

**Update on the catch and bycatch composition of illegal fishing in the British Indian Ocean Territory (BIOT) and a summary of abandoned and lost fishing gear.**

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## Introduction

IOTC-2013-WPEB09-56 Rev\_1 presented the results of analysis on the catch taken from vessels detailed for illegal fishing with the British Indian Ocean (BIOT) between 2007 and 2013. It included catch data from 37 vessels based on measurements and estimates made by the Senior Fisheries Protection Officer (SFPO). This paper gives a brief update based on catches from a further 15 vessels, detained on suspicion of fishing illegally in BIOT waters during 2014 and 2015. The amount of information collected will vary between vessels depending on the time available to the SFPO, priority is given to identifying and estimating the weight of key species and if time allows length measurements can also be taken. A summary of the length measurements taken from shark species was given in the previous paper, no new measurements have been taken and this has not been updated.

As with previous years the majority of vessels detained have been using longlines and nets, however 2014 and 2015 did see a number larger vessels detained that showed a significantly higher catch volume and composition. A number of trawlers were also seen by the patrol vessel in inshore waters, however it was not possible board and inspect them to assess the catch composition of if they had been fishing illegally.

Finally this paper brings to the attention of the WPEB an apparent recent increase in lost or abandoned fishing gear during 2014 and 2015, the majority of which have been fish aggregating devices (FADs) that have been found washed on shore.

## Location of detentions

Most detentions have been made in inshore areas around reefs, with fewer taking place outside the island archipelago (Figure 1). Although the location of the detentions is not necessarily an indication of where they were fishing, the catch composition does tend to be mainly made up of reef species suggesting the majority of fishing does take place in the shallower waters around the reefs.

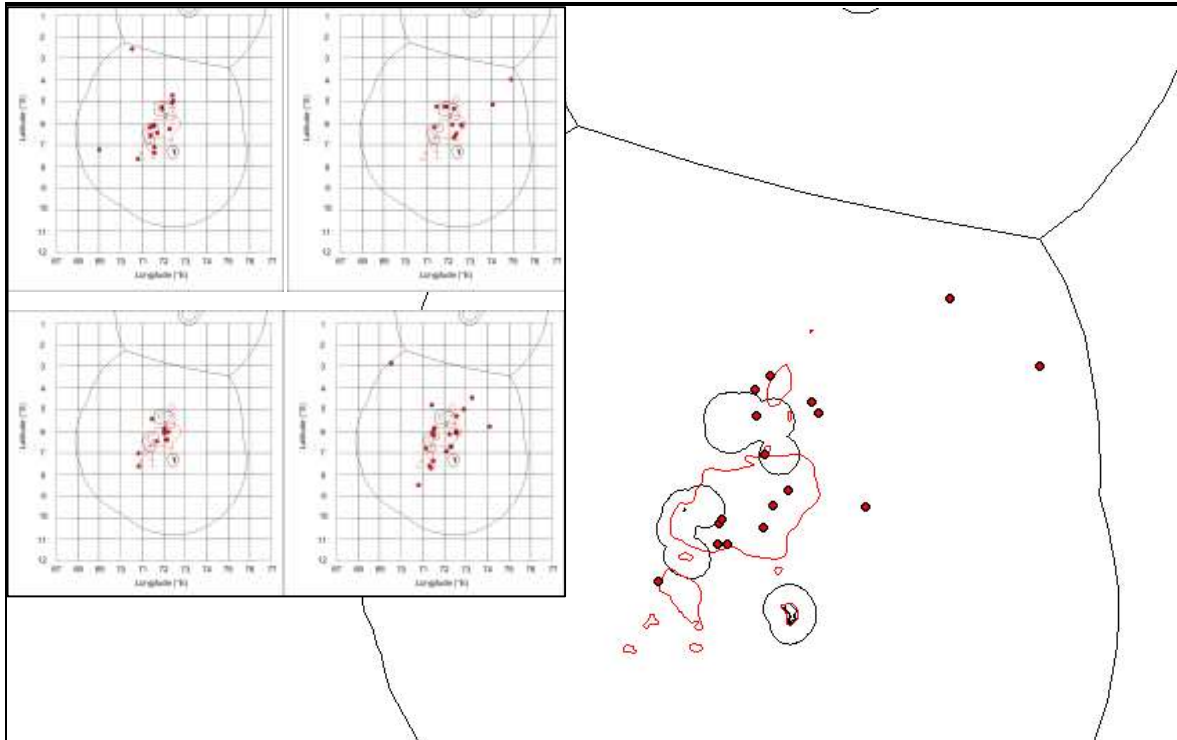


Figure 1. Map showing location of detentions in the BIOT MPA during 2014 and 2015. Insert, arrests in previous years, clockwise from top left - (i) 2001-2003, (ii) 2004-2006, (iii) 2007-2009 and (iv) 2010-2013.

## Number of detained vessels

Between 1 and 12 detentions have taken place annually since 1996 (Figure 2) with the two highest years, 2010 and 2014 being since the declaration of the MPA in 2010.

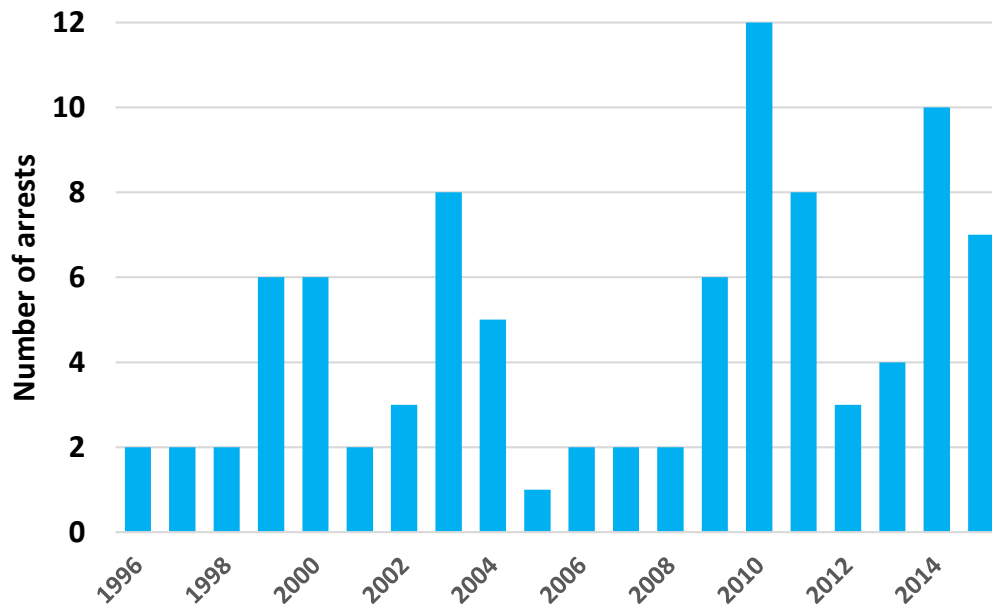


Figure 2. Number of arrested vessels in BIOT by year.

## Gear

The fishing gear observed on board detained vessels was similar to that in previous years and mainly consisted of pelagic longlines and drift or gill nets, used separately or connected together. Since December 2014 seven larger vessels, approximately 20 meters LOA, have been detained and been found to be using more demersal gear such as deep sea gillnets and longlines. They have a larger capacity than previously detained vessels, between 13 and 15mt, compared to 5mt. Regardless of the longline type, wire trace was present on over 90% of boats.

## Catch composition

Catch data available for analysis were limited, based on what had been recorded at the time of detention. Data from 2006-2015 are analysed below. The mean total catch on board (where catches were present as two boats had no catches on board) was 2,558 kg and 386 individuals, based on weight figures from 35 vessels and numbers of individuals from 30 vessels. Sharks were present on 91% of vessels which had catch on board, of which two vessels had finned sharks. Where present, the mean weight of sharks on board was 2,344kg and the mean numbers 146. This formed 60% of the total catch numbers and 80% of the

total weight. The remaining species comprised predominantly tuna, jobfish and mixed reef fish.

Figure 3 provides a summary of the number of identified shark species observed on arrested vessels between 2006 and 2015. These data should be interpreted cautiously, however, as the figure excludes 2826 sharks which were observed in vessel catch but not identified to species level. This low level of species identification may have been because the SFPO did not have sufficient time in addition to patrol activities, or alternatively because catches were already partially decomposed or part-processed. Indeed five vessels were recorded as carrying part-processed shark, shark fins or shark meat. Moreover shark species which have clearly identifiable distinguishing features are also likely to show higher relative abundance. Nevertheless the data provide an indication of the main species caught, and catch was made up predominantly of reef sharks; specifically blacktip reef (*Carcharhinus melanopterus*), silvertip reef (*C. albimarginatus*) grey reef (*C. amblyrhynchos*) and whitetip reef (*Triaenodon obesus*). These were followed by the tiger shark (*Galeocerdo cuvier*), hammerhead (Sphyrnidae) species, oceanic whitetip (*C. longimanus*) and blue (*Prionace glauca*).

Figure 4 provides a summary of the number of identified non-shark species (excluding reef fish species such as snapper, grouper and emperor) observed on arrested vessels in the same time period. The catch statistics were dominated by jobfish (*Pristipomoides filamentosus* & *Aprion virescens*), although these mainly from two of the larger vessels and are not included in Figure 4, and several species of tuna, specifically yellowfin (*Thunnus albacares*), skipjack (*Katsuwonus pelamis*), kawakawa (*Euthynnus affinis*) and tuna species not elsewhere included. Other large carnivorous fish such as barracuda (Sphyrnaeidae) and trevally (Carangidae) also feature prominently in the observed catch.

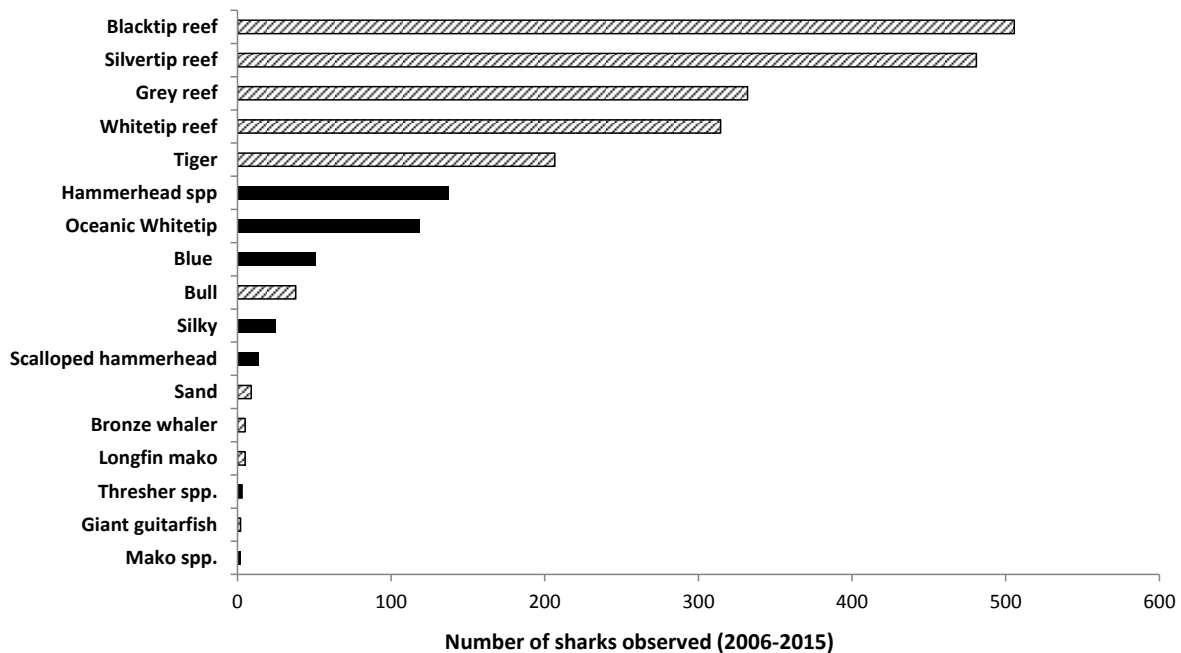


Figure 3. Numbers of sharks (identified to species level) observed on board arrested vessels between 2006 and 2015 (based on records from 44 vessels). Species of interest to WPEB are represented by solid bars.

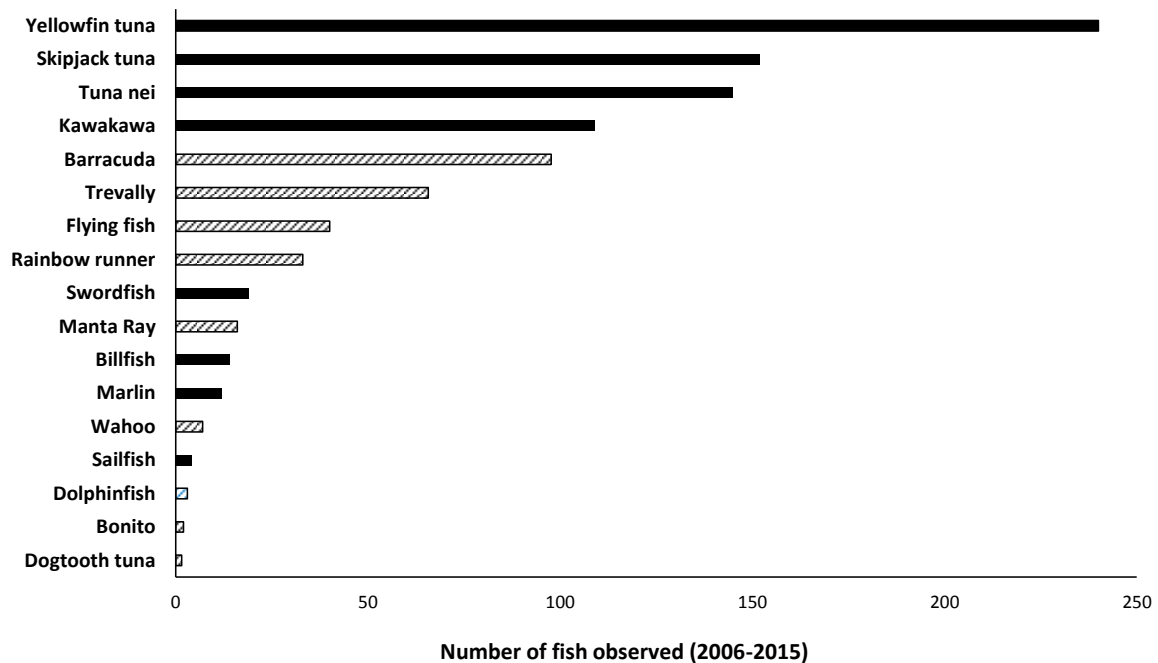


Figure 4. Numbers of identified non-shark species (excluding reef fish) observed on board arrested vessel between 2006 and 2015 (based on records from 44 vessels). Species of interest to WPEB are represented by solid bars.

IOTC-2013-WPEB09-56 Rev\_1 attempted to estimate the total removals of all fish species in general and shark species in particular based on the assumption that the BIOT Patrol Vessel (BPV) only intercepts a proportion of the vessels that are fishing illegally within the MPA. The potential number of vessels fishing illegally in BIOT has previously been estimated by Price et al. (2010) which resulted in a range from 30-60 up to 100-200. Although these ranges are unlikely to be accurate given such high uncertainty and anecdotal methods of estimation, they provided a starting point for exploratory catch predictions and have been used in this update for continuity. The total annual catch can therefore be estimated from the mean total catch for all vessels for which catch information is available (including vessels which had no catch on board) multiplied by these estimates (Table 1). The estimated total removals of fish has increased by around 36% by weight and 100% by numbers from the previous estimations. This is due to the inclusion of the catches from the recently detained larger vessels and implies they are catching larger numbers of fish. Based on these figures, total catch could be in the region of 73-484 t or 11,000 -72,000 specimens. Shark catches alone also increase by weight, although the numbers remain similar to previous estimations: catches might range from 58 -385 t or 4,000 – 26,000 specimens. These estimates will continue to be refined as more catch data become available.

Table 1. Predicted total catches based on estimates of vessel numbers (Price et al., 2010)

Number of vessels	Total catch		Shark catch	
	Weight (t)	Number	Weight (t)	Number
200	484	72,363	385	25,615
100	242	36,181	193	12,808
60	145	21,709	116	7,685
30	72	10,854	58	3,842

## Lost and abandoned fishing gear

In addition to gathering evidence from the catch of arrested illegal fishing vessels, patrols have also recently recorded several encounters with abandoned or lost fishing gear, mainly fish aggregating devices (FADs), in 2015 in BIOT waters. While abandoned gear has been encountered in the past it has been a relatively rare occurrence, between March and April 2015 however 18 items were found. Details of these items, and others found in 2015, are summarised in Table 2. All but one of these items, a longline flag found in the water on Grande Ile Mapou, were FADs, where possible the name and flag of the deploying vessel is also given.

**Table 2. Record of abandoned or lost FADs encountered during patrol activities.**

Date	Location	Name of deploying vessel	Flag
15/02/2015	Ile de la Passe (PB) - oceanside	Erroxape	Korea, D. R
24/03/2015	Grande Seour - oceanside	T Gorri - Possibly Txori Gorri	Spain
15/03/2015	Petite Ile Bois Mangue - oceanside	Alakrana	Spain
24/03/2015	Ile Monpatre - oceanside	Elai Alai	Spain
24/03/2015	Ile Gabrielle - oceanside	Dolomieu	France
24/03/2015	Grande Ile Mapou	Unknown	N/A
27/03/2015	Petite Ile Coquillage - oceanside	Unknown	N/A
27/03/2015	Petite Ile Coquillage - oceanside	Albacan	Spain
29/03/2015	Ile de la Passe - oceanside (SI)	Unknown	N/A
01/04/2015	Ile Anglaise (SI)	Manapany	France
01/04/2015	Ile Anglaise (SI)	Izurdia	Spain
04/04/2015	Nelson's Island	Manapany	France
05/04/2015	Middle Brother	CSM - Possibly Cap Saint Marie	France
06/04/2015	South Brother	Glenan	France
07/04/2015	Eagle Island	B. Isle - Possibly Belle Isle	Mauritius
06/04/2015	South Brother	Unknown	N/A
07/04/2015	Eagle Island	Unknown	N/A
07/04/2015	Eagle Island	Unknown	N/A
10/04/2015	Ile Sudest	Unknown	N/A
24/05/2015	Ile-duCoin	Campolibre 8 981	Spain
01/08/2015	Moresby and St Brandon Islands	Belouve	France

The risk to some animals posed by FADs was demonstrated by the sighting of a juvenile green turtle trapped in the netting of a FAD which washed up on Ile Anglaise (Figure 5), although in this case the turtle was released alive. It should be noted that, following IOTC Resolution 13/08, it is recommended that the sub-surface component of a FAD is made from non-meshed materials such as ropes or canvas sheets instead of netting. FADs evidently utilising netted material were encountered on a number of occasions.



Figure 5. Juvenile green turtle found trapped in a FAD washed up on Ile Anglaise on the 1<sup>st</sup> of April 2015.

Abandoned fishing gear is only encountered opportunistically, while on patrol, rather than during any systematic surveys so the numbers and locations may not represent the true extent of gear in BIOT. The locations are given in Figure 6, most of the gear was found washed up on shore, on the seaward side or trapped on the seaward side reef.

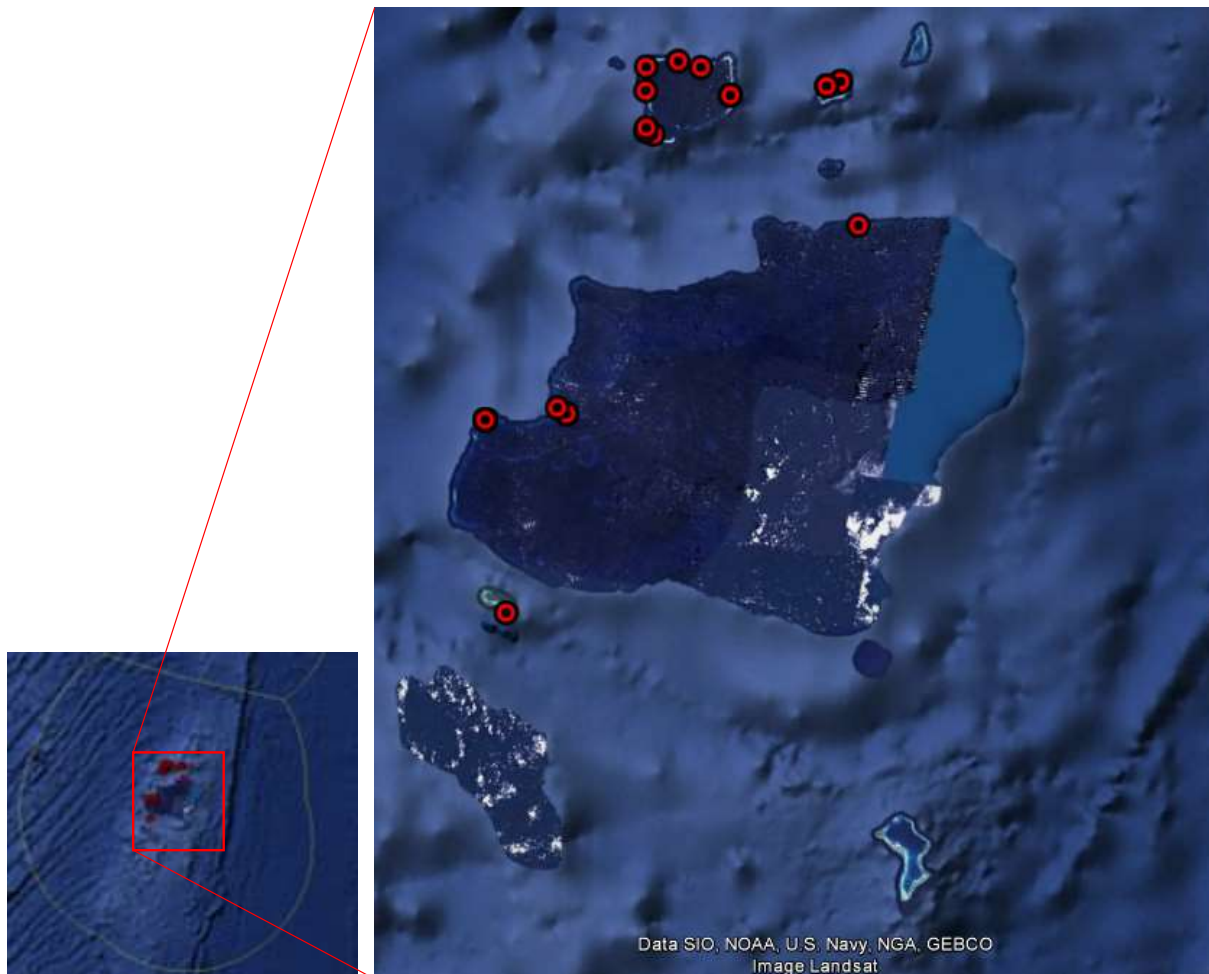


Figure 6. Location of lost and abandoned fishing gear found in BIOT waters in 2015.



## Conclusions

This paper provides a brief update to IOTC-2013-WPEB09-56 Rev\_1 on the information obtained from the illegal fisheries operating in BIOT. The majority of arrests continue to take place in inshore areas with, in respect of the recent vessels and mainly attributable to the larger vessels that appear to fish differently from the typical smaller vessels observed in the past, most species recorded being associated with reefs and shallower waters. Sharks are the primary target species for these vessels, present on 91% of vessels with landings on board and comprising 79% of the catch (by weight) of those vessels.

The estimated overall removals of fish species, and sharks in particular, has increased since 2013. This is due to the observation of a greater number of larger vessels with significantly higher catches than previously seen.

This paper also provides information on the apparent recent increase in encounters with lost or abandoned fishing gear. As this information hasn't been collected systematically in the past, evidence of this trend is only anecdotal, however more comprehensive information will be collected on encounters in the future so more detailed analysis can be carried out.

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