
Preliminary analysis of catch trends of narrow-barred Spanish mackerel *Scomberomorus commerson* caught from recreational trolling line fisheries in Kenya

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Abstract

Recreational trolling line fisheries is becoming increasingly important in Kenya due to increased participation and fishing power, total catch is considered significant especially when compared to the artisanal commercial fisheries. The catch composition is varied with a total of fifteen pelagic species commonly landed. This paper provides a preliminary analysis of the nominal catch trend of narrow barred Spanish mackerel *Scomberomorus commerson* caught by recreational trolling line boats over a twenty year period. Data was obtained from retained daily landings of narrow-barred Spanish mackerel from recreational boats reported at each sport fishing club. Nominal catches and effort are highly variable depending on vessels activity with the highest ever recorded annual catch reaching 8 tons and showing a general declining trend in the recent years. Great variability was observed in the nominal catch per unit effort with an observed distinct cycles of high and low nominal catch rates.

Introduction

The narrow-barred Spanish mackerel (often referred to as kingfish), *Scomberomorus commerson* (Lacepède, 1800) are large, valuable, tropical epipelagic fish in the Scombridae that are targeted throughout the Indo-West Pacific region by commercial, recreational and artisanal fishers (Grandcourt *et al* 2005). *S. commerson* occurs from the edge of the continental shelf to shallow coastal waters where it is found along drop-offs, gently sloping reefs and lagoon waters from depths less than 100m (Claereboudt *et al*, 2005). They are reported to have lengthy long-shore migrations (Grandcourt *et al* 2005), but permanent resident populations also exist. It is found in small schools, feeds primarily on small fishes like anchovies, clupeids, carangids, squid, and penaeid shrimps (Collette *et al* 2011).

S. commerson can reach a size of 230 cm in fork length (FL) and 59 kg in weight. The mean length at which 50% of *S. commerson* are sexually mature (data for all regions combined) has previously been estimated at 809 mm FL \pm 9.8 SE (898 mm TL) for females and 628 mm FL \pm 13.8 SE (706 mm TL) for males, the estimated mean age at 50% sexual maturity 1.4 yrs for females and 0.8 yrs for males (Newman *et al* 2012). Several sub-regional stock assessment in the Western Indian Ocean report this species to be under heavy fishing pressure, with some estimates of fishing mortality in the Arabian Gulf between two and four times over the optimum (Collette *et al* 2011). In Kenya no stock assessment studies have been conducted for this species.

Locally, *S. commerson* is targeted by commercial small scale artisanal fishers caught by line and gillnet fishing gears. Over 200 small wooden planked or fibre glass crafts are actively engaged in fishing for Kingfish. Commercial catches from artisanal fishers have remained modest at about 100 - 150 tonnes over the years. *S. commerson* is also a key target species by recreational anglers. Retained catches from recreational trolling fisheries can be as high 17 tons a year and this is considered important and may have implications for its sustainability and the broader ecosystem of which they are a part.

Recreational trolling line fisheries in Kenya are historically restricted to more affluent individuals including tourists owing to the technical fishing expertise required and high capital and trip costs. The main target species being marlins, sailfish (istiophoridae), swordfish (Xiphidae) and tuna (scombridae). The narrow barred Spanish mackerel is a retained non-target species in the recreational trolling fisheries in Kenya. They are caught by trolling line with baits and artificial lures by sport-fishing enthusiasts using chartered boats.

Recreational fisheries despite their small fleet sizes, their efficiency have demonstrated to have a significant impact on populations of target species, particularly those that are already exploited by commercial fisheries (Zischke *et al* 2012). Furthermore, as recreational fisheries generally use different techniques than commercial fisheries targeting the same species the age composition of the catch may also differ and are important considerations for both stock assessments. This paper presents preliminary analysis of the catches of narrow-barred Spanish mackerel *Scomberomorus commerson* caught by recreational trolling line fisheries in Kenya and characterises the catches and the overall trend in catch per unit effort over a twenty year period.

Materials and methods

Study area and description of the fishery

The recreational trolling line fishery is practiced by sport fishing clubs located along the entire Kenyan shoreline; the highest concentration of the fishing fleet is located in Kilifi County (Watamu and Malindi areas). This area accounts for more than 50 % of all the recreational kingfish catches in any particular year. Fishing locations outside this area were not included in this study. The common fishing locations are indicated in Figure 1 on the Watamu and Malindi banks and reef drop offs. Fishing has distinct high seasons and low seasons related to the tourist season. Organised tournaments for participating fishermen are also common.

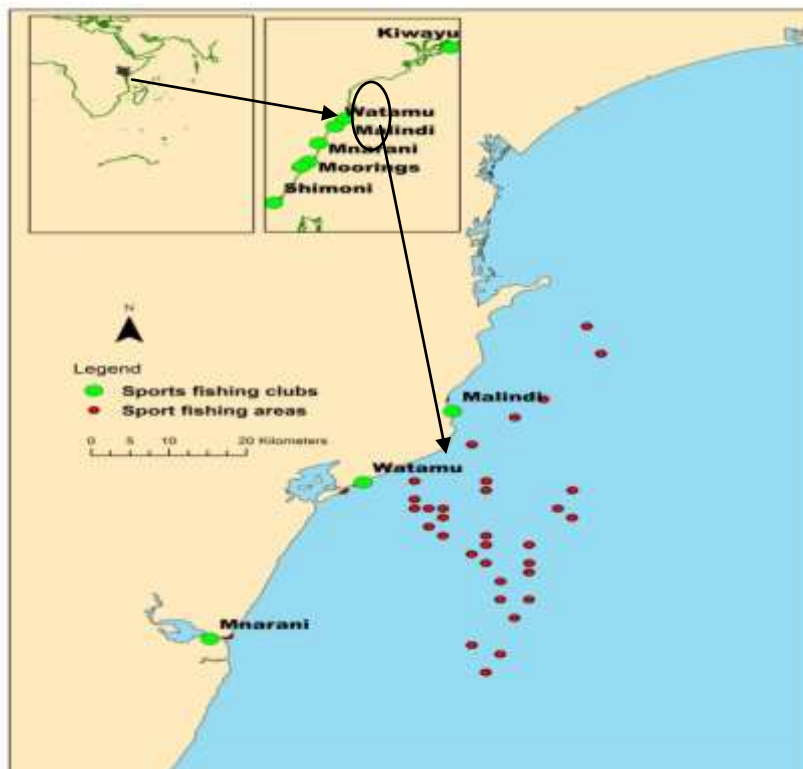


Figure 1: Map of Africa showing location of Kenya (inset) Location of all the sport fishing clubs along the Kenyan shoreline (inset) and the main fishing sites for the region under study

Catch and Effort data:

Retained catch data of narrow-barred Spanish mackerel was obtained from daily vessel records kept by each respective sport fishing club using a systematic data recording protocol that is coordinated by the Kenya Sea Anglers Association from 1999 to 2009. Fishing effort data was similarly obtained from daily boat activity records from these sport-fishing clubs. Due to the excellent cooperation between the sport fishing clubs and the department of fisheries, with the support of IOTC-OFCE project this data was stored in a database. Excluded in this analyses include data for years 1995-96 and 2002-03 where the available data is incomplete. Catch and effort statistics were analysed to describe the trends in catch, effort and Catch per unit effort.

Results

Profile of fish sizes in Catches

A total of 3,172 records of retained individual weights of fish in catches show the size of Spanish mackerel in catches range from a low of 1 kg to 39 kg size fish which was a record size recorded over the twenty years (figure 2). The mean weight in catches is 7.8 kg showing variability over the years with the mean individual weight of fish in catches showing a stable increasing trend (Figure 3).

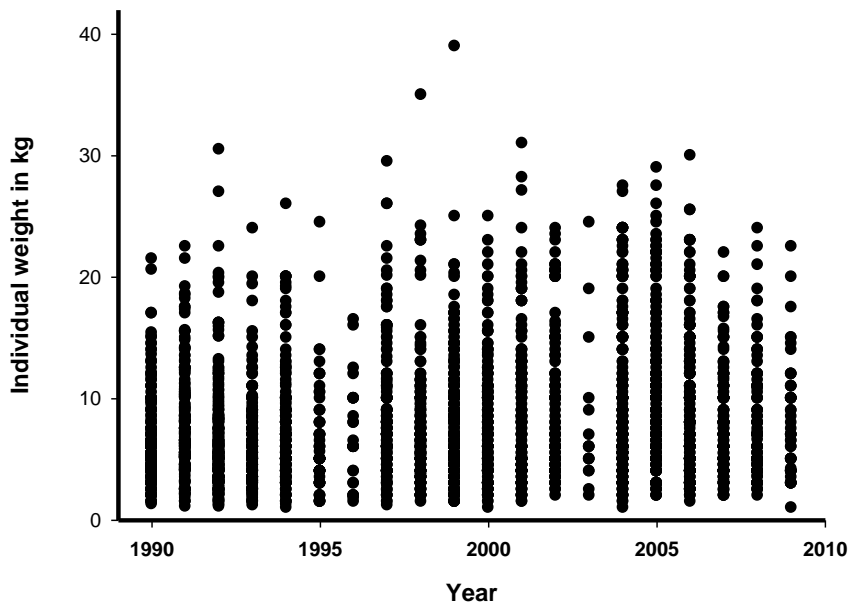


Figure 2: Scatter plot of retained individual weight of fish caught in recreational trolling line fisheries in Kenya

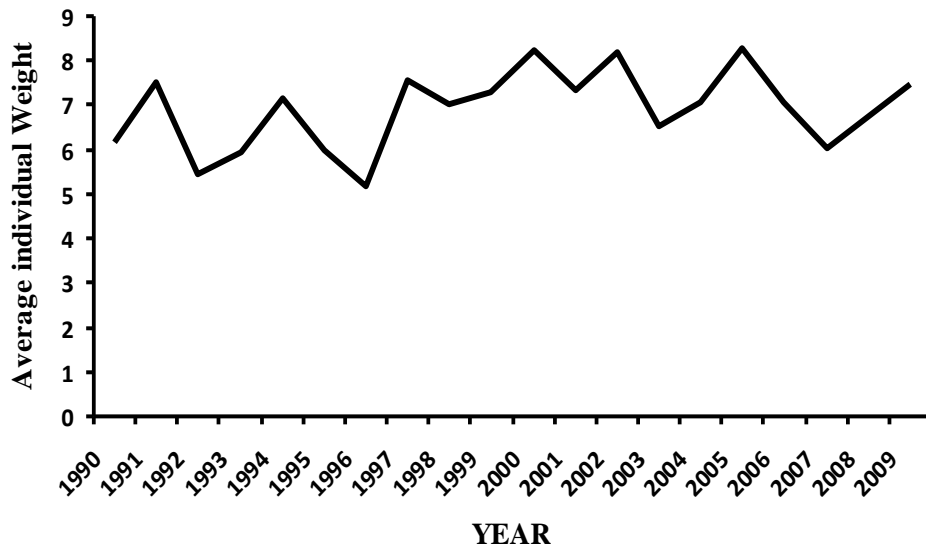


Figure 3: Annual variation of mean individual weights of fish in catches

Nominal Catches

The nominal catches recorded over the 20 year period were 63 tons. Annual fluctuations in catches are observed due to the variations in the total number of active vessels. The annual recorded catch was low in 1999 at 2.03 tons in 1991 and increased steadily to peak at 8.5 tons in 2004. The subsequent years have recorded declines in nominal catches to low of 1.4 tons in the year 2008 (Figure 4). The nominal catch records for 1995-1996, 2002-2003 and 2009 are incomplete and therefore not included.

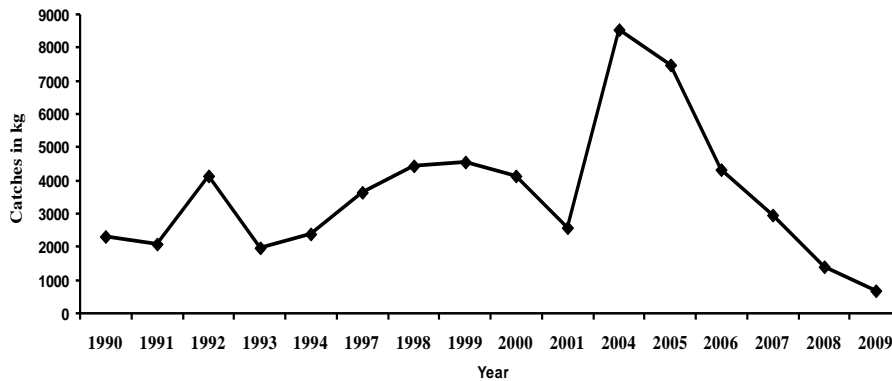


Figure 4: Nominal catches in Kgs 1990-2009 (incomplete catch records 1995-1996, and 2002-2003)
Nominal effort

The nominal fishing effort was expressed as the number of boats * the number of fishing days and expressed as boat*days. The nominal fishing effort in boat days shows an overall steady decline from 1990 to 2007 with annual variations from year to year. The decline is more drastic from 2007 mainly attributable to increased pirate activities off the coast of Somalia (Figure 5). The highest recorded fishing effort was 1,827 boatdays in 1991 and declined to a low of 833 boat days in 2008. The main fishing season is from September to March with annual peaks in boat activities in the month of January and February. April to July are low season with low boat activity.

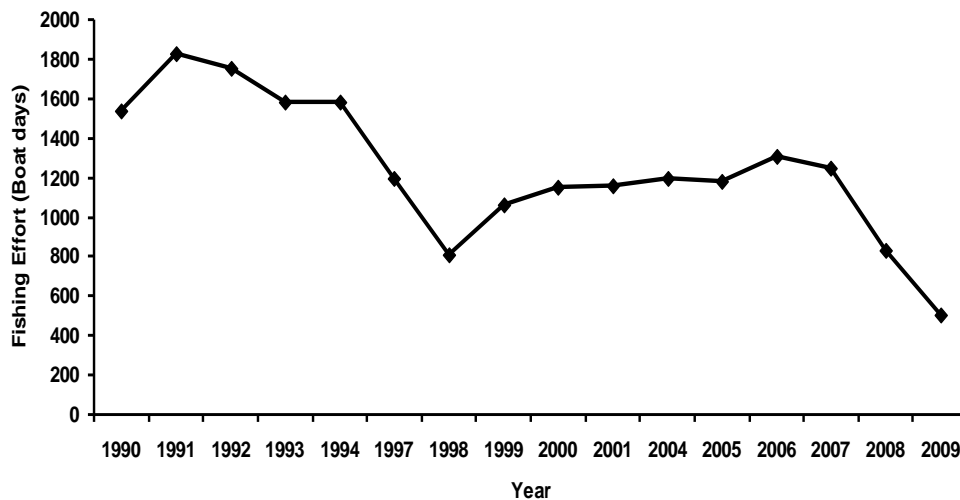


Figure 5: Annual fishing effort (boat days) 1990-2009

Nominal catch per unit effort

The nominal catch per unit effort was calculated as the total weight of catch (kg)/total fishing effort (boat*days). The catch rates show great variability with two distinct cycles of high and low catch rates over the twenty year period. The lowest recorded catch rates were 1.3 Kg/boat/day in 2009 and highest catch rates recorded of 7.1 kg boat⁻¹ day⁻¹. Two peaks are discernible from the nominal CPUE curve in 1998 and the highest in 2004 (Figure 6). Catch per unit of effort has been declining since peaking in 2004 with recent annual estimates of 1.6 kg/boat/day in 2008.

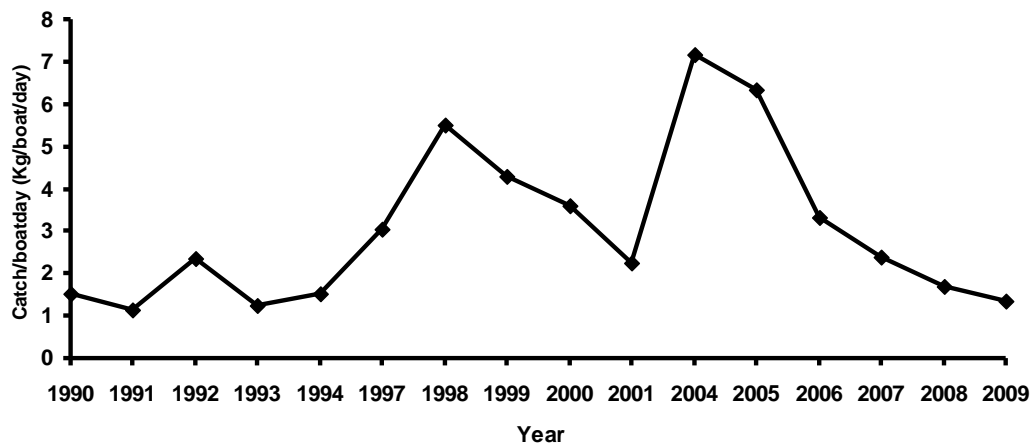


Figure 6 Nominal catch per unit effort 1999-2009 (Missing data 1995-1996, and 2002-2003)

Discussion

The observed large annual and monthly variations in the nominal catches and nominal catch rates may in part explained by the changing fishing tactic and skill of the sport fishers. In general terms, the variability of the fisheries catch data may be attributed in part to the skill and experience of each individual recreational fisherman to locate and catch *S. commerson*, Recreational fisheries enthusiasts can be of professional, or beginner level, each with varying fishing skills and even though with similar fishing resources can result in the variability in the catches. The seasonal variation in fishing effort is a function of the tourist season with the main fishing season coinciding with the tourist season starting from September and ending in April. The months of April to August are low seasons due to low tourist numbers. The declining trend of fishing effort is due to the problem of piracy off Somalia coast.

Recreational fisheries are increasingly contributing significantly to the total catches and should not be ignored in future stock assessment. This paper characterizes the catch and effort trends of recreational *S. commerson* fishery in Kenya. More reliable estimates based on observers and periodic monitoring of catch and catch rates are necessary. It is imperative for the Kenyan fisheries authorities to implement a catch monitoring and reporting scheme as recommended by IOTC resolution of data reporting for both commercial and recreational trolling line fisheries to facilitate future stock assessments.

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