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Seychelles National Report to the Scientific Committee of the Indian Ocean Tuna Commission, 2013-2014

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INFORMATION ON FISHERIES, RESEARCH AND STATISTICS

In accordance with IOTC Resolution 10/02, final scientific data for the previous year was provided to the Secretariat by 30 June of the current year, **for all fleets other than longline**	Yes 02/07/2014 Purse seine and locally based longline fleet
In accordance with IOTC Resolution 10/02, provisional **longline data** for the previous year was provided to the Secretariat by 30 June of the current year	YES 02/07/2014 Final industrial longline data for 2013 will be submitted to the Secretariat by 30 December of the current year

EXECUTIVE SUMMARY

The Seychelles National Report summarizes activities of the Seychelles' fishing fleet targeting tuna and tuna-like species in the WIO for the year 2013 in comparison with previous years. It also summarizes research, and data collection related activities as well as actions undertaken in 2013 to implement Scientific Committee recommendations and IOTC Conservation and Management Measures.

The Seychelles purse seine fleet which consisted of eight purse seiners for the previous 3 years, was reduced to 7 vessels in 2013 whilst the number of supply vessels increased from 3 to 4. In general nominal effort has been on a downward trend over the past 5 years, and it further declined by 324 days (15%) in 2013, which can be attributed to the drop in the number of purse seine vessel.

The total annual catch reported by the purse seine fleet decreased by 33% between 2010 and 2012. However despite the drop in fishing effort the total annual catch increased by 13% from 50, 938 MT in 2012 to 57,324 MT in 2013. Catch rate increased by 7.81 MT/Fishing day to reach 31.69MT/Fishing day in 2013 compared to 23.88 MT/Fishing day in 2012. Even though yellowfin tuna was the dominant species caught making up 46% of the total catch in 2013, it experienced a slight decline of 4% from 2012, whilst skipjack tuna catch increased by 32 %.

Two more fishing vessels joined the Seychelles Industrial longline fleet in 2013 making a total of 32 vessels. The total catch reported by the industrial longline fleet for 2013 is estimated at 10,565 MT representing a 28% drop in catches, despite an 18% increase in fishing effort when compared to 2012.

In term of species composition, bigeye tuna remained as the dominant species caught by this fleet for the past seven years, accounting for an average of 56% of the total catch, even though catches of this species decreased by 46% in 2013 when compared to 2012. The estimated catch rate decreased from 0.77 MT/1000 hooks in 2012, to reach 0.47 MT/1000 hooks which is at similar level to catch rate reported prior to 2012.

The semi industrial longline fleet reported a total catch of 262 MT in 2013, representing a slight decrease of 3% over the 271 MT reported in 2012. Despite a reduction in the number of active vessel, from 9 to 8, fishing effort increase by 21% and catch rate dropped to 0.66MT/1000 hooks from an average of 0.82 MT/1000 hooks reported over the 2011/ 2012 period.

SFA is implementing various actions to improve the quantity and quality of data collected from its fleet targeting tuna and tuna-like species in the Indian Ocean. Actions include improved logbook, review and upgrade of data collection and management system and implementation of National Scientific Observer Programme.

CONTENTS

1. BACKGROUND/GENERAL FISHERY INFORMATION

The Republic of Seychelles is an archipelago of around 115 islands scattered over an exclusive economic zone of 1.37 million km^2 in the WIO. Typical of small-island developing states, marine resources are of significant social, economic and cultural importance. Apart from tourism, the country has limited opportunities for land-based development, and as a result, the fishing industry is a major contributor to the economic development of the country. The economic importance is derived from its role as a source of employment, contribution to production, food security and income generation, trade and foreign exchange generation and government revenue.

Since the mid 1980's the Seychelles have been granting access to foreign flagged vessels to fish for tuna and tuna like species inside of the Seychelles EEZ through various access agreements. Seychelles registered vessels, initially purse seiners, started operating in 1997, followed in 1999 with industrial longliners. A small scale semi-industrial longline fleet also started operation in 1995.

The Seychelles Fishing Authority (SFA) was incorporated in August 1984, and since it was set up, the SFA has been implementing data collection programme, mainly to collect catch and effort information via logbook system, as well as port sampling programmes to collect data on transhipments, landings, size frequencies and species composition.

Port Victoria is the home base for the WIO purse seiners and the Seychelles semi-industrial longline fleet, , hence the activities of those fleet are covered almost 100%. On the other hand, distant water industrial longline vessels seldom use Port Victoria as their port of transhipment, making it difficult to obtain good logbook coverage, transhipment/ landings as well as size frequency data. The Seychelles is however participating in the regional Observer Scheme to monitor transhipment at sea. Furthermore an at sea scientific observer programme is currently being implemented.

The Seychelles National Report summarizes activities of the Seychelles' industrial purse seine and longline (industrial and semi-industrial) fleet in the WIO, reported over the past 5 years. It also summarizes research, and data collection related activities as well as actions undertaken in 2013 to implement Scientific Committee recommendations and IOTC resolution.

2. FLEET STRUCTURE

Table 1a. Shows the number of Seychelles registered purse seiners, supply vessels, industrial and semi-industrial longliners for the period 2009 to 2013. The number of Seychelles registered purse seiners and semi industrial longline vessels both decreased by one from 8 to 7 and from 9 to 8 respectively in 2013 when compared to 2012. On the other hand the number of industrial longline vessels increased from 30 to 32 and likewise the number of supply vessels increase by 1 to a total of 4 vessels in 2013.

Table1a. Number of Seychelles registered vessel for the period 2009 to 2013

Year	Purse seiners	Supply vessels	Longliners	Semi-Industrial
2009	9	5	26	9
2010	8	5	26	9
2011	8	4	24	4
2012	8	3	30	9
2013	7	4	32	8

Table 1b.Seychelles registered vessels by size (GT) as reported to IOTC in 2013

GT	Purse seiners	Supply vessels	Longliners	Semi-Industrial
<50	-		-	5
51-100	-		-	3
101-500	-	4	10	-
501-1000	-		22	-
>1000	7		-	-

3. CATCH AND EFFORT

3.1 Purse Seine Fishery

Table 2a summarizes the total annual catches by species, fishing effort and catch rates for the Seychelles purse seine fleet reported over the 2009 to 2013 period. A gradual decline in catches were reported between 2010 and 2012. Overall catches dropped by 33% over this period. However in 2013, the catch increased by 13% to 57,324 MT from 50,938 MT in 2012 (Table 2a and Figure 1a)

The annual trend in fishing effort in term of fishing days has been on an overall downward trend over the past 5 years, partly due to the reduction in the number of purse seiners. In 2013 the nominal effort dropped further by 324 days (15%) when compared to the previous year.

A significant decline of 55% were recorded in Skipjack tuna catches between 2010 and 2012 (from 43,828 Mt to 19,641 Mt), whilst catches of yellowfin increased by 7% (1890 MT) over the same period.

In 2013 catch for yellowfin tuna decrease slightly by 4% whilst skipjack increase by 32 % compared to the previous year. For the second year in a row, yellowfin was the dominant species making up 46% of the reported catch, with skipjack making up 45%. Catches of big eye tuna have remained more or less stable at around 9%.

Overall catch rate is back on the increase following drops in 2011and 2012. Catch rate increased by 7.81 MT/Fishing day to reach 31.69MT/Fishing day in 2013 compared to 23.88 MT/Fishing day in 2012

Table 2a. Seychelles flag purse seine annual catch, fishing effort and catch rates reported between 2009 and 2013.

Year	Fishing Days	Catch Rate	YFT	SKJ	BET	ALB	NEI	Total
2009	2432	28.10	21330	40156	6821	10	22	68339
2010	2323	32.63	25330	43828	6602	14	12	75787
2011	2347	26.94	25371	32962	4837	29	13	63212
2012	2133	23.88	27220	19641	3928	148	1	50938
2013	1809	31.69	26231	25997	5045	49	2	57324

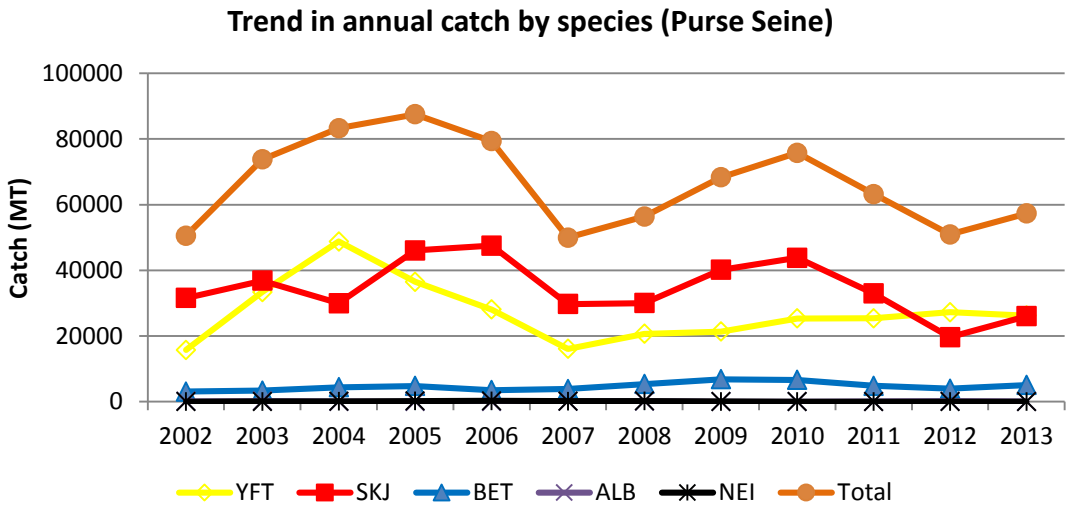
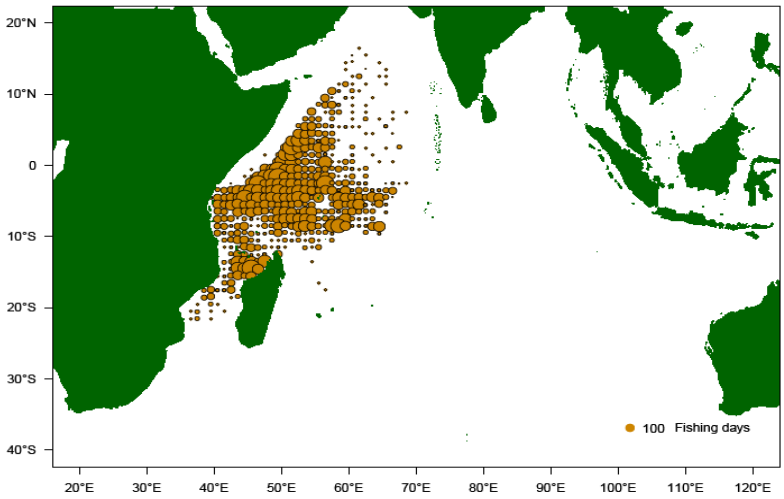


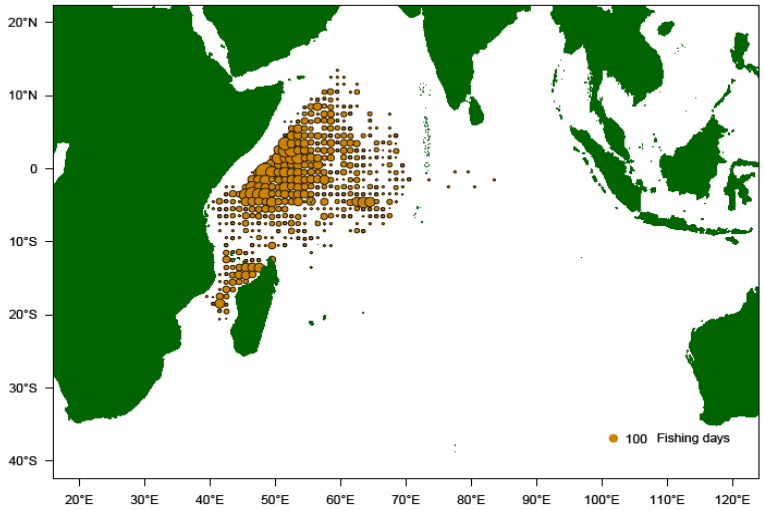
Figure 1a.Trends in annual catches by species for Seychelles'purse seine fleet reported for the period 2002-2013

Maps 3.1 *a(i), a(ii)* and *a(iii)* show the distribution of fishing effort by 1º square reported by Seychelles purse seine fleet for 2012, 2013 and for the previous 4 years (2009 – 2012) respectively. No significant changes can be observed in fishing pattern except for a slight decrease in activities in the south.

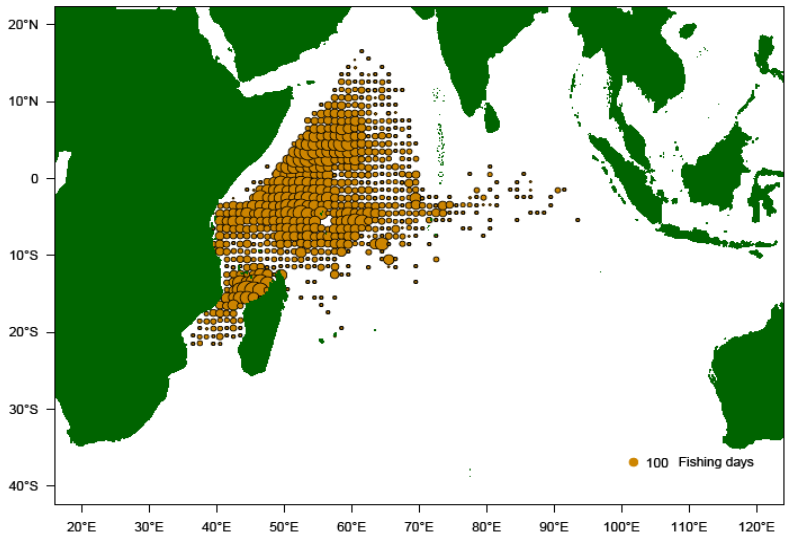
Map 3.1 a(i). Distribution of fishing effort (purse seine fleet) by 1º square, reported in 2012.



Map 3.1 a(ii). Distribution of fishing effort (purse seine fleet) by 1º square, reported in 2013.

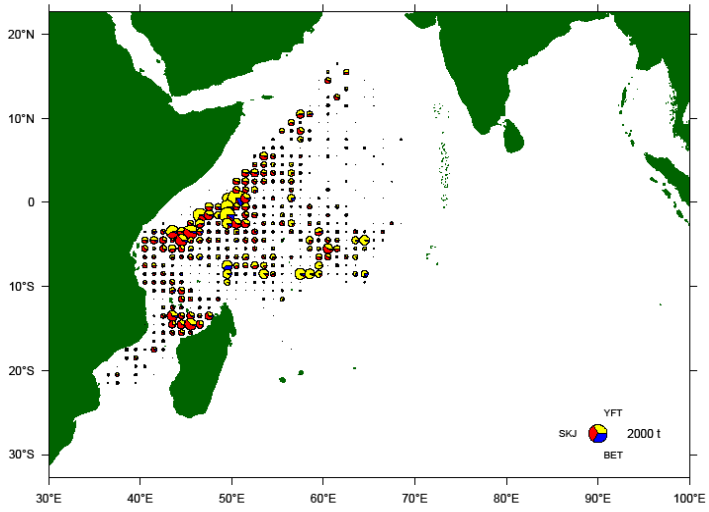


Map 3.1 a(iii). Distribution of fishing effort (purse seine fleet) by 1º square, previous 4 years (2009 – 2012).

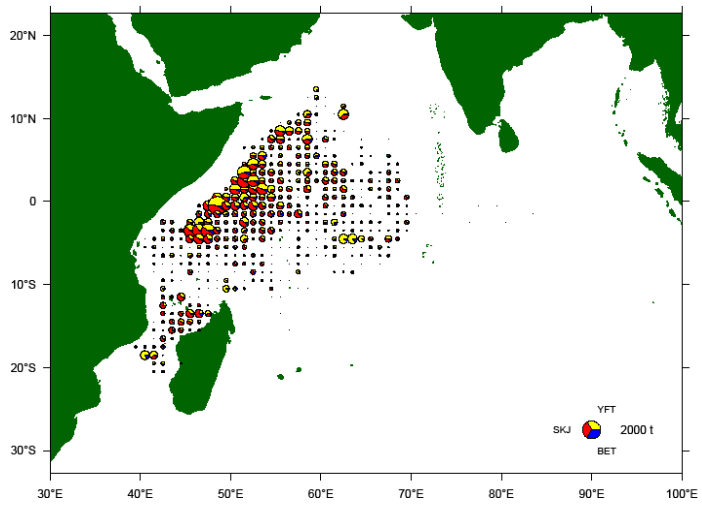


Maps 3.1 *b(i)* , *b(ii)* and *b(iii)* show the distribution of catches by 1º square reported by Seychelles purse seine fleet for 2012, 2013 and for the previous 4 years (2009 – 2012) respectively.

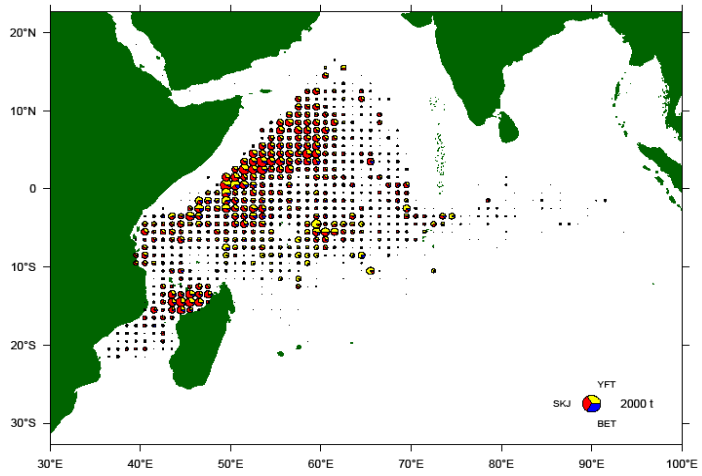
Map 3.1 b(i). Distribution of catch (purse seine fleet) by species by 1º square, reported in 2012.



Map 3.1 b(ii). Distribution of catch (purse seine fleet) by species by 1º square, reported in 2013



Map 3.1 b(iii). Distribution of catch (purse seine fleet) by speciesby 1º square, previous 4 years (2009 – 2012).



3.2 Industrial Longline Fishery

Table 2b summarizes total yearly catch by species, fishing effort and catch rates reported by the Seychelles industrial longline fleet during period 2009 to 2013.

The reported fishing effort in terms of the number of hooks set showed a general declining trend between 2009 and 2011 (from nearly 20 million hooks set to 16 million hooks). This reduction in fishing effort is partially due to the decrease in the number of industrial longliners. The number of industrial longliners increased from 30 in 2012 to 32 in 2013.

For the year 2013, the Seychelles registered industrial longliners reported an estimated catch of 10,565 MT representing a 28% drop in catches, despite an 18% increase in fishing effort when compared to 2012. In term of species composition, bigeye tuna has remained the dominant species caught by this fleet for the past seven years, accounting for an average of 56% of the catch. In 2013, the reported catch of bigeye tuna decreased by 46% when compared to the previous year (figure 2a).

NEI consist of albacore, marlins, sailfish, sharks and unspecified species. In 2013, the unspecified species category accounted for 16% of the total catch whilst marlin, shark and albacore accounted for 5%, 3% and 2 % respectively.

Following an increase in catch rate to 0.77 MT/1000 hooks in 2012, the average catch rate reported in 2013 decreased to reach 0.47 MT/1000 hooks which is at similar level to catch rate reported prior to 2012.

Table 2b. Annual catch, fishing effort and catch rates reported by Seychelles industrial longline fleet from the years 2009 - 2013

Year	Fishing Effort (million hooks)	Catch rate (Mt/1000 hooks)	Yellowfin	Bigeye	Swordfish	NEI	Total
2009	19.87	0.42	468	4117	581	3142	8323
2010	17.63	0.38	527	3384	409	2304	6658
2011	16.33	0.46	1184	4082	396	1872	7566
2012	18.97	0.77	1173	10434	1057	1981	14692
2013	22.33	0.47	1118	5662	901	2838	10565

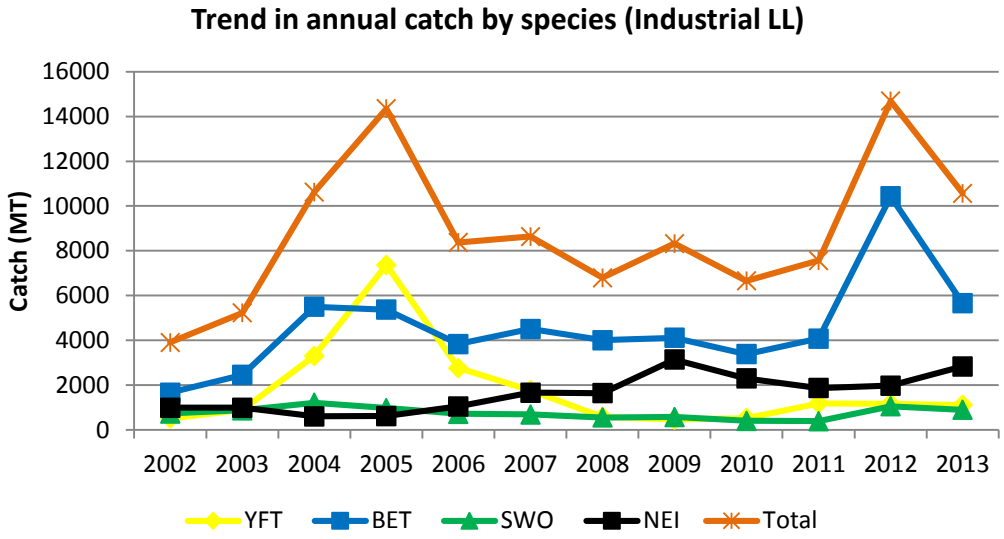
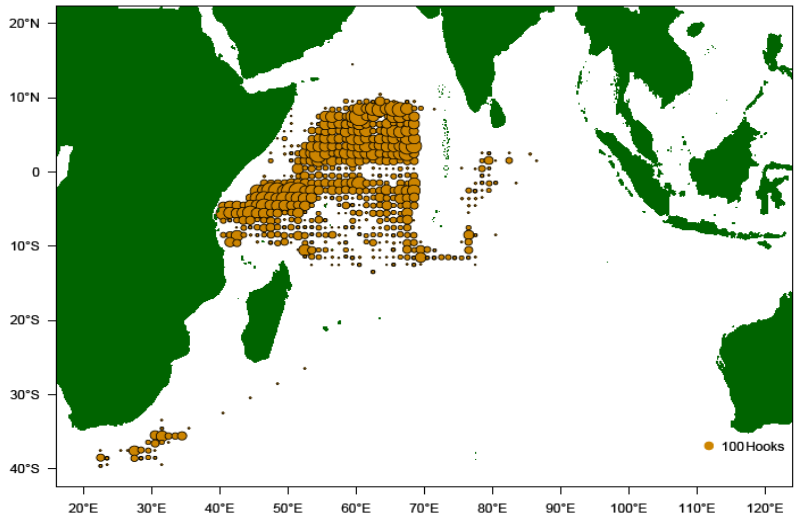


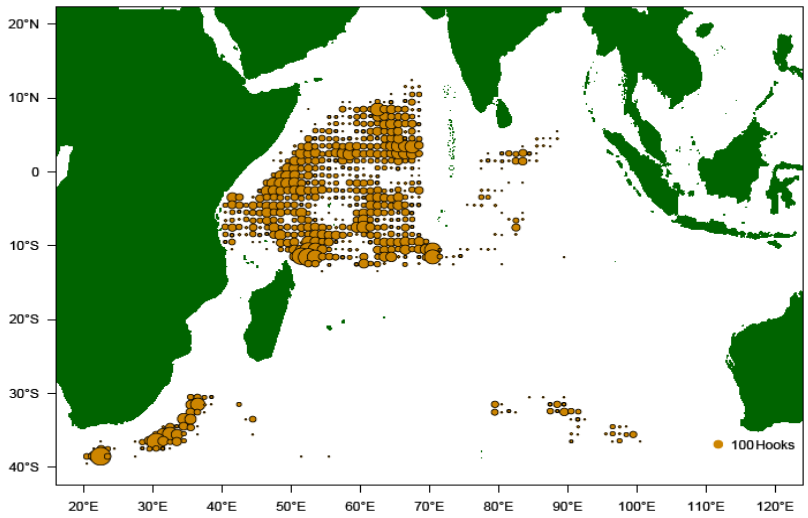
Figure 2a.Trends in annual catch by species reported by the Seychelles industrial longline fleet for period 2002-2013

Maps 3.2 a(i), a(ii) and a(iii) show the distribution of fishing effort by 1º square reported by Seychelles'industrial longline fleet for 2012, 2013 and the previous 4 years (2009 – 20112) respectively. A clear shift of activities back towards the East African coast can be observed in 2012 when compared to the previous year.

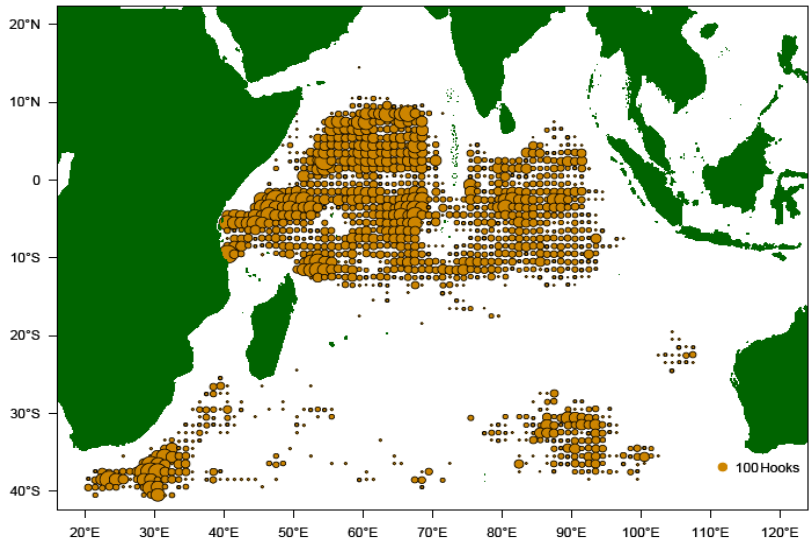
Map 3.2 a(i). Distribution of fishing effort (industrial LL fleet) by 1º square, reported in 2012.



Map 3.2 a(ii). Distribution of fishing effort (industrial LL fleet) by 1º square, reported in 2013.

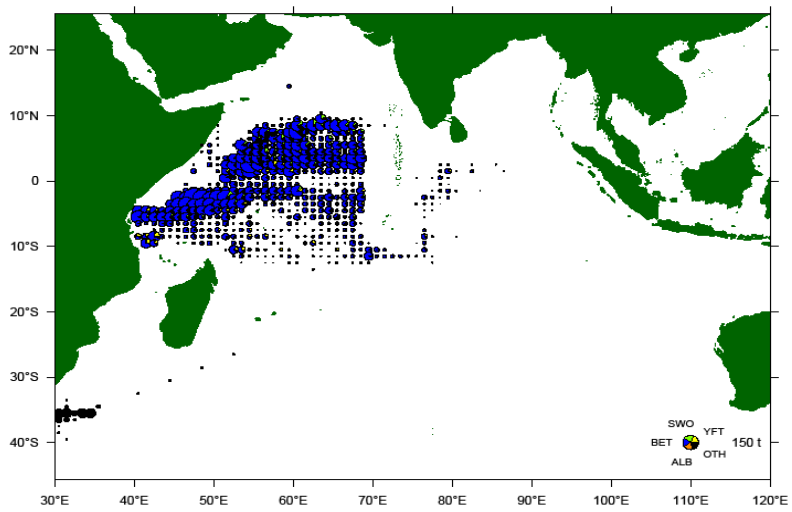


Map 3.2 a(iii). Distribution of fishing effort (industrial LL fleet) by 1º square, previous 4 years (2009 – 2012).

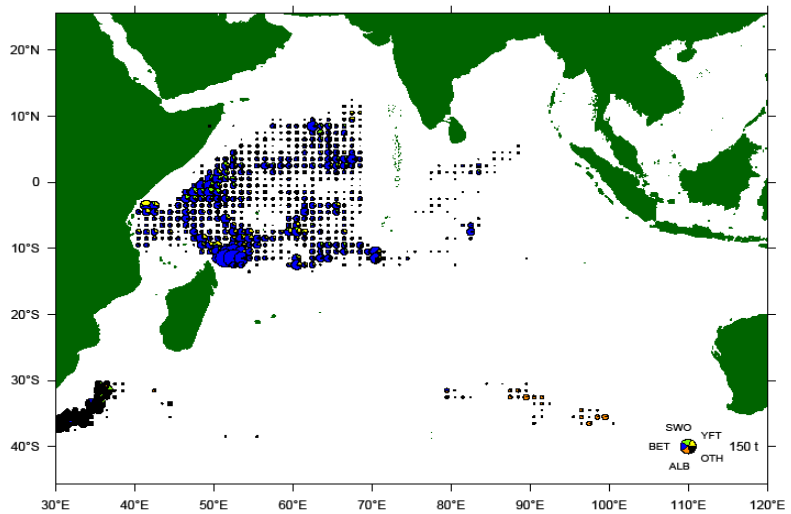


Map 3.2 b(i), b(ii) and b(iii) show the distribution of catches by species by 1º square reported by Seychelles' industrial longline fleet for 2012, 2013 and the previous 4 years (2009 – 2012) respectively.

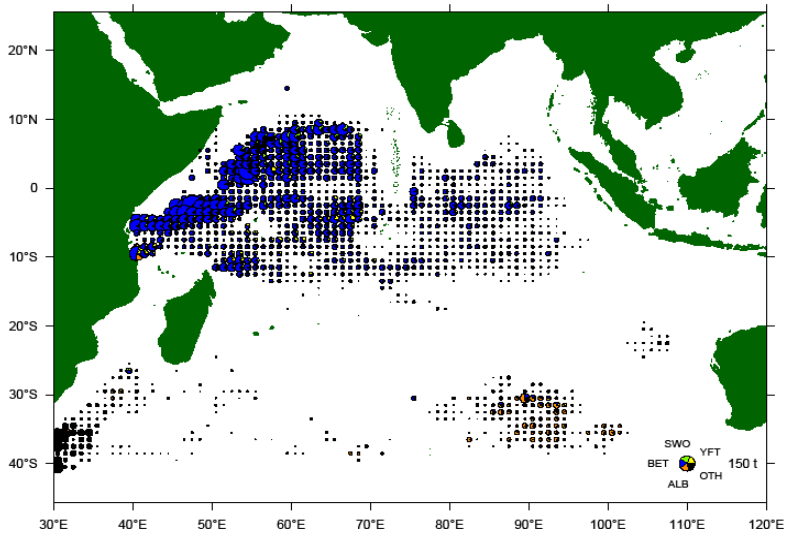
Map 3.2 b(i). Distribution of catch (industrial LL fleet) by species by 1º square, reported in 2012.



Map 3.2 b(ii). Distribution of catch (industrial LL fleet) by species by 1º square, reported in 2013.



Map 3.2 b(iii). Distribution of catch (industrial LL fleet) by speciesby 1º square, previous 4 years (2009 – 2012).



3.3 Semi Industrial Fishery

Table 2c summarizes the fishing activities of the locally based semi-industrial longline fleet from 2009 to 2013. The fishing effort has been on an increasing trend following a drop by 43% in 2011. A total of 398,770 hooks were reported to have been set in 2013, representing an increase of 21% when compared to 2012. Despite that increase in fishing effort the total catch reported during the year under review shows a slight decrease of 3 % compared to 2012.

Swordfish dominated the catch composition accounting for an average of 58% of the total reported catch over the period 2009 -2012. In 2013, swordfish accounted for 62% of the total catch, followed by yellowfin (21%) and bigeye tuna (9%). Catch rate which had increased to an average of 0.82 MT/1000 hooks in 2011 and 2012 dropped down to 0.66 MT/1000 hooks in 2013.

Table 2c.Catch, Fishing effort and catch rates reported by the Semi Industrial longline fleet between 2009 and 2013.

Year	Effort (Hooks)	Catch rate (MT/1000 hooks)	SWO	YFT	BET	SFA	MAR	SHK	OTH	Total
2009	481,668	0.68	170	68	59	15	5	12	1	329
2010	506,334	0.58	186	58	26	5	12	6	2	295
2011	287,938	0.83	141	46	23	5	7	15	1	238
2012	330,466	0.82	159	47	38	3	9	14	1	271
2013	398,770	0.66	162	55	24	3	5	12	0	262

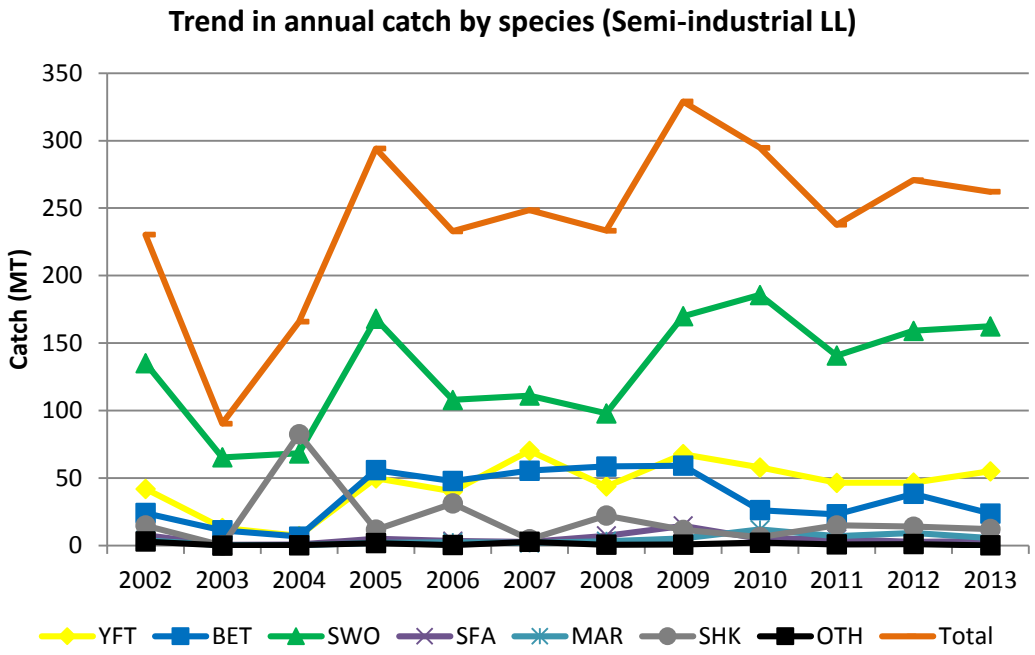


Figure 1c. Trends in annual catch by species reported by the Semi Industrial longline fleet between the period 2009 and 2013.

4. RECREATIONAL FISHERY

A logbook system was introduced several years ago for the Seychelles Recreational Fishery. However returns were relatively low and subsequently drop to zero. The management of vessel involved in recreational fishing activities does not fall under the responsibility of the Seychelles Fishing Authority, making it difficult to implement a logbook system. SFA is currently (2013) reviewing its data collection system for the domestic fishery, and is working in close collaboration with relevant stakeholders to develop and implement a more effective system that will cover all the important sectors including the sport fishing sector which target tuna and tunalike species.This year we have initiated a sampling programme at major sport fishing tournaments.

SFA have also endorsed its first co-management plan with stakeholders in the artisanal dermarsal line and trap fishery. One of the action under this plan is the setting up of community based monitoring which also include data collection by fishers. This initiative could be extended to other sectors and would permit the collection of finer-scaled data.

5. ECOSYSTEM AND BY CATCH ISSUES

Sharks

The Seychelles Shark NPOA, in accordance with FAO guidelines under its International Plan of Action (IPOA), was developed in April 2007 by the Seychelles Fishing Authority under the umbrella of the then Ministry of Environment and Natural Resources (MENRT). The NPOA is divided into 11 work programmes and 59 actions, each with different levels of priority. The NPOA was due for review in 2011 however as a result of budgetary constraints this activity has been delayed. The agreement for the review and update of the NPOA shark has been concluded and the work is expected to be completed in June 2015.

The NPOA identified the lack of species based information as an impediment to effective management of shark fishery in the Seychelles. The SFA in collaboration with various NGO's have implemented research programmes to address this issue.
Worked with the Artisanal Shark Fishers Association (ASFA) to gather catch as well as size data of sharks at various landing sites continued in 2013. A digital database is being compiled. The catch data will improve the estimation of shark catches by the artisanal fishery sector. Furthermore the size data will be used to develop models which will allow species identification as well as size estimates based on measurement(s) taken from dressed carcases.

SFA is also working with an NGO, Green Island Foundation (GIF) to develop a Shark Identification Field guide. Although this guide will focus mainly on coastal sharks captured in the local artisanal fishery, it will cover a few of the pelagic species. The guide is expected to be completed in early 2015.

Seabirds

The Seychelles islands are nesting grounds for about 18 species of seabirds. To date, Seychelles does not have a NPOA on seabirds in place. Seychelles has a domestic semi industrial longline fleet (eight vessels active in 2013) and there have been no reports of interactions with seabirds. On the other hand, the industrial longline fleet has been advised to avoid sea birds hotspots and if they do fish south of 25°S to use the mitigation measures recommended by the IOTC resolution 12/06. Fishing activities of the Seychelles industrial longlines fleet have been declining in areas south of 25°S in recent years. The logbook has been upgraded to record interactions and to date no interaction have been reported.

Marine Turtle

Several marine turtle monitoring programmes are coordinated by a number of different non-governmental organisations (NGOs) (SIF, Nature Seychelles and MCSS) to monitor turtle population in Seychelles. Under the national fisheries legislation, it is illegal to catch, kill or retain green turtle and hawksbill turtle. The Seychelles fleet (purse seine, industrial longline and semi-industrail longline) have not reported any interactions with marine turtles via logbook. However data on interaction if and when they occur will be collected via our at sea observer programme current being implemented.

Other Ecologically Related Species

Not Applicable

6. NATIONAL DATA COLLECTION AND PROCESSING SYSTEMS

6.1 Logbook

A logbook system collecting catch and effort and other relevant data (such as bycatch, environmental data) exist for the following fisheries targeting tuna and tuna like species

- **Industrial longline:** From early 80's to 2012 (<70% annual coverage with 89% for more recent years)
- **Industrial purse seine:** 1984 to date (95 – 100% annual coverage)
- **Semi-industrial longline:** 1995 to date (95 – 100% coverage)

Logbook are reviewed as and when the required to cater for new obligation as they arise.

6.2 Vessel Monitoring System

Since 2003, one of the prerequisite for any Seychelles registered vessel to be authorized to target tuna and tuna-like species in the WIO is to have an operational Vessel Monitoring System. VMS reports are being automatically transmitted to the Fisheries Monitoring Centre (FMC) at SFA on an hourly basis. VMS information collected are use to validate logbook data.

6.3 Scientific Observer Programme

At sea deployment of observers on industrial tuna purse seiners under the framework of the Seychelles National Scientific Observer Programme was initiated in July 2013. A second deployment was completed in September – October of the same year. A total of 66 days of observation were completed. The data compilation and observer reports are being prepared and will be submitted to the IOTC secretariat. Training of more observers for expansion of the programme is anticipated in 2014 and 2015.

6.4 Port sampling programme

Port sampling is a routine and ongoing activity for the purse seine and semi-industrial longline fleet. On the other hand the distant water industrial longline fleet does not land in Port Victoria; hence there are currently no port sampling programmes for those vessels. However size frequency data are being recorded by the crew and transmitted to the Seychelles Fishing Authority.

SFA is planning to undertake a comprehensive assessment of the local sport/recreational fishery within the next 2 years. The main objective of the assessment is to develop a framework within which the sport / recreational fishery can be monitored, controlled and managed.

6.5 Unloading/Transhipment

Collection of transshipment and landing forms from fish processing companies for the purse seine fishery and the semi-industrial longline fishery is an ongoing activity with a 95 -100% coverage for each fleet. On the other hand, the distant water industrial longliners rarely land in port Victoria, making monitoring of transhipments/ landing difficult. However we do receive information on landing in foreign ports. Seychelles is also participating in the IOTC regional observer scheme to monitor transhipment at sea on carrier vessels.

7. NATIONAL RESEARCH PROGRAMS

SFA is working with IFREMER to develop a new data collection and management system for the Artisanal Fishery. In the same line IOTC and the OFCF programme supported the SFA to assess the existing Catch Assessment Survey system in 2013. The recommendations from the report will be incorporated in the new system.

SFA is currently implementing a research project in collaboration with IRD to look at the level of mercury in local fishes (including tuna and tuna-like, particularly swordfish) and other sea food.

SFA is also collaborating with IRD on 3 other projects;

EMOTION, (Estimation of Maternal effects On the sustainability of large pelagic populations)have two main objectives. The first objective is to estimate age and

individual growth of the three main tropical tuna species using otolith reading. Growth models will also be developed using dataset of the Indian Ocean Tuna Tagging Programme (IOTTP). The second objective is to investigate the body condition, lipid and fatty acid dynamics during the reproduction cycle.

IOT –CANAL project aims is to find out why tropical tunas caught from March to June in the Mozambique Channel and processed by the Indian Ocean Tuna cannery (IOT) leads to meat with lower quality compare to tunas fished during the rest of the year.

GERMON- Determine the genetic structure of the Albacore stock of the Indian Ocean and assess if there are linkage with the South Atlantic stock

8. IMPLEMENTATION OF SCIENTIFIC COMMITTEE RECOMMENDATIONS AND RESOLUTION OF THE IOTC RELEVANT TO THE SC

Res. No.	Resolution	Scientific requirement	CPC progress
05/05	Concerning the conservation of sharks caught in association with fisheries managed by IOTC	Paragraphs 1–12	The Seychelles fishing Authority is working with local NGO's to; 1. Develop a field guide for identification of sharks landed locally 2. To develop model to identify shark species based on measurements and body profile to facilitate identification when fins are not attached to the carcase The Shark NPOA is now under review.
10/02	Mandatory statistical requirements for IOTC members and cooperating non contracting parties	Paragraphs 1–7	Seychelles has been regularly providing catch, effort, and size data for its purse seine, industrial and semi-industrial longline fleets and catch data of artisanal fishery to the secretariat in the required formats
10/06	On reducing the incidental bycatch of seabirds in longline fisheries.	Paragraphs 3–7	The locally based longline fleet does not operate in areas whereby they could interact with sea birds. In recent years a very low proportion of activities of the industrial longline fishing fleets are within areas where they could interact with seabirds. They have been advised to avoid seabirds hotspots and/or to adopts mitigation measures in accordance with IOTC Resolution 12/06

Res. No.	Resolution	Scientific requirement	CPC progress
11/04	On a regional observer scheme	Paragraph 9	Seychelles National Scientific Observer Programme is in progress. 66 days (two fishing trips) were covered on the purse seine fleet in 2013. Observer reports to be transmitted to the secretariat.
12/04	On the conservation of marine turtles	Paragraphs 3, 4, 6–10	No report of interactions from Seychelles' fleet in logbook. Data will be collected via the at sea observer programme
12/09	On the conservation of thresher sharks (family alopiidae) caught in association with fisheries in the IOTC area of competence	Paragraphs 4–8	The Seychelles fleets, particularly longline, have been notified of their obligations under IOTC resolutions 12/09, particularly non retention. The logbooks have been updated to allow for the reporting of interactions.
13/03	On the recording of catch and effort by fishing vessels in the IOTC area of competence	Paragraphs 1–9	A logbook system exists for the industrial/semi-industrial fisheries targeting tuna and tuna-like species in accordance with IOTC standard. The data collection system for the domestic fishery is currently under review.
13/04	On the conservation of cetaceans	Paragraphs 7– 9	The concern fleet (s) has been notified of the requirement of IOTC resolution 13/04 and the need to comply and report interactions. There has been no report of any interaction in logbook or via observer programme.
13/05	On the conservation of whale sharks (*Rhincodon typus*)		The concern fleet (s) has been notified of the requirement of IOTC resolution 13/05 and the need to comply and report interactions. There has been no report of any interaction in logbook or via observer programme.
13/06	On a scientific and management framework on the conservation of shark species caught in association with IOTC managed fisheries		The concern fleet (s) has been notified of the requirement of IOTC resolution 13/06 and the need to comply and report interactions. Logbook have been modified to report interaction including releases.

9. LITERATURE CITED

SEYCHELLES FISHING AUTHORITY (2007) Seychelles national plan of action for the conservation and management of sharks,59 pp**.**

National Bureau of Statistics, Statistical Bulletin, Population and vital statistics. No: 2 of 2013. August 2013.