



**REBYC**

Reduction of Environmental Impact from Tropical Shrimp Trawling, through the introduction of By-catch  
Reduction Technologies and Change of Management  
(EP/GLO/201/GEF)

# Nigeria

## Report of onboard data collection

**EP/GLO/201/GEF**





## **EP/210/GLO/GEF – Nigeria.**

### **REDUCTION OF ENVIRONMENTAL IMPACT FROM TROPICAL SHRIMP TRAWLING THROUGH THE INTRODUCTION OF BY-CATCH REDUCTION TECHNOLOGIES AND CHANGE OF MANAGEMENT.**

#### **REPORT OF ONBOARD DATA COLLECTION**

**FUNDING:** GLOBAL ENVIRONMENTAL FACILITY (GEF)

**IMPLEMENTING:** UNITED NATIONS ENVIRONMENTAL PROGRAMME (UNEP)

**EXECUTING:** FOOD & AGRICULTURE ORGANISATION (FAO); FEDERAL DEPARTMENT OF FISHERIES (FDF); NIGERIAN INSTITUTE OF OCEANOGRAPHY & MARINE RESEARCH (NIOMR); RELEVANT AGENCY IN CAMEROON.

**National Institutions** - FDF & NIOMR

**National Steering Committee** - G.N.Shimang (Director FDF - Chairman)

**National Coordinator** - Mr. J.C. Ogbonna

**Consultant (Nigeria)** - A.A. Aderounmu (FFS)

**MCS** - Mr. A.V. Amire (FDF)

**Technology** - Dr. B.B. Solarin (NIOMR)

**Socioeconomics** - Mr. P. Aboheyere (NIOMR)

**Statistics** - Mr. B.C. Udeh (FDF)  
- Mrs. T.O. Esan (FDF)

#### **EP/201/GLO/GEF SHRIMP FISHERIES PROJECT.**

# Reducing the impact of Shrimp Trawling by use of By-Catch Reduction Technologies and Change in Management.

## *ON-BOARD DATA COLLECTION*

### INTRODUCTION

#### **Nigeria Water and Fish Resources**

Nigeria has a coastline of about 850 kilometres (see Map). The coastline is fed by the great Rivers Niger and Benue including their tributary systems carrying debris via lagoons/creeks into the sea. This accounts for availability of shrimps in the lagoons/creeks and at sea in the area adjacent to Benin and Calabar River estuaries up to 50 metre depths. Nigeria is a coastal country with multi-fishery species whose potentials are yet to be fully harnessed and tapped especially where Dams/Reservoirs exist.

**Map1: Nigeria's Rivers and Dams**



The Industrial fishing activities thus consist of trawling for demersal living resources especially Penaeid Shrimps and Sciaenids within the inshore waters of Nigeria.

The Nigerian Fisheries is multispecies and research has shown that there are up to 71 families and up to 157 species which are small. The major families/species include

- Sciaenidae - Croaker
- Cynoglossidae - Soles
- Ariidae - Catfish
- Polynemidae - Shinynose
- Haemulidae - Grunter
- Carangidae - Caranx
- Lutjanidae - Snappers
- Serianidae - Grouper

Some of the Sciaenid which occur but are generally small sized and include the *Brachydeuterus auritus* (big eye), *Vomer Setapinis* (moon fish) and some members of the Pelagic families like the *Sardinella* species and the popular Bonga.



The Penaeid species inhabit the soft mud substrate of the Niger Delta and eastwards to Cross River. They occur too in Lagos West Grounds. Their order of importance in the inshore shrimp fishery of Nigeria as follows:

- Penaeus notialis (White prawn down 27m to 45m)
- Parapenaeopsis atlantica (Brown (or Guinea) Shrimp down 9m – 27m)
- Penaeus monodon
- Parapenaeus longirostris (Rose or Red deep water shrimp down 150m – 200m) only marginally exploited
- Penaeus kerathurus (striped or tiger shrimp)
- Palaemonidae, Nemotopalaemon hastatus (Estuarine Prawn) also occur in the Nigerian waters but are mostly exploited by the small-scale fishermen.

The story of sale of trash fish by trawler crew is very well known mainly from stories and experiences of those involved in the trash fish trade. However the quantum of such catch vis a vis other selected by-catch and shrimps have not been well documented. The focus of the onboard data collection was thus to attempt to establish the level of catch (trash fish) that is sold at sea, identify the species in the trash and analyze the so-called trash fish to know the percentage of composition of all the species and ascertain whether the level of exploitation is harmful to the fishes. The analysis of catch data so collected would enable management make informed decisions on the use of by-catch reduction technologies in terms of putting the right legislations in place.

### **THE PROJECT: ON-BOARD DATA COLLECTION**

This component of the project commenced with the training of data collectors in readiness for on board activities. After the training, 22 Data Collectors were deployed to 11 major fishing companies. However, 4 of the candidates declined to participate leaving only 18 Collectors. Furthermore, two other student observers left for school at various times. The vessels spent various periods at Sea but most complete trips lasted over 50 days.

The summary result of the On-Board data collection is as listed below:

a. Size of vessels	-	(24 – 26.6) m LOA
b. GRT	-	130 - 150
c. Number of fishing days	-	2479
d. Fishing Hours	-	40,609 Hrs
e. Quantity of fish landed	-	1,497,863.51 kg
f. Quantity of Shrimp landed	-	385,883.8 kg
g. Quantity of Mix	-	702,317 kg
h. Mix III & IV	-	510,758 kg
i. Trash/Misc.	-	490,044.4 kg
j. Total Landings	-	1,883,747.31 kg
k. Percentage composition of By-Catch	-	80%
l. Percentage composition of Trash Fish	-	27%
m. Catch Per Catch per fishing day	-	759.88 Kg/day
n. Catch Per Unit Effort (CPUE)	-	46.39 Kg/Hr.
o. Composition of Trash Fish:	-	10 Families; 17 Species
	- Mix III	
	- Mix IV	20 Families; 34 Species
	- Trash	24 Families; 53 Species

The sorting/grading of fish into sizes especially the commercially important species has over the years followed a very interesting pattern. Twenty years ago when trips only lasted between 28 – 35 days, sorting used to be in the form of;

- Large
- Medium
- Small
- Mixed/or Miscellaneous fish

Later as fishing trips started lasting up to 40 – 45 days, Mix II was added and Mix III became a matter of choice. With fishing trips getting as long as 55 – 60 days Mix III Mix IV became prominent. By this period CPUE /day have become

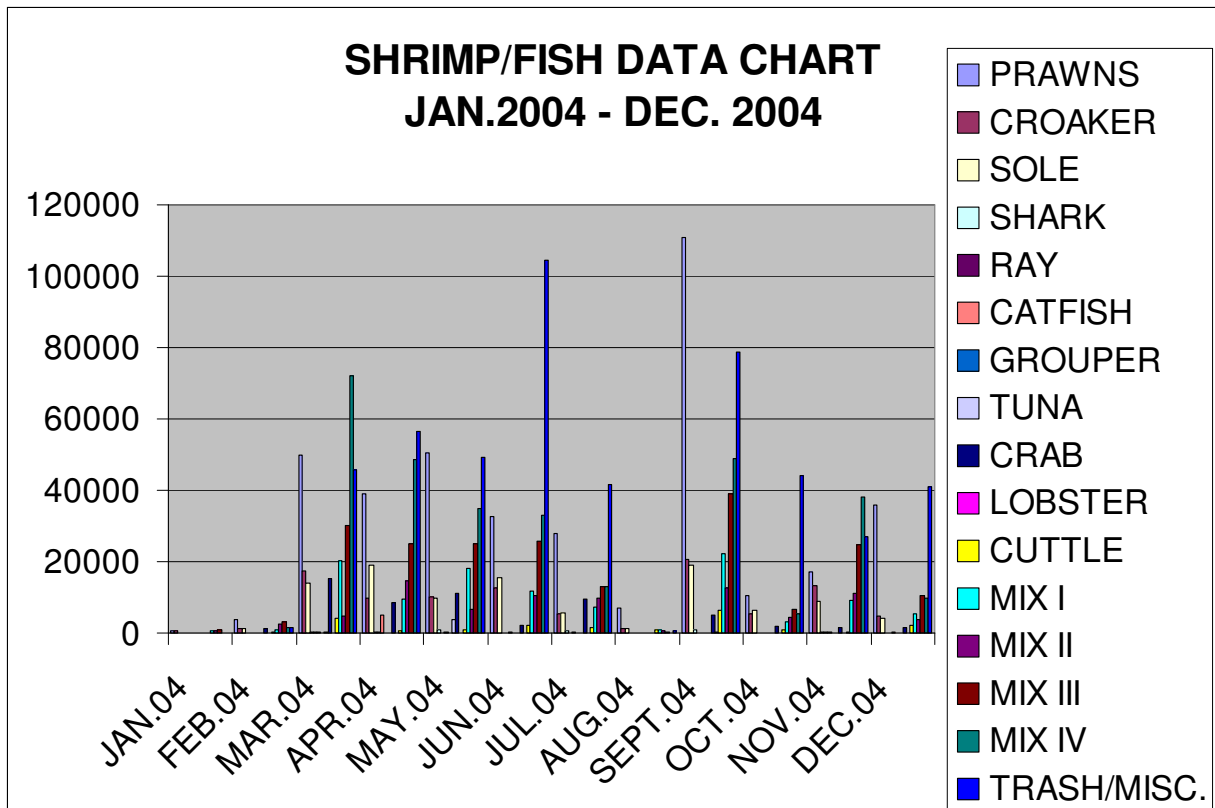
relatively small; there was enough time to grade the small fish. The bottom line of this is that the so-called Mix III and IV are virtually not different from the completely ungraded trash/miscellaneous.

**Data**

The data collected included characteristics of vessels; gear used, Days on Port, Days at Sea, Fishing Days/Hours. These were not shown in this report.

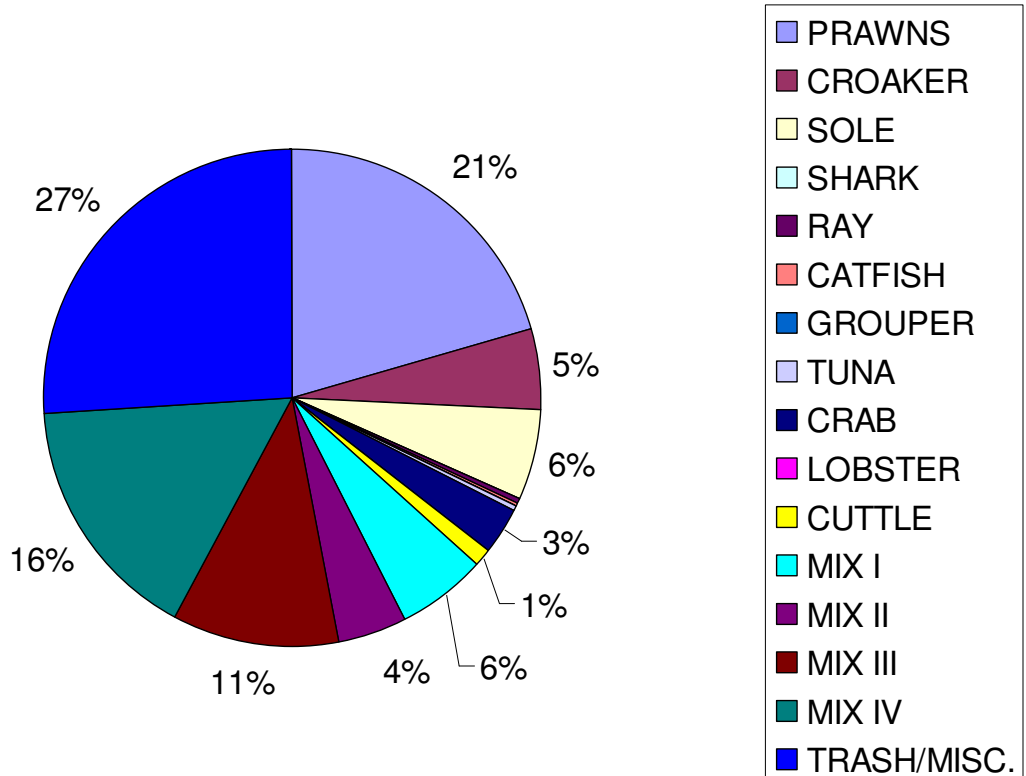
MONTH	PRAWNS	CROAKER	SOLE	SHARK	RAY	CATFISH	GROUPER	TUNA
JAN.04	572	560	140			20		
FEB.04	3846	1380	1200	44.97	118	84		26.61
MAR.04	49951.8	17473	14040	300	172	418	21	195
APR.04	39067.8	10000	18940	400.43	360	4960	15	
MAY.04	50399	10063	9940	1075	60	383.5	158	3915
JUN.04	32727.2	12758	15702	140	145	460	100	30.5
JUL.04	28050	5470	5710	731	52	220	15	33
AUG.04	6948	1322	1248	76.3			38.1	
SEPT.04	110862	20605	18957	833	83	143	43	60
OCT.04	10342	5490	6486	20		80.6	80	
NOV.04	17100	13284	9037	457	404	240	29.5	90
DEC.04	36,018	4792.8	4088	36.7	70.6	303.7	8.8	3.8

CRAB	LOBSTER	CUTTLE	MIX I	MIX II	MIX III	MIX IV	TRASH/MISC.
			560	620	900	20	100
1347		186	1000	2560	3160	1640	1447
15215	106	4018.8	20210	4720	30245	72092	45740
8663.5	10	716	9670	14490	25200	48530	56371
11249	21	883	18060	6600	25110	35030	49058
2327	73	2145.6	11774	10388	25792	33002	104570
9651		1592	7460	9908	13170	13070	41500
	11	816	960	540	340	120	500
5137.5	204	6358.8	22070	12700	39025	48993	78582
1764	40	890	3240	4360	6720	5260	44260
1466.5	30	442.4	9332	11037	24829	38150	26875
1554	12.1	2132	5500	3800	10500	9860	41041.38



Three prawn production peaks are discernable from the graph – July, September and October with the highest shrimp production recorded in September.

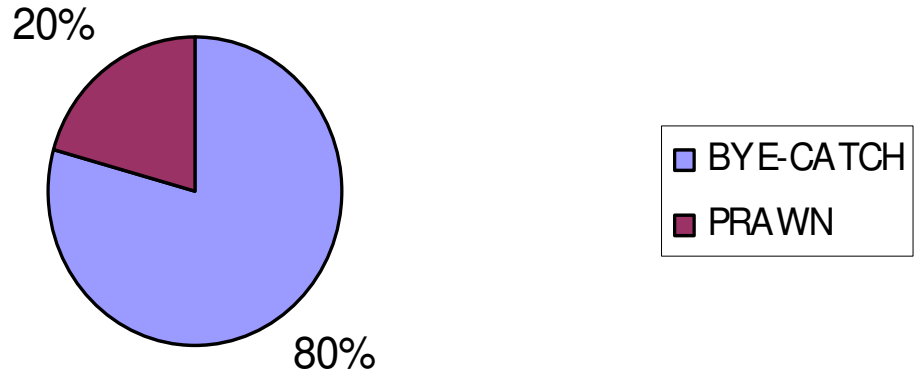
## SHRIMP/FISH DATA CHART JAN.2004 - DEC. 2004.



Trash/Misc, Mix III and Mix IV constitute 54% production while commercially important species like the Soles, Croakers and Groupers constitute only 17%. Please note that only species that were up to 1% of the total catch were indicated or captured by the chart.

By-Catch	Shrimp
1,497,864	385,883.8

**Percentage Composition of Shrimp and Bye Catch  
for Jan. 2004 - Dec. 2004.**



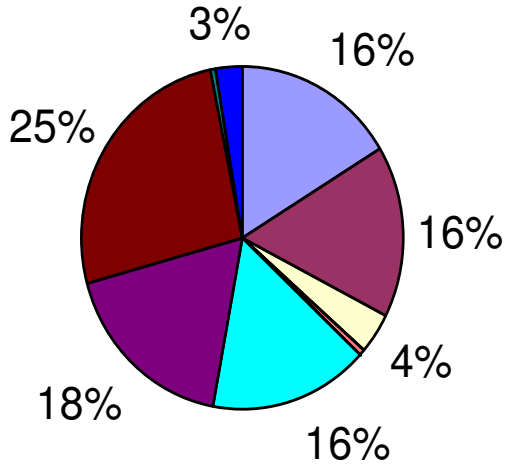
Information was collected on quantity of fish landed and quantity that could not be sorted further. It is from this last category that the crew of fishing vessels make private money by selling to artisanal fishermen who are always available. On occasions where there are no buyers the unsorted fish is thrown overboard as trash.

However, it is worthy to not that this occasion was rare and the observers never reported any incidence of throwing trash fish over board.

In the 16 vessels where data was collected this class of fish formed 27% of the total landings higher than the prawns and other premium food fish.

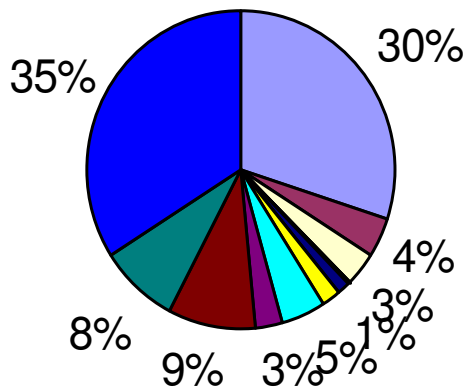
Monthly Catch of Fish/Shrimp for January 2004 – December 2004

### Fish/Shrimp Species for JAN.2004



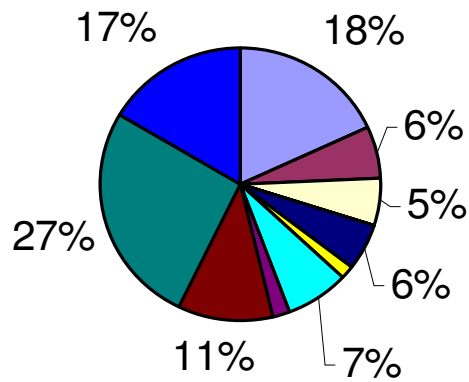
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPER
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

### Fish/Shrimp Species for Feb. 2004.



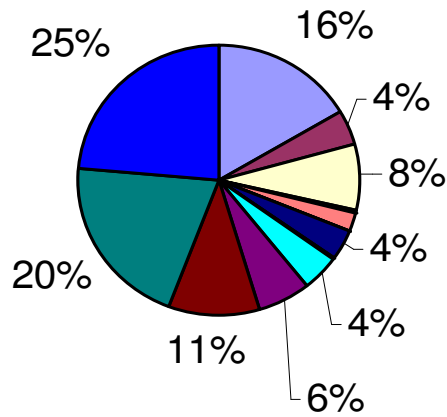
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPER
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

## Fish/Shrimp Species for March 2004



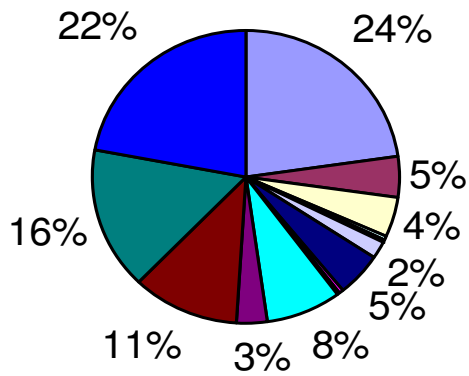
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPEL
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

## Fish/Shrimp Species for April 2004



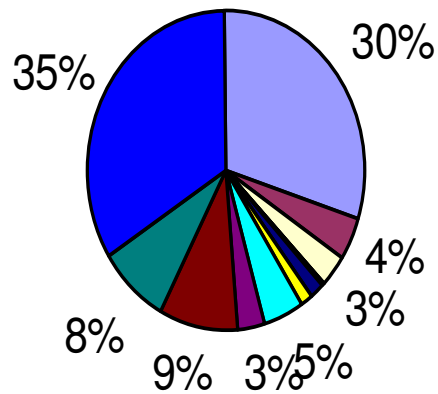
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPEL
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

## Fish/Shrimp Species for MAY 2004



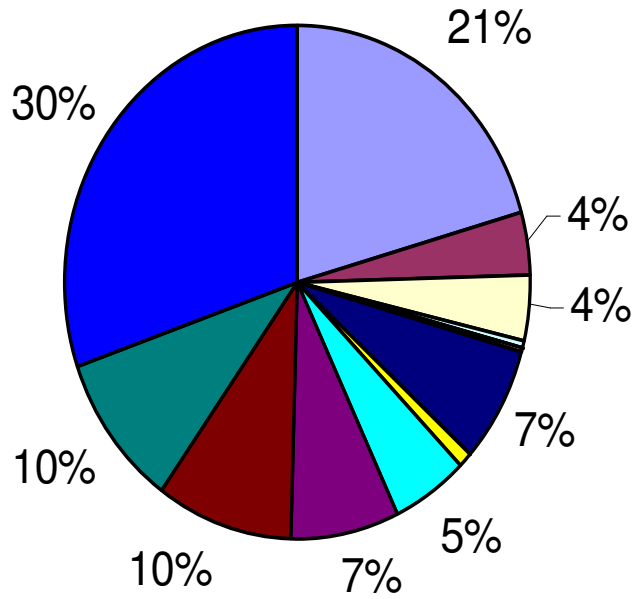
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPEL
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/M ISC.

## Fish/Shrimp Species for June 2004.

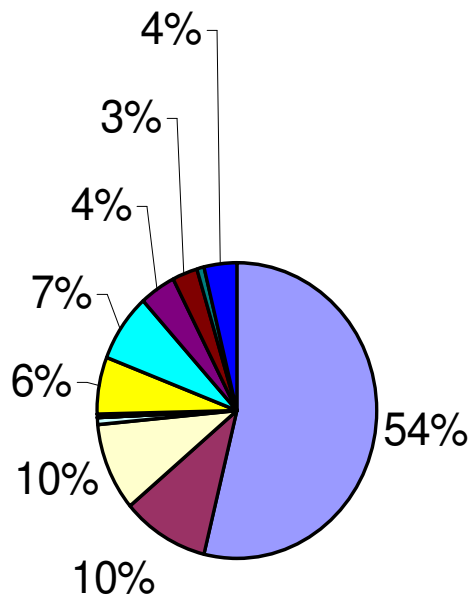


- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPEL
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/M ISC.

## Fish/Shrimp Species for July 2004.



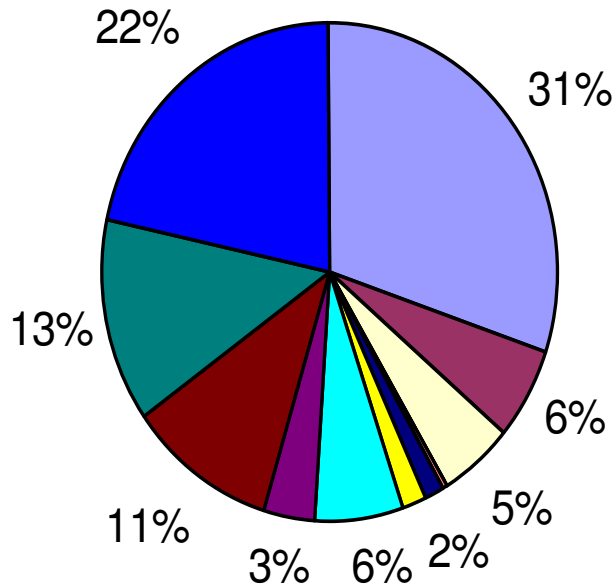
- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPEL
- TUNA
- CRAB
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- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.



- PRAWNS
- CROAKER
- SOLE
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- TUNA
- CRAB
- LOBSTER
- CUTTLE
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- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

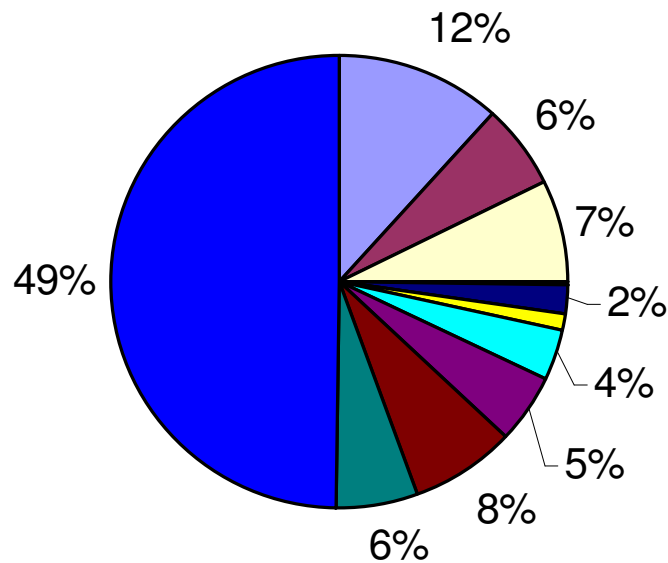
## Fish/Shrimp Species for AUG. 2004

## Fish/Shrimp Species for SEPT. 2004

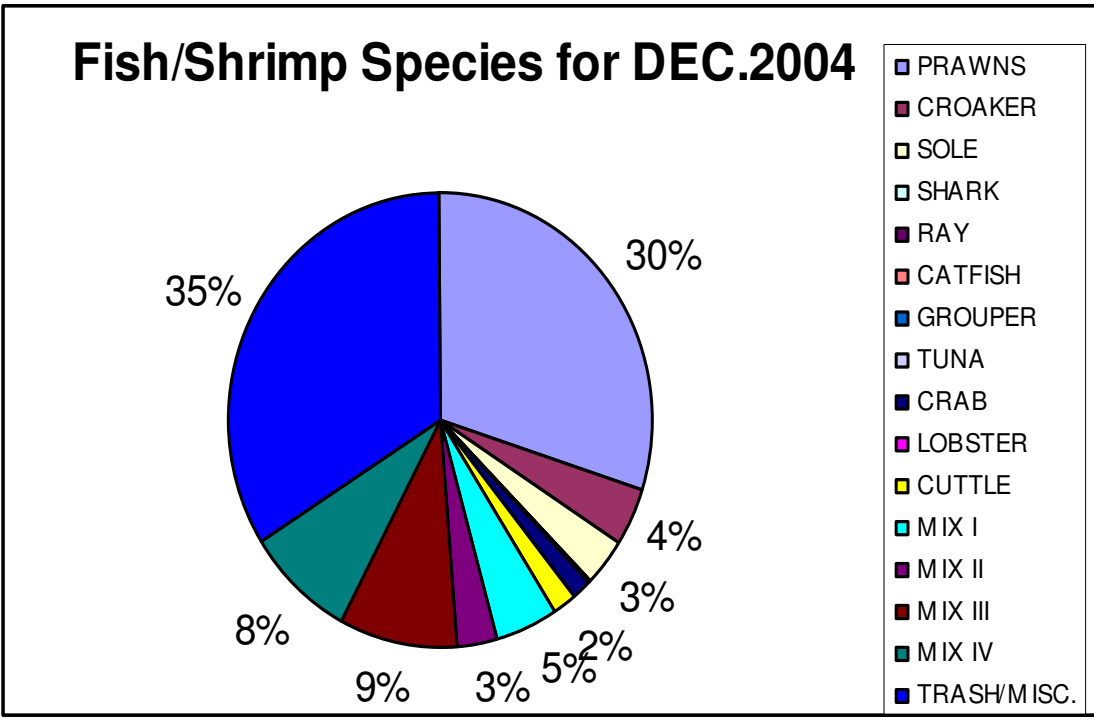
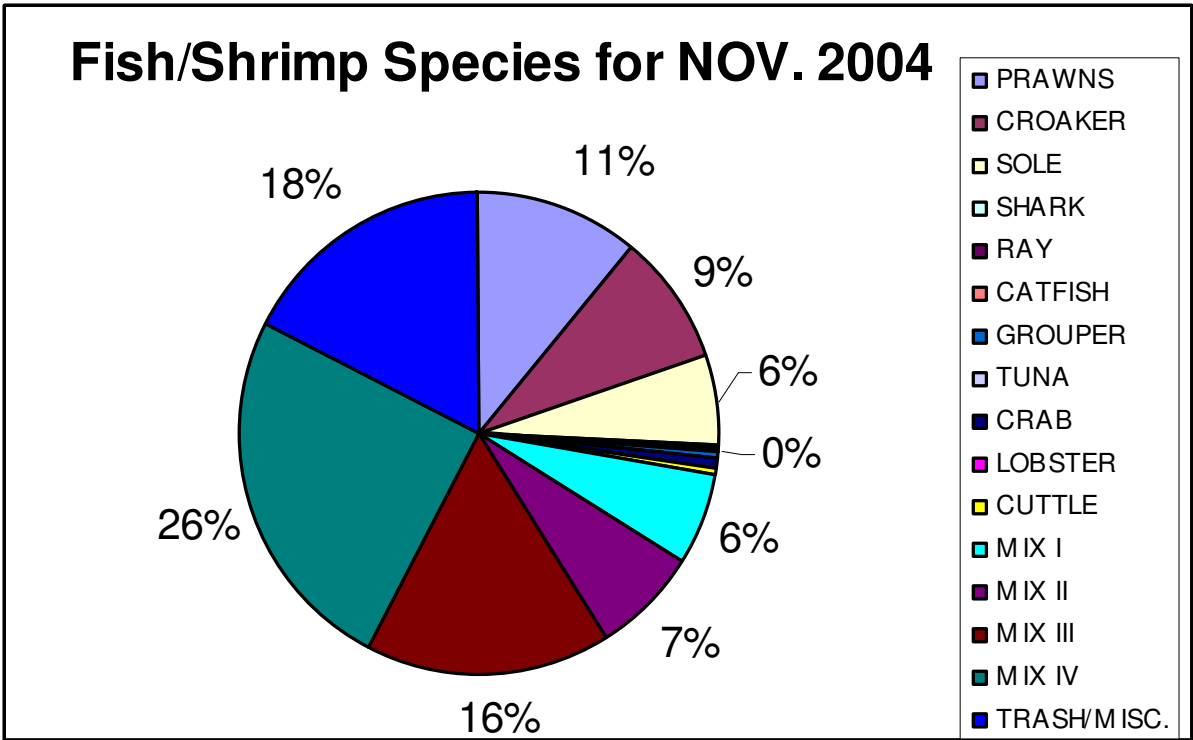


- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPER
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.

## Fish/Shrimp Species for OCT. 2004



- PRAWNS
- CROAKER
- SOLE
- SHARK
- RAY
- CATFISH
- GROUPER
- TUNA
- CRAB
- LOBSTER
- CUTTLE
- MIX I
- MIX II
- MIX III
- MIX IV
- TRASH/MISC.



A monthly chart of total production was also carried out to ascertain the period when trash fish production was very high. The result showed that trash fish

constituted over 20% of the total catch in August and October with August peak as large as 54% of the total catch. This trend needs to interest management especially the MCS in their overall resource management activities.

A closer look and further analysis of the data showed that August and October had low fish landing. By plotting the figures seen of trash fish alone it was shown that trash fish production pattern was similar to the shrimp production pattern even when trash fish had its peak in July.

A few incidentals were reported by the observers which management is looking into and this includes;

- i. Violent attacks by pirates and one occasion an observer was shot at.
- ii. All the vessels carried the required TEDs but only seldomly used them
- iii. Many vessels often purposely ventured into the non-trawl zone to scoop shrimps (*Parapaenopsis atlantica*) mainly and small fish (Juveniles)
- iv. Some of the vessels were aging and often had broken voyages
- v. Vessels now stay at an average of 60 days and at Sea for a complete fishing trip compared to the usual 30 days.

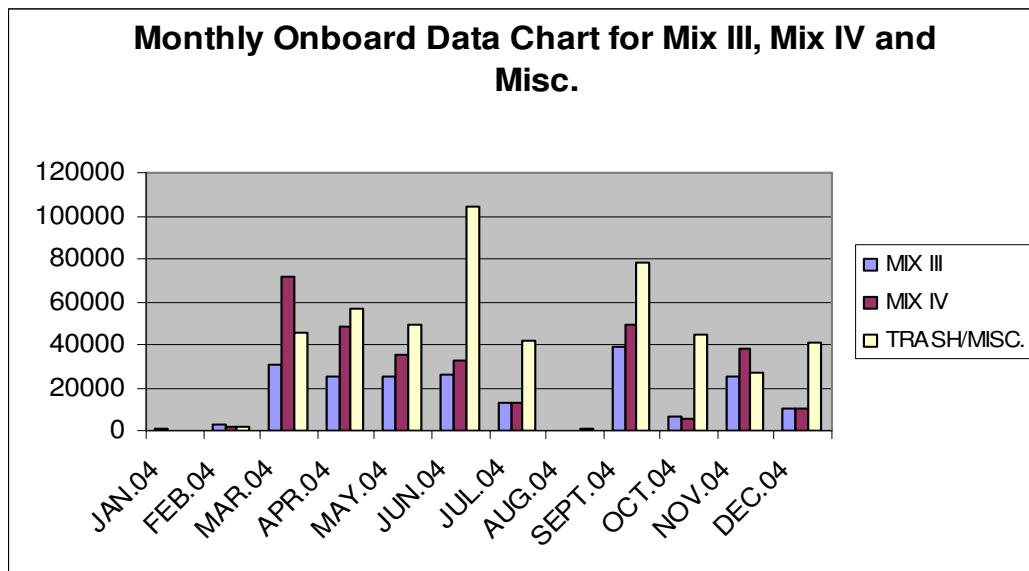
### **TRASH COMPOSITION**

A look at the composition of the trash fish shows that only juveniles of large species occurred in significant percentages e.g. the Croakers – 27%, Silver fish – 13%, Treadfins – 11%, Soles – 9%, Grouper – 5%, while the genetically small fish big eye 4%, Sardinella Species 2% and the rest less than 2%.

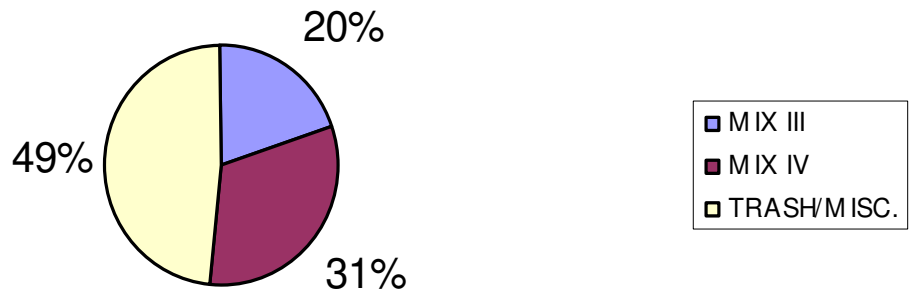
SN	Species	Frequency	Percentage
1	<i>Albula vulpes</i>	1	0
2	<i>Alectis alexandrinus</i>	13	1
3	<i>Arius heudeolitti</i>	1	0
4	<i>Batrachoides</i> spp.	1	0
5	<i>Bothus guibei</i>	6	0
6	<i>Bothus podas africanus</i>	10	1
7	<i>Brachydeuterus auritus</i>	51	4
8	<i>Caranx bicolor</i>	1	0
9	<i>Caranx carangus</i>	1	0
10	<i>Caranx chrysos</i>	14	1
11	<i>Caranx hippos</i>	2	0
12	<i>Caranx lugubris</i>	1	0
13	<i>Caranx senegallus</i>	11	1
14	<i>Chaetodipterus goreensis</i>	1	0
15	<i>Chloroscombrus chrysurus</i>	47	4
16	<i>Cynoglossus browni</i>	32	3
17	<i>Cynoglossus cadenati</i>	9	1
18	<i>Cynoglossus senegalensis</i>	16	1
19	<i>Cynoponticus ferox</i>	24	3
20	<i>Dasyatis margarita</i>	2	0
21	<i>Dentex angoensis</i>	1	0
22	<i>Dentex congolensis</i>	1	0
23	<i>Drepane africana</i>	70	6
24	<i>Elops lacerta</i>	3	0
25	<i>Ehipus goreensis</i>	1	9
26	<i>Epinephelus aeneus</i>	31	3
27	<i>Ethmalosa fimbriata</i>	13	1
28	<i>Eucinostomus melanopterus</i>	4	0
29	<i>Galeoides decadactylus</i>	150	12
30	<i>Ilisha africana</i>	18	1
31	<i>Lagocephalus laevigatus</i>	14	1
32	<i>Mugil cephalus</i>	9	1
33	<i>Ophichthus ophis</i>	1	0
34	<i>Pagellus belloti</i>	1	0
35	<i>Pegusa cadenati</i>	8	1
36	<i>Pentanemus quinquarius</i>	12	1
37	<i>Platycephalus gruveli</i>	9	1
38	<i>Platycephalus lavigatus</i>	8	1
39	<i>Pomadasys jubelini</i>	37	3
40	<i>Pseudepeneus prayensis</i>	7	1
41	<i>Pseudolithus senegalensis</i>	10	1
42	<i>Pseudopeneaus prayensis</i>	1	0

43	<i>Pseudotolithus brachygnathus</i>	11	1
44	<i>Pseudotolithus elongatus</i>	39	3
45	<i>Pseudotolithus epipercus</i>	2	0
46	<i>Pseudotolithus moorii</i>	16	1
47	<i>Pseudotolithus senegalensis</i>	114	9
48	<i>Pseudotolithus typus</i>	82	6
49	<i>Pteroscion peli</i>	30	2
50	<i>Raja miraletus</i>	11	1
51	<i>Sardinella maderensis</i>	15	1
52	<i>Sardinella eba</i>	1	0
53	<i>Scomberomerus tritor</i>	15	1
54	<i>Scyris alexandrinus</i>	17	1
55	<i>Selar crumenoptthalmus</i>	1	0
56	<i>Selene dorsalis</i>	61	5
57	<i>Sphyraena guachancho</i>	16	1
58	<i>Sphyraena sphyraena</i>	1	0
59	<i>Symphurus liguatus</i>	1	0
60	<i>Syphurus nigrescens</i>	1	0
61	<i>Trachinotus trachinotus</i>	2	0
62	<i>Trachinus lineolatus</i>	1	0
63	<i>Trichiurus lepturus</i>	167	13
64	<i>Trophius vallianti</i>	1	0
65	<i>Uranoscopi polli</i>	1	0
66	<i>Vomer setapinnis</i>	14	1

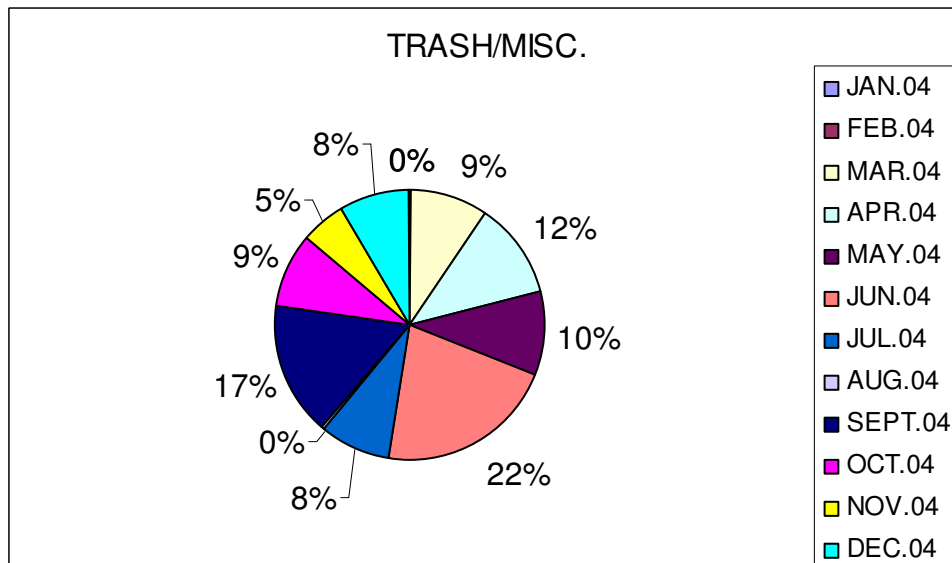
MONTH	MIX III	MIX IV	TRASH/MISC.
JAN.04	900	20	100
FEB.04	3160	1640	1447
MAR.04	30245	72092	45740
APR.04	25200	48530	56371
MAY.04	25110	35030	49058
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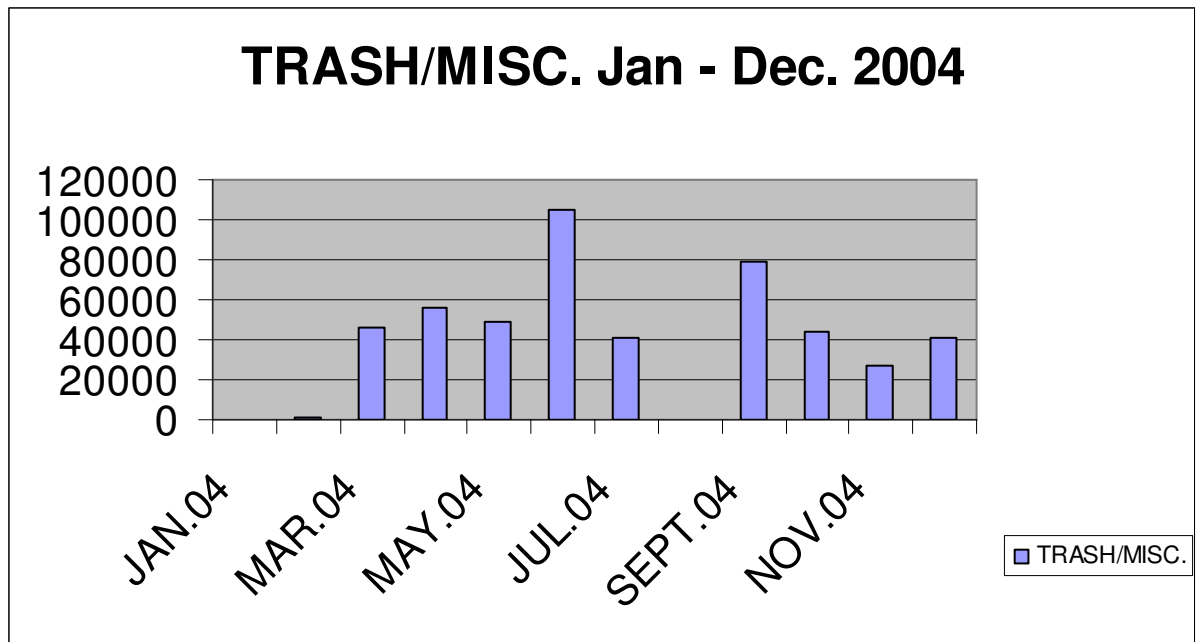


**On Board Data Chart for Mix III, IV and MISC.  
for Jan - Dec. 2004.**



MONTH	TRASH/MISC.
JAN.04	100
FEB.04	1447
MAR.04	45740
APR.04	56371
MAY.04	49058
JUN.04	104570
JUL.04	41500
AUG.04	500
SEPT.04	78582
OCT.04	44260
NOV.04	26875
DEC.04	41041.38





On board trash fish sales was highest in the month of June followed by the month of September. The sorting of fish showed the Mix III - 20% was the least while Mix IV – 31% followed and then trash was highest with 40%.

The high production of trash fish and the fact that a high percentage of the trash is made up of juveniles of commercially important species underlines the need for by-catch mitigating devices to be used on all shrimping trawl nets.