ANALYSIS OF DATA OBTAINED FROM OBSERVER PROGRAMMES CONDUCTED IN 2005 AND 2006 IN THE INDIAN OCEAN ON BOARD FRENCH PURSE SEINERS

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(Preliminary version(

ABSTRACT

This paper is a preliminary analysis of the data obtained under the National Database Plan (PNDB). Between October 2005 and July 2006, three observers from the Development and Research Institute (IRD) have been on board four French tuna purse seiners. They had to estimate by-catch and discard and collect detailed information on the fishing activities and the use of FADs.

Areas prospected during these 134 days were NW Seychelles, SE Seychelles, E. Somalia and Maldives-Chagos; 194 sets (116 positives and 86 negative) have been observed, with a majority (84%) on free schools (162 sets, 51% positive) and quite few (16%) on associated schools (32 sets, 81% positives). During the day, the main activities of the boat were searching and fishing, respectively 31% and 13% of total activity. Main reasons for null sets over free school as well as FADs was that fish sinks or move too fast.

Discards were practically nulls and concerned mainly yellowfin tuna. About by-catch, it represents less than 1% of total catch (in weight), mainly triggerfish, rainbow runner and wahoo. Selacians (except shark whales) represented nearly 12% of the total by-catch (in weight) with mainly silky shark over FADs and skate over free school. As regards billfishes, they represent 5% of total by-catch (in weight) with mainly Indo-Pacific Sailfish over free school and black marlin over FADs.

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INTRODUCTION

The Council Regulation (EC) No 1543/2000 of 29 June 2000 establishes a Community framework for the collection and management of the data needed to conduct the common fisheries policy. In this context, the “Direction des Pêches Maritimes et de l’Aquaculture” (Direction of Marines Fisheries and Aquaculture) implements a National Database Plan (PNDB), which aims to collect information about fishery aspects that cannot be obtained from fishing logs, sampling in port and offloads.

IRD has to undertake the part concerning the tropical fishery tuna, which contains an observer program in order to estimate by-catch and discard (species, quantity and size) of French purse seiners in the Indian and Atlantic Ocean, with a cover of 10% of the fleet for each ocean. In addition, detailed information on the fishing activities and the use of FADs are collected.

The program has effectively started in October 2005, and this paper presents a preliminary analysis of data obtained during the four campaigns done in the Indian Ocean since then.

MATERIALS AND METHODS

Between October 2005 and July 2006, three observers have been on board of four French purse seiners in activity in the Indian Ocean.

IRD has given to the observers a handbook for the identification of species and five kinds of forms:

Form A	This form gives an account of the purse seiner route, the different activities (search, transit, fishing …) and their duration, environmental parameters, system observed and kind of detection. It is written for each change of activity of the boat, or every hour if none; one form is filled every day.
Form B	For each set, the observer notes the main characteristics (system observed, duration, estimation of school size …), catch and discard per species and per weight-group in weight and by-catch per species, weight and size and their future (discarded dead or alive, or kept onboard).
Form C1 and C2	Sampling of size (discarded target species and accessory species).
Form D	Each time the purse seiner finds an object or a FAD, the observer note the kind of object (tree, carrion, plastic…), its future (abandoned, destroyed, sunk …) and if it was deployed, visited or fished.

Works carried out by the observer after each set have different priorities. We need to organize this in the following way:

- ✓ Estimate in weight the different target species discard and if they are taken on board make a representative sampling.
- ✓ Make a sampling of the accessory species (weight or number) in the following order: turtles, billfishes, selacians, and other fishes.
- ✓ Concerning catches of target species make the specific composition and a representative sampling.

RESULTS

Table I: Observation days and number of sets and catch per mode of fishing and per quarter.

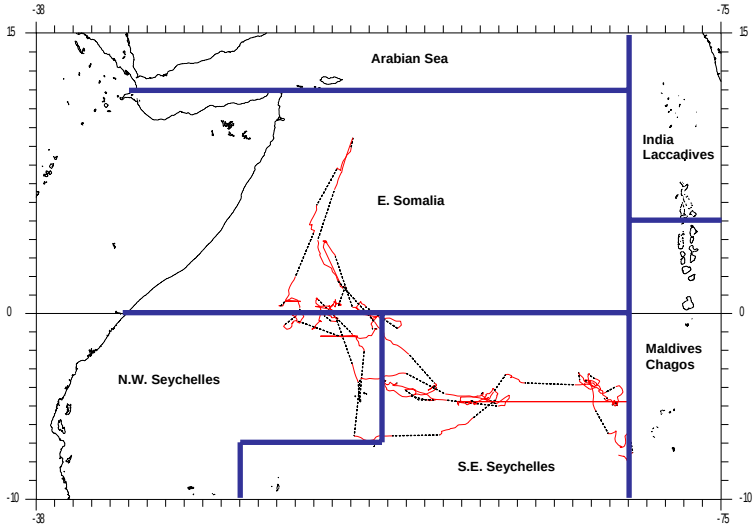
4th quarter 2005					
N° observation days	58				
ET area observed	E. Somalia, NW Seychelles, SE Seychelles, Maldives-Chagos				
Set	**Free school**	**Whale**	**Shark whale**	**Object**	**Total**
Positive set	29	7	3	11	**50**
Negative set	31	3	1	2	**37**
Total	**60**	**10**	**4**	**13**	**87**
Catch YFT	553	34	19	193	**799**
Catch SKJ	369	190	21	133	**713**
Catch BET	43	3	0	6	**52**
Total	**965**	**227**	**40**	**332**	**1564**
Discard YFT	1,5	0	0	0,1	**1,6**
Discard Ravil	0	0	0	0,1	**0,1**
Total	**1,5**	**0**	**0**	**0,2**	**1,7**
1th quarter 2006					
N° observation days	42				
ET area observed	NW Seychelles, SE Seychelles, E Somalia, Maldives-Chagos				
Set	**Free school**	**Whale**	**Shark whale**	**Object**	**Total**
Positive set	25	3	0	8	**36**
Negative set	24	1	0	2	**27**
Total	**49**	**4**	**0**	**10**	**63**
Catch YFT	819	34	0	62	**915**
Catch SKJ	99	0	0	569	**668**
Catch BET	0	0	0	0	**0**
Total	**918**	**34**	**0**	**631**	**1583**
Discard YFT	0	0	0	7	**7**
Discard SKJ	0	0	0	0	**0**
Total	**0**	**0**	**0**	**7**	**7**
2th and 3th quarters 2006					
N° observation days	34				
ET area observed	NW Seychelles, SE Seychelles				
Set	**Free school**	**Whale**	**Shark whale**	**Object**	**Total**
Positive set	18	0	0	6	**24**
Negative set	20	1	0	1	**22**
Total	**38**	**1**	**0**	**7**	**46**
Catch YFT	478	0	0	35	**513**
Catch SKJ	0	0	0	62	**62**
Catch BET	3	0	0	10	**13**
Catch GER	4	0	0	0	**4**
Total	**485**	**0**	**0**	**107**	**592**
Discard YFT	0	0	0	3,3	**3,3**
Discard SKJ	0	0	0	2,6	**2,6**
Total	**0**	**0**	**0**	**5,9**	**5,9**

Table II: Operations with object

FAD type	Deployed	Visited	Fished
Tree	59,1%	7,7%	29,2%
Raft with buoy	18,2%	53,8%	25,0%
Box	0%	0%	4,2%
Ropes	4,5%	7,7%	4,2%
Plastic	9,1%	0%	4,2%
Previous	4,5%	15,4%	25,0%
Others	4,5%	15,4%	8,3%
FAD Devenir			
Abandoned		61,5%	33,3%
Bouyed		23,1%	58,3%
Others		15,4%	8,3%

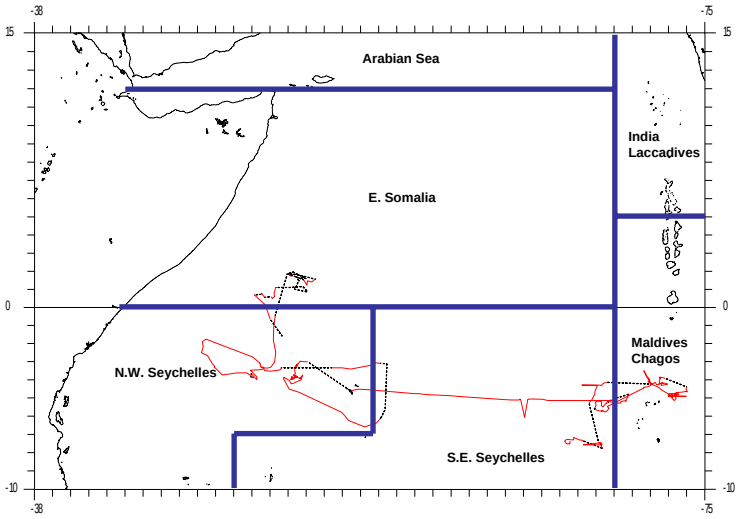
Table II: List of accessories species observed

Latin name	Common name	Free school	Object
	Billfishes		
Makaira indica	Black marlin	+	+
Istiophoridés		+	-
Istiophorus platypterus	Indo-Pacific sailfish	+	+
Tetrapturus angustirostris	Shortbill spearfish	+	-
Tetrapturus audax	Striped marlin	-	+
	Sharks		
Carcharhinus falciformis	Silky shark	+	+
Carcharhinus longimanus	Oceanic shark	+	+
Rhinodion typus	Whale shark	+	-
	Rays		
Dasyatis violacea	Pelagic stingray	+	+
Masturus lanceolatus	Sharptail mola	+	-
Manta birostris	Giant manta	+	-
Mobula	Devil fish	+	-
	Turtles		
Caretta caretta	Loggerhead sea turtle	-	+
	Fishes		
Abalistes stellatus	Triggerfishes	-	+
Acanthocybium solandri	Wahoo	+	+
Alepisaurus ferox	Longnose lancetfish	-	+
Balistidae	Spotted Oceanic Triggerfishes	+	+
Balistes punctatus	Bluespotted Triggerfishes	-	+
Belonidae	Needlefishes	-	+
Coryphaena equiselis	Pompano dolphinfish	-	+
Coryphaena hippurus	Common dolphinfish	-	+
Diodontidae	Spotfin burrfish	+	+
Elagatis bippunalata	Rainbow runner	+	+
Kyphosus sp.		-	+
Lobotes surinamensis	Atlantic tripletail	-	+
Naucrates ductor	Pilotfish	-	+
Platax sp.	Bathfish	-	+
Shyphraena barracuda	Great barracuda	+	+
Urapsis secunda	White tongue jack	-	+



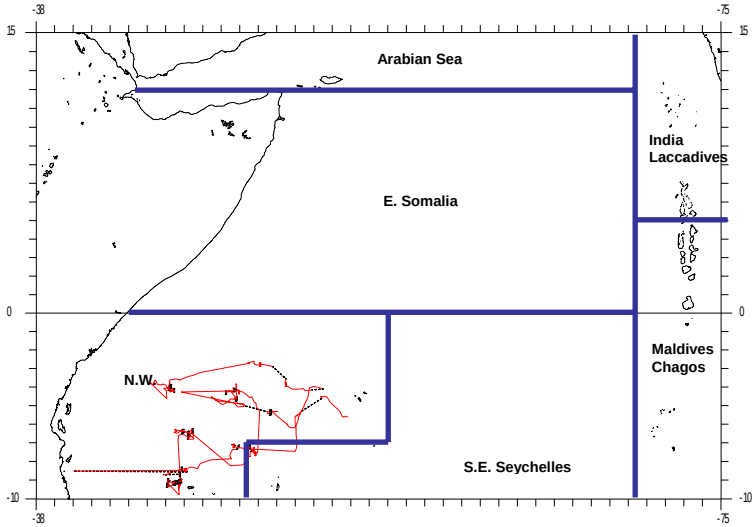
4th quarter 2005

58 fishing days
60 sets on free schools
10 sets on whales
4 sets on shark whales
13 sets on log schools



1st quarter 2006

42 fishing days
49 sets on free schools
4 sets on whales
0 sets on shark whales
8 sets on log schools



2nd and 3rd quarter 2006

34 fishing days
38 sets on free schools
1 sets on whales
0 sets on shark whales
7 sets on log schools

Figure 1: Trip routes (red: route searching, black: route without searching or night).

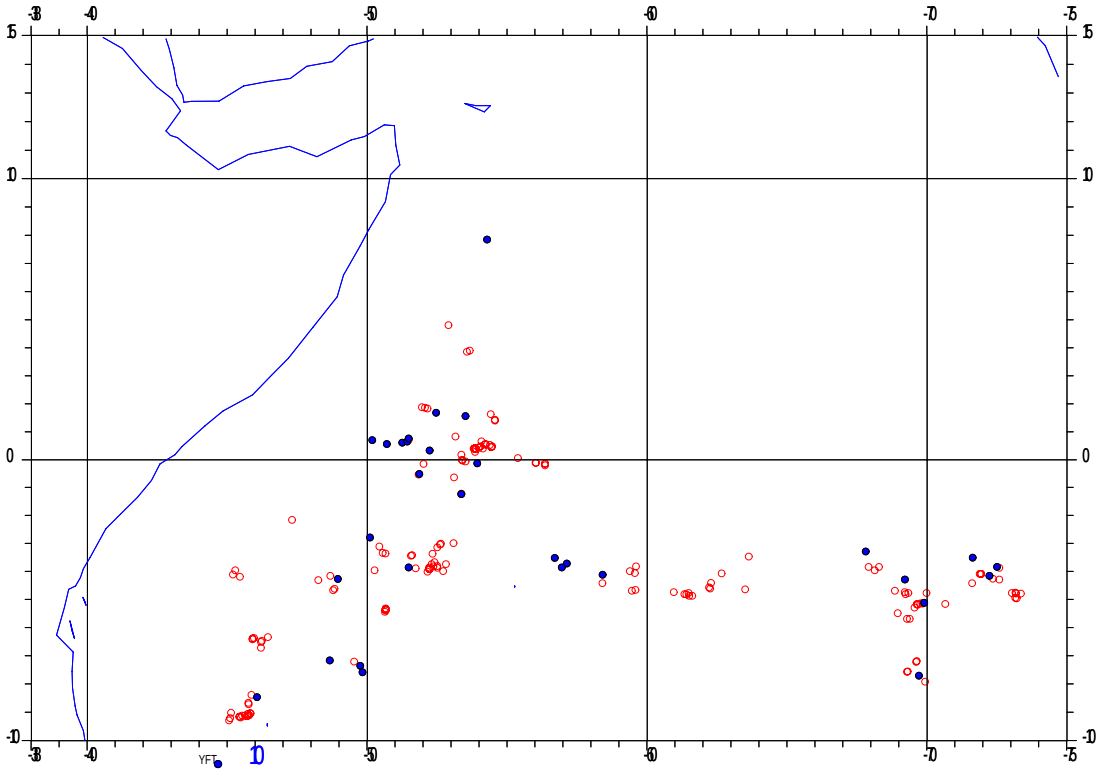


Figure 2: Position of all sets (Free school: red circle; associated school: blue point).

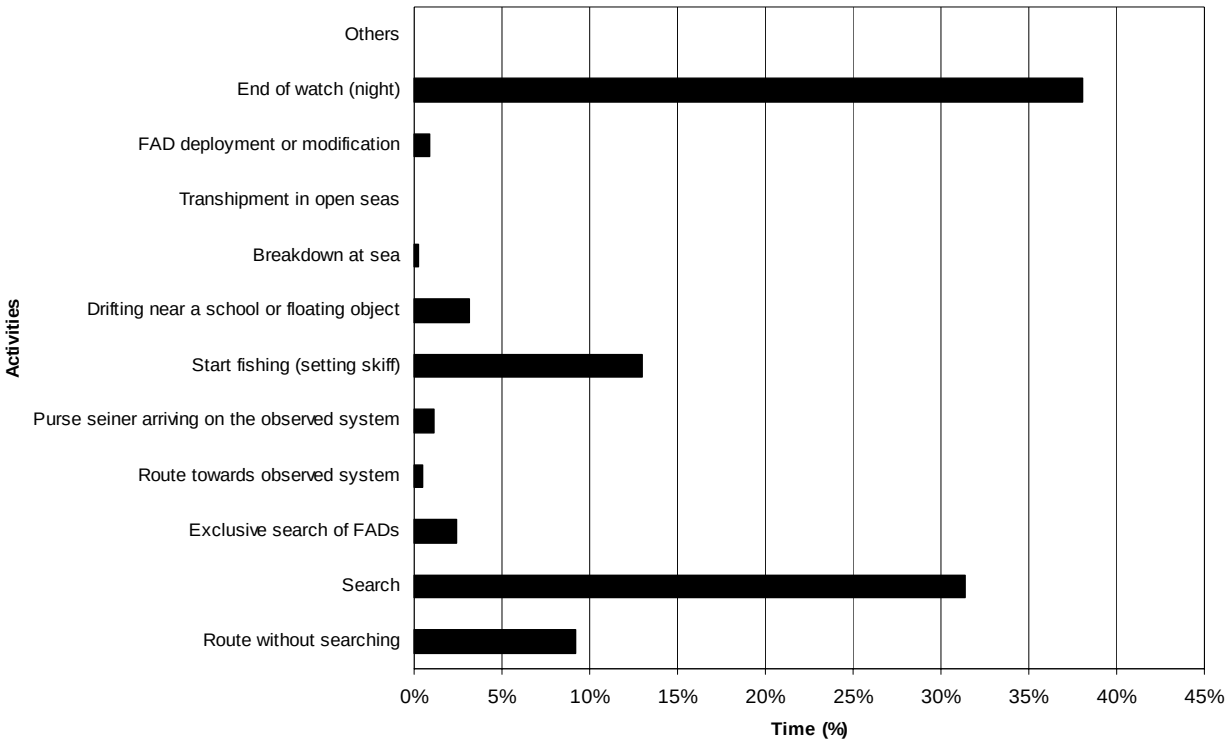
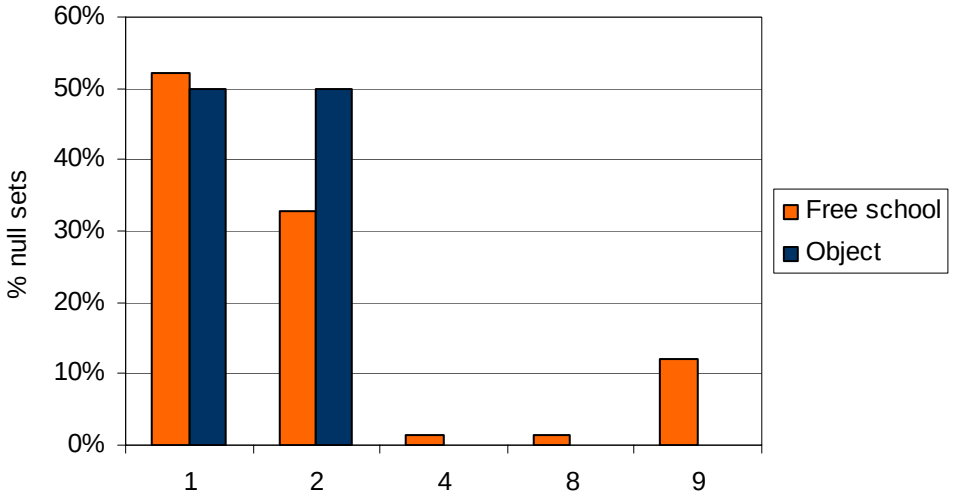


Figure 3: Purse seiner activity.



1: Fish sinks; **2**: Fish movement too fast; **4**: too many fish; **8**: fish follows the whale; **9**: others

Figure 4: Reasons for null set per type of association (free school and object).

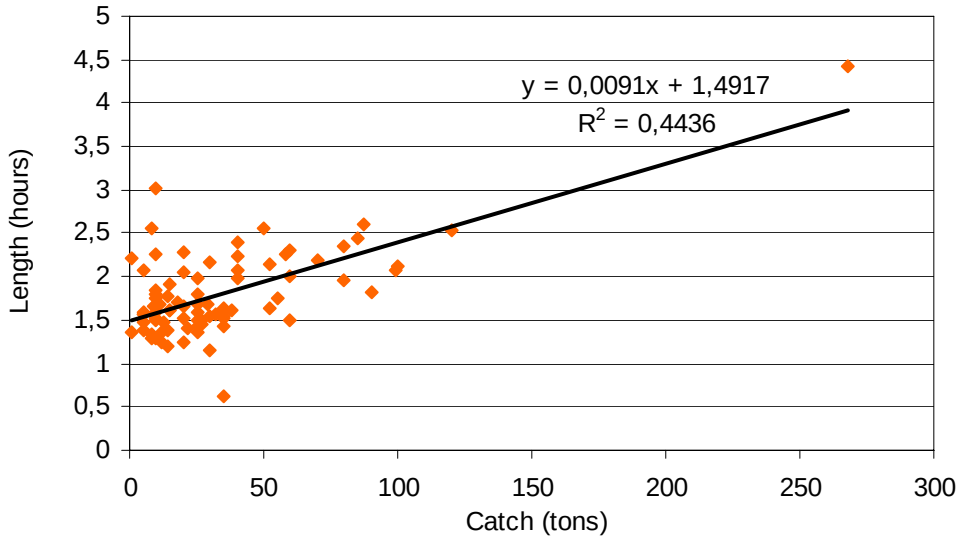


Figure 5: Distribution of positive set duration over free school and average catch obtained.

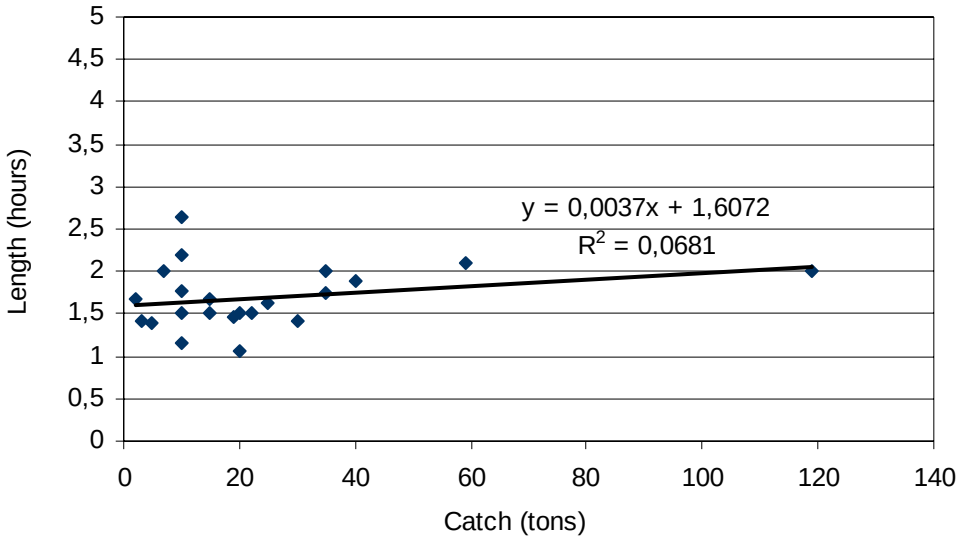


Figure 6: Distribution of positive set duration over FAD's and average catch obtained.

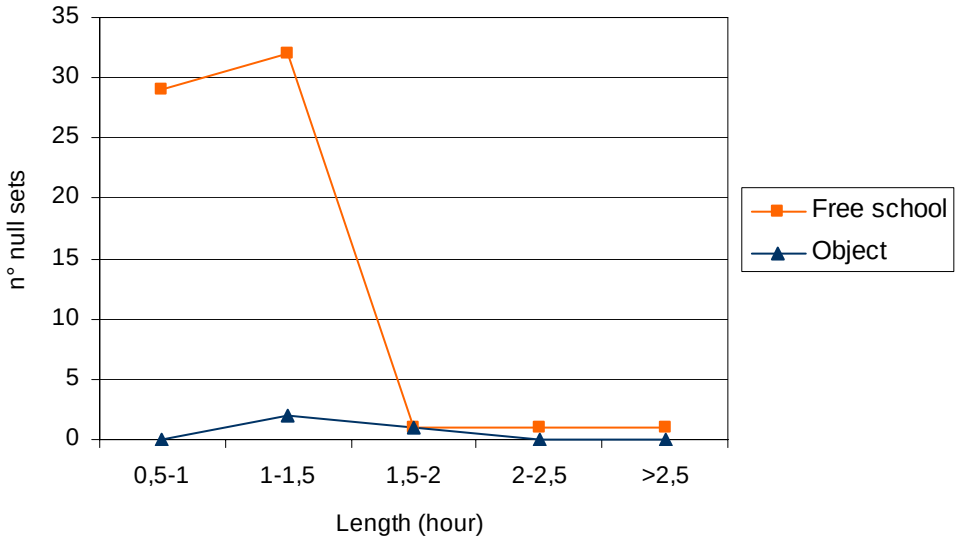


Figure 7: Distribution of null sets per type of association.

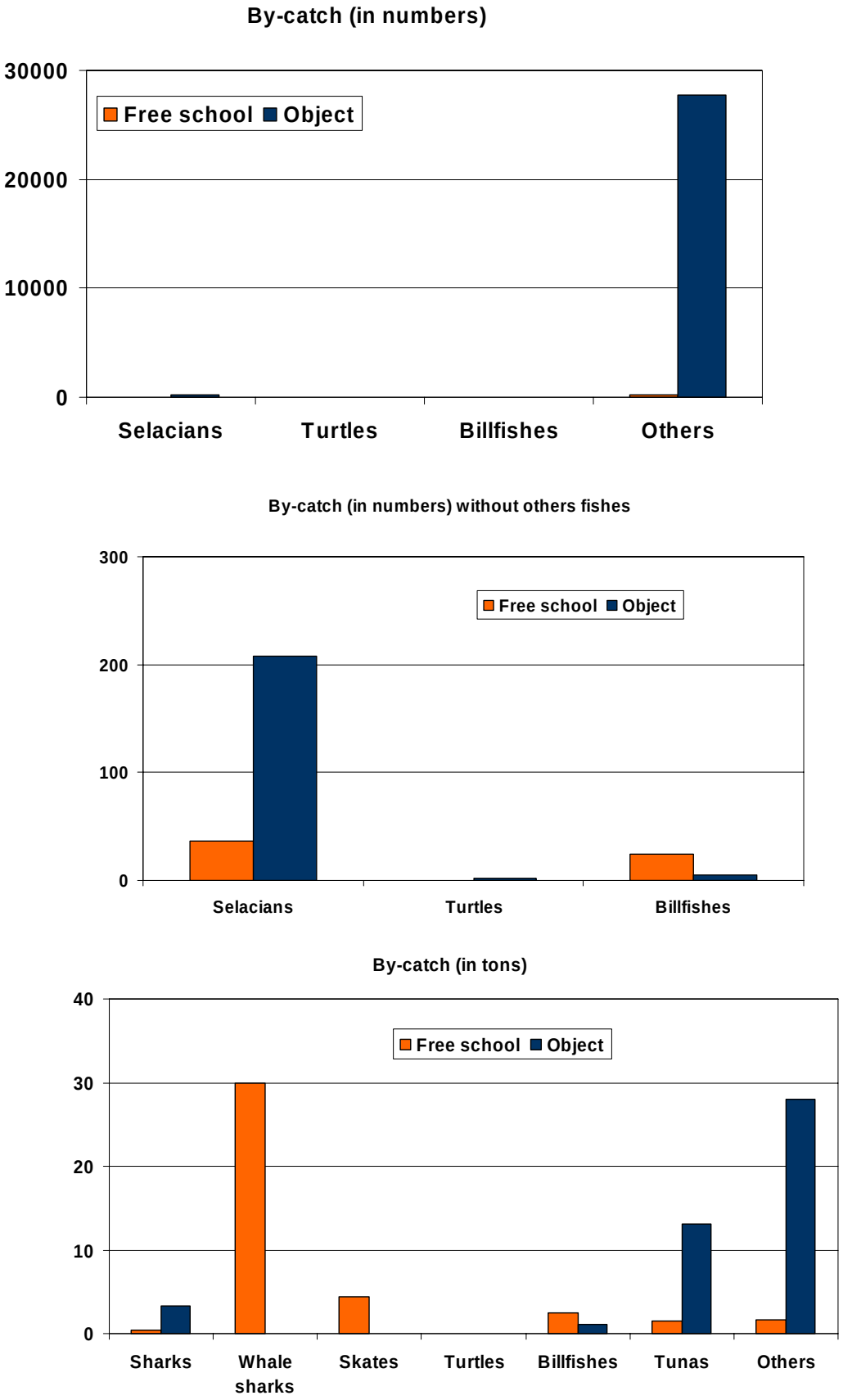


Figure 8: Catch of different groups of accessory fauna in number and tons, over object and free school.

Information about Selacians catches

Species	Free school	Object	Future				
			Exit alive from the net	Discarded alive at sea	Discarded dead at sea	Partially kept onboard	Other
Silky shark	9	204	0,5%	6,6%	61,5%	30,5%	0,9%
Oceanic shark	1	2	0%	0%	33,3%	66,7%	0%
Whale shark	3	0	100%	0%	0%	0%	0%
Dasyatis violacea	9	2	0%	27,3%	72,7%	0%	0%
Manta birostris	2	0	0%	0%	100%	0%	0%
Mobula	12	0	0%	0%	100%	0%	0%

Table IV: Number of species of Selacians fished and their future.

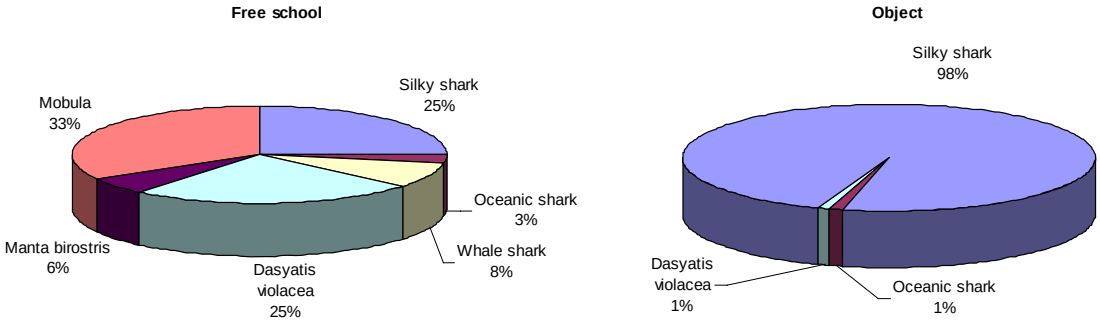
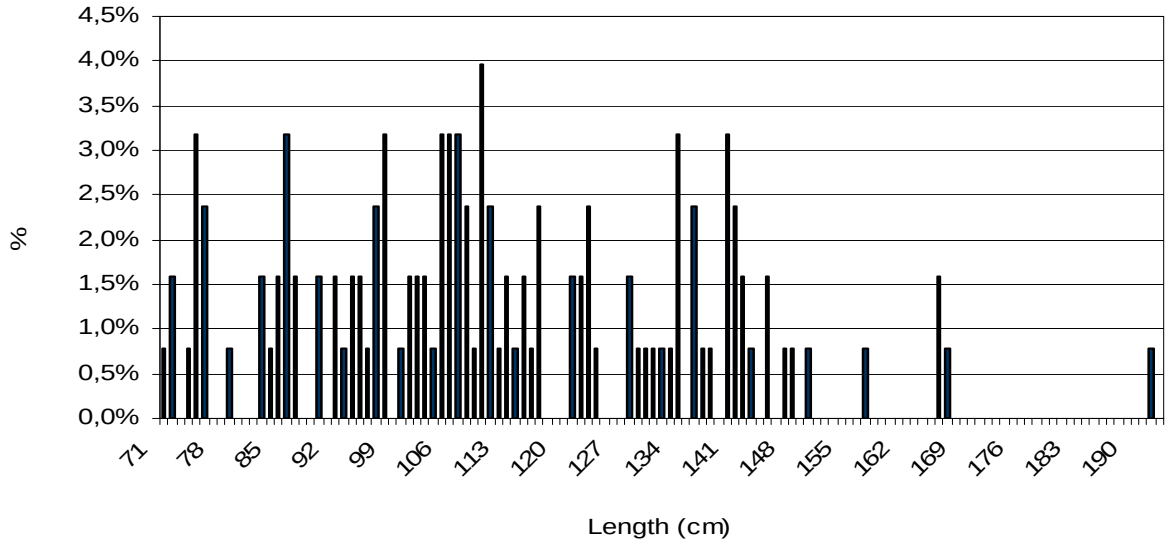


Figure 9: Number ratio of species of Selachians over free school and object.



	Male	Female
Silky shark	52,59%	47,41%

Figure 10: Length frequency and sex ratio of Silky shark.

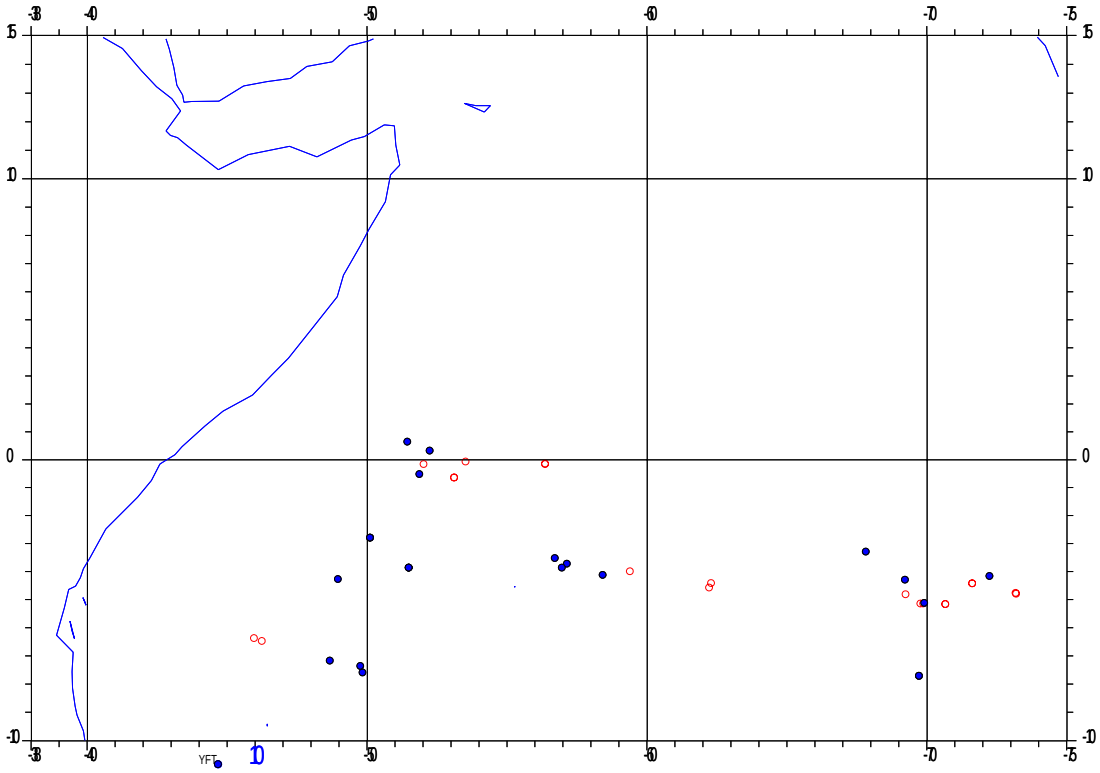


Figure 11: Catch of Selacians (Free school: red circle; object: blue point).

Information about Billfishes catches

Species	Free school	Object	Future			
			Discarded dead at sea	Partially kept onboard	Used for kitchen	Other
Black marlin	9	3	25,00%	25,00%	0%	50%
Istiophoridés	1	0	0%	0%	0%	100%
Indo-Pacific sailfish	13	1	0%	42,86%	7,14%	50%
Shortbill spearfish	1	0	0%	0%	0%	100%
Striped marlin	0	1	0%	0%	0%	100%

Table V: Number of species of Billfishes fished and their future.

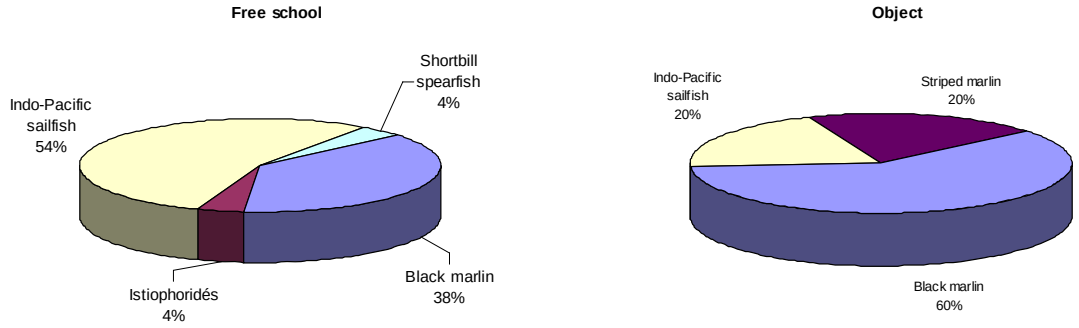


Figure 12: Number ratio of species of Billfishes over free school and object.

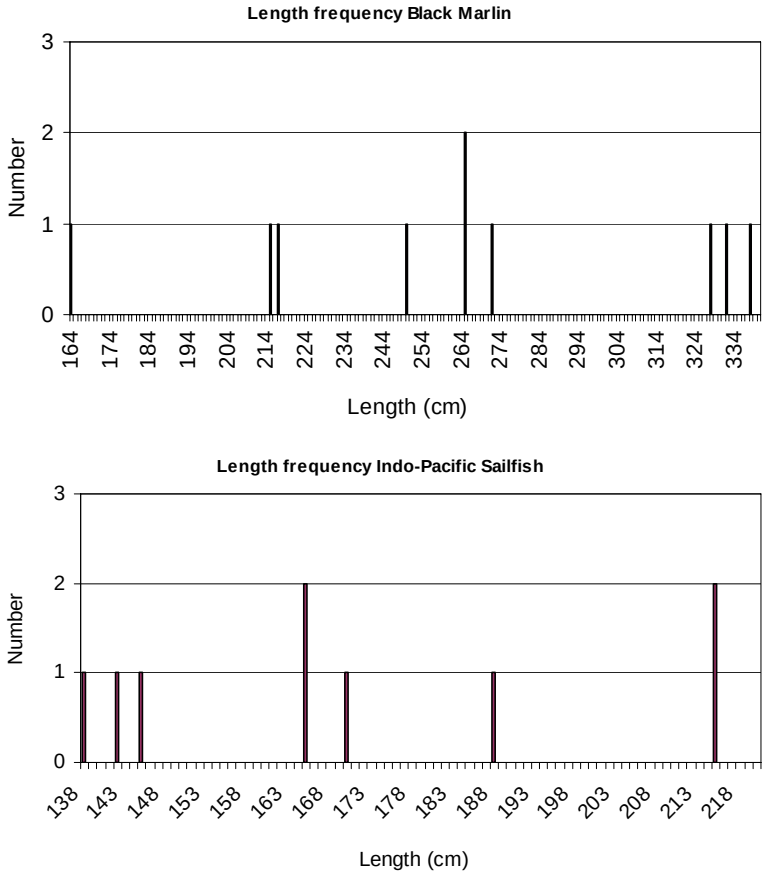


Figure 13: Length frequency of Black Marllin and Indo-Pacific Sailfish.

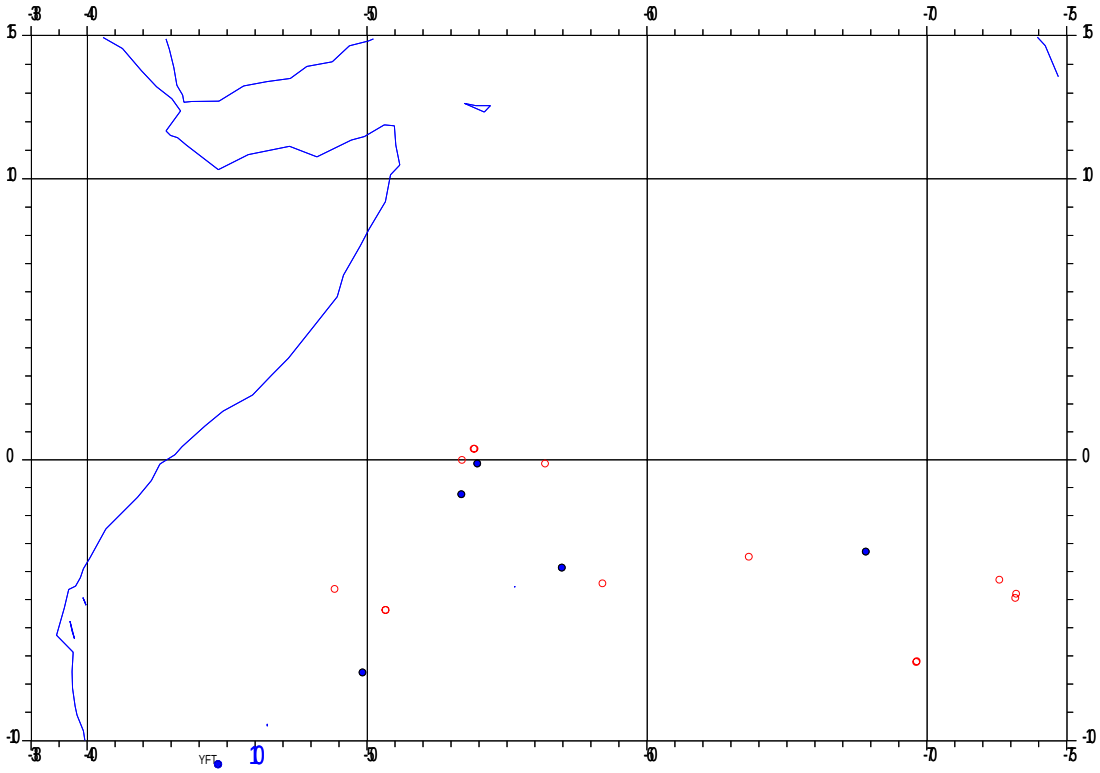
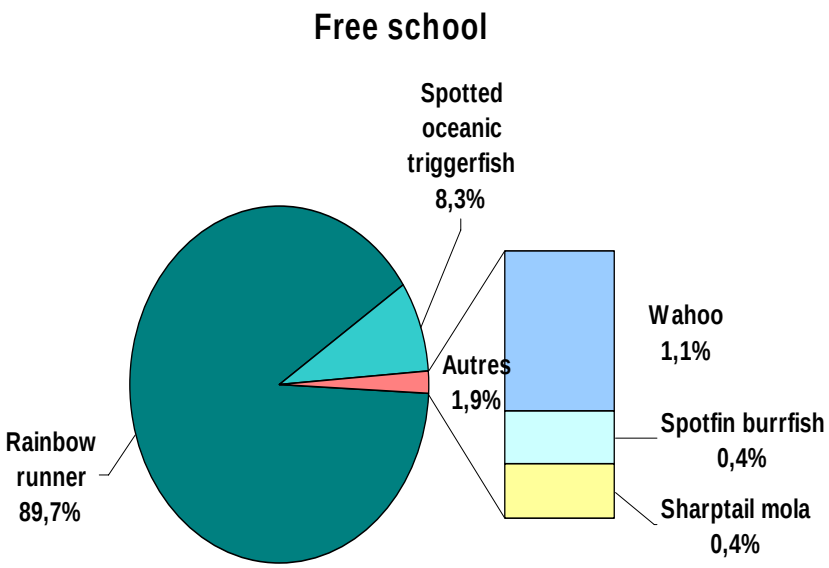


Figure 14: Catch of Billfishes (Free school: red circle; object: blue point).

Information about other fishes

Species	Free school	Object	Future				
			Discarded alive at sea	Discarded dead at sea	Put in tanks	Used for kitchen	Other (mainly sold in Mahé)
Triggerfishes (stellatus)	0	700	100%	0%	0%	0%	0%
Bluespotted triggerfish	0	935	100%	0%	0%	0%	0%
Pompano dolphinfish	0	3	0%	0%	0%	0%	100%
Common dolphinfish	0	607	0%	5,4%	0%	6,1%	88,5%
White tongue jack	0	8	0%	0%	0%	0%	100%
Spotfin burrfish	1	1	100%	0%	0%	0%	0%
Rainbow runner	235	3587	64,5%	33,9%	0%	0%	1,6%
Spotted oceanic triggerfish	22	21464	87,9%	12,1%	0%	0%	0%
Needlefishes	0	25	0%	100%	0%	0%	0%
Urapsis sp.	0	15	0%	100%	0%	0%	0%
Atlantic tripletail	0	24	0%	4,2%	4,2%	12,5%	79,2%
Sharptail mola	**1**	0	100%	0%	0%	0%	0%
Others	0	10	100%	0%	0%	0%	0%
Great barracuda	0	33	0%	6,1%	0%	3,0%	90,9%
Wahoo	**3**	306	0%	1,3%	0%	3,9%	94,8%

Table VI: Number of the other species fished and their future.



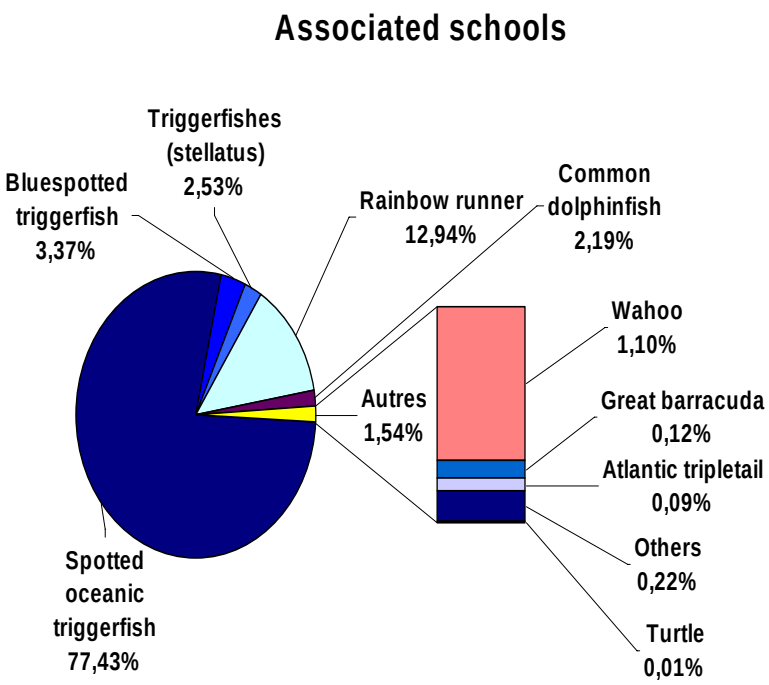
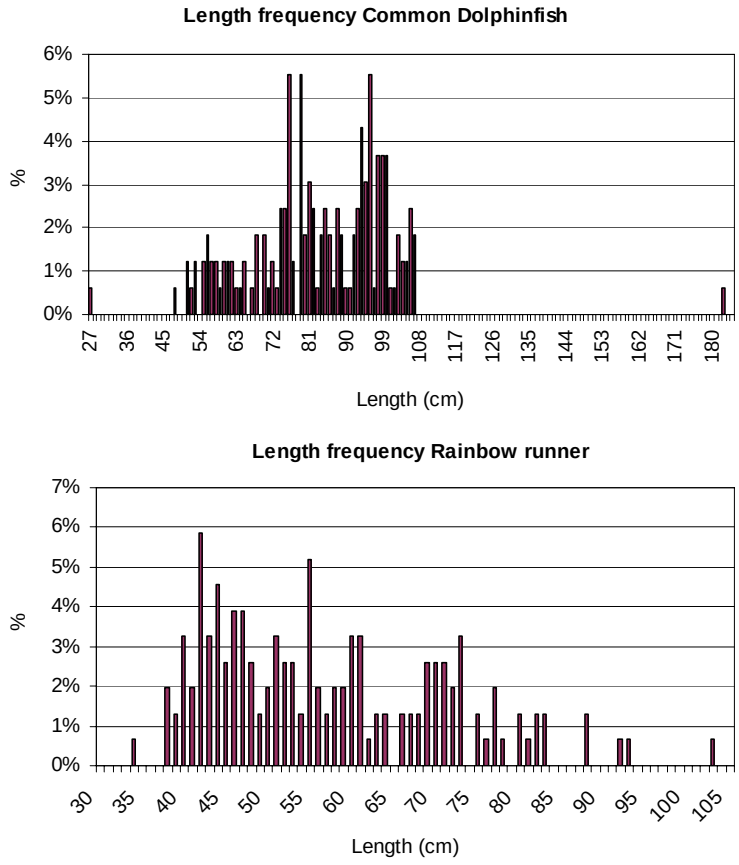
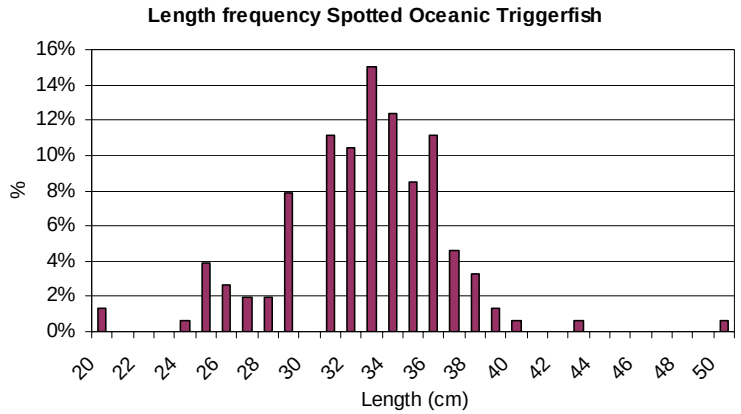


Figure 15: Number ratio of the other species over free school and object.





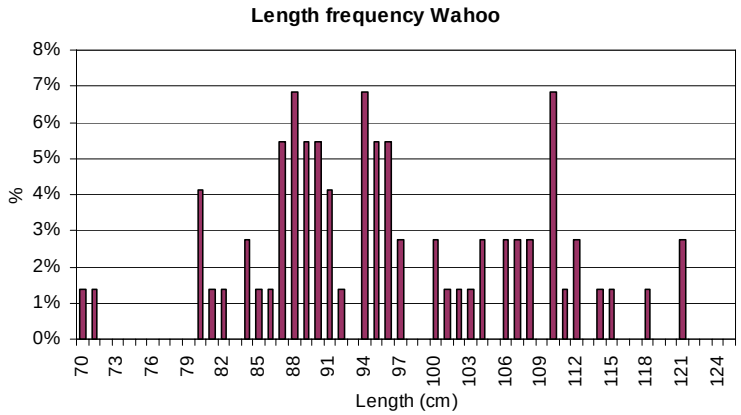


Figure 16: Length frequency of Common dolphinfish, Raibow runner, Spotted oceanic Triggerfish and Wahoo.

Information about Turtles

Species	Free school	Object	Future				
			Discarded alive at sea	Discarded dead at sea	Put in tanks	Used for kitchen	Other (mainly sold in Mahé)
Loggerhead sea turtle	0	1	100%	0%	0%	0%	0%
Turtle	0	1	0%	100%	0%	0%	0%