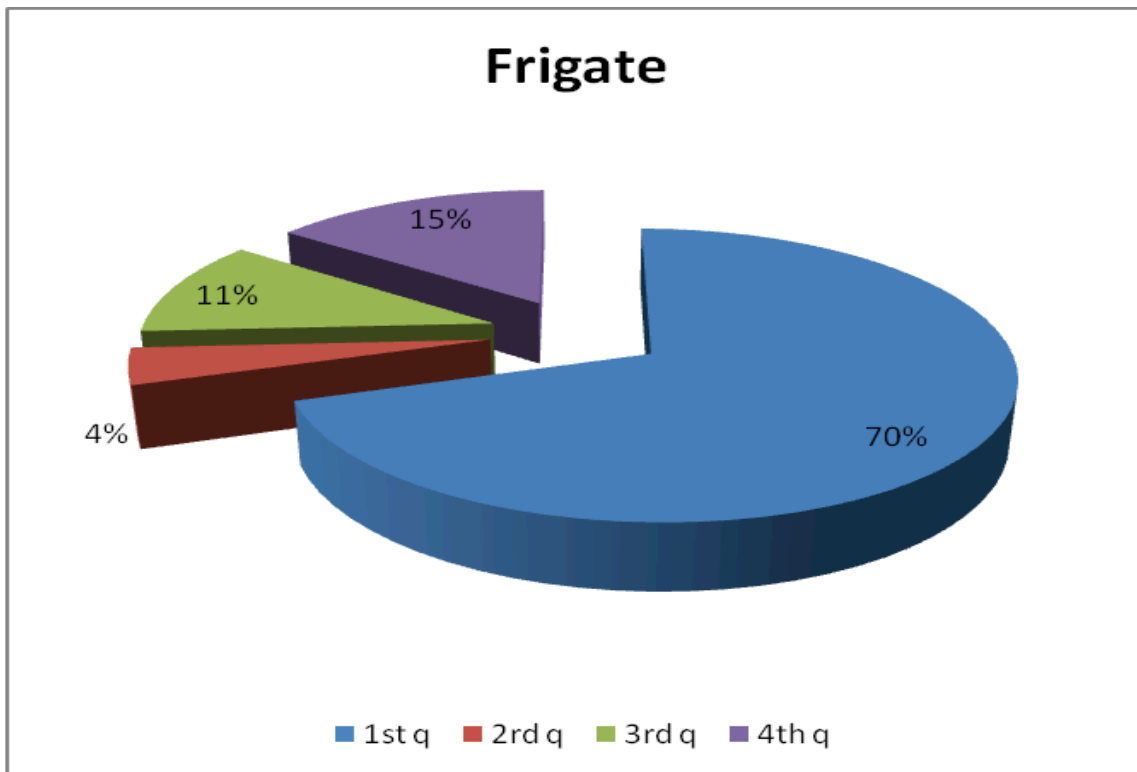


Figure 7: Temporal distribution of Frigate tuna

### 3. Conclusion and way forward

The catches of nerritic tuna are highest during the first quarter of the year followed by the last quarter of the years. The catches of sports fishing can be used as an indicator of the index of abundance of the fish species. Monitoring of the sports fishing catches in the region could also add more information to the working party on nerritic tuna. There is need to improve on the data collection by recording Length, maturity status, feeding habits etc for more understanding on the nerritic tuna species.