UPDATED ANALYSIS OF OBSERVERS DATA AVAILABLE FROM THE 1998-1999 MORATORIUM IN THE INDIAN OCEAN.

Mina X, I. Artetxe and H. Arrizabalaga

AZTI Txatxarramendi Ugartea z/g 48395 SUKARRIETA (Bizkaia) SPAIN

SUMMARY

An updated analysis of observers data available from the 1998-1999 moratoriums in the Indian Ocean is presented, giving information on the number, type and spatial location of the totality of fishing operation performed. An eastward migration of the fleet is observed, with an average yield of 21.6 MT per successful set for free school fishing (the main modality used). Skippers estimates of species composition in the catch are compared with observers' samplings, showing that skippers underestimate both yellowfin and bigeye tuna in a significant manner in FAD catches. The amount and species composition of discarded tuna is presented. 0.21%, 0.37% and 4.69% was discarded for YFT, BET and SKJ respectively. The size frequency distributions of discarded tuna are provided, showing that almost all SKJ discarded was smaller than 1.5 kg. Other observed bycatch species are also listed.

INTRODUCTION

The three European organizations of frozen tuna producers (ANABAC-OPTUC, OPAGAC and ORTHONGEL) adopted an agreement in September 1998 in which it was not allowed to use FADs for fishing tuna in the area delimited by 5º South - 10º North in latitude and 53º East – African coast in longitude. The banning period was from 15 th of November 1998 till 15th of January 1999 (Artetxe 1999).

The control of the fulfilment of the moratorium was made with observers onboard each one of the vessels, both purse seiners and auxiliary boats.

In the WPTT of the year 2000 a preliminary analysis on the biological and fishery data collected by the observers was performed, giving information relative to only part of the vessels involved (Arrizabalaga and Artetxe 2000). The aim of this document is to present the information relative to the whole number of vessels involved.

On one hand, the moratorium period did not coincide with maximum activity of the FAD fishery in the Somalia area. On the other hand, the presence of a moratorium could affect the normal behaviour of the fishing vessels in the period studied. Because of this, the results obtained in this analysis should be interpreted with caution. In spite of this, the moratorium allowed to cover almost 100% of the fleet with observers during a 2 month period, which is not usually achieved in other circumstances. Considering the importance of observers data for some fishery biology studies, the data collected during the moratorium could be useful for some studies of interest to the IOTC.

MATERIAL AND METHODS:

The formularies used for data collection on route parameters, catches and size distributions were adopted from the ones used in the research project UE 96/028 (Delgado de Molina et al. 1997).

40 observers went aboard 10 auxiliary boats and 30 purse seiners belonging to the Spanish organizations OPTUC-ANABAC and OPAGAC. A total of 1886 and 583 days at sea were covered for purse seiners and auxiliary boats respectively.

Routes of some of the vessels were presented in (Arrizabalaga et al. 2001) so they are not presented again, but the fishing operations of 29 purse seiners are mapped by month and fishing modality to have an idea of the spatial scope of the data presented and the temporal evolution of the fleet and its activity. The total number of FAD associated and free school fishing operations were 425 and 667 respectively.

Skippers estimates of the species composition of the catch is corrected with the sampling information of the observers. For this purpose information of 22 observers was used, as was considered that the rest of the observers did not sample randomly. These 22 purse seiners made 353 and 497 fishing operations on FAD and free schools respectively. The yield was computed as MT caught by set and positive set (334 out of 353 and 308 out of 497 fishing operations were successful for FAD and free school respectively).

The species composition of the discards are direct estimates of the skippers or captains and covers information collected by 29 observers. They were not corrected with observers information as discarded species were not sampled randomly. Size frequency distributions of discarded species were also collected. Bycatch species were identified by observers and the amount caught was estimated by them.

RESULTS AND DISCUSSION

Figure 1 represents quite well the spatial dynamics of the fleet during the studied period. In November 1998 the fleet was concentrated in the Somalia area mainly fishing on FADs (191 fishing operations) but occasionally fishing on free school (43 fishing operations). Some of the sets on free school are already located on the Chagos area. In December, the number of FAD fishing operations (178) in homogeneously extended in Somalia and Chagos areas, while the 298 fishing operations on free schools are very concentrated in a very narrow area, in which a big percentage of the vessels were fishing face to face on adult yellowfin schools. In January all the fleet is fishing in Chagos and North of Seychelles and the majority of the fishing operations are on free school (326 versus 56 on FADs). What it is observed is that when the fleet migrates east for free school fishing, the number of FAD fishing

operation decreases with respect to the number observed in November in the Somalia area (moreover taking into account that the fishing operation in November correspond to approximately 15 days), but it still remains quite high. This is favoured by the activities of supply vessels that moved to the area to seed objects previously to purse seiners migration. In this situation, purse seiners working with supplies are in an advantageous position, as in days in which free schools are not located they can access to FADs that are nearby, while purse seiners not working with supplies need to decide whether they move to other far away areas (such as Somalia) where their FADs are. The advantage described here may be applied in any case where the fleet migrates considerably throughout the year.

Figure 2 shows the yield by set (MT) and by successful set respectively, by fishing modality, showing that although the yield per set is higher for FAD associated catches, the yield per successful set is slightly higher for free school ones, with an average yield of 21.6 MT.

Figure 3 represents the species compositions of the FAD and free school catches. In the upper panel there is the skippers estimate, and in the lower one the catch composition is according to the observers sampling information. It is seen that there is almost no difference in the species composition predicted by the skipper and measured by the observer of free school catches, but there is a slight difference in the case of FAD associated catches, in which both yellowfin and bigeye are underestimated by the skipper. In the case of yellowfin, the observer and the skipper estimated 27% and 18% respectively, and for bigeye the estimates were 13% (skipper) versus 20% (observer). This difference is reflected in the estimation of the amount caught for each species as reflected in figure 4. According to the skippers of the 22 vessels studied, 6600, 1420 and 4651 MT of YFT, BET and SKJ were caught, while according to their observers the corresponding quantities were 7112, 1864 and 3645 MT respectively.

Figure 5 resumes the species composition of discards by fishing modality. It is observed that almost the totality of discards of tuna species come from FAD associated fishing operations. Most discarded species are skipjack and frigate, with 288 and 238 MT respectively in the 29 vessels considered. Only 19 and 7 MT of YFT and BET were discarded in the 29 vessels during the whole period. The ratio of discarded/retained MT (according to the skippers estimates and relative to the same number of vessels) is 0.21, 0.37 and 4.69 for YFT, BET and SKJ respectively. The discarded quantities and discarded/retained ratio for SKJ is quite high. Discards of SKJ were observed in 52 fishing operations, and in 4 of them 200 MT of SKJ were discarded, so we think that the quantities reflected in the present study may not necessarily reflect the real discards in the fishery in other seasons/areas and specially in a non moratorium scenario (in which it was accorded not to land fish smaller than 1.5 kg). Same comments may apply to other species.

Figure 6 shows the size distributions of discarded yellowfin, skipjack, bigeye and frigate, showing that almost all the discarded skipjack lies bellow 15 kg. This makes think of whether this fish was discarded because of the moratorium, although these sizes are neither well reflected in the length distributions of the landings.

Table 1 lists the bycatch species found by fishing modality, including seamounts (as was observed that many species did appear associated to them).

AKNOWLEDGEMENTS

The data used in this document were obtained by observers financed by the associations OPTUC-ANABAC and OPAGAC.

A. Maceira, J. Martinez and I. Velasco helped in computerizing the information.

REFERENCES

Arrizabalaga, H., J. Ariz, et al. (2001). Analysis of the activities of supply vessels in the Indian Ocean from observers data. WPTT, Victoria, Mahe, Seychelles.

Arrizabalaga, H. and I. Artetxe (2000). Preliminary analysis of observers data available from the 1998-1999 moratorium in the Indian ocean. Working Party on Tropical Tunas, Seychelles.

Artetxe, I. (1999). Resultados del seguimiento del acuerdo de las organizaciones de productores de atún congelado en los oceanos Atlántico e Indico. Sukarrieta, AZTI.

Delgado de Molina, A., J. C. Santana, et al. (1997). "Manual de los observadores embarcados a bordo de Atuneros cerqueros (Proyecto UE 96/028). Grupo de trabajo ad hoc ICCAT sobre el patudo (SCRS/97/10)." Collect. Vol. Sci. Pap. Iccat Recl. Doc. Sci. Cicta Colecc. Doc. Cient. Cicaa.

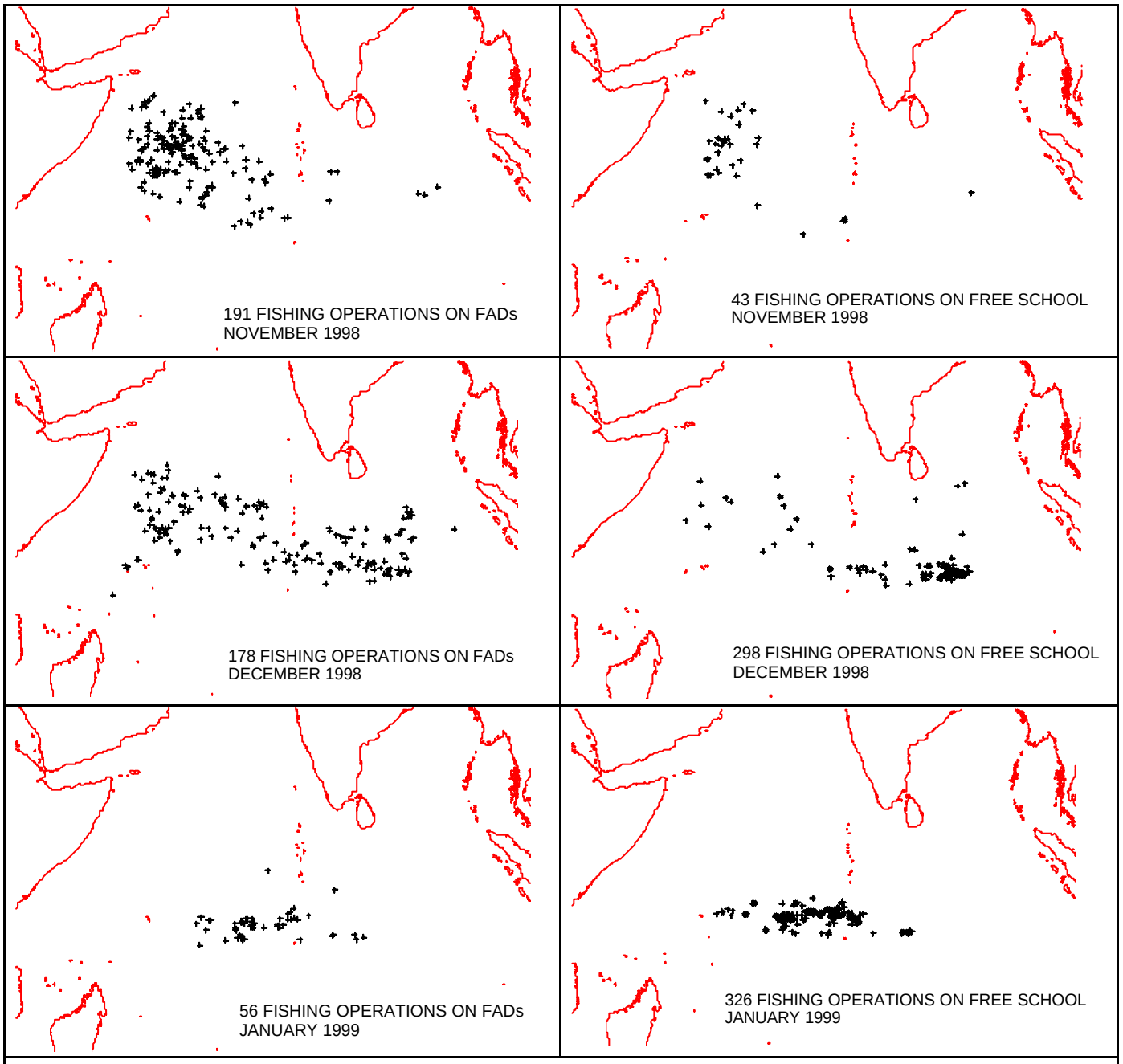


Figure 1. Spatial location of the fishing operations on FAD and free school by month.

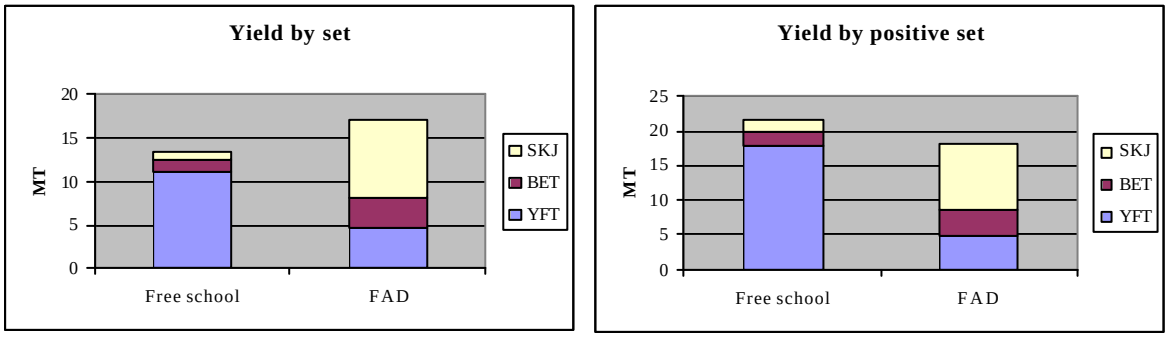


Figure 2. Yield by set and yield by positive set (MT) for free school and FAD associated fishing operations observed during the study period.

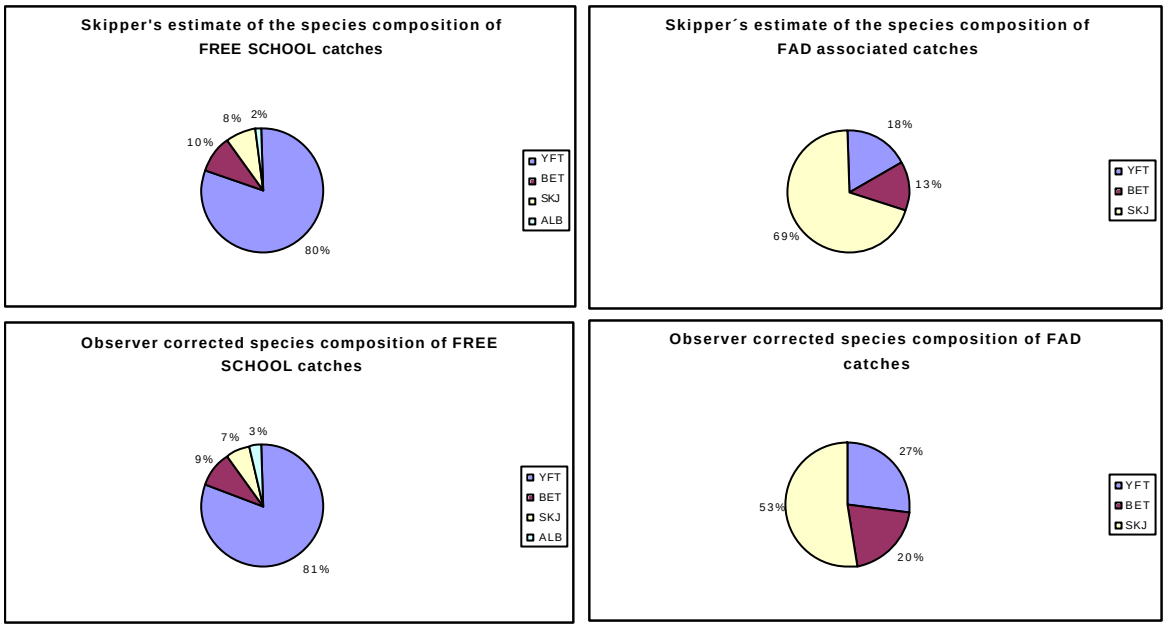


Figure 3. Upper panel: Species composition of the catch as estimated by the skippers, for free school catches and catches associated with FADs. Lower panel: Species composition of the same catches once corrected with the sampling done onboard by observers.

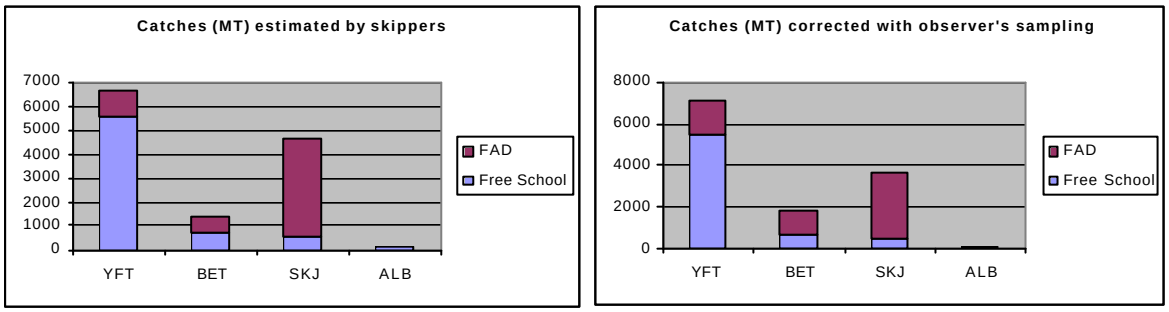


Figure 4. Skippers estimate of the catch (MT) by species (left figure) and the catch by species once corrected with observer's sampling information (based on information of 22 vessels).

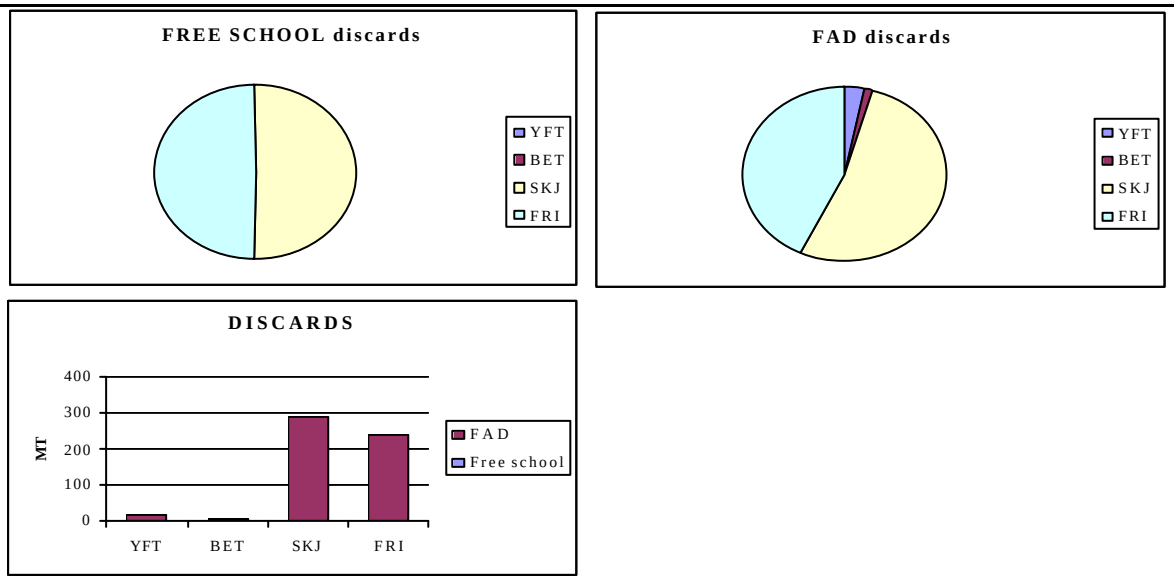
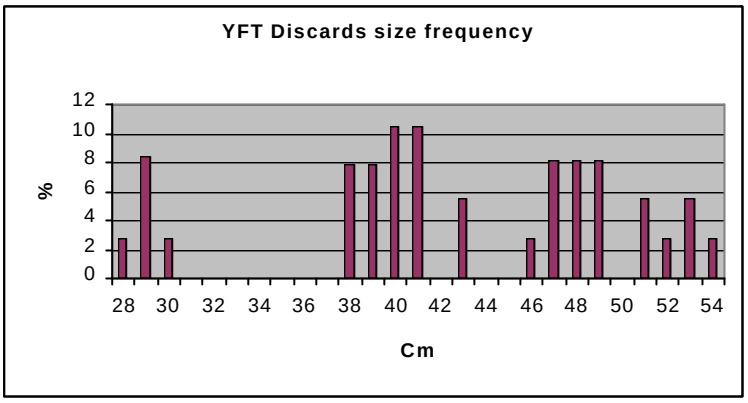
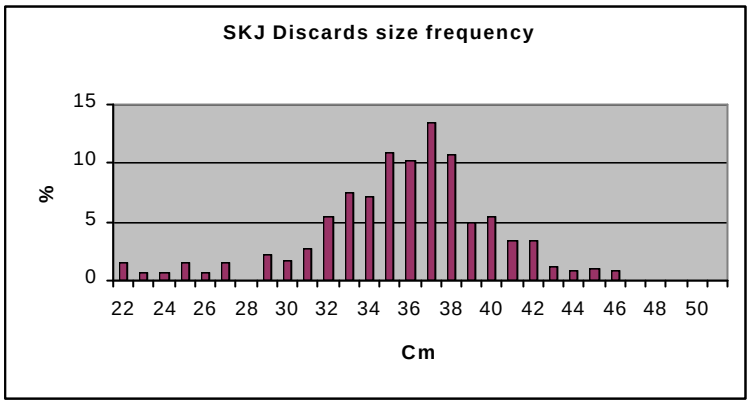
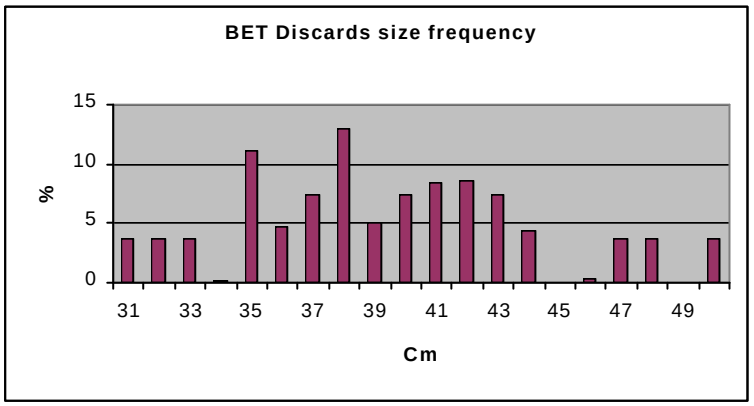


Figure 5. Upper panel: species composition of discards associated to free school and FAD catches. Lower panel: estimated amount of discards (based on information of 29 vessels) in MT (left) and percentage of discards associated to FAD or Free school catches (right).







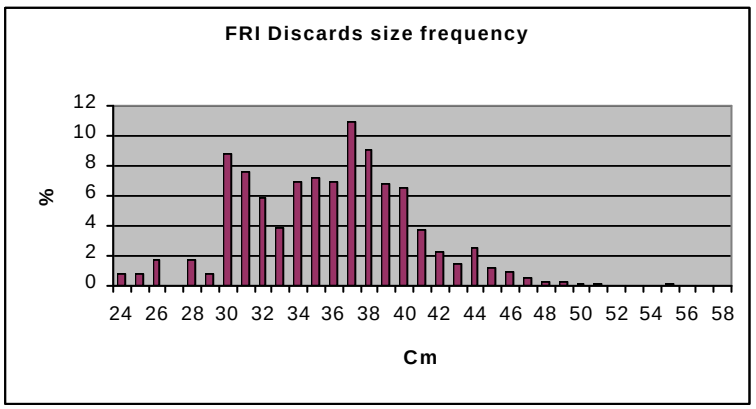


Figure 6. Size frequency distributions for discards of yellowfin tuna (n=42), skipjack (n=247), bigeye (68) and Auxis sp (1385).

Table 1. List of fish, mammal and reptile species found as bycatch species in FAD associated catches, free schools and catches in seamounts.

	Free School	FAD	Seamount		Free School	FAD	Seamount
FISH							
Dasyatidae				*Auxis thazard*	+	+	+
Dasyatis violacea	+	+		*Euthynnus alleteratus*		+	
Mobulidae				**Scomberomoridae**			
Manta birostris	+	+	+	*Scomberomorus tritor*	+	+	
Mobula coilloti	+	+	+	**Istiophoridae**			
Mobula mobula	+			*Istiophorus albicans*	+	+	+
Rhinopteridae				*Istiophorus platypterus*	+	+	
Rhinopteridae sp.				*Makaira nigricans*	+	+	
Aetobatus narinari	+			*Tegrapturus angustirostris*	+	+	
Rhiniodontidae				*Tetrapturas pfluegeri*	+		
Rhiniodon typus	+	+		*Tetrapturus albidus*	+	+	
Lamnidae				*Tetrapturus audax*	+	+	+
Carcharodon carcharias		+	+	*Makaira indica*	+	+	
Isurus oxyrinchus	+	+		**Balistidae**			
Carcharhinidae				*Balistes carolinensis*	+	+	
Carcharhinus falciformis	+	+	+	*Balistes punctatus*		+	
Prionace glauca	+	+		*Canthidermis maculatus*	+	+	
Carcharhinus longimanus	+	+	+	**Diodontidae**			
Sphyrnidae				*Diodon hystrix*	+	+	
Sphyrna lewini		+	+	**Serranidae**			
Sphyrna mokarran	+	+	+	*Lobotes surinamensis*		+	
Sphyrna zygaena	+	+	+	**Molidae**			
Alopiidae				*Mola mola*	+	+	+
Alopias pelagicus	+			*Masturus lanceolatus*	+	+	
Alopias superciliosus			+	*Ranzania laevis*	+	+	
Alopias vulpinus			+	**Echeneidae**			
Squalidae				*Remora remora*	+	+	
Isistius brasiliensis	+	+		**Bramidae**			
Exocoetidae				*Bramidae sp.*		+	
Exocoetidae sp.	+	+		**Monacanthidae**			
Belonidae				*Aluterus monoceros*	+	+	+
Belonidae sp.		+		**Xiphiidae**			
Lampidae				*Xiphias gladius*	+	+	+
Lampris guttatus	+			**Khyposidae**			
Sphyraenidae				*Kyphosus sectator*	+	+	
Sphyraena barracuda	+	+	+	*Kyphosus sp.*		+	
Carangidae							
Uraspis secunda	+	+		MAMMALS			
Caranx crycos	+	+		**Balaenopteridae**			
Elagatis bipinnulata	+	+	+	*Balaenoptera acutorostrata*		+	
Naucrates ductor		+		*Megaptera novaeangliae*	+		
Seriola rivoliana		+		*Balaenoptera sp.*	+		
Coryphaenidae							
Coryphaena equiselis	+	+		TURTLES			
Coryphaena hippurus	+	+	+	*Caretta caretta*	+	+	
Scombridae				*Chelonia mydas*		+	
Acanthocybium solandri	+	+	+	*Dermochelys coriacea*	+	+	+
Scomber scombrus		+		*Eretmochelys imbricata*	+	+	
Auxis rochei	+	+		*Lepidochelis kempii*	+	+	