

**SURVEYS OF THE FISH RESOURCES OF
THE EASTERN GULF OF GUINEA**

Nigeria, Cameroon and São Tomé and Príncipe

Survey of the pelagic and demersal resources

11 June - 13 July 2004

**Nigerian Institute for Oceanography and Marine Research
Lagos
Nigeria**

**Direcção das Pescas
São Tomé and Príncipe**

**Institute of Marine Research (IMR)
Bergen
Norway**

**Ministry of Livestock, Fisheries and Animal Industry
Douala
Cameroon**

**Ministerio de Pesca y Medio Ambiente
Malabo
Equatorial Guinea**

**IRAD - Fisheries and Oceanography Research
Limbe
Cameroon**

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The programme has previously focused on the western Gulf of Guinea, but from 2004 two surveys have covered the area, Part I from Côte d'Ivoire to Benin, and Part II from Nigeria to Gabon. The following surveys has previously been conducted in the Gulf of Guinea:

Area	Period
Cape Verga (Rep. of Guinea) to Cape St. Paul (Ghana)	02 - 25 June 1981
Togo to Cameroon	07 - 20 August 1981
Côte d'Ivoire and Ghana	12 - 20 October 1989
Benin, Togo, Ghana and Côte d'Ivoire	19 April - 06 May 1999
Benin, Togo, Ghana and Côte d'Ivoire	29 August - 17 September 2000
Benin, Togo, Ghana and Côte d'Ivoire	6 July - 09 August 2002
Benin, Togo, Ghana and Côte d'Ivoire (Gulf of Guinea Part I)	14 May - 08 June 2004

CRUISE REPORTS "DR. FRIDTJOF NANSEN"

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**Survey of the pelagic and demersal resources
10 June - 13 July 2004**

by

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CHAPTER 1 INTRODUCTION

Following a request from the member countries of the Central Atlantic Fisheries Commission (CECAF) to extend the coverage of surveys of the RV “Dr. Fridtjof Nansen” from the western part Gulf of Guinea to also include the eastern part of the region, IMR and FAO agreed to conduct a survey covering the waters from Nigeria to Gabon including São Tomé and Príncipe. The present survey is an extension of the surveys in the western Gulf of Guinea conducted from Côte d’Ivoire to Bénin, 14 May to 08 June this year. The two surveys will together cover the whole Gulf of Guinea Large Marine Ecosystem (GCLME).

The survey was organised by IMR and FAO under the project GCP/INT/730/NOR: International Cooperation with the Nansen Programme: Fisheries Management and Marine Environment. This project is the continuation of a series of projects and agreements between NORAD, IMR and FAO involving surveys with the research vessel “Dr. Fridtjof Nansen”. The objectives of the survey was discussed and agreed upon during a pre-survey meeting held onboard “Dr. Fridtjof Nansen” in Tema, Ghana on 11 June 2004 where representatives from Nigeria, Cameroon, São Tomé and Príncipe and Norway participated.

1.1 Objectives

The main objectives of the survey were:

- to map the distribution and estimate the acoustic abundance of the main pelagic species/groups in the region
- to describe the distribution, composition and estimate the abundance of the main demersal species on the shelf by a swept-area trawl programme
- to collect zooplankton samples for distribution and species identification
- to map the general hydrographic regime by using a CTD-sonde to monitor the temperature, salinity and oxygen at bottom trawl stations and on hydrographical transects
- on-the-job training of local scientists in the main survey routines

1.2 Participation

Nigerian Institute for Oceanography and Marine Research:

Catherine Ekaete Ukut-Isebor, Emmanuel Olusegun Oyewo, Akanbi Bamikole Williams

Nigerian Navy Hydrographic Office:

Cdr. Maloude Aching Maiha, MWO^{SR} Sikiri A. Olufade

Ministry of Livestock, Fisheries and Animal Industry, Service Provincial des Peches du Littoral Douala, SPPLD, Cameroon:

Pierre Nolasque Meke Soung

Station des Recherches Halieutique et Oceanographique, Limbe, SRHOL, Cameroon:

Chiambeng George Yongbi, Charles Emene Gabche

Marine Fisheries Research Division, Tema, Ghana:

Daniel Ofori-Adu

Direcção das Pescas, São Tomé and Príncipe:

José Dias de Sousa Lopes, Maria Manuela do Nascimento Bandeira

Ministerio de Pesca y Medio Ambiente, Equatorial Guinea:

Simon Osa Aduga, Paulino Esono Mesie

Institute of Marine Research, Norway:

Tore Mørk, Jarle Kristiansen, Jens-Otto Krakstad (cruise leader), and Magne Olsen

Marine Research Institute Reykjavík, Iceland:

Haraldur Einarson

1.3 Narrative

The vessel left Tema (Ghana) at 12:50 on the 11th June and steamed eastwards to the border between Benin and Nigeria at 2°42' E where the first transect started at 06:35 on the 12th June, (GMT=local time). The shelf was surveyed during daytime (06:00 to 18:00) by parallel course tracks about 15 NM (nautical miles) apart. Due to a general concern about pirates that reportedly frequents parts of Nigerian waters it was decided to stay outside the shelf break at night. The captain had been asked to have double lookout in the wheelhouse, and it was therefore not possible to do any trawling or zooplankton sampling at night, from 18:00 to 06:00 while in Nigerian waters. Sampling was continued around the clock outside Nigerian territorial waters. The border between Nigeria, Cameroon and Equatorial Guinea south of the Apayafe River (4°40'N) was reached on the 25th June at 11:00, and the vessel thereafter continued to survey the shelf and slope around the Island of Bioco in Equatorial Guinea. However the survey in Equatorial Guinea was terminated after an incidence with their navy on the 26th of June. A separate report has been filed about the incidence. The vessel then

reached Douala on the 28/6 at 13:20, and two Nigerian scientists departed while two from Equatorial Guinea came on board. A meeting with representation from the Ministry of Livestock, Fisheries and Animal Husbandry in Cameroon, the Service Provincial des Pêches du Littoral in Douala, the Station des Recherches Halieutique et Océanographique in Limbe, and the cruise leader was held onboard the vessel. The representatives were informed about the Nansen program, their cooperation with the FAO, and the research activities of Dr. Fridtjof Nansen in the GCLME region. The vessel then departed from Douala on 30th June at 14:15 and steamed towards the border between Nigeria and Cameroon where the second leg of the survey, covering Cameroon and São Tomé and Príncipe started at 06:00 on the 1st July. The southern border of Cameroon, at the Campo River estuary (2°20'N) was reached on 6th July in the afternoon, and the vessel continued to the Islands of São Tomé and Príncipe. Their territorial waters were covered from the morning of the 7th July to the evening of the 11th July where after the vessel continued to Port Gentil in Gabon where it arrived on the 12 July at 07:00.

During the survey semi-random swept-area hauls were carried out on the shelf within the depth zones 20-30 m, 31-50 m, 51-100 m and when possible deeper than 100 m during daytime. Continuous acoustic registrations were done throughout the survey. To obtain a denser acoustic coverage, night registrations were made in between the daytime course tracks outside of Nigerian waters. Pelagic trawling on registrations was also carried out during dark hours. Additional random blind trawl hauls were made close to the surface, mainly at the inner shelf, with pelagic trawl or bottom trawl equipped with large floats.

CTD-stations were taken at the bottom trawl stations. In addition, hydrographical profiles were made with CTD from the surface down to the bottom, or 500 m depth, at approximately each 60 NM coastline sailed, and at 200 m bottom depth on each transect after 18/6. Zooplankton samples were taken irregularly with Hydrobios multinet plankton sampler.

The Nigerian shelf was covered from 12/6-25/6, Equatorial Guinea from 25/6-26/6, Cameroon from 1/7-6/7 and São Tomé and Príncipe from 7/7-11/7.

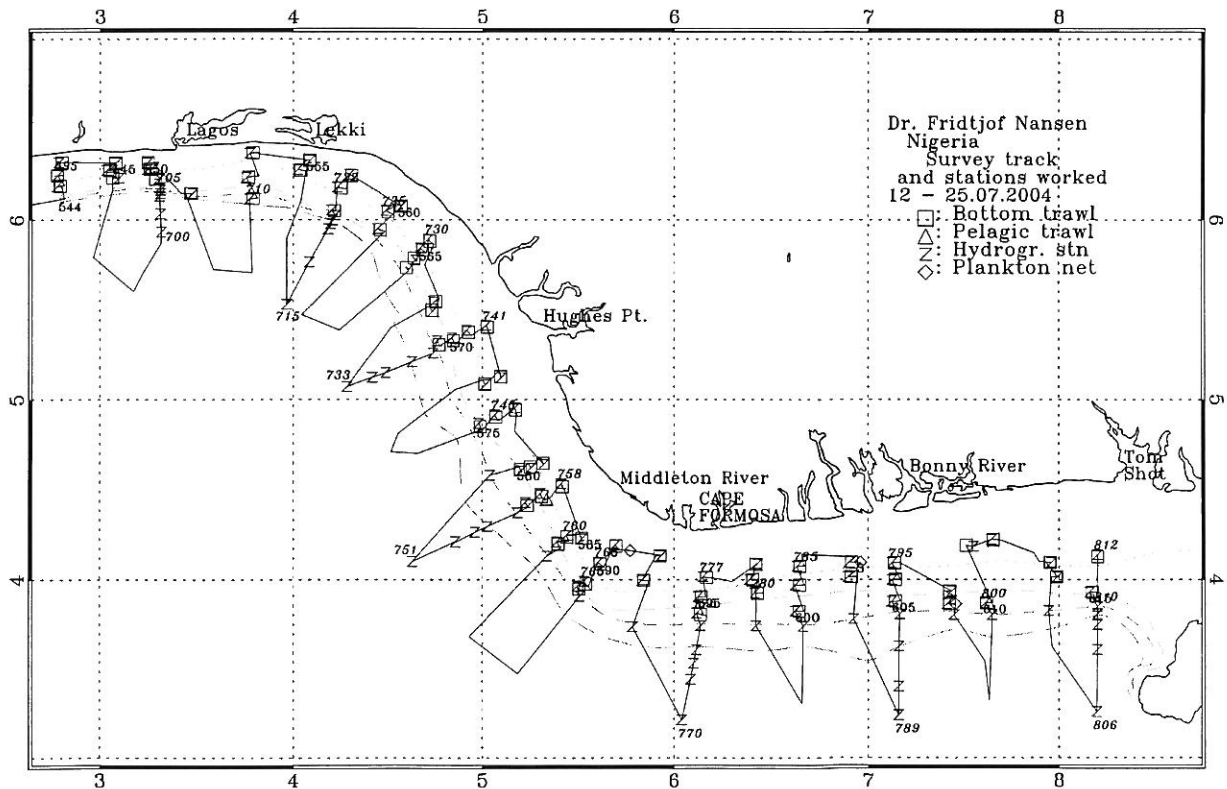
1.4 Survey effort

Figure 1. shows the cruise tracks with trawl, hydrographic and plankton stations. Table 1.1 summarises the survey effort in each sector. No area was calculated for Equatorial Guinea because the survey in this region was interrupted. The area calculated for São Tomé and Príncipe is the total area for both islands for the depth region surveyed.

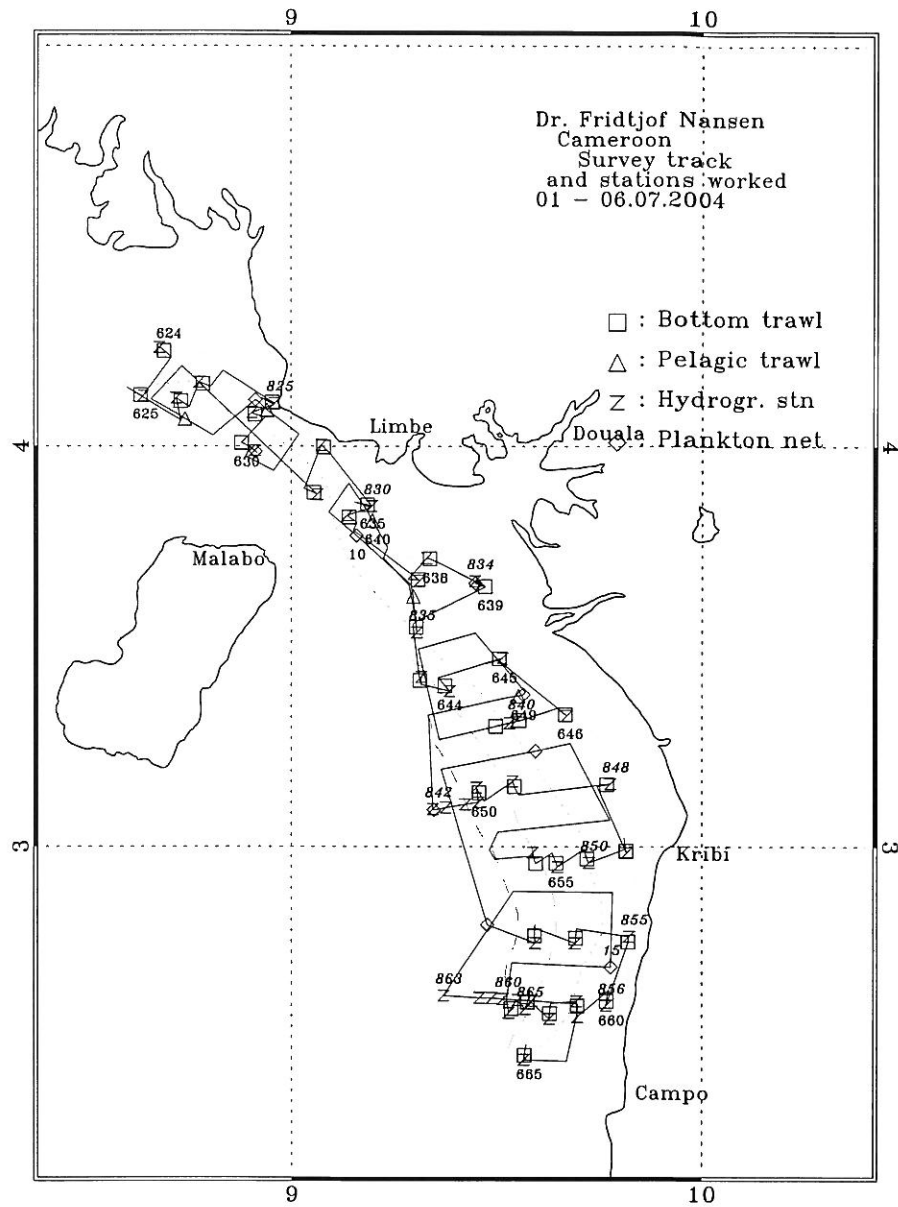
Table 1.1 Number of hydrographic (CTD), plankton (P), pelagic trawl (PT) and bottom trawl (BT) stations, successful swept-area hauls, distance surveyed (NM) and size of survey area (NM²).

Region	CTD	P	PT	BT	Swept-area hauls					Distance Surveyed
					0-30 m	31-50m	51-100 m	100-200 m	>200 m	
Nigeria	119	3	1	74	11	25	25	12	1	-
Area (NM ²)					8 268.2	3 902.0	4 892.0	3 398.4	-	1 995
Cameroon	48	9	5	36	12	7	11	5	1	-
Area (NM ²)					2 497.4	859.4	677.9	380.7	-	830
Equatorial Guinea	8	0	0	7	0	0	4	2	1	-
Area (NM ²)					-	-	-	-	-	-
São Tomé & Príncipe	59	9	2	10	2	1	9	-	-	568
Area (NM ²)					-	-	521.9	-	-	-
Total Area (NM²)										4 150

a) **Nigeria – Cameroon**



b) Cameroon – Gabon



c) São Tomé and Príncipe

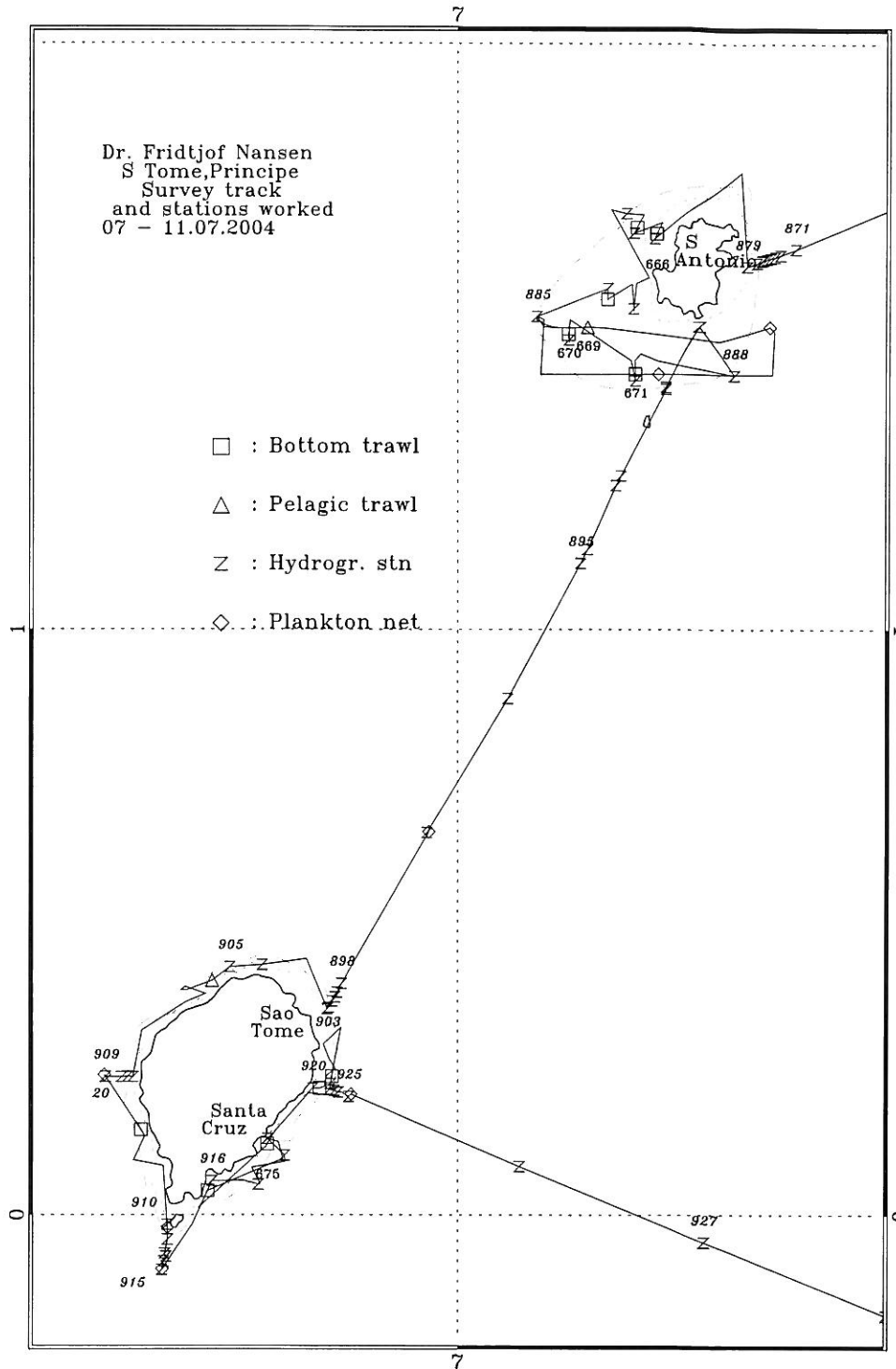


Figure 1.1 Course track with fishing, plankton and hydrographic stations for a) Nigeria, b) Cameroon and c) São Tomé and Príncipe. Depth contours are indicated

CHAPTER 2 METHODS

2.1 Meteorological and hydrographical sampling

Temperature, salinity and oxygen

CTD stations were taken in connection with most bottom trawl stations and at five hydrographic transects. Figure 1 presents positions for the CTD stations taken on the five transects. A Seabird 911 CTD plus was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the Seabird Seasave software installed on a PC. The profiles were usually taken down to a few metres above the bottom, but not deeper than 500 m. At some stations two Niskin bottles were triggered in stable water to collect samples for calibration of the salinity and oxygen sensors. The samples are normally analysed for salinity using a Guildline Portasal salinometer, and the oxygen content is determined using the Winkler method.

For oxygen, 16 samples out of 16 from the central part of Nigeria collected 15/6 - 16/6 were accepted for the calibration. A linear regression gave the following formula for correcting the oxygen values:

$$O_2 = O_{2ctd} 1.3471 - 0.3255$$

A second oxygen calibration was conducted on the 10 July, 24 samples out of 24 was accepted for the calibration. A linear regression gave the following formula for correcting the oxygen values:

$$O_2 = O_{2ctd} 1.2376 - 0.3524$$

The calibration was applied for all oxygen samples on São Tomé and Príncipe.

For the salinity, the analyses of 25 April 2004 were applied. The average differences between the salinometer and CTD values were very small and the CTD values were accepted.

Thermosalinograph

A new SBE 21 Seacat Thermosalinograph was installed during the survey. The thermosalinograph was running routinely from the 21st June 00:00, midnight. However this first survey should be considered a test run. Temperature comparisons between the CTD at 5 m and the thermosalinograph showed temperatures 0.25-0.3°C warmer for the

thermosalinograph because of heating in the pipes. This will be corrected by another temperature sensor mounted on the water inlet at a later stage.

No calibration of the salinity sensor was done during the survey, the factory calibration settings were applied.

Current speed and direction measurements (ADCP)

The ship-born Acoustic Doppler Current Profiler (ADCP) was not in order and no data was logged during the survey.

Meteorological observations

Wind direction and speed, air temperature, global radiation and sea surface temperature (5 m depth) were logged automatically every nautical mile on an Aanderaa meteorological station.

2.2 Biological sampling

The trawl catches were sampled for species composition by weight and numbers. The deck sampling procedure is described in more detail by Strømme (1992). Length measurements (total length) were taken for target species. The length of each fish was recorded to the nearest 1 cm below. The carapace length was measured to the nearest 0.5 cm below for shrimp. The mantle length was measured to the nearest 1 cm below for *Sepia* spp. In addition, at a few stations total length and body weight (g) were recorded for the target species in the acoustic survey. Basic information recorded at each fishing stations, i.e. trawl hauls, is presented in Annex I. Pooled length frequency distributions, raised to catch per hour, of selected species by area are shown in Annex II. Annex III gives basic information of all biological samples collected during the survey. Target groups for Nigeria and Cameroon are indicated in Annex IV, while the swept-area estimates are presented in Annex V.

A description of the fishing gears used, acoustic instruments and their standard settings is given in Annex VII.

2.3 Zooplankton sampling

Zooplankton was collected with the Hydrobios multinet zooplankton sampler that takes up to five discrete samples at predefined depths while measuring the water flow through the net. Samples were taken irregularly in Nigeria, while a more systematic sampling program was put in place in Cameroon with one sample station each 20 NM close to the coast and offshore.

2.4 Biomass estimates

Acoustic abundance estimation

A SIMRAD EK500 Echo sounder was used and the echograms were stored on both paper and files. The acoustic biomass estimates were based on the integration technique. The Bergen Integrator (BEI, see Knudsen 1990) was used for analysis and allocation of the integrated s_A -values (average area back scattering coefficient in m^2/NM^2). The splitting and allocation of the integrator outputs (s_A -values) was based on a combination of a visual scrutiny of the behaviour pattern as deduced from echo diagrams, the BEI analysis and the catch composition. The mean integrator value in each sampling unit (s_A -values) was divided between the standard categories/groups of fish, as noted below, on the basis of trawl catches and characteristics of echo traces:

- sardinella (*Sardinella aurita* and *S. maderensis*)
- PEL 1 (other clupeids than sardinella and anchovy)
- PEL 2 (carangids, scombrids, barracudas, hairtail)
- mesopelagic fish
- demersal fish
- plankton

The following target strength (TS) function was applied to convert s_A -values (mean integrator value for a given area) to number of fish (sardinella, PEL 2):

$$TS = 20 \log L - 72 \text{ dB} \quad (1)$$

or in the form

$$C_F = 1.26 \cdot 10^6 \cdot L^{-2} \quad (2)$$

where L is total length and C_F is the reciprocal back scattering strength, or the so-called fish conversion factor. In order to split and convert the allocated s_A -values (m^2/NM^2) to fish densities (number per length group per NM^2) the following formula was used

$$N_i = A \cdot s_A \cdot \frac{P_i}{\sum_{i=1}^n \frac{P_i}{C_{Fi}}} \quad (3)$$

where: N_i = number of fish in length group i
 A = area (NM^2) of fish concentration

s_A = mean integrator value (echo density) in area A (m^2/NM^2)

p_i = proportion of fish in length group i in samples from the area

C_{Fi} = fish conversion factor for length group i

The number per length group (N_i) was then summed and the total number of fish obtained:

$$N = \sum_{i=1}^n N_i \quad (4)$$

The length distribution of a given species within an area was computed by simple adding of the length frequencies obtained in the pelagic trawl samples within the area. In the case of co-occurrence of target species, the s_A value was split in accordance with length distribution and catch rate in numbers in the trawl catches. Biomass per length group (B_i) was estimated by applying measured weights by length (W_i) when available or theoretical weights (calculated by using condition factors), multiplied with number of fish in the same length group (N_i). The total biomass in each area was obtained by summing the biomass of each length group:

$$B = \sum_{i=1}^n N_i \bar{W}_i \quad (5)$$

The number and biomass per length group in each concentration were then added up to obtain totals for each region.

Biomass estimates based on swept-area method

In the bottom trawl survey, stock biomasses was estimated by the swept-area method with catch per haul as the index of abundance (see Strømme 1992). The general formula to estimate biomass B , using this method is:

$$B = \frac{A}{a} \cdot \frac{\bar{X}}{q} \quad (6)$$

A is the total area surveyed, a is the swept area of the net per haul, \bar{X} is the average catch per haul (the index of abundance) and q is the proportion of fish in the path of the net that are actually caught. The density of the resource is estimated as biomass per unit area. In a stratified survey of k non-overlapping strata, if the mean catch per haul in stratum i and its variance are denoted by \bar{X}_i and s_i^2 respectively, then an unbiased estimate of the population mean \bar{X} is the stratified mean \bar{X}_{st} , which is given by:

$$\bar{X}_{st} = \frac{1}{N} \sum_{i=1}^k N_i \bar{X}_i = \sum_{i=1}^k W_i \bar{X}_i \quad (7)$$

where $W_i = \frac{N_i}{N} = \frac{A_i}{A}$ is the relative size of the i^{th} stratum (A_i is the area of the i^{th} stratum and A is the total area surveyed). The variance of the stratified mean is given by

$$\text{var}(\bar{X}_{st}) = \sum_{i=1}^k W_i^2 \text{var} \bar{X}_i = \sum_{i=1}^k W_i^2 \frac{s_i^2}{n_i} \quad (8)$$

where n_i is number of hauls in the i^{th} stratum and n is the total number of hauls in the survey.

Table 1.1 shows the areas used in the swept-area method to estimate biomass for the different regions. A stratified semi-random design was used with depth and country as stratification factors. Estimated total biomass by species/group was obtained by summing estimates for each depth stratum.

For conversion of catch rates (kg/hour) to fish densities (t/NM²), 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 based on GPS readings. The area swept for each haul was thus 18.5 times the distance trawled, raised to NM²/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 VI on a spreadsheet, ANNEX VII) and raised to total area. Since NAN-SIS does not produce variance estimates of the mean densities (ANNEX IV), the 95% confidence limits for the biomass estimates were calculated with the underlying assumption that the coefficient of variation ($CV = SD/\text{mean}$) is constant when catch rates in kg/hour are converted to densities (t/NM²). In other words 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 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 V were used to calculate standard error (SE) on the arithmetic mean and confidence intervals (see the spreadsheet BIOMASS.xls, and example in ANNEX VII). 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 the arithmetic mean, but the lognormal based Pennington's estimator can also be calculated (equations 8 to 12 in ANNEX VI).

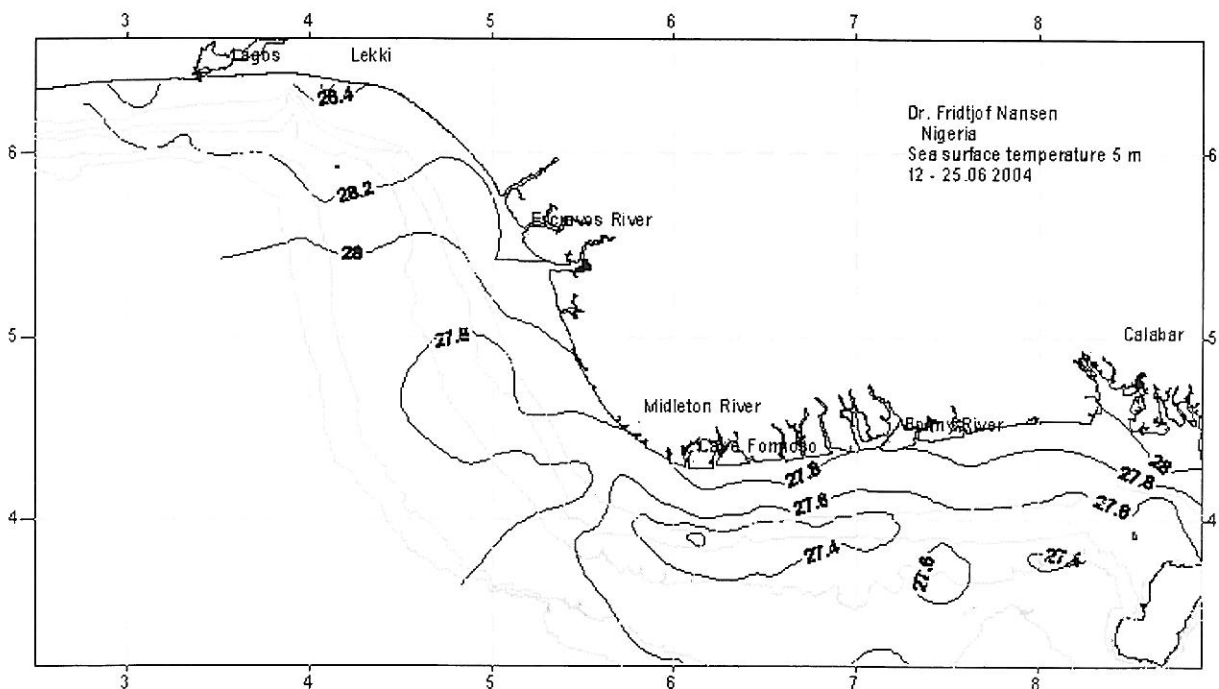
CHAPTER 3 OCEANOGRAPHIC CONDITIONS

3.1 Surface distribution

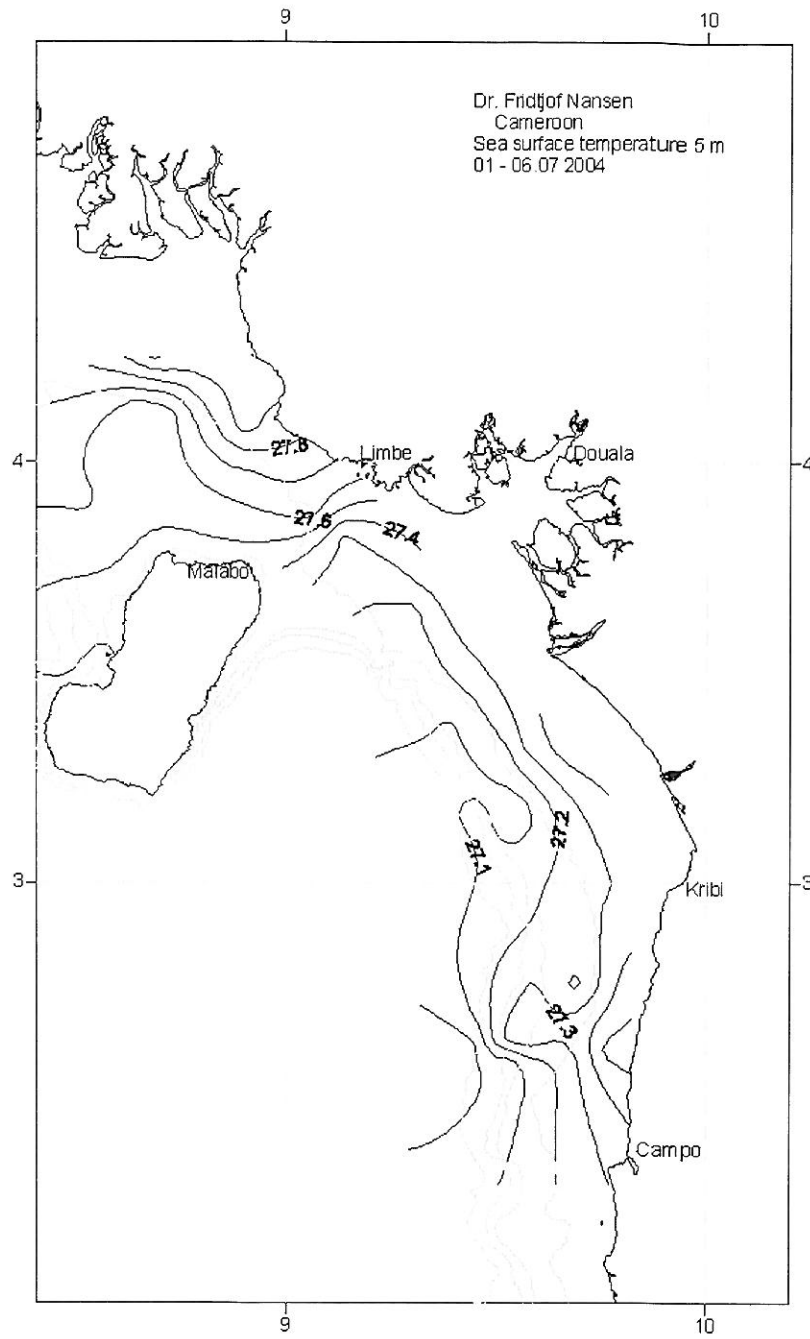
The surface layer temperature (5 m depth) was continuously recorded during the cruise. Figure 3.1a and b show the horizontal distribution of sea surface temperature (SST) for Nigeria – Cameroon and Cameroon to Port Gentil in Gabon respectively. The highest temperature in Nigeria, 28.7 °C, was recorded close to the coast east of Lagos. This area was dominated of water masses with temperature >28°C. Further east and offshore gradually cooler water masses was found, but the surface temperature generally never dropped below 27°C, except a small filament of water slightly cooler, 26.9°C outside Cape Formoso.

In Cameroon temperature extremes where found in the shallow strait between Cameroon and Equatorial Guinea, with temperatures reaching 28.3°C. South of Douala, temperature gradients where along shelf with slightly warmer temperatures inshore and cooler waters in the deeper parts of the survey area. Some of this warmer water seems to be deflected offshore between Kribi and Campo. The sea surface temperature around Principe ranged from 26.9°C – 27.1°C with the warmer temperatures on the northwestern side. The temperature range at São Tomé ranged from 25.8 °C in a pocket on the eastern part of the shelf, to 26.6 °C on the northern side of the shelf.

a) Nigeria - Cameroon



b) Cameroon



c) São Tomé and Príncipe

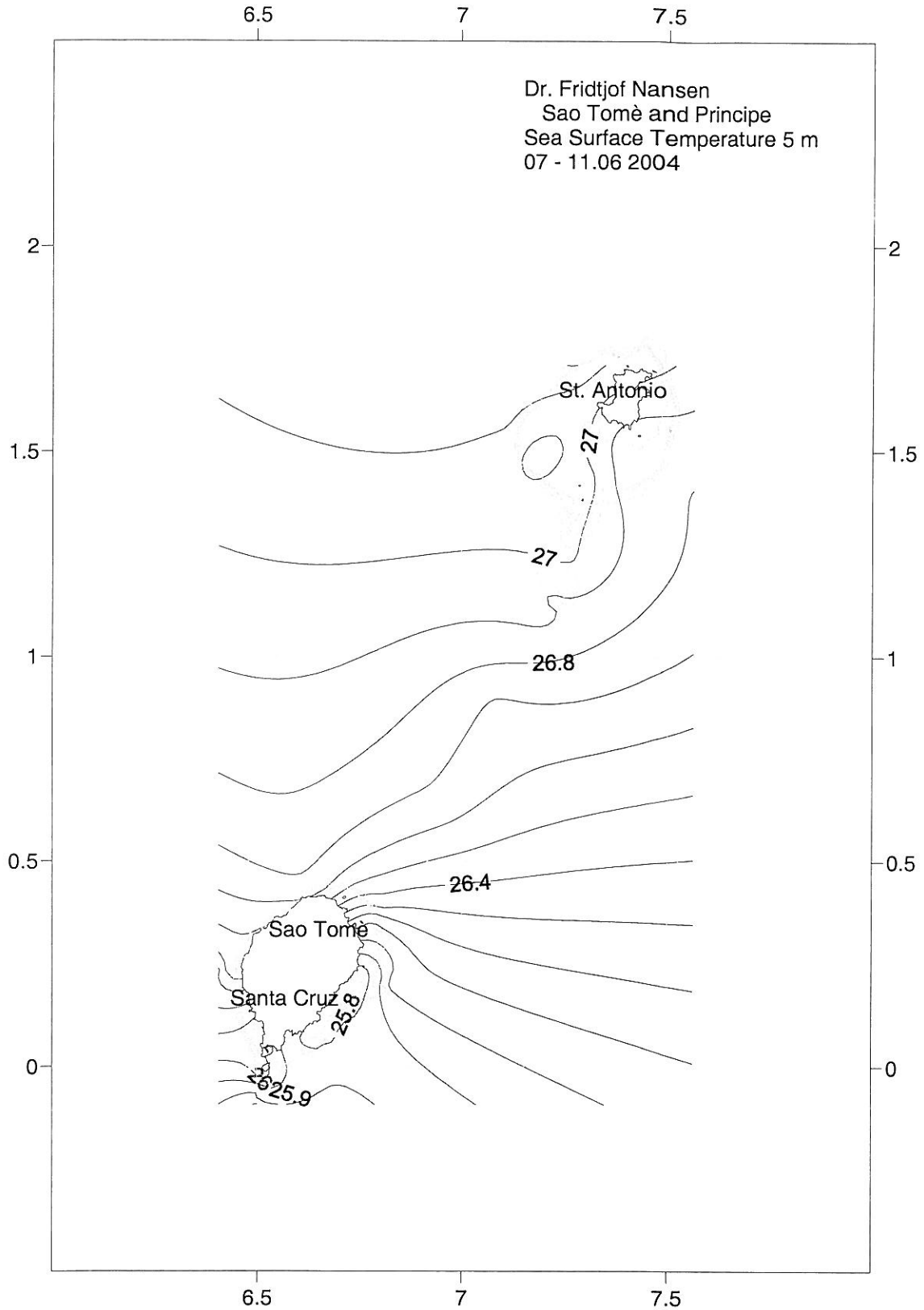
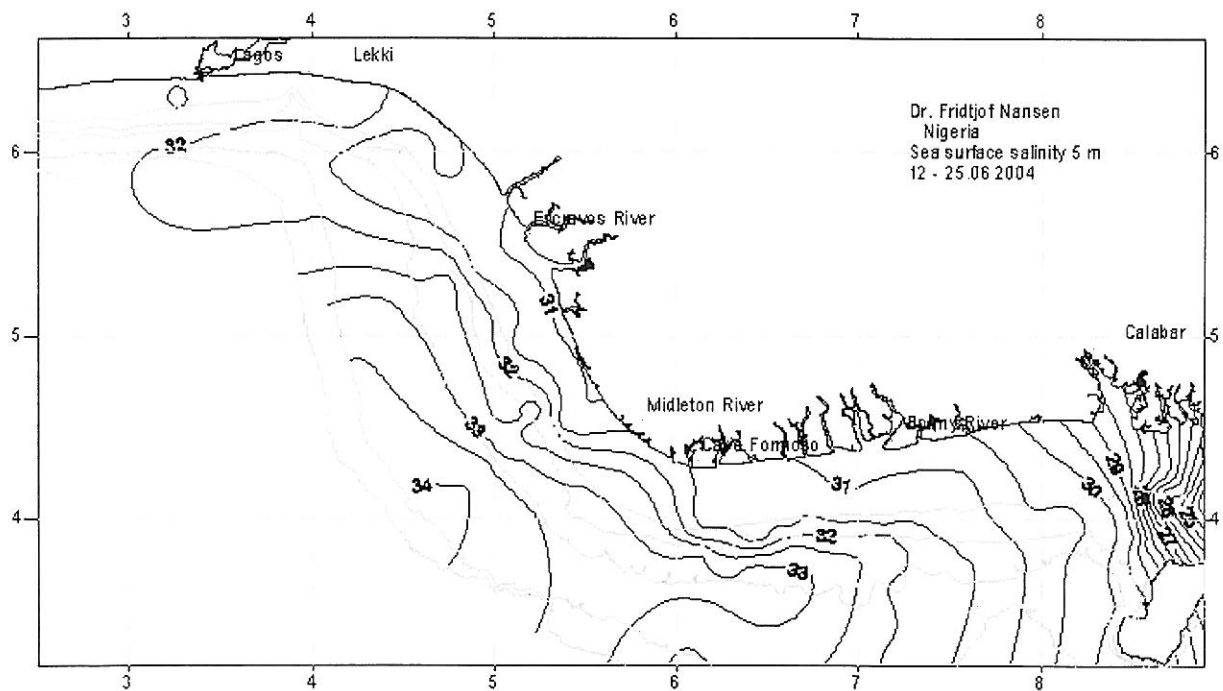


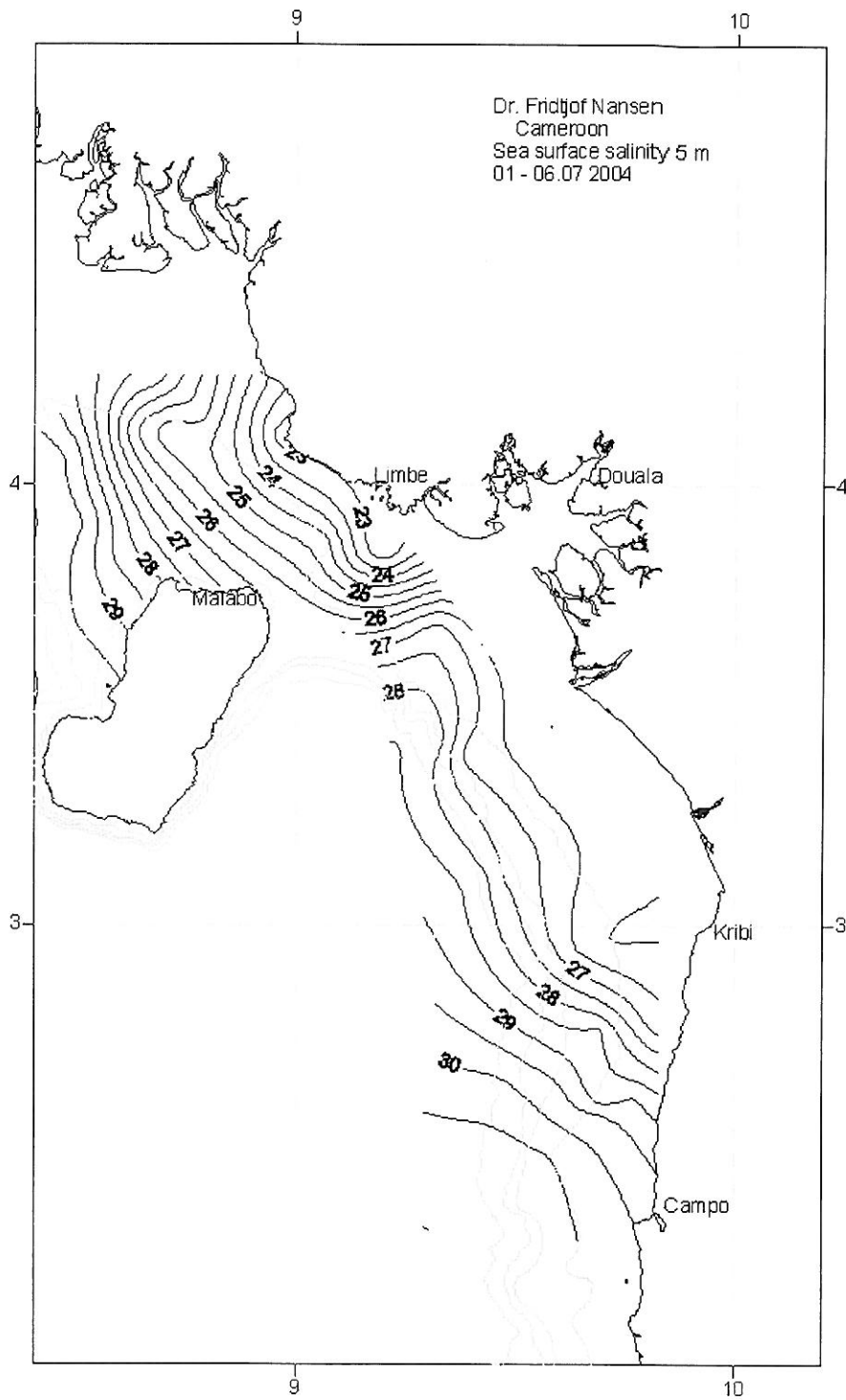
Figure 3.1 Horizontal distribution of surface temperature (5 m depth) at a) Nigeria - Cameroon b) Cameroon - Port Gentil, Gabon and c) São Tomé and Príncipe.

The surface salinity (Figure 3.2 a and b) was recorded from the CTD stations at 5 m depth. The salinity varied dramatically in the survey area due to fresh water influx from the numerous rivers discharging from the Niger delta into the sea. Generally the salinity ranged between 30 psu and 34 psu in Nigeria, and the salinity increased offshore and westwards. Low salinity, <31 psu, was found in the coastal areas, and especially in the eastern part of Nigeria where the low salinity surface waters was extending offshore and between Bioco Island (Equatorial Guinea) and the mainland. The Gulf of Guinea surface current is directed south and westwards and brings the river water masses in this direction for most parts of the year. In Cameroon surface salinity were ranging between 20.7 psu -30.5 psu. Generally low salinity waters were associated with the higher temperatures in the northern part of Cameroon and inshore, while higher salinities were associated with lower temperatures and areas further south and offshore. The gradients were along shelf over most parts of Cameroon but becoming more across shelf in the Campo area. The sea surface salinity was as expected higher in São Tomé and Príncipe than on the main land. In Príncipe sea surface salinity ranged from 33.0 psu in a small area on the western shelf, to 32.8 psu over most of the most of the eastern side of the shelf. In São Tomé surface salinity ranged from 33.2 psu at the southwestern side of the islands to the highest values of 34.4 psu on the southeastern side of the islands. These high salinity values correspond with an area of slightly cooler temperatures, indicating upwelling in this area.

a) Nigeria - Cameroon



b) Cameroon



c) São Tomé and Príncipe

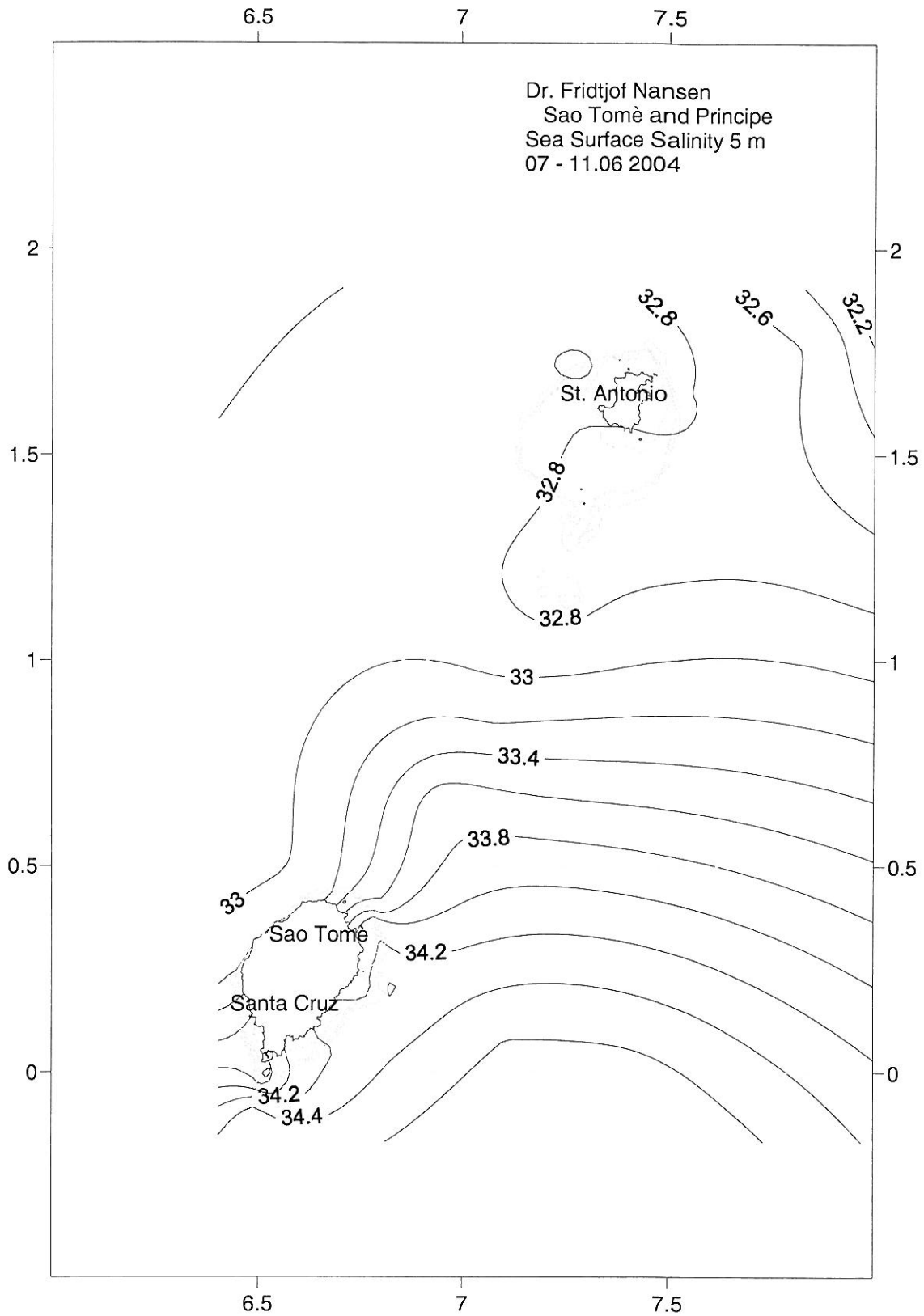


Figure 3.2 Horizontal distribution of surface salinity (5 m depth) at a) Nigeria - Cameroon b) Cameroon – Port Gentil, Gabon and c) São Tomé and Príncipe.

3.2 Vertical sections

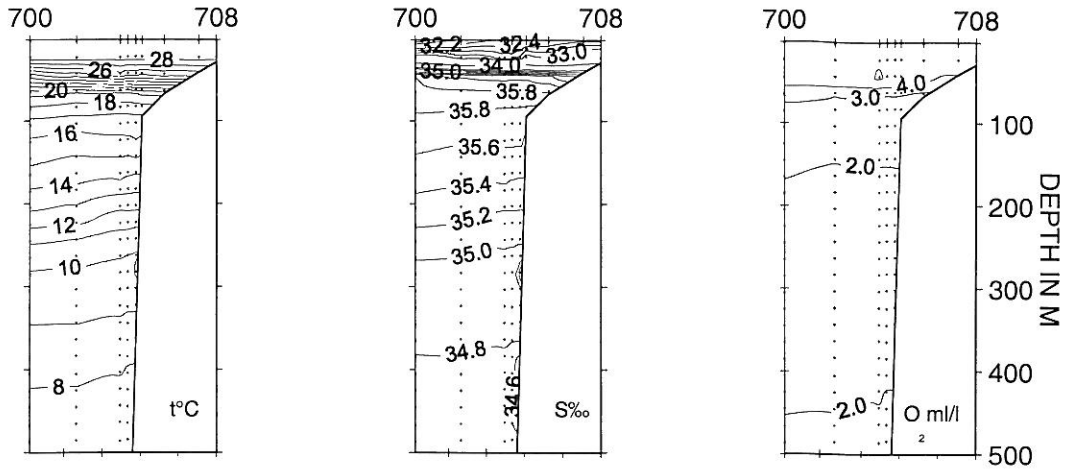
Figures 3.3a-o show the vertical distribution of temperature, salinity and dissolved oxygen as recorded on the hydrographic transects worked during the survey. There were only small differences between the profiles with no signs of upwelling both in Nigeria and Cameroon. The most prominent feature during the survey was a pronounced thermocline and salinocline around 50 m depth in Nigeria, and around 25 m depth further south in Cameroon. The water was well oxygenated throughout the survey area.

Surface temperature was varied around 27-28°C, typically warmer westwards, and inshore. A temperature maximum corresponded with the thermocline at approximately 50 m depth. Likewise the surface salinity was around 30-32 psu and showed great variability due to the large water discharge from the many rivers in the Niger delta and from Wouri river estuary. The salinity showed an increase to the maximum values around 35.9 psu around approximately 50-70 m depth, and thereafter a small decrease towards the bottom. Dissolved oxygen values ranged between 2 ml/l at the bottom and more than 5 ml/l at the surface with a minimum layer around 250 m depth with oxygen values around 1.4 ml/l.

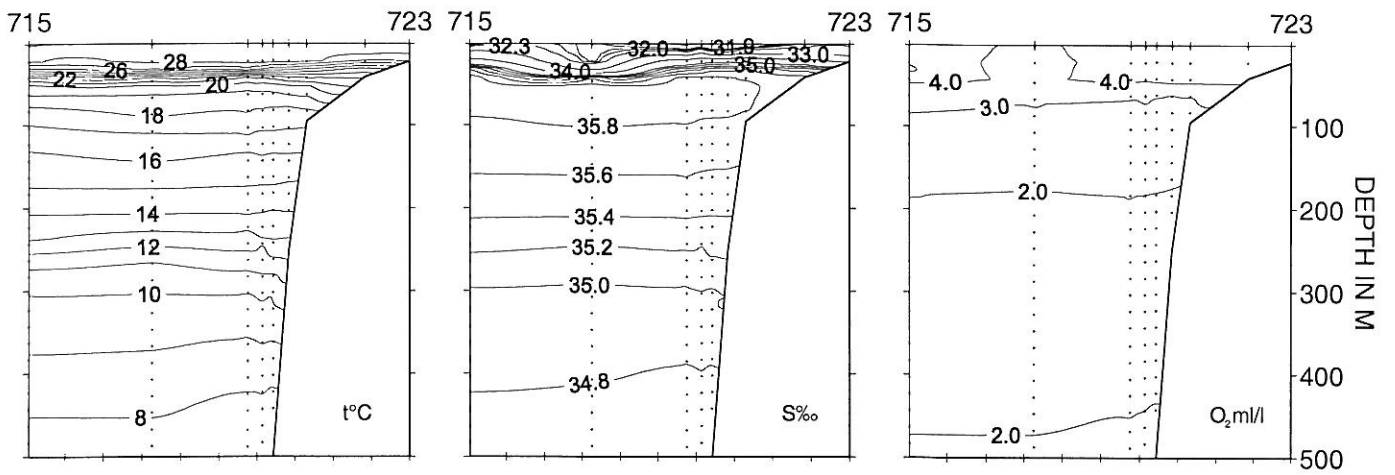
The area of São Tomé and Príncipe showed surface temperatures of 27°C, a pronounced thermocline at 30 m depth with a decrease in water temperature to 19°C, and bottom waters at 500 m around 8°C. The salinity concentrations on the islands differed somewhat from the picture on the mainland because of the lesser influence from river waters. Surface salinities was around 33 psu, the salinocline at 30 m corresponded with the thermocline, and salinity increased here to 36 psu. Bottom salinity values were around 34.8 psu. The oxygen values in the region ranged from approximately 3 ml/l at the surface, an oxygen maximum around 30 m depth with values around 4.5 ml/l, and a sharp decrease to 3.1 ml/l O₂ at 35 m depth. The oxygen was thereafter stable in the deeper stations to around 150 m depth before they continued to drop to the minimum levels of 1.2 ml/l at approximately 300 m depth. The values thereafter increased slightly in deeper waters.

NIGERIA

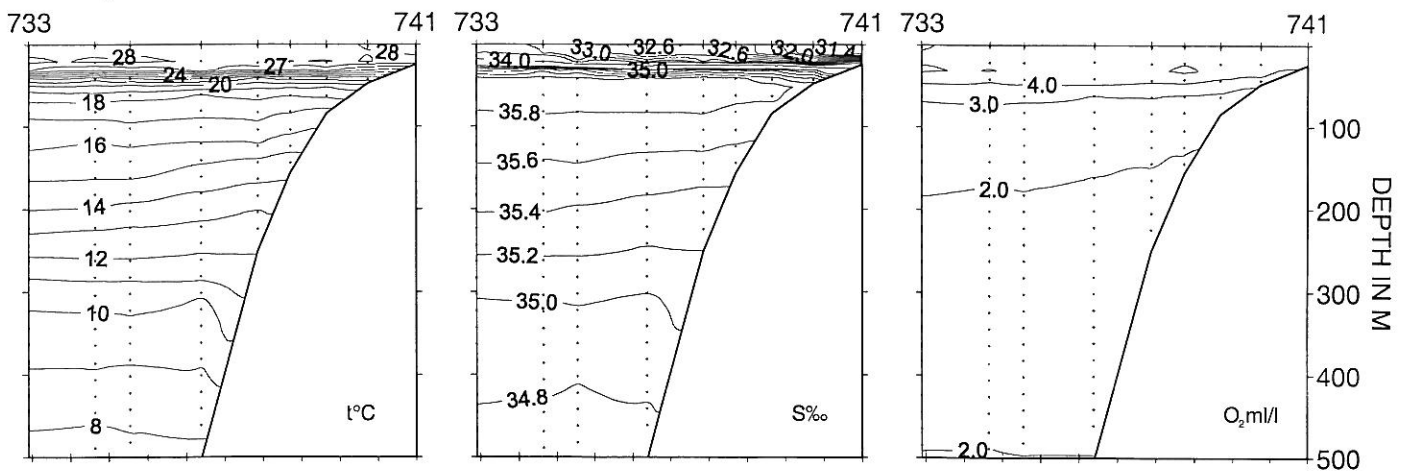
a) Lagos 13/6-04



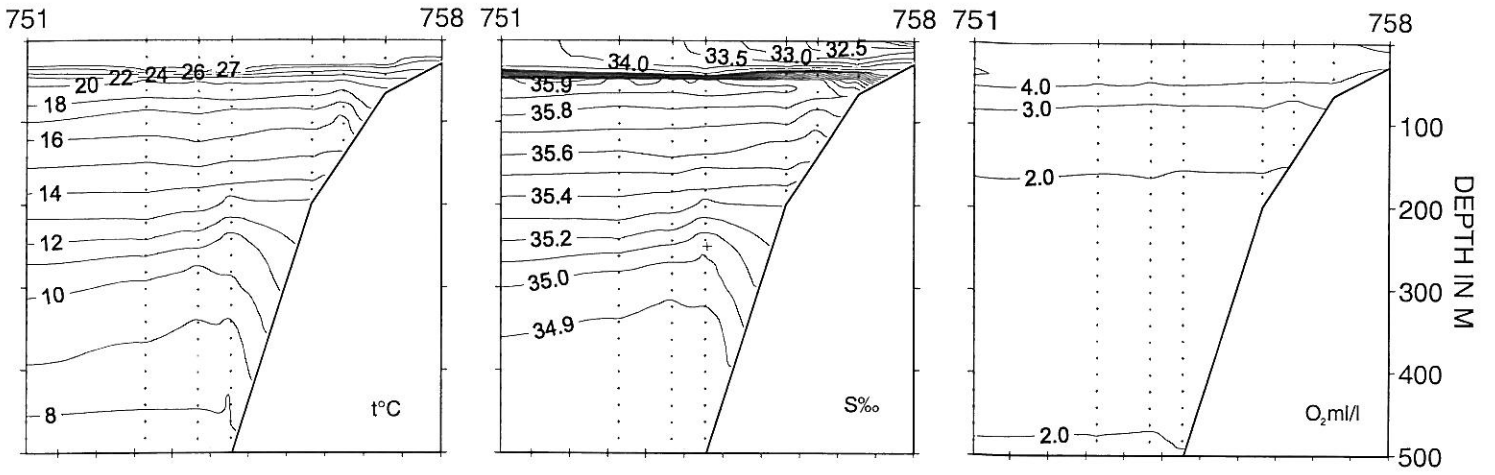
b) Lekki 15/6-04



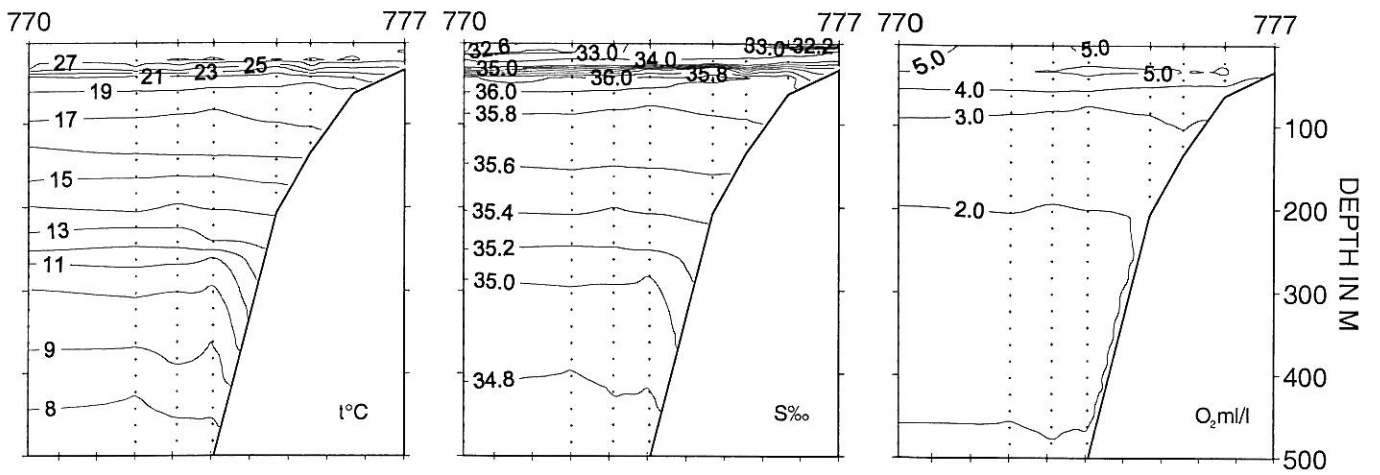
c) Escravos River 17/6-04



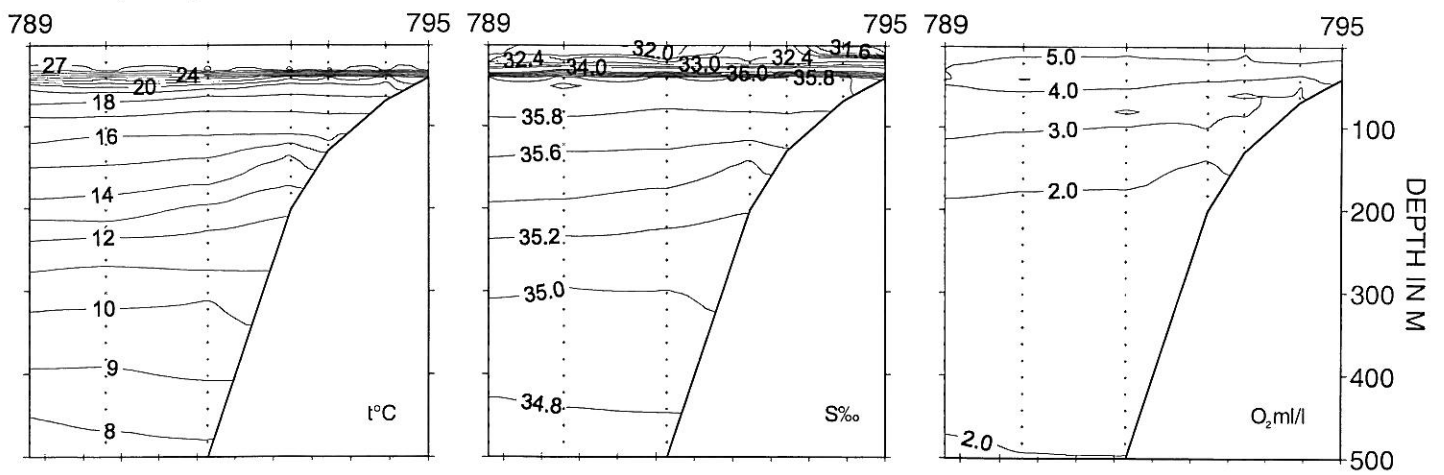
d) Middleton River 19/6-04



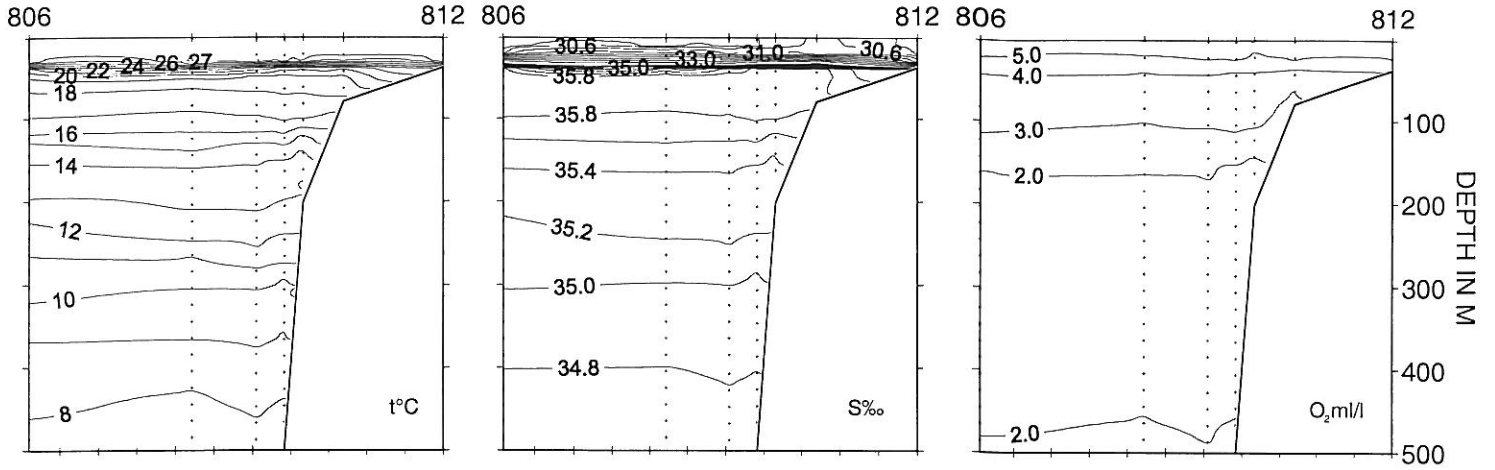
e) Brass River 21/6-04



f) Bonny River 23/6-04

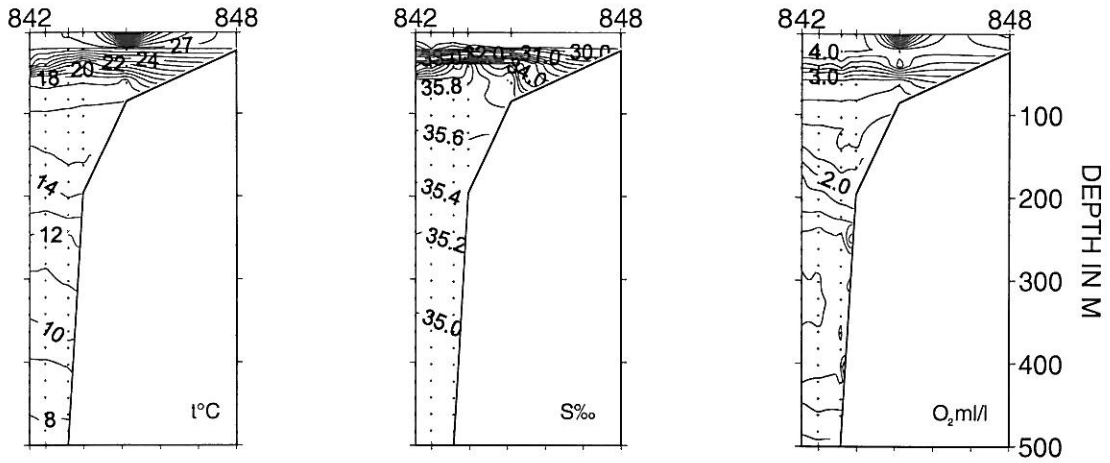


g) Calabar River 25/6-04

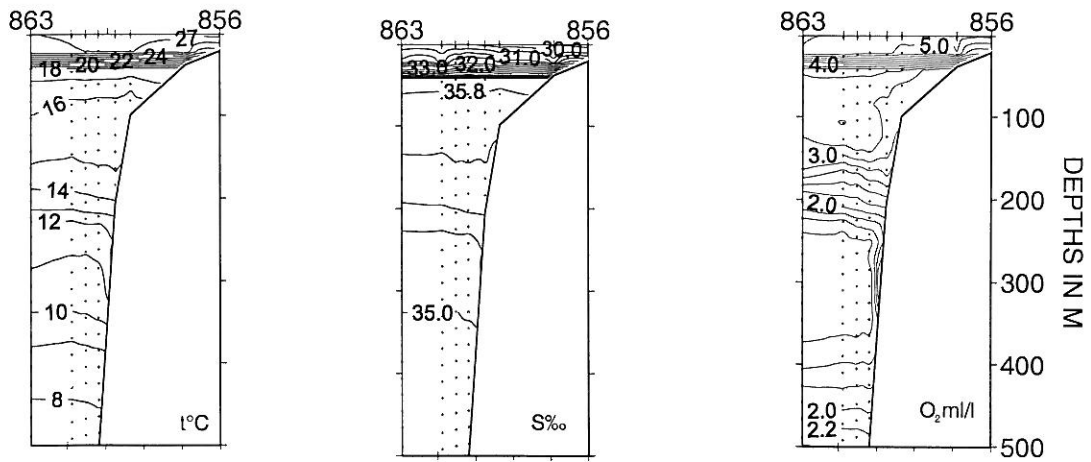


CAMEROON

h) Kribi

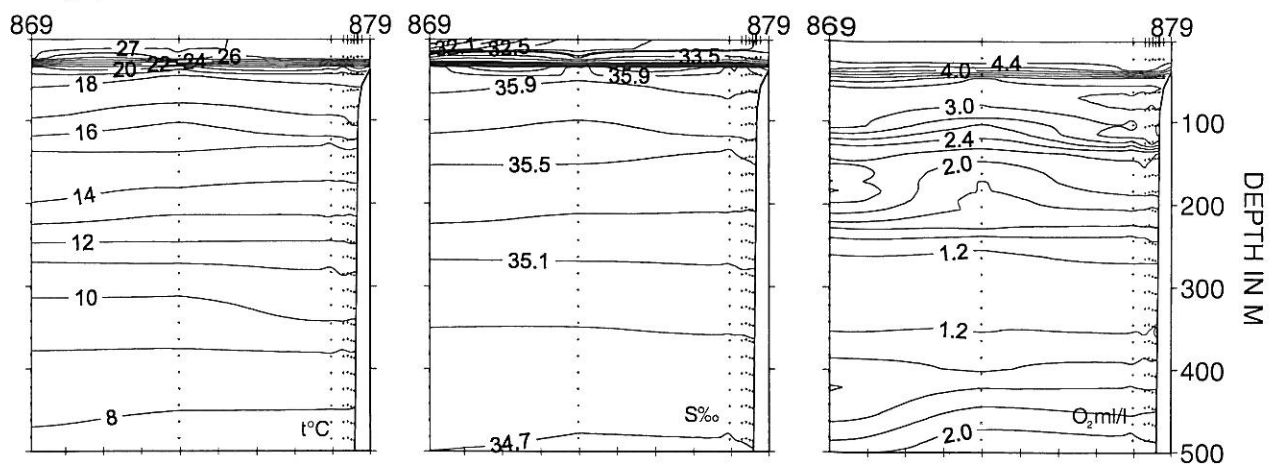


i) Campo River

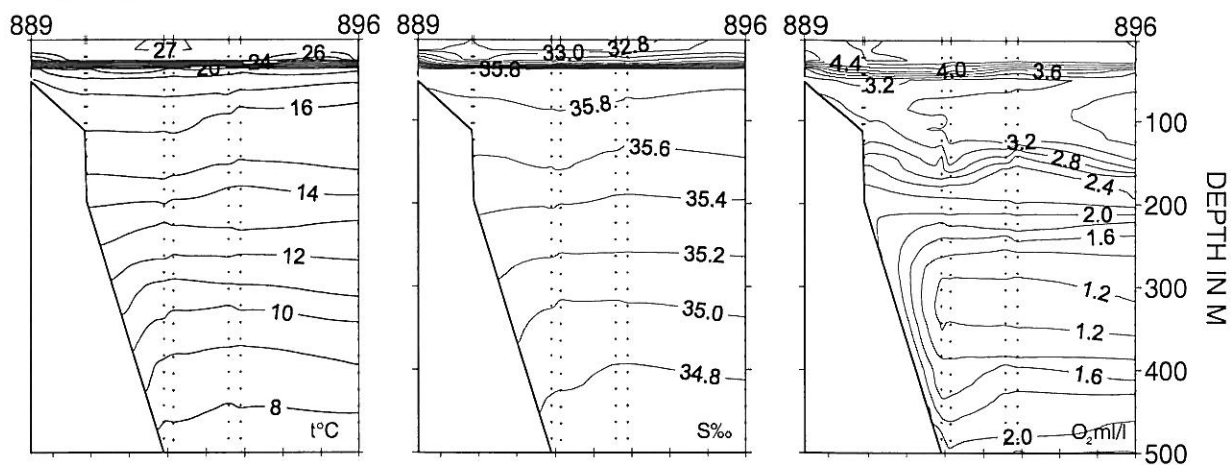


SÃO TOMÉ AND PRINCIPE

j) Príncipe, North

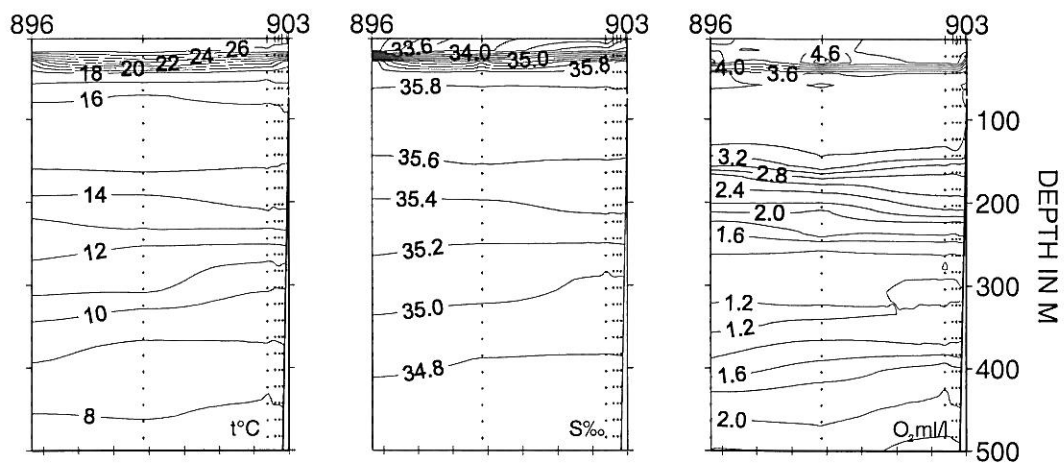


k) Príncipe South

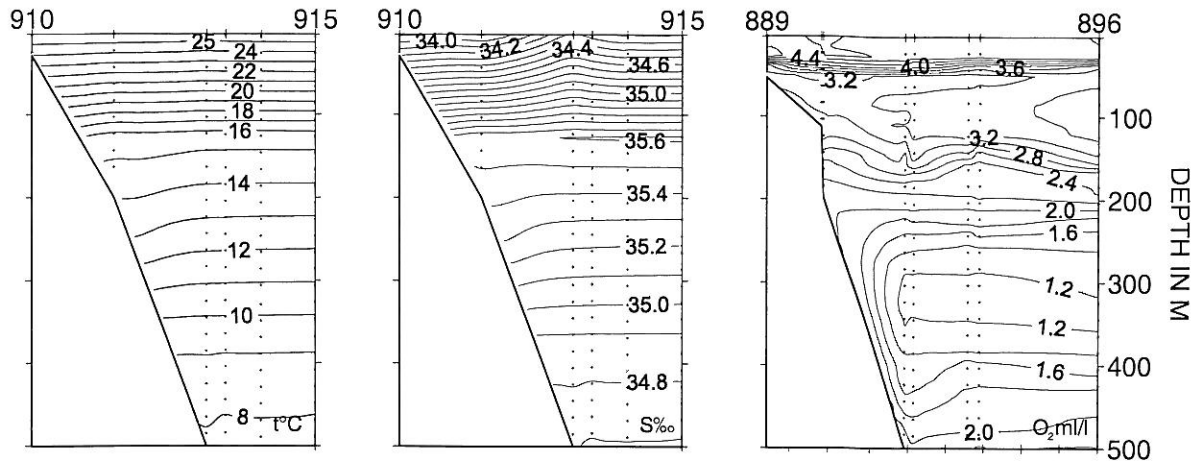


l)

m) São Tomé North



n) São Tomé South



o) São Tomé East

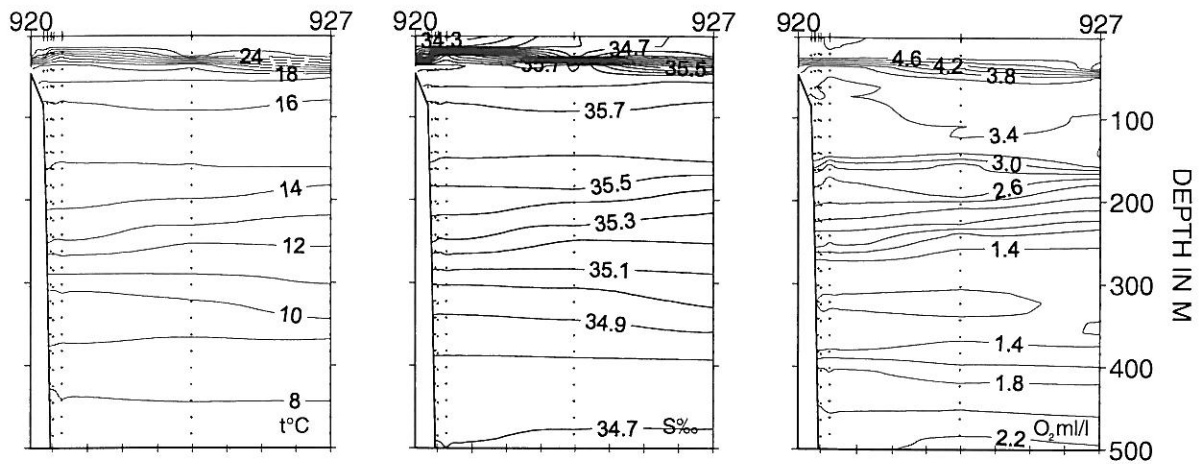


Figure 3.3 Vertical sections of temperature, salinity and oxygen in Nigeria, at a) Lagos, b) Lekki, c) Escravos River, d) Middleton River, e) Brass River, f) Bonny River and g) Calabar River, Cameroon at, h) kribi and i) Campo River, and São Tomé and Príncipe at j) Príncipe North k) Príncipe South l) São Tomé North o) São Tomé North.

CHAPTER 4 RESULTS OF THE ACOUSTIC SURVEY

The distribution area of main groups of pelagic fish in the region, i.e. sardinellas, PEL 1 (Clupeids) and PEL 2 (mainly carangids), are depicted in the following figures using the integrator values from the BEI echo-integration system recorded with the ES38B, 38 kHz transducer connected to the EK500. The acoustic densities (in m^2/NM^2) are illustrated by a scale normally used on acoustic surveys with “Dr. Fridtjof Nansen”.

4.1 Nigeria

The hydro acoustic survey of Nigeria covered the shelf and slope systematically to 200 m bottom depth during the day, and continued offshore of this at night in a less systematic manner. The shelf was surveyed during the day only, and only bottom trawl were used for species identification. Generally low to medium acoustic densities were found over most of the shelf and only plankton was found in the water column from the shelf break and further offshore. The bottom channel was scrutinized continuously to 500 m bottom depth, but with only few fish targets seen offshore from the shelf break. Clear fish targets were however seen at several occasions between 700 and 1200 m (at night), but no bottom trawls were carried out at these depths to verify the targets.

Clupeids

Only few sardinellas were recorded along the coast, mainly in shallow waters. *Sardinella maderensis* dominated the catches while some *S. aurita* were found in deeper waters. No separate biomass estimate was calculated for sardinellas. Length frequencies from the bottom trawl catches can be found in Annex II.

Ilisha africana was taken in some bottom trawl hauls on the shallow part of the shelf. A few low-density schools were allocated to the PEL 1 group, but no estimate of abundance was made.

PEL 2 (carangids, scombrids, barracudas and hairtail)

The species category PEL 2 consisted of carangidae, trichiuridae and sphyraenidae, and scombridae. *Chloroscombrus chrysurus* dominated by weight in the trawl catches followed by *Selene dorsalis*, *Sphyraena guachancho*, *Trichiurus lepturus*, *Decapterus punctatus* and *Scomberomorus tritor*.

Chloroscombrus chrysurus dominated inshore above the thermocline to depths of 50 m, while *Selene dorsalis* had a slightly deeper distribution and were present in trawl catches to 100 m

depth. Outside of this only *Trichiurus lepturus* were present among the pelagic species. Length frequencies of the species can be found in Annex II.

Schools of PEL 2 species, mainly of low density, were found along the whole coastline Figure 4.1. Assuming an average total length of 23 cm for all the species and a measured condition factor of 0.88 the biomass of PEL 2 was estimated to about 193 000 tonnes.

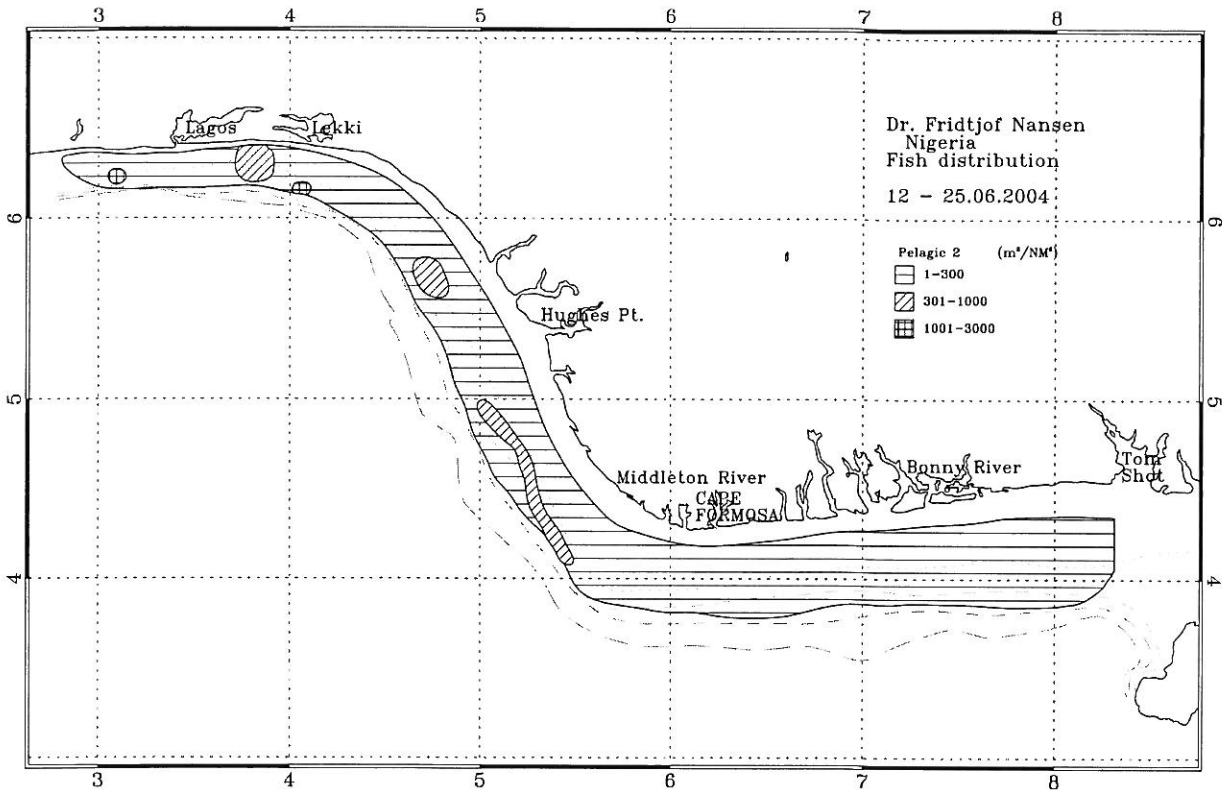


Figure 4.1 Distribution of PEL 2 (Carangids, scombrids, barracudas and hairtail) off Nigeria.

4.2 Equatorial Guinea

The hydro acoustic survey off Equatorial Guinea was interrupted, and no separate biomass estimates were made for this area. No pelagic fish were observed from the trawl stations in the region, but all were deeper than 50 m and no pelagic hauls were made.

4.3 Cameroon

The hydro acoustic survey of Cameroon covered the coast from the border to Equatorial Guinea to 20 m bottom depth. These borders therefore limit the distributions and abundance of pelagic fish. Both sardinella and other clupeids were together with carangids and associated species (PEL 2) found at the inner limit of the survey, with distributions continuing inshore into shallow waters. PEL 2 were also found to extend out of the survey area into the territorial waters of Equatorial Guinea.

Clupeids

Sardinella maderensis was found in three areas along the coast between 20 and 50 m bottom depth, Figure 4.3. The distribution continued inshore of the survey area in shallow waters. The total biomass in Cameroon was estimated to be 11 000 tonnes. 90% of the biomass was < 24 cm. The numbers in millions are shown in Figure 4.2. The figure shows that the majority of the fish were juveniles <10 cm. It may seem like the inner shelf of Cameroon is a nursery area of sardinella. The area is characterized by relatively large salinity and temperature gradients. Besides the juvenile fish, 3 other cohorts are visible in Figure 4.2 with modal peaks of 12, 19 and 22 cm.

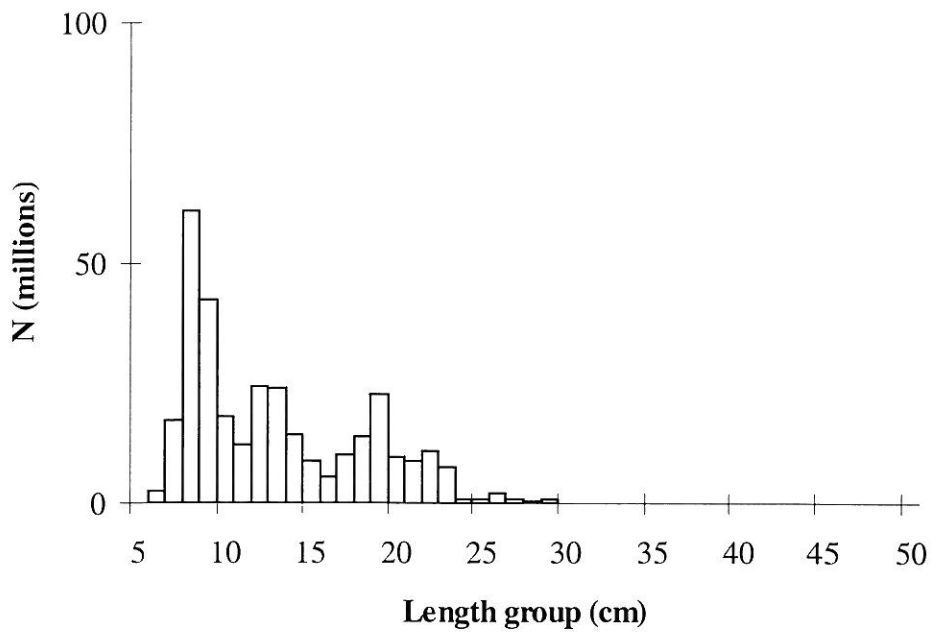


Figure 4.2 The numbers in millions of *Sardinella maderensis* found on the Cameroonian shelf

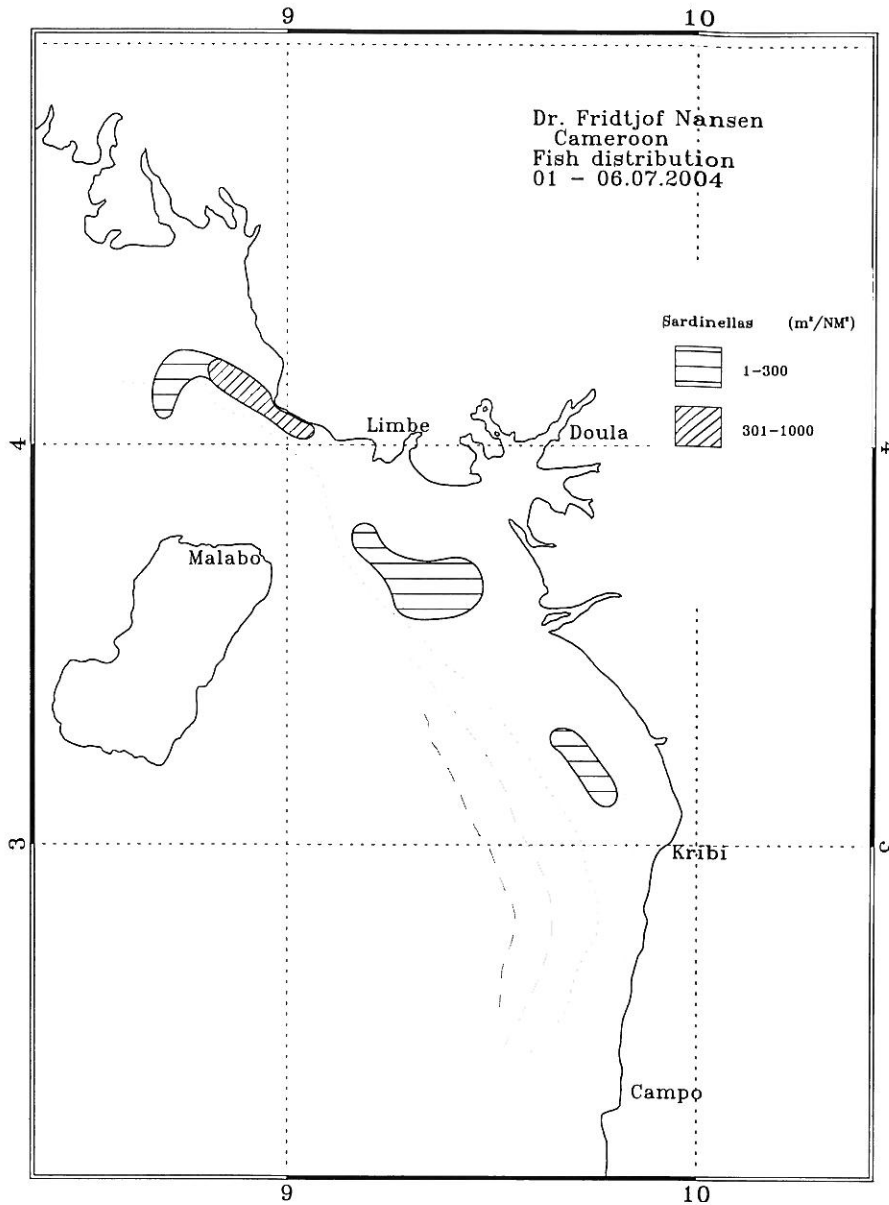


Figure 4.3 Distribution of *Sardinella maderensis* off Cameroon.

The pelagic group, PEL 1 consisted mainly of *Ilisha africana*, Figure 4.4. This species were generally found in the same areas as the Sardinella, between 20 and 50 m depth, with the highest concentrations in the area outside Douala. The total biomass of *Ilisha africana* was 2 000 tonnes. The size range was 5-20 cm with an average length of 12.7 cm.

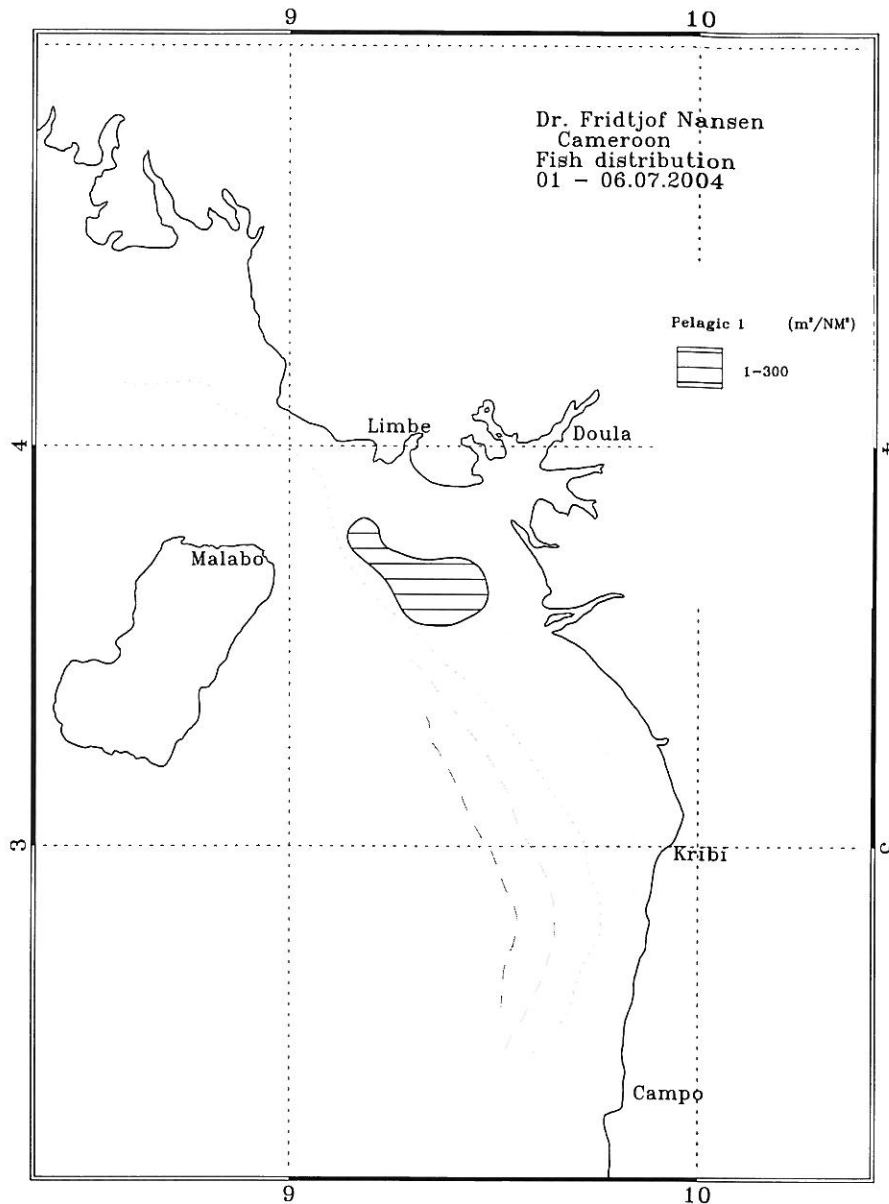


Figure 4.4 Distribution of PEL 1 (Clupeids) off Cameroon

The Pelagic group PEL 2, consisting of carangids, scombrids, barracudas and hairtail. The distribution of these species were almost continues in Cameroon, but with a small break in distribution around the river mouth of Wouri near Douala 4.5. The main distribution extended from inside of the survey area to approximately 50 m depth. The main species in order of abundance in the catches were *Selene dorsalis*, *Trichiurus lepturus*, *Sphyraena guachancho*, *Chloroscombrus chrysurus* and *Scomberomorus tritor*. The length distributions of the species are found in Annex II. Assuming an average total length of 23 cm for all the species and a measured condition factor of 0.88 the biomass of PEL 2 was estimated to about 14 000 tonnes.

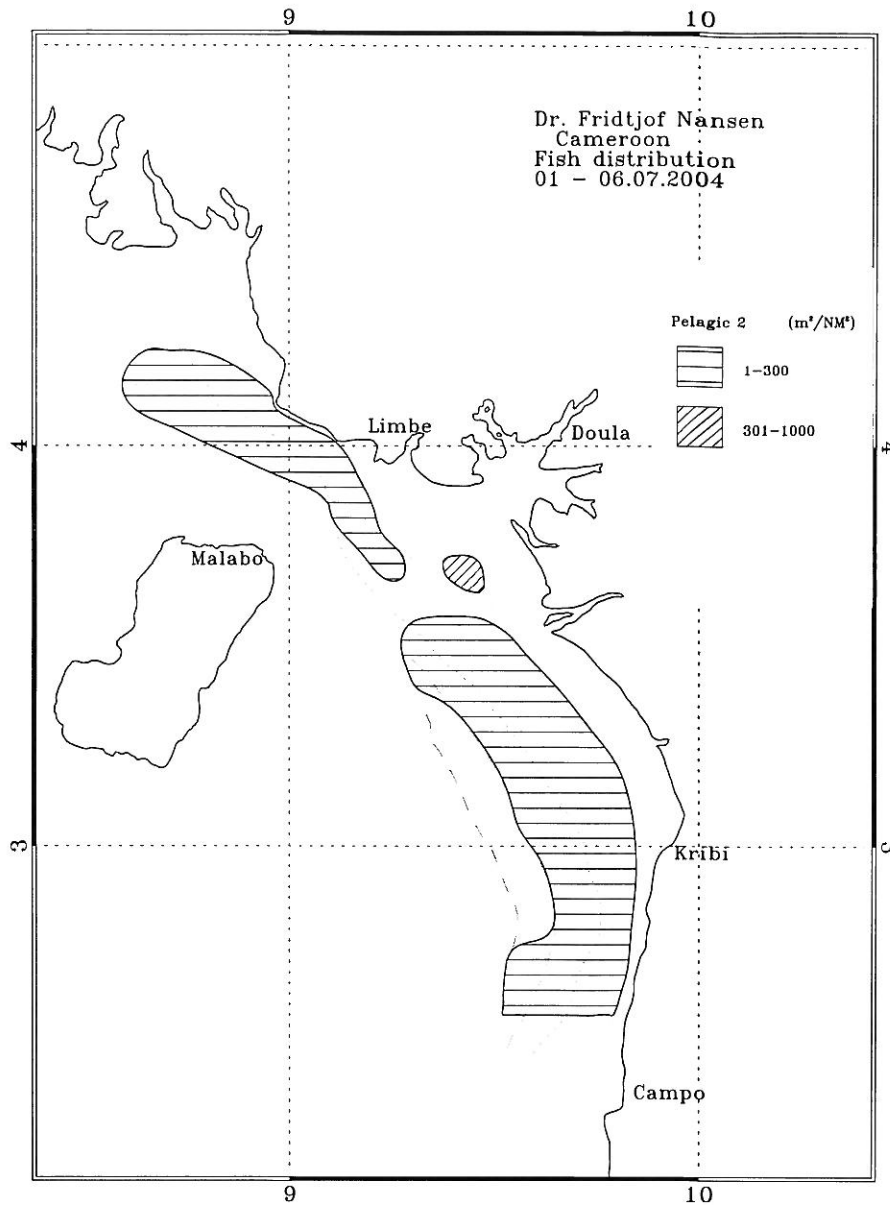


Figure 4.5 Distribution of PEL 2 (Carangids, scombrids, barracudas and hairtail) off Cameroon.

4.4 São Tomé and Príncipe

The hydroacoustic survey of São Tomé and Príncipe revealed little pelagic fish. No estimate of abundance was therefore made for these areas. However, there were consistent acoustic recordings of demersal fish over the whole shelf area, also over untrawlable grounds, which support the findings from the trawl survey that the narrow shelf had relatively high abundance of demersal fish.

4.5 Review of results

No previous pelagic surveys are available for comparisons in the region. Since this survey was the first pelagic hydroacoustic survey covering the region, no comparisons with previous surveys were made. Some general features observed during this survey are commented below.

Pelagic fish were present over large parts of the region. The main densities of pelagic fish were found inshore of 50 m bottom depth, extending inshore into <20 m depth (inshore of the survey area). Oil platforms limited the survey area inshore in Nigeria while this was not a problem in the rest of the survey area.

Most pelagic hauls at night were taken as blind hauls as relatively few schools were seen on the echo sounder during nighttime. This was partly due to a dispersed distribution and partly due to high abundance of plankton that made acoustic detection and separation difficult. During daytime it was sometimes difficult to catch schools of pelagic fish with the trawls. Sardinellas and carangids dominated on the inner shelf, while carangids, scombrids and barracudas were more widely distributed over the entire shelf.

CHAPTER 5 RESULTS FROM THE SWEEP AREA TRAWL SURVEY

The composition of the fish fauna on the continental shelf and slope of the Gulf of Guinea changes with depth (Williams 1968). The catch-distribution analyses were therefore performed for three depth strata on the shelf, 0-50 m (inner shelf) and 51-100 m (outer shelf) and 101-250 m depth. Table 5.1 gives the main species groups with common species in the region. For the different analysis the “other” group includes all species not accounted for in the other groups. Therefore, the content of “other” will change from table to table, but will never include the species listed.

The locations of the trawl stations are shown in Figure 1.1. Records of fishing stations and catches are presented in Annex I and pooled length distributions (weighted by catch) of main species by area are shown in Annex II.

In the swept-area biomass estimates, only the shelf area down to depths of 200 m was included, divided into 0-30 m, 31-50 m 51-100 m and 101-200 m. Mean densities of the main demersal species by depth strata, occurrence and catch distributions are shown in Annex IV.

Table 5.1 Main groups of species included in the analyses of diversity in the eastern Gulf of Guinea

Main Groups	Main Families	Typical Species
Demersal	Sciaenidae	<i>Pentheroscion mbizi</i> <i>Pseudolithus senegalensis</i> <i>Pseudolithus elongatus</i> <i>Pseudolithus typus</i>
	Sparidae	<i>Dentex angolensis</i> <i>Dentex congoensis</i> <i>Pagellus bellottii</i> <i>Pagrus caeruleostictus</i> <i>Boops boops</i>
	*Ariidae	<i>Arius latiscutatus</i>
	Serranidae	<i>Serranus accraensis</i> <i>Epinephelus aeneus</i>
	*Lutjanidae	<i>Lutjanus fulgens</i>
	Polynemidae	<i>Galeoides decadactylus</i>
	Haemulidae (=Pomadasyidae)	<i>Brachydeuterus auritus</i> <i>Pomadasy jubelini</i>
	Ophidiidae	<i>Brotula barbata</i>
	*Lethrinidae	<i>Lethrinus atlanticus</i>

Pelagic	Clupeidae	<i>Sardinella maderensis</i> <i>Sardinella aurita</i> <i>Ilisha africana</i>	
	Carangidae	<i>Selene dorsalis</i> <i>Chloroscombrus chrysurus</i> <i>Decapterus punctatus</i> <i>Selar crumenophthalmus</i> <i>Caranx hippos</i> <i>Caranx crysos</i> <i>Alectis alexandrinus</i>	
	Scombridae	<i>Scomberomorus tritor</i>	
	Trichiuridae	<i>Trichiurus lepturus</i>	
	Sphyrnaeidae	<i>Sphyrnaea guachancho</i>	
Shrimps		<i>Parapenaeus longirostris</i> <i>Penaeus notialis</i>	
Cephalopods		<i>Sepia officinalis hierredda</i> <i>Illex coindetii</i> <i>Alloteuthis africana</i> <i>Sepiella ornata</i> <i>Octopus vulgaris</i>	
	Sharks and Rays	<i>Raja miraletus</i> <i>Squatina oculata</i> <i>Mustelus mustelus</i>	
	Others	Priacanthidae	<i>Priacanthus arenatus</i>
		Citharidae	<i>Citharus linguatula</i>
Platycephalidae		<i>Grammoplites grueli</i>	
Synodontidae		<i>Saurida brasiliensis</i>	
Triglidae		<i>Lepidotrigla cadmani</i> <i>Lepidotrigla carolae</i>	
		Bothidae	<i>Syacium micrurum</i>
Ariommatidae		<i>Ariomma bondi</i>	
Tetraodontidae		<i>Lagocephalus laevigatus</i>	
Uranoscopidae		<i>Uranoscopus albesca</i>	
Mullidae		<i>Pseudupeneus prayensis</i>	
Fistulariidae		<i>Fistularia petimba</i>	
Cynoglossidae		<i>Cynoglossus canariensis</i>	
Drepanidae		<i>Drepane africana</i>	

* Not included in the swept area estimate because of low abundance

5.1 Nigeria

A total of 74 swept-area trawl hauls were made on the Nigerian shelf. Several trawl hauls were aborted early at depths >100 m due to muddy bottom. However because this is a first attempt to map the fish distributions of Nigeria these bottom trawls were included in the analyses if the trawl stayed more than 10 min on the bottom. Table 5.2 a, b and c show catch rates by main groups for the inner (0-50 m), mid (51-100 m) and outer shelf and slope (101-250 m) shelf, respectively. Catch rates in general were low with average catches around 185 kg/h on the inner shelf, 193 kg on the mid shelf and 435 kg on the outer shelf.

The pelagic group contributed 64 % of the total catch and an average catch of 119 kg/h on the inner shelf, < 50 m depth, while the demersal group accounted for 19 % of the catch. The catch composition changed at the mid shelf between 50-100 m depth. Demersal and pelagic species contributed 27 and 28% or 52 and 54 kg/h respectively while cephalopods accounted for 13 % of the total catch. The demersal group contributed 24%, or 103 kg/h on the outer shelf and slope between 100-150 m, note one station at 250 m while the 'other' group were dominant with 60% of the catch. The main part of the catch in this group consisted of *Ariomma bondi*, which was the second most common species, after *Chloroscombrus chrysurus*.

Shrimps, and especially the introduced *Penaeus monodon* together with *Penaeus notialis* and *Penaeus kerathurus* are important commercial and highly valuable species in Nigeria. The catches of these species were all inside of 50 m depth, with increasing concentrations inside of 30 m.

The cephalopods, and especially *Sepia officinalis hierredda* were present at all depths but most dominant on the outer shelf between 50-100 m with catch rates around 25 kg/h.

Sharks and rays were also present across the shelf but more dominant on the outer shelf.

The length frequencies of all main species together with the main length – weight parameters are shown in Annex II and III.

Table 5.2 Nigeria. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m) and c) outer shelf and slope (101-250).

a) Inner shelf, 0-50 m								
ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
543	38	16.0	40.5	3.0	1.3	0.0	28.8	89.6
544	23	16.8	24.1	10.5	0.0	0.0	39.0	90.3
545	25	19.8	61.7	0.4	1.5	0.0	51.1	134.4
546	38	49.1	74.5	1.7	2.2	0.9	33.3	161.7
549	41	94.1	1 325.5	3.1	82.2	0.0	124.4	1 629.3
550	30	14.2	29.9	1.4	1.5	0.0	21.3	68.4
554	25	0.9	21.5	0.0	0.9	0.0	9.5	32.9
555	19	23.4	79.5	7.8	1.5	0.0	31.6	143.9
556	37	13.9	82.9	3.0	3.1	0.0	43.1	146.0
558	42	26.9	29.9	2.4	10.2	0.0	20.9	90.4
559	25	50.3	1 150.4	0.6	0.0	0.0	18.9	1 220.3
560	25	53.9	160.3	8.4	5.9	0.0	41.0	269.5
561	44	21.4	30.5	0.7	2.2	0.0	4.7	59.5
565	39	102.9	27.3	1.9	10.8	0.0	33.0	175.9
566	28	50.0	209.8	0.5	0.5	0.0	9.0	269.7
571	47	110.1	1.1	2.6	38.8	0.0	8.7	161.3
572	26	10.7	155.0	2.5	3.1	0.0	14.5	185.8
573	41	37.6	20.0	18.1	11.6	0.0	34.3	121.7
577	42	40.5	45.9	4.1	3.3	0.0	6.3	100.1
578	40	74.5	52.8	0.4	2.7	0.0	5.8	136.2
584	30	17.9	19.5	0.9	0.0	0.0	25.2	63.5
585	33	2.6	31.1	0.0	1.5	0.0	21.3	56.6
590	36	4.9	24.7	0.0	8.2	0.0	17.5	55.4
591	25	15.8	103.9	0.5	1.4	4.3	8.1	134.0
592	22	112.0	89.4	0.3	1.0	3.2	26.8	232.6
593	39	33.7	16.3	0.0	1.1	0.0	12.4	63.5
596	35	3.7	38.1	0.0	3.0	0.0	8.7	53.4
597	30	23.4	90.6	0.1	1.2	0.0	6.0	121.4
598	48	4.7	0.8	0.1	21.6	4.7	2.8	34.7
602	40	6.3	25.0	0.0	2.0	0.0	2.7	36.0
603	41	31.9	40.3	0.3	2.2	0.0	2.1	76.9
607	41	4.2	0.3	0.5	7.2	0.0	4.9	17.0
611	34	8.3	44.0	0.2	0.5	0.0	15.7	68.7
612	23	9.7	44.5	0.3	1.7	0.0	42.0	98.2
613	47	79.1	61.4	8.7	3.3	0.0	15.3	167.8
616	41	48.1	26.5	0.7	2.2	0.0	13.7	91.2
MEAN	34	34.3	118.9	2.4	6.7	0.4	22.3	184.9
% Catch		18.5	64.3	1.3	3.6	0.2	12.1	100.0

b) Mid shelf, 51-100 m

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
542	65	74.8	194.1	0.2	28.2	12.9	102.9	413.1
547	55	187.9	746.3	3.7	13.8	0.0	112.1	1063.8
548	67	78.2	43.8	8.5	68.7	0.0	35.9	235.0
553	77	161.2	15.1	0.0	48.0	8.2	81.2	313.7
557 ¹	98	40.5	4.5	0.5	51.9	0.0	117.3	214.8
562	86	51.0	33.2	0.9	13.1	9.5	119.0	226.7
564	62	240.8	223.5	2.8	29.4	5.4	54.4	556.3
567	71	15.4	2.0	1.5	41.4	16.9	64.1	141.2
570	82	4.3	0.2	0.5	17.0	9.2	51.4	82.6
574	61	45.7	0.8	2.0	20.7	8.1	51.3	128.6
576	69	22.4	0.2	0.5	26.9	0.0	30.6	80.5
579	62	7.3	4.4	1.8	4.4	7.7	19.4	45.1
580	90	47.1	0.0	0.0	29.3	6.7	108.2	191.3
582	66	28.0	10.7	0.3	15.1	4.3	11.3	69.7
586	58	5.8	25.8	0.0	4.4	9.1	18.8	63.9
587	92	51.1	4.6	1.0	45.7	4.6	60.4	167.3
589	66	8.5	4.4	0.0	39.0	11.4	16.1	79.3
595	64	9.7	0.6	0.1	38.9	0.0	37.9	87.2
599	81	3.0	2.7	0.0	18.1	27.6	28.0	79.4
601	77	10.9	1.5	1.1	20.2	8.0	29.4	71.0
604	65	33.2	3.6	1.0	10.4	0.0	10.6	58.8
606	69	24.9	8.8	0.1	5.5	0.0	21.7	61.1
608	90	8.4	6.5	0.3	17.9	4.6	79.7	117.4
614	65	101.4	1.4	0.7	6.9	2.7	69.1	182.3
615	83	44.7	4.3	0.0	1.4	0.0	48.9	99.3
MEAN	73	52.3	53.7	1.1	24.7	6.3	55.2	193.2
% Catch		27.0	27.8	0.6	12.8	3.2	28.6	100.0

1. Trawl time <10 min. Not included in swept area analyses.

c) Outer shelf and slope, 101-250 m

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
551	111	766.0	27.1	0.0	15.8	3.5	135.5	947.9
552 ²	251	66.3	0.0	86.9	30.7	0.0	996.1	1180.0
563	112	76.4	3.3	2.3	17.9	0.0	223.9	323.8
568	107	21.8	3.8	0.0	283.3	86.4	344.9	740.2
569 ¹	152	34.0	16.8	1.6	57.2	0.0	395.7	505.3
575	106	76.4	0.0	0.0	21.7	4.3	204.6	307.0
581 ¹	142	48.2	1.6	1.0	41.5	0.0	201.5	293.8
588 ¹	119	94.8	2.1	0.0	70.6	43.7	273.9	485.1
594	149	6.2	3.4	0.2	4.4	6.0	198.5	218.7
600	136	10.3	0.6	0.2	7.3	18.6	90.5	127.5
605	126	48.6	8.2	0.0	7.2	0.0	43.2	107.2
609	135	15.6	0.8	0.0	9.3	3.2	82.6	111.5
610 ¹	135	74.4	0.3	0.4	23.2	0.0	213.0	311.3
MEAN	114	103.0	5.2	7.1	45.4	12.8	261.8	435.3
% Catch		23.7	1.2	1.6	10.4	2.9	60.1	100.0

1. Trawl time <10 min. Not included in swept area analyses. 2. >200 m. Not included in swept area analyses

Table 5.3 a and b show the catch rates of the main pelagic families caught in the bottom trawl. The dominant species at the inner shelf were carangids dominated by *Chloroscombrus chrysurus* and *Selene dorsalis*, with average catch rate of about 78 kg/h, constituting 42% of the total catch. Barracudas, mainly *Sphyræna guachancho*, were second and contributed about 9% to the total, while hairtails (*Trichiurus lepturus*) were less abundant and contributed 6%. The clupeid species that dominates the shallow water pelagic ecosystems in large parts of western Africa were also less common on the inner shelf of Nigeria. Those that occurred most frequently were *Sardinella maderensis* and *Ilisha africana*. In total these species contributed 4% of the total catch.

The total catch rate of pelagic species was lower at the mid shelf than at the coast. Carangids were most abundant, and contributed 44 kg/h to the total catch, or 23%. *Selene dorsalis* had its highest abundance at these depths while *Chloroscombrus chrysurus* were not seen at these depths at all. In addition to *S. dorsalis*, *Decapterus punctatus* were the second most abundant carangid at these depths. Barracudas, clupeids and hairtails were all present at these depths, but in small quantities. Scombrids were only present in one station.

Table 5.3 Nigeria. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m) and c) outer shelf and slope (101-250).

a) Inner shelf, 0-50 m

ST.NO.	DEP.	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
543	38	0.6	12.4	0.9	0.8	25.8	49.1	89.6
544	23	3.4	6.4	0.0	7.9	6.5	66.2	90.3
545	25	30.9	15.2	0.3	13.7	1.7	72.7	134.4
546	38	12.3	25.0	2.4	16.1	18.8	87.2	161.7
549	41	29.6	1035.8	7.8	80.6	171.6	303.8	1629.3
550	30	6.6	7.0	2.7	6.8	6.9	38.4	68.4
554	25	0.6	11.5	5.8	0.0	3.6	11.3	32.9
555	19	5.1	17.0	7.7	47.3	2.5	64.3	143.9
556	37	12.6	27.4	6.1	18.9	18.0	63.1	146.0
558	42	0.5	18.7	4.3	1.6	4.7	60.4	90.4
559	25	24.8	910.2	15.6	57.0	142.8	69.9	1220.3
560	25	9.3	93.8	12.9	3.2	41.1	109.2	269.5
561	44	7.2	11.4	0.8	0.2	10.9	29.0	59.5
565	39	0.1	18.4	2.1	0.2	6.6	148.6	175.9
566	28	2.8	136.4	1.4	0.1	69.2	60.0	269.7
571	47	0.0	0.1	0.0	0.4	0.5	160.2	161.3
572	26	25.9	53.4	11.3	57.9	6.4	30.8	185.8
573	41	0.3	4.4	0.0	3.4	11.9	101.6	121.7
577	42	1.3	15.5	0.0	24.7	4.4	54.2	100.1
578	40	0.6	38.4	9.5	2.0	2.3	83.4	136.2
584	30	0.8	5.7	6.4	3.4	3.1	44.0	63.5
585	33	0.0	16.1	4.7	0.0	10.3	25.4	56.6
590	36	0.0	16.2	3.1	0.0	5.5	30.6	55.4
591	25	3.4	37.6	6.1	55.0	1.7	30.2	134.0
592	22	69.3	7.1	7.2	3.8	2.0	143.2	232.6
593	39	1.0	2.1	1.2	0.2	11.8	47.2	63.5
596	35	1.7	36.4	0.0	0.0	0.0	15.4	53.4
597	30	1.6	84.6	0.2	0.0	4.1	30.8	121.4
598	48	0.0	0.8	0.0	0.0	0.0	33.9	34.7
602	40	0.9	16.5	7.5	0.0	0.0	11.0	36.0
603	41	0.7	38.1	0.6	0.0	0.9	36.5	76.9
607	41	0.0	0.3	0.0	0.0	0.0	16.8	17.0
611	34	5.1	9.4	17.3	1.6	10.7	24.7	68.7
612	23	1.3	23.1	14.1	3.6	2.4	53.7	98.2
613	47	0.1	58.1	0.0	1.5	1.6	106.4	167.8
616	41	1.6	3.8	0.0	9.5	11.7	64.7	91.2
MEAN	36	7.3	78.2	4.5	11.7	17.3	66.1	184.9
% Catch		3.9	42.3	2.4	6.3	9.3	35.7	100.0

b) Mid shelf, 51-100 m

ST.NO.	DEP.	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
542	65	40.1	148.2	0.0	0.0	5.8	219.0	413.1
547	55	3.6	671.9	6.8	24.8	39.3	317.5	1 063.8
548	67	0.0	0.2	0.0	38.3	5.4	191.2	235.0
553	77	0.0	0.0	0.0	0.0	15.1	298.6	313.7
557	98	0.0	0.0	0.0	2.0	2.6	210.3	214.8
562	86	27.2	0.0	0.0	1.8	4.1	193.5	226.7
564	62	0.0	211.8	0.0	0.0	11.7	332.8	556.3
567	71	0.0	1.0	0.0	0.3	0.6	139.2	141.2
570	82	0.0	0.0	0.0	0.2	0.0	82.4	82.6
574	61	0.0	0.6	0.0	0.0	0.3	127.8	128.6
576	69	0.0	0.0	0.0	0.0	0.2	80.3	80.5
579	62	0.0	3.7	0.0	0.8	0.0	40.7	45.1
580	90	0.0	0.0	0.0	0.0	0.0	191.3	191.3
582	66	0.0	10.7	0.0	0.0	0.0	59.0	69.7
586	58	0.0	23.4	0.0	0.0	2.4	38.1	63.9
587	92	0.0	1.3	0.0	3.3	0.0	162.7	167.3
589	66	0.2	4.0	0.0	0.1	0.0	74.9	79.3
595	64	0.0	0.6	0.0	0.0	0.0	86.6	87.2
599	81	0.0	0.0	0.0	2.7	0.0	76.7	79.4
601	77	0.0	0.0	0.0	1.5	0.0	69.5	71.0
604	65	0.0	3.0	0.0	0.6	0.0	55.2	58.8
606	69	0.0	0.9	0.0	7.9	0.0	52.3	61.1
608	90	1.9	1.4	0.0	1.5	1.8	110.9	117.4
614	65	0.4	0.1	0.0	0.0	1.0	180.8	182.3
615	83	0.5	3.8	0.0	0.0	0.0	95.0	99.3
MEAN	72.8	3.0	43.5	0.3	3.4	3.6	139.5	193.2
% Catch		1.5	22.5	0.1	1.8	1.9	72.2	

Very few pelagic species were present at the outer shelf and slope, no clupeids, carangids or scombrids were present at these depths except at one station, st. 551, where some *Sardinella aurita* and *Scomberomorus tritor* probably were caught in the net on the way up. *Trichiurus lepturus* was present at some stations, but catch rates were low, 3.1 kg/h. The table is not shown. A striking feature is the absence of *Trachurus trecae* which otherwise is abundant on the outer shelf between Angola to Mauritania.

Table 5.4 Nigeria. Catch rates (kg/h) of valuable demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m) and c) outer shelf and slope (101-250).

a) Inner shelf, 0-50 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
543	38	0.0	0.0	0.1	2.8	13.1	73.6	89.6
544	23	0.0	3.0	0.0	5.3	8.5	73.6	90.3
545	25	3.3	0.0	0.0	10.9	5.6	114.7	134.4
546	38	0.0	0.0	0.0	19.4	28.6	113.8	161.7
549	41	0.0	0.0	0.0	34.3	59.8	1 535.1	1 629.3
550	30	0.0	0.0	0.0	7.6	6.3	54.5	68.4
554	25	0.0	0.0	0.0	0.5	0.0	32.4	32.9
555	19	0.0	0.0	0.0	2.0	21.4	120.5	143.9
556	37	0.0	0.0	0.4	9.9	3.7	132.1	146.0
558	42	4.3	0.0	1.2	21.4	0.0	63.5	90.4
559	25	0.0	0.0	0.0	33.8	16.5	1 169.9	1 220.3
560	25	0.0	0.0	0.0	0.3	53.6	215.6	269.5
561	44	5.5	0.0	0.0	15.6	0.2	38.1	59.5
565	39	0.0	0.0	0.2	102.6	0.1	73.0	175.9
566	28	0.0	0.0	0.0	49.4	0.6	219.7	269.7
571	47	0.0	0.0	0.3	109.8	0.0	51.2	161.3
572	26	0.0	0.0	0.0	2.0	8.7	175.1	185.8
573	41	0.0	0.0	0.5	30.2	7.0	84.0	121.7
577	42	0.0	0.0	0.3	36.1	3.5	60.3	100.1
578	40	0.0	0.0	0.0	74.5	0.0	61.7	136.2
584	30	0.0	0.0	0.2	13.9	3.7	45.6	63.5
585	33	2.5	0.0	0.0	0.1	0.0	53.9	56.6
590	36	1.4	0.0	0.0	3.4	0.0	50.5	55.4
591	25	0.0	0.0	0.0	4.5	12.6	118.2	135.2
592	22	0.0	0.0	3.3	0.8	107.8	120.7	232.6
593	39	0.0	0.0	0.0	33.5	0.2	29.9	63.5
596	35	2.5	0.0	1.3	0.0	0.0	49.7	53.4
597	30	1.4	0.0	0.0	22.0	0.0	98.0	121.4
598	48	1.8	0.0	1.1	1.8	0.0	30.0	34.7
602	40	0.5	0.0	0.0	5.8	0.0	29.7	36.0
603	41	0.0	0.0	0.5	31.4	0.0	45.0	76.9
607	41	0.0	0.0	0.0	4.1	0.0	12.9	17.0
611	34	0.0	0.0	0.3	7.8	0.2	60.4	68.7
612	23	0.0	0.0	0.0	9.0	0.7	88.5	98.2
613	47	0.0	0.0	1.5	72.0	5.6	88.7	167.8
616	41	0.2	0.0	0.0	41.0	7.0	43.1	91.2
MEAN	34.4	0.7	0.1	0.3	22.8	10.4	150.8	185.0
% Catch		0.4	0.0	0.2	12.3	5.6	81.5	100.0

Catch rates of the commercially most important demersal fish groups on the shelf are presented in Table 5.4 a, b and c. The catch rates were in general low on the inner shelf. Seabreams, snappers and groupers were only present in very low numbers. These groups together contributed only 0.6% of the total catch in this area. Grunts, mainly *Brachydeuterus auritus*, but also some *Pomadasys jubelini* gave average catches of 23 kg/h, or 12.3% of the total catches in the area, while croakers, Croakers (10,4 kg/h, or 5.6% of the total) were the second most important group, with *Pseudotolithus senegalensis* and *Pseudotolithus typus* as the most common species.

b) Mid shelf, 51-100 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
542	65	50.5	0.0	7.4	15.5	0.0	339.7	413.1
547	55	0.0	0.0	1.2	181.2	4.6	876.8	1 063.8
548	67	14.7	0.0	14.2	47.6	1.0	157.6	235.0
553	77	134.1	0.0	12.2	4.3	0.0	163.1	313.7
557	98	37.9	0.0	1.7	0.0	0.0	175.2	214.8
562	86	12.9	0.0	0.5	0.8	34.1	178.4	226.7
564	62	4.0	0.0	19.8	212.5	4.5	315.5	556.3
567	71	1.6	0.0	3.8	2.1	7.2	126.5	141.2
570	82	3.0	0.0	0.5	0.0	0.8	78.3	82.6
574	61	0.0	0.0	4.3	39.4	2.1	82.9	128.6
576	69	0.3	0.0	3.7	17.8	0.5	58.1	80.5
579	62	0.0	0.0	0.9	6.4	0.0	37.8	45.1
580	90	8.0	0.0	36.4	0.0	2.6	144.3	191.3
582	66	0.7	0.0	0.4	26.9	0.0	41.6	69.7
586	58	0.8	0.0	0.7	4.2	0.0	58.2	63.9
587	92	16.3	0.0	28.9	0.0	0.5	121.7	167.3
589	66	5.8	0.0	2.3	0.1	0.0	71.1	79.3
595	64	6.4	0.0	3.3	0.0	0.0	77.4	87.2
599	81	1.7	0.0	0.8	0.0	0.5	76.4	79.4
601	77	5.8	0.0	0.5	0.0	4.5	60.3	71.0
604	65	0.0	0.0	1.0	30.0	2.0	25.7	58.8
606	69	0.0	0.0	0.6	22.0	2.3	36.2	61.1
608	90	5.9	0.0	1.2	0.0	0.5	109.8	117.4
614	65	0.7	0.0	2.3	98.0	0.0	81.2	182.3
615	83	42.9	0.0	0.0	0.0	0.0	56.4	99.3
MEAN	72.8	14.2	0.0	6.0	28.4	2.7	142.0	193.2
% Catch		7.3	0.0	3.1	14.7	1.4	73.5	100.0

Grunts, and especially *Brachydeuterus auritus* was abundant on the mid shelf, and together with the less abundant *Pomadasys jubelini*, this group gave 28.4 kg/h, or 14.7% of the total

catch, with increasing catches in deeper waters. The second most important demersal group on the mid shelf was the seabreams, mainly *Dentex congoensis*, *D. angolensis* and some few *Boops boops*, who together had average catches of 14.2 kg/h, or 7.3% of the total catch. Less abundant, but the third most important group was the groupers with average catches of 6 kg/h or 3.1% of the total. Croakers gave low catches, 1.4% of the total while no snappers were found.

On the outer shelf and shelf break, seabreams dominated the important demersal species with a relative contribution of 14 % and an average catch rate of 61 kg/h. *Dentex congoensis* and *D. angolensis* were also at these depths the most important species while other commonly occurring species like *Pagellus bellottii* and *D. canariensis* were rear in the catches. However, with only 12 trawls deeper than 100 m, one big catch (603 kg/h) of seabreams close to Lagos increased the average considerably. Croakers, 17,7 kg/h, or 4.1% of the total catch constituted the second most important group, The main specie in this group, at depths was *Pentheroscion mbizi*. Groupers contributed 0.9% to the total catch, while grunts and snappers were only caught in low numbers. The most abundant off all demersal species at the outer shelf and slope was *Ariomma bondi* who gave average catch rates of 110 kg/h but is not considered a commercial species.

c) Outer shelf and slope, 100-250 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
551	111	603.2	0.0	5.1	0.0	0.0	339.6	947.9
552	251	12.6	0.0	31.6	0.0	14.3	1121.5	1180.0
563	112	10.0	0.0	0.0	0.0	63.2	250.6	323.8
568	107	19.6	0.0	0.0	0.0	2.2	718.4	740.2
569	152	12.0	0.0	0.0	0.0	15.6	477.7	505.3
575	106	29.3	0.0	16.1	0.0	28.8	232.8	307.0
581	142	15.4	0.0	0.0	0.0	3.1	275.3	293.8
588	119	57.7	0.0	0.0	0.0	7.0	420.4	485.1
594	149	3.4	0.0	0.0	1.0	1.8	212.5	218.7
600	136	5.6	0.0	0.2	0.0	3.6	118.1	127.5
605	126	3.5	0.0	0.0	0.0	44.8	58.8	107.2
609	135	5.3	0.0	0.0	0.0	8.0	98.2	111.5
610	135	21.1	0.0	0.6	0.0	37.6	252.1	311.3
MEAN	137.0	61.4	0.0	4.1	0.1	17.7	352.0	435.3
% Catch		14.1	0.0	0.9	0.0	4.1	80.9	100.0

5.2 Equatorial Guinea

Only seven trawl stations were conducted in Equatorial Guinea. All trawl stations were made on the north side of Bioco Island. Few stations were made in shallow waters because of the very steep shelf around the island. The catch rates were relatively good for the area, with higher catch rates in the deeper stations, Table 5.5. The species that dominated were the same as those on the deeper stations in Nigeria, *Ariomma bondi*, *Decapterus punctatus*, *Boops boops* and *Dentex congolensis*. *Hypoclydonia bella* and *Parasudis fraser-bruenneri* dominated on the deep station. No separate biomass estimate was calculated for the area.

Table 5.5 Equatorial Guinea. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the shelf and slope shelf

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
617	59	100.7	2.6	1.5	3.3	0.0	15.2	123.4
618	82	165.0	9.7	0.0	13.1	8.0	78.0	273.8
619	83	2.78	7.7	0.0	2.7	3.7	30.3	47.2
620	77	22.5	0.7	0.0	3.4	8.7	20.3	55.7
621	102	84.7	175.3	0.0	17.1	24.7	723.4	1 025.3
622	321	0.0	0.0	2.6	41.2	10.5	798.4	852.7
623	120	31.2	0.0	0.1	8.2	21.3	18.7	79.4
MEAN	121	58.1	28.0	0.6	12.7	11.0	240.6	351.1
% Catch		16.6	8.0	0.2	3.6	3.1	68.5	100.0

5.3 Cameroon

A total of 42 swept-area trawl hauls were made on the Nigerian shelf. The shelf was mainly even, with mud and sandy substrate, and suited for bottom trawling except in the southern parts, around Campo, where corals and hard bottom made bottom trawling difficult in some localities. The shelf edge was harder and rocky, with a steep shelf break at 150 in the south. The deep waters >500 m in the southern part of Cameroon was uneven and untrawlable.

Figure 5.6 a, b and c shows catch rates by main groups for the inner (0-50 m), mid (51-100 m) and outer shelf and slope (101-250 m) respectively. Catch rates were low in general. The catches from 0-50 m depth were dominated by demersal species. The mean catch rates were 173 kg/h or 45% of the total catch in this region. However, one station, st. 627, of 2 300 kg increased the mean considerably. The catches of pelagic species was on average 82 kg/h or 22% of the total while sharks and rays, shrimp and cephalopods contributed only marginally to the total catch in this depth region, with 0.1%, 6.8% and 0.6% respectively. The group of other species had a mean catch rate of 99 kg/h or 25% of the total.

The average catch rate declined from 383 kg/h at 0-50 m depth to 72 kg/h at 51-100 m depth, and the contribution of the different groups to the overall catch changed. The catch rate of demersal species was 21 kg/h or 29% of the total, pelagic species had an average catch rate of 6 kg/h or 8% of the total. Shrimps contributed with average catches of 2.8 kg/h or 3.9%, Cephalopods increased in abundance from the inner stations with average catches of 8.6 kg/h and 12% of the catches while sharks and rays had average catches of 1.1 kg/h.

The deeper stations were all collected in the southern parts of Cameroon, approximately from the latitude of the Sanaga river system (3°30'N). Several areas on the outer shelf and shelf break gave good acoustic registrations of demersal fish but were untrawlable because of rocky bottom. The average catch rates were skewed because of one station, st 657, where the total catch was 5400 kg/h. The total catch on the other five stations varied between 31 and 317 kg/h. The group of demersal species contributed 8% to the total catch. Cephalopods contributed 3.1% while the group of other species contributed with 88% of the total catch in this region. The main species in this group was *Ariomma bondi*. Although the highly varying catches, this species was abundant on the outer shelf in the south.

Shrimps are important commercial species in the Gulf of Guinea region, and abundant on the inner shelf and the estuaries. The most dominant species in Cameroon were *Nematopalaemon hastatus* with catches of 35 kg/h between 0-30 m depth. This estuarine prawn was especially abundant in some catches in the Wouri river estuary. Other abundant shrimps in the estuarine and innermost part of the shelf (0-30 m) were *Parapenaeopsis atlantica*, 1.5 kg/h, and *Penaeus monodon*, 0.45 kg/h. In slightly deeper waters between 30 and 50 m depth *Penaeus notialis* became more abundant with average catches of 2.7 kg/h, while *Parapenaeus longirostris* dominated at depths deeper than 50 m with catches of 1.7 kg/h.

Squids are also important in the fishery. Two species dominated in Cameroon. *Sepia officinalis hierredda* was found over the entire shelf while *Illex coindetii* were found at depths deeper than 50 m.

Table 5.6 Cameroon. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m) and c) outer shelf and slope (101-250).

a) Inner shelf, 0-50 m

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
624	22	62.3	62.7	53.2	0.4	0.0	155.6	334.2
627	46	2 311.3	321.7	6.1	0.0	0.0	43.7	2 682.7
628	29	118.8	94.4	11.1	0.2	0.0	101.8	326.4
629	42	153.8	18.8	0.6	0.7	0.0	12.1	186.0
634	30	82.6	163.6	106.1	0.5	0.0	29.9	382.6
635	25	87.9	140.3	82.8	1.0	1.0	81.0	394.0
636	35	95.5	208.9	17.4	9.2	0.0	7.9	338.9
637	26	56.2	291.5	8.6	1.1	4.2	41.3	402.9
638	19	26.8	98.3	1.7	1.0	0.0	34.3	162.1
639	24	171.7	77.9	235.1	2.3	0.0	44.0	531.1
642	44	0.5	9.8	0.1	1.9	0.0	708.4	720.7
645	27	17.8	33.1	0.0	1.1	4.9	11.6	68.4
646	23	21.8	36.6	0.0	0.3	0.0	36.1	94.8
647	33	8.1	12.2	0.0	0.9	0.0	6.5	27.7
652	28	15.5	31.7	0.0	1.9	0.0	14.0	63.0
653	24	1.8	18.3	0.0	0.1	0.0	4.3	24.5
654	50	5.3	5.5	0.0	1.4	0.0	604.2	616.6
659	22	81.9	3.0	0.0	14.3	0.0	28.8	128.0
660	23	114.1	12.8	0.0	2.1	0.0	5.1	134.0
664	43	27.8	5.9	0.1	3.5	0.0	11.6	48.9
MEAN	30.8	173.1	82.4	26.2	2.2	0.5	99.1	383.4
% Catch		45.1	21.5	6.8	0.6	0.1	25.8	100.0

b) Mid shelf, 51-100 m

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
625	58	25.8	4.6	15.0	2.8	0.0	69.1	117.3
626	61	16.8	0.5	1.0	4.2	1.0	11.6	35.1
630	61	75.9	6.9	4.0	3.5	0.0	39.1	129.3
633	56	12.6	4.0	7.6	5.5	0.0	30.2	59.9
644	77	17.9	0.3	0.0	9.1	7.0	5.9	40.1
648	52	2.5	2.5	0.1	3.3	0.0	59.5	67.9
651	88	29.3	0.5	0.0	14.5	0.0	26.8	71.1
655	82	8.5	0.2	0.0	3.5	1.3	69.9	83.4
658	79	0.7	0.0	0.1	16.8	1.1	7.2	25.9
663	67	4.6	13.6	0.5	11.5	0.0	4.7	34.9
MEAN	68.1	21.0	5.7	2.8	8.6	1.1	32.6	71.8
% Catch		29.2	8.0	3.9	12.0	1.5	45.4	100.0

c) Outer shelf and slope, 101-250 m

ST.NO.	DEP.	Demersal	Pelagic	Shrimps	Cephalopod	Sharks and rays	Other	Total
643	135	5.2	0.0	0.1	0.3	0.0	75.5	81.1
650	128	170.2	0.0	0.0	94.5	11.3	41.7	317.6
656	103	133.8	8.1	0.2	10.0	19.2	75.9	247.2
657	140	183.4	0.0	0.0	66.4	0.7	5 170.8	5 421.3
661	220	0.6	0.0	1.9	4.2	5.4	18.7	30.9
662	106	17.5	0.0	0.1	23.0	6.0	195.5	242.1
MEAN	138.7	85.1	1.4	0.4	33.1	7.1	929.7	1 056.7
% Catch		8.1	0.1	0.0	3.1	0.7	88.0	100.0

The catches of the different pelagic groups in the bottom trawl survey off Cameroon is described in Table 5.7. Most species had higher catch rates in the northern part of Cameroon, and in the Campo River estuary. Carangids dominated on the inner stations and comprised 8.5% of the total, and a mean catch rate of 32.6 kg/h in this area. Clupeids had a mean catch rate of 18.3 kg/h while hairtails, barracudas and scombrids had 17.5, 10.6 and 3.3 kg/h respectively. The dominating carangids in this depth region were *Selene dorsalis* and *Chloroscombrus chrysurus*, with a somewhat deeper distribution of *Selene dorsalis*.

Very few pelagic species were found on the mid and outer shelf and shelf break. Carangids had catch rates of 5.1 kg/h and 1.4 kg/h at 51-100 m depth and 101-250 m depth respectively. Catches of all other pelagic species at these depths were insignificant. The carangid that dominated below 50 m depth was *Decapterus punctatus* who was found on 8 stations, other species like *Hemicaranx bicolor*, *Selar crumenophthalmus* and *Caranx senegallus* were caught infrequently.

Table 5.7 Cameroon. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m)

a) Inner shelf, 0-50 m								
ST.NO.	DEP.	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
624	22	27.8	18.7	0.3	15.8	0.0	271.5	334.2
627	46	0.0	314.6	0.0	0.5	6.6	2 361.1	2 682.7
628	29	35.2	5.6	6.4	39.4	7.9	231.9	326.4
629	42	4.2	7.8	0.0	0.3	6.6	167.2	186.0
634	30	68.9	3.0	4.3	83.2	4.2	219.0	382.6
635	25	54.5	18.6	0.0	61.0	6.2	253.7	394.0
636	35	4.9	41.6	2.4	82.0	78.0	130.0	338.9
637	26	103.9	123.7	2.1	24.6	37.1	111.5	402.9
638	19	25.6	41.3	2.5	4.9	24.0	63.8	162.1
639	24	28.2	15.2	0.0	30.2	4.4	453.1	531.1
642	44	0.5	9.3	0.0	0.0	0.0	710.9	720.7
645	27	8.0	5.8	5.2	8.1	6.0	35.4	68.4
646	23	2.1	8.3	5.2	0.7	20.3	58.3	94.8
647	33	0.1	10.7	0.0	0.1	1.3	15.5	27.7
652	28	2.1	5.0	16.6	0.3	7.7	31.3	63.0
653	24	0.1	8.4	9.6	0.0	0.2	6.2	24.5
654	50	0.0	1.3	4.0	0.0	0.2	611.0	616.6
659	22	0.0	3.0	0.0	0.0	0.0	125.0	128.0
660	23	0.0	3.9	7.3	0.0	1.6	121.2	134.0
664	43	0.0	5.9	0.0	0.0	0.0	42.9	48.9
MEAN	30.8	18.3	32.6	3.3	17.5	10.6	301.0	383.4
% Catch		4.8	8.5	0.9	4.6	2.8	78.5	100.0
b) Mid shelf, 51-100 m								
ST.NO.	DEP.	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
625	58	0.1	4.1	0.0	0.4	0.0	112.8	117.3
626	61	0.1	0.0	0.0	0.4	0.0	34.5	35.1
630	61	0.1	5.7	0.0	0.0	1.1	122.5	129.3
633	56	0.3	1.9	0.0	0.0	1.8	55.9	59.9
644	77	0.0	0.3	0.0	0.0	0.0	39.8	40.1
648	52	0.0	0.1	0.0	0.0	2.4	65.4	67.9
651	88	0.0	0.5	0.0	0.0	0.0	70.6	71.1
655	82	0.0	0.2	0.0	0.0	0.0	83.3	83.4
658	79	0.0	0.0	0.0	0.0	0.0	25.9	25.9
663	67	0.0	13.6	0.0	0.0	0.0	21.3	34.9
MEAN	68.1	0.1	5.1	0.0	0.1	0.5	66.0	71.8
% Catch		0.1	7.1	0.0	0.1	0.7	92.0	100.0

Catch rates of the commercially most important demersal fish groups in Cameroon are presented in Table 5.8 a, b and c. *Brachydeuterus auritus* was the most dominant of any single species on the inner shelf, this grunt had a catch rate of 135 kg/h, or 35% of the total catch, at depths between 0-50 m. Croakers, especially *Pseudotolithus elongates* and *Pseudotolithus typus* were also abundant with catch rates of 26.6 kg/h, or 7% of the catch. Seabreams, snappers and groupers were less abundant with 2.5, 7.6 and 0.7 kg/h.

The seabreams dominated on the midshelf with catch rates of 8.1 kg/h or 11% of the total catch. The dominant species of this group at these depths were *Dentex congoensis* and *D. angolensis*. The second most important group was the grunts with 10% of the total catch. *Brachydeuterus auritus* was still dominant at these depths. Groupers contributed 8% of the total catch. The dominant species here was *Epinephelus aeneus*. Catches of croakers were insignificant, while no snappers were found on these depths.

On the other shelf and shelf break seabreams were, with average catches of 74 kg/h or 7% of the total catch, the only dominant group of the important commercial species. Groupers had insignificant catches while no catches were made of snappers, grunts and croakers. The dominant species of seabreams, *Dentex congoensis* and *D. angolensis*, were the same as between 50-100 m. The group of other species contributed 92.5% of the total catch. This group mainly consisted of *Ariomma bondi*, a presently non-commercial species that were abundant on the shelf break.

Table 5.8 Cameroon. Catch rates (kg/h) of valuable demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m), b) mid shelf (51-100 m) and c) outer shelf and slope (101-250).

a) Inner shelf, 0-50 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
624	22	0.0	0.0	0.0	16.8	45.5	271.9	334.2
627	46	0.0	0.0	2.0	2 309.3	0.0	371.4	2 682.7
628	29	0.0	0.0	0.0	2.3	116.5	207.5	326.4
629	42	0.0	0.0	0.6	152.9	0.3	32.2	186.0
634	30	0.0	0.0	0.0	5.9	76.4	300.4	382.6
635	25	0.0	0.4	0.0	13.4	73.9	306.2	394.0
636	35	0.0	0.0	2.0	92.0	1.0	243.9	338.9
637	26	0.0	0.0	3.1	36.6	16.6	346.7	402.9
638	19	0.0	0.0	0.0	11.4	15.4	135.3	162.1
639	24	0.0	0.0	0.0	11.7	159.7	359.7	531.1
642	44	0.0	0.0	0.4	0.1	0.0	720.2	720.7
645	27	0.0	0.0	0.0	2.2	15.4	50.8	68.4
646	23	0.0	1.1	1.3	8.4	11.0	73.0	94.8
647	33	6.6	0.0	1.4	0.1	0.0	19.6	27.7
652	28	0.0	0.0	2.1	12.9	0.5	47.6	63.0
653	24	0.0	0.0	1.5	0.3	0.0	22.7	24.5
654	50	0.2	0.0	0.0	5.1	0.0	611.2	616.6
659	22	0.0	79.8	0.5	0.0	0.0	47.7	128.0
660	23	42.2	69.6	0.0	0.0	0.0	22.2	134.0
664	43	0.5	0.0	0.0	27.4	0.0	21.0	48.9
MEAN	30.8	2.5	7.6	0.7	135.4	26.6	210.6	383.4
% Catch		0.6	2.0	0.2	35.3	6.9	54.9	100.0

b) Mid shelf, 51-100 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
625	58	0.5	0.0	5.3	19.9	0.0	91.6	117.3
626	61	1.9	0.0	10.0	3.9	0.9	18.3	35.1
630	61	10.5	0.0	25.8	38.3	0.0	54.7	129.3
633	56	3.3	0.0	2.5	5.5	0.0	48.6	59.9
644	77	16.5	0.0	0.9	0.0	0.4	22.2	40.1
648	52	1.1	0.0	0.7	0.7	0.0	65.4	67.9
651	88	29.2	0.0	0.1	0.0	0.0	41.8	71.1
655	82	8.5	0.0	0.0	0.0	0.0	74.9	83.4
658	79	0.7	0.0	0.0	0.0	0.0	25.2	25.9
663	67	4.6	0.0	0.0	0.0	0.0	30.3	34.9
MEAN	68.1	8.1	0.0	5.6	6.8	0.1	51.0	71.8
% Catch		11.3	0.0	7.9	9.5	0.2	71.1	100.0

c) c) Outer shelf and slope, 101-250 m

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
643	135	5.2	0.0	0.0	0.0	0.0	75.9	81.1
650	128	170.2	0.0	0.0	0.0	0.0	147.4	317.6
656	103	91.7	0.0	9.8	0.0	0.0	145.6	247.2
657	140	158.8	0.0	24.6	0.0	0.0	5 237.9	5 421.3
661	220	0.4	0.0	0.0	0.0	0.0	30.4	30.9
662	106	17.5	0.0	0.0	0.0	0.0	224.6	242.1
MEAN	138.7	74.0	0.0	5.7	0.0	0.0	977.0	1 056.7
% Catch		7.0	0.0	0.5	0.0	0.0	92.5	100.0

5.4 São Tomé and Príncipe

São Tomé and Príncipe are volcanic islands generally characterized by narrow rocky shelves, and steep shelf breaks. Demersal fish were seen frequently on the echosounder on the shelf break, but the rough bottom made trawling difficult. The area, and especially the island of São Tomé were also characterized with abundant seabirds and dolphins. Predators like these were almost absent off the mainland of Nigeria and Cameroon during the survey. The analyses are done for each island separately.

Fishing lines were used in the surface to try to catch pelagic fish while steaming to Príncipe and between the islands. However this approach were not fruitful this time.

Príncipe

Demersal fish were seen frequently on the narrow shelf off Príncipe. Trawling was difficult because of the uneven bottom and trawling was mainly confined to the southern and eastern part of the island. Five bottom trawl station was conducted, one at 41 m depth, and the others between 50 and 100 m. The species composition was similar in all trawls, and catch rates on the five stations were relatively good,

Table 5.9. The most abundant species in order of mean abundance was Seabreams were the most important species in the total catches with 82 kg/h, and 55% of the total. The group consisted mainly of *Pagellus bellottii*, *Dentex congoensis* and *Pagrus caeruleostictus*. The flying gurnard, *Dactylopterus volitans*, was the second most important with catch rates of 44 kg/h or 30%. Squids were also important with *Sepia officinalis hierredda* accounting for 6 kg/h or 4%, while the red cornet fish, *Fistularia petimba*, accounted for 3% of the catches.

Table 5.9 The main groups and species caught around the island of Principe, catches in kg/h.

ST.NO.	DEP.	Seabreams	Flying gurnard	Red cornet fish	Squid	John dory	Other	Total
666	40	0.0	182.5	0.2	7.8	0.0	20.5	211.1
667	58	18.8	25.7	10.4	19.0	0.0	17.5	91.4
668	79	45.3	5.4	3.5	0.8	1.0	11.3	67.1
670	86	241.4	4.1	8.2	0.4	1.7	9.0	264.7
671	74	104.8	3.6	0.6	2.6	0.8	2.2	114.5
MEAN	67.4	82.1	44.3	4.6	6.1	0.7	12.1	149.7
% Catch		54.8	29.6	3.1	4.1	0.4	8.1	100.0

Four hook and line stations (“snik”) with bait were also tried on untrawlable ground, No catch were made on these stations.

The biomass was calculated based on the four trawl stations from 50-100 m depth for the same depth stratum. No separate estimates were made for other strata.

São Tomé

Pelagic fish were seen only in small quantities on the echosounder but there were several observations of surface schools of tuna and flying fish on the surface. However, no samples were possible to obtain from these. A total of five swept area trawl stations were possible to carry out at São Tomé, one on the southwestern side, and the four others on the east coast. All trawl stations were between 50-100 m as the shelf generally was very steep and no trawl stations were possible deeper or shallower than this.

The catch rate was on average 226 kg/h. The seabreams dominated in the catches with average catch rates of 93 kg/h or 41% of the total catch. The most abundant seabreams were *Pagellus bellottii*, *Pagrus caeruleostictus* and *Dentex congoensis*. The snappers had average catch rates of 37 kg/h or 16% of the total catch. *Lutjanus fulgens* was the dominant species in this group and was the single most abundant off all species in the total catch. The groupers had average catches of 32 kg/h or 14% of the total catch. *Paranthias furcifer* and *Epinephelus aeneus* dominated the group. Only few grunts mainly *Pomadasys c.f. olivaceum*, and no croakers were caught in the bottom trawls in São Tomé. In the group of other species *Dactylopterus volitans* were dominant together with *Fistularia petimba* and. No shrimps were caught in the bottom trawls, and only small catches of the squid *Sepia officinalis hierredda* and *Alloteuthis africana*.

Table 5.10 São Tomé. Catch rates (kg/h) of main demersal species grouped by families in swept-area bottom-trawl hauls on the shelf (51-100 m)

ST.NO.	DEP.	Seabreams	Snappers	Groupers	Grunts	Croakers	Other	Total
673	73	25.3	0.0	0.0	0.0	0.0	13.0	38.3
674	71	12.4	0.0	2.2	0.2	0.0	19.1	33.9
675	55	281.7	184.6	132.0	23.7	0.0	107.5	729.5
676	54	139.0	0.0	6.9	0.0	0.0	123.0	268.9
677	77	6.9	0.0	17.6	0.0	0.0	35.4	59.9
MEAN	66.0	93.1	36.9	31.7	4.8	0.0	59.6	226.1
% Catch		41.2	16.3	14.0	2.1	0.0	26.4	100.0

5.5 Review of results

The survey was conducted in the middle of the rainy season, and the weather was generally overcast and calm, with occasional heavy rainfall associated with strong winds.

Nigeria and Cameroon

The survey area in Nigeria and Cameroon generally had a lack of seabirds and marine mammal predators, otherwise frequently observed along most of the West-African coast. Only a few terns and gulls were observed in the survey area. These observations were in line with generally low fish catches in the area, although oil platforms and pipelines hampered trawling in the most shallow and reportedly more productive parts of the Nigerian coast, mainly < 30 m depth. The bottom substrate although not systematically monitored consisted in most of the survey area of sand and silt and mud close to the coast, with gradually finer particles in deeper waters. Several areas were untrawlable especially deeper than 100 m depth.

Generally two different fish communities could be identified, the Carangidae and Clupeidae communities above the thermocline, and the Sparidae communities below the thermocline around 100 m depth and deeper.

The biomass of the major demersal groups is listed in Table 5.11 together with other important species groups from the area. In Nigeria, the most abundant species group was the Ariomma species. These are not caught for commercial purposes, but are abundant on the shelf from approximately 100 m depth. The total biomass of the two species was 14 000 tonnes. Seabreams, with a total biomass for all depth strata of 11 000 tonnes was the most abundant of the commercial species. The second most abundant group was the grunts, with a biomass of 11 000 tonnes. 9 000 tonnes of croakers were found while groupers and snappers

were less abundant. Swept area estimates were also produced for several species that are not truly demersal, and estimates using this method will therefore underestimate the biomass. These were Carangids, Barracuda and cephalopods. The biomass of these groups calculated by the swept area method gave 39 000, 7 000 and 11 000 tonnes respectively.

As for Nigeria, the most abundant species in Cameroon was *Ariomma bondi*. The biomass of the species was 14 000 tonnes. The grunts were the most abundant of the commercial species groups in Cameroon with a total biomass of 11 000 tonnes. The major part of this consisted of the *Brachydeuterus auritus*. The second most important group was the croakers with 2 600 tonnes. Seabreams had a biomass of 1 600 tonnes while the other commercial groups only had low abundance. The biomass of the Carangids, Barracuda and cephalopods were 3 000, 900 and 800 tonnes respectively.

São Tomé and Príncipe

The marine environment, habitat and demersal communities were different on the islands of Príncipe and São Tomé than on the main land. The islands had higher salinity and lower temperatures than along the coast of Nigeria and Cameroon. The bottom topography was very uneven and rocky, with only few places where it was possible to trawl. While the biomass estimate for Nigeria and Cameroon was calculated from 0 – 200 m depth, the biomass estimate for São Tomé and Príncipe was only calculated for the area between 50 – 100 m depth, this because no trawls were made in other depth strata. The species composition on Príncipe consisted mainly of Gurnards and Seabreams. No biomass estimate was calculated for the first group, while the biomass estimate for seabreams was estimated to be 1 500 tonnes. It was also estimated 100 tonnes of cephalopods and 24 tonnes of carangids. The most abundant species group on São Tomé was the seabreams with a biomass of 370 tonnes. The snappers were the second most important group with 137 tonnes, while the biomass of groupers was estimated to be 120 tonnes. The biomass of cephalopods was estimated to be 61 tonnes.

Table 5.11 Swept area biomass estimates for the main fish groups and Cephalopods encountered during the bottom trawl survey. Total for all depth strata, 0-200 m for Nigeria and Cameroon, 50-100 m for the islands of Principe and São Tomé. Values in tonnes

Group/species	Nigeria	Cameroon	Principe	São Tome	Equatorial Guinea
Seabreams	11 481	1 616	1 496	370	-
Grunts	10 957	10 830	0	18	-
Croakers	8 857	2 616	0	0	-
Groupers	1 304	249	0	119	-
Snappers	83	350	0	137	-
Sharks	2 878	180	0	6	-
Rays	819	140	0	4	-
Barracudas	7 387	925	0	0	-
Cephalopods	10 857	797	101	61	-
Ariomma	14 463	14 266	0	0	-
Carangids	39 253	3 103	24	20	-
Total for the groups	108 339	35 072	1 621	735	-

Annex I Records of fishing stations

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 542
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 611
 start stop duration Long E 247
 TIME :08:01:56 08:18:41 17 (min) Purpose code: 3
 LOG :7940.01 7940.82 0.79 Area code : 5
 FDEPTH: 65 64 GearCond.code:
 BDEPTH: 65 64 Validity code:
 Towing dir: 80° Wire out: 210 m Speed: 30 kn*10
 Sorted: 20 Kg Total catch: 117.05 CATCH/HOUR: 413.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Decapterus punctatus	147.35	9212	35.67	2567
Pagellus bellottii	50.47	1253	12.22	2568
Lepidotrigla cadmani	46.06	1412	11.15	
Sardinella aurita	40.06	4288	9.70	2570
Cymbium pepo	17.93	39	4.34	
Sepia officinalis hierredda	16.06	244	3.89	
Brachydeuterus auritus	15.53	2947	3.76	2569
Squatina oculata	12.88	7	3.12	
Alloteuthis africana	12.18	4288	2.95	
Grammolites gruvelli	9.00	459	2.18	
Serranus accraensis	7.41	318	1.79	
Chilomycterus spinosus mauret.	6.81	21	1.65	
Priacanthus arenatus	6.18	794	1.50	
Sphyræna guachancho	5.82	176	1.41	
Dicologlossa cuneata	4.06	88	0.98	
Syacium micrurum	3.00	512	0.73	
Fistularia petimba	2.29	14	0.55	
Calappa pelli	2.12	18	0.51	
Pseudupeneus prayensis	1.94	71	0.47	
Brotula barbata	1.38	7	0.33	
Gobioideus sp	1.24	194	0.30	
Scorpaena normani	1.24	71	0.30	
Selar crumenophthalmus	0.86	18	0.21	
Saurida brasiliensis	0.53	124	0.13	
Spherooides marmoratus	0.35	35	0.08	
HOLUTHROIDEA	0.18	18	0.04	
Sicyonia galeata	0.18	53	0.04	
Total	413.13		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 543
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 615
 start stop duration Long E 246
 TIME :10:02:46 10:32:01 29 (min) Purpose code: 3
 LOG :7949.96 7951.34 1.37 Area code : 5
 FDEPTH: 38 38 GearCond.code:
 BDEPTH: 38 38 Validity code:
 Towing dir: 80° Wire out: 140 m Speed: 30 kn*10
 Sorted: Kg Total catch: 43.30 CATCH/HOUR: 89.59

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyræna guachancho	25.76	403	28.75	2574
Galeoides decadactylus	19.24	352	21.48	2575
Pseudotolithus typus	8.71	48	9.72	2572
Chloroscombrus chrysurus	7.86	180	8.77	
Pseudotolithus senegalensis	4.34	21	4.84	2571
Drepane africana	3.23	31	3.61	2573
Brachydeuterus auritus	2.81	95	3.14	
Penaeus notialis	2.71	33	3.02	
Portunus validus	2.11	6	2.36	
Selene dorsalis	1.63	39	1.82	
Caranx hippos	1.41	8	1.57	
Lagocephalus laevigatus	1.24	10	1.38	
Sepia officinalis hierredda	1.03	54	1.15	
Scorpaenomorris tritor	0.93	2	1.04	
Trichiurus lepturus	0.77	43	0.86	
Syacium micrurum	0.72	31	0.80	
Scyllarides herklotsii	0.58	130	0.65	
Selar crumenophthalmus	0.56	2	0.63	
Baetodes helcheri	0.46	2	0.51	
Chaetodipterus goreensis	0.39	2	0.44	
Ilisha africana	0.35	118	0.39	
Caranx crysos	0.35	2	0.39	
Chilomycterus spinosus mauret.	0.35	2	0.39	
Alectis alexandrinus	0.31	4	0.35	
Decapterus punctatus	0.31	23	0.35	
Alloteuthis africana	0.29	372	0.32	
Parapenaeopsis atlantica	0.27	52	0.30	
Grammolites gruvelli	0.25	14	0.28	
Sardinella maderensis	0.21		0.23	
Epinephelus aeneus	0.10	2	0.11	
Lepidotrigla cadmani	0.08	2	0.09	
Scorpaena normani	0.06	2	0.07	
Monochirus hispidus	0.06	8	0.07	
Serranus accraensis	0.04	2	0.04	
Sepiella ornata	0.02	2	0.02	
Spherooides marmoratus	0.02	2	0.02	
Total	89.56		99.96	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 544
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 619
 start stop duration Long E 248
 TIME :11:44:34 12:15:08 31 (min) Purpose code: 3
 LOG :7959.83 7961.40 1.55 Area code : 5
 FDEPTH: 22 23 GearCond.code:
 BDEPTH: 22 23 Validity code:
 Towing dir: 90° Wire out: 120 m Speed: 30 kn*10
 Sorted: 47 Kg Total catch: 46.68 CATCH/HOUR: 90.35

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Polydactylus quadrifilis	18.39	6	20.35	
Galeoides decadactylus	10.57	186	11.70	2580
Nematopalaemon hastatus	9.77	13963	10.81	
Trichiurus lepturus	7.88	174	8.72	2587
Sphyræna guachancho	6.46	46	7.15	2585
Pomadasy jubelini	4.90	17	5.42	2579
Selene dorsalis	3.79	234	4.19	2586
Pseudotolithus typus	3.64	19	4.03	2576
Ilisha africana	3.29	405	3.64	2584
Lutjanus fulgens	2.98	4	3.30	
Pseudotolithus elongatus	2.81	70	3.11	2581
Portunus validus	2.81	14	3.11	
Elops lacerta	2.52	14	2.79	
Pseudotolithus senegalensis	2.03	15	2.25	2578
Caranx hippos	1.90	12	2.10	2582
Squilla mantis	1.22	6	1.35	
Drepane africana	1.03	29	1.14	
Pentaneumus quinquarius	0.70	12	0.77	2577
Chloroscombrus chrysurus	0.70	37	0.77	2583
Parapenaeopsis atlantica	0.56	108	0.62	
Pisodonophis semicinctus	0.52	2	0.58	
Paraconger notialis	0.39	2	0.43	
Brachydeuterus auritus	0.39	10	0.43	
Lagocephalus laevigatus	0.31	2	0.34	
Panulirus regius	0.19	2	0.21	
Penaeus kerathurus	0.17	12	0.19	
Batrachoides liberiensis	0.14	2	0.15	
Scyllarides herklotsii	0.08	8	0.09	
Sardinella maderensis	0.06	4	0.07	
Trachinocephalus myops	0.04	2	0.04	
Penaeus notialis	0.04	2	0.04	
Monochirus hispidus	0.02	2	0.02	
Cynoglossus browni	0.02	2	0.02	
Total	90.32		99.93	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 545
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 619
 start stop duration Long E 305
 TIME :14:09:50 14:39:45 30 (min) Purpose code: 3
 LOG :7977.71 7979.20 1.48 Area code : 5
 FDEPTH: 25 24 GearCond.code:
 BDEPTH: 25 24 Validity code:
 Towing dir: 270° Wire out: 125 m Speed: 30 kn*10
 Sorted: 15 Kg Total catch: 67.69 CATCH/HOUR: 135.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	31.80	350	23.49	2592
Ilisha africana	30.54	1892	22.56	2588
Trichiurus lepturus	13.66	430	10.09	2590
Chloroscombrus chrysurus	13.56	360	10.02	2591
Brachydeuterus auritus	7.16	146	5.29	2589
Portunus validus	4.96	34	3.66	
Albula vulpes	4.76	24	3.52	
Pseudotolithus senegalensis	4.40	14	3.25	
Lagocephalus laevigatus	3.80	4	2.81	
Pomadasy jubelini	3.70	16	2.73	
Egagrus caeruleostictus	3.00	4	2.22	
Drepane africana	2.56	56	1.89	
Panulirus regius	1.80	2	1.33	
Sphyræna guachancho	1.66	10	1.23	
Sepia officinalis hierredda	1.46	10	1.08	
Pteroscion pelli	1.24	24	0.92	
Selene dorsalis	0.86	60	0.64	
Caranx hippos	0.66	10	0.49	
Chaetodipterus goreensis	0.56	4	0.41	
Lepidotrigla cadmani	0.50	10	0.37	
Sardinella maderensis	0.36	34	0.27	
Penaeus kerathurus	0.28	6	0.21	
Cynoglossus canariensis	0.26	10	0.19	
Scorpaenomorris tritor	0.26	10	0.19	
Pagellus bellottii	0.26	4	0.19	
Alectis alexandrinus	0.14	4	0.10	
Penaeus notialis	0.14	12	0.10	
Pythomichthys microphthalmus	0.08	2	0.06	
Total	134.42		99.31	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 546
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 616
 start stop duration Long E 303
 TIME :15:50:37 16:20:21 30 (min) Purpose code: 3
 LOG :7985.90 7987.59 1.67 Area code : 5
 FDEPTH: 38 37 GearCond.code:
 BDEPTH: 38 37 Validity code:
 Towing dir: 90ø Wire out: 160 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 80.85 CATCH/HOUR: 161.70

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyræna guachancho	18.80	116	11.63	
Galeoides decadactylus	18.06	86	11.17	
Pseudolithus senegalensis	17.26	130	10.67	2597
Trichiurus lepturus	16.10	896	9.96	2595
Selene dorsalis	14.40	686	8.91	
Pomadasy jubelini	13.90	70	8.60	2596
Ilisha africana	12.10	730	7.48	
Pteroscion pelli	11.30	246	6.99	2593
Chloroscombrus chrysurus	9.10	290	5.63	
Portunus validus	7.70	26	4.76	
Albula vulpes	6.86	30	4.24	
Brachydeuterus auritus	5.46	116	3.38	2594
Scomberomorus tritor	2.36	16	1.46	
Sepia officinalis hierredda	2.16	6	1.34	
Caranx hippos	1.50	10	0.93	
Arius latiscutatus	1.12	2	0.69	
Mustelus mustelus	0.90	6	0.56	
Pennaeus kerathurus	0.80	156	0.49	
Pennaeus monodon	0.76	4	0.47	
Lagocephalus laevigatus	0.30	30	0.19	
Grammolites gruvelli	0.20	20	0.12	
Sardinella maderensis	0.16	16	0.10	
Pennaeus notialis	0.16	10	0.10	
Brotula barbata	0.06	16	0.04	
'Spider crab'	0.06	6	0.04	
Cynoglossus cadenati	0.06	6	0.04	
Sphoeroides marmoratus	0.06	6	0.04	
Total	161.70		100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 547
 DATE:12/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 614
 start stop duration Long E 304
 TIME :17:12:51 17:42:35 30 (min) Purpose code: 3
 LOG :7993.61 7995.16 1.52 Area code : 5
 FDEPTH: 55 54 GearCond.code:
 BDEPTH: 55 54 Validity code:
 Towing dir: 90ø Wire out: 195 m Speed: 30 kn*10
 Sorted: 66 Kg Total catch: 531.90 CATCH/HOUR: 1063.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	666.40	2652	62.64	2598
Brachydeuterus auritus	120.02	13090	11.28	2599
Pomadasy jubelini	61.20	86	5.75	
Sphyræna guachancho	39.28	238	3.69	
Cymbium pepo	34.20	30	3.21	
Raja miraletus	24.82	186	2.33	
Trichiurus lepturus	24.80	1854	2.33	
Citharus linguatula	22.96	1004	2.16	
Sepia officinalis hierredda	13.60	154	1.28	
Cynoglossus canariensis	8.34	374	0.78	
Scomberomorus tritor	6.80	12	0.64	
Microchirus frechkepi	4.94	170	0.46	
Pteroscion pelli	4.60	68	0.43	
Uranoscopus albesca	4.42	34	0.42	
Selene dorsalis, juveniles	4.26	1616	0.40	
Parapenaeus longirostris	3.74	816	0.35	
Ilisha africana	3.58	136	0.34	
Priacanthus arenatus	3.40	18	0.32	
Grammolites gruvelli	2.72	306	0.26	
Torpedo torpedo	1.48	2	0.14	
Dicologlossa cuneata	1.20	18	0.11	
Saurida brasiliensis	1.20	374	0.11	
Aluterus heudelotii	1.20	18	0.11	
Serranus accraensis	1.20	68	0.11	
Uraspis secunda	1.20	2	0.11	
Scyllarides herklotsii	0.86	102	0.08	
Brotula barbata	0.86	18	0.08	
Sepiella ornata	0.18	52	0.02	
Squilla cadenati	0.18	18	0.02	
Gobius sp	0.18	34	0.02	
Total	1063.82		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 548
 DATE:13/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 614
 start stop duration Long E 317
 TIME :09:40:40 10:11:18 31 (min) Purpose code: 3
 LOG :8091.49 8093.07 1.55 Area code : 5
 FDEPTH: 66 68 GearCond.code:
 BDEPTH: 66 68 Validity code:
 Towing dir: 96ø Wire out: 210 m Speed: 30 kn*10
 Sorted: 69 Kg Total catch: 121.44 CATCH/HOUR: 235.05

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	64.05	499	27.25	
Brachydeuterus auritus	47.61	1446	20.26	
Trichiurus lepturus	38.26	215	16.28	
Pagellus bellottii	13.01	197	5.53	2600
Lepidotrigla cadmani	12.14	314	5.16	
Epinephelus aeneus	11.61	17	4.94	
Parapenaeus longirostris	8.36	1138	3.56	
Sphyræna guachancho	5.40	52	2.30	
Pseudupeneus prayensis	4.99	75	2.12	
Citharus linguatula	4.76	383	2.03	
Priacanthus arenatus	4.76	854	2.03	
Uranoscopus albesca	4.47	17	1.90	
Octopus vulgaris	2.90	6	1.23	
Serranus accraensis	2.55	110	1.08	
Dentex angolensis	1.68	41	0.71	
Grammolites gruvelli	1.68	81	0.71	
Sepia juveniles	1.22	145	0.52	
Pentheroscion mbizi	0.99	12	0.42	
Brotula barbata	0.70	6	0.30	
Alloteuthis africana	0.52	134	0.22	
Venus verrucosa	0.46	12	0.20	
Syacium micrurum	0.41	58	0.17	
Chilomycterus spinosus mauret.	0.41	6	0.17	
Gobius sp	0.41	70	0.17	
Cymbium sp.	0.29	52	0.12	
Dicologlossa cuneata	0.29	6	0.12	
Saurida brasiliensis	0.23	64	0.10	
Cymbium pepo	0.17	6	0.07	
Lepidotrigla carolae	0.17	23	0.07	
Parapandalus narval	0.12	87	0.05	
Decapterus punctatus	0.12	6	0.05	
Lophiodes kemp	0.12	6	0.05	
Squilla mantis	0.06	6	0.03	
Scyllarides herklotsii	0.06	12	0.03	
Selene dorsalis, juveniles	0.06	12	0.03	
Total	235.04		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 549
 DATE:13/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 617
 start stop duration Long E 316
 TIME :11:34:47 12:04:31 30 (min) Purpose code: 3
 LOG :8101.87 8103.41 1.52 Area code : 5
 FDEPTH: 41 41 GearCond.code:
 BDEPTH: 41 41 Validity code:
 Towing dir: 90ø Wire out: 150 m Speed: 30 kn*10
 Sorted: 37 Kg Total catch: 814.63 CATCH/HOUR: 1629.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	967.20	18252	59.36	2601
Sphyræna guachancho	171.60	1664	10.53	2604
Sepia sp.	82.16	156	5.04	
Trichiurus lepturus	80.60	3120	4.95	2605
Lepidochelys olivacea	59.00	2	3.62	
Caranx crysos	41.60	312	2.55	2602
Brachydeuterus auritus	34.32	1352	2.11	2603
Pseudolithus senegalensis	33.80	572	2.07	2608
Ilisha africana	27.56	2010	1.69	2607
Pteroscion pelli	26.00	2912	1.60	2606
Selene dorsalis	21.84	5356	1.34	2609
Priacanthus arenatus	16.12	104	0.99	
Cynoglossus browni	13.00	114	0.80	
Callinectes amnicola	11.44	676	0.70	
Scomberomorus tritor	7.80	52	0.48	
Grammolites gruvelli	6.76	416	0.41	
Scyllarides herklotsii	5.20	52	0.32	
Caranx hippos	5.20	52	0.32	
Antennarius sp.	4.68	312	0.29	
Parapenaeopsis atlantica	3.12	728	0.19	
Dicologlossa cuneata	3.12	52	0.19	
Galeoides decadactylus	2.60	156	0.16	
Sardinella maderensis	2.08	52	0.13	
Citharus linguatula	1.56	52	0.10	
Raja miraletus	0.90	2	0.06	
Total	1629.26		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 550
 DATE:13/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 619
 start stop duration Long E 315
 TIME :13:16:13 13:46:11 30 (min) Purpose code: 3
 LOG :8110.81 8112.45 1.62 Area code : 5
 FDEPTH: 29 30 GearCond.code:
 BDEPTH: 29 30 Validity code:
 Towing dir: 90° Wire out: 135 m Speed: 30 kn*10
 Sorted: 34 Kg Total catch: 34.19 CATCH/HOUR: 68.38

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Galeoides decadactylus	11.60 208	16.96	2618
Sphyræna guachancho	6.88 66	10.06	2611
Trichiurus lepturus	6.78 38	9.92	
Brachydeuterus auritus	6.44 138	9.42	2619
Ilisha africana	5.72 888	8.37	2615
Chloroscombrus chrysurus	4.90 128	7.17	2617
Portunus validus	4.80 88	7.02	
Pseudotolithus senegalensis	4.48 36	6.55	2612
Scomberomorus tritor	2.70 18	3.95	
Caranx hippos	2.06 14	3.01	2610
Albula vulpes	1.92 8	2.81	
Peresocion pelli	1.80 56	2.63	2616
Pemæus monodon	1.38 10	2.02	
Sepiella ornata	1.28 644	1.87	
Pomadasyg rogeri	1.14 8	1.67	2613
Sardinella maderensis - Juv.	0.84 12	1.23	
Drepane africana	0.66 26	0.97	
Lagocephalus laevigatus	0.58 104	0.85	
Uranoscopus polli	0.54 2	0.79	
Lethrinus atlanticus	0.38 2	0.56	
Squilla mantis	0.36 14	0.53	
Cynoglossus browni	0.32 8	0.47	
Pseudupeneus prayensis	0.24 6	0.35	
Sepia officinalis hierredda	0.22 2	0.32	
Eucinostomus melanopterus	0.16 4	0.23	
ANTENNARIDAE	0.04 4	0.06	
Selene dorsalis	0.04 2	0.06	2614
Grammolites gruvelli	0.04 4	0.06	
Sphaeroides marmoratus	0.04 6	0.06	
Trachinus lineolatus	0.02 2	0.03	
Alectis alexandrinus	0.02 2	0.03	
Total	68.38	100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 551
 DATE:13/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 609
 start stop duration Long E 328
 TIME :16:04:47 16:35:17 31 (min) Purpose code: 3
 LOG :8130.47 8132.04 1.55 Area code : 5
 FDEPTH: 111 110 GearCond.code:
 BDEPTH: 111 110 Validity code:
 Towing dir: 270° Wire out: 320 m Speed: 30 kn*10
 Sorted: 60 Kg Total catch: 489.51 CATCH/HOUR: 947.44

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Dentex congongensis	539.61 10719	56.95	2623
Boops boops	152.25 2510	16.07	2620
Dentex angolensis	63.56 801	6.71	2622
Zeus faber	53.59 35	5.66	
Uranoscopus polli	23.32 178	2.46	
Selar crumenophthalmus	18.87 89	1.99	
Lepidotrigla cadmani	18.15 410	1.92	
Priacanthus arenatus	15.68 250	1.65	
Lophiodes kemp	10.14 54	1.07	
Sepia officinalis hierredda	8.73 232	0.92	
Sardinella aurita	6.75 75	0.71	2621
Brotula barbata	5.52 35	0.58	
Epinephelus aeneus	4.20 2	0.44	
Todarodes sagittatus	4.10 124	0.43	
Lepidotrigla carclae	3.21 161	0.34	
Gobius sp	2.50 68	0.26	
Illex coindettii	2.50 17	0.26	
Citharus linguatula	2.50 195	0.26	
Mustelus mustelus	2.34 2	0.25	
Calappa pelli	2.32 17	0.24	
Scomber japonicus	1.43 17	0.15	
Microchirus frechkopi	1.43 35	0.15	
Scyliorhinus sp.	1.18 2	0.12	
Serranus africana	0.89 72	0.09	
Scorpaena normani	0.89 17	0.09	
Syacium micrurum	0.54 35	0.06	
Squilla mantis	0.54 17	0.06	
Octopus vulgaris	0.37 2	0.04	
Cepola pauciradiatus	0.35 17	0.04	
Ariomma bondi	0.17 17	0.02	
Microchirus wittei	0.17 17	0.02	
Sepiella ornata	0.10 17	0.01	
Total	947.90	100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 552
 DATE:14/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 607
 start stop duration Long E 347
 TIME :06:33:17 07:03:06 30 (min) Purpose code: 3
 LOG :8202.33 8203.75 1.40 Area code : 5
 FDEPTH: 245 257 GearCond.code:
 BDEPTH: 245 257 Validity code:
 Towing dir: 82° Wire out: 730 m Speed: 30 kn*10
 Sorted: 27 Kg Total catch: 589.98 CATCH/HOUR: 1179.96

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Zenion longipinnis	262.50 30660	22.25	
Ariomma melanum	252.00 9616	21.36	2624
Cubiceps sp.	182.70 12222	15.48	2625
Parasudis fraser-brueneri	136.08 11428	11.53	
Parapenaeus longirostris	86.94 12264	7.37	2626
Xenolepidichthys sp.	56.70 4620	4.81	
Antigonia capros	46.20 588	3.92	
Epinephelus haifensis	31.60 2	2.68	
Illex coindettii	30.66 1470	2.60	
Pentheroscion mbizi	14.28 84	1.21	
MACROURIDAE	12.60 420	1.07	
Dentex angolensis	12.60 84	1.07	
Synagrops microlepis	9.24 2772	0.78	
Zenopsis conchifer	7.80 6	0.66	
Brotula barbata	7.78 8	0.66	
Trigla lyra	7.14 84	0.61	
Chlorophthalmus atlanticus	6.72 1260	0.57	
Dicologlossa cuneata	5.88 252	0.50	
'Unidentified crab'	4.20 378	0.36	
Bembrops greyi	2.52 378	0.21	
Perestedion cataphractum *	1.26 42	0.11	
Microchirus wittei	1.26 42	0.11	
Chascanopsetta lugubris	0.84 84	0.07	
Syacium micrurum	0.42 42	0.04	
GCNEPLACIDAE	0.04 42		
Total	1179.96	100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 553
 DATE:14/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 614
 start stop duration Long E 346
 TIME :09:05:25 09:05:34 30 (min) Purpose code: 3
 LOG :8222.93 8224.35 1.41 Area code : 5
 FDEPTH: 77 77 GearCond.code:
 BDEPTH: 77 77 Validity code:
 Towing dir: 80° Wire out: 240 m Speed: 30 kn*10
 Sorted: 27 Kg Total catch: 156.84 CATCH/HOUR: 313.68

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Dentex angolensis	94.04 748	29.98	2632
Sepia officinalis hierredda	44.60 92	14.22	
Priacanthus arenatus	41.80 558	13.33	
Dentex congongensis	23.40 638	7.46	2630
Sphyræna guachancho	15.12 90	4.82	
Epinephelus aeneus	12.20 2	3.89	
Pagellus bellottii	11.52 252	3.67	2631
Squatina oculata	8.16 10	2.60	
Boops boops	7.56 198	2.41	2627
Trigla lyra	6.58 216	2.10	
Ariomma bondi	6.58 116	2.10	2628
Pseudupeneus prayensis	6.40 116	2.04	2629
Cynoglossus canariensis	4.32 8	1.38	
Brachydeuterus auritus	4.32 54	1.38	
Scorpaena scrofa	4.06 8	1.29	
Illex coindettii	3.42 44	1.09	
Brotula barbata	2.98 10	0.95	
Dentex canariensis	2.88 8	0.92	
Raja miraletus	2.74 10	0.87	
Uranoscopus albesca	2.52 8	0.80	
Fistularia petimba	2.50 14	0.80	
Pagrus caeruleostictus	2.26 8	0.72	
Citharus linguatula	2.08 234	0.66	
G A S T R O P O D S	0.54 8	0.17	
Syacium micrurum	0.54 98	0.17	
Chaetodon marcellae	0.46 8	0.15	
Calappa pelli	0.10 8	0.03	
Total	313.68	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 554
 DATE:14/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 622
 start stop duration Long E 347
 TIME :11:07:00 12:06:51 30 (min) Purpose code: 3
 LOG :8237.98 8239.47 1.46 Area code : 5
 FDEPTH: 25 25 GearCond.code:
 BDEPTH: 25 25 Validity code:
 Towing dir: 90° Wire out: 125 m Speed: 30 kn*10
 Sorted: 16 Kg Total catch: 16.37 CATCH/HOUR: 32.74

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Alectis alexandrinus	11.54 18	35.25	2633
Scomberomorus tritor	5.82 10	17.78	2634
Ephippion guttifer	4.52 4	13.81	
Sphyræna agra	3.56 4	10.87	2636
Priacanthus arenatus	1.98 20	6.05	
Elops lacerta	1.62 4	4.95	
Sepia orbignyana	0.90 2	2.75	
Sardinella aurita	0.60 2	1.83	
Balistes punctatus	0.54 2	1.65	
Pomadasyg jubelini	0.50 2	1.53	
Chaetodipterus gorensis	0.46 4	1.41	2635
Lethrinus atlanticus	0.34 2	1.04	
Raja miraletus	0.20 2	0.61	
Boops boops	0.06 2	0.18	
Eucinostomus melanopterus	0.06 2	0.18	
Lepidotrigla cadmani	0.04 2	0.12	
Total	32.74	100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 555
 DATE:14/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 620
 start stop duration Long E 405
 TIME :14:14:18 14:44:28 30 (min) Purpose code: 3
 LOG :8257.24 8258.67 1.43 Area code : 5
 FDEPTH: 18 19 GearCond.code:
 BDEPTH: 18 19 Validity code:
 Towing dir: 280e Wire out: 105 m Speed: 30 kn*10
 Sorted: 29 Kg Total catch: 71.94 CATCH/HOUR: 143.88

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	47.26	2790	32.85	
Pentanemus quinquarius	15.66	550	10.88	2640
Pseudolithus typhus	15.56	350	10.81	2637
Galeoides decadactylus	9.66	264	6.71	2638
Scomberomorus tritor	7.74	44	5.38	2641
Caranx hippos	7.66	36	5.32	
Chloroscombrus chrysurus	7.66	264	5.32	2644
Nemastopalaemon hastatus	6.76	2070	4.70	
Ilisha africana	4.90	574	3.41	2647
Pseudolithus epiperus	3.30	60	2.29	2645
Pteroscion pelli	2.36	70	1.64	2643
Sphyræna afra	1.92	6	1.33	2639
Squilla acuelata calmani	1.90	114	1.32	
Callinectes amnicola	1.66	70	1.15	
Selene dorsalis	1.66	120	1.15	2646
Drepane africana	1.64	40	1.14	
Sepiella ornata	1.50	370	1.04	
Brachydeuterus auritus	1.46	30	1.01	2642
Parapenaeopsis atlantica	1.06	164	0.74	
Pomadasy jubelini	0.54	4	0.38	
Sphyræna guachancho	0.54	4	0.38	
Lagocephalus laevigatus	0.26	10	0.18	
Sardinella maderensis	0.20	24	0.14	
Halobatrachus didactylus	0.20	2	0.14	
Psettodes belcheri	0.16	4	0.11	
Pythonichthys microphthalmus	0.16	10	0.11	
Pseudolithus senegalensis	0.16	20	0.11	
Cynoglossus browni	0.10	4	0.07	
Ephippion guttifer	0.10	20	0.07	
Peristedion cataphractum	0.08	2	0.06	
Brotula barbata	0.06	4	0.04	
Total	143.88		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 556
 DATE:14/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 617
 start stop duration Long E 402
 TIME :15:58:23 16:28:25 30 (min) Purpose code: 3
 LOG :8266.78 8268.44 1.63 Area code : 5
 FDEPTH: 38 35 GearCond.code:
 BDEPTH: 38 35 Validity code:
 Towing dir: 100e Wire out: 155 m Speed: 30 kn*10
 Sorted: 24 Kg Total catch: 73.00 CATCH/HOUR: 146.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Galeoides decadactylus	25.36	490	17.37	2652
Trichiurus lepturus	18.90	490	12.95	
Sphyræna guachancho	18.00	140	12.33	2649
Selene dorsalis	15.80	426	10.82	2650
Ilisha africana	11.24	750	7.70	2651
Portunus validus	10.40	80	7.12	
Chloroscombrus chrysurus	9.86	110	6.75	2654
Brachydeuterus auritus	6.16	126	4.22	2656
Scomberomorus tritor	6.10	24	4.18	2648
Drepane africana	4.16	126	2.85	
Pomadasy jubelini	3.70	20	2.53	
Sepia officinalis hierredda	3.06	16	2.10	
Penaeus notialis	2.50	60	1.71	
Pteroscion pelli	2.20	66	1.51	2655
Caranx hippos	1.70	6	1.16	
Pseudolithus typhus	1.46	16	1.00	
Sardinella maderensis	1.34	40	0.92	2653
Psettodes belcheri	0.80	10	0.55	
Lagocephalus laevigatus	0.70	10	0.48	
Squilla acuelata calmani	0.46	20	0.32	
Calappa rubroguttata	0.46	6	0.32	
Epinephelus aeneus	0.40	6	0.27	
Ephippion guttifer	0.36	20	0.25	
Chaetodipterus goreensis	0.26	6	0.18	
Parapenaeopsis atlantica	0.20	30	0.14	
Penaeus kerathurus	0.20	6	0.14	
Antennarius sp.	0.10	20	0.07	
Pentanemus quinquarius	0.06	6	0.04	
Sicyonia galeata	0.06	26	0.04	
Total	146.00		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 557
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 603
 start stop duration Long E 413
 TIME :06:17:04 06:23:37 7 (min) Purpose code: 3
 LOG :8355.41 8355.72 0.30 Area code : 5
 FDEPTH: 98 98 GearCond.code:
 BDEPTH: 98 98 Validity code: 3
 Towing dir: 105e Wire out: 270 m Speed: 30 kn*10
 Sorted: 25 Kg Total catch: 25.06 CATCH/HOUR: 214.80

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	40.97	531	19.07	
Uranoscopus albesca	27.60	283	12.85	
Dentex congoensis	25.80	669	12.01	2657
Portunus validus	13.54	86	6.30	
Lepidotrigla cadmani	12.43	240	5.79	
Dentex angolensis	12.09	137	5.63	2658
Gobius sp.	9.94	1706	4.63	
Pythonichthys microphthalmus	9.43	34	4.39	
Citharus linguatula	8.66	86	4.03	
Octopus vulgaris	7.54	51	3.51	
Cynoglossus canariensis	6.77	26	3.15	
Raja miraletus	6.17	26	2.87	
Dicologlossa cuneata	4.37	51	2.03	
Microchirus frechkopi	3.86	94	1.80	
Lepidotrigla carolae	3.43	154	1.60	
Illex coindetii	3.43	86	1.60	
Lophiodon kempii	3.26	26	1.52	
Sphyræna guachancho	2.57	26	1.20	
Scorpaena normani	2.23	43	1.04	
Trichiurus lepturus	1.97	43	0.92	
Syacium micrurum	1.97	377	0.92	
Serranus accraensis	1.71	103	0.80	
Sphoeroides pachgaster	1.11	26	0.52	
Brotula barbata	0.94	9	0.44	
Ariomma bondi	0.77	26	0.36	
HOLLTHUROIDEA	0.60	60	0.28	
Solenocera africana	0.51	103	0.24	
Priacanthus arenatus	0.43	17	0.20	
Blennius normani	0.43	17	0.20	
Physiculus huloti	0.26	9	0.12	
Total	214.79		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 558
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 611
 start stop duration Long E 415
 TIME :08:20:15 08:50:02 30 (min) Purpose code: 3
 LOG :8369.51 8371.04 1.51 Area code : 5
 FDEPTH: 42 42 GearCond.code:
 BDEPTH: 42 42 Validity code:
 Towing dir: 100e Wire out: 140 m Speed: 30 kn*10
 Sorted: 45 Kg Total catch: 45.18 CATCH/HOUR: 90.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	21.40	788	23.68	2659
Chloroscombrus chrysurus	18.28	202	20.23	2661
Portunus validus	16.90	68	18.70	
Sepia officinalis hierredda	9.40	26	10.40	
Sphyræna guachancho	4.74	98	5.25	2662
Scomberomorus tritor	4.34	8	4.80	
Pagellus bellottii	4.30	52	4.76	2660
Parapenaeus longirostris	2.40	442	2.66	
Trichiurus lepturus	1.58	204	1.75	
Citharus linguatula	1.14	58	1.26	
Epinephelus aeneus	1.14	4	1.26	
Grammolites gruvelli	1.10	68	1.22	
Saurida brasiliensis	0.84	292	0.93	
Lolligonula mercatoris	0.54	480	0.60	
Sardinella maderensis	0.54	8	0.60	
Selene dorsalis, juveniles	0.42	152	0.46	
Balistes capricus	0.40	2	0.44	
Psettodes belcheri	0.20	2	0.22	
Fistularia petimba	0.18	4	0.20	
Alloteuthis africana	0.16	54	0.18	
Lagocephalus laevigatus	0.14	10	0.15	
Illex coindetii	0.04	2	0.04	
Sepiella ornata	0.04	16	0.04	
Sicyonia galeata	0.04	16	0.04	
Lepidotrigla carolae	0.02	2	0.02	
Gobius sp.	0.02	2	0.02	
Naucrates ductor	0.02	2	0.02	
Decapterus macarellus	0.02	10	0.02	
Serranus accraensis	0.02	6	0.02	
Total	90.36		99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 559
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 615
 start stop duration Long E 418
 TIME :10:02:25 10:32:03 30 (min) Purpose code: 3
 LOG :8379.45 8381.08 1.61 Area code : 5
 FDEPTH: 23 26 GearCond.code:
 BDEPTH: 23 26 Validity code:
 Towing dir: 130e Wire out: 120 m Speed: 30 kn*10

Sorted: 57 Kg Total catch: 610.14 CATCH/HOUR: 1220.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	825.40	8780	67.64	2665
Sphyraena guachancho	91.80	280	7.52	2663
Trichiurus lepturus	57.00	3860	4.67	
Caranx senegallus	52.60	160	4.31	
Sphyraena afra	51.00	10	4.18	
Pomadasyd jubelini	27.00	120	2.21	
Hemicaranx bicolor	22.40	140	1.84	
Sardinella maderensis	19.00	160	1.56	
Scomberomorus tritor	15.62	88	1.28	2664
Pteroscion pelli	12.20	440	1.00	
Galeoides decadactylus	9.60	200	0.79	
Selene dorsalis	7.80	80	0.64	
Brachydeuterus auritus	6.80	100	0.56	
Portunus validus	6.40	40	0.52	
Ilisha africana	5.80	640	0.48	
Pseudotolithus typus	4.34	34	0.36	2666
Caranx hippos	2.00	20	0.16	
Raja miraletus	1.20	4	0.10	
Elops lacerta	0.98	4	0.08	
Parapeneopsis atlantica	0.60	100	0.05	
Drepane africana	0.40	20	0.03	
ANTENNARIIDAE	0.20	20	0.02	
Halobatrachus didactylus	0.14	2	0.01	
Total	1220.28		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 560
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 605
 start stop duration Long E 434
 TIME :12:34:11 12:50:58 17 (min) Purpose code: 3
 LOG :8398.85 8399.60 0.73 Area code : 5
 FDEPTH: 25 25 GearCond.code:
 BDEPTH: 25 25 Validity code:
 Towing dir: 300e Wire out: 115 m Speed: 30 kn*10

Sorted: 21 Kg Total catch: 76.35 CATCH/HOUR: 269.47

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	81.53	1112	30.26	2667
Pseudotolithus senegalensis	41.72	1080	15.48	2673
Sphyraena guachancho	41.12	187	15.26	2668
Scomberomorus tritor	12.92	85	4.79	2669
Selene dorsalis	12.28	381	4.56	2670
Pteroscion pelli	11.86	1461	4.40	2674
Galeoides decadactylus	10.06	1112	3.73	2671
Elops lacerta	9.74	42	3.61	
Parapeneopsis atlantica	6.99	487	2.59	
Portunus validus	6.99	180	2.59	
Ilisha africana	6.25	519	2.32	2675
Sepiella ornata	5.93	32	2.20	
Cynoglossus canariensis	5.40	233	2.00	
Cynoponticus ferox	4.02	11	1.49	
Trichiurus lepturus	3.18	265	1.18	
Sardinella maderensis	3.04	28	1.13	2672
Drepane africana	1.69	53	0.63	
Squilla acuelata calmani	1.69	95	0.63	
Peneaus monodon	0.78	4	0.29	
Peneaus notialis	0.64	32	0.24	
Batrachoides didactylus *	0.53	7	0.20	
Brachydeuterus auritus	0.32	11	0.12	
ANTENNARIIDAE	0.32	32	0.12	
Citharichthys stampflii	0.18	11	0.07	
C R A B S	0.11	32	0.04	
Ehippion guttifer	0.11	11	0.04	
Gobioideus sp	0.11	21	0.04	
Total	269.51		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 561
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 603
 start stop duration Long E 430
 TIME :14:09:30 14:39:15 30 (min) Purpose code: 3
 LOG :8407.86 8409.62 1.75 Area code : 5
 FDEPTH: 45 42 GearCond.code:
 BDEPTH: 45 42 Validity code:
 Towing dir: 120e Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 29.73 CATCH/HOUR: 59.46

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	15.60	640	26.24	2678
Sphyraena guachancho	10.92	56	18.37	2676
Selene dorsalis	7.60	116	12.78	2680
Sardinella maderensis	7.22	72	12.14	2681
Pagellus bellottii	5.54	50	9.32	2679
Chloroscombrus chrysurus	3.56	34	5.99	2677
Portunus validus	2.68	8	4.51	
Sepia officinalis hierredda	0.96	6	1.61	
Scomberomorus tritor	0.78	2	1.31	
Saurida brasiliensis	0.74	242	1.24	
Lolligoncula mercatoris	0.64	762	1.08	
Parapeneaus longirostris	0.54	128	0.91	
Alloteuthis africana	0.48	120	0.81	
Elops lacerta	0.46	2	0.77	
Citharus linguatula	0.38	16	0.64	
Grammolites gruvelli	0.36	32	0.61	
Decapterus punctatus	0.24	6	0.40	
Pteroscion pelli	0.24	12	0.40	
Trichiurus lepturus	0.16	16	0.27	
Peneaus notialis	0.12	8	0.20	
Sepiella ornata	0.10	18	0.17	
Sicyonia sp.	0.08	14	0.13	
C R A B S	0.02	10	0.03	
Uranoscopus albesca	0.02	2	0.03	
Serranus accraensis	0.02	4	0.03	
Total	59.46		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 562
 DATE:15/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 557
 start stop duration Long E 427
 TIME :16:20:26 16:50:11 30 (min) Purpose code: 3
 LOG :8420.02 8421.69 1.65 Area code : 5
 FDEPTH: 91 81 GearCond.code:
 BDEPTH: 91 81 Validity code:
 Towing dir: 110e Wire out: 290 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 113.34 CATCH/HOUR: 226.68

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	85.20	432	37.59	
Pentheroscion mbizi	34.08	318	15.03	2683
Sardinella aurita	26.40	288	11.65	2682
Illex coindetii	9.78	120	4.31	
Dentex angolensis	8.52	96	3.76	
Citharus linguatula	5.94	372	2.62	
Uranoscopus albesca	5.40	78	2.38	
Raja miraletus	5.34	32	2.36	
Chilomycterus spinosus mauret.	5.04	24	2.22	
Mustelus mustelus	4.80	2	2.12	
Scutina oculata	4.70	4	2.07	
Dentex congoensis	4.38	66	1.93	
Sphyraena guachancho	4.14	18	1.83	
Lepidotrigla cadmani	3.78	72	1.67	
Octopus vulgaris	3.30	36	1.46	
Priacanthus arenatus	3.06	48	1.35	
Portunus validus	1.92	6	0.85	
Trichiurus lepturus	1.80	36	0.79	
Boops boops	1.74	24	0.77	
Brotula barbata	0.96	6	0.42	
Parapeneopsis atlantica	0.90	114	0.40	
Fistularia petimba	0.84	12	0.37	
Brachydeuterus auritus	0.84	6	0.37	
Sardinella maderensis	0.82	8	0.36	
Cynoglossus canariensis	0.60	6	0.26	
Scorpaena normani	0.48	12	0.21	
Lepidotrigla carolae	0.42	18	0.19	
Serranus accraensis	0.30	12	0.13	
Lophiodes kempi	0.30	6	0.13	
Syacium micrum	0.24	42	0.11	
Microchirus frechkopi	0.24	6	0.11	
Serranus africana	0.18	6	0.08	
Gobius sp	0.12	18	0.05	
Grammolites gruvelli	0.12	6	0.05	
Total	226.68		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 563
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 544
 start stop duration Long E 436
 TIME :06:17:11 06:38:36 21 (min) Purpose code: 3
 LOG :8507.92 8508.89 0.96 Area code : 5
 FDEPTH: 118 106 GearCond.code:
 BDEPTH: 118 106 Validity code:
 Towing dir: 145° Wire out: 340 m Speed: 30 kn*10

Sorted: 38 Kg Total catch: 113.34 CATCH/HOUR: 323.83

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	188.14	6223	58.10	2686
Pentheroscion mbizi	63.17	489	19.51	2684
Illex coindetii	11.91	411	3.68	
Dentex angolensis	10.03	94	3.10	2685
Uranoscopus albesca	10.03	171	3.10	
Raja miraletus	5.66	26	1.75	
Sepia officinalis hierredda	4.63	111	1.43	
Priacanthus arenatus	3.86	69	1.19	
Dactylopterus volitans	3.86	9	1.19	
Pterothrissus belloci	3.77	26	1.16	
Trichiurus lepturus	3.34	69	1.03	
Brotula barbata	3.17	9	0.98	
Citharus linguatula	2.74	94	0.85	
Parapenaeus longirostris	2.31	489	0.71	
Lepidotrigla cadmani	2.31	34	0.71	
Octopus vulgaris	1.37	17	0.42	
Pontinus accraensis	0.94	17	0.29	
Ephippion guttifer	0.77	9	0.24	
Saurida brasiliensis	0.60	154	0.19	
Syacium micrurum	0.43	86	0.13	
Gobius sp	0.43	51	0.13	
Zeus faber	0.26	9	0.08	
Antennarius sp.	0.09	9	0.03	
Total	323.82		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 564
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 547
 start stop duration Long E 438
 TIME :07:58:15 08:28:47 31 (min) Purpose code: 3
 LOG :8516.22 8517.75 1.51 Area code : 5
 FDEPTH: 62 62 GearCond.code:
 BDEPTH: 62 62 Validity code:
 Towing dir: 150° Wire out: 180 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 287.42 CATCH/HOUR: 556.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	212.52	14667	38.20	2687
Selene dorsalis	196.84	1986	35.38	2688
Sepia officinalis hierredda	28.05	383	5.04	
Epinephelus aeneus	16.45	2	2.96	
Decapterus punctatus	14.98	122	2.69	
Sphyræna guachancho	11.67	70	2.10	
Grammolites gruvelli	9.41	401	1.69	
Raja straeleni	6.79	105	1.22	
Chilomycterus spinosus mauret.	6.62	17	1.19	
Citharus linguatula	5.75	540	1.03	
Squatina oculata	5.42	2	0.97	
Saurida brasiliensis	5.05	1132	0.91	
Lepidotrigla cadmani	4.88	105	0.88	
Pentheroscion mbizi	4.53	52	0.81	
Priacanthus arenatus	4.01	35	0.72	
Ariomma bondi	3.83	122	0.69	
Gobius sp	3.31	557	0.60	
Serranus accraensis	3.31	122	0.60	
Parapenaeus longirostris	2.79	366	0.50	
Pagrus caeruleostictus	2.09	17	0.38	
Pagellus bellottii	1.92	17	0.35	
Uranoscopus albesca	1.39	17	0.25	
Illex coindetii	1.22	17	0.22	
Pseudupeneus prayensis	0.87	52	0.16	
Dicologlossa cuneata	0.70	17	0.13	
Syacium micrurum	0.70	139	0.13	
Lepidotrigla carolae	0.52	52	0.09	
Fistularia petimba	0.52	17	0.09	
Alloteuthis africana	0.17	105	0.03	
Total	556.31		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 565
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 550
 start stop duration Long E 441
 TIME :09:45:54 10:15:55 30 (min) Purpose code: 3
 LOG :8526.03 8527.60 1.56 Area code : 5
 FDEPTH: 39 38 GearCond.code:
 BDEPTH: 39 38 Validity code:
 Towing dir: 125° Wire out: 140 m Speed: 30 kn*10

Sorted: 35 Kg Total catch: 87.95 CATCH/HOUR: 175.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	102.60	5370	58.33	2773
Portunus validus	24.76	104	14.08	
Selene dorsalis	18.36	144	10.44	2689
Sepia officinalis hierredda	10.40	14	5.91	
Sphyræna guachancho	6.60	84	3.75	
Saurida brasiliensis	4.76	1660	2.71	
Scomberomorus tritor	2.10	4	1.19	
Parapenaeopsis atlantica	1.46	260	0.83	
Grammolites gruvelli	1.40	84	0.80	
Pseudupeneus prayensis	1.00	10	0.57	
Lagocephalus laevis	0.96	24	0.55	
Penaeus notialis	0.46	34	0.26	
Alloteuthis africana	0.26	54	0.15	
Serranus accraensis	0.20	4	0.11	
Gobius sp	0.16	54	0.09	
Trichiurus lepturus	0.16	14	0.09	
Sardinella maderensis	0.10	4	0.06	
Sepiella ornata	0.10	10	0.06	
Pteroscacion peli	0.06	4	0.03	
Total	175.90		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 566
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 553
 start stop duration Long E 443
 TIME :11:27:11 11:57:14 30 (min) Purpose code: 3
 LOG :8535.11 8536.75 1.61 Area code : 5
 FDEPTH: 28 27 GearCond.code:
 BDEPTH: 28 27 Validity code:
 Towing dir: 145° Wire out: 120 m Speed: 30 kn*10

Sorted: 37 Kg Total catch: 134.82 CATCH/HOUR: 269.64

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	71.68	686	26.58	2690
Sphyræna guachancho	69.16	420	25.65	2692
Chloroscombrus chrysurus	58.04	832	21.52	2693
Brachydeuterus auritus	49.42	806	18.33	2691
Portunus validus	5.10	24	1.89	
Caranx hippos	3.22	14	1.19	
Sardinella maderensis	2.76	72	1.02	2694
Drepane africana	2.04	28	0.76	
Caranx senegalus	1.96	6	0.73	
Caranx crysos	1.40	14	0.52	
Galeoides decadactylus	1.40	42	0.52	
Scomberomorus tritor	1.38	6	0.51	
Pteroscacion peli	0.56	6	0.21	
Lolligoncula mercatoris	0.42	496	0.16	
Penaeus notialis	0.42	28	0.16	
Saurida brasiliensis	0.28	76	0.10	
Trichiurus lepturus	0.08	6	0.03	
Sepiella ornata	0.08	14	0.03	
Antennarius sp.	0.08	6	0.03	
Cynoglossus browni	0.08	6	0.03	
Parapenaeopsis atlantica	0.08	14	0.03	
Alectis alexandrinus	0.08	8	0.03	
Total	269.72		100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 567
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 533
 start stop duration Long E 445
 TIME :14:37:28 15:07:14 30 (min) Purpose code: 3
 LOG :8559.76 8561.28 1.48 Area code : 5
 FDEPTH: 78 64 GearCond.code:
 BDEPTH: 78 64 Validity code:
 Towing dir: 62° Wire out: 230 m Speed: 30 kn*10

Sorted: 35 Kg Total catch: 70.62 CATCH/HOUR: 141.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	35.20	1600	24.92	
Squatina oculata	16.88	20	11.95	
Priacanthus arenatus	14.80	1236	10.48	
Saurida brasiliensis	12.24	2572	8.67	
Lepidotrigla cadmani	8.56	192	6.06	
Citharus linguatula	7.76	700	5.49	
Pentheroscion mbizi	7.24	88	5.13	2695
Uranoscopus albesca	6.36	60	4.50	
Alloteuthis africana	4.00	1044	2.83	
Serranus accraensis	3.76	124	2.66	
Cymbium pepo	2.92	2	2.07	
Grammolites gruvelli	2.80	96	1.98	
Brachydeuterus auritus	2.12	28	1.50	
Illex coindetii	1.92	20	1.36	
Gobius sp	1.76	236	1.25	
Dentex angolensis	1.64	24	1.16	
Parapenaeus longirostris	1.48	216	1.05	
Chilomycterus spinosus mauret.	1.40	12	0.99	
Syacium micrurum	1.28	240	0.91	
Fistularia petimba	0.92	12	0.65	
Brotula barbata	0.64	8	0.45	
Sphyræna guachancho	0.64	4	0.45	
Lepidotrigla carolae	0.60	24	0.42	
Ariomma bondi	0.56	8	0.40	
Fontinus accraensis	0.52	36	0.37	
Chloroscombrus chrysurus	0.52	8	0.37	
Decapterus punctatus	0.52	16	0.37	
Lophiodon kempii	0.40	16	0.28	
Pseudupeneus prayensis	0.32	8	0.23	
Trichiurus lepturus	0.32	12	0.23	
Todaropsis eblanae	0.24	4	0.17	
Scyllarides herklotsii	0.16	16	0.11	
Raja miraletus	0.12	4	0.08	
Microchirus frechkopi	0.12	4	0.08	
Blennius sp.	0.12	24	0.08	
Zeus faber	0.12	4	0.08	
Liocarcinus corrugatus	0.08	8	0.06	
Lagocephalus laevis	0.08	4	0.06	
Sphaeroides marmoratus	0.08	8	0.06	
Antennarius sp.	0.04	4	0.03	
Total	141.24		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 568
 DATE:16/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 530
 start stop duration Long E 444
 TIME :16:28:35 16:58:18 30 (min) Purpose code: 3
 LOG :8569.61 8571.19 1.56 Area code : 5
 FDEPTH: 105 109 GearCond.code:
 BDEPTH: 105 109 Validity code:
 Towing dir: 317° Wire out: 320 m Speed: 30 kn*10
 Sorted: 41 Kg Total catch: 369.46 CATCH/HOUR: 738.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Illex coindetii	265.50	5148	35.93	
Ariomma bondi	258.30	12798	34.96	2696
Squatina oculata	86.40	54	11.69	
Saurida brasiliensis	19.08	3474	2.58	
Priacanthus arenatus	17.28	450	2.34	
Dentex angolensis	16.20	162	2.19	
Todaropsis eblanae	12.60	576	1.71	
Citharus linguatula	11.88	756	1.61	
Lepidotrigla cadmani	9.90	198	1.34	
Fistularia petimba	7.38	54	1.00	
Raja miraletus	6.30	18	0.85	
Sepia officinalis hierredda	4.16	14	0.56	
Trichiurus lepturus	3.78	72	0.51	
Dentex congolensis	3.42	54	0.46	
Lepidotrigla carolae	3.42	180	0.46	
Pterothrissus belloni	2.52	18	0.34	
Uranoscopus albesca	2.52	36	0.34	
Pentheroscion mbizi	2.16	18	0.29	
Lophiodes kempi	1.80	18	0.24	
Gobius sp	1.62	54	0.22	
Sphoeroides pachgaster	1.62	36	0.22	
Octopus vulgaris	1.08	18	0.15	
Pontinus accraensis	0.72	18	0.10	
Syacium micrurum	0.54	90	0.07	
Total	740.18		100.16	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 569
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 518
 start stop duration Long E 446
 TIME :06:34:54 06:43:32 9 (min) Purpose code: 3
 LOG :8649.39 8649.79 0.39 Area code : 5
 FDEPTH: 152 151 GearCond.code:
 BDEPTH: 152 151 Validity code:
 Towing dir: 160° Wire out: 450 m Speed: 30 kn*10
 Sorted: 25 Kg Total catch: 75.80 CATCH/HOUR: 505.33

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	233.40	8780	46.19	2697
Sepia officinalis hierredda	31.40	520	6.21	
Antigonia capros	31.40	680	6.21	
Uranoscopus albesca	23.20	480	4.59	
Todaropsis eblanae	21.00	740	4.16	
Pterothrissus belloni	20.40	200	4.04	
Priacanthus arenatus	18.40	200	3.64	
Trichiurus lepturus	16.80	220	3.32	
Pentheroscion mbizi	15.60	100	3.09	
Peristedion cataphractum	13.20	420	2.61	
Dentex angolensis	12.00	120	2.37	
Citharus linguatula	8.80	380	1.74	
Gobius sp	8.00	1820	1.58	
Saurida brasiliensis	6.80	1880	1.35	
Grammolites gruvelli	6.40	140	1.27	
Brotula barbata	6.40	20	1.27	
Lepidotrigla cadmani	5.93	80	1.17	
Raja miraletus	5.00	20	0.99	
Pontinus accraensis	4.80	60	0.95	
Lepidotrigla carolae	3.80	140	0.75	
Octopus vulgaris	3.00	20	0.59	
Pythonichthys microphthalmus	2.80	20	0.55	
Illex coindetii	1.80	80	0.36	
Parapenaeus longirostris	1.60	480	0.32	
Squilla mantis	1.40	20	0.28	
Bembrops greyi	0.80	20	0.16	
Sphoeroides pachgaster	0.60	20	0.12	
Physiculus huloti	0.60	20	0.12	
Total	505.33		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 570
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 520
 start stop duration Long E 451
 TIME :08:19:07 08:49:04 30 (min) Purpose code: 3
 LOG :8659.30 8660.81 1.51 Area code : 5
 FDEPTH: 83 81 GearCond.code:
 BDEPTH: 83 81 Validity code:
 Towing dir: 160° Wire out: 2209 m Speed: 30 kn*10
 Sorted: 41 Kg Total catch: 41.28 CATCH/HOUR: 82.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Priacanthus arenatus	16.90	594	20.47	
Sepia officinalis hierredda	13.24	92	16.04	
Ariomma bondi	10.10	202	12.23	
Squatina oculata	9.20	4	11.14	
Lepidotrigla cadmani	7.44	166	9.01	
Fistularia petimba	3.06	26	3.71	
Alloteuthis africana	3.04	612	3.68	
Dentex angolensis	2.96	52	3.59	
Citharus linguatula	2.72	174	3.29	
Chilomycterus spinosus mauret.	2.36	8	2.86	
Raja miraletus	1.80	8	2.18	
Saurida brasiliensis	1.46	238	1.77	
Uranoscopus albesca	1.38	20	1.67	
Cymbium pape	1.30	2	1.57	
Illex coindetii	0.76	10	0.92	
Pentheroscion mbizi	0.76	6	0.92	
Serranus accraensis	0.54	20	0.65	
Pontinus kuhlii	0.52	14	0.63	
Parapenaeus longirostris	0.48	62	0.58	
Syacium micrurum	0.42	80	0.51	
Lophiodes kempi	0.38	4	0.46	
Pseudupeneus prayensis	0.36	4	0.44	
Antigonia capros	0.24	6	0.29	
Grammolites gruvelli	0.22	8	0.27	
Gobius sp	0.22	28	0.27	
Peristedion cataphractum	0.20	4	0.24	
Trichiurus lepturus	0.16	4	0.19	
Lepidotrigla carolae	0.14	8	0.17	
Physiculus huloti	0.12	6	0.15	
Pecten jacobus	0.04	4	0.05	
Scyllarides herklotsii	0.04	2	0.05	
Total	82.56		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 571
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 522
 start stop duration Long E 456
 TIME :10:25:31 10:55:06 30 (min) Purpose code: 3
 LOG :8672.14 8673.60 1.44 Area code : 5
 FDEPTH: 48 46 GearCond.code:
 BDEPTH: 48 46 Validity code:
 Towing dir: 140° Wire out: 140 m Speed: 30 kn*10
 Sorted: 26 Kg Total catch: 80.54 CATCH/HOUR: 161.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus Juv.	109.80	11928	68.16	
Sepiella ornata juv.	37.80	9120	23.47	
Priacanthus arenatus	3.90	120	2.42	
Parapenaeus longirostris	2.16	234	1.34	
Portunus validus	2.16	6	1.34	
Saurida brasiliensis	0.66	150	0.41	
Grammolites gruvelli	0.54	16	0.34	
Sphyraena guachancho	0.54	18	0.34	
Alloteuthis africana	0.54	306	0.34	
Octopus vulgaris	0.50	14	0.31	
Trichiurus lepturus	0.42	96	0.26	
Lagocephalus laevigatus	0.36	18	0.22	
Citharus linguatula	0.36	30	0.22	
Penaeus notialis	0.34	8	0.21	
Cynoglossus canariensis	0.26	2	0.16	
Epinephelus aeneus	0.18	2	0.11	
Serranus accraensis	0.12	12	0.07	
Lepidotrigla cadmani	0.12	6	0.07	
Selene dorsalis	0.12	42	0.07	
ANTENNARIIDAE	0.08	4	0.05	
Sicyonia sp.	0.06	12	0.04	
Pseudupeneus prayensis	0.06	6	0.04	
Pecten jacobus	0.06	6	0.04	
Total	161.14		100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 572
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 524
 start stop duration Long E 501
 TIME :12:17:55 12:47:46 30 (min) Purpose code: 3
 LOG :8682.88 8684.51 1.59 Area code : 5
 FDEPTH: 25 26 GearCond.code:
 BDEPTH: 25 26 Validity code:
 Towing dir: 163ø Wire out: 120 m Speed: 30 kn*10
 Sorted: 41 Kg Total catch: 92.91 CATCH/HOUR: 185.82

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Trichiurus lepturus	57.90 1686	31.16	2706
Hemicaranx bicolor	38.76 402	20.86	2698
Ilisha africana	25.14 1218	13.53	2704
Scomberomorus tritor	11.34 46	6.10	2699
Sphyræna guachancho	6.44 30	3.47	2701
Chloroscombrus chrysurus	5.82 84	3.13	2700
Pseudolithus senegalensis	4.80 12	2.58	
Galeoides decadactylus	4.08 78	2.20	
Caranx senegalensis	3.68 20	1.98	2703
Selene dorsalis	3.00 126	1.61	2705
Stromateus fiatola	2.78 6	1.50	
Trachinotus ovatus	2.16 12	1.16	
Pseudolithus typus	2.04 18	1.10	
Portunus validus	2.02 24	1.09	
Brachydeuterus auritus	1.98 60	1.07	
Sepiella ornata	1.92 312	1.03	
Pisodonophis semicinctus	1.86 6	1.00	
Pteroscion peli	1.86 102	1.00	
Penaeus monodon	1.64 18	0.88	
Aluterus monoceros	1.62 6	0.87	
Raja miraletus	0.90 6	0.48	
Penaeus notialis	0.80 24	0.43	
Sepiella ornata juv.	0.78 558	0.42	
Sardinella maderensis	0.74 30	0.40	2702
Antennarius sp.	0.42 60	0.23	
Todaropsis eblanae	0.42 6	0.23	
Squilla mantis	0.30 6	0.16	
Lepidotrigla cadmani	0.24 6	0.13	
Cynoglossus browni	0.18 18	0.10	
Citharus linguatula	0.12 6	0.06	
Parapenaeopsis atlantica	0.06 6	0.03	
Priacanthus arenatus	0.02 4	0.01	
Total	185.82	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 574
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 505
 start stop duration Long E 501
 TIME :16:41:35 17:13:42 32 (min) Purpose code: 3
 LOG :8712.22 8713.72 1.50 Area code : 5
 FDEPTH: 61 61 GearCond.code:
 BDEPTH: 61 61 Validity code:
 Towing dir: 333ø Wire out: 195 m Speed: 30 kn*10
 Sorted: 32 Kg Total catch: 68.55 CATCH/HOUR: 128.53

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Brachydeuterus auritus Juv.	39.38 5021	30.64	
Saurida brasiliensis	21.38 4759	16.63	
Sepia officinalis hierredda	15.98 248	12.43	
Mustelus mustelus	8.06 6	6.27	
Grammolites gruvelli	6.15 300	4.78	
Ariomma bondi	5.70 90	4.43	
Serranus accraensis	3.64 203	2.83	
Lagocephalus laevigatus	3.15 53	2.45	
Citharus linguatula	3.08 229	2.40	
GOBIIDAE	2.59 338	2.02	
Alloteuthis africana	2.44 518	1.90	
Illex coindetii	2.25 26	1.75	
Pentheroscion mbizi	2.06 26	1.60	
Parapenaeus longirostris	1.99 300	1.55	
Syacium micrurum	1.76 240	1.37	
Raja miraletus	1.35 34	1.05	
Pseudupeneus prayensis	1.31 64	1.02	
Lepidotrigla carolae	1.09 86	0.85	
Priacanthus arenatus	0.79 26	0.61	
Epinephelus aeneus	0.66 4	0.51	
Antennarius sp.	0.64 26	0.50	
Scyllarides herklotsii	0.64 53	0.50	
Dicologlossa cuneata	0.64 15	0.50	
G A S T R O P O D S	0.49 98	0.38	
Seriola carpenteri	0.34 2	0.26	
Sphyræna guachancho	0.26 8	0.20	
Selar crumenophthalmus	0.23 8	0.18	
Chilomycterus spinosus mauret.	0.23 4	0.18	
Microchirus frechkopi	0.19 8	0.15	
Fistularia petimba	0.08 4	0.06	
Sicyonia galeata	0.04 15	0.03	
Total	128.59	100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 573
 DATE:17/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 508
 start stop duration Long E 506
 TIME :14:49:33 15:19:26 30 (min) Purpose code: 3
 LOG :8701.12 8702.50 1.37 Area code : 5
 FDEPTH: 41 40 GearCond.code:
 BDEPTH: 41 40 Validity code:
 Towing dir: 340ø Wire out: 165 m Speed: 30 kn*10
 Sorted: 30 Kg Total catch: 60.83 CATCH/HOUR: 121.66

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Brachydeuterus auritus	30.20 448	24.82	2708
Parapenaeus longirostris	14.36 5544	11.80	
Sphyræna guachancho	11.88 268	9.76	2707
Sepiella ornata	9.24 1192	7.59	
Pteroscion peli	6.96 1276	5.72	
Dicologlossa cuneata	6.84 260	5.62	
Grammolites gruvelli	6.52 788	5.36	
Portunus validus	6.12 32	5.03	
Cynoglossus canariensis	5.40 44	4.44	
Saurida brasiliensis	4.76 1440	3.91	
Trichiurus lepturus	3.44 344	2.83	
Selene dorsalis	2.92 1012	2.40	
Penaeus notialis	2.72 232	2.24	
Sepia officinalis hierredda	2.40 4	1.97	
Citharus linguatula	2.00 296	1.64	
Cynoponticus ferax	1.54 2	1.27	
Hemicaranx bicolor	0.84 8	0.69	
Parapenaeopsis atlantica	0.64 248	0.53	
Trachinotus ovatus	0.64 4	0.53	
Galeoides decadactylus	0.48 4	0.39	
Sicyonia galeata	0.36 148	0.30	
Ilisha africana	0.32 8	0.26	
Pythonichthys microphthalmus	0.28 20	0.23	
Serranus accraensis	0.28 64	0.23	
Epinephelus aeneus	0.20 4	0.16	
Antennarius sp.	0.16 4	0.13	
Lagocephalus laevigatus	0.08 4	0.07	
GOBIIDAE	0.08 8	0.07	
Total	121.66	99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 575
 DATE:18/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 451
 start stop duration Long E 459
 TIME :06:15:39 06:45:39 30 (min) Purpose code: 3
 LOG :8788.39 8789.87 1.49 Area code : 5
 FDEPTH: 103 108 GearCond.code:
 BDEPTH: 103 108 Validity code:
 Towing dir: 160ø Wire out: 300 m Speed: 30 kn*10
 Sorted: 35 Kg Total catch: 153.51 CATCH/HOUR: 307.02

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
weight numbers			
Ariomma bondi	156.80 8336	51.07	2712
Pentheroscion mbizi	28.80 272	9.38	2711
Dentex angolensis	20.56 152	6.70	2710
Epinephelus aeneus	16.10 2	5.24	
Sepia officinalis hierredda	14.80 240	4.82	
Lepidotrigla cadmani	9.60 192	3.13	
Dentex congoensis	8.72 104	2.84	2709
Uranoscopus albesca	8.72 128	2.84	
Citharus linguatula	8.16 512	2.66	
Illex coindetii	6.24 584	2.03	
Squatina oculata	4.30 2	1.40	
Raja miraletus	3.04 24	0.99	
Priacanthus arenatus	3.04 112	0.99	
Lepidotrigla carolae	2.88 144	0.94	
Fistularia petimba	2.88 28	0.94	
Pontinus accraensis	2.64 64	0.86	
Brotula barbata	2.24 6	0.73	
Gobioiodes sp.	1.68 288	0.55	
Sphoeroides pachgaster	1.12 32	0.36	
Syacium micrurum	1.12 112	0.36	
Zeus faber	0.94 2	0.31	
Todaropsis eblanae	0.64 32	0.21	
Grammolites gruvelli	0.64 16	0.21	
Sea urchins (weak spines)	0.56 48	0.18	
Microchirus frechkopi	0.24 8	0.08	
Lophiodes kempi	0.24 24	0.08	
Venus verrucosa	0.16 8	0.05	
Scyllarides herklotsii	0.08 8	0.03	
Saurida brasiliensis	0.08 16	0.03	
Total	307.02	100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 576
 DATE:18/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 454
 start stop duration Long E 504
 TIME :08:24:53 08:55:23 31 (min) Purpose code: 3
 LOG :8801.04 8802.56 1.51 Area code : 5
 FDEPTH: 69 69 GearCond.code:
 BDEPTH: 69 69 Validity code:
 Towing dir: 150e Wire out: 210 m Speed: 30 kn*10
 Sorted: 42 Kg Total catch: 41.63 CATCH/HOUR: 80.57

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
<i>Sepia officinalis hierredda</i>	21.85	333	27.12	
<i>Brachydeuterus auritus</i>	17.81	1572	22.11	2714
<i>Ariomma bondi</i>	6.74	205	8.37	2713
<i>Lepidotrigla carolae</i>	4.03	172	5.00	
<i>Cymbium cymbium</i>	3.87	6	4.80	
<i>Saurida brasiliensis</i>	3.81	832	4.73	2715
<i>Serranus accraensis</i>	3.19	116	3.96	
<i>Citharus linguatula</i>	2.48	178	3.08	
<i>Alloteuthis africana</i>	2.40	619	2.98	
<i>Illex coindetii</i>	1.82	23	2.26	
<i>Grammolites gruvelli</i>	1.68	89	2.09	
<i>Fistularia petimba</i>	1.41	31	1.75	
<i>Priacanthus arenatus</i>	1.37	45	1.70	
<i>Syacium micrurum</i>	1.22	215	1.51	
<i>Venus verrucosa</i>	1.14	45	1.41	
<i>Gobioideus sp</i>	0.72	108	0.89	
<i>Octopus vulgaris</i>	0.68	10	0.84	
<i>Pentheroscion mbizi</i>	0.54	6	0.67	
<i>Epinephelus aeneus</i>	0.52	4	0.65	
<i>Parapenaeus longirostris</i>	0.48	56	0.60	
<i>Raja miraletus</i>	0.41	14	0.51	
<i>Dentex angolensis</i>	0.31	4	0.38	
<i>Uranoscopus albesca</i>	0.29	6	0.36	
<i>Pseudupeneus prayensis</i>	0.29	8	0.36	
<i>Microchirus frechkopi</i>	0.23	12	0.29	
<i>Sphyræna guachancho</i>	0.19	4	0.24	
<i>Cardita ajar</i>	0.19	10	0.19	
<i>Scyllarides herklotsii</i>	0.15	15	0.19	
<i>Spherooides marmoratus</i>	0.15	12	0.19	
<i>Chilomycterus spinosus mauret.</i>	0.14	2	0.17	
<i>Sepiella ornata</i>	0.12	89	0.15	
<i>Liocarcinus corrugatus</i>	0.10	12	0.12	
<i>Dicologlossa cuneata</i>	0.06	2	0.07	
<i>Pontinus accraensis</i>	0.04	8	0.05	
<i>Pecten jacobus</i>	0.04	4	0.05	
<i>Lophiodes kempfi</i>	0.02	2	0.02	
<i>Blennius normani</i>	0.02	2	0.02	
Total	80.47		99.88	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 577
 DATE:18/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 457
 start stop duration Long E 510
 TIME :10:23:52 10:53:51 30 (min) Purpose code: 3
 LOG :8812.91 8814.50 1.58 Area code : 5
 FDEPTH: 42 42 GearCond.code:
 BDEPTH: 42 42 Validity code:
 Towing dir: 160e Wire out: 140 m Speed: 3 kn*10
 Sorted: 30 Kg Total catch: 50.03 CATCH/HOUR: 100.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
<i>Brachydeuterus auritus</i>	36.08	2238	36.06	2716
<i>Trichiurus lepturus</i>	24.66	1422	24.65	2724
<i>Selene dorsalis</i>	14.02	170	14.01	2717
<i>Sphyræna guachancho</i>	4.38	56	4.38	
<i>Sepia officinalis hierredda</i>	3.16	30	3.16	
<i>Parapenaeus longirostris</i>	2.50	538	2.50	
<i>Pseudolithus senegalensis</i>	1.90	6	1.90	
<i>Penaeus notialis</i>	1.62	102	1.62	
<i>Pentheroscion mbizi</i>	1.56	50	1.56	
<i>Cerax hippos</i>	1.46	4	1.46	
<i>Portunus validus</i>	1.40	6	1.40	
<i>Lagocephalus laevigatus</i>	1.22	4	1.22	
<i>Lepidotrigla carolae</i>	1.16	6	1.16	
<i>Priacanthus arenatus</i>	1.12	14	1.12	
<i>Ilisha africana</i>	0.86	50	0.86	
<i>Brotula barbata</i>	0.70	10	0.70	
<i>Raja miraletus</i>	0.56	14	0.56	
<i>Sardinella maderensis</i>	0.44	6	0.44	
<i>Citharus linguatula</i>	0.26	44	0.26	
<i>Antennarius sp.</i>	0.24	20	0.24	
<i>Grammolites gruvelli</i>	0.24	10	0.24	
<i>Epinephelus aeneus</i>	0.16	4	0.16	
<i>Octopus vulgaris</i>	0.14	6	0.14	
<i>Serranus cabrilla</i>	0.10	10	0.10	
<i>Pseudupeneus prayensis</i>	0.06	4	0.06	
<i>Saurida brasiliensis</i>	0.04	103	0.04	
<i>Selene dorsalis, juveniles</i>	0.04	40	0.04	
Total	100.08		100.04	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 578
 DATE:18/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 439
 start stop duration Long E 519
 TIME :13:12:01 13:43:01 31 (min) Purpose code: 3
 LOG :8835.20 8836.90 1.70 Area code : 5
 FDEPTH: 39 40 GearCond.code:
 BDEPTH: 39 40 Validity code:
 Towing dir: 337e Wire out: 165 m Speed: 3 kn*10
 Sorted: 37 Kg Total catch: 70.37 CATCH/HOUR: 136.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
<i>Brachydeuterus auritus</i>	74.52	3172	54.71	2718
<i>Selene dorsalis</i>	20.52	188	15.07	2720
<i>Chloroscombrus chrysurus</i>	15.97	145	11.73	2721
<i>Scomberomorus tritor</i>	9.48	31	6.96	2719
<i>Portunus validus</i>	2.94	12	2.16	
<i>Sphyræna guachancho</i>	2.28	8	1.67	
<i>Trichiurus lepturus</i>	1.99	157	1.46	
<i>Octopus vulgaris</i>	1.94	2	1.42	
<i>Selar crumenophthalmus</i>	1.30	10	0.95	
<i>Grammolites gruvelli</i>	0.97	8	0.71	
<i>Aluterus monoceros</i>	0.81	2	0.59	
<i>Sepiella ornata</i>	0.77	145	0.57	
<i>Sardinella maderensis</i>	0.64	6	0.47	
<i>Alectis alexandrinus</i>	0.64	2	0.47	
<i>Cynoglossus canariensis</i>	0.52	2	0.38	
<i>Penaeus notialis</i>	0.31	14	0.23	
<i>Scyllarides herklotsii</i>	0.25	139	0.18	
<i>Lagocephalus laevigatus</i>	0.14	120	0.10	
<i>Sicyonia galeata</i>	0.08	29	0.06	
<i>Saurida brasiliensis</i>	0.08	54	0.06	
<i>Gobius sp</i>	0.04	12	0.03	
<i>Antennarius sp.</i>	0.02	4	0.01	
Total	136.21		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 579
 DATE:18/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 438
 start stop duration Long E 515
 TIME :14:55:42 15:25:23 30 (min) Purpose code: 3
 LOG :8845.02 8846.55 1.48 Area code : 5
 FDEPTH: 62 62 GearCond.code:
 BDEPTH: 62 62 Validity code:
 Towing dir: 337e Wire out: 205 m Speed: 3 kn*10
 Sorted: 22 Kg Total catch: 22.52 CATCH/HOUR: 45.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
<i>Mustelus mustelus</i>	7.70	2	17.10	
<i>Brachydeuterus auritus</i>	6.40	1028	14.21	2723
<i>Saurida brasiliensis</i>	6.08	1308	13.50	
<i>Selar crumenophthalmus</i>	3.46	26	7.68	2722
<i>Sepia officinalis hierredda</i>	2.14	152	4.75	
<i>Cymbium pepo</i>	2.04	2	4.53	
<i>Parapenaeus longirostris</i>	1.76	244	3.91	
<i>Alloteuthis africana</i>	1.64	370	3.64	
<i>Grammolites gruvelli</i>	1.52	104	3.37	
<i>Syacium micrurum</i>	1.40	134	3.11	
<i>Raja miraletus</i>	1.20	8	2.66	
'Unidentified crab'	1.14	184	2.53	
<i>Serranus accraensis</i>	0.90	34	2.00	
<i>Fistularia petimba</i>	0.90	12	2.00	
<i>Lepidotrigla cadmani</i>	0.82	18	1.82	
<i>Trichiurus lepturus</i>	0.76	76	1.69	2727
<i>Citharus linguatula</i>	0.74	62	1.64	
<i>Scyllarides herklotsii</i>	0.68	140	1.51	
<i>Priacanthus arenatus</i>	0.58	82	1.29	
<i>Lagocephalus laevigatus</i>	0.48	8	1.07	
<i>Portunus validus</i>	0.36	2	0.80	
<i>Calappa peiia</i>	0.32	2	0.71	
<i>Octopus vulgaris</i>	0.32	4	0.71	
<i>Illex coindetii</i>	0.26	2	0.58	
C R A B S	0.24	16	0.53	
<i>Blennius normani</i>	0.22	24	0.49	
<i>Chloroscombrus chrysurus</i>	0.20	2	0.44	
<i>Microchirus frechkopi</i>	0.18	8	0.40	
<i>Spherooides marmoratus</i>	0.14	20	0.31	
<i>Bathygobius paganellus</i>	0.12	34	0.27	
<i>Lepidotrigla carolae</i>	0.10	18	0.22	
<i>Lophiodes kempfi</i>	0.08	12	0.18	
<i>Sicyonia galeata</i>	0.06	18	0.13	
<i>Dentex angolensis</i>	0.04	4	0.09	
<i>Ariomma bondi</i>	0.04	8	0.09	
<i>Pontocaris lacazei</i>	0.02	2	0.04	
<i>Pontinus accraensis</i>	0.02	12	0.04	
<i>Decapterus punctatus</i>	0.02	4	0.04	
<i>Antennarius sp.</i>	0.02	4	0.04	
Total	45.10		100.12	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 580
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 437
 start stop duration Long E 512
 TIME :16:31:54 16:52:47 21 (min) Purpose code: 3
 LOG :8853.33 8854.29 0.97 Area code : 5
 FDEPTH: 90 89 GearCond.code:
 BDEPTH: 90 89 Validity code:
 Towing dir: 340e Wire out: 285 m Speed: 30 kn*10

Sorted: 48 Kg Total catch: 66.95 CATCH/HOUR: 191.29

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Epinephelus aeneus	35.71	6	18.67	
Ariomma bondi	26.57	754	13.89	2726
Lepidotrigla cadmani	24.80	589	12.96	
Sepia officinalis hierredda	24.80	514	12.96	
Citharus linguatula	16.63	1240	8.69	
Dentex canariensis	8.00	200	4.18	2725
Uranoscopus albesca	7.26	91	3.80	
Squatina oculata	6.71	6	3.51	
Scorpaena scrofa	5.89	11	3.08	
Bathygobius paganellus	4.74	543	2.48	
Lepidotrigla carolae	3.89	200	2.03	
Pontinus accraensis	3.43	137	1.79	
Alloteuthis africana	2.63	989	1.37	
Pentheroscion mbizi	2.57	23	1.34	
Microchirus frechkopi	2.51	86	1.31	
Priacanthus arenatus	2.29	29	1.20	
Syacium micrurum	1.66	320	0.87	
Illex coindetii	1.54	17	0.81	
Dicologlossa cuneata	1.37	29	0.72	
Pythonichthys microphthalmus	1.31	23	0.68	
Calappa pelli	1.26	11	0.66	
Fistularia petimba	1.26	17	0.66	
Lophiodes kemp	0.91	40	0.48	
Serranus accraensis	0.69	34	0.36	
Saurida brasiliensis	0.51	103	0.27	
Grammolites gruvelli	0.46	17	0.24	
Sphoeroides marmoratus	0.40	17	0.21	
Trachinus lineolatus	0.34	11	0.18	
'Unidentified crab'	0.29	51	0.15	
Octopus vulgaris	0.29	6	0.15	
C R A B S	0.17	6	0.09	
Blennius normani	0.11	6	0.06	
Physiculus huloti	0.11	6	0.06	
Brotula barbata	0.11	6	0.06	
Gobius sp	0.06	6	0.03	
Total	191.28		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 581
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 425
 start stop duration Long E 514
 TIME :06:22:32 06:27:12 5 (min) Purpose code: 3
 LOG :8948.11 8948.33 0.21 Area code : 5
 FDEPTH: 142 142 GearCond.code:
 BDEPTH: 142 142 Validity code:
 Towing dir: 150e Wire out: 420 m Speed: 30 kn*10

Sorted: Kg Total catch: 24.50 CATCH/HOUR: 294.00

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Uranoscopus albesca	50.88	636	17.31	
Lepidotrigla cadmani	41.28	672	14.04	
Sepia officinalis hierredda	34.68	660	11.80	
Brotula barbata	29.76	132	10.12	2729
Pontinus accraensis	23.04	408	7.84	
Grammolites gruvelli	17.04	600	5.80	
Dentex angolensis	15.36	108	5.22	2730
Citharus linguatula	15.12	540	5.14	2728
Priacanthus arenatus	13.08	132	4.45	
Pythonichthys microphthalmus	9.84	96	3.35	
Bathygobius paganellus	9.48	1440	3.22	
Pterothrissus belloni	4.92	36	1.67	
Raja miraletus	3.96	24	1.35	
Illex coindetii	3.48	84	1.18	
Saurida brasiliensis	3.12	756	1.06	
Pentheroscion mbizi	3.12	24	1.06	
Lophiodes kemp	2.76	24	0.94	
Octopus vulgaris	2.16	48	0.73	
Trichiurus lepturus	1.56	48	0.53	
Dicologlossa cuneata	1.32	12	0.45	
Todaropsis eblanae	1.20	60	0.41	
Antigonia capros	1.20	48	0.41	
Parapenaeus longirostris	0.96	228	0.33	
Microchirus frechkopi	0.96	24	0.33	
Lepidotrigla carolae	0.96	60	0.33	
F O L Y C H A E T A	0.72	12	0.24	
Ariomma bondi	0.72	36	0.24	
HOLUTHUROIDEA	0.60	84	0.20	
Sphoeroides pachgaster	0.24	12	0.08	
Scyllarides herklotsii	0.12	12	0.04	
Cynoglossus canariensis	0.12	12	0.04	
Total	293.76		99.91	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 582
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 428
 start stop duration Long E 518
 TIME :08:00:54 08:29:17 28 (min) Purpose code: 3
 LOG :8957.42 8958.80 1.37 Area code : 5
 FDEPTH: 66 65 GearCond.code:
 BDEPTH: 66 65 Validity code:
 Towing dir: 150e Wire out: 200 m Speed: 30 kn*10

Sorted: Kg Total catch: 32.63 CATCH/HOUR: 69.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	26.89	1954	38.46	2732
Selene dorsalis	9.54	124	13.64	2731
Alloteuthis africana	8.38	6144	11.99	
Sepia officinalis hierredda	6.00	126	8.58	
Mustelus mustelus	4.26	2	6.09	
Saurida brasiliensis	3.34	782	4.78	
Selar crumenophthalmus	1.11	9	1.59	
Fistularia petimba	1.05	15	1.50	
Citharus linguatula	1.03	133	1.47	
Illex coindetii	0.75	15	1.07	
Pagellus bellottii	0.73	15	1.04	
Raja miraletus	0.71	6	1.02	
Blennius normani	0.64	47	0.92	
Chilomycterus spinosus mauret.	0.56	6	0.80	
Sea urchins (strong spines)	0.49	116	0.70	
Priacanthus arenatus	0.47	41	0.67	
Syacium micrurum	0.45	92	0.64	
Serranus accraensis	0.41	17	0.59	
Lophiodes kemp	0.36	2	0.51	
Grammolites gruvelli	0.34	13	0.49	
Pseudopenaeus prayensis	0.34	13	0.34	
Lagocephalus laevigatus	0.21	4	0.30	
Pythonichthys microphthalmus	0.19	2	0.27	
Parapenaeus longirostris	0.17	26	0.24	
Peristedion cataphractum	0.17	4	0.24	
Uranoscopus albesca	0.17	2	0.24	
Pontinus kuhlii	0.17	11	0.24	
Ariomma bondi	0.17	26	0.24	
Penaeus notialis	0.17	6	0.24	
Antennarius sp.	0.15	2	0.21	
Scyllarides herklotsii	0.11	9	0.16	
Antigonia capros	0.09	2	0.13	
C R A B S	0.06	4	0.09	
Bathygobius paganellus	0.04	4	0.06	
HOLUTHUROIDEA	0.02	2	0.03	
Sphoeroides marmoratus	0.02	2	0.03	
Total	69.66		99.61	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 583
 DATE:19/ 6/04 GEAR TYPE: PT No: 2 POSITION:Lat N 427
 start stop duration Long E 512
 TIME :09:07:41 09:36:03 28 (min) Purpose code: 3
 LOG :8960.57 8963.34 2.77 Area code : 5
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 57 49 Validity code:
 Towing dir: 60e Wire out: 100 m Speed: 43 kn*10

Sorted: 1 Kg Total catch: 0.87 CATCH/HOUR: 1.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Euthynnus alletteratus	1.56	2	83.87	
Illex coindetii	0.30	16	16.13	
Total	1.86		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 584
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 431
 start stop duration Long E 525
 TIME :10:51:45 11:21:28 30 (min) Purpose code: 3
 LOG :8972.01 8973.42 1.39 Area code : 5
 FDEPTH: 30 30 GearCond.code:
 BDEPTH: 30 30 Validity code:
 Towing dir: 160e Wire out: 120 m Speed: 3 kn*10

Sorted: 32 Kg Total catch: 32.02 CATCH/HOUR: 64.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	13.94	242	21.77	2733
Galeoides decadactylus	13.06	230	20.39	2734
Scomberomorus tritor	6.42	20	10.02	2738
Portunus validus	5.02	38	7.84	
Drepane africana	4.20	42	6.56	2735
Trichiurus lepturus	3.44	718	5.37	
Sphyræna guanchæno	3.10	36	4.84	2740
Alectis alexandrinus	2.22	30	3.47	2736
Pseudotolithus senegalensis	2.06	8	3.22	
Selene dorsalis	1.58	48	2.47	2739
Pseudotolithus typus	1.52	8	2.37	
Raja miraletus	1.52	18	2.37	
Chloroscombrus chrysurus	1.32	14	2.06	
Penaeus notialis	0.94	38	1.47	
Caranx senegalensis	0.62	2	0.97	
Citharus linguatula	0.46	20	0.72	
C R A B S	0.42	70	0.66	
Ilisha africana	0.42	32	0.66	2737
Sardinella maderensis	0.34	20	0.53	2741
Epinephelus aeneus	0.24	2	0.37	
Squilla cadenati	0.16	8	0.25	
Lepidotrigla carolae	0.14	4	0.22	
Pteroscion pelli	0.12	2	0.19	
Scyllarides herklotsii	0.12	38	0.19	
Lagocephalus laevigatus	0.10	2	0.16	
Monochirus hispidus	0.02	2	0.03	
Total	63.50		99.17	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 585
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 414
 start stop duration Long E 531
 TIME :13:24:44 13:54:32 30 (min) Purpose code: 3
 LOG :8991.48 8992.98 1.48 Area code : 5
 FDEPTH: 33 33 GearCond.code:
 BDEPTH: 33 33 Validity code:
 Towing dir: 335ø Wire out: 145 m Speed: 30 kn*10
 Sorted: 28 Kg Total catch: 28.30 CATCH/HOUR: 56.60

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Portunus validus	10.40	38	18.37	
Sphyræna guachancho	10.30	48	18.20	2742
Caranx crysos	7.62	32	13.46	
Scomberomorus tritor	4.74	14	8.37	2743
Selene dorsalis	4.28	46	7.56	2745
Chloroscombrus chrysurus	3.88	48	6.86	2744
Ballistes capriscus	3.62	22	6.40	
Pseudupeneus prayensis	3.00	26	5.30	
Pagrus caeruleostictus	2.54	20	4.49	2746
Sea cucumbers	1.84	4	3.25	
Sepia officinalis hierredda	1.52	2	2.69	
Lagocephalus laevigatus	1.46	12	2.58	
Chilomycterus spinosus mauret.	0.60	4	1.06	
Fistularia tabacaria	0.34	2	0.60	
Selar crumenophthalmus	0.32	2	0.57	
Brachydeuterus auritus	0.10	26	0.18	
Scyllarides sp.	0.02	6	0.04	
Total	56.58		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 586
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 414
 start stop duration Long E 526
 TIME :15:01:17 15:31:32 30 (min) Purpose code: 3
 LOG :9000.70 9002.28 1.58 Area code : 5
 FDEPTH: 59 57 GearCond.code:
 BDEPTH: 59 57 Validity code:
 Towing dir: 150ø Wire out: 195 m Speed: 30 kn*10
 Sorted: Kg Total catch: 32.08 CATCH/HOUR: 64.16

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	30.12	194	31.36	2747
Paragaleus pectoralis	9.10	4	14.18	
Priacanthus arenatus	8.48	120	13.22	
Brachydeuterus auritus	4.20	368	6.55	2748
Alloteuthis africana	3.56	828	5.55	
Sphyræna guachancho	2.38	8	3.71	
Pseudupeneus prayensis	2.16	28	3.37	
Saurida brasiliensis	1.86	496	2.90	
Selar crumenophthalmus	1.82	16	2.84	
Portunus validus	1.52	4	2.37	
Ballistes capriscus	1.04	4	1.62	
Caranx crysos	0.82	4	1.28	
Syacium micrurum	0.76	162	1.18	
Raja miraletus	0.76	4	1.18	
Sepia officinalis hierredda	0.74	26	1.15	
Epinephelus aeneus	0.70	4	1.09	
Citharus linguatula	0.70	30	1.09	
Chloroscombrus chrysurus	0.64	8	1.00	
Pagellus bellottii	0.52	4	0.81	
Lagocephalus laevigatus	0.50	8	0.78	
Pagrus caeruleostictus	0.24	2	0.37	
Calappa sp.	0.16	2	0.25	
Chilomycterus spinosus mauret.	0.16	2	0.25	
Grammolites gruvelli	0.16	12	0.25	
Brotula barbata	0.14	2	0.22	
Lepidotrigla cadmani	0.14	4	0.22	
Lophiodes kemp	0.10	4	0.16	
Galeoides decadactylus	0.10	2	0.16	
Bathygobius paganellus	0.08	34	0.12	
Sepiella ornata	0.06	6	0.09	
Scyllarides herklotsii	0.06	8	0.09	
Microchirus frechkopi	0.04	2	0.06	
Antennarius sp.	0.04	2	0.06	
Monochirus hispidus	0.02	2	0.03	
Total	63.88		99.56	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 587
 DATE:19/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 412
 start stop duration Long E 524
 TIME :16:41:54 17:11:37 30 (min) Purpose code: 3
 LOG :9009.87 9011.38 1.53 Area code : 5
 FDEPTH: 96 88 GearCond.code:
 BDEPTH: 96 88 Validity code:
 Towing dir: 150ø Wire out: 309 m Speed: 30 kn*10
 Sorted: 54 Kg Total catch: 83.67 CATCH/HOUR: 167.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	40.84	836	24.41	2751
Epinephelus aeneus	28.80	4	17.21	
Sepia officinalis hierredda	28.36	128	16.95	
Alloteuthis africana	14.68	5784	8.77	
Dentex angolensis	13.10	168	7.83	2749
Lepidotrigla cadmani	7.64	152	4.57	
Brotula barbata	5.48	40	3.27	
Squatina oculata	4.60	232	2.75	
Uranoscopus albesca	4.12	52	2.46	
Trichiurus lepturus	3.32	68	1.98	
Dentex congoensis	3.16	44	1.89	2750
Illex coindetii	1.80	20	1.08	
Chilomycterus spinosus mauret.	1.48	12	0.88	
Pontinus accraensis	1.36	4	0.81	
Saurida brasiliensis	1.32	320	0.79	
Selene dorsalis	1.28	12	0.76	
Parapenaeus longirostris	0.96	136	0.57	
Todarodes sagittatus	0.84	52	0.50	
Microchirus frechkopi	0.56	192	0.33	
Priacanthus arenatus	0.56	16	0.33	
Dactylopterus volitans	0.52	4	0.31	
Pentheroscion mbizi	0.52	4	0.31	
Raja miraletus	0.44	4	0.26	
Calappa pelli	0.44	4	0.26	
Grammolites gruvelli	0.28	4	0.17	
Citharus linguatula	0.24	8	0.14	
Fistularia petimba	0.24	4	0.14	
Lepidotrigla carolae	0.20	8	0.12	
Physiculus huloti	0.12	8	0.07	
Serranus accraensis	0.08	4	0.05	
Total	167.34		99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 588
 DATE:20/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 357
 start stop duration Long E 530
 TIME :06:32:06 06:39:21 7 (min) Purpose code: 3
 LOG :9111.91 9112.23 0.31 Area code : 5
 FDEPTH: 126 111 GearCond.code:
 BDEPTH: 126 111 Validity code:
 Towing dir: 150ø Wire out: 350 m Speed: 30 kn*10
 Sorted: 23 Kg Total catch: 56.60 CATCH/HOUR: 485.14

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lepidotrigla cadmani	115.71	2417	23.85	
Sepia officinalis hierredda	66.00	1354	13.60	
Pontinus accraensis	62.91	1286	12.97	
Mustelus mustelus	43.71	17	9.01	
Dentex angolensis	35.31	317	7.28	2752
Uranoscopus albesca	33.94	34	7.00	
Brotula barbata	30.09	94	6.20	2754
Dentex congoensis	22.37	274	4.61	2753
Citharus linguatula	17.31	891	3.57	
Pterothrissus belloci	12.00	86	2.47	
Bathygobius paganellus	9.77	1457	2.01	
Priacanthus arenatus	8.74	103	1.80	
Pentheroscion mbizi	7.03	51	1.45	
Todaropsis eblanae	4.63	257	0.95	
Lepidotrigla carolae	3.43	154	0.71	
Trichiurus lepturus	2.06	34	0.42	
Grammolites gruvelli	1.89	69	0.39	
Lophiodes kemp	1.89	34	0.39	
Dicologlossa cuneata	1.71	34	0.35	
Raja miraletus	1.54	34	0.32	
Maja goetziana	1.03	17	0.21	
P O L Y C H A E T A	0.69	17	0.14	
Physiculus huloti	0.69	17	0.14	
Microchirus frechkopi	0.51	17	0.11	
Syacium micrurum	0.17	17	0.04	
Total	485.13		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 589
 DATE:20/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 359
 start stop duration Long E 532
 TIME :08:01:41 08:11:33 30 (min) Purpose code: 3
 LOG :9119.43 9120.99 1.55 Area code : 5
 FDEPTH: 68 64 GearCond.code:
 BDEPTH: 68 64 Validity code:
 Towing dir: 150ø Wire out: 210 m Speed: 30 kn*10

Sorted: Kg Total catch: 39.72 CATCH/HOUR: 79.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Alloteuthis africana	18.90	14440	23.79	
Sepia officinalis hierredda	17.86	50	22.48	
Musculus mastelus	11.36	14	14.30	
Dentex angolensis	4.56	28	5.74	2756
Priacanthus arenatus	4.52	72	5.69	
Lepidotrigla cadmani	4.28	124	5.39	
Decapterus punctatus	3.84	86	4.83	2757
Epinephelus aeneus	2.30	6	2.90	
Todaropsis eblanae	1.72	116	2.17	
Raja miraletus	1.60	6	2.01	
Fistularia petimba	1.58	26	1.99	
Dentex congoensis	1.26	20	1.59	2755
Chilomycterus spinosus mauret.	1.24	10	1.56	
Zeus faber	0.74	4	0.93	
Citharus linguatula	0.60	50	0.76	
Illex coindetii	0.52	4	0.65	
Pontinus kuhlii	0.48	6	0.60	
Grammoplites gruvelli	0.32	14	0.40	
Brotula barbata	0.32	2	0.40	
Pseudupeneus prayensis	0.30	2	0.38	
Sardinella aurita	0.22	2	0.28	
Selar crumenophthalmus	0.20	2	0.25	
Syacium micrurum	0.18	38	0.23	
Trichiurus lepturus	0.14	2	0.18	
Sphaeroides marmoratus	0.12	10	0.15	
Brachydeuterus auritus	0.08	2	0.10	
Ariomma bondi	0.06	6	0.08	
Pecten jacobus	0.04	2	0.05	
Total	79.34		99.88	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 590
 DATE:20/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 405
 start stop duration Long E 537
 TIME :10:12:02 10:41:32 30 (min) Purpose code: 3
 LOG :9133.57 9135.00 1.44 Area code : 5
 FDEPTH: 36 36 GearCond.code:
 BDEPTH: 36 36 Validity code:
 Towing dir: 140ø Wire out: 120 m Speed: 30 kn*10

Sorted: 28 Kg Total catch: 27.69 CATCH/HOUR: 55.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	7.76	20	14.01	
Caranx crysos	7.22	44	13.04	2760
Selene dorsalis	6.12	66	11.05	
Sphyræna guachancho	5.52	18	9.97	2761
Pseudupeneus prayensis	5.08	50	9.17	2762
Balistes caprisicus	4.48	34	8.09	2759
Brachydeuterus auritus	3.44	54	6.21	2758
HOLTHUROIDEA	3.20	10	5.78	
Scomberomorus tritor	3.06	12	5.53	2763
Chloroscombrus chrysurus	1.66	24	3.00	
Lagocephalus laevigatus	1.48	16	2.67	
J E L L Y F I S H	1.46	82	2.64	
Portunus validus	1.08	4	1.95	
Pagrus caeruleostictus	0.92	16	1.66	
Decapterus punctatus	0.72	14	1.30	
Dentex canariensis	0.50	2	0.90	
Lolligoncula mercatoris	0.48	352	0.87	
Selar crumenophthalmus	0.44	4	0.79	
Priacanthus arenatus	0.32	2	0.58	
Lepidotrigla cadmani	0.20	4	0.36	
Chilomycterus spinosus mauret.	0.08	2	0.14	
Syacium micrurum	0.08	2	0.14	
Pontinus accraensis	0.06	2	0.11	
Scyllarides herklotsii	0.02	2	0.04	
Total	55.38		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 591
 DATE:20/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 411
 start stop duration Long E 542
 TIME :12:14:58 12:44:40 30 (min) Purpose code: 3
 LOG :9146.19 9147.76 1.56 Area code : 5
 FDEPTH: 25 25 GearCond.code:
 BDEPTH: 25 25 Validity code:
 Towing dir: 136ø Wire out: 105 m Speed: 3 kn*10

Sorted: 48 Kg Total catch: 67.01 CATCH/HOUR: 134.02

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Trichiurus lepturus	55.00	596	41.04	2770
Chloroscombrus chrysurus	35.00	1120	26.12	
Pseudotolithus typus	7.60	86	5.67	2769
Scomberomorus tritor	6.14	46	4.58	2766
Rhizoprionodon acutus	4.30	16	3.21	
Pomadasys jubelini	3.88	10	2.90	2764
Galeoides decadactylus	3.80	50	2.84	
Pseudotolithus senegalensis	2.66	14	1.98	2767
Ilisha africana	2.60	186	1.94	
Sphyræna guachancho	1.68	10	1.25	
Lagocephalus laevigatus	1.48	2	1.10	
Sepiella ornata juv.	1.40	244	1.04	
Selene dorsalis	1.26	116	0.94	
Pseudotolithus elongatus	1.00	20	0.75	2768
Pteroscion pelli	0.96	16	0.72	
Portunus validus	0.86	20	0.64	
Sardinella maderensis	0.82	16	0.61	2765
ANTENNARIIDAE	0.66	4	0.49	
Caranx hippos	0.66	4	0.49	
Caranx crysos	0.66	4	0.49	
Brachydeuterus auritus	0.60	10	0.45	
Pseudupeneus prayensis	0.48	4	0.36	
Squilla acuelata calmani	0.36	26	0.27	
Penaeus notialis	0.26	10	0.19	
Penaeus monodon	0.26	2	0.19	
Balistes caprisicus	0.22	2	0.16	
Pentanemus quinquarius	0.22	4	0.16	
Pseudotolithus brachygnathus	0.20	2	0.15	
Pseudotolithus epipercus	0.16	2	0.12	
Hemicaranx bicolor juv.	0.04	4	0.03	
Drepane africana	0.02	2	0.01	
Total	135.24		100.89	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 592
 DATE:20/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 408
 start stop duration Long E 556
 TIME :15:17:13 15:37:34 20 (min) Purpose code: 3
 LOG :9162.79 9163.80 0.99 Area code : 5
 FDEPTH: 22 22 GearCond.code:
 BDEPTH: 22 22 Validity code:
 Towing dir: 280ø Wire out: 105 m Speed: 30 kn*10

Sorted: 16 Kg Total catch: 77.54 CATCH/HOUR: 232.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ilisha africana	67.80	2982	29.15	
Pseudotolithus typus	56.25	123	24.18	2771
Pseudotolithus senegalensis	49.20	135	21.15	2772
Galeoides decadactylus	14.22	138	6.11	
Scomberomorus tritor	7.20	30	3.10	
Portunus validus	5.16	87	2.22	
Chloroscombrus chrysurus	4.86	300	2.09	
Elops lacerta	4.26	18	1.83	
Trichiurus lepturus	3.84	306	1.65	
Epinephelus aeneus	3.30	3	1.42	
Rhizoprionodon acutus	3.18	9	1.37	
Sphyræna guachancho	1.98	9	0.85	
Sardinella maderensis	1.53	30	0.66	
Pteroscion pelli	1.44	42	0.62	
Selene dorsalis	1.08	24	0.46	
Sepiella ornata	0.96	102	0.41	
Pseudotolithus epipercus	0.93	12	0.40	
Caranx hippos	0.66	6	0.28	
Pentanemus quinquarius	0.63	12	0.27	
Pomadasys jubelini	0.60	3	0.26	
Halobatrachus didactylus	0.60	6	0.26	
Drepane africana	0.54	18	0.23	
Cynoglossus browni	0.54	6	0.23	
Trachinotus ovatus	0.48	3	0.21	
Cymbium cymbium	0.27	6	0.12	
Fanulirus regius	0.27	3	0.12	
Brachydeuterus auritus	0.24	3	0.10	
Parapenaeopsis atlantica	0.24	57	0.10	
Lagocephalus laevigatus	0.12	6	0.05	
Citharichthys stampflii	0.12	6	0.05	
Penaeus monodon	0.09	9	0.04	
Scyllarides herklotsii	0.03	6	0.01	
Total	232.62		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 593
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 400
 start stop duration Long E 550
 TIME :17:04:00 17:34:31 31 (min) Purpose code: 3
 LOG :9175.52 9177.18 1.64 Area code : 5
 FDEPTH: 39 39 GearCond.code:
 BDEPTH: 39 39 Validity code:
 Towing dir: 100a Wire out: 145 m Speed: 30 kn*10

Sorted: 33 Kg Total catch: 32.80 CATCH/HOUR: 63.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	33.45	749	52.69	
Sphyræna guachancho	11.75	81	18.51	
Portunus validus	9.89	52	15.58	
DIOGENIDAE	1.37	2	2.16	
Scomberomus tritor	1.16	8	1.83	
Selene dorsalis	1.10	17	1.73	
Sepia officinalis hierredda	1.08	8	1.70	
Sea cucumbers	0.62	2	0.98	
Ilisha africana	0.60	19	0.95	
Chloroscombrus chrysurus	0.58	10	0.91	
Caranx crysos	0.45	2	0.71	
Sardinella maderensis	0.41	8	0.65	
Chilomycterus spinosus mauret.	0.23	2	0.36	
Trichiurus lepturus	0.21	10	0.33	
Pseudotolithus senegalensis	0.19	2	0.30	
Ballistes caprisicus	0.19	2	0.30	
Pentaneus quinquarius	0.08	2	0.13	
Grammolites gruvelli	0.06	2	0.09	
Pontocaris lacazei	0.02	2	0.03	
Alloteuthis africana	0.02	2	0.03	
Penaeus notialis	0.02	2	0.03	
Brotula barbata	0.02	2	0.03	
Total	63.50		100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 594
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 348
 start stop duration Long E 608
 TIME :06:27:05 07:00:07 33 (min) Purpose code: 3
 LOG :9269.35 9270.94 1.60 Area code : 5
 FDEPTH: 144 153 GearCond.code:
 BDEPTH: 144 153 Validity code:
 Towing dir: 110a Wire out: 360 m Speed: 30 kn*10

Sorted: 4 Kg Total catch: 120.26 CATCH/HOUR: 218.65

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	179.27	4233	81.99	
Uranoscopus albesca	9.09	95	4.16	
SQUATINIDAE	6.00	2	2.74	
Priacanthus arenatus	3.56	58	1.63	
Trichiurus lepturus	3.42	65	1.56	
Dentex angolensis	3.35	29	1.53	
Illex coindetii	2.47	65	1.13	
Portunus validus	2.04	9	0.93	
Sepia officinalis hierredda	1.96	36	0.90	
Pentheroscion mbizi	1.82	22	0.83	
Brachydeuterus auritus	1.02	36	0.47	
Lophiodes kempii	1.02	7	0.47	
Pterothrissus belloci	0.80	7	0.37	
Saurida brasiliensis	0.80	196	0.37	
Lepidotrigla cadmani	0.51	7	0.23	
Grammolites gruvelli	0.44	15	0.20	
Pontinus accraensis	0.36	7	0.16	
Peristodion octaphractum	0.22	7	0.10	
Physiculus huloti	0.22	7	0.10	
Parapenaeus longirostris	0.15	36	0.07	
Lagocephalus laevigatus	0.15	15	0.07	
Total	218.67		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 595
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 354
 start stop duration Long E 609
 TIME :08:39:24 09:09:02 30 (min) Purpose code: 3
 LOG :9282.41 9283.85 1.42 Area code : 5
 FDEPTH: 64 64 GearCond.code:
 BDEPTH: 64 64 Validity code:
 Towing dir: 97a Wire out: 180 m Speed: 30 kn*10

Sorted: 1 Kg Total catch: 43.67 CATCH/HOUR: 87.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	19.02	50	21.78	
Alloteuthis africana	18.00	8466	20.61	
Saurida brasiliensis	16.24	4458	18.59	
Priacanthus arenatus	6.40	78	7.33	
Dentex angolensis	6.16	54	7.05	2774
Epinephelus aeneus	3.30	10	3.78	
Citharus linguatula	3.04	162	3.48	
Lepidotrigla cadmani	1.80	38	2.06	
Raja miraletus	1.64	8	1.88	
Syacium micrurum	1.36	224	1.56	
Fistularia petimba	1.34	20	1.53	
Ariomma bondi	1.04	22	1.19	
Grammolites gruvelli	1.00	40	1.14	
Scorpaena scrofa	0.96	4	1.10	
Sepia juveniles	0.92	36	1.05	
Octopus vulgaris	0.90	2	1.03	
Pseudupeneus prayensis	0.82	8	0.94	
Chilomycterus spinosus mauret.	0.82	6	0.94	
Sea urchins (waeck spines)	0.62	300	0.71	
Seriola carpenteri	0.50	2	0.57	
Ariomma bondi juv.	0.20	56	0.23	
Uranoscopus albesca	0.16	2	0.18	
Spherooides marmoratus	0.16	8	0.18	
Pagellus bellottii	0.16	2	0.18	
Portunus validus	0.12	2	0.14	
Dentex congoensis	0.12	2	0.14	
Sicyonia galeata	0.06	10	0.07	
Decapterus punctatus	0.06	4	0.07	
Octopus defilippi	0.06	2	0.07	
Cardita ajar	0.04	4	0.05	
Bathygobius paganellus	0.04	6	0.05	
Physiculus huloti	0.04	2	0.05	
Squilla mantis	0.02	2	0.02	
Lepidotrigla carolae	0.02	2	0.02	
Zeus faber	0.02	2	0.02	
Total	87.16		99.79	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 596
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 401
 start stop duration Long E 610
 TIME :11:08:16 11:38:54 31 (min) Purpose code: 3
 LOG :9295.96 9297.58 1.61 Area code : 5
 FDEPTH: 35 35 GearCond.code:
 BDEPTH: 35 35 Validity code:
 Towing dir: 95a Wire out: 120 m Speed: 30 kn*10

Sorted: 28 Kg Total catch: 27.61 CATCH/HOUR: 53.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	22.22	286	41.58	2775
Selene dorsalis	6.75	79	12.63	2776
Selar crumenophthalmus	4.39	39	8.21	2780
Caranx crysos	3.06	15	5.73	
Pagrus caeruleostictus	2.46	21	4.60	
Pseudupeneus prayensis	2.36	29	4.42	
Portunus validus	2.03	6	3.80	
Sepia officinalis hierredda	1.92	6	3.59	
Sardinella maderensis	1.66	15	3.11	
Priacanthus arenatus	1.51	23	2.83	
Epinephelus aeneus	1.28	6	2.40	
Alloteuthis africana	1.01	604	1.89	
Raja miraletus	0.83	6	1.55	
Balistes caprisicus	0.68	4	1.27	
Lagocephalus laevigatus	0.60	6	1.12	
Citharus linguatula	0.15	8	0.28	
Saurida brasiliensis	0.15	37	0.28	
Grammolites gruvelli	0.10	4	0.19	
Syacium micrurum	0.10	8	0.19	
Starfish	0.08	4	0.15	
Scyllarides herklotsii	0.06	12	0.11	
Todaropsis eblanae	0.04	2	0.07	
Total	53.44		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 597
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 405
 start stop duration Long E 626
 TIME :13:43:20 14:13:36 30 (min) Purpose code: 3
 LOG :9315.29 9316.82 1.52 Area code : 5
 FDEPTH: 29 31 GearCond.code:
 BDEPTH: 29 31 Validity code:
 Towing dir: 234° Wire out: 120 m Speed: 30 kn*10

Sorted: Kg Total catch: 60.68 CATCH/HOUR: 121.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Chloroscombrus chrysurus	72.10	1026	59.41	2777
Brachydeuterus auritus	21.36	458	17.60	2779
Selene dorsalis	7.38	90	6.08	2778
Sphyræna guachancho	4.08	16	3.36	
Selar crumenophthalmus	3.08	20	2.54	
Portunus validus	3.00	12	2.47	
Caranx senegallus	2.06	8	1.70	
Sardinella maderensis - Juv.	1.62	20	1.33	
Pagrus caeruleostictus	1.38	10	1.14	
Sepia officinalis hierredda	1.02	2	0.84	
Pseudupeneus prayensis	1.02	8	0.84	
Balistes capriscus	0.94	8	0.77	
Galeoides decadactylus	0.74	4	0.61	
Pemadasy jubelini	0.66	4	0.54	
Scomberomorus titor	0.24	2	0.20	
Priacanthus arenatus	0.20	2	0.16	
Alloteuthis africana	0.16	142	0.13	
Penaeus notialis	0.12	2	0.10	
Sepiella ornata	0.06	6	0.05	
Syacium micrurum	0.04	2	0.03	
Saurida brasiliensis	0.04	12	0.03	
Starfish	0.04	2	0.03	
Scyllarides herklotsii	0.02	2	0.02	
Total	121.36		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 598
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 400
 start stop duration Long E 625
 TIME :15:37:02 16:07:06 30 (min) Purpose code: 3
 LOG :9326.13 9327.82 1.68 Area code : 5
 FDEPTH: 47 49 GearCond.code:
 BDEPTH: 47 49 Validity code:
 Towing dir: 90° Wire out: 165 m Speed: 3 kn*10

Sorted: 1 Kg Total catch: 17.33 CATCH/HOUR: 34.66

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	18.10	38	52.22	
Paragaleus pectoralis	4.70	4	13.56	
Brachydeuterus auritus	1.84	32	5.31	
Illex coindetii	1.84	20	5.31	
Pagrus caeruleostictus	1.76	18	5.08	
Alloteuthis africana	1.60	332	4.62	
Priacanthus arenatus	1.34	6	3.87	
Epinephelus aeneus	1.10	6	3.17	
Selar crumenophthalmus	0.40	30	1.15	
Saurida brasiliensis	0.40	110	1.15	
Chloroscombrus chrysurus	0.38	6	1.10	
Grammolites gruvelli	0.28	4	0.81	
Syacium micrurum	0.26	58	0.75	
Citharus linguatula	0.14	20	0.40	
Octopus vulgaris	0.10	2	0.29	
Liocarcinus sp	0.08	20	0.23	
Bathygobius paganellus	0.06	8	0.17	
C R A B S	0.06	4	0.17	
Penaeus notialis	0.04	2	0.12	
Calappa sp.	0.04	4	0.12	
Lepidotrigla carolae	0.04	6	0.12	
'Spider crab'	0.02	4	0.06	
Pentacaris lacazei	0.02	2	0.06	
Sicyonia galeata	0.02	14	0.06	
Antennarius sp.	0.02	2	0.06	
Scyllarides herklotsii	0.02	6	0.06	
Total	34.66		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 599
 DATE:21/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 356
 start stop duration Long E 627
 TIME :17:06:50 17:36:33 30 (min) Purpose code: 3
 LOG :9334.43 9336.06 1.64 Area code : 5
 FDEPTH: 79 82 GearCond.code:
 BDEPTH: 79 82 Validity code:
 Towing dir: 90° Wire out: 245 m Speed: 3 kn*10

Sorted: 2 Kg Total catch: 39.71 CATCH/HOUR: 79.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Mustelus mustelus	20.90	2	26.32	
Ariomma bondi	15.00	354	18.89	
Alloteuthis africana	10.76	4612	13.55	
Squatina oculata	6.70	6	8.44	
Sepia officinalis hierredda	5.06	30	6.37	
Trichiurus lepturus	2.68	42	3.37	
Lepidotrigla cadmani	2.52	76	3.17	
Illex coindetii	2.06	24	2.59	
Scorpaena scrofa	2.00	6	2.52	
Priacanthus arenatus	1.64	36	2.06	
Dentex congoensis	1.52	26	1.91	
Uranoscopus albesca	1.32	18	1.66	
Fistularia petimba	1.02	10	1.28	
Serranus accraensis	0.84	32	1.06	
Sea urchins (weak spines)	0.80	314	1.01	
Raja miraletus	0.72	4	0.91	
Citharus linguatula	0.54	98	0.68	
Pentheroscion mbizi	0.46	4	0.58	
Lepidotrigla carolae	0.40	26	0.50	
Grammolites gruvelli	0.38	16	0.48	
Saurida brasiliensis	0.36	74	0.45	
Calappa pelli	0.30	2	0.38	
Syacium micrurum	0.28	48	0.35	
Pseudupeneus prayensis	0.22	6	0.28	
Lophiodon kempi	0.18	2	0.23	
Dentex angolensis	0.16	2	0.20	
Sepia juveniles	0.14	6	0.18	
Octopus defilippi	0.08	2	0.10	
Blennius normani	0.08	6	0.10	
Microchirus frechkopi	0.06	2	0.08	
Sphoeroides marmoratus	0.06	6	0.08	
Liocarcinus corrugatus	0.04	2	0.05	
Bathygobius paganellus	0.04	4	0.05	
Parapenaeus longirostris	0.04	8	0.05	
DIOGENIDAE	0.02	2	0.03	
Scyllarides herklotsii	0.02	2	0.03	
Physiculus huloti	0.02	2	0.03	
Total	79.42		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 600
 DATE:22/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 349
 start stop duration Long E 640
 TIME :06:27:21 06:57:03 30 (min) Purpose code: 3
 LOG :9420.75 9422.31 1.56 Area code : 5
 FDEPTH: 135 136 GearCond.code:
 BDEPTH: 135 136 Validity code:
 Towing dir: 90° Wire out: 400 m Speed: 30 kn*10

Sorted: Kg Total catch: 63.75 CATCH/HOUR: 127.50

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	79.50	2478	62.35	
Squatina oculata	13.20	6	10.35	
Illex coindetii	6.72	470	5.27	
Oxymotus centrina	5.42	2	4.25	
Dentex congoensis	4.32	68	3.39	
Pentheroscion mbizi	3.62	36	2.84	
Priacanthus arenatus	2.02	38	1.58	
Raja miraletus	1.88	12	1.47	
Citharus linguatula	1.56	116	1.22	
Pterothrissus belloci	1.34	12	1.05	
Dentex angolensis	1.28	14	1.00	
Brotula barbata	0.90	2	0.71	
Fistularia petimba	0.88	4	0.69	
Zeus faber	0.76	6	0.60	
Uranoscopus albesca	0.72	8	0.56	
Trichiurus lepturus	0.64	8	0.50	
Lepidotrigla cadmani	0.42	8	0.33	
Octopus defilippi	0.40	4	0.31	
Sphoeroides pachgaster	0.26	12	0.20	
Spicara alta	0.24	2	0.19	
Calappa sp.	0.24	2	0.19	
Copula pauciradiatus	0.22	18	0.17	
Lepidotrigla carolae	0.20	6	0.16	
Serranus africana	0.18	2	0.14	
Parapenaeus longirostris	0.16	30	0.13	
Sepia juveniles	0.16	6	0.13	
Bathygobius paganellus	0.12	12	0.09	
Pontinus accraensis	0.12	2	0.09	
Microchirus frechkopi	0.02	4	0.02	
Total	127.50		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 601
 DATE:22/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 358
 start stop duration Long E 640
 TIME :08:54:29 09:24:40 30 (min) Purpose code: 3
 LOG :9436.39 9437.87 1.47 Area code : 5
 FDEPTH: 77 77 GearCond.code:
 BDEPTH: 77 77 Validity code:
 Towing dir: 90ø Wire out: 250 m Speed: 30 kn*10

Sorted: Kg Total catch: 35.52 CATCH/HOUR: 71.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	11.30	32	15.91	
Lepidotrigla cadmani	8.74	226	12.30	
Squatina oculata	7.96	4	11.20	
Ariomma bondi	6.58	124	9.26	
Dentex angolensis	4.80	58	6.76	
Alloteuthis africana	4.54	2270	6.39	
Pentheroscion mbizi	4.48	36	6.31	
Sepia juveniles	3.22	78	4.53	
Citharus linguatula	2.64	188	3.72	
Priacanthus arenatus	2.34	50	3.29	
Raja miraletus	1.66	8	2.34	
Trichiurus lepturus	1.48	24	2.08	
Grammolites gruvelli	1.08	48	1.52	
Lepidotrigla carolae	1.04	58	1.46	
Parapandalus narval	1.02	408	1.44	
Dentex congoensis	0.98	24	1.38	
Fistularia petimba	0.96	12	1.35	
Illex coindetii	0.86	10	1.21	
Uranoscopus albesca	0.72	10	1.01	
Syacium micrurum	0.68	160	0.96	
Sea urchins (weak spines)	0.58	254	0.82	
Serranus accraensis	0.46	20	0.65	
Chilomycterus spinosus mauret.	0.42	2	0.59	
Todaropsis eblanae	0.32	20	0.45	
Lophiodes kemp	0.28	6	0.39	
Dicologlossa cuneata	0.24	2	0.34	
Maja gothiciana	0.22	2	0.31	
Scorpaena scrofa	0.20	4	0.28	
Physiculus huloti	0.18	4	0.25	
Bathygobius paganellus	0.18	26	0.25	
Saurida brasiliensis	0.16	28	0.23	
Pseudupeneus prayensis	0.16	2	0.23	
Brotula barbata	0.14	2	0.20	
Sphoeroides pachgaster	0.10	2	0.14	
Venus verrucosa	0.08	4	0.11	
Cardita ajar	0.04	2	0.06	
Parapeneus longirostris	0.04	6	0.06	
Lagocephalus laevigatus	0.04	2	0.06	
Blennius normani	0.04	20	0.06	
Decapterus punctatus	0.02	2	0.03	
Scyllarides herklotsii	0.02	2	0.03	
Sphoeroides marmoratus	0.02	2	0.03	
Serranus africana	0.02	2	0.03	
Total		71.04	100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 603
 DATE:22/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 406
 start stop duration Long E 655
 TIME :14:30:53 15:00:42 30 (min) Purpose code: 3
 LOG :9477.77 9479.49 1.71 Area code : 5
 FDEPTH: 41 41 GearCond.code:
 BDEPTH: 41 41 Validity code:
 Towing dir: 90ø Wire out: 152 m Speed: 30 kn*10

Sorted: 9 Kg Total catch: 38.43 CATCH/HOUR: 76.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	31.60	214	41.11	2784
Brachydeuterus auritus	31.40	1036	40.85	2785
Selar crumenophthalmus	3.78	26	4.92	
Priacanthus arenatus	1.54	6	2.00	
Chloroscombrus chrysurus	1.46	12	1.90	
Alectis alexandrinus	0.94	2	1.22	
Sepia officinalis hierredda	0.92	2	1.20	
Sphyraena guachancho	0.90	6	1.17	
Sepiella ornata	0.82	140	1.07	
Sardinella maderensis	0.66	8	0.86	
Scomberomorus tritor	0.64	2	0.83	
Epinephelus aeneus	0.42	2	0.55	
Caranx crysos	0.32	2	0.42	
Alloteuthis africana	0.28	70	0.36	
Fistularia petimba	0.28	2	0.36	
Parapeneopsis atlantica	0.26	70	0.34	
Grammolites gruvelli	0.20	14	0.26	
Todaropsis eblanae	0.18	2	0.23	
Saurida brasiliensis	0.06	26	0.08	
Peneus notialis	0.06	2	0.08	
Serranus accraensis	0.04	14	0.05	
Syacium micrurum	0.04	4	0.05	
Decapterus punctatus	0.02	34	0.03	
Scyllarides herklotsii	0.02	2	0.03	
Sicyonia galeata	0.02	2	0.03	
Total		76.86	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 604
 DATE:22/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 401
 start stop duration Long E 655
 TIME :16:43:45 17:13:31 30 (min) Purpose code: 3
 LOG :9490.80 9492.52 1.72 Area code : 5
 FDEPTH: 65 65 GearCond.code:
 BDEPTH: 65 65 Validity code:
 Towing dir: 90ø Wire out: 205 m Speed: 30 kn*10

Sorted: Kg Total catch: 29.41 CATCH/HOUR: 58.82

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	30.04	2434	51.07	
Alloteuthis africana	6.48	2848	11.02	
Sepia officinalis hierredda	2.28	10	3.88	
Pentheroscion mbizi	2.00	18	3.40	
Selene dorsalis	1.90	8	3.23	
Lepidotrigla cadmani	1.52	34	2.58	
Illex coindetii	1.30	14	2.21	
Ariomma bondi juv.	1.14	58	1.94	
Decapterus punctatus	1.10	44	1.87	
Cymbium cymbium	1.00	2	1.70	
Serranus accraensis	1.00	40	1.70	
Parapeneus longirostris	0.98	20	1.67	
Ariomma bondi	0.96	14	1.63	
Priacanthus arenatus	0.88	8	1.50	
Raja miraletus	0.66	4	1.12	
Trichiurus lepturus	0.62	8	1.05	
Portunus validus	0.54	2	0.92	
Grammolites gruvelli	0.54	28	0.92	
Citharus linguatula	0.52	50	0.88	
Chilomycterus spinosus mauret.	0.50	6	0.85	
Lophiodes kemp	0.40	2	0.68	
Sepia juveniles	0.38	20	0.65	
Lagocephalus laevigatus	0.30	8	0.51	
Saurida brasiliensis	0.30	54	0.51	
Syacium micrurum	0.30	96	0.51	
Cymbium sp.	0.24	22	0.41	
Liccarcinus corrugatus	0.24	34	0.41	
Brotula barbata	0.14	2	0.24	
Calappa sp.	0.14	4	0.24	
Lepidotrigla carolae	0.14	8	0.24	
Zeus faber	0.08	2	0.14	
Scyllarides herklotsii	0.06	10	0.10	
Blennius normani	0.04	10	0.07	
Cephalopholis nigri	0.04	2	0.07	
Antemarius sp.	0.02	2	0.03	
Pontinus accraensis	0.02	2	0.03	
Uranoscopus albesca	0.02	4	0.03	
Total		58.82	100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 602
 DATE:22/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 405
 start stop duration Long E 640
 TIME :10:58:58 11:28:33 30 (min) Purpose code: 3
 LOG :9449.40 9450.95 1.53 Area code : 5
 FDEPTH: 39 40 GearCond.code:
 BDEPTH: 39 40 Validity code:
 Towing dir: 90ø Wire out: 130 m Speed: 30 kn*10

Sorted: Kg Total catch: 17.93 CATCH/HOUR: 35.86

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Selene dorsalis	15.16	162	42.28	2783
Scomberomorus tritor	7.54	22	21.03	2781
Brachydeuterus auritus	5.68	132	15.84	2782
Sepiella ornata	1.66	368	4.63	
Scorpaena scrofa	1.02	2	2.84	
Sardinella maderensis	0.94	6	2.62	
Priacanthus arenatus	0.86	16	2.40	
Chloroscombrus chrysurus	0.86	8	2.40	
Pagrus caeruleostictus	0.48	4	1.34	
Selar crumenophthalmus	0.42	4	1.17	
Alloteuthis africana	0.28	166	0.78	
J E L Y F I S H	0.14	30	0.39	
Pseudupeneus prayensis	0.14	4	0.39	
Brachydeuterus auritus Juv.	0.12	106	0.33	
Citharichthys stampflii	0.08	2	0.22	
Decapterus punctatus juv.	0.06	104	0.17	
Scarfish	0.06	6	0.17	
Grammolites gruvelli	0.06	2	0.17	
Scyllarides herklotsii	0.04	18	0.11	
Lepidotrigla carolae	0.04	6	0.11	
Todaropsis eblanae	0.04	2	0.11	
Peneus notialis	0.02	2	0.06	
Lagocephalus laevigatus	0.02	2	0.06	
P O L Y C H A E T A	0.02	4	0.06	
Syacium micrurum	0.02	2	0.06	
Sicyonia galeata	0.02	2	0.06	
'Spider crab'	0.02	2	0.06	
Saurida brasiliensis	0.02	20	0.06	
Portunus validus	0.02	2	0.06	
Citharus linguatula	0.02	2	0.06	
Total		35.86	100.04	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 605
 DATE:23/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 353
 start stop duration Long E 709
 TIME :06:31:37 07:03:11 32 (min) Purpose code: 3
 LOG :9586.49 9587.98 1.48 Area code : 5
 FDEPTH: 127 124 GearCond.code:
 BDEPTH: 127 124 Validity code:
 Towing dir: 90a Wire out: 330 m Speed: 30 kn*10

Sorted: 27 Kg Total catch: 57.15 CATCH/HOUR: 107.16

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Pentheroscion mbizi	44.81 641	41.82	2786
Ariomma bondi	16.35 428	15.26	
Trichiurus lepturus	8.21 113	7.66	2787
Priacanthus arenatus	6.56 105	6.12	
Uranoscopus albesca	3.75 34	3.50	
Todaropsis eblanae	3.49 139	3.26	
Lepidotrigla cadmani	3.30 68	3.08	
Pterothrissus belloci	2.89 26	2.70	
Saurida brasiliensis	2.81 859	2.62	
Illex coindetii	2.66 128	2.48	
Pontinus accraensis	2.29 56	2.14	
Dentex angolensis	2.12 21	1.98	
Citharus linguatula	2.10 113	1.96	
Raja miraletus	2.06 15	1.92	
Dentex congoensis	1.41 23	1.32	
Sepia officinalis hierredda	1.05 30	0.98	
Starfish	0.34 26	0.32	
J E L L Y F I S H	0.23 4	0.21	
Brotula barbata	0.21 2	0.20	
Bombrops greyi	0.19 8	0.18	
Physiculus huloti	0.11 4	0.10	
Liocarcinus corrugatus	0.08 11	0.07	
Bathygobius paganellus	0.08 8	0.07	
Parapenaeus longirostris	0.04 8	0.04	
Scyllarides herklotsii	0.04 4	0.04	
Total	107.18	100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 607
 DATE:23/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 406
 start stop duration Long E 708
 TIME :10:51:07 11:21:00 30 (min) Purpose code: 3
 LOG :9612.35 9613.92 1.56 Area code : 5
 FDEPTH: 41 41 GearCond.code:
 BDEPTH: 41 41 Validity code:
 Towing dir: 90a Wire out: 120 m Speed: 30 kn*10

Sorted: Kg Total catch: 8.52 CATCH/HOUR: 17.04

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Sepia officinalis hierredda	6.12 8	35.92	
Brachydeuterus auritus	3.82 262	22.42	
J E L L Y F I S H	1.98 266	11.62	
Priacanthus arenatus	0.92 56	5.40	
Sepiella ornata	0.72 154	4.23	
Raja miraletus	0.68 4	3.99	
Bathygobius paganellus	0.64 8	3.76	
Cymbium cymbium	0.46 74	2.70	
Parapenaeus longirostris	0.36 64	2.11	
Brachydeuterus auritus Juv.	0.32 130	1.88	
Selar crumenophthalmus	0.24 4	1.41	
Illex coindetii	0.16 2	0.94	
Todaropsis eblanae	0.14 10	0.82	
Alloteuthis africana	0.10 8	0.59	
Penaeus notialis	0.10 8	0.59	
Saurida brasiliensis	0.08 52	0.47	
Liocarcinus corrugatus	0.06 6	0.35	
Scyllarides herklotsii	0.04 12	0.23	
Grammoplites gruvelli	0.02 2	0.12	
Serranus accraensis	0.02 2	0.12	
Pontinus accraensis	0.02 2	0.12	
Hemicaranx bicolor juv.	0.02 2	0.12	
Sardinella maderensis	0.02 2	0.12	
Total	17.04	100.03	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 606
 DATE:23/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 400
 start stop duration Long E 709
 TIME :08:45:08 09:15:03 30 (min) Purpose code: 3
 LOG :9600.11 9601.63 1.52 Area code : 5
 FDEPTH: 69 68 GearCond.code:
 BDEPTH: 69 68 Validity code:
 Towing dir: 90a Wire out: 200 m Speed: 30 kn*10

Sorted: 31 Kg Total catch: 30.54 CATCH/HOUR: 61.08

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	22.00 1928	36.02	
Priacanthus arenatus	13.00 804	21.28	
Trichiurus lepturus	7.92 106	12.97	
Alloteuthis africana	3.48 1688	5.70	
Pentheroscion mbizi	2.28 22	3.73	
Lepidotrigla cadmani	2.24 56	3.67	
Ariomma bondi	2.08 52	3.41	
Sepia officinalis hierredda	1.14 50	1.87	
Raja miraletus	1.02 4	1.67	
Selene dorsalis	0.74 8	1.21	
Lagodon rhomboides	0.70 18	1.15	
Serranus accraensis	0.58 24	0.95	
Illex coindetii	0.56 6	0.92	
Saurida brasiliensis	0.44 82	0.72	
J E L L Y F I S H	0.40 18	0.65	
Todaropsis eblanae	0.34 12	0.56	
Citharus linguatula	0.34 34	0.56	
Chilomycterus spinosus mauret.	0.22 2	0.36	
Sphoeroides pachgaster	0.22 4	0.36	
Fistularia petimba	0.22 6	0.36	
Liocarcinus corrugatus	0.20 14	0.33	
Decapterus punctatus	0.14 6	0.23	
Bathygobius paganellus	0.14 10	0.23	
Parapenaeus longirostris	0.14 22	0.23	
Lepidotrigla carolae	0.14 12	0.23	
Grammoplites gruvelli	0.12 8	0.20	
Scyllarides herklotsii	0.06 6	0.10	
Syacium micrurum	0.06 12	0.10	
Sea urchins (weak spines)	0.04 28	0.07	
Blennius normani	0.02 2	0.03	
Lepidodes kempii	0.02 6	0.03	
Calappa pelii	0.02 2	0.03	
Physiculus huloti	0.02 2	0.03	
Pagellus bellottii	0.02 2	0.03	
Pontinus accraensis	0.02 2	0.03	
Total	61.08	100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 608
 DATE:23/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 356
 start stop duration Long E 725
 TIME :14:01:46 14:31:35 30 (min) Purpose code: 3
 LOG :9637.41 9638.96 1.54 Area code : 5
 FDEPTH: 90 89 GearCond.code:
 BDEPTH: 90 89 Validity code:
 Towing dir: 270a Wire out: 205 m Speed: 30 kn*10

Sorted: Kg Total catch: 58.72 CATCH/HOUR: 117.44

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Ariomma bondi	33.80 800	28.78	
Lepidotrigla cadmani	19.80 560	16.86	
Sepia officinalis hierredda	14.44 244	12.30	
Citharus linguatula	8.12 620	6.91	
Squatina oculata	4.56 4	3.88	
Sphoeroides pachgaster	3.72 124	3.17	
Dentex angolensis	3.52 44	3.00	
Raja miraletus	3.40 16	2.90	
Dentex congoensis	2.36 52	2.01	
Lepidotrigla carolae	2.36 120	2.01	
Chilomycterus spinosus mauret.	1.92 12	1.63	
Illex coindetii	1.88 96	1.60	
Uranoscopus albesca	1.80 44	1.53	
Sphyræna guachancho	1.76 4	1.50	
Alloteuthis africana	1.60 472	1.36	
Trichiurus lepturus	1.52 24	1.29	
Decapterus punctatus	1.36 30	1.16	
Saurida brasiliensis	1.28 320	1.09	
Serranus scriba	1.24 44	1.06	
Sardinella aurita	1.04 8	0.89	
Pontinus accraensis	1.04 40	0.89	
Sardinella maderensis	0.84 32	0.72	
Brotula barbata	0.76 16	0.65	
Fistularia petimba	0.76 8	0.65	
Priacanthus arenatus	0.52 4	0.44	
Pentheroscion mbizi	0.52 8	0.44	
Pterothrissus belloci	0.52 4	0.44	
VENERIDAE	0.36 24	0.31	
Parapenaeus longirostris	0.32 72	0.27	
Syacium micrurum	0.20 36	0.17	
Scyllarides herklotsii	0.04 4	0.03	
Blennius normani	0.04 4	0.03	
Bathygobius paganellus	0.04 12	0.03	
Total	117.44	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 609
 DATE:23/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 352
 start stop duration Long E 725
 TIME :16:04:38 16:34:24 30 (min) Purpose code: 3
 LOG :9649.75 9651.29 1.54 Area code : 5
 FDEPTH: 133 136 GearCond.code:
 BDEPTH: 133 136 Validity code:
 Towing dir: 90ø Wire out: 395 m Speed: 3 kn*10

Sorted: Kg Total catch: 55.76 CATCH/HOUR: 111.52

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Ariomma bondi	69.30 3444	62.14	
Pentheroscion mbizi	7.98 84	7.16	
Priacanthus arenatus	6.36 108	5.70	
Illex coindetii	5.98 400	5.36	
Dentex angolensis	4.16 46	3.73	2788
Squatina oculata	3.24 2	2.91	
Citharus linguatula	2.40 164	2.15	
Brotula barbata	2.24 10	2.01	
Octopus vulgaris	1.18 6	1.06	
Todaropsis eblanae	1.18 40	1.06	
Dentex congoensis	1.14 14	1.02	2789
Raja miraletus	1.08 4	0.97	
Sepia officinalis hierredda	0.94 20	0.84	
Lepidotrigla cadmani	0.94 24	0.84	
Trichiurus lepturus	0.74 8	0.66	
Saurida brasiliensis	0.60 158	0.54	
Pterothrissus belloci	0.44 4	0.39	
Zeus faber	0.36 4	0.32	
Lepidotrigla carolae	0.22 10	0.20	
Uranoscopus albesca	0.18 6	0.16	
Pontinus accraensis	0.18 8	0.16	
Fistularia petimba	0.16 2	0.14	
Sphoeroides pachgaster	0.12 2	0.11	
Decapterus punctatus	0.10 2	0.09	
Cepola pauciradiatus	0.08 6	0.07	
Bembrops heterurus	0.08 2	0.07	
Bathygobius paganellus	0.06 4	0.05	
Serranus africana	0.04 2	0.04	
Syacium micrurus	0.02 4	0.02	
Parapenaeus longirostris	0.02 8	0.02	
Total	111.52	99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 610
 DATE:24/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 352
 start stop duration Long E 737
 TIME :06:17:44 06:28:52 11 (min) Purpose code: 3
 LOG :9729.77 9730.29 0.52 Area code : 5
 FDEPTH: 135 135 GearCond.code:
 BDEPTH: 135 135 Validity code:
 Towing dir: 90ø Wire out: 360 m Speed: 30 kn*10

Sorted: Kg Total catch: 56.98 CATCH/HOUR: 310.80

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Ariomma bondi	90.00 4124	28.96	
Pentheroscion mbizi	37.58 425	12.09	
Pontinus accraensis	23.24 551	7.48	
Brotula barbata	15.16 76	4.88	
Priacanthus arenatus	15.00 229	4.83	
Pterothrissus belloci	14.51 164	4.67	
Sepia officinalis hierredda	12.22 267	3.93	
Saurida brasiliensis	12.00 2624	3.86	
Bembrops greyi	11.13 709	3.58	
Uranoscopus albesca	11.07 164	3.56	
Dentex congoensis	10.64 153	3.42	
Dentex angolensis	10.42 98	3.35	
Bembrops heterurus	8.18 513	2.63	
Citharus linguatula	7.47 518	2.40	
Lepidotrigla cadmani	6.11 131	1.97	
Octopus vulgaris	4.47 22	1.44	
Todaropsis eblanae	4.31 196	1.39	
Pythionichthys microphthalmus	3.33 33	1.07	
Lepidotrigla carolae	2.45 109	0.79	
HOLTHUROIDEA	2.40 420	0.77	
Illex coindetii	2.24 38	0.72	
Bathygobius paganellus	2.13 316	0.69	
Sphoeroides pachgaster	1.53 33	0.49	
P O L Y C H A E T A	0.60 33	0.19	
Serranus accraensis	0.60 38	0.19	
Starfish	0.55 33	0.18	
Zeus faber	0.55 5	0.18	
Parapenaeus longirostris	0.44 142	0.14	
Trichiurus lepturus	0.27 5	0.09	
Physiculus huloti	0.22 11	0.07	
Microchirus frechkopi	0.22 5	0.07	
Blennius normani	0.16 5	0.05	
Sea urchins (weak spines)	0.11 11	0.04	
Total	311.31	100.17	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 611
 DATE:24/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 411
 start stop duration Long E 731
 TIME :09:44:46 10:14:12 29 (min) Purpose code: 3
 LOG :9758.15 9759.72 1.56 Area code : 5
 FDEPTH: 34 33 GearCond.code:
 BDEPTH: 34 33 Validity code:
 Towing dir: 100ø Wire out: 120 m Speed: 30 kn*10

Sorted: Kg Total catch: 33.21 CATCH/HOUR: 68.71

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Scomberomorus tritor	17.28 147	25.15	2790
Sphyraena guachancho	10.66 182	15.51	2791
Brachydeuterus auritus	7.80 424	11.35	2795
Galeoides decadactylus	7.32 79	10.65	2793
Portunus validus	4.47 25	6.51	
Selene dorsalis	3.93 48	5.72	
Chloroscombrus chrysurus	3.12 52	4.54	2794
Ilisha africana	3.00 230	4.37	2795
Sardinella maderensis	2.07 79	3.01	2792
Trichiurus lepturus	1.61 17	2.34	2797
Caranx hippos	1.61 8	2.34	
Stromateus fiatola	1.16 4	1.69	
J E L L Y F I S H	1.03 6	1.50	
Raja miraletus	0.66 2	0.96	
Caranx crysos	0.64 2	0.93	
Calappa rubroguttata	0.54 2	0.79	
Pseudipeneus prayensis	0.29 2	0.42	
Sepia officinalis hierredda	0.29 2	0.42	
Epinephelus aeneus	0.29 2	0.42	
Pteroscion pelli	0.23 10	0.33	
Sepiella ornata	0.19 124	0.28	
PENAEIDAE	0.14 54	0.20	
Cynoglossus monodi	0.06 4	0.09	
Penaeus notialis	0.06 4	0.09	
Chloroscombrus Juvenile	0.04 87	0.06	2798
Uranoscopus albesca	0.04 2	0.06	
Alectis alexandrinus	0.04 2	0.06	
Bembrops greyi	0.04 4	0.06	
Scyllarides herklotsii	0.02 2	0.03	
Lepidotrigla carolae	0.02 2	0.03	
Decapterus punctatus	0.02 6	0.03	
Total	68.67	99.94	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 612
 DATE:24/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 413
 start stop duration Long E 739
 TIME :12:07:26 12:37:12 30 (min) Purpose code: 3
 LOG :9773.36 9774.98 1.60 Area code : 5
 FDEPTH: 23 23 GearCond.code:
 BDEPTH: 23 23 Validity code:
 Towing dir: 90ø Wire out: m Speed: kn*10

Sorted: Kg Total catch: 49.08 CATCH/HOUR: 98.16

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Galeoides decadactylus	37.10 390	37.80	2810
Scomberomorus tritor	14.10 70	14.36	2811
Brachydeuterus auritus	7.34 176	7.48	2799
Selene dorsalis	5.48 154	5.58	2801
Caranx crysos	4.64 20	4.73	2809
Caranx senegalensis	4.64 20	4.73	
Trichiurus lepturus	3.60 40	3.67	2808
Caranx hippos	3.02 20	3.08	2807
Chloroscombrus chrysurus	2.58 54	2.63	2802
Sphyraena guachancho	2.42 20	2.47	2803
Alectis alexandrinus	2.10 34	2.14	2800
Chaetodipterus goreensis	2.06 14	2.10	
Sepia officinalis hierredda	1.72 2	1.75	
Pomadoury jubelini	1.62 22	1.65	2804
Drepane africana	1.08 16	1.10	
Lagocephalus laevigatus	0.74 6	0.75	
Ilisha africana	0.70 24	0.71	2806
Portunus validus	0.66 6	0.67	
Selar crumenophthalmus	0.64 4	0.65	
Sardinella maderensis	0.56 24	0.57	2805
Pteroscion pelli	0.52 6	0.53	
Stromateus fiatola	0.30 2	0.31	
Penaeus monodon	0.26 2	0.26	
Pseudolithus senegalensis	0.22 2	0.22	
Trachinocephalus myops	0.06 2	0.06	
Total	98.16	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 613
 DATE:24/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 406
 start stop duration Long E 757
 TIME :14:00:57 15:00:43 28 (min) Purpose code: 3
 LOG :9795.22 9796.64 1.41 Area code : 5
 FDEPTH: 47 46 GearCond.code:
 BDEPTH: 47 46 Validity code:
 Towing dir: 275ø Wire out: 175 m Speed: 30 kn*10
 Sorted: 62 Kg Total catch: 78.29 CATCH/HOUR: 167.76

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	72.00	14621	42.92	
Alectis alexandrinus	57.86	17	34.49	2812
Parapenaeus longirostris	8.46	1286	5.04	2813
Pentaceroscion mdoi	5.59	111	3.33	
Saurida brasiliensis	3.99	1356	2.38	
Cymbium cymbium	3.56	2	2.12	
Grammolites gruvelli	2.61	135	1.56	
Citharus linguatula	1.71	105	1.02	
Trichiurus lepturus	1.52	66	0.91	
Sepia officinalis hierredda	1.33	2	0.79	
Portunus validus	1.33	6	0.79	
Epinephelus aeneus	1.22	4	0.73	
Sphyræna afra	1.03	2	0.61	
Priacanthus arenatus	0.96	28	0.57	
Alloteuthis africana	0.90	225	0.54	
Sepia juveniles	0.75	58	0.45	
Raja miraletus	0.66	6	0.39	
Sphyræna guachancho	0.58	58	0.35	
Illex coindetii	0.36	2	0.21	
Serranus accraensis	0.26	26	0.15	
Selene dorsalis, juveniles	0.26	73	0.15	
Antennarius sp.	0.13	15	0.08	
Penaeus notialis	0.13	4	0.08	
Sardinella maderensis	0.11	6	0.07	
Sicyonia galeata	0.11	28	0.07	
Scyllarides herklotsii	0.11	13	0.07	
Uranoscopus albesca	0.06	6	0.04	
Bathygobius paganellus	0.04	6	0.02	
Sphoeroides marmoratus	0.04	2	0.02	
Liocarcinus corrugatus	0.04	6	0.02	
Lophiodes kempii	0.04	2	0.02	
Total	167.75		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 614
 DATE:24/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 401
 start stop duration Long E 759
 TIME :16:49:59 17:19:43 30 (min) Purpose code: 3
 LOG :9806.50 9808.05 1.54 Area code : 5
 FDEPTH: 66 64 GearCond.code:
 BDEPTH: 66 64 Validity code:
 Towing dir: 270ø Wire out: 216 m Speed: 30 kn*10
 Sorted: Kg Total catch: 91.14 CATCH/HOUR: 182.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	98.00	2012	53.76	
Rachycentron canadum	38.60	2	21.18	
Ariomma bondi	10.52	212	5.77	
Priacanthus arenatus	9.68	1084	5.31	
Sepia officinalis hierredda	5.80	24	3.18	
Squatina oculata	2.70	2	1.48	
Epinephelus aeneus	2.34	10	1.28	
Lepidotrigla cadmani	2.24	68	1.23	
Lagocephalus laevisgatus	1.72	28	0.94	
Fistularia petimba	1.50	22	0.82	
Pseudupeneus prayensis	1.48	36	0.81	
Sphyræna guachancho	0.96	4	0.53	
Parapenaeus longirostris	0.72	76	0.39	
Illex coindetii	0.56	8	0.31	
Syacium micrurum	0.52	112	0.29	
Chilomycterus spinosus mauret.	0.50	4	0.27	
Grammolites gruvelli	0.48	20	0.26	
Sardinella maderensis	0.40	32	0.22	
Zeus faber	0.32	8	0.18	
Pagrus caeruleostictus	0.32	4	0.18	
Brotula barbata	0.28	8	0.15	
Dentex congoensis	0.26	6	0.14	
Citharus linguatula	0.24	20	0.13	
Octopus vulgaris	0.20	4	0.11	
Sepia juveniles	0.20	12	0.11	
Saurida brasiliensis	0.20	52	0.11	
Cynoglossus canariensis	0.16	20	0.09	
Alloteuthis africana	0.16	4	0.09	
Raja miraletus	0.16	16	0.09	
Dentex angolensis	0.16	2	0.09	
Antennarius sp.	0.14	6	0.08	
Blennius normani	0.12	8	0.07	
Lepidotrigla carolae	0.12	12	0.07	
Pontinus accraensis	0.12	16	0.07	
Selar crumenophthalmus	0.08	4	0.04	
Liocarcinus corrugatus	0.08	8	0.04	
Sphoeroides marmoratus	0.04	8	0.02	
Trachinus lineolatus	0.04	4	0.02	
Total	182.28		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 615
 DATE:25/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 356
 start stop duration Long E 811
 TIME :07:02:06 07:32:05 30 (min) Purpose code: 3
 LOG :9909.55 9911.07 1.50 Area code : 5
 FDEPTH: 80 85 GearCond.code:
 BDEPTH: 80 85 Validity code:
 Towing dir: 90ø Wire out: 230 m Speed: 30 kn*10
 Sorted: Kg Total catch: 49.65 CATCH/HOUR: 99.30

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	36.10	1198	36.35	2818
Dentex congoensis	29.30	604	29.51	2814
Dentex angolensis	12.82	124	12.91	2815
Priacanthus arenatus	6.18	100	6.22	
Decapterus punctatus	3.80	106	3.83	2819
Boops boops	1.54	32	1.55	2817
Fistularia petimba	1.50	16	1.51	
Illex coindetii	1.34	86	1.35	
Zeus faber	1.14	8	1.15	
Raja miraletus	1.02	16	1.03	
Chilomycterus spinosus mauret.	0.86	2	0.87	
Pagellus bellottii	0.78	6	0.79	
Lepidotrigla cadmani	0.70	16	0.70	
Sardinella maderensis	0.48	16	0.48	2816
Citharus linguatula	0.28	26	0.28	
Brotula barbata	0.26	4	0.26	
Erythrocles monodi	0.24	4	0.24	
Chaetodon marcellae	0.20	6	0.20	
Syacium micrurum	0.16	28	0.16	
Sphoeroides marmoratus	0.14	4	0.14	
Lophiodes kempii	0.14	2	0.14	
Pseudupeneus prayensis	0.12	2	0.12	
Lepidotrigla carolae	0.10	4	0.10	
Octopus defilippi	0.10	2	0.10	
Total	99.30		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 616
 DATE:25/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 408
 start stop duration Long E 812
 TIME :09:20:45 09:50:02 29 (min) Purpose code: 3
 LOG :9924.97 9926.42 1.45 Area code : 5
 FDEPTH: 39 43 GearCond.code:
 BDEPTH: 39 43 Validity code:
 Towing dir: 180ø Wire out: 120 m Speed: 30 kn*10
 Sorted: Kg Total catch: 44.07 CATCH/HOUR: 91.18

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	40.97	3894	44.93	
Sphyræna guachancho	11.73	130	12.86	
Trichiurus lepturus	9.50	1214	10.42	
J E L L Y F I S H	9.39	143	10.30	
Pseudotolithus epipecrus	5.42	87	5.94	
Sepiella ornata	1.99	966	2.18	
Selene dorsalis, juveniles	1.47	509	1.61	
Selene dorsalis	1.45	33	1.59	
Sardinella maderensis	1.41	93	1.55	
Pseudotolithus senegalensis	1.14	4	1.25	
Citharus linguatula	0.87	56	0.95	
Decapterus punctatus	0.83	17	0.91	
Antennarius pardalis	0.66	8	0.72	
Stromateus fiatola	0.60	2	0.66	
Portunus validus	0.60	2	0.66	
Penaeus notialis	0.41	23	0.45	
Pteroscion pelli	0.41	54	0.45	
Erythrocles monodi	0.33	6	0.36	
Grammolites gruvelli	0.29	17	0.32	
Saurida brasiliensis	0.27	91	0.30	
Raja miraletus	0.23	4	0.25	
Parapenaeus longirostris	0.21	72	0.23	
Octopus vulgaris	0.21	2	0.23	
Pagrus caeruleostictus	0.17	2	0.19	
Lophiodes kempii	0.14	4	0.15	
Ilsha africana	0.14	21	0.15	
Dicologlossa cuneata	0.10	2	0.11	
XENOCONGRIDAE	0.08	4	0.09	
Cymbium sp.	0.06	27	0.07	
Sicyonia galeata	0.04	12	0.04	
C R A B S	0.02	6	0.02	
Scyllarides herklotsii	0.02	2	0.02	
Lagocephalus laevisgatus	0.02	4	0.02	
Total	91.18		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 617
 DATE:25/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 404
 start stop duration Long E 8200
 TIME :12:23:34 12:53:14 30 (min) Purpose code: 3
 LOG :9944.72 9946.29 3.22 Area code : 7
 FDEPTH: 59 59 GearCond.code:
 BDEPTH: 59 59 Validity code:
 Towing dir: 270e Wire out: 189 m Speed: 30 kn*10

Sorted: 32 Kg Total catch: 61.70 CATCH/HOUR: 123.40

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus Juv.	99.20	14512	80.39	
Lepidotrigla cadmani	3.60	80	2.92	
Sepia juveniles	1.56	44	1.26	
Illex coindetii	1.56	20	1.26	
Lagocephalus laevigatus	1.42	20	1.15	
Trichurus lepturus	1.28	12	1.04	
Pseudupeneus prayensis	1.20	32	0.97	
Fistularia petimba	1.14	22	0.92	
Citharus linguatula	1.08	64	0.88	
Parapenaeus longirostris	1.04	156	0.84	
Serranus accraensis	1.00	44	0.81	
Calappa rubroguttata	0.96	6	0.78	
Syacium micrurum	0.96	204	0.78	
Sphyræna guachancho	0.76	4	0.62	
Priacanthus arenatus	0.68	76	0.55	
Saurida brasiliensis	0.64	128	0.52	
Starfish	0.60	8	0.49	
Chilomycterus spinosus mauret.	0.58	4	0.47	
Sea urchins (weak spines)	0.44	108	0.36	
Pemaeus notialis	0.44	12	0.36	
Decapterus punctatus	0.40	40	0.32	
Cynoglossus cadenati	0.32	2	0.26	
Grammolites gruvelli	0.32	16	0.26	
Pagellus bellottii	0.26	8	0.21	
Lophiodes kemp	0.24	8	0.19	
Octopus defilippi	0.20	4	0.16	
Antennarius sp.	0.20	8	0.16	
Pagrus caeruleostictus	0.20	2	0.16	
Selar crumenophthalmus	0.20	12	0.16	
Raja miraletus	0.14	4	0.11	
Microchirus frechkopi	0.12	4	0.10	
Bathygobius paganellus	0.12	36	0.10	
Cymbium sp.	0.10	100	0.08	
Cardita ajar	0.08	8	0.06	
Dentex maroccanus	0.08	6	0.06	
Pontinus accraensis	0.08	12	0.06	
C R A B S	0.04	4	0.03	
Liocarcinus corrugatus	0.04	8	0.03	
Dactylopterus volitans	0.04	4	0.03	
Sicyonia galeata	0.04	4	0.03	
Ariomma bondi	0.04	8	0.03	
Total	123.40		99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 618
 DATE:25/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 355
 start stop duration Long E 830
 TIME :14:48:02 15:19:37 32 (min) Purpose code: 3
 LOG :9960.64 9962.23 1.59 Area code : 7
 FDEPTH: 81 83 GearCond.code:
 BDEPTH: 81 83 Validity code:
 Towing dir: 270e Wire out: 245 m Speed: 3 kn*10

Sorted: 29 Kg Total catch: 145.90 CATCH/HOUR: 273.56

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Boops boops	127.69	3971	46.68	2820
Ariomma bondi	33.41	889	12.21	
Dentex congoensis	17.33	326	6.33	2822
Lepidotrigla cadmani	17.10	461	6.25	
Dentex angolensis	12.15	236	4.44	2823
Sepia officinalis hierredda	11.48	293	4.20	
Saurida brasiliensis	10.58	2025	3.87	
Decapterus punctatus	9.45	304	3.45	2821
Squatina oculata	7.11	8	2.60	
Raja miraletus	4.16	45	1.52	
Pagellus bellottii	3.00	34	1.32	
Pontinus accraensis	3.26	113	1.19	
Uranoscopus albesca	1.69	23	0.62	
Todaropsis eblanæ	1.58	23	0.58	
Pentheroscion mbi	1.46	11	0.53	
Lepidotrigla carolæ	1.24	90	0.45	
Brotula barbata	1.13	4	0.41	
Priacanthus arenatus	1.13	101	0.41	
Epinephelus aeneus	1.09	2	0.40	
Citharus linguatula	1.01	68	0.37	
Rhizoprionodon acutus	0.92	2	0.34	
Lophiodes kemp	0.79	23	0.29	
Chilomycterus spinosus mauret.	0.79	11	0.29	
Blennius normani	0.68	45	0.25	
Brachydeuterus auritus	0.45	90	0.16	
Pseudupeneus prayensis	0.45	11	0.16	
B I V A L V E S	0.34	11	0.12	
Bathygobius paganellus	0.34	11	0.12	
Trichurus lepturus	0.23	11	0.08	
Grammolites gruvelli	0.23	11	0.08	
Trachinocephalus myops	0.23	6	0.08	
Fistularia petimba	0.23	11	0.08	
Syacium micrurum	0.11	11	0.04	
Serranus africana	0.11	11	0.04	
Sphoeroides pachgaster	0.11	2	0.04	
Scyllarides herklotsii	0.11	11	0.04	
Total	273.77		100.04	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 619
 DATE:25/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 351
 start stop duration Long E 834
 TIME :16:42:20 17:12:08 30 (min) Purpose code: 3
 LOG :9971.49 9973.15 1.64 Area code : 7
 FDEPTH: 82 84 GearCond.code:
 BDEPTH: 82 84 Validity code:
 Towing dir: 307e Wire out: 275 m Speed: 30 kn*10

Sorted: Kg Total catch: 23.62 CATCH/HOUR: 47.24

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	12.24	952	25.91	
Pythonichthys microphthalmus	8.54	130	18.08	
Decapterus punctatus	7.40	366	15.66	2824
Squatina oculata	3.70	2	7.83	
Priacanthus arenatus	2.38	40	5.04	
Dentex congoensis	1.90	34	4.02	
Raja miraletus	1.82	12	3.85	
Illex coindetii	1.62	48	3.43	
Lepidotrigla cadmani	1.06	24	2.24	
Sepia officinalis hierredda	0.82	10	1.74	
Chilomycterus spinosus mauret.	0.80	4	1.69	
Lophiodes kemp	0.74	8	1.57	
Fistularia petimba	0.68	10	1.44	
Citharus linguatula	0.60	56	1.27	
Brotula barbata	0.42	2	0.89	
Zeus faber	0.36	2	0.76	
Selar crumenophthalmus	0.30	6	0.64	
Syacium micrurum	0.30	56	0.64	
Octopus vulgaris	0.28	2	0.59	
Calappa pelli	0.28	2	0.59	
Uranoscopus albesca	0.26	6	0.55	
Pagrus caeruleostictus	0.24	4	0.51	
Boops boops	0.22	6	0.47	
Saurida brasiliensis	0.16	24	0.34	
Blennius normani	0.12	2	0.25	
Total	47.24		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 620
 DATE:26/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 346
 start stop duration Long E 839
 TIME :05:43:01 06:12:45 30 (min) Purpose code: 3
 LOG : 76.70 78.17 1.45 Area code : 7
 FDEPTH: 73 81 GearCond.code:
 BDEPTH: 73 81 Validity code:
 Towing dir: 267e Wire out: 240 m Speed: 30 kn*10

Sorted: Kg Total catch: 27.87 CATCH/HOUR: 55.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus Juv.	16.34	644	29.31	
Squatina oculata	8.74	2	15.68	
Ariomma bondi	8.26	142	14.82	
Priacanthus arenatus	7.50	306	13.46	
Dentex angolensis	4.78	62	8.58	
Illex coindetii	3.10	124	5.56	
Raja miraletus	1.34	10	2.40	
Fistularia petimba	0.96	10	1.72	
Pagellus bellottii	0.68	12	1.22	
Chilomycterus spinosus mauret.	0.60	2	1.08	
Uranoscopus albesca	0.60	10	1.08	
Decapterus punctatus	0.56	24	1.00	
Dentex congoensis	0.42	6	0.75	
Lepidotrigla cadmani	0.32	8	0.57	
Sepia officinalis hierredda	0.30	4	0.54	
Pentheroscion mbi	0.26	2	0.47	
Sardinella maderensis	0.18	6	0.32	
Saurida brasiliensis	0.16	36	0.29	
Lophiodes kemp	0.14	2	0.25	
Cardita ajar	0.10	6	0.18	
Citharus linguatula	0.08	4	0.14	
Syacium micrurum	0.06	12	0.11	
Sea urchins (weak spines)	0.06	18	0.11	
Sphoeroides pachgaster	0.04	2	0.07	
Pteroscion peli	0.04	2	0.07	
Sphoeroides marmoratus	0.04	2	0.07	
Alloteuthis africana	0.02	6	0.04	
Sicyonia galeata	0.02	4	0.04	
Cepola pauciradiatus	0.02	2	0.04	
Total	55.72		99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 621
 DATE:26/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 342
 start stop duration Long E 830
 TIME :08:12:39 08:42:05 29 (min) Purpose code: 3
 LOG : 91.85 93.36 1.51 Area code : 7
 FDEPTH: 103 101 GearCond.code:
 BDEPTH: 103 101 Validity code:
 Towing dir: 340e Wire out: 300 m Speed: 30 kn*10

Sorted: 54 Kg Total catch: 495.55 CATCH/HOUR: 1025.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	673.45	3025	65.68	
Decapterus punctatus	175.34	2824	17.10	
Dentex congoensis	63.00	1179	6.14	
Epinephelus aeneus	21.72	2	2.12	
Erythrocles monodi	18.62	341	1.82	
Antigonia capros	15.52	559	1.51	
Squatina oculata	14.17	4	1.36	
Hexanchus griseus	10.55	2	1.03	
Sepia officinalis hierredda	10.24	186	1.00	
Illex coindetii	6.83	62	0.67	
Sphoeroides pachgaster	5.90	155	0.58	
Astropecten sp.	5.28	31	0.51	
Raja miraletus	3.10	341	0.30	
Sea urchins (weak spines)	1.55	310	0.15	
Total	1025.27		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 622
 DATE:26/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 336
 start stop duration Long E 829
 TIME :10:41:27 11:11:15 30 (min) Purpose code: 3
 LOG : 105.27 106.72 1.44 Area code : 7
 FDEPTH: 327 314 GearCond.code:
 BDEPTH: 327 314 Validity code:
 Towing dir: 341ø Wire out:1000 m Speed: 30 kn*10
 Sorted: 34 Kg Total catch: 426.36 CATCH/HOUR: 852.72

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Hypoclydonia bella	354.00	12560	41.51	
Parasudis fraser-brueneri	330.36	29454	38.74	
Chlorophthalmus atlanticus	65.80	5860	7.72	
Illex coindetii	29.20	340	3.42	
Zenion longipinnis	18.00	1360	2.11	
Todaropsis eblanae	8.00	60	0.94	
Ariomma bondi	5.40	280	0.63	
Setarches guentheri	5.20	340	0.61	
Polymetme corythaeola	5.00	360	0.59	
Hexanchus griseus	4.52	2	0.53	
Todarodes sagittatus	4.00	20	0.47	
Syngnops microlepis	4.00	200	0.47	
Galeus polli	3.60	260	0.42	
Ijmaia lepei	2.80	20	0.33	
Scyllorhinus sp.	2.40	20	0.28	
Parapenaeus longirostris	1.80	120	0.21	
Calappa-like with spines	1.40	60	0.16	
Trigla lyra	1.20	20	0.14	
Malaccocephalus laevis	1.20	40	0.14	
Ariomma melanum	1.00	40	0.12	
Lophius vaillanti	0.80	20	0.09	
Dibranchius atlanticus	0.80	120	0.09	
GALATHEIDAE	0.40	20	0.05	
Plesionika martia	0.40	100	0.05	
Peristedion cataphractum	0.40	40	0.05	
Selenocera africana	0.20	20	0.02	
Monolele microstoma	0.20	20	0.02	
Heterocarpus ensifer	0.20	40	0.02	
Stereomastis sp.	0.20	20	0.02	
Chascanopsetta lugubris	0.20	20	0.02	
Chaunax pictus	0.04	2		
Total	852.72		99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 624
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 414
 start stop duration Long E 841
 TIME :05:19:39 05:49:05 29 (min) Purpose code: 3
 LOG : 404.20 405.66 1.45 Area code : 6
 FDEPTH: 20 23 GearCond.code:
 BDEPTH: 20 23 Validity code:
 Towing dir: 131ø Wire out: 120 m Speed: 30 kn*10
 Sorted: 33 Kg Total catch: 161.44 CATCH/HOUR: 334.01

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	110.69	114	33.14	
Nematopalaemon hastatus	36.21	62586	10.84	
Ilisha africana	27.62	2328	8.37	
Callinectes amnicola	24.72	517	7.40	
Pseudotolithus elongatus	24.62	497	7.37	2828
Chloroscombrus chrysurus	17.17	693	5.14	2852
Brachydeuterus auritus	16.76	714	5.02	2851
Trichiurus lepturus	15.83	507	4.74	
Parapenaeopsis atlantica	11.46	1614	3.43	2832
Pseudotolithus typus	9.72	217	2.91	2829
Pseudotolithus senegalensis	9.31	207	2.79	2827
Pisodonophis semicinctus	5.17	31	1.55	
Squilla aculeata calmani	4.66	238	1.40	
Galeoides decadactylus	4.66	124	1.40	
Penaeus notialis	3.21	114	0.96	2831
Cynoglossus monodi	2.69	424	0.81	
Penaeus monodon	2.36	23	0.71	2830
Pteroscion peli	1.24	83	0.37	
Lagocephalus laevigatus	1.14	21	0.34	
Pentanezum quinquarius	1.03	31	0.31	
Pseudotolithus epipecus	0.62	10	0.19	
Sepia officinalis hierredda	0.41	103	0.12	
Alectis alexandrinus	0.41	31	0.12	
Hemicaranx bicolor	0.41	21	0.12	
Chloroscombrus Juvenile	0.31	631	0.09	
Batrachoides liberiensis	0.31	10	0.09	
Selene dorsalis	0.31	31	0.09	
Scomberomorus tritor	0.31	10	0.09	
Syacium micrurum	0.21	10	0.06	
Sardinella maderensis	0.21	21	0.06	
Hemicaranx bicolor juv.	0.10	10	0.03	
Cepola macrophthalma	0.10	10	0.03	
Cymbium cymbium	0.10	10	0.03	
Bathygobius paganellus	0.10	10	0.03	
Total	334.18		100.05	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 623
 DATE:26/ 6/04 GEAR TYPE: BT No:15 POSITION:Lat N 333
 start stop duration Long E 832
 TIME :13:32:33 14:02:10 30 (min) Purpose code: 3
 LOG : 121.88 123.47 1.59 Area code : 7
 FDEPTH: 111 129 GearCond.code:
 BDEPTH: 111 129 Validity code:
 Towing dir: 320ø Wire out: 320 m Speed: 30 kn*10
 Sorted: Kg Total catch: 39.71 CATCH/HOUR: 79.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Squatina oculata	21.00	180	26.44	
Dentex congolensis	15.78	258	19.87	2826
Dentex angolensis	15.08	152	18.99	2825
Illex coindetii	4.72	124	5.94	
Priacanthus arenatus	3.02	100	3.80	
Todaropsis eblanae	2.68	28	3.37	
Zeus faber	2.12	6	2.67	
Citharus linguatula	2.10	154	2.64	
Lepidotrigla cadmani	1.70	34	2.14	
Raja sp.	1.30	2	1.64	
Raja miraletus	1.08	8	1.36	
Astropecten sp.	1.04	70	1.31	
Spicara alta	0.98	20	1.23	
Dibranchius atlanticus	0.82	2	1.03	
Sphoeroides pachgaster	0.82	4	1.03	
Sepia officinalis hierredda	0.78	12	0.98	
Antigonia capros	0.74	22	0.93	
Bemdrops greyi	0.70	2	0.88	
Cyrtopsis roseus	0.62	20	0.78	
Malaccocephalus laevis	0.48	16	0.60	
Boops boops	0.32	6	0.40	
Galeus polli	0.28	24	0.35	
Chascanopsetta lugubris	0.20	20	0.25	
Uranoscopus albesca	0.16	10	0.20	
Pterothrissus belloci	0.16	12	0.20	
Setarches guentheri	0.14	8	0.18	
Peristedion cataphractum	0.14	6	0.18	
Lepidotrigla carclae	0.10	4	0.13	
Ijmaia lepei	0.08	4	0.10	
Stereomastis sp.	0.08	6	0.10	
Microchirus wittei	0.06	2	0.08	
Parapandalus narval	0.04	10	0.05	
Physiculus hulot	0.04	2	0.05	
Squilla mantis	0.02	4	0.03	
Heterocarpus ensifer	0.02	2	0.03	
Scorpaena normani	0.02	2	0.03	
Total	79.42		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 625
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 408
 start stop duration Long E 838
 TIME :07:37:40 08:07:21 30 (min) Purpose code: 3
 LOG : 419.80 421.31 1.51 Area code : 6
 FDEPTH: 60 56 GearCond.code:
 BDEPTH: 60 56 Validity code:
 Towing dir: 300ø Wire out: 170 m Speed: 30 kn*10
 Sorted: 32 Kg Total catch: 58.67 CATCH/HOUR: 117.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Saurida brasiliensis	44.60	21152	38.01	
Parapenaeus longirostris	13.84	54	11.79	
Brachydeuterus auritus Juv.	11.44	3052	9.75	
Brachydeuterus auritus	8.48	488	7.23	
Citharus linguatula	5.36	108	4.57	
Uranoscopus albesca	5.12	72	4.36	
Epinephelus aeneus	4.00	4	3.41	
Cymbium cymbium	3.58	4	3.05	
Selar crumenophthalmus	3.26	20	2.78	
Raja miraletus	3.24	28	2.76	
Calappa pelii	1.92	8	1.64	
Serranus accraensis	1.32	48	1.12	
Bathygobius paganellus	1.08	296	0.92	
J E L L Y F I S H	1.00	24	0.85	
Penaeus notialis	0.88	32	0.75	
Portunus validus	0.84	36	0.72	
Hemicaranx bicolor	0.84	8	0.72	
Illex coindetii	0.80	8	0.68	
Alloteuthis africana	0.80	120	0.68	
Sepia officinalis hierredda	0.70	10	0.60	
Sepia juveniles	0.52	112	0.44	
Priacanthus arenatus	0.52	4	0.44	
Syacium micrurum	0.52	76	0.44	
Pagellus bellottii	0.52	2	0.44	
Grammolites gruvelli	0.48	32	0.41	
Trichiurus lepturus	0.40	4	0.34	
Antennarius sp.	0.40	8	0.34	
Parapenaeopsis atlantica	0.28	4	0.24	
Scyllarides herklotsii	0.24	16	0.20	
Echinocardium sp.	0.12	8	0.10	
Sardinella maderensis	0.08	4	0.07	
Pontinus accraensis	0.08	8	0.07	
Sphoeroides marmoratus	0.04	8	0.03	
Sicyonia galeata	0.04	8	0.03	
Total	117.34		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 626
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 407
 start stop duration Long E 844
 TIME :10:13:19 10:43:00 30 (min) Purpose code: 3
 LOG : 438.16 439.69 1.52 Area code : 6
 FDEPTH: 60 61 GearCond.code:
 BDEPTH: 60 61 Validity code:
 Towing dir: 130° Wire out: 170 m Speed: 30 kn*10
 Sorted: 17 Kg Total catch: 17.53 CATCH/HOUR: 35.06

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Epinephelus aeneus	9.90	4	28.24	
Brachydeuterus auritus	3.92	628	11.18	2834
Cymbium cymbium	3.92	10	11.18	
Ilixes coindetii	3.12	40	8.90	
Raja miraletus	2.72	24	7.76	
Pagellus bellottii	1.92	28	5.48	2833
Saurida brasiliensis	1.22	250	3.48	
Leptocharias smythii	1.04	2	2.97	
Pentheroscion mbizi	0.92	18	2.62	
Fistularia petimba	0.78	4	2.22	
Drepane africana	0.68	24	1.94	
Lepidotrigla cadmani	0.66	10	1.88	
Alloteuthis africana	0.52	134	1.48	
Penaeus notialis	0.50	10	1.43	
Parapenaeus longirostris	0.44	38	1.25	
Trichiurus lepturus	0.42	2	1.20	
Sepia officinalis hierredda	0.38	38	1.08	
Grammoplites gruvelli	0.36	18	1.03	
Chilomycterus spinosus mauret.	0.30	2	0.86	
Citharus linguatula	0.28	28	0.80	
Todaropsis eblanae	0.16	2	0.46	
Portunus validus	0.12	6	0.34	
Serranus accraensis	0.10	4	0.29	
Lepidotrigla carolae	0.08	6	0.23	
Scyllarides herklotsii	0.08	10	0.23	
Styrium micrum	0.08	18	0.23	
Sardinella maderensis	0.06	4	0.17	
Bathygobius paganellus	0.06	12	0.17	
Lophiodes kemp	0.06	2	0.17	
C R A B S	0.04	2	0.11	
Liocarcinus corrugatus	0.04	8	0.11	
Cynoglossus browni	0.04	4	0.11	
Decapterus punctatus	0.04	4	0.11	
Parapenaeopsis atlantica	0.02	2	0.06	
Scorpaena normani	0.02	2	0.06	
Blennius normani	0.02	4	0.06	
Aricma bondi	0.02	2	0.06	
Dentex angolensis	0.02	2	0.06	
Total	35.06		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 627
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 409
 start stop duration Long E 847
 TIME :12:02:20 12:25:33 23 (min) Purpose code: 3
 LOG : 447.02 448.24 1.21 Area code : 6
 FDEPTH: 46 45 GearCond.code:
 BDEPTH: 46 45 Validity code:
 Towing dir: 110° Wire out: 165 m Speed: 30 kn*10
 Sorted: 58 Kg Total catch: 1028.38 CATCH/HOUR: 2682.73

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	2309.32	93772	86.08	2836
Selene dorsalis	312.26	2066	11.64	2835
Portunus validus	29.11	94	1.09	
Raja miraletus	12.68	94	0.47	
Sphyraena guachancho	6.57	188	0.24	
Penaeus notialis	5.63	188	0.21	
Uraspis helvola	2.35	13	0.09	
Epinephelus aeneus	1.98	10	0.07	
Bathygobius paganellus	0.94	282	0.04	
Trichiurus lepturus	0.47	141	0.02	
Parapenaeus longirostris	0.47	329	0.02	
Saurida brasiliensis	0.47	188	0.02	
Citharus linguatula	0.47	188	0.02	
Total	2682.72		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 628
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 407
 start stop duration Long E 857
 TIME :14:11:49 14:41:33 30 (min) Purpose code: 3
 LOG : 462.26 463.85 1.58 Area code : 6
 FDEPTH: 32 26 GearCond.code:
 BDEPTH: 32 26 Validity code:
 Towing dir: 295° Wire out: 115 m Speed: 30 kn*10
 Sorted: 22 Kg Total catch: 163.19 CATCH/HOUR: 326.38

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pseudotolithus elongatus	78.00	744	23.90	2837
Chelonia mydas	56.40	2	17.28	
Trichiurus lepturus	39.36	1392	12.06	2838
Ilisha africana	34.44	1980	10.55	2841
Pseudotolithus typus	22.92	288	7.02	2840
Portunus validus	16.80	468	5.15	
Elops lacerta	14.76	72	4.52	
Pteroscion peli	9.84	660	3.01	
Sphyraena guachancho	7.92	48	2.43	
Scorberomorus tritor	6.36	24	1.95	
Penaeus notialis	6.24	288	1.91	
Galeoides decadactylus	5.40	60	1.65	
Nematopalaemon hastatus	4.56	4836	1.40	
Drepane africana	4.20	144	1.29	2839
Chloroscombrus chrysurus	4.08	72	1.25	2842
Pseudotolithus senegalensis	3.12	96	0.96	
Pseudotolithus brachygnathus	2.64	12	0.81	
Cynoglossus canariensis	2.52	36	0.77	
Brachydeuterus auritus	2.04	48	0.63	
Selene dorsalis	1.44	60	0.44	
Lycodontis afer	0.84	12	0.26	
Sardinella maderensis	0.72	36	0.22	
Antennarius sp.	0.48	96	0.15	
Penaeus monodon	0.30	2	0.09	
Pomadourus peroteti	0.28	2	0.08	
Sepiella ornata	0.24	36	0.07	
Squilla aculeata calmani	0.12	60	0.04	
Chloroscombrus Juvenile	0.12	108	0.04	
Sphoeroides pachgaster	0.12	12	0.04	
Lagocephalus lagocephalus	0.12	12	0.04	
Total	326.38		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 629
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 405
 start stop duration Long E 855
 TIME :15:56:09 16:26:19 30 (min) Purpose code: 3
 LOG : 472.03 473.59 1.57 Area code : 6
 FDEPTH: 42 41 GearCond.code:
 BDEPTH: 42 41 Validity code:
 Towing dir: 110° Wire out: 152 m Speed: 30 kn*10
 Sorted: 37 Kg Total catch: 93.01 CATCH/HOUR: 186.02

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus	150.60	3246	80.96	
Cymbium cymbium	10.86	30	5.84	
Sphyraena guachancho	6.60	6	3.55	
Ilisha africana	4.20	108	2.26	
Selene dorsalis	2.94	14	1.58	
Caranx hippos	2.44	10	1.31	
Brachydeuterus auritus Juv.	2.34	240	1.26	
Uraspis helvola	2.04	4	1.10	
Sepia orbignyana	0.62	2	0.33	
Epinephelus aeneus	0.56	4	0.30	
Penaeus notialis	0.56	18	0.30	
Raja miraletus	0.40	2	0.22	
Selar crumenophthalmus	0.34	4	0.18	
Pseudotolithus elongatus	0.28	2	0.15	
Trichiurus lepturus	0.26	6	0.14	
Bathygobius paganellus	0.18	96	0.10	
Portunus validus	0.18	6	0.10	
Saurida brasiliensis	0.18	90	0.10	
Citharus linguatula	0.18	12	0.10	
Antennarius sp.	0.14	4	0.08	
Alloteuthis africana	0.06	6	0.03	
Serranus accraensis	0.06	6	0.03	
Total	186.02		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 630
 DATE: 1/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 401
 start stop duration Long E 853
 TIME :17:34:05 18:04:13 30 (min) Purpose code: 3
 LOG : 482.23 483.74 1.47 Area code : 6
 FDEPTH: 61 60 GearCond.code:
 BDEPTH: 61 60 Validity code:
 Towing dir: 110° Wire out: 180 m Speed: 30 kn*10

Sorted: Kg Total catch: 64.67 CATCH/HOUR: 129.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Brachydeuterus auritus Juv.	36.60	4604	28.30	2844
Epinephelus aeneus	24.60	4	19.02	
Saurida brasiliensis	18.24	6036	14.10	
Dentex angolensis	7.66	56	5.92	2843
Decapterus punctatus	5.32	580	4.11	
Parapenaeus longirostris	3.68	532	2.85	
Venus verrucosa	3.52	176	2.72	
Uranoscopus albesca	3.00	36	2.32	
Pagellus bellottii	2.88	86	2.23	
Chilomycterus spinosus mauret.	2.72	12	2.10	
Echinocardium sp.	1.80	68	1.39	
Sepia officinalis hierredda	1.76	12	1.36	
Brachydeuterus auritus	1.68	56	1.30	
Citharus linguatula	1.64	176	1.27	
Brotula barbata	1.24	8	0.96	
Serranus accraensis	1.20	44	0.93	
Grammolites gruvelli	1.20	64	0.93	
Raja miraletus	1.12	12	0.87	
Sphyræna guanchancho	1.08	4	0.84	
Syacium micrurum	0.96	228	0.74	
Calappa pelii	0.84	4	0.65	
Alloteuthis africana	0.84	336	0.65	
Ariomma bondi	0.64	16	0.49	
Bathygobius paganellus	0.60	156	0.46	
Priacanthus arenatus	0.56	40	0.43	
Sepia juveniles	0.52	56	0.40	
Lepidotrigla cadmani	0.52	12	0.40	
J E L L Y F I S H	0.48	16	0.37	
Caranx hippos	0.40	2	0.31	
Penaeus notialis	0.36	12	0.28	
C R A B S	0.24	8	0.19	
Illex coindetii	0.24	4	0.19	
Lepidotrigla carolae	0.16	8	0.12	
Lophius vaillanti	0.16	8	0.12	
Octopus vulgaris	0.12	4	0.09	
Scyllarides herklotsii	0.12	16	0.09	
Paronchellus stauchi	0.08	8	0.06	
Blennius normani	0.08	12	0.06	
Ilisha africana	0.08	8	0.06	
Microchirus frechkopi	0.08	4	0.06	
Portunus validus	0.08	4	0.06	
Gobius sp	0.08	4	0.06	
Pontinus accraensis	0.08	20	0.06	
'Spider crab'	0.04	4	0.03	
Zeus faber	0.04	4	0.03	
Total	129.34		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 631
 DATE: 1/ 7/04 GEAR TYPE: PT No: 7 POSITION:Lat N 405
 start stop duration Long E 857
 TIME :21:21:20 21:51:03 30 (min) Purpose code: 3
 LOG : 506.14 507.73 1.58 Area code : 6
 FDEPTH: 0 0 GearCond.code:
 BDEPTH: 30 28 Validity code:
 Towing dir: 321° Wire out: 120 m Speed: 30 kn*10

Sorted: 36 Kg Total catch: 35.81 CATCH/HOUR: 71.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	42.30	94	59.06	
Caranx senegallus	12.92	48	18.04	2846
Chloroscombrus chrysurus	4.88	42	6.81	
Scomberomorus tritor	4.20	18	5.86	
Sardinella maderensis - Juv.	1.38	182	1.93	2845
Sardinella maderensis	1.24	24	1.73	2847
Sphyræna guanchancho	1.16	8	1.62	
Trachinotus ovatus	0.96	4	1.34	
Raja miraletus	0.84	10	1.17	
Selene dorsalis	0.70	4	0.98	
Albula vulpes	0.44	2	0.61	
Ilisha africana	0.28	20	0.39	
Trichurus lepturus	0.16	20	0.22	
Chloroscombrus Juvenile	0.16	168	0.22	
Total	71.62		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 632
 DATE: 2/ 7/04 GEAR TYPE: FT No: 2 POSITION:Lat N 404
 start stop duration Long E 845
 TIME :00:04:50 00:34:31 30 (min) Purpose code: 3
 LOG : 523.37 525.10 1.68 Area code : 6
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 64 63 Validity code:
 Towing dir: 300° Wire out: 140 m Speed: 40 kn*10

Sorted: Kg Total catch: 13.17 CATCH/HOUR: 26.34

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	12.64	26	47.99	2848
Saurida brasiliensis	3.30	408	12.53	
Sardinella maderensis	2.94	20	11.16	2850
Euthymus alletteratus	2.28	4	8.66	
Sphyræna guanchancho	1.90	4	7.21	
Ariomma bondi	1.42	24	5.39	
Sardinella maderensis - Juv.	1.00	120	3.80	2849
Bregmaceros sp.	0.54	778	2.05	
Selar crumenophthalmus	0.14	2	0.53	
Echeneis naucrates	0.06	2	0.23	
Alloteuthis africana	0.04	22	0.15	
Aluterus heudelotii	0.04	2	0.15	
Priacanthus arenatus	0.02	2	0.08	
Total	26.32		99.93	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 633
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 353
 start stop duration Long E 903
 TIME :05:25:13 05:55:05 30 (min) Purpose code: 3
 LOG : 565.23 566.65 1.41 Area code : 6
 FDEPTH: 56 56 GearCond.code:
 BDEPTH: 56 56 Validity code:
 Towing dir: 300° Wire out: 170 m Speed: 30 kn*10

Sorted: Kg Total catch: 29.96 CATCH/HOUR: 59.92

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Saurida brasiliensis	16.84	6780	28.10	
Parapenaeopsis atlantica	7.42	1412	12.38	
Brachydeuterus auritus	5.46	384	9.11	2853
Pagellus bellottii	3.30	16	5.51	
Sepia officinalis hierredda	3.06	18	5.11	
Fistularia petimba	2.64	24	4.41	
Caranx senegallus	1.88	6	3.24	
Chilomycterus spinosus mauret.	1.86	6	3.10	
Sphyræna guanchancho	1.78	18	2.97	2854
Sepia juveniles	1.56	216	2.60	
Epinephelus aeneus	1.32	4	2.20	
Brotula barbata	1.28	4	2.14	
Serranus accraensis	1.20	58	2.00	
J E L L Y F I S H	1.18	24	1.97	
Raja miraletus	1.18	10	1.97	
Citharus linguatula	1.02	68	1.70	
Syacium micrurum	0.98	230	1.64	
Alloteuthis africana	0.72	142	1.20	
Uranoscopus albesca	0.72	22	1.20	
Grammolites gruvelli	0.70	34	1.17	
Calappa pelii	0.68	4	1.13	
Lagocephalus laevigatus	0.56	2	0.93	
Cymbium cymbium	0.42	2	0.70	
Scyllarides herklotsii	0.36	60	0.60	
Venus verrucosa	0.32	14	0.53	
Sardinella maderensis	0.32	6	0.53	
Lepidotrigla cadmani	0.22	4	0.37	
Penaeus notialis	0.18	6	0.30	
Illex coindetii	0.18	2	0.30	
Lophiodes kempii	0.14	10	0.23	
Echinocardium sp.	0.08	10	0.13	
Lepidotrigla carolae	0.06	8	0.10	
Dicologlossa cuneata	0.04	2	0.07	
Cynoponticus ferox	0.04	2	0.07	
Centrolophus niger	0.04	2	0.07	
Bathygobius paganellus	0.04	40	0.07	
Blennius normani	0.04	14	0.07	
Sicyonia galeata	0.04	10	0.07	
'Unidentified crab'	0.02	2	0.03	
Serranus africana	0.02	2	0.03	
Pontinus accraensis	0.02	2	0.03	
Total	59.92		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 634
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 400
 start stop duration Long E 905
 TIME :07:31:20 08:01:16 30 (min) Purpose code: 3
 LOG : 576.94 578.39 1.53 Area code : 6
 FDEPTH: 31 29 GearCond.code:
 BDEPTH: 31 29 Validity code:
 Towing dir: 133ø Wire out: 120 m Speed: 30 kn*10
 Sorted: 37 Kg Total catch: 191.31 CATCH/HOUR: 382.62

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Nematopalaemon hastatus	104.64 288336	27.35	
Trichiurus lepturus	83.16 8316	21.73	
Ilisha africana	68.76 5940	17.97	2856
Pteroscion peli	59.76 4368	15.62	
Pseudotolithus elongatus	15.84 204	4.14	
Portunus validus	13.20 708	3.45	
Cynoponticus ferox	7.50 18	1.96	
Brachydeuterus auritus	5.88 348	1.54	2855
Scomberomorus tritor	4.32 12	1.13	
Sphyræna guachancho	4.24 24	1.11	
Selene dorsalis	3.00 144	0.78	
Elops lacerta	2.40 6	0.63	
Grammolites gruvelli	2.04 252	0.53	
Antennarius sp	1.56 336	0.41	
Penæus notialis	1.32 84	0.34	
Cynoglossus canariensis	1.20 6	0.31	
Pseudotolithus senegalensis	0.76 6	0.20	
Fistularia petimba	0.64 4	0.17	
Bathygobius paganellus	0.60 276	0.16	
Squilla aculeata calmani	0.60 24	0.16	
Brotula barbata	0.36 60	0.09	
Sepiella ornata	0.24 18	0.06	
Octopus vulgaris	0.24 2	0.06	
Sicyonia galeata	0.12 12	0.03	
Sardinella maderensis	0.12 12	0.03	
Scyllarides herklotsii	0.12 12	0.03	
Total	382.62	99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 635
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 351
 start stop duration Long E 911
 TIME :09:35:17 10:05:06 30 (min) Purpose code: 3
 LOG : 589.86 591.49 1.61 Area code : 6
 FDEPTH: 21 28 GearCond.code:
 BDEPTH: 21 28 Validity code:
 Towing dir: 300ø Wire out: 120 m Speed: 30 kn*10
 Sorted: 33 Kg Total catch: 196.98 CATCH/HOUR: 393.96

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Nematopalaemon hastatus	81.48 41826	20.68	
J E L Y F I S H	62.28 108	15.81	
Trichiurus lepturus	60.96 480	15.47	
Ilisha africana	54.24 1908	13.77	
Pseudotolithus elongatus	35.16 384	8.92	2858
Pteroscion peli	20.28 504	5.15	2857
Brachydeuterus auritus	13.44 528	3.41	2861
Chloroscombrus chrysurus	10.80 576	2.74	
Portunus validus	9.60 492	2.44	
Pseudotolithus typus	9.60 72	2.44	2862
Selene dorsalis	7.68 276	1.95	
Pentheroscion mbizi	7.56 120	1.92	2859
Sphyræna guachancho	6.24 168	1.58	
Cynoponticus ferox	3.88 10	0.98	
Galeoides decadactylus	3.84 36	0.97	2860
Pseudotolithus senegalensis	1.32 36	0.34	
Pisodonophis semicinctus	1.08 8	0.27	
Squatinia oculata	0.96 36	0.24	
Sepiella ornata	0.96 144	0.24	
Parapenaeopsis atlantica	0.72 288	0.18	
Lutjanus goreensis	0.40 2	0.10	
Penæus notialis	0.36 12	0.09	
Penæus monodon	0.28 2	0.07	
Grammolites gruvelli	0.24 36	0.06	
Sardinella maderensis	0.24 12	0.06	
Cynoglossus browni	0.12 12	0.03	
Hemicaranx bicolor	0.12 24	0.03	
Brotula barbata	0.12 12	0.03	
Total	393.96	99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 636
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 349
 start stop duration Long E 909
 TIME :11:24:02 11:54:05 30 (min) Purpose code: 3
 LOG : 600.55 601.97 1.41 Area code : 6
 FDEPTH: 37 32 GearCond.code:
 BDEPTH: 37 32 Validity code:
 Towing dir: 130ø Wire out: 152 m Speed: 30 kn*10
 Sorted: 34 Kg Total catch: 169.50 CATCH/HOUR: 339.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	92.00 7210	27.14	
Trichiurus lepturus	82.00 6214	24.19	
Sphyræna guachancho	78.00 1230	23.01	2863
Chloroscombrus chrysurus	30.60 470	9.03	2865
Penæus notialis	12.40 610	3.66	
Selene dorsalis	8.70 290	2.57	2864
Sepia officinalis hierredda	7.30 12	2.15	
Portunus validus	4.70 90	1.39	
Nematopalaemon hastatus	4.20 12180	1.24	
Ilisha africana	4.20 220	1.24	2866
Scomberomorus tritor	2.40 20	0.71	
Caranx hippos	2.30 10	0.68	
Epinephelus aeneus	2.00 30	0.59	
Octopus vulgaris	1.10 10	0.32	
Pseudotolithus senegalensis	0.90 10	0.27	
Alloteuthis africana	0.70 820	0.21	
Bathygobius paganellus	0.70 350	0.21	
Sardinella maderensis	0.70 70	0.21	
Dicologlossa cuneata	0.60 10	0.18	
Pisodonophis semicinctus	0.52 4	0.15	
Penæus kerathurus	0.50 10	0.15	
Lethrinus atlanticus	0.48 2	0.14	
Psetodes belcheri	0.40 10	0.12	
Grammolites gruvelli	0.40 50	0.12	
Parapenæus longirostris	0.20 110	0.06	
Uranoscopus albesca	0.20 70	0.06	
Sicyonia galeata	0.10 10	0.03	
Sepiella ornata	0.10 10	0.03	
Antennarius sp.	0.10 30	0.03	
Saurida brasiliensis	0.10 10	0.03	
Pteroscion peli	0.10 30	0.03	
Pseudupeneus prayensis	0.10 10	0.03	
Cynoglossus canariensis	0.10 10	0.03	
Total	338.90	100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 637
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 340
 start stop duration Long E 919
 TIME :13:45:38 14:15:18 30 (min) Purpose code: 3
 LOG : 617.19 618.68 1.48 Area code : 6
 FDEPTH: 25 26 GearCond.code:
 BDEPTH: 25 26 Validity code:
 Towing dir: 280ø Wire out: 125 m Speed: 30 kn*10
 Sorted: 32 Kg Total catch: 201.50 CATCH/HOUR: 403.00

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Ilisha africana	93.84 3564	23.29	2869
Chloroscombrus chrysurus	91.20 2796	22.63	2871
Brachydeuterus auritus	36.12 1092	8.96	2873
Sphyræna guachancho	29.64 120	7.35	2872
Selene dorsalis	28.80 564	7.15	2870
Galeoides decadactylus	26.52 468	6.58	2867
Trichiurus lepturus	24.60 1224	6.10	
Pteroscion peli	13.56 2400	3.36	
Sardinella maderensis	10.06 180	2.50	2874
Sphyræna afra	7.50 2	1.86	
Elops lacerta	6.24 24	1.55	
Parapenaeopsis atlantica	5.04 3246	1.25	
Rhizoprionodon acutus	4.20 2	1.04	
Epinephelus aeneus	3.12 12	0.77	
Pseudotolithus senegalensis	3.00 96	0.74	
Drepane africana	3.00 84	0.74	
Caranx hippos	2.54 12	0.63	2868
Scomberomorus tritor	2.10 6	0.52	
Portunus validus	2.04 96	0.51	
Nematopalaemon hastatus	1.92 736	0.48	
Cynoglossus browni	1.20 12	0.30	
Selar crumenophthalmus	0.96 12	0.24	
Psetodes belcheri	0.86 8	0.21	
Penæus notialis	0.84 60	0.21	
Sepiella ornata	0.84 72	0.21	
Penæus monodon	0.82 6	0.20	
Squilla aculeata calmani	0.48 12	0.12	
Citharichthys stampflii	0.48 36	0.12	
Pisodonophis semicinctus	0.48 2	0.12	
Pemadasys jubelini	0.44 2	0.11	
Hemicaranx bicolor	0.24 2	0.06	
Alloteuthis africana	0.24 72	0.06	
Echeneis naucrates	0.02 2		
Total	402.94	99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 636
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 343
 start stop duration Long E 920
 TIME :15:29:17 15:59:09 30 (min) Purpose code: 3
 LOG : 626.85 628.52 1.68 Area code : 6
 FDEPTH: 18 20 GearCond.code:
 BDEPTH: 18 20 Validity code:
 Towing dir: 115° Wire out: 116 m Speed: 30 kn*10

Sorted: 10 Kg Total catch: 81.04 CATCH/HOUR: 162.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sphyræna guachancho	24.00	108	14.81	2878
Chloroscombrus chrysurus	21.60	670	13.33	
Sardinella maderensis	16.92	236	10.44	2875
Polydactylus quadrifiliis	14.70	2	9.07	
Selene dorsalis	12.24	258	7.55	
Galeoides decadactylus	10.26	222	6.33	
Ilisha africana	8.64	338	5.33	2876
Brachydeuterus auritus	6.60	204	4.07	
Pseudotolithus senegalensis	5.58	30	3.44	
Pseudotolithus typus	5.28	48	3.26	
Trichiurus lepturus	4.94	66	3.05	2877
Pomadasy jubelini	4.80	18	2.96	
Caranx senegalensis	4.32	12	2.67	
Scorpaenomor tritor	2.46	12	1.52	
Selar crumenophthalmus	2.28	18	1.41	
Pteroscion peli	2.28	66	1.41	
Pentheroscion mbizi	2.28	66	1.41	
Drepane africana	2.22	120	1.37	
Portunus validus	2.16	66	1.33	
Penaeus notialis	1.62	72	1.00	
Psettodes belcheri	1.62	18	1.00	
Liza grandisquamis	0.96	6	0.59	
Cynoglossus browni	0.84	6	0.52	
Hemicaranx bicolor	0.84	12	0.52	
Liza falcipinnis	0.72	6	0.44	
Mugil curema	0.66	6	0.41	
Sepiella ornata	0.54	510	0.33	
Sepia officinalis hierredda	0.48	48	0.30	
Squilla mantis	0.12	12	0.07	
Alectis alexandrinus	0.06	6	0.04	
Parapenaeopsis atlantica	0.06	12	0.04	
Total	162.08		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 639
 DATE: 2/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 339
 start stop duration Long E 929
 TIME :17:05:47 17:33:04 27 (min) Purpose code: 3
 LOG : 637.36 638.74 1.42 Area code : 6
 FDEPTH: 25 22 GearCond.code:
 BDEPTH: 25 22 Validity code:
 Towing dir: 306° Wire out: 121 m Speed: 30 kn*10

Sorted: Kg Total catch: 238.98 CATCH/HOUR: 531.07

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Nematopalaemon hastatus	231.00	565942	43.50	
Pseudotolithus typus	92.24	1338	17.37	
Trichiurus lepturus	30.18	1167	5.68	
Ilisha africana	26.13	1244	4.92	
Pentheroscion mbizi	19.44	280	3.66	
Pseudotolithus elongatus	18.04	280	3.40	
Pentanemus quinquequarius	15.56	42	2.93	
Pteroscion peli	14.31	451	2.69	
J E L L Y F I S H	12.29	16	2.31	
Pseudotolithus senegalensis	10.89	420	2.05	
Chloroscombrus chrysurus	9.64	218	1.82	
Cynoglossus ferox	7.29	22	1.37	
Pomadasy jubelini	6.22	47	1.17	
Portunus validus	5.91	156	1.11	
Brachydeuterus auritus	5.44	93	1.02	
Pseudotolithus moorii	4.82	31	0.91	
Sphyræna guachancho	4.36	16	0.82	
Selene dorsalis	4.04	233	0.76	
Sepia officinalis hierredda	2.33	78	0.44	
Penaeus monodon	2.09	16	0.39	
Parapenaeopsis atlantica	2.02	249	0.38	
Sardinella maderensis	2.02	109	0.38	
Pisodonophis semicinctus	1.67	11	0.31	
Trachinotus ovatus	1.56	31	0.29	
Drepane africana	0.78	62	0.15	
Brotula barbata	0.31	47	0.06	
Galeoides decadactylus	0.31	16	0.06	
Cynoglossus browni	0.16	31	0.03	
Total	531.05		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 640
 DATE: 2/ 7/04 GEAR TYPE: PT No: 7 POSITION:Lat N 349
 start stop duration Long E 912
 TIME :20:00:05 21:41:02 29 (min) Purpose code: 3
 LOG : 670.87 672.68 1.80 Area code : 6
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 21 22 Validity code:
 Towing dir: 335° Wire out: 120 m Speed: 35 kn*10

Sorted: 17 Kg Total catch: 17.42 CATCH/HOUR: 36.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	14.90	23	41.34	
Ethmalosa fimbriata	4.86	66	13.49	2879
Sardinella maderensis	3.21	99	8.91	2881
Ilisha africana	2.46	139	6.83	2882
Sphyræna guachancho	1.94	10	5.38	
Chloroscombrus chrysurus	1.92	58	5.33	2880
Nematopalaemon hastatus	1.68	4759	4.66	
Selene dorsalis	1.22	17	3.39	
Trichiurus lepturus	1.14	10	3.16	
Scorpaenomor tritor	1.12	4	3.11	
Brachydeuterus auritus	0.66	17	1.83	
Selar crumenophthalmus	0.27	2	0.75	
Portunus validus	0.25	10	0.69	
Trachinotus ovatus	0.12	2	0.33	
Pseudotolithus elongatus	0.12	2	0.33	
Liza grandisquamis	0.08	2	0.22	
Pseudotolithus senegalensis	0.04	2	0.11	
Hemicaranx bicolor	0.02	2	0.06	
Chloroscombrus Juvenile	0.02	50	0.06	
Total	36.03		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 641
 DATE: 3/ 7/04 GEAR TYPE: PT No: 7 POSITION:Lat N 337
 start stop duration Long E 918
 TIME :00:00:23 01:40:10 30 (min) Purpose code: 3
 LOG : 701.59 703.10 1.50 Area code : 6
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 33 34 Validity code:
 Towing dir: ° Wire out: 120 m Speed: 40 kn*10

Sorted: 2 Kg Total catch: 2.21 CATCH/HOUR: 4.42

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sardinella maderensis	1.90	72	42.99	2883
Ethmalosa fimbriata	0.80	10	18.10	
Sphyræna guachancho	0.74	2	16.74	
Trichiurus lepturus	0.56	8	12.67	
Portunus validus	0.14	6	3.17	
Trachinotus ovatus	0.08	2	1.81	
Ilisha africana	0.06	6	1.36	
Brachydeuterus auritus	0.04	2	0.90	
Sepiella ornata	0.04	24	0.90	
Chloroscombrus chrysurus	0.04	2	0.90	
Sepia juveniles	0.02	42	0.45	
Total	4.42		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 642
 DATE: 3/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 333
 start stop duration Long E 918
 TIME :05:20:35 05:49:12 29 (min) Purpose code: 3
 LOG : 710.50 711.89 3.29 Area code : 6
 FDEPTH: 44 44 GearCond.code:
 BDEPTH: 44 44 Validity code:
 Towing dir: 340° Wire out: 150 m Speed: 30 kn*10

Sorted: Kg Total catch: 348.36 CATCH/HOUR: 720.74

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	707.59	7988	98.18	
Selene dorsalis	9.31	87	1.29	2884
Sepia officinalis hierredda	1.88	8	0.26	
Saurida brasiliensis	0.70	17	0.10	
Sardinella maderensis	0.50	12	0.07	
Epinephelus aeneus	0.43	2	0.06	
Parapenaeopsis atlantica	0.12	4	0.02	
Schedophilus pamarco	0.10	2	0.01	
Brachydeuterus auritus	0.06	8	0.01	
Alloteuthis africana	0.02	2		
Sicyonia galeata	0.02	2		
Total	720.73		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 643
 DATE: 3/ 7/04 GEAR TYPE: BT No:15 POSITION:Lat N 325
 start stop duration Long E 919
 TIME :07:29:37 07:40:37 11 (min) Purpose code: 3
 LOG : 725.24 725.57 0.33 Area code : 6
 FDEPTH: 134 135 GearCond.code: 8
 BDEPTH: 134 135 Validity code: 4
 Towing dir: 345° Wire out: 360 m Speed: 30 kn*10

Sorted: Kg Total catch: 14.87 CATCH/HOUR: 81.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	75.27	671	92.80	
Dentex angolensis	4.64	27	5.72	2885
Dentex congoensis	0.60	5	0.74	
Sepia officinalis hierredda	0.33	5	0.41	
Citharus linguatula	0.16	5	0.20	
Parapenaeus longirostris	0.05	5	0.06	
Saurida brasiliensis	0.05	5	0.06	
Total	81.10		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 644
 DATE: 3/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 324
 start stop duration Long E 923
 TIME :09:21:52 09:51:02 29 (min) Purpose code: 3
 LOG : 734.08 735.56 1.48 Area code : 6
 FDEPTH: 78 76 GearCond.code:
 BDEPTH: 78 76 Validity code:
 Towing dir: 311s Wire out: 240 m Speed: 30 kn*10

Sorted: 19 Kg Total catch: 19.38 CATCH/HOUR: 40.10

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dentex congoensis	13.99 463	34.89	2886
Sepia officinalis hierredda	8.34 62	20.80	
Squatina oculata	7.01 4	17.48	
Priacanthus arenatus	3.14 93	7.83	
Dentex angolensis	1.74 33	4.34	2887
Lepidotrigla cadmani	0.91 21	2.27	
Pagellus bellottii	0.77 14	1.92	
Illex coindetii	0.74 17	1.85	
Epinephelus aeneus	0.62 2	1.55	
Pentheroscion mbizi	0.43 2	1.07	
J E L L Y F I S H	0.43 2	1.07	
Fistularia petimba	0.39 8	0.97	
Serranus accraensis	0.31 10	0.77	
Ariomma bondi	0.31 12	0.77	
Decapterus punctatus	0.27 4	0.67	
Sphaeroides marmoratus	0.19 6	0.47	
Sphaeroides pachygaster	0.14 2	0.35	
Lepidotrigla carolae	0.14 4	0.35	
Saurida brasiliensis	0.10 2	0.25	
Blennius normani	0.10 2	0.25	
Total	40.07	99.92	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 645
 DATE: 3/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 328
 start stop duration Long E 931
 TIME :11:29:10 11:59:10 30 (min) Purpose code: 3
 LOG : 747.58 749.05 1.46 Area code : 6
 FDEPTH: 26 28 GearCond.code:
 BDEPTH: 26 28 Validity code:
 Towing dir: 250s Wire out: 129 m Speed: 30 kn*10

Sorted: 34 Kg Total catch: 34.22 CATCH/HOUR: 68.44

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Pseudotolithus senegalensis	12.04 100	17.59	2892
Trichiurus lepturus	8.08 80	11.81	2893
Galeoides decadactylus	7.70 114	11.25	2890
Ilisha africana	7.68 322	11.22	2889
Sphyræna guachancho	5.96 202	8.71	2888
Scomberomorus tritor	5.20 42	7.60	2891
Rhizoprionodon acutus	2.46 8	3.59	
Sphyrna lewini	2.40 2	3.51	
Pseudotolithus typus	2.14 10	3.13	
Brachydeuterus auritus	1.78 122	2.60	
Selene dorsalis	1.72 60	2.51	
Alectis alexandrinus	1.52 2	2.22	
Cynoponticus ferox	1.00 2	1.46	
Chloroscombrus chrysurus	0.94 16	1.37	
Pteroscion pelli	0.84 20	1.23	
Psettodes belcheri	0.82 6	1.20	
Drepane africana	0.82 24	1.20	
Sepiella ornata	0.74 260	1.08	
Lagocephalus laevigatus	0.74 6	1.08	
Decapterus punctatus	0.60 14	0.88	
Hemicaranx bicolor	0.50 4	0.73	
Caranx hippos	0.50 4	0.73	
Pomadasyd jubelini	0.46 2	0.67	
Priacanthus arenatus	0.44 12	0.64	
Pseudotolithus brachygnathus	0.38 4	0.56	
Sardinella maderensis	0.32 26	0.47	
Todaropsis eblanae	0.20 10	0.29	
Lolligoncula mercatoris	0.16 256	0.23	
Lethrinus atlanticus	0.16 2	0.23	
Selar crumenophthalmus	0.06 2	0.09	
Ariomma bondi	0.04 4	0.06	
Cynoglossus browni	0.02 2	0.03	
Portunus validus	0.02 2	0.03	
Total	68.44	100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 646
 DATE: 3/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 320
 start stop duration Long E 940
 TIME :13:51:18 14:21:11 30 (min) Purpose code: 3
 LOG : 764.69 766.25 1.54 Area code : 6
 FDEPTH: 22 24 GearCond.code:
 BDEPTH: 22 24 Validity code:
 Towing dir: 309e Wire out: 111 m Speed: 30 kn*10

Sorted: 47 Kg Total catch: 47.43 CATCH/HOUR: 94.86

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Galeoides decadactylus	19.20 180	20.24	2900
Sphyræna afra	10.80 6	11.39	
Sphyræna guachancho	9.50 60	10.01	2895
Brachydeuterus auritus	8.38 174	8.83	2894
Pteromylaeus bovinus	7.50 2	7.91	
Pseudotolithus senegalensis	6.22 32	6.56	2899
Caranx hippos	5.66 38	5.97	2902
Scomberomorus tritor	5.22 20	5.50	2898
Drepane africana	4.52 52	4.76	2896
Elops lacerta	2.72 12	2.87	
Pseudotolithus brachygnathus	2.10 6	2.21	
Pseudotolithus typus	2.08 10	2.19	2897
Ilisha africana	1.62 102	1.71	2903
Epinephelus aeneus	1.26 2	1.33	
Chloroscombrus chrysurus	1.22 26	1.29	
Lutjanus goreensis	1.14 2	1.20	
Balistes punctatus	0.70 2	0.74	
Trichiurus lepturus	0.66 68	0.70	
Pteroscion pelli	0.64 12	0.67	
Chaetodipterus goreensis	0.60 4	0.63	
Selene dorsalis	0.56 40	0.59	2901
Alectis alexandrinus	0.52 6	0.55	
Sardinella maderensis	0.50 44	0.53	2908
Psettodes belcheri	0.44 6	0.46	
Hemicaranx bicolor	0.26 2	0.27	
Portunus validus	0.24 42	0.25	
Panulirus regius	0.20 2	0.21	
Lolligoncula mercatoris	0.18 188	0.19	
Todaropsis eblanae	0.12 2	0.13	
Sepiella ornata	0.04 20	0.04	
Selar crumenophthalmus	0.04 2	0.04	
Total	94.84	99.97	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 647
 DATE: 3/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 319
 start stop duration Long E 934
 TIME :15:38:10 16:08:13 30 (min) Purpose code: 3
 LOG : 775.29 776.82 1.56 Area code : 6
 FDEPTH: 34 31 GearCond.code:
 BDEPTH: 34 31 Validity code:
 Towing dir: 77e Wire out: 131 m Speed: 30 kn*10

Sorted: Kg Total catch: 13.86 CATCH/HOUR: 27.72

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Alectis alexandrinus	9.80 22	35.35	2904
Pagrus caeruleostictus	6.56 16	23.67	
Lagocephalus laevigatus	5.42 30	19.55	
Epinephelus aeneus	1.40 2	5.05	
Sphyræna afra	1.34 2	4.83	
Sepia officinalis hierredda	0.70 2	2.53	
Selene dorsalis	0.56 6	2.02	
Psettodes belcheri	0.50 4	1.80	
Fistularia petimba	0.46 2	1.66	
Caranx hippos	0.20 2	0.72	
Chloroscombrus chrysurus	0.18 4	0.65	
Brachydeuterus auritus	0.12 4	0.43	
Todaropsis eblanae	0.12 2	0.43	
Chilomycterus spinosus mauret.	0.10 2	0.36	
Sardinella maderensis	0.10 4	0.36	2905
Trichiurus lepturus	0.06 4	0.22	
Alloteuthis africana	0.06 14	0.22	
Lolligoncula mercatoris	0.04 52	0.14	
Total	27.72	99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 648
 DATE: 3/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 318
 start stop duration Long E 930
 TIME :17:06:50 17:36:06 29 (min) Purpose code: 3
 LOG : 784.08 785.54 1.45 Area code : 6
 FDEPTH: 57 47 GearCond.code:
 BDEPTH: 57 47 Validity code:
 Towing dir: 77e Wire out: 160 m Speed: 30 kn*10

Sorted: Kg Total catch: 32.85 CATCH/HOUR: 67.97

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
J E L L Y F I S H	57.52 722	84.63	
Alloteuthis africana	3.29 1316	4.84	
Sphyræna guachancho	2.36 10	3.47	2907
Pagellus bellottii	1.12 12	1.65	2906
Balistes caprisicus	0.89 2	1.31	
Epinephelus aeneus	0.72 2	1.06	
Saurida brasiliensis	0.72 166	1.06	
Brachydeuterus auritus Juv.	0.66 387	0.97	
Fistularia petimba	0.27 4	0.40	
Decapterus punctatus	0.10 17	0.15	
Ariomma bondi juv.	0.08 25	0.12	
Penaeus notialis	0.06 2	0.09	
Priacanthus arenatus	0.04 2	0.06	
Brachydeuterus auritus	0.04 2	0.06	
Trichiurus lepturus	0.02 4	0.03	
Syacium micrurum	0.02 2	0.03	
Total	67.91	99.93	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 649
 DATE: 3/ 7/04 GEAR TYPE: PT No: 7 POSITION:Lat N 323
 start stop duration Long E 934
 TIME :23:19:48 23:49:36 30 (min) Purpose code: 3
 LOG : 833.23 834.83 1.57 Area code : 6
 FDEPTH: 1 1 GearCond.code:
 BDEPTH: 27 30 Validity code:
 Towing dir: 257° Wire out: 120 m Speed: 40 kn*10

Sorted: 2 Kg Total catch: 2.04 CATCH/HOUR: 4.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	1.90	44	46.57	
Raja miraletus	0.74	4	18.14	
Sardinella maderensis	0.66	36	16.18	2909
Alloteuthis africana	0.36	216	8.82	
Ilisha africana	0.24	28	5.88	
Brachydeuterus auritus	0.12	6	2.94	
Lolligoncula mercatoris	0.02	10	0.49	
Sepiella ornata	0.02	6	0.49	
Saurida brasiliensis	0.02	4	0.49	
Total	4.08		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 650
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 308
 start stop duration Long E 928
 TIME :05:34:26 06:04:14 30 (min) Purpose code: 3
 LOG : 873.31 874.77 1.46 Area code : 6
 FDEPTH: 128 128 GearCond.code:
 BDEPTH: 128 128 Validity code:
 Towing dir: 155° Wire out: 380 m Speed: 30 kn*10

Sorted: Kg Total catch: 158.81 CATCH/HOUR: 317.62

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	160.60	2750	50.56	
Illex coindetii	94.50	2250	29.75	
Spicara alta	13.70	250	4.31	2911
Ariomma bondi	11.80	260	3.72	2910
Priacanthus arenatus	11.70	100	3.68	
Squatina oculata	11.26	6	3.55	
Dentex angolensis	9.60	120	3.02	2912
Zeus faber	2.10	10	0.66	
Raja miraletus	1.06	4	0.33	
Physiculus huloti	0.90	10	0.28	
Citharus linguatula	0.30	20	0.09	
Pterothrissus belloci	0.10	10	0.03	
Total	317.62		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 651
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 309
 start stop duration Long E 933
 TIME :07:27:36 07:57:11 30 (min) Purpose code: 3
 LOG : 883.46 884.85 1.39 Area code : 6
 FDEPTH: 87 88 GearCond.code:
 BDEPTH: 87 88 Validity code:
 Towing dir: 155° Wire out: 160 m Speed: 30 kn*10

Sorted: 36 Kg Total catch: 35.54 CATCH/HOUR: 71.08

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	20.60	352	28.98	2916
Ariomma bondi	12.04	180	16.94	2913
Sepia officinalis hierredda	11.92	58	16.77	2915
Dentex angolensis	8.42	84	11.85	2914
Priacanthus arenatus	7.84	98	11.03	
Lepidotrigla cadmani	2.64	48	3.71	
Illex coindetii	2.44	42	3.43	
Lepidotrigla carolae	1.72	76	2.42	
Spicara alta	0.84	6	1.18	
Raja miraletus	0.60	2	0.84	
Saurida brasiliensis	0.48	100	0.68	
Decapterus punctatus	0.48	26	0.68	
Fistularia petimba	0.24	4	0.34	
Sphaeroides pachygaster	0.22	6	0.31	
Pagellus bellottii	0.22	2	0.31	
Alloteuthis africana	0.16	56	0.23	
Zeus faber	0.10	2	0.14	
Serranus acraensis	0.06	2	0.08	
Sea urchins (weak spines)	0.02	2	0.03	
Parapenaeus longirostris	0.02	8	0.03	
Blennius normani	0.02	4	0.03	
Total	71.08		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 652
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 309
 start stop duration Long E 946
 TIME :09:50:45 10:20:48 30 (min) Purpose code: 3
 LOG : 899.38 900.83 1.43 Area code : 6
 FDEPTH: 28 28 GearCond.code:
 BDEPTH: 28 28 Validity code:
 Towing dir: 260° Wire out: 120 m Speed: 30 kn*10

Sorted: 32 Kg Total catch: 31.52 CATCH/HOUR: 63.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	16.60	82	26.33	2924
Brachydeuterus auritus	12.50	266	19.87	2919
Sphyræna guachancho	3.45	18	5.49	2920
Priacanthus arenatus	2.90	40	4.60	
Drepane africana	2.86	42	4.54	2923
Galeoides decadactylus	2.74	16	4.35	2918
Sphyræna afra	2.42	2	3.84	
Psetodes belcheri	2.28	12	3.62	
Caranx senegallus	2.26	4	3.59	
Epinephelus aeneus	2.06	3	3.27	
Sphyræna juveniles	1.78	96	2.82	2921
Sardinella maderensis - Juv.	1.68	156	2.66	2922
Ariomma bondi	1.16	16	1.84	
Sepiella ornata	0.92	416	1.46	
Selene dorsalis	0.74	12	1.17	
Alektis alexandrinus	0.74	12	1.17	2925
Chloroscombrus chrysurus	0.72	14	1.14	
Panulirus regius	0.72	2	1.14	
Elops lacerta	0.58	2	0.92	
J E L L Y F I S H	0.56	60	0.88	
Todaropsis eblanae	0.50	12	0.79	
Illex coindetii	0.46	2	0.73	
Ilisha africana	0.44	18	0.70	
Pomadasyus jubelini	0.42	2	0.67	
Pseudotolithus brachygnathus	0.32	2	0.51	
Trichiurus lepturus	0.30	126	0.48	
Caranx hippos	0.22	2	0.35	
Decapterus punctatus	0.18	14	0.29	
Pseudotolithus senegalensis	0.16	2	0.25	
Selar crumenophthalmus	0.12	4	0.19	
Chaetodipterus gorenensis	0.12	2	0.19	
Lepidotrigla cadmani	0.06	2	0.10	
Chloroscombrus Juvenile	0.02	34	0.03	
Alektis alexandrinus juv.	0.02	20	0.03	
Lagocephalus laevigatus	0.02	2	0.03	
Total	63.04		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 653
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 259
 start stop duration Long E 949
 TIME :11:58:54 12:28:42 30 (min) Purpose code: 3
 LOG : 913.01 914.60 1.59 Area code : 6
 FDEPTH: 24 23 GearCond.code:
 BDEPTH: 24 23 Validity code:
 Towing dir: 350° Wire out: 111 m Speed: 30 kn*10

Sorted: Kg Total catch: 12.26 CATCH/HOUR: 24.52

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Scomberomorus tritor	9.64	24	39.31	2927
Alektis alexandrinus	8.22	10	33.52	2926
Drepane africana	3.12	18	12.72	2928
Epinephelus alexandrinus *	1.52	2	6.20	
Pterothrissus belloci	0.72	4	2.94	
Brachydeuterus auritus	0.28	12	1.14	
Chilomycterus spinosus mauret.	0.24	2	0.98	
Galeoides decadactylus	0.24	2	0.98	
Sphyræna sp.	0.16	10	0.65	
Caranx senegallus	0.14	2	0.57	
Sardinella maderensis	0.08	8	0.33	
Alloteuthis africana	0.06	14	0.24	
Lolligoncula mercatoris	0.04	124	0.16	
Decapterus punctatus	0.04	6	0.16	
Sepiella ornata	0.02	20	0.08	
Total	24.52		99.98	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 654
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 258
 start stop duration Long E 944
 TIME :13:56:30 14:26:17 30 (min) Purpose code: 3
 LOG : 925.07 926.62 1.86 Area code : 6
 FDEPTH: 50 50 GearCond.code:
 BDEPTH: 50 50 Validity code:
 Towing dir: 340° Wire out: 164 m Speed: 30 kn*10

Sorted: Kg Total catch: 308.29 CATCH/HOUR: 616.58

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
J E L L Y F I S H	600.00	5294	97.31	
Brachydeuterus auritus	5.12	98	0.83	2917
Scomberomorus tritor	4.04	10	0.66	2929
Ballistes capricus	2.60	4	0.42	
Torpedo torpedo	1.24	2	0.20	
Alloteuthis africana	1.00	340	0.16	
Selar crumenophthalmus	0.68	16	0.11	2930
Sepia officinalis hierredda	0.42	2	0.07	
Selene dorsalis	0.34	4	0.06	
Drepane africana	0.32	2	0.05	
Decapterus punctatus	0.26	16	0.04	
Pagellus bellottii	0.22	2	0.04	
Sphyræna sp.	0.18	2	0.03	
Penaeus notialis	0.04	2	0.01	
Priacanthus arenatus	0.04	4	0.01	
Sardinella maderensis	0.04	4	0.01	
Ariomma bondi	0.02	2	0.01	
Total	616.56		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 655
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 258
 start stop duration Long E 939
 TIME :15:45:24 16:15:14 30 (min) Purpose code: 3
 LOG : 935.22 936.84 1.63 Area code : 6
 FDEPTH: 83 81 GearCond.code:
 BDEPTH: 83 81 Validity code:
 Towing dir: 340° Wire out: 249 m Speed: 30 kn*10

Sorted: Kg Total catch: 41.72 CATCH/HOUR: 83.44

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	60.80	995	72.87	2933
Priacanthus arenatus	5.88	46	7.05	
Dentex angolensis	4.52	48	5.42	2931
Dentex congoensis	4.00	76	4.79	2932
Alloteuthis africana	2.36	10	2.83	
Torpedo torpedo	1.52	4	1.82	
Squatina oculata	1.30	2	1.56	
Illex coindetii	1.14	14	1.37	
Fistularia petimba	0.82	12	0.98	
Pseudupeneus prayensis	0.22	2	0.26	
Raja miraletus	0.22	2	0.26	
Decapterus punctatus	0.18	8	0.22	
Lepidotrigla cadmani	0.16	4	0.19	
Zeus faber	0.16	4	0.19	
Syacium micurum	0.06	10	0.07	
Lepidotrigla carolae	0.04	6	0.05	
Saurida brasiliensis	0.02	6	0.02	
Blennius normani	0.02	6	0.02	
Pagellus bellottii	0.02	2	0.02	
Total	83.44		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 656
 DATE: 4/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 258
 start stop duration Long E 936
 TIME :17:15:26 17:40:01 25 (min) Purpose code: 3
 LOG : 943.47 944.55 1.22 Area code : 6
 FDEPTH: 103 103 GearCond.code:
 BDEPTH: 103 103 Validity code:
 Towing dir: 345° Wire out: 300 m Speed: 30 kn*10

Sorted: Kg Total catch: 103.00 CATCH/HOUR: 247.20

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dentex congoensis	75.24	1361	30.44	2936
Ariomma bondi	53.14	1951	21.50	
Boops boops	32.18	766	13.02	2934
Dentex angolensis	15.91	166	6.44	2935
Oxymotus centrina	13.08	2	5.29	
Epinephelus aeneus	9.84	2	3.98	
Priacanthus arenatus	9.65	137	3.90	
Decapterus punctatus juv.	8.14	230	3.29	
Illex coindetii	7.85	173	3.18	
J E L Y F I S H	5.47	432	2.21	
Scorpaena scrofa	4.97	7	2.01	
Mustelus mustelus	4.32	2	1.75	
Sepia officinalis hierredda	1.80	7	0.73	
Squatina oculata	1.80	2	0.73	
Lepidotrigla carolae	0.65	36	0.26	
Lepidotrigla cadmani	0.58	14	0.23	
Pagellus bellottii	0.58	7	0.23	
Citharus linguatula	0.43	36	0.17	
Alloteuthis africana	0.36	173	0.15	
Bathygobius paganellus	0.29	187	0.12	
Saurida brasiliensis	0.29	94	0.12	
Parapenaeus longirostris	0.22	65	0.09	
Spicara sp.	0.14	43	0.06	
Syacium micurum	0.07	7	0.03	
Starfish	0.07	7	0.03	
Sea urchins (weak spines)	0.07	7	0.03	
Uranoscopus albesca	0.07	7	0.03	
Total	247.21		100.02	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 657
 DATE: 5/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 247
 start stop duration Long E 936
 TIME :05:28:57 05:58:40 30 (min) Purpose code: 3
 LOG :1042.70 1044.14 1.42 Area code : 6
 FDEPTH: 145 135 GearCond.code:
 BDEPTH: 145 135 Validity code:
 Towing dir: 360° Wire out: 450 m Speed: 30 kn*10

Sorted: Kg Total catch: 2710.63 CATCH/HOUR: 5421.26

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Ariomma bondi	5036.00	225140	92.89	2937
Dentex congoensis	134.46	2268	2.48	2938
Illex coindetii	66.42	1458	1.23	
Ariomma bondi juv.	45.36	9720	0.84	2937
Priacanthus arenatus	45.36	384	0.84	
Synagrops microlepis	42.12	12150	0.78	
Epinephelus haifensis	24.60	4	0.45	
Dentex angolensis	24.30	162	0.45	
Raja miraletus	1.98	8	0.04	
Squatina oculata	0.66	2	0.01	
Total	5421.26		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 658
 DATE: 5/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 246
 start stop duration Long E 942
 TIME :07:37:22 08:07:05 30 (min) Purpose code: 3
 LOG :1054.17 1055.61 1.44 Area code : 6
 FDEPTH: 78 79 GearCond.code:
 BDEPTH: 78 79 Validity code:
 Towing dir: 100° Wire out: 230 m Speed: 30 kn*10

Sorted: Kg Total catch: 12.97 CATCH/HOUR: 25.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Sepia officinalis hierredda	12.74	116	49.11	
Saurida brasiliensis	3.64	634	14.03	
Illex coindetii	3.42	60	13.18	
Squatina oculata	1.12	2	4.32	
Lepidotrigla cadmani	1.00	30	3.86	
Dentex congoensis	0.68	18	2.62	
Alloteuthis africana	0.68	234	2.62	
Torpedo torpedo	0.58	2	2.24	
Cynoglossus canariensis	0.52	2	2.00	
Raja miraletus	0.40	2	1.54	
Lepidotrigla carolae	0.26	18	1.00	
Priacanthus arenatus	0.26	18	1.00	
J E L Y F I S H	0.16	4	0.62	
Blennius normani	0.16	28	0.62	
Fistularia petimba	0.12	2	0.46	
Parapenaeus longirostris	0.06	10	0.23	
Physiculus huloti	0.04	2	0.15	
Serranus accraensis	0.04	2	0.15	
Cymbium sp.	0.02	10	0.08	
Sea urchins (weak spines)	0.02	6	0.08	
Chilomycterus sp.	0.02	2	0.08	
Total	25.94		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 659
 DATE: 5/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 246
 start stop duration Long E 950
 TIME :09:35:57 09:40:02 4 (min) Purpose code: 3
 LOG :1065.65 1065.83 0.17 Area code : 6
 FDEPTH: 21 23 GearCond.code: 9
 BDEPTH: 21 23 Validity code: 4
 Towing dir: 190° Wire out: 110 m Speed: 30 kn*10

Sorted: Kg Total catch: 8.53 CATCH/HOUR: 127.95

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lutjanus goreensis	79.80	45	62.37	
Chaetodipterus lippei	24.00	60	18.76	
Illex coindetii	12.90	255	10.08	
Priacanthus arenatus	3.30	255	2.58	
Decapterus punctatus juv.	2.55	135	1.99	
Lethrinus atlanticus	1.65	15	1.29	
Alloteuthis africana	1.35	465	1.06	
Saurida brasiliensis	0.75	150	0.59	
Bodianus speciosus	0.60	15	0.47	
Serranus accraensis	0.45	15	0.35	
Decapterus punctatus	0.45	210	0.35	
Synagrops microlepis	0.15	15	0.12	
Total	127.95		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 660
 DATE: 5/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 237
 start stop duration Long E 946
 TIME :11:20:41 11:50:24 30 (min) Purpose code: 3
 LOG :1076.83 1078.40 1.57 Area code : 6
 FDEPTH: 21 25 GearCond.code:
 BDEPTH: 21 25 Validity code:
 Towing dir: 100° Wire out: 110 m Speed: 30 kn*10

Sorted: Kg Total catch: 67.02 CATCH/HOUR: 134.04

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lutjanus goreensis	44.60	60	33.27	2940
Pagrus caeruleostictus	42.20	74	31.48	2939
Lutjanus fulgens	25.00	42	18.65	2942
Scomberomorus tritor	7.34	12	5.48	2941
Alectis alexandrinus	2.56	2	1.91	
Lethrinus atlanticus	2.26	4	1.45	
Fistularia petimba	1.94	18	1.45	
Sepia officinalis hierredda	1.86	2	1.39	
Sphyrna guachancho	1.60	2	1.19	
Selar crumenophthalmus	1.32	16	0.98	
Lagocephalus laevigatus	1.08	4	0.81	
Chaetodipterus goreensis	1.00	4	0.75	
Pseudupeneus prayensis	0.56	4	0.42	
Psettodes belcheri	0.52	2	0.39	
Todaropsis eblanae	0.20	2	0.15	
Total	134.04		100.01	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 661
 DATE: 6/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 236
 start stop duration Long E 932
 TIME :03:50:10 04:20:09 30 (min) Purpose code: 3
 LOG :1189.75 1191.33 1.57 Area code : 6
 FDEPTH: 221 219 GearCond.code:
 BDEPTH: 221 219 Validity code:
 Towing dir: 350 Wire out: 619 m Speed: 31 kn*10
 Sorted: Kg Total catch: 15.43 CATCH/HOUR: 30.86

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Paronchelius stauchi	9.34	2490	30.27
Squalus acanthias	5.42	4	17.56
Synagrops microlepis	5.12	560	16.59
Illex coindetii	4.24	72	13.74
Parapenaeus longirostris	1.86	466	6.03
Peristedion cataphractum	1.74	54	5.64
Lepidotrigla cadmani	0.78	8	2.53
Promethichthys prometheus	0.62	20	2.01
Dentex angolensis	0.42	2	1.36
Erythrocles monodi	0.28	2	0.91
Uranoscopus albesca	0.26	6	0.84
Merluccius poll	0.22	2	0.71
Pterothrissus bellocci	0.18	2	0.58
Physiculus huloti	0.14	4	0.45
Zenopsis conchifer	0.14	2	0.45
Chlorophthalmus atlanticus	0.06	8	0.19
Microchirus wittei	0.04	2	0.13
Total	30.86		99.99

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 662
 DATE: 6/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 237
 start stop duration Long E 935
 TIME :05:26:55 05:56:03 29 (min) Purpose code: 3
 LOG :1196.73 1198.17 1.44 Area code : 6
 FDEPTH: 104 107 GearCond.code:
 BDEPTH: 104 107 Validity code:
 Towing dir: 200 Wire out: 300 m Speed: 30 kn*10
 Sorted: Kg Total catch: 117.01 CATCH/HOUR: 242.09

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Ariomma bondi	182.79	4804	75.50
Dentex congoensis	13.47	310	5.56
Sepia officinalis hierredda	12.23	161	5.05
Illex coindetii	10.74	186	4.44
Squatina oculata	5.98	2	2.47
Peristedion cataphractum	4.66	143	1.92
Dentex angolensis	4.03	35	1.66
Pterothrissus bellocci	1.80	12	0.74
Priacanthus arenatus	1.55	12	0.64
Lepidotrigla cadmani	1.28	25	0.53
Raja miraletus	0.91	6	0.38
Fistularia petimba	0.81	12	0.33
Zeus faber	0.64	4	0.26
Lepidotrigla carolae	0.31	12	0.13
Zenopsis conchifer	0.17	6	0.07
Parapenaeus longirostris	0.12	6	0.05
Blennius normani	0.12	6	0.05
Citharus linguatula	0.12	6	0.05
Spicara alta	0.12	6	0.05
Antigonia capros	0.12	6	0.05
P O L Y C H A E T A	0.10	4	0.04
Total	242.07		99.97

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 663
 DATE: 6/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 235
 start stop duration Long E 938
 TIME :07:20:50 07:50:02 29 (min) Purpose code: 3
 LOG :1207.06 1208.62 1.55 Area code : 6
 FDEPTH: 65 68 GearCond.code:
 BDEPTH: 65 68 Validity code:
 Towing dir: 100 Wire out: 200 m Speed: 30 kn*10
 Sorted: Kg Total catch: 16.86 CATCH/HOUR: 34.88

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Decapterus punctatus	13.61	1502	39.02
Sepia officinalis hierredda	5.50	17	15.77
Illex coindetii	3.19	41	9.15
Dentex angolensis	2.81	27	8.06
Alloteuthis africana	2.67	1370	7.65
Dentex congoensis	1.78	41	5.10
Saurida brasiliensis	1.24	199	3.56
Torpedo torpedo	1.08	2	3.10
Priacanthus arenatus	0.77	8	2.21
Parapenaeus longirostris	0.50	379	1.43
Lepidotrigla cadmani	0.48	12	1.38
Pseudupeneus prayensis	0.43	17	1.23
Peristedion cataphractum	0.25	12	0.72
Uranoscopus albesca	0.17	2	0.49
Lepidotrigla carolae	0.12	8	0.34
Todaropsis eblanae	0.10	12	0.29
Setarches quentheri	0.08	2	0.23
Sphoeroides pachgaster	0.04	2	0.11
Blennius normani	0.02	2	0.06
Syacium micrurum	0.02	8	0.06
Citharus linguatula	0.02	2	0.06
Total	34.88		100.02

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 664
 DATE: 6/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 236
 start stop duration Long E 942
 TIME :08:49:06 09:19:02 30 (min) Purpose code: 3
 LOG :1213.55 1215.02 1.47 Area code : 6
 FDEPTH: 43 42 GearCond.code:
 BDEPTH: 43 42 Validity code:
 Towing dir: 1800 Wire out: 135 m Speed: 30 kn*10
 Sorted: Kg Total catch: 24.43 CATCH/HOUR: 48.86

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Brachydeuterus auritus	27.30	518	55.87
J E L L Y F I S H	9.48	204	19.40
Selene dorsalis	3.64	16	7.45
Alloteuthis africana	2.32	638	4.75
Alectis alexandrinus	2.24	4	4.58
Lagocephalus laevigatus	1.66	4	3.40
Lolligoncula mercatoris	0.40	6	0.82
Sepia officinalis hierredda	0.40	8	0.82
Sepiella ornata	0.36	108	0.74
Dentex congoensis	0.30	4	0.61
Dentex angolensis	0.16	2	0.33
Dicologlossa cuneata	0.16	2	0.33
Citharus linguatula	0.12	6	0.25
Brachydeuterus auritus Juv.	0.06	36	0.12
Syacium micrurum	0.06	2	0.12
Penaeus notialis	0.04	2	0.08
Parapenaeus atlantica	0.04	14	0.08
Saurida brasiliensis	0.04	12	0.08
Selene dorsalis juveniles	0.04	22	0.08
Pseudupeneus prayensis	0.04	2	0.08
Total	48.86		99.99

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 665
 DATE: 6/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 229
 start stop duration Long E 934
 TIME :11:40:07 12:10:09 30 (min) Purpose code: 3
 LOG :1231.81 1233.46 1.64 Area code : 6
 FDEPTH: 71 71 GearCond.code:
 BDEPTH: 71 71 Validity code:
 Towing dir: 100 Wire out: 215 m Speed: 31 kn*10
 Sorted: 27 Kg Total catch: 26.35 CATCH/HOUR: 52.70

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Decapterus punctatus	24.30	2096	46.11
Epinephelus alexandrinus *	11.00	2	20.87
Sepia officinalis hierredda	7.48	32	14.19
Alloteuthis africana	1.94	808	3.68
Dentex angolensis	1.66	16	3.15
Dentex congoensis	1.38	30	2.62
Octopus vulgaris	1.08	2	2.05
Diplodus vulgaris	1.08	2	2.05
Pseudupeneus prayensis	0.82	20	1.56
Raja miraletus	0.76	2	1.44
Illex coindetii	0.58	6	1.10
Fistularia petimba	0.16	2	0.30
Lepidotrigla cadmani	0.12	6	0.23
Brachydeuterus auritus	0.12	2	0.23
Todaropsis eblanae	0.10	2	0.19
Saurida undosquamis	0.08	14	0.15
Peristedion cataphractum	0.02	2	0.04
Blennius normani	0.02	2	0.04
Total	52.70		100.00

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 666
 DATE: 7/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 140
 start stop duration Long E 920
 TIME :10:29:47 11:00:31 31 (min) Purpose code: 3
 LOG :1396.96 1398.22 1.26 Area code : 8
 FDEPTH: 41 38 GearCond.code:
 BDEPTH: 41 38 Validity code:
 Towing dir: 240 Wire out: 130 m Speed: 30 kn*10
 Sorted: 116 Kg Total catch: 109.14 CATCH/HOUR: 211.24

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP
	weight numbers		
Dactylopterus volitans	182.52	975	86.40
Sepia officinalis hierredda	7.76	8	3.67
Acanthostracion guineensis	6.25	50	2.96
Fistularia tabacaria	4.12	10	1.95
Pagrus caeruleostictus	4.05	6	1.92
Lophiodon calori	3.87	27	1.83
Sphoeroides spengleri	1.55	4	0.73
Acanthostracion notacanthus	0.29	4	0.14
Stephanolepis hispidus	0.27	4	0.13
Fistularia petimba	0.23	2	0.11
Xyrichtys novacula	0.14	2	0.07
Total	211.05		99.91

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 667
 DATE: 7/ 7/04 GEAR TYPE: BT No: POSITION:Lat N 141
 start stop duration Long E 718
 TIME :12:34:00 13:04:05 30 (min) Purpose code: 3
 LOG :1408.42 1409.92 1.49 Area code : 8
 FDEPTH: 59 57 GearCond.code:
 BDEPTH: 59 57 Validity code:
 Towing dir: 240 Wire out: 204 m Speed: 30 kn*10
 Sorted: 46 Kg Total catch: 45.68 CATCH/HOUR: 91.36

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dactylopterus volitans	25.70	144	28.13	
Sepia officinalis hierredda	19.00	74	20.80	
Dentex congoensis	18.80	320	20.58	2954
Fistularia petimba	10.40	56	11.38	
Pagrus caeruleostictus	9.80	38	10.73	2956
Decapterus macarellus	4.28	24	4.68	2955
Decapterus punctatus	1.70	32	1.86	2957
Priacanthus arenatus	0.96	6	1.05	
Lophodiodon calori	0.56	2	0.61	
Rypticus saponaceus	0.16	2	0.18	
Total	91.36		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 668
 DATE: 7/ 7/04 GEAR TYPE: BT No: POSITION:Lat N 134
 start stop duration Long E 715
 TIME :17:12:17 17:32:16 20 (min) Purpose code: 3
 LOG :1434.93 1435.88 0.96 Area code : 8
 FDEPTH: 79 78 GearCond.code:
 BDEPTH: 79 78 Validity code:
 Towing dir: 360 Wire out: 230 m Speed: 30 kn*10
 Sorted: Kg Total catch: 23.37 CATCH/HOUR: 67.11

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	43.20	267	64.37	2958
Alloteuthis africana	6.39	3006	9.52	
Dactylopterus volitans	5.37	21	8.00	
Fistularia petimba	3.45	18	5.14	
Lepidotrigla cadmani	2.16	60	3.22	
Dentex congoensis	2.07	42	3.08	
Echelus myrus	1.86	9	2.77	
Zeus faber	0.96	3	1.43	
Sepia officinalis hierredda	0.75	6	1.12	
Pseudupeneus prayensis	0.36	3	0.54	
Citharus linguatula	0.24	6	0.36	
Lepidotrigla carolae	0.15	9	0.22	
Ariomma bondi	0.15	12	0.22	
Total	67.11		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 669
 DATE: 7/ 7/04 GEAR TYPE: BT No: 1 POSITION:Lat N 131
 start stop duration Long E 713
 TIME :20:57:54 21:27:04 29 (min) Purpose code: 3
 LOG :1453.69 1455.39 1.69 Area code : 8
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 81 75 Validity code:
 Towing dir: 94 Wire out: 120 m Speed: 35 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
N O C A T C H	0.00			
Total				

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 670
 DATE: 8/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 130
 start stop duration Long E 711
 TIME :11:11:20 11:35:40 24 (min) Purpose code: 3
 LOG :1543.59 1544.76 1.17 Area code : 8
 FDEPTH: 82 89 GearCond.code:
 BDEPTH: 82 89 Validity code:
 Towing dir: 360 Wire out: 240 m Speed: 30 kn*10
 Sorted: 106 Kg Total catch: 105.88 CATCH/HOUR: 264.70

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	239.63	995	90.53	2960
Fistularia petimba	8.20	83	3.10	
Pagrus caeruleostictus	6.10	3	2.30	
Dactylopterus volitans	4.10	15	1.55	
Dentex congoensis	1.78	40	0.67	2959
Zeus faber	1.65	5	0.62	
Elagatis bipinnulata	1.50	5	0.57	
Antigonia capros	0.53	10	0.20	
Boops boops	0.53	3	0.20	
Sepia officinalis hierredda	0.38	8	0.14	
Chilomycterus spinosus mauret.	0.33	3	0.12	
Total	264.73		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 671
 DATE: 8/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 126
 start stop duration Long E 718
 TIME :13:05:26 13:35:16 30 (min) Purpose code: 3
 LOG :1556.04 1557.46 1.41 Area code : 8
 FDEPTH: 75 72 GearCond.code:
 BDEPTH: 75 72 Validity code:
 Towing dir: 360 Wire out: 225 m Speed: 30 kn*10
 Sorted: 57 Kg Total catch: 57.24 CATCH/HOUR: 114.48

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	104.30	426	91.11	2961
Dactylopterus volitans	3.62	16	3.16	
Sepia officinalis hierredda	2.58	20	2.25	
Pseudupeneus prayensis	1.50	20	1.31	
Zeus faber	0.76	4	0.66	
Fistularia petimba	0.56	6	0.49	
Dentex congoensis	0.48	14	0.42	
Chilomycterus antennatus	0.36	4	0.31	
Trachinus armatus	0.32	6	0.28	
Total	114.48		99.99	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 672
 DATE: 8/ 7/04 GEAR TYPE: PT No: 7 POSITION:Lat N 23
 start stop duration Long E 632
 TIME :10:24:00 11:00:00 36 (min) Purpose code: 3
 LOG :1687.70 1691.00 3.30 Area code : 8
 FDEPTH: 20 20 GearCond.code:
 BDEPTH: 531 Validity code:
 Towing dir: 240 Wire out: m Speed: 30 kn*10
 Sorted: Kg Total catch: CATCH/HOUR:

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
N O C A T C H	0.00			
Total				

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 673
 DATE:10/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 8
 start stop duration Long E 628
 TIME :15:46:00 16:01:00 15 (min) Purpose code: 3
 LOG :1719.40 1720.20 0.80 Area code : 8
 FDEPTH: 72 74 GearCond.code:
 BDEPTH: 72 74 Validity code:
 Towing dir: 330 Wire out: 211 m Speed: 30 kn*10
 Sorted: 9 Kg Total catch: 9.57 CATCH/HOUR: 38.28

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	19.72	144	51.52	2963
Fistularia petimba	5.92	28	15.46	
Dentex congoensis	5.56	208	14.52	2962
Sepia officinalis hierredda	3.56	32	9.30	
Alloteuthis africana	2.76	1656	7.21	
Pseudupeneus prayensis	0.68	8	1.78	
Priacanthus arenatus	0.08	4	0.21	
Total	38.28		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 674
 DATE:11/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 2
 start stop duration Long E 635
 TIME :05:38:12 06:08:05 30 (min) Purpose code: 3
 LOG :1789.24 1790.67 1.43 Area code : 8
 FDEPTH: 63 78 GearCond.code:
 BDEPTH: 63 78 Validity code:
 Towing dir: 205 Wire out: 200 m Speed: 30 kn*10
 Sorted: Kg Total catch: 16.97 CATCH/HOUR: 33.94

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Fistularia petimba	11.90	34	35.06	
Dentex congoensis	6.58	262	19.39	
Pagellus bellottii	3.90	48	11.49	2964
Epinephelus aeneus	2.16	2	6.36	
Sarda sarda	2.10	2	6.19	
Dentex angolensis	1.96	4	5.77	
Priacanthus arenatus	1.30	6	3.83	
Alloteuthis africana	0.92	434	2.71	
Torpedo torpedo	0.72	2	2.12	
Spicara alta	0.46	2	1.36	
Sepia officinalis hierredda	0.38	2	1.12	
Dactylopterus volitans	0.36	2	1.06	
Chilomycterus spinosus mauret.	0.36	4	1.06	
Saurida brasiliensis	0.30	80	0.88	
Citharus linguatula	0.22	2	0.65	
Brachydeuterus auritus	0.20	32	0.65	
Ariomma bondi	0.04	10	0.12	
Sepia juveniles	0.02	2	0.06	
Physiculus huloti	0.02	2	0.06	
Selene dorsalis, juveniles	0.02	8	0.06	
Blennius normani	0.02	4	0.06	
Total	33.94		100.00	

DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 675
 DATE:11/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 7
 start stop duration Long E 641
 TIME :07:32:32 08:02:21 30 (min) Purpose code: 3
 LOG :1801.27 1802.85 1.58 Area code : 8
 FDEPTH: 56 53 GearCond.code:
 BDEPTH: 56 53 Validity code:
 Towing dir: 250 Wire out: 160 m Speed: 30 kn*10
 Sorted: 102 Kg Total catch: 364.56 CATCH/HOUR: 729.12

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Lutjanus fulgens	173.60	472	23.81	
Dentex canariensis	157.20	144	21.56	
Paranthias furcifer	122.00	736	16.73	
Pagrus caeruleostictus	62.32	160	8.55	2965
Pagellus bellottii	62.16	360	8.53	
Pomadasys olivaceum	23.68	224	3.25	
Fistularia petimba	20.80	72	2.85	
Selene dorsalis	16.16	32	2.22	
Apsilus fuscus	11.04	192	1.51	
Epinephelus aeneus	10.00	2	1.37	
Alloteuthis africana	9.92	5008	1.36	
Pseudupeneus prayensis	9.92	200	1.36	
Dactylopterus volitans	9.28	40	1.27	
Acanthurus monroviae	8.00	16	1.10	
Paragaleus pectoralis	7.80	2	1.07	
Sepia officinalis hierredda	7.12	18	0.98	
Seriola dumerili	5.36	8	0.74	
Acanthostracion quadricornis	4.96	16	0.68	
Torpedo sp.	3.52	8	0.48	
Aluterus monoceros	2.96	2	0.41	
Chaetodon robustus	0.80	8	0.11	
MULLIDAE	0.80	240	0.11	
Chaetodon marcellae	0.08	16	0.01	
Total	729.48		100.06	

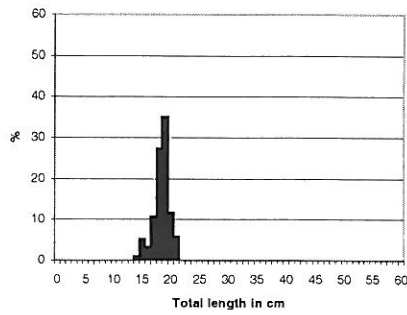
DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 676
 DATE:11/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 13
 start stop duration Long E 646
 TIME :08:20:55 10:00:52 30 (min) Purpose code: 3
 LOG :1814.76 1816.13 1.37 Area code : 8
 FDEPTH: 54 53 GearCond.code:
 BDEPTH: 54 53 Validity code:
 Towing dir: 2120 Wire out: 160 m Speed: 30 kn*10
 Sorted: 27 Kg Total catch: 134.45 CATCH/HOUR: 268.90

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Pagellus bellottii	69.02	546	25.67	2967
Dentex canariensis	58.74	50	21.84	2969
Dactylopterus volitans	43.20	220	16.07	2966
Alloteuthis africana	22.54	12446	8.38	
Sepia officinalis hierredda	17.10	118	6.36	
Zeus faber	12.96	8	4.82	
Pagrus caeruleostictus	11.20	36	4.17	2968
Fistularia petimba	9.50	36	3.53	
Boops boops	9.32	946	3.47	
Epinephelus aeneus	6.90	6	2.57	2970
Pseudupeneus prayensis	6.10	134	2.27	
Chilomycterus spinosus mauret.	1.06	14	0.39	
Citharichthys stampflii	0.98	8	0.36	
Paronchellius stauchi	0.14	28	0.05	
Decapterus punctatus	0.14	14	0.05	
Total	268.90		100.00	

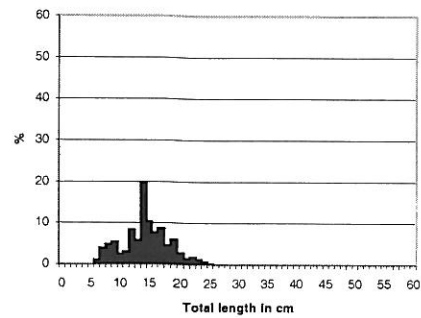
DR. FRIDTJOF NANSEN PROJECT:IG PROJECT STATION: 677
 DATE:11/ 7/04 GEAR TYPE: BT No: 8 POSITION:Lat N 14
 start stop duration Long E 647
 TIME :13:21:13 13:21:26 20 (min) Purpose code: 3
 LOG :1838.25 1839.30 1.05 Area code : 8
 FDEPTH: 73 81 GearCond.code:
 BDEPTH: 73 81 Validity code:
 Towing dir: 100 Wire out: 215 m Speed: 30 kn*10
 Sorted: Kg Total catch: 19.97 CATCH/HOUR: 59.91

SPECIES	CATCH/HOUR		% OF TOT. C	SAMP
	weight	numbers		
Dactylopterus volitans	18.96	93	31.65	2971
Epinephelus aeneus	17.55	3	29.29	
Alloteuthis africana	8.91	6009	14.87	
Pagellus bellottii	6.87	33	11.47	2972
Seriola carpenteri	4.77	3	7.96	
Sepia officinalis hierredda	1.71	21	2.65	
Torpedo torpedo	1.05	3	1.75	
Dentex congoensis	0.06	3	0.10	
Syacium micurum	0.03	3	0.05	
Total	59.91		99.99	

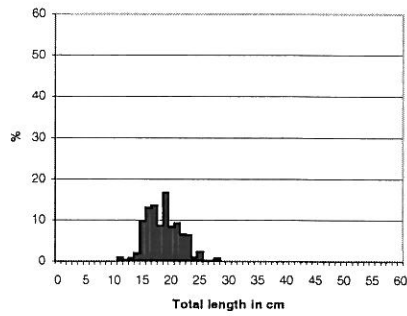
Annex II Length distribution of main species



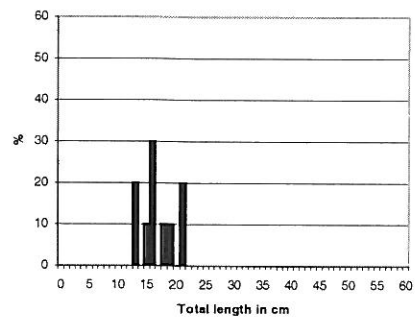
Boops boops NIGERIA
Mean length = 18.89 cm N = 85



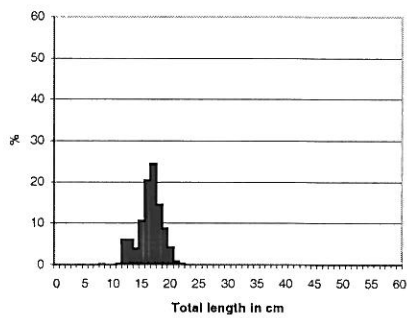
Pagellus bellottii NIGERIA
Mean length = 14.77 cm N = 184



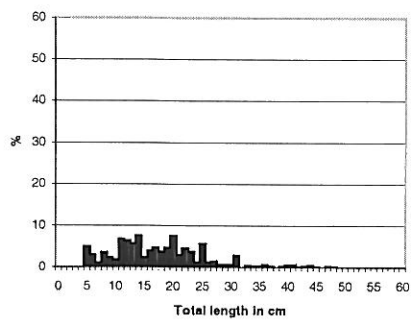
Dentex angolensis NIGERIA
Mean length = 19.12 cm N = 381



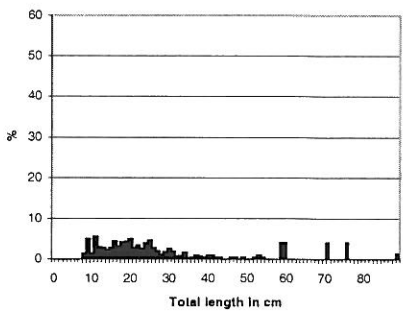
Pagrus caeruleostictus NIGERIA
Mean length = 17.3 cm N = 10



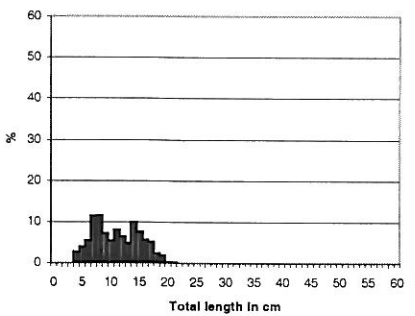
Dentex congoensis NIGERIA
Mean length = 15.88 cm N = 615



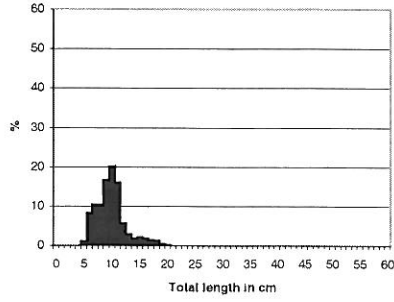
Pseudotolithus senegalensis NIGERIA
Mean length = 18.03 cm N = 227



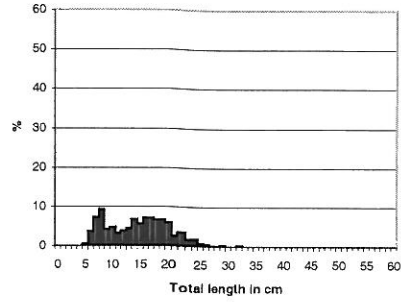
Pseudotolithus typus NIGERIA
Mean length = 29.25.0 cm N = 204



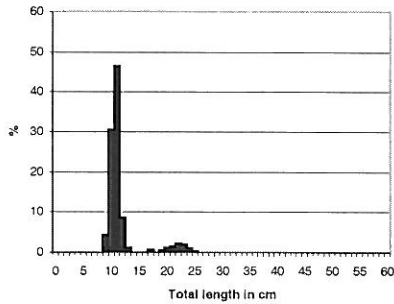
Ilisha africana NIGERIA
Mean length = 11.53 cm N = 963



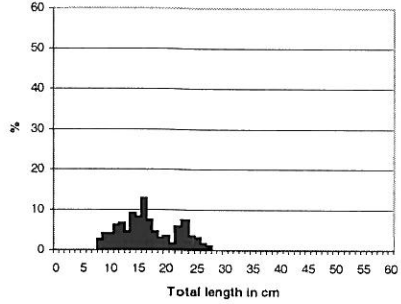
Brachydeuterus auritus NIGERIA
Mean length = 10.34 cm N = 2420



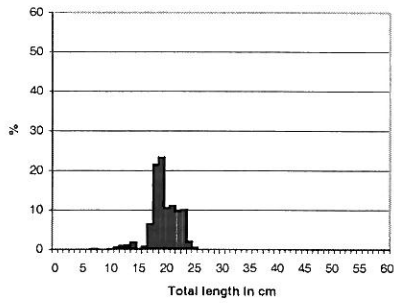
Galeoides decadcylus NIGERIA
Mean length = 14.95 cm N = 778



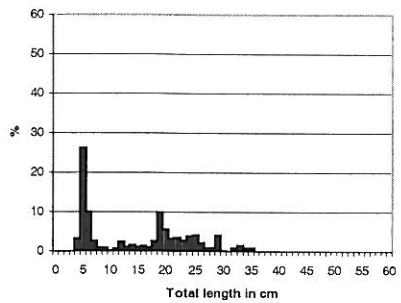
Sardinella aurita NIGERIA
Mean length = 12.18 cm 334



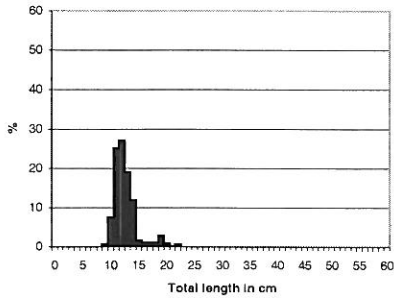
Sardinella maderensis NIGERIA
Mean length = 16.96 cm N = 190



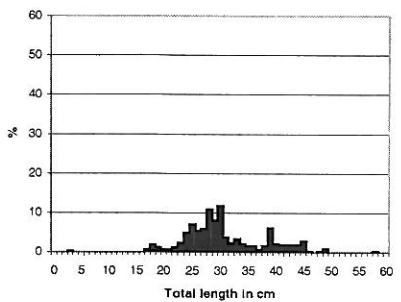
Chloroscombrus chrysurus NIGERIA
Mean length = 20.0 cm 980



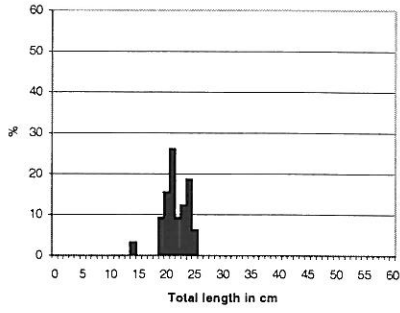
Selene dorsalis NIGERIA
Mean length = 15.1 cm N = 1251



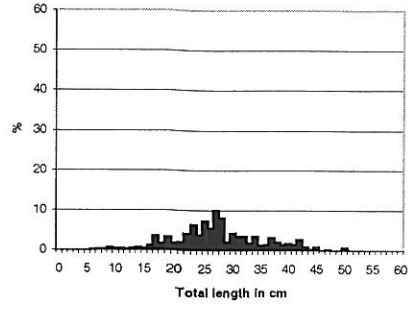
Decapterus punctatus NIGERIA
Mean length = 13.05 cm N = 241



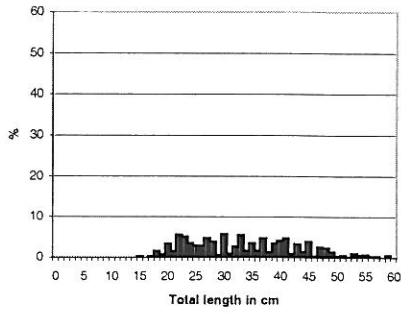
Scomberomorus tritor NIGERIA
Mean length = 31.3 cm N = 293



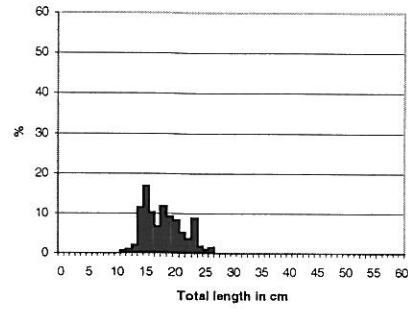
Selar crumenophthalmus NIGERIA
Mean length = 22.0 cm N = 33



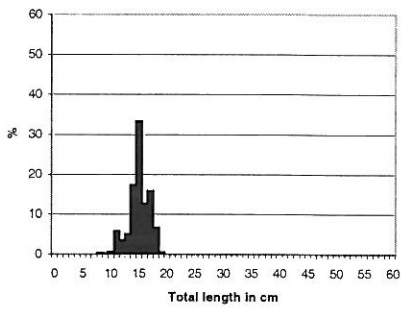
Sphyraena guachancho NIGERIA
Mean length = 28.2 cm N = 671



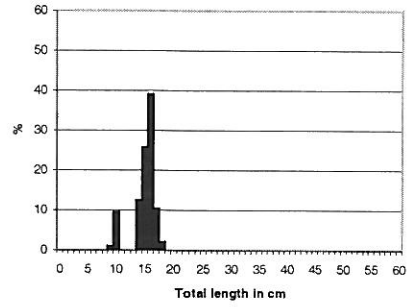
Trichiurus lepturus NIGERIA
Mean length = 34.5 cm N = 431



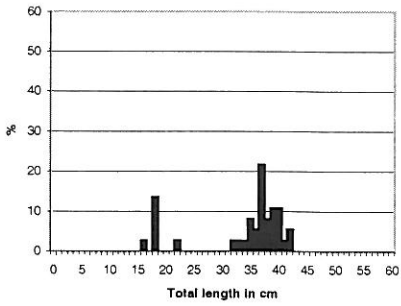
Dentex angolensis CAMEROON
Mean length = 15.0 cm N = 177



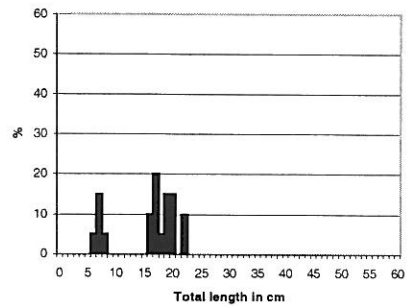
Dentex congoensis CAMEROON
Mean length = 15.41 cm N = 245



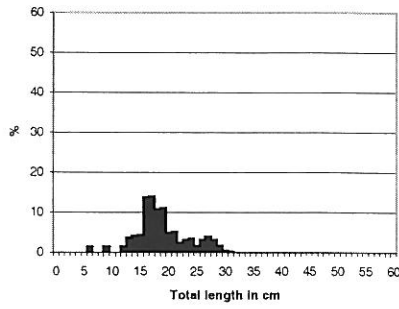
Boops boops CAMEROON
Mean length = 15.50 cm N = 105



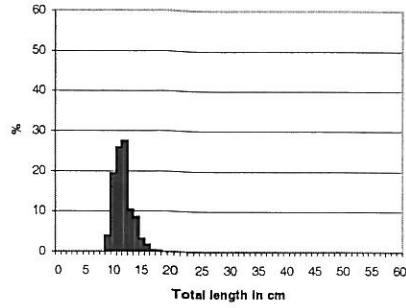
Pagrus caeruleostictus CAMEROON
Mean length = 34.42 cm N = 37



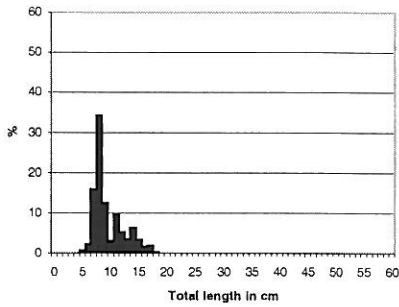
Pagellus bellottii CAMEROON
Mean length = 16.2 cm N = 20



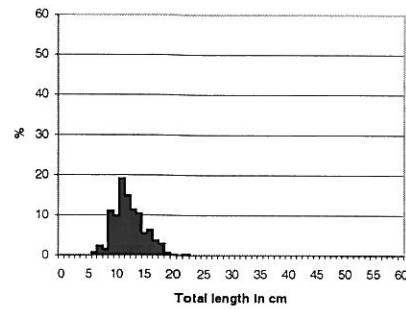
Galeoides decadactylus CAMEROON
Mean length = 19.36 cm N = 197



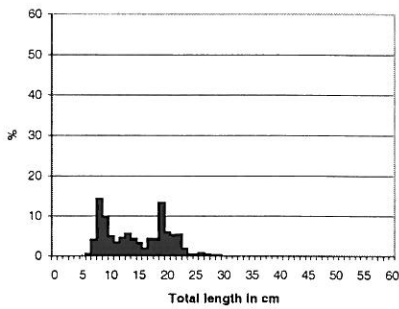
Ariomma bondi CAMEROON
Mean length = 12.19 cm N = 284



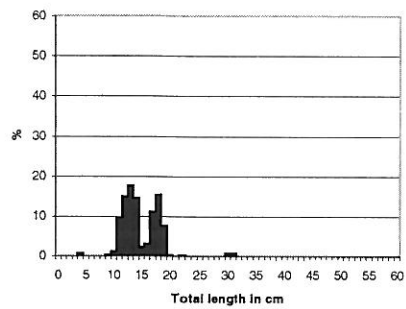
Brachydeuterus auritus CAMEROON
Mean length = 9.58 cm N = 940



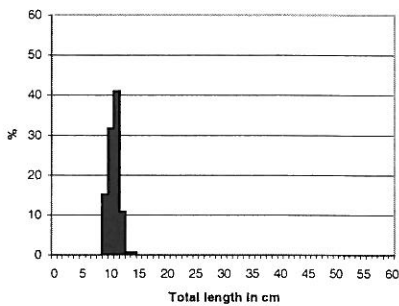
Ilisha africana CAMEROON
Mean length = 12.72 cm N = 565



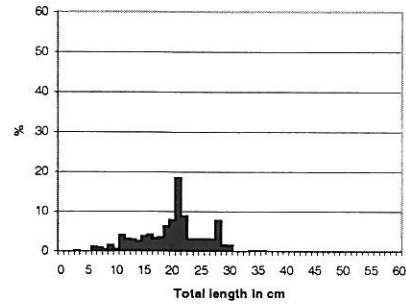
Sardinella maderensis CAMEROON
Mean length = 12.59 cm N = 492



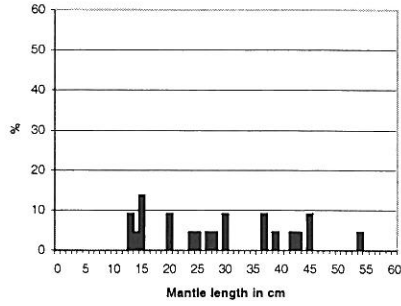
Chloroscombrus chrysurus CAMEROON
Mean length = 15.3 mm N = 205



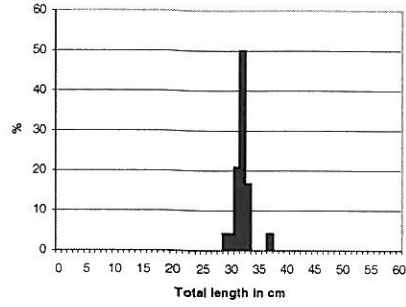
Decapterus punctatus CAMEROON
Mean length = 11.02 cm N = 139



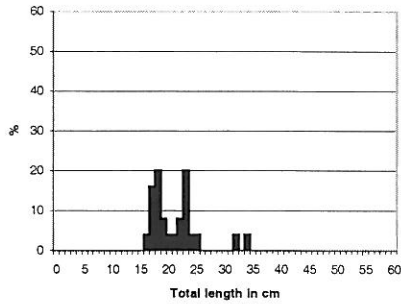
Selene dorsalis CAMEROON
Mean length = 20.45 cm N = 189



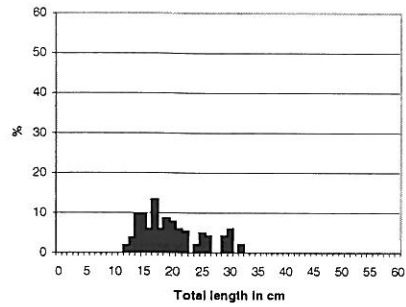
Alectis alexandrinus CAMEROON
Mean length = 29.18 cm N = 22



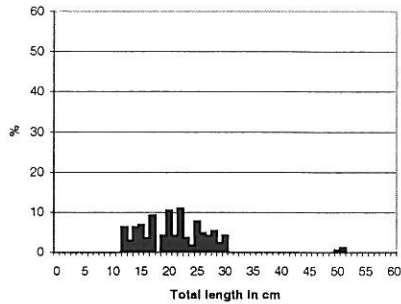
Caranx senegallus CAMEROON
Mean length = 32.46 cm N = 24



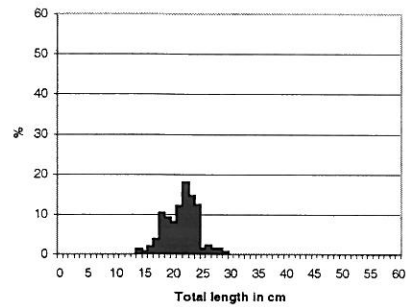
Caranx hippos CAMEROON
Mean length = 22.46 cm N = 25



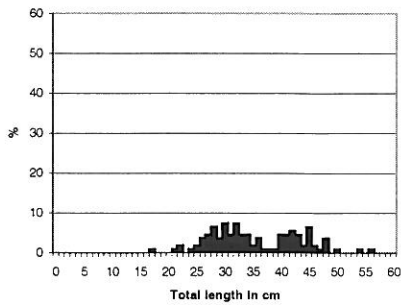
Pseudotolithus typus CAMEROON
Mean length = 20.13 cm N = 56



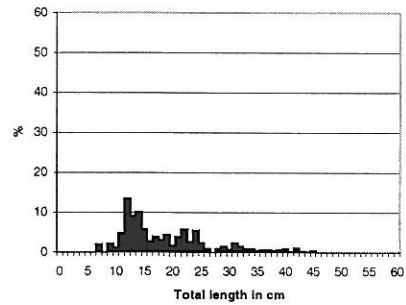
Pseudotolithus senegalensis CAMEROON
Mean length = 21.28 cm N = 86



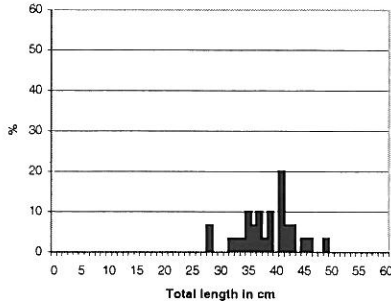
Pseudotolithus elongatus CAMEROON
Mean length = 21.8 cm N = 143



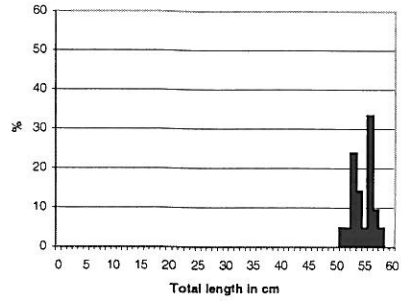
Scomberomorus tritor CAMEROON
Mean length = 35.89cm N = 27



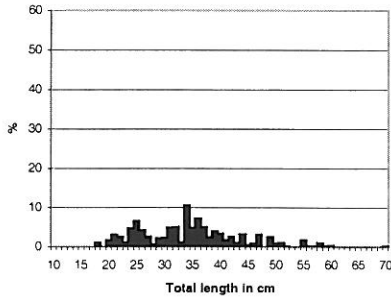
Sphyaena guachancho CAMEROON
Mean length = 18.76 cm N = 354



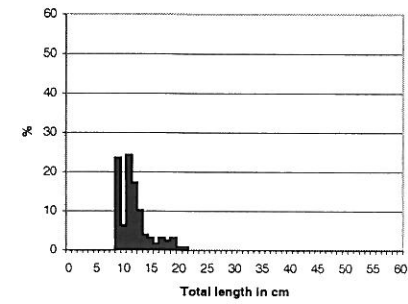
Lutjanus goreensis CAMEROON
Mean length = 38.97 cm N = 30



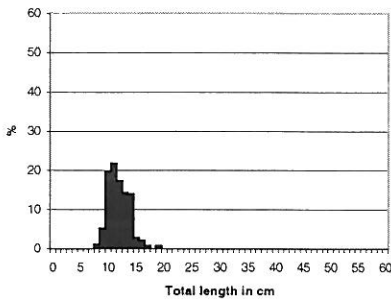
Lutjanus fulgens CAMEROON
Mean length = 36.21 cm N = 21



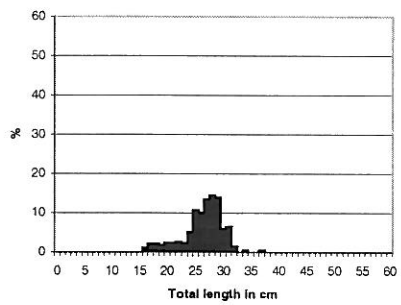
Trichiurus lepturus CAMEROON
Mean length = 34.8 cm N = 189



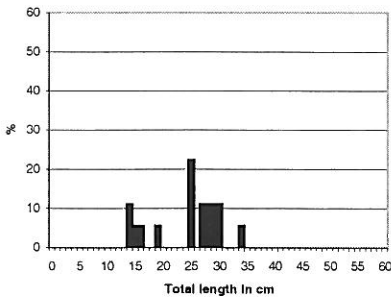
Drepane africana CAMEROON
Mean length = 12.41 cm N = 68



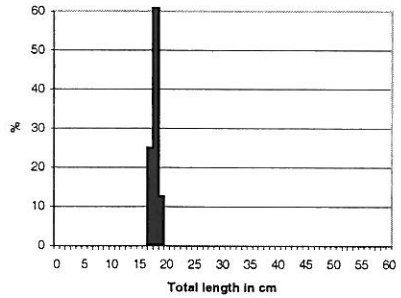
Dentex congoensis PRINCIPE
Mean length = 12.38 cm N = 176



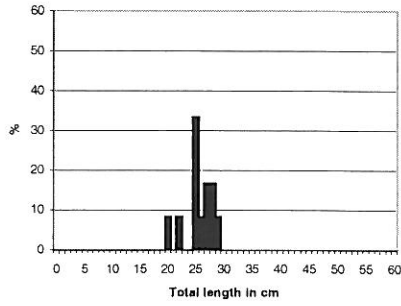
Pagellus bellottii PRINCIPE
Mean length = 26.9 cm N = 154



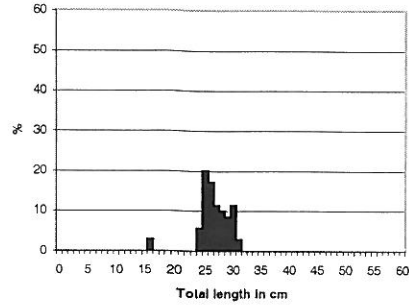
Pagrus caeruleostictus PRINCIPE
Mean length = 24.94 cm N = 18



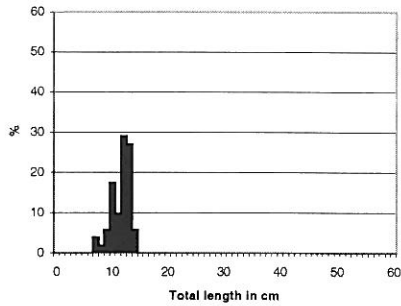
Decapterus punctatus PRINCIPE
Mean length = 16.8 cm N = 607



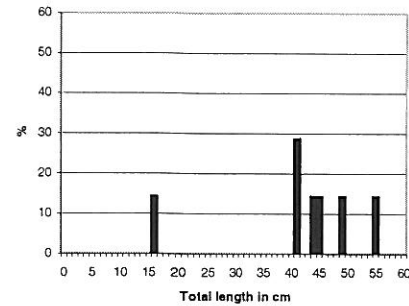
Decapterus macarellus PRINCIPE
Mean length = 26.08 cm N = 12



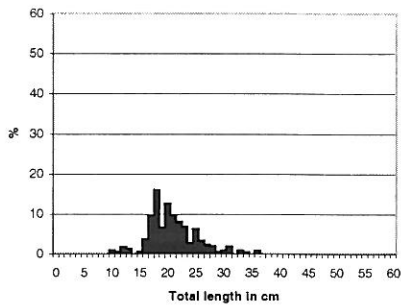
Dactylopterus volitans PRINCIPE
Mean length = 27.27 cm N = 35



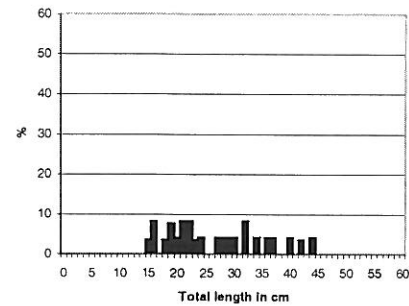
Dentex congoensis SAO TOME
Mean length = 12.00 cm N = 52



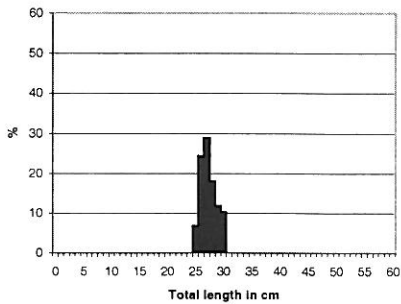
Dentex canariensis SAO TOME
Mean length = 42.8 cm N = 7



Pagellus bellottii SAO TOME
Mean length = 19.7 cm N = 147



Pagrus caeruleostictus SAO TOME
Mean length = 18.8 cm N = 47



Dactylopterus volitans SAO TOME
Mean length = 27.9 cm N = 61

Annex III Summary of biological samples

Table I: Nigeria

Species	# Samples	Cond. Factor	St. Dev	Min Length	Max Length	Length weight relationship		
						α	β	R^2
<i>Alectis alexandrinus</i>	40	1.37	0.29	4.9	81	0.0328	2.70	0.98
<i>Ariomma bondi</i>	166	1.20	0.07	6.7	18.5	0.0100	3.08	0.97
<i>Balistes capricus</i>	17	1.75	0.28	13.4	29.6	0.5208	2.85	0.97
<i>Boops boops</i>	16	1.08	0.04	13.5	18.8	0.0168	2.84	0.99
<i>Brachydeuterus auritus</i>	236	1.32	0.10	6.5	19.8	0.0114	3.06	0.97
<i>Brotula barbata</i>	10	0.64	0.03	24.0	48.1	0.0078	2.94	0.99
<i>Caranx crysos</i>	38	0.98	0.12	17.6	35.2	0.2152	2.60	0.96
<i>Caranx hippos</i>	10	1.19	0.04	21.0	24.8	0.0147	2.93	0.97
<i>Caranx senegallus</i>	10	0.76	0.04	23.0	31.3	0.0135	2.83	0.97
<i>Chaetodipterus goreensis</i>	7	2.64	0.16	14.1	21.7	0.0587	2.72	1.00
<i>Chloroscombrus chrysurus</i>	118	0.87	0.08	11.6	25	0.0066	3.12	0.97
<i>Citharus linguatula</i>	65	0.72	0.04	7.7	17.5	0.0091	2.91	0.97
<i>Decapterus punctatus</i>	53	0.82	0.04	13.4	20.8	0.0078	3.02	0.98
<i>Dentex angolensis</i>	105	1.41	0.12	11.8	26.5	0.0120	3.06	0.97
<i>Dentex canariensis</i>	35	1.52	0.15	9.9	20.5	0.0270	2.79	0.97
<i>Dentex congoensis</i>	179	1.39	0.10	8.6	20.4	0.0176	2.92	0.98
<i>Drepane africana</i>	29	2.52	0.26	11.0	25.6	0.0108	3.32	0.91
<i>Galeoides decadactylus</i>	202	1.01	0.06	7.0	32.7	0.0072	3.09	0.93
<i>Hemicaranx bicolor</i>	65	1.12	0.07	15.5	22.9	0.0187	2.49	0.94
<i>Ilisha africana</i>	78	0.69	0.07	5.3	19.75	0.0076	2.96	0.95
<i>Microchirus frechkopi</i>	16	1.15	0.07	11.1	15.2	0.0115	3.00	0.98
<i>Pagellus bellotii</i>	4	1.18	0.08	9.3	23.5	0.0116	3.01	0.99
<i>Pagrus caeruleostictus</i>	17	1.61	0.10	17.3	22.4	0.0374	2.71	0.97
<i>Parapenaeus longirostris</i>	152	52.16	4.08	1.1	2.87	0.6267	2.84	0.98
<i>Pentheroscion mbizi</i>	107	1.04	0.07	15.5	24.5	0.0085	3.07	0.97
<i>Pomadasys jubelini</i>	16	1.27	0.04	15.5	29.4	0.0153	2.94	0.99
<i>Priacanthus arenatus</i>	40	1.50	0.15	6.0	22.9	0.0287	2.83	0.96
<i>Pseudopeneus prayensis</i>	24	1.30	0.09	15.8	23.4	0.7527	2.42	0.97
<i>Pseudolithus elongatus</i>	10	0.74	0.07	17.3	20.9	0.0099	2.90	0.87
<i>Pseudolithus senegalensis</i>	112	0.83	0.10	9.3	47.8	0.0033	3.27	0.94
<i>Pseudolithus typus</i>	88	0.67	0.10	9.0	70.7	0.0065	3.14	0.92
<i>Sardinella aurita</i>	183	0.86	0.06	16.9	27.2	0.0137	2.85	0.93
<i>Sardinella maderensis</i>	191	0.87	0.10	8.2	29.3	0.0145	2.80	0.94
<i>Scomberomorus tritor</i>	136	0.53	0.04	16.9	51.2	0.0097	2.87	0.95
<i>Selar crumenophthalmus</i>	49	1.17	0.07	13.7	25.8	0.0049	3.28	0.96
<i>Selene dorsalis</i>	192	1.13	0.11	4.2	29.6	0.0106	3.04	0.94
<i>Serranus accraensis</i>	16	1.15	0.11	10.7	13.7	0.0031	3.52	0.94
<i>Sphyraena guachancho</i>	149	0.48	0.10	4.3	55.2	0.0054	2.96	0.92
<i>Syacium micrurum</i>	50	0.90	0.07	6.2	10.4	0.0196	2.63	0.97
<i>Trichiurus lepturus</i>	120	0.06	0.01	14.9	77.5	0.0001	3.37	0.90
Total number of species	40							
Total number of individuals	3151							

Annex IV Target Species

TARGET SPECIES NIGERIA

–Dr. Fridtjof Nansen Survey

11/06 to 13/07/04

DEMERSAL SPECIES

Sciaenidae

- *Pseudolithus typus*
- *P. senegalensis*
- *P. elongatus*
- *P. mbizi*
- *P. brachynathus*
- *P. moori*
- *P. epipercus*

Cynoglossidae

- *Cynoglossus. senegalensis*
- *C. canariensis*
- *C. browni*
- *C. cadenati*
- *C. monodi*

Caranigidae

- *Decapterus rhonchus*
- *D. punctatus*
- *Caranx crysos*
- *C. hippos*
- *C. senegallus*
- *Hemicaranx. bicolor*
- *Alectis alexandrinus*
- *ciliaris*
- *Chloroscombrus chrysurus*
- *Selene dorsalis*

Pomadasyidae=Haemulidae

- *Pomadasy jubelini*
- *P. peroteti*
- *P. insisus*
- *P. rogerii*

Polynemidae

- *Polydactylus quadrifilis*
- *Pentanemus quinquarius*
- *Galeoides decadactylus*

Sparidae

- *Pagellus bellottii*

- *Pagrus caeruleostictus*
- *Boops boops*
- *Pagrus pagrus africanus*
- *Dentex congoensis*
- *D. angolensis*
- *D. canariensis*

Lutjanidae

- *Lutjanus goreensis*
- *L. dentatus*
- *L. agennes*
- *L. fulgen*

Serranidae

- *Epinephelus aeneus*
- *E. goreensis*
- *E. guaza*

Sphyraenidae

- *Sphyraena guachancho*
- *S. afra*
- *S. sphyraena*
- *S. barracuda*

Ariommatidae

- *Ariomma bondi*
- *A. melamun*

PELAGICS

Scombridae

- *Scomberomorus tritor*

Clupeidae

- *Ilisha africana*
- *Sardinella maderensis*
- *Sardinella aurita*
- *Ethmalosa fimbriata*

Engraulidae

- *Engraulis encrasicolus*

CRUSTACEAN

DECAPODA

Crabs

Portunidae

- *Portunus validus*

Geryonidae

- *Geryon maritae*

Shrimps

Penaeidae

- *Penaeus notialis*
- *Parapenaeopsis atlantica*
- *Penaeus monodon*
- *Penaeus kerathurus*
- *Parapenaeus longirostris*

MOLLUSCA

CEPHALOPODA

Sepiidae

- *Sepia officinalis hierreda*
- *S. elegans*
- *Sepiella ornata*

Loliginidae

- *Alloteuthis africana*

Ommastrephidae

- *Illex sp*

Octopodidae

- *Octopus vulgaris*

ZOOPLANKTON

TARGET SPECIES CAMEROON

DEMERSAL SPECIES

Sciaenidae

- *Pseudolithus typus*
- *P. elongatus*
- *P. senegalensis*
- *P. brachygnathus*
- *Sciaena umbra*

Polynemidae

- *Pentanemus quinquarius*
- *Polydactylus quadrifilis*
- *Galeoides decadactylus*

Pomadasyidae

- *Brachydeuterus auritus*

Drepanidae

- *Drepane africana*

Ariidae

- *Arius heudeloti*
- *Arius parkii*

Cynoglossidae

- *Cynoglossus senegalensis*
- *Cynoglossus monodi*

Trichiuridae

- *Trichiurus lepturus*

Soleidae

- *Synaptura sp.*

Sphyraenidae

- *Sphyraena sp.*

Carangidae

- *Alectis alexandrinus*
- *Caranx hippos*

Lutjanidae

- *Lutjanus spp.*

Congridae

Serranidae

- *Epinephelus spp.*

Haemulidae

- *Pomadasys jubelini*

Sparidae

- *Dentex angolensis*
- *Dentex congoensis*
- *Boops boops*

Mugilidae

- *Mugil spp*

Rays and sharks

Rajidae

- *Raja miraletus*
- *Dasyatis margaritus*

Torpedinidae

PELAGIC SPECIES

Clupeidae

- *Sardinella maderensis*
- *Ethmalosa fimbriata*
- *Ilisha africana*

Scombridae

- *Scomber japonicus*

CRUSTACEA

Crabs

Xanthidae

Portunidae

Palinuridae

Lobsters

Scyllaridae

Callinidae

Penaeidae

- *Parapaenopsis atlantica*
- *Penaeus kerathurus*
- *P. monodon*
- *P. notialis*

MOLLUSCA

Gastropods

- *Cymbium* sp.

Cephalopods

Sepiidae

- *Sepia officinalis*

SEA TURTLES

Annex V Swept-area biomass estimates

SWEPT AREA ANALYSIS FROM STATION 542 TO STATION 616

Nigeria 2004

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²				
	Lower limits, Kg/nm							- 30m	30- 50m	50-100m	100-200m	
	>0	10	30	100	300	1000						
<i>Chloroscombrus chrysurus</i>	25	3	1	1	1		42	0.97				
<i>Ariomma bondi</i>	19	6	6				42	0.74				
<i>Brachydeuterus auritus</i>	36	9	4				67	0.56	0.20	0.74	0.85	3.68
<i>Selene dorsalis</i>	35	1	1	1			52	0.54	0.29	0.25	1.24	
<i>Sepia officinalis hierredda</i>	48	6					74	0.31	0.01	0.09	0.56	0.56
<i>Dentex congoensis</i>	17			1			25	0.30			0.09	1.65
<i>Sphyraena guachancho</i>	38	4	1				59	0.29	0.61	0.45	0.12	
<i>Trichiurus lepturus</i>	44	6					68	0.25	0.68	0.22	0.12	0.13
<i>Lepidotrigla cadmani</i>	34	2	1				51	0.18			0.23	0.66
<i>Dentex angolensis</i>	24	2	1				37	0.17			0.22	0.57
<i>Illex coindetii</i>	34		1				48	0.16			0.05	0.84
<i>Pentheroscion mbizi</i>	23	4					37	0.14		0.01	0.08	0.64
<i>Priacanthus arenatus</i>	48	1					67	0.14	0.01	0.04	0.22	0.34
<i>Uranoscopus albesca</i>	28	2					41	0.10			0.06	0.48
<i>Galeoides decadactylus</i>	18	2					27	0.10	0.37	0.13		
<i>Ilisha africana</i>	19	2					29	0.10	0.41	0.08	0.01	
<i>Squatina oculata</i>	15	1					22	0.09			0.13	0.29
<i>Citharus linguatula</i>	47						64	0.09		0.01	0.13	0.24
<i>Decapterus punctatus</i>	18		1				26	0.09			0.26	
<i>Boops boops</i>	4		1				5	0.08			0.02	0.42
<i>Scomberomorus tritor</i>	28						38	0.08	0.23	0.10	0.01	
<i>Pseudotolithus senegalensis</i>	13	3					22	0.08	0.31	0.08		
<i>Saurida brasiliensis</i>	45						62	0.07		0.02	0.11	0.13
<i>Epinephelus aeneus</i>	25	1					36	0.07	0.01	0.01	0.16	0.06
<i>Pontinus accraensis</i>	21	1					30	0.07			0.01	0.38
<i>Brachydeuterus auritus</i> Juv.	2	1	1				5	0.07			0.06	
<i>Portunus validus</i>	36						49	0.07	0.10	0.16	0.01	0.01
<i>Alloteuthis africana</i>	33						45	0.06		0.01	0.17	
<i>Brotula barbata</i>	27	2					40	0.06			0.02	0.30
<i>Mustelus mustelus</i>	8	1					12	0.05			0.08	0.14
<i>Pseudotolithus typus</i>	8	1					12	0.05	0.25	0.02		
<i>Pomadasyd jubelini</i>	11	1					16	0.05	0.11	0.02	0.08	
<i>Parapenaeus longirostris</i>	32						44	0.03		0.04	0.03	0.02
<i>Nematopalaemon hastatus</i>	2						3	0.01	0.05			
<i>Penaeus notialis</i>	26						36	0.01	0.01	0.02		
<i>Parapenaeopsis atlantica</i>	14						19	0.01	0.03	0.01		
<i>Sicyonia galeata</i>	13						18					
<i>Sicyonia</i> sp.	2						3					
<i>Penaeus monodon</i>	7						10		0.01			
<i>Penaeus kerathurus</i>	4						5					
PENAEIDAE	1						1					
<i>Parapandalus narval</i>	2						3					
<i>Pontocaris lacazei</i>	3						4					
Other fish								1.06	1.20	0.81	0.91	1.55
Sum all species								7.30	7.63	4.97	6.44	13.09
Sum Snappers								0.09	0.01			
Sum Groupers								0.68	0.31	0.91	0.99	
Sum Grunts								0.32	0.68	0.18	0.09	0.64
Sum Croakers								0.61	0.01	0.02	0.48	2.64
Sum Seabreams								0.15	0.02	0.01	0.22	0.47
Sum Sharks								0.04	0.01	0.01	0.08	0.09
Sum Rays								0.64	0.05	0.28	0.80	1.60
Sum Squids								0.07				

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

73

12

25

24

12

SWEEP AREA ANALYSIS FROM STATION 617 TO STATION 623

Equatorial Guinea 2004

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES					% inci- dence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	Lower limits, Kg/nm >0 10 30 100 300 1000							- 30m	30- 50m	50-100m	100-200m
<i>Ariomma bondi</i>	3	1		1		67	3.89			0.45	10.78
<i>Decapterus punctatus</i>	4		1			83	1.03			0.14	2.81
<i>Boops boops</i>	2			1		50	0.72			1.07	0.01
<i>Dentex congoensis</i>	4	1				83	0.53			0.16	1.26
<i>Brachydeuterus auritus</i> Juv.	1	1				33	0.35			0.53	
<i>Squatina oculata</i>	5					83	0.29			0.16	0.56
<i>Dentex angolensis</i>	3					50	0.18			0.14	0.24
<i>Sepia officinalis hierredda</i>	5					83	0.13			0.11	0.18
<i>Lepidotrigla cadmani</i>	5					83	0.12			0.17	0.03
<i>Epinephelus aeneus</i>	2					33	0.12			0.01	0.35
<i>Erythrocles monodi</i>	1					1	0.10				0.30
<i>Illex coindetii</i>	5					67	0.09			0.05	0.18
<i>Antigonia capros</i>	2					33	0.09				0.26
<i>Priacanthus arenatus</i>	5					83	0.08			0.10	0.05
<i>Saurida brasiliensis</i>	4					50	0.06			0.09	
<i>Hexanchus griseus</i>	1					17	0.06				0.17
<i>Raja miraletus</i>	6					100	0.06			0.06	0.07
<i>Sicyonia galeata</i>	2					17					
<i>Penaeus notialis</i>	1										
<i>Parapenaeus longirostris</i>	1					17					
<i>Parapandalus narval</i>	1										
<i>Heterocarpus ensifer</i>	1										
Other fish							0.37			0.36	0.43
Sum all species							8.27			3.60	17.68
Sum Snappers											
Sum Groupers							0.12			0.01	0.35
Sum Grunts							0.35			0.53	
Sum Croakers							0.01			0.02	
Sum Seabreams							1.46			1.41	1.51
Sum Sharks							0.36			0.17	0.74
Sum Rays							0.07			0.06	0.09
Sum Squids							0.24			0.18	0.40
Sum											

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

6

4

2

SWEPT AREA ANALYSIS FROM STATION 624 TO STATION 665

Cameroon 2004

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% incidence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²				
	>0	10	30	100	300			1000	- 30m	30- 50m	50-100m	100-200m
<i>Ariomma bondi</i>	9	2	1			1	33	4.82	0.01		0.19	46.42
<i>Brachydeuterus auritus</i>	23	1	2			1	69	2.22	0.21	11.76	0.07	
J E L L Y F I S H	11	3	1	2			44	0.95	0.49	1.53	1.51	0.05
<i>Dentex congocensis</i>	8	1	2				28	0.38			0.12	3.31
<i>Nematopalaemon hastatus</i>	4	2	2				21	0.38	0.71	0.51		
<i>Selene dorsalis</i>	18		1				49	0.32	0.12	1.53		
<i>Trichiurus lepturus</i>	16	4					51	0.30	0.37	0.81		
<i>Ilisha africana</i>	13	3	1				44	0.28	0.52	0.36		
<i>Illex coindetii</i>	13	1	1				38	0.17			0.04	1.55
<i>Sphyræna guachancho</i>	18	2					51	0.17	0.20	0.48	0.02	
<i>Chloroscombrus chrysurus</i>	12	1	1				36	0.17	0.34	0.16		
<i>Pseudotolithus elongatus</i>	5	2					18	0.14	0.31	0.08		
<i>Pseudotolithus typus</i>	6	1					18	0.12	0.29			
<i>Pteroscion peli</i>	9	1					26	0.10	0.13	0.28		
<i>Saurida brasiliensis</i>	17	1					46	0.08	0.01	0.01	0.25	
<i>Priacanthus arenatus</i>	15	1					41	0.08	0.01		0.05	0.60
<i>Sepia officinalis hierredda</i>	20						51	0.07	0.01	0.05	0.15	0.12
<i>Dentex angolensis</i>	12						31	0.07			0.08	0.47
<i>Scomberomorus tritor</i>	15						38	0.07	0.15	0.03	0.01	
<i>Galeoides decadactylus</i>	10						26	0.07	0.17			
<i>Portunus validus</i>	16						41	0.07	0.07	0.22		
<i>Epinephelus aeneus</i>	15						38	0.06	0.01	0.03	0.12	0.08
<i>Chelonia mydas</i>		1					3	0.05	0.11			
<i>Pseudotolithus senegalensis</i>	12						31	0.05	0.11	0.01		
<i>Penaeus notialis</i>	16						41	0.03	0.02	0.10	0.01	
<i>Parapenaeus longirostris</i>	10						26	0.02			0.05	
<i>Parapenaeopsis atlantica</i>	10						26	0.02	0.04		0.02	
<i>Penaeus monodon</i>	5						13	0.01	0.01			
<i>Sicyonia galeata</i>	5						13					
<i>Penaeus kerathurus</i>	1						3					
Other fish								0.83	0.94	0.43	0.68	2.00
Sum all species								12.10	5.36	18.38	3.37	54.60
Sum Snappers								0.06	0.14			
Sum Groupers								0.09	0.01	0.03	0.16	0.30
Sum Grunts								2.27	0.23	11.77	0.21	
Sum Croakers								0.45	0.92	0.37		
Sum Seabreams								0.53	0.08	0.03	0.23	4.07
Sum Sharks								0.05	0.02		0.03	0.32
Sum Rays								0.03	0.02	0.06	0.04	0.03
Sum Squids								0.26	0.02	0.08	0.24	1.67
Sum								0.61				

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

39

16

7

12

4

SWEPT AREA ANALYSIS FROM STATION 666 TO STATION 671

Principe 2004

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% incidence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	>0	10	30	100	300			1000	- 30m	30- 50m	50-100m
Pagellus bellottii			1	2			2.23			3.35	
Dactylopterus volitans	4			1		50	1.47		7.48	0.33	
Sepia officinalis hierredda	5					83	0.18		0.32	0.19	
Dentex congoensis	4					67	0.13			0.20	
Fistularia petimba	5					83	0.13		0.01	0.19	
Pagrus caeruleostictus	3					50	0.12		0.17	0.14	
Other fish							0.25		0.68	0.25	
Sum all species							4.51		8.66	4.65	
Sum Snappers											
Sum Groupers											
Sum Grunts											
Sum Croakers											
Sum Seabreams							2.48		0.17	3.70	
Sum Sharks											
Sum Rays											
Sum Squids							0.22		0.32	0.25	
Sum											

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

6 1 1 4

SWEPT AREA ANALYSIS FROM STATION 672 TO STATION 677

São-Tome 2004

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES Lower limits, Kg/nm					% incidence	Mean dens. t/nm ²	Mean densities by bottom depth strata t/nm ²			
	>0	10	30	100	300			1000	- 30m	30- 50m	50-100m
Dentex canariensis			1	1		33	1.19			1.42	
Lutjanus fulgens				1			0.92			1.10	
Pagellus bellottii	3	2				83	0.91			1.09	
Paranthias furcifer				1		17	0.64			0.77	
Dactylopterus volitans	3	1				50	0.41			0.50	
Pagrus caeruleostictus	1	1				33	0.40			0.48	
Fistularia petimba	4					67	0.27			0.32	
Alloteuthis africana	5					83	0.26			0.31	
Epinephelus aeneus	4					50	0.20			0.24	
Sepia officinalis hierredda	5					83	0.17			0.21	
Pomadasyd olivaceum	1					17	0.13			0.15	
Pseudupeneus prayensis	3					50	0.09			0.11	
Selene dorsalis	1						0.09			0.10	
Zeus faber	1					17	0.08			0.10	
Dentex congoensis	3					50	0.07			0.08	
Boops boops	1					17	0.06			0.07	
Apsilus fuscus	1					17	0.06			0.07	
Other fish							0.27			0.32	
Sum all species							6.22			7.44	
Sum Snappers							0.98			1.17	
Sum Groupers							0.84			1.01	
Sum Grunts							0.13			0.15	
Sum Croakers											
Sum Seabreams							2.64			3.15	
Sum Sharks							0.04			0.05	
Sum Rays							0.03			0.03	
Sum Squids							0.43			0.52	
Sum											

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

6 1 5

Annex VI Estimates of sample variance

1. STRATIFIED MEAN DENSITY AND CONFIDENCE INTERVALS

The stratified estimator of mean density in the entire area is calculated as (Cochran, 1977; eq. 5.1, p. 91)

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

where

L is the number of strata,

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

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

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

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

or $t/nmi^2 = \frac{y_{ik}}{area\ swept_{ik}}$ 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 t/nmi^2 then an estimate of the total biomass in the area is calculated by

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

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, pp. 39-44)

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

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 Instruments and fishing gear used

Echo sounder

The SIMRAD EK500/38 kHz scientific sounder was used during the survey for fish abundance estimation. The lowering keel was not submerged during the survey. The Bergen Echo Integrator system (BEI) was used to scrutinise the acoustic records. System calibration experiment using a standard copper sphere was performed 08.11.2003. The settings of 38 kHz echo sounder were as follows:

Tranceiver-1 menu (38 kHz, mounted in lowering keel)

Transducer depth	5.5 m (lowering keel not submerged)
Absorption coeff.	10 dB/km
Pulse length	medium (1 ms)
Bandwith	wide
Max Power	2000 Watt
2-way beam angle	-21.0 dB
Sv Transducer gain	26.98 dB
TS Transducer gain	27.15 dB
Angle sensitivity	21.9
3 dB beamwidth	6.8 ° alongship 6.7 ° athwardship
Alongship offset	-0.07 °
Athwardship effect	0.07 °

Display menu

Echogram	1 (38 kHz)
Bottom range	15 m
Bottom range start	10 m
Sv colour min	-67 dB

Printer menu

Echogram	1 (38 kHz)
Range	50 m, 100 m, 250 m, 500 m
Range start	0
Bottom range	12 m
Bottom range start	10 m
TVG	20 log R
Sv Colour min	- 60 dB

Bottom detection menu

Minimum level -50 dB

Fishing gear

The vessel has "Harstad" and "Åkrahamn" pelagic trawls and "Gisund super bottom trawl".

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm meshsize in the codend with an innernet of 10 mm meshsize. 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 m², 1670 kg, their distance while trawling about 45 - 55 m in average, depending on the depth (least distance at low depths). This distance can be kept 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. On the present survey, however, the strap was not applied because most of the trawl hauls were made in shallower waters.

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.

The pelagic trawl can be equipped with a trawleye that provides information on the trawl opening and the distance of the footrope to the bottom.

Annex VII Example sheet used for calculations of biomass and confidence intervals

Made 23/3 1999 by Jeppe Kolding

This example is the biomass of seabreams in Benin 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 t-value can be set. NOTE that the Station field MUST be 1 even if there is no catch

Density (t/nm^2) is from NAN-SIS and Coefficient of variation (CV) is from GRAFER using the same depth intervals

The underlying assumption is that the CV from the catch (kg/hour) is equal for the density (t/nm^2), i.a. that the swept area is constant per hour
Equation numbers (1) and (2) refers to Appendix in report

Input from NANSIS GRAFER

Depth (m)	Area	No Stations	Density (t/nm^2)	CV (kg/hour)	Equation(1)=	SD	Est. Variance	Equation (2)=
20-30	387	6	0.08	1.83	0.04	0.146	0.021	0.001
31-50	134	6	0.53	1.54	0.09	0.816	0.666	0.003
51-100	244	5	2.59	1.20	0.83	3.108	9.660	0.197
Total	5561						Var(strat-mean)=	0.20

t-value =

Stratified mean =

SE(strat-mean)=

95% Confidence limits:

Total biomass=	734	48	1420
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