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REGIONAL PROJECT TO EVALUATE THE FISHERIES STOCKS.

**SCIENTIFIC REPORT OF THE DEMERSAL FISH RESOURCES IN THE WATERS OF THE GAMBIA, 21st
May, 2012.**

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1.0. Introduction

1.1. Background

The West African Economic Monitoring Union (WAEMU) among its programmes commenced implementation of a five year Programme for development of the Fisheries Sector within the framework of its Agricultural Policy. These programmes included fisheries surveys and analysis of the demersal and pelagic fish resources within the participating coastal countries in the sub-region. The idea is to have information and knowledge of the fish stocks in order to assist the Government to manage their fisheries resources.

The Regional Project for Evaluation of the Fish Stocks is aimed to improve and strengthen the knowledge-base of the participating coastal states. The regional survey was divided into two (Demersal Trawl Survey and Pelagic Trawl Survey) based on the request of the participating countries. The Demersal Trawl Survey was successfully conducted in all the countries of the North except in the waters of Guinea Bissau. The Demersal Trawl Survey was executed by the *Centre National des Sciences Halieutiques de Boussoura (CNSHB)* with its research vessel - *Général Lansana Conté (R/V GLC)*.

This report is specifically concerned with the Demersal Trawl Survey conducted in the Gambian waters by the GLC, on 21st May, 2012. The report is prepared by Messrs Ebou Mass Mbye and Saloum Jatta, both Focal Points of the UEMOA Project, The Gambia.

2.0: Objectives of the Demersal Trawl Survey

2.1. The main objective:

The main objective of the Demersal Trawl Survey was to have information on the fish stocks in the waters of The Gambia with specific objectives as follows:

- To obtain relative abundance indices of the selected demersal commercial species.
- To have knowledge of the fish and bathymetrical distribution of the main fish species.
- To have knowledge of the fish size (length of fish) of the main fish species.

3.0: Materials and methods.

3.1. Materials

3.1.1. Characteristics of the GLC (survey vessel).

The R/O GLC is a fisheries research vessel managed by the CNSHB (*Centre National des Sciences Halieutiques de Boussoura*). Its specifications are provided in Table 1.

Table 1. Characteristics of GLC.

No.	Characteristics	Size.
1.	Length	29.93 m.
2.	Depth	7.30 m.
3.	Width	2.60 m.
4.	Engine Horse power	750 HP.
5.	Gross Registered Tonnage (GRT)	198 Mt.
6.	Maximum speed	10.0 knots.
7.	Trawling speed	4.0 knots

3.1.2. The Trawl gear

The fishing gear used in the survey is a six (6) Seam Semi-balloon Trawl. The netting material is *polyethylene*. The net consists of several panels. Mesh depth varies. Stretched mesh sizes from wing tips to the last belly is 75.0 mm, decreasing to 25.0 mm. at cod-end. The ground gear consists of rubber and bobbin. The specification of the trawl gear is presented in Table 2.

Table 2. Specifications of the trawl gear.

No.	Specification	Size
1.	Total length of the trawl net	39.85 m
3.	Stretched Mesh size at Cod-end	25.0 mm
4.	Stretched Mesh size at bellies and wings	75.0 mm
5.	Warps (Bobbin & iron)	80.0 & 120.0 mm dia.
6.	Weight of net in the water	220.0 kg
7.	Weight of otter boards at sea	450.0 kg

3.1.3. The scientific materials.

The scientific materials used during the trawl survey are presented in Table 3 below.

Table 3. The scientific materials.

No.	Material	Purpose	Size
1.	Marel M1100e electronic scale.	To measure (weigh) baskets of fish species	60.0 kg.
2.	Spring hand scale.	To measure individual fish species	50.0 kg.
3.	Fish measuring boards (Ichtyometer)	To measure fish length	50.0 & 60.0 cm
4.	Computer	Entry of the trawl data, biology and oceanography	
		Data analysis & report writing.	
5.	Catalogue (book) of fish species	Identification of fish species	

3.2: Survey Sampling Plan

Based on the continental shelf of The Gambia, six (6) stations were allocated to The Gambia during the UEMOA Togo meeting 2011. The Gambia opted for three strata with a maximum of two stations per stratum. These strata and the number of stations are as follows:

1. 010 - 050m = 2 stations.
2. 051 - 100m = 2 stations.
3. 101 - 200m = 2 stations

3.3: Itinerary of GLC at the Gambian coast.

The GLC arrived at the Port of Banjul on 20th May, 2012, at about mid-day, only to disembark the two Senegalese Scientists. Two other Gambian fisheries personnel embarked to the vessel the same day to participate in the demersal survey in the Gambian waters. The Gambian participants were as follows:

- Mr. Saloum Jatta, Fisheries Officer.
- Mr. Salifu Ceesay, Fisheries Assistant.

The GLC left the Port of Banjul on the 20th May, 2012, at about 19:00, for the Atlantic Coast (Marine waters) of The Gambia, to commence the UEMOA funded demersal trawl survey. The vessel returned to the Port of Banjul early morning of the 22nd May, 2012, to disembark the two Gambian participants and sailed the same day at around 16:00 to the coast of Guinea.

It should be noted that Mr. Ebou Mass Mbye was participating in the Ecosystem Survey of the CCLME, onboard the R/V. Dr. Fridtjof Nansen, in the waters of Guinea to Central Dakar, during the time of the Demersal Trawl Survey, funded by the UEMOA Project.

3.4: The Demersal Trawl Survey.

The Demersal Trawl Survey conducted in the Gambian waters took place on the 21st May, 2012 (one day). Trawling was conducted at six (6) Trawl Stations (57, 58, 59, 60, 61 & 62) from 08:23 to 18:15 (during the day) (Fig. 1).

3.5: Data collection.

In all fisheries surveys it is required to list down the necessary data before the actual survey commenced. In this survey three categories of data were collected:

- **Biological data:** family and taxonomic name of each species, weight and number of each category of fish species; length measurements of ten selected fish species.
- **Spatial and temporal data:** trawling positions (Latitudes / longitudes), trawling time (Start and end in minutes), dates, bathymetric depths and stratum.
- **Environmental data:** bottom and surface water temperature in °C.

Carte de Campagne d PRESH UEMOA - Gambie

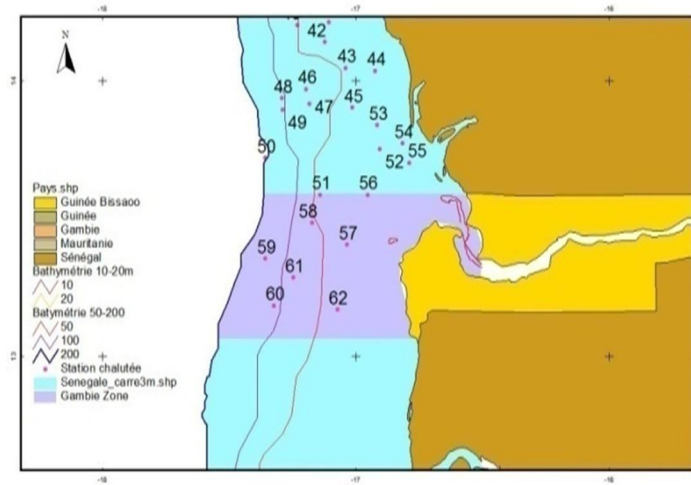


Fig. 1. Map depicting Trawling stations in the Gambian waters.

3.6: Data processing:

The trawl data are stored in Excel. The sums were calculated using a hand-held calculator. The specific biomass of individual fish species were also calculated based on the strata and the trawl stations. The total biomass is the sum of the six stations. The method used in the calculation of biomass is provided in 3.6.1.

3.6.1. Method of Biomass estimation.

- Calculation of the distance covered by the vessel (D), is translated to the formula below:

➤ $D = S * T.$

- ✓ Where: D = Distance covered by the vessel in Nautical miles.
- ✓ S = Speed of the vessel (knots).
- ✓ T = Time taken for a Trawl.

The formula used to estimate biomass is as follows:

- $C/a * A$ (Catch (kg)/surface area (km²) * Area of the stratum. This indicates that C = Catch, a = area covered and A = Coverage area of the stratum (Reference) from previous surveys.
- Abundance indices:
 - $C/t.$ This implies that C = Catch (kg) and t = time (hr).
- Density:

➤ **C/a**

This implies that C = Catch (kg).

a = area covered.

4.0: Results

4.1. Hydrography (Sea water temperature).

Table 4 represents the Temperature of the bottom and the surface of the sea. The water samples were tested and temperature recorded at all the six trawl stations by a thermometer onboard. The average surface temperature was relatively cold (25.5°C), while average temperature at the bottom was colder (18.8°C). Surface temperature close to the shores (Station 62) was warmer compared to stations 57, 58, 59, 60 and 61.

Table 4. Average bottom and surface temperatures of the 6 trawled stations.

No.	Station No.	Stratum (m)	Fishing depth (m)	Bottom Temperature (°C)	Surface Temperature (°C)
1.	57	010.0 – 050.0	21.0	19.5	25.13
2.	58	051.0 – 100.0	52.0	18.7	24.93
3.	59	101.0 – 200.0	110.0	18.4	25.04
4.	60	101.0 – 200.0	105.0	18.4	25.79
5.	61	051.0 – 100.0	43.0	18.9	25.76
6.	62	010.0 – 050.0	22.0	18.6	26.20

4.2. Coverage Area.

The total coverage area of the three bathymetric strata (010-050 m, 051-100 m & 101-200 m) is 0.30655 km² (Table 5).

Table 5. Coverage area (km²) by strata.

Country	010-050m	051-100m	101-200m	Total
The Gambia, GLC (Coverage Area in km ²)	0.10267	0.10267	0.10121	0.30655
Coverage Area from previous surveys	2514.00	1341.00	161.00	4016.00

The survey was divided into three strata that are determined by the bathymetric depths. The six (6) trawl stations (57 – 62) were conducted in three (3) strata and each stratum has two (2) stations based on the bathymetric depths (Table 6).

Table 6. Bathymetric depths, coverage area and catches

No.	Station No.	Stratum (m)	Coverage area (km ²).	Trawling depth (m)	Catches (kg)
1.	57 & 62	010 – 050	0.10267	21.0 – 26.0	146.60
2.	58 & 61	050 – 100	0.10267	75.0 – 48.0	426.60
3.	59 & 60	101 – 200	0.10121	98.0 – 112.0	51.21
	Total coverage		0.30655		624.41

4.3. Fish species caught.

A total of sixty-six (66) fish species from forty-one (41) families were sampled in the Gambian waters (Annex 2). Based on the stratum, more fishes were caught within the 051 - 100m stratum (60.28 %) as compared to the 010 - 050m stratum that represented 38.84 % of the catches and 101 – 200m stratum representing only 0.88 % of the catches (Fig. 2). This means that the 051 - 100m stratum is found to be more productive during the survey than the others.

Table 7. Catches by trawl station/ stratum

No.	Station No.	Strata	Catches (kgs)	Catch/min
1.	57	010 – 050	9.20	0.31
2.	58	051 – 100	105.15	3.51
3.	59	101 – 200	35.12	1.17
4.	60	101 – 200	16.09	0.54
5.	61	051 – 100	321.45	10.72
6.	62	010 – 050	137.40	4.58

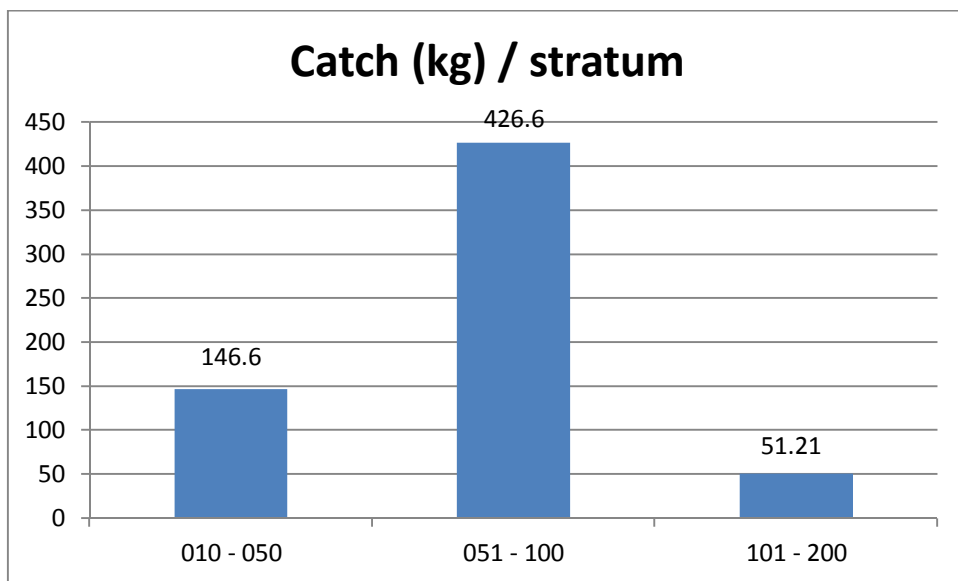


Fig. 2. Total catch (kg) by stratum.

4.4. Specific catches (kg) and abundances (kg/h) of some fish families (Table 8, Table 9).

Table 8. Total catches of fish species in family categories.

BALISTIDAE	Total catch	% Total catch	PARALICHTHYIDAE	Total catch	% Total catch
<i>Balistes capriscus</i>	1.9	10	<i>Citharichthys stampflii</i>	5.16	69
<i>Balistes punctatus</i>	17.7	90	<i>Syacium micrurum</i>	2.30	31
Total		100	Total	7.46	100
BOTHIDAE	Total catch	% Total catch	RHINOBATIDAE	Total catch	% Total catch
<i>Arnoglossus imperialis</i>	0.11	10	<i>Rhinobatos cemiculus</i>	3.0	27
<i>Bothus podas</i>	0.99	90	<i>Rhinobatos rhinobatos</i>	4.0	36
Total	1.10	100	<i>Zanobatus schoenleinii</i>	4.0	36
CARANGIDAE	Total catch	% Total catch	Total	11.0	99
<i>Decapterus rhonchus</i>	9.18	17	SERRANIDAE	Total catch	% Total catch
<i>Trachurus trecae</i>	45.78	83	<i>Epinephelus aeneus</i>	8.90	83
Total	54.96	100	<i>Epinephelus Goreensis</i>	0.10	1
CHAETODONTIDAE	Total catch	% Total catch	<i>Serranus scriba</i>	1.75	16
<i>Chaetodon hoeferi</i>	1.23	96	Total	10.75	100
<i>Chaetodon marcellae</i>	0.05	4	SOLEIDAE	Total catch	% Total catch
Total	1.28	100	<i>Dicologlossa hexophthalma</i>	6.00	59
FISTULARIIDAE	Total catch	% Total catch	<i>Monochirus hispidus</i>	0.05	0
<i>Fistularia petimba</i>	1.91	83	<i>Pegusa triophthalmus</i>	0.20	2
<i>Fistularia tabacaria</i>	0.40	17	<i>Solea senegalensis</i>	0.12	1
Total	2.31	100	<i>Synaptura cadenati</i>	1.73	17
HAEMULIDAE	Total catch	% Total catch	<i>Synaptura lusitanica</i>	2.00	20
<i>Brachydeuterus auritus</i>	0.20	0	Total	10.10	99
<i>Parapristipoma octolineatum</i>	5.78	12	SPARIDAE	Total catch	% Total catch
<i>Plectorhynchus mediterraneus</i>	14.95	30	<i>Boops boops</i>	0.15	0
<i>Pomadasys incisus</i>	28.98	58	<i>Pagellus bellottii</i>	26.25	47
Total	49.91	100	<i>Sparus caeruleostictus</i>	24.82	44
LABRIDAE	Total catch	% Total catch	<i>Spondyliosoma cantharus</i>	4.70	8
<i>Bodianus scrofa</i>	5.90	74	Total	55.92	99
<i>Bodianus speciosus</i>	0.20	2	TETRAODONTIDAE	Total catch	% Total catch
<i>Coris julis</i>	1.92	24	<i>Sphoeroides pachygaster</i>	0.25	2
Total	8.02	100	<i>Sphoeroides spengleri</i>	12.85	98
MONACANTHIDAE	Total catch	% Total catch	Total	13.10	100
<i>Aluterus punctatus</i>	0.70	64			
<i>Stephanolepis hispidus</i>	0.40	36			
Total	1.10	100			

Table 9. Abundance indices by species (kg/hr).

	<u>Species</u>	<u>CPU (kg/hr)</u>	<u>No.</u>	<u>Species</u>	<u>CPU (kg/hr)</u>
1	<i>Acanthurus monroviae</i>	4.64	34	<i>Syacium micrurum</i>	1.53
2	<i>Antennarius senegalensis</i>	0.20	35	<i>Penaeus notialis</i>	0.17
3	<i>Arius parkii</i>	0.80	36	<i>Grammoplites gruveli</i>	0.27
4	<i>Balistes capriscus</i>	1.27	37	<i>Chromis chromis</i>	0.40
5	<i>Balistes punctatus</i>	17.70	38	<i>Cronius ruber</i>	0.40
6	<i>Halobatrachus didactylus</i>	0.60	39	<i>Priacanthus arenatus</i>	72.04
7	<i>Arnoglossus imperialis</i>	0.11	40	<i>Raja miraletus</i>	2.20
8	<i>Bothus podas</i>	0.50	41	<i>Rhinobatos cemiculus</i>	6.00
9	<i>Calappa rubroguttata</i>	0.10	42	<i>Rhinobatos rhinobatos</i>	8.00
10	<i>Decapterus rhonchus</i>	3.67	43	<i>Zanobatus schoenleinii</i>	8.00
11	<i>Trachurus trecae</i>	18.31	44	<i>Scomber japonicus</i>	7.93
12	<i>Schedophilus pamarco</i>	0.80	45	<i>Scorpaena stephanica</i>	12.39
13	<i>Chaetodon hoeferi</i>	0.82	46	<i>Sepia officinalis</i>	4.84
14	<i>Chaetodon marcellae</i>	0.10	47	<i>Epinephelus aeneus</i>	8.90
15	<i>Sardinella aurita</i>	0.10	48	<i>Epinephelus Goreensis</i>	0.20
16	<i>Chilomycterus spinosus</i>	8.88	49	<i>Serranus scriba</i>	1.75
17	<i>Fistularia petimba</i>	0.64	50	<i>Dicologlossa hexophthalma</i>	2.40
18	<i>Fistularia tabacaria</i>	0.80	51	<i>Monochirus hispidus</i>	0.10
19	<i>Eucinostomus melanopterus</i>	0.20	52	<i>Pegusa triophthalmus</i>	0.40
20	<i>Brachydeuterus auritus</i>	0.40	53	<i>Solea senegalensis</i>	0.12
21	<i>Parapristipoma octolineatum</i>	3.85	54	<i>Synaptura cadenati</i>	0.87
22	<i>Plectorhynchus mediterraneus</i>	14.95	55	<i>Synaptura lusitanica</i>	4.00
23	<i>Pomadasys incisus</i>	14.49	56	<i>Boops boops</i>	0.30
24	<i>Bodianus scrofa</i>	2.95	57	<i>Pagellus bellottii</i>	10.50
25	<i>Bodianus speciosus</i>	0.40	58	<i>Sparus caeruleostictus</i>	12.41
26	<i>Coris julis</i>	1.92	59	<i>Spondylisoma cantharus</i>	3.13
27	<i>Lutjanus goreensis</i>	10.20	60	<i>Trachinocephalus myops</i>	1.07
28	<i>Aluterus punctatus</i>	0.70	61	<i>Sphoeroides pachygaster</i>	0.50
29	<i>Stephanolepis hispidus</i>	0.80	62	<i>Sphoeroides spengleri</i>	6.43
30	<i>Pseudupeneus prayensis</i>	57.05	63	<i>Trachinus armatus</i>	0.10
31	<i>Octopus vulgaris</i>	8.85	64	<i>Chelidonichthys gabonensis</i>	9.61
32	<i>Brotula barbata</i>	0.20	65	<i>Cymbium pepo</i>	11.00
33	<i>Citharichthys stampflii</i>	10.32	66	<i>Zeus faber</i>	0.56

4.5. Estimated biomass.

The total catches and estimated biomass are provided in Table 10. A total of **624.41 kg** (Table 10) of marine species were caught at bathymetric depths between 21 and 112.0 m. Biomass estimation was not carried out on board the GLC, but at the Fisheries Department in Banjul. The method used to calculate biomass was based on standardized fishing operations which consider sampling of all the individuals captured in the swept area of the trawl gear. Total biomass is estimated at **9,243.08 t** (Table 12).

Table 10. Catches (kg) and estimated biomass (t) by stratum.

Station No.	Strata (m)	Trawling depths (m)	Catches (kg)	Estimated biomass (t)	% catches
59 & 60	101 – 200	98 – 112	51.21	81.46	0.88
58 & 61	051 - 100	75 – 48	426.60	5,571.94	60.28
57 & 62	010 - 050	21 – 26	146.60	3,589.68	38.84
Total			624.41	9,243.08	100

The total density is 2,036.89 kg/km² or 2.04 t/km². Also, the total abundance index is 208.14 kg/hr or 0.208 t / hr.

Table 11. Density and abundance index / stratum.

Stratum (m).	Area covered (km ²)	Density (kg/km ²).	Abundance index (kg/hr)
101 - 200	0.10121	505.98	51.21
051 - 100	0.10267	4,155.06	426.60
010 -050	0.10267	1,427.88	146.60

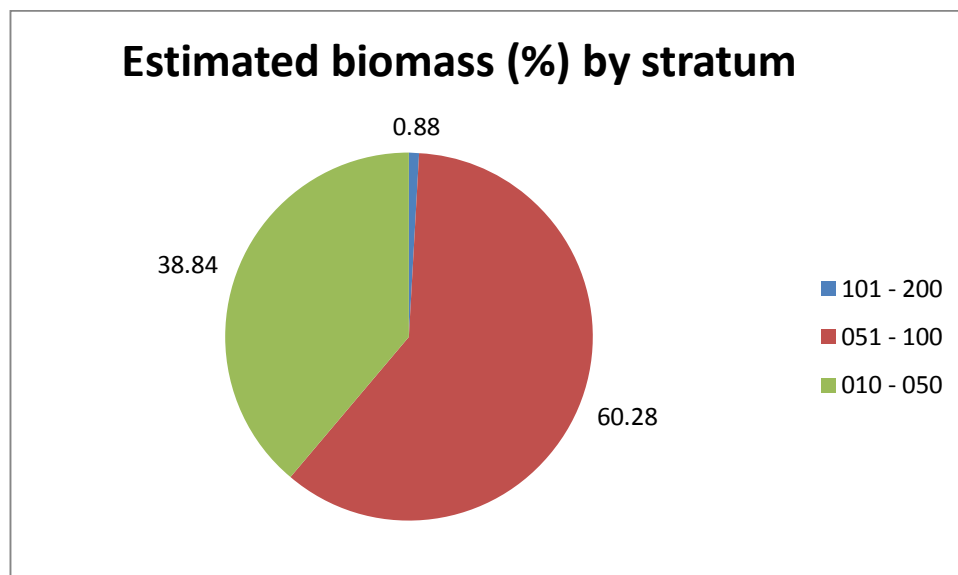


Fig. 3. Estimated biomass (%) by stratum.

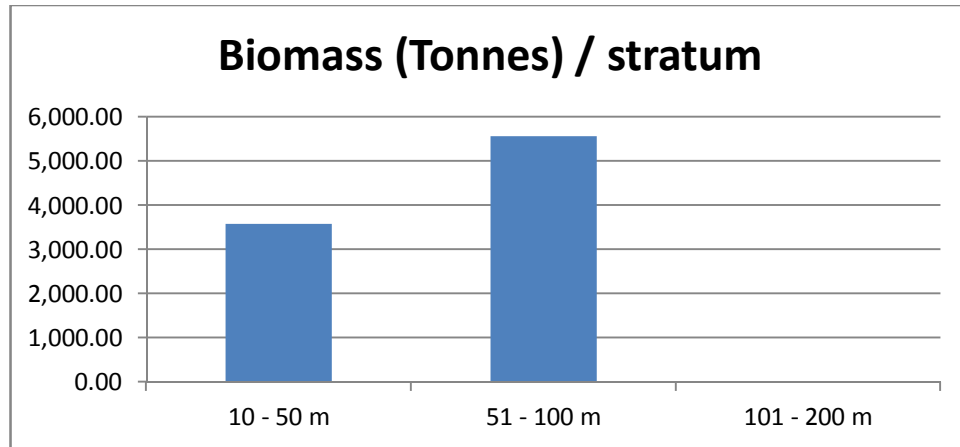


Fig. 4. Estimated biomass (t) by stratum.

Table 12. Estimated biomass (t) by species.

Taxonomy	10-50m		51-100m		101-200m		Total
	St. 57	St. 62	St. 58	St. 61	St. 59	St. 60	
<i>Acanthurus monroviae</i>	0.0	0.0	15.7	44.9	0.0	0.0	60.6
<i>Aluterus punctatus</i>	0.0	2.4	0.0	7.8	0.0	0.0	10.3
<i>Antennarius senegalensis</i>		0.0	0.0	0.0	0.2	0.0	0.2
<i>Arius parkii</i>	9.8	0.0	0.0	0.0	0.0	0.0	9.8
<i>Arnoglossus imperialis</i>	0.0	0.0	0.0	0.0	0.2	0.0	0.2
<i>Balistes capriscus</i>	4.9	39.2	1.3	0.0	0.0	0.0	45.4
<i>Balistes punctatus</i>	0.0	350.1	0.0	44.4	0.0	0.0	394.5
<i>Bodianus scrofa</i>	2.4	29.4	3.9	56.2	0.0	0.0	91.9
<i>Bodianus speciosus</i>	0.0	4.9	0.0	0.0	0.0	0.0	4.9
<i>Boops boops</i>	0.0	0.0	2.0	0.0	0.0	0.0	2.0
<i>Bothus podas</i>	0.0	19.6	0.0	0.5	0.1	0.2	20.3
<i>Brachydeuterus auritus</i>	4.9	0.0	0.0	0.0	0.0	0.0	4.9
<i>Brotula barbata</i>	0.0	0.0	1.3	0.0	0.0	0.0	1.3
<i>Calappa rubroguttata</i>	0.0	0.0	0.0	0.0	0.1	0.0	0.1
<i>Chaetodon hoefleri</i>	0.0	4.9	7.8	5.6	0.0	0.0	18.3
<i>Chaetodon marcellae</i>	0.0	0.0	0.7	0.0	0.0	0.0	0.7
<i>Chelidonichthys gabonensis</i>	0.0	9.8	7.8	280.8	2.4	0.0	300.8
<i>Chilomycterus spinosus</i>	0.0	49.0	0.0	89.9	0.0	0.0	138.8
<i>Chromis chromis</i>	0.0	0.0	2.6	0.0	0.0	0.0	2.6
<i>Citharichthys stampflii</i>	0.0	0.0	0.0	67.4	0.0	0.0	67.4
<i>Coris julis</i>	0.0	4.9	0.0	22.5	0.0	0.0	27.4
<i>Cronius ruber</i>	0.0	0.0	0.0	0.0	0.3	0.0	0.3
<i>Cymbium pepo</i>	134.7	0.0	0.0	0.0	0.0	0.0	134.7
<i>Decapterus rhonchus</i>	4.9	0.0	52.2	33.7	0.6	3.2	94.6
<i>Dicologlossa hexophthalma</i>	0.0	4.9	2.6	56.2	0.8	1.3	65.7

<i>Epinephelus aeneus</i>	0.0	58.8	0.0	84.9	0.0	0.0	143.7
<i>Epinephelus Goreensis</i>	0.0	0.0	1.3	0.0	0.0	0.0	1.3
<i>Eucinostomus melanopterus</i>	2.4	0.0	0.0	0.0	0.0	0.0	2.4
<i>Fistularia petimba</i>	4.9	4.9	6.5	11.8	0.2	0.0	28.3
<i>Fistularia tabacaria</i>	0.0	9.8	0.0	0.0	0.0	0.0	9.8
<i>Grammoplites gruvelli</i>	0.0	2.4	1.3	0.0	0.3	0.0	4.1
<i>Halobatrachus didactylus</i>	9.8	4.9	0.0	0.0	0.0	0.0	14.7
<i>Lutjanus goreensis</i>	0.0	0.0	0.0	66.6	0.0	0.0	66.6
<i>Monochirus hispidus</i>	0.0	0.0	0.7	0.0	0.0	0.0	0.7
<i>Octopus vulgaris</i>	0.0	9.8	15.7	160.6	6.0	0.0	192.1
<i>Pagellus bellottii</i>	1.2	264.4	52.2	112.3	4.5	0.0	434.7
<i>Parapristipoma octolineatum</i>	0.0	4.9	39.2	33.7	0.0	0.0	77.8
<i>Pegusa triophthalmus</i>	0.0	4.9	0.0	0.0	0.0	0.0	4.9
<i>Penaeus notialis</i>	0.0	0.0	0.0	0.3	0.2	0.0	0.5
<i>Plectorhynchus mediterraneus</i>	0.0	0.0	58.8	136.5	0.0	0.0	195.2
<i>Pomadasyis incisus</i>	0.0	58.8	164.6	146.0	4.5	0.0	373.8
<i>Priacanthus arenatus</i>	0.0	49.0	26.1	1359.0	0.0	0.0	1434.1
<i>Pseudupeneus prayensis</i>	0.0	1145.8	350.0	841.5	3.2	4.1	2344.6
<i>Raja miraletus</i>	0.0	0.0	15.7	13.1	0.0	0.0	28.7
<i>Rhinobatos cemiculus</i>	0.0	0.0	0.0	39.2	0.0	0.0	39.2
<i>Rhinobatos rhinobatos</i>	0.0	97.9	0.0	0.0	0.0	0.0	97.9
<i>Sardinella aurita</i>	0.0	0.0	0.7	0.0	0.0	0.1	0.7
<i>Schedophilus pamarco</i>	9.8	0.0	0.0	0.0	0.0	0.0	9.8
<i>Scomber japonicus</i>	0.0	58.8	39.2	5.6	9.5	12.7	125.8
<i>Scorpaena stephanica</i>	1.2	0.0	0.0	213.4	3.5	0.0	218.1
<i>Sepia officinalis</i>	4.9	88.1	1.3	134.8	0.2	0.3	229.6
<i>Serranus scriba</i>	0.0	39.2	2.0	0.0	0.0	0.0	41.1
<i>Solea senegalensis</i>	0.0	2.4	0.0	0.0	0.0	0.0	2.5
<i>Sparus caeruleostictus</i>	24.5	497.0	23.5	22.5	0.0	0.0	567.5
<i>Sphaeroides pachygaster</i>	0.0	0.0	0.0	0.0	0.4	0.0	0.4
<i>Sphaeroides spengleri</i>	0.0	205.7	1.3	56.2	0.0	0.1	263.2
<i>Spondyliosoma cantharus</i>	0.0	0.0	31.3	28.1	0.0	0.2	59.7
<i>Stephanolepis hispidus</i>	0.0	9.8	0.0	0.0	0.0	0.0	9.8
<i>Syacium micrurum</i>	0.0	49.0	2.6	0.0	0.2	0.0	51.7
<i>Synaptura cadenati</i>	4.9	0.0	1.3	5.6	1.6	0.0	13.4
<i>Synaptura lusitanica</i>	0.0	49.0	0.0	0.0	0.0	0.0	49.0
<i>Trachinocephalus myops</i>	0.0	0.0	5.2	5.6	1.9	0.2	12.9
<i>Trachinus armatus</i>	0.0	0.0	0.0	0.0	0.1	0.0	0.1
<i>Trachurus trecae</i>	0.0	29.4	429.7	5.6	14.7	3.2	482.6
<i>Zanobatus schoenleinii</i>	0.0	97.9	0.0	0.0	0.0	0.0	97.9
<i>Zeus faber</i>	0.0	2.4	5.2	5.6	0.3	0.0	13.6

4.6. Length measurements of the selected fish species.

Length measurement was conducted on ten fish species, the purpose of which was to determine the maximum, minimum and the modal length of each taxon (Table 13). The fish species that length measurement was conducted included eight (8) demersal (*Pagellus bellottii*, *Epinephelus aeneus*, *pomadasys incisus*, *Pseudupeneus prayensis*, *Parapristipoma octolineatum*, *Plectorhynchus mediterraneus*, *SpondylIOSoma cantharus* and *Sparus caeruleostictus*) and two small pelagic fish species (*Decapterus rhoncus* and *Trachurus trecae*). The length measurements were based on the total length of the fish species and were each measured on a wooden fish measuring board. A total of 901 individual fish species were measured.

4.7. Description of some selected fish species.

The fish species considered in the length measurements are described below:

4.7.1. *Pagellus bellottii*.

Pagellus bellottii is a fish species of the SPARIDAE family. It was captured at Stations 57, 58, 59, 61 and 62. A total catch of 674 individual species equivalent to 26.25 kg was captured in a 150 min. trawling of 5 x 30 min.

4.7.2. *Epinephelus aeneus*.

Epinephelus aeneus belongs to the SERRANIDAE family. It is considered among the most high value fish species in the list of all captured fish species from the Gambian waters. The fish species was found close to the shores at Stations 61 and 62, at bathymetric depths from 22.0 to 75.0 m. The catch was 7 individuals representing 8.9 kg. The average length is approximately 50.0 cm of the five fish measured at station 61.

4.7.3. *Pomadasys incisus*

Pomadasys incisus belongs to the HAEMULIDAE family. The fish species was found at Stations 58, 59, 61 and 62, at water depths ranging from 22.0 to 112.0 m at the continental shelf. A total of 195 individuals equivalent to 28.98 kg were caught in a 120.0 min. trawling time. A 43 % of the fish species was caught at Station 58, at bathymetric depth between 48.0 and 52.0 m. The average total length of stations 58, 59 and 61 is 21.23 cm. This fish species is highly landed by the Artisanal fishing boats and is commercially important.

4.7.4. *Sparus caeruleostictus*

This fish species belongs to the SPARIDAE family. It was found at Stations 57, 58, 61 and 62, at depths ranging from 21.0 to 75.0 m. A total of 185 individuals representing 81.8 % of the total catch of the species were caught at Station 62 (22.0 – 26.0 m depth). Total catch in 120.0 min. trawling time was 24.82 kg.

4.7.5. *Pseudupeneus prayensis*

This fish species belongs to the MULLIDAE family. The fish species was found at stations 58, 59, 60, 61 and 62 at depth ranges between 22.0 and 112.0 m. A total of 656 individuals equivalent to 142.63 kg were caught in a 150 min. trawling. The average weight is 0.22 kg while average total length is approximately 20 cm.

4.7.6. *Trachurus trecae*

This fish species is a Small Pelagic Fish and was captured at Stations 58, 59, 60, 61 and 62. A total of 579 individuals weighed 45.78 kg were captured. The average weight per fish is 0.08 kg. The catches were clearly juvenile fish species.

Table 13. Maximum, minimum and modal lengths of selected fish species.

Station	Fish species	Nb	Max. – Min. length (cm)	Mode (cm)
57	<i>Decapterus rhonchus</i>	1		
57	<i>Pagellus bellottii</i>	2		
57	<i>Sparus caeruleostictus</i>	20	18.0 - 11.0	12, 13
58	<i>Decapterus rhonchus</i>	15	31 - 24	29
58	<i>Pagellus bellottii</i>	55	25 - 10	15
58	<i>Parapristipoma octolineatum</i>	19	27 - 18	22
58	<i>Plectorhynchus mediterraneus</i>	17	31 - 22	25
58	<i>Pomadasys incisus</i>	28	24 - 19	20
58	<i>Pseudupeneus prayensis</i>	92	25 -12	22
58	<i>Sparus caeruleostictus</i>	7	28 - 22	22, 26
58	<i>Spondylisoma cantharus</i>	18	28 - 19	20
58	<i>Trachurus trecae</i>	89	26 - 17	19
59	<i>Pagellus bellottii</i>	90	18.0 – 8.0	10.0
59	<i>Pomadasys incisus</i>	15	25.0 – 21.0	24.0
59	<i>Pseudupeneus prayensis</i>	24	25.0 – 16.0	19.0
59	<i>Trachurus trecae</i>	115	27.0 – 18.0	21.0
60	<i>Pseudupeneus prayensis</i>	18	26.0 – 18.0	24.0
60	<i>Trachurus trecae</i>	15	28.0 – 11.0	21.0
61	<i>Epinephelus aeneus</i>	5	73.0 – 24.0	24, 30, 50, 72, 73,
61	<i>Pagellus bellottii</i>	42	21.0 – 4.0	17.0
61	<i>Pomadasys incisus</i>	16	25.0 – 20.0	22.0
61	<i>Pseudupeneus prayensis</i>	45	26.0 – 13.0	22.0
62.	<i>Pseudupeneus prayensis</i>	70	25.0 – 11.0	14.0
62	<i>Sparus caeruleostictus</i>	83	35.0 – 12.0	14.0

Nb: Max – Maximum length, Min. – Minimum length.

5.0. Conclusions

The survey could be summarized as follows:

1. A total of six (6) trawling stations were conducted in The Gambian waters and all took place on 21st May, 2012.

2. Each of the six trawling lasted for a period of 30.0 minutes.
3. Total catches from the Gambian waters is 624.41 kg
4. Estimated biomass is 9,243.08 tons
5. A total of 5,446 individual species were caught.
6. Average No. of species per station was 908
7. Average surface temperature was 25.5°C
8. Average bottom temperature was 18.8°C
9. Bathymetric depths of trawling area are within 21.0 to 112.0 m.
10. Total coverage area equals to 0.30655 km².

6.0. Gaps

1. Some of the trawl survey data do not reach the Fisheries Department on time which has affected the deadline to submit the report.
2. The proposed survey dates were changed on several occasions and the actual survey dates coincided with the Nansen survey in the region (Guinea – Morocco).
3. The main Focal Point who is the most experienced in terms of fisheries surveys could not participate in the UEMOA Survey due to numerous changes of dates. Instead he participated in the Nansen survey.
4. Biological sampling to determine sex and maturity of the fish species was not carried-out in the Gambian waters compared to the survey in the Guinean and Senegalese waters.
5. The Gambian Scientists did not participate fully because they were inexperienced; it was their first time to participate in a fisheries survey.
6. GLC did not communicate with Port officials prior to their landing at the GPA, Banjul.
7. The Gambian Scientists did not participate in the data entry (form and computer) on board.
8. Guinean Scientists dominated the scientific crew.
9. The environmental data were forwarded late through email on 1st September, 2012, by the Cruise Leader.
10. Printing of the draft copies of the report was a problem at the Fisheries Department.

7.0. Remarks.

Almost all the fish species caught during the UEMOA survey in the waters of The Gambia are threatening. There is a large capacity of traditional fishing boats concentrating on the 0.5 to 5.0 NM (Artisanal) and 8.0 to the 12.0 NM Limits (Industrial). Illegal fishing practices are the main courses of the decline (depletion) of the demersal fish stocks.

8.0. Recommendations.

1. To ensure that any survey, workshop or meeting organized by the UEMOA Project does not coincide with activities of the CCLME.
2. To respect the dates of all planned surveys.
3. A Planning Group of survey activities should be established.

4. Scientists from all the countries in the region should participate in future surveys from beginning to the end.
5. All survey materials, equipment and their functions as well as safety on board should be explained to the local participants prior to commencement of the survey.
6. Limit the fishing capacities (Artisanal and Industrial) in the region.
7. Establish close season at all breeding and spawning grounds.
8. To ensure that all destructive fishing gears are not use in the waters of the region.
9. Implement the Ecosystem Approach to Fisheries (EAF) in the Sub-region for sustainability of the fish resources.
10. Due to the state of the fish stocks, the Fisheries Department in collaboration with The Gambia Marine should enforce the Fisheries Regulations 2008, especially on fishing methods and mesh sizes.

9.0. Acknowledgement.

The Government of The Republic of The Gambia, in collaboration with the Ministry of Fisheries and Water Resources and the Fisheries Department, would like to express their gratitude to the UEMOA / WAEMU Project, for incorporating The Gambia as a non-Member State of the UEMOA to the fisheries component. Special thanks to Mm. Maria Luisa FERREIRA, Directress of Animal Resources & Fisheries, UEMOA.

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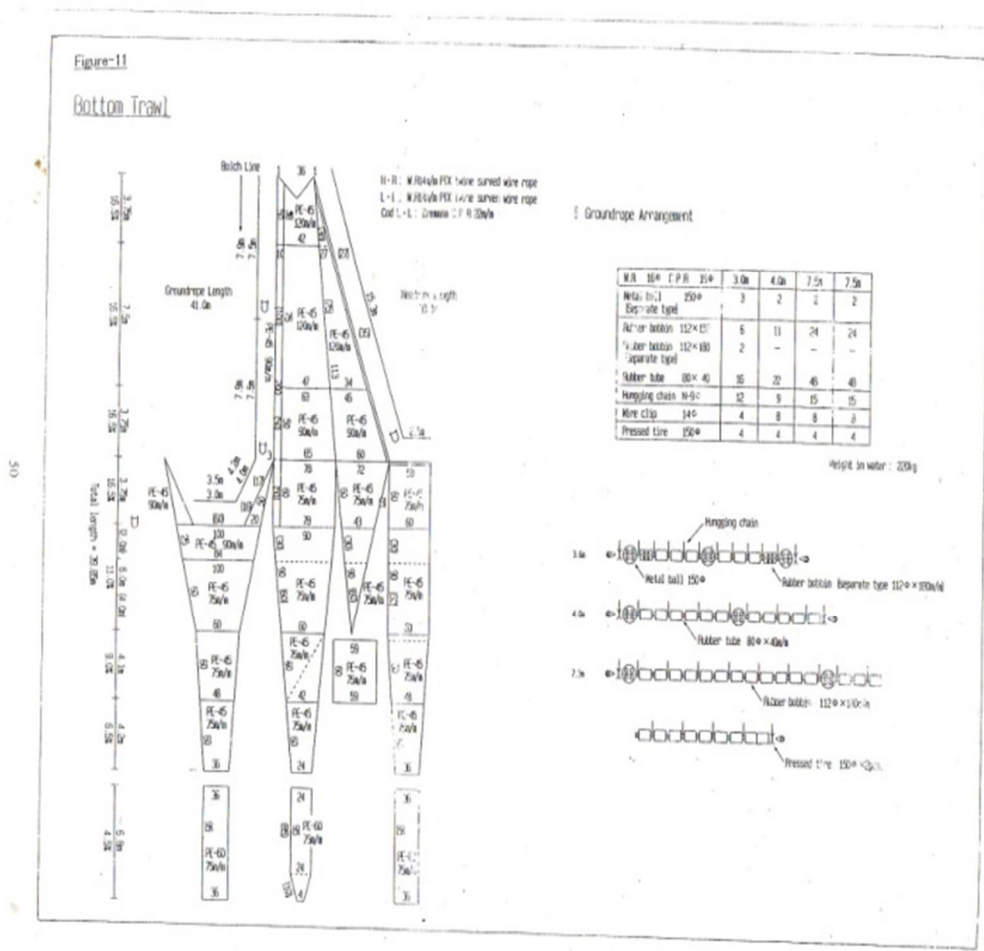
10.0. Abbreviations.

CCLME - Canary Current Large Marine Ecosystem.
 CNSHB – *Centre National des Sciences Halieutiques de Boussoura*.
 CRODT – *Centre de Recherches Océanographiques de Dakar – Thiaroye*.
 CPU – Catch Per Unit.
 FAO – Food & Agriculture Organizations.
 FD – Fisheries Department.
 GDP – Gross Domestic Products (*PIB* in French).
 GMT – Geographical Meridian Time
 GPA – Gambia Ports Authority.
 IEO – *Instituto Espanol de Oceanografia*.
 Kg/h.- kilogram / hour.
 NM – Nautical Miles.

R/O. GLC – General Lansana Conte
 UEMOA – Union Economique et Monétaire Ouest Africaine.
 UNDP – United Nations Development Programme.
 WAEMU – West African Economy and Monetary Union.

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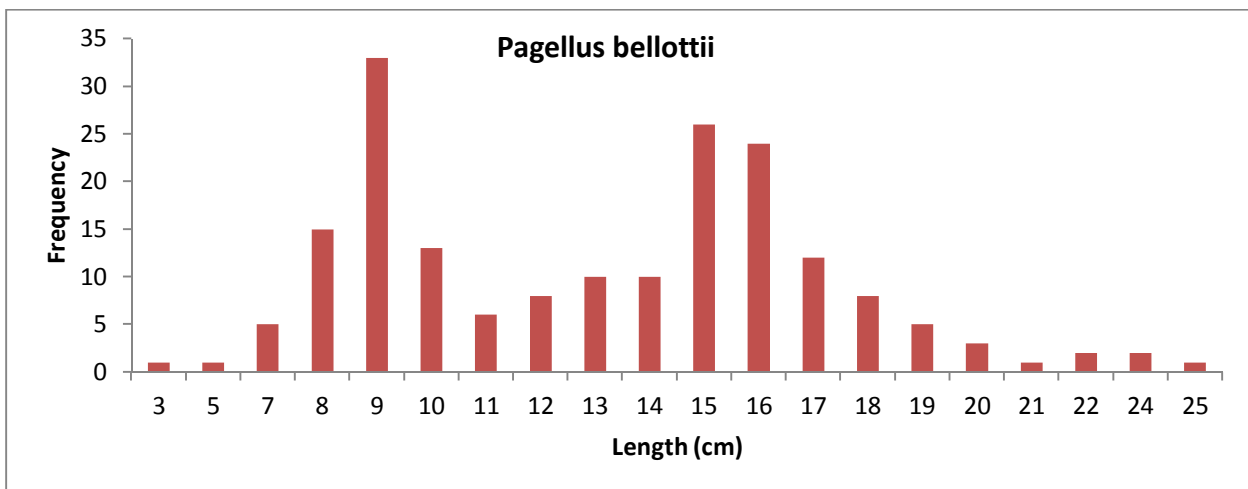
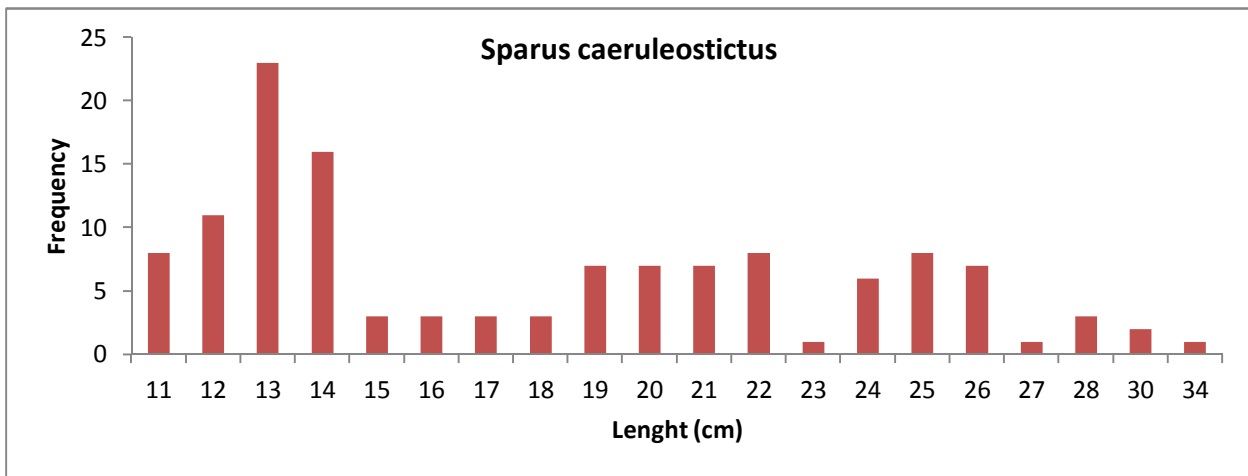
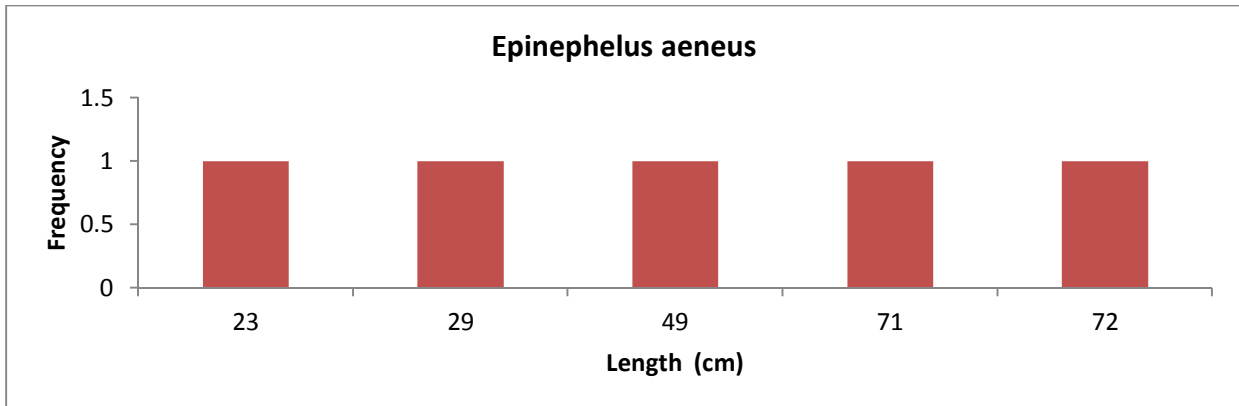
Annex 1. The Trawl designed.

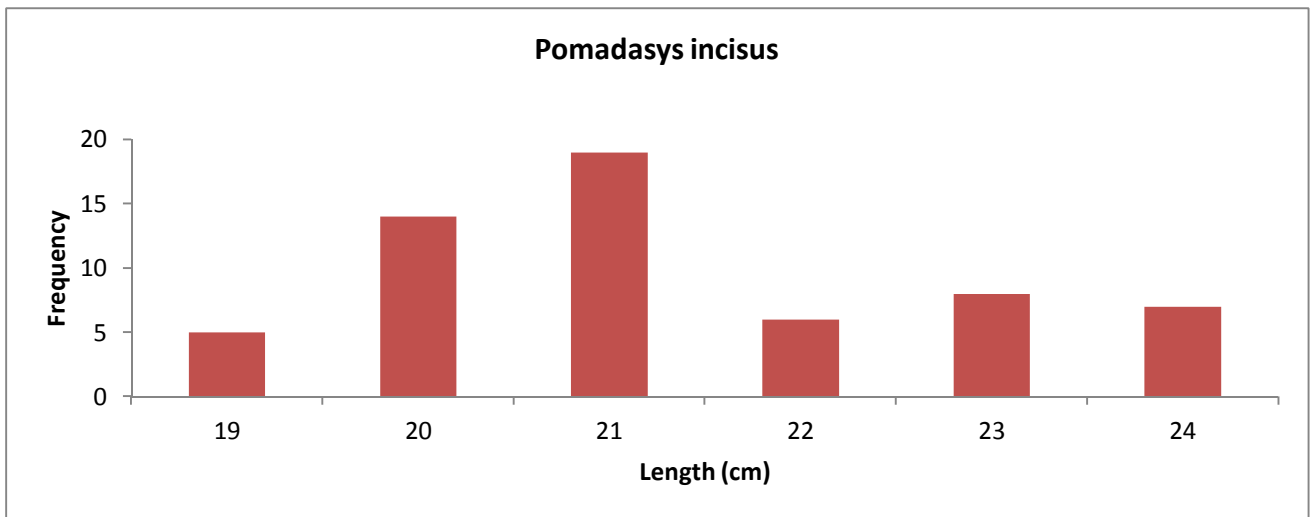
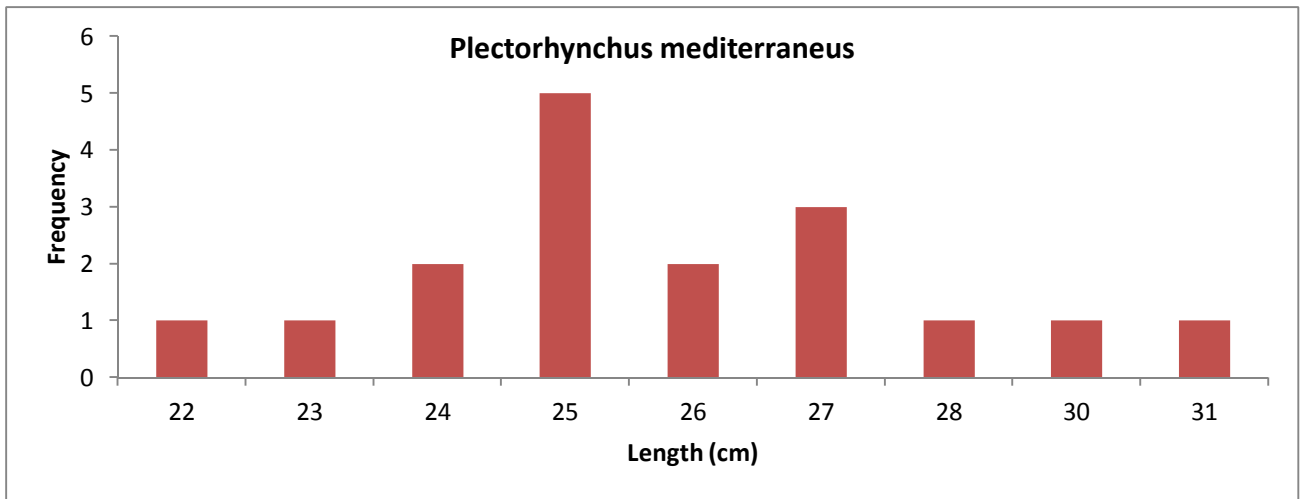
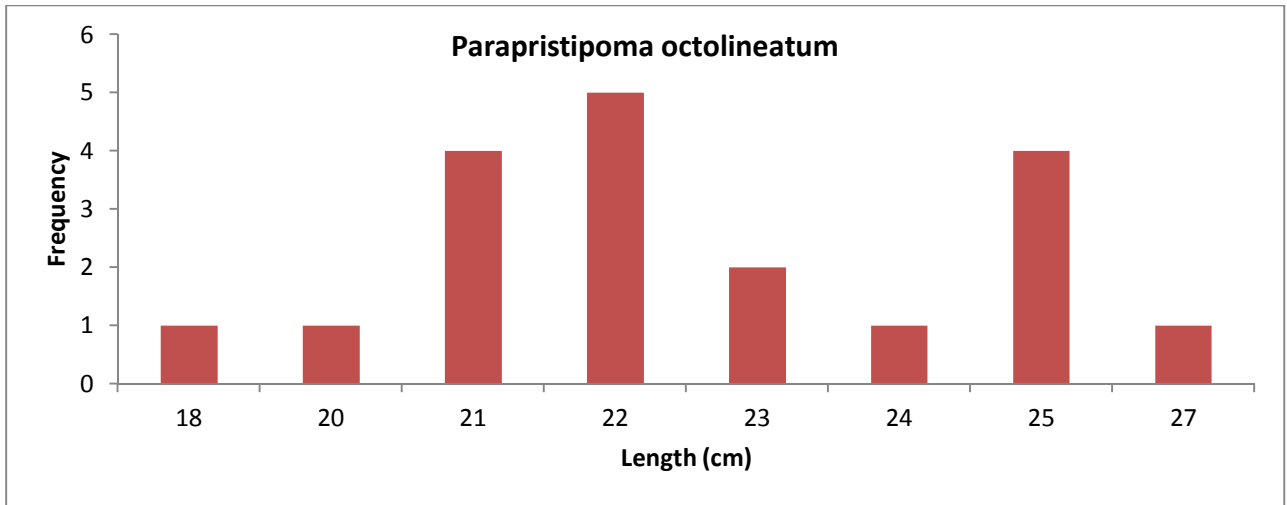
Annex 2. Fish species and families caught during the cruise.

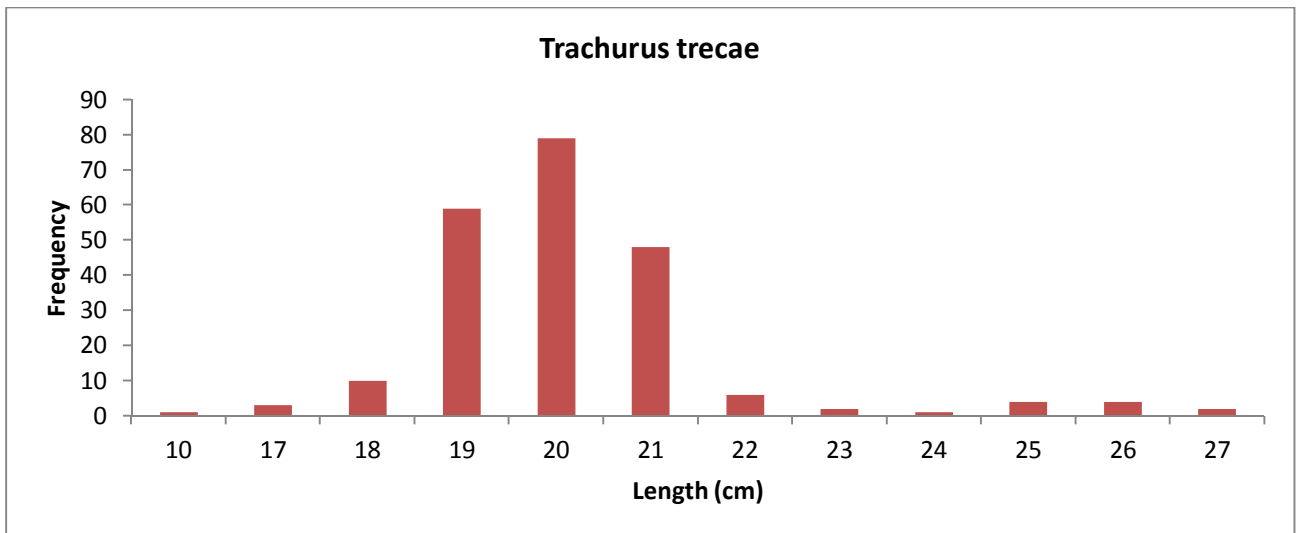
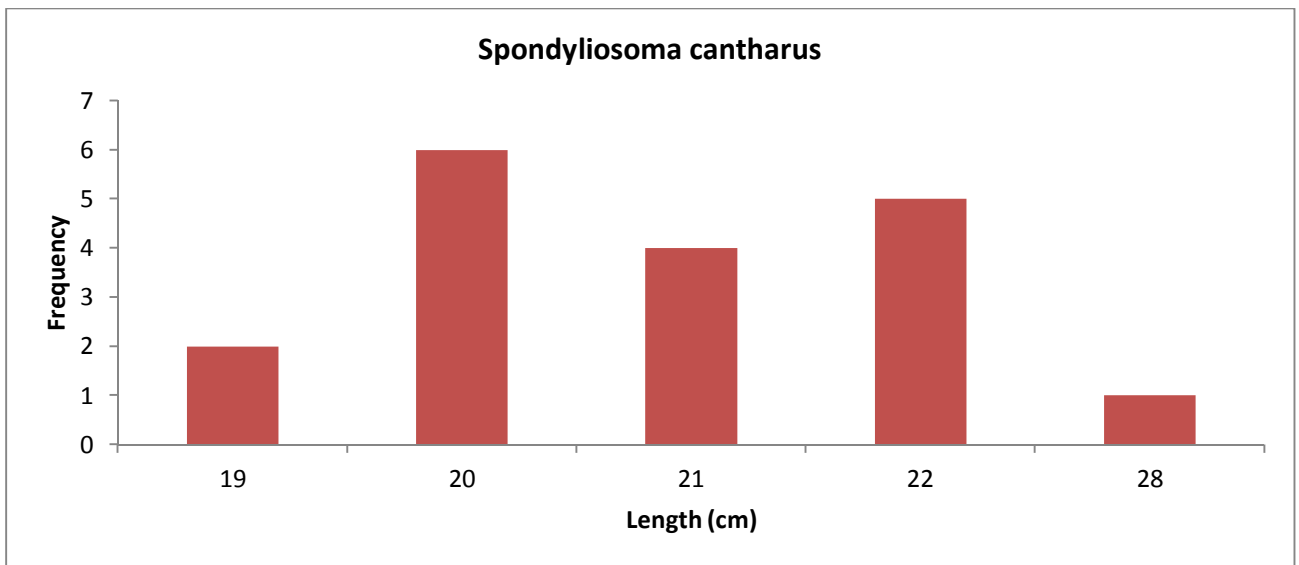
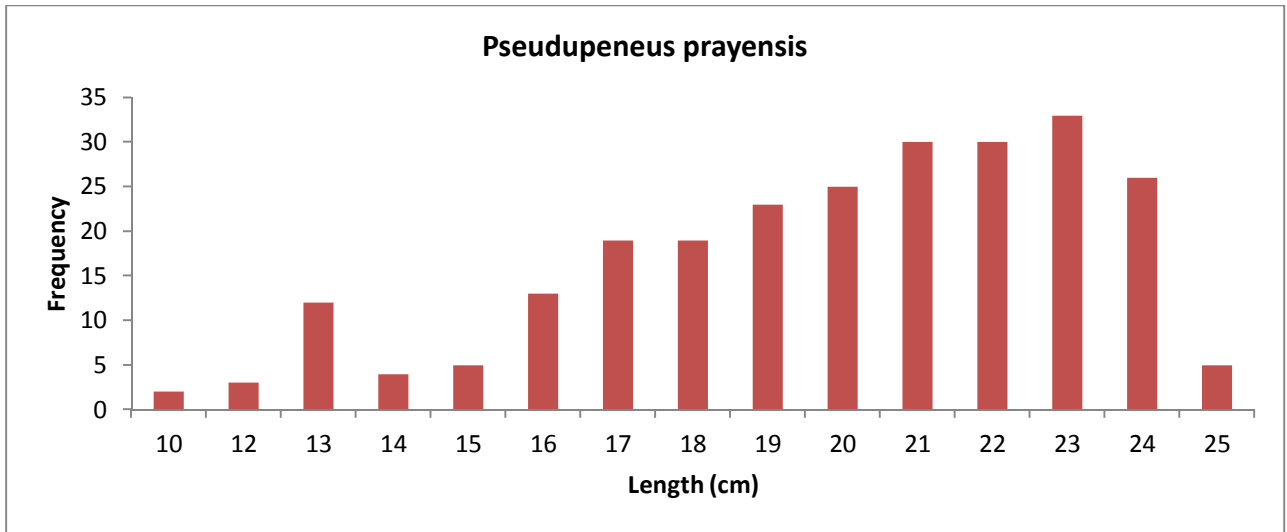
No.	Family name	Taxonomy	No.
1	<i>ACANTHURIDAE</i>	<i>Acanthurus monroviae</i>	1
2	<i>ANTENNARIIDAE</i>	<i>Antennarius senegalensis</i>	2
3	<i>ARIIDAE</i>	<i>Arius parkii</i>	3
4	<i>BALISTIDAE</i>	<i>Balistes capriscus</i>	4
		<i>Balistes punctatus</i>	5
5	<i>BATRACHOIDIDAE</i>	<i>Halobatrachus didactylus</i>	6
6	<i>BOTHIDAE</i>	<i>Arnoglossus imperialis</i>	7
		<i>Bothus podas</i>	8
7	<i>BYTHITIDAE</i>	<i>Grammoplites gruvelli</i>	9
8	<i>CALAPPIDAE</i>	<i>Calappa rubroguttata</i>	10
9	<i>CARANGIDAE</i>	<i>Decapterus rhonchus</i>	11
		<i>Trachurus trecae</i>	12
10	<i>CENTROLOPHIDAE</i>	<i>Schedophilus pemarko</i>	13
11	<i>CHAETODONTIDAE</i>	<i>Chaetodon hoefleri</i>	14
		<i>Chaetodon marcellae</i>	15
12	<i>CLUPEIDAE</i>	<i>Sardinella aurita</i>	16
13	<i>DIODONTIDAE</i>	<i>Chilomycterus spinosus</i>	17
14	<i>FISTULARIIDAE</i>	<i>Fistularia petimba</i>	18
		<i>Fistularia tabacaria</i>	19
15	<i>GERREIDAE</i>	<i>Eucinostomus melanopterus</i>	20
16	<i>HAEMULIDAE</i>	<i>Brachydeuterus auritus</i>	21
		<i>Parapristipoma octolineatum</i>	22
		<i>Plectorhynchus mediterraneus</i>	23
		<i>Pomadasys incisus</i>	24
17	<i>LABRIDAE</i>	<i>Bodianus scrofa</i>	25
		<i>Bodianus speciosus</i>	26
		<i>Coris julis</i>	27
18	<i>LUTJANIDAE</i>	<i>Lutjanus goreensis</i>	28
19	<i>MONACANTHIDAE</i>	<i>Aluterus punctatus</i>	29
		<i>Stephanolepis hispidus</i>	30
20	<i>MULLIDAE</i>	<i>Pseudupeneus prayensis</i>	31
21	<i>OCTOPODIDAE</i>	<i>Octopus vulgaris</i>	32
22	<i>OPHIDIIDAE</i>	<i>Brotula barbata</i>	33
23	<i>PARALICHTHYIDAE</i>	<i>Citharichthys stampflii</i>	34

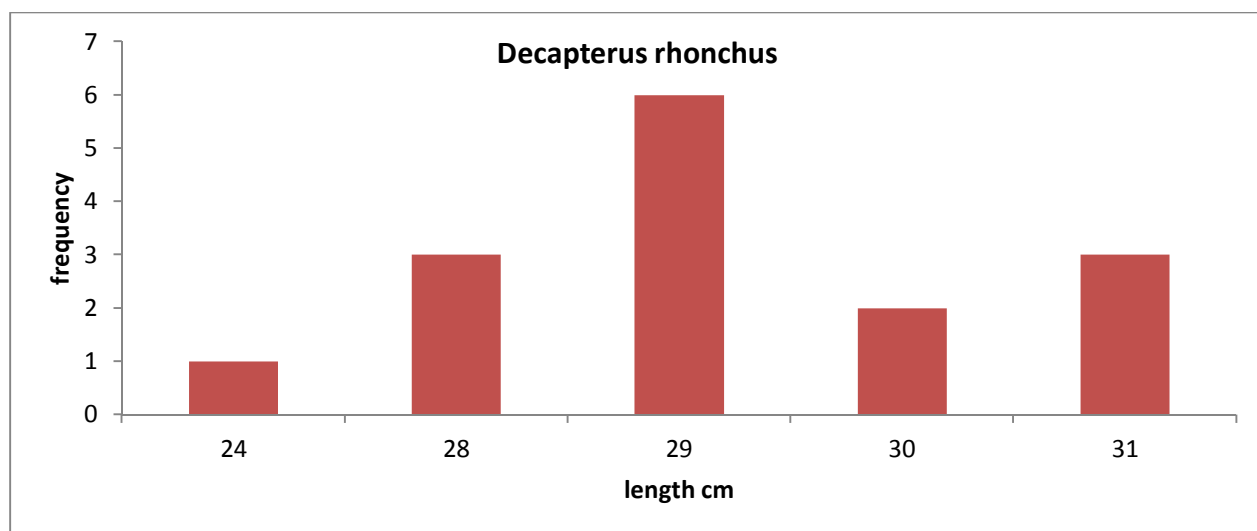
		<i>Syacium micrurum</i>	35
24	PENAEIDAE	<i>Penaeus notialis</i>	36
25	PLATYCEPHALIDAE	<i>Grammoplites gruveli</i>	37
26	POMACENTRIDAE	<i>Chromis chromis</i>	38
27	PORTUNIDAE	<i>Cronius ruber</i>	39
28	PRIACANTHIDAE	<i>Priacanthus arenatus</i>	40
29	RAJIDAE	<i>Raja miraletus</i>	41
30	RHINOBATIDAE	<i>Rhinobatos cemiculus</i>	42
		<i>Rhinobatos rhinobatos</i>	43
		<i>Zanobatus schoenleinii</i>	44
		<i>Zeus faber</i>	45
31	SCOMBRIDAE	<i>Scomber japonicus</i>	46
32	SCORPAENIDAE	<i>Scorpaena stephanica</i>	47
33	SEPIIDAE	<i>Sepia officinalis</i>	48
34	SERRANIDAE	<i>Epinephelus aeneus</i>	49
		<i>Epinephelus Goreensis</i>	50
		<i>Serranus scriba</i>	51
35	SOLEIDAE	<i>Dicologoglossa hexophthalma</i>	52
		<i>Pegusa triophthalmus</i>	53
		<i>Solea senegalensis</i>	54
		<i>Synaptura cadenati</i>	55
		<i>Synaptura lusitanica</i>	56
36	SPARIDAE	<i>Pagellus bellottii</i>	57
		<i>Sparus caeruleostictus</i>	58
		<i>Spondylisoma cantharus</i>	59
37	SYNODONTIDAE	<i>Trachinocephalus myops</i>	60
38	TETRAODONTIDAE	<i>Sphoeroides pachygaster</i>	61
		<i>Sphoeroides spengleri</i>	62
39	TRACHINIDAE	<i>Trachinus armatus</i>	63
40	TRIGLIDAE	<i>Chelidonichthys gabonensis</i>	64
41	VOLUTIDAE	<i>Cymbium pepo</i>	65
42	ZEIDAE	<i>Zeus faber</i>	66

Annex 3. Length measurements of the selected fish species.









Annex 4. Total catch at each trawl station (Kg), number and estimated biomass (t).

Station No.	Trawling position	Stratum	Trawling depths (m)	Estimated biomass (t)
57	N13°40'.47, W17°03'.03 N13°40'.08, W17°05'.61	010 - 050	21.0	225.25

No.	Species	Catch (kg)	No. of individuals	Estimated biomass
1.	<i>Arius parkii</i>	0.40	1	9.79
2.	<i>Balistes capriscus</i>	0.20	1	4.90
3.	<i>Bodianus scrofa</i>	0.10	1	2.45
4.	<i>Brachydeuterus auritus</i>	0.20	9	4.90
5.	<i>Cymbium pepo</i>	5.50	1	134.66
6.	<i>Decapterus rhonchus</i>	0.20	1	4.90
7.	<i>Eucinostomus melanopterus</i>	0.10	1	2.45
8.	<i>Fistularia petimba</i>	0.20	4	4.90
9.	<i>Halobatrachus didactylus</i>	0.40	6	9.79
10.	<i>Pagellus bellottii</i>	0.05	2	1.22
11.	<i>Schedophilus pamarco</i>	0.40	1	9.79
12.	<i>Scorpaena stephanica</i>	0.05	1	1.22
13.	<i>Sepia officinalis</i>	0.20	3	4.90
14.	<i>Sparus caeruleostictus</i>	1.00	20	24.48
15.	<i>Synaptura cadenati</i>	0.20	1	4.90
	Total	9.20	53	225.25

Station No.	Trawling position	Stratum	Trawling depths (m)	Estimated biomass (t)
58	N13°48'.44, W17°16'.83 N13°48'.39, W17°16'.83	051 - 100	52	1373.26

No.	Species	Catch (kg)	No. of individuals	Estimated biomass
1.	<i>Acanthurus monroviae</i>	1.2	2	15.67
2.	<i>Balistes capriscus</i>	0.1	1	1.31
3.	<i>Bodianus scrofa</i>	0.3	2	3.92
4.	<i>Boops boops</i>	0.15	3	1.96
5.	<i>Brotula barbata</i>	0.10	1	1.31
6.	<i>Chaetodon hoefleri</i>	0.60	5	7.84
7.	<i>Chaetodon marcellae</i>	0.05	1	0.65
8.	<i>Chelidonichthys gabonensis</i>	0.60	15	7.84
9.	<i>Chromis chromis</i>	0.2	8	2.61
10.	<i>Decapterus rhonchus</i>	4.0	15	52.24
11.	<i>Dicologlossa hexophthalma</i>	0.2	3	2.61
12.	<i>Epinephelus goreensis</i>	0.1	1	1.31
13.	<i>Fistularia petimba</i>	0.5	11	6.53
14.	<i>Grammoplites grueli</i>	0.1	3	1.31
15.	<i>Monochirus hispidus</i>	0.05	2	0.65
16.	<i>Octopus vulgaris</i>	1.2	3	15.67
17.	<i>Pagellus bellottii</i>	4.0	54	52.24
18.	<i>Parapristipoma octolineatum</i>	3.0	19	39.18
19.	<i>Plectorhynchus mediterraneus</i>	4.5	17	58.77
20.	<i>Pomadasy incisis</i>	12.6	88	164.56
21.	<i>Priacanthus arenatus</i>	2.0	8	26.12
22.	<i>Pseudupeneus prayensis</i>	26.8	216	350.01
23.	<i>Raja miraletus</i>	1.2	2	15.67
24.	<i>Sardinella aurita</i>	0.05	1	0.65
25.	<i>Scomber japonicus</i>	3.0	58	39.18
26.	<i>Sepia officinalis</i>	0.1	2	1.31
27.	<i>Serranus scriba</i>	0.15	1	1.96
28.	<i>Sparus caeruleostictus</i>	1.80	7	23.51
29.	<i>Sphoerodes spengleri</i>	0.10	3	1.31
30.	<i>Spondyliosoma cantharus</i>	2.40	18	31.34
31.	<i>Syacium micrurum</i>	0.2	1	2.61
32.	<i>Synaptura cadenati</i>	0.1	1	1.31
33.	<i>Trachinocephalus myops</i>	0.4	2	5.22
34.	<i>Trachurus trecae</i>	32.9	371	429.67
35.	<i>Zeus faber</i>	0.4	19	5.22
	Total	105.15	964	1373.26

Station No.	Trawling position	Stratum	Trawling depth (m)	Estimated biomass (t)
59	N13°35'. 44" W17°35'. 25" N13°32'. 92" W17°35'. 06"	101 – 200	110 – 112	55.86

No.	Species	Total catch (kg)	No. of individual	Estimated biomass
1.	<i>Antennarius Senegalensis</i>	0.1	1	0.16
2.	<i>Arnoglossus imperialis</i>	0.1	5	0.16
3.	<i>Bothus podas</i>	0.05	14	0.08
4.	<i>Calappa rubroguttata</i>	0.05	1	0.08
5.	<i>Chelidonichthys gabonensis</i>	1.5	42	2.39
6.	<i>Cronius ruber</i>	0.2	14	0.32
7.	<i>Decapterus rhonchus</i>	0.4	1	0.64
8.	<i>Dicologoglossa hexophthalma</i>	0.5	3	0.80
9.	<i>Fistularia petimba</i>	0.1	13	0.16
10.	<i>Grammoplites gruvelli</i>	0.2	6	0.32
11.	<i>Octopus vulgaris</i>	3.8	3	6.04
12.	<i>Pagellus bellottii</i>	2.8	90	4.45
13.	<i>Penaeus notialis</i>	0.15	3	0.24
14.	<i>Pomadasys incises</i>	2.8	16	4.45
15.	<i>Pseudupeneus prayensis</i>	2.0	24	3.18
16.	<i>Scombre japonicas</i>	6.0	99	9.54
17.	<i>Scorpaena stephanica</i>	2.2	31	3.50
18.	<i>Sepia officinalis</i>	0.1	2	0.16
19.	<i>Solea Senegalensis</i>	0.02	1	0.03
20.	<i>Sphoeroides pachygaster</i>	0.25	1	0.40
21.	<i>Syacium microrum</i>	0.1	7	0.16
22.	<i>Synaptura cadenattii</i>	1.0	1	1.59
23.	<i>Trachinocephalus myops</i>	1.2	5	1.91
24.	<i>Trachinus armatus</i>	0.05	1	0.08
25.	<i>Trachurus trecae</i>	9.25	115	14.71
26.	<i>Zeus faber</i>	0.20	6	0.32
	TOTAL	35.12	505	55.86

Station No.	Trawling position	Stratum	Trawling depth (m)	Estimated biomass (t)
60	N13°18'. 36" W17°31'.89" N13°18'. 39" W17°36'.31"	101 – 200	105 – 98	25.59

No.	Species	Total catch (kg).	No. of individual	Estimated biomass
1.	<i>Arnoglossus imperialis</i>	0.01	1	0.02
2.	<i>Bothus podas</i>	0.1	3	0.16
3.	<i>Chelidonichthys gabonensis</i>	0.02	2	0.03
4.	<i>Decapterus rhonchus</i>	2	6	3.18
5.	<i>Dicologoglossa hexophthalmus</i>	0.8	8	1.27
6.	<i>Fistularia petimba</i>	0.01	1	0.02
7.	<i>Pseudupeneus prayensis</i>	2.6	18	4.14
8.	<i>Sardinella aurita</i>	0.05	1	0.08
9.	<i>Scomber japonicas</i>	8.0	140	12.72
10.	<i>Sepia officinalis</i>	0.2	1	0.32
11.	<i>Sphoeroides spengleri</i>	0.05	1	0.08
12.	<i>Spondyliosoma cantharus</i>	0.15	1	0.24
13.	<i>Trachinocephalus myops</i>	0.1	1	0.16
14.	<i>Trachurus trecae</i>	2.0	15	3.18
	TOTAL	16.09	199	25.59

Station No.	Trawling position	Stratum	Trawling depth (m)	Estimated biomass (t)
61	N13°28'. 53" W17°24'.19" N13°28'. 22" W17°23'.03"	051 – 100	75 – 68	4186.90

No.	Species	Total catch (kg).	No. of individual	Estimated biomass
1.	<i>Acanthurus monroviae</i>	3.44	4	44.93
2.	<i>Alluturus punctatus</i>	0.60	1	7.84
3.	<i>Balistes punctatus</i>	3.40	2	44.40
4.	<i>Bodianus scrofa</i>	4.30	30	56.16
5.	<i>Bothus podas</i>	0.04	4	0.52
6.	<i>Chaetodon hoeferi</i>	0.43	9	5.62
7.	<i>Chelidonichthys gabonensis</i>	21.5	877	280.79
8.	<i>Chilomycterus spinosus</i>	6.88	13	89.85
9.	<i>Citharichthys stampflii</i>	5.16	44	67.39
10.	<i>Coris julis</i>	1.72	13	22.46
11.	<i>Decapterus rhonchus</i>	2.58	4	33.69

12.	<i>Dicologoglossa hexophthalmus</i>	4.30	47	56.16
13.	<i>Epinephalus aenus</i>	6.50	5	84.89
14.	<i>Fistularia petimba</i>	0.9	13	11.75
15.	<i>Lutjanus goreensis</i>	5.1	1	66.61
16.	<i>Octopus vulgaris</i>	12.3	22	160.64
17.	<i>Pegellus bellottii</i>	8.6	181	112.32
18.	<i>Parapristipoma Octolineatum</i>	2.58	4	33.69
19.	<i>Penaeus notialis</i>	0.02	1	0.26
20.	<i>Plectorhynchus mediterraneus</i>	10.45	25	136.48
21.	<i>Pomadasyis incisus</i>	11.18	69	146.01
22.	<i>Priacanthus arenatus</i>	104.06	446	1359.02
23.	<i>Pseudupeneus prayensis</i>	64.43	125	841.46
24.	<i>Raja miraletus</i>	1.0	2	13.06
25.	<i>Rhinobatos cemiculus</i>	3.0	1	39.18
26.	<i>Scomber japonicas</i>	0.43	9	5.62
27.	<i>Scorpaena stephanica</i>	16.34	189	213.40
28.	<i>Sepia officinalis</i>	10.32	120	134.78
29.	<i>Sparus caeruleostictus</i>	1.72	9	22.46
30.	<i>Sphoeroides spengleri</i>	4.30	43	56.16
31.	<i>Spondyliosoma cantharus</i>	2.15	21	28.08
32.	<i>Synaptura cadenattii</i>	0.43	4	5.62
33.	<i>Trachinocephalus myops</i>	0.43	4	5.62
34.	<i>Trachurus trecae</i>	0.43	21	5.62
35.	<i>Zeus faber</i>	0.43	26	5.62
	Total	321.45	2,389	4198.13

Station No.	Trawling position	Stratum	Trawling depth (m)	Estimated biomass (t)
62	N13°16'. 89" W17°06'.83" N13°18'. 10" W17°10'.72"	010 – 050	22 – 26	3364.08

No.	Species	Total catch (kg.)	No. of individuals	Estimated biomass
1.	<i>Aluterus punctatus</i>	0.1	2	2.45
2.	<i>Balistes capriscus</i>	1.6	6	39.17
3.	<i>Balistes punctatus</i>	14.3	16	350.12
4.	<i>Bodianus scrofa</i>	1.2	6	29.38
5.	<i>Bodianus speciosus</i>	0.2	2	4.90
6.	<i>Bothus podas</i>	0.8	28	19.59
7.	<i>Chaetodon hoeferi</i>	0.2	4	4.90
8.	<i>Chelidonichthys gabonensis</i>	0.4	30	9.79

9.	<i>Chilomycterus spinosus</i>	2.0	6	48.97
10.	<i>Coris julis</i>	0.2	2	4.90
11.	<i>Dicologoglossa hexophthalma</i>	0.2	2	4.90
12.	<i>Epinephelus aeneus</i>	2.4	2	58.76
13.	<i>Fistularia petimba</i>	0.2	2	4.90
14.	" <i>tabacaria</i>	0.4	2	9.79
15.	<i>Grammoplites gruveli</i>	0.1	2	2.45
16.	<i>Halobatrachus didactylus</i>	0.2	2	4.90
17.	<i>Octopus vulgaris</i>	0.4	2	9.79
18.	<i>Pagellus bellottii</i>	10.8	347	264.43
19.	<i>Parapristipoma octolineatis</i>	0.2	2	4.90
20.	<i>Pegusa triophthalmus</i>	0.2	2	4.90
21.	<i>Pomadasy's incises</i>	2.4	22	58.76
22.	<i>Priacanthus arenatus</i>	2.0	6	48.97
23.	<i>Pseudupeneus prayensis</i>	46.8	273	1145.84
24.	<i>Rhinobatus rhinobatus</i>	4.0	4	97.94
25.	<i>Scomber japonicas</i>	2.4	54	58.76
26.	<i>Sepia officinalis</i>	3.6	4	88.14
27.	<i>Serranus scriba</i>	1.6	8	39.17
28.	<i>Solae senegalensis</i>	0.1	2	2.45
29.	<i>Sparus caeruleostictus</i>	20.3	176	497.02
30.	<i>Sphoeroides spengleri</i>	8.4	204	205.66
31.	<i>Stephanolepis hispidus</i>	0.4	2	9.79
32.	<i>Syacium micrurum</i>	2	16	48.97
33.	<i>Synaptura lusitanica</i>	2	14	48.97
34.	<i>Trachurus trecae</i>	1.2	74	29.38
35.	<i>Zanobatus schoenleini</i>	4.0	8	97.94
36.	<i>Zeus faber</i>	0.1	2	2.45
	Total	137.4	1,336	3364.08

Annex 5. Important fish species of commercial value, catch and % catch.

Family	Species	Catch (KG)	% catch
SERRANIDAE	<i>Epinephelus aeneus</i>	8.90	1.43
	<i>Epinephelus Goreensis</i>	0.10	0.02
SPARIDAE	<i>Pagellus bellottii</i>	26.25	4.20
	<i>Sparus caeruleostictus</i>	24.82	3.97
MULLIDAE	<i>Pseudupeneus prayensis</i>	142.63	22.84
SEPIIDAE	<i>Sepia officinalis</i>	14.52	2.33
PENAEIDAE	<i>Penaeus notialis</i>	0.17	0.03
HAEMULIDAE	<i>Pomadasys incisus</i>	28.98	4.64
VOLUTIDAE	<i>Cymbium pepo</i>	5.50	0.88

Annex 6. Catches of species (kg) by station and total.

Taxonomy	St. 57	St. 58	St. 59	St. 60	St. 61	St. 62	Total
<i>Acanthurus monroviae</i>		1.2			3.44		4.64
<i>Aluterus punctatus</i>					0.6	0.1	0.7
<i>Antennarius senegalensis</i>			0.1				0.1
<i>Arius parkii</i>	0.4						0.4
<i>Arnoglossus imperialis</i>			0.1	0.01			0.11
<i>Balistes capriscus</i>	0.2	0.1				1.6	1.9
<i>Balistes punctatus</i>					3.4	14.3	17.7
<i>Bodianus scrofa</i>	0.1	0.3			4.3	1.2	5.9
<i>Bodianus speciosus</i>						0.2	0.2
<i>Boops boops</i>		0.15					0.15
<i>Bothus podas</i>			0.05	0.1	0.04	0.8	0.99
<i>Brachydeuterus auritus</i>	0.2						0.2
<i>Brotula barbata</i>		0.1					0.1
<i>Calappa rubroguttata</i>			0.05				0.05
<i>Chaetodon hoeferi</i>		0.6			0.43	0.2	1.23
<i>Chaetodon marcellae</i>		0.05					0.05
<i>Chelidonichthys gabonensis</i>		0.6	1.5	0.02	21.5	0.4	24.02
<i>Chilomycterus spinosus</i>					6.88	2	8.88
<i>Chromis chromis</i>		0.2					0.2
<i>Citharichthys stampflii</i>					5.16		5.16
<i>Coris julis</i>					1.72	0.2	1.92
<i>Cronius ruber</i>			0.2				0.2
<i>Cymbium pepo</i>	5.5						5.5
<i>Decapterus rhonchus</i>	0.2	4	0.4	2	2.58		9.18
<i>Dicologlossa hexophthalma</i>		0.2	0.5	0.8	4.3	0.2	6
<i>Epinephelus aeneus</i>					6.5	2.4	8.9

<i>Epinephelus Goreensis</i>		0.1					0.1
<i>Eucinostomus melanopterus</i>	0.1						0.1
<i>Fistularia petimba</i>	0.2	0.5	0.1	0.01	0.9	0.2	1.91
<i>Fistularia tabacaria</i>						0.4	0.4
<i>Grammoplites gruveli</i>		0.1	0.2			0.1	0.4
<i>Halobatrachus didactylus</i>	0.4					0.2	0.6
<i>Lutjanus goreensis</i>					5.1		5.1
<i>Monochirus hispidus</i>		0.05					0.05
<i>Octopus vulgaris</i>		1.2	3.8		12.3	0.4	17.7
<i>Pagellus bellottii</i>	0.05	4	2.8		8.6	10.8	26.25
<i>Parapristipoma octolineatum</i>		3			2.58	0.2	5.78
<i>Pegusa triophthalmus</i>						0.2	0.2
<i>Penaeus notialis</i>			0.15		0.02		0.17
<i>Plectorhynchus mediterraneus</i>		4.5			10.45		14.95
<i>Pomadasyus incisus</i>		12.6	2.8		11.18	2.4	28.98
<i>Priacanthus arenatus</i>		2			104.06	2	108.06
<i>Pseudupeneus prayensis</i>		26.8	2	2.6	64.43	46.8	142.63
<i>Raja miraletus</i>		1.2			1		2.2
<i>Rhinobatos cemiculus</i>					3		3
<i>Rhinobatos rhinobatos</i>						4	4
<i>Sardinella aurita</i>		0.05		0.05			0.1
<i>Schedophilus pamarco</i>	0.4						0.4
<i>Scomber japonicus</i>		3	6	8	0.43	2.4	19.83
<i>Scorpaena stephanica</i>	0.05		2.2		16.34		18.59
<i>Sepia officinalis</i>	0.2	0.1	0.1	0.2	10.32	3.6	14.52
<i>Serranus scriba</i>		0.15				1.6	1.75
<i>Solea senegalensis</i>			0.02			0.1	0.12
<i>Sparus caeruleostictus</i>	1	1.8			1.72	20.3	24.82
<i>Sphoeroides pachygaster</i>			0.25				0.25
<i>Sphoeroides spengleri</i>		0.1		0.05	4.3	8.4	12.85
<i>Spondyliosoma cantharus</i>		2.4		0.15	2.15		4.7
<i>Stephanolepis hispidus</i>						0.4	0.4
<i>Syacium micrurum</i>		0.2	0.1			2	2.3
<i>Synaptura cadenati</i>	0.2	0.1	1		0.43		1.73
<i>Synaptura lusitanica</i>						2	2
<i>Trachinocephalus myops</i>		0.4	1.2	0.1	0.43		2.13
<i>Trachinus armatus</i>			0.05				0.05
<i>Trachurus trecae</i>		32.9	9.25	2	0.43	1.2	45.78
<i>Zanobatus schoenleinii</i>						4	4
<i>Zeus faber</i>		0.4	0.2		0.43	0.1	1.13
Total							624.41

