

## **SURVEY OF THE FISH RESOURCES OF ANGOLA**

**Survey of the demersal resources  
27 February - 27 March 2002**

**Institute of Marine Research  
IMR, Bergen  
Norway**

**Instituto de Investigação Marinha  
IIM, Luanda  
Angola**

CRUISE REPORTS "DR. FRIDTJOF NANSEN"

**SURVEYS OF THE FISH RESOURCES OF ANGOLA**

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by

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The Programme has previously conducted the following demersal surveys in the area:

January 1985	-	June 1986	(6 surveys)
January 1989	-	December 1989	(3 surveys)
May 1991	-	September 1992	(3 surveys)
January 1994	-	March 2001	(8 surveys)

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## CHAPTER 1 INTRODUCTION

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### 1.1 Objectives

The objectives of the cruise had been previously discussed and agreed upon by the responsible of the Demersal Programme of the Instituto de Investigação Marinha (IIM), of Angola, and the responsible from the Institute of Marine Research, Bergen (IMR) for the Angolan Demersal Programme, and were the following:

- To survey, map, and describe the distribution, composition and abundance of the main demersal species, with special emphasis on sea breams (Sparidae), croakers (Sciaenidae), grunts (Haemulidae), groupers (Serranidae), hakes (Merluccidae) and shrimps (*Parapenaeus longirostris* and *Aristeus varidens*) on the Angolan shelf and slope (down to 800 m), from Cunene River (17°14' S) to Tombua (15°40' S), and from Benguela (12°35' S) to Congo River (06°00' S) using bottom trawl and the swept-area method.
- Collect biological data (length, weight, sex and maturity) of *Dentex macrophthalmus*, *D. angolensis*, *Pagellus bellottii*, *Pseudotolithus typus*, *Merluccius polli*, commercially important flatfish (Citharidae, Soleidae, Cynoglossidae and Bothidae), *Aristeus varidens*, *Parapenaeus longirostris* and *Chaceon maritae* for future analyses.
- To monitor the general hydrographic conditions using a CTD-sonde on each trawl stations all over the survey area, and map the temperature, salinity and oxygen along standard IIM hydrographic profiles.
- To verify the taxonomic identity of the species caught on board (taxonomist specialists Dr. Denis Tweddle and Dr. Reinhold Hanel), retaining problematic specimens for more detailed examination and identification later at the South African Institute for Aquatic Biodiversity (SAIAB); to build up a collection of the different species, with tissue samples for future genetic studies, for future reference based at SAIAB; to build on the vessel's digital photographic reference collection. A brief report on the taxonomy work is provided in ANNEX VIII and IX.

### 1.2 Participation

The scientific staff consisted of:

From IIM, Angola: Maria de Lourdes SARDINHA (27/2-30/3, Local Cruise Leader 27/2-12/3), Kumbi KILONGO (27/2-30/3, Local Cruise Leader 12/3-27/3), Francisco de ALMEIDA (27/2-12/3), Guilherme CAMARADA (27/2-27/3), Virgilio ESTEVÃO (12/3-27/3), Quilanda FIDEL (12/3-27/3), Vianda FILIPE (27/2-12/3), Tânia MANDINGA (27/2-27/3), Lia NETO (12/3-27/3), Silvie Edith NSIANGANGO (27/2-12/3), Pedro PANZO (27/2-12/3), Domingos PEDRO (12/3-27/3), Eusébio dos SANTOS (12/3-27/3) and Marcelo TCHICULUPITI (27/2-12/3).

From IMR, Norway: Bjørn Erik AXELSEN (12/3-30/3, Cruise Leader), Diana ZAERA (27/2-30/3, Cruise Leader 27/2-12/3), Ingve FJELSTAD (27/2-27/3), Thor Egil JOHANSSON (27/2-30/3), Magne OLSEN (27/2-12/3) and Marek OSTROWSKI (12/3-27/3).

From South Africa: Denis TWEDDLE (27/2-30/3), South African Institute for Aquatic Biodiversity (SAIAB), formerly JBL Smith Institute of Ichthyology.

From Germany: Reinhold HANEL (27/2-30/3), Biozentrum der Universität Würzburg.

### 1.3 Narrative

The vessel left Walvis Bay, Namibia, in the morning of 27 February and steamed north to reach the border of Angola at Cunene River. The survey started in the evening of 1 March with trawl stations and the hydrographic transects at Baía dos Tigres and Namibe. The slope in this area is very steep, being difficult to find trawlable bottom between 200 and 600 m, therefore this area was not adequately sampled. North of Tombua and up to Benguela the shelf and slope are very narrow and with rough bottom, not making it suitable for swept area surveys. Only one standard hydrographic profile was worked out off Namibe. Benguela (12° 35' S) was reached the 4 March in the late evening and during the next 8 days the central region of the Angolan coast from Benguela to Luanda (9°00' S) was covered. In the central region, three standard hydrographic transects were conducted at Lobito, Pta. do Morro and Pta. das Palmerinhas. The vessel called port at Luanda on 11 March to exchange crew and cruise leader, and departed on 12 March to resume the survey of the northern region from 9°00' to 6°00'. The coverage of the northern part of the northern region was partly impeded by the many restrictions in this area due to oil exploitation and, due to the presence of large areas of rough bottom. The inshore areas from N'zeto to the Congo River were not satisfactorily covered. In the northern region, two standard hydrographic transects were conducted at Ambriz and Ponta da Moita Seca. The cruise finished in the morning of 27 of March when 'Dr. Fridtjof Nansen' called at Luanda.

Course tracks were set between 10 and 15 nautical miles (NM) apart, covering the shelf and the slope to 750 m depth. Semi-random swept-area hauls, allocated according to the area of each 100 m depth stratum, were carried out on the shelf during daytime, and on the slope deeper than 400 m during dark hours. Acoustic recordings were logged continuously at 38 kHz throughout the survey.

## CHAPTER 2 METHODS

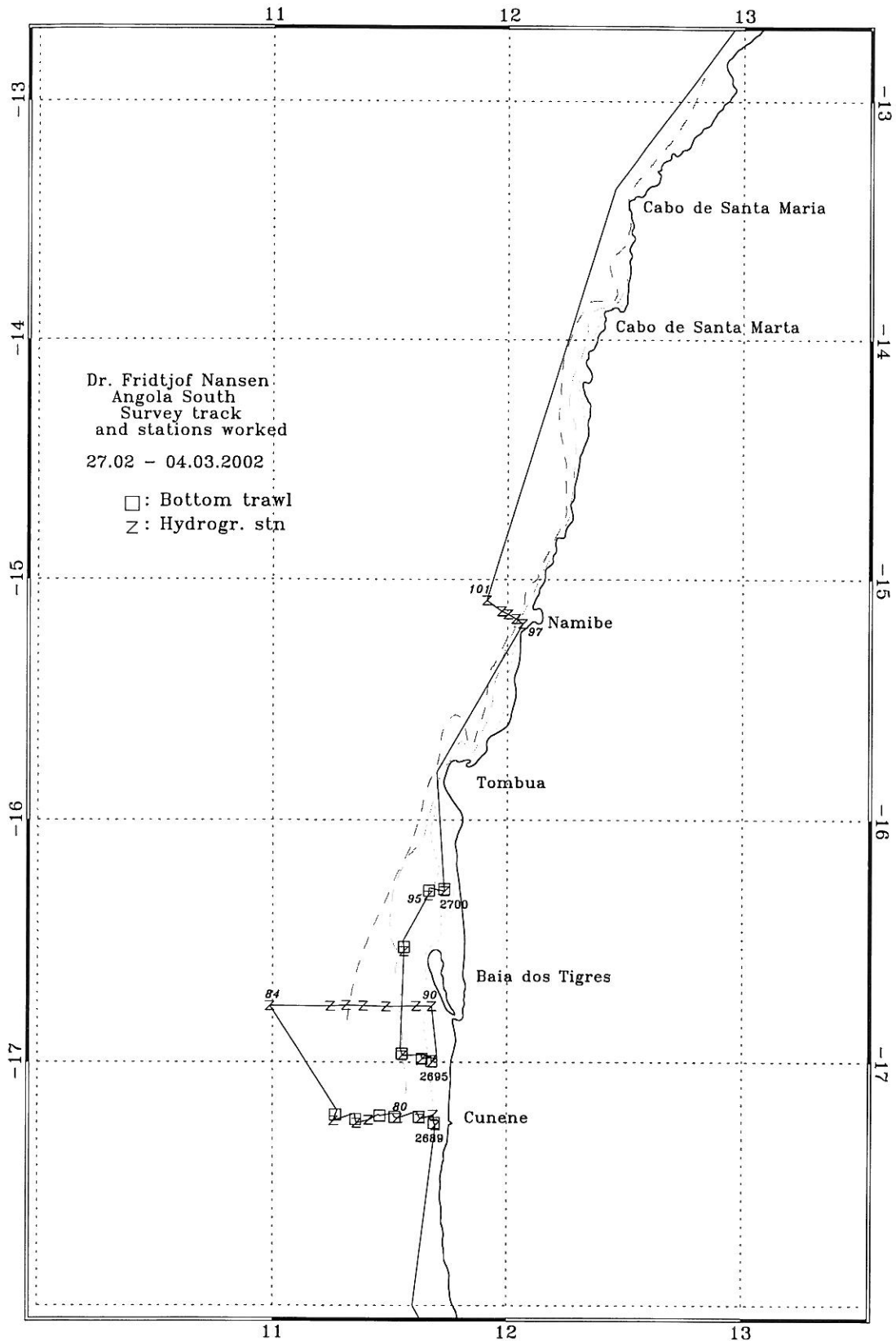
### 2.1 Survey effort

Table 2.1 presents the survey area by depth strata, allocation of trawl stations, total number of successful swept-area hauls, number of hauls failed, number of CTD stations, and the distance surveyed. Table 2.1 also shows the allocation of effort relative to the stratum size as percentage hauls versus percentage area, by depth, by region, and by the total area. The overall average coverage was 1 trawl station per 87 NM<sup>2</sup>. Figures 2.1-2.3 show the cruise tracks in the southern, central and northern regions, respectively, and the locations of bottom trawl stations and hydrographic transects.

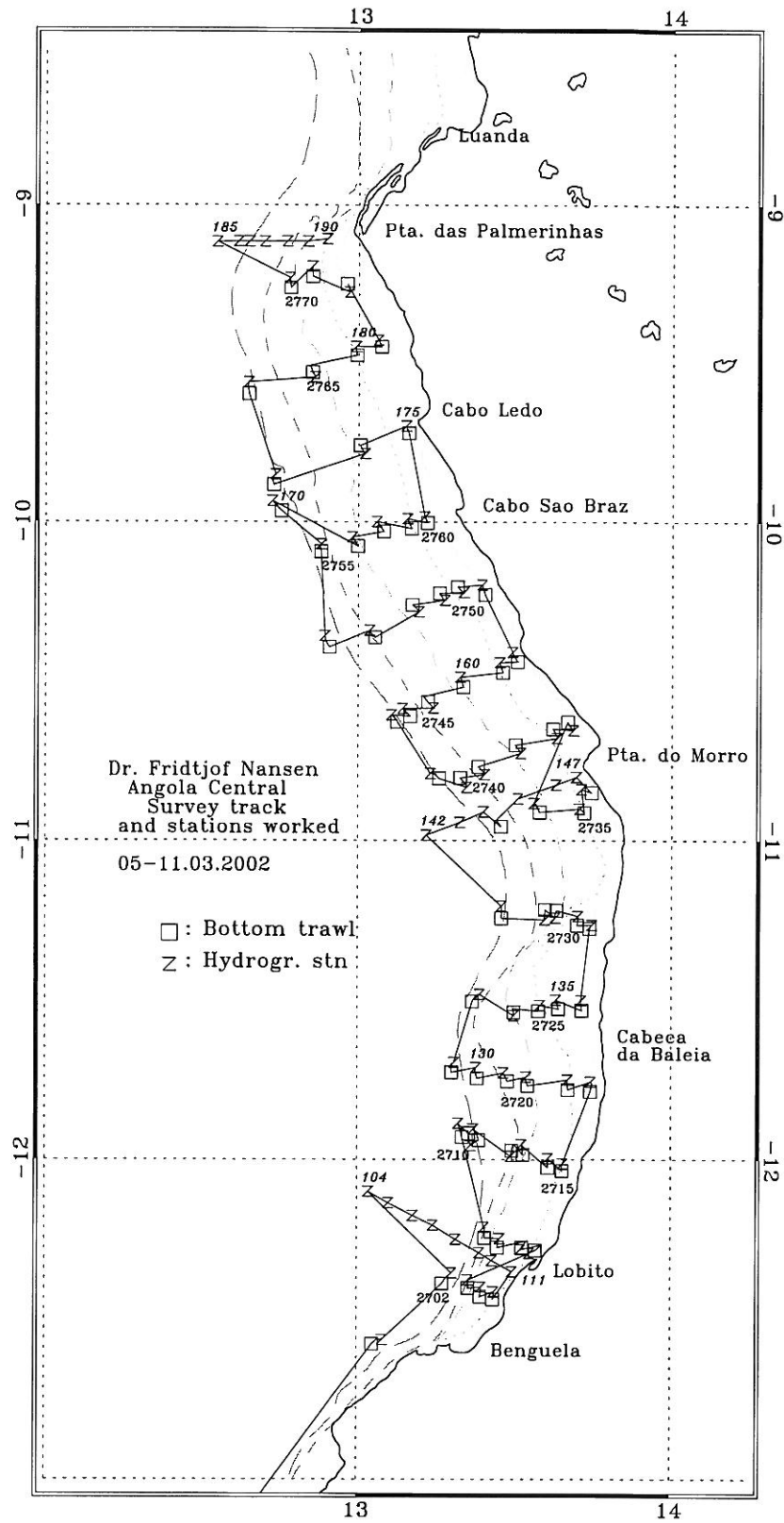
**Table 2.1.** Survey design and effort. Size of the survey area by depth stratum, allocation of trawl stations, proportion of stations relative to stratum size, total number of successful swept-area hauls, number of hauls failed, number of CTD stations, and the distance surveyed, divided into the southern region (Cunene-Tombua), the central region (Benguela to Luanda), and the northern region: (Luanda to Congo River).

Region	Depth strata (m)									Total	Failures	CTD	Distance
	20-50	50-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800				
<b>Cunene - Tombua</b>											25	775	
Area (NM <sup>2</sup> )	507	591	594	100	77	48	39			1956			
# hauls (BT)	2	5	3	0	1	0	0	1	0	12			
% area	25,9	30,2	30,4	5,1	3,9	2,5	2,0	0,0	0,0	11,8			
% hauls	16,7	41,7	25,0	0,0	8,3	0,0	0,0	8,3	0,0	6,4			
<b>Benguela - Luanda</b>											90	1079	
Area (NM <sup>2</sup> )	1068	1586	1439	407	372	343	346	268	357	6186			
# hauls (BT)	16	18	15	2	6	2	6	4	4	73	1		
% area	17,3	25,6	23,3	6,6	6,0	5,5	5,6	4,3	5,8	37,4			
% hauls	21,9	24,7	20,5	2,7	8,2	2,7	8,2	5,5	5,5	39,0			
<b>Luanda - Congo River</b>											104	1478	
Area (NM <sup>2</sup> )	1379	1969	1940	601	550	437	409	408	702	8395			
# hauls (BT)	16	23	23	7	6	6	6	6	9	102	3		
% area	16,4	23,5	23,1	7,2	6,6	5,2	4,9	4,9	8,4	50,8			
% hauls	15,7	22,5	22,5	6,9	5,9	5,9	5,9	5,9	8,8	54,5			
<b>Grand total</b>													
Area (NM <sup>2</sup> )	2954	4146	3973	1108	999	828	794	676	1059	16537			
# hauls (BT)	34	46	41	9	13	8	12	11	13	187	4	219	3332
% area	17,9	25,1	24,0	6,7	6,0	5,0	4,8	4,1	6,4				
% hauls	18,2	24,6	21,9	4,8	7,0	4,3	6,4	5,9	7,0		191	Total hauls	

A stratified semi- random survey design was adopted during the survey (Table 2.1, Figures 2.1-2.3), with depth and area as stratifying variables. Trawl hauls were taken along transects perpendicular to the coast and with a distance of approximately 15 NM apart. Allocation of trawl effort was approximately proportional to stratum size (100 m depth intervals by region, Table 2.1). The planned design was sometimes slightly modified due to adverse conditions such as unsuitable bottom conditions, or non-accessible areas due to oil exploitation in the northern region.

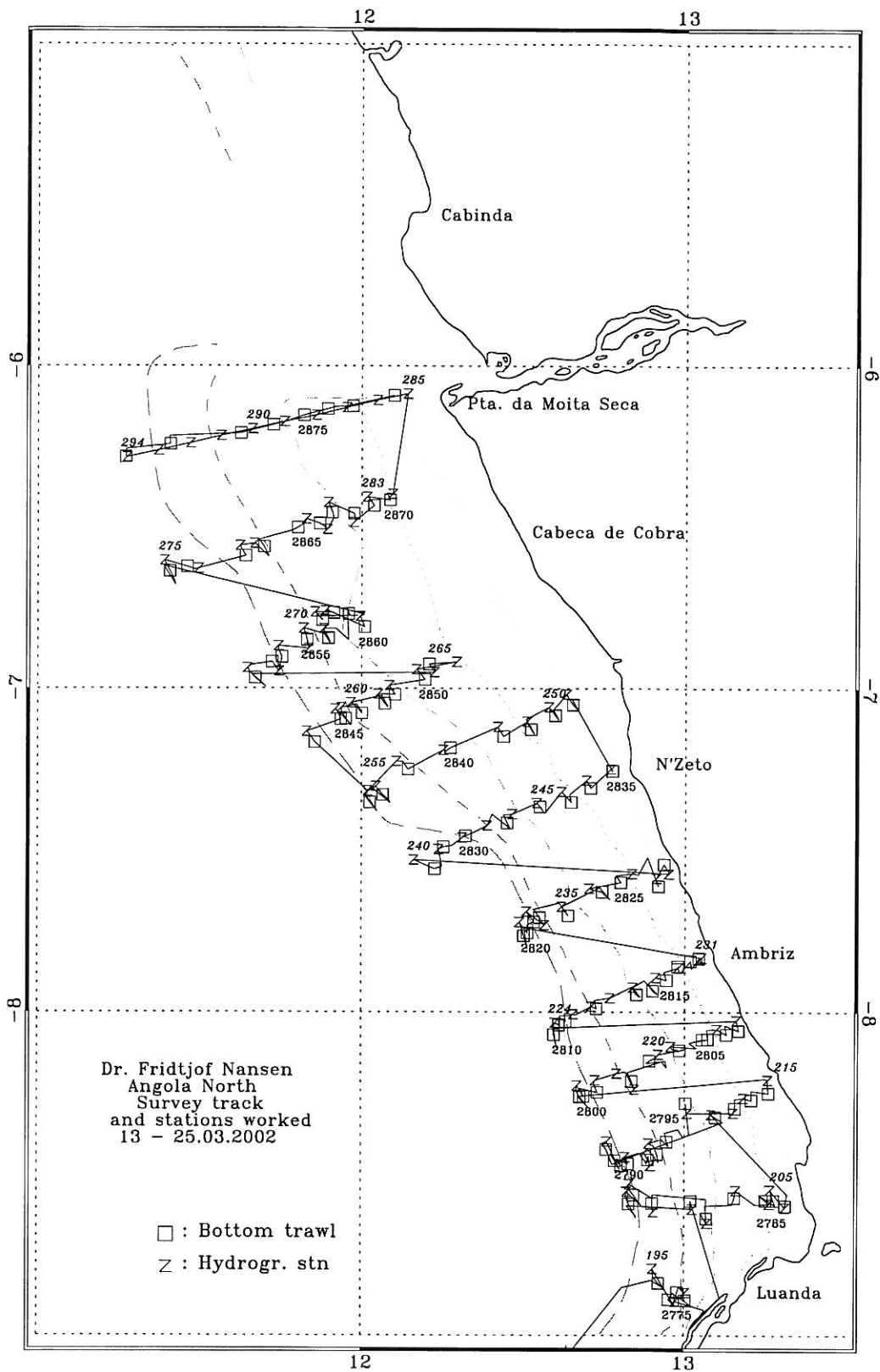


**Figure 2.1** Angola south: Cunene to Tombua. Course track with fishing stations and hydrographic transects. Hydrographic stations were also taken at all the fishing stations. Depth contours at 20, 50, 100 and 200 m.



**Figure 2.2** Angola central: Benguela to Luanda. Course track with fishing stations and hydrographic transects. Hydrographic stations were also taken at all the fishing stations. Depth contours at 20, 50, 100, 200 and 500 m.





**Figure 2.3.** Angola north: Congo River to Luanda. Course track with fishing stations and hydrographic transects. Hydrographic stations were also taken at all the fishing stations. Depth contours as in Fig. 2.2

## 2.2 Meteorological and hydrographic sampling

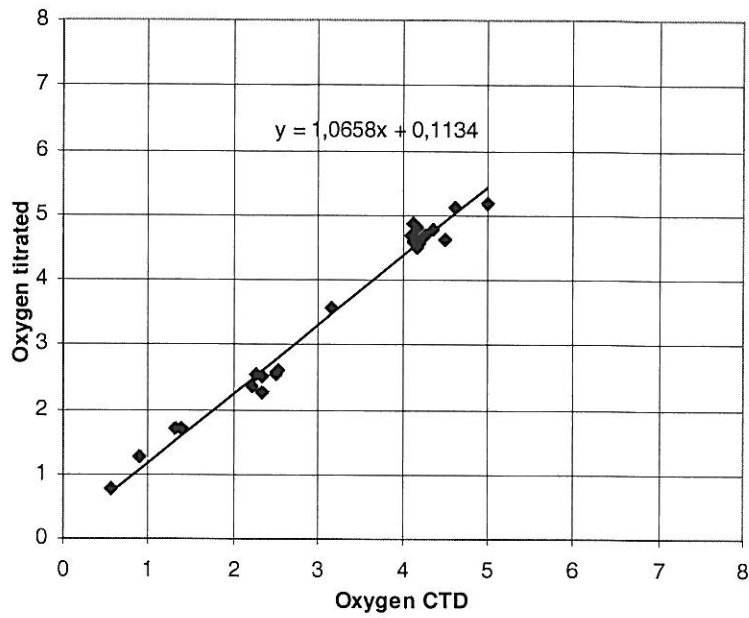
Meteorological observations including wind direction and speed, air temperature, global radiation and sea surface temperature (SST) were automatically logged every nautical mile using an Aanderaa meteorological station. CTD-stations and current profiles with ADCP were recorded at all of the trawl stations, and at the standard hydrographic transects.

### *ADCP current measurements*

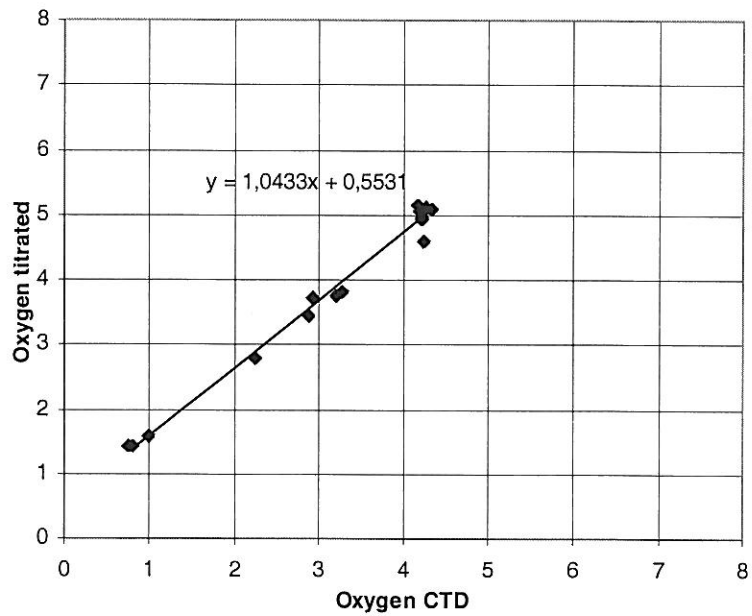
A ship-born Acoustic Doppler Current Profiler (ADCP) from RD Instruments was activated on every CTD station. The ADCP was set to ping every 4 seconds, the depth cell interval set to 8 m and the number of cells was set to 40. The data were routinely averaged over 300 seconds and averaged data stored on files. The data have not been analysed in this report, but this can be done by e.g. the PC software UMS (Underway Mapping System), supported by Marine and Coastal Management in Cape Town, South Africa.

### *Conductivity, salinity and oxygen measurements and water sampling*

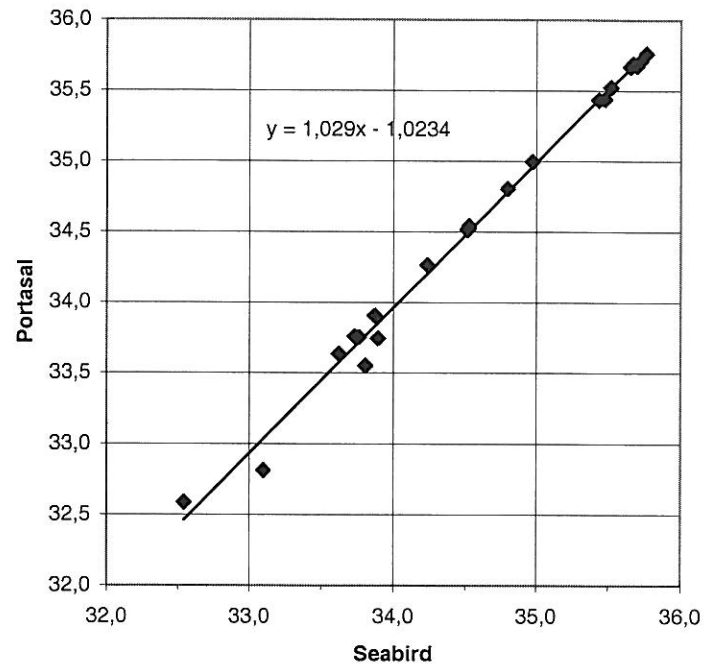
A Seabird 911+ CTD probe was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the customised Seabird Seasave software installed on a PC. Profile data were logged down to a few meters above the bottom or, in deep stations, until 700 m. At each station on the standard hydrographic transects two Niskin bottles were triggered for water samples, one near the surface and one near the bottom, in order to calibrate the oxygen sensor. The water samples were analysed for dissolved oxygen using the Winkler method (Carrit and Carpenter, 1966). A total of 217 samples were taken for oxygen calibration. A linear regression of the Winkler determinations on the CTD values, separated into the central and northern sector respectively, produced the results shown in Figures 2.4 and 2.5.



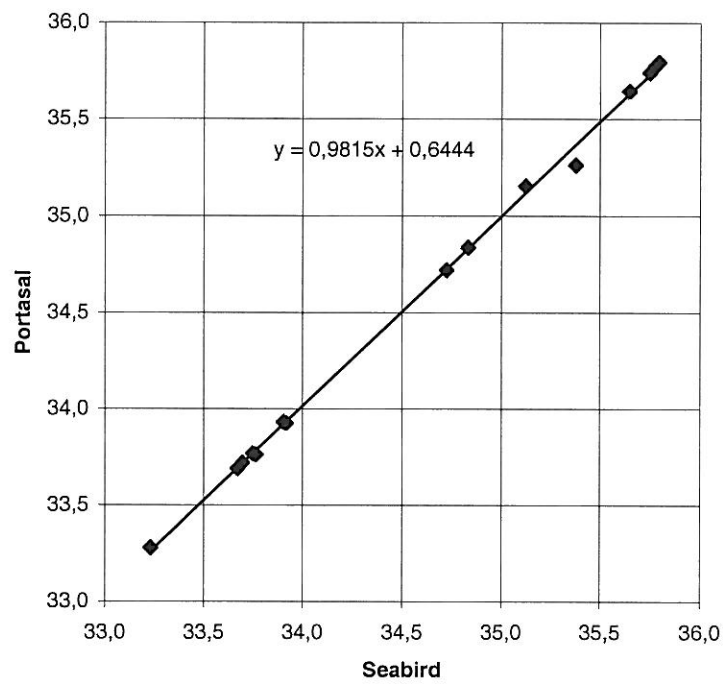
**Figure 2.4a.** A regression of the Winkler determined oxygen concentrations from the Niskin bottles against linear the CTD values obtained from hydrographic stations 100-114



**Figure 2.4b.** A regression of the Winkler determined oxygen concentrations from the Niskin bottles against linear the CTD values obtained from hydrographic stations 241-248



**Figure 2.5a.** A linear regression of the salinometer determined salinity concentrations from the Niskin bottles against the CTD values obtained from hydrographic stations 100-114



**Figure 2.5b.** A linear regression of the salinometer determined salinity concentrations from the Niskin bottles against the CTD values obtained from hydrographic stations 241-248.

## 2.3 Biological sampling

### *Sampling gear*

A Gisund Super bottom trawl was used during the survey. The trawl has a headline height of 4.6-4.8 m and a distance between the front part of the wings of about 21 m during deployment at a speed of 3 NM/h. Thyborøn' Kombi 6.7 m<sup>2</sup> trawl doors weighing 1 670 kg were used throughout the survey (this setting is standard on all swept area surveys with the Nansen). In previous surveys (1999, 2000 and 2001), a 44 m long tickler chain has been routinely attached to the footrope (47 m) on deployments deeper than 300 m in order to improve the catchability of deep-water shrimp. This practice was not followed on the current survey. During all tows deeper than 70 m, a 9.5 m long restraining rope ("strapping") was mounted between the wires 140 m in front of the trawl doors, fixing the distance between the doors at about 53 m ( $\pm 2$  m), irrespective of wire out/ depth trawled. The distance from the trawl doors has usually been about 130 m from the trawl doors, producing a door spread of close to 50 m, which is the ideal width. The distance must, however, be adjusted according to the performance of the trawl doors. The slightly higher door spread would, however, should not affect the trawl geometry to any significant extent, but this was examined using the SCANMAR distance sensors. These are usually mounted on the doors, while height sensor/trawl eye is mounted on the headline. This enables the navigators to accurately determine the door spread, vertical trawl opening (headline height), bottom clearance, and hence the effective tow duration (i.e. the time that the trawl is in fishing position on the bottom).

In order to examine the fishing width, the distance sensors were moved from the trawl doors to about 0.5 m behind the tips of the wings. The experiment was carried out 23-25 March; on the two northernmost transect lines of the survey, just south of Congo River. Altogether 18 hauls were conducted, ranging from 38 to 745 m depth. Distance between the wings was measured at the start and end of each deployment. Attempts were made to relate mean distance to mean depth of deployment, but the two parameters were uncorrelated. Average distance was  $21.4 \pm 0.5$  m (SD), confirming that the gear operated as anticipated. The experiment also revealed that the gear performs stably over time, on different types of bottom and over a great depth interval. This may have been enhanced by the use of restraining rope.

The duration of each tow was standardized at 30 min. In a few cases the trawl had to be terminated early due to bad bottom, but never after less than 20 min tow time, and hence data from all stations are used. A detailed description of the fishing gear is given in ANNEX VII. Acoustic recordings were carried out at 38 kHz using a SIMRAD EK500 Echosounder. Acoustic data were not processed on board, but all data were stored to files using the Bergen Echo Integrator (BEI).

### *Sampling the catches*

Catches were sampled (or sub-sampled for large catches) for species composition by weight and numbers. Length measurements were taken as follows: for fish, total body length (cm) was measured to the nearest 1 cm below the longest lobe of caudal fin, and for shrimp carapace length to 1 mm below was recorded. The records of fishing stations are presented in ANNEX I. A total of 416 length samples were measured during the cruise. For commercially

important species, pooled length frequency distributions, in which individual samples are raised to total catch, are shown by area in ANNEX II.

Additional biological data obtained included body weight (1g), sex and reproductive stage as determined by macroscopic examination, scoring each individually sampled fish and shrimp.

## 2.4 Areas and depth strata

Table 2.1 shows the areas ( $\text{NM}^2$ ) in the southern region (Cunene-Tombua), in the central region (Benguela-Luanda), and the northern region (Luanda-Congo River) by depth strata. These strata are used in the swept-area biomass estimates in the time series. All samples are treated as representative for the relevant depth intervals where the species, or group, was found, and the average density (biomass) is estimated for the entire area covered by the depth strata.

## 2.5 Calculations

All equations for the calculations, including some theoretical background, are given in ANNEX IV. In the swept-area time series estimates of the Nansen, the effective distance between the wings where fish are being caught, or the effective fishing width of the gear, has been considered to be a fixed value of 18.5 m. This value was also applied this year, having reconfirmed that the width of the gear was equivalent to the nominal 21 m (see chapter 2.3). Previous experiments carried out in order to determine the geometry of the trawl during standard deployments of 30 min duration with nominal speed of 3 knots (speed over ground) have shown that 18.5 m is a good proxy for the effective fishing width of the trawl for corresponding wing spreads of about 21 m.

For conversion of catch rates ( $\text{kg}/\text{hour}$ ) to fish densities ( $\text{t}/\text{NM}^2$ ), the effective fishing area was considered as the product of the wing spread and the haul length, or distance over the bottom, as measured by means of the SCANMAR equipment. The area swept ( $a_k$ ) for each haul<sub>k</sub> was thus 18.5 times the distance trawled, raised to  $\text{NM}^2/\text{hour}$ . The catchability coefficient ( $q$ ), i.e. the fraction of the fish encountered by the trawl that was actually caught, was conservatively (and for comparison with previous surveys) assumed equal to 1. Mean fish densities by species and strata, were calculated by the swept-area module in NAN-SIS.

Total biomass estimates by species, and their confidence intervals, were obtained from a stratified mean density estimator (using equations 1, 2, and 4 in ANNEX IV on a spreadsheet, ANNEX V) and raised to total area. Since NAN-SIS does not produce variance estimates of the mean densities (ANNEX III), the 95% confidence limits for the biomass estimates were calculated with the underlying assumption that the coefficient of variation ( $\text{CV}=\text{SD}/\text{mean}$ ) is constant when catch rates in  $\text{kg}/\text{hour}$  are converted to densities ( $\text{t}/\text{NM}^2$ ), in other words that the area swept (normalised per hour) was approximately constant for each haul. Coefficients of variation of the catch rates, by depth strata for each species or group, were obtained in EXCEL spreadsheets (this can also be done using the WinGrafer module of

NAN-SIS). Variance of the densities were estimated from the mean and the CV, and equations 2, 3, 6 and 7 in ANNEX IV were used to calculate standard error (SE) on the arithmetic mean and confidence intervals (see the spreadsheet BIOMASS.xls, and example in ANNEX V). GRAFER was also used to produce the figures and tables with grouped catch-rates and time-series presented in this report. SE and confidence intervals in the figures are based on both the arithmetic mean and the lognormal based Pennington's estimator (equations 8 to 12 in ANNEX IV).

## CHAPTER 3 OCEANOGRAPHIC CONDITIONS

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### 3.1 Surface distribution

The salient feature of the hydrographic conditions off Angola between December and March is the drop in the salinity at the surface, associated to the seasonal rise in the precipitation over the continent and the consequent increase in the discharge of freshwater carried to the ocean by the Congo River and by smaller rivers along the Angolan coast. The regular surveys carried out with 'Dr. F. Nansen' in March are coincident with the late phase of the wet season and, typically, observe low salinity in the surface waters in shelf off the northern and central Angola regions. No salinity decrease has been observed off the southern Angola (15-16°S), except of one survey done during the anomalous "Benguela Niño" event in February-March 1995.

The salinities and temperatures observed at the surface during this survey were typical for March. The three main regions (Angola south, central and north) displayed the usual, distribution patterns with respect to these parameters, (Figure 3.1-3.3). In the southern region (Figure 3.1), the offshore temperature was 28 °C and salinity was 35.8 psu, which was in the typical range for the tropical surface water, characterizing the mid-oceanic conditions in the South East Atlantic. A strong south-easterly, upwelling- favourable wind event (velocity > 10 m/s), which was recorded along the survey track, may have been responsible for observed drop in the surface temperature and salinity values inshore off Cunene River to  $T < 24$  °C and  $S < 35.4$  psu.

In the central Angola region, the surface salinities were in the range between 32.5 and 34.1 psu and temperatures were in the range between 29 and 30 °C. The warmest and the least saline surface waters were typically observed offshore. The narrow bands of the markedly colder and more saline water ( $T < 28$  °C and  $S > 34.1$  psu) were observed inshore off Cabeça da Baleia and between Pta do Morro and Pta. das Palmerinhas (Figure 3.2). Since in these regions, the calm conditions with a varying wind direction prevailed, it is unlikely that the observed, obvious surface upwelling signature was related to a typical, wind-induced coastal upwelling process. It is more likely that the upwelling was coupled the seasonal intensification of the Equatorial Counter Current (ECC), which during March assumes its southernmost position located off Angola at approximately 9°S.

In the northern Angola, the surface temperature and salinity in the regions deeper than 100 m were characterized by nearly constant values. The average value was 33.3 psu and 29.3 °C for the surface salinity and temperature, respectively. The only colder and more saline surface water cell was found inshore north of Ambriz, (min.  $T = 26.6$  °C, max. salinity 34.6 psu). The fresh water plume, originating at the Congo River was characterized by the inshore salinity < 33 psu reached its southernmost end at N'zeto (Figure 3.3a).



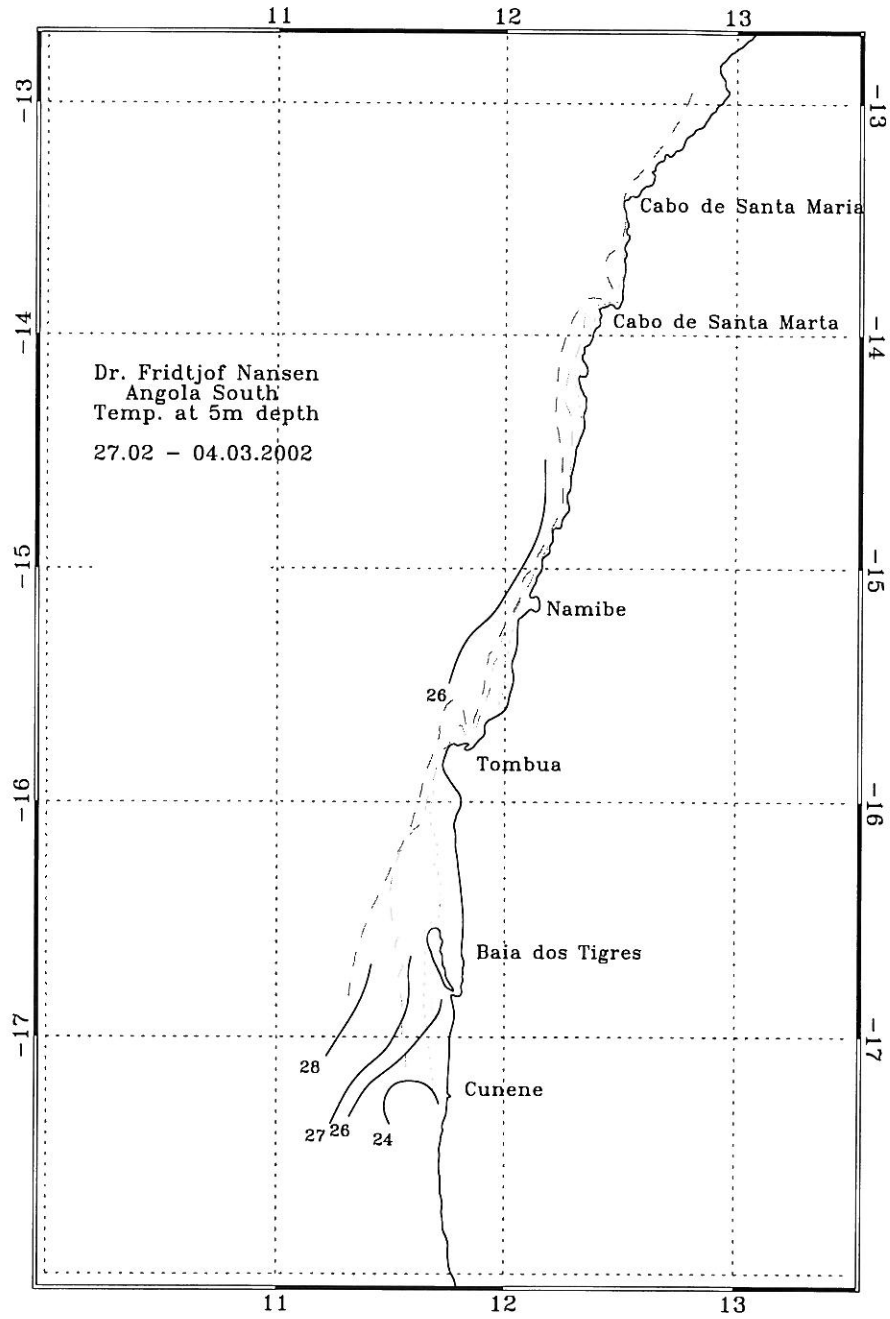
### 3.2 Vertical sections

The section off Baía dos Tigres (Figure 3.4a) displayed the conditions typical to the Angola-Benguela frontal region. In the surface layers, the core of Tropical Surface Water (TSW), characterized by  $T > 23$  °C,  $S > 35.8$  psu and  $O_2 > 5$  ml/l, dominated the offshore part of the section. It was separated from the underlying Atlantic central water mass by the well-developed pycnocline at depth 40 m, which was collocated with sharp gradients of all measured properties including oxygen, as shown in Figure 3.4.a. Inshore, the distributions in the surface water were characterized by the up sloping isolines, revealing a shallow the coastal upwelling pattern.

The section off Namibe (Figure 3.4b) is located in a very steep section of the coast, where the continental slope reaches the coastline and virtually there is no shelf. The ranges and vertical distributions of the seawater properties observed at this section, were very similar to those found at the offshore end of the Baía dos Tigres section.

The three sections off the central Angola, presented in Figure 3.4c-e, reveal the distribution patterns in temperature, salinity and oxygen, which are very distinct from those observed in the south. At the surface, the layer of the brackish water with salinity less than 34 psu coupled to the seasonal rainfall maximum occupied the entire extent of the section. The pycnocline occurred between 20 and 40 meters, and it was best manifested in the salinity distribution, but was also visible in temperature. The bottom shelf layers in rather were well saturated in oxygen, which decreased gradually from 4 ml/l at the surface reaching 2 ml/l at a depth between 90 and 100 m. A weak upwelling pattern, as manifested by the rise of isolines inshore, was observed at the Pta. do Morro section (Figure 3.4d).

The two sections located in Angola north are shown in Figure 3.4.(f and g). The vertical structure was similar to that observed off the central Angola. The brackish water layer dominated the surface layer with salinity below 34 psu. The main pycnocline persisted between 20 and 40 meters, and the bottom layers in the shelf were well saturated with oxygen. The main difference were in the slightly higher salinity values in the subsurface layer ( $S > 35.8$  psu as opposed to 35.7 psu off the central Angola), and in the presence of the Congo River freshwater plume at the surface, inshore the Moita Seca section (Figure 3.4g).



**Figure 3.1a** Angola south. Horizontal distribution of surface temperature (5 m depth). HT=hydrographic transect. Depth contours as in Fig 2.1.

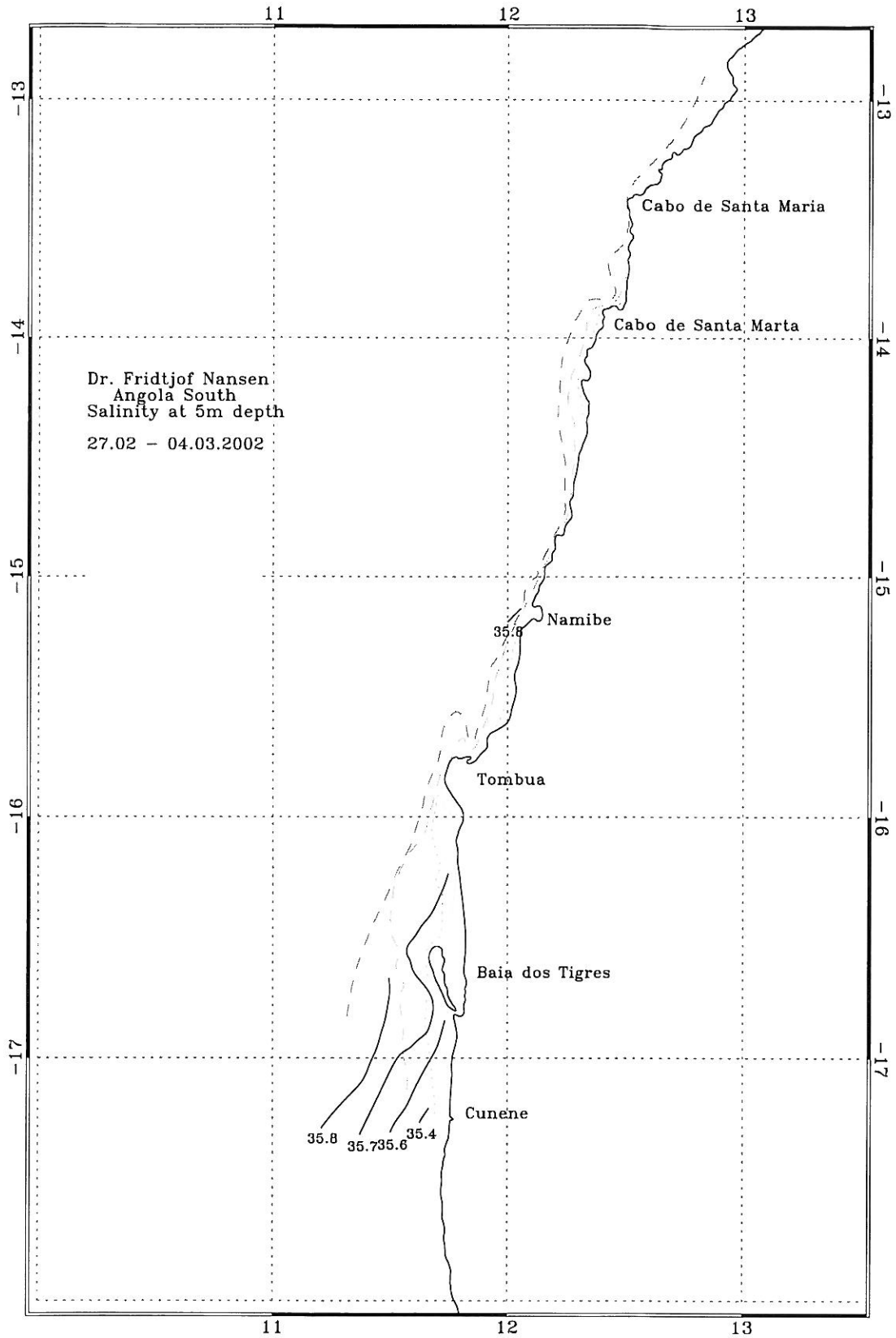
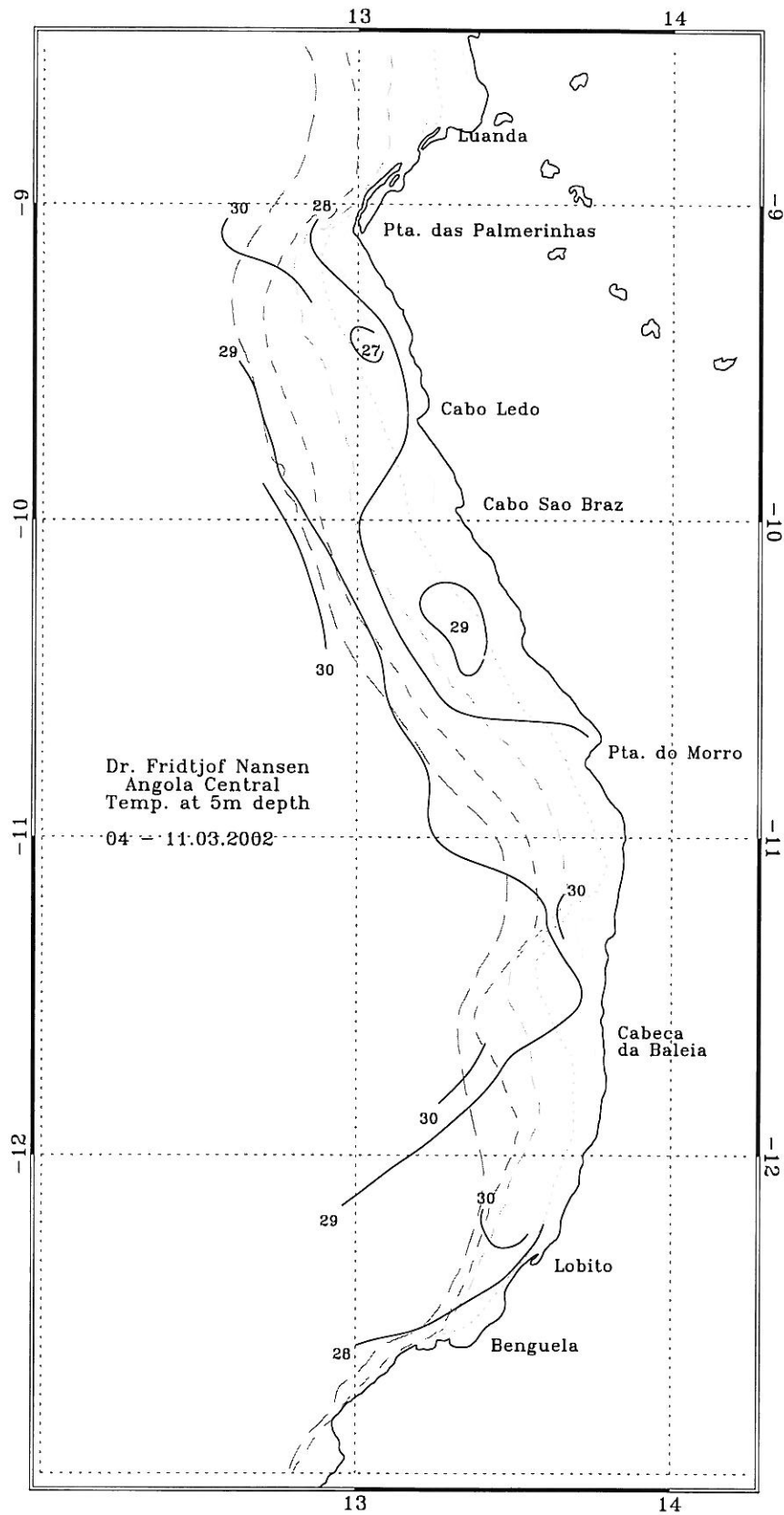
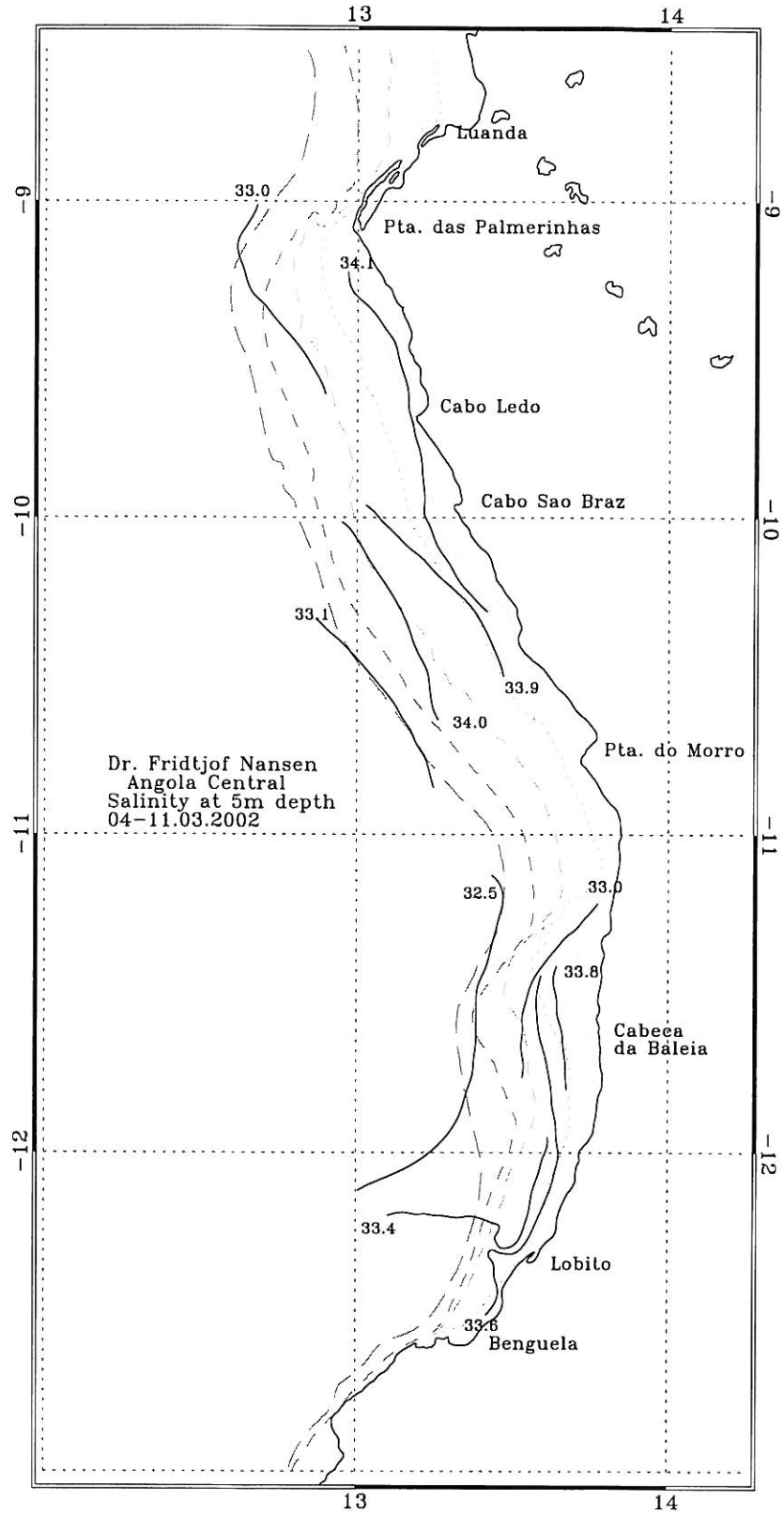


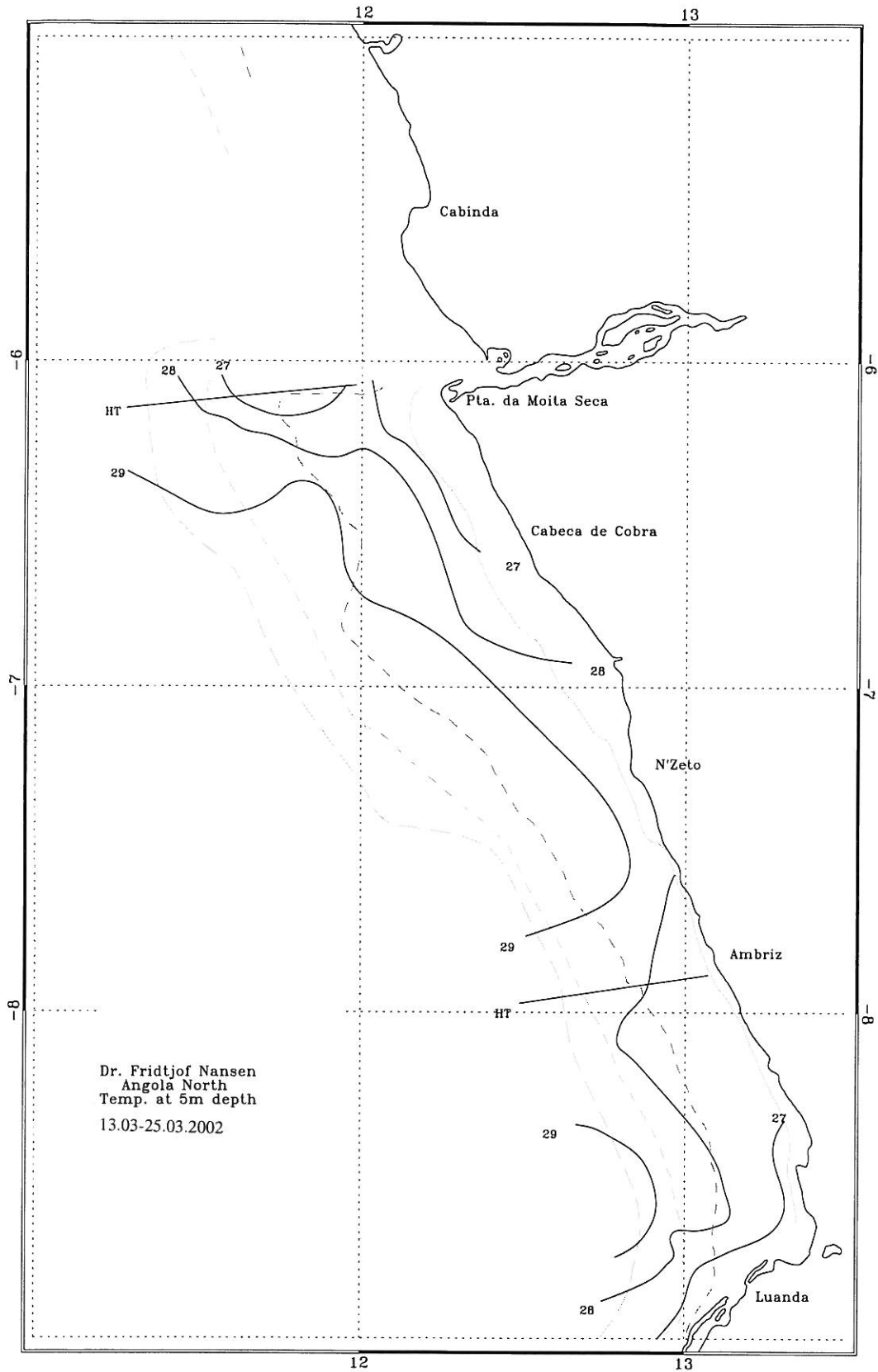
Figure 3.1b. Angola south. Horizontal distribution of surface salinity (5 m depth). Depth contours as in Fig 2.1



**Figure 3.2a** Angola central. Horizontal distribution of surface temperature (5 m depth). HT=hydrographic transect. Depth contours as in Fig 2.2.



**Figure 3.2b.** Angola central. Horizontal distribution of surface salinity (5 m depth). Depth contours as in Fig 2.2.



**Figure 3.3a.** Angola north. Horizontal distribution of surface temperature (5 m depth). HT=hydrographic transect. Depth contours as in Fig 2.2.

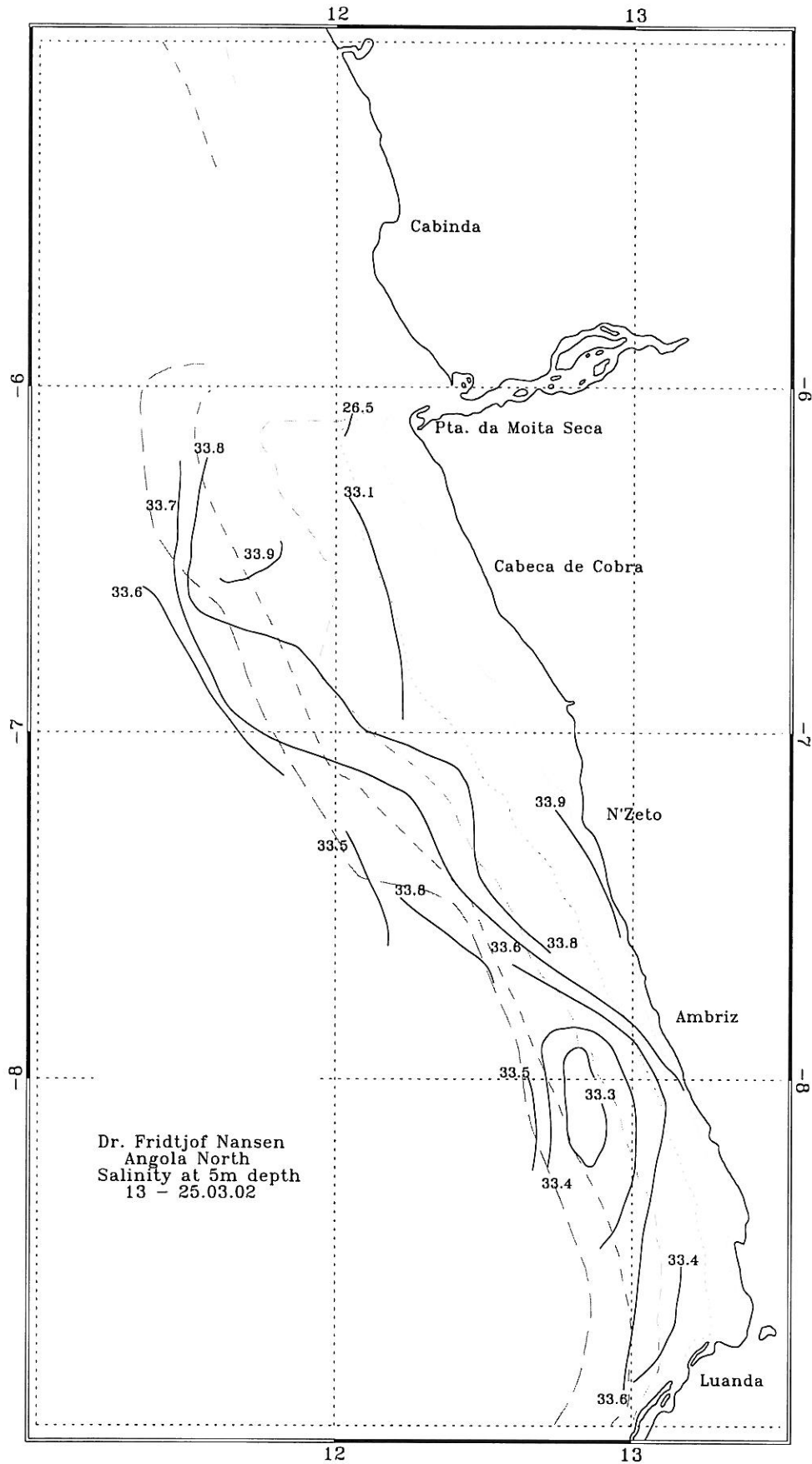
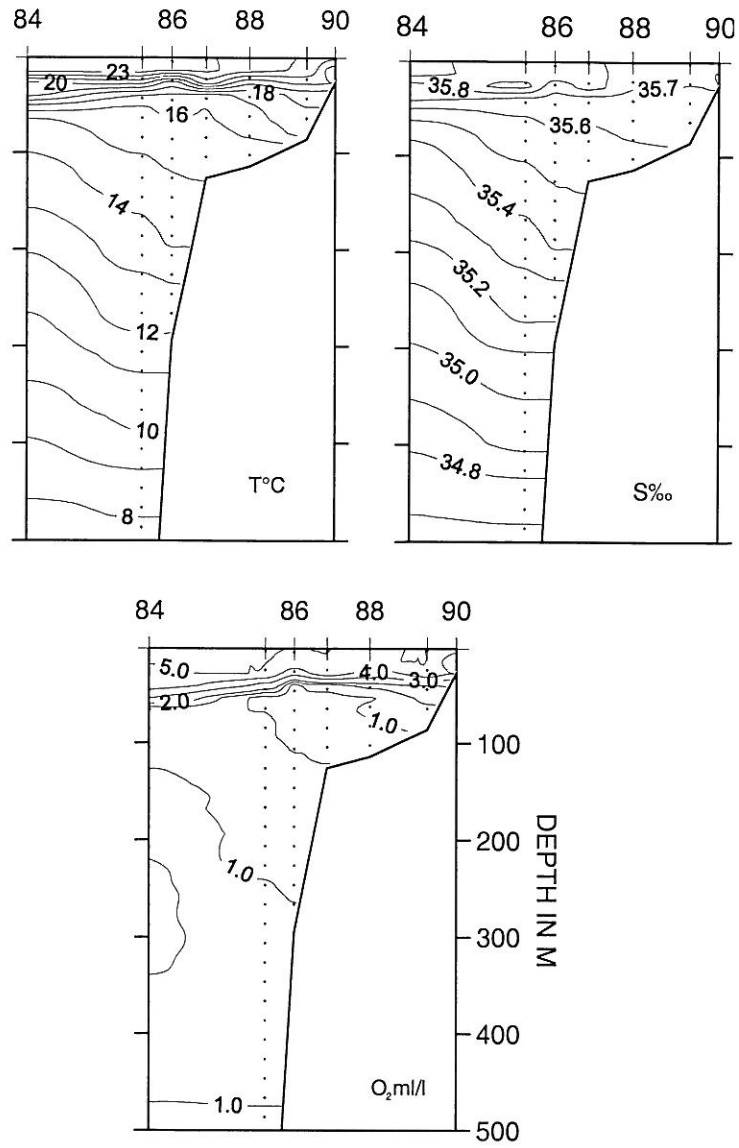
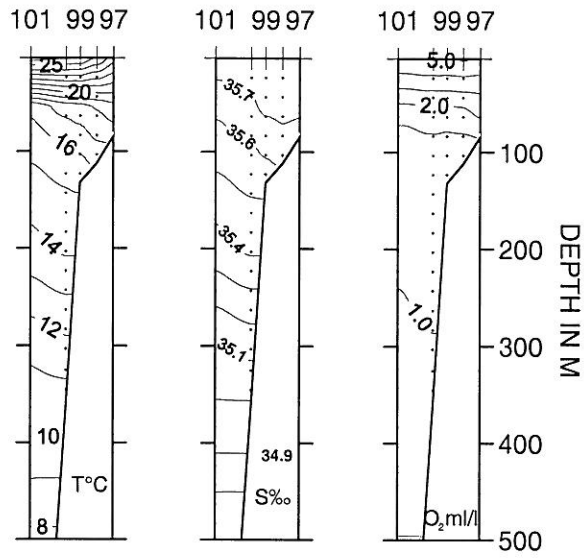


Figure 3.3b. Angola north. Horizontal distribution of surface salinity (5 m depth). Depth contours as in Fig 2.2.

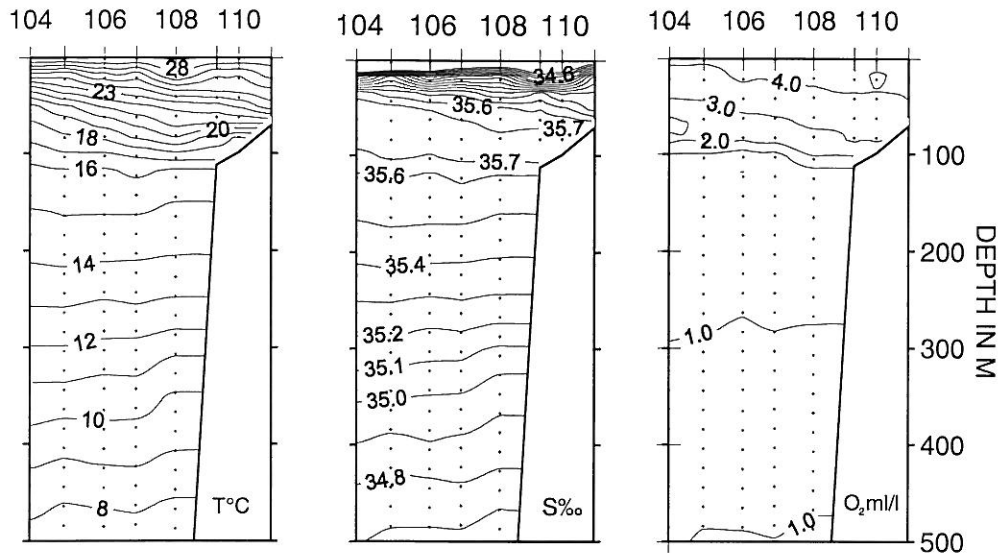


**Figure 3.4a.** Angola south. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Baía dos Tigres.

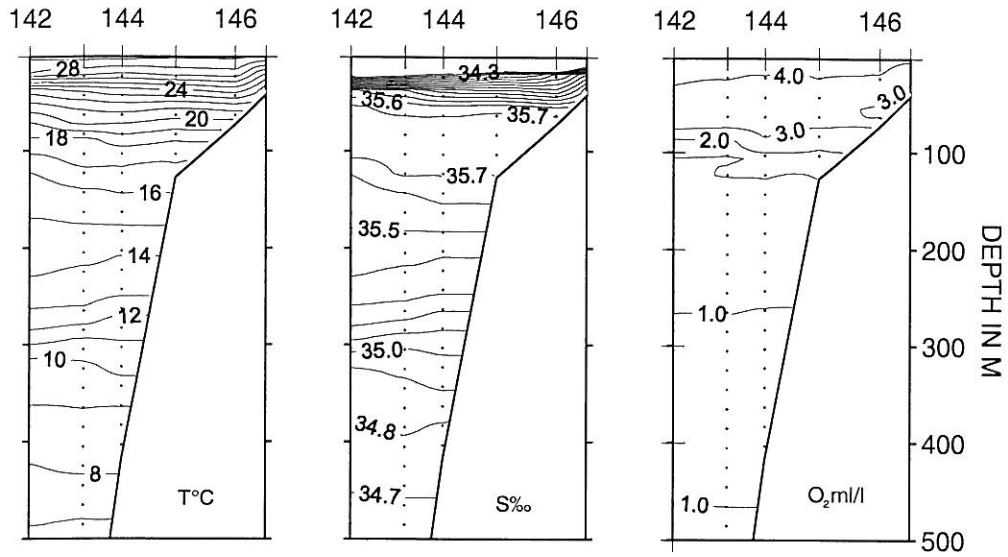




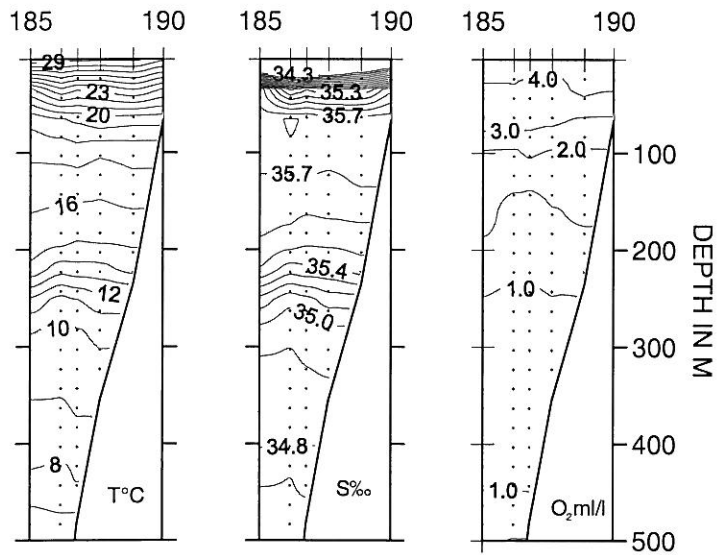
**Figure 3.4b.** Angola south. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Namibe.



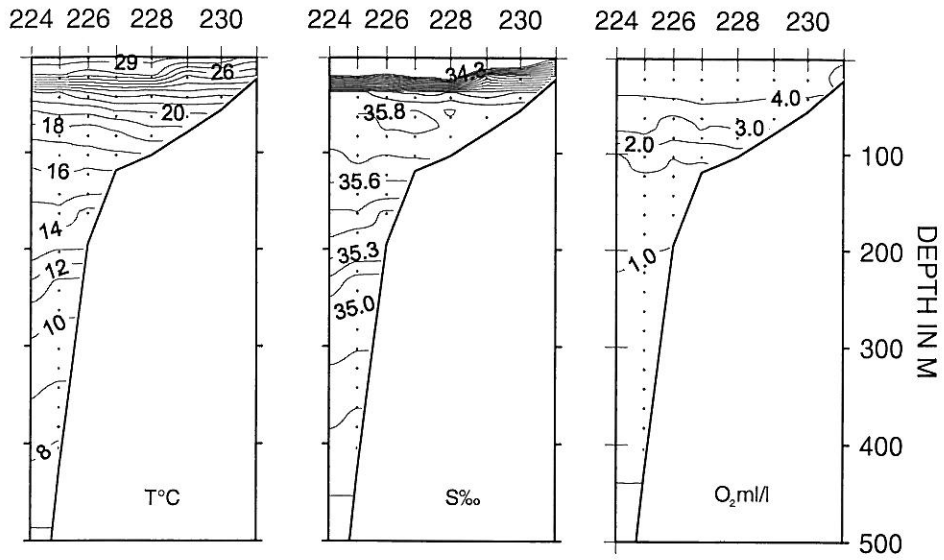
**Figure 3.4c.** Angola central. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Lobito.



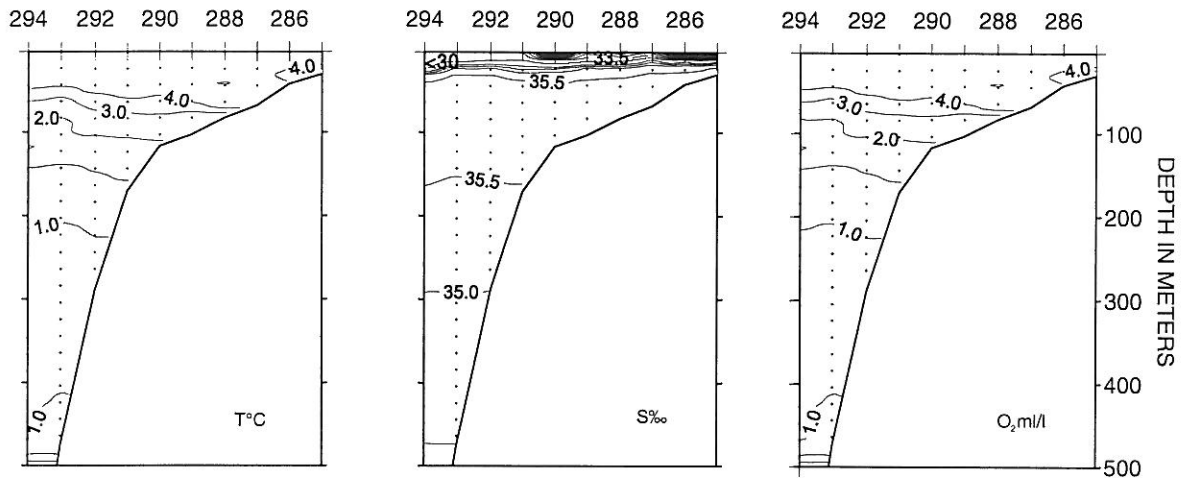
**Figure 3.4d.** Angola central. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Pta do Morro.



**Figure 3.4e.** Angola central. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Pta das Palmerinhas.



**Figure 3.4f.** Angola north. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Ambriz.



**Figure 3.4g.** Angola north. Vertical sections of a) temperature, b) salinity and c) oxygen on the hydrographic transect at Pta. da Moita Seca.

## **CHAPTER 4 CATCH RATES, DISTRIBUTION, COMPOSITION AND BIOMASS ESTIMATES OF DEMERSAL RESOURCES (SHELF)**

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Two different depth strata, i.e. the inner shelf (20-70 m depth) and the outer shelf (71-200 m depth), are used to present the total catches and species compositions on the Angolan shelf. However, it should be noted that several of the ‘shelf’-species, particularly the Sparidae and the Sciaenidae, have a distribution beyond the 200 m isobath. Catch rates for the main species beyond the 200 m isobath are reported in Chapter 5.

The locations of the trawl stations are shown in Figs. 2.1-2.3. Records of fishing stations and catches are presented in ANNEX I, and pooled length distributions (weighted by the catch) of main species by sector are shown in ANNEX II. Mean densities (t/NM<sup>2</sup>) of the main species sorted by abundance and depth strata, the frequency of occurrence, and the catch distributions are output from NAN-SIS and shown in ANNEX III.

### **4.1 Cunene-Tombua shelf**

Altogether, 10 successful swept-area trawl stations were accomplished on the small shelf area of this region (Table 2.1). The low number of stations in this region is due to time constraints, as the central region was to be covered before change of crews in Luanda 12 March. The results from this area should be interpreted with caution and catch rates can only be seen as indicative. Table 4.1 shows the catch rates by main species groups for the inner (20-70 m) and the outer shelf (71-200 m). The group ‘Demersal’ comprises the commercially important families Sparidae, Sciaenidae, Haemulidae (=Pomadasyidae), Serranidae, Lutjanidae, Merluccidae, Ophidiidae, and Ariidae, while the group ‘Pelagic’ includes the families Engraulidae, Clupeidae, Carangidae, Scombridae, Sphyraenidae, Stromateidae, and the benthopelagic family Trichiuridae (ANNEX VI give the NAN-SIS species codes used to extract the information in the various tables).

On the inner shelf the ‘Pelagic’ group dominated the catch rates with a relative contribution of 96%. The dominance of the pelagic group is due to high catch rates of the horse mackerel *Trachurus trecae* (>10 t/h in station number 2700). The ‘Demersal’ group contributed about 2%, while cephalopods constituted just above 1 % of the total. Some sharks were caught too, but the contribution of this group was negligible (<0.1%). Shrimps were not found in this area.

The ‘Pelagic’ group also dominated on the outer shelf with a relative contribution of 79%. Also on the outer shelf, the dominance of the pelagic group is ascribed to high catch rates of the horse mackerel, both *T. capensis* (>15 t/h in station number 2690) and *T. trecae* (~5 t/h, station 2698). The ‘Demersal’ group made up 20%, while cephalopods and sharks contributed less than 1% each. As was the case on the inner shelf, no shrimps were caught.

**Table 4.1.** Southern region March 2002. Catch rates (kg/hour) by main groups in swept area bottom trawl hauls on the shelf. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

A. Inner shelf 20-70 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2689	56.0	42.3	2 040.3				64.1	2 146.7
2695	37.0		2 156.5		4.5	1.6		2 162.5
2696	67.0		5 217.0		6.9	8.6		5 232.5
2699	66.0	459.6	3 690.0		256.8		2.4	4 408.8
2700	47.0	81.0	10 180.5		3.8		14.2	10 279.4
MEAN	54.6	116.6	4 656.9		54.4	2.0	16.1	4 846.0
SE	5.7	87.1	1 497.6		50.6	1.7	12.3	1 489.1
% CATCH		2.4	96.1		1.1	0.0	0.3	

**Table 4.1...** continued.

B. Outer shelf 71-200 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2690	92.0	43.2	15 705.8		193.4		51.8	15 994.2
2691	132.0	1 257.8	43.8				124.5	1 426.1
2692	160.0	620.5	2281.5				3.6	2 905.7
2697	103.0	54.7	189.4		9.0		10.9	263.8
2698	94.0	3 857.0	4 768.0			6.3	45.8	8 677.1
MEAN	116.2	1 166.6	4 597.7		40.5	1.3	47.3	5 853.4
SE	13.1	708.6	2 906.5		38.3		21.5	2 918.4
% CATCH		19.9	78.5		0.7	0.0	0.8	

*Pelagic groups*

Catch rates of the most important pelagic fish families caught with bottom trawl during this survey are presented in Table 4.2. Carangids, with Cunene horse mackerel (*T. trecae*) as the dominating species, dominated both the inner (94%) and outer (79%) shelf. Only a single catch of clupeids was obtained on the inner shelf, constituting about 1% of the total, and none on the outer shelf. Scombrids, on the other hand, were caught on four of five stations inshore, but in low numbers (<1%), and not on the outer shelf at all. Barracudas and hairtails were not caught in this area.

**Table 4.2.** Southern region March 2002. Catch rates (kg/hour) of main pelagic families on the shelf obtained with bottom trawl hauls. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

A. Inner shelf 20-70 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
2689	56.0	314.9	1 723.2	2.3			106.4	2 146.7
2695	37.0		2 155.8	0.7			6.0	2 162.5
2696	67.0		5 214.9	2.1			15.5	5 232.5
2699	66.0		3 690.0				718.8	4 408.8
2700	47.0		10 095.0	85.5			98.9	10 279.4
MEAN	54.6	63.0	4 575.8	18.1			189.1	4 846.0
SE	5.7		1 510.8	16.9			134.0	1 489.1
% CATCH		1.3	94.4	0.4			3.9	

**Table 4.2 ...continued.**

B. Outer shelf 71-200 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtail	Barracudas	Other	Total
2690	92.0		15 705.8				288.4	15 994.2
2691	132.0		43.8				1 382.2	1 426.1
2692	160.0		2 281.5				624.1	2 905.7
2697	103.0		189.4				74.5	263.8
2698	94.0		4 768.0				3 909.1	8 677.1
MEAN	116.2		4 597.7				1 255.7	5 853.4
SE	13.1		2 906.5				699.5	2 918.4
% CATCH			78.5				21.5	

*Demersal groups*

Table 4.3 presents catch rates of the most valuable demersal species grouped into ‘families’: seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*), and croakers (Sciaenidae). There were few catches of demersal species in the southern region, and the ‘other species’ group dominated due to the high catch rates of horse mackerel, both on the inner (98%) and outer (82%) shelf.

The only valuable demersal groups that were caught in the south were seabreams and croakers. Among the seabreams *Dentex macrophthalmus* was the dominating species. As was observed during the 2000 survey, catch rates of this species were an order of magnitude higher on the outer (up to 3.6 t/h) than on the inner shelf (367 kg/h). The croakers were much less abundant, and like in previous years, species caught included *Umbrina canariensis* and *Atractoscion aequidens*.

**Table 4.3.** Southern region March 2002. Catch rates (kg/hour) of valuable demersal species grouped by families. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

A. Inner shelf 20-70 m

STAT	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
2689	56.0					3.2	2 143.5	2 146.7
2695	37.0						2 162.5	2 162.5
2696	67.0						5 232.5	5 232.5
2699	66.0	367.2				33.0	4 008.6	4 408.8
2700	47.0					81.0	10 198.4	10 279.4
MEAN	54.6	73.4				23.4	4 749.1	4 846.0
SE	5.7					15.7	1 482.5	1 489.1
% CATCH		1.5				0.5	98.0	

**Table 4.3 ...continued..**

B. Outer shelf 71-200 m

STAT	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
2690	92.0						15 994.2	15 994.2
2691	132.0	1 172.5					253.6	1426.1
2692	160.0	330.7				3.6	2571.3	2 905.7
2697	103.0	23.0				10.5	230.3	263.8
2698	94.0	3 640.3				41.7	4 995.1	8 677.1
MEAN	116.2	1 033.3				11.2	4 808.9	5 853.4
SE	13.1	685.5				7.9	2 931.4	2 918.4
% CATCH		17.7				0.2	82.2	

Table 4.4 presents swept-area biomass estimates for valuable demersal groups and other groups that occurred in sizeable quantities. Due to the low sample intensity in this region (10 stations), all strata (i.e. 20-49 m, 50-99 m and 100-199 m depth) were combined for all species. Obviously, the results from the southern region can therefore only be seen as course indications, and any interpretation should be done with extreme caution.

The seabream biomass estimate of 29 762 tonnes is lower than last years' estimate, but within the (wide) confidence limits of previous years. However, no conclusion can be drawn due to the low sample number. This is reflected in the 95% confidence interval, including the value 0 and ranging to about 68 726 tonnes for 2002.

The biomass of croakers was estimated to about 900 tonnes, which the lowest estimate of the time series.

The Cunene horse mackerel estimate of 104 701 is about the same as found in but much higher than the results from previous surveys. This estimate may very well be positively biased by a few particularly large catches (catch rate >10 t/hour), and should in any case be expected to be extremely imprecise due to the huge sample-variance, including several zero-hauls. The same is the case for the 150 000 tonnes biomass estimate of other carangids, mainly Cape horse mackerel (*T. capensis*).

**Table 4.4.** Biomass estimates (tonnes) of valuable demersal and pelagic fish by main groups on the shelf, by year of investigation. Cunene-Benguela.

	Biomass tonnes ❖										2002 95% conf. limits		
	1986/I ❖	1989/I ❖	1989/II ◆	1991/I ◆	1991/II ◆	1991/III ◆	1992 ◆	1997 ◆	2000 ❖	2001 ❖		2002 ❖	
Seabreams	21 000	17 700	35 400	20 700	26 600	40 000	40 000	45 000	61 633	29 762	29 762	0	68 726
Croakers		1 570	4 370	1 700	1 600	2 100			3 621	948	948	14	1 881
Groupers									6	surveyed			
Sum demersal		19 270	39 770	22 400	28 200	42 100			65 260	30 710	30 710		
Horse mackerel				21 300	12 700	8 000			185 150	104 701	104 701	0	219 641
Other carangids				20 800	26 700	82 000			33 097	150 080	150 080	0	322 850
Hairtail									1 004				

❖ summer season (February-March)

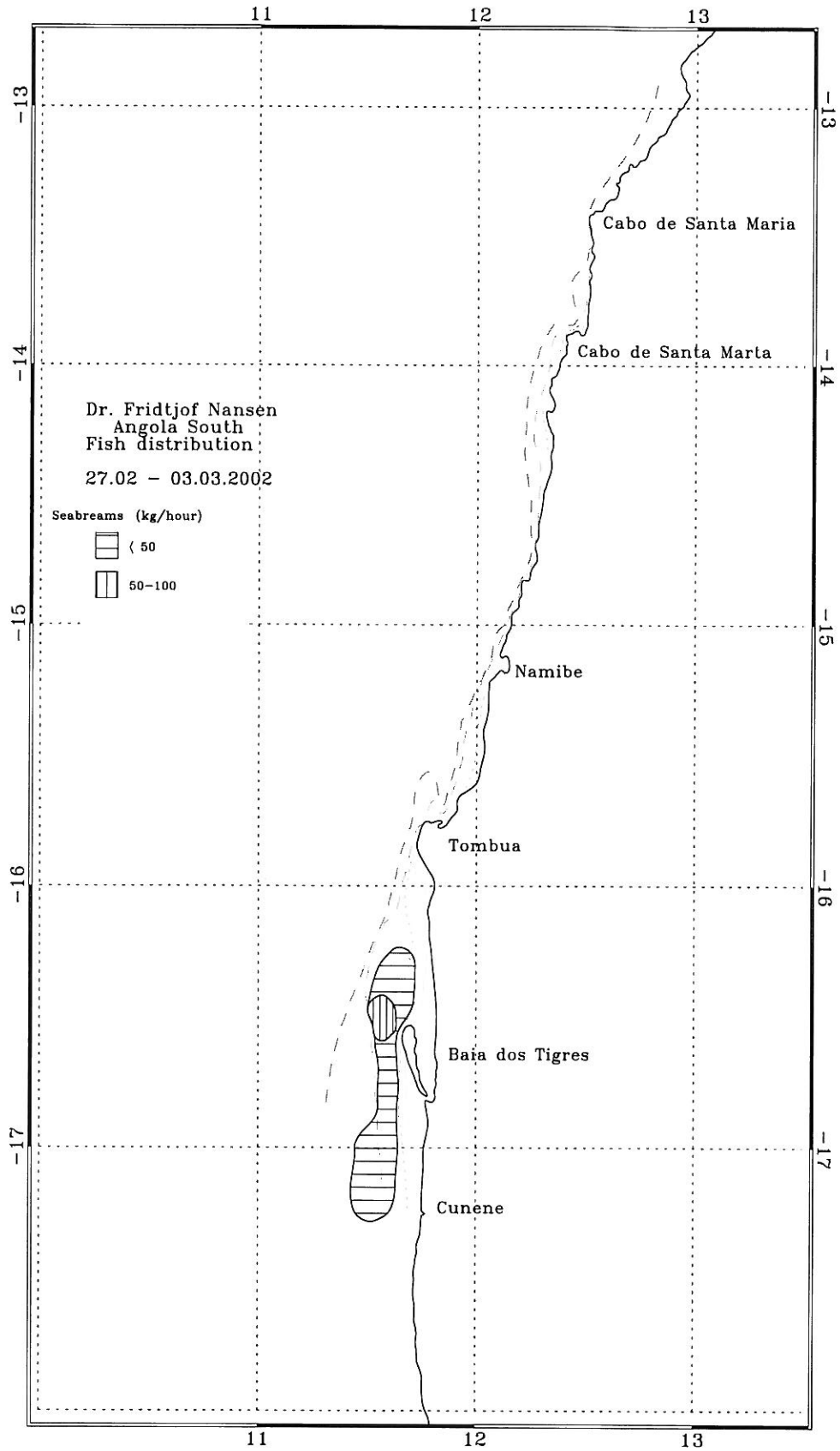
◆ winter season (May-September)



Note that different surveys have used different areas, depth strata, and depth limits in the biomass estimations. Stratified biomass estimates are made from equations (1) and (4), ANNEX IV, covering the whole depth range of the distribution, ANNEX IV. Since NAN-SIS does not produce variance estimates of the mean densities (ANNEX III), the 95% confidence limits for this survey were calculated from the assumption that the coefficient of variation (SD/mean) is constant between catch rates in kg/hour and  $t/NM^2$ , in other words that the area swept (normalised per hour) is approximately constant during the survey.

The NAN-SIS program GroupSpec2 was used to sort the samples by region, depth, purpose, validity and stations. Mean catch rates and corresponding standard deviation SD, standard error SE and coefficient of variation CV for the catch rates (kg/h) were calculated in EXCEL spreadsheets (this can also be done in the NAN-SIS WinGrafer module). Equations for all calculations are given in ANNEX IV. Conversion from catch rates in kg/h to swept area densities were done using the NAN-SIS swept area program, which produces swept area densities for all species by depth (and geographical and/or station limitations) and summaries for groups. Mean density, CV and numbers of stations were punched into an EXCEL spreadsheet for estimation of biomass and respective confidence limits (ANNEX V).

Figure 4.1 shows the distribution of seabreams in the region between Cunene and Tombua. The main concentration was found on the outer shelf off Baía dos Tigres. This is slightly different of what was found in the 2000 survey where the highest concentration was found from Cunene to north of Baía dos Tigres. In 2001 this area was not surveyed.



**Figure 4.1.** Estimated distribution of seabreams (family Sparidae). Cunene-Tombua. Depth contours as in Fig.2.1.

## 4.2 Benguela - Luanda shelf

A total of 49 successful swept-area trawl stations were accomplished on the shelf area (Table 2.1). Table 4.5 presents the catch rates by main species groups on the inner and outer shelf. The 'demersal' group dominated on the inner shelf with an average catch rate of 1.3 t/hour and a relative contribution of 71%. The 'pelagic' group contributed 23%, while shrimps, cephalopods and sharks each contributed less than 1% and were much less frequent. These results are noticeably near the estimates of recent years (2001, 2000 and 1999) in relative terms, but the overall catch rates were generally higher than in 2001 (300-400%) and in the two previous years (~130%).

**Table 4.5.** Central region March 2002. Catch rates (kg/hour) by main groups in swept area bottom trawl hauls on the shelf. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

### A. Inner shelf 20-70 m

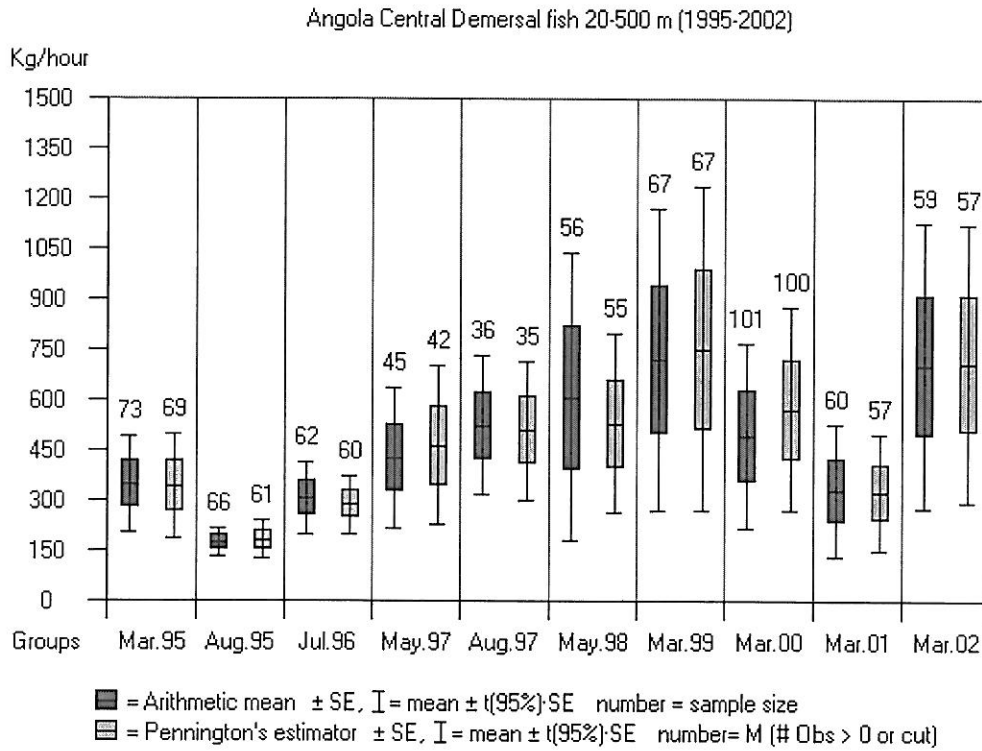
STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2703	66.0	844.8	1 743.6		2.3		71.4	2 662.1
2706	46.0	2 388.6	313.1		1.6		269.0	2 972.1
2716	52.0	688.8	835.7		8.8		18.7	1 552.0
2717	27.0	5.5	133.5				6.9	145.9
2718	66.0	476.7	446.0		32.8		70.1	1 025.6
2725	59.0	431.6	2 465.2				47.0	2 943.8
2726	42.0	167.6	85.0		5.6		3.8	261.9
2727	28.0	100.4	177.0	14.5	4.4		143.0	439.3
2729	21.0	0.8	0.5			1.5	5.8	8.7
2734	38.0	139.1	168.3	0.1			349.0	656.5
2735	53.0	5 374.2	479.1	0.3			145.9	5 999.4
2737	30.0	180.4	288.4	1.9	6.9		138.7	616.3
2738	47.0	322.0	117.5		13.2		85.1	537.7
2747	49.0	768.3	117.9				45.1	931.3
2748	31.0	377.5	203.0	0.4	1.1		52.9	635.0
2749	28.0	507.5	61.6	1.5	0.1	1.2	70.3	642.2
2750	47.0	149.2	130.9		1.2		97.3	378.6
2759	60.0	915.5	311.7	0.3			4.7	1 232.1
2760	34.0	10 270.1	1 358.5				98.8	11 727.4
2761	31.0	4 890.8	112.6	41.4	9.9		285.5	5 340.2
2766	51.0	388.0	47.1	0.6	1.4		27.0	464.1
2767	26.0	52.3	19.8				68.6	140.7
2768	26.0	485.5	145.2				105.2	735.9
MEAN	41.7	1 301.1	424.4	2.7	3.9	0.1	96.1	1 828.2
SE	2.9	505.1	129.1	1.9	1.5	0.1	19.4	560.1
% CATCH		71.2	23.2	0.1	0.2		5.3	

Pelagic fish were most abundant on the outer shelf, constituting some 50% of the catches. This is in contrast to the estimates of last year and of 1999, where demersal fish dominated (34% and 69%, respectively). In the 2000 estimate, pelagic and demersal groups were equally important (~30%). The relative catch rate of the 'demersal' group was 22%, or about 30% of the catch rate on the inner shelf (corresponding rates were 109% last year and 25% in 2000). The most abundant species this year was *Trachurus trecae*.

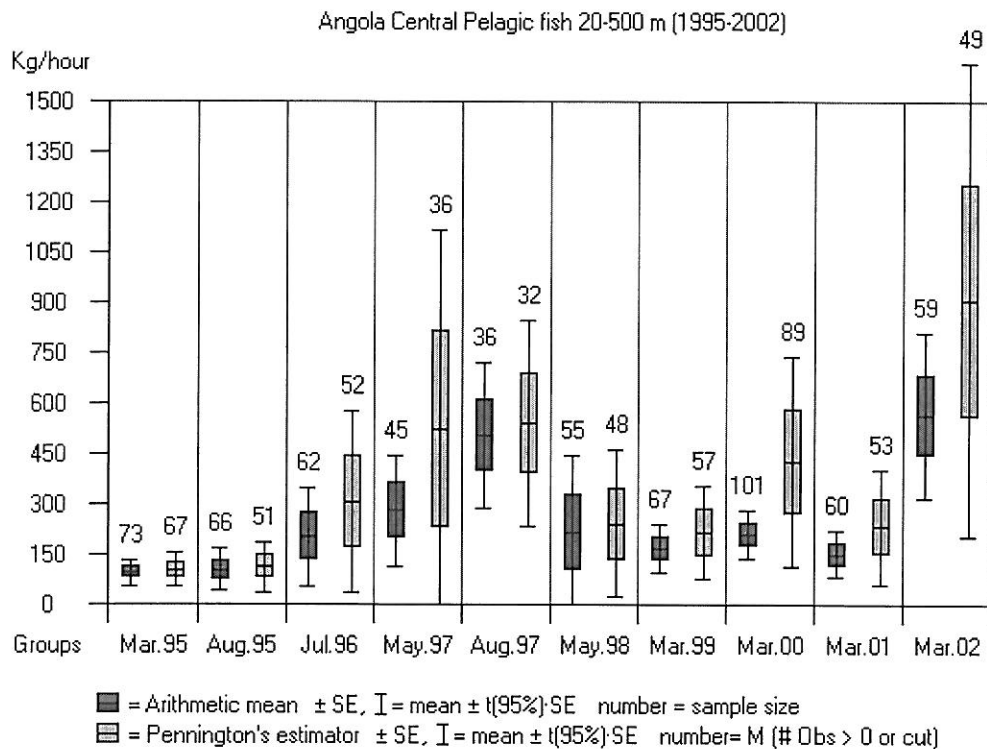
**Table 4.5...** continued.

B. Outer shelf 71-200 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2704	96.0	202.3	2 176.2		13.0		142.8	2 534.3
2705	111.0	135.4	223.5		7.6		68.4	434.9
2707	73.0	472.4	442.4				9.2	924.0
2708	97.0	329.1	7.5				25.1	361.7
2709	112.0	777.3	2.7		3.0		128.3	911.2
2714	104.0	86.7	2 752.6		57.6	14.2	49.6	2 960.7
2715	72.0	112.4	725.9				11.4	849.7
2719	111.0	48.4	1 701.3		268.8		29.2	2 047.6
2720	161.0	246.9	16.8	6.2	27.9	7.7	334.9	640.3
2724	103.0	320.8	308.4		37.0		2 497.0	
2730	115.0	37.9	37.9	1.0	3.4		1 399.4	1 479.5
2731	148.0	165.5	5.8	17.1	10.6		313.3	512.2
2736	115.0	410.4	379.0	4.3	3.7		84.8	882.1
2739	91.0	2 146.9	2 133.3	2.4			154.6	4 437.2
2740	152.0	2 644.5	262.1	63.2	179.6	11.0	1 828.3	4 988.6
2745	131.0	296.8	783.1		21.8		92.1	1 193.8
2746	96.0	6.3	5.3		15.4		19.7	46.6
2751	71.0	352.6	1 447.0		1.6		17.3	1 818.5
2752	96.0	549.4	4 537.2		11.9		137.6	5 236.1
2753	171.0	140.7	2.7	25.1	33.5	2.6	479.3	683.8
2757	105.0	436.8	3 515.4		29.5		17.8	3 999.5
2758	86.0	22.1	519.6		51.7		6.8	600.1
2762	94.0	206.8	227.3	0.5	37.2		128.6	600.4
2765	113.0	52.6	803.5	4.4	35.3		2 426.3	3 322.0
2769	75.0	44.0	160.3	0.1	1.1		11.0	216.5
2770	115.0	243.7	463.9	0.9	4.6		2 370.0	3 083.1
MEAN	108.2	403.4	909.3	4.8	32.9	1.4	491.6	1 790.6
SE	5.2	121.4	236.0	2.6	11.8	0.7	163.2	310.3
% CATCH		21.9	49.3	0.3	1.8	0.1	26.7	



**Figure 4.2** A time series of the mean catch rates of the main group “demersal” from 20 to 500 m in the Angola central sector from 1995 to 2002. For calculations of confidence intervals and cut of level for the Pennington estimator see ANNEX IV.



**Figure 4.3.** A time series of the mean catch rates of the main group “pelagic” from 20 to 500 m in the Angola central sector from 1995 to 2002.

Figures 4.2 and 4.3 show that there seem to be some long-term trends in the main groups 'demersal' and 'pelagic', with an overall increase in the former until 1999, followed by a decreasing trend in 2000 and 2001. In 2002 survey the mean catch rates estimated represented one of the highest of the time series. A cyclic fluctuation was observed in the 'pelagic group'. The year-to-year variation, however, is generally small, and very few point estimates are actually significantly different. It should be noted that the August 1995 survey was specifically aimed at the deep-water shrimp and hake resources with sampling only deeper than 150 m, and that the August 1997 survey was specifically aimed at the large-eye dentex (*Dentex macrophthalmus*) with sampling between 50 and 300 m only. When disregarding these two surveys, none of the annual point estimates are significantly different from each other (although the trends still seem valid).

#### *Pelagic groups*

Catch rates of the most important pelagic fish families, caught with bottom trawl during this survey, are presented in Table 4.6. Carangids dominated on both the inner and outer shelf, and like last year the most abundant species were Cunene horse mackerel (*Trachurus trecae*), Atlantic bumper (*Chloroscombrus chrysurus*) and African lookdown (*Selene dorsalis*). The highest catches of "clupeids" were obtained on the inner shelf and consisted mainly of *Ilisha africana* followed by *Sardinella maderensis* and *S. aurita*. Barracudas were caught only on the inner shelf, while hairtails were found both on the inner and outer shelf, with the highest average catch rate on the former. This pattern is slightly different from last year where barracudas were found both on the inner and outer shelf and hairtails dominated the outer shelf.

**Table 4.6.** Central region. March 2002. Catch rates (kg/hour) of main pelagic families on the shelf obtained with bottom trawl hauls. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

A. Inner shelf 20-70 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
2703	66.0	20.8	1 703.5		19.3		918.5	2 662.1
2706	46.0	18.9	217.7		13.6	62.9	2 659.1	2 972.1
2716	52.0	2.0	372.1		460.4	1.3	716.3	1 552.0
2717	27.0	4.0	128.6			1.0	12.4	145.9
2718	66.0	4.2	373.5		45.8	22.5	579.6	1 025.6
2725	59.0	28.0	2 375.2		6.2	55.9	478.6	2 943.8
2726	42.0	2.3	68.0	1.6		13.1	177.0	261.9
2727	28.0	108.0	28.1		36.3	4.6	262.3	439.3
2729	21.0					0.5	8.2	8.7
2734	38.0	34.3	14.4		119.6		488.2	656.5
2735	53.0	68.0	92.9		236.5		5 574.0	5 971.4
2737	30.0	22.9	148.0		117.5		327.9	616.3
2738	47.0	12.6	1.8		103.1		420.2	537.7
2747	49.0	10.4	54.7		46.8	6.0	813.3	931.3
2748	31.0	94.4	24.4	3.6	67.7	12.9	432.0	635.0
2749	28.0	10.2	22.0		21.6	7.7	580.6	642.2
2750	47.0	4.7	59.4		22.7	44.0	247.8	378.6
2759	60.0	9.1	280.5			22.1	920.4	1 232.1
2760	34.0	226.6	945.3		186.6		10 368.9	11 727.4
2761	31.0	15.3	73.0		24.3		5 227.7	5 340.2
2766	51.0	4.5	17.5		25.2		417.0	464.1
2767	26.0	10.0	3.9			5.9	120.9	140.7
2768	26.0	5.2	130.2			9.8	590.7	735.9
MEAN	41.7	31.1	310.2	0.2	67.5	11.7	1 406.1	1 827.0
SE	2.9	10.7	123.4	0.2	22.2	3.8	512.1	559.7
% CATCH		1.7	17.0	0.0	3.7	0.6	77.0	

Table 4.6 ...continued..

## B. Outer shelf 71-200 m

STAT	Depth	Clupeids	Carangids	Scombrids	Hairtail	Barracudas	Other	Total
2704	96.0		2 176.2				358.1	2 534.3
2705	111.0		18.4	205.1			211.4	434.9
2707	73.0	1.1	441.3				481.6	924.0
2708	97.0				7.5		354.2	361.7
2709	112.0			2.7			908.6	911.2
2714	104.0		2 744.0	5.2	3.4		208.1	2 960.7
2715	72.0		724.8		1.1		123.8	849.7
2719	111.0		1 589.0		112.3		346.3	2 047.6
2720	161.0		13.5	3.3			623.5	640.3
2724	103.0		272.8		35.6		2 854.8	3 163.2
2730	115.0		37.9				1 441.6	1 479.5
2736	115.0		22.4		356.6		503.2	882.1
2739	91.0	2.4	1 848.3		282.5		2 303.9	4 437.2
2740	152.0		262.1				4 726.5	4 988.6
2745	131.0		762.1		21.0		410.7	1 193.8
2746	96.0		2.2	2.4	0.7		41.3	46.6
2751	71.0		1 367.4		76.1		369.6	1 813.2
2752	96.0		4 537.2				698.9	5 236.1
2753	171.0		2.7				681.1	683.8
2757	105.0		3 507.3	5.8	2.3		484.1	3 999.5
2758	86.0		519.6				80.6	600.1
2762	94.0		227.3				373.1	600.4
2765	113.0		468.6		334.9		2 518.6	3 322.0
2769	75.0		6.7		153.6		56.2	216.5
2770	115.0		463.9				2 619.2	3 083.1
MEAN	106.6	0.1	880.6	9.0	55.5		951.2	1 896.4
SE	5.2	0.1	244.2	8.2	21.8		232.0	316.4
% CATCH			46.4	0.5	2.9		50.2	

Figures 4.4, 4.5 and 4.6 show the average catch rates of Cunene horse mackerel, Atlantic bumper and all “other carangids”, respectively, on the shelf (20-200 m) back to 1995. Figures 4.7 and 4.8 show the average catch rates of barracudas, mainly *Sphyraena guachancho*, on the shelf, and the hairtails, mainly *Trichiurus lepturus*, (down to 600 m as this group is found at all depths).



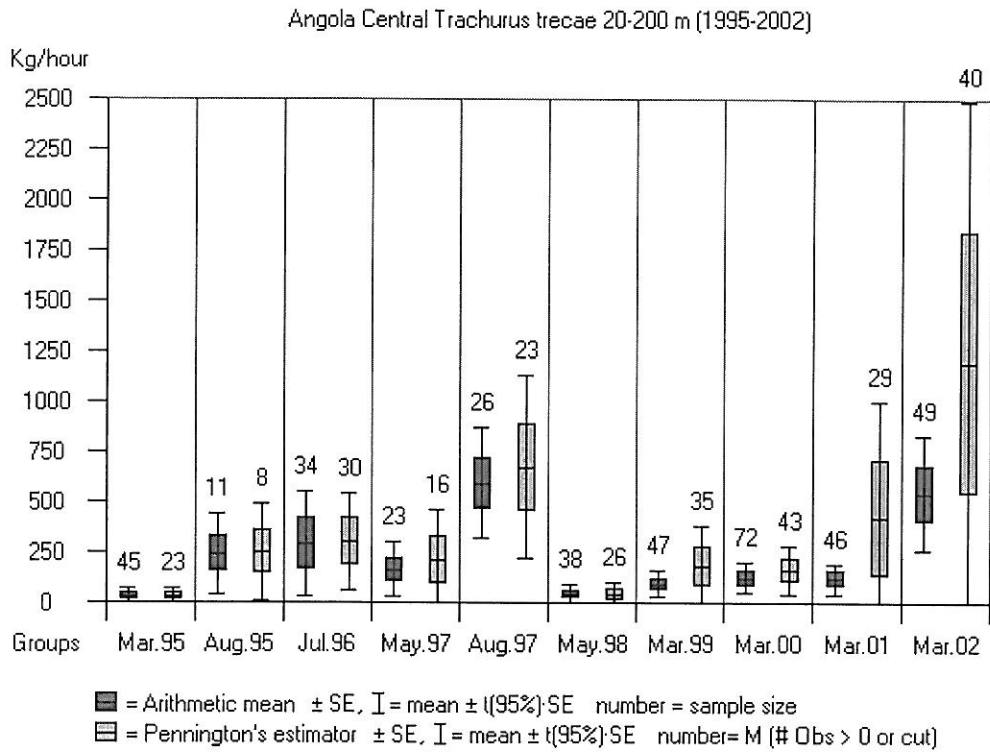


Figure 4.4. Mean catch rates of horse mackerel (*Trachurus trecae*) in bottom trawls on the central shelf.

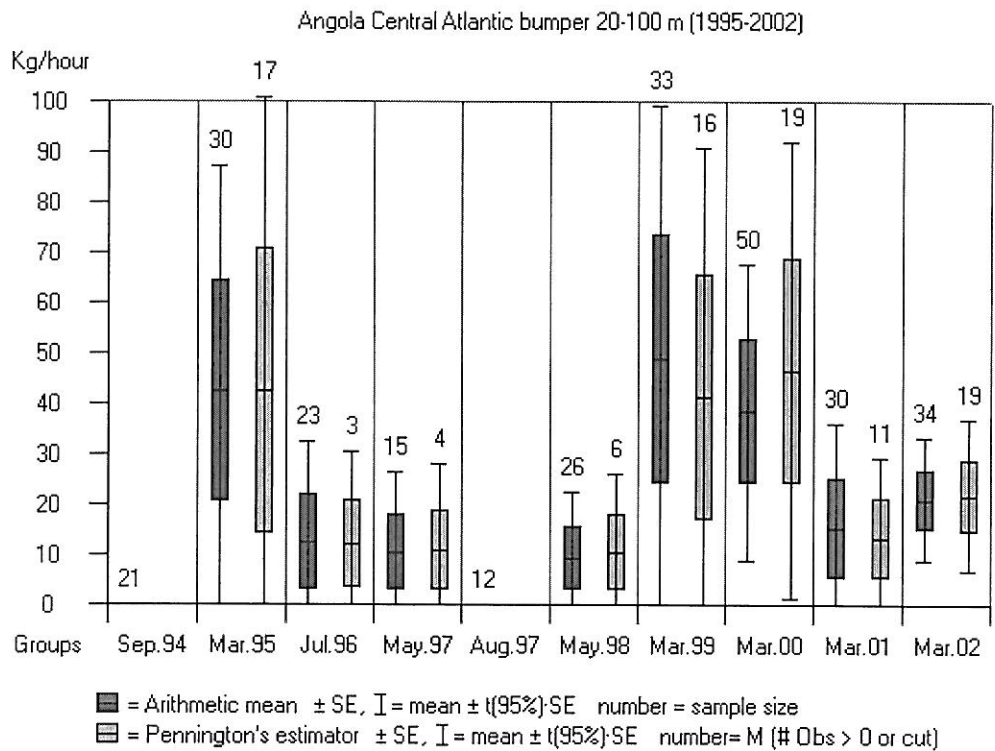
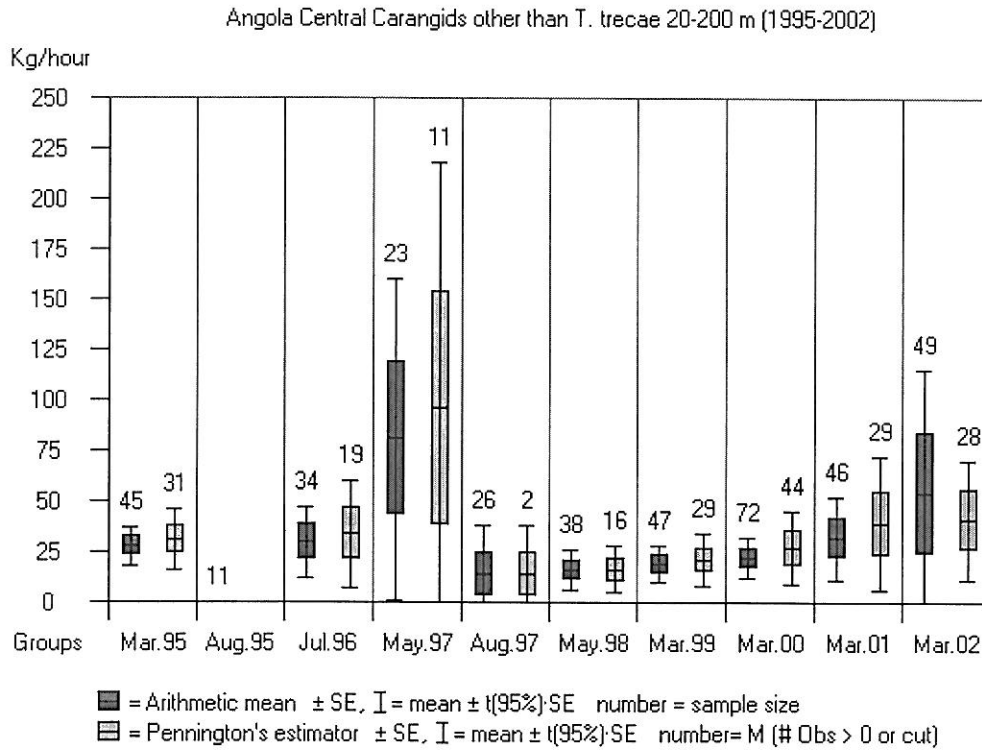
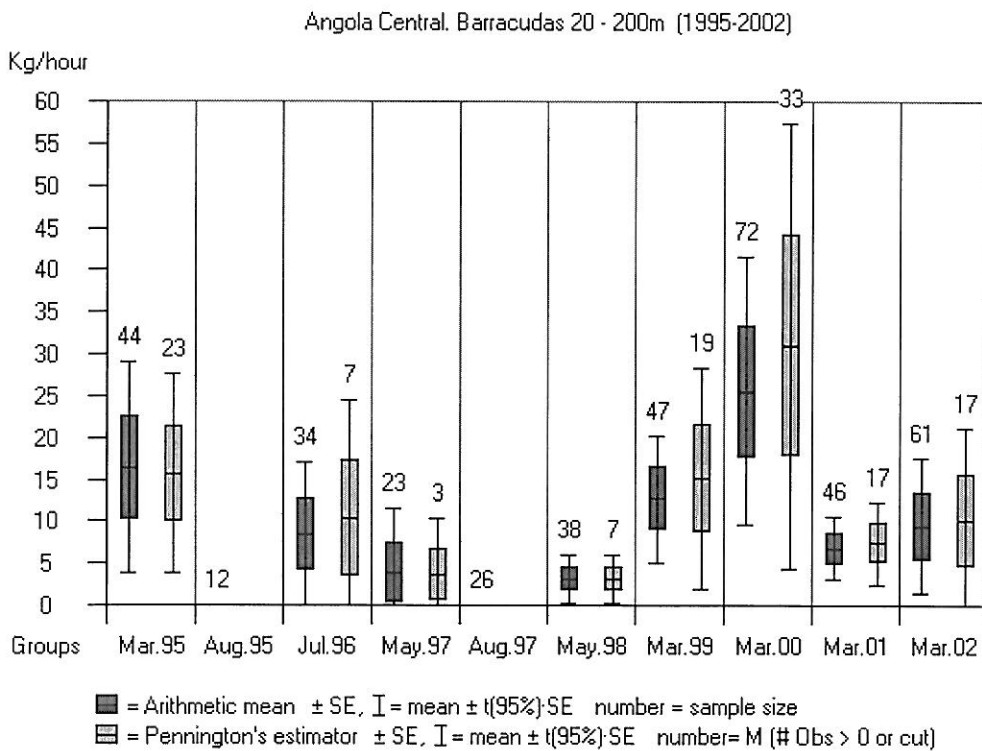


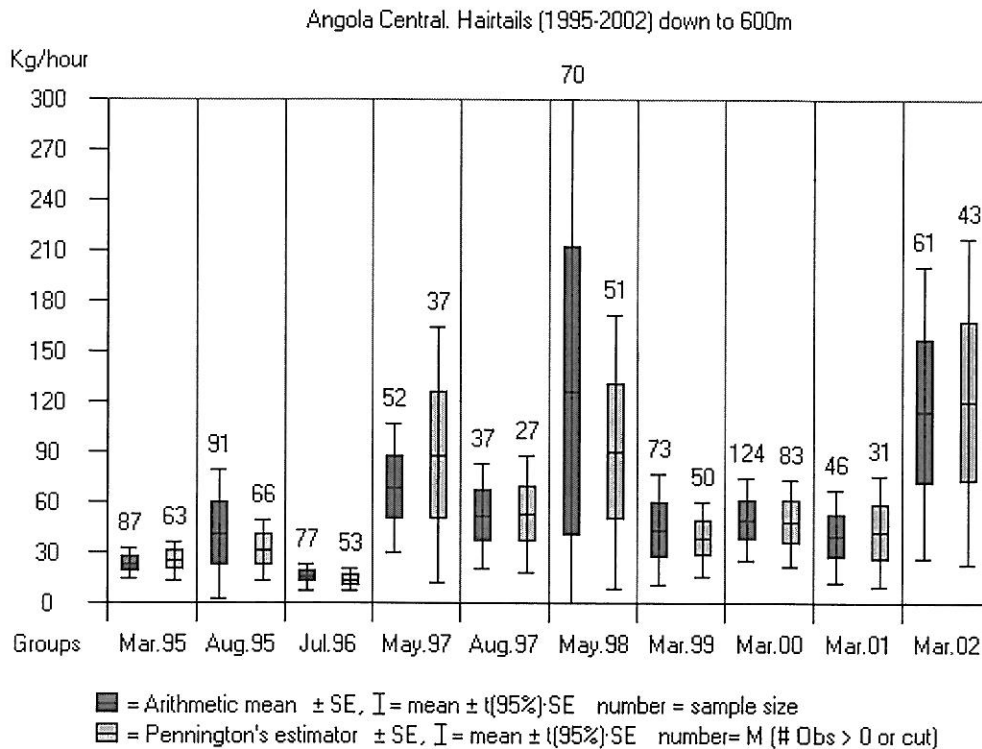
Figure 4.5 Mean catch rates of Atlantic bumper (*Chloroscombrus chrysurus*) on the central Angolan shelf (20-100 m).



**Figure 4.6.** Mean catch rates of the family Carangidae, not including *Cunene* horse mackerel (*Trachurus trecae*), on the central Angolan shelf (20-200 m).



**Figure 4.7.** Mean catch rates of the family Sphyraenidae (barracudas), on the central Angolan shelf (20-200 m).



**Figure 4.8.** Mean catch rates of the family Trichiuridae (hairtail) in the central Angolan region (down to 600 m).

Figures 4.4-4.8 show that the mean catch rates of the pelagic groups have been fluctuating over the years with large confidence intervals. The catch rates of *Cunene* horse mackerel seem to explain most of the variation in the overall 'pelagic group' (Fig. 4.3). The 'other' carangids (i.e. all except *Cunene* horse mackerel) seem to have a more stable pattern than those of the horse mackerel. Hairtails seems to have changed little, except for the two high mean catch rates observed in 1998 and in 2002.

It should be noted that the "sample number" given in the figures above the Pennington estimator indicates the number of observations above zero (or above the truncate level of very small catches, see ANNEX IV for explanation). In other words this number, compared with sample number given above the arithmetic mean estimator, provides an indication of the encounter rate relative to the total number of samples (i.e. frequency of occurrence). For many of the previous cruises (not taking into account the August 1995 and August 1997 surveys) the 'encounter rate' of both 'other carangids' and barracudas seems very low, but with higher catches during the warm season (March).

#### *Demersal groups*

Table 4.7 presents the catch rates of the most valuable demersal species on the shelf down to 200 m grouped into 'families': seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*), and croakers (Sciaenidae).

Like in previous surveys seabreams was the main demersal group on both the inner and outer shelf. The average catch rates were slightly higher than those obtained in 2001 but about 50% of 2000 estimates on the inner shelf. *Dentex macrophthalmus* was the dominating species followed by *Pagellus bellottii*, *D. congoensis*, *D. angolensis* and *D. barnardi*. The second most important demersal family was grunts, and consisted mainly of *Pomadasys incisus*, *P. jubelini* and *P. peroteti*. Croakers, mainly *Umbrina canariensis*, *Atractoscion aequidens* and *Pseudotolithus senegalensis* and *P. typus* were also common. This group appears consistently to have an extremely skewed, or sometimes bimodal, catch distribution, resulting in very large confidence intervals (Fig. 4.9). The overall mean catch rates appear to be constant over the last years.

Like in previous surveys snappers were rare, found only in one station on the inner shelf. Groupers, mainly *Epinephelus aeneus*, were more abundant compared to 2001, especially on the inner shelf (Fig. 4.10).

**Table 4.7.** Central region March 2002. Catch rates (kg/hour) of valuable demersal species grouped by families. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

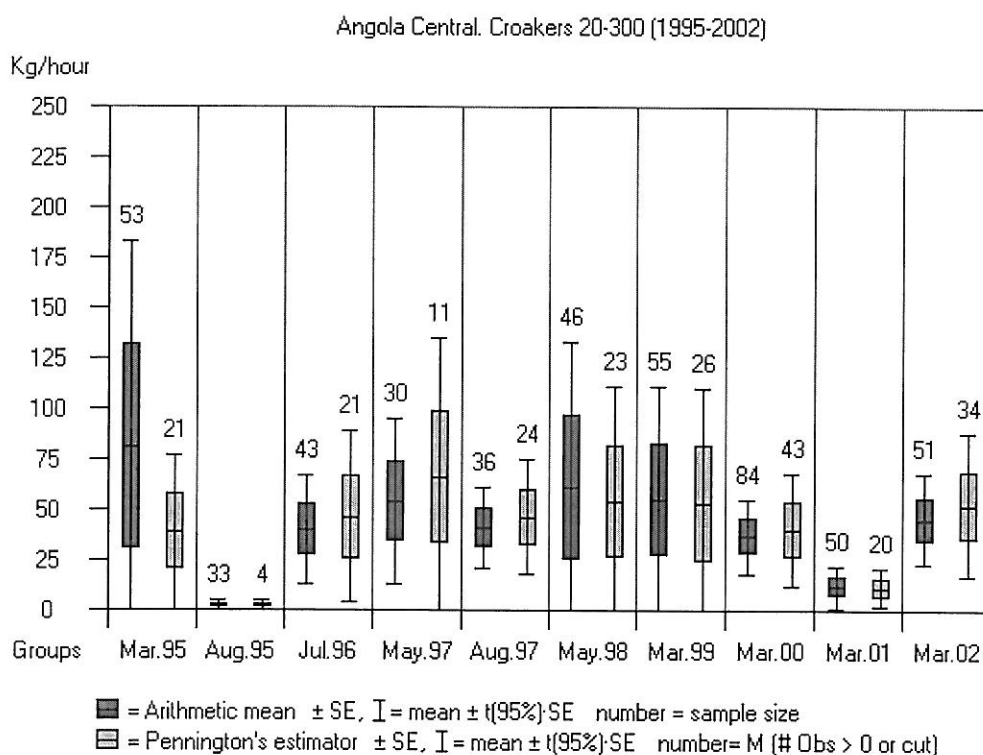
A. Inner shelf 20-70 m								
STAT	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
2703	66	426.4		48.0	188.0	68.8	1 930.9	2 662.1
2706	46	17.7			231.6	90.7	2 632.1	2 972.1
2716	52	20.6			2.7	1.8	1 526.9	1 552.0
2717	27	2.6			2.8		140.4	145.9
2718	66	234.0			4.2	3.7	783.7	1 025.6
2725	59	403.6			12.7		2 527.4	2 943.8
2726	42	24.1			137.3	2.1	98.5	261.9
2727	28				3.6	96.8	338.9	439.3
2729	21						8.7	8.7
2734	38				69.5	43.7	543.3	656.5
2735	53				29.2	209.8	5 732.4	5 971.4
2737	30	0.4			16.2	65.8	533.9	616.3
2738	47	27.7			54.1	92.5	363.4	537.7
2747	49	68.0		9.5	36.7	8.2	808.8	931.3
2748	31		0.3	1.9	3.4	15.6	613.8	635.0
2749	28				30.2	20.6	591.4	642.2
2750	47	4.2			2.6	12.0	359.8	378.6
2759	60	54.6			27.6		1 150.0	1 232.1
2760	34				292.2	113.2	11 322.0	11 727.4
2761	31				72.0	18.5	5 249.7	5 340.2
2766	51	28.6			10.1	21.3	404.2	464.1
2767	26	15.5		1.7	19.0	14.3	90.2	140.7
2768	26	4.3			15.0		716.6	735.9
MEAN	41.7	57.9		2.7	54.8	39.1	1 672.5	1 827.0
SE	2.9	25.7		2.1	16.8	11.0	542.0	559.7
% CATCH		3.2		0.1	3.0	2.1	91.5	

**Table 4.7 ...continued..**

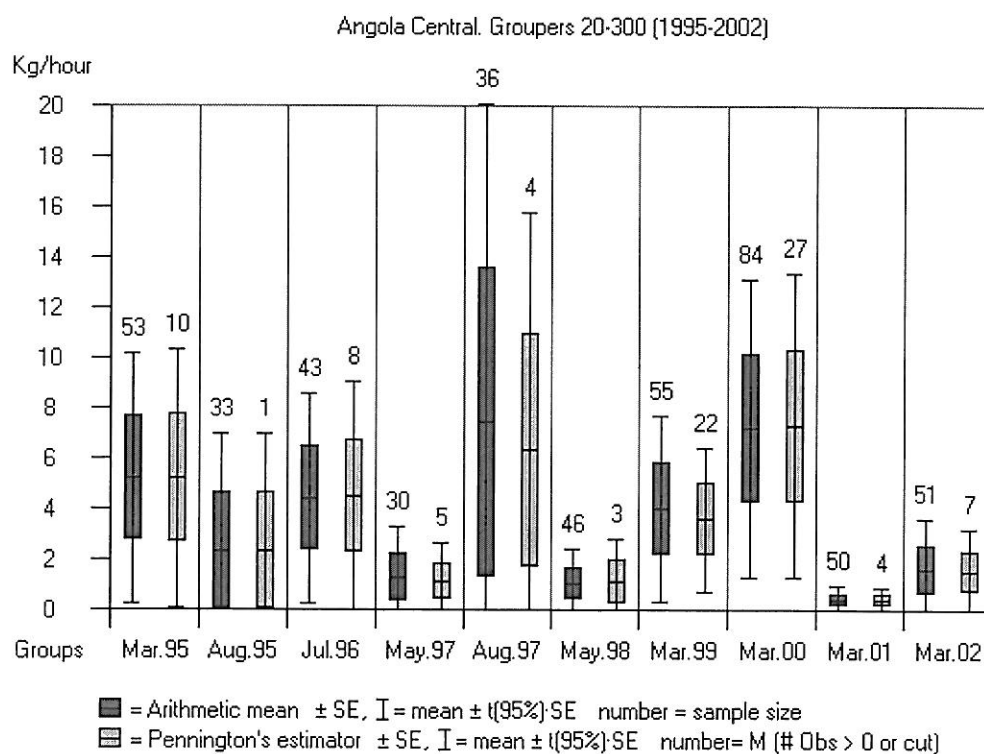
## B. Outer shelf 71-200 m

STAT	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
2704	96.0	151.2				43.8	2 339.3	2 534.3
2705	111.0	73.0				61.8	300.2	434.9
2707	73.0	364.8			5.5	97.9	455.8	924.0
2708	97.0	143.2		14.4		163.8	40.4	361.7
2709	112.0	413.2				263.8	234.3	911.2
2714	104.0	70.0				11.7	2 879.0	2 960.7
2715	72.0	91.2		5.5	8.4	6.6	738.0	849.7
2719	111.0	36.2				8.6	2 002.8	2 047.6
2720	161.0	36.1				50.0	554.2	640.3
2724	103.0	250.9				42.6	2 869.7	3 163.2
2730	115.0	8.9					1 470.6	1 479.5
2736	115.0	73.4				3.3	805.5	882.1
2739	91.0	291.6				413.9	3 731.7	4 437.2
2740	152.0	2 511.2					2 477.4	4 988.6
2745	131.0	234.6		2.5		21.6	935.1	1 193.8
2746	96.0	2.8				2.7	41.1	46.6
2751	71.0	335.6			5.9		1 471.6	1 813.2
2752	96.0	304.1				211.0	4 721.0	5 236.1
2753	171.0	63.3				13.7	606.8	683.8
2757	105.0	393.4					3 606.0	3 999.5
2758	86.0	8.6					591.5	600.1
2762	94.0	132.7					467.7	600.4
2765	113.0	1.7					3 320.3	3 322.0
2769	75.0	1.0				0.4	215.2	216.5
2770	115.0						3 083.1	3 083.1
MEAN	106.6	239.7		0.9	0.8	56.7	1 598.3	1 896.4
SE	5.2	98.6		0.6	0.4	20.5	277.1	316.4
% CATCH		12.6				3.0	84.3	

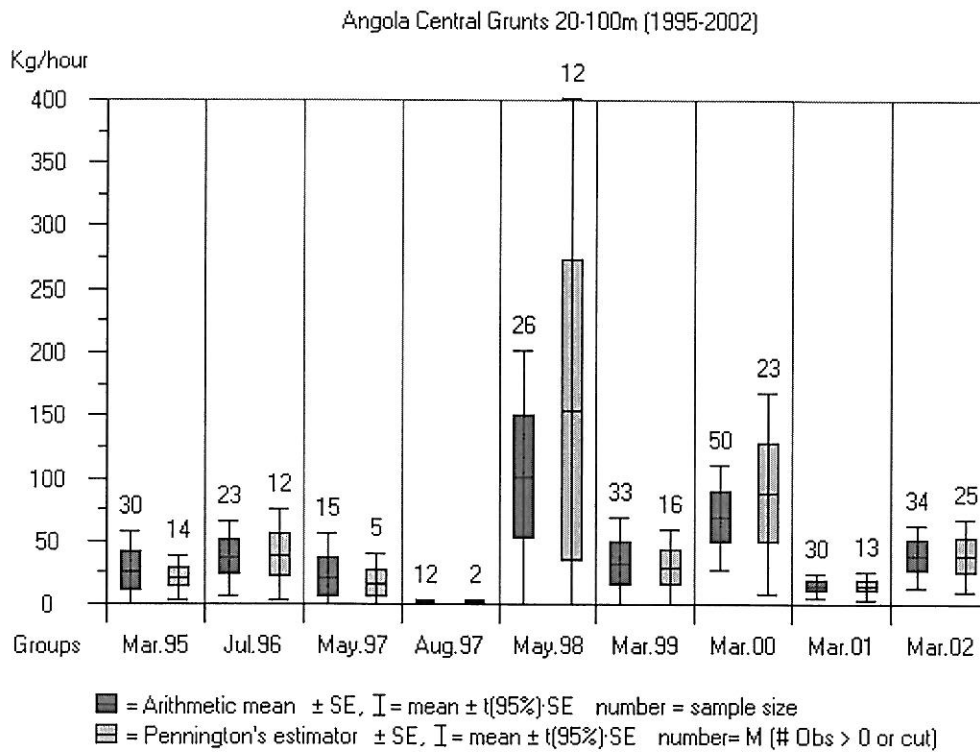
Figure 4.11 shows a time series of the catch rates of the family Haemulidae (grunts) in the central Angolan region from 20 to 100 m (the range of their distribution) over the past 9 years (the August 1995 deep-water survey not included). Differing from what was observed in most other demersal groups, there seems to be some fluctuations on the abundance of this family. The inadequate sampling and survey design for this group can not lead to firm conclusions on biomass level changes (see cruise reports 1/1999,1/2000).



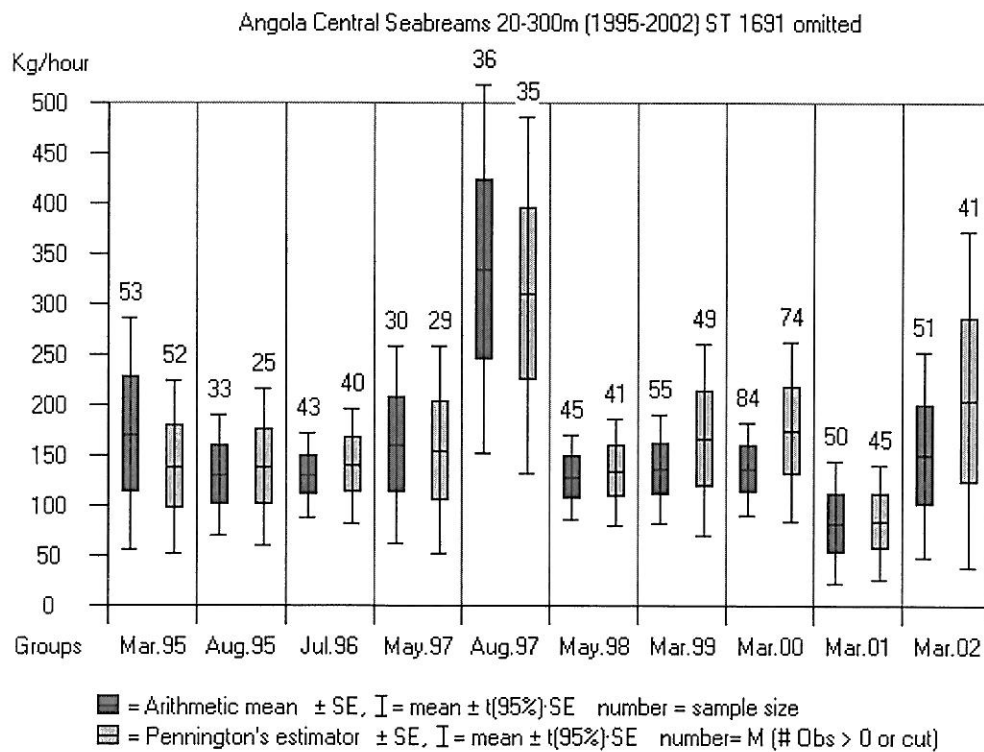
**Figure 4.9.** Mean catch rates of the family Sciaenidae (Croakers) in the central Angolan region from 20 to 300 m.



**Figure 4.10.** Mean catch rates of the family Serranidae (groupers) in the central Angolan region from 20 to 300 m.



**Figure 4.11** Mean catch rates of the family Haemulidae (Grunts) in the central Angolan region from 20 to 100 m.



**Figure 4.12.** Mean catch rates of the valuable seabreams in the central Angolan region from 10 to 300 m. Station 1691 from the May 1998 survey is omitted (see cruise report 1/2000).

Figure 4.12 shows the mean catch rates of valuable seabreams (all Sparidae except *Boops boops*) over the past 7 years. It should be noted that station 1691 from the May 1998 survey is omitted due to its likely erroneous effect on the estimate (see cruise report 1/2000). The total biomass of seabreams in the central region in 1998 was considerably higher than in the previous years (Table 4.8b), mostly due to station 1691 that contained the highest catch of demersal fish on record since 1994. Justification for omitting the station from the estimates is the high catch rate combined with this particular tow having to be interrupted due to bad bottom conditions after only 8 minutes. Nevertheless 1.6 tonnes, mainly of *D. macrophthalmus*, was landed and when raised to catch per hour it resulted in the high catch rate. If included in the estimate of 2000, it would have tripled the biomass estimates and the respective confidence limits with a factor of almost 6 (see cruise report 1/2000).

Last year (2001) the average catch rates of sea breams appeared a little bit lower (83 kg/h) than previous years (typically around 130 kg/h), while in this year's estimates the catch rates seemed somewhat higher (150 kg/h). However, there are no significant differences and this could reflect the relatively low precision of the estimates. Figure 4.12 also shows that the mean catch rate of seabreams in the August 1997 survey appear to be higher than in all other years, although there was not demonstrated a statistically significant difference. The August 1997 survey was aimed specifically at *D. macrophthalmus* in order to establish its distribution and biomass levels, and was therefore conducted between the 50 and 350 m isobaths. It should, however, be noted that although Fig. 4.12 covers the range between 20 and 300 m, the general picture would not change notably if the surveys were delimited by the 50 to 350 m depth interval instead. The August 1997 report concluded that the biomass of *D. macrophthalmus* in the central region was 22 000 tonnes. This estimate has, however, not been included in the time series (Table 4.8) due to the discrepancy between the May 1997 and the August 1997 surveys. This raises some questions to variability (seasonal) and validity of estimated densities of seabreams, as surveys, although some with different aims, but covering the same area with similar intensity and with the same gear and method, produce strikingly different catch rates in different seasons (see cruise report 1/2000).

Another problem when evaluating and comparing seabreams biomass estimates from previous surveys, is the lack of consistency in how these have been derived in terms of depth stratification and area considerations. It appears that most reports, but not all, only have used catch rates on the shelf, i.e. down to 200 m, for calculating biomass estimates of the 'shelf species'. However, the distribution of seabreams extends down to at least 300 m (see cruise report 1/2000), and when the distribution beyond 200 m is not included, about a third of the seabreams catches, and 8% of the area, are not accounted for. Furthermore, some reports have used the area in the shallowest strata from 0 to 50 m, while others are using the area from 20 to 50 m. Given these inconsistencies and the relatively large sample variance, the time series should be interpreted with caution.

Table 4.8a shows that this year's estimate of 33 700 tonnes is considerably higher than last year's estimate of 13 500 tonnes. Except for 1998 (see above), all biomass estimates from 1991 to 2000 ranged from 19 000 to 29 000 tonnes (Table 4.8b). However, these numbers probably do not reflect actual changes in the population, and are also within the confidence limits of the earlier year's estimates. The conclusion is that the catch rates of seabreams in the Luanda-Benguela region appear to have been relatively stable during the past decade.



Also the biomass estimates of the other demersal families are within the estimates from previous years. The estimated 3 900 tonnes of grunts is practically the same as last year. Disregarding the 2000 estimate, which was relatively high (6 800 tonnes), and the presumably biased 1998 value, this is more or less in line with the level in earlier years, at least back to 1995. The small biomass estimate of groupers (300 tonnes) is somewhat higher than last year's estimate (80 tonnes) and lower than the 2000 estimate (1000 tonnes), but within the confidence limits. The sum of biomass estimates of valuable demersal species is 46 000 tonnes. This is more than twice the level of last year and higher than normal. In most years from 1992 to 2000 this sum was between 31 000 and 39 000 tonnes, while last year's value was somewhat lower (19 000 tonnes).

The biomass estimate of bigeye grunt was relatively high (84 000 tonnes), but within the confidence limits of previous years. The horse mackerel estimate was, however, almost an order of magnitude larger (100 000 tonnes) than last year (16 500 tonnes). This estimate is the highest on record. The nearest estimate was in 1992 (75 000 tonnes). This estimate, must, however, not be interpreted as an increase in the stock. The confidence band is wide (50 000 to 150 000 tonnes) and the catch rate of this semi-pelagic species may well vary from year to year due to changes in the behaviour. Also, the estimates of the last pelagic survey in August 2001 indicated a low stock level for this species. The development of this stock should be monitored closely in the time to come.

Concerning the biomass estimates of the other groups and species presented in Table 4.8b, most of the results from the present survey are within the confidence limits of last years' estimates and comparable to what has been obtained in most previous years.

Figure 4.13 shows the distribution of the seabreams in the region between Benguela and Luanda. The general distribution, and areas with high concentration, is very similar to previous years.

**Table 4.8a.** Biomass estimates (tonnes) with 95% confidence limits of valuable demersal and pelagic fish by main groups on the shelf in 1999-2001, Benguela-Luanda.

Biomass in tons with 95% confidence limits ①									
	2000	2000 95% confidence limits		2001	2001 95% confidence limits		2002	2002 95% confidence limits	
Seabreams	22 452	14 731	30 173	13 594	5 029	22 160	33 744	10 639	56 850
Grunts	6 815	2 587	11 043	3 894	1 209	6 579	3 930	1 500	6 359
Croakers	5 435	2 787	8 084	1 745	255	3 236	8 062	3 896	12 228
Groupers	1 039	226	1 851	78	0	182	297	0	647
Sum demersal	35 741	24 839	46 644	19 311	10 437	28 186	46 033	15 982	76 084
Bigeye grunt	55 819	0	111 911	38 526	5 252	71 800	83 867	15 823	151 910
Horse mackerel	19 094	8 061	30 128	16 487	6 676	26 300	101 047	50 060	152 034
Other carangids	5 912	3 058	8 765	3 996	1 332	6 661	8 938	0	20 895
Barracudas	3 304	1 652	4 956	944	472	1 416	857	250	1 463
Hairtail	11 810	6 113	17 507	5 727	2 026	9 429	10 907	5 105	16 709

① Stratified biomass estimates are made from equations (1) and (4), ANNEX IV, covering the whole depth range of the distribution, ANNEX IV. Since NAN-SIS does not produce variance estimates of the mean densities (ANNEX III), the 95% confidence limits for this survey were calculated from the assumption that the coefficient of variation (SD/mean) is constant between catch rates in kg/hour and  $t/NM^2$ , in other words that the area swept (normalised per hour) is approximately constant during the survey. Coefficients of variation by depth strata for the various groups were obtained from the GRAFER module which is linked to NAN-SIS and equations (2), (3), (6) and (7) in ANNEX IV were used to calculate SE and confidence limits.

**Table 4.8b.** Biomass estimates (tonnes) of valuable demersal and pelagic fish by main groups on the shelf, by year of investigation. Benguela-Luanda.

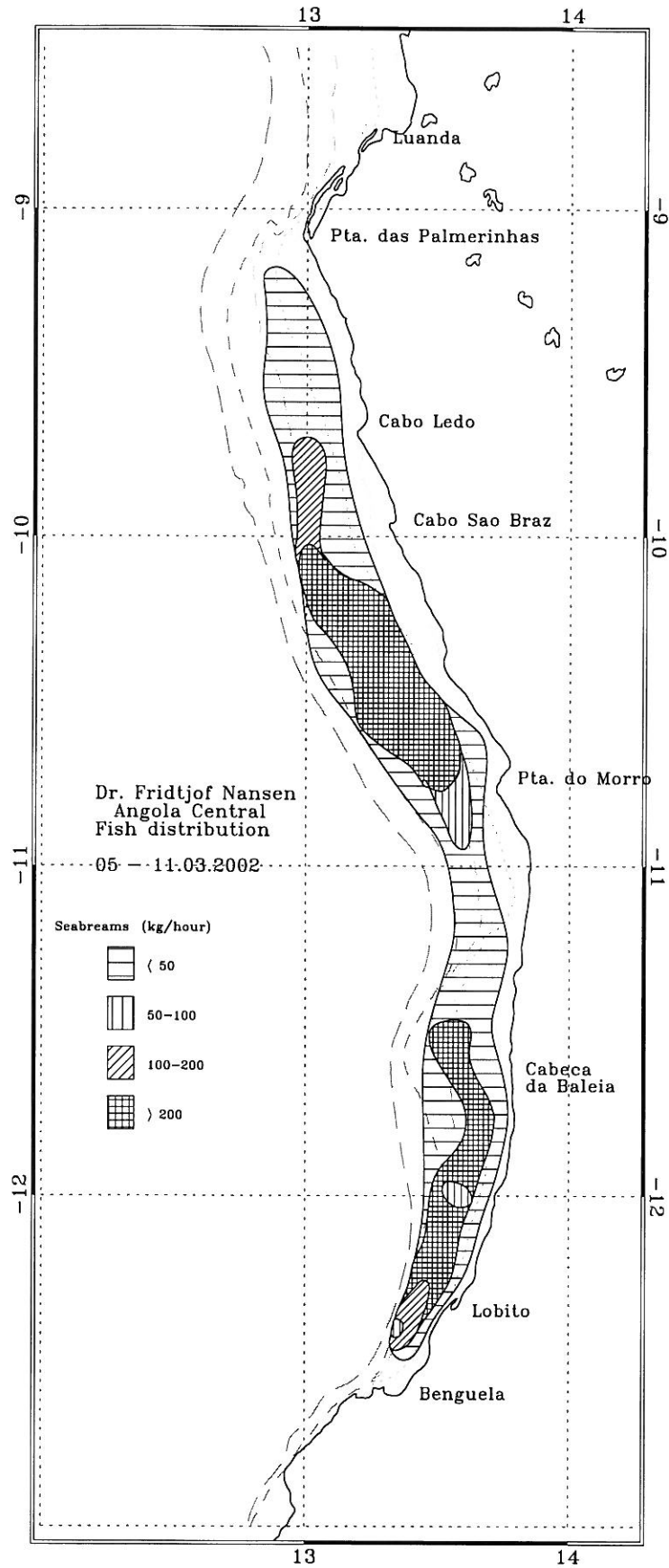
	Biomass tonnes ❖												
	1986/I ❖	1989/I ❖	1991/II ◆	1992 ◆	1994 ◆	1995 ❖	1996 ◆	1997 ◆	1998 ◆	1999 ❖	2000 ❖	2001 ❖	2002 ❖
Seabreams	9 300	11 100	24 580	28 000	29 200	21 800	19 000	21 650	*56 110	19 960	22 452	13 594	33 744
Grunts	2 700	5 600	5 500	2 000	120	3 400	5 230	2 320	*12 700	3 246	6 815	3 894	3 930
Croakers	5 500	1 450	19 000	2 000	4 010	13 290	6 140	8 490		9 907	5 435	1 745	8 062
Groupers	470	550	1 000	1 000	350	470	830	300	330	624	1 039	78	297
Sum demersal	17 970	18 700	50 080	33 000	33 680	38 960	31 200	32 760	*78 830	33 737	35 741	19 311	46 033
Bigeye grunt	44 600	18 500	18 500	52 000	2 990	29 500	31 120	44 110	34 765	93 415	55 819	38 526	83 867
Horse mackerel	21 000	7 200	48 500	75 000	65 100	4 200	37 090	42 480	5 500	12 880	19 094	16 487	101 047
Other carangids	3 100	8 500	290	1 640	2 790	8 400	5 360	16 120	2 360	7 484	5 912	3 996	8 938
Barracudas	1 900	3 000			740	2 700	1 540	4 810	755	1 573	3 304	944	857
Hairtail	17 300	12 500	4 100	1 300	26 200	5 300	5 080	23 120	47 351	7 882	11 810	5 727	10 907

❖ Note that different surveys have used different areas, depth strata, and depth limits in the biomass estimations (see text)

❖ summer season (February-March)

◆ winter season (May-September)

\* Note these figures are overestimated



**Figure 4.13.** Estimated distribution of seabreams (family Sparidae). Benguela-Luanda. Depth contours as in Fig 2.2.

### 4.3 Luanda-Congo River shelf

The present survey covered the northern region of Angola from Congo River to Luanda (Fig. 2.3). The Cabinda area is now practically inaccessible to fisheries surveys due to the increased restrictions from the oil exploitation. However, most of the previous surveys in this region also have covered the Cabinda area north to the Congo River. This difference in the survey designs should be remembered when comparing the biomass tables presented.

A total of 62 successful swept-area trawl stations were accomplished on the shelf area (20-200 m) in the northern region (Table 2.1). Table 4.9 shows the catch rates by main species groups for the inner (20-70 m) and the outer shelf (71-200 m). The group definitions are the same as for the central region and are given in ANNEX VI.

**Table 4.9.** Northern region, April 2002. Catch rates (kg/hour) by main groups in swept area bottom trawl hauls on the shelf. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

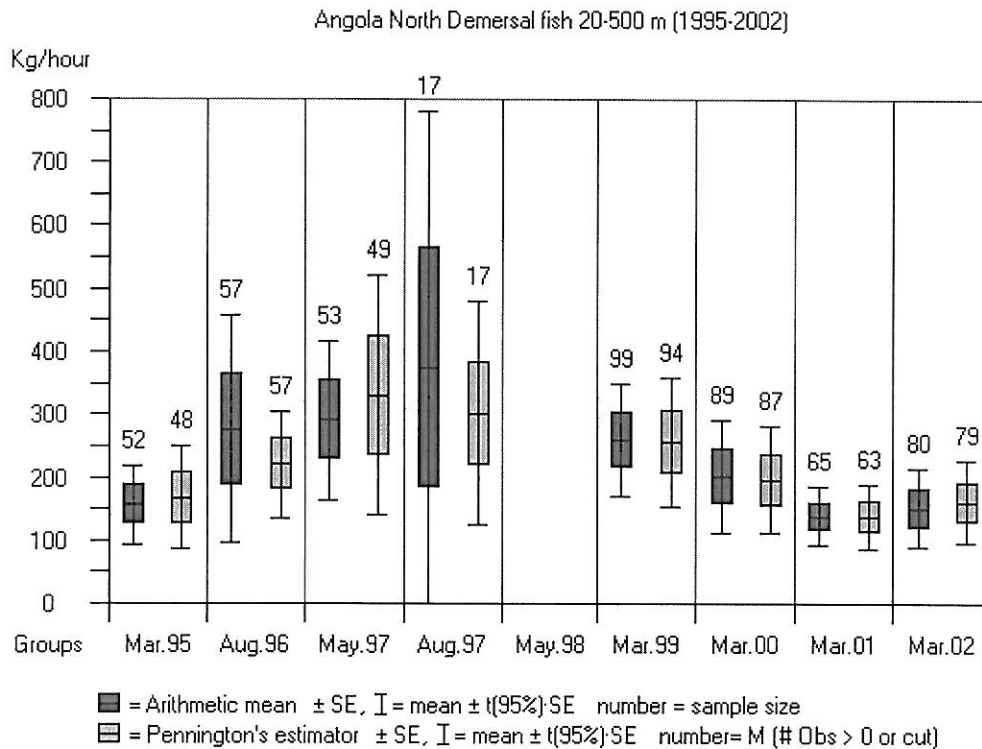
#### A. Inner shelf 20-70 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2784	56	27.7	142.2		2.6		6.1	178.7
2785	44	197.8	206.7	0.6	4.2	9.4	44.6	463.5
2786	30	188.4	164.9	0.5		15.7	68.1	437.8
2796	62	315.2	80.7		6.9		7.4	410.4
2797	44	320.8	143.4	0.9			112.1	577.4
2798	27	177.5	293.0	1.8		9.7	296.0	778.2
2806	64	1 894.2	219.4	0.3	2.4		24.8	2 141.3
2807	41	101.9	77.8	0.9			117.5	298.2
2808	27	198.1	93.6	1.7	2.7	9.8	59.3	365.5
2816	57	186.3	149.8		5.8		7.4	349.4
2817	44	426.9	344.4	0.6			22.8	794.8
2818	28	396.3	317.1	2.0			27.6	743.2
2825	69	29.3	93.6		4.8		54.1	182.0
2826	38	303.8	109.8				3.0	416.8
2827	26	20.4	16.2		0.4		2.1	39.3
2833	61	91.9	11.9				2.1	106.0
2834	42	8.1	2.9				1.1	12.2
2835	25	44.4	6.1		4.3		14.8	69.7
2836	26	109.9	128.3		10.9	9.3	22.6	281.2
2837	38	7.1	15.7				7.7	30.6
2838	48	76.7	50.2				3.2	130.3
2870	55	1 416.8	427.7		3.7		66.8	1 915.2
2877	69	243.2	242.2	0.4	0.7		46.3	533.1
MEAN	44.4	294.9	145.2	0.4	2.2	2.4	44.3	489.3
SE	3.1	94.4	24.6	0.1	0.6	1.0	13.5	112.7
% CATCH		60.3	29.7	0.1	0.4	0.5	9.0	

On the inner shelf, the 'demersal' group dominated with a contribution of about 60% of the total catches. The mean catch rate of 'the pelagic group' was higher than the one observed in 2001, but is only 55% of the value obtained in 2000. Shrimps, cephalopods and sharks were like in previous years less frequent and contribute little. (Table 4.9 b). The pelagic group was the most important on the outer shelf with a relative contribution of 27% while the 'demersal group' contributed about 10%.

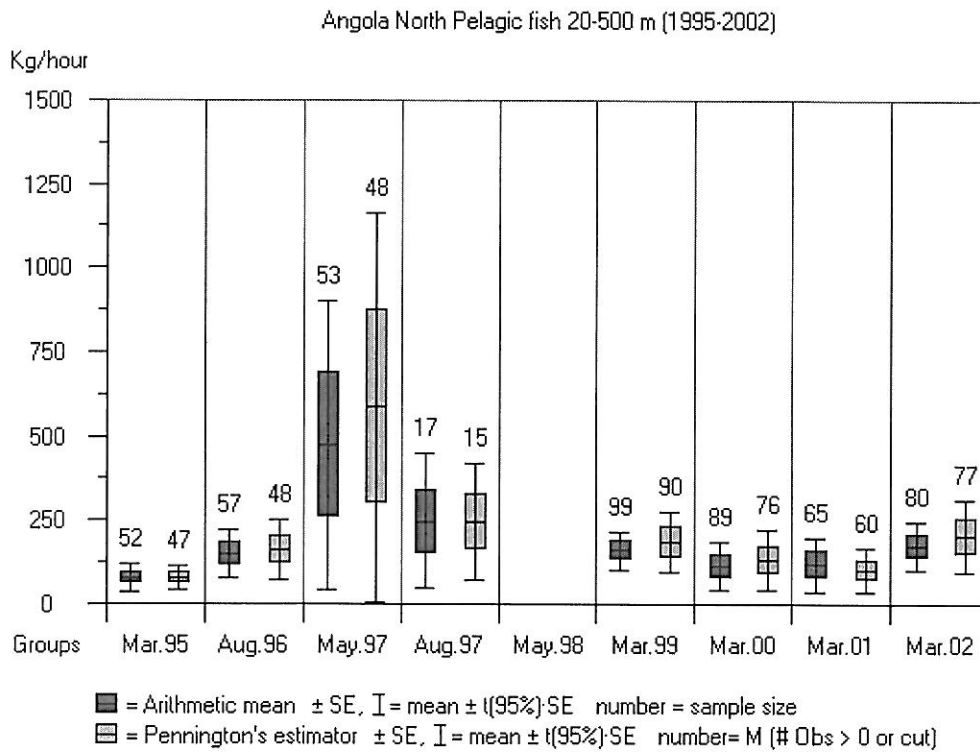
**Table 4.9...** continued.  
 B. Outer shelf 71-200 m

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2776	191	74.8	154.8		15.9		3 555.4	3 801.1
2778	148	43.4	3.1	0.4	86.7		44.1	178.0
2782	113	44.6	3.8		0.7		6.1	55.4
2787	85	17.4	2 411.2	0.1	3.3		23.4	2 455.7
2794	155	17.9			3.2		6.2	27.4
2795	112	4.2	511.3		5.3		367.4	888.3
2802	137	3.9	4.9		61.2		4.6	74.7
2803	116	53.9	4.7		0.4		4.3	63.4
2804	98	31.8	975.8		4.8		22.0	1 034.6
2805	75	103.0	114.8	0.08	4.8		9.4	232.2
2812	154		271.7		8.9		10 364.5	10 645.2
2813	105	156.9	31.3		0.5		4.7	193.6
2814	87	34.1	29.0		3.8		9.5	76.5
2815	71	51.8	4.9		3.9		9.2	70.0
2823	115	64.2	3.3		2.3		0.8	70.8
2824	91	66.9	358.5		1.1		11.2	437.8
2831	116	27.0	104.3		1.2		7.5	140.2
2832	88	118.8	271.3		7.2	1.4	20.7	419.5
2839	75	483.9	16.0				2.8	502.8
2840	124	41.8	88.3		1.1		13.8	145.2
2847	152	17.7	39.1		7.8	1.2	56.6	122.5
2848	119	35.8	243.4		3.4	1	9.0	292.8
2849	110	65.5	879.0		2.9		33.5	981.1
2850	87	299.7					6.0	305.8
2851	81	91.0	13.0		1.5		9.4	115.0
2856	139	80.6	111.4		4.9		1 442.9	1 640.1
2858	150	9.4	42.8	1.3	52.8		4 795.5	4 902.0
2859	122	139.3	132.8				21.4	293.7
2860	91	10.3	13.6		1.2		13.5	38.7
2865	121	34.6	652.5				2.7	689.9
2866	115	281.8	498.0		0.1		12.2	792.2
2867	109	41.8	71.5	0.04	1.8		4.0	119.2
2868	98	96.5	45.3	0.5	2.5		10.1	155.1
2869	80	582.3	613.0	0.06	2.2		18.2	1 215.9
2873	121	64.8	264.4		0.9		19.9	350.2
2874	106	12.4	142.9					155.3
2875	87	32.0	127.2		0.2		1.6	161.2
2876	74	387.1	125.3	4.0			17.7	534.2
MEAN	111.0	98.0	246.8	0.2	7.9	0.1	551.7	904.7
SE	4.5	21.7	71.0	0.1	3.0	0.1	308.4	311.5
% CATCH		10.8	27.3	0.0	0.9	0.0	61.0	



**Figure 4.14.** A time series of the mean catch rates of the main group “demersal” from 20 to 500 m in the Angola northern sector from 1995 to 2002.

Figures 4.14 and 4.15 show the time series of catch rates (20-500 m) for the two main groups: ‘demersal’ and ‘pelagic’ in the northern region for the bottom trawl surveys back to 1995. There was no survey of the demersal resources in 1998, and again it should be noted that the August 1997 survey was specifically aimed at the large-eye dentex (*Dentex macrophthalmus*) with sampling between 50 and 300 m only. The two figures show approximately the same pattern, i.e. a slightly increasing trend over time with somewhat higher catch rates in 1997 and a stable situation from 2000 although with lower catch rates. The overall reduced catch rates of demersal fish in north compared of those in the central region, seem to be a consistent feature for all the surveys in the northern region. Statistically, however, it appears that there are no significant differences in the catch rates between the two regions for each survey until 2000. For the “pelagic” group, the more cyclic fluctuation with a peak in 1997 observed in the central region, seems repeated in the northern region. The overall catch rates are also lower than in the central area.



**Figure 4.15.** A time series of the mean catch rates of the main group “pelagic” from 20 to 500 m in the Angola northern sector from 1995 to 2002.



*Pelagic groups*

Catch rates of the most important pelagic fish families, caught with bottom trawls during this survey, are presented in Table 4.10.

**Table 4.10.** Northern region April 2002. Catch rates (kg/hour) of main pelagic families on the shelf obtained with bottom trawl hauls. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

## A. Inner shelf 20-70 m

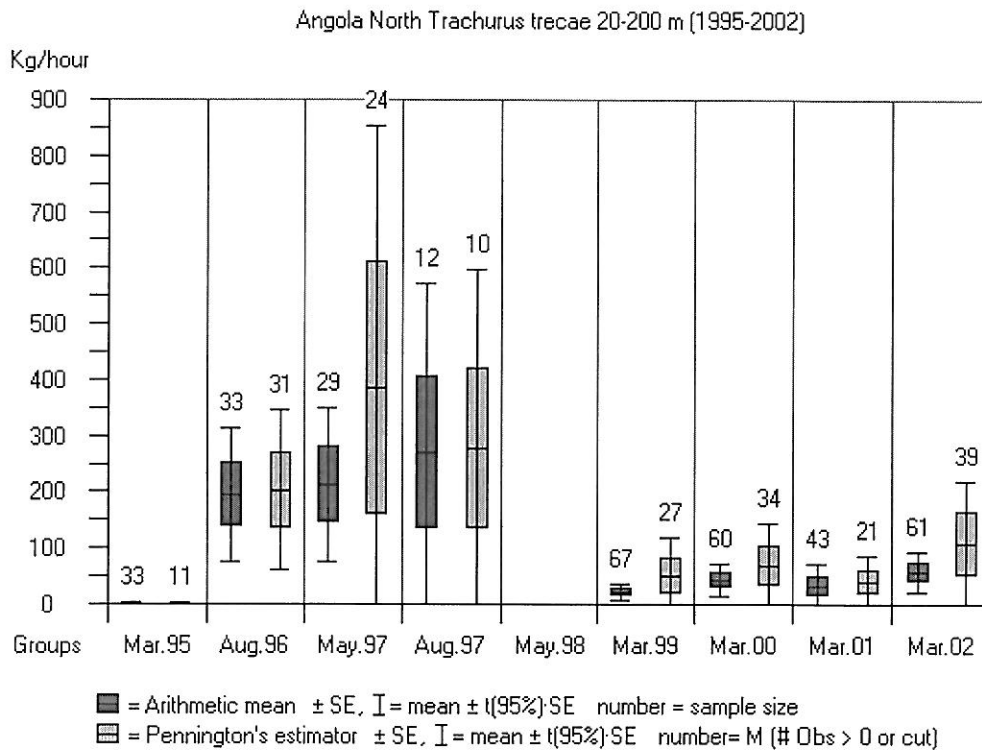
STAT	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
2784	56	7.1	105.9		21.8	7.3	36.5	178.7
2785	44	6.9	180.7		12.4	6.6	256.7	463.5
2786	30	99.0	15.8		40.7	9.2	272.8	437.8
2796	62	1.2	35.6		43.9		329.6	410.4
2797	44	22.1	34.0		87.3		433.9	577.4
2798	27	79.5	35.3		86.8	91.3	485.1	778.2
2806	64	3.7	124.7		91.0		1 921.9	2 141.3
2807	41	9.7	21.9		15.4	30.8	220.4	298.2
2808	27	56.7	10.1	1.7	14.7	10.3	271.8	365.5
2816	57	17.4	127.6			4.7	199.6	349.4
2817	44	1.2	115.9		67.8	159.5	450.3	794.8
2818	28	72.6	102.1		4.2	138.0	426.0	743.2
2825	69	12.9	58.2		21.3	1.1	88.3	182.0
2826	38		109.8				306.8	416.8
2827	26	0.1	11.8	3.1		1.1	23.0	39.3
2833	61		11.5			0.4	94.0	106.0
2834	42		1.4	1.5			9.2	12.2
2835	25		4.1			2.0	63.6	69.7
2836	26	103.1	6.1	2.1	8.5	8.2	152.8	281.2
2837	38	0.1	2.6	6.9		6.0	14.8	30.6
2838	48		46.8	1.5		1.8	79.9	130.3
2870	55	8.1	284.6		38.3	96.6	1 487.5	1 915.2
2877	69		12.4		229.8		290.8	533.1
MEAN	44.4	21.8	63.5	0.7	34.1	25.0	344.2	489.3
SE	3.1	7.1	14.8	0.3	11.0	9.9	95.7	112.7
% CATCH		4.5	13.0	0.2	7.0	5.1	70.3	

Like in the central region, carangids dominated both on the inner and outer shelf. Cunene horse mackerel (*Trachurus trecae*) was the most frequent species in the catches. Figure 4.16 and 4.17 show the average catch rates of Cunene horse mackerel and all “other carangids” on the northern shelf (20-200 m) back to 1995. Figures 4.18 and 4.19 show the average catch rates of barracudas, mainly *Sphyræna guachancho*, on the northern shelf, and the hairtails, mainly *Trichiurus lepturus*, (down to 600 m as this group is found at all depths).

Table 4.10 ...continued..

## B. Outer shelf 70-199 m

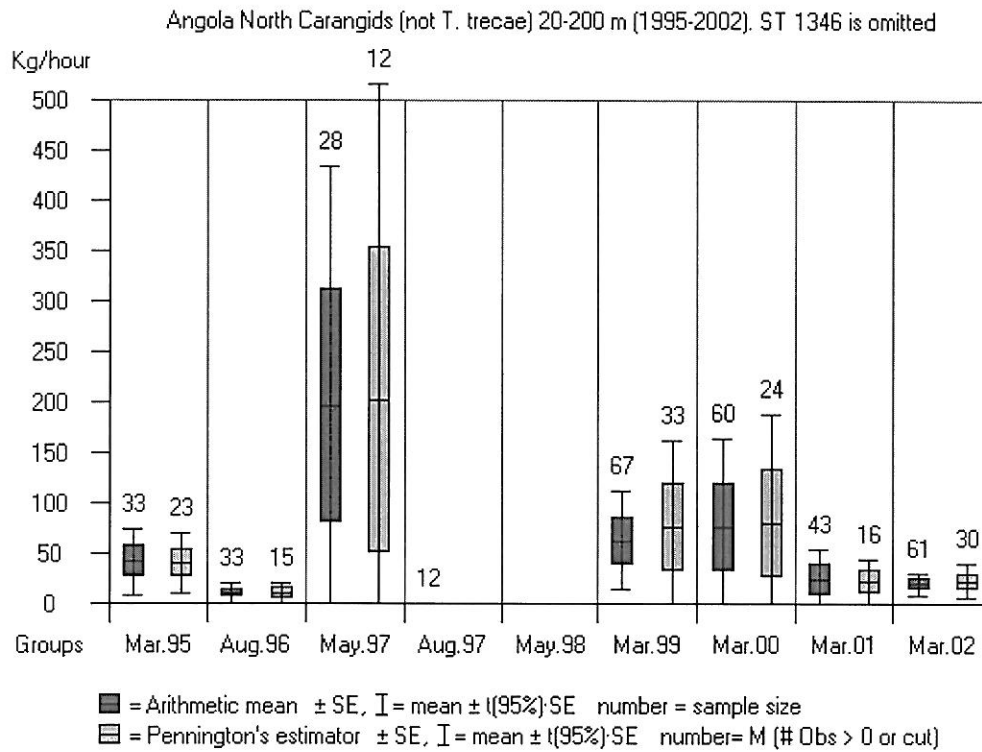
STAT	Depth	Clupeids	Carangids	Scombrids	Hairtail	Barracudas	Other	Total
2776	191	74.8	154.8		15.9		3 555.4	3 801.1
2778	148	43.4	3.19	0.4	86.7		44.1	178.0
2782	113	44.6	3.8		0.7		6.1	55.4
2787	85	17.4	2 411.2	0.1	3.3		23.4	2 455.7
2794	155	17.9			3.2		6.2	27.4
2795	112	4.2	511.3		5.3		367.4	888.3
2802	137	3.9	4.9		61.2		4.6	74.7
2803	116	53.9	4.7		0.4		4.3	63.4
2804	98	31.8	975.8		4.8		22.0	1 034.6
2805	75	103.0	114.8	0.08	4.8		9.4	232.2
2812	154		271.7		8.9		10 364.5	10 645.2
2813	105	156.9	31.3		0.5		4.7	193.6
2814	87	34.1	29.0		3.8		9.5	76.5
2815	71	51.8	4.9		3.9		9.2	70.0
2823	115	64.2	3.3		2.3		0.8	70.8
2824	91	66.9	358.5		1.1		11.2	437.8
2831	116	27.0	104.3		1.2		7.5	140.2
2832	88	118.8	271.3		7.2	1.4	20.7	419.5
2839	75	483.9	16.0				2.84	502.8
2840	124	41.8	88.3		1.1		13.8	145.2
2847	152	17.7	39.1		7.8	1.2	56.6	122.5
2848	119	35.8	243.4		3.4	1	9.0	292.8
2849	110	65.5	879.0		2.9		33.5	981.1
2850	87	299.7					6.0	305.8
2851	81	91.0	13.0		1.5		9.4	115.0
2856	139	80.6	111.4		4.9		1 442.9	1 640.1
2858	150	9.4	42.8	1.3	52.8		4 795.5	4 902.0
2859	122	139.3	132.8				21.4	293.7
2860	91	10.3	13.6		1.2		13.5	38.7
2865	121	34.6	652.5				2.7	689.9
2866	115	281.8	498.0		0.1		12.2	792.2
2867	109	41.8	71.5	0.04	1.8		4.0	119.2
2868	98	96.5	45.3	0.5	2.5		10.1	155.1
2869	80	582.3	613.0	0.06	2.2		18.2	1 215.9
2873	121	64.8	264.4		0.9		19.9	350.2
2874	106	12.4	142.9					155.3
2875	87	32.0	127.2		0.2		1.6	161.2
2876	74	387.1	125.3	4.0			17.7	534.2
MEAN	111.0	98.0	246.8	0.2	7.9	0.1	551.7	904.7
SE	4.5	21.7	71.0	0.1	3.0	0.1	308.4	311.5
% CATCH		10.8	27.3	0.0	0.9	0.0	61.0	



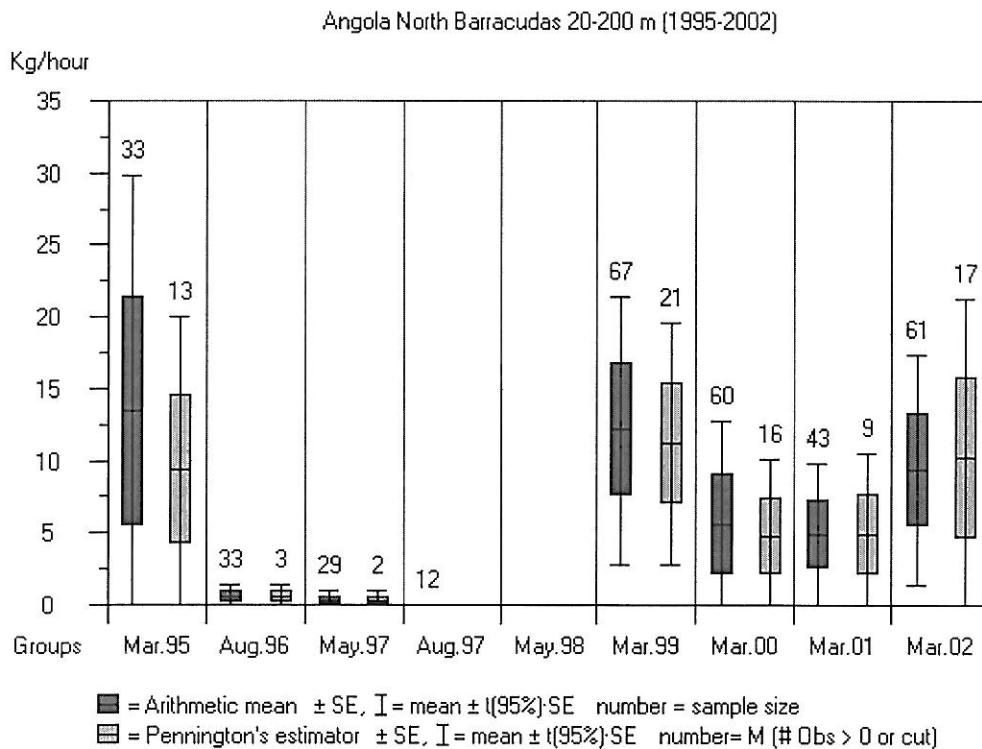
**Figure 4.16.** Mean catch rates of horse mackerel (*Trachurus trecae*) on the northern shelf 20-200 m.

The pattern in catches rates of the Cunene horse mackerel over time in the northern and central region (Fig. 4.4 and 4.16) is very similar, with a increase from 1996 to 1997 but very low catch rates in 1995 and 1998. There is a tendency of a slight increase of the catches rates from 1999 to the present. For the “other carangids” (Fig 4.6 and 4.17) there is less similarity, probably because the proportion of different species is different in the two ‘groups’. Mean catch rates seem to be fluctuating with a decreasing trend from 2000.

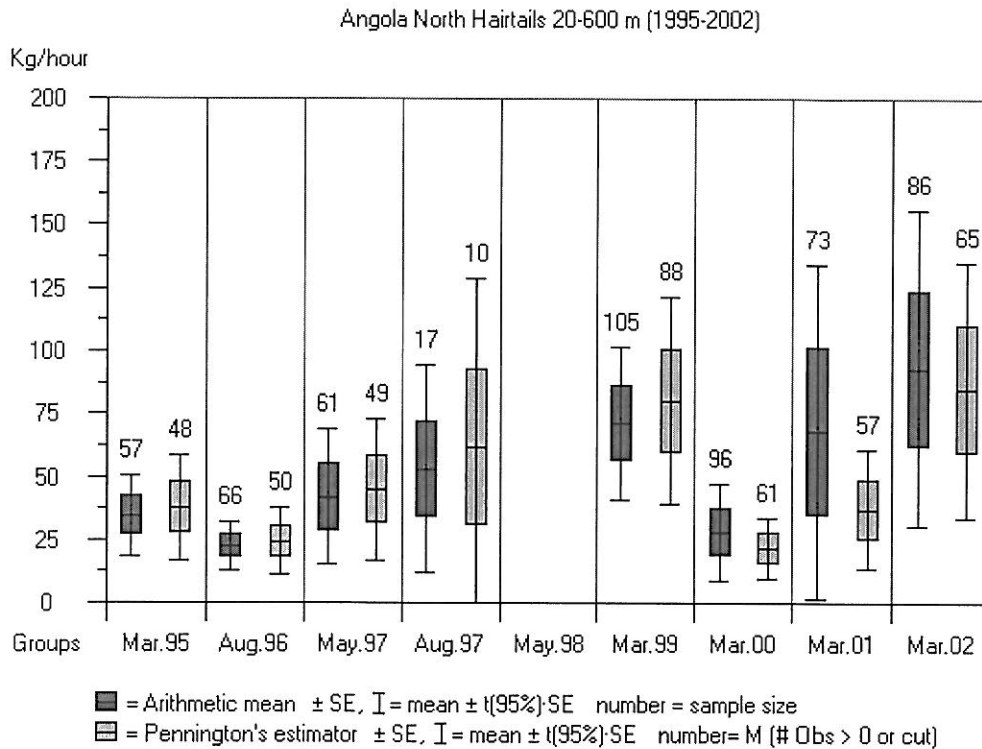
Barracudas (Fig.4.18) seem to be fluctuating with very low catch rates observed in 1996 whereas hairtails (Fig. 4.19) show a slightly increasing trend in the northern region. Biomass estimates for all the pelagic groups are presented in Table 4.12.



**Figure 4.17.** Mean catch rates of the family Carangidae, excluding *Cunene* horse mackerel (*Trachurus trecae*), on the northern Angolan shelf.



**Figure 4.18.** Mean catch rates of the family Sphyraenidae (barracudas), on the northern Angolan shelf.



**Figure 4.19.** Mean catch rates of the family Trichiuridae (hairtails) in the northern Angolan region (20-600 m).

### Demersal groups

Table 4.11 presents the catch rates of the most valuable demersal species on the shelf down to 200 m grouped into 'families': seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*) and croakers (Sciaenidae).

Among the seabreams, as during the 2001 demersal survey, *Pagellus bellottii* was the dominating species in the north (ANNEX III) followed by *Dentex congolensis*, *D. angolensis*, and *Pagrus caeruleostictus*. *Dentex macrophthalmus*, the most important seabream species in the central region, was found in small scale in the northern region during this cruise. As obtained last year the non-commercial bigeye grunt (*Brachydeuterus auritus*) was the overall most important species among the grunts. The commercially important grunts *Pomadasyss incisus*; *P. jubelini* and *P. rogeri* were very scarce. The average density of groupers, mainly *Epinephelus aeneus*, was the same as in the central region but occurred deeper (20-200 m) than in central area (20-100 m).

Croakers, mainly *Umbrina canariensis* and *Pseudotolithus typus*, were still common in the north, but with slightly lower mean densities than in the central region.

Seabreams was the main demersal group both in the inner and outer shelf. The catch rates of seabreams in the northern sector (Fig 4.23) were generally lower than those found in the central region. Otherwise, apart from the apparently distinct seasonal variation in the north,

the time series indicate, like in the central sector, a remarkable stable situation. Also the distribution pattern (Fig. 4.24) showing three main concentration areas off Cabeça da Cobra, N'zeto and Ambriz, seems consistent with previous surveys.

**Table 4.11.** Northern region. April 2002. Catch rates (kg/hour) of valuable demersal species grouped by families. A: Inner shelf (20-70 m), B: Outer shelf (71-200 m).

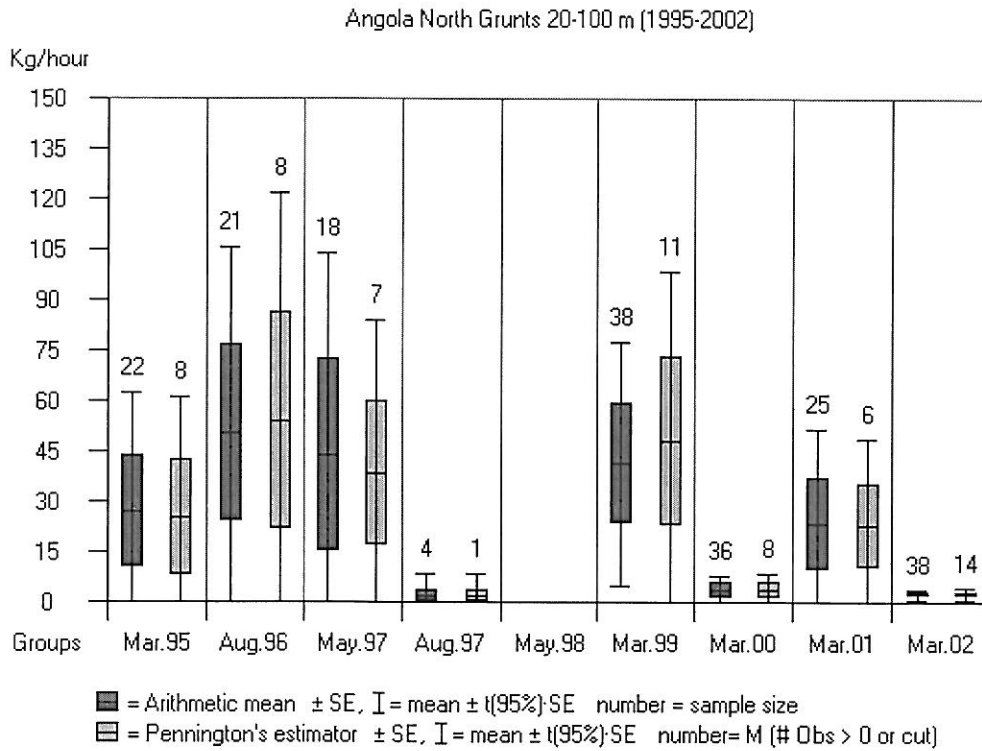
A. Inner shelf 20-70 m

STAT	Depth	Seabream	Snappers	Groupers	Grunts	Croakers	Other	Total
2784	56	3.9				13.9	160.9	178.7
2785	44	4.1			3.04	12.9	443.3	463.5
2786	30			1.6	18.8	28.0	389.1	437.8
2796	62	4.3				3.76	402.2	410.4
2797	44	2.4				4.8	570.1	577.4
2798	27				7.6	82.4	688.1	778.2
2806	64	37.0				23.9	2 080.4	2 141.3
2807	41	3.3			0.4		294.4	298.2
2808	27				13.3	98.4	253.7	365.5
2816	57	182.3			0.7		166.3	349.4
2817	44					16.5	778.2	794.8
2818	28	15.0			4.5	4.4	719.1	743.2
2825	69	10.8			3.52	5.2	162.4	182.0
2826	38	282.0	21.8				112.8	416.8
2827	26	20.4					18.8	39.3
2833	61	57.5			1.3		47.0	106.0
2834	42	5.5		2.3			4.3	12.2
2835	25	44.3					25.3	69.7
2836	26	23.8			4.7	39.0	213.5	281.2
2837	38	3.4					27.1	30.6
2838	48	76.7					53.5	130.3
2870	55	10.1					1 905.0	1 915.2
2877	69	23.1			1.2	209.0	299.6	533.1
2784	56	3.9				13.9	160.9	178.7
2785	44	4.1			3.0	12.9	443.3	463.5
MEAN	44.4	35.3	1.0	0.2	2.6	23.6	426.8	489.3
SE	3.1	14.0		0.1	1.0	10.0	114.1	112.7
% CATCH		7.2	0.2	0.0	0.5	4.8	87.2	

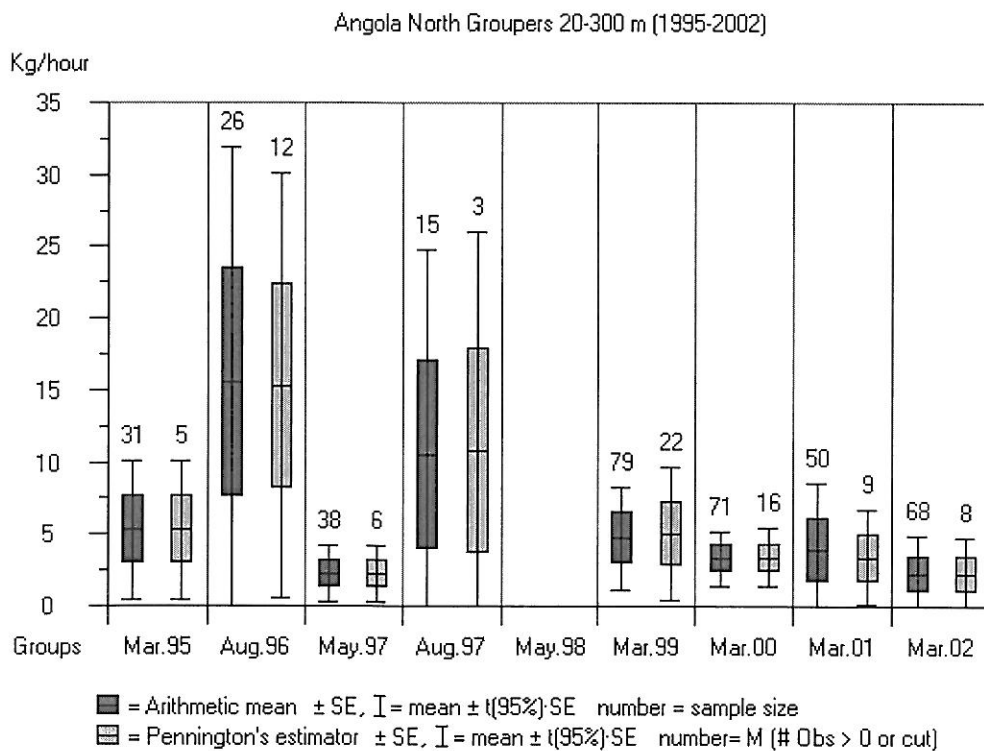
Table 4.11... continued..

## B. Outer shelf 71-200 m

STAT	Depth	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
2776	191	23.9				16.5	3 760.5	3 801.1
2778	148	34.7				3.9	139.2	178.0
2782	113	35.1				7.6	12.5	55.4
2787	85	2.4				1.4	2 451.8	2 455.7
2794	155	14.8					12.5	27.4
2795	112	0.9				1.4	885.8	888.3
2802	137	3.9					70.7	74.7
2803	116	50.4				1.3	11.6	63.4
2804	98	5.2				1.1	1 028.1	1 034.6
2805	75	64.9			12.3	0.7	154.1	232.2
2812	154						10 645.1	10 645.2
2813	105	29.5		79.8		39.6	44.6	193.6
2814	87	6.0		15.0	9.1	3.8	42.4	76.5
2815	71	50.3			1.5		18.1	70.0
2823	115	46.0		18.2			6.5	70.8
2824	91	33.9					403.9	437.8
2831	116	17.7				8.0	114.3	140.2
2832	88	117.1					302.4	419.5
2839	75	483.9					18.8	502.8
2840	124	29.5					115.6	145.2
2847	152	16.6					105.8	122.5
2848	119	34.1					258.6	292.8
2849	110	65.4					915.6	981.1
2850	87	149.2				150.5	6.0	305.8
2851	81	81.3		6-0	0.9		26.8	115.0
2856	139	12.7				39.2	1588.1	1 640.1
2858	150	9.4					4 892.5	4 902.0
2859	122	126.4		8.8			158.3	293.7
2860	91	10.3					28.4	38.7
2865	121	34.4					655.4	689.9
2866	115	262.4					529.8	792.2
2867	109	13.4					105.7	119.2
2868	98	7.7					147.4	155.1
2869	80	155.1				26.7	1 033.9	1 215.9
2873	121	61.1					289.0	350.2
2874	106	5.3				7.0	142.9	155.3
2875	87	25.4				3.5	132.2	161.2
2876	74	237.0		24.7		100.8	171.7	534.2
MEAN	113.1	97.1		3.1	1.9	9.7	354.4	466.3
SE	5.2	22.1		1.2	1.9	4.1	110.8	113.4
% CATCH		20.8		0.7	0.4	2.1	76.0	

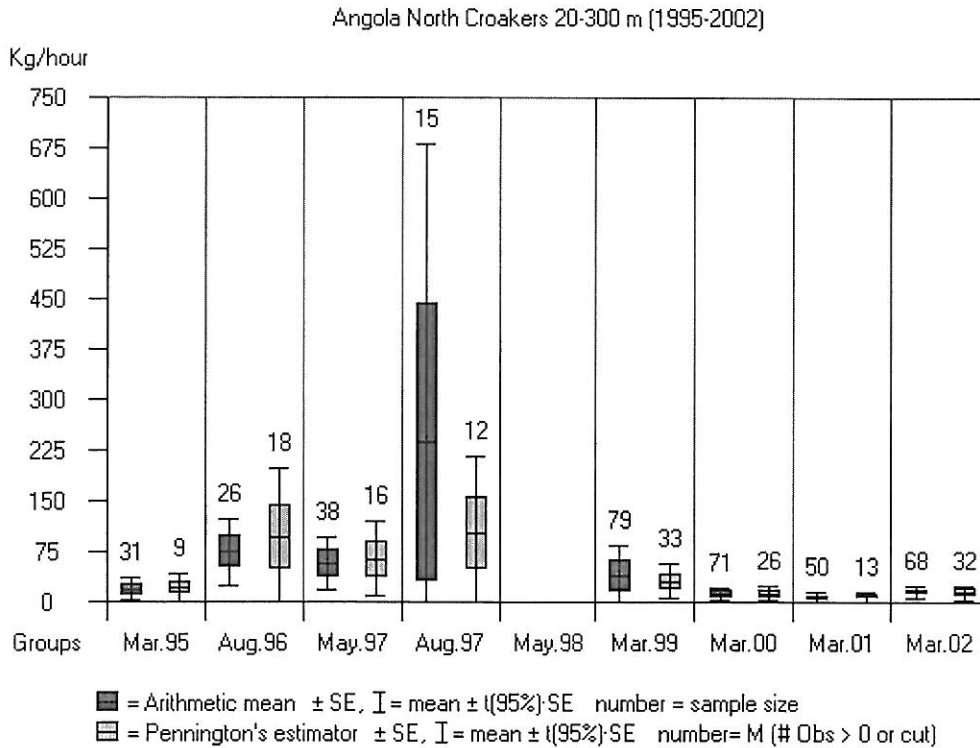


**Figure 4.20.** Mean catch rates of the family Haemulidae (grunts) in the northern Angolan region from 20 to 100 m.

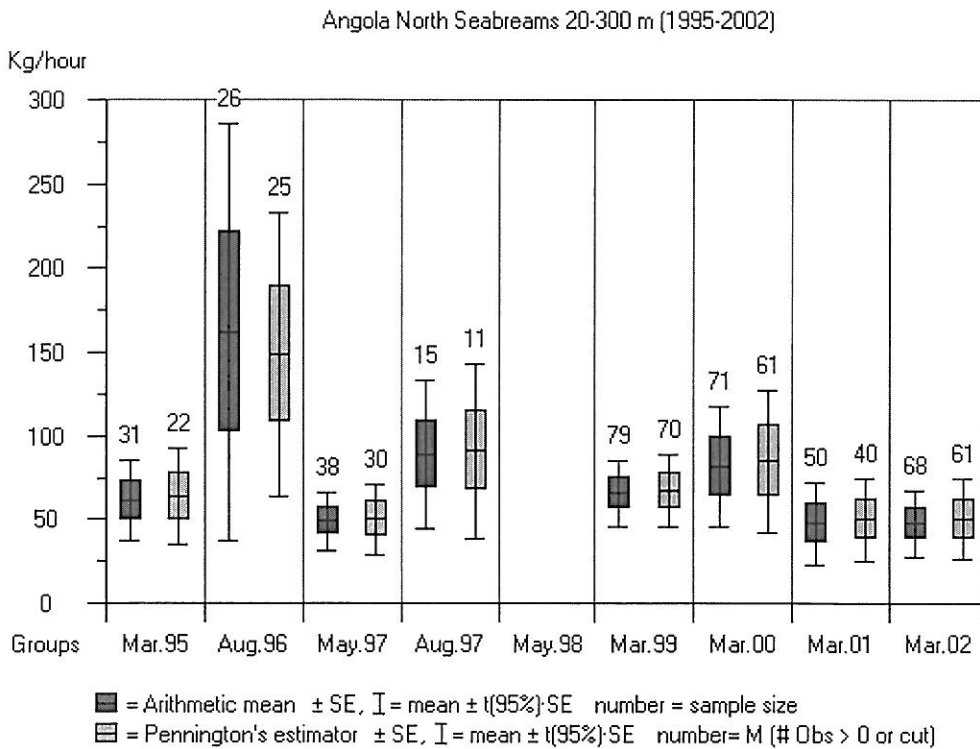


**Figure 4.21.** Mean catch rates of the family Serranidae (groupers) in the northern Angolan region from 20 to 300 m.

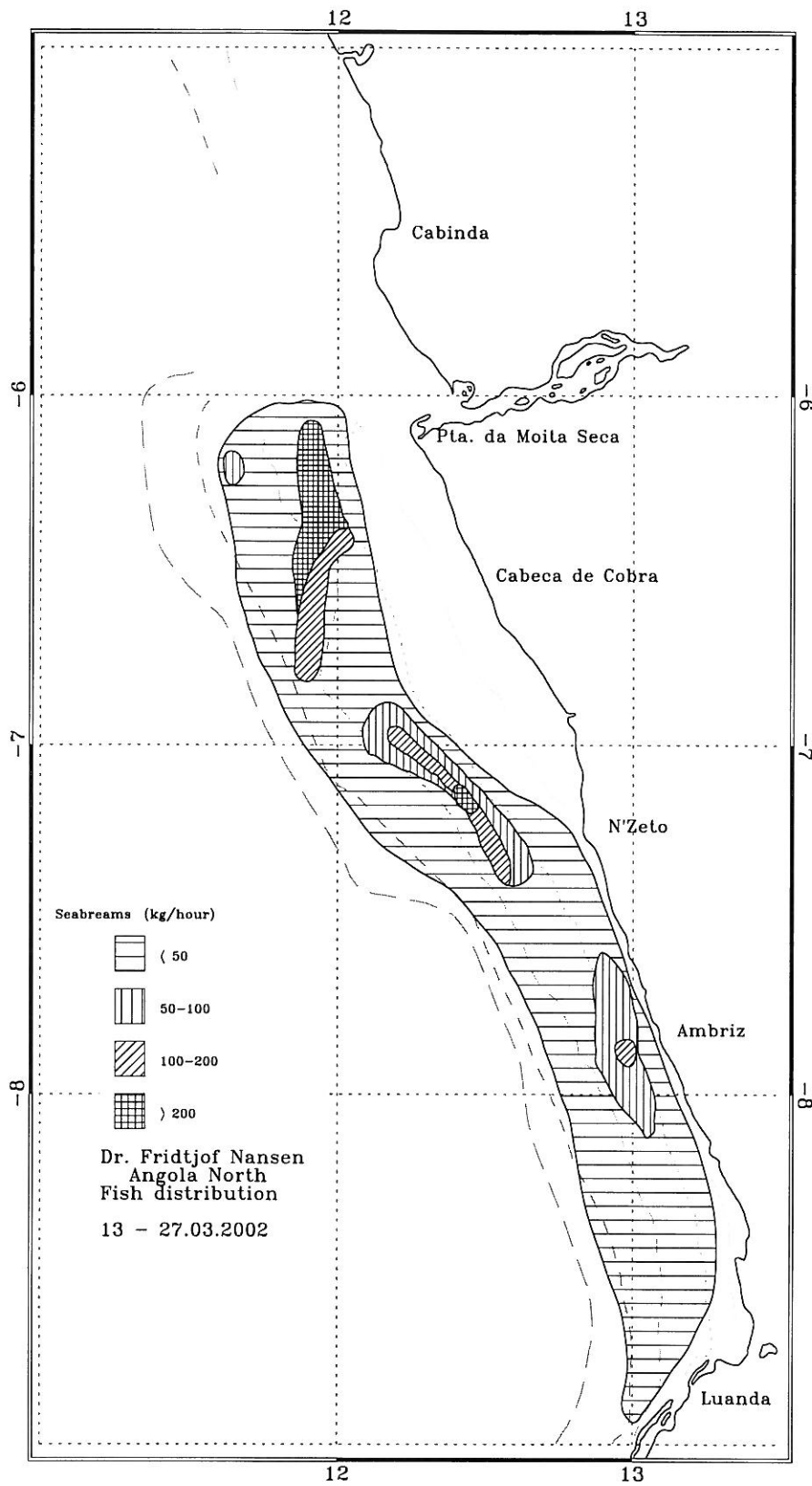




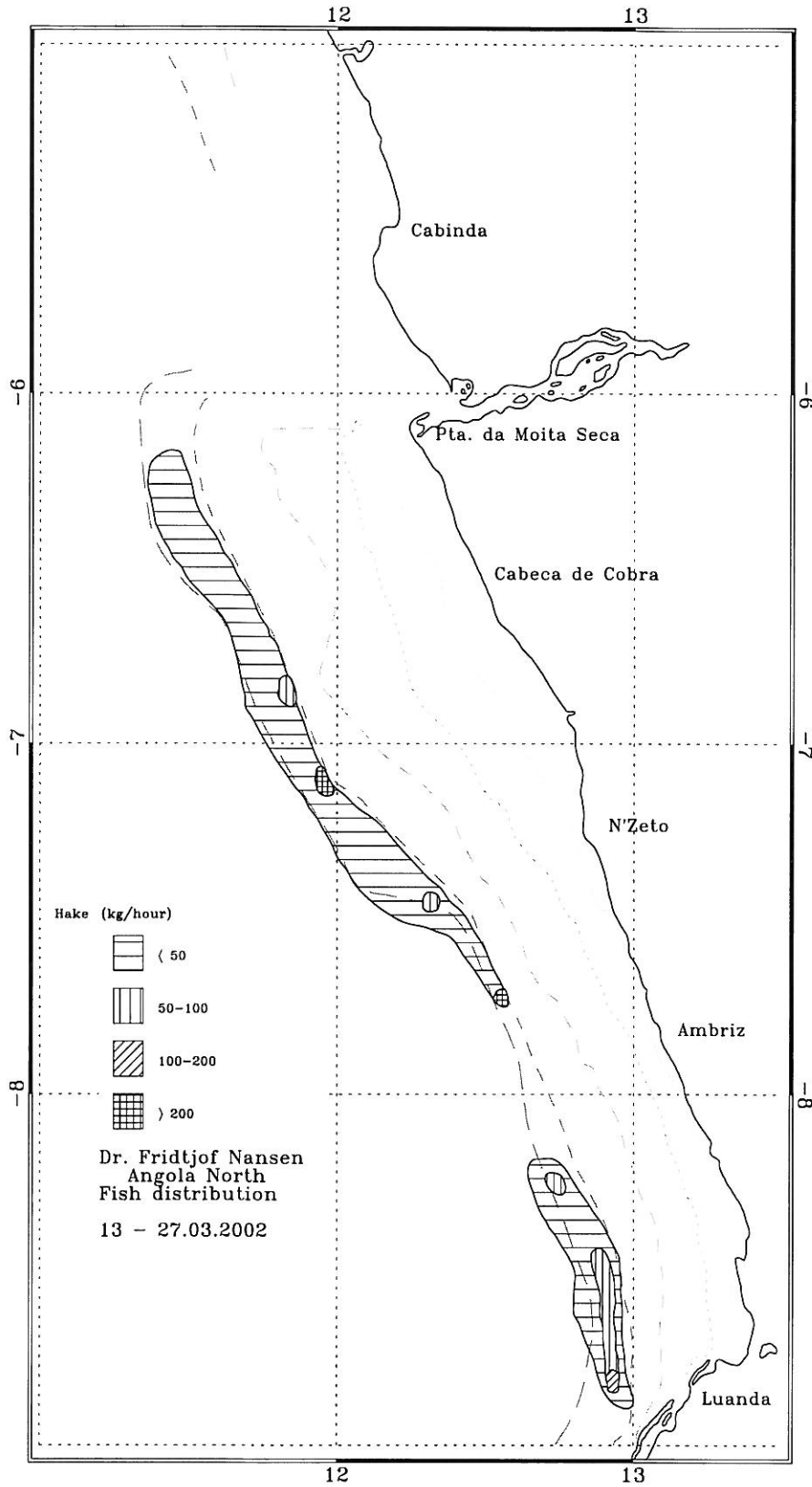
**Figure 4.22.** Mean catch rates of the family Sciaenidae (croakers) in the northern Angolan region from 20 to 300 m.



**Figure 4.23.** Mean catch rates of the valuable seabreams in the northern Angolan region from 20 to 300 m.



**Figure 4.24.** Estimated distribution of seabreams (family Sparidae). Luanda-Congo River. Depth contours as in Fig. 2.2.



**Figure 4.25.** Estimated distribution of Benguela hake (*Merluccius polli*). Luanda-Congo River. Depth contours as in Fig. 2.2

Biomass estimates of the commercially important demersal groups in the northern region are presented in Table 4.12. Most of the estimates are similar to previous surveys and within the confidence intervals. The slightly increase of the biomass estimates of “sum demersal” from 2000 and may be due to the contribution of the grunts that shows the highest biomass estimate of the time series, however the main resources seems to be in a stable situation..

**Table 4.12a.** Biomass estimates (tonnes) with 95% confidence limits of valuable demersal and pelagic fish by main groups on the shelf in 1999-2001, Luanda-Congo River.

Biomass in tonnes with 95% confidence limits ①									
	2000	2000	95%	2001	2001	2002	2001		
		confidence limits	confidence limits		95% confidence limits		95% confidence limits		
Seabreams	15 211	8 983	21 439	9 550	5 072	14 028	7 523	4 479	10 566
Grunts	380	0	838	3 475	579	6 371	11 584	43	23 125
Croakers	2 476	557	4 396	1 500	243	2 757	2 838	1 105	4 571
Groupers	639	288	991	347	0	711	315	49	581
Sum demersal	18 707	12 427	24 987	15 318	7 002	22 741	19 898	5 975	33 820
Bigeye grunt	22 774	3 705	41 844	12 631	423	2 446	15 782	3 353	28 212
Horse mackerel	5 373	1 634	9 113	5 490	490	11 469	2 311	1 028	3 594
Other carangids	17 850	0	37 491	4 068	1 182	9 317	3,163	892	5 434
Barracudas	1 164	0	2 761	863	105	1 620	867	141	1 592
Hairtail	5 690	1 384	9 995	17 789	2 994	38 572	22 037	7 290	36 784

**Table 4.12b.** Biomass estimates (tonnes) of valuable demersal and pelagic fish by main groups on the shelf, by year of investigation. The surveys between 1986-1997 covered the area from Luanda to Cabinda. The 1999, 2000-2002 surveys covered the area Luanda to Congo River, and in 2001 Luanda to north of Cabeça de Cobra.

	Biomass tonnes												
	1986/I ⊙	1989/I ⊙	1991/II ◆	1992 ◆	1994 ◆	1995 ⊙	1996 ◆	1997 ◆	1998 ◆	1999 ⊙	2000 ⊙	2001 ⊙	2002 ⊙
Seabreams	14 700	9 500	16 500	16 000	*31 200	10 100	*30 200	12 130	13 670	15 211	9 550	7 523	
Grunts	1 400	840	2 900	1 000	900	4 200	11 200	10 460	No Survey	5 630	380	3 475	11 584
Croakers	5 200	4 600	15 600	14 000	6 100	4 100	11 600	10 050	8 641	2 476	1 500	2 838	
Groupers	740	950	940	3 000	3 200	900	3 700	670	1 020	639	793	315	
Sum demersal	22 040	15 900	35 940	34 000	41 400	19 300	56 700	33 310	28 961	18 707	15 318	19 898	
Bigeye grunt	42 800	6 900	19 700	21 000	17 100	21 200	57 800	76 610	37 669	22 774	12 631	15 782	
Horse mackerel	11 900	9 300	12 000	20 000	18 500	600	44 700	50 950	4 170	5 373	5 490	2 311	
Other carangids	8 900	1 650	860	4 000	13 300	11 800	3 200	*143 790	12 409	17 850	3 823	3 163	
Barracudas	1 800	900	-	1 000	820	4 100	200	120	2 371	1 164	863	867	
Hairtail	9 600	2 200	8 300	7 000	8 900	11 200	6 700	9 190	16 931	5 690	17 789	22 037	

◆ Note that different surveys have used different areas, depth strata, and depth limits in the biomass estimations (see text)

⊙ summer season (February-March)

◆ winter season (May-September)

\* Note these figures are probably overestimated

① Stratified biomass estimates are made from equations (1) and (4), ANNEX IV, covering the whole depth range of the distribution, ANNEX IV. Since NAN-SIS does not produce variance estimates of the mean densities (ANNEX III), the 95% confidence limits for this survey were calculated from the assumption that the coefficient of variation (SD/mean) is constant between catch rates in kg/hour and  $t/NM^2$ , in other words that the area swept (normalised per hour) is approximately constant during the survey. Coefficients of variation by depth strata for the various groups were obtained from the GRAFER module which is linked to NAN-SIS and equations (2), (3), (6) and (7) in ANNEX IV were used to calculate SE and confidence limits.

#### 4.4 Review of results

Tables 4.4, 4.8.b and 4.12b give the time series of biomass estimates of the most important 'inshore' species for the southern, central and northern regions, respectively. Except for the seabreams in the central region in 1998 and this year (2002) and for grunts in 1998, the estimates of the demersal' species are close to the previous years and contained within the 95% confidence intervals estimated for this year in both the northern and central regions.

There is perhaps a slightly increasing trend in the overall demersal biomass over the past 5 years, but all the valuable species seem to have remained stable.

For the 'pelagic' species there is more variation, particularly for horse mackerel, barracudas, and hairtails, although few of the changes are statistically significant. Still, the pelagic species appear to be more influenced by the oceanographic conditions, with horse mackerel fluctuating negatively with the warm, low salinity events in 1995, 1999 and in 2001, while 'other' carangids and barracudas are fluctuating in opposite phase. The high value estimated in south (Cunene-Benguela) this year might be biased as explained before due to few exceptionally large catches.

As it has been emphasized in previous reports, there is an urgent need to reassess the biomass figures in a standardised way, using the same areas, depth stratification, distribution ranges, and with proper confidence intervals.

## CHAPTER 5 CATCH RATES, DISTRIBUTION, COMPOSITION AND BIOMASS ESTIMATES OF DEEP-WATER SHRIMP AND HAKE (SLOPE)

The slope (from 201 to 800 m) of the central region (Benguela-Luanda) was covered with 24 swept-area hauls, and the slope of the northern region (Luanda-Congo River) was covered with 40 hauls. The distribution of the hauls by region, position and depth intervals are shown in Table 2.1 and Figures 2.2 and 2.3. The results from the swept-area analysis by region and depth intervals are presented in ANNEX III.

Tables 5.1 and 5.2 show the composition of the catches on the slope by sector and main groups, using the same group definitions as in Table 4.1 (ANNEX VI).

**Table 5.1.** Central region. March 2002. Catch rates (kg/hour) by main groups in swept-area bottom trawl hauls on the slope (201-800 m).

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2701	767.0	59.3		30.6		1.9	712.8	804.7
2702	730.0	104.4		22.5		1.1	222.8	350.8
2710	660.0	14.1	1.1	0.7	0.6		82.3	98.8
2711	576.0	14.5	10.8	34.5		0.4	139.1	199.4
2712	474.0	0.4	8.2	157.0	3.9		100.3	269.8
2713	265.0	439.6	3.2	33.2	6.9		157.3	640.2
2721	353.0	153.3		53.6		14.6	120.9	342.4
2722	673.0	20.0	2.6	41.2	10.7		309.3	383.8
2723	353.0	11.0	4.7	64.9	8.9	15.6	191.7	296.8
2732	535.0	25.9	0.8	114.0		0.6	87.7	229.0
2733	356.0	13.6	3.6	205.7	1.7	7.6	68.0	300.2
2741	334.0	251.5	1.5	22.5	3.9	0.5	472.8	752.5
2742	509.0	8.3	4.4	163.7	9.5	1.7	95.3	282.9
2743	529.0	20.4	13.2	152.6	2.9		206.5	395.6
2744	347.0	49.1		7.8	4.7	1.6	212.0	275.2
2754	617.0	4.3	7.6	24.6	2.5	3.5	112.3	154.7
2755	305.0	15.9		3.5	4.3		470.6	494.4
2756	744.0	19.7		5.8	22.7	7.3	269.8	325.2
2763	668.0	1.2	14.5	14.2		1.0	407.3	438.2
2764	539.0	50.9	13.1	5.3	2.6	3.7	58.7	134.2
2771	259.0	77.1		9.4	19.2		2 421.6	2 527.3
2772	421.0	44.1	1.9	33.7	13.3	11.8	48.8	153.6
2773	734.0	19.9		8.3			70.4	98.7
2779	705.0	51.2		24.6	52.8		225.4	354.0
MEAN	518.9	61.2	3.8	51.4	7.1	3.0	302.7	429.3
SE	34.4	20.1	1.0	12.2	2.4	1.0	98.0	98.8
% CATCH		14.3	0.9	12.0	1.7	0.7	70.5	

**Table 5.2.** Northern region April 2002. Catch rates (kg/hour) by main groups in swept area bottom trawl hauls on the slope (201-800 m).

STAT	Depth	Demersal	Pelagic	Shrimp	Cephalopods	Sharks	Other	Total
2774	326	167.4	4.0	7.4	1.9		426.9	607.8
2777	217	257.6	490.2	7.6	9.8		9 199.8	9 965.1
2779	705	51.1		24.6	52.7		225.4	354.0
2780	555	15.0	3.2	170.1	10.6		176.3	375.3
2781	406	95.5	6.9	102.3	3.6		20.1	228.5
2788	709	82.8		145.8	20.4		383.1	632.2
2789	624	35.3	9.0	179.6	9.5		332.4	566.1
2790	541	12.6	2.5	111.0			252.0	378.2
2791	447	46.3	22.0	23.9		1.4	56.3	150.0
2792	309	78.1	7.2	5.9	1.0		410.6	503.0
2793	228	53.9	36.3	2.3	0.5		286.3	379.5
2799	704	14.9		134.7	13.1		294.0	456.8
2800	621	1.95	2.1	99.4	8.8		140.7	253.1
2801	424	70.8	5.4	4.4			25.9	106.6
2809	734	1.9		17.1	4.3	7	64.6	95.0
2810	626	5.8	0.7	178.5	7.3		108.1	300.6
2811	526	2.5	16.9	98.2	0.3		30.4	148.4
2819	745	7.0		0.3	11.2	1.3	56.1	76.2
2820	624	6.4	0.9	103.0	9.6	2.4	56.4	179.0
2821	395	2.8	68.1	606.5	4.6		55.1	737.4
2822	269	221.2	32.1	12.6	5.2		883.3	1 154.6
2828	722	2.6		1.0	8.7		86.9	99.3
2829	522	29.4	73.6	4.2	2.0		22.6	132.2
2830	405	71.5		9.2	4.8		141.6	227.1
2841	232	127.3	18.6	7.5	84.5		724.7	962.8
2842	420	25.71	27.0	9.8	1.6	2.7	43.2	110.3
2843	525	21.9		100.1	4.5	2.1	84.0	212.9
2844	632	18.8		5.7	1.8		210.7	237.0
2845	313	48.4	10.2	25.9	3.6		120.6	208.8
2846	274	243.7	105.3	36.2	3.4		400.1	788.9
2852	726	5.2		1.4		2.8	92.2	101.7
2853	525	13.3		2.6	0.9		45.8	62.8
2854	442	36.4	30.6	4.9	1.5	0.2	36.9	110.7
2855	261	84.5	55.3	130.2	17.6		721.4	1 009.1
2861	712	1.9		10.3	2.6	7.1	110.7	132.8
2862	653	1.16		31.7	5.7	0.4	53.9	93.0
2863	332	8.0	16.0	21.9	1.6		185.6	233.4
2864	220	6.6	7.	3.6	5.0		235.8	258.9
2871	745	1.9		4.9		7.9	121.0	135.9
2872	384	3.1	42.8	21.6	2.3	8.0	26.5	104.4
MEAN	494.5	49.6	27.4	61.7	8.2	1.1	423.7	571.7
SE	27.9	10.6	12.5	16.7	2.4	0.4	227.4	244.9
% CATCH		8.7	4.8	10.8	1.4	0.2	74.1	

As seen from Tables 5.1 and 5.2, the general trends found on the shelf are to a large extent repeated on the slopes. The overall catch rates of the “demersal” group in the northern sector are lower than those found in the central sector while commercial “shrimp” had generally higher catch rates in the north. Also the “pelagic” group had higher catch rates in the northern sector than in the central. This general picture seems consistent with previous



surveys. In terms of “by-catch” of the commercial shrimp fisheries, the central sector ‘shrimps’ contributed 12% of the total catches on the slope, while in the northern sector this proportion is somewhat decreased to 10.8%. This is different from the common trend observed in previous surveys where the proportion in northern region is higher than in the central region.

## 5.1 Deep water shrimp

Tables 5.3 and 5.4 show the catch rates of the commercially most important demersal fish (seabream and hake), the most important shrimp species (*Parapenaeus longirostris*, *Aristeus varidens*, and *Nematocarcinus africanus*), and ‘other’ (i.e. by-catch) species on the slopes of the central and northern sectors. As elaborated in Chapter 4, seabream is also a major component on the slope down to 350 m. In the central region the average catch rate of *P. longirostris* was identical of last year’s estimate and almost twice of the estimate of 2000, while the average catch rate of *A. varidens* decreased to 50%. *Nematocarcinus africanus* was more abundant than in the previous survey.

5.3. Central region March 2002. Catch rates (kg/hour) by main commercial groups in swept-area bottom trawl hauls on the slope (201-800 m).

STAT	Depth	Seabreams	Hake	P.longirostris	A.varidens	N.africanus	Other	Total
2701	767		12.3		16.4		775.9	804.7
2702	730		98.2		15.8		236.7	350.8
2710	660		9.1		0.6		89.0	98.8
2711	576		11.3		0.08	34.4	153.5	199.4
2712	474				0.6	155.0	114.2	269.8
2713	265	309.4	130.2	33.1			167.3	640.2
2721	353		65.9	0.5	1.8	50.5	223.5	342.4
2722	673		9.97		3.4	37.0	333.4	383.8
2723	353		11.0		1.4	63.5	220.9	296.8
2732	535				2.0	112.0	115.0	229.0
2733	356		13.6	0.3	0.3	204.0	81.8	300.2
2741	334		251.4	9.0	0.6	12.7	478.5	752.5
2742	509				0.2	163.4	119.1	282.9
2743	529		1.5			152.5	241.5	395.6
2744	347		49.0	5.1	2.0		218.8	275.2
2754	617		1.5		7.1	17.2	128.8	154.7
2755	305		15.9	3.5			474.9	494.4
2756	744		6.5		4.1		314.5	325.2
2763	668		0.6		2.9		434.6	438.2
2764	539		50.8		2.6	1.3	79.3	134.2
2771	259	22.9	54.1	9.0			2 441.1	2 527.3
2772	421		44.1		5.2	28.2	75.9	153.6
2773	734		11.6		8.3		78.7	98.7
MEAN	510.8	14.4	36.9	2.6	3.3	44.9	330.3	432.5
SE	34.9	13.4	12.1	1.5	1.0	13.5	102.4	103.1
% CATCH		3.3	8.5	0.6	0.8	10.4	76.4	

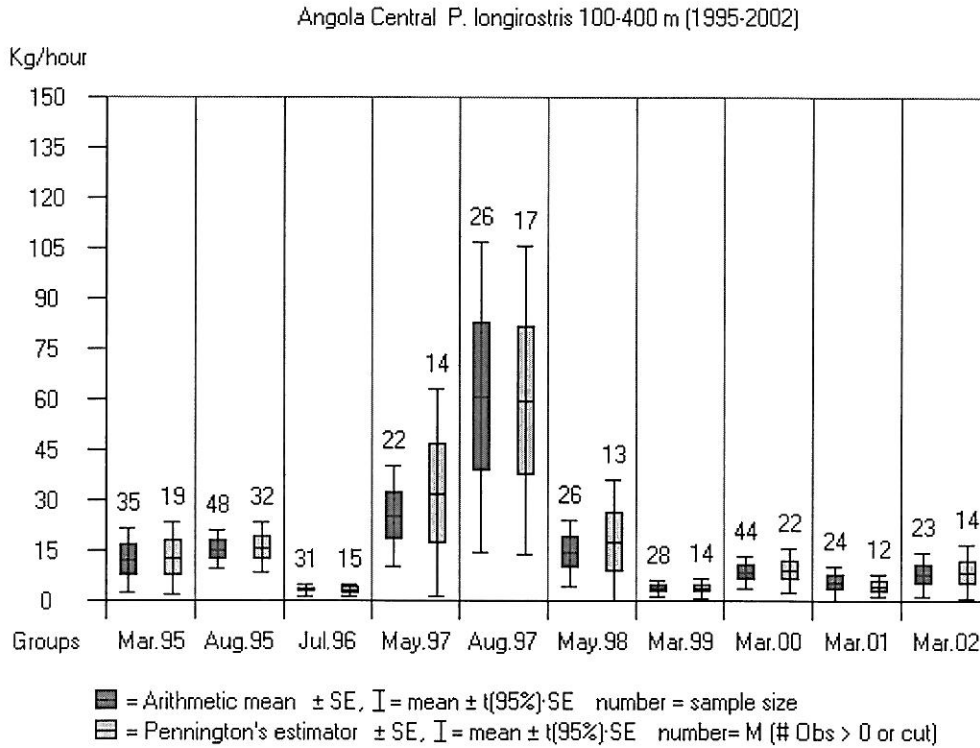
**Table 5.4.** Northern region April 2002. Catch rates (kg/hour) by main commercial groups in swept-area bottom trawl hauls on the slope (201-800 m).

STAT	Depth	Seabreams	Hake	<i>P.longirostris</i>	<i>A.varidens</i>	<i>N.africanus</i>	Other	Total
2774	326		167.4	7.3			432.9	607.8
2777	217	49.4	10.6	7.6			9 897.4	9 965.1
2779	705		1.6		11.2	11.9	329.2	354.0
2780	555		3.8		1.1	167.3	203.1	375.3
2781	406		95.0		2.0	99.5	31.9	228.5
2788	709		0.8		0.6	141.0	489.7	632.2
2789	624				2.6	170.7	392.7	566.1
2790	541				3.4	107.1	267.6	378.2
2791	447		46.3		2.2	20.2	81.2	150.0
2792	309		78.1	5.6			419.2	503.0
2793	228	13.8	28.5	2.3			334.7	379.5
2799	704		2.1		0.6	133.6	320.4	456.8
2800	621		0.8		0.2	99.1	152.7	253.1
2801	424		70.8		1.1	3.3	31.3	106.6
2809	734					4.3	90.6	95.0
2810	626				2.7	175.8	122.0	300.6
2811	526				0.3	97.5	50.6	148.4
2819	745				0.3		75.8	76.2
2820	624				1.4	101.6	75.9	179.0
2821	395			0.5	2.0	603.2	131.5	737.4
2822	269		221.2	12.6			920.7	1 154.6
2828	722				0.8		98.4	99.3
2829	522		24.9		1.3	1.8	104.0	132.2
2830	405		71.5		3.9	5.2	146.4	227.1
2841	232	4.4	26.6	7.5			924.1	962.8
2842	420		25.7	1.2	1.2	6.7	75.2	110.3
2843	525		13.6		5.8	93.4	100.0	212.9
2844	632				0.6	3.5	232.9	237.0
2845	313		48.4	22.5		2.1	135.6	208.8
2846	274		243.7	36.2			508.8	788.9
2852	726				0.4		101.3	101.7
2853	525		1.1		1.7	0.8	59.0	62.8
2854	442		30.6		3.0	1.7	75.3	110.7
2855	261	1.3	75.2	130.2			802.3	1 009.1
2861	712				0.3	1.1	131.2	132.8
2862	653				0.2	30.8	61.8	93.0
2863	332		7.9	18.5			206.8	233.4
2864	220	6.3	0.2	3.6			248.5	258.9
2871	745				0.7		135.1	135.9
2872	384		3.1	20.6			80.6	104.4
MEAN	494.5	1.9	32.5	6.9	1.3	52.1	477.0	571.7
SE	27.9	1.3	9.3	3.4	0.3	16.8	244.2	244.9
% CATCH		0.3	5.7	1.2	0.2	9.1	83.4	

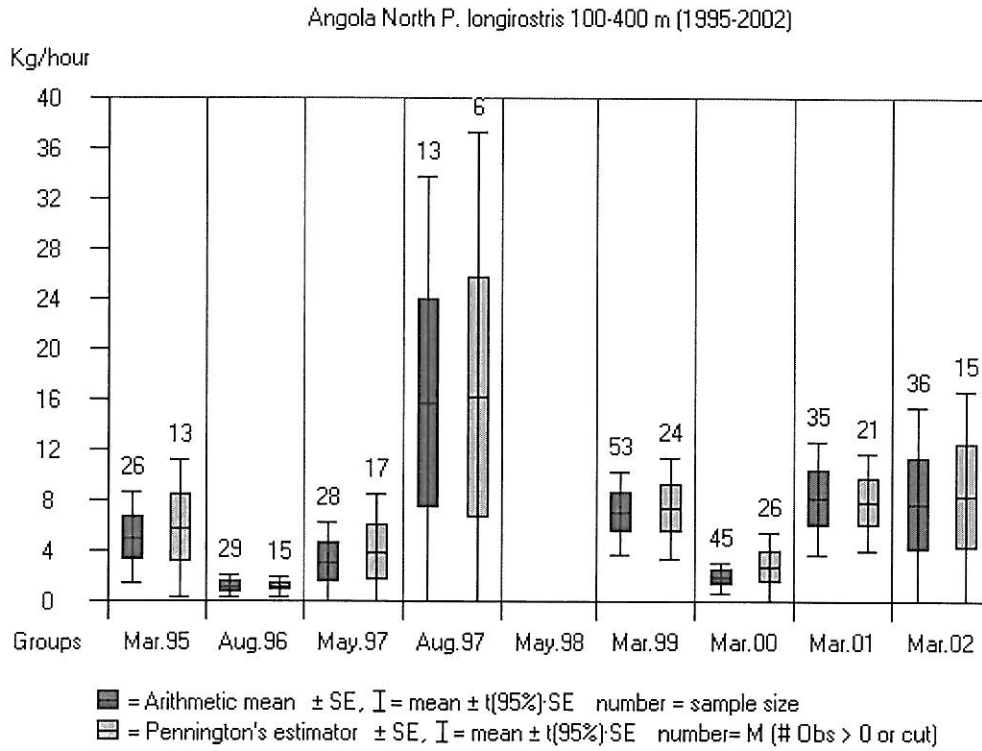
Also in the northern region the average catch rate of *P. longirostris* was about the same as last year's estimate, while the average catch rate of *A. varidens* was only 50% of what was found in 2001 and 2002. The average catch rate of *N. africanus* was less than what was obtained in the previous surveys.

Figures 5.1 to 5.6 show the time series of catch rates of the three main shrimp species, Rose shrimp (*P. longirostris*), Striped red shrimp (*A. varidens*), and African spider shrimp

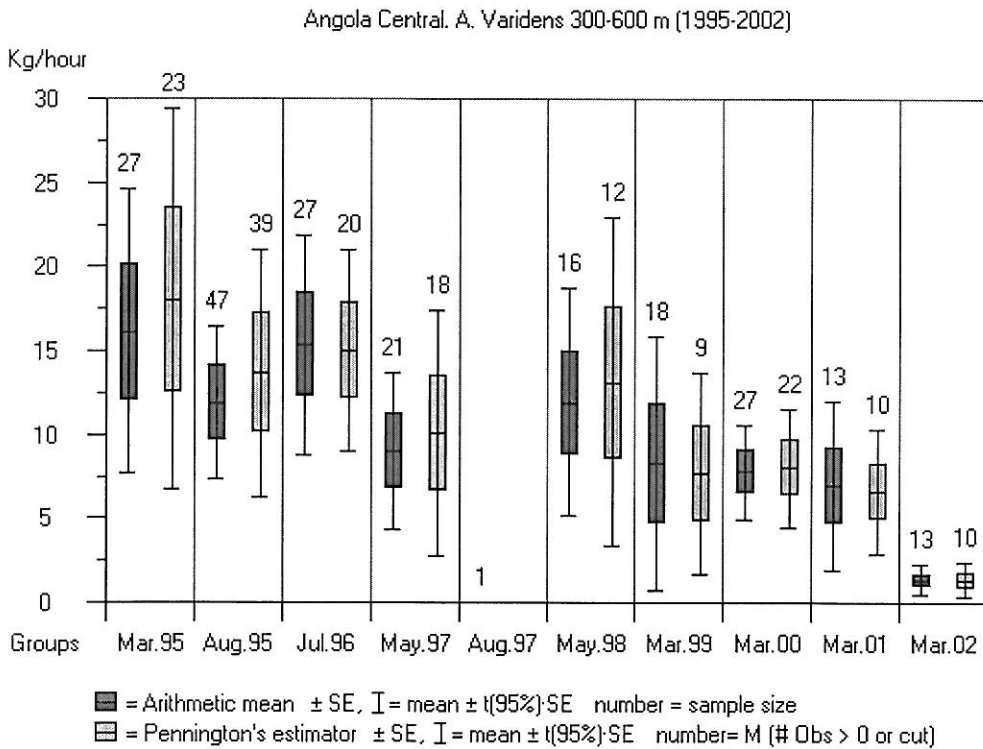
(*N. africanus*) in the depth intervals of their distribution by region since 1995. *P. longirostris* appears to have been fluctuating with very low catches in 1996 and 1999, and perhaps a peak in 1997. From 2000 it appears to have a stability of the mean catches rates although the level is still low.



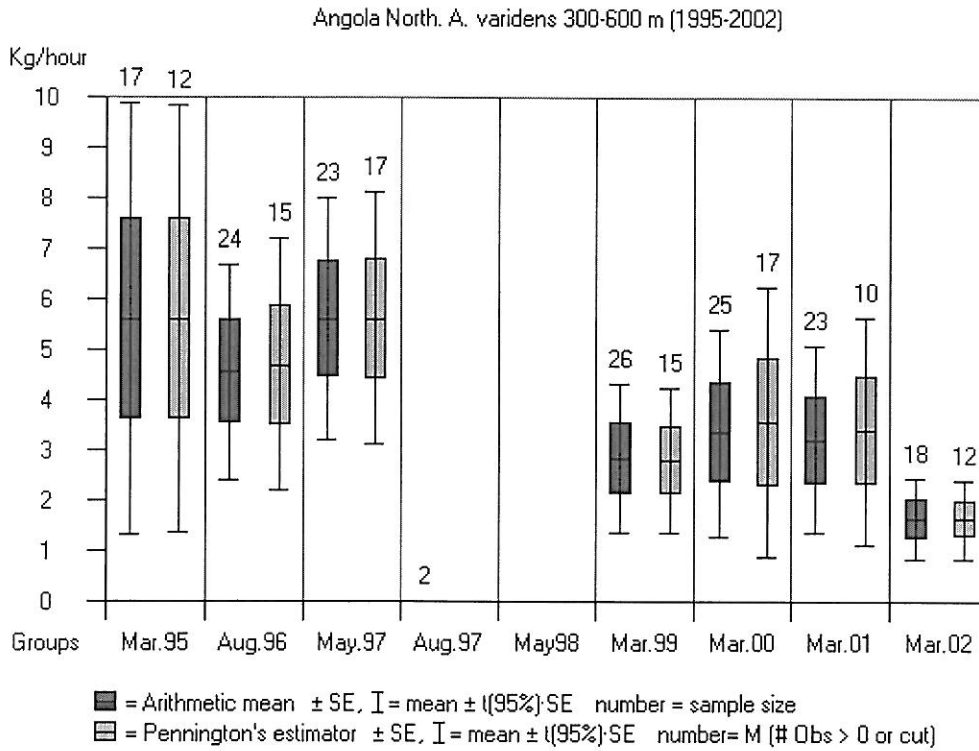
**Figure 5.1.** Mean catch rates (kg/hour) of the Rose shrimp (*Parapenaeus longirostris*), on the central Angolan shelf in the depth interval 100-400 m.



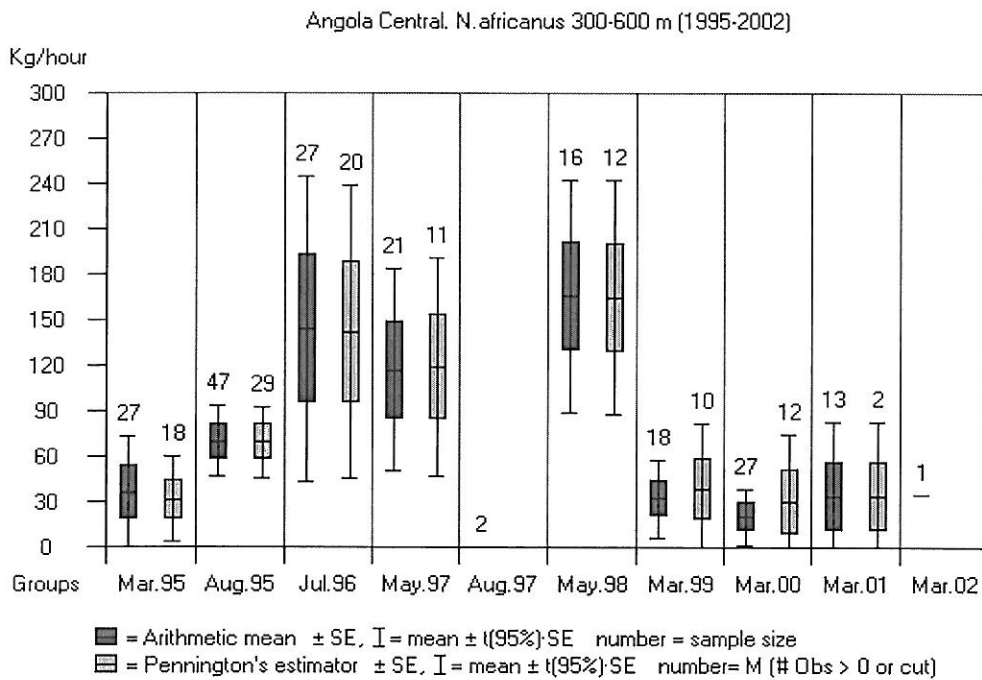
**Figure 5.2.** Mean catch rates (kg/hour) of the Rose shrimp (*Parapenaeus longirostris*), on the northern Angolan shelf in the depth interval 100-400 m.



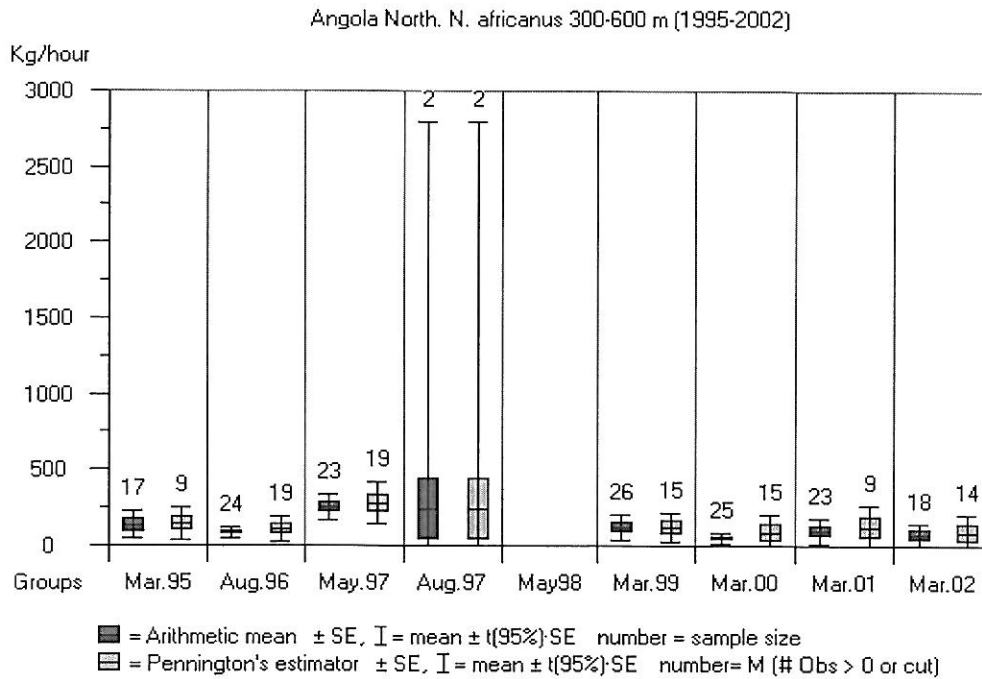
**Figure 5.3.** Mean catch rates (kg/hour) of the Striped red shrimp (*Aristeus varidens*), on the central Angolan shelf in the depth interval 300-600



**Figure 5.4.** Mean catch rates (kg/hour) of the striped red shrimp (*Aristeus varidens*), on the northern Angolan shelf in the depth interval 300-600 m.



**Figure 5.5.** Mean catch rates (kg/hour) of the African spider shrimp (*Nematocarcinus africanus*), on the central Angolan shelf in the depth interval 300-600 m.



**Figure 5.6.** Mean catch rates (kg/hour) of the African spider shrimp (*Nematocarcinus africanus*), on the northern Angolan shelf in the depth interval 300-600 m.

The striped shrimp (Figs. 5.3 and 5.4) is generally more abundant in the central region than in the northern (Tables 5.3 and 5.4), but shows a downward decline in both regions since 1995. *N. africanus* (Figs 5.5 and 5.6) also seems to have slightly fluctuated like rose shrimp with a peak from 1997 to 1998.

**Table 5.5.** Rose shrimp (*Parapenaeus longirostris*). Mean catch rates (kg/hour) by region, depth range and year of investigation. Note that the overall mean appears not to have been weighted before 1999 (see Fig 5.1 and 5.2).

Region/ Depth	Year of investigation													
	1986/1	1989	1991/1	1992	1994	1995/1	1995/2	1996	1997	1998	1999	2000	2001	2002
<b>Luanda -Cabinda *</b>														
100-200 m	4	+	+	2	3	8	No	+	2	No	2	+	1	-
200-300 m	60	10	8	18	15	34	Survey	6	26	Survey	21	14	11	29
300-400 m	4	5	1	+	12	10		1	4		6	9	18	13
Mean	19	5	2	8	10	16		3	10		7	4	8	8
<b>Benguela-Luanda</b>														
100-200 m	32	5	-	2	3	6	6	1	23	3	+	6	4	8
200-300 m	38	14	14	26	30	16	21	6	51	39	7	14	3	21
300-400 m	11	26	2	1	14	18	13	3	1	4	8	7	11	3
Mean	25	11	4	8	13	12	15	3	25	15	4	8	5	8

\* From 1997 the surveys did not cover the Cabinda area north of the Congo River

Mean catch rates (kg/hour) of the rose shrimp by depth are shown in Table 5.5. Both in the central region (Benguela-Luanda) and in the north (Luanda-Cabinda) this species had a shallower distribution compared to 2001. The overall mean catch rate was almost twice last year's estimate in central area whereas in the northern region the average catch rate was the same as previous year.

**Table 5.6.** Striped red shrimp (*Aristeus varidens*). Mean catch rates (kg/hour) by region, depth range and year of investigation. Note that the overall mean appears not to have been weighted before 1999 (see Figs 5.3 and 5.4).

Area/ Depth	Year of investigation														
	1986/1	1989	1991/1	1992	1994	1995/1	1995/2	1996	1997	1998	1999	2000	2001	2002	
Luanda-Cabinda*															
300-400 m	3	+	+	1	+	2	No	1	1	No	1	+	+	+	
400-500 m	1	3	4	6	6	14	Survey	9	10	Survey	3	7	4	2	
500-600 m	37	5	1	7	10	3		6	7		5	3	7	2	
600-800 m	-	3	-	4	5	3		2	4		-	2	2	2	
Mean	13	3	2	4	5	5		5	5		3	3	3	2	
Benguela- Luanda															
300-400 m	1	1	3	1	1	17		11	3	7	7	5	4	2	1
400-500 m	22	10	19	2	23	13		22	23	16	24	4	12	5	3
500-600 m	16	6	32	5	15	17		4	21	4	10	16	9	17	1
600-800 m	-	-	-	15	10	9		7	7	-	26	-	3	10	7
Mean	13	6	12	6	12	14		12	13	9	22	8	6	8	4

\* From 1997 the surveys did not cover the Cabinda area north of the Congo River

Mean catch rates of striped red shrimp (*A. varidens*) are presented in Table 5.6. In the central area the highest catch rate was observed within the stratum 600-800 m. This pattern on the distribution can only be comparable to what was found in surveys performed in 1992 and 1998. There seems to be a declining trend in the catch rates both in the central and northern area (Figs. 5.3 and 5.4).

Biomass estimates and 95% confidence intervals of the main commercial shrimp species are presented in Tables 5.7. Scarlet shrimp (*Plesiopenaeus edwardsianus*) is also included, although the abundance of this species has always been relatively small. The estimated biomass of *P. longirostris* in both central and northern areas is slightly higher than 2001 estimate but is still one of the lowest of the time series. Also, the biomass estimate of *Aristeus varidens* is one of the lowest in the time series although the values are within the confidence limits of last year's estimate.

Notice, that the differences in the trend of the catch rates and on the biomass estimates of rose shrimp between the north and central regions (Tables 5.5 and 5.7) compared to last year may be due to the fact that catch rates were not weighted.

**Table 5.7a.** Biomass (t) and 95% confidence limits of commercial deep-water shrimps by region, in 1999-2002.

Region/ Species	Year of investigation								
	1999	95% CL	2000	95% CL	2001	95% CL	2002	95% CL	
Luanda -Congo River									
Rose shrimp	540	305-775	503	326-680	655	384-926	821	109-1532	
Striped red shrimp	148	75-222	180	103-256	246	147-345	109	66-151	
Scarlet shrimp	42	5-78	8	0-17	11	2-20	+	+	
Benguela Luanda									
Rose shrimp	227	82-372	758	232-1283	409	255-564	750	205-1296	
Striped red shrimp	503	102-903	382	270-494	424	200-649	254	151-357	
Scarlet shrimp	14	0-30	3	0-10	+		+	+	
Total	1474		1834		1745		1934		



**Table 5.7b.** Biomass (tonnes) of commercial deep water shrimps by sector and year of investigation.

Region/ Species	Year of investigation													
	1985/1	1986/1	1989	1992	1994	1995/1	1995/2	1996	1997	1998	1999	2000	2001	2002
Cabinda-Luanda*														
Rose shrimp	380	150	550	615	1110	1580	No	210	830	No	540	503	655	821
Striped red shrimp	-	1200	400	515	610	500	Survey	440	590	Survey	148	180	246	109
Scarlet shrimp	-	+	+	130	+	+		50	10		42	8	11	+
Luanda-Benguela														
Rose shrimp	-	3400	700	680	710	460	750	130	1780	847	227	758	409	750
Striped red shrimp	-	1000	370	570	890	940	730	850	370	1493	503	382	424	254
Scarlet shrimp	-	100	+	+	+	+	+	90	10	187	14	3	+	+
Total		5850	2020	2570	3410	3480		1770	3580		1474	1834	1745	1934

\* From 1997 the surveys did not cover the Cabinda area north of the Congo River

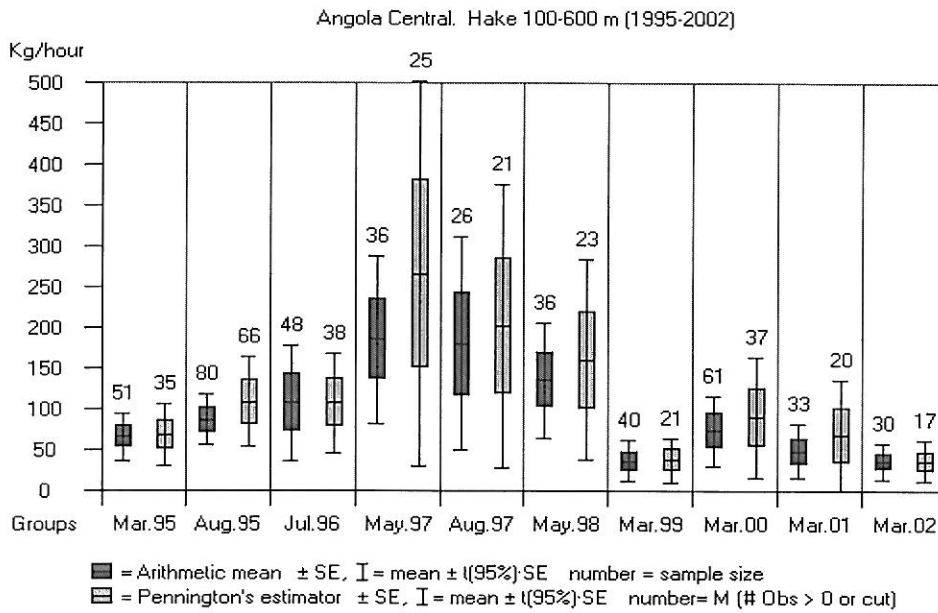
### Concluding remarks

Although most values of the biomass estimates for the rose shrimp (*P. longirostris*) are within the confidence interval, the species shows cyclical fluctuations along the years of investigation. As a short-lived species its abundance have a strong dependence on the recruitment. Therefore, fluctuations can be associated with the success of the recruitment that may be largely influenced by environmental conditions. The Striped shrimp (*A. varidens*) has a deeper distribution than rose shrimp being less dependent on the environmental conditions. However, it shows a very fast decreasing trend since 1998.

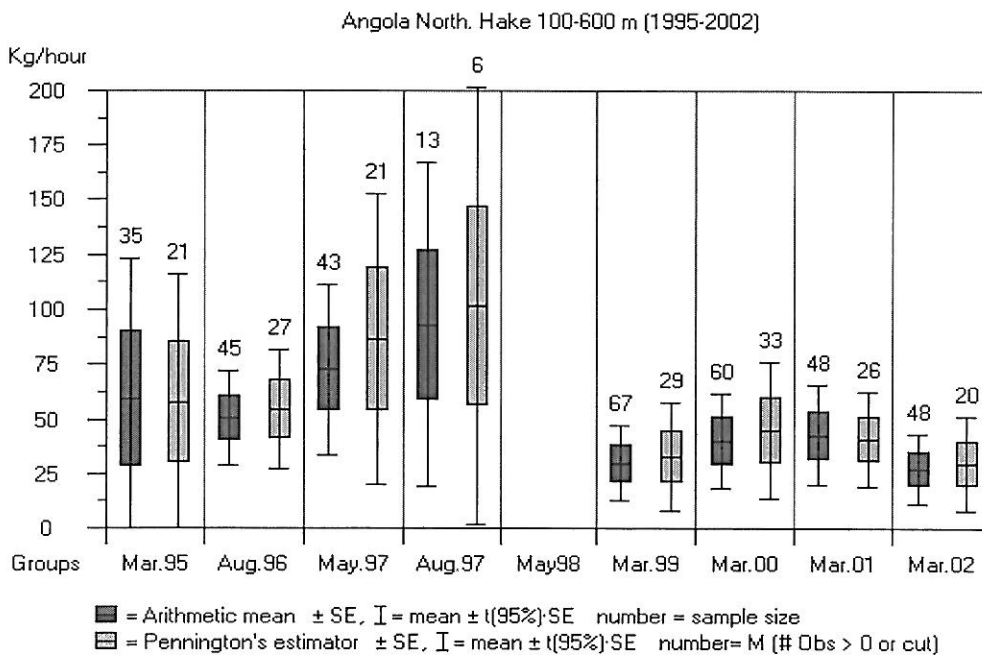
The hydrographical conditions off Angola during the 2002 survey were stable and typical for this time of the year (see Chapter 3). Also, the coverage of the distributional area of the resources in central and in northern region was about the same as last year. Consequently and as for the demersal species, the trend observed this year might be related with changes on the resources alone. In the case of the striped shrimp the absence of a tickler chain on the footrope may have further reduce the catch rates and biomass estimates. Results from the fishing experiments with tickler chain (see cruise report No 2/95) suggest that the presence of the chain positively affects the catches of *A. varidens* and a correction factor should be applied to reduce the calculated biomass by 25%. But, still the decreasing trend observed in this species from 1998.

## 5.2 Benguela hake

Figures 5.7 and 5.8 show the time series of catch rates of Benguela hake (*Merluccius polli*) in the central and northern regions for period 1995-2002 in the depth range 100-600 m, and Table 5.8 shows the mean catch rates in both regions by depth zones. The overall trend in the two areas seems to be identical by a general slow increase until 1997, followed by decrease. In the central region the mean catch rate obtained in the present survey was slightly lower than found in last year's survey but comparable to 1998. In the northern region the average catch rate was among the lowest and about the same as obtained in the central region.



**Figure 5.7.** Mean catch rates (kg/hour) of the Benguela hake (*Merluccius polli*), on the central Angolan shelf in the depth interval 100-600 m.



**Figure 5.8.** Mean catch rates (kg/hour) of the Benguela hake (*Merluccius polli*), on the northern Angolan shelf in the depth interval 100-600 m.

**Table 5.8.** Benguela hake (*Merluccius polli*). Mean catch rates (kg/hour) by region, depth range and year of investigation.

Region/depth	Year of investigation													
	1986/I	1989	1991/I	1992	1994	1995/I	1995/2	1996	1997	1998	1999	2000	2001	2002
<b>Luanda-Cabinda*</b>														
100-200 m	+	3	1	13	+	2	No	-	+	No	+	+	1	+
200-300 m	59	44	11	104	28	9	Survey	43	63	Survey	4	78	63	87
300-400 m	289	145	382	264	134	194		136	302		121	89	99	50
400-500 m	258	223	564	224	43	86		96	17		74	76	104	57
500-600 m	83	25	28	21	12	6		7	3		6	5	10	7
600-800 m	-	56	-	12	1	10		8	2		-	4	5	-
Mean	114	72	203	90	40	47		48	65		30	27	37	33
<b>Benguela- Luanda</b>														
100-200 m	6	8	+	31	49	3	39	15	98	8	+	5	3	24
200-300 m	161	167	30	112	122	23	51	31	301	149	25	192	97	92
300-400 m	822	82	384	220	55	196	197	330	44	423	87	153	122	68
400-500 m	433	291	394	174	64	80	121	116	93	247	88	50	61	22
500-600 m	45	44	180	39	52	27	8	44	2	9	1	13	109	13
600-800 m	-	-	-	10	5	30	3	10	-	5	-	2	8	19
Mean	378	93	138	91	63	61	74	95	185	140	32	47	42	32

\* From 1997 the surveys did not cover the Cabinda area north of the Congo River.

Biomass estimates of hake and the confidence limits are presented in Table 5.9. The estimated biomass was slightly lower than last year's result both in the central and north areas but within its confidence limits.

#### 5.9a. Biomass estimates (tonnes) with 95% confidence limits of hake by sector in 1999 - 2002.

Region	Year of investigation							
	1999	95% CL	2000	95% CL	2001	95% CL	2002	95% CL
Luanda-Congo River	3 431	1 947-4 915	4 430	1 579-7 227	4 999	2 387-7 611	3 461	1 655-5 268
Benguela -Luanda	2 987	1 158-4 816	5 600	2 752-8 449	4 813	1 558-8 068	4 208	2 201-6 216
Benguela -Congo River	6 418		10 030		9 812		7 669	
Cunene-Tombua <sup>1</sup>	No survey		6 057	2 374-9 740				

<sup>1)</sup> Includes *M. polli* and *M. capensis*

**Table 5.9b.** Biomass estimates (tonnes) of hake by sector and year of investigation.

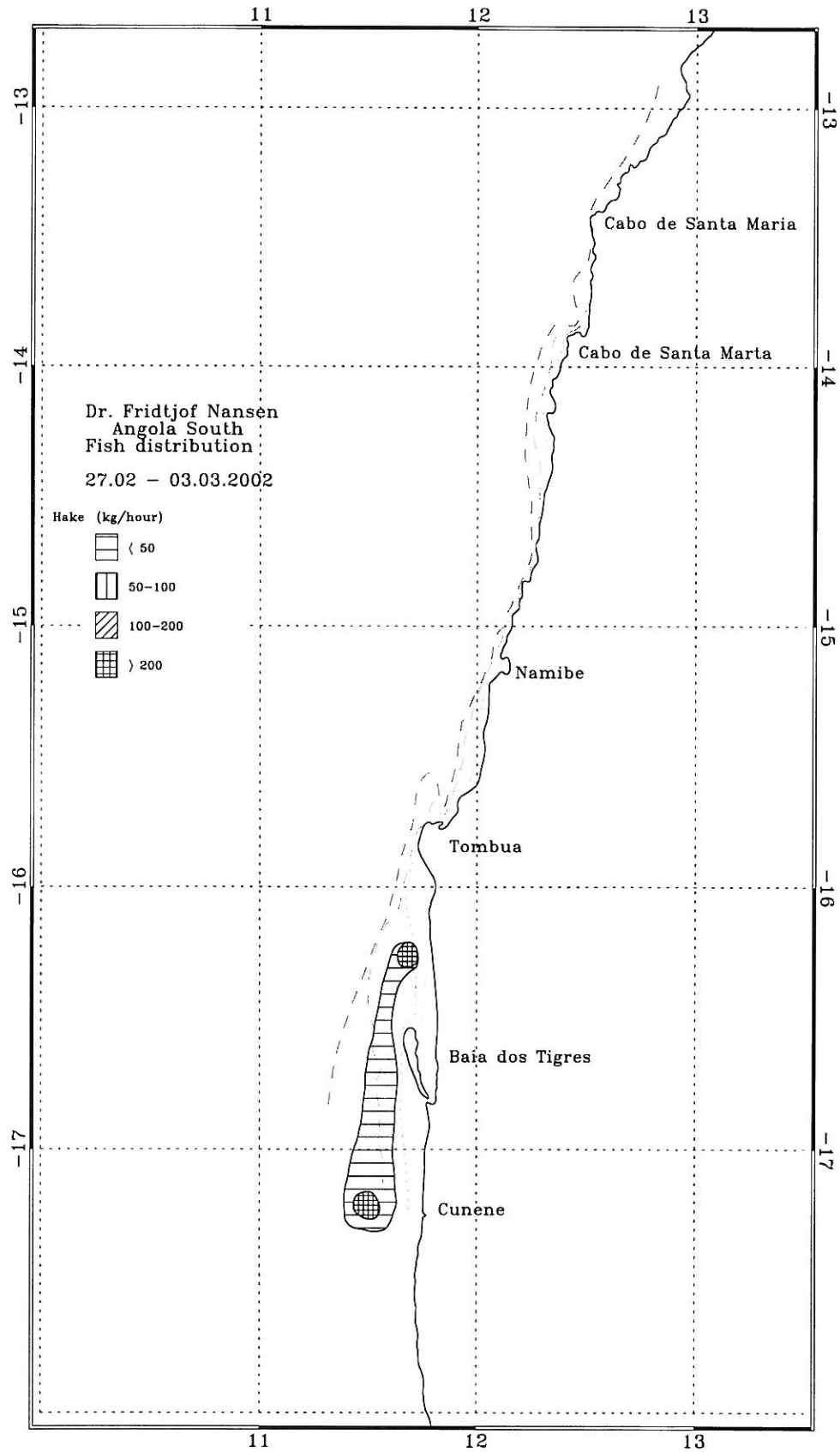
Region	Year of investigation													
	1986/1	1989	1991/1	1992	1994	1995/1	1995/2	1996	1997	1998	1999	2000	2001	2002
Luanda - Cabinda <sup>1</sup>	17 000	15 300	18 000	14 000	4 700	7 100	No survey	6 170	8 500	No survey	3 431	4 430	4 999	3 461
Benguela - Luanda	31 400	5 300	11 000	8 100	6 670	4 950	6 830	7 510	15 230	11 370	2 987	5 600	4 813	4 208
Benguela - Cabinda	48 400	20 600	29 000	22 100	11 370	12 050		13 680	23 730		6 418	10 030	9 812	7 669
Cunene - Tombua <sup>2</sup>	1 100	1 200	4 000	5 600	No survey	No survey	No survey	No survey	No survey	No survey	No survey	6057	No survey	

<sup>1)</sup> From 1997 the surveys did not cover the Cabinda area north of the Congo River.

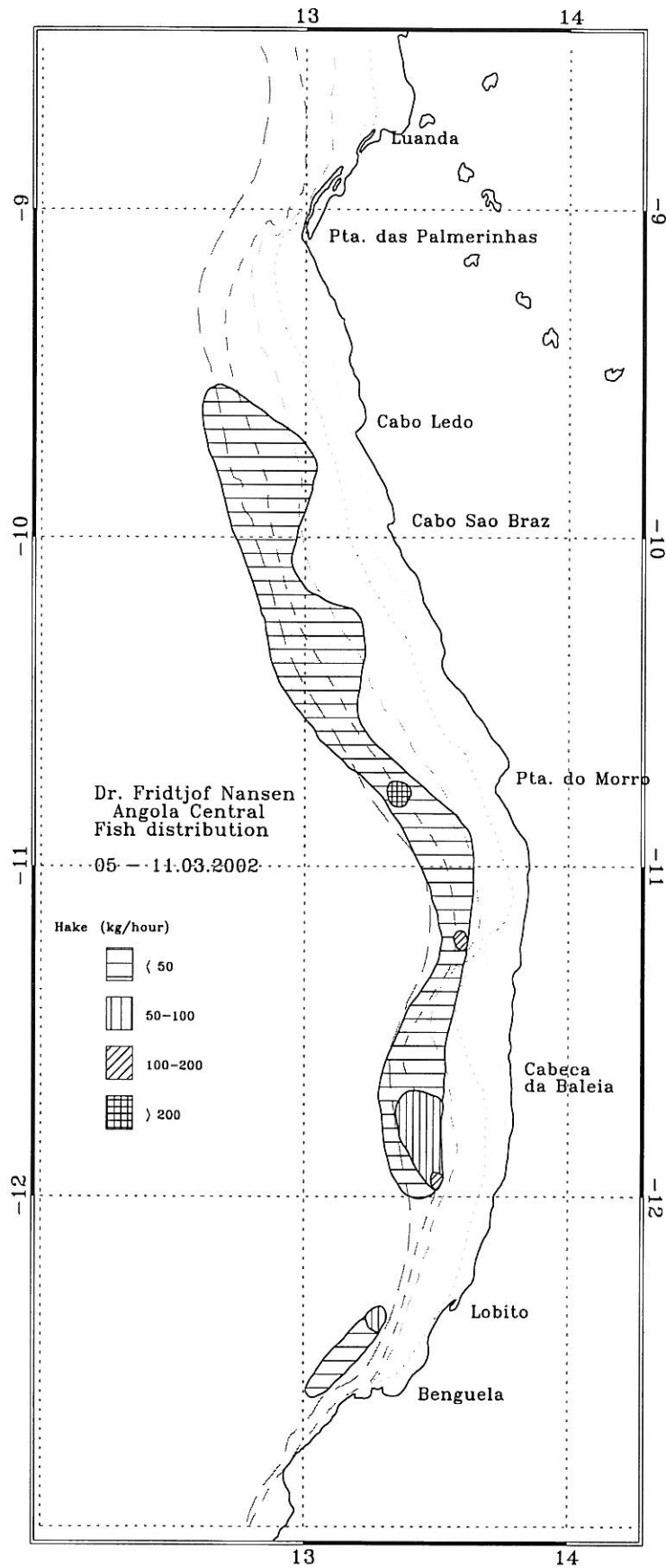
<sup>2)</sup> Includes *M. polli* and *M. capensis*<sup>1)</sup>

The distribution appears to have been largely covered within the 600 m isobath and the decrease in overall catch rates and biomass is mainly due to stock changes on the upper part of the slope from 200 to 400 m.

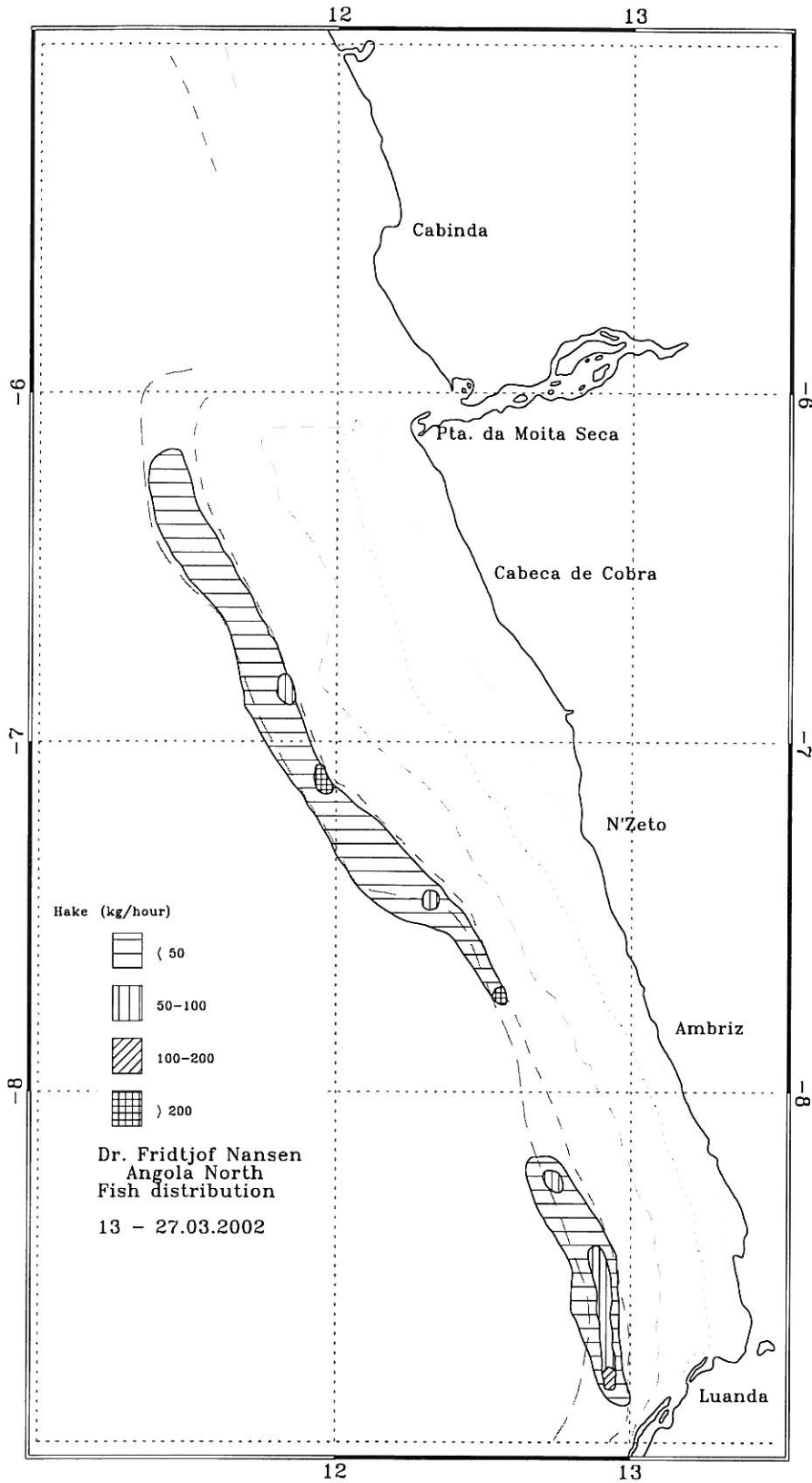
Figures 5.9 - 5.11 show the distribution of hake in the southern, central and northern regions, respectively. Apart from the generally lower catch rates, the geographical distribution and areas of concentrations are similar to previous surveys.



**Figure 5.9.** Estimated distribution of Benguela hake (*Merluccius polli*). Cunene-Tombua. Depth contours as in Fig. 2.1.



**Figure 5.10.** Estimated distribution of Benguela hake (*Merluccius polli*). Luanda-Benguela. Depth contours as in Fig. 2.2.



**Figure 5.11.** Estimated distribution of Benguela hake (*Merluccius polli*). Congo River-Luanda. Depth contours as in Fig. 2.2.

**REFERENCES**

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Carrit, D. E. and Carpenter, J. H. 1966. Comparison and Evaluation of Currently Employed Modifications of the Winkler Method for Determining Dissolved Oxygen in Sea Water. NASCO Report J. Mar. Res. 24: 286-310

Cochran, W. G., 1977. Sampling Techniques, 3<sup>rd</sup> ed. John Wiley and Sons, New York, NY, 428 pp.

Strømme, T. 1992. Software for fishery survey data logging and analysis. User's manual. FAO Computerized Information Series (fisheries). No. 4. Rome, FAO. 103 p.



# ANNEX I Records of fishing stations

PROJECT STATION:2689  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1715  
 start stop duration Long E 1141  
 TIME :05:25:14 05:54:29 29 (min) Purpose code: 3  
 LOG :2667.91 2669.39 1.48 Area code : 1  
 FDEPTH: 58 53 GearCond.code: 1  
 BDEPTH: 58 53 Validity code: 1  
 Towing dir: 360° Wire out: 200 m Speed: 30 kn\*10  
 Sorted: 72 Kg Total catch: 1037.59 CATCH/HOUR: 2146.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	1720.55	83392	80.15	5839
Engraulis encrasicolus	210.87	11065	9.82	
Etrumeus whiteheadi	103.99	7097	4.84	
Merluccius capensis	39.10	753	1.82	5840
DASYATIDAE	36.70	2	1.71	
Myliobatis aquila	10.03	4	0.47	
Dasyatis marmorata	9.41	2	0.44	
Dicologlossa cuneata	6.66	377	0.31	5841
Umbriina canariensis	3.19	58	0.15	
Trachurus capensis	2.61	29	0.12	
Scomberomus tritor	2.32	29	0.11	
Raja miraletus	1.30	2	0.06	
Total	2146.73		100.00	

PROJECT STATION:2693  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1714  
 start stop duration Long E 1121  
 TIME :12:32:56 13:02:42 30 (min) Purpose code: 3  
 LOG :2703.17 2704.64 1.46 Area code : 1  
 FDEPTH: 349 344 GearCond.code: 1  
 BDEPTH: 349 344 Validity code: 1  
 Towing dir: 350° Wire out: 950 m Speed: 30 kn\*10  
 Sorted: 26 Kg Total catch: 206.24 CATCH/HOUR: 412.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	137.60	848	33.36	5849
Helicolenus dactylopterus	71.84	1760	17.42	
Bathynectes piperitus	57.28	2384	13.89	
Pterothrissus belloci	53.92	288	13.07	
Caelorinchus simorhynchus	27.20	864	6.59	
Laemonema laureysi	18.40	416	4.46	
Zenopsis conchifer	11.20	48	2.72	
Squalus megalops	8.96	16	2.17	
Malacocephalus occidentalis	6.56	128	1.59	
Chlorophthalmus atlanticus	6.24	192	1.51	
Trigla lyra	2.88	16	0.70	
Galeus polli	2.56	512	0.62	
Synagrops microlepis	2.40	272	0.58	
NEMATOCARCINIDAE	2.24	976	0.54	
Octopus vulgaris	1.60	16	0.39	
Lepidopus caudatus	1.60	32	0.39	
Total	412.48		100.00	

PROJECT STATION:2690  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1714  
 start stop duration Long E 1138  
 TIME :07:13:33 07:43:15 30 (min) Purpose code: 3  
 LOG :2675.33 2676.82 1.48 Area code : 1  
 FDEPTH: 90 93 GearCond.code: 1  
 BDEPTH: 90 93 Validity code: 1  
 Towing dir: 350° Wire out: 300 m Speed: 30 kn\*10  
 Sorted: 68 Kg Total catch: 8000.00 CATCH/HOUR: 16000.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	15705.80	699504	98.16	5842
Octopus vulgaris	120.20	2360	0.75	
Sepia orbignyana	73.16	2360	0.46	
Raja miraletus	47.24	2360	0.30	
Brotula orbata	26.68	2360	0.17	
Merluccius capensis	16.52	2360	0.10	
Pegusa lascaris	4.60	2360	0.03	
Total	15994.20		99.97	

PROJECT STATION:2694  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1713  
 start stop duration Long E 1116  
 TIME :14:47:43 15:13:01 25 (min) Purpose code: 3  
 LOG :2713.51 2714.70 1.18 Area code : 1  
 FDEPTH: 603 617 GearCond.code: 1  
 BDEPTH: 603 617 Validity code: 1  
 Towing dir: 20° Wire out:1520 m Speed: 30 kn\*10  
 Sorted: 96 Kg Total catch: 273.04 CATCH/HOUR: 655.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	335.76	622	51.24	5850
Trachyrincus scabrus	139.92	775	21.35	
Malacocephalus occidentalis	77.23	2786	11.79	
Ommastrephes bartrami	38.59	60	5.89	
Ebinania costaecanarie	23.02	120	3.51	
Lophius vaillanti	10.73	2	1.64	
Hoplostethus cadenati	8.50	106	1.30	
Chaceon maritae, male	4.58	7	0.70	5851
Raja confundens	4.54	106	0.69	
Bathynectes piperitus	3.17	86	0.48	
Chaceon maritae, female	2.57	10	0.39	5852
Triplophus heningi	1.99	271	0.30	
Laemonema laureysi	1.78	14	0.27	
Stomias boa boa	1.44	12	0.22	
Lamprogrammus exutus	0.79	19	0.12	
Bathyroconger vicinus	0.53	7	0.08	
Gonostoma sp.	0.19	19	0.03	
Total	655.33		100.00	

PROJECT STATION:2691  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1714  
 start stop duration Long E 1131  
 TIME :08:59:13 09:19:57 21 (min) Purpose code: 3  
 LOG :2684.36 2685.49 1.10 Area code : 1  
 FDEPTH: 131 133 GearCond.code: 9  
 BDEPTH: 131 133 Validity code: 1  
 Towing dir: 340° Wire out: 380 m Speed: 30 kn\*10  
 Sorted: 64 Kg Total catch: 499.10 CATCH/HOUR: 1426.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	1172.46	23229	82.22	5843
Pterothrissus belloci	106.29	1860	7.45	
Merluccius capensis	80.86	820	5.67	5845
Trachurus capensis	43.83	1571	3.07	5844
Squilla mantis	13.29	46	0.93	
Dicologlossa cuneata	4.43	89	0.31	
Galeichthys feliceps	4.43	23	0.31	
Microchirus boscanion	0.46	23	0.03	
Total	1426.05		99.99	

PROJECT STATION:2695  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1700  
 start stop duration Long E 1141  
 TIME :05:23:28 05:48:17 25 (min) Purpose code: 3  
 LOG :2821.05 2822.31 1.46 Area code : 1  
 FDEPTH: 37 36 GearCond.code: 1  
 BDEPTH: 37 36 Validity code: 1  
 Towing dir: 340° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 33 Kg Total catch: 901.05 CATCH/HOUR: 2162.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	2154.72	115668	99.64	5853
Sepiella ornata	2.78	2	0.13	
Sepia orbignyana	1.68	5	0.08	
Callorhynchus capensis	1.58	2	0.07	
Seriola sp.	1.10	2	0.05	
Scomberomus tritor	0.65	2	0.03	
Total	2162.51		100.00	

PROJECT STATION:2692  
 DATE: 1/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1713  
 start stop duration Long E 1128  
 TIME :10:00:59 10:01:10 9 (min) Purpose code: 3  
 LOG :2690.42 2690.85 0.42 Area code : 1  
 FDEPTH: 160 160 GearCond.code: 9  
 BDEPTH: 160 160 Validity code: 1  
 Towing dir: 340° Wire out: 470 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 435.85 CATCH/HOUR: 2905.67

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis	2281.53	69657	78.52	5848
Dentex macrophthalmus	330.73	6387	11.38	5846
Merluccius capensis	286.20	1173	9.85	5847
Atractoscion aequidens	3.60	7	0.12	
Pterothrissus belloci	3.60	40	0.12	
Total	2905.66		99.99	

PROJECT STATION:2696  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1659  
 start stop duration Long E 1138  
 TIME :06:51:59 07:12:42 21 (min) Purpose code: 3  
 LOG :2827.69 2828.73 1.04 Area code : 1  
 FDEPTH: 66 67 GearCond.code: 9  
 BDEPTH: 66 67 Validity code: 1  
 Towing dir: 350° Wire out: 200 m Speed: 30 kn\*10  
 Sorted: 35 Kg Total catch: 1832.50 CATCH/HOUR: 5235.71

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus capensis, juvenile	4568.57	150503	87.26	5854
Trachurus trecae, juvenile	646.29	25617	12.34	5855
Callorhynchus capensis	8.57	3	0.16	
Todaropsis eblanai	5.20	54	0.10	
Sarda sarda	5.11	3	0.04	
Sepia orbignyana	1.74	9	0.03	
Total	5232.48		99.93	

PROJECT STATION:2697  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1658  
 start stop duration Long E 1133  
 TIME :08:09:14 08:40:31 31 (min) Purpose code: 3  
 LOG :2835.18 2836.69 1.50 Area code : 1  
 FDEPTH: 102 103 GearCond.code:  
 BDEPTH: 102 103 Validity code: 1  
 Towing dir: 350e Wire out: 310 m Speed: 30 kn\*10  
 Sorted: 39 Kg Total catch: 136.33 CATCH/HOUR: 263.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	131.42	4105	49.81	5859
Trachurus capensis, juvenile	57.93	1810	21.95	5858
Dentex macrophthalmus	23.03	623	8.73	5856
Merluccius capensis	21.14	157	8.01	5857
Atractoscion aequidens	10.49	41	3.98	
Zeus faber	6.97	203	2.64	
Illex sp.	5.03	780	1.91	
Sepia orbignyana	3.48	203	1.32	
Squilla mantis	3.29	108	1.25	
Loligo vulgaris	0.46	8	0.17	
AMGULLIFORMES	0.35	8	0.13	
Dicologlossa cuneata	0.19	21	0.07	
Thorogobius angolensis	0.06	14	0.02	
Total	263.84		99.99	

PROJECT STATION:2698  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1631  
 start stop duration Long E 1134  
 TIME :11:16:24 11:46:43 30 (min) Purpose code: 3  
 LOG :2861.75 2863.37 1.60 Area code : 1  
 FDEPTH: 94 93 GearCond.code:  
 BDEPTH: 94 93 Validity code: 1  
 Towing dir: 360e Wire out: 300 m Speed: 30 kn\*10  
 Sorted: 71 Kg Total catch: 4338.57 CATCH/HOUR: 8677.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	4768.00	135250	54.95	5861
Dentex macrophthalmus	3382.00	113250	38.98	5862
Dentex barnardi	220.84	500	2.55	
Merluccius capensis	175.00	1334	2.02	5860
Zeus faber	45.84	250	0.53	
Atractoscion aequidens	41.66	166	0.48	
Pagellus bellottii	37.50	166	0.43	
Mustelus mustelus	6.30	4	0.07	
Total	8677.14		100.01	

PROJECT STATION:2699  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1618  
 start stop duration Long E 1140  
 TIME :13:20:26 13:21:02 14 (min) Purpose code: 3  
 LOG :2877.72 2878.43 0.70 Area code : 1  
 FDEPTH: 65 65 GearCond.code: 9  
 BDEPTH: 66 65 Validity code: 1  
 Towing dir: 360e Wire out: 240 m Speed: 30 kn\*10  
 Sorted: 73 Kg Total catch: 1028.72 CATCH/HOUR: 4408.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	3690.00	151620	83.70	
Dentex macrophthalmus	360.00	16080	8.17	
Sepia officinalis hierredda	256.80	420	5.82	
Merluccius capensis	59.40	480	1.35	
Atractoscion aequidens	33.00	137	0.75	5863
Dentex barnardi	7.20	60	0.16	
Dicologlossa cuneata	2.40	60	0.05	
Total	4408.80		100.00	

PROJECT STATION:2700  
 DATE: 2/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1617  
 start stop duration Long E 1144  
 TIME :13:20:55 13:21:07 12 (min) Purpose code: 3  
 LOG :2884.76 2885.40 0.63 Area code : 1  
 FDEPTH: 46 47 GearCond.code: 9  
 BDEPTH: 46 47 Validity code: 1  
 Towing dir: 350e Wire out: 160 m Speed: 30 kn\*10  
 Sorted: 68 Kg Total catch: 2055.88 CATCH/HOUR: 10279.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	10095.00	169500	98.21	5864
Scomber japonicus	85.50	450	0.83	
Atractoscion aequidens	81.00	150	0.79	
Myliobatis aquila	14.15	5	0.14	
Sepia officinalis hierredda	3.75	5	0.04	
Total	10279.40		100.01	

PROJECT STATION:2701  
 DATE: 3/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1235  
 start stop duration Long E 1303  
 TIME :18:17:24 18:47:20 30 (min) Purpose code: 3  
 LOG :3143.02 3144.33 1.30 Area code : 2  
 FDEPTH: 760 773 GearCond.code:  
 BDEPTH: 760 773 Validity code: 1  
 Towing dir: 45e Wire out:1700 m Speed: 30 kn\*10  
 Sorted: 66 Kg Total catch: 402.37 CATCH/HOUR: 804.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L Y F I S H	420.80	84	52.29	
Hoplostethus mediterraneus	124.80	2004	15.51	
Yarella blackfordi	70.80	1740	8.80	
Lamprogrammus exutus	39.60	144	4.92	
Nezumia aequalis	33.00	660	4.10	
Talismania bifurcata	27.96	240	3.47	
Glyphus marsupialis	14.16	528	1.76	
Merluccius polli	12.30	14	1.53	
Aristeus varidens, female	11.04	1092	1.37	5867
GOMSTOMATIDAE	10.92	72	1.36	
Dicrolene intronigra	7.44	168	0.92	
Aristeus varidens, male	5.40	696	0.67	5865
Phototeuthis parvimanus	5.16	84	0.64	
Stomias boa	5.04	72	0.63	
Synaphobranchus kaupii	4.62	72	0.57	
Psychrolutes macrocephalus	4.56	12	0.57	
Deania profundorum	1.92	12	0.24	
POLYCHAELIDAE	1.80	36	0.22	
Chaceon maritae, male	1.42	2	0.18	
Dibranchius atlanticus	0.96	24	0.12	
Chaceon maritae, female	0.38	2	0.05	
Halosaurus ovenii	0.36	12	0.04	
Xenodermichthys copei	0.24	12	0.03	
Total	804.68		99.99	

PROJECT STATION:2702  
 DATE: 3/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1223  
 start stop duration Long E 1316  
 TIME :21:41:08 22:11:40 31 (min) Purpose code: 3  
 LOG :3161.97 3163.38 1.41 Area code : 2  
 FDEPTH: 737 723 GearCond.code:  
 BDEPTH: 737 723 Validity code: 1  
 Towing dir: 35e Wire out:1670 m Speed: 30 kn\*10  
 Sorted: 36 Kg Total catch: 181.25 CATCH/HOUR: 350.81

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	185.32	4452	52.83	
Merluccius polli	98.23	116	28.00	5870
Stomias boa	13.35	281	3.81	
Aristeus varidens, female	9.19	881	2.62	5868
Aristeus varidens, male	6.68	1055	1.90	5869
Glyphus marsupialis	5.90	203	1.68	
Trachipterus jacksonensis	5.90	2	1.68	
Yarella blackfordi	5.23	106	1.49	
Lamprogrammus exutus	4.94	19	1.41	
Malacocephalus occidentalis	2.71	58	0.77	
POLYCHAELIDAE	2.23	97	0.64	
Nezumia sp.	1.84	29	0.52	
Synaphobranchus kaupii	1.74	19	0.50	
Halosaurus ovenii	1.65	29	0.47	
Dicrolene intronigra	1.26	29	0.36	
Chaceon maritae	1.16	2	0.33	
Etmopterus lucifer	1.06	10	0.30	
Bathyroconger vicinus	0.97	19	0.28	
Penaeus kerathurus	0.77	39	0.22	
Melanocetus johnsoni	0.68	10	0.19	
Total	350.81		100.00	

PROJECT STATION:2703  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1326  
 start stop duration Long E 1326  
 TIME :07:50:22 08:11:03 21 (min) Purpose code: 3  
 LOG :3227.35 3228.41 1.05 Area code : 2  
 FDEPTH: 61 70 GearCond.code: 9  
 BDEPTH: 61 70 Validity code: 1  
 Towing dir: 25e Wire out: 200 m Speed: 30 kn\*10  
 Sorted: 62 Kg Total catch: 931.72 CATCH/HOUR: 2662.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1562.00	84080	58.68	5873
Pagellus bellottii	344.00	2920	12.92	5874
Pomadasys incisus	188.00	1640	7.06	5871
Selene dorsalis	136.29	160	5.12	
Brachydeuterus auritus	72.00	600	2.70	
Lithognathus mormyrus	70.00	160	2.63	
Umbrina canariensis	54.00	840	2.03	5872
Epinephelus aeneus	45.57	6	1.71	
Pterothrissus belloci	38.00	943	1.43	
Boops boops	38.00	760	1.43	
Trichurus lepturus	19.29	51	0.72	
ENGRAULIDIDAE	16.40	2520	0.62	
Atractoscion aequidens	14.80	80	0.56	
Priacanthus aeneus	14.40	280	0.54	
Citharus linguatula	12.40	640	0.47	5875
Dentex barnardi	12.40	280	0.47	
Chloroscobrus chrysurus	5.20	40	0.20	
Sardinella aurita	4.40	120	0.17	
Brotula barbata	3.60	80	0.14	
Grammolites gruvelli	3.20	40	0.12	
Stromateus fiatola	3.00	3	0.11	
Serranus accraensis	2.40	40	0.09	
Sepia officinalis hierredda	2.31	6	0.09	
Saurida brasiliensis	0.40	40	0.02	
Total	2662.06		100.03	

PROJECT STATION:2704  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1226  
 start stop duration Long E 1324  
 TIME :09:07:00 09:36:21 29 (min) Purpose code: 3  
 LOG :3233.73 3235.30 1.56 Area code : 2  
 FDEPTH: 94 97 GearCond.code:  
 BDEPTH: 94 97 Validity code: 1  
 Towing dir: 20ø Wire out: 300 m Speed: 30 kn\*10

Sorted: 29 Kg Total catch: 1224.90 CATCH/HOUR: 2534.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	2073.72	84805	81.83	5879
Dentex macrophthalmus	145.97	1026	5.76	5877
Zeus faber	84.72	323	3.34	
Trachurus trecae	76.66	323	3.02	
Umbrina canariensis	43.76	95	1.73	5876
Raja miraletus	38.73	81	1.53	
Selene dorsalis	25.82	81	1.02	
Sphoeroides pachgaster	19.37	81	0.76	
Illex coindetii	9.68	484	0.38	
Boops boops	7.26	242	0.29	
Pagellus bellottii	4.90	101	0.19	5878
Octopus vulgaris	2.54	2	0.10	
Sepia orbignyana	0.77	4	0.03	
Dentex angolensis	0.37	2	0.01	
Total	2534.27		99.99	

PROJECT STATION:2707  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1216  
 start stop duration Long E 1332  
 TIME :14:29:01 14:59:10 30 (min) Purpose code: 3  
 LOG :3265.21 3266.78 1.56 Area code : 2  
 FDEPTH: 74 71 GearCond.code:  
 BDEPTH: 74 71 Validity code: 1  
 Towing dir: 40ø Wire out: 250 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 462.00 CATCH/HOUR: 924.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	435.40	38766	47.12	5882
Pagellus bellottii	352.10	2240	38.11	5883
Umbrina canariensis	97.86	336	10.59	
Dentex barnardi	12.74	70	1.38	
Pomadasys arenatus	7.70	140	0.83	
Chloroscombrus chrysurus	5.88	42	0.64	
Pomadasys incisus	5.46	28	0.59	
Brachydeuterus auritus	2.94	42	0.32	
Boops boops	1.26	42	0.14	
Pterothrissus belloci	1.12	14	0.12	
Engraulis encrasicolus	1.12	140	0.12	
Fistularia petimba	0.42	14	0.05	
Total	924.00		100.01	

PROJECT STATION:2705  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1224  
 start stop duration Long E 1321  
 TIME :10:34:05 10:56:05 22 (min) Purpose code: 3  
 LOG :3240.88 3241.99 1.08 Area code : 2  
 FDEPTH: 110 111 GearCond.code: 9  
 BDEPTH: 110 111 Validity code: 1  
 Towing dir: 15ø Wire out: 320 m Speed: 30 kn\*10

Sorted: 53 Kg Total catch: 159.47 CATCH/HOUR: 434.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomber japonicus	205.09	1931	47.16	
Dentex macrophthalmus	57.41	254	13.20	5881
Umbrina canariensis	48.68	134	11.19	5880
Anthias anthias	20.18	164	4.64	
Trachurus trecae, juvenile	18.44	862	4.24	
Lepidotrigla cadmani	17.45	131	4.01	
Atractoscion aequidens	13.09	8	3.01	
Spicara alta	11.73	71	2.70	
Dentex angolensis	11.45	44	2.63	
Zeus faber	9.95	22	2.29	
Sphoeroides pachgaster	4.34	5	1.00	
Octopus vulgaris	3.33	3	0.77	
Erythrocles monodi	2.73	5	0.63	
Illex coindetii	2.35	115	0.54	
Pagellus bellottii	2.07	5	0.48	
Dentex barnardi	2.05	5	0.47	
Sepia officinalis hierredda	1.96	11	0.45	
Raja miraletus	1.75	3	0.40	
Boops boops	0.60	5	0.14	
Monolene microstoma	0.27	11	0.06	
Total	434.92		100.01	

PROJECT STATION:2708  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1216  
 start stop duration Long E 1327  
 TIME :16:16:22 16:40:14 24 (min) Purpose code: 3  
 LOG :3277.96 3279.19 1.23 Area code : 2  
 FDEPTH: 96 97 GearCond.code: 9  
 BDEPTH: 96 97 Validity code: 1  
 Towing dir: 4ø Wire out: 300 m Speed: 30 kn\*10

Sorted: 60 Kg Total catch: 144.70 CATCH/HOUR: 361.75

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Umbrina canariensis	163.75	1385	45.27	5887
Dentex macrophthalmus	55.50	298	15.34	5884
Dentex angolensis	29.00	158	8.02	5888
Dentex barnardi	29.00	85	8.02	5886
Pagellus bellottii	24.75	108	6.84	5885
Epinephelus aeneus	14.38	3	3.98	
Zeus faber	14.00	35	3.87	
Trichiurus lepturus	7.50	5	2.07	
Lithognathus mormyrus	4.95	5	1.37	
Sparus pagrus africanus *	4.75	5	1.31	
Trigla lyra	4.28	35	1.18	
Chaetodon hoeferli	4.00	23	1.11	
Parapristipoma octolineatum	3.00	5	0.83	
Scorpaena stephanica	2.50	5	0.69	
Citharus linguatula	0.33	13	0.09	
Total	361.69		99.99	

PROJECT STATION:2706  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1217  
 start stop duration Long E 1334  
 TIME :12:57:08 13:28:13 31 (min) Purpose code: 3  
 LOG :3256.91 3258.53 1.60 Area code : 2  
 FDEPTH: 50 41 GearCond.code:  
 BDEPTH: 50 41 Validity code: 1  
 Towing dir: 50ø Wire out: 200 m Speed: 30 kn\*10

Sorted: 93 Kg Total catch: 1537.04 CATCH/HOUR: 2974.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	2045.42	36975	68.76	
Pomadasys peroteti	135.95	279	4.57	
Trachurus trecae, juvenile	126.97	5326	4.27	
Galeoides decadactylus	95.69	495	3.22	
Pomadasys incisus	95.69	774	3.22	
Gymnura altavela	81.29	2	2.73	
Chloroscombrus chrysurus	74.01	836	2.49	
Sphyræna guanchancho	62.86	495	2.11	
Stromateus fiatola	60.39	62	2.03	
Pteroscion peli	42.12	557	1.42	
Lagocephalus laevigatus	26.94	31	0.91	
Pseudotolithus senegalensis	24.77	62	0.83	
Argyrosomus hololepidotus	23.85	31	0.80	
Ilisha africana	18.89	650	0.63	
Selene dorsalis	15.48	186	0.52	
Trichiurus lepturus	13.63	124	0.46	
Lithognathus mormyrus	12.70	124	0.43	
Pagellus bellottii	4.95	31	0.17	
Chaetodon hoeferli	3.41	31	0.11	
Boops boops	3.10	31	0.10	
Sepiella ornata	1.55	62	0.05	
Decapterus rhonchus	1.24	31	0.04	
Citharus linguatula	0.93	31	0.03	
Dicologlossa cuneata	0.31	62	0.01	
Total	2972.14		99.91	

PROJECT STATION:2709  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1215  
 start stop duration Long E 1325  
 TIME :16:40:03 18:20:54 26 (min) Purpose code: 3  
 LOG :3286.57 3287.99 1.40 Area code : 2  
 FDEPTH: 111 112 GearCond.code:  
 BDEPTH: 111 112 Validity code: 1  
 Towing dir: 10ø Wire out: 320 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 394.90 CATCH/HOUR: 911.31

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	392.08	1625	43.02	5889
Atractoscion aequidens	202.85	69	22.26	5891
Boops boops	100.38	1396	11.01	
Umbrina canariensis	60.92	192	6.68	5890
Erythrocles monodi	29.82	141	3.27	
Spicara alta	24.12	152	2.65	
Hoplostethus mediterraneus	19.04	25	2.09	
Chelidonichthys sp.	16.75	152	1.84	
Dentex angolensis	15.23	76	1.67	
Scorpaena elongata	13.96	25	1.53	
Synagrops microlepis	13.96	914	1.53	
MURAENESCICIDAE	8.31	406	0.91	
Dentex barnardi	5.84	25	0.64	
Octopus vulgaris	3.00	2	0.33	
Scomber japonicus	2.65	25	0.29	
Lophiodes kemp	2.03	14	0.22	
Squilla sp.	0.23	14	0.03	
Physiculus sp.	0.07	7	0.01	
Total	911.24		99.98	

PROJECT STATION:2710  
 DATE: 4/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1156 Long E 1320  
 start stop duration Purpose code: 3  
 TIME :21:38:02 22:08:58 31 (min) Area code : 2  
 LOG :3313.59 3315.01 1.43 GearCond.code:  
 FDEPTH: 657 662 Validity code: 1  
 BDEPTH: 657 662  
 Towing dir: 355e Wire out:1620 m Speed: 30 kn\*10

Sorted: 51 Kg Total catch: 51.05 CATCH/HOUR: 98.81

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	42.00	1585	42.51	
Erythrocles monodi	9.83	89	9.95	
Merluccius polli	9.10	10	9.21	
Stomias affinis	8.71	161	8.81	
Yarrella blackfordi	6.58	168	6.66	
Lamprogrammus exutus	4.95	19	5.01	
Necunia sp.	4.90	149	4.96	
Malacocephalus occidentalis	2.57	74	2.60	
POLYCHAELIDAE	2.17	296	2.20	
Chaceon maritae	1.18	2	1.19	
Benthodesmus tenuis	1.12	31	1.13	
Lophiodes kemp	1.12	2	1.13	
Ebinania costaecanarie	1.10	4	1.11	
Aristeus varidens	0.64	89	0.65	
Triplophus hemingi	0.50	75	0.51	
Bathyroconger vicinus	0.45	17	0.46	
CMMASTREPHIDAE	0.35	4	0.35	
ALEPOCEPHALIDAE	0.35	8	0.35	
Talismania bifurcata	0.29	8	0.29	
HISTIOTEUTHIDAE	0.25	2	0.25	
Peristedion cataphractum	0.15	2	0.15	
LIPARIDAE	0.12	2	0.12	
Xenomystax sp.	0.08	4	0.08	
Cubiceps sp.	0.06	2	0.06	
Monomitopus metriostoma	0.06	14	0.06	
Bathypterois quadrifilis	0.06	2	0.06	
OPLOPHORIDAE	0.06	4	0.06	
PSYCHROLUTIDAE	0.02	2	0.02	
Phrynichthys wedli	0.02	4	0.02	
Gonostoma elongatum	0.02	4	0.02	
Total	98.81		99.98	

PROJECT STATION:2713  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1158 Long E 1330  
 start stop duration Purpose code: 3  
 TIME :05:11:27 05:41:16 30 (min) Area code : 2  
 LOG :3341.67 3343.07 1.39 GearCond.code:  
 FDEPTH: 264 266 Validity code: 1  
 BDEPTH: 264 266  
 Towing dir: 14e Wire out: 750 m Speed: 30 kn\*10

Sorted: 46 Kg Total catch: 320.08 CATCH/HOUR: 640.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	309.40	1666	48.33	5892
Merluccius polli	130.20	1596	20.34	5893
Chlorophthalmus atlanticus	114.10	3472	17.82	
Synagrops microlepis	30.60	2702	4.78	
Parapenaeus longirostris, fem.	17.08	2730	2.67	5894
Parapenaeus longirostris, male	16.10	2646	2.51	5895
Illex coindetii	6.30	84	0.98	
Hoplostethus mediterraneus	5.04	28	0.79	
Pterothrissus bellotti	3.64	28	0.57	
Trichiurus lepturus	3.22	70	0.50	
Parasudis sp.	1.68	28	0.26	
Nezumia aequalis	1.12	14	0.17	
Ommastrephes pteropus	0.56	14	0.09	
Bassanago albescens	0.56	28	0.09	
Epigonus telescopus	0.56	28	0.09	
Total	640.16		99.99	

PROJECT STATION:2714  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1159 Long E 1332  
 start stop duration Purpose code: 3  
 TIME :06:53:11 07:23:34 30 (min) Area code : 2  
 LOG :3349.31 3350.82 1.51 GearCond.code:  
 FDEPTH: 101 106 Validity code: 1  
 BDEPTH: 101 106  
 Towing dir: 360e Wire out: 305 m Speed: 30 kn\*10

Sorted: 36 Kg Total catch: 1480.36 CATCH/HOUR: 2960.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	2744.00	112560	92.68	5900
Illex coindetii	57.60	1680	1.95	
Chaetodon hoefleri	41.60	80	1.41	
Dentex angolensis	30.60	124	1.03	5898
Dentex macrophthalmus	24.20	134	0.82	5897
Squatina oculata	14.24	2	0.48	
Umbrina canariensis	11.70	32	0.40	5896
Dentex barnardi	10.30	36	0.35	5899
Sarda sarda	5.24	4	0.18	
Raja miraletus	4.50	6	0.15	
Pseudupeneus prayensis	3.48	16	0.12	
Trichiurus sp.	3.40	2	0.11	
Brotula barbata	2.68	2	0.09	
Dentex congoensis	2.58	14	0.09	
Pagellus bellottii	2.34	10	0.08	
Sparus pagrus africanus *	2.26	4	0.08	
Total	2960.72		100.02	

PROJECT STATION:2715  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1201 Long E 1337  
 start stop duration Purpose code: 3  
 TIME :08:51:04 09:20:05 29 (min) Area code : 2  
 LOG :3360.30 3361.74 1.44 GearCond.code:  
 FDEPTH: 70 73 Validity code: 1  
 BDEPTH: 70 73  
 Towing dir: 360e Wire out: 220 m Speed: 30 kn\*10

Sorted: 55 Kg Total catch: 410.68 CATCH/HOUR: 849.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	724.76	36244	85.30	5904
Dentex barnardi	58.34	265	6.87	5901
Pagellus bellottii	25.66	163	3.02	5902
Pomadasys incisus	8.38	46	0.99	5903
Dentex gibbosus	7.18	19	0.85	
Epinephelus aeneus	5.48	2	0.64	
Umbrina canariensis	4.34	12	0.51	
Lagocephalus laevigatus	4.03	14	0.47	
Atractoscion aequidens	2.30	2	0.27	
Chaetodon hoefleri	2.15	14	0.25	
Zeus faber	2.15	2	0.25	
Priacanthus arenatus	1.61	27	0.19	
Trichiurus lepturus	1.14	2	0.13	
Fistularia petimba	1.08	2	0.13	
Boops boops	0.68	27	0.08	
Citharus linguatula	0.41	27	0.05	
Total	849.69		100.00	

PROJECT STATION:2712  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1156 Long E 1323  
 start stop duration Purpose code: 3  
 TIME :02:08:18 02:38:10 30 (min) Area code : 2  
 LOG :3326.79 3328.30 1.51 GearCond.code:  
 FDEPTH: 471 477 Validity code: 1  
 BDEPTH: 471 477  
 Towing dir: 350e Wire out:1270 m Speed: 30 kn\*10

Sorted: 27 Kg Total catch: 134.90 CATCH/HOUR: 269.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	155.00	5210	57.45	
Hoplostethus cadenati	63.90	3460	23.68	
Stomias affinis	21.50	420	7.97	
Benthodesmus tenuis	8.20	280	3.04	
Triplophus hemingi	4.40	630	1.63	
Laemonema laureysi	3.30	150	1.22	
Illex coindetii	3.00	20	1.11	
Coelorrhinchus coelorrhinchus	2.00	50	0.74	
Gadella imberbis	1.70	70	0.63	
Xenodermichthys copei	1.60	170	0.59	
Plesionika martia	1.40	420	0.52	
Onychoteuthis banksi	0.90	20	0.33	
CERATIIDAE	0.70	10	0.26	
Aristeus varidens	0.60	110	0.22	
MYCTOPHIDAE	0.40	80	0.15	
Lamprogrammus exutus	0.40	30	0.15	
Nemichthys scolopaceus	0.40	20	0.15	
Chaunax pictus	0.20	10	0.07	
Zenion hololepis	0.10	10	0.04	
POLYCHAELIDAE	0.10	30	0.04	
Total	269.80		99.99	

PROJECT STATION:2716  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1202  
 start stop duration Long E 1339  
 TIME :10:19:02 10:39:11 20 (min) Purpose code: 3  
 LOG :3367.46 3368.52 1.06 Area code : 2  
 FDEPTH: 49 54 GearCond.code: 9  
 BDEPTH: 49 54 Validity code: 1  
 Towing dir: 355° Wire out: 160 m Speed: 30 kn\*10

Sorted: 60 Kg Total catch: 517.32 CATCH/HOUR: 1551.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	663.30	10077	42.74	
Trichiurus lepturus	460.35	1077	29.66	
Trachurus trecae	357.30	19854	23.02	5905
Pagellus bellottii	19.50	117	1.26	5906
Stromateus fiatola	14.40	18	0.93	
Chloroscombrus chrysurus	12.78	90	0.82	
Sepia officinalis hierredda	8.82	18	0.57	
Chaetodon hoeffleri	2.70	18	0.17	
Pomadasy incisus	2.70	36	0.17	
Engraulis encrasicolus	1.98	180	0.13	
Selene dorsalis	1.98	18	0.13	
Sphyraena sphyraena	1.26	18	0.08	
Dentex barnardi	1.11	6	0.07	
Pteroscion pelli	1.08	18	0.07	
Citharus linguatula	0.90	18	0.06	
Fistularia petimba	0.72	18	0.05	
Umbrina canariensis	0.72	18	0.05	
Boops boops	0.36	18	0.02	
Total	1551.96		100.00	

PROJECT STATION:2717  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1147  
 start stop duration Long E 1345  
 TIME :12:27:59 12:57:52 30 (min) Purpose code: 3  
 LOG :3383.64 3385.24 1.59 Area code : 2  
 FDEPTH: 28 26 GearCond.code: 1  
 BDEPTH: 28 26 Validity code: 1  
 Towing dir: 9° Wire out: 160 m Speed: 30 kn\*10

Sorted: 50 Kg Total catch: 72.95 CATCH/HOUR: 145.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	90.00	8694	61.69	
Alectis alexandrinus	19.30	24	13.23	
Decapterus rhonchus	11.94	396	8.18	5908
Rhinobatos albomaculatus	6.66	6	4.56	
Trachurus trecae	5.98	480	3.82	5907
Dentex barnardi	2.64	90	1.81	
Pomadasy jubelini	2.40	4	1.64	
Sardinella maderensis	1.74	36	1.19	
Sardinella aurita	1.68	36	1.15	
Selene dorsalis	1.38	6	0.95	
Sphyraena guachancho	1.02	60	0.70	
Engraulis encrasicolus	0.54	96	0.37	
Plectorhynchus mediterraneus	0.42	18	0.29	
Trachinotus ovatus	0.36	6	0.25	
Galeoides decadactylus	0.24	6	0.16	
Total	145.90		99.99	

PROJECT STATION:2718  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1147  
 start stop duration Long E 1341  
 TIME :14:30:23 14:59:34 29 (min) Purpose code: 3  
 LOG :3398.18 3399.74 1.56 Area code : 2  
 FDEPTH: 66 65 GearCond.code: 1  
 BDEPTH: 66 65 Validity code: 1  
 Towing dir: 360° Wire out: 210 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 495.68 CATCH/HOUR: 1025.55

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	357.68	16870	34.88	5909
Brachydeuterus auritus	232.76	2965	22.70	
Pagellus bellottii	227.34	1752	22.17	5910
Trichiurus lepturus	45.79	93	4.46	
Stromateus fiatola	42.52	46	4.15	
Sepia officinalis hierredda	32.75	31	3.19	
Sphyraena guachancho	22.51	108	2.19	
Chloroscombrus chrysurus	13.66	93	1.33	
Priacanthus arenatus	11.96	201	1.17	
Lagocephalus laevigatus	8.59	14	0.85	
Bemrops heterurus	5.13	46	0.50	
Sardinella maderensis	4.20	4	0.41	
Pomadasy incisus	4.20	31	0.41	
Umbrina canariensis	3.72	14	0.36	
Dentex barnardi	3.72	14	0.36	
Lithognathus mormyrus	2.92	4	0.28	
Selene dorsalis	2.17	14	0.21	
Brotula barbata	2.01	31	0.20	
Citharus linguatula	1.66	14	0.16	
Saurida brasiliensis	0.17	14	0.02	
Total	1025.56		100.00	

PROJECT STATION:2719  
 DATE: 5/ 3/02 GEAR TYPE: BT No: 1 POSITION:Lat S 1146  
 start stop duration Long E 1333  
 TIME :16:34:24 17:03:04 29 (min) Purpose code: 3  
 LOG :3411.58 3412.96 1.37 Area code : 2  
 FDEPTH: 110 111 GearCond.code: 1  
 BDEPTH: 110 111 Validity code: 1  
 Towing dir: 340° Wire out: 340 m Speed: 30 kn\*10

Sorted: 30 Kg Total catch: 989.67 CATCH/HOUR: 2047.59

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1588.97	77524	77.60	5912
Illex coindetii	268.76	11297	13.13	
Trichiurus lepturus	112.34	1179	5.49	
Dentex angolensis	15.00	68	0.73	5911
Zeus faber	14.90	124	0.73	
Pagellus bellottii	10.45	6	0.51	
Dentex macrophthalmus	10.41	60	0.51	5914
Umbrina canariensis	8.59	23	0.42	5913
Synagrops microlepis	7.43	1322	0.36	
Citharus linguatula	3.72	62	0.18	
Brotula barbata	3.62	4	0.18	
Priacanthus arenatus	2.48	62	0.12	
Saurida brasiliensis	0.62	248	0.03	
Dentex barnardi	0.31	2	0.02	
Total	2047.60		100.01	

PROJECT STATION:2720  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1145  
 start stop duration Long E 1329  
 TIME :18:00:06 19:01:11 29 (min) Purpose code: 3  
 LOG :3423.35 3424.73 1.38 Area code : 2  
 FDEPTH: 161 160 GearCond.code: 1  
 BDEPTH: 161 160 Validity code: 1  
 Towing dir: 340° Wire out: 480 m Speed: 30 kn\*10

Sorted: 88 Kg Total catch: 309.47 CATCH/HOUR: 640.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	197.59	565	30.86	
Brotula barbata	102.83	101	16.06	
Merluccius polli	57.93	536	9.05	5917
Umbrina canariensis	49.97	87	7.80	5916
Pterochrissus bellocci	49.24	232	7.69	
Illex coindetii	27.93	312	4.36	
Trigla lyra	23.17	95	3.62	
Dentex angolensis	22.80	37	3.56	
Scorpaena normani	16.66	72	2.60	
Trachurus trecae	13.45	391	2.10	5918
Dentex macrophthalmus	13.32	58	2.08	
Raja miraletus	13.24	14	2.07	
Bembrops greyi	10.51	81	1.64	
Bassanago albescens	7.68	246	1.20	
Scylliorhinus cervigoni	7.66	246	1.20	
Peristedion cataphractum	4.63	72	0.72	
Citharus linguatula	4.63	130	0.72	5915
Zenopsis conchifer	4.55	37	0.71	
Parapenaeus longirostris, fem.	3.48	892	0.54	5920
Scomber scombrus	3.31	14	0.52	
Saurida brasiliensis	2.90	29	0.45	
Parapenaeus longirostris, male	2.75	646	0.43	5919
Squilla mantis	0.06	8	0.01	
Total	640.29		99.99	

PROJECT STATION:2721  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1145  
 start stop duration Long E 1323  
 TIME :20:00:37 21:00:52 29 (min) Purpose code: 3  
 LOG :3434.69 3436.10 1.40 Area code : 2  
 FDEPTH: 349 356 GearCond.code: 1  
 BDEPTH: 349 356 Validity code: 1  
 Towing dir: 345° Wire out: 980 m Speed: 30 kn\*10

Sorted: 267 Kg Total catch: 165.50 CATCH/HOUR: 342.41

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hymenocephalus italicus	100.86	10210	29.46	
LUTJANIDAE	87.41	848	25.53	
Merluccius polli	65.90	137	19.25	5921
Nematocarcinus africanus	50.59	33672	14.77	
Deania profundorum	14.59	331	4.26	
Malacocephalus occidentalis	13.45	93	3.93	
Bassanago albescens	3.10	52	0.91	
Coelorrhinus coelorrhinus	2.28	52	0.67	
Aristeus varidens, male	1.45	186	0.42	5922
Peristedion cataphractum	1.24	10	0.36	
Parapenaeus longirostris	0.52	103	0.15	
Solenocera africana	0.41	41	0.12	
Aristeus varidens, female	0.41	62	0.12	5923
Shrimps, small, non comm.	0.21	41	0.06	
Total	342.42		100.01	

PROJECT STATION:2722  
 DATE: 5/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1144  
 start stop duration Long E 1318  
 TIME :23:21:02 23:51:39 31 (min) Purpose code: 3  
 LOG :3447.57 3449.01 1.42 Area code : 2  
 FDEPTH: 674 672 GearCond.code: 1  
 BDEPTH: 674 672 Validity code: 1  
 Towing dir: 350° Wire out:1650 m Speed: 30 kn\*10

Sorted: 24 Kg Total catch: 198.32 CATCH/HOUR: 383.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	249.29	163	64.94	
Nematocarcinus africanus	37.01	8888	9.64	
Yarella blackfordi	26.79	697	6.98	
Merluccius polli	9.97	14	2.60	
Lamprogrammus exutus	8.36	15	2.18	
Moroteuthis roboni	7.74	15	2.02	
Hymenocephalus italicus	7.74	914	2.02	
Stomias affinis	5.88	124	1.53	
Nezumia sp.	4.80	186	1.25	
POLYCHAELIDAE	4.03	480	1.05	
Todaropsis eblanae	2.94	15	0.77	
Benthodesmus tenuis	2.63	77	0.69	
Bathyrhoconger vicinus	2.01	62	0.52	
Aristeus varidens, male	2.01	279	0.52	5925
Monomipterus metriostoma	1.70	186	0.44	
Triplophus hemingi	1.55	186	0.40	
Xenodermichthys copei	1.39	93	0.36	
Aristeus varidens, female	1.39	108	0.36	5924
Bajacalifornia magalops	1.24	31	0.32	
Gadella imberbis	1.24	31	0.32	
Talismania bifurcata	0.93	46	0.24	
Himantolophus groenlandicus	0.83	2	0.22	
NEMATOCARCINIDAE	0.77	15	0.20	
Melanocetus johnsoni	0.62	31	0.16	
ZOARCIDAE	0.62	31	0.16	
Chaceon maritae	0.35	2	0.09	
Total	383.83		99.98	

PROJECT STATION:2723  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1130  
 start stop duration Long E 1322  
 TIME :02:23:21 02:53:12 30 (min) Purpose code: 3  
 LOG :3452.50 3463.98 1.46 Area code : 2  
 FDEPTH: 351 354 GearCond.code:  
 BDEPTH: 351 354 Validity code: 1  
 Towing dir: 200 Wire out:1050 m Speed: 30 kn\*10

Sorted: 28 Kg Total catch: 148.40 CATCH/HOUR: 296.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Laemonema laureysi	63.90	1100	21.53
Nematocarcinus africanus	63.50	4150	21.39
Hoplostethus cadenati	62.00	2690	20.89
Yarrella blackfordi	35.50	1360	11.96
Etmopterus lucifer	15.60	960	5.26
Merluccius polli	11.00	24	3.71
Hymenocephalus italicus	6.40	790	2.16
Trichiurus lepturus	4.70	150	1.58
Todaropsis eblanae	3.70	20	1.25
Ommastrephes bartrami	3.60	10	1.21
Pterothrissus belloci	3.60	18	1.21
Synagrops microlepis	3.50	210	1.18
Malacocephalus occidentalis	3.30	40	1.11
Triplophus hemingi	2.10	180	0.71
Chlorophthalmus atlanticus	1.70	30	0.57
Onychoteuthis banksi	1.60	30	0.54
Bassanago albacens	1.60	40	0.54
Lophius vaillanti	1.50	20	0.51
Helicolenus dactylopterus	1.20	110	0.40
Chaunax pictus	1.10	90	0.37
Bathynectes piperitus	0.90	10	0.30
POLYCHAETIDAE	0.80	90	0.27
Aristeus varidens, male	0.80	130	0.27
Nezumia sp.	0.80	40	0.27
Aristeus varidens, female	0.60	130	0.20
GALATHEIDAE	0.50	50	0.17
Peristedion cataphractum	0.50	40	0.17
Halosaurus ovenii	0.40	10	0.13
MYCTOPHIDAE	0.40	300	0.13
Total	296.80	99.99	

PROJECT STATION:2724  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1132  
 start stop duration Long E 1330  
 TIME :05:28:21 05:43:40 15 (min) Purpose code: 3  
 LOG :3475.17 3475.94 0.77 Area code : 2  
 FDEPTH: 103 102 GearCond.code: 9  
 BDEPTH: 103 102 Validity code: 1  
 Towing dir: 330 Wire out: 300 m Speed: 30 kn\*10

Sorted: 7 Kg Total catch: 790.80 CATCH/HOUR: 3163.20

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Synagrops microlepis	2450.80	307472	77.48
Trachurus trecae	272.80	15048	8.62
Dentex macrophthalmus	228.80	1488	7.23
Umbrina canariensis	42.60	104	1.35
Illex coindetii	36.96	2024	1.17
Trichiurus lepturus	35.60	60	1.13
Merluccius polli	25.52	528	0.81
Citharus linguatula	17.20	240	0.54
Pagellus bellottii	16.32	64	0.52
Zeus faber	12.32	88	0.39
Trigla lyra	10.56	88	0.33
Pterothrissus belloci	6.16	88	0.19
Dentex angolensis	5.80	28	0.18
Boops boops	1.76	88	0.06
Total	3163.20	100.00	

PROJECT STATION:2725  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1132  
 start stop duration Long E 1335  
 TIME :06:55:00 07:11:57 17 (min) Purpose code: 3  
 LOG :3484.30 3485.16 0.85 Area code : 2  
 FDEPTH: 61 56 GearCond.code: 9  
 BDEPTH: 61 56 Validity code: 1  
 Towing dir: 350 Wire out: 190 m Speed: 30 kn\*10

Sorted: 69 Kg Total catch: 834.07 CATCH/HOUR: 2943.78

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Trachurus trecae	2367.53	136122	80.42
Pagellus bellottii	380.33	2456	12.92
Sphyraena sphyraena	55.91	254	1.90
Raja miraletus	37.27	42	1.27
Sardinella aurita - Juveniles	27.95	551	0.95
Lithognathus mormyrus	23.29	42	0.79
Pomadasy incisus	12.71	85	0.43
Fistularia tabacaria	9.74	42	0.33
Decapterus rhonchus	7.62	127	0.26
Brachydeuterus auritus	7.62	127	0.26
Boops boops	7.62	339	0.26
Trichiurus lepturus	6.18	11	0.21
Total	2943.77	100.00	

PROJECT STATION:2726  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1132  
 start stop duration Long E 1339  
 TIME :08:18:06 08:47:18 29 (min) Purpose code: 3  
 LOG :3491.93 3493.48 1.54 Area code : 2  
 FDEPTH: 42 42 GearCond.code:  
 BDEPTH: 42 42 Validity code: 1  
 Towing dir: 345 Wire out: 160 m Speed: 30 kn\*10

Sorted: Kg Total catch: 126.59 CATCH/HOUR: 261.91

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Pomadasy incisus	131.69	542	50.28
Decapterus rhonchus	40.39	1109	15.42
Lithognathus mormyrus	18.72	39	7.15
Sphyraena sphyraena	13.14	29	5.02
Trachurus trecae	12.52	817	4.78
Chloroscombus chrysurus	10.86	12	4.15
Octopus vulgaris	5.59	2	2.13
Plectorhynchus mediterraneus	5.59	17	2.13
Dentex barnardi	4.55	17	1.74
Alectis alexandrinus	4.20	4	1.60
Parapristipoma octolineatum	4.12	8	1.57
Sardinella aurita	2.28	64	0.87
Atractoscion aequidens	2.11	2	0.81
Citharus linguatula	1.97	10	0.75
Scomberomorus tritor	1.59	2	0.61
Pseudupeneus prayensis	1.10	6	0.42
Pagrus caeruleostictus	0.83	2	0.32
Trigla lyra	0.48	2	0.18
BOTHIDAE	0.21	2	0.08
Total	261.94	100.01	

PROJECT STATION:2727  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1132  
 start stop duration Long E 1343  
 TIME :09:57:43 10:26:27 29 (min) Purpose code: 3  
 LOG :3501.82 3503.36 1.53 Area code : 2  
 FDEPTH: 28 27 GearCond.code:  
 BDEPTH: 28 27 Validity code: 1  
 Towing dir: 350 Wire out: 120 m Speed: 30 kn\*10

Sorted: 47 Kg Total catch: 212.34 CATCH/HOUR: 439.32

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Ilisha africana	103.86	2996	23.64
Galeoides decadactylus	79.03	323	17.99
Pteroscion pelli	48.41	1225	11.02
Pseudotolithus typus	48.10	97	10.95
Trichiurus lepturus	36.33	778	8.27
Dicologlossa cuneata	26.40	439	6.01
Panulirus regius	14.90	8	3.39
Penaeus notialis	14.48	257	3.30
Selene dorsalis	12.91	1068	2.94
Stromateus fiatola	11.09	58	2.52
Chloroscombus chrysurus	10.10	149	2.30
Pentapemus quinquarius	5.21	83	1.19
Trachurus trecae	5.05	281	1.15
Sphyraena guachancho	4.63	58	1.05
Gymnura altavela	4.55	2	1.04
Sepia officinalis hierredda	4.39	207	1.00
Pomadasy incisus	3.56	33	0.81
Sardinella maderensis	2.32	124	0.53
Sardinella aurita	1.74	58	0.40
Bembrops heterurus	1.16	17	0.26
Dasyatis margarita	0.68	2	0.15
Umbrina canariensis	0.33	33	0.08
Engraulis encrasicolus	0.08	17	0.02
Total	439.31	100.01	

PROJECT STATION:2728  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1116  
 start stop duration Long E 1345  
 TIME :12:08:45 12:16:50 8 (min) Purpose code: 3  
 LOG :3518.05 3518.52 0.46 Area code : 2  
 FDEPTH: 23 24 GearCond.code: 9  
 BDEPTH: 23 24 Validity code: 4  
 Towing dir: 27 Wire out:2103 m Speed: 30 kn\*10

Sorted: 63 Kg Total catch: 287.04 CATCH/HOUR: 2152.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Sphyraena guachancho	826.50	1680	38.39
Brachydeuterus auritus	472.50	5580	21.95
Pomadasy incisus	149.70	1830	6.95
Chlorophthalmus atlanticus	138.90	1500	6.45
Galeoides decadactylus	133.50	720	6.20
Pseudotolithus typus	97.50	8	4.53
Gymnura micrura	93.38	15	4.34
Ilisha africana	55.80	1500	2.59
Pteroscion pelli	45.60	1200	2.12
Rhizoprionodon acutus	40.80	23	1.90
Pseudotolithus senegalensis	18.00	30	0.84
Selene dorsalis	17.10	720	0.79
Panulirus regius	16.35	38	0.76
Arius parkii	9.90	30	0.46
Trichiurus lepturus	9.60	300	0.45
Lithognathus mormyrus	9.60	60	0.45
Drepane africana	5.70	23	0.26
Pomadasy jubelini	4.35	8	0.20
Pomadasy peroteti	3.53	8	0.16
Pentapemus quinquarius	2.10	60	0.10
Sepiella ornata	1.20	60	0.06
Pseudupeneus prayensis	0.60	30	0.03
Engraulis encrasicolus	0.30	30	0.01
Sphaeroides "marmor"	0.30	8	0.01
Total	2152.81	100.00	

PROJECT STATION:2729  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1116  
 start stop duration Long E 1342  
 TIME :13:15:52 13:44:26 29 (min) Purpose code: 3  
 LOG :3524.09 3525.51 1.40 Area code : 2  
 FDEPTH: 20 21 GearCond.code:  
 BDEPTH: 20 21 Validity code: 1  
 Towing dir: 6 Wire out: 120 m Speed: 30 kn\*10

Sorted: 4 Kg Total catch: 4.18 CATCH/HOUR: 8.65

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Balistes capricus	4.70	8	54.34
Rhizoprionodon acutus	1.53	2	17.69
Xyrichtys novacula	0.83	4	9.60
Brachydeuterus auritus	0.83	10	9.60
Sphyraena guachancho	0.46	4	5.32
Fistularia petimba	0.31	10	3.58
Total	8.66	100.13	

PROJECT STATION:2730  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1113  
 start stop duration Long E 1338  
 TIME :14:56:16 15:16:14 20 (min) Purpose code: 3  
 LOG :3534.48 3535.46 0.97 Area code : 2  
 FDEPTH: 113 116 GearCond.code: 9  
 BDEPTH: 113 116 Validity code: 1  
 Towing dir: 200 Wire out: 345 m Speed: 30 kn\*10

Sorted: 30 Kg Total catch: 493.18 CATCH/HOUR: 1479.54

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight	numbers		
Synagrops microlepis	1370.40	167610	92.62
Trachurus trecae	37.92	1248	2.56
Brotula barbata	28.95	42	1.96
Pterothrissus belloci	25.44	528	1.72
Dentex macrophthalmus	5.49	30	0.37
Zeus faber	2.88	48	0.19
Ommastrephes bartrami	1.92	96	0.13
Dentex angolensis	1.89	6	0.13
Pagellus bellottii	1.53	6	0.10
Illex coindetii	1.44	96	0.10
Parapenaeus longirostris	0.96	336	0.06
GOBIIDAE	0.48	96	0.03
Citharus linguatula	0.24	3	0.02
Total	1479.54	99.99	



PROJECT STATION:2731  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1113 Long E 1336  
 start stop duration Purpose code: 3  
 TIME :16:27:31 16:57:11 30 (min) Area code : 2  
 LOG :3542.39 3543.89 1.49 GearCond.code: 1  
 FDEPTH: 144 151 Validity code: 1  
 BDEPTH: 144 151  
 Towing dir: 190° Wire out: 450 m Speed: 30 kn\*10  
 Sorted: 57 Kg Total catch: 256.14 CATCH/HOUR: 512.28

PROJECT STATION:2735  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1055 Long E 1344  
 start stop duration Purpose code: 3  
 TIME :07:20:29 07:35:37 15 (min) Area code : 2  
 LOG :3635.93 3636.68 0.73 GearCond.code: 9  
 FDEPTH: 52 53 Validity code: 1  
 BDEPTH: 52 53  
 Towing dir: 340° Wire out: 160 m Speed: 30 kn\*10  
 Sorted: 70 Kg Total catch: 1499.86 CATCH/HOUR: 5999.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	256.00	19666	49.97	
Merluccius polli	153.00	3680	29.87	5941
Pterothrissus bellocci	40.50	864	7.91	
Parapenaeus longirostris, fem.	12.48	3564	2.44	5943
Zenopsis conchifer	11.70	154	2.28	
Illex coindetii	10.62	316	2.07	
Brotula barbata	8.60	18	1.68	
Parapenaeus longirostris, male	4.60	2214	0.90	5942
Trachurus trecae	3.42	28	0.67	
Dentex macrophthalmus	2.60	10	0.51	
Scomberomorus tritor	2.34	18	0.46	
MYCTOPHIDAE	1.88	432	0.37	
Dentex angolensis	1.26	10	0.25	
Calappa pelii	0.98	10	0.19	
Monolene microstoma	0.80	18	0.16	
Bembrops greyi	0.54	10	0.11	
Squilla mantis	0.44	118	0.09	
Thorogobius angolensis	0.44	36	0.09	
Total	512.20		100.02	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	5018.12	88752	83.64	5949
Trichiurus lepturus	236.52	2152	3.94	
Arius parkii	129.00	88	2.15	
Galeoides decadactylus	127.28	688	2.12	
Atractoscion aequidens	103.20	88	1.72	
Pseudolithus senegalensis	94.60	88	1.58	
STROMATEIDAE	81.68	88	1.35	
Trachurus trecae	73.12	172	1.22	
Sardinella aurita	63.64	1548	1.06	
Pomadasys incisus	29.24	172	0.49	
Selene dorsalis	19.80	172	0.33	
Citharus linguatula	8.08	160	0.13	5950
GOBIIDAE	6.04	604	0.10	
Dicologlossa cuneata	4.52	36	0.08	5951
Ilisha africana	4.32	88	0.07	
Penaeus notialis	0.28	4		
Total	5999.44		99.99	

PROJECT STATION:2732  
 DATE: 6/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1115 Long E 1328  
 start stop duration Purpose code: 3  
 TIME :19:00:23 19:30:23 30 (min) Area code : 2  
 LOG :3557.86 3559.22 1.35 GearCond.code: 1  
 FDEPTH: 529 540 Validity code: 1  
 BDEPTH: 529 540  
 Towing dir: 5° Wire out: 1300 m Speed: 30 kn\*10  
 Sorted: 23 Kg Total catch: 114.50 CATCH/HOUR: 229.00

PROJECT STATION:2736  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1055 Long E 1335  
 start stop duration Purpose code: 3  
 TIME :08:55:19 09:26:29 31 (min) Area code : 2  
 LOG :3645.95 3647.59 1.63 GearCond.code: 1  
 FDEPTH: 115 114 Validity code: 1  
 BDEPTH: 115 114  
 Towing dir: 350° Wire out: 360 m Speed: 30 kn\*10  
 Sorted: 83 Kg Total catch: 455.70 CATCH/HOUR: 882.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	112.00	20000	48.91	
Hoplostethus cadenati	45.80	7800	20.00	
Lamprogrammus exutus	25.90	600	11.31	
Yarella blackfordi	17.60	420	7.69	
Triplophos sp.	8.80	1100	3.84	
Stomias boa boa	6.70	130	2.93	
Xenodermichthys copei	2.90	160	1.27	
STOMIIDAE	2.80	50	1.22	
Gadella imberbis	2.80	130	1.22	
Aristeus varidens, male	1.30	190	0.57	5945
TRICHIURIDAE	0.80	20	0.35	
Aristeus varidens, female	0.70	50	0.31	5944
Deania profundorum	0.60	10	0.26	
POLYCHAELIDAE	0.30	60	0.13	
Total	229.00		100.01	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	356.61	3397	40.43	
Brotula barbata	183.10	161	20.76	
Brachydeuterus auritus	142.65	830	16.17	5952
Synagrops microlepis	53.61	6569	6.08	
Dentex angolensis	52.65	182	5.97	5953
Trachurus trecae	22.35	799	2.53	5954
Zeus faber	14.90	85	1.69	
Dentex canariensis	12.77	43	1.45	
Uranoscopus albesca	12.23	43	1.39	
Merluccius polli	7.97	139	0.90	
Dentex macrophthalmus	4.47	21	0.51	
Illex coindetii	3.74	56	0.42	
Dentex barnardi	3.50	12	0.40	
Miracostea angolensis	3.29	12	0.37	
Pterothrissus bellocci	3.29	97	0.37	
Parapenaeus longirostris, fem.	3.19	681	0.36	5956
Parapenaeus longirostris, male	1.06	310	0.12	5955
Dicologlossa cuneata	0.54	21	0.06	
Citharus linguatula	0.21	21	0.02	
Total	882.13		100.00	

PROJECT STATION:2733  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1057 Long E 1328  
 start stop duration Purpose code: 3  
 TIME :01:37:33 02:07:03 30 (min) Area code : 2  
 LOG :3601.20 3602.69 1.50 GearCond.code: 1  
 FDEPTH: 356 355 Validity code: 1  
 BDEPTH: 356 355  
 Towing dir: 330° Wire out: 160 m Speed: 30 kn\*10  
 Sorted: 24 Kg Total catch: 150.08 CATCH/HOUR: 300.16

PROJECT STATION:2737  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1038 Long E 1340  
 start stop duration Purpose code: 3  
 TIME :11:41:25 12:11:01 39 (min) Area code : 2  
 LOG :3667.51 3669.06 1.56 GearCond.code: 1  
 FDEPTH: 30 30 Validity code: 1  
 BDEPTH: 30 30  
 Towing dir: 145° Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 61 Kg Total catch: 308.09 CATCH/HOUR: 616.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	204.00	53022	67.96	
Laemonema laureysi	36.36	504	12.11	
Merluccius polli	13.60	30	4.53	5946
Hoplostethus mediterraneus	7.80	276	2.60	
Bassanago albescens	7.44	156	2.48	
Etmopterus polli	6.48	420	2.16	
Chaunax pictus	4.20	252	1.40	
Benthodesmus tenuis	3.60	36	1.20	
Nemichthys scolopaceus	3.60	24	1.20	
Hymenocephalus italicus	3.48	300	1.16	
Ommastrephes bartramii	1.68	24	0.56	
Triplophus hemingi	1.32	1032	0.44	
Isistius brasiliensis	1.08	12	0.36	
Lophius vaillanti	0.96	12	0.32	
Solenocera africana	0.96	96	0.32	
Stomias affinis	0.84	24	0.28	
Malacocephalus laevis	0.72	12	0.24	
Yarella blackfordi	0.48	24	0.16	
Dibranchius atlanticus	0.48	36	0.16	
Parapenaeus longirostris	0.36	60	0.12	
Aristeus varidens	0.36	36	0.12	
MYCTOPHIDAE	0.12	84	0.04	
Gadella imberbis	0.12	12	0.04	
Peristedion cataphractum	0.12	24	0.04	
Total	300.16		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	146.00	3132	23.69	
Galeoides decadactylus	123.00	796	19.96	
Trichiurus lepturus	117.50	550	19.07	
Brachydeuterus auritus	98.00	1458	15.90	
Pseudolithus typus	48.80	150	7.92	5957
Ilisha africana	22.90	700	3.72	
Pteroscion pelli	15.60	320	2.53	
Stromateus fiatola	14.70	30	2.39	
Pomadasys incisus	13.10	210	2.13	
Illex coindetii	5.00	60	0.81	
Pomadasys jubelini	3.10	10	0.50	
Selene dorsalis	2.00	60	0.32	
Sepia orbignyana	1.90	110	0.31	
Penaeus notialis, Female	1.54	28	0.25	5959
Umbrina canariensis	1.40	30	0.23	
Dicologlossa cuneata	1.00	10	0.16	
Dentex barnardi	0.40	10	0.06	
Penaeus notialis, male	0.34	12	0.06	5958
Total	616.28		100.01	

PROJECT STATION:2734  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1051 Long E 1345  
 start stop duration Purpose code: 3  
 TIME :05:42:35 06:12:07 30 (min) Area code : 2  
 LOG :3627.60 3629.19 1.56 GearCond.code: 1  
 FDEPTH: 35 40 Validity code: 1  
 BDEPTH: 35 40  
 Towing dir: 310° Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 39 Kg Total catch: 328.25 CATCH/HOUR: 656.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pterothrissus bellocci	149.80	2184	22.82	
Trichiurus lepturus	119.60	378	18.22	
Gymnura micrura	110.00	2	16.76	
Galeoides decadactylus	79.80	476	12.16	
Pomadasys jubelini	49.60	56	7.56	
Pseudolithus typus	29.40	84	4.48	
Sardinella aurita	27.72	700	4.22	5947
Brachydeuterus auritus	25.90	462	3.95	
Pomadasys jubelini	19.88	168	3.03	
Chloroscombrus chrysurus	14.42	182	2.20	
Atractoscion aequidens	14.00	14	2.13	
Dicologlossa cuneata	8.40	234	1.28	5948
Ilisha africana	5.58	158	1.00	
Grammolitoides gruvelli	0.98	42	0.15	
Pseudolithus senegalensis	0.28	14	0.04	
Penaeus notialis	0.12	4	0.02	
Parapenaeopsis atlantica	0.02	14		
Total	656.50		100.02	

PROJECT STATION: 2738  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1039 Long E 1338  
 start stop duration  
 TIME :13:14:03 13:44:03 30 (min) Purpose code: 3  
 LOG :3675.87 3677.47 1.60 Area code : 2  
 FDEPTH: 46 47 GearCond.code:  
 BDEPTH: 46 47 Validity code: 1  
 Towing dir: 160° Wire out: 160 m Speed: 30 kn\*10

Sorted: 41 Kg Total catch: 268.86 CATCH/HOUR: 537.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	147.60	3386	27.45	
Trichiurus lepturus	103.08	444	19.17	
Galeoides decadactylus	58.08	228	10.80	
Pomadourus incisus	54.12	336	10.06	
Pteroscion pelli	37.56	1140	6.99	
Umbrina canariensis	34.80	72	6.47	
Pagellus bellottii	22.70	118	4.22	5960
Sepia officinalis hierredda	12.96	96	2.41	
Ilisa africana	11.76	156	2.19	
Pseudolithus typus	9.10	16	1.69	5961
Grammolites gruvelli	8.40	12	1.56	
Miracorvina angolensis	7.20	24	1.34	
Stromateus fiatola	6.00	6	1.12	
Citharus linguatula	5.16	108	0.96	
Dentex barnardi	5.04	168	0.94	
Atractoscion aequidens	3.84	12	0.71	
Dasyatis margarita	3.00	2	0.56	
Dicologlossa cuneata	2.76	60	0.51	
Trachinotus ovatus	1.80	12	0.33	
Rhinobatos albomaculatus	1.68	2	0.31	
Sardinella aurita	0.84	12	0.16	
Illex coindetii	0.24	24	0.04	
Total		537.72	99.99	

PROJECT STATION: 2741  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1048 Long E 1320  
 start stop duration  
 TIME :19:19:21 19:48:42 29 (min) Purpose code: 3  
 LOG :3712.73 3714.29 1.55 Area code : 2  
 FDEPTH: 331 336 GearCond.code:  
 BDEPTH: 331 336 Validity code: 1  
 Towing dir: 130° Wire out: 900 m Speed: 30 kn\*10

Sorted: 66 Kg Total catch: 363.77 CATCH/HOUR: 752.63

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	421.49	7227	56.00	
Merluccius polli	251.48	2152	33.41	5967
Laemonema laureysi	38.11	490	5.06	
Nematocarcinus africanus	12.74	55175	1.69	
Parapenaeus longirostris, fem.	6.70	1593	0.89	5968
Hoplostethus cadenati	4.78	182	0.64	
MYCTOPHIDAE	2.50	1366	0.33	
Parapenaeus longirostris, male	2.38	149	0.32	5969
Todarodes sagittatus	2.05	12	0.27	
Todaropsis eblanae	1.82	12	0.24	
Bathymectes piperitus	1.59	35	0.21	
Trichiurus lepturus	1.47	58	0.20	
Epigonus sp.	1.47	12	0.20	
Zenopsis conchifer	0.91	12	0.12	
Aristeus varidens	0.68	35	0.09	
Synagrops microlepis	0.56	137	0.07	
Chaunax pictus	0.56	35	0.07	
Peristedion cataphractum	0.46	12	0.06	
Deania profundorum	0.46	12	0.06	
Munida sp. *	0.33	46	0.04	
Total		752.54	99.97	

PROJECT STATION: 2739  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1042 Long E 1330  
 start stop duration  
 TIME :15:10:42 15:40:10 29 (min) Purpose code: 3  
 LOG :3688.92 3690.41 1.47 Area code : 2  
 FDEPTH: 91 91 GearCond.code:  
 BDEPTH: 91 91 Validity code: 1  
 Towing dir: 145° Wire out: 280 m Speed: 30 kn\*10

Sorted: 73 Kg Total catch: 2143.88 CATCH/HOUR: 4435.61

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	1482.19	2965	33.42	
Brachydeuterus auritus	1273.03	9573	28.70	
Trachurus trecae	366.14	16003	8.25	
Umbrina canariensis	317.65	728	7.16	
Trichiurus lepturus	282.50	2547	6.37	
Pagellus bellottii	243.10	1332	5.48	
Brotula barbata	167.17	122	3.77	
Atractoscion aequidens	80.48	60	1.81	
Pistularia petimba	47.28	60	1.07	
Raja miraletus	47.28	60	1.07	
Synagrops microlepis	29.71	5820	0.67	
Dentex barnardi	26.07	122	0.59	
Dentex macrophthalmus	22.43	60	0.51	
Torpedo torpedo	16.97	60	0.38	
Pentheroscion mbizi	15.77	60	0.36	
Pterothrissus belloci	9.70	424	0.22	
Citharus linguatula	3.64	60	0.08	
Parapenaeus longirostris	2.42	600	0.05	
Sardinella aurita	2.42	60	0.05	
Boops boops	1.22	122	0.03	
Total		4437.17	100.04	

PROJECT STATION: 2742  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1048 Long E 1316  
 start stop duration  
 TIME :21:27:35 21:57:17 30 (min) Purpose code: 3  
 LOG :3721.35 3722.68 1.32 Area code : 2  
 FDEPTH: 504 514 GearCond.code:  
 BDEPTH: 504 514 Validity code: 1  
 Towing dir: 320° Wire out: 1280 m Speed: 30 kn\*10

Sorted: 40 Kg Total catch: 141.43 CATCH/HOUR: 282.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	163.46	44634	57.79	
Triplophus hemingi	34.44	4010	12.18	
Hoplostethus cadenati	21.56	752	7.62	
Yarella blackfordi	21.28	642	7.52	
Stomias boa boa	14.50	330	5.13	
Lamprogrammus exutus	8.34	126	2.95	
Todarodes angolensis	7.14	98	2.52	
Benthodesmus tenuis	4.42	162	1.56	
Histioteuthis reversa	1.20	22	0.42	
Ommastrephes pteropus	1.12	8	0.40	
Chlorophthalmus atlanticus	1.06	22	0.37	
Scymnodon squamulosus	0.98	8	0.35	
Etmopterus lucifer	0.70	22	0.25	
Gadella imberbis	0.64	28	0.23	
Nemichthys scolopaceus	0.42	28	0.15	
Ectreposebastes imus	0.40	4	0.14	
Hymenocephalus italicus	0.36	36	0.13	
Ariomma melanum	0.28	14	0.10	
Aristeus varidens	0.24	22	0.08	
Cataetix laticeps	0.08	8	0.03	
Macroparalepis macrogeneion	0.08	8	0.03	
GALATHEIDAE *	0.08	8	0.03	
POLYCHAELIDAE	0.08	8	0.03	
Total		282.86	100.01	

PROJECT STATION: 2740  
 DATE: 7/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1046 Long E 1323  
 start stop duration  
 TIME :17:20:57 17:49:21 28 (min) Purpose code: 3  
 LOG :3702.29 3703.71 1.41 Area code : 2  
 FDEPTH: 151 152 GearCond.code:  
 BDEPTH: 151 152 Validity code: 1  
 Towing dir: 130° Wire out: 450 m Speed: 30 kn\*10

Sorted: 100 Kg Total catch: 2328.37 CATCH/HOUR: 4989.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex macrophthalmus	2511.21	9936	50.33	5962
Synagrops microlepis	1567.71	167659	31.42	
Trachurus trecae	262.11	11334	5.25	5964
Illex coindetii	179.57	3045	3.60	
Zenopsis conchifer	139.80	2346	2.80	
Merluccius polli	109.84	2646	2.20	5963
Parapenaeus longirostris, fem.	34.29	9986	0.69	5966
Pterothrissus belloci	32.44	199	0.65	
Parapenaeus longirostris, male	28.93	9786	0.58	5965
Sphoeroides pachygaster	22.46	49	0.45	
Brotula barbata	16.97	49	0.34	
Grammolites gruvelli	14.98	49	0.30	
Saurida brasiliensis	14.98	1498	0.30	
Scyliorhinus cervigoni	10.97	49	0.22	
Spicara alta	10.48	49	0.21	
Uranoscopus albesca	9.47	49	0.19	
Chlorophthalmus sp.	8.49	1749	0.17	
Boops boops	6.47	150	0.13	
Trigla lyra	5.49	49	0.11	
Squilla mantis	1.48	101	0.03	
Citharus linguatula	0.49	150	0.01	
Total		4988.63	99.98	

PROJECT STATION: 2743  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 1038 Long E 1308  
 start stop duration  
 TIME :00:11:08 00:32:26 21 (min) Purpose code: 3  
 LOG :3735.40 3736.40 0.99 Area code : 2  
 FDEPTH: 532 526 GearCond.code: 9  
 BDEPTH: 532 526 Validity code: 1  
 Towing dir: 335° Wire out: 1350 m Speed: 30 kn\*10

Sorted: 23 Kg Total catch: 138.43 CATCH/HOUR: 395.51

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	152.57	34937	38.58	
Hoplostethus cadenati	140.06	5811	35.41	
Yarella blackfordi	46.63	1509	11.79	
Lamprogrammus exutus	18.86	840	4.77	
Benthodesmus tenuis	13.20	429	3.34	
Triplophus hemingi	6.00	926	1.52	
Lophius vaillanti	3.74	3	0.95	
Ommastrephes bartramii	2.91	17	0.74	
Stomias affinis	2.91	69	0.74	
Xenodermichthys copei	2.23	189	0.56	
Bathyrcongiger vicinus	1.71	17	0.43	
Merluccius polli	1.54	3	0.39	
POLYCHAELIDAE	1.37	154	0.35	
Nemichthys scolopaceus	0.86	17	0.22	
Ariomma melanum	0.34	17	0.09	
Gadella imberbis	0.34	17	0.09	
Hymenocephalus italicus	0.34	34	0.09	
Total		395.61	100.06	



PROJECT STATION:2744  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1037 Long E 1310  
 start stop duration Purpose code: 3  
 TIME :02:22:31 02:52:01 30 (min) Area code : 2  
 LOG :3744.59 3746.02 1.41 GearCond.code:  
 FDEPTH: 344 349 Validity code: 1  
 BDEPTH: 344 349  
 Towing dir: 325° Wire out:1050 m Speed: 30 kn\*10

Sorted: 30 Kg Total catch: 137.53 CATCH/HOUR: 275.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	142.20	2340	51.70	
Merluccius polli	49.06	262	17.84	5970
Laemonema laureysi	47.70	802	17.34	
Hymenocephalus italicus	12.42	954	4.52	
Ommastrephes bartrami	4.68	28	1.70	
Hoplostethus cadenati	4.50	162	1.64	
Parapenaeus longirostris, fem.	3.96	478	1.44	5972
Aristeus varidens, male	2.98	136	0.76	5971
Etmopterus lucifer	1.62	46	0.59	
Parapenaeus longirostris, male	1.18	28	0.43	5973
Chaunax pictus	1.00	36	0.36	
Malacocephalus occidentalis	0.90	18	0.33	
Lophius vaillanti	0.64	18	0.23	
Bathynectes piperitus	0.54	10	0.20	
Solenocera africana	0.54	82	0.20	
Helicolenus dactylopterus	0.46	28	0.17	
GALATHEIDAE	0.46	72	0.17	
Synagrops microlepis	0.46	28	0.17	
Coelorrhinus coelorrhinus	0.28	10	0.10	
Gadella imberbis	0.18	10	0.07	
Zenion hololepis	0.10	10	0.04	
MYCTOPHIDAE	0.10	64	0.04	
POLYCHAELIDAE	0.10	28	0.04	
Total	275.16		100.08	

PROJECT STATION:2747  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1028 Long E 1328  
 start stop duration Purpose code: 3  
 TIME :08:58:50 09:28:46 30 (min) Area code : 2  
 LOG :3778.62 3780.32 1.69 GearCond.code:  
 FDEPTH: 50 48 Validity code: 1  
 BDEPTH: 50 48  
 Towing dir: 340° Wire out: 160 m Speed: 30 kn\*10

Sorted: 62 Kg Total catch: 465.63 CATCH/HOUR: 931.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	607.60	3624	65.24	5979
Trichiurus lepturus	46.80	104	5.03	
Chloroscombrus chrysurus	40.60	196	4.36	
Pagellus bellottii	39.90	196	4.28	5981
Brachydeuterus auritus Juv.	38.22	3158	4.10	5980
Galeoides decadactylus	27.58	98	2.96	
Pomadasy incisus	25.90	140	2.78	
Dentex barnardi	19.32	84	2.07	
Stromateus fiatola	11.20	14	1.20	
Plectrothinchus mediterraneus	10.78	42	1.16	
Lithognathus mormyrus	8.82	14	0.95	
Trachurus trecae	8.54	588	0.92	5978
Atractoscion aequidens	8.20	48	0.88	
Sardinella maderensis	7.70	28	0.83	
Pseudupeneus prayensis	6.30	28	0.68	
Sphyræna sphyraena	6.02	14	0.65	
Decapterus rhonchus	4.76	182	0.51	
Epinephelus costae	3.70	2	0.40	
Epinephelus aeneus	3.30	2	0.35	
Sardinella aurita	2.66	28	0.29	
Epinephelus juveniles	2.52	14	0.27	
Selene dorsalis	0.84	14	0.09	
Total	931.26		100.00	

PROJECT STATION:2745  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1034 Long E 1313  
 start stop duration Purpose code: 3  
 TIME :05:40:58 06:07:06 26 (min) Area code : 2  
 LOG :3755.87 3757.18 1.30 GearCond.code:  
 FDEPTH: 130 131 Validity code: 1  
 BDEPTH: 130 131  
 Towing dir: 325° Wire out: 390 m Speed: 30 kn\*10

Sorted: 100 Kg Total catch: 517.25 CATCH/HOUR: 1193.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	762.12	38112	63.85	5975
Dentex macropthalmus	159.81	588	13.39	5976
Dentex angolensis	63.46	242	5.32	5974
Boops boops	38.08	404	3.19	
Illex coindetii	21.81	612	1.83	
Trichiurus lepturus	21.00	32	1.76	
Zeus faber	17.65	46	1.48	
Erythrocles monodi	15.00	35	1.26	
Spicara alta	14.31	127	1.20	
Sphoeroides pachgaster	12.12	12	1.02	
Atractoscion aequidens	11.65	7	0.98	
Zenopsis conchifer	11.54	23	0.97	
Dentex barnardi	11.31	23	0.95	
Raja miraletus	10.73	12	0.90	
Umbrina canariensis	9.90	35	0.83	
Citharus linguatula	6.12	35	0.51	
Anthias anthias	4.62	23	0.39	
Myxeroperca rubra	2.54	2	0.21	
Total	1193.77		100.04	

PROJECT STATION:2748  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1026 Long E 1331  
 start stop duration Purpose code: 3  
 TIME :10:23:56 10:52:37 29 (min) Area code : 2  
 LOG :3786.10 3787.83 1.68 GearCond.code:  
 FDEPTH: 30 31 Validity code: 1  
 BDEPTH: 30 31  
 Towing dir: 330° Wire out: 100 m Speed: 30 kn\*10

Sorted: 53 Kg Total catch: 306.93 CATCH/HOUR: 635.03

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	348.79	3494	54.92	
Trichiurus lepturus	67.72	250	10.66	
Galeoides decadactylus	49.66	194	7.82	
Ilisha africana	48.93	809	7.71	
Sardinella maderensis	38.23	900	6.02	
Chloroscombrus chrysurus	19.70	172	3.10	
Sphyræna guanchano	12.87	35	2.03	
Pseudotolithus senegalensis	12.00	17	1.89	
Arius parkii	7.47	6	1.18	
Sardinella aurita	7.28	149	1.15	
Selene dorsalis	4.55	103	0.72	
Pteroscion pelli	3.64	137	0.57	
Scomberomorus tritor	3.64	4	0.57	
Pomadasy incisus	3.41	46	0.54	
Stromateus fiatola	3.23	4	0.51	
Epinephelus aeneus	1.94	2	0.31	
Sepiella ornata	1.14	114	0.18	
Penaeus notialis	0.43	12	0.07	
Lutjanus fulgens	0.25	2	0.04	
Trachurus trecae	0.12	12	0.02	
Total	635.00		100.01	

PROJECT STATION:2746  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1031 Long E 1320  
 start stop duration Purpose code: 3  
 TIME :06:40:19 06:41:01 27 (min) Area code : 2  
 LOG :3766.55 3768.11 1.55 GearCond.code:  
 FDEPTH: 97 94 Validity code: 1  
 BDEPTH: 97 94  
 Towing dir: 355° Wire out: 300 m Speed: 30 kn\*10

Sorted: 21 Kg Total catch: 20.94 CATCH/HOUR: 46.53

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
OMMASTREPHIDAE	11.00	378	23.64	
Fistularia petimba	10.89	18	23.40	
Pagellus bellottii	2.78	18	5.97	
Umbrina canariensis	2.69	2	5.78	
Todaropsis eblanae	2.67	51	5.74	
Auxis thazard	2.36	4	5.07	
Raja miraletus	2.29	2	4.92	
Trachurus trecae	2.18	73	4.69	
Zeus faber	2.00	2	4.30	
Citharus linguatula	1.58	18	3.40	5977
Synagrops microlepis	1.13	204	2.43	
Uranoscopus cadenati	1.00	2	2.15	
Sepia officinalis hierredda	0.87	4	1.87	
Sepia orbignyana	0.82	2	1.76	
Brotula barbata	0.82	2	1.76	
Microchirus frechkopi	0.76	2	1.63	
Trichiurus lepturus	0.71	33	1.53	
Total	46.55		100.04	

PROJECT STATION:2749  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1014 Long E 1324  
 start stop duration Purpose code: 3  
 TIME :12:17:37 12:47:03 29 (min) Area code : 2  
 LOG :3800.37 3801.90 1.50 GearCond.code:  
 FDEPTH: 29 27 Validity code: 1  
 BDEPTH: 29 27  
 Towing dir: 335° Wire out: 120 m Speed: 30 kn\*10

Sorted: 61 Kg Total catch: 310.39 CATCH/HOUR: 642.19

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	456.72	4372	71.12	
Galeoides decadactylus	60.93	259	9.49	
Trichiurus lepturus	21.62	93	3.37	
Chloroscombrus chrysurus	19.14	186	2.98	
Pomadasy peroteti	19.03	10	2.96	
Pseudotolithus senegalensis	12.10	72	1.88	
Ilisha africana	10.24	197	1.59	
Pomadasy jubelini	9.00	31	1.40	
Pteroscion pelli	8.48	321	1.32	
Sphyræna sphyraena	7.66	21	1.19	
Ephippion guttifer	3.06	2	0.48	
Trachurus trecae	2.59	155	0.40	
Torpedo marmorata	2.36	8	0.37	
Pomadasy incisus	2.17	41	0.34	
Penaeus notialis	1.51	48	0.24	
Cynoglossus canariensis	1.24	4	0.19	
Rhizoprionodon acutus	1.16	2	0.18	
Eucinostomus melanopterus	1.03	10	0.16	
Dasyatis marmorata	0.91	2	0.14	
Panulirus regius	0.81	2	0.13	
Selene dorsalis	0.31	21	0.05	
Sepiella ornata	0.10	10	0.02	
Total	642.17		100.00	

PROJECT STATION:2750  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1012 Long E 1319  
 start stop duration Purpose code: 3  
 TIME :13:53:04 14:18:39 26 (min) Area code : 2  
 LOG :3809.76 3811.08 1.31 GearCond.code:  
 FDEPTH: 47 47 Validity code: 1  
 BDEPTH: 47 47  
 Towing dir: 150° Wire out: 160 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 164.26 CATCH/HOUR: 379.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	130.38	1348	34.40	
Stromateus fiatola	57.12	69	15.07	
Chloroscombrus chrysurus	55.96	35	14.76	
Sphyræna sphyraena	44.01	65	11.61	
Galeoides decadactylus	35.47	157	9.36	
Trichiurus lepturus	22.73	242	6.00	
Pteroscion pelli	9.00	127	2.37	
Pagellus bellottii	4.15	16	1.09	6039
Ilisha africana	3.58	46	0.94	
Pentheroncion mbizi	3.00	12	0.79	
Seriola rivolana	2.12	23	0.56	
Pomadasya jubelini	1.38	7	0.36	
Monolene microstoma	1.20	18	0.32	
Pomadasya incisus	1.20	18	0.32	
Engraulis encrasicolus	1.15	242	0.30	
Dicologlossa cuneata	1.15	18	0.30	
Citharichthys stamplii	0.76	5	0.20	
Citharus linguatula	0.69	18	0.18	
Trachurus trecae	0.69	46	0.18	
Decapterus rhonchus	0.62	23	0.16	
Alloteuthis africana	0.46	7	0.12	
Sepiella ornata	0.39	23	0.10	
Sepia officinalis hierredda	0.39	23	0.10	
Grammolites graveli	0.35	7	0.09	
Pseudupeneus prayensis	0.35	2	0.09	
Calappa pelli	0.12	2	0.03	
Cepola pauciradiatus	0.12	2	0.03	
Dentex barnardi	0.09	2	0.02	
Total	378.63		99.85	

PROJECT STATION:2753  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1022 Long E 1303  
 start stop duration Purpose code: 3  
 TIME :19:49:27 20:17:54 28 (min) Area code : 2  
 LOG :3846.79 3848.18 1.37 GearCond.code:  
 FDEPTH: 173 168 Validity code: 1  
 BDEPTH: 173 168  
 Towing dir: 312° Wire out: 510 m Speed: 30 kn\*10

Sorted: 67 Kg Total catch: 319.09 CATCH/HOUR: 683.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	383.57	28466	56.10	
Brotula barbata	40.18	39	5.88	
Dentex macrophthalmus	35.68	251	5.22	5984
Dentex angolensis	27.58	88	4.03	5985
Illex coindetii	26.23	30	3.84	
Uranoscopus cadenati	24.39	154	3.57	
Pterothrissus belloci	23.79	281	3.48	
Parapenaeus longirostris, fem.	23.14	4031	3.38	5986
OPHIDIIDAE	14.57	471	2.13	
Umbrina canariensis	13.69	39	2.00	
OBHITHIDAE	12.73	96	1.86	
Bembrops heterurus	10.89	135	1.59	
Citharus linguatula	8.49	96	1.24	5988
Merluccius polli	7.44	77	1.09	
Sepia orbignyana	7.24	49	1.06	
Hoplostethus cadenati	5.36	11	0.78	
Xenomystax sp.	3.47	146	0.51	
Spicara alta	3.28	30	0.48	
Trachurus trecae	2.70	88	0.39	
Squatina oculata	2.61	11	0.38	
Parapenaeus longirostris, male	1.93	343	0.28	5987
Zeus faber	1.71	19	0.25	
Boops boops	1.54	30	0.23	
XANTHIDAE	0.88	11	0.13	
Monolene microstoma	0.69	19	0.10	
Total	683.78		100.00	

PROJECT STATION:2754  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1024 Long E 1255  
 start stop duration Purpose code: 3  
 TIME :22:39:54 23:09:27 30 (min) Area code : 2  
 LOG :3862.23 3863.55 1.32 GearCond.code:  
 FDEPTH: 610 624 Validity code: 1  
 BDEPTH: 610 624  
 Towing dir: 320° Wire out:1520 m Speed: 30 kn\*10

Sorted: 32 Kg Total catch: 77.34 CATCH/HOUR: 154.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	44.26	1802	28.61	
Yarella blackfordi	32.60	686	21.08	
Nematocarcinus africanus	17.20	396	11.12	
Stomias boa boa	12.06	230	7.80	
Benthodesmus tenuis	7.60	226	4.91	
Torpedo sp.	6.50	2	4.20	
Aristeus varidens, female	5.06	210	3.27	5990
Scymnodon squamulosus	3.46	26	2.24	
STOMIIDAE	3.26	50	2.11	
POLYCHAELIDAE	2.86	430	1.85	
Ebinania costaeacanarie	2.46	10	1.59	
Nezumia sp.	2.40	66	1.55	
Aristeus varidens, male	2.10	190	1.36	5989
Lamprogrammus exotus	2.08	6	1.34	
Triplophus hemingi	1.76	210	1.14	
UNIDENTIFIED FISH	1.56	56	1.01	
Merluccius polli	1.50	2	0.97	
OCTOPODUTHIDAE	1.36	20	0.88	
Ommastrephes bartrami	1.10	20	0.71	
Dicrolene intronigra	0.70	86	0.45	
MYCTOPHIDAE	0.60	56	0.39	
Bathyroconger vicinus	0.40	16	0.26	
Caristius groenlandicus	0.32	4	0.21	
Xenodermichthys copei	0.26	16	0.17	
UNIDENTIFIED FISH	0.16	6	0.10	
Cubiceps sp.	0.16	6	0.10	
NEMATOCARCINIDAE	0.16	16	0.10	
Chauliodus sloani	0.16	10	0.10	
Talismania bifurcata	0.10	6	0.06	
Raja confundens	0.10	6	0.06	
Lophius vaillanti	0.10	6	0.06	
Nemichthys scolopaceus	0.10	16	0.06	
Melanocetus johnsoni	0.06	6	0.04	
Bathygadus melanobranchus	0.06	6	0.04	
Acanthephyra sp.	0.06	6	0.04	
Total	154.68		99.98	

PROJECT STATION:2751  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1013 Long E 1316  
 start stop duration Purpose code: 3  
 TIME :15:34:14 16:04:03 30 (min) Area code : 2  
 LOG :3819.43 3820.85 1.42 GearCond.code:  
 FDEPTH: 70 71 Validity code: 1  
 BDEPTH: 70 71  
 Towing dir: 160° Wire out: 260 m Speed: 30 kn\*10

Sorted: 67 Kg Total catch: 909.28 CATCH/HOUR: 1818.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	1367.40	71604	75.19	6030
Pagellus bellottii	334.80	2592	18.41	6031
Trichiurus lepturus	76.14	162	4.19	
Pseudupeneus prayensis	12.68	108	0.70	
Brachydeuterus auritus	7.28	82	0.40	
Pomadasya incisus	5.94	82	0.33	
Chloroscombrus chrysurus	3.50	54	0.19	
Monolene microstoma	2.42	28	0.13	
Brotula barbata	2.16	28	0.12	
Alloteuthis africana	1.62	594	0.09	
Dicologlossa cuneata	1.62	28	0.09	
Boops boops	1.62	28	0.09	
Dentex barnardi	0.80	54	0.04	
Zeus faber	0.54	28	0.03	
Total	1818.52		100.00	

PROJECT STATION:2752  
 DATE: 8/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1016 Long E 1310  
 start stop duration Purpose code: 3  
 TIME :17:22:43 17:51:22 29 (min) Area code : 2  
 LOG :3830.43 3831.87 1.43 GearCond.code:  
 FDEPTH: 96 96 Validity code: 1  
 BDEPTH: 96 96  
 Towing dir: 145° Wire out: 280 m Speed: 30 kn\*10

Sorted: 211 Kg Total catch: 2531.28 CATCH/HOUR: 5237.13

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	4537.24	199912	86.64	5982
Pagellus bellottii	304.14	2756	5.81	6033
Umbrina canariensis	211.03	372	4.03	5983
Citharus linguatula	65.05	2185	1.24	6032
Trigla lyra	50.40	1887	0.96	
Brachydeuterus auritus	27.79	124	0.53	
Sepia orbignyana	6.21	124	0.12	
Scorpaena normani	5.96	124	0.11	
Saurida brasiliensis	5.71	497	0.11	
Zeus faber	4.97	74	0.09	
Illex coindetii	4.47	199	0.09	
Priacanthus arenatus	4.22	50	0.08	
Merluccius polli	3.48	99	0.07	
Boops boops	2.98	99	0.06	
ONMASTREPHIDAE	1.24	273	0.02	
Monolene microstoma	0.50	149	0.01	
GOBIIDAE	0.50	99	0.01	
Arnoglossus imperialis	0.25	25		
Total	5236.14		99.98	

PROJECT STATION:2755  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1006 Long E 1253  
 start stop duration Purpose code: 3  
 TIME :01:45:20 02:05:21 20 (min) Area code : 2  
 LOG :3880.81 3881.76 0.93 GearCond.code:  
 FDEPTH: 308 301 Validity code: 9  
 BDEPTH: 308 301 Validity code: 1  
 Towing dir: 345° Wire out: 920 m Speed: 30 kn\*10

Sorted: 28 Kg Total catch: 164.83 CATCH/HOUR: 494.49

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	336.12	1563	67.97	
Synagrops microlepis	72.90	5544	14.74	
Gephyroberyx darwini	25.05	42	5.07	
Laemonema laureysi	21.60	297	4.37	
Merluccius polli	15.93	216	3.22	
Zenopsis conchifer	4.80	3	0.97	
Illex coindetii	4.32	27	0.87	
Pterothrissus belloci	3.51	27	0.71	
Parapenaeus longirostris, fem.	2.70	459	0.55	5991
Pontinus accraensis	2.43	54	0.49	
Gadella imberbis	1.62	54	0.33	
Lophius vaillanti	1.26	27	0.25	
Parapenaeus longirostris, male	0.81	216	0.16	5992
Malacoccephalus occidentalis	0.54	27	0.11	
Macroparalepis macrogeneion	0.27	27	0.05	
Peristedion cataphractum	0.27	27	0.05	
POLYCHAELIDAE	0.27	81	0.05	
Total	494.40		99.96	

PROJECT STATION:2756  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 958  
 start stop duration Long E 1245  
 TIME :04:16:09 04:45:47 30 (min) Purpose code: 3  
 LOG :3892.94 3894.31 1.36 Area code : 2  
 FDEPTH: 739 749 GearCond.code: 2  
 BDEPTH: 739 749 Validity code: 1  
 Towing dir: 313° Wire out:1700 m Speed: 30 kn\*10  
 Sorted: 26 Kg Total catch: 162.61 CATCH/HOUR: 325.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	183.48	8748	56.42	
Yarella blackfordi	52.80	150	16.24	
Ommastrephes bartramii	22.68	48	6.97	
Lamprogrammus exotus	13.08	72	4.02	
POLYCHAELIDAE	9.12	2736	2.80	
Nezumia aequalis	8.28	168	2.55	
Stomias boa boa	7.68	144	2.36	
Merluccius polli	6.58	12	2.02	
Centrophorus granulosus	5.10	2	1.57	
Aristeus varidensis, female	4.00	180	1.23	5994
AFROGONIDAE	3.00	144	0.92	
Deania calcea	2.16	24	0.66	
Chaceon maritae	2.08	4	0.64	
Triplophos hemingi	1.92	240	0.59	
Shrimps, small, non comm.	1.68	180	0.52	
Talissmania sp.	1.08	120	0.33	
Peristadion cataphractum	0.24	24	0.07	
Aristeus varidensis, male	0.14	22	0.04	5993
Xenodermichthys copei	0.12	24	0.04	
Total	325.22		99.99	

PROJECT STATION:2757  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1005  
 start stop duration Long E 1300  
 TIME :08:12:39 08:40:41 28 (min) Purpose code: 3  
 LOG :3916.66 3918.14 1.55 Area code : 2  
 FDEPTH: 103 106 GearCond.code: 1  
 BDEPTH: 103 106 Validity code: 1  
 Towing dir: 333° Wire out: 300 m Speed: 30 kn\*10  
 Sorted: 69 Kg Total catch: 1866.41 CATCH/HOUR: 3999.45

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	3488.79	138510	87.23	5995
Dentex congoensis	376.07	3066	9.40	5996
Boops boops	34.14	2256	0.85	
Illex coindetii	29.51	984	0.74	
Pagellus bellottii	17.36	58	0.43	
Seriola lalandi	16.39	2	0.41	
Zeus faber	12.73	58	0.32	
Brachydeuterus auritus	9.26	58	0.23	
Scomberomorus tritor	5.79	58	0.14	
Fistularia petimba	5.04	9	0.13	
Trichiurus lepturus	2.25	2	0.06	
Selene dorsalis	2.14	4	0.05	
Total	3999.47		99.99	

PROJECT STATION:2758  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1002  
 start stop duration Long E 1305  
 TIME :10:00:43 10:31:08 30 (min) Purpose code: 3  
 LOG :3927.09 3928.69 1.58 Area code : 2  
 FDEPTH: 86 86 GearCond.code: 1  
 BDEPTH: 86 86 Validity code: 1  
 Towing dir: 315° Wire out: 280 m Speed: 30 kn\*10  
 Sorted: 32 Kg Total catch: 300.06 CATCH/HOUR: 600.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	513.00	27036	85.48	5998
Alloteuthis africana	50.40	17304	8.40	
Brachydeuterus auritus	8.82	54	1.47	
Boops boops	4.68	324	0.78	
Pagellus bellottii	4.26	42	0.71	5997
Selene dorsalis	3.72	8	0.62	
Sphoeroides pachgaster	1.94	2	0.32	
Decapterus rhonchus	1.86	2	0.31	
Dentex angolensis	1.80	36	0.30	
Dentex congoensis	1.80	18	0.30	
Zeus faber	1.62	18	0.27	
Fistularia petimba	1.48	6	0.25	
Ommastrephes bartramii	1.26	72	0.21	
Priacanthus arenatus	1.24	4	0.21	
Chloroscombrus chrysurus	0.98	6	0.16	
Dentex barnardi	0.72	6	0.12	
Citharus linguatula	0.36	18	0.06	
Syacium micrum	0.18	18	0.03	
Total	600.12		100.00	

PROJECT STATION:2759  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1001  
 start stop duration Long E 1310  
 TIME :11:54:21 12:24:11 30 (min) Purpose code: 3  
 LOG :3938.82 3940.37 1.33 Area code : 2  
 FDEPTH: 60 60 GearCond.code: 1  
 BDEPTH: 60 60 Validity code: 1  
 Towing dir: 345° Wire out: 210 m Speed: 30 kn\*10  
 Sorted: 48 Kg Total catch: 616.07 CATCH/HOUR: 1232.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	830.70	9514	67.42	
Trachurus trecae	158.60	2206	12.87	5999
Chloroscombrus chrysurus	104.78	936	8.50	
Pagellus bellottii	54.60	338	4.43	6000
Pomadasy incisus	27.56	286	2.24	
Sphyræna sphyraena	22.10	156	1.79	
Decapterus rhonchus	15.08	312	1.22	
Sardinella maderensis	9.10	78	0.74	
Pseudupeneus prayensis	2.86	26	0.23	
Boops boops	2.60	26	0.21	
Selene dorsalis	2.08	26	0.17	
Bombrops heterurus	1.04	26	0.08	
Citharus linguatula	0.78	26	0.06	
Parapenaeus longirostris	0.26	26	0.02	
Total	1232.14		99.98	

PROJECT STATION:2760  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 1000  
 start stop duration Long E 1313  
 TIME :13:28:06 13:43:16 15 (min) Purpose code: 3  
 LOG :3947.04 3947.85 0.80 Area code : 2  
 FDEPTH: 34 34 GearCond.code: 9  
 BDEPTH: 34 34 Validity code: 1  
 Towing dir: 350° Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 86 Kg Total catch: 2927.40 CATCH/HOUR: 11709.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	9864.68	135828	84.24	
Trachurus trecae	920.60	7272	7.86	6002
Pomadasy jubelini	257.84	276	2.20	
Trichiurus lepturus	186.60	824	1.59	
Sardinella maderensis	160.08	1944	1.37	6001
Pteroscion pelli	108.40	2468	0.93	
Galeoides decadactylus	98.80	688	0.84	
Sardinella aurita	39.80	684	0.34	
Pomadasy incisus	34.32	136	0.29	
Ilisha africana	26.76	412	0.23	
Selene dorsalis	15.08	136	0.13	
Decapterus rhonchus	9.60	412	0.08	
Pseudotolithus senegalensis	4.84	4	0.04	
Total	11727.40		100.14	

PROJECT STATION:2761  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 943  
 start stop duration Long E 1310  
 TIME :15:39:32 15:58:01 18 (min) Purpose code: 3  
 LOG :3964.41 3965.37 0.96 Area code : 2  
 FDEPTH: 31 31 GearCond.code: 9  
 BDEPTH: 31 31 Validity code: 1  
 Towing dir: 330° Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 58 Kg Total catch: 1602.07 CATCH/HOUR: 5340.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	4797.00	38783	89.83	
Galeoides decadactylus	203.93	1170	3.82	
Trachinocephalus myops	72.00	90	1.35	
Pomadasy incisus	72.00	180	1.35	
Trachurus trecae	32.40	270	0.61	
Chloroscombrus chrysurus	29.77	270	0.56	
Penaeus kerathurus	26.10	540	0.49	
Trichiurus lepturus	24.30	90	0.46	
Pseudotolithus senegalensis	18.50	23	0.35	
Penaeus notialis	15.30	720	0.29	
Ilisha africana	15.30	2430	0.29	
Sepia orbignyana	9.90	90	0.19	
Decapterus rhonchus	9.00	270	0.17	
CONGRIDAE	3.40	7	0.06	
Arius parkii	3.33	3	0.06	
Squilla mantis	2.70	90	0.05	
Dicologlossa cuneata	2.70	90	0.05	
Selene dorsalis	1.80	180	0.03	
Trachinus araneus	0.80	3	0.01	
Total	5340.23		100.02	

PROJECT STATION:2762  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 946  
 start stop duration Long E 1300  
 TIME :17:30:56 18:02:22 31 (min) Purpose code: 3  
 LOG :3977.72 3979.21 1.46 Area code : 2  
 FDEPTH: 94 93 GearCond.code: 2  
 BDEPTH: 94 93 Validity code: 1  
 Towing dir: 150° Wire out: 290 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 310.26 CATCH/HOUR: 600.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	227.32	6714	37.86	6005
Pagellus bellottii	116.19	2170	19.35	6006
Trigla lyra	41.46	958	6.90	
Brotula barbata	31.55	29	5.25	
Alloteuthis africana	26.42	7682	4.40	
Boops boops	24.48	88796	4.08	
Citharus linguatula	22.99	637	3.83	6003
Saurida brasiliensis	15.29	1742	2.55	
Brachydeuterus auritus	13.74	79	2.29	
Dentex angolensis	11.50	132	1.92	6004
Pterothrissus belloci	11.32	261	1.89	
Zeus faber	10.28	114	1.71	
Sepia orbignyana	10.01	149	1.67	
Uranoscopus cadenati	9.23	45	1.54	
Scorpaena normani	5.85	70	0.97	
Raja miraletus	5.57	10	0.93	
Dentex macrophthalmus	5.03	323	0.84	6007
Merluccius polli	4.35	122	0.72	
Monolene microstoma	3.48	474	0.58	
GOBIIDAE	1.12	348	0.19	
Priacanthus arenatus	1.12	114	0.19	
Spicara alta	0.60	52	0.10	
Octopus vulgaris	0.45	6	0.07	
BRANCHIOSTEGIDAE	0.27	10	0.04	
Parapenaeus longirostris	0.27	45	0.04	
Solenocera africana	0.27	122	0.04	
Sepia officinalis hierredda	0.27	10	0.04	
Total	600.43		99.99	

PROJECT STATION:2763  
 DATE: 9/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 953  
 Long E 1244  
 start stop duration  
 TIME :21:11:03 21:39:55 29 (min) Purpose code: 3  
 LOG :4005.56 4006.89 1.31 Area code : 2  
 FDEPTH: 628 707 GearCond.code:  
 BDEPTH: 628 707 Validity code: 1  
 Towing dir: 330ø Wire out:1650 m Speed: 30 kn\*10  
 Sorted: 29 Kg Total catch: 211.96 CATCH/HOUR: 438.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Yarella blackfordi	321.52	8704	73.32	
Hoplostethus cadenati	22.45	898	5.12	
Stomias boa boa	22.14	463	5.05	
TRICHIURIDAE	14.48	507	3.30	
NEMATOCARCINIDAE	11.30	1043	2.58	
Xenodermichthys copei	9.41	637	2.15	
Lophiodes kempi	8.01	2	1.83	
POLYCHAELIDAE	6.37	608	1.45	
Triplophus hemingi	5.94	637	1.35	
Nezumia aequalis	5.36	116	1.22	
Aristeus varidensis, female	2.71	132	0.62	6008
STOMIIDAE	2.17	29	0.49	
Deania profundorum	1.01	14	0.23	
Coeliorhynchus coeliorhynchus	1.01	14	0.23	
Talismania sp.	0.87	29	0.20	
Merluccius polli	0.60	8	0.14	
Bathyrroconger vicinus	0.58	14	0.13	
Nemichthys scolopaceus	0.58	14	0.13	
Lamprogrammus exutus	0.58	14	0.13	
Synaphobranchus kaupii	0.58	43	0.13	
SYNAPHOBRANCHIDAE	0.29	14	0.07	
Aristeus varidensis, male	0.19	23	0.04	6009
Total	438.15		99.91	

PROJECT STATION:2764  
 DATE:10/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 936  
 Long E 1239  
 start stop duration  
 TIME :00:29:16 00:59:04 30 (min) Purpose code: 3  
 LOG :4024.68 4026.12 1.42 Area code : 2  
 FDEPTH: 536 542 GearCond.code:  
 BDEPTH: 536 542 Validity code: 1  
 Towing dir: 350ø Wire out:1400 m Speed: 30 kn\*10  
 Sorted: 28 Kg Total catch: 67.10 CATCH/HOUR: 134.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius polli	50.80	78	37.85	6010
Yarella blackfordi	17.08	664	12.73	
Stomias boa boa	16.56	334	12.34	
Benthodesmus tenuis	13.08	528	9.75	
Laemonema laureysi	13.02	138	9.70	
Scymnodon squamulosus	3.72	24	2.77	
POLYCHAELIDAE	3.24	322	2.41	
Hoplostethus cadenati	2.04	118	1.52	
Xenodermichthys copei	1.92	268	1.43	
Histioteuthis reversa	1.84	22	1.37	
Nematocarcinus africanus	1.38	490	1.03	
Aristeus varidensis, female	1.36	72	1.01	6012
Aristeus varidensis, male	1.30	174	0.97	6011
Gadella imberbis	1.00	48	0.75	
Plesionika martia	0.88	378	0.66	
Chaceon maritae	0.72	2	0.54	
MYCTOPHIDAE	0.66	1088	0.49	
Triplophus hemingi	0.58	178	0.43	
Ommastrephes bartramii	0.42	4	0.31	
Halosaurus ovenii	0.36	10	0.27	
OMMASTREPHIDAE	0.30	4	0.22	
OPLOPHORIDAE	0.28	48	0.21	
Dibranchius atlanticus	0.28	10	0.21	
Nemichthys scolopaceus	0.22	10	0.16	
MURAENIDAE	0.18	4	0.13	
Nezumia micronychodon	0.18	6	0.13	
Plesionaeus edwardsianus	0.12	16	0.09	
STOMIIDAE	0.12	10	0.09	
NETNEOJ	0.10	4	0.07	
OPHICHTHIDAE	0.10	10	0.07	
Raja confundens	0.10	6	0.07	
Lamprogrammus exutus	0.06	6	0.04	
Macroparalepis macrogeneion	0.04	4	0.03	
Zenopsis conchifer	0.04	4	0.03	
Cubiceps sp.	0.04	4	0.03	
Hymenocephalus italicus	0.04	4	0.03	
Bathynectes piperitus	0.04	4	0.03	
Total	134.20		99.97	

PROJECT STATION:2765  
 DATE:10/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 932  
 Long E 1251  
 start stop duration  
 TIME :05:38:41 06:09:12 31 (min) Purpose code: 3  
 LOG :4045.89 4047.33 1.42 Area code : 2  
 FDEPTH: 114 112 GearCond.code:  
 BDEPTH: 114 112 Validity code: 1  
 Towing dir: 340ø Wire out: 330 m Speed: 30 kn\*10  
 Sorted: 34 Kg Total catch: 1716.39 CATCH/HOUR: 3322.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	2338.55	32808	70.39	
Trachurus trecae	468.58	20816	14.11	6013
Trichiurus lepturus	334.90	722	10.08	
Brotula barbata	36.97	33	1.11	
Tillex caduetii	33.97	1306	1.02	
Uranoscopus cadenati	33.10	87	1.00	
GOBIIDAE	29.61	17594	0.89	
Pterothrissus belloci	17.42	435	0.52	
Boops boops	13.94	1045	0.42	
Parapanaeus longirostris, Fem.	3.48	1132	0.10	6014
Menolene microstoma	3.48	87	0.10	
Saurida brasiliensis	2.61	542	0.08	
Dentex angolensis	1.70	10	0.05	
Sepia officinalis hierreda	1.35	87	0.04	
Parapanaeus longirostris, male	0.87	261	0.03	6015
Zeus faber	0.87	87	0.03	
Scorpaena normani	0.64	2	0.02	
Total	3322.04		99.99	

PROJECT STATION:2766  
 DATE:10/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 928  
 Long E 1300  
 start stop duration  
 TIME :07:52:35 08:23:12 31 (min) Purpose code: 3  
 LOG :4060.14 4061.57 1.52 Area code : 2  
 FDEPTH: 52 50 GearCond.code:  
 BDEPTH: 52 50 Validity code: 1  
 Towing dir: 350ø Wire out: 160 m Speed: 30 kn\*10  
 Sorted: 57 Kg Total catch: 239.83 CATCH/HOUR: 464.19

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	327.87	7483	70.63	6017
Pagellus bellottii	28.55	135	6.15	6016
Trichiurus lepturus	25.16	147	5.42	
Trachurus trecae	13.55	457	2.92	6018
Atractoscion aequidens	13.39	39	2.88	
Pomadasy incinus	10.14	85	2.18	
Galeoides decadactylus	7.97	31	1.72	
Umbrina canariensis	7.90	39	1.70	
GOBIIDAE	4.88	1068	1.05	
Engraulis encrasicolus	4.10	495	0.88	
Spherooides pachgaster	3.56	8	0.77	
Chloroscombrus chrysurus	3.17	31	0.68	
Chelidonichthys gabonensis	3.17	46	0.68	
Stromateus fiatola	2.55	8	0.55	
Cynoglossus canariensis	2.01	8	0.43	
Priacanthus arenatus	1.39	15	0.30	
Alloteuthis africana	1.39	395	0.30	
Decapterus rhonchus	0.77	15	0.17	
Penaeus notialis	0.60	15	0.13	
Citharus sp.	0.54	23	0.12	
Sardinella aurita	0.39	8	0.08	
Squilla sp.	0.39	8	0.08	
Saurida brasiliensis	0.23	39	0.05	
Boops boops	0.15	8	0.03	
Syacium micrurum	0.15	15	0.03	
Monolene microstoma	0.15	15	0.03	
Sepia orbignyana	0.02	6		
Total	464.14		99.96	

PROJECT STATION:2767  
 DATE:10/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 927  
 Long E 1304  
 start stop duration  
 TIME :09:25:43 09:48:17 23 (min) Purpose code: 3  
 LOG :4068.19 4069.37 1.17 Area code : 2  
 FDEPTH: 26 25 GearCond.code: 9  
 BDEPTH: 26 25 Validity code: 1  
 Towing dir: 340ø Wire out: 90 m Speed: 30 kn\*10  
 Sorted: 54 Kg Total catch: 53.94 CATCH/HOUR: 140.71

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	50.74	146	36.06	
Atractoscion aequidens	12.63	13	8.98	
Pragrus caeruleostictus	11.63	26	8.27	
Pomadasy incinus	10.12	50	7.19	
Engraulis encrasicolus	8.17	3230	5.81	
Plectorhynchus mediterraneus	6.68	18	4.75	
Acanthurus monroviae	6.31	8	4.48	
Sphyræna sphyraena	5.92	34	4.21	
Dræpane africana	5.27	5	3.75	
Dentex barnardi	3.91	5	2.78	
Pseudupeneus prayensis	3.47	70	2.47	
Pomadasy rogeri	2.22	3	1.58	
Alectis alexandrinus	1.83	3	1.30	
Brachydeuterus auritus	1.77	2624	1.26	
Epinephelus aeneus	1.67	3	1.19	
Sardinella sp.	1.43	180	1.02	
Raja miraletus	1.41	3	1.00	
Selene dorsalis	1.41	3	1.00	
Chaetodon hoefleri	1.20	8	0.85	
Pseudotolithus typus	0.89	3	0.63	
Pentheroscion mbizi	0.73	8	0.52	
Ilisha africana	0.44	8	0.31	
Decapterus rhonchus	0.39	13	0.28	
Scorpaena stephanica	0.23	3	0.16	
Chloroscombrus chrysurus	0.23	3	0.16	
Total	140.70		100.01	

PROJECT STATION:2768  
 DATE:10/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 915  
 Long E 1258  
 start stop duration  
 TIME :11:50:05 12:20:48 31 (min) Purpose code: 3  
 LOG :4084.65 4086.02 1.37 Area code : 2  
 FDEPTH: 24 27 GearCond.code:  
 BDEPTH: 24 27 Validity code: 1  
 Towing dir: 160ø Wire out: 100 m Speed: 30 kn\*10  
 Sorted: 63 Kg Total catch: 380.20 CATCH/HOUR: 735.87

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	466.26	50425	63.36	
Galeoides decadactylus	94.65	1672	12.86	
Chloroscombrus chrysurus	50.28	534	6.83	
Selene dorsalis	28.57	720	3.88	
Trachurus trecae	27.87	2950	3.79	6020
Decapterus rhonchus	23.46	776	3.19	6019
Pomadasy peroteti	14.98	35	2.04	
Sphyræna guachancho	9.75	81	1.32	
Raja miraletus	9.06	12	1.23	
Lithognathus mormyrus	4.30	12	0.58	
Sardinella maderensis	3.25	35	0.44	
Sardinella aurita	1.97	139	0.27	
Callinectes amnicola	1.24	4	0.17	
Torpedo marmorata	0.23	12	0.03	
Total	735.87		99.99	

PROJECT STATION: 2769  
 DATE: 10/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 914  
 start stop duration Long E 1251  
 TIME :13:47:36 14:17:05 29 (min) Purpose code: 3  
 LOG :4097.72 4099.29 1.56 Area code: 2  
 FDEPTH: 74 76 GearCond.code: 2  
 BDEPTH: 74 76 Validity code: 1  
 Towing dir: 334e Wire out: 250 m Speed: 30 kn\*10

Sorted: 17 Kg Total catch: 104.66 CATCH/HOUR: 216.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	153.62	511	70.94	
Brachydeuterus auritus	39.93	248	18.44	
Stromateus fiatola	9.12	17	4.21	
Trachurus trecae	6.35	275	2.93	6021
Brotula barbata	2.61	2	1.21	
Priacanthus arenatus	1.08	2	0.50	
Dentex angolensis	0.99	6	0.46	
Alloteuthis africana	0.95	250	0.44	
Citharus linguatula	0.39	6	0.18	
Umbrina canariensis	0.37	4	0.17	
Chloroscombrus chrysurus	0.33	2	0.15	
Momolene microstoma	0.21	2	0.10	
Pterothrissus bellocci	0.21	4	0.10	
Boops boops	0.14	8	0.06	
Sepia officinalis hierredda	0.12	2	0.06	
Parapenaeus longirostris	0.10	29	0.05	
Total	216.52		100.00	

PROJECT STATION: 2770  
 DATE: 10/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 916  
 start stop duration Long E 1247  
 TIME :15:36:17 16:01:59 26 (min) Purpose code: 3  
 LOG :4108.65 4110.03 1.38 Area code: 2  
 FDEPTH: 116 114 GearCond.code: 2  
 BDEPTH: 116 114 Validity code: 1  
 Towing dir: 355e Wire out: 350 m Speed: 30 kn\*10

Sorted: 127 Kg Total catch: 1336.00 CATCH/HOUR: 3083.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Saurida brasiliensis	1527.69	2215	49.55	
Synagrops microlepis	808.85	85638	26.24	
Trachurus trecae	463.85	21462	15.05	6022
Brotula barbata	225.92	69	7.33	
Boops boops	17.77	185	0.58	
Pterothrissus bellocci	16.85	185	0.55	
Uranoscopus cadenati	14.31	46	0.46	
Illex coindetii	4.62	23	0.15	
Uranoscopus polli	1.62	277	0.05	
Thorogobius angolensis	0.69	18	0.02	
Parapenaeus longirostris, fem.	0.46	115	0.01	
Parapenaeus longirostris, male	0.46	115	0.01	
Total	3083.09		100.00	

PROJECT STATION: 2771  
 DATE: 13/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 912  
 start stop duration Long E 1242  
 TIME :14:19:55 14:46:19 26 (min) Purpose code: 3  
 LOG :4267.10 4268.45 1.34 Area code: 2  
 FDEPTH: 259 259 GearCond.code: 2  
 BDEPTH: 259 259 Validity code: 1  
 Towing dir: e Wire out: 800 m Speed: 31 kn\*10

Sorted: 64 Kg Total catch: 1095.15 CATCH/HOUR: 2527.27

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	2371.50	1815136	93.84	
Merluccius polli	54.14	745	2.14	6025
MYCTOPHIDAE	26.28	10671	1.04	
Illex coindetii	19.22	235	0.76	
Dentex angolensis	16.85	37	0.67	6023
Momolene microstoma	12.16	39	0.48	
Dentex macrophthalmus	6.07	14	0.24	6024
Parapenaeus longirostris, fem.	5.49	902	0.22	6027
Nezumia aequalis	4.71	39	0.19	
Parapenaeus longirostris, male	3.53	745	0.14	6026
Zenopsis conchifer	3.00	2	0.12	
Chlorophthalmus atlanticus	1.96	235	0.08	
Gadella imberbis	1.18	78	0.05	
Coelorinchus coelorhincus	0.78	39	0.03	
Solenocera africana	0.39	39	0.02	
Total	2527.26		100.02	

PROJECT STATION: 2772  
 DATE: 13/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 906  
 start stop duration Long E 1241  
 TIME :18:02:04 18:33:07 31 (min) Purpose code: 3  
 LOG :4295.92 4297.51 1.57 Area code: 2  
 FDEPTH: 438 404 GearCond.code: 2  
 BDEPTH: 438 404 Validity code: 1  
 Towing dir: 180e Wire out: 1260 m Speed: 30 kn\*10

Sorted: 26 Kg Total catch: 79.35 CATCH/HOUR: 153.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius polli	44.13	122	28.73	6068
Nematocarcinus africanus	28.26	16728	18.40	
Dibranchius atlanticus	10.61	668	6.91	
Ommastrephes bartrami	9.72	116	6.33	
Centrophorus granulosus	7.16	2	4.66	
Yarella blackfordi	6.50	182	4.23	
Laemonema laureysi	6.31	85	4.11	
Etmopterus polli	4.65	19	3.03	
Aristeus varidens, female	4.61	263	3.00	6070
Chaunax pictus	3.93	85	2.56	
Synagrops microlepis	3.87	335	2.52	
Chaccon maritae	3.52	8	2.29	
Triplophos hemingi	2.79	739	1.82	
Todaropsis eblanae	2.75	19	1.79	
Xenodermichthys copei	2.13	27	1.39	
Hoplostethus cadenati	2.13	116	1.39	
Trichiurus lepturus	1.94	62	1.26	
Gadella imberbis	1.63	62	1.06	
Malacocephalus occidentalis	1.28	8	0.83	
Stomias boa boa	1.24	27	0.81	
MYCTOPHIDAE	1.12	288	0.73	
Todarodes sagittatus	0.81	294	0.53	
Aristeus varidens, male	0.66	120	0.43	6069
Coelorinchus coelorhincus	0.50	4	0.33	
Callinectes marginatus	0.43	8	0.28	
Lophius vaillanti	0.27	4	0.18	
Hymenocephalus italicus	0.27	12	0.18	
Nezumia aequalis	0.23	4	0.15	
Plesiopeanaus edwardsianus	0.15	4	0.10	
Total	153.60		100.03	

PROJECT STATION: 2773  
 DATE: 13/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 905  
 start stop duration Long E 1237  
 TIME :21:07:14 21:37:10 30 (min) Purpose code: 3  
 LOG :4310.58 4311.98 1.38 Area code: 2  
 FDEPTH: 738 729 GearCond.code: 2  
 BDEPTH: 738 729 Validity code: 1  
 Towing dir: 210e Wire out: 1800 m Speed: 27 kn\*10

Sorted: 22 Kg Total catch: 49.34 CATCH/HOUR: 98.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nezumia aequalis	20.84	400	21.12	
Merluccius polli	11.60	12	11.76	6071
Hoplostethus cadenati	10.28	108	10.42	
Aristeus varidens, female	8.28	336	8.39	6073
Raja clavata	7.16	4	7.26	
GALATHEIDAE *	6.92	428	7.01	
Lamprogrammus exutus	6.80	16	6.89	
Dibranchius atlanticus	6.36	284	6.45	
Yarella blackfordi	5.56	80	5.63	
Paromella cuvieri	3.56	8	3.61	
Chaccon maritae, male	3.04	4	3.08	
Talismania bifurcata	2.96	16	3.00	
Raja confundens	2.16	20	2.19	
Dicrolene intronigra	1.52	72	1.54	
Stomias boa boa	0.76	20	0.77	
Cubiceps sp.	0.52	12	0.53	
Bathypterois quadrifilis	0.24	16	0.24	
Xenodermichthys copei	0.08	4	0.08	
Aristeus varidens, male	0.04	8	0.04	6072
Total	98.68		100.01	

PROJECT STATION: 2774  
 DATE: 14/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 850  
 start stop duration Long E 1255  
 TIME :05:41:27 06:11:48 30 (min) Purpose code: 3  
 LOG :4343.99 4345.53 1.54 Area code: 3  
 FDEPTH: 308 343 GearCond.code: 3  
 BDEPTH: 308 343 Validity code: 1  
 Towing dir: 304e Wire out: 910 m Speed: 30 kn\*10

Sorted: 56 Kg Total catch: 303.88 CATCH/HOUR: 607.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	222.60	17652	36.63	
Merluccius polli	167.46	96	27.55	
Chlorophthalmus atlanticus	123.90	2362	20.39	
Laemonema laureysi	13.44	106	2.21	
Zenopsis conchifer	11.80	12	1.94	
Lophius vaillanti	11.60	2	1.91	
MYCTOPHIDAE	11.56	5460	1.90	
Scorpaena notata	8.82	42	1.45	
Parapenaeus longirostris, fem.	7.14	830	1.17	6029
Lestidium atlanticum	6.30	32	1.04	
Gadella imberbis	4.72	148	0.78	
Pterothrissus bellocci	4.42	22	0.73	
Coelorinchus coelorhincus	4.30	22	0.71	
Trichiurus lepturus	4.00	232	0.66	
Dibranchius atlanticus	1.68	116	0.28	
Todaropsis eblanae	1.16	400	0.19	
Illex coindetii	0.74	10	0.12	
Callinectes marginatus	0.64	10	0.11	
GALATHEIDAE *	0.52	64	0.09	
Raja confundens	0.42	10	0.07	
Nezumia aequalis	0.22	10	0.04	
Parapenaeus longirostris, male	0.22	74	0.04	6028
Solenocera africana	0.10	84	0.02	
Total	607.76		100.03	

PROJECT STATION: 2775  
 DATE: 14/ 3/02 GEAR TYPE: BT No:14 POSITION: Lat S 853  
 start stop duration Long E 1257  
 TIME :08:23:09 08:25:06 2 (min) Purpose code: 3  
 LOG :4357.17 4357.24 0.03 Area code: 3  
 FDEPTH: 230 230 GearCond.code: 8  
 BDEPTH: 230 230 Validity code: 4  
 Towing dir: 305e Wire out: 610 m Speed: 30 kn\*10

Sorted: 14 Kg Total catch: 13.80 CATCH/HOUR: 414.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	390.00	62400	94.20	
Scorpaena normani	15.00	30	3.62	
Illex coindetii	9.00	390	2.17	
Total	414.00		99.99	

PROJECT STATION: 2776  
 DATE: 14/ 3/02 GEAR TYPE: BT No: 2 POSITION: Lat S 854  
 start stop duration Long E 1300  
 TIME :09:44:10 10:04:25 20 (min) Purpose code: 3  
 LOG :4365.12 4366.09 0.88 Area code: 3  
 FDEPTH: 186 195 GearCond.code: 9  
 BDEPTH: 186 195 Validity code: 1  
 Towing dir: 305e Wire out: 460 m Speed: 30 kn\*10

Sorted: 58 Kg Total catch: 1267.03 CATCH/HOUR: 3801.09

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	3490.20	767178	91.82	
Trichiurus lepturus	154.80	1476	4.07	
Brotula barbata	34.35	30	0.90	
Pterothrissus bellocci	31.35	123	0.82	
Zenopsis conchifer	23.70	54	0.62	
Dentex angolensis	22.80	69	0.60	6074
Pentheroscion mbizi	16.59	63	0.44	
Illex coindetii	15.99	186	0.42	
Zenopsis conchifer	9.00	6	0.24	
Scorpaena normani	1.17	3	0.03	
Dentex macrophthalmus	1.14	3	0.03	
Total	3801.09		99.99	



PROJECT STATION:2777  
 DATE:14/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 852  
 start stop duration Long E 1259  
 TIME :10:58:51 11:28:21 30 (min) Purpose code: 3  
 LOG :4369.53 4371.01 1.49 Area code : 3  
 FDEPTH: 215 219 GearCond.code:  
 BDEPTH: 215 219 Validity code: 1  
 Towing dir: 200° Wire out: 620 m Speed: 31 kn\*10

Sorted: 131 Kg Total catch: 4982.56 CATCH/HOUR: 9965.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	8812.20	645848	88.43	
Trichiurus lepturus	490.20	608	4.92	
Zenopsis conchifer	277.40	456	2.78	
Brotula barbata	197.60	76	1.98	
Pterothrissus bellocci	105.64	532	1.06	
Dentex angolensis	49.40	228	0.50	
Merluccius polli	10.64	152	0.11	
Illex coindetii	9.88	304	0.10	
Parapenaeus longirostris, fem.	3.80	532	0.04	6076
Parapenaeus longirostris, male	3.80	1444	0.04	6075
Synaptura sp.	3.80	76	0.04	
Chlorophthalmus atlanticus	0.76	76	0.01	
Total	9965.12		100.01	

PROJECT STATION:2778  
 DATE:14/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 835  
 start stop duration Long E 1301  
 TIME :16:01:00 16:26:52 26 (min) Purpose code: 3  
 LOG :4411.28 4412.62 1.34 Area code : 3  
 FDEPTH: 145 150 GearCond.code:  
 BDEPTH: 145 150 Validity code: 1  
 Towing dir: 180° Wire out: 500 m Speed: 31 kn\*10

Sorted: 77 Kg Total catch: 77.12 CATCH/HOUR: 177.97

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Illex coindetii	83.88	1745	47.13	
Dentex angolensis	27.46	97	15.43	6077
Spicara alta	26.19	162	14.72	
Dentex macropthalmus	7.25	21	4.07	6078
Pterothrissus bellocci	5.93	28	3.33	
Zenopsis conchifer	5.22	5	2.93	
Brotula barbata	4.80	5	2.70	
Atractoscion aequidens	3.16	2	1.78	
Trichiurus lepturus	3.12	21	1.75	
Octopus vulgaris	2.88	2	1.62	
Anthias anthias	2.45	32	1.38	
Zeus faber	1.85	14	1.04	
Umbrina canariensis	0.81	2	0.46	
Bembrops heterurus	0.69	7	0.39	
Scorpaena normani	0.67	2	0.38	
Citharus linguatula	0.55	18	0.31	
Parapenaeus longirostris, fem.	0.39	62	0.22	6079
Uranoscopus cadenati	0.30	2	0.17	
Chelidonicichthys gabonensis	0.28	2	0.15	
Trachurus trecae	0.07	2	0.04	
Parapenaeus longirostris, male	0.02	2	0.01	
Total	177.97		100.02	

PROJECT STATION:2779  
 DATE:14/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 836  
 start stop duration Long E 1250  
 TIME :18:51:12 19:21:37 30 (min) Purpose code: 3  
 LOG :4431.34 4432.85 1.50 Area code : 2  
 FDEPTH: 708 701 GearCond.code:  
 BDEPTH: 708 701 Validity code: 1  
 Towing dir: 330° Wire out:1780 m Speed: 30 kn\*10

Sorted: 25 Kg Total catch: 177.00 CATCH/HOUR: 354.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Yarella blackfordi	84.84	2488	23.97	
Triphophus hemingi	46.62	5996	13.17	
Hoplostethus cadenati	35.70	1622	10.08	
Lamprogrammus exutus	25.76	112	7.28	
Dicrolene sp.	23.80	322	6.72	
ONYCHOTEUTHIDAE	20.16	14	5.69	
GALATHEIDAE *	19.60	1408	5.54	
Xenodermichthys copei	18.48	294	5.22	
ALLOPOSIDAE	17.36	308	4.90	
Nematocarcinus africanus	11.90	2696	3.36	
Stomias boa boa	11.48	322	3.24	
Aristeus varidens, female	11.20	42	3.16	
Ommastrephes pteropus	10.78	70	3.05	
Nezumia aequalis	5.46	84	1.54	
Todaropsis eblanae	4.48	70	1.27	
CONGRIDAE	2.52	56	0.71	
Merluccius polli	1.62	2	0.45	
Plesionika martia	0.84	42	0.24	
Plesionipenaeus edwardsianus	0.70	28	0.20	
MYCTOPHIDAE	0.42	168	0.12	
Dibranchius atlanticus	0.28	14	0.08	
Total	354.00		100.00	

PROJECT STATION:2780  
 DATE:14/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 834  
 start stop duration Long E 1251  
 TIME :21:12:06 21:42:22 30 (min) Purpose code: 3  
 LOG :4440.50 4442.12 1.62 Area code : 3  
 FDEPTH: 535 574 GearCond.code:  
 BDEPTH: 535 574 Validity code: 1  
 Towing dir: 320° Wire out:1420 m Speed: 30 kn\*10

Sorted: 26 Kg Total catch: 187.67 CATCH/HOUR: 375.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	167.30	46060	44.57	
Triphophus hemingi	55.72	7056	14.85	
Yarella blackfordi	55.02	1750	14.66	
Hoplostethus cadenati	33.60	1372	8.95	
Xenodermichthys copei	16.80	1638	4.48	
Lamprogrammus exutus	11.20	1288	2.98	
Ommastrephes pteropus	9.94	42	2.65	
Stomias sp.	6.72	140	1.79	
Unidentified fish	4.60	2	1.23	
Merluccius polli	3.80	6	1.01	
Trichiurus lepturus	3.22	112	0.86	
Plesionika martia	1.68	574	0.45	
Hymenoccephalus italicus	1.54	294	0.41	
GALATHEIDAE *	1.40	224	0.37	
ALLOPOSIDAE	0.70	42	0.19	
Aristeus varidens, male	0.56	70	0.15	
Aristeus varidens, female	0.56	28	0.15	
Nomichthys scolopaceus	0.42	14	0.11	
CONGRIDAE	0.28	42	0.07	
MYCTOPHIDAE	0.28	336	0.07	
Total	375.34		100.00	

PROJECT STATION:2781  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 836  
 start stop duration Long E 1254  
 TIME :00:12:02 00:42:20 30 (min) Purpose code: 3  
 LOG :4453.45 4455.06 1.59 Area code : 3  
 FDEPTH: 414 397 GearCond.code:  
 BDEPTH: 414 397 Validity code: 1  
 Towing dir: 360° Wire out:1250 m Speed: 30 kn\*10

Sorted: 46 Kg Total catch: 114.22 CATCH/HOUR: 228.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	99.50	27450	43.56	
Merluccius polli	95.00	280	41.59	6036
TRICHIURIDAE	6.90	180	3.02	
Chaunax laureysi	6.80	56	2.98	
Stomias boa boa	4.00	96	1.75	
Dibranchius atlanticus	3.30	256	1.44	
Ommastrephes pteropus	3.10	20	1.36	
Chaunax pictus	2.90	256	1.27	
Triphophus hemingi	1.30	176	0.57	
Aristeus varidens, male	1.04	156	0.46	6034
Aristeus varidens, female	1.00	230	0.44	6035
Solenocera africana	0.76	70	0.33	
Yarella blackfordi	0.70	76	0.31	
Illex coindetii	0.56	6	0.25	
Lophiodon kempi	0.56	16	0.25	
Lamprogrammus exutus	0.50	20	0.22	
Gadella imberbis	0.30	6	0.13	
MYCTOPHIDAE	0.10	100	0.04	
Peristedion cataphractum	0.10	16	0.04	
POLYCHAELIDAE	0.06	10	0.03	
Total	228.48		100.04	

PROJECT STATION:2782  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 838  
 start stop duration Long E 1304  
 TIME :05:39:10 06:10:16 31 (min) Purpose code: 3  
 LOG :4477.68 4479.33 1.64 Area code : 3  
 FDEPTH: 113 113 GearCond.code:  
 BDEPTH: 113 113 Validity code: 1  
 Towing dir: 358° Wire out: 340 m Speed: 30 kn\*10

Sorted: Kg Total catch: 28.65 CATCH/HOUR: 55.45

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	33.39	149	60.22	6037
Umbrina canariensis	5.42	14	9.77	6038
Atractoscion aequidens	2.26	2	4.08	
Scomber japonicus	2.01	19	3.62	
Trichiurus lepturus	1.86	2	3.35	
Zeus faber	1.84	15	3.32	
Brotula barbata	1.74	2	3.14	
Pterothrissus bellocci	1.45	10	2.61	
Chelidonicichthys gabonensis	1.35	4	2.43	
Dentex congongensis	1.22	14	2.20	
Illex coindetii	0.77	15	1.39	
Citharus linguatula	0.74	12	1.33	
Dentex macropthalmus	0.58	2	1.05	
Chaetodon hoefleri	0.52	4	0.94	
Spicara alta	0.29	2	0.52	
Total	55.44		99.97	

PROJECT STATION:2783  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 835  
 start stop duration Long E 1309  
 TIME :07:16:19 07:33:14 17 (min) Purpose code: 3  
 LOG :4485.44 4487.19 0.74 Area code : 3  
 FDEPTH: 82 81 GearCond.code: 9  
 BDEPTH: 82 81 Validity code: 4  
 Towing dir: 20° Wire out: 270 m Speed: 30 kn\*10

Sorted: Kg Total catch: 0.50 CATCH/HOUR: 1.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dicologlossa cuneata	0.88	7	50.00	
Citharus linguatula	0.53	4	30.11	
Monolele microstoma	0.35	4	19.89	
Total	1.76		100.00	

PROJECT STATION:2784  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 835  
 start stop duration Long E 1315  
 TIME :09:24:30 09:54:14 30 (min) Purpose code: 3  
 LOG :4496.48 4498.10 1.60 Area code : 3  
 FDEPTH: 52 59 GearCond.code:  
 BDEPTH: 52 59 Validity code: 1  
 Towing dir: 310° Wire out: 150 m Speed: 30 kn\*10

Sorted: 89 Kg Total catch: 89.36 CATCH/HOUR: 178.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	95.50	796	53.44	
Trichiurus lepturus	21.80	712	12.20	
Pseudolithus elongatus	13.92	4	7.79	
Brachydeuterus auritus	9.82	644	5.49	
Sphyrna guanchancho	7.34	14	4.11	
Trachurus trecae	6.54	406	3.66	
Engraulis encrasicolus	5.02	980	2.81	
Alectis alexandrinus	3.60	2	2.01	
Galeoides decadactylus	2.76	10	1.54	
Pagellus bellottii	2.52	18	1.41	
Sardinella maderensis	2.08	12	1.16	
Torpedo nobiliana	1.78	2	1.00	
Sepia orbignyana	1.50	916	0.84	
Stromateus fiatola	1.40	2	0.78	
Lithognathus mormyrus	1.38	6	0.77	
Sepia officinalis hierredda	1.16	2	0.65	
Trachinotus ovatus	0.34	2	0.19	
Bembrops heterurus	0.10	2	0.06	
Brotula barbata	0.08	2	0.04	
Citharus linguatula	0.08	6	0.04	
Total	178.72		99.99	

PROJECT STATION:2785  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 835  
 start stop duration Long E 1317  
 TIME :10:45:47 11:15:31 30 (min) Purpose code: 3  
 LOG :4503.76 4505.34 1.57 Area code : 3  
 FDEPTH: 43 45 GearCond.code:  
 BDEPTH: 43 45 Validity code: 1  
 Towing dir: 340° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 231.73 CATCH/HOUR: 463.46

PROJECT STATION:2788  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 826  
 start stop duration Long E 1246  
 TIME :19:32:23 20:02:12 30 (min) Purpose code: 3  
 LOG :4563.62 4565.08 1.38 Area code : 3  
 FDEPTH: 700 717 GearCond.code:  
 BDEPTH: 700 717 Validity code: 1  
 Towing dir: 320° Wire out:1800 m Speed: 30 kn\*10  
 Sorted: 36 Kg Total catch: 316.08 CATCH/HOUR: 632.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	172.80	7446	37.28	
Chloroscombrus chrysurus	167.10	1650	36.05	
Stromateus fiatola	25.90	34	5.59	
Galeoides decadactylus	18.06	48	3.90	
Alectis alexandrinus	12.40	8	2.68	
Pseudotolithus senegalensis	12.20	8	2.63	
Trichiurus sp.	11.04	558	2.38	
Rhizopronodon acutus	9.40	2	2.03	
Sphyræna guachancho	6.10	10	1.32	
Arius parkii	4.90	2	1.06	
Ilisha africana	4.80	60	1.04	
Lithognathus mormyrus	4.14	12	0.89	
Pomadasy peroteti	3.04	4	0.66	
Sepia juveniles	2.52	1302	0.54	
Octopus vulgaris	1.74	6	0.38	
Trichiurus lepturus	1.40	4	0.30	
Sardinella aurita	1.32	12	0.28	
Engraulis encrasicolus	0.84	144	0.18	
Pentheroscion mbizi	0.72	12	0.16	
GOBIIDAE	0.72	414	0.16	
Trachurus trecae	0.66	30	0.14	
Penaeus notialis	0.60	30	0.13	
Decapterus rhonchus	0.54	6	0.12	
Sphyræna guachancho	0.52	2	0.11	
Total	463.46		100.01	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	171.60	5780	27.15	
Nematocarcinus africanus	141.00	32430	22.30	
Yarella blackfordi	123.20	1340	19.49	
Lamprogrammus exutus	80.40	420	12.72	
Triplophos hemingi	37.40	4280	5.92	
Xenodermichthys copei	19.40	1140	3.07	
Ommastrephes pteropus	16.20	60	2.56	
GALATHEIDAE *	10.80	700	1.71	
Nezumia aequalis	7.80	140	1.23	
Stomias boa boa	5.40	160	0.85	
ALLOPOSIDAE	4.20	100	0.66	
Plesionika martia	2.40	580	0.38	
Halosaurus owenii	2.20	20	0.35	
Plesiopeneus edwardsianus	1.80	140	0.28	
Dicrolene intronigra	1.60	40	0.25	
Ebinania costaecanarie	1.34	2	0.21	
CONGRIDAE	1.00	20	0.16	
Merluccius polli	0.82	2	0.13	
Gadella imberbis	0.80	60	0.13	
Diceratias pileatus	0.80	20	0.13	
Caristius groenlandicus	0.80	40	0.13	
Aristeus varidens, female	0.60	60	0.09	
Dibranchius atlanticus	0.60	20	0.09	
Total	632.16		99.99	

PROJECT STATION:2786  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 836  
 start stop duration Long E 1319  
 TIME :12:30:55 13:00:43 30 (min) Purpose code: 3  
 LOG :4511.64 4513.31 1.67 Area code : 3  
 FDEPTH: 32 28 GearCond.code:  
 BDEPTH: 32 28 Validity code: 1  
 Towing dir: 360° Wire out: 110 m Speed: 30 kn\*10  
 Sorted: 42 Kg Total catch: 218.89 CATCH/HOUR: 437.78

PROJECT STATION:2789  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 828  
 start stop duration Long E 1247  
 TIME :22:00:36 22:31:44 31 (min) Purpose code: 3  
 LOG :4574.32 4575.83 1.50 Area code : 3  
 FDEPTH: 601 647 GearCond.code:  
 BDEPTH: 601 647 Validity code: 1  
 Towing dir: 320° Wire out:1650 m Speed: 30 kn\*10  
 Sorted: 32 Kg Total catch: 292.57 CATCH/HOUR: 566.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	127.60	4152	29.15	
Ilisha africana	97.20	2400	22.20	
Galeoides decadactylus	49.20	120	11.24	
Trichiurus lepturus	40.76	186	9.31	
Pseudotolithus cypus	25.60	42	5.85	6040
Pomadasy olivaceum	18.88	24	4.31	
Rhizopronodon acutus	15.70	6	3.59	
Stromateus fiatola	13.84	24	3.16	
Arius parkii	12.20	10	2.79	
Selene dorsalis	11.28	352	2.58	
Sphyræna guachancho	9.28	16	2.12	
Drepane africana	5.14	14	1.17	
Chloroscombrus chrysurus	3.60	40	0.82	
Pentheroscion mbizi	2.48	72	0.57	
Sardinella aurita	1.84	16	0.42	
Epinephelus aeneus	1.64	2	0.37	
Decapterus rhonchus	0.96	40	0.22	
Penaeus notialis	0.58	16	0.13	
Total	437.78		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	170.71	24143	30.15	
Yarella blackfordi	128.90	2491	22.76	
Hoplostethus cadenati	104.86	3919	18.52	
Triplophos hemingi	35.88	1934	6.34	
Lamprogrammus exutus	35.19	557	6.21	
Stomias boa boa	26.65	697	4.71	
Xenodermichthys copei	18.29	923	3.23	
OMMASTREPHIDAE	9.58	17	1.69	
POLYCHAELIDAE	9.06	540	1.60	
TRICHIURIDAE	9.06	105	1.60	
Nemichthys scolopaceus	6.27	17	1.11	
Glyphus marsupialis	6.27	70	1.11	
Aristeus varidens, female	1.92	52	0.34	6044
Chaceon maritae	1.18	2	0.21	
Aristeus varidens, male	0.70	35	0.12	6043
CONGRIDAE	0.52	105	0.09	
Photoneustes braueri	0.35	17	0.06	
Ectreposebastes imus	0.35	17	0.06	
Nezumia aequalis	0.17	17	0.03	
OPHIDIIDAE	0.17	35	0.03	
Total	566.08		99.97	

PROJECT STATION:2787  
 DATE:15/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 820  
 start stop duration Long E 1306  
 TIME :15:57:13 16:27:21 30 (min) Purpose code: 3  
 LOG :4536.19 4537.81 1.60 Area code : 3  
 FDEPTH: 87 82 GearCond.code:  
 BDEPTH: 87 82 Validity code: 1  
 Towing dir: 130° Wire out: 310 m Speed: 30 kn\*10  
 Sorted: 287 Kg Total catch: 1227.84 CATCH/HOUR: 2455.68

PROJECT STATION:2790  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 829  
 start stop duration Long E 1248  
 TIME :00:00:56 00:30:41 30 (min) Purpose code: 3  
 LOG :4583.71 4585.24 1.52 Area code : 3  
 FDEPTH: 536 546 GearCond.code:  
 BDEPTH: 536 546 Validity code: 1  
 Towing dir: 330° Wire out:1500 m Speed: 30 kn\*10  
 Sorted: 27 Kg Total catch: 189.10 CATCH/HOUR: 378.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	2410.80	11844	98.17	
Stromateus fiatola	10.92	16	0.44	
Brachydeuterus auritus	8.28	60	0.34	
Fisularia petimba	5.60	12	0.23	
Arius laticutatus	4.00	2	0.16	
Octopus vulgaris	3.26	2	0.13	
Raja miraletus	3.22	4	0.13	
Dentex angolensis	2.40	14	0.10	6041
Torpedo torpedo	2.10	8	0.09	
Pentheroscion mbizi	1.46	4	0.06	
Brotula barbata	1.28	4	0.05	
Zeus faber	1.14	4	0.05	
Selene dorsalis	0.48	2	0.02	
Chaetodon hoefleri	0.26	2	0.01	
Citharus linguatula	0.20	4	0.01	
Parapenaeus longirostris, fem.	0.16	18	0.01	6042
Illex coindetii	0.12	2	0.01	
Total	2455.68		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	158.20	7728	41.83	
Nematocarcinus africanus	107.10	25704	28.32	
Triplophos hemingi	36.68	1974	9.70	
Yarella blackfordi	23.80	812	6.29	
Stomias boa boa	21.42	448	5.66	
Lamprogrammus exutus	12.60	770	3.33	
Xenodermichthys copei	5.88	742	1.55	
POLYCHAELIDAE	2.66	294	0.70	
TRICHIURIDAE	2.52	84	0.67	
Aristeus varidens, female	2.44	84	0.65	6046
Nezumia aequalis	1.26	98	0.33	
Aristeus varidens, male	0.98	148	0.26	6045
CONGRIDAE	0.70	28	0.19	
Glyphus marsupialis	0.56	168	0.15	
Nemichthys scolopaceus	0.56	28	0.15	
Gadella imberbis	0.28	14	0.07	
MYCTOPHIDAE	0.28	252	0.07	
Epigonus sp.	0.14	14	0.04	
MELANOCETIDAE	0.14	28	0.04	
Total	378.20		100.00	

PROJECT STATION:2791  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 828  
 start stop duration  
 TIME :01:45:00 02:15:08 30 (min) Purpose code: 3  
 LOG :4591.79 4593.35 1.55 Area code : 3  
 FDEPTH: 448 446 GearCond.code:  
 BDEPTH: 448 446 Validity code: 1  
 Towing dir: 340° Wire out:1250 m Speed: 30 kn\*10  
 Sorted: 18 Kg Total catch: 75.02 CATCH/HOUR: 150.04

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Merluccius polli	46.30 96	30.86	6047
Triplophos hemingi	23.04 2896	15.36	
TRICHIURIDAE	22.08 816	14.72	
Nematocarcinus africanus	20.24 89056	13.49	
Yareella blackfordi	13.28 496	8.85	
Malacocephalus occidentalis	6.56 48	4.37	
Stomias boa boa	4.96 96	3.31	
Hoplostethus cademati	2.72 176	1.81	
Aristeus varidensis, female	1.60 176	1.07	6049
Xenodermichthys copei	1.44 432	0.96	
Etmopterus spinax	1.44 32	0.96	
Dibranchius atlanticus	1.44 80	0.96	
S H R I M P S	1.28 368	0.85	
Chauliodus sloani	1.28 16	0.85	
Laemonema laureysi	0.96 64	0.64	
MYCTOPHIDAE	0.64 224	0.43	
Aristeus varidensis, male	0.64 112	0.43	6048
Plesionaeus edwardsianus	0.14 2	0.09	
Total	150.04	100.01	

PROJECT STATION:2792  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 828  
 start stop duration  
 TIME :05:42:44 06:12:07 29 (min) Purpose code: 3  
 LOG :4606.20 4607.69 1.49 Area code : 3  
 FDEPTH: 308 309 GearCond.code:  
 BDEPTH: 308 309 Validity code: 1  
 Towing dir: 320° Wire out: 950 m Speed: 30 kn\*10  
 Sorted: 28 Kg Total catch: 243.12 CATCH/HOUR: 503.01

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Synagrops microlepis	303.72 25769	60.38	
Merluccius polli	78.12 497	15.53	
Chlorophthalmus atlanticus	50.42 844	10.02	
Zeus faber	29.28 39	5.82	
Laemonema laureysi	15.06 149	2.99	
Trichiurus lepturus	7.28 10	1.45	
Parapanaeus longirostris, fem.	5.46 761	1.09	6050
Lestidiops sp.	2.67 215	0.76	
Hyperoglyphe mosselii	2.32 17	0.46	
Pterothrissus belloci	1.82 33	0.36	
Nezumia aequalis	1.39 6	0.28	
Scorpaena normani	0.50 17	0.10	
Illex coindetii	0.50 17	0.10	
Todaropsis eblanae	0.33 50	0.07	
Solenocera africana	0.17 33	0.03	6051
Parapanaeus longirostris, male	0.17 17	0.03	
Peristedion cataphractum	0.17 17	0.03	
Total	503.02	100.00	

PROJECT STATION:2793  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 826  
 start stop duration  
 TIME :07:29:45 08:00:18 31 (min) Purpose code: 3  
 LOG :4613.84 4615.50 1.65 Area code : 3  
 FDEPTH: 230 226 GearCond.code:  
 BDEPTH: 230 226 Validity code: 1  
 Towing dir: 340° Wire out: 620 m Speed: 30 kn\*10  
 Sorted: 21 Kg Total catch: 196.08 CATCH/HOUR: 379.51

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Synagrops microlepis	153.87 15176	40.54	
Zeus faber	121.65 184	32.05	
Trichiurus lepturus	36.39 27	9.59	
Merluccius polli	28.55 455	7.52	6054
Dentex angolensis	9.21 27	2.43	6052
Pentheroscion mbizi	7.74 10	2.04	
Pterothrissus belloci	5.81 29	1.53	
Dentex macrocephalus	4.68 12	1.23	6053
Brotula barbata	3.72 6	0.98	
Chlorophthalmus atlanticus	2.61 223	0.69	
Parapanaeus longirostris, fem.	2.13 329	0.56	6056
Bembrops greyi	1.16 10	0.31	
Lophius vailanti	1.03 2	0.27	
Illex coindetii	0.58 10	0.15	
Parapanaeus longirostris, male	0.19 87	0.05	6055
Citharus linguatula	0.19 10	0.05	
Total	379.51	99.99	

PROJECT STATION:2794  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 824  
 start stop duration  
 TIME :09:17:00 09:47:26 30 (min) Purpose code: 3  
 LOG :4623.00 4624.66 1.63 Area code : 3  
 FDEPTH: 159 150 GearCond.code:  
 BDEPTH: 159 150 Validity code: 1  
 Towing dir: 340° Wire out: 480 m Speed: 30 kn\*10  
 Sorted: 14 Kg Total catch: 13.71 CATCH/HOUR: 27.42

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex angolensis	14.88 58	54.27	6057
Brotula barbata	3.08 4	11.23	
Todaropsis eblanae	3.00 108	10.94	
Pterothrissus belloci	2.46 30	8.97	
Lagocephalus laevigatus	1.12 2	4.08	
Spicara alta	1.04 8	3.79	
Zeus faber	1.02 8	3.72	
Chelidonichthys gabonensis	0.30 2	1.09	
Citharus linguatula	0.26 8	0.95	
Illex coindetii	0.26 16	0.95	
Total	27.42	99.99	

PROJECT STATION:2795  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 817  
 start stop duration  
 TIME :11:36:37 12:01:48 25 (min) Purpose code: 3  
 LOG :4638.76 4640.24 1.48 Area code : 3  
 FDEPTH: 110 113 GearCond.code:  
 BDEPTH: 110 113 Validity code: 1  
 Towing dir: 170° Wire out: 350 m Speed: 30 kn\*10  
 Sorted: 30 Kg Total catch: 370.12 CATCH/HOUR: 888.29

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Trachurus trecae	509.76 22723	57.39	6058
Synagrops microlepis	358.56 49997	40.37	
Zeus faber	5.40 60	0.61	
Illex coindetii	3.17 86	0.36	
Uranoscopus polli	2.66 7	0.30	
Trichiurus lepturus	1.58 2	0.18	
Atractoscion aequidens	1.44 7	0.16	
Ommastrephes pteropus	1.15 29	0.13	
Dentex angolensis	0.98 5	0.11	
Brotula barbata	0.94 5	0.11	
Boops boops	0.86 29	0.10	
Octopus vulgaris	0.77 2	0.09	
Saurida brasiliensis	0.58 86	0.07	
Sepia orbignyana	0.22 2	0.02	
Citharus linguatula	0.17 2	0.02	
Monolene microstoma	0.05 5	0.01	
Total	888.29	100.03	

PROJECT STATION:2796  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 818  
 start stop duration  
 TIME :13:48:56 14:18:40 30 (min) Purpose code: 3  
 LOG :4651.47 4653.18 1.71 Area code : 3  
 FDEPTH: 63 60 GearCond.code:  
 BDEPTH: 63 60 Validity code: 1  
 Towing dir: 360° Wire out: 220 m Speed: 30 kn\*10  
 Sorted: 29 Kg Total catch: 205.18 CATCH/HOUR: 410.36

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	304.80 4200	74.28	6060
Trichiurus lepturus	43.90 460	10.70	
Trachurus trecae	33.72 1416	8.22	6061
Octopus vulgaris	5.54 10	1.35	
Torpedo torpedo	3.60 6	0.88	
Atractoscion aequidens	3.40 14	0.83	
Pagellus bellottii	2.78 24	0.68	6059
Brotula barbata	2.32 4	0.57	
Selene dorsalis	1.92 36	0.47	
Dentex angolensis	1.58 8	0.39	
Sardinella aurita	1.08 12	0.26	
Stromateus fiatola	1.06 4	0.26	
Zeus faber	0.90 2	0.22	
Lagocephalus laevigatus	0.88 2	0.21	
Allotautis africana	0.84 252	0.20	
Chaetodon hoefleri	0.84 4	0.20	
Sepia juveniles	0.60 264	0.15	
Pentheroscion mbizi	0.36 12	0.09	
Citharus linguatula	0.12 2	0.03	
Engraulis encrasicolus	0.12 168	0.03	
Total	410.36	100.02	

PROJECT STATION:2797  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 816  
 start stop duration  
 TIME :15:05:51 15:35:38 30 (min) Purpose code: 3  
 LOG :4657.79 4659.50 1.69 Area code : 3  
 FDEPTH: 45 42 GearCond.code:  
 BDEPTH: 45 42 Validity code: 1  
 Towing dir: 360° Wire out: 190 m Speed: 31 kn\*10  
 Sorted: 59 Kg Total catch: 288.70 CATCH/HOUR: 577.40

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	313.60 15136	54.31	6062
Trichiurus lepturus	87.30 602	15.12	
Galeoides decadactylus	66.16 168	11.46	
Stromateus fiatola	38.72 56	6.71	
Chloroscombrus chrysurus	26.40 240	4.57	
Ilisha africana	17.20 288	2.98	
Cynoponticus ferox	7.30 2	1.26	
Selene dorsalis	6.40 112	1.11	
Sardinella aurita	4.96 56	0.86	
Pseudotolithus typus	4.80 4	0.83	
Pagellus bellottii	2.44 8	0.42	
Trachurus trecae	0.96 40	0.17	
Penaeus notialis	0.92 50	0.16	
Decapterus rhonchus	0.24 24	0.04	
Total	577.40	100.00	

PROJECT STATION:2798  
 DATE:16/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 815  
 start stop duration  
 TIME :15:01:26 16:40:08 30 (min) Purpose code: 3  
 LOG :4664.49 4666.20 1.70 Area code : 3  
 FDEPTH: 28 25 GearCond.code:  
 BDEPTH: 28 25 Validity code: 1  
 Towing dir: 350° Wire out: 120 m Speed: 32 kn\*10  
 Sorted: 78 Kg Total catch: 389.11 CATCH/HOUR: 778.22

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Galeoides decadactylus	149.86 198	19.26	
Stromateus fiatola	97.66 604	12.55	
Sphyræna guachancho	91.36 190	11.74	
Trichiurus lepturus	86.84 432	11.16	
Brachydeuterus auritus	77.40 5590	9.95	
Ilisha africana	60.12 2174	7.73	
Pseudotolithus typus	42.40 98	5.45	6063
Pteroscion peli	40.06 1502	5.15	
Raja clavata	34.12 18	4.38	
Sardinella maderensis	19.44 18	2.50	
Selene dorsalis	19.18 720	2.46	
Chloroscombrus chrysurus	16.12 162	2.07	
Rhizoprionodon acutus	9.70 4	1.25	
Eucinostomus melanopterus	8.64 118	1.11	
Arius heudeloti	7.70 2	0.99	
Pomadasys jubelini	7.66 22	0.98	
Panulirus sp.	5.80 4	0.75	
Arius parkii	2.36 2	0.30	
Penaeus notialis	1.80 18	0.23	
Total	778.22	100.01	



PROJECT STATION:2799  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 816  
 start stop duration Long E 1241  
 TIME :21:26:12 21:56:12 30 (min) Purpose code: 3  
 LOG :4708.47 4709.89 1.42 Area code : 3  
 FDEPTH: 703 705 GearCond.code: 1  
 BDEPTH: 703 705 Validity code: 1  
 Towing dir: 320° Wire out:1800 m Speed: 30 kn\*10  
 Sorted: 28 Kg Total catch: 228.39 CATCH/HOUR: 456.78

PROJECT STATION:2803  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 809  
 start stop duration Long E 1254  
 TIME :07:41:22 08:11:18 30 (min) Purpose code: 3  
 LOG :4759.75 4761.25 1.46 Area code : 3  
 FDEPTH: 116 115 GearCond.code: 1  
 BDEPTH: 116 115 Validity code: 1  
 Towing dir: 80° Wire out: 340 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 31.72 CATCH/HOUR: 63.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	192.00	7536	42.03	
Nematocarcinus africanus	133.60	31904	29.25	
Yarella blackfordi	38.88	976	8.51	
POLYCHAELIDAE	14.24	1104	3.12	
OMMASTREPHIDAE	13.12	64	2.87	
Lamprogrammus exutus	12.80	34	2.80	
Nezumia aequalis	10.56	160	2.31	
Triplophus hemingi	10.56	1552	2.11	
Xenodermichthys copei	9.76	496	2.14	
Stomias boa	7.04	128	1.54	
MYCTOPHIDAE	4.80	1392	1.05	
Laemonema laureysi	3.20	256	0.70	
Merluccius polli	2.10	4	0.46	
Talismania sp.	1.44	16	0.32	
Bassanago albescens	1.12	16	0.25	
Glyphus marsupialis	0.48	64	0.11	
Aristeus varidens, female	0.32	16	0.07	
Aristeus varidens, male	0.32	16	0.07	
NETTASTOMATIDAE	0.28	2	0.06	
Nemichthys scolopaceus	0.16	16	0.04	
Total	456.78		100.01	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	25.24	108	39.79	6066
Dentex barnardi	23.40	60	36.89	6067
Trachurus trecae	3.78	22	5.96	
Brotula barbata	2.14	2	3.37	
Pagellus bellottii	1.84	8	2.90	
Umbrina canariensis	1.36	4	2.14	
Anthias anthias	1.02	4	1.61	
Scomber japonicus	0.92	10	1.45	
Zeus faber	0.86	8	1.36	
Torpedo marmorata	0.66	2	1.04	
Chelidonichthys gabonensis	0.58	4	0.91	
Chaetodon hoefleri	0.56	4	0.88	
Scorpaena stephanica	0.42	4	0.66	
Octopus sp.	0.40	2	0.63	
Citharus linguatula	0.22	4	0.35	
Spicara alta	0.04	2	0.06	
Total	63.44		100.00	

PROJECT STATION:2800  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 816  
 start stop duration Long E 1241  
 TIME :00:05:16 00:36:31 31 (min) Purpose code: 3  
 LOG :4718.51 4720.20 1.68 Area code : 3  
 FDEPTH: 624 618 GearCond.code: 1  
 BDEPTH: 624 618 Validity code: 1  
 Towing dir: 340° Wire out:1650 m Speed: 31 kn\*10  
 Sorted: 26 Kg Total catch: 130.76 CATCH/HOUR: 253.08

PROJECT STATION:2804  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 807  
 start stop duration Long E 1259  
 TIME :09:20:08 09:47:01 27 (min) Purpose code: 3  
 LOG :4768.78 4770.20 1.39 Area code : 3  
 FDEPTH: 95 101 GearCond.code: 1  
 BDEPTH: 95 101 Validity code: 1  
 Towing dir: 260° Wire out: 350 m Speed: 30 kn\*10  
 Sorted: 51 Kg Total catch: 465.55 CATCH/HOUR: 1034.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	99.19	20303	39.19	
Stomias boa	61.16	1200	24.17	
Triplophus hemingi	32.03	14303	12.66	
Hoplostethus cadenati	21.97	1190	8.68	
Xenodermichthys copei	14.42	910	5.70	
OMMASTREPHIDAE	8.81	39	3.48	
Yarella blackfordi	4.74	2961	1.87	
Photonectes braueri	2.23	87	0.88	
TRICHIURIDAE	2.13	68	0.84	
POLYCHAELIDAE	1.65	252	0.65	
NOTOSUDIDAE	1.06	19	0.42	
Lamprogrammus exutus	1.06	10	0.42	
Merluccius polli	0.89	2	0.35	
Laemonema laureysi	0.77	39	0.30	
MYCTOPHIDAE	0.68	861	0.27	
Aristeus varidens, female	0.19	10	0.08	
Aristeus varidens, male	0.10	10	0.04	
Total	253.08		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	857.00	1669	82.84	
Trachurus trecae, juvenile	118.80	5782	11.48	6079
Brachydeuterus auritus	17.80	120	1.72	
Fistularia petimba	5.33	13	0.52	
Dentex angolensis	5.02	22	0.49	
Alloteuthis africana	4.80	1320	0.46	
Boops boops	4.00	40	0.39	
Pterothrissus belloci	4.00	100	0.39	
Brotula barbata	3.69	2	0.36	
Engraulis encrasicolus	3.20	400	0.31	
Uranoscopus polli	2.22	11	0.21	
Raja miraletus	1.91	2	0.18	
Citharus linguatula	1.80	36	0.17	
Chelidonichthys gabonensis	1.18	7	0.11	
Zeus faber	1.16	4	0.11	
Torpedo torpedo	1.09	2	0.11	
Umbrina canariensis	0.64	4	0.06	
Pentheroscion mbizi	0.53	4	0.05	
Saurida brasiliensis	0.20	80	0.02	
Pagellus bellottii	0.18	2	0.02	
Total	1034.55		100.00	

PROJECT STATION:2801  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 815  
 start stop duration Long E 1244  
 TIME :02:11:56 02:41:39 30 (min) Purpose code: 3  
 LOG :4728.80 4730.50 1.70 Area code : 3  
 FDEPTH: 425 422 GearCond.code: 1  
 BDEPTH: 425 422 Validity code: 1  
 Towing dir: 340° Wire out:1250 m Speed: 32 kn\*10  
 Sorted: 23 Kg Total catch: 53.30 CATCH/HOUR: 106.60

PROJECT STATION:2805  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 805  
 start stop duration Long E 1303  
 TIME :12:10:42 12:40:26 30 (min) Purpose code: 3  
 LOG :4782.44 4784.09 1.62 Area code : 3  
 FDEPTH: 70 79 GearCond.code: 1  
 BDEPTH: 70 79 Validity code: 1  
 Towing dir: 255° Wire out: 250 m Speed: 31 kn\*10  
 Sorted: 58 Kg Total catch: 116.08 CATCH/HOUR: 232.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius polli	70.80	172	66.42	6064
Stomias boa	7.52	160	7.05	
Chaenax pictus	7.20	32	6.75	
TRICHIURIDAE	5.44	224	5.10	
Triplophus hemingi	4.80	864	4.50	
Laemonema laureysi	3.84	32	3.60	
Nematocarcinus africanus	3.32	70720	3.11	
MYCTOPHIDAE	1.60	2192	1.50	
Aristeus varidens, female	0.80	80	0.75	
Nemichthys scolopaceus	0.32	16	0.30	
Aristeus varidens, male	0.32	48	0.30	
Dibranchius atlanticus	0.32	32	0.30	
Gadella imberbis	0.16	16	0.15	
Hymenocephalus italicus	0.16	16	0.15	
Total	106.60		99.98	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	74.20	304	31.96	
Dentex angolensis	49.20	220	21.19	6081
Trachurus trecae	40.60	2536	17.49	6083
Brachydeuterus auritus	24.80	468	10.68	
Pomadasys incisus	12.36	124	5.32	6084
Pagellus bellottii	8.76	56	3.77	6082
Dentex barnardi	6.96	60	3.00	
Alloteuthis africana	4.60	1400	1.98	
Torpedo torpedo	2.52	8	1.09	
Chaetodon hoefleri	2.08	16	0.90	
Citharus linguatula	1.76	36	0.76	6080
Fistularia petimba	1.04	8	0.45	
Umbrina canariensis	0.72	8	0.31	
Grammolites gruvelli	0.68	12	0.29	
Vanstraelenia chirophthalmus	0.48	4	0.21	
Pseudupeneus prayensis	0.40	4	0.17	
Loligo vulgaris	0.28	4	0.12	
Engraulis encrasicolus	0.24	40	0.10	
Brotula barbata	0.20	4	0.09	
Priacanthus arenatus	0.16	4	0.07	
Parapenaeus longirostris	0.08	4	0.03	
Arnoglossus imperialis	0.04	4	0.02	
Total	232.16		100.00	

PROJECT STATION:2802  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 813  
 start stop duration Long E 1250  
 TIME :05:33:22 06:03:28 30 (min) Purpose code: 3  
 LOG :4743.45 4745.25 1.80 Area code : 3  
 FDEPTH: 139 135 GearCond.code: 1  
 BDEPTH: 139 135 Validity code: 1  
 Towing dir: 330° Wire out: 450 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 37.33 CATCH/HOUR: 74.66

PROJECT STATION:2806  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 805  
 start stop duration Long E 1304  
 TIME :13:25:23 13:55:10 30 (min) Purpose code: 3  
 LOG :4789.08 4790.86 1.77 Area code : 3  
 FDEPTH: 65 62 GearCond.code: 1  
 BDEPTH: 65 62 Validity code: 1  
 Towing dir: 350° Wire out: 220 m Speed: 30 kn\*10  
 Sorted: 57 Kg Total catch: 1070.67 CATCH/HOUR: 2141.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Illex coindetii	61.20	2410	81.97	
Trichiurus lepturus	4.90	4	6.56	
Dentex angolensis	3.96	20	5.30	6065
Zeus faber	3.28	16	4.39	
Pterothrissus belloci	1.32	8	1.77	
Total	74.66		99.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1833.36	23236	85.62	6086
Trachurus trecae	119.14	2812	5.56	6087
Trichiurus lepturus	91.02	4070	4.25	
Dentex macrophthalmus	29.24	74	1.37	
Atractoscion aequidens	23.90	78	1.12	6085
Galeoides decadactylus	22.94	370	1.07	
Dentex angolensis	7.78	370	0.36	
Decapterus rhonchus	5.56	148	0.26	
Sardinella maderensis	2.96	370	0.14	
Citharus linguatula	1.86	370	0.09	
Octopus vulgaris	1.64	2	0.08	
Sepia officinalis hierredda	0.82	2	0.04	
Engraulis encrasicolus	0.74	1850	0.03	
Parapenaeopsis atlantica	0.38	74	0.02	
Total	2141.34		100.01	

PROJECT STATION:2807  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 804  
 start stop duration Long E 1308  
 TIME :14:55:43 15:25:38 30 (min) Purpose code: 3  
 LOG :4796.70 4798.47 1.76 Area code : 3  
 FDEPTH: 42 40 GearCond.code:  
 BDEPTH: 42 40 Validity code: 1  
 Towing dir: 350a Wire out: 150 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 149.11 CATCH/HOUR: 298.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	98.20	7432	32.93	
Stromateus fiatola	71.40	22	23.94	
Galeoides decadactylus	42.50	94	14.25	
Sphyraena sphyraena	30.80	66	10.33	
Trichiurus lepturus	15.40	158	5.16	
Chloroscombrus chrysurus	11.32	104	3.80	
Selene dorsalis	9.06	836	3.04	
Ilisha africana	5.44	110	1.82	
Cynoponticus ferox	3.60	6	1.21	
Engraulis encrasicolus	3.42	856	1.15	
Pagrus caeruleostictus	2.62	8	0.88	
Penaeus notialis	0.94	38	0.32	
Sardinella maderensis	0.84	18	0.28	
Dentex macrophthalmus	0.74	2	0.25	
Decapterus rhonchus	0.66	32	0.22	
Trachurus trecae	0.50	38	0.17	
Pomadasyx peroteti	0.40	2	0.13	
Trachinotus ovatus	0.38	2	0.13	
Total	298.22		100.01	

PROJECT STATION:2810  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 802  
 start stop duration Long E 1237  
 TIME :23:41:08 00:11:08 30 (min) Purpose code: 3  
 LOG :4854.15 4855.64 1.49 Area code : 3  
 FDEPTH: 635 616 GearCond.code:  
 BDEPTH: 635 616 Validity code: 1  
 Towing dir: 350a Wire out:1650 m Speed: 30 kn\*10  
 Sorted: 25 Kg Total catch: 150.30 CATCH/HOUR: 300.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	175.80	33588	58.48	
Hoplostethus cadenati	60.72	2484	20.20	
Stomias boa boa	15.72	324	5.23	
Yarella blackfordi	14.28	372	4.75	
Triplophus hemingi	8.52	1092	2.83	
OMMASTREPHIDAE	7.32	36	2.44	
Lamprogrammus exutus	5.88	36	1.96	
POLYCHAELIDAE	3.24	312	1.08	
Xenodermichthys copei	3.24	180	1.08	
Aristeus varidens, female	2.76	108	0.92	6091
Photonectes braueri	1.44	108	0.48	
TRICHIURIDAE	0.72	24	0.24	
Talismania sp.	0.36	12	0.12	
Coelorinchus coelorhincus	0.24	12	0.08	
MYCTOPHIDAE	0.12	120	0.04	
Laemonema laureysi	0.12	12	0.04	
Nezumia aequalis	0.12	12	0.04	
Total	300.60		100.01	

PROJECT STATION:2808  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 803  
 start stop duration Long E 1310  
 TIME :15:00:33 16:40:08 31 (min) Purpose code: 3  
 LOG :4803.24 4805.00 1.75 Area code : 3  
 FDEPTH: 28 26 GearCond.code:  
 BDEPTH: 28 26 Validity code: 1  
 Towing dir: 350a Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 57 Kg Total catch: 188.86 CATCH/HOUR: 365.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pseudotolithus typus	82.94	39	22.69	6088
Brachydeuterus auritus	64.84	8702	17.74	
Ilisha africana	56.71	1185	15.51	
Galeoides decadactylus	41.34	197	11.31	
Arius parkii	21.52	17	5.89	
Trichiurus lepturus	14.71	333	4.02	
Pomadasyx jubelini	13.08	39	3.58	
Stromateus fiatola	11.34	43	3.10	
Sphyraena guachancho	10.34	23	2.83	
Leptocharias smithii	9.87	8	2.70	
Selene dorsalis	6.85	619	1.87	
Pteroscion pelli	6.31	443	1.73	
Pseudotolithus epiperucus	5.34	8	1.46	
Cynoponticus ferox	4.06	2	1.11	
Pseudotolithus senegalensis	3.87	2	1.06	
Chloroscombrus chrysurus	2.86	159	0.78	
Sepia officinalis hierredda	2.75	85	0.75	
Scomberomorus tritor	1.74	2	0.48	
Zeus faber	1.24	4	0.34	
Penaeus notialis, female	1.08	21	0.30	6089
Penaeus notialis, male	0.66	25	0.18	6090
Panulirus regius	0.62	4	0.17	
Lagocephalus laevigatus	0.50	8	0.14	
Trachurus trecae	0.46	23	0.13	
Pomadasyx incisus	0.25	2	0.07	
Pentanemus quinquarius	0.23	12	0.06	
Total	365.51		100.00	

PROJECT STATION:2811  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 802  
 start stop duration Long E 1238  
 TIME :00:01:34 01:41:19 30 (min) Purpose code: 3  
 LOG :4861.98 4863.45 1.47 Area code : 3  
 FDEPTH: 524 527 GearCond.code:  
 BDEPTH: 524 527 Validity code: 1  
 Towing dir: 350a Wire out:1350 m Speed: 30 kn\*10  
 Sorted: 25 Kg Total catch: 74.19 CATCH/HOUR: 148.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	97.50	24882	65.71	
Stomias boa boa	17.28	354	11.65	
TRICHIURIDAE	16.92	474	11.40	
Triplophus hemingi	4.14	528	2.79	
Hoplostethus cadenati	2.94	150	1.98	
Lamprogrammus exutus	2.58	102	1.74	
Yarella blackfordi	2.16	42	1.46	
Photonectes braueri	1.26	42	0.85	
POLYCHAELIDAE	1.20	96	0.81	
Xenodermichthys copei	0.84	48	0.57	
Gadella imberbis	0.48	12	0.32	
Shrimps, small, non comm.	0.42	126	0.28	
Pyroteuthis margaretiifera	0.30	6	0.20	
Aristeus varidens	0.30	12	0.20	
MYCTOPHIDAE	0.12	108	0.08	
Total	148.44		100.04	

PROJECT STATION:2812  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 759  
 start stop duration Long E 1244  
 TIME :05:35:36 06:06:46 31 (min) Purpose code: 3  
 LOG :4875.51 4877.09 1.58 Area code : 3  
 FDEPTH: 160 147 GearCond.code:  
 BDEPTH: 160 147 Validity code: 1  
 Towing dir: 340a Wire out: 480 m Speed: 30 kn\*10  
 Sorted: 60 Kg Total catch: 5500.00 CATCH/HOUR: 10645.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	10354.52	2670002	97.36	
Trichiurus lepturus	271.74	9677	2.55	
Illex coindetii	8.90	4839	0.08	
Total	10645.16		99.99	

PROJECT STATION:2809  
 DATE:17/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 804  
 start stop duration Long E 1236  
 TIME :21:17:18 21:47:24 30 (min) Purpose code: 3  
 LOG :4846.25 4847.53 1.29 Area code : 3  
 FDEPTH: 736 732 GearCond.code:  
 BDEPTH: 736 732 Validity code: 1  
 Towing dir: 350a Wire out:1800 m Speed: 28 kn\*10  
 Sorted: 27 Kg Total catch: 47.56 CATCH/HOUR: 95.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
GALATHEIDAE *	18.24	736	19.18	
Nezumia aequalis	14.72	272	15.48	
Sicyonia galeata	12.80	16	13.46	
Hoplostethus cadenati	7.20	13232	7.57	
Centrophorus granulosus	7.00	2	7.36	
Xenodermichthys copei	6.88	288	7.23	
Triplophus hemingi	4.80	640	5.05	
ALLOPOSIDAE	4.32	144	4.54	
Nematocarcinus africanus	4.32	1120	4.54	
Stomias boa boa	4.16	60	4.37	
Yarella blackfordi	4.16	384	4.37	
MYCTOPHIDAE	2.16	272	2.27	
Lamprogrammus exutus	1.92	16	2.02	
Chaceon maritae	1.68	4	1.77	
Dibranchius atlanticus	0.64	16	0.67	
Total	95.00		99.88	

PROJECT STATION:2813  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 757  
 start stop duration Long E 1251  
 TIME :06:41:39 08:20:02 20 (min) Purpose code: 3  
 LOG :4889.53 4890.43 0.89 Area code : 3  
 FDEPTH: 104 105 GearCond.code: 9  
 BDEPTH: 104 105 Validity code: 1  
 Towing dir: 320a Wire out: 320 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 64.54 CATCH/HOUR: 193.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Mycteroperca rubra	79.80	3	41.21	
Umbrina canariensis	39.60	69	20.45	6092
Trachurus trecae	31.35	1731	16.19	
Pagrus caeruleostictus	23.25	15	12.01	
Boops boops	5.13	345	2.65	
Dentex barnardi	4.20	15	2.17	
Fistularia petimba	2.40	3	1.24	
Sparus auriga *	2.13	3	1.10	
Pagellus bellottii	2.10	6	1.08	
Zeus faber	0.81	12	0.42	
Brotula barbata	0.78	3	0.40	
Citharus linguatula	0.66	18	0.34	
Spicara alta	0.54	72	0.28	
Octopus vulgaris	0.48	3	0.25	
Saurida brasiliensis	0.21	72	0.11	
Pterothrissus belloci	0.15	3	0.08	
Illex coindetii	0.03	3	0.02	
Total	193.62		100.00	

PROJECT STATION:2814  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 756  
 start stop duration Long E 1254  
 TIME :10:04:02 10:34:07 30 (min) Purpose code: 3  
 LOG :4899.14 4900.63 1.48 Area code : 3  
 FDEPTH: 86 88 GearCond.code:  
 BDEPTH: 86 88 Validity code: 1  
 Towing dir: 320e Wire out: 270 m Speed: 30 kn\*10  
 Sorted: 38 Kg Total catch: 38.24 CATCH/HOUR: 76.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	29.00	1860	37.92	6093
Epinephelus aeneus	15.00	2	19.61	
Pomadasy peroteti	9.10	12	11.90	
Fistularia petimba	8.56	16	11.19	
Dentex congolensis	5.16	46	6.75	6094
Alloteuthis africana	3.84	1122	5.02	
Attractoscion aequidens	3.82	2	4.99	
Zeus faber	0.98	6	1.28	
Pagellus bellottii	0.38	2	0.50	
Dentex barnardi	0.34	6	0.44	
Dentex angolensis	0.20	4	0.26	
Boops boops	0.10	6	0.13	
Total	76.48		99.99	

PROJECT STATION:2815  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 754  
 start stop duration Long E 1257  
 TIME :11:37:54 12:07:37 30 (min) Purpose code: 3  
 LOG :4907.19 4908.71 1.50 Area code : 3  
 FDEPTH: 71 70 GearCond.code:  
 BDEPTH: 71 70 Validity code: 1  
 Towing dir: 340e Wire out: 240 m Speed: 31 kn\*10  
 Sorted: 35 Kg Total catch: 35.02 CATCH/HOUR: 70.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	22.40	204	31.98	6097
Dentex congolensis	17.50	174	24.99	6096
Dentex angolensis	9.20	52	13.14	6095
Trichiurus lepturus	2.68	6	3.83	
Raja miraletus	2.56	6	3.66	
Sepia officinalis hierredda	2.06	4	2.94	
Fistularia petimba	1.92	2	2.74	
Torpedo torpedo	1.84	2	2.63	
Pomadasy peroteti	1.56	2	2.21	
Lagocephalus laevigatus	1.48	4	2.11	
Sardinella maderensis	1.26	40	1.80	
Dentex barnardi	1.22	40	1.74	6098
Pseudupeneus prayensis	1.14	14	1.63	
Alloteuthis africana	1.10	898	1.57	
Octopus vulgaris	0.80	2	1.14	
Trachurus trecae	0.46	28	0.66	
Decapterus rhonchus	0.32	8	0.46	
Sphyræna sphyraena	0.26	2	0.37	
Trigla lyra	0.22	2	0.31	
Citharus linguatula	0.06	4	0.09	
Total	70.04		100.02	

PROJECT STATION:2816  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 752  
 start stop duration Long E 1259  
 TIME :13:49:09 14:19:09 30 (min) Purpose code: 3  
 LOG :4918.44 4919.81 1.35 Area code : 3  
 FDEPTH: 55 58 GearCond.code:  
 BDEPTH: 55 58 Validity code: 1  
 Towing dir: 170e Wire out: 200 m Speed: 30 kn\*10  
 Sorted: 70 Kg Total catch: 174.70 CATCH/HOUR: 349.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	163.00	1390	46.65	6099
Decapterus rhonchus	84.24	3270	24.11	6100
Trachurus trecae	41.80	3610	11.96	6101
Sardinella maderensis	17.40	686	4.98	
Pagrus pagrus	10.40	26	2.98	
Dentex barnardi	8.90	40	2.55	
Sphyræna sphyraena	4.76	16	1.36	
Sepia officinalis hierredda	4.06	6	1.16	
Lagocephalus laevigatus	3.40	6	0.97	
Brachydeuterus auritus	3.10	26	0.89	
Torpedo torpedo	2.70	6	0.77	
Alloteuthis africana	1.76	400	0.50	
Selene dorsalis	1.60	6	0.46	
Pomadasy incisus	0.76	6	0.22	
Pseudupeneus prayensis	0.60	20	0.17	
Zeus faber	0.50	6	0.14	
Citharus linguatula	0.20	6	0.06	
Boops boops	0.16	16	0.05	
Grammolites gruvelli	0.06	6	0.02	
Total	349.40		100.00	

PROJECT STATION:2817  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 751  
 start stop duration Long E 1301  
 TIME :15:05:00 15:35:03 30 (min) Purpose code: 3  
 LOG :4925.16 4926.60 1.43 Area code : 3  
 FDEPTH: 43 45 GearCond.code:  
 BDEPTH: 43 45 Validity code: 1  
 Towing dir: 170e Wire out: 180 m Speed: 30 kn\*10  
 Sorted: 52 Kg Total catch: 397.38 CATCH/HOUR: 794.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	410.40	23036	51.64	6102
Sphyræna sphyraena	155.80	308	19.60	
Trichiurus lepturus	67.80	756	8.53	
Chloroscombrus chrysurus	59.76	684	7.52	
Selene dorsalis	53.88	1428	6.78	
Stromateus fiatola	17.16	24	2.16	
Pseudotolithus senegalensis	16.50	16	2.08	
Galeoides decadactylus	5.64	12	0.71	
Sphyræna juveniles	3.72	72	0.47	
Sardinella maderensis	1.20	24	0.15	
Decapterus rhonchus	1.20	60	0.15	
Trachurus trecae	1.08	120	0.14	
Penaeus notialis	0.56	32	0.07	
Penaeus kerathurus	0.06	2	0.01	
Total	794.76		100.01	

PROJECT STATION:2818  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 750  
 start stop duration Long E 1303  
 TIME :16:17:57 16:47:43 30 (min) Purpose code: 3  
 LOG :4931.54 4933.00 1.45 Area code : 3  
 FDEPTH: 29 27 GearCond.code:  
 BDEPTH: 29 27 Validity code: 1  
 Towing dir: 160e Wire out: 120 m Speed: 30 kn\*10  
 Sorted: 55 Kg Total catch: 371.38 CATCH/HOUR: 742.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	367.90	53550	49.53	
Sphyræna guachancho	138.06	748	18.59	
Ilisha africana	72.28	528	9.73	
Selene dorsalis	64.62	6276	8.70	
Galeoides decadactylus	23.28	480	3.13	
Chloroscombrus chrysurus	22.76	494	3.06	
Pagellus bellottii	15.08	26	2.03	
Alectis ciliaris	8.50	8	1.14	
Decapterus rhonchus	6.24	404	0.84	
Pomadasy jubelini	4.50	10	0.61	
Arius parkii	4.46	2	0.60	
Pteroscion peli	4.42	338	0.60	
Trichiurus lepturus	4.28	442	0.58	
Panulirus regius	3.46	6	0.47	
Penaeus notialis, female	1.74	34	0.23	6103
Scyllarides herklotsii	0.90	2	0.12	
Sardinella aurita	0.40	14	0.05	
Penaeus notialis, male	0.28	10	0.04	6104
Total	743.16		100.05	

PROJECT STATION:2819  
 DATE:18/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 746  
 start stop duration Long E 1230  
 TIME :21:18:04 21:49:34 32 (min) Purpose code: 3  
 LOG :4975.18 4976.72 1.53 Area code : 3  
 FDEPTH: 730 759 GearCond.code:  
 BDEPTH: 730 759 Validity code: 1  
 Towing dir: 350e Wire out:1800 m Speed: 30 kn\*10  
 Sorted: 41 Kg Total catch: 40.66 CATCH/HOUR: 76.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nezumia aequalis	18.66	324	24.48	
OMMASTREPHIDAE	11.25	32	14.76	
Yarella blackfordi	9.84	197	12.91	
Stomias boa boa	7.14	128	9.37	
POLYCHAELIDAE	6.00	278	7.87	
Xenodermichthys copei	5.89	218	7.73	
Triplophus hemingi	5.34	1013	7.00	
Lamprogrammus exutus	4.29	17	5.63	
Dicrolene intronigra	2.63	101	3.45	
Talismania sp.	1.44	19	1.89	
Etmopterus pusillus	0.83	6	1.09	
Deania calcea	0.56	2	0.73	
Bassanago albescens	0.43	8	0.56	
Dibranchius atlanticus	0.43	13	0.50	
Aristeus varidens, female	0.38	13	0.56	6105
Photonectes braueri	0.30	24	0.39	
Cubiceps sp.	0.24	9	0.31	
Halosaurus ovenii	0.23	6	0.30	
Stomias sp.	0.13	8	0.17	
OPHIDIIDAE	0.11	2	0.14	
Lampadena sp.	0.08	4	0.10	
Chaceon maritae	0.04	2	0.05	
Total	76.24		99.99	

PROJECT STATION:2820  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 745  
 start stop duration Long E 1231  
 TIME :23:55:35 00:25:11 30 (min) Purpose code: 3  
 LOG :4985.71 4987.22 1.48 Area code : 3  
 FDEPTH: 645 602 GearCond.code:  
 BDEPTH: 645 602 Validity code: 1  
 Towing dir: 350e Wire out:1650 m Speed: 30 kn\*10  
 Sorted: 22 Kg Total catch: 89.48 CATCH/HOUR: 178.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	101.60	16712	56.77	
POLYCHAELIDAE	15.04	976	8.40	
Yarella blackfordi	13.44	312	7.51	
OMMASTREPHIDAE	9.68	48	5.41	
Stomias boa boa	8.56	160	4.78	
Triplophus hemingi	8.00	1016	4.47	
Lamprogrammus exutus	5.76	32	3.22	
Etmopterus spinax	2.40	16	1.34	
Xenodermichthys copei	2.32	88	1.30	
Nezumia aequalis	1.44	24	0.80	
MYCTOPHIDAE	1.44	1440	0.80	
Hoplostethus cadenati	1.36	64	0.76	
Aristeus varidens, female	1.36	56	0.76	6106
Talismania sp.	1.20	8	0.67	
TRICHIURIDAE	0.96	24	0.54	
Photonectes braueri	0.88	48	0.49	
Cubiceps sp.	0.72	8	0.40	
Dicrolene intronigra	0.72	8	0.40	
Stomias sp.	0.56	40	0.31	
NETTASTOMATIDAE	0.40	16	0.22	
Nemichthys scolopaceus	0.40	8	0.22	
Halosaurus ovenii	0.40	8	0.22	
Gadella imberbis	0.24	8	0.13	
Aristeus varidens, male	0.08	8	0.04	
Total	178.96		99.96	

PROJECT STATION:2821  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 743 Long E 1232  
 start stop duration  
 TIME :01:41:39 02:11:23 30 (min) Purpose code: 3  
 LOG :4994.01 4995.54 1.51 Area code : 3  
 FDEPTH: 390 399 GearCond.code:  
 BDEPTH: 390 399 Validity code: 1  
 Towing dir: 350° Wire out:1350 m Speed: 30 kn\*10  
 Sorted: 28 Kg Total catch: 368.68 CATCH/HOUR: 737.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	603.20	127820	81.81	
TRICHIURIDAE	68.12	2470	9.24	
Malacocephalus occidentalis	23.66	390	3.21	
Chaunax pictus	6.50	104	0.88	
POLYCHAELIDAE	6.24	624	0.85	
Illex coindetii	4.68	26	0.63	
Dibranchius atlanticus	3.90	312	0.53	
Hoplostethus cadenati	3.64	156	0.49	
Dicrolene intronigra	2.86	26	0.39	
Hymenoccephalus italicus	2.60	260	0.35	
Lophiodes kempii	2.60	26	0.35	
Triplphus hemingi	1.30	156	0.18	
Coelorrhinus coelorrhinus	1.04	26	0.14	
Gadella imberbis	1.04	26	0.14	
Aristeus varidensis, female	1.04	78	0.14	
Aristeus varidensis, male	1.04	130	0.14	
Laemonema laureysi	0.78	78	0.11	
Yarella blackfordi	0.78	26	0.11	
MYCTOPHIDAE	0.78	780	0.11	
Parapenaeus longirostris	0.52	26	0.07	
Solenocera africana	0.52	52	0.07	
Nezumia aequalis	0.26	26	0.04	
S H R I M P S	0.26	78	0.04	
Total	737.36		100.02	

PROJECT STATION:2822  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 743 Long E 1233  
 start stop duration  
 TIME :05:40:04 06:10:15 30 (min) Purpose code: 3  
 LOG :5006.06 5007.56 1.49 Area code : 3  
 FDEPTH: 262 275 GearCond.code:  
 BDEPTH: 262 275 Validity code: 1  
 Towing dir: 330° Wire out: 670 m Speed: 30 kn\*10  
 Sorted: 32 Kg Total catch: 577.27 CATCH/HOUR: 1154.54

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	857.50	3068	74.27	
Merluccius polli	221.24	2520	19.16	6107
Trichiurus lepturus	32.10	44	2.78	
Chlorophthalmus atlanticus	11.90	420	1.03	
Zenopsis conchifer	11.88	108	1.03	
Parapenaeus longirostris, fem.	8.06	2206	0.70	6108
Parapenaeus longirostris, male	4.56	1610	0.39	6109
Alloteuthis africana	4.20	1856	0.36	
Illex coindetii	1.06	36	0.09	
GALATHEIDAE *	1.02	172	0.09	
Dibranchius atlanticus	0.70	140	0.06	
MYCTOPHIDAE	0.36	316	0.03	
Total	1154.58		99.99	

PROJECT STATION:2823  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 742 Long E 1238  
 start stop duration  
 TIME :07:42:48 08:13:09 30 (min) Purpose code: 3  
 LOG :5017.40 5018.94 1.53 Area code : 3  
 FDEPTH: 114 115 GearCond.code:  
 BDEPTH: 114 115 Validity code: 1  
 Towing dir: 330° Wire out: 350 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 35.39 CATCH/HOUR: 70.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	29.16	88	41.20	6111
Epinephelus aeneus	18.20	2	25.71	
Pagellus bellottii	6.18	40	8.73	6113
Dentex barnardi	5.82	16	8.22	6112
Dentex congoensis	4.88	42	6.89	6110
Trichiurus lepturus	3.38	4	4.78	
Illex coindetii	2.34	116	3.31	
Zeus faber	0.74	4	1.05	
Citharus linguatula	0.08	2	0.11	
Total	70.78		100.00	

PROJECT STATION:2824  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 738 Long E 1245  
 start stop duration  
 TIME :10:05:42 10:35:14 30 (min) Purpose code: 3  
 LOG :5032.56 5034.18 1.56 Area code : 3  
 FDEPTH: 88 93 GearCond.code:  
 BDEPTH: 88 93 Validity code: 1  
 Towing dir: 320° Wire out: 270 m Speed: 30 kn\*10  
 Sorted: 71 Kg Total catch: 218.91 CATCH/HOUR: 437.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	350.40	17010	80.03	6117
Brachydeuterus auritus	30.30	288	6.92	6114
Dentex congoensis	22.98	270	5.25	6115
Pagellus bellottii	8.34	102	1.90	6116
Fistularia petimba	7.10	10	1.62	
Sardinella maderensis	6.24	120	1.43	
Brotula barbata	2.70	2	0.62	
Dentex angolensis	2.58	18	0.59	
Zeus faber	1.96	4	0.45	
Trigla lyza	1.92	6	0.44	
Selene dorsalis	1.86	12	0.42	
Alloteuthis africana	1.14	312	0.26	
Engraulis encrasicolus	0.30	36	0.07	
Total	437.82		100.00	

PROJECT STATION:2825  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 736 Long E 1248  
 start stop duration  
 TIME :11:40:05 11:40:07 30 (min) Purpose code: 3  
 LOG :5043.19 5044.76 1.55 Area code : 3  
 FDEPTH: 68 70 GearCond.code:  
 BDEPTH: 68 70 Validity code: 1  
 Towing dir: 340° Wire out: 230 m Speed: 30 kn\*10  
 Sorted: 91 Kg Total catch: 91.00 CATCH/HOUR: 182.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	50.40	70	27.69	
Decapterus rhonchus	41.80	1186	22.97	6119
Trichiurus lepturus	21.30	38	11.70	
Trachurus trecae	16.10	1440	8.85	6122
Sardinella maderensis	12.42	316	6.82	
Pagellus bellottii	10.62	234	5.84	6120
Brachydeuterus auritus	9.82	226	5.40	6118
Octopus vulgaris	4.42	6	2.43	
Atractoscion aequidens	3.54	10	1.95	
Pomadasys incisus	3.52	22	1.93	6121
Lagocephalus laevigatus	2.50	8	1.37	
Umrina canariensis	1.66	6	0.91	
Sphyræna-juveniles	1.12	22	0.62	
Saurida brasiliensis	0.56	126	0.31	
Engraulis encrasicolus	0.50	88	0.27	
Sepia officinalis hierredda	0.42	2	0.23	
Chloroscombrus chrysurus	0.30	2	0.16	
Priacanthus arenatus	0.30	6	0.16	
Chelidichthys gabonensis	0.26	4	0.14	
Dentex barnardi	0.22	6	0.12	
Selene dorsalis	0.08	2	0.04	
Pseudupeneus prayensis	0.06	2	0.03	
Citharus linguatula	0.06	2	0.03	
Grammolites gruvelli	0.02	2	0.01	
Total	182.00		99.98	

PROJECT STATION:2826  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 737 Long E 1255  
 start stop duration  
 TIME :13:20:12 15:01:13 24 (min) Purpose code: 3  
 LOG :5063.19 5064.38 1.19 Area code : 3  
 FDEPTH: 38 38 GearCond.code: 9  
 BDEPTH: 38 38 Validity code: 1  
 Towing dir: 350° Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 167 Kg Total catch: 166.69 CATCH/HOUR: 416.73

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	198.13	790	47.54	6123
Decapterus rhonchus	85.13	155	22.83	6124
Pagrus caeruleostictus	50.88	80	12.21	
Dentex barnardi	28.50	90	6.84	
Lutjanus agennes	21.88	3	5.25	
Alectis alexandrinus	10.38	5	2.49	
Dentex canariensis	4.50	8	1.08	
Caranx crysos	4.35	5	1.04	
Aluterus heudelotii	3.00	3	0.72	
Total	416.75		100.00	

PROJECT STATION:2827  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 733 Long E 1256  
 start stop duration  
 TIME :15:59:41 16:29:30 30 (min) Purpose code: 3  
 LOG :5069.90 5071.47 1.52 Area code : 3  
 FDEPTH: 27 25 GearCond.code:  
 BDEPTH: 27 25 Validity code: 1  
 Towing dir: 160° Wire out: 120 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 19.66 CATCH/HOUR: 39.32

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagrus africanus	12.60	30	32.04	6125
Decapterus rhonchus	10.80	648	27.47	
Pagellus bellottii	7.08	24	18.01	6126
Scomberomorus tritor	3.12	4	7.93	
Raja miraletus	1.36	2	3.46	
Sphyræna guanchancho	1.18	2	3.00	
Selene dorsalis	1.00	2	2.54	
Lagocephalus laevigatus	0.82	2	2.09	
Dentex barnardi	0.78	2	1.98	
Alloteuthis africana	0.42	142	1.07	
Sardinella aurita	0.16	4	0.41	
Total	39.32		100.00	

PROJECT STATION:2828  
 DATE:19/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 734 Long E 1214  
 start stop duration  
 TIME :22:30:31 23:00:07 30 (min) Purpose code: 3  
 LOG :5126.09 5127.50 1.40 Area code : 3  
 FDEPTH: 721 722 GearCond.code:  
 BDEPTH: 721 722 Validity code: 1  
 Towing dir: 110° Wire out:1800 m Speed: 30 kn\*10  
 Sorted: 24 Kg Total catch: 49.63 CATCH/HOUR: 99.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Yarella blackfordi	17.88	388	18.01	
Nezumia aequalis	17.72	320	17.85	
POLYCHAELIDAE	16.72	1140	16.84	
Stomias boa boa	8.92	184	8.99	
OMMASTREPHIDAE	8.72	40	8.79	
Hoplostethus cadenati	7.24	80	7.29	
Xenodermichthys copei	6.84	204	6.89	
Dicrolene intronigra	2.60	132	2.62	
Triplphus hemingi	2.36	248	2.38	
Himantolophus groenlandicus	2.34	2	2.36	
Talismania sp.	1.64	24	1.65	
Ebinania sp	1.20	12	1.21	
Photonectes braueri	1.20	72	1.21	
RAJIDAE	0.80	8	0.81	
Aristeus varidensis, female	0.80	28	0.81	6127
Bassanago albescens	0.56	4	0.56	
UNIDENTIFIED FISH	0.44	8	0.44	
Stomias sp.	0.44	16	0.44	
Bathygadus sp.	0.32	8	0.32	
S H R I M P S	0.12	36	0.12	
Halosaurus ovenii	0.12	8	0.12	
Nemichthys scolopaceus	0.12	8	0.12	
Glyphus marsupialis	0.08	8	0.08	
MYCTOPHIDAE	0.04	4	0.04	
Bathyporeos quadrifilis	0.04	4	0.04	
Total	99.26		99.99	

PROJECT STATION:2829  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 730  
 start stop duration Long E 1215  
 TIME :00:44:22 01:16:18 32 (min) Purpose code: 3  
 LOG :5134.47 5136.09 1.60 Area code : 3  
 FDEPTH: 525 519 GearCond.code:  
 BDEPTH: 525 519 Validity code: 1  
 Towing dir: 80e Wire out:1350 m Speed: 30 kn\*10  
 Sorted: 19 Kg Total catch: 70.51 CATCH/HOUR: 132.21

PROJECT STATION:2832  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 722  
 start stop duration Long E 1233  
 TIME :07:19:55 07:50:11 30 (min) Purpose code: 3  
 LOG :5169.80 5171.27 1.45 Area code : 3  
 FDEPTH: 88 88 GearCond.code:  
 BDEPTH: 88 88 Validity code: 1  
 Towing dir: 150e Wire out: 270 m Speed: 30 kn\*10  
 Sorted: 55 Kg Total catch: 209.76 CATCH/HOUR: 419.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
TRICHIURIDAE	73.69	2762	55.74	
Merluccius polli	24.94	53	18.86	6130
Hoplostethus cadenati	10.97	596	8.30	
POLYCHAELIDAE	5.29	523	4.00	
Lamprogrammus exultans	4.44	28	3.36	
Stomias boa	3.54	84	2.68	
OMMASTREPHIDAE	2.08	17	1.57	
Nematocarcinus africanus	1.86	574	1.41	
Yarrella blackfordi	1.41	51	1.07	
S H R I M P S	1.07	191	0.81	
Aristeus varidensis, female	1.01	96	0.76	6129
Xenodermichthys copei	0.56	39	0.42	
Triplophus hemingi	0.51	73	0.39	
MELANOSTOMIATIDAE	0.34	17	0.26	
Aristeus varidensis, male	0.34	45	0.26	6128
OPHIDIIDAE	0.11	11	0.08	
Nemichthys scolopaceus	0.06	11	0.05	
Total	132.22		100.02	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	255.86	15162	60.99	6142
Dentex congoensis	91.00	1098	21.69	6139
Sardinella aurita	15.48	386	3.69	6141
Dentex angolensis	12.54	40	2.99	6138
Pagellus bellottii	10.34	104	2.46	6140
Zeus faber	7.22	8	1.72	
Sepia officinalis hierredda	6.58	14	1.57	
Fistularia petimba	4.84	16	1.15	
Chaetodon hoeffleri	2.48	14	0.59	
Engraulis encrasicolus	2.22	28	0.53	
Pseudupeneus prayensis	1.68	8	0.40	
Brachydeuterus auritus	1.48	14	0.35	
Mustelus mustelus	1.40	2	0.33	
Pagrus caeruleostictus	1.36	2	0.32	
Dentex barnardi	1.10	10	0.26	
Raja miraletus	0.90	2	0.21	
Lagocephalus laevigatus	0.80	2	0.19	
Dentex gibbosus	0.76	2	0.18	
Chelidonicichthys gabonensis	0.70	8	0.17	
Boops boops	0.28	22	0.07	
Trigla lyra	0.28	8	0.07	
Spicara alta	0.14	42	0.03	
Citharus linguatula	0.08	8	0.02	
Total	419.52		99.98	

PROJECT STATION:2830  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 727  
 start stop duration Long E 1219  
 TIME :02:42:02 03:12:31 30 (min) Purpose code: 3  
 LOG :5141.86 5143.46 1.57 Area code : 3  
 FDEPTH: 427 383 GearCond.code:  
 BDEPTH: 427 383 Validity code: 1  
 Towing dir: 90e Wire out:1250 m Speed: 30 kn\*10  
 Sorted: 18 Kg Total catch: 113.57 CATCH/HOUR: 227.14

PROJECT STATION:2833  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 721  
 start stop duration Long E 1239  
 TIME :09:18:13 09:48:06 30 (min) Purpose code: 3  
 LOG :5181.79 5183.27 1.46 Area code : 3  
 FDEPTH: 64 57 GearCond.code:  
 BDEPTH: 64 57 Validity code: 1  
 Towing dir: 360e Wire out: 210 m Speed: 30 kn\*10  
 Sorted: 53 Kg Total catch: 52.99 CATCH/HOUR: 105.98

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
TRACHICHTHYIDAE	103.20	3496	45.43	
Merluccius polli	71.50	290	31.48	6131
Malacocephalus laevis	11.04	208	4.86	
LOPHIDAE	6.92	4	3.05	
POLYCHAELIDAE	6.00	576	2.64	
Nematocarcinus africanus	5.28	2376	2.32	
Hymenocephalus italicus	5.20	408	2.29	
OMMASTREPHIDAE	4.80	8	2.11	
Aristeus varidensis, female	2.96	240	1.30	6133
Pterothrissus belloci	1.60	8	0.70	
Gadella imberbis	1.60	48	0.70	
Dibranchius atlanticus	1.28	88	0.56	
Coelorinchus coelorrhincus	1.20	16	0.53	
Stomias sp.	0.96	80	0.42	
Aristeus varidensis, male	0.96	136	0.42	6132
Chaunax pictus	0.80	16	0.35	
MVCTOPHIDAE	0.72	736	0.32	
Necunia aequalis	0.32	16	0.14	
Halosaurus sp.	0.24	8	0.11	
MELANOSTOMIATIDAE	0.24	8	0.11	
Peristedion cataphractum	0.16	24	0.07	
Triplophus hemingi	0.08	8	0.04	
Nemichthys scolopaceus	0.08	8	0.04	
Total	227.14		99.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	52.70	346	49.73	6143
Boops boops	33.00	2592	31.14	
Decapterus punctatus	7.74	234	7.30	6144
Caranx hippos	3.64	4	3.43	
Dentex canariensis	3.00	4	2.83	
Pagrus caeruleostictus	1.70	4	1.60	
Pomadasy incisus	1.34	34	1.26	
Lagocephalus laevigatus	1.34	4	1.26	
Sphyræna sphyraena	0.42	4	0.40	
Priacanthus arenatus	0.36	4	0.34	
Chelidonicichthys capensis	0.24	2	0.23	
Fistularia petimba	0.18	8	0.17	
Dentex barnardi	0.16	2	0.15	
Decapterus rhonchus	0.16	4	0.15	
Total	105.98		99.99	

PROJECT STATION:2831  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 725  
 start stop duration Long E 1227  
 TIME :05:26:40 05:56:50 30 (min) Purpose code: 3  
 LOG :5159.32 5160.95 1.62 Area code : 3  
 FDEPTH: 116 115 GearCond.code:  
 BDEPTH: 116 115 Validity code: 1  
 Towing dir: 335e Wire out: 350 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 70.08 CATCH/HOUR: 140.16

PROJECT STATION:2834  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 719  
 start stop duration Long E 1243  
 TIME :10:57:09 11:27:08 30 (min) Purpose code: 3  
 LOG :5191.13 5192.60 1.47 Area code : 3  
 FDEPTH: 42 42 GearCond.code:  
 BDEPTH: 42 42 Validity code: 1  
 Towing dir: 330e Wire out: 150 m Speed: 30 kn\*10  
 Sorted: 6 Kg Total catch: 6.09 CATCH/HOUR: 12.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae, juvenile	70.20	3706	50.09	6137
Trichiurus lepturus	34.10	46	24.33	
Dentex angolensis	11.80	50	8.42	6136
Umbra canariensis	8.06	28	5.75	6134
Pagellus bellottii	5.22	26	3.72	6135
Rhinobatos albomaculatus	4.70	362	3.35	
Zeus faber	2.40	8	1.71	
Boops boops	1.26	64	0.90	
Illex coindetii	1.26	50	0.90	
Dentex barnardi	0.72	2	0.51	
Anthias anthias	0.22	14	0.16	
Spicara alta	0.22	20	0.16	
Total	140.16		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagrus caeruleostictus	2.94	8	24.14	
Epinephelus costae	2.30	4	18.88	
Scomberomorus tritor	1.56	2	12.81	
Dentex canariensis	1.42	2	11.66	
Dentex barnardi	1.18	2	9.69	
Caranx crysos	1.04	2	8.54	
Torpedo torpedo	0.72	2	5.91	
Chilomycterus spinosus mauret.	0.40	2	3.28	
Decapterus rhonchus	0.36	14	2.96	
Boops boops	0.26	22	2.13	
Total	12.18		100.00	

PROJECT STATION:2835  
 DATE:20/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 715  
 start stop duration Long E 1247  
 TIME :12:35:04 13:05:07 30 (min) Purpose code: 3  
 LOG :5199.33 5200.85 1.51 Area code : 3  
 FDEPTH: 24 26 GearCond.code:  
 BDEPTH: 24 26 Validity code: 1  
 Towing dir: 330e Wire out: 100 m Speed: 30 kn\*10  
 Sorted: 35 Kg Total catch: 34.86 CATCH/HOUR: 69.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagrus caeruleostictus	40.30	68	57.80	6145
Octopus vulgaris	4.34	2	6.22	
Aluterus heudelotii	4.30	4	6.17	
Dentex barnardi	4.04	6	5.79	
Selene dorsalis	3.94	8	5.65	
Bodianus speciosus	3.68	2	5.28	
Acanthurus monroviae	2.58	2	3.70	
Drepane africana	2.56	2	3.67	
Sphyræna sphyraena	2.00	6	2.87	
Balistes punctatus	1.74	2	2.50	
Decapterus rhonchus	0.16	6	0.23	
Boops boops	0.08	10	0.11	
Total	69.72		99.99	



PROJECT STATION:2836  
 DATE:21/ 7/01 GEAR TYPE: PT No: 6 POSITION:Lat S 615  
 start stop duration Long E 1205  
 TIME :20:49:27 21:20:07 31 (min) Purpose code: 3  
 LOG : 361.93 363.64 1.69 Area code : 3  
 FDEPTH: 5 5 GearCond.code: 1  
 BDEPTH: 45 50 Validity code: 1  
 Towing dir: 270° Wire out: 140 m Speed: 30 kn\*10  
 Sorted: 26 Kg Total catch: 145.27 CATCH/HOUR: 281.17

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ilisha africana	97.55	2090	34.69	
Pseudolithichthys typus	37.16	45	13.22	6146
Brachydeuterus auritus	27.17	735	9.66	
Pagrus caeruleostictus	22.45	52	7.98	6147
Galeoides decadactylus	18.10	161	6.44	
Arius parkii	15.10	17	5.37	
Octopus vulgaris	9.48	8	3.37	
Rhizopropiondon acutus	9.39	10	3.34	
Trichiurus lepturus	8.54	17	3.04	
Sphyræna sp	8.25	23	2.93	
Selene dorsalis	4.95	29	1.76	
Pomadourys peroteti	4.76	4	1.69	
Stromateus fiatola	4.53	6	1.61	
Sardinella maderensis	4.01	52	1.43	
Scomberomorus tritor	2.15	4	0.76	
Pteroscion pelli	1.86	23	0.66	
Engraulis encrasicolus	1.63	735	0.58	
Sepia officinalis hierredda	1.45	4	0.52	
Dentex gibbosus	1.43	8	0.51	
Chloroscombrus chrysurus	0.99	6	0.35	
Trachurus trecae, juvenile	0.23	23	0.08	
Total	281.18		99.99	

PROJECT STATION:2837  
 DATE:21/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 705  
 start stop duration Long E 1236  
 TIME :09:03:13 09:33:18 30 (min) Purpose code: 3  
 LOG :5229.92 5231.47 1.53 Area code : 3  
 FDEPTH: 38 38 GearCond.code: 1  
 BDEPTH: 38 38 Validity code: 1  
 Towing dir: 330° Wire out: 160 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 15.30 CATCH/HOUR: 30.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	6.96	6	22.75	
Sphyræna guachancho	3.84	6	12.55	
Arius parkii	3.68	4	12.03	
Pagrus caeruleostictus	3.48	6	11.37	
Balistes caprisicus	3.06	6	10.00	
Decapterus rhonchus	2.60	6	8.50	
Sphyræna sphyraena	2.18	8	7.12	
Lagocephalus laevigatus	1.94	6	6.34	
Trachinus armatus	1.60	2	5.23	
Chelidonichthys gabonensis	0.54	2	1.76	
Pegusa lascaris	0.38	2	1.24	
Trachinus lineolatus	0.18	2	0.59	
Sardinella aurita	0.16	4	0.52	
Total	30.60		100.00	

PROJECT STATION:2838  
 DATE:21/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 708  
 start stop duration Long E 1232  
 TIME :11:03:33 11:32:45 29 (min) Purpose code: 3  
 LOG :5240.99 5242.33 1.32 Area code : 3  
 FDEPTH: 47 48 GearCond.code: 1  
 BDEPTH: 47 48 Validity code: 1  
 Towing dir: ° Wire out: 170 m Speed: 30 kn\*10  
 Sorted: 63 Kg Total catch: 62.96 CATCH/HOUR: 130.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagrus caeruleostictus	51.31	91	39.39	6149
Decapterus rhonchus	46.86	79	35.97	6150
Dentex barnardi	23.28	43	17.87	6148
Pagellus bellottii	2.13	4	1.64	
Sphyræna guachancho	1.84	2	1.41	
Scomberomorus tritor	1.57	2	1.21	
Balistes caprisicus	1.24	2	0.95	
Lagocephalus laevigatus	1.14	2	0.88	
Fistularia petimba	0.77	2	0.59	
Rypticus saponaceus	0.12	2	0.09	
Total	130.26		100.00	

PROJECT STATION:2839  
 DATE:21/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 709  
 start stop duration Long E 1226  
 TIME :12:49:18 13:19:17 30 (min) Purpose code: 3  
 LOG :5251.17 5252.76 1.57 Area code : 3  
 FDEPTH: 75 75 GearCond.code: 1  
 BDEPTH: 75 75 Validity code: 1  
 Towing dir: 330° Wire out: 250 m Speed: 31 kn\*10  
 Sorted: 80 Kg Total catch: 251.42 CATCH/HOUR: 502.84

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	199.00	2508	79.35	6152
Dentex barnardi	51.18	198	10.18	6151
Pagrus caeruleostictus	13.74	36	2.73	
Dentex congoensis	11.22	90	2.23	
Trichiurus lepturus	10.98	14	2.18	
Dentex gibbosus	8.82	24	1.75	
Decapterus rhonchus	4.74	18	0.94	
Chelidonichthys gabonensis	1.42	2	0.28	
Fistularia petimba	1.22	22	0.24	
Sardinella maderensis	0.32	6	0.06	
Pseudupeneus prayensis	0.20	2	0.04	
Total	502.84		99.98	

PROJECT STATION:2840  
 DATE:21/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 711  
 start stop duration Long E 1217  
 TIME :14:47:38 15:10:20 23 (min) Purpose code: 3  
 LOG :5263.58 5264.71 1.12 Area code : 3  
 FDEPTH: 121 127 GearCond.code: 9  
 BDEPTH: 121 127 Validity code: 1  
 Towing dir: 250° Wire out: 400 m Speed: 30 kn\*10  
 Sorted: 56 Kg Total catch: 55.67 CATCH/HOUR: 145.23

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	85.30	5017	58.73	6156
Dentex barnardi	11.50	29	7.92	6155
Brachydeuterus auritus	11.50	83	7.92	6153
Zeus faber	6.70	23	4.61	
Dentex congoensis	5.95	44	4.10	6154
Pagellus bellottii	4.77	21	3.28	
Dentex angolensis	4.20	26	2.89	
Dentex gibbosus	3.16	3	2.18	
Trichiurus lepturus	2.45	8	1.69	
Fistularia petimba	2.45	8	1.69	
Spicara alba	2.17	248	1.49	
Chelidonichthys gabonensis	1.62	10	1.12	
Octopus vulgaris	0.86	3	0.59	
Boops boops	0.73	3	0.50	
Scomberomorus tritor	0.47	5	0.32	
Citharus linguatula	0.47	10	0.32	
Pterothrissus belloci	0.39	3	0.27	
Illex coindetii	0.31	16	0.21	
Decapterus rhonchus	0.16	3	0.11	
Anthias anthias	0.05	5	0.03	
Total	145.21		99.97	

PROJECT STATION:2841  
 DATE:21/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 715  
 start stop duration Long E 1209  
 TIME :16:46:20 17:16:07 30 (min) Purpose code: 3  
 LOG :5275.24 5276.96 1.71 Area code : 3  
 FDEPTH: 235 229 GearCond.code: 1  
 BDEPTH: 235 229 Validity code: 1  
 Towing dir: 330° Wire out: 740 m Speed: 30 kn\*10  
 Sorted: 32 Kg Total catch: 481.40 CATCH/HOUR: 962.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	581.00	3186	60.34	
Brotula barbata	96.32	84	10.00	
Illex coindetii	84.56	1512	8.78	
Pterothrissus belloci	49.00	392	5.09	
Zenopsis conchifer	47.38	172	4.92	
MYCTOPHIDAE	41.16	20168	4.28	
Merluccius polli	26.60	392	2.76	6158
Trichiurus lepturus	18.60	28	1.93	
Parapenaeus longirostris, fem.	5.04	812	0.52	6159
Dentex angolensis	4.46	14	0.46	6157
Ariomma bondi	3.36	112	0.35	
Parapenaeus longirostris, male	2.52	644	0.26	6160
Chlorophthalmus atlanticus	2.24	420	0.23	
Citharus linguatula	0.56	28	0.06	
Total	962.80		99.98	

PROJECT STATION:2842  
 DATE:21/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 720  
 start stop duration Long E 1204  
 TIME :19:34:53 19:56:21 21 (min) Purpose code: 3  
 LOG :5293.44 5294.55 1.10 Area code : 3  
 FDEPTH: 416 423 GearCond.code: 9  
 BDEPTH: 416 423 Validity code: 1  
 Towing dir: 310° Wire out:1200 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 38.59 CATCH/HOUR: 110.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	27.00	811	24.49	
Merluccius polli	25.71	106	23.32	6161
Laemonema laureysi	22.00	249	19.95	
Nematocarcinus africanus	6.74	3066	6.11	
Hymenocephalus italicus	4.94	409	4.48	
Chaunax pictus	4.14	54	3.75	
Epigonus telescopus	3.89	29	3.53	
Galeus polli	2.77	40	2.51	
GALATHEIDAE *	2.31	169	2.10	
MYCTOPHIDAE	2.09	1286	1.90	
Malacocephalus occidentalis	1.46	9	1.32	
Parapenaeus longirostris, fem.	1.26	94	1.14	6164
Todaropsis eblanae	1.00	6	0.91	
Nezumia aequalis	0.86	29	0.78	
Aristeus varidens, male	0.71	86	0.64	6163
Illex coindetii	0.66	20	0.60	
Aristeus varidens, female	0.57	49	0.52	6162
Solenocera africana	0.54	43	0.49	
Hoplostethus cadenati	0.43	6	0.39	
Gadella imberbis	0.40	11	0.36	
Halosaurus ovenii	0.23	9	0.21	
Dibranchius atlanticus	0.20	11	0.18	
Callinectes marginatus	0.17	3	0.15	
STOMIIDAE	0.11	11	0.10	
Peristedion cataphractum	0.03	3	0.03	
Citharus linguatula	0.03	6	0.03	
Total	110.25		99.99	

PROJECT STATION:2843  
 DATE:21/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 721  
 start stop duration Long E 1202  
 TIME :21:58:34 22:28:16 30 (min) Purpose code: 3  
 LOG :5305.15 5306.61 1.45 Area code : 3  
 FDEPTH: 521 529 GearCond.code: 1  
 BDEPTH: 521 529 Validity code: 1  
 Towing dir: 320e Wire out:1400 m Speed: 30 kn\*10  
 Sorted: 30 Kg Total catch: 106.45 CATCH/HOUR: 212.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	93.44	20440	43.89	
TRACHICHTHYIDAE	20.80	736	9.77	
Xenodermichthys copei	13.72	526	6.44	
Merluccius polli	13.64	36	6.41	
GALATHEIDAE *	13.24	1050	6.22	
Triplophus hemingi	8.82	162	4.14	
Hoplostethus cadenati	8.76	232	4.11	
Yarella blackfordi	8.62	218	4.05	
Lamprogrammus exutus	8.34	28	3.92	
Stomias boa boa	5.40	98	2.54	
OMMASTREPHIDAE	4.56	28	2.14	
Aristeus varidens, female	3.72	204	1.75	6165
Aristeus varidens, male	2.10	260	0.99	6166
Deania profundorum	1.54	14	0.72	
S H R I M P S	0.92	154	0.43	
Malacocephalus laevis	0.92	8	0.43	
Laemonema laureysi	0.70	14	0.33	
UNIDENTIFIED FISH	0.70	8	0.33	
Rtmopterus spinax	0.56	14	0.26	
Photonetes braueri	0.50	22	0.23	
Halosaurus ovenii	0.42	8	0.20	
Dibranchius atlanticus	0.42	22	0.20	
Hymenocephalus italicus	0.28	28	0.13	
NETTASTOMATIDAE	0.28	14	0.13	
MYCTOPHIDAE	0.22	224	0.10	
Peristedion cataphractum	0.14	22	0.07	
Bathygadus sp.	0.14	8	0.07	
Total	212.90		100.00	

PROJECT STATION:2844  
 DATE:22/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 710  
 start stop duration Long E 1151  
 TIME :01:00:16 01:30:12 30 (min) Purpose code: 3  
 LOG :5322.15 5323.71 1.55 Area code : 3  
 FDEPTH: 631 633 GearCond.code: 1  
 BDEPTH: 631 633 Validity code: 1  
 Towing dir: 330e Wire out:1650 m Speed: 31 kn\*10  
 Sorted: 24 Kg Total catch: 118.50 CATCH/HOUR: 237.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	159.00	5220	67.09	
Triplophus hemingi	23.00	3500	9.70	
Lamprogrammus exutus	17.60	80	7.43	
POLYCHAELIDAE	14.20	1030	5.99	
Xenodermichthys copei	8.70	320	3.67	
Nematocarcinus africanus	3.50	1090	1.48	
Stomias boa boa	2.40	40	1.01	
OMMASTREPHIDAE	1.80	10	0.76	
Nezumia aequalis	1.80	30	0.76	
S H R I M P S	1.60	580	0.68	
Dicrolene intronigra	1.20	90	0.51	
Bassanago albescens	0.80	10	0.34	
RAJIDAE	0.50	20	0.21	
Aristeus varidens, female	0.50	20	0.21	
STOMIDAE	0.30	20	0.13	
Aristeus varidens, male	0.10	10	0.04	
Total	237.00		100.01	

PROJECT STATION:2845  
 DATE:22/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 706  
 start stop duration Long E 1156  
 TIME :01:35:28 04:05:15 30 (min) Purpose code: 3  
 LOG :5334.79 5336.31 1.50 Area code : 3  
 FDEPTH: 319 306 GearCond.code: 1  
 BDEPTH: 319 306 Validity code: 1  
 Towing dir: 340e Wire out:1000 m Speed: 31 kn\*10  
 Sorted: 26 Kg Total catch: 104.40 CATCH/HOUR: 208.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chlorophthalmus atlanticus	63.60	1096	30.46	
Merluccius polli	48.40	464	23.18	6209
Synagrops microlepis	23.20	1058	11.11	
Parapanaeus longirostris, fem.	19.84	1374	9.50	6167
Laemonema laureysi	15.60	232	7.47	
Trichiurus lepturus	10.24	382	4.90	
Pterothrissus bellocci	8.00	40	3.83	
Illex sp.	3.60	56	1.72	
Parapanaeus longirostris, male	2.72	424	1.30	6168
Nematocarcinus africanus	2.16	912	1.03	
GALATHEIDAE *	1.92	128	0.92	
Malacocephalus occidentalis	1.68	16	0.80	
MYCTOPHIDAE	1.36	1104	0.65	
Solenocera africana	1.20	248	0.57	
Peristedion cataphractum	1.04	72	0.50	
Lophius vaillanti	0.96	16	0.46	
Gadella imberbis	0.96	40	0.46	
Hymenocephalus italicus	0.96	88	0.46	
Scorpaena normani	0.64	8	0.31	
Nezumia aequalis	0.56	8	0.27	
Epigonus telescopus	0.16	8	0.08	
Total	208.80		99.98	

PROJECT STATION:2846  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 706  
 start stop duration Long E 1157  
 TIME :05:33:30 06:03:11 30 (min) Purpose code: 3  
 LOG :5343.72 5345.34 1.62 Area code : 3  
 FDEPTH: 276 272 GearCond.code: 1  
 BDEPTH: 276 272 Validity code: 1  
 Towing dir: 330e Wire out: 780 m Speed: 30 kn\*10  
 Sorted: 61 Kg Total catch: 394.43 CATCH/HOUR: 788.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Merluccius capensis	243.76	1376	30.90	6169
Synagrops microlepis	232.00	16244	29.41	
Trichiurus lepturus	105.30	130	13.35	
Chlorophthalmus atlanticus	95.56	2594	12.11	
Parapanaeus longirostris, fem.	26.66	4510	3.38	6170
Zenopsis conchifer	22.76	66	2.89	
Parasudis sp.	20.94	494	2.65	
MYCTOPHIDAE	14.04	1054	1.78	
Pterothrissus bellocci	10.66	78	1.35	
Parapanaeus longirostris, male	9.62	2404	1.22	6171
Illex sp.	2.48	40	0.31	
Ariomma bondi	2.20	52	0.28	
Alloteuthis africana	0.92	286	0.12	
Laemonema laureysi	0.78	14	0.10	
Peristedion cataphractum	0.52	14	0.07	
Gadella imberbis	0.40	26	0.05	
GALATHEIDAE *	0.26	40	0.03	
Total	788.86		100.00	

PROJECT STATION:2847  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 705  
 start stop duration Long E 1200  
 TIME :07:32:40 08:02:40 30 (min) Purpose code: 3  
 LOG :5354.33 5355.86 1.51 Area code : 3  
 FDEPTH: 153 150 GearCond.code: 1  
 BDEPTH: 153 150 Validity code: 1  
 Towing dir: 320e Wire out: 450 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 61.26 CATCH/HOUR: 122.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	37.00	72	30.20	
Synagrops microlepis	23.90	8844	19.51	
Zenopsis conchifer	23.70	56	19.34	
Dentex angolensis	15.00	62	12.24	6172
Illex sp.	6.84	168	5.58	
Raja miraletus	3.42	6	2.79	
Torpedo torpedo	2.34	4	1.91	
Trachurus trecae	2.14	6	1.75	
Squatina oculata	1.24	4	1.01	
Brotula barbata	1.08	2	0.88	
Dentex macrophthalmus	1.08	8	0.88	6173
Citharus linguatula	0.96	18	0.78	
Zeus faber	0.80	4	0.65	
Todaropsis eblanae	0.68	38	0.56	
Raja clavata	0.62	2	0.51	
Pterothrissus bellocci	0.60	6	0.49	
Dentex congoensis	0.58	8	0.47	
Octopus vulgaris	0.28	2	0.23	
Chelidonichthys gabonensis	0.26	2	0.21	
Total	122.52		99.99	

PROJECT STATION:2848  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 703  
 start stop duration Long E 1204  
 TIME :09:47:06 10:17:09 30 (min) Purpose code: 3  
 LOG :5366.97 5368.64 1.65 Area code : 3  
 FDEPTH: 120 118 GearCond.code: 1  
 BDEPTH: 120 118 Validity code: 1  
 Towing dir: 330e Wire out: 360 m Speed: 30 kn\*10  
 Sorted: 71 Kg Total catch: 146.39 CATCH/HOUR: 292.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	243.20	13764	83.07	6174
Dentex congoensis	25.20	276	8.61	
Dentex angolensis	6.20	36	2.12	
Priacanthus arenatus	6.06	12	2.07	
Pagellus bellottii	2.72	16	0.93	
Fistularia petimba	2.10	6	0.72	
Illex coindetii	1.64	48	0.63	
Brachydeuterus auritus	1.72	12	0.59	
Todaropsis eblanae	1.12	44	0.38	
Squatina oculata	1.00	2	0.34	
Zeus faber	0.48	4	0.16	
Octopus vulgaris	0.44	4	0.15	
Chelidonichthys capensis	0.38	2	0.13	
Scomber japonicus	0.28	4	0.10	
Synaptura lusitanica	0.04	4	0.01	
Total	292.78		100.01	

PROJECT STATION:2849  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 701  
 start stop duration Long E 1206  
 TIME :11:25:44 11:55:47 30 (min) Purpose code: 3  
 LOG :5375.18 5376.69 1.38 Area code : 3  
 FDEPTH: 111 109 GearCond.code: 1  
 BDEPTH: 111 109 Validity code: 1  
 Towing dir: 340e Wire out: 350 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 490.50 CATCH/HOUR: 981.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	879.00	49426	89.60	6177
Dentex congoensis	31.80	510	3.24	6176
Priacanthus arenatus	25.00	60	2.55	
Dentex angolensis	24.90	226	2.54	6175
Pagellus bellottii	8.70	60	0.89	
Zeus faber	5.70	46	0.58	
Ariomma bondi	2.40	46	0.24	
Sepia orbignyana	2.20	2	0.22	
Illex coindetii	0.76	16	0.08	
Citharus linguatula	0.46	16	0.05	
Boops boops	0.16	16	0.02	
Total	981.08		100.01	

PROJECT STATION:2850  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 658  
 start stop duration Long E 1212  
 TIME :13:29:40 13:59:25 30 (min) Purpose code: 3  
 LOG :5387.16 5388.83 1.65 Area code : 3  
 FDEPTH: 87 87 GearCond.code:  
 BDEPTH: 87 87 Validity code: 1  
 Towing dir: 335e Wire out: 290 m Speed: 30 kn\*10

Sorted: 61 Kg Total catch: 152.89 CATCH/HOUR: 305.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Umbrina canariensis	150.50	320	49.22	6179
Pagellus bellottii	101.80	396	33.29	6180
Dentex barnardi	37.00	96	12.10	6178
Dentex gibbosus	10.40	20	3.40	
Zeus faber	3.60	6	1.18	
Fistularia petimba	2.48	10	0.81	
Total	305.78		100.00	

PROJECT STATION:2851  
 DATE:22/ 1/02 GEAR TYPE: BT No:14 POSITION:Lat S 659  
 start stop duration Long E 1213  
 TIME :16:18:26 16:48:19 30 (min) Purpose code: 3  
 LOG :5405.79 5406.95 1.14 Area code : 3  
 FDEPTH: 81 81 GearCond.code:  
 BDEPTH: 81 81 Validity code: 1  
 Towing dir: 240e Wire out: 270 m Speed: 30 kn\*10

Sorted: Kg Total catch: 57.51 CATCH/HOUR: 115.02

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	34.70	444	30.17	
Dentex angolensis	31.50	156	27.39	6181
Pagellus bellottii	15.10	116	13.13	6182
Trichiurus lepturus	12.20	20	10.61	
Epinephelus aeneus	6.00	2	5.22	
Raja marulatus	3.98	8	3.46	
Brachydeuterus auritus	2.86	18	2.49	
Sepia officinalis hierredda	1.52	2	1.32	
Lagocephalus laevigatus	1.12	2	0.97	
Pomadourus incisus	0.92	4	0.80	
Zeus faber	0.90	4	0.78	
Chaetodon hoefleri	0.72	6	0.63	
Chelidichthys gabonensis	0.70	6	0.61	
Selene dorsalis	0.64	4	0.56	
Fistularia petimba	0.62	4	0.54	
Priacanthus arenatus	0.48	2	0.42	
Chelidichthys capensis	0.40	2	0.35	
Pseudupeneus prayensis	0.38	4	0.33	
Trachurus trecae	0.18	2	0.16	
Citharus linguatula	0.10	2	0.09	
Total	115.02		100.03	

PROJECT STATION:2852  
 DATE:22/ 3/02 GEAR TYPE: BT No:14 POSITION:Lat S 658  
 start stop duration Long E 1140  
 TIME :21:20:54 21:51:11 30 (min) Purpose code: 3  
 LOG :5448.43 5449.95 1.50 Area code : 3  
 FDEPTH: 724 728 GearCond.code:  
 BDEPTH: 724 728 Validity code: 1  
 Towing dir: 310e Wire out:1800 m Speed: 30 kn\*10

Sorted: 51 Kg Total catch: 50.87 CATCH/HOUR: 101.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	41.90	586	41.18	
Nezumia aequalis	12.80	286	12.58	
Yarrella blackfordi	8.50	152	8.35	
Triplophus hemingi	8.48	946	8.33	
POLYCHAELIDAE	7.92	930	7.78	
Xenodermichthys copei	4.04	138	3.97	
Dicrolene intronigra	3.54	132	3.48	
Bassanago albescens	2.52	22	2.48	
Stomias boa boa	2.52	62	2.48	
Hydrolagus sp.	2.00	6	1.97	
Lamprogrammus exutus	1.68	4	1.65	
Lophius vaillanti	1.16	2	1.14	
Bathygadus sp.	0.96	6	0.94	
Etmopterus princeps	0.80	6	0.79	
Glyphus marsupialis	0.78	32	0.77	
Halosaurus ovenii	0.74	10	0.73	
Talismania bifurcata	0.62	16	0.61	
Aristeus varidens, female	0.42	16	0.41	6183
S H R I M P S	0.24	48	0.24	
RAJIDAE	0.12	2	0.12	
Total	101.74		100.00	

PROJECT STATION:2853  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 655  
 start stop duration Long E 1143  
 TIME :23:39:41 00:09:30 30 (min) Purpose code: 3  
 LOG :5456.95 5458.46 1.51 Area code : 3  
 FDEPTH: 525 525 GearCond.code:  
 BDEPTH: 525 525 Validity code: 1  
 Towing dir: 145e Wire out:1350 m Speed: 30 kn\*10

Sorted: 15 Kg Total catch: 31.38 CATCH/HOUR: 62.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	28.80	1440	45.89	
Lamprogrammus exutus	11.76	56	18.74	
Triplophus hemingi	4.56	540	7.27	
POLYCHAELIDAE	3.96	464	6.31	
Xenodermichthys copei	3.88	112	6.18	
Bathygadus sp.	1.88	4	3.00	
Aristeus varidens, female	1.26	54	2.01	6185
Merluccius polli	1.12	2	1.78	
Nezumia aequalis	1.00	20	1.59	
OMMASTREPHIDAE	0.92	4	1.47	
Nematocarcinus africanus	0.80	352	1.27	
Stomias boa boa	0.72	12	1.15	
Aristeus varidens, male	0.50	58	0.80	6184
Dicrolene intronigra	0.44	18	0.70	
Chaunax pictus	0.32	4	0.51	
MYCTOPHIDAE	0.28	208	0.45	
Yarrella blackfordi	0.24	4	0.38	
Halosaurus ovenii	0.12	4	0.19	
GALATHEIDAE *	0.08	60	0.13	
Glyphus marsupialis	0.08	4	0.13	
S H R I M P S	0.04	8	0.06	
Total	62.76		100.01	

PROJECT STATION:2854  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 654  
 start stop duration Long E 1145  
 TIME :01:33:18 02:03:26 30 (min) Purpose code: 3  
 LOG :5463.08 5464.71 1.62 Area code : 3  
 FDEPTH: 445 439 GearCond.code:  
 BDEPTH: 445 439 Validity code: 1  
 Towing dir: 345e Wire out:1250 m Speed: 30 kn\*10

Sorted: 28 Kg Total catch: 55.36 CATCH/HOUR: 110.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
TRICHIURIDAE	30.68	1000	27.71	
Merluccius polli	30.60	64	27.64	6186
Laemonema laureysi	20.40	300	18.42	
Lamprogrammus exutus	5.52	16	4.99	
Gadella imberbis	4.36	124	3.94	
POLYCHAELIDAE	4.08	268	3.68	
Chaunax pictus	2.76	24	2.49	
Aristeus varidens, female	2.72	192	2.46	6188
Nematocarcinus africanus	1.76	36	1.59	
Illex coindetii	1.52	16	1.37	
Hymenoccephalus italicus	1.48	148	1.34	
Stomias boa boa	1.04	20	0.94	
Triplophus hemingi	0.68	120	0.61	
Halosaurus ovenii	0.52	12	0.47	
Hoplostethus cadenati	0.44	28	0.40	
Yarrella blackfordi	0.40	12	0.36	
Aristeus varidens, male	0.32	60	0.29	6187
Dicrolene intronigra	0.32	32	0.29	
SCORPAENIDAE	0.24	12	0.22	
Etmopterus spinax	0.20	4	0.18	
Chlorophthalmus atlanticus	0.20	4	0.18	
Dibranchius atlanticus	0.20	16	0.18	
S H R I M P S	0.12	16	0.11	
STOMIDAE	0.12	8	0.11	
Peristedion cataphractum	0.04	4	0.04	
Total	110.72		100.01	

PROJECT STATION:2855  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 651  
 start stop duration Long E 1150  
 TIME :05:40:52 06:11:01 30 (min) Purpose code: 3  
 LOG :5482.03 5483.51 1.47 Area code : 3  
 FDEPTH: 267 255 GearCond.code:  
 BDEPTH: 267 255 Validity code: 1  
 Towing dir: 340e Wire out: 840 m Speed: 30 kn\*10

Sorted: 58 Kg Total catch: 504.57 CATCH/HOUR: 1009.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	548.80	40768	54.38	
Parapanaeus longirostris, male	99.20	10032	9.83	6191
Merluccius polli	75.20	1456	7.45	6189
Chlorophthalmus atlanticus	56.96	1872	5.64	
Trichiurus lepturus	55.30	136	5.48	
Parapanaeus longirostris, fem.	31.04	5216	3.08	6190
Parasudis sp.	19.20	400	1.90	
Spicara alta	18.50	82	1.83	
Pterochirus belloci	17.28	128	1.71	
Scorpaena normani	15.84	160	1.57	
MYCTOPHIDAE	15.84	11568	1.57	
Illex coindetii	12.32	288	1.22	
Peristedion cataphractum	11.20	240	1.11	
Brotula barbata	5.80	4	0.57	
Todaropsis eblanae	5.28	96	0.52	
Trigla lyra	4.10	18	0.41	
Bembrops greyi	3.68	48	0.36	
Epigonus telescopus	2.72	32	0.27	
Miracorvina angolensis	2.18	2	0.22	
GALATHEIDAE *	1.92	160	0.19	
Hoplostethus mediterraneus	1.92	16	0.19	
Dentex angolensis	1.38	4	0.14	
Arionma bondi	1.12	48	0.11	
Synchiropus phaeton	0.80	16	0.08	
Dicologlossa cuneata	0.80	16	0.08	
Zenopsis conchifer	0.60	2	0.06	
Citharus linguatula	0.16	16	0.02	
Total	1009.14		99.99	

PROJECT STATION:2856  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 651  
 start stop duration Long E 1154  
 TIME :07:41:27 08:10:48 29 (min) Purpose code: 3  
 LOG :5492.10 5493.67 1.56 Area code : 3  
 FDEPTH: 132 146 GearCond.code:  
 BDEPTH: 132 146 Validity code: 1  
 Towing dir: 330e Wire out: 400 m Speed: 30 kn\*10

Sorted: 82 Kg Total catch: 792.70 CATCH/HOUR: 1640.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Spicara alta	1386.41	1790	84.53	6195
Trachurus trecae	108.14	3952	6.59	
Umbrina canariensis	39.21	97	2.39	6192
Erythrocles monodi	32.13	327	1.96	
Boops boops	23.86	403	1.45	
Peristedion cataphractum	12.31	19	0.75	
Dentex angolensis	9.14	43	0.56	6194
Illex coindetii	4.99	962	0.30	
Brotula barbata	4.84	4	0.30	
Trichiurus lepturus	3.29	4	0.20	
Anthias anthias	3.08	39	0.19	
Dentex congoensis	2.92	35	0.18	6193
Arionma bondi	2.32	19	0.14	
Chelidichthys gabonensis	2.11	19	0.13	
Zenopsis conchifer	2.07	2	0.13	
Scorpaena stephanica	1.43	6	0.09	
Citharus linguatula	0.77	19	0.05	
Dentex macrophthalmus	0.72	2	0.04	
Zeus faber	0.35	4	0.02	
Total	1640.09		100.00	



PROJECT STATION:2857  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 646  
 start stop duration Long E 1158  
 TIME :09:54:55 10:11:05 16 (min) Purpose code: 3  
 LOG :5506.75 5507.32 0.55 Area code : 3  
 FDEPTH: 100 100 GearCond.code: 8  
 BDEPTH: 100 100 Validity code: 4  
 Towing dir: 175e Wire out: 330 m Speed: 30 kn\*10  
 Sorted: 38 Kg Total catch: 37.89 CATCH/HOUR: 142.09

PROJECT STATION:2861  
 DATE:23/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 638  
 start stop duration Long E 1125  
 TIME :21:49:19 22:19:09 30 (min) Purpose code: 3  
 LOG :5588.10 5589.60 1.48 Area code : 3  
 FDEPTH: 720 704 GearCond.code: 1  
 BDEPTH: 720 704 Validity code: 1  
 Towing dir: 330e Wire out:1800 m Speed: 30 kn\*10  
 Sorted: 27 Kg Total catch: 66.39 CATCH/HOUR: 132.78

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	44.25	788	31.14	6199
Dentex barnardi	43.31	101	30.48	6198
Mycteroperca rubra	19.13	4	13.46	
Sparus pagrus africanus *	10.35	4	7.28	
Dentex angolensis	8.51	38	5.99	6197
Erythrocles monodi	5.70	45	4.01	
Pagellus bellottii	3.64	34	2.56	6196
Scorpaena stephanica	3.00	4	2.11	
Plectrocinchus mediterraneus	2.44	4	1.72	
Fistularia petimba	1.50	4	1.06	
Anthias anthias	0.15	11	0.11	
Peristedion cataphractum	0.11	4	0.08	
Total	142.09		100.00	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Yarrella blackfordi	32.54	556	24.51	
Hoplostethus cadenati	29.00	176	21.84	
Nezumia aequalis	16.50	320	12.43	
Bathygadus sp.	10.00	30	7.53	
S H R I M P S	6.96	1060	5.24	
POLYCHAELIDAE	6.56	410	4.94	
Xenodermichthys copei	6.14	160	4.62	
Deania calcea	5.80	10	4.37	
OMMASTREPHIDAE	2.60	16	1.96	
Dicrolene intronigra	1.90	80	1.43	
Halosaurus ovenii	1.80	30	1.36	
Glyphus marsupialis	1.74	66	1.31	
Pseenes pellicidus	1.60	6	1.21	
Hydrolagus sp.	1.36	6	1.02	
Borostomias elusens	1.20	6	0.90	
Nematocarcinus africanus	1.10	230	0.83	
Bassanago albescens	1.10	6	0.83	
Stomias boa boa	0.90	26	0.68	
SYNPHOBORANCHIDAE	0.80	10	0.60	
Coelorinchus sp.	0.74	6	0.56	
Chelidonicichthys gabonensis	0.74	6	0.56	
Triplophus hemingi	0.66	90	0.50	
Aristeus varidens, female	0.34	16	0.26	
PASIPHAELIDAE	0.20	10	0.15	
Talismania sp.	0.20	6	0.15	
NETTASTOMATIDAE	0.14	6	0.11	
MYCTOPHIDAE	0.10	86	0.08	
Aristeus varidens, male	0.04	6	0.03	
Total	132.76		100.01	

PROJECT STATION:2858  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 647  
 start stop duration Long E 1153  
 TIME :12:41:41 13:11:25 30 (min) Purpose code: 3  
 LOG :5519.28 5520.80 1.49 Area code : 3  
 FDEPTH: 143 156 GearCond.code: 2  
 BDEPTH: 143 156 Validity code: 1  
 Towing dir: 317e Wire out: 440 m Speed: 30 kn\*10  
 Sorted: 37 Kg Total catch: 2450.99 CATCH/HOUR: 4901.98

PROJECT STATION:2862  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 637  
 start stop duration Long E 1128  
 TIME :00:06:52 00:36:38 30 (min) Purpose code: 3  
 LOG :5594.97 5596.42 1.43 Area code : 3  
 FDEPTH: 654 652 GearCond.code: 2  
 BDEPTH: 654 652 Validity code: 1  
 Towing dir: 125e Wire out:1650 m Speed: 30 kn\*10  
 Sorted: 23 Kg Total catch: 46.48 CATCH/HOUR: 92.96

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	4778.40	559680	97.48	
Illex coindetii	52.80	1584	1.08	
Trichiurus lepturus	30.20	46	0.62	
Pterothrissus belloci	17.16	132	0.35	
Selene dorsalis	8.70	24	0.18	
Dentex angolensis	6.72	32	0.14	6200
Trachurus trecae	3.96	132	0.08	
Dentex congoensis	2.72	36	0.06	6201
Parapenaeus longirostris	1.32	132	0.03	
Total	4901.98		100.02	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematocarcinus africanus	30.80	8788	33.13	
Hoplostethus cadenati	16.40	176	17.64	
Yarrella blackfordi	15.52	244	16.70	
POLYCHAELIDAE	9.92	580	10.67	
OMMASTREPHIDAE	5.76	32	6.20	
Xenodermichthys copei	3.84	100	4.13	
Nezumia aequalis	2.48	48	2.67	
Stomias boa boa	2.36	56	2.54	
Triplophus hemingi	1.28	188	1.38	
Dicrolene intronigra	1.16	84	1.25	
Bassanago albescens	1.08	8	1.16	
Deania profundorum	0.40	4	0.43	
S H R I M P S	0.40	48	0.43	
Halosaurus ovenii	0.36	12	0.39	
Laemonema laureysi	0.32	4	0.34	
Aristeus varidens, female	0.28	12	0.30	
SYNPHOBORANCHIDAE	0.24	8	0.26	
Glyphus marsupialis	0.24	16	0.26	
MYCTOPHIDAE	0.12	108	0.13	
Total	92.96		100.01	

PROJECT STATION:2859  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 645  
 start stop duration Long E 1155  
 TIME :14:21:33 14:48:35 27 (min) Purpose code: 3  
 LOG :5526.69 5527.98 1.26 Area code : 3  
 FDEPTH: 117 126 GearCond.code: 9  
 BDEPTH: 117 126 Validity code: 1  
 Towing dir: 270e Wire out: 380 m Speed: 30 kn\*10  
 Sorted: 64 Kg Total catch: 132.16 CATCH/HOUR: 293.69

PROJECT STATION:2863  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 635  
 start stop duration Long E 1138  
 TIME :02:54:10 03:24:12 30 (min) Purpose code: 3  
 LOG :5609.68 5611.24 1.54 Area code : 3  
 FDEPTH: 343 320 GearCond.code: 2  
 BDEPTH: 343 320 Validity code: 1  
 Towing dir: 335e Wire out: 990 m Speed: 30 kn\*10  
 Sorted: 29 Kg Total catch: 116.68 CATCH/HOUR: 233.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	128.00	5871	43.58	6204
Dentex congoensis	112.89	1387	38.44	6203
Dentex angolensis	12.89	58	4.39	6202
Epinephelus aeneus	8.89	2	3.03	
Fistularia petimba	6.22	13	2.12	
Brotula barbata	4.00	4	1.36	
Torpedo marmorata	4.00	4	1.36	
Thunnus albacares	3.33	4	1.13	
Chelidonicichthys gabonensis	2.98	22	1.01	
Raja miraletus	2.80	4	0.95	
Lagocephalus laevigatus	2.27	4	0.77	
Zeus faber	1.96	4	0.67	
Trichiurus lepturus	1.56	4	0.53	
Spicara alta	1.20	49	0.41	
Pagellus bellottii	0.71	9	0.24	
Total	293.70		99.99	

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	108.40	3896	46.45	
Chlorophthalmus punctatus	60.00	1152	25.71	
Parapenaeus longirostris, fem.	17.60	1904	7.54	6210
TRICHIURIDAE	16.08	648	6.89	
Merluccius polli	7.92	64	3.39	
Laemonema laureysi	4.32	80	1.85	
S H R I M P S	2.48	480	1.06	
Malacocephalus laevis	2.24	16	0.96	
Epigonus telescopus	2.24	72	0.96	
Illex coindetii	1.68	16	0.72	
Pontinus nigropunctatus	1.52	8	0.65	
POLYCHAELIDAE	1.52	120	0.65	
Pterothrissus belloci	1.20	8	0.51	
Hymenocephalus sp.	1.12	152	0.48	
Parapenaeus longirostris, male	0.96	96	0.41	6211
Solenocera africana	0.88	168	0.38	
Chaunax pictus	0.72	16	0.31	
Coelorinchus coelorinchus	0.64	8	0.27	
Hoplostethus cadenati	0.48	8	0.21	
Beryx splendens	0.40	8	0.17	
Peristedion cataphractum	0.32	16	0.14	
Munida sp. *	0.16	16	0.07	
Dicrolene intronigra	0.16	8	0.07	
Gadella imberbis	0.16	8	0.07	
GRANMISTIDAE	0.16	16	0.07	
Total	233.36		99.99	

PROJECT STATION:2860  
 DATE:23/ 3/02 GEAR TYPE: BT No: 2 POSITION:Lat S 649  
 start stop duration Long E 1201  
 TIME :16:28:46 16:58:26 30 (min) Purpose code: 3  
 LOG :5538.95 5540.43 1.48 Area code : 3  
 FDEPTH: 91 90 GearCond.code: 2  
 BDEPTH: 91 90 Validity code: 1  
 Towing dir: 340e Wire out: 310 m Speed: 30 kn\*10  
 Sorted: Kg Total catch: 19.37 CATCH/HOUR: 38.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trachurus trecae	12.90	838	33.30	6207
Pagellus bellottii	8.84	92	22.82	6205
Chelidonicichthys capensis	6.42	48	16.57	
Fistularia petimba	4.50	10	11.62	
Lagocephalus laevigatus	2.04	2	5.27	
Dentex congoensis	1.48	28	3.82	6206
Illex coindetii	0.66	24	1.70	
Zeus faber	0.62	4	1.60	
Sepia officinalis hierredda	0.54	4	1.39	
Sardinella aurita	0.48	18	1.24	6208
Scomber japonicus	0.26	2	0.67	
Total	38.74		100.00	

PROJECT STATION:2864  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 634  
 start stop duration Long E 1142  
 TIME :05:39:04 06:09:52 31 (min) Purpose code: 3  
 LOG :5621.36 5622.98 1.61 Area code : 3  
 FDEPTH: 221 219 GearCond.code:  
 BDEPTH: 221 219 Validity code: 1  
 Towing dir: 225e Wire out: 360 m Speed: 30 kn\*10  
 Sorted: 27 Kg Total catch: 133.74 CATCH/HOUR: 258.85

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Synagrops microlepis	225.10	17646	86.96	
Trichiurus lepturus	7.70	52	2.97	
Dentex angolensis	6.37	21	2.46	6212
Zenopsis conchifer	5.40	4	2.09	
Illex coindetii	5.05	106	1.95	
Pterothrissus belloci	4.18	35	1.61	
Parapenaeus longirostris, fem.	2.61	323	1.01	6213
Parapenaeus longirostris, male	1.05	132	0.41	6214
Bembrops greyi	0.70	10	0.27	
Peristedion cataphractum	0.25	6	0.10	
Merluccius polli	0.25	4	0.10	
Scorpaena normani	0.19	4	0.07	
Total	258.85		100.00	

PROJECT STATION:2865  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 630  
 start stop duration Long E 1148  
 TIME :07:21:27 07:51:53 30 (min) Purpose code: 3  
 LOG :5631.67 5633.27 1.57 Area code : 3  
 FDEPTH: 123 119 GearCond.code:  
 BDEPTH: 123 119 Validity code: 1  
 Towing dir: 70e Wire out: 390 m Speed: 30 kn\*10  
 Sorted: 74 Kg Total catch: 344.93 CATCH/HOUR: 689.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	627.00	5052	90.89	
Trachurus trecae, juvenile	25.52	1838	3.70	
Dentex congoensis	25.52	320	3.70	6215
Dentex angolensis	8.90	58	1.29	6216
Ariomma bondi	1.44	22	0.21	
Priacanthus arenatus	1.04	2	0.15	
Saurida brasiliensis	0.22	44	0.03	
Boops boops	0.22	12	0.03	
Total	689.86		100.00	

PROJECT STATION:2866  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 629  
 start stop duration Long E 1152  
 TIME :08:48:57 09:18:50 30 (min) Purpose code: 3  
 LOG :5637.13 5638.55 1.40 Area code : 3  
 FDEPTH: 115 114 GearCond.code:  
 BDEPTH: 115 114 Validity code: 1  
 Towing dir: 130e Wire out: 350 m Speed: 30 kn\*10  
 Sorted: 65 Kg Total catch: 396.12 CATCH/HOUR: 792.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	421.20	1340	53.17	
Dentex congoensis	259.20	2376	32.72	6218
Trachurus trecae, juvenile	76.80	4224	9.69	6217
Brotula barbata	18.84	12	2.38	
Fistularia petimba	6.24	16	0.79	
Ariomma bondi	2.40	24	0.30	
Dentex angolensis	1.92	12	0.24	
Priacanthus arenatus	1.68	4	0.21	
Chelidonichthys gabonensis	1.44	12	0.18	
Pagellus bellottii	1.32	12	0.17	
Boops boops	0.60	36	0.08	
Saurida brasiliensis	0.48	120	0.06	
Sepia sp.	0.12	12	0.02	
Total	792.24		100.01	

PROJECT STATION:2867  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 627  
 start stop duration Long E 1154  
 TIME :10:09:17 10:39:18 30 (min) Purpose code: 3  
 LOG :5642.59 5644.68 2.04 Area code : 3  
 FDEPTH: 110 108 GearCond.code:  
 BDEPTH: 110 108 Validity code: 1  
 Towing dir: 350e Wire out: 340 m Speed: 30 kn\*10  
 Sorted: 60 Kg Total catch: 59.61 CATCH/HOUR: 119.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	62.80	192	52.68	
Brachydeuterus auritus	28.40	98	23.82	6219
Trachurus trecae	8.74	352	7.33	6222
Dentex angolensis	7.94	32	6.66	6220
Dentex congoensis	4.80	40	4.03	6221
Saurida brasiliensis	1.84	368	1.54	
Illex coindetii	1.80	8	1.51	
Priacanthus arenatus	1.06	2	0.89	
Zeus faber	0.70	2	0.59	
Pagellus bellottii	0.70	4	0.59	
Pterothrissus belloci	0.28	2	0.23	
Citharus linguatula	0.12	4	0.10	
Parapenaeus longirostris	0.04	10	0.03	
Total	119.22		100.00	

PROJECT STATION:2868  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 628  
 start stop duration Long E 1159  
 TIME :11:53:36 12:23:21 30 (min) Purpose code: 3  
 LOG :5650.75 5652.14 1.39 Area code : 3  
 FDEPTH: 97 98 GearCond.code:  
 BDEPTH: 97 98 Validity code: 1  
 Towing dir: 160e Wire out: 320 m Speed: 30 kn\*10  
 Sorted: 78 Kg Total catch: 77.57 CATCH/HOUR: 155.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	70.00	688	45.12	6223
Trichiurus lepturus	22.80	88	14.70	
Trachurus trecae	22.50	1144	14.50	6226
Brotula barbata	18.20	18	11.73	
Dentex congoensis	4.70	50	3.03	6225
Dentex angolensis	1.74	10	1.12	
Pagellus bellottii	1.30	10	0.84	
Priacanthus arenatus	1.26	4	0.81	
Octopus vulgaris	1.24	6	0.80	
Pterothrissus belloci	1.24	8	0.80	
Scorpaena stephanica	1.22	2	0.79	
Sepia orbignyana	1.20	6	0.77	
Saurida brasiliensis	1.18	234	0.76	
Torpedo marmorata	0.98	2	0.63	
Raja miraletus	0.88	2	0.57	
Uranoscopus albesca	0.82	6	0.53	
Lagocephalus laevigatus	0.70	2	0.45	
Boops boops	0.64	50	0.41	
Chelidonichthys gabonensis	0.56	4	0.36	
Citharus linguatula	0.54	16	0.35	6224
Parapenaeus longirostris, male	0.40	122	0.26	6227
Torpedo torpedo	0.32	2	0.21	
Chaetodon hoefleri	0.30	2	0.19	
Parapenaeus longirostris, fem.	0.18	34	0.12	6228
Zeus faber	0.12	2	0.08	
Alloteuthis africana	0.06	6	0.04	
GOBIIDAE	0.04	24	0.03	
Arnoglossus sp.	0.02	2	0.01	
Total	155.14		100.01	

PROJECT STATION:2869  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 626  
 start stop duration Long E 1202  
 TIME :13:41:00 14:11:04 30 (min) Purpose code: 3  
 LOG :5660.14 5661.69 1.55 Area code : 3  
 FDEPTH: 80 80 GearCond.code:  
 BDEPTH: 80 80 Validity code: 1  
 Towing dir: 340e Wire out: 280 m Speed: 30 kn\*10  
 Sorted: 172 Kg Total catch: 607.97 CATCH/HOUR: 1215.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus sp.	599.20	3542	49.28	
Brachydeuterus auritus	400.40	4312	32.93	6229
Dentex congoensis	89.80	204	7.39	6231
Dentex angolensis	63.00	252	5.18	6230
Umbriina canariensis	18.68	70	1.54	
Trachurus trecae	10.22	316	0.84	6232
Argyrosomus hololepidotus	8.10	2	0.67	
Scorpaena stephanica	5.80	8	0.48	
Uranoscopus albesca	2.72	6	0.22	
Lagocephalus laevigatus	2.58	8	0.21	
Cynoglossus canariensis	2.54	6	0.21	
Sardinella maderensis	2.38	14	0.20	
Citharus linguatula	2.38	70	0.20	6233
Pagellus bellottii	2.38	56	0.20	
Sepia orbignyana	1.72	6	0.14	
Selene dorsalis	1.26	8	0.10	
Zeus faber	0.90	6	0.07	
TRGCHO6	0.48	6	0.04	
Arnoglossus imperialis	0.42	42	0.03	
Sepia officinalis hierredda	0.42	4	0.03	
Saurida brasiliensis	0.28	56	0.02	
Squilla sp.	0.14	6	0.01	
Alloteuthis africana	0.08	6	0.01	
Penaeus kerathurus, male	0.06	14		
Total	1215.94		100.00	

PROJECT STATION:2870  
 DATE:24/ 3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 625  
 start stop duration Long E 1205  
 TIME :15:00:07 15:01:27 30 (min) Purpose code: 3  
 LOG :5668.97 5670.41 1.43 Area code : 3  
 FDEPTH: 54 56 GearCond.code:  
 BDEPTH: 54 56 Validity code: 1  
 Towing dir: 340e Wire out: 190 m Speed: 30 kn\*10  
 Sorted: 34 Kg Total catch: 957.61 CATCH/HOUR: 1915.22

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	1406.70	17290	73.45	6235
Decapterus rhonchus	129.60	4428	6.77	6236
Trachurus trecae, juvenile	124.74	7614	6.51	6237
Sphyræna sphyraena	95.66	702	5.05	
Trichiurus lepturus	38.30	294	2.00	
Lagocephalus laevigatus	34.56	54	1.80	
Stromateus fiatola	30.70	34	1.60	
Alectis alexandrinus	15.30	8	0.80	
Selene dorsalis	13.50	108	0.70	
Pagellus bellottii	8.98	88	0.47	6234
Sardinella maderensis	8.10	918	0.42	
Alloteuthis africana	3.78	1134	0.20	
Citharus linguatula	1.62	54	0.08	
Caranx hippos	1.52	2	0.08	
Pagrus caeruleostictus	1.16	2	0.06	
Total	1915.22		99.99	

PROJECT STATION:2871  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 617  
 start stop duration Long E 1116  
 TIME :01:18:10 01:48:05 30 (min) Purpose code: 3  
 LOG :551.33 5752.81 1.47 Area code : 3  
 FDEPTH: 744 745 GearCond.code:  
 BDEPTH: 744 745 Validity code: 1  
 Towing dir: 360° Wire out:1800 m Speed: 30 kn\*10

Sorted: 23 Kg Total catch: 67.95 CATCH/HOUR: 135.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hoplostethus cadenati	71.40	3366	52.54	
Nezumia aequalis	22.02	370	16.20	
Xenodermichthys copei	7.20	168	5.30	
Yareella blaekfordi	6.90	126	5.08	
POLYCHAELIDAE	5.58	246	4.11	
S H R T M P S	3.90	570	2.87	
Hydrolagus africanus	3.90	6	2.87	
UNIDENTIFIED FISH	3.18	12	2.34	
Deania calcei	2.40	6	1.77	
Dicrolene intransigra	1.98	102	1.46	
Conger conger	1.74	18	1.28	
Deania profundorum	1.62	6	1.19	
Stomias boa boa	1.14	24	0.84	
Aristeus varidens, female	0.76	28	0.56	6239
Triplophus hmingi	0.66	84	0.49	
Gadella imberbis	0.42	12	0.31	
NETTASTOMATINE	0.30	6	0.22	
Laemonema lazeysi	0.24	6	0.18	
Glyphus marsupialis	0.24	18	0.18	
STOMIIDAE	0.18	30	0.13	
Talismania sp.	0.12	6	0.09	
Aristeus varidens, male	0.02	2	0.01	6238
Total	135.90		100.02	

PROJECT STATION:2875  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 609  
 start stop duration Long E 1149  
 TIME :08:51:32 09:20:39 29 (min) Purpose code: 3  
 LOG :5797.08 5798.53 1.44 Area code : 3  
 FDEPTH: 89 84 GearCond.code:  
 BDEPTH: 89 84 Validity code: 1  
 Towing dir: 77° Wire out: 270 m Speed: 30 kn\*10

Sorted: Kg Total catch: 77.92 CATCH/HOUR: 161.21

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	112.66	180	69.88	
Dentex angolensis	12.72	79	7.89	6246
Selene dorsalis	9.68	37	6.00	
Dentex congongensis	8.73	99	5.42	6247
Trachurus trecae, juvenile	4.80	213	2.98	
Pagellus bellottii	4.03	23	2.50	6245
Umbrina canariensis	3.50	21	2.17	6244
Brotula barbata	3.06	4	1.90	
Zeus faber	0.81	2	0.50	
Chelidonichthys capensis	0.48	2	0.30	
Chaetodon hoefleri	0.31	2	0.19	
Sepia officinalis hierreda	0.27	2	0.17	
Sardinella aurita	0.08	2	0.05	
Citharus linguatula	0.08	2	0.05	
Total	161.21		100.00	

PROJECT STATION:2872  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 615  
 start stop duration Long E 1125  
 TIME :01:44:45 04:14:38 30 (min) Purpose code: 3  
 LOG :565.52 5767.06 1.53 Area code : 3  
 FDEPTH: 385 383 GearCond.code:  
 BDEPTH: 385 383 Validity code: 1  
 Towing dir: 355° Wire out:1180 m Speed: 30 kn\*10

Sorted: 23 Kg Total catch: 52.22 CATCH/HOUR: 104.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	42.80	1552	40.98	
Parapenaeus longirostris, fem.	20.68	1716	19.80	6240
Centrolophus granulosus	7.50	2	7.18	
Laemonema lazeysi	6.92	152	6.63	
Setarches guntheri	3.96	56	3.79	
Synagrops microlepis	3.88	112	3.72	
Merluccius pilli	3.10	16	2.97	
Epigonus telescopus	2.92	24	2.80	
Gadella imberbis	2.68	92	2.57	
Hoplostethus mediterraneus	2.36	72	2.26	
Illex coindetii	1.68	16	1.61	
GALATHEIDAE	1.64	116	1.57	
Solenocera africana	1.00	96	0.96	
Hymenoccephalus italicus	1.00	104	0.96	
Ommastrephes pteropus	0.64	4	0.61	
Nezumia aequalis	0.60	20	0.57	
Etmopterus lucifer	0.52	24	0.50	
Parasudis sp.	0.28	4	0.27	
Xenodermichthys copei	0.20	4	0.19	
Halosaurus omeii	0.08	4	0.08	
Total	104.44		100.02	

PROJECT STATION:2876  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 608  
 start stop duration Long E 1154  
 TIME :08:21:03 10:00:57 30 (min) Purpose code: 3  
 LOG :5801.71 5803.14 1.40 Area code : 3  
 FDEPTH: 76 72 GearCond.code:  
 BDEPTH: 76 72 Validity code: 1  
 Towing dir: 77° Wire out: 240 m Speed: 30 kn\*10

Sorted: 55 Kg Total catch: 267.10 CATCH/HOUR: 534.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex angolensis	209.20	964	39.16	6248
Trichiurus lepturus	103.80	684	19.43	
Pentheroscion mbizi	90.00	1018	16.85	
Dentex congongensis	27.80	324	5.20	6249
Epinephelus aeneus	24.70	8	4.62	
Selene dorsalis	19.70	100	3.69	
Brotula barbata	18.60	22	3.48	
Umbrina canariensis	10.80	144	2.02	
Brachydeuterus auritus	6.02	64	1.13	
Gadella imberbis	5.94	18	1.11	
Cynoglossus canariensis	4.22	10	0.79	
Parapenaeus longirostris, fem.	2.88	630	0.54	6252
Scorpaena stephanica	2.52	10	0.47	
Trachurus trecae	1.80	64	0.34	
Chaetodon hoefleri	1.54	10	0.29	
Citharus linguatula	1.44	244	0.27	6250
Parapenaeus longirostris, male	1.18	414	0.22	6251
Echelus myrus	0.98	10	0.18	
Microchirus frechkopi	0.54	10	0.10	
Arnoglossus imperialis	0.36	46	0.07	
Bembrops heterurus	0.18	10	0.03	
Total	534.20		99.99	

PROJECT STATION:2873  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 613  
 start stop duration Long E 1138  
 TIME :05:54:53 06:24:44 30 (min) Purpose code: 3  
 LOG :5781.01 5782.58 1.55 Area code : 3  
 FDEPTH: 125 117 GearCond.code:  
 BDEPTH: 125 117 Validity code: 1  
 Towing dir: 77° Wire out: 350 m Speed: 30 kn\*10

Sorted: 55 Kg Total catch: 175.09 CATCH/HOUR: 350.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	134.70	264	38.47	
Trachurus trecae, juvenile	126.90	4230	36.24	6242
Dentex congongensis	42.30	522	12.08	6243
Dentex angolensis	17.80	94	5.08	6241
Ariomma bondi	10.14	204	2.90	
Spicara alta	7.80	96	2.23	
Brotula barbata	3.70	2	1.06	
Scomber japonicus	2.10	24	0.60	
Fistularia petimba	1.50	6	0.43	
Pagellus bellottii	1.08	6	0.31	
Illex coindetii	0.90	24	0.26	
Sardinella aurita	0.72	18	0.21	
Chelidonichthys gabonensis	0.54	6	0.15	
Total	350.18		100.02	

PROJECT STATION:2877  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 607  
 start stop duration Long E 1158  
 TIME :11:14:54 11:44:46 30 (min) Purpose code: 3  
 LOG :5808.38 5809.69 1.28 Area code : 3  
 FDEPTH: 68 69 GearCond.code:  
 BDEPTH: 68 69 Validity code: 1  
 Towing dir: 270° Wire out: 240 m Speed: 30 kn\*10

Sorted: 102 Kg Total catch: 266.60 CATCH/HOUR: 533.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	229.80	1634	43.10	
Pentheroscion mbizi	200.24	2694	37.55	
Echelus myrus	24.70	14	4.63	
Dentex angolensis	21.34	94	4.00	6253
Selene dorsalis	9.84	44	1.85	
Umbrina canariensis	8.80	20	1.65	
Cynoglossus canariensis	8.24	20	1.55	
Uranoscopus albesca	6.70	80	1.26	
Brotula barbata	5.30	20	0.99	
Galeoides decadactylus	3.80	14	0.71	
Brachydeuterus auritus	3.80	44	0.71	
Dentex congongensis	1.84	30	0.35	
Chloroscombrus chrysurus	1.44	10	0.27	
Pterothrissus belloci	1.40	30	0.26	
Pomadourus incisus	1.20	4	0.23	
Trachurus trecae	1.20	40	0.23	
Citharus linguatula	0.90	30	0.17	6254
Brotula sp.	0.74	10	0.14	
Sepia orbignyana	0.70	4	0.13	
Bembrops heterurus	0.50	14	0.09	
Parapenaeus longirostris, fem.	0.44	54	0.08	
Arnoglossus imperialis	0.14	20	0.03	
Parapenaeus longirostris, male	0.04	4	0.01	
Total	533.10		99.99	

PROJECT STATION:2874  
 DATE:25/3/02 GEAR TYPE: BT No: 8 POSITION:Lat S 611  
 start stop duration Long E 1144  
 TIME :07:16:15 07:46:26 30 (min) Purpose code: 3  
 LOG :5787.19 5788.59 1.37 Area code : 3  
 FDEPTH: 107 105 GearCond.code:  
 BDEPTH: 107 105 Validity code: 1  
 Towing dir: 77° Wire out: 330 m Speed: 30 kn\*10

Sorted: Kg Total catch: 77.65 CATCH/HOUR: 155.30

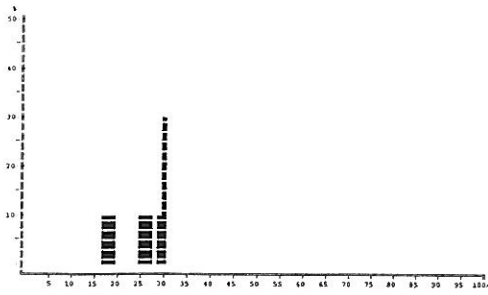
SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	142.90	210	92.02	
Umbrina canariensis	7.08	18	4.56	
Dentex congongensis	2.14	24	1.38	
Dentex barnardi	1.64	2	1.06	
Dentex angolensis	1.54	8	0.99	
Total	155.30		100.01	

PROJECT STATION: 2878  
 DATE: 25/ 3/02 GEAR TYPE: BT No: 8 POSITION: Lat S 605  
 start stop duration Long E 1206  
 TIME 13:06:54 13:36:41 30 (min) Purpose code: 3  
 LOG 5820.97 5822.42 1.42 Area code : 3  
 FDEPTH: 38 45 GearCond code:  
 BDEPTH: 38 45 Validity code: 1  
 Towing dir: 260° Wire out: 150 m Speed: 30 kn\*10

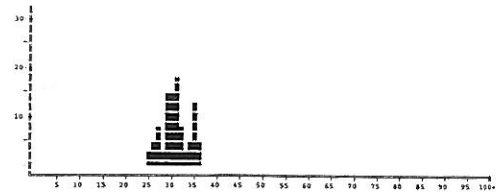
Sorted: 76 Kg Total catch: 75.67 CATCH/HOUR: 151.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	61.46	828	40.61	
Pseudotolithus typus	20.00	4	13.22	
Galeoides decadactylus	9.84	80	6.50	
Rhizoprionodon acutus	9.00	4	5.95	
Epinephelus aeneus	9.00	10	5.95	
Pteroscion pelli	6.98	208	4.61	
Umbrina canariensis	6.64	28	4.39	
Selene dorsalis	6.50	36	4.29	
Pomadasys toperi	4.96	6	3.28	
Brachydeuterus auritus	4.28	54	2.83	
Ilisha africana	2.26	32	1.49	
Pagrus caeruleostictus	2.26	4	1.49	
Octopus vulgaris	1.92	2	1.27	
Penaeus notialis	0.98	26	0.65	
Citharus linguatula	0.84	8	0.56	
Sepiella ornata	0.84	4	0.56	
Bembrops heterurus	0.82	30	0.54	
Pseudotolithus moorii	0.58	8	0.38	
Pisodonophis semicinctus	0.50	2	0.33	
S H R I M P S	0.38	406	0.25	
Pomadasys incisus	0.38	6	0.25	
Parapenaeopsis atlantica	0.34	204	0.22	
Sardinella maderensis	0.28	2	0.19	
Cynoglossus canariensis	0.24	2	0.16	
Sepia officinalis hierredda	0.06	4	0.04	
Total	151.34		100.01	

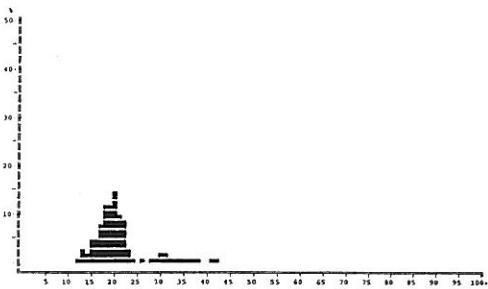
## ANNEX II Length distributions of main species



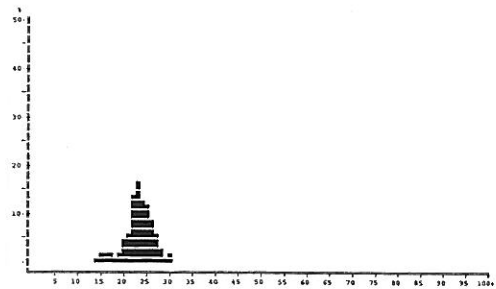
**Dentex macrophthalmus**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 25.65cm N = 10  
NUMBER OF SUBSAMPLES = 2  
SAMPLES FOUND BETWEEN ST. NO 2793 AND 2817  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



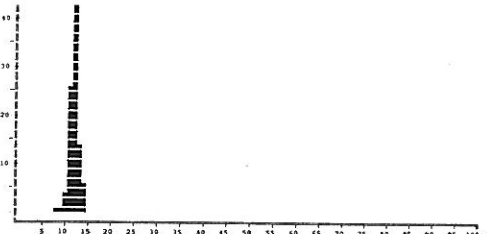
**Atractoscion aequidens**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 21.28cm N = 35  
NUMBER OF SUBSAMPLES = 3  
SAMPLES FOUND BETWEEN ST. NO 2804 AND 2806  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



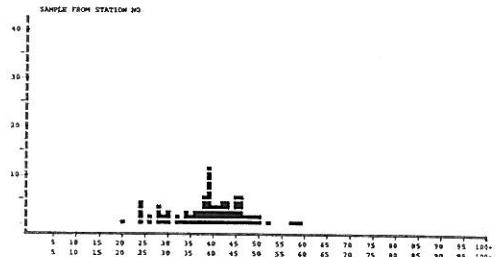
**Merluccius polli**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 21.76cm N = 627  
NUMBER OF SUBSAMPLES = 13  
SAMPLES FOUND BETWEEN ST. NO 2781 AND 2855  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



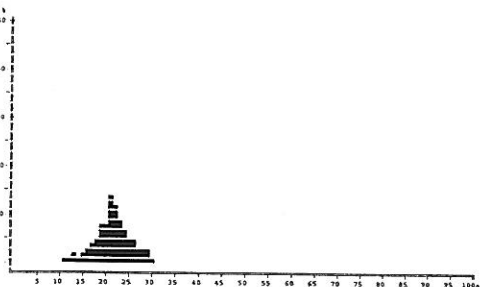
**Dentex angolensis**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 23.61cm N = 888  
NUMBER OF SUBSAMPLES = 29  
SAMPLES FOUND BETWEEN ST. NO 2774 AND 2877  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



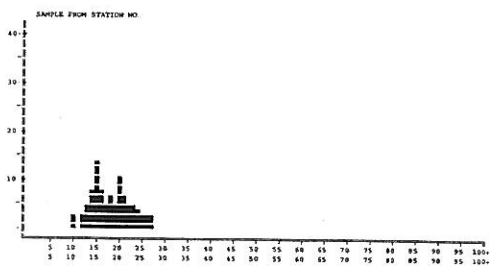
**Trachurus trecae**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 15.12cm N = 1793  
NUMBER OF SUBSAMPLES = 17  
SAMPLES FOUND BETWEEN ST. NO 2795 AND 2870  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



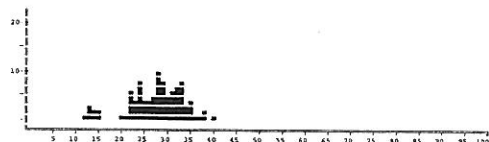
**Pseudotolithus typus**  
Northern region  
MEAN LENGTH = 39.82cm N = 93



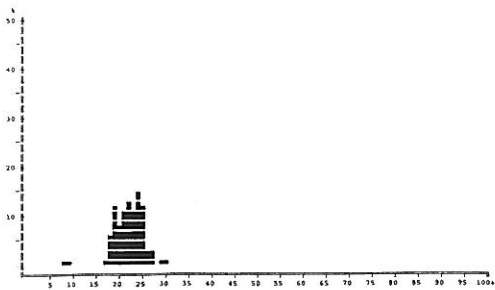
**Pagellus bellottii**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 21.39cm N = 378  
NUMBER OF SUBSAMPLES = 19  
SAMPLES FOUND BETWEEN ST. NO 2786 AND 2875  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



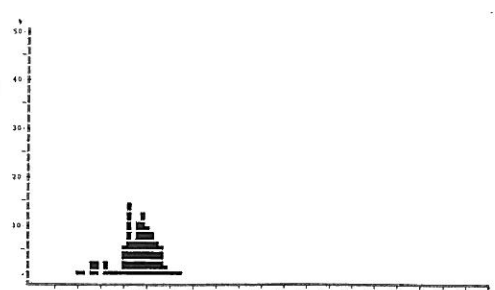
**Pomadasys incisus**  
Northern region  
MEAN LENGTH = 18.76cm N = 62



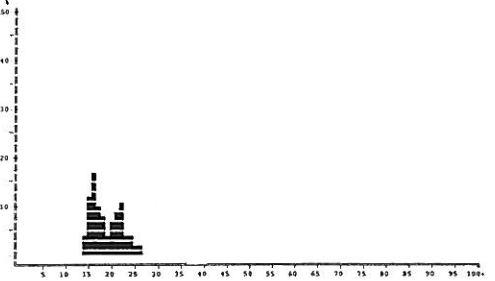
**Dentex barnardi**  
Northern region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 27.39cm N = 169  
NUMBER OF SUBSAMPLES = 8  
SAMPLES FOUND BETWEEN ST. NO 2863 AND 2857  
SAMPLES SEARCHED BETWEEN ST. NO 2774 AND 2878



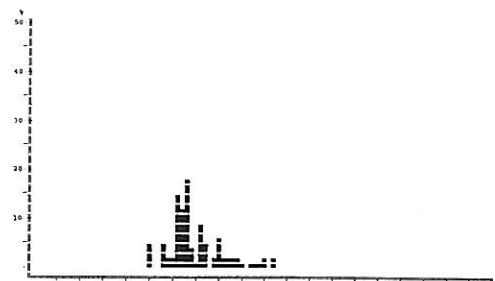
*Dentex macrophthalmus*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 22.56cm N= 819  
NUMBER OF SUBSAMPLES = 15  
SAMPLES FOUND BETWEEN ST. NO 2728 AND 2771  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



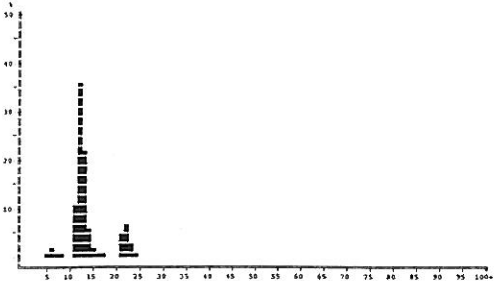
*Dentex angolensis*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 23.46cm N= 291  
NUMBER OF SUBSAMPLES = 8  
SAMPLES FOUND BETWEEN ST. NO 2768 AND 2773  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



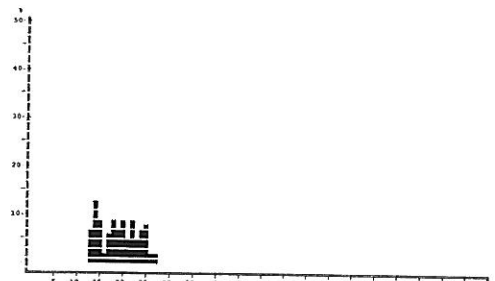
*Merluccius polli*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 20.38cm N= 639  
NUMBER OF SUBSAMPLES = 21  
SAMPLES FOUND BETWEEN ST. NO 2701 AND 2773  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



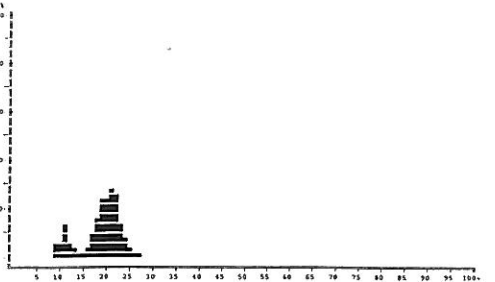
*Pseudotolithus typus*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 35.02cm N= 70  
NUMBER OF SUBSAMPLES = 3  
SAMPLES FOUND BETWEEN ST. NO 2727 AND 2738  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



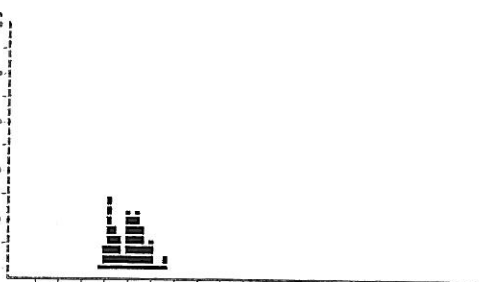
*Trachurus trecae*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 14.27cm N= 2899  
NUMBER OF SUBSAMPLES = 24  
SAMPLES FOUND BETWEEN ST. NO 2703 AND 2778  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



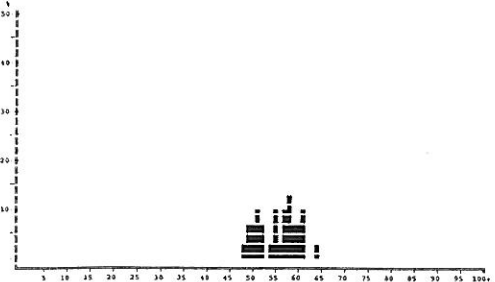
*Pomadasys incisus*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 18.64cm N= 114  
NUMBER OF SUBSAMPLES = 3  
SAMPLES FOUND BETWEEN ST. NO 2783 AND 2728  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



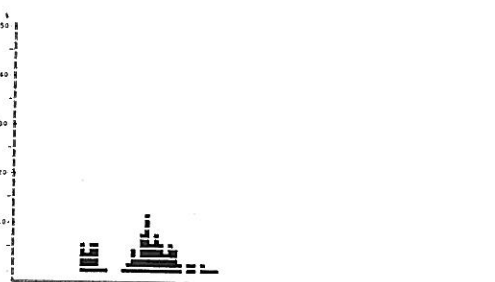
*Pagellus bellottii*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 19.36cm N= 1013  
NUMBER OF SUBSAMPLES = 17  
SAMPLES FOUND BETWEEN ST. NO 2763 AND 2766  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



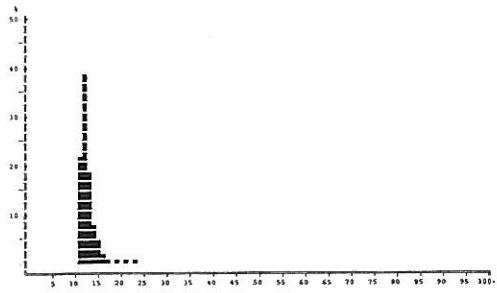
*Dentex barnardi*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 25.68cm N= 93  
NUMBER OF SUBSAMPLES = 3  
SAMPLES FOUND BETWEEN ST. NO 2708 AND 2715  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



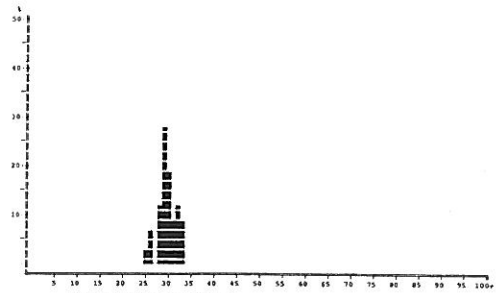
*Atractoscion aequidens*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 55.95cm N= 10  
NUMBER OF SUBSAMPLES = 1  
SAMPLES FOUND BETWEEN ST. NO 2705 AND 2709  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



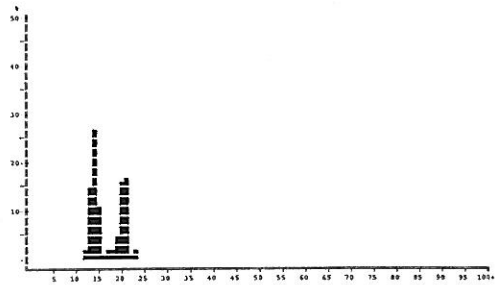
*Umbrina canariensis*  
Central region  
Pooled sample ( weighted by catch).  
MEAN LENGTH = 27.23cm N= 100  
NUMBER OF SUBSAMPLES = 10  
SAMPLES FOUND BETWEEN ST. NO 2703 AND 2752  
SAMPLES SEARCHED BETWEEN ST. NO 2701 AND 2773



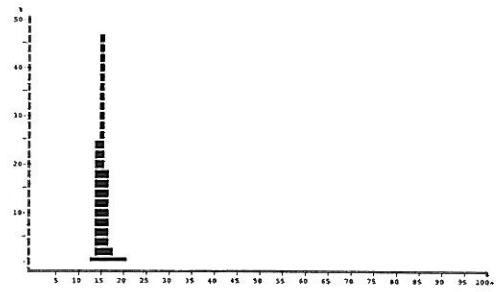
*Dentex macrophthalmus*  
 Southern region  
 Pooled sample (weighted by catch).  
 MEAN LENGTH = 13.16cm N = 474  
 NUMBER OF SUBSAMPLES = 4  
 SAMPLES FOUND BETWEEN ST. NO 2691 AND 2698  
 SAMPLES SEARCHED BETWEEN ST. NO 2689 AND 2700



*Atractoscion aequidens*  
 Southern region  
 Pooled sample (weighted by catch).  
 MEAN LENGTH = 30.19cm N = 32  
 NUMBER OF SUBSAMPLES = 1  
 SAMPLES FOUND BETWEEN ST. NO 2699 AND 2699  
 SAMPLES SEARCHED BETWEEN ST. NO 2689 AND 2700



*Trachurus trecae*  
 Southern region  
 Pooled sample (weighted by catch).  
 MEAN LENGTH = 17.21cm N = 173  
 NUMBER OF SUBSAMPLES = 1  
 SAMPLES FOUND BETWEEN ST. NO 2700 AND 2700  
 SAMPLES SEARCHED BETWEEN ST. NO 2689 AND 2700



*Trachurus capensis*  
 Southern region  
 Pooled sample (weighted by catch).  
 MEAN LENGTH = 15.61cm N = 249  
 NUMBER OF SUBSAMPLES = 2  
 SAMPLES FOUND BETWEEN ST. NO 2691 AND 2692  
 SAMPLES SEARCHED BETWEEN ST. NO 2689 AND 2700

## ANNEX III Swept area estimates

SWEPT AREA ANALYSIS FROM STATION 2689 TO STATION 2700

A. Cunene - Tombua shelf

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>				
	Lower limits, Kg/nm							20- 50m	50-100m	100-200m	200-200m	
	>0	10	30	100	300	1000						
Trachurus capensis, juvenile	1			2	2		50	80.40	30.75	148.11	0.67	
Trachurus trecae					1		10	32.05	160.24			
Trachurus trecae, juvenile			1	1		2	40	29.83		58.75	1.51	
Dentex macrophthalmus	1			2	1	1	50	16.76		23.54	16.64	
Trachurus capensis	1	1				1	30	8.30		0.02	27.63	
Merluccius capensis	2	3	1	1			70	2.28		1.86	4.51	
Sepia officinalis hierredda	1		1				20	0.87	0.06	1.71		
Dentex barnardi	1		1				20	0.71		1.43		
Engraulis encrasicolus				1			10	0.69		1.38		
Atractoscion aequidens	2	3					50	0.55	1.29	0.48	0.16	
Octopus vulgaris			1				10	0.41		0.81		
Pterothrissus bellocci	1		1				20	0.35			1.17	
Etrumeus whiteheadi				1			10	0.34		0.68		
Sepia orbignyana	3	1					40	0.27	0.02	0.51	0.04	
Scomber japonicus		1					10	0.27	1.36			
Zeus faber	1	1					20	0.17		0.29	0.08	
Raja miraletus	1	1					20	0.16		0.33		
Pagellus bellottii			1				10	0.12		0.23		
DASYATIDAE			1				10	0.12		0.24		
Brotula barbata	1						10	0.09		0.18		
Myliobatis aquila	2						10	0.08	0.23	0.07		
Dicologlossa cuneata	4						40	0.05		0.06	0.05	
Squilla mantis	2						20	0.05			0.18	
Other fish								0.19	0.09	0.28	0.13	
Sum all species								175.11	194.04	240.96	52.77	
Sum Snappers												
Sum Groupers												
Sum Grunts												
Sum Croakers								0.56	1.29	0.50	0.16	
Sum Seabreams								17.59		25.20	16.64	
Sum Sharks								0.05	0.02	0.10		
Sum Rays								0.39	0.23	0.70		
Sum Squids								1.60	0.12	3.07	0.11	
Sum												

Number of stations included in analysis, total and by depth strata

10                      2                      5                      3



SWEPT AREA ANALYSIS FROM STATION 2689 TO STATION 2700

A. Cunene - Tombua slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/nm							200-300m	300-400m	400-500m	500-500m
	>0	10	30	100	300 1000						
Merluccius capensis				1			4.71		4.71		
Helicolenus dactylopterus			1				2.46		2.46		
Bathynectes piperitus			1				1.96		1.96		
Pterothrissus belloei			1				1.85		1.85		
Caelorinchus simorhynchus		1					0.93		0.93		
Laemonema laureysi		1					0.63		0.63		
Zenopsis conchifer		1					0.38		0.38		
Squalus megalops		1					0.31		0.31		
Malacocephalus occidentalis		1					0.23		0.23		
Chlorophthalmus atlanticus		1					0.21		0.21		
Trigla lyra		1					0.10		0.10		
Galeus polli		1					0.09		0.09		
NEMATOCARCINIDAE		1					0.08		0.08		
Synagrops microlepis		1				100	0.08		0.08		
Lepidopus caudatus		1					0.06		0.06		
Octopus vulgaris		1					0.06		0.06		
Other fish											
Sum all species							14.14		14.14		
Sum Snappers											
Sum Groupers											
Sum Grunts											
Sum Croakers											
Sum Seabreams											
Sum Sharks							0.40		0.40		
Sum Rays											
Sum Squids							0.06		0.06		
Sum											
0.08											

Number of stations included in analysis, total and by depth strata 1 1

SWEPT AREA ANALYSIS FROM STATION 2689 TO STATION 2700

A. Cunene - Tombua slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/nm							500-600m	600-700m	700-800m	800-800m
	>0	10	30	100	300 1000						
Merluccius capensis				1			11.86		11.86		
Trachyrincus scabrus				1			4.94		4.94		
Malacocephalus occidentalis			1				2.73		2.73		
Ommastrephes bartrami			1				1.36		1.36		
Ebinania costaeacanarie		1					0.81		0.81		
Lophius vaillanti		1					0.38		0.38		
Hoplostethus cadenati		1					0.30		0.30		
Raja confundens		1					0.16		0.16		
Chaceon maritae, male		1					0.16		0.16		
Bathynectes piperitus		1					0.11		0.11		
Chaceon maritae, female		1					0.09		0.09		
Triplophus hemingi		1					0.07		0.07		
Laemonema laureysi		1					0.06		0.06		
Stomias boa boa		1					0.05		0.05		
Other fish							0.06		0.06		
Sum all species							23.14		23.14		
Sum Snappers											
Sum Groupers											
Sum Grunts											
Sum Croakers											
Sum Seabreams											
Sum Sharks											
Sum Rays							0.16		0.16		
Sum Squids							1.36		1.36		
Sum											

Number of stations included in analysis, total and by depth strata 1 1

SWEPT AREA ANALYSIS FROM STATION 2701 TO STATION 2773

B. Benguela - Luanda. Shelf

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci- dence	Mean dens. t/nm <sup>3</sup>	Mean densities by bottom depth strata t/nm <sup>3</sup>			
	Lower limits, Kg/nm								20- 50m	50-100m	100-200m	200-200m
	>0	10	30	100	300	1000						
Brachydeuterus auritus	10	2	5	6	3	3	59	18.21	37.35	16.12	0.32	
Trachurus trecae	14	5	4	9	5	1	78	12.96	2.00	15.20	21.95	
Synagrops microlepis	4	1	2	2	4		27	6.55		0.06	21.33	
Trachurus trecae, juvenile	1		1	1	1	1	10	4.82	0.26	12.87	0.04	
Dentex macrophthalmus	8	3	3	1	1		33	2.46		0.40	7.55	
Trichiurus lepturus	12	6	8	3			59	1.96	1.49	2.37	1.96	
Pagellus bellottii	16	2	3	5			53	1.76	0.14	4.57	0.11	
Selene dorsalis	17	1	1		1		41	1.18	0.18	3.06		
Saurida brasiliensis	9				1		20	1.01		0.04	3.25	
Umbrina canariensis	12	7	3	1			47	0.80	0.07	1.66	0.54	
Galeoides decadactylus	3	7	6				33	0.79	2.12	0.26		
Brotula barbata	10	3	4				35	0.58		0.39	1.42	
Illex coindetii	13	3	2				37	0.50	0.01	0.03	1.60	
Pomadasy incisus	14	5	3				45	0.49	0.88	0.55		
Chloroscombrus chrysurus	15	5	2				45	0.48	1.13	0.30		
Atractoscion aegidens	10	1	2				27	0.32	0.08	0.40	0.47	
Pterothrissus bellocci	10	4	1				31	0.29	0.30	0.11	0.49	
Merluccius polli	5	1	2				16	0.25		0.02	0.81	
Dentex congoensis	2			1			6	0.23			0.76	
Pomadasy jubelini	5	1	1				12	0.22	0.68			
Boops boops	20	3	1				49	0.21	0.01	0.17	0.45	
Dentex angolensis	14	3					35	0.20		0.08	0.55	
Pteroscion pelli	5	3	1				18	0.18	0.54			
Ilisha africana	10	1	1				24	0.17	0.52	0.01		
Stromateus fiatola	9	3					24	0.15	0.33	0.12		
Zeus faber	16	1					35	0.14		0.21	0.19	
Dentex barnardi	21	1					45	0.14	0.07	0.27	0.07	
Scomber japonicus	1		1				4	0.14			0.47	
Sardinella maderensis	6	1	1				16	0.14	0.41	0.03		
Raja miraletus	8	3					22	0.12	0.02	0.24	0.07	
Citharus linguatula	24	1					51	0.12	0.02	0.22	0.09	
Zenopsis conchifer	3		1				8	0.11			0.37	
Sphyræna sphyraena	6	2					16	0.11	0.16	0.15		
Pseudotolithus senegalensis	6		1				14	0.11	0.14	0.18		
Pomadasy peroteti	2		1				6	0.11	0.35			
Trigla lyra	5	2					14	0.10		0.18	0.09	
Lithognathus morzmyrus	7	1					16	0.10	0.09	0.19		
Sardinella aurita	11	2					27	0.10	0.17	0.13		
Arius parkii	2		1				6	0.10	0.02	0.25		
Pseudotolithus typus	3	2					10	0.09	0.27			
Decapterus rhonchus	12	1					27	0.09	0.21	0.05		
Sphyræna guachancho	6	1					14	0.08	0.19	0.04		
Gymnura micrura			1				2	0.07	0.22			
Uranoscopus cadenati	4	1					10	0.06		0.02	0.17	
STROMATEIDAE		1					2	0.06		0.16		
Alloteuthis africana	5	1					12	0.06		0.15		
Parapenaeus longirostris, fem.	6	1					14	0.06			0.18	
Gymnura altavela	1	1					4	0.06	0.17			
Trachinocephalus myops		1					2	0.05	0.14			
Epinephelus aeneus	5	1					12	0.05	0.01	0.12		
Parapenaeus longirostris, male	7						14	0.03			0.09	
Penaeus kerathurus	1						2	0.02	0.05			
Penaeus notialis	7						14	0.02	0.06			
Solenocera africana	1						2					
Penaeus notialis, female	1											
Penaeus notialis, male	1						2					
Parapenaeus longirostris	5						10			0.01		
Parapenaeopsis atlantica	1						2					
Other fish								0.88	0.76	0.74	1.33	
Sum all species								60.09	51.62	62.13	66.72	
Sum Snappers								0.05	0.03	0.12	0.01	
Sum Groupers								19.08	39.40	16.68	0.32	
Sum Grunts								1.54	1.17	2.27	1.02	
Sum Croakers								5.14	0.34	5.70	9.53	
Sum SeaStreams								0.02	0.01		0.08	
Sum Sharks								0.27	0.45	0.27	0.07	
Sum Squids								0.65	0.09	0.32	1.64	
Sum												
0.01												

Number of stations included in analysis, total and by depth strata

49

16

18

15

SWEPT AREA ANALYSIS FROM STATION 2701 TO STATION 2773

B. Benguela - Luanda. Slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/rm <sup>2</sup>	Mean densities by bottom depth strata t/rm <sup>2</sup>				
	Lower limits, Kg/rm							+200-300m	+300-400m	+400-500m	+500-500m	
	>0	10	30	100	300	1000						
Synagrops microlepis	4	2			1		70	8.07	38.90	0.46	0.06	
Chlorophthalmus atlanticus	2		2	2			60	3.45	2.08	5.05		
Merluccius polli	3	4	2				90	2.11	3.22	2.21	0.73	
Nematocarcinus africanus	2	2	2				60	1.72		1.85	3.03	
Dentex macrophthalmus	1			1			20	1.13	5.66			
Laemonema laureysi	3	4					70	0.74		1.18	0.16	
Hoplostethus cadenati	3	2					50	0.46		0.41	1.09	
Hymenocephalus italicus	4		1				50	0.43		0.71	0.01	
LUTJANIDAE			1				10	0.30		0.50		
Yarellia blackfordi	2	1					30	0.15		0.21	0.11	
Parapenaeus longirostris, fem.	5						50	0.12	0.40	0.07		
Illex coindetii	4						40	0.11	0.43	0.03	0.05	
MYCTOPHIDAE	7						70	0.10	0.43	0.02	0.03	
Gephyroberyx darwini	1						10	0.09		0.15		
Parapenaeus longirostris, male	5						50	0.08	0.35	0.02		
Stomias affinis	2						20	0.07		0.01	0.36	
Omastrophes bartrami	4						40	0.07		0.06	0.16	
Malacocephalus occidentalis	5						50	0.07		0.11	0.02	
Dentex angolensis	1							0.06	0.27			
Stenopterus lucifer	2						20	0.06		0.10		
Deania profundorum	2						20	0.05		0.09		
Aristeus varidens, female	3						30	0.02		0.01	0.08	
Aristeus varidens, male	4						40	0.02		0.03	0.01	
Solenocera africana	4						40	0.01	0.01			
Plesionika martia	1						10	0.01			0.02	
Aristeus varidens	3						30	0.01		0.01	0.01	
Parapenaeus longirostris	2						20			0.01		
Plesiopenaeus edwardsianus	1						10					
Shrimps, small, non comm.	1						10					
Other fish								0.67	0.66	0.59	1.11	
Sum all species								20.18	52.41	13.90	7.04	
Sum Snappers								0.30		0.50		
Sum Groupers												
Sum Grunts												
Sum Croakers												
Sum Seabreams								1.19	5.93			
Sum Sharks								0.17		0.24	0.20	
Sum Rays												
Sum Squids								0.23	0.44	0.14	0.29	
Sum												
2.01												
Number of stations included in analysis, total and by depth strata								10	2	6	2	

SWEPT AREA ANALYSIS FROM STATION 2701 TO STATION 2773

B. Benguela - Luanda. Slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/rm <sup>2</sup>	Mean densities by bottom depth strata t/rm <sup>2</sup>			
	Lower limits, Kg/rm							+500-600m	+600-700m	+700-800m	+800-800m
	>0	10	30	100	300	1000					
Hoplostethus cadenati	4	3	5				85	2.91	2.16	3.27	3.48
Yarellia blackfordi	8	4		1			100	1.82	0.85	3.58	1.26
Nematocarcinus africanus	2	2	3	1			54	1.46	3.39	0.50	
J E L L Y F I S H				1			8	1.25			4.05
Merluccius polli	9	1	1				77	0.60	0.45	0.19	1.18
Lamprogrammus exotus	12	1					100	0.39	0.41	0.15	0.61
Hoplostethus mediterraneus			1				8	0.37			1.20
Stomias boa boa	9						69	0.28	0.28	0.32	0.25
Nezumia aequalis	3	1					31	0.19		0.05	0.58
Benthodesmus tenuis	7						54	0.15	0.29	0.11	
Triplopus hemingi	5	1					46	0.14	0.30	0.09	
Aristeus varidens, female	9						69	0.13	0.02	0.09	0.30
Stomias affinis	4						31	0.10	0.15	0.13	
POLYCHAELIDAE	12						92	0.10	0.04	0.14	0.12
Talismania bifurcata	5	1					46	0.10		0.01	0.30
Omastrophes bartrami	4						31	0.08	0.02	0.01	0.21
Glyphus marsupialis	2						15	0.06			0.19
Aristeus varidens, male	9						69	0.06	0.02	0.04	0.12
Xenodermichthys copei	10						77	0.05	0.05	0.10	
NEMATOCARCINIDAE	3						23	0.04		0.11	
Shrimps, small, non comm.	1						8	0.01			0.02
Penaeus kerathurus	1						8		0.01		0.01
Plesionika martia	1						8				
Acantheephyra sp.	1						8				
OPLOPHORIDAE	2						15				
Plesiopenaeus edwardsianus	1						8			0.01	
Aristeus varidens	3						23			0.98	0.99
Other fish								0.79	0.50		
Sum all species								11.08	8.94	9.88	14.87
Sum Snappers											
Sum Groupers											
Sum Grunts											
Sum Croakers											
Sum Seabreams								0.06	0.04	0.04	0.10
Sum Sharks								0.05		0.06	0.09
Sum Rays								0.14	0.10	0.12	0.21
Sum Squids											
Sum											
0.75											
Number of stations included in analysis, total and by depth strata								13	5	4	4

SWEPT AREA ANALYSIS FROM STATION 2774 TO STATION 2878

C Luanda - Congo River. Shelf

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>			
	Lower limits, Kg/nm								20-50m	50-100m	100-200m	200-200m
	>0	10	30	100	300	1000						
Synagrops microlepis	1			1	3		8	10.36			27.93	
Trichiurus lepturus	19	13	7	3	1	3	69	3.34	0.76	5.66	2.82	
Brachydeuterus suritus	16	4	4	3	2		47	2.97	3.35	5.62	0.05	
Trachurus trecae	21	4	5	2	1		53	1.49	0.01	1.14	2.88	
Spicara alta	10				1		18	0.71			1.92	
Pagellus bellottii	30	1	3	1			56	0.58	0.47	1.19	0.05	
Dentex congogensis	19	4	3				42	0.47		0.48	0.79	
Dentex amploensis	31	4	1				58	0.40		0.65	0.41	
Trachurus trecae, juvenile	3	2	3				13	0.37		0.56	0.43	
Trichiurus sp.	1			1			3	0.32	0.02	0.84		
Galeoides decadactylus	8	5	1				23	0.25	0.80	0.11		
Docapterus rhonchus	15	2	3				32	0.24	0.36	0.41		
Ilisha africana	4	5					15	0.21	0.80			
Chloroscombrus chrysurus	9	2	1				19	0.21	0.63	0.13		
Pentheroscion mbizi	6		2				13	0.19	0.01	0.48	0.03	
Stromateus fiatola	8	4					19	0.16	0.52	0.07		
Sphyræna sphyraena	6		2				13	0.16	0.40	0.16		
Umbrina canariensis	13	2	1				26	0.11	0.13	0.27	0.15	
Sphyræna guachancho	8	1	1				15	0.14	0.53	0.01		
Selene dorsalis	21	2					37	0.14	0.39	0.09	0.01	
Illex coindetii	16	3					31	0.12			0.33	
Pagrus caeruleostictus	10	3					21	0.12	0.37	0.03	0.04	
Dentex barnardi	18	2					32	0.11	0.40	0.15	0.07	
Pseudotolithus typus	3	3					10	0.10				
Brotula barbata	21	1					35	0.08		0.09	0.12	
Mycteroperca rubra		1					2	0.05			0.13	
Epinephelus aeneus	7						11	0.05	0.02	0.07	0.04	
Parapenaeus notialis, female	2						3		0.01			
Parapenaeus notialis, male	2						3					
Parapenaeus kerathurus, male	1						2					
Parapenaeus longirostris, fem.	5						8			0.01		
Parapenaeus longirostris, male	4						6					
Parapenaeus kerathurus	1						2					
Parapenaeus notialis	7						11		0.01			
Parapenaeus longirostris	3						5					
Parapenaeopsis atlantica	2						3					
S H R I M P S	1						2					
Other fish								0.82	1.17	0.93	0.63	
Sum all species								24.32	11.18	19.16	38.83	
Sum Snappers								0.01	0.05			
Sum Groupers								0.10	0.03	0.07	0.17	
Sum Grunts								3.01	3.47	5.67	0.05	
Sum Croakers								0.53	0.62	0.82	0.19	
Sum Seabreams								1.78	1.02	2.66	1.44	
Sum Sharks								0.04	0.12			
Sum Rays								0.04	0.06	0.04	0.03	
Sum Squids								0.16	0.06	0.09	0.36	
Sum												
0.01												
Number of stations included in analysis, total and by depth strata								62	16	23	23	

SWEPT AREA ANALYSIS FROM STATION 2774 TO STATION 2878

C Luanda - Congo River. Slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>				
	Lower limits, Kg/nm							+200-300m	+300-400m	+400-500m	+500-500m	
	>0	10	30	100	300	1000						
Synagrops microlepis	2		6	3		1	63	21.10	54.19	3.58		
Merluccius polli	8	7	3				95	2.11	2.79	1.66	1.77	
Trichurus lepturus	6	4	1	1			63	1.45	3.51	0.35	0.14	
Nematocarcinus africanus	6		1	1			42	1.28		3.34	0.72	
Chlorophthalmus atlanticus	5	4	1				53	0.70		0.78	1.30	
Zenopsis conchifer	5	1	1				37	0.65	1.71	0.06		
Brotula barbata	2	1	1				21	0.51	1.39			
Pterothrissus belloci	9	1	1				58	0.36	0.89	0.09	0.01	
Parapenaeus longirostris, fem.	12	1					68	0.26	0.37	0.39	0.01	
Zeus faber	1		1				11	0.25	0.54	0.16		
TRICHIURIDAE	5	1					32	0.25		0.46	0.34	
Parapenaeus longirostris, male	10		1				58	0.22	0.58	0.02		
Illex coindetii	13	1					74	0.20	0.49	0.05	0.01	
Laemonema lauceysi	12						63	0.19		0.31	0.28	
TRACHICHTHYIDAE			1				5	0.17			0.55	
MYCTOPHIDAE	11	1					63	0.15	0.31	0.07	0.03	
Dentex angolensis	4	1					21	0.12	0.33			
Chlorophthalmus punctatus	3	1					5	0.10		0.33		
Parasudis sp.	3						16	0.07	0.19			
Malaccocephalus occidentalis	4						21	0.06		0.14	0.04	
Aristeus varidens, female	7						37	0.02		0.01	0.05	
Solenocera africana	8						42	0.01		0.02	0.01	
Aristeus varidens, male	7						37	0.01		0.01	0.02	
S H R I M P S	4						21	0.01		0.02	0.01	
Parapenaeus longirostris	1						5					
Plesiopeanaeus edwardsianus	1						5					
Other fish								0.70	0.51	0.69	0.92	
Sum all species								30.95	68.58	13.06	4.91	
Sum Snappers												
Sum Groupers												
Sum Grunts												
Sum Croakers								0.01	0.05			
Sum Seabreams								0.13	0.35			
Sum Sharks								0.02		0.04	0.03	
Sum Rays												
Sum Squids								0.25	0.55	0.08	0.07	
Sum												
3.81												
Number of stations included in analysis, total and by depth strata								19	7	6	6	

SWEPT AREA ANALYSIS FROM STATION 2774 TO STATION 2878

C Luanda - Congo River. Slope

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm <sup>2</sup>	Mean densities by bottom depth strata t/nm <sup>2</sup>				
	Lower limits, Kg/nm							+500-600m	+600-700m	+700-800m	+800-800m	
	>0	10	30	100	300	1000						
Nematocarcinus africanus	6	1	10				81	2.15	2.55	3.24	1.16	
Hoplostethus cadenati	10	5	5				95	1.88	1.33	2.01	2.17	
Yarella blackfordi	14	4	2				95	0.97	0.48	1.01	1.27	
Lamprogammarus exultus	15	2					81	0.40	0.28	0.37	0.50	
Stomias boa boa	19	1					95	0.34	0.27	0.63	0.19	
Xenodermichthys copei	21						100	0.29	0.23	0.28	0.33	
Triplophus hemingi	16	1					81	0.27	0.10	0.39	0.30	
Triplophos hemingi			4				19	0.26	0.49	0.21	0.15	
Neruzia aequalis	16						76	0.22	0.01	0.03	0.49	
POLYCHAELIDAE	16						76	0.20	0.07	0.30	0.22	
TRICHIURIDAE	6	1					33	0.17	0.52	0.07		
OMMASTREPHIDAE	13						62	0.14	0.04	0.24	0.14	
GALATHEIDAE	6						29	0.11	0.08		0.20	
Merluccius polli	8						38	0.08	0.24	0.01	0.02	
Ommastrephes pteropus	3						10	0.06	0.05		0.11	
Aristeus varidens, female	19						90	0.05	0.05	0.04	0.06	
S H R I M P S	9						43	0.03	0.01	0.01	0.04	
Sicyonia galeata	1						5	0.02			0.06	
Glyphus marsupialis	9						43	0.02		0.04	0.01	
Plesionika martia	3						14	0.01	0.01		0.01	
Aristeus varidens, male	12						57	0.01	0.03	0.01		
PASIPHAIDAE	1						5					
Plesiopeanaeus edwardsianus	2						10				0.01	
Aristeus varidens	1											
Shrimps, small, non comm.	1						5					
Other fish								0.40	0.28	0.17	0.71	
Sum all species								8.08	7.12	9.06	8.15	
Sum Snappers												
Sum Groupers												
Sum Grunts												
Sum Croakers												
Sum Seabreams												
Sum Sharks								0.06	0.01	0.01	0.10	
Sum Rays												
Sum Squids								0.28	0.09	0.24	0.45	
Sum												
3.34												
Number of stations included in analysis, total and by depth strata								21	6	6	9	

# ANNEX IV Excel Sheet used for calculations of biomass and confidence intervals

Survey March 2002

This sheet is used to calculate stratified mean density, total biomass, and 95% confidence limits on the total biomass. Inputs are only required in the yellow fields and optionally the Students t-value can be set.

The underlying assumption is that the CV from the catch rates (kg/hour) is equal for the density ( $t/nm^2$ ) Equation numbers (1) and (2) refers to Appendix in report

Use Incl (=1 or 0) to select-deselect strata

Depth (m)	Incl	Area (NM <sup>2</sup> )	No Obs	Density (t/NM <sup>2</sup> )	CV (kg/hour)	Equation(1)=	SD st. Variance	Equation (2)=
20-200	1	1692	10	61,880	1,736	53,53	107,409 11536,779	863,272
20-50	1	507				0,00	0,000 0,000	0,000
50-100	1	591				0,00	0,000 0,000	0,000
100-200	1	594				0,00	0,000 0,000	0,000
200-300	1	100				0,00	0,000 0,000	0,000
300-400	1	77				0,00	0,000 0,000	0,000
400-500	1	48				0,00	0,000 0,000	0,000
500-600	1	39				0,00	0,000 0,000	0,000
600-700	1					0,00	0,000 0,000	0,000
700-800	1					0,00	0,000 0,000	0,000
Total		1956					Var(strat-mean)=	863,27

t-value =

Stratified mean =

SE(strat-mean)=

95% Confidence limits:

Total biomass=	104 701	-10 239	219 641
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## ANNEX V

### 1. Stratified mean density and confidence intervals

The stratified estimator of mean density in the entire area is calculated as (Cochran, 1977)

$$\bar{y}_{st} = \sum_{i=1}^L W_i \bar{y}_i, \quad (1)$$

where

$L$  is the number of strata,

$W_i = \frac{\text{area}_i}{\text{total area}}$  is the proportion of the survey area in the  $i^{\text{th}}$  stratum,

$\bar{y}_i = \frac{\sum_{k=1}^{n_i} y_{i,k}}{n_i}$  is the average catch in the  $i^{\text{th}}$  stratum

$n_i$  is the number of tows in the  $i^{\text{th}}$  stratum, and

$y_{i,k}$  is the catch by the  $k^{\text{th}}$  tow in stratum  $i$  (normalized to either kg/hour

or  $\text{t/NMi}^2 = \frac{y_{ik}}{\text{area swept}_{ik}}$  for biomass estimates).

The estimated variance of the stratified mean,  $\bar{y}_{st}$ , is

$$\text{var}(\bar{y}_{st}) = \sum_{i=1}^L W_i^2 \frac{s_i^2}{n_i}, \quad (2)$$

where

$$s_i^2 = \frac{\sum_{k=1}^{n_i} (y_{i,k} - \bar{y}_i)^2}{n_i - 1}. \quad (3)$$

When  $\bar{y}_{st}$  is estimated in  $\text{t/NMi}^2$  then an estimate of the total biomass in the area is calculated by

$$B = \bar{y}_{st} \cdot \text{total area} \quad (4)$$

## 2. Precision of the estimates of mean density

### 2.1. Estimates based on the sample mean

The estimate of the standard error for each stratum mean is given by

$$se(\bar{y}_i) = \sqrt{\frac{s_i^2}{n_i}}, \quad (5)$$

where  $s_i^2$  is from equation (3).

The standard error of the stratified mean ( $\bar{y}_{st}$ , equation 1), i.e. the square root of the variance of  $\bar{y}_{st}$ , is calculated as

$$se(\bar{y}_{st}) = \sqrt{\text{var}(\bar{y}_{st})}, \quad (6)$$

where  $\text{var}(\bar{y}_{st})$  is defined by equation (2).

If the sample size is “large” enough, then the Central Limit Theorem states that each time a survey is conducted there is a 95% chance that the true mean lies in the interval (see Cochran, 1977)

$$\bar{y}_{st} \pm t_{(n-1)} se(\bar{y}_{st}), \quad (7)$$

where  $t$  is from Students t-table with  $(n-1)$  degrees of freedom and  $\alpha = 0.025$ .

### 2.2. Estimates of the mean based on lognormal theory - The Pennington estimator

Since abundance data from marine surveys usually have a large variance (much higher than the mean) and are highly skewed to the right, the sample sizes are typically not large enough so that equation (2) is a valid 95% confidence interval. In fact, the confidence associated with the interval given by equation (7) is usually much lower than 95% (McConnaughey and Conquest, 1992; Conquest *et al.*, 1996; Pennington, 1996). A major problem to the degree of skewness is due to the high proportion of zero tows often observed. Development of confidence intervals is complicated by the asymmetric distribution, and the occurrence of zero catches confounds an effective normalization transformation. Logarithmic transformation will



stabilize the variance but data will still not be normally distributed and interpretation of re-transformed means is difficult (Pennington and Grosslein 1978).

One way to generate more precise estimates of the mean and more accurate confidence statements for skewed marine data is to base the estimators on the lognormal Delta distribution (Pennington, 1983, 1996; Conquest *et al.*, 1996), in which catches are divided into zero and non-zero units, followed by transformation of the non-zero values to natural logarithms. When it is found that the transformed non-zero data are approximated by a lognormal distribution (*i.e.* the logged values are normally distributed), then a more efficient estimator of mean density,  $c_i$ , within each stratum is given by (Pennington, 1983, 1996)

$$c_i = \frac{m_i}{n_i} \exp(\bar{x}_i) G_{m_i}(s_{x,i}^2 / 2), \quad (8)$$

where

$m_i$  is the number of sample values greater than 0 in stratum  $i$ ,

$\bar{x}_i$  and  $s_{x,i}^2$  are the mean and variance, respectively, of the log transformed values of catches greater than 0, and

$G_m(f)$  is an infinite series function of  $m$  and  $f$  [for example,  $m = m_i$  and  $f = s_{x,i}^2 / 2$  in equation (8)] which is used to correct for bias in re-transformation from log to arithmetic scale and is defined by

$$G_m(f) = 1 + \frac{m-1}{m} f + \sum_{j=2}^{\infty} \frac{(m-1)^{2j-1} f^j}{m^j (m+1)(m+3) \cdots (m+2j-3) j!} \quad (9)$$

The variance of  $c_i$  is given by

$$\text{var}(c_i) = \frac{m_i}{n_i} \exp(2\bar{x}_i) \left\{ \frac{m_i}{n_i} G_{m_i}^2(s_{x,i}^2 / 2) - \frac{(m_i-1)}{(n_i-1)} G_{m_i} \left( \frac{m_i-2}{m_i-1} s_{x,i}^2 \right) \right\} \quad (10)$$

### 2.3. The modified Pennington estimator

In contrast to estimates based on the sample mean (equation 1 and 2), which are highly sensitive to a single or a few isolated high catch rates that may account for more than 50% of the total catch, Pennington's estimator (equations 8 and 10) is sensitive to low catch rates which contribute little to the total catch, but when log-transformed may give large negative values resulting in a distribution skewed to the left. In such a case a more precise estimator of mean density within each stratum,  $\hat{\mu}_i$ , is given by (modified from Pennington, 1983, 1996)

$$\hat{\mu}_i = \frac{(n_i - m_i)}{n_i} \bar{y}'_i + \frac{m_i}{n_i} \exp(\bar{x}_i) G_{m_i}(s_{x,i}^2 / 2), \quad (11)$$

where

$m_i$  is the number of sample values greater than a defined 'cut-level' (rather than 0 as in equation 8) in stratum  $i$ ,

$\bar{y}'_i$  denotes the arithmetic mean of the non-transformed values less than the cut-level,

and

$\bar{x}_i$  and  $s_{x,i}^2$  are the mean and variance, respectively, of the logged values of catches greater than the cut-level.

The variance of  $\hat{\mu}_i$  is given by

$$\text{var}(\hat{\mu}_i) = \text{var}(c_i) + \left( \frac{n_i - m_i - 1}{n_i(n_i - 1)} \right) s_i'^2 + \left( \frac{m_i(n_i - m_i)}{n_i^2(n_i - 1)} \right) \bar{y}_i'^2 - 2 \left( \frac{n_i - m_i}{n_i(n_i - 1)} \right) \bar{y}_i' \times c_i, \quad (12)$$

where

$s_i'^2$  is the variance of the values less than the cut-level (equation 3), and

$c_i$  and  $\text{var}(c_i)$  are equations (8) and (10) with  $m_i$  bigger than the cut-level.

There is no single objective criterion upon which to define a cut-level bigger than zero. Basically the logged Delta distribution should be viewed (e.g. in GRAFER) in order to determine if it is skewed to the left and/or contains isolated small catches. As a 'rule of thumb' (Pennington pers. com.) the cut-level should be set =  $(2\bar{x}_i - x_{\max})$ , where  $\bar{x}_i$  and  $x_{\max}$  are the mean and the largest value, respectively, of the log transformed values of catches greater than 0.

## 2.4. Stratified mean and confidence interval based on lognormal theory

The stratified estimate of mean density (denoted by  $\hat{\mu}_{st}$ ) in the entire area is calculated by replacing  $\bar{y}_i$  with  $\hat{\mu}_i$  for each stratum in equation (1). The standard error of  $\hat{\mu}_{st}$  is obtained by substituting  $\text{var}(\hat{\mu}_i)$  for  $s_i^2 / n_i$  (which equals  $\text{var}(\bar{y}_i)$ ) in equation (2) and then

$$\text{se}(\hat{\mu}_{st}) = \sqrt{\text{var}(\hat{\mu}_{st})} \quad (13)$$

Sometimes the  $\hat{\mu}_{st}$ -estimator is higher than the one based on the sample mean. This is because, given the sample sizes typical for marine surveys, the sample mean tends to underestimate the true mean most of the time for these highly skewed distributions (Pennington, 1983, 1996; Conquest *et al.*, 1996).

An approximate 95% confidence interval for  $\hat{\mu}_{st}$  is given by

$$\hat{\mu}_{st} \pm t_{(n-1)} \text{se}(\hat{\mu}_{st}) \quad (14)$$

## ANNEX VI

### NAN-SIS species codes used in defining the 'grouped species' tables

MAIN GROUP	Demersal	Pelagic	Shrimp	Cephalopod	Sharks
	SPA0000	ENG0000	SHR0000	SQU0000	SHA0000
	POD0000	CLU0000			
	SCI0000	CAR0000			
	ARD0000	SCM0000			
	SER0000	SPH0000			
	LUT0000	TRI0000			
	OPDAA00	STRAA00			
	MERME00				

PELAGIC	Clupeids	Carangids	Scombrids	Hairtails	Barracudas
	ENG0000	CAR0000	SCM0000	TRI0000	SPH0000
	CLU0000				

DEMERSAL	Seabream	Snappers	Groupers	Grunts	Croakers
	SPADE00	LUT0000	SER0000	PODPO00	SCI0000
	SPADI00				
	SPALI00				
	SPAPA00				
	SPAPR00				
	SPASP00				

DEEP 1	Seabream	Hake	P.longirostris	A.varidens	N.africanus
	SPADE00	MERME03	SHRPE31	SHRAR22	SHRNE21
	SPADI00	MERME12	SHRPEP1	SHRARA1	
	SPALI00	MERME13	SHRPEP2	SHRARA2	
	SPAPA00	MERME92			
	SPAPR00				
	SPASP00				

DEEP 2	Hake	Ommastrephidae	Sepiidae	A.varidens	P.longirostris
	MERME03	SQUOM21	SQUSE10	SHRAR22	SHRPE31
	MERME12	SQUOM31	SQUSE11	SHRARA1	SHRPEP1
	MERME13	SQUOM51	SQUSE12	SHRARA2	SHRPEP2
	MERME92		SQUSE13		
			SQUSE15		

#### NAN-SIS sectors in Angola

Latitude	Sector	Region
17°14' - 13° S	1	Cunene River – Benguela
13° - 9° S	2	Benguela – Pta. das Palmerinhas
9° - 6° S	3	Pta. das Palmerinhas – Congo River
6° - 5° S	4	Cabinda
17°14' >> S	5	South of Cunene River (Namibia)



## ANNEX VII Instruments and fishing gear used

The Simrad EK-500/38kHz scientific sounder was run during the survey only for observation of fish and bottom conditions.

The details of the settings of the 38kHz echo sounder where as follows:

### Transceiver-1 menu (38 kHz lowering keel)

Transducer depth	5.50 m
Absorption coeff.	10 dB/km
Pulse length	medium (1ms)
Bandwidth	wide
Max power	2000 Watt
2-way beam angle	-21.0 dB
SV transducers gain	27.39 dB
TS transducers gain	27.52 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 dg along / athwardship: 6.7 dg
Along ship offset	-0.03 "
Athwardship offset	0.06 "

### Display menu

Echogram	1 (38 kHz)
Sv colour min	-67 dB

### Printer- menu

Echogram	1 (38 kHz)
Range	50, 100, 250, 500, 750 and 1000 m
Range start	0
Bottom range	15 m
Bottom range start	10 m
Sv colour min	-67 dB
TVG	20 log R

**Bottom detection menu**      Minimum level -40 dB

## Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl". During the present survey only the bottom trawl was used.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm mesh size in the cod end with an inner net of 10 mm mesh size. The estimated opening is 6 m (observed 5.7) and distance between wings during towing about 18 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. The doors are of 'Thyborøn' combi type, 7.81 m<sup>2</sup> 1670 kg, their distance while trawling about 45 - 55 m in average depending on the depth (least distance at low depths). During the present survey this distance was kept nearly constant (about 50 m) at all depths by the use of a 9.5 m strap between the wires at 130 m distance from the doors (normally applied at depths greater than 80 m). At depths greater than 300 m the trawl was equipped with a tickler chain, which is supposed to improve the catchability of bottom living and borrowing species, particularly shrimps.

The SCANMAR system was used on all trawl hauls. This equipment consists of sensors, a hydrophone, a receiver, a display unit and a battery charger. Communication between sensors and ship is based on acoustic transmission. The doors are fitted with sensors to provide information on their distance and a height sensor is fitted to the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

## ANNEX VIII

### Report of taxonomist-on-board RV Dr Fridtjof Nansen Angola Demersal Cruise – 27 February to 30 March 2002

D. Tweddle, South African Institute of Aquatic Biodiversity (formerly JLB Smith Institute),  
Grahamstown RSA

#### Objectives

1. To assist fisheries scientists on the demersal cruise in the identification of problem species caught in the trawl.
2. To preserve specimens of species which it was not possible to identify with certainty on board for later study at the SAIAB.
3. To check on existing identifications made on board and correct if necessary or refer to the SAIAB for further investigation.
4. To add to the vessel's reference collection of digital photographs of Angolan fish species.
5. To make a representative collection of the fishes caught for deposition in the SAIAB's reference collection, with particular emphasis on those species not found off the South African coast and thus less likely to be represented in the SAIAB's holdings. Following the successful general collection of 2001, this year's collecting is more focussed, aiming at rarer species and problem species noted last year. The collection will act as voucher specimens for the R/V 'Dr Fridtjof Nansen's' research programme, and will be available for future reference by any interested scientists.
6. To collect tissue samples preserved in alcohol of as many of the species as possible for the SAIAB genetic tissue collection (200 vials available, = two specimens from each of 100 species), preserving also one of the sampled specimens of each species.

#### Methods

Samples were taken from each trawl by the fisheries scientists on board for sorting, weighing and measurement. The fishes in this sample were checked and if there was any uncertainty over identification, the fish were examined further in the vessel's laboratory, using available identification keys on board. In addition to the sample taken, each trawl haul was examined on deck for any unusual species present, which were not represented in the sample.

Following last year's collection, a list was prepared in advance of desirable species for the SAIAB collection in consultation with Dr Heemstra (shallow water species) and Dr Anderson (deep water species). Up to ten good specimens were collected for each of these species and preserved in formalin. In addition, specimens were collected of any species which could not be positively identified to species level, for later study at the SAIAB. Specimens were also collected of rare or unusual species not included in the FAO Angolan guide. Each fish kept was labelled with a code number written in pencil on plastic paper, which was inserted in the mouth or gill cover, cross-referenced with the field notes and station number, so full collection details could be added later at the SAIAB.

When time permitted and specimens of the various species were available in good condition, photos were taken, generally against a standard yellow background, using the vessel's Olympus digital camera. Some photos were also taken on slide film. Most photographed specimens were kept and preserved, with the specimen and photo cross-referenced, though some larger and/or commoner species were not retained.



## Results

Activities carried out are summarised below, based on the objectives listed as an introduction to this report.

*To assist fisheries scientists on the demersal cruise in the identification of problem species caught in the trawl.* In addition to the guidebooks on board, I brought with me the volume on eastern Atlantic fishes by Blache *et al.* Although dated 1970, this guide is invaluable in keying out species. I also brought CLOFETA, a set of three volumes, which should be obtained and kept in the ship's library, as it is the most up-to-date reference on current taxonomic terminology.

*To preserve specimens of species which it was not possible to identify with certainty on board for later study at the SAIAB.* In 2001 several problem species were collected. A new species in the genus *Physiculus* has been described (paper recently submitted), three other new species await description, and several new distribution records for the area were made. Investigations are still underway in collaboration with experts in various fish groups. Similar efforts will be made in 2002.

*To check on existing identifications made on board and correct if necessary or refer to the SAIAB for further investigation.*

*To add to the vessel's reference collection of digital photographs of Angolan fish species.*

*To make a representative collection of the fishes caught for deposition in the SAIAB's reference collection, with particular emphasis on those species not found off the South African coast and thus less likely to be represented in the SAIAB's holdings. This collection will act as voucher specimens for the R/V 'Dr. Fridtjof Nansen's' research programme, and will be available for future reference by any interested scientists.*

*To collect tissue samples preserved in alcohol of as many of the species as possible for the SAIAB genetic tissue collection (200 vials available, = two specimens from each of 100 species), preserving also one of the sampled specimens of each species.*

## ANNEX IX

Dr Reinhold Hanel  
Institut fuer Physiologische Chemie  
Biozentrum  
University of Wuerzburg

### **Purpose of my participation in the demersal trawl survey off Angola**

The main purpose of my participation in the demersal trawl survey of IMR is to take tissue samples of as many species as possible for phylogenetic and population genetic analyses to be done in the near future. Voucher specimens are kept and will be sent to the Chicago Field Museum as well as to the Vienna Museum of Natural History.

Three ongoing projects have priority:

#### **Molecular phylogeny analysis of seabreams:**

After publishing a molecular phylogenetic analysis of the northeastern Atlantic seabreams (Sparidae) (Hanel and Sturmbauer, 2001; Summerer et al., 2002), new questions concerning the systematic position of eastern central Atlantic distributed species arose. Most of the genera investigated appeared to be paraphyletic. The taxa that should be added to an enlarged data set particularly include all species presently assigned to the genera *Dentex*, *Pagrus* and *SpondylIOSoma*. Some of these are endemic to the survey area.

#### **Biogeography of the rainbow wrasse (*Coris julis*)**

*Coris julis* is recorded to range from Sweden to South of Cape Lopez (Gabon). I have already sampled and sequenced various populations inside and outside the Mediterranean. Specimens from Angola would cover the southernmost distribution limit of the species and therefore provide important information about the genetic diversity of different populations of the in terms of colour highly polymorphic rainbow wrasse.

#### **Molecular phylogeny of mullets of the family Mugilidae**

A molecular phylogeny of mullets is planned in cooperation with the American Museum of Natural History, New York. As I have already collected all Mediterranean distributed species, the cruise might help to add more species to the on growing data set.

Further projects that could be pushed forward by participating in the survey include a molecular phylogeny of the genus *Spicara* and the general relationship of the sister families Centranchidae and Sparidae. Additionally I would like to get samples of eastern central Atlantic distributed Trachinidae of the genus *Trachinus*.

Samples of all other species appearing in the trawls are equally valuable not only for use as out-group taxa for ongoing projects but also as a stock for future investigations and cooperation.

## ANNEX X

During the Angolan demersal survey several samples were taken for different purposes:

1. Fish, crustaceans and molluscs samples of the commercially important species, with emphasis on those species difficult to identify. The specimens were kept in formalin and will be used to review the Angolan Field Guide in a workshop to be held in June this year.
2. Shark heads of the following species: *Deania profundorum*, *Scymnodon obscurus* (now called *Zameus squamulosus*), *Squatina oculata*, *Scyliorhinus cervigoni* and *Leptocharias smithii*. These heads were frozen and at the end of the survey, thawed and packed in salt. They will be sent to Dr. Mark Harris in F.S.C., USA. Personnel from the IIM in Luanda, and particularly Maria de Lourdes Sardinha, has previously collaborated with Dr. Harris.
3. Morphometric parameters of all sharks caught, especially of the deep-water species. Hopefully this could help in finding an easier way to identify sharks on board.