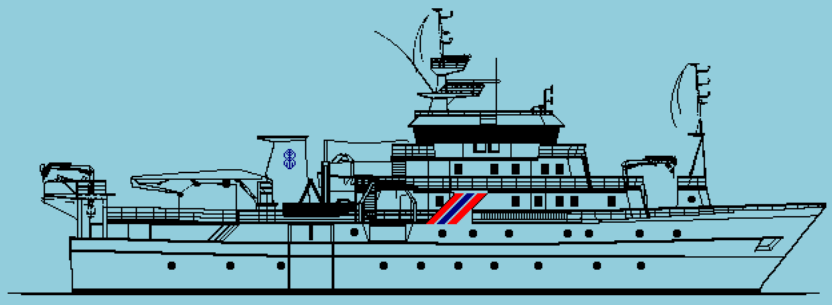

SURVEYS OF THE FISH RESOURCES OF ANGOLA

25 February – 26 March 2016

Bergen, 16 May 2016

The DR FRIDTJOF NANSEN RESEARCH PROGRAMME is sponsored by the Norwegian Agency for Development Cooperation (NORAD). The Food and Agriculture Organization of the United Nations (FAO) provides support to the Programme through Project GCP/INT/730/NOR: International Cooperation with the Nansen Programme: Fisheries Management and Marine Environment. This project is the follow-up to the Project NORAD/FAO/UNDP GLO/92/013. The Institute of Marine Research (IMR), Bergen, Norway is responsible for the implementation of the Programme in cooperation with FAO Fisheries Department and the local fisheries administrations. The aim of the Nansen Programme is to assist developing countries in fisheries research, management and institutional strengthening.

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

January 1985	-	June 1986	(6 surveys)
January 1989	-	December 1989	(3 surveys)
May 1991	-	September 1992	(3 surveys)
January 1994	-	March 2014	(23 surveys)

SURVEYS OF THE FISH RESOURCES OF ANGOLA

25 February – 26 March 2016

Survey Report No 2/2016

by

Kathrine Michalsen/Arved Staby
Magne Olsen/Merete Kvalsund

Institute of Marine Research
P.O. Box 1870 Nordnes N-5817 Bergen
Norway

Virgílio Estevão
Marisa Macueria

Instituto Nacional de
Investigação Pesqueira
P.O. Box 2601 Luanda
Angola

Bergen, 16 May 2016

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THE EAF-NANSEN PROJECT

FAO started the implementation of the project "Strengthening the Knowledge Base for and Implementing an Ecosystem Approach to Marine Fisheries in Developing Countries (EAF-Nansen GCP/INT/003/NOR)" in December 2006 with funding from the Norwegian Agency for Development Cooperation (Norad). The EAF-Nansen project is a follow-up to earlier projects/programmes in a partnership involving FAO, Norad and the Institute of Marine Research (IMR), Bergen, Norway on assessment and management of marine fishery resources in developing countries. The project works in partnership with governments and also GEF-supported Large Marine Ecosystem (LME) projects and other projects that have the potential to contribute to some components of the EAF-Nansen project.

The EAF-Nansen project offers an opportunity to coastal countries in sub-Saharan Africa, working in partnership with the project, to receive technical support from FAO for the development of national and regional frameworks for the implementation of Ecosystem Approach to Fisheries management and to acquire additional knowledge on their marine ecosystems for their use in planning and monitoring. The project contributes to building the capacity of national fisheries management administrations in ecological risk assessment methods to identify critical management issues and in the preparation, operationalization and tracking the progress of implementation of fisheries management plans consistent with the ecosystem approach to fisheries.

O PROJETO EAF-NANSEN

A FAO iniciou a implementação do projeto "Fortalecimento da base de conhecimento para implementação do enfoque ecossistêmico para a pesca em países em desenvolvimento (EAF-Nansen GCP/INT/003/NOR)" em dezembro de 2006, com financiamento da Agência Norueguesa para Desenvolvimento e Cooperação (Norad). O Projeto EAF-Nansen dá continuidade a projetos e programas anteriores, numa parceria que envolve a FAO, a Norad e o Instituto de Investigação Marinha (IMR), Bergen, Noruega, voltados a avaliação e gestão dos recursos pesqueiros marinhos nos países em desenvolvimento. O projeto trabalha em parceria com governos e também projetos financiados pelo programa GEF-Grandes Ecossistemas Marinhos (LME) e outros projetos que têm o potencial de contribuir para alguns componentes do projecto EAF-Nansen.

O Projecto EAF-Nansen oferece uma oportunidade para os países costeiros da África sub-saariana, trabalhando em parceria com o projeto, para receber apoio técnico da FAO para o desenvolvimento de capacidade nacional e regional para a implementação do Enfoque Ecossistêmico para a gestão das pescas e para adquirir conhecimento adicional sobre os seus ecossistemas marinhos para a sua utilização no planejamento e monitoramento. O projeto contribui para o desenvolvimento da capacidade das agências nacionais de gestão das pescas em métodos de avaliação dos riscos ecológicos para identificar as questões críticas de manejo e na preparação, operacionalização e monitoramento o progresso da implementação dos planos de gestão das pescas coerente com o enfoque ecossistêmico.

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Executive summary

Since the late 1990 a demersal survey has been performed annually in February – April to map and describe the distribution, composition and abundance of the main demersal species. Special emphasis has been put on seabreams (Sparidae), croakers (Sciaenidae), grunts (Haemulidae), groupers (Serranidae), snappers (Lutjanidae), hakes (Merlucciidae), cephalopods and shrimps, including collection of biological data such as length, weight, sex, maturity stage and stomach content for selected species. In addition the general hydrographical conditions have been monitored by mapping temperature, salinity and oxygen. Water samples have been collected for analyzes of nutritients and phytoplankton, and zooplankton has been sampled along the hydrographic transects.

The hydrography of the Angolan shelf is characterized by a semi-annual seasonal cycle, with two stratified periods in February-March and in October-November. The principal upwelling season occurs in June-August, while it is weak and less regular in December-January. The demersal surveys in March coincide with the late phase of the wet season, characterised by low salinity of the inshore surface waters on the shelf off northern and central Angola resulting from freshwater run-offs.

Angolan waters inhabit of a great diversity of fish and invertebrate marine species which individually have a relatively low biomass but together form an important fishery. Abundance trends within stocks of low biomass may show great variation from year to year due to low frequency of occurrence and large variability in catch rates. Low biomass estimates with relatively large coefficients of variability may sometimes obscure the greater picture, and make it difficult to use them for management purposes. In 2015 a small error was discovered in the R-code which calculates the biomass estimates and corresponding coefficients of variability (CVs). This error meant that the CVs calculated for estimates prior to 2015 were higher than they should have been. The CVs for all previous data have been recalculated and are shown in this years report. The biomass estimates are not affected by this error.

The 2016 biomass estimates for the combined northern and central regions, i.e. Congo River – Benguela, show a decrease for hake, groupers, croakers, grunts and to a lesser extent for seabreams compared to 2015. The combined estimate for shrimps on the other hand has increased. The combined estimate of important demersal species is about 19 % lower than in 2015, and is approximately a third below the 10 year average. The main pelagic species caught in the bottom trawl, horse mackerel and sardinellas, are schooling species and may be caught in great abundance, and may therefore obscure the overall tendency for the demersal species. In the northern and central regions, the biomass estimate of Cunene horse mackerel (*T. trecae*) was 9 681 tonnes, which is a fourth of the 2015 estimate and below the 10 year average.

CHAPTER 1 INTRODUCTION

Objectives

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

- To survey, map and describe the distribution, composition and abundance of the main demersal species, with special emphasis on seabreams (Sparidae), croakers (Sciaenidae), grunts (Haemulidae), groupers (Serranidae), hakes (Merlucciidae), cephalopods and shrimps (*Parapenaeus longirostris* and *Aristeus varidens*) on the Angolan shelf and slope (down to 800 m), from Cunene River (17°14'S) to Tombua* (15°40'S), and from Benguela (12°35'S) to Congo River (06°00'S) using bottom trawl and the swept-area method.

- To collect biological data such as length, weight, sex and maturity stage of *Dentex macrophthalmus, D. angolensis, Pagellus bellottii, Pseudotolithus* spp., *Umbrina canariensis, Merluccius polli, M. capensis, Trachurus trecae, Brachydeuterus auritus, Penaeus notialis, P. keraturus, Aristeus varidens, P. longirostris,* and *Chaceon maritae.*

- To collect the stomach contents for some species such as *Dentex angolensis, D. Macrophthalmus.* In addition, collect otholits from *T. trecae,* for subsequent analyses in the INIP Lab.

- To collect depth-stratified samples of zoo- and phytoplankton on five monitoring lines – Luanda, Lobito, Namibe, Congo River, and Cunene – in order to continue the studies on feeding biology, and relate stomach content to estimated zooplankton composition and observed density.

- To monitor the general hydrographical conditions using thermosalinograph and CTD-sonde on trawl stations and five oceanographic lines, and map the vertical and horisontal temperature, salinity, oxygen and fluroesence distribution.

*The Tombua-Benguela region has been excluded in all the demersal surveys as the bottom is very steep and rocky and unsuitable for bottom trawling, however, the abundance of demersal species in the region is low as the shelf and the slope are very narrow. The trends in the time series of the demersal biomass estimates are therefore insignificantly affected by the exclusion of the region.

Participation

The scientific staff consisted of:

From INIP, Angola:
25.02-26.03: Virgílio Estevão (local cruise leader), Noemia Nganga, Stela Pedro, Pedro Panzo, Marisa Macuéria, João Eusébio dos Santos, João Morais, Domingos Pedro (25.2-15.03), Alberto Filomena (25.2-15.03), Fátima Delicado (25.02-15.03), Guilherme Camarada (16.03-26.03), Domingas Nsaku (16.03-26.03)

From IMR, Norway:
Kathrine Michalsen, cruiseleader (25.02-15.03), Arved Staby, cruise leader (16.03-26.03), Magne Olsen (25.02-15.03), Merete Kvalsund (16.03-26.03), Jan Frode Wilhelmsen (25.02-26.03), Inge Nymark (25.02-26.03).

Narrative

R/V "Dr. Fridtjof Nansen" departed Walvis Bay at 15:40 UTC the 25th February 2016. The vessel steamed northwards and arrived at the inshore sampling station on the Cunene monitoring line at 05:00 UTC. A total of 4 multinet and 14 CTD / WP 2 stations were sampled on this line. Due to rough weather in addition to the bad bottom conditions, only three bottom trawl stations were conducted on this line. By midnight the vessel broke off surveying to steam to Walvis Bay to drop off a Norwegian crew member whose wife had become seriously ill. After the crew member was transferred to the pilot vessel at 11h00 UTC on the 29th February the vessel steamed north to complete the bottom trawl coverage of the southern region. The vessel proceeded northwards and conducted a total of 27 bottom trawls in this region, by the 4th March at 12h30. Sampling of the Namibe environmental line (3 multinet and 14 CTD / WP2 stations) started on the 4th March at 18h00 and finished on the 5th March at 06h00.

The vessel arrived in the central region at 01h:00 the 6th March and proceeded with the deepest station on Lobito environmental line. The vessel continued with bottom trawls and completed the bottom trawl coverage of the central region and finished the Luanda environemtal line on the 13th March at 00h15. Two transects were completed in the northern region before the vessel docked in Luanda on the 15th March for a crew change the following day.

Delayed with one day the vessel left Luanda on the 17th March to cover the remaining transects of the northern region, heading to the northern environmental monitoring line off the Congo river. The line and 8 bottom trawl were finished by 7h30 on the 19th March. The vessel then continued working southwards, and finished the last bottom trawl stations of a total of 191 stations at 11h30 on Friday 25th. On Saturday 09h00 the vessel docked alongside in Luanda.

CHAPTER 2 METHODS

Survey effort

Table 2.1 presents the surveyed area by depth strata, allocation of trawl stations, total number of successful swept-area hauls, number of invalid hauls, number of CTD stations, and the distance surveyed. Table 2.1 also shows the allocation of effort relative to the stratum size as percentage hauls versus percentage area, by depth, by region, and by total area. The overall average coverage was 1 valid trawl station per 87 square nautical miles (NM²). Figure 2.1, Figure 2.2 and Figure 2.3 show the cruise tracks in the northern, central and southern regions, respectively, as well as the locations of bottom trawl and hydrographical stations.

Table 2.1 Survey design and effort for the 2015 demersal survey. Size of the survey area by depth stratum, allocation of trawl stations, proportion of stations relative to stratum size, total number of successful swept-area hauls, number of hauls failed, number of CTD stations, and the distance surveyed, divided in to: northern region (Luanda to Congo River), central region (Benguela to Luanda) and southern region (Cunene to Tombua).

	Depth strata												
Region	20-50m	50-100m	100-200m	200-300m	300-400m	400-500m	500-600m	600-700m	700-800m	**Valid**	**Invalid**	**CTD***	**Distance**
Luanda-Congo River													
Area (NM2)	1379	1969	1940	601	550	437	409	408	702	**8395**			
# hauls (BT)	15	19	17	8	8	6	6	4	5	**88**	**0**	**88**	**1280**
%area	16.4	23.5	23.1	7.2	6.6	5.2	4.9	4.9	8.4	**51**			
%hauls	17	21.6	19.3	9.1	9.1	6.8	6.8	4.5	5.7				
Benguela-Luanda													
Area (NM²)	1068	1586	1439	407	372	343	346	268	357	**6186**			
# hauls (BT)	13	16	12	8	8	8	6	4	3	**78**		**82**	**1179**
%area	17.3	25.6	23.3	6.6	6.0	5.5	5.6	4.3	5.8	**37**			
%hauls	16.7	20.5	15.4	10.3	10.3	10.3	7.7	5.1	3.8				
Cunene-Tombua													
Area (NM²)	507	591	594	100	77	48	39			**1956**			
# hauls (BT)	7	8	5		2	1	0	2		**25**	**2**	**38**	**627**
%area	25.9	30.2	30.4	5.1	3.9	2.5	2.0	0.0	0.0	**12**			
%hauls	28.0	32.0	20.0	0.0	8.0	4.0	0.0	8.0	0.0				
Grand total													
Area (NM2)	2954	4146	3973	1108	999	828	794	676	1059	**16537**			
# hauls (BT)	35	43	34	16	18	15	12	10	8	**191**	**3**	**209**	**2982**
%area	17.9	25.1	24.0	6.7	6.0	5.0	4.8	4.1	6.4				
%hauls	18.3	22.3	17.8	8.4	9.4	7.9	6.3	5.2	4.2	**Total hauls: 191**			

A stratified semi-random survey design was used with depth and area as stratifying variables. Trawling was, as far as bottom conditions allowed, carried out along transects perpendicular to the coast (see Figure 2.1- 2.3), and the allocation of trawl stations was proportional to stratum size. Due to time constraints, several stations conducted in 2014 in the central and northern region were omitted in this survey. Trawling shallower than 300 m was mainly done

during daytime and deeper than 300 m during dark hours. When necessary the planned design was slightly modified due to unsuitable bottom conditions or non-accessible oil production areas in the northern region. Based on a decision made in 2003 the trawl positions of the 2000 demersal survey should be the standard for future surveys in the southern region as the survey had a reasonable good coverage. Furthermore, it was decided that the trawl positions of the 2002 demersal survey should be used as the standard for future surveys in the central and northern regions, as the survey had a good coverage of these regions. Therefore, the station positions and effort have been similar during the 2000 and 2003-2014 surveys in the southern region and during the 2002-2014 surveys in the central and northern regions (see ANNEX IX). In 2015 a small error was discovered in the R-code which calculates the biomass estimates and corresponding coefficients of variability (CVs). This error meant that the CVs calculated for estimates prior to 2015 were higher than they should have been. The CVs for all previous data have been recalculated and are shown in last years report. The reduction of number of stations in the central and northern area, in 2015, compared to 2014, did not affect the CV's. As in 2013-2015, additional trawl stations were performed in the area between Benguela and Tombua to obtain a time series of catch rates of demersal important species for future analyses. These stations are not included in the current biomass estimates.

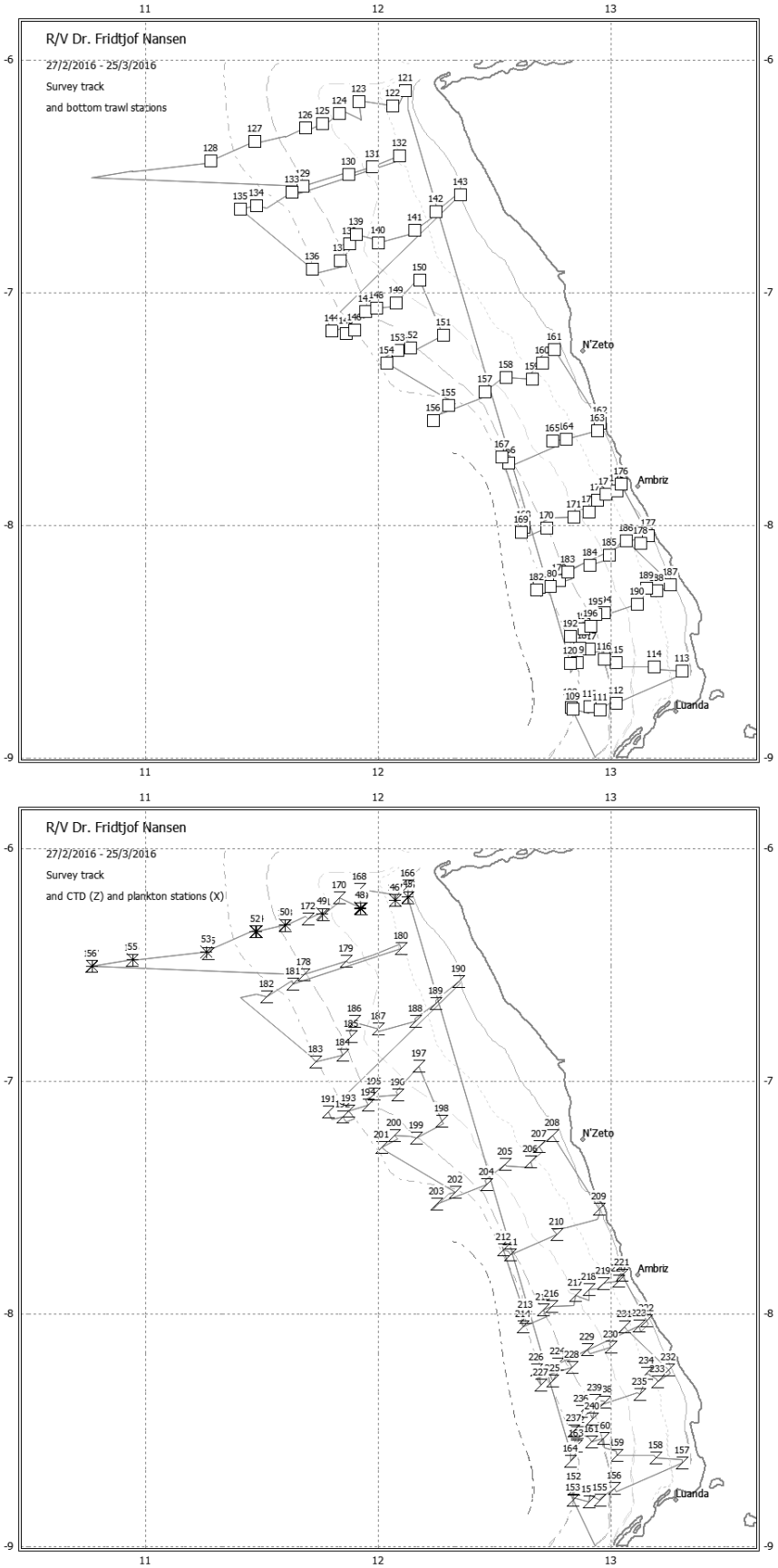


Figure 2.1 Angola north: Congo River - Ponta das Palmerinhas. Course track with trawl and hydrographical stations. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

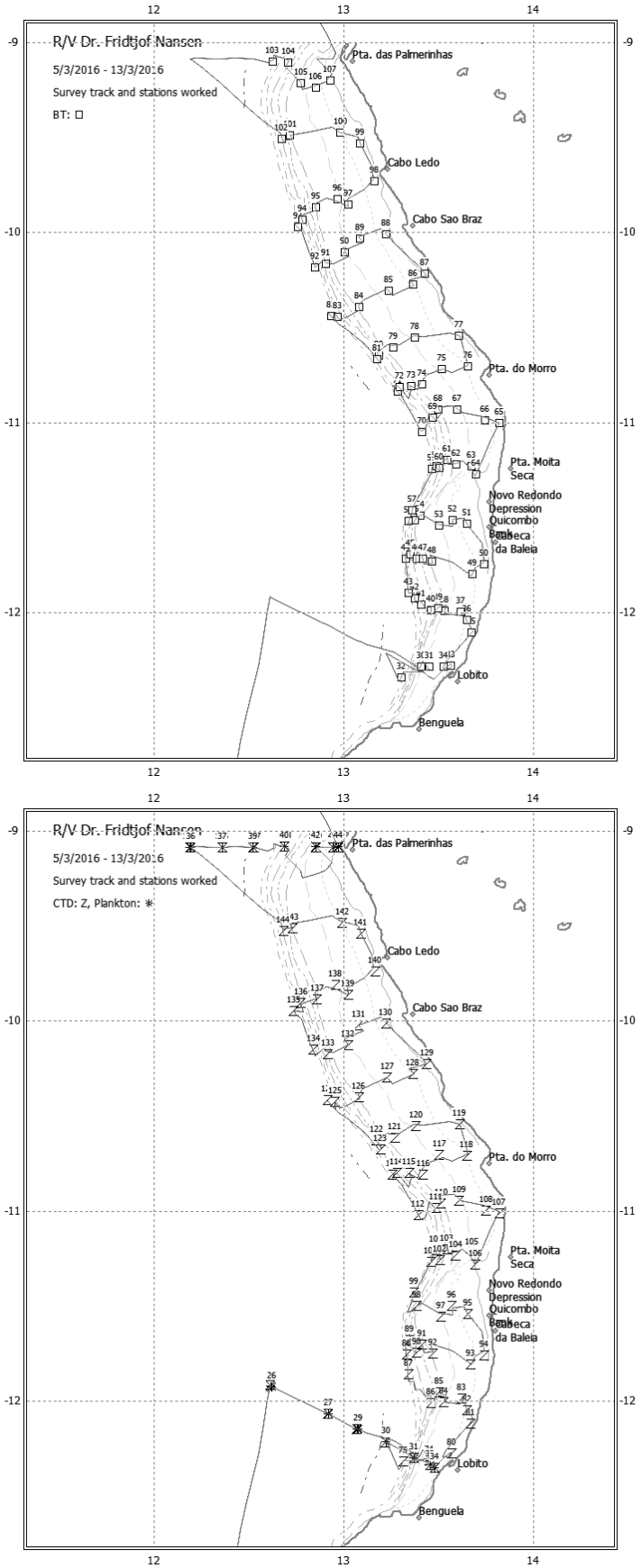


Figure 2.2 Angola central: Ponta das Palmerinhas - Benguela. Course track with trawl, hydrographical and plankton stations. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

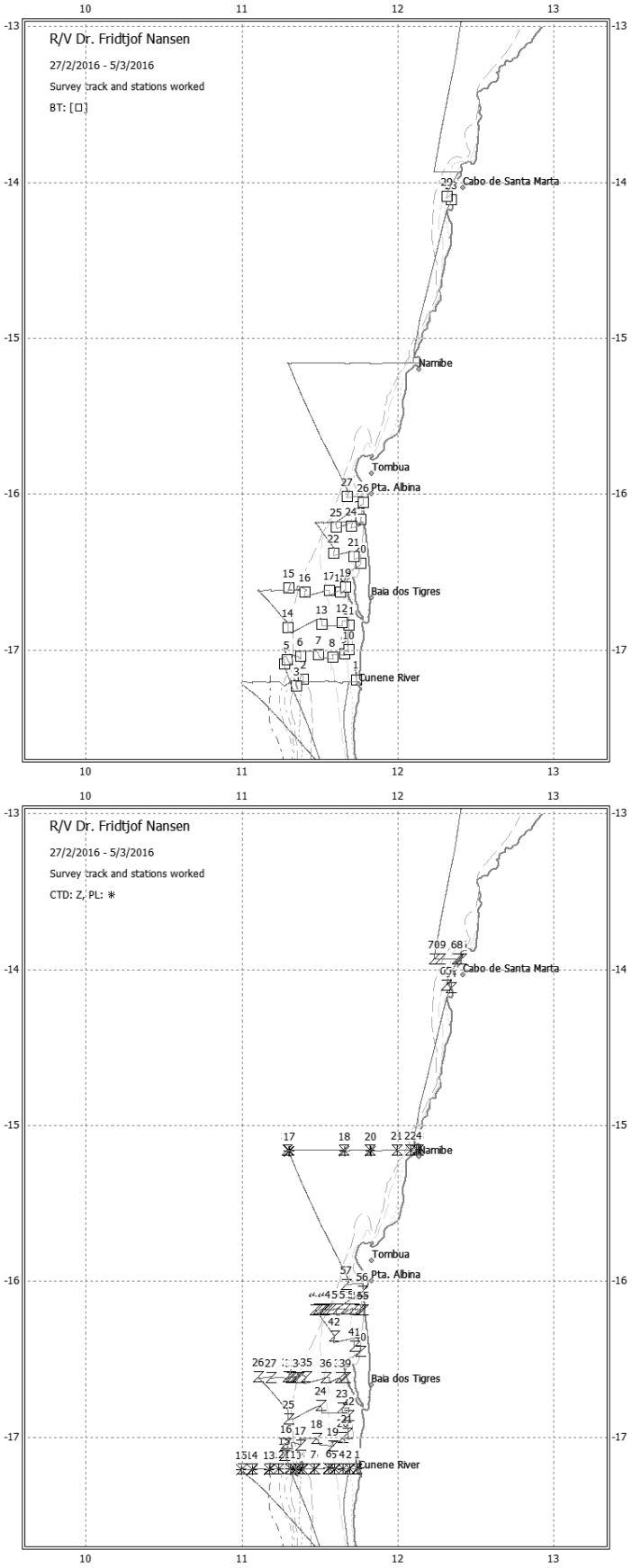


Figure 2.3 Angola south: Tombua - Cunene. Course track with trawl, hydrographical and plankton stations. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

Meteorological and hydrographical sampling

Location of stations belonging to monitoring lines or to standard hydrographical sections can be found in ANNEX VIII. Additional CTD stations were cast at each bottom trawl station.

The general monitoring of the oceanographic condition along the Angola coast includes Main monitoring lines of highest priority (Red) (CRML, PML, LBML, NML, CML): Multinet, WP2, bottles and CTD (Figure 2.4).

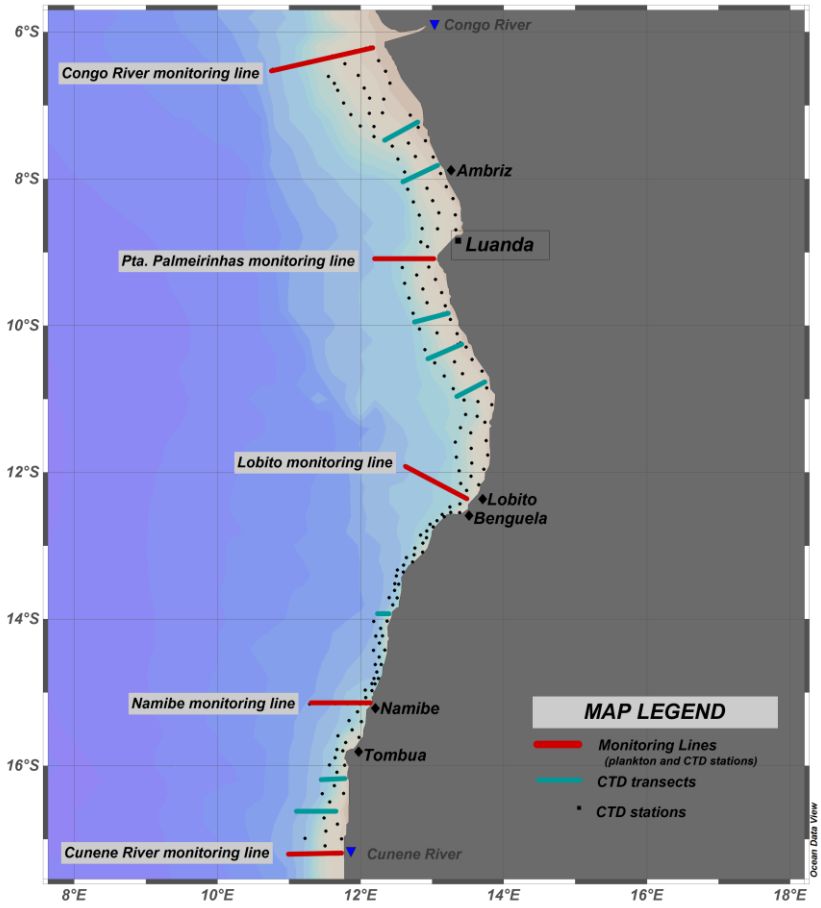


Figure 2.4 Monitoring lines and CTD transects in Angola. Additional CTD stations were carried out on the acoustic transects. See also

Figure 2.1

A Seabird 911+ CTD probe was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done with the customised Seabird Sea save software installed on a PC. Profile data were logged down to a few meters above the bottom.
Attached to the CTD was also a Chelsea fluorometer of the type Mk III Aquatracka. It measures chlorophyll A in microgram per litre with an uncertainty of 3%. Factory slope and offset was 0.00921 and -0.02.

The SBE 21 Seacat thermosalinograph was running routinely during the survey obtaining samples of sea surface salinity, relative temperature and fluorescence (5 m depth) every 10 seconds. An attached in-line Turner Design SCUFA Fluorometer continuously measured

Chlorophyll A levels [RFU] at 5 m below the sea surface while underway during the entire cruise.

Meteorological data including wind direction and speed, air temperature, global radiation and sea surface temperature (SST) were automatically logged using a WIMDA meteorological station. These observations were averaged by every nautical mile distance sailed.

The vessel-mounted Acoustic Doppler Current Profiler (VMADCP) from RD Instruments was used during the whole survey.

To compare hydrological and biological condition between seasons, years and regions it's necessarily to produce map of comparable scales. From this survey we produce maps with scales shown in Table 2.2. The map scales were selected based on long term monitoring of hydrological and biological condition in the Angola waters, and the minimum and maximum observed values were selected as scale boundaries.

Table 2.2 Scales for temperature, salinity, oxygen and FLU (chlorophyll a) mapping.

Type of maps	Minimum value	Maximum value	Intervals
Temperature	10	32	1
Salinity	32	37	0.25
Oxygen	0	7	0.5
FLU (chlorophyll *a*)	0	3	0.1

Plankton sampling

Phytoplankton

Samples of phytoplankton were collected on the five fixed monitoring lines (Appendix VIII) by obtaining water samples with the CTD bottles at 5, 15, 25, 50 and 75 meter depth. The samples were preserved in **2%** formalin.

Zooplankton

Zooplankton samples were collected with both a HYDROBIOS Multinet (180 µm) and WP2 net (180 µm). Multinet sampling was conducted at five depth intervals, 0-25, 25-50,50-75,75-100 and 100-200 m, at 3 selected stations on the Namibe, Lobito, Luanda and Congo River monitoring lines. Due to bad weather at the Cunene line, only one multinet station was achievable (Appendix VIII). Once at the desired depth the unit was hauled at app. 1-1.5 m/s while the vessel was moving with approximately 2 knots. Data was recorded electronically from only the outer flow meter of the Multinet. A SCANMAR depth sensor gave real-time information of the depth. The nets were opened and closed remotely from the bridge of the vessel. The samples were preserved in 4% formalin. WP2 samples were collected at every CTD station. At shallower stations (< 200m) the net was lowered to approximately 10 m off the bottom, while at deeper stations(> 200m) the net was lowered to a maximum depth corresponding to 200 m wire out. The net was vertically heaved at 0.5 m/s. Samples were preserved in 4% formalin. A flowmeter mounted in the centre of the WP2 recorded the distance sampled on all stations.

Fish sampling

Sampling gear

A "Gisund Super" bottom trawl with a headline height of about 4.5m was used during the survey, and the doors are of the "Thyborøn" combi type. The distance between the front parts of the wings was about 21m during deployment at a speed of 3 NM h^{-1}. These settings have been the standard on all swept area surveys with R/V "Dr. Fridtjof Nansen".

As in previous surveys, except during the 2002 survey, a 44m long tickler chain was attached to the footrope at depths of more than 300m in order to catch more of the bottom dwelling deep-water shrimps. During all tows deeper than 80m, a 9m long constraining rope was attached between the wires about 120-125m in front of the trawl doors. This kept a constant distance between the doors of about 55m during trawling. In shallow stations with depths less than 80m, the door-to-door distance varied more, depending on bottom type and currents.

Trawl duration was standardized to 30 minutes, however trawls with durations of more than 15 minutes were included in the estimates. On several transects in the northern region trawl duration was reduced to 15 minutes so that the planed number of stations on a transect could be completed during light hours. The trawling start time is controlled by using a "SCANMAR" sensor to detect the landing of the trawl on the bottom, and the stop-time is defined as the time when the wires start to haul the net. In some cases the towing was interrupted before 30 minutes either due to poor bottom conditions or too high catches of fish indicated by the installed catch sensors. If the stations were not trusted to reflect the density of fish on the bottom they were coded as invalid (code 9) in the Nansis database. Table 2.1 shows the numbers of valid and invalid stations. A detailed description of the fishing gear is given in ANNEX VII.

Sampling the catches

Catches were sampled for species composition by weight and numbers. The total body length of the fish (cm) was measured to the nearest 1 cm below, the carapace length of shrimps and carapace width of crabs to 1 mm below. The records of fishing stations are presented in Annex I. For selected commercially important species, pooled length frequency distributions, in which individual samples are raised to total catch, are shown by area in Annex II. All biological data records were entered in the Nansis database and were quality controlled during the survey. The catch rates (kg/h) by main groups caught, in valid swept area bottom trawl hauls are presented in (ANNEX VI). The distribution of density (tonnes /nm^2) along the coast of some of the main spcies are presented in maps.

Acoustic sampling

Acoustic recordings were carried out at four frequencies: 18, 38, 120 and 200 kHz using a SIMRAD ER60 echo sounder. Acoustic data were not processed on board, but all data were stored to files. A detailed description of the acoustic settings is given in ANNEX VII.

Areas, depth strata and calculations

Table 2.1 shows the areas in NM^2 for the southern region (Cunene - Tombua: S17º15'-S16º 00'), the central region (Benguela - Ponta das Palmerinhas: S12º40'-S09º00') and the northern region (Ponta das Palmerinhas - Congo River: S09º00'-S06º00') by depth strata.

These strata are used to calculate the swept-area biomass estimates. All valid stations are treated as representative for the relevant depth intervals where the species or group of species were caught.

All equations for the calculations are given in ANNEX IV. The effective fishing width of trawl gear used by R/V "Dr Fridtjof Nansen" is considered to be 18.5 m. The effective fishing area is the product of the fishing width multiplied by the towing distance measured by the GPS. It is assumed that all fish within the trawling path are caught, which gives a catchability coefficient (q), *i.e.* the fraction of the fish encountered by the trawl that was actually caught, equal to 1. The catchability coefficient is seldom known, but because the coefficient is assumed to be constant between surveys, the swept-area estimates will reflect any change in population abundances between surveys.

The survey design and effort were previously inconsistent, and made difficult any comparison between surveys. Therefore, it was discussed and agreed upon by the responsible of the Demersal Programme of the Instituto Nacional de Investigação Pesqueira of Angola, and the responsible for the Angolan Demersal Programme at the Institute of Marine Research, Norway that all biomass estimates since 1985 should be calculated in a standardized procedure.

Data from the "Nansis" database were exported to flat ASCII text files. The software R 3.0.2[⊗] was used to calculate stratified density estimates sorted by survey and stratified by depth and latitude. Biomass estimates by species or species groups were obtained from a stratified mean density estimator using the equations in ANNEX IV.

[⊗] R Development Core Team (2005). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL http://www.R-project.org.

CHAPTER 3 OCEANOGRAPHIC CONDITIONS

The Angolan shelf is characterized by the semi-annual seasonal cycle, with the two stratified periods, during February-March and in October-November. The principal upwelling season occurs in June-August while it is weak and less regular in December-January.

Surface Distribution

The salient feature of the hydrographical conditions in Angola waters between December and March is the drop in the salinity at surface, associated with the seasonal increase in precipitation (rainfall) over the continent and the consequent increase in the discharge of freshwater carried to the ocean by Congo river (north), Kwanza river (central), Cunene river (south) and by other rivers along the Angola coast. The regular demersal survey carried out by R/N "Dr. Fridjof Nansen" in March coincide with the late phase of the wet season and typically low salinity of surface waters on the shelf off the northern, central and southern Angola regions are observed. During the cruise sea surface temperature and salinity (SST and SSS at 5 m depth) were continuously recorded. In 2016, the SST was 4°C higher along the whole coast of Angola, compared to 2015. The salinity was also higher compared to the values recordedin 2015 (from 24 to 29).

Southern Region
SST ranged from 20°C to 29°C. The minimum value (20°C) was observed off the mouth of Cunene River (Figure 3.1). The maximum temperature of 29°C was observed north of Namibe. Highest values of salinity (<35.5) occurred between Cunene river and Pta. Albina. Minimum value (34) was observed west Namibe and Cabo de Santa Marta in open sea.

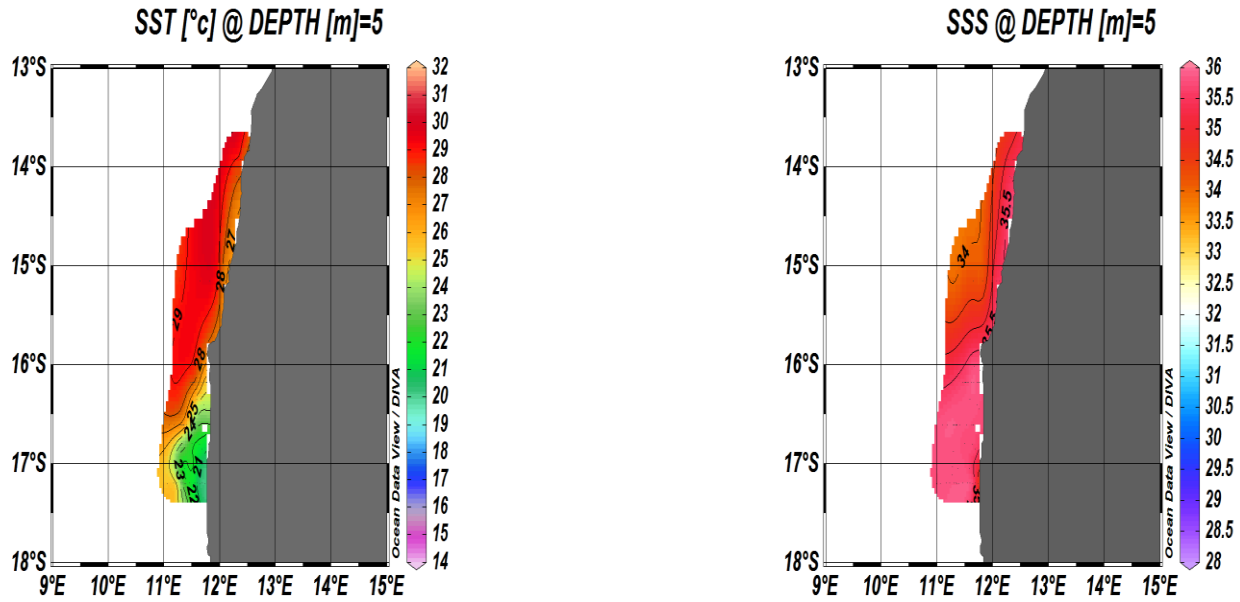


Figure 3.1. Horizontal distributions of SST and SSS at 5m depth in the southern region.

Central Region

SST showed little variation (28°C to 30°C) in whole region. The minimum values of temperature (28°C) were observed south of Palmeirinhas in the inshore area. Maximum temperature was registed between Lobito and Palmeirinhas in the open sea. The salinity was relatively low in the entire region and ranged between 29 - 33.5. These (Figure 3.2).

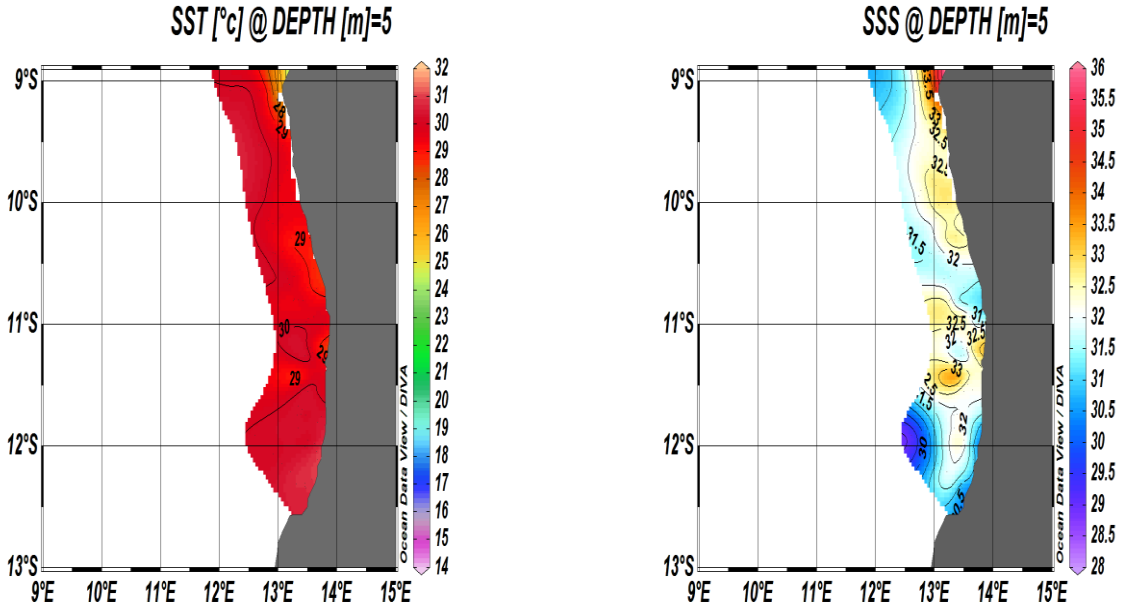


Figure 3.2. Horizontal distributions of SST and SSS at 5m depth in the Central region.

Northern Region

SST ranged from 27 °C to 30 °C and the salinity from 31 to 35 (Figure 3.3). Minimum temperatures (27 ° C) were observed along the coast in the Cabeça da Cobra area until the south of Ambriz with a gradual increase towards the open sea for the whole region. Low concentrations (<33) salinity were observed in the Foz of the Congo River section and the highest concentration (> 34.5) was observed between south of Ambriz and in the inner shelf of north off Luanda.

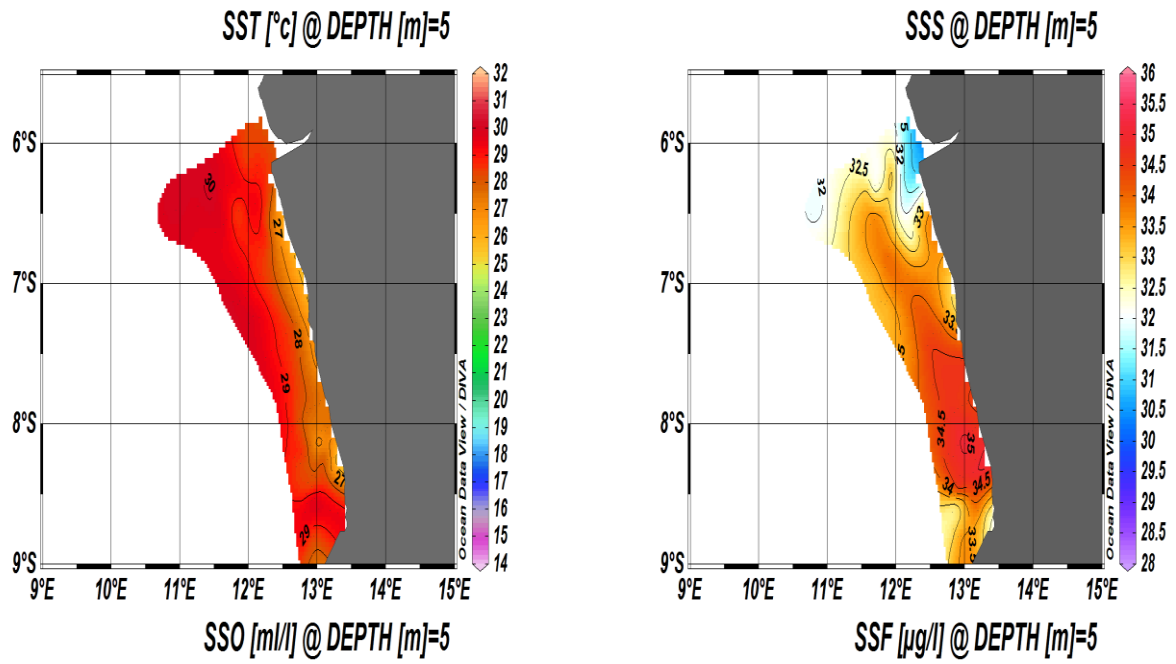


Figure 3.3 Horizontal distributions of SST and SSS at 5m depth in the Northern Region.

Standard sections

In the southern sections downwelling was observedbetween 0 - 100 m depth . This process occurs when warm waters coming from the open sea towards the coast sink down. This process normally occurs in the northern part of Angola, but due to the occurence of El Niño, intrusion of warm water masses could be observed all the way towards the southern parts of Angola.

Cunene River

The vertical transects of Cunene river show that the temperature, salinity and oxygen increased with distance from the coast and decreased with the depth (Figure 3.4). Sea surface temperature was 7°C higher than last year. The stratification layer was well pronounced with depth and was located betwen surface to below 100 m depth. The temperature in this layer varied between 25°C at surface to 14°C at edge of layer. Salinity showed little variation. The oxygen decreased with depth, values were 1 - 5ml/l and the minimum oxygen zone (<1ml/l) was observed below 130 m depth. The fluorescence (0.5 – 0.9 µg/l) indicated high biological activity at surface in 100 m layer in the coast.

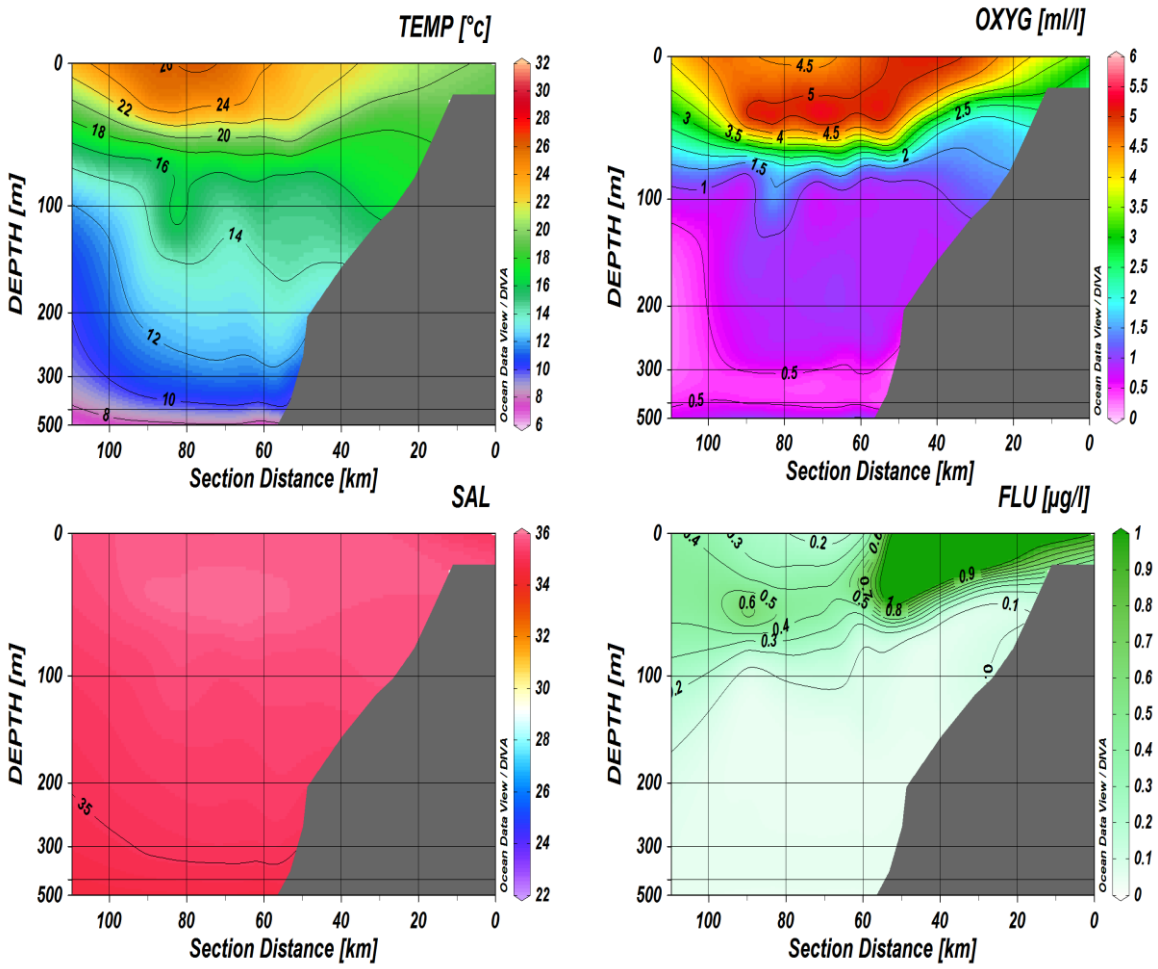


Figure 3.4 Vertical sections of temperature, salinity, oxygen and fluorescence off Cunene River.

Namibe

The Namibe section was characterised by high values of temperature, salinity and oxygen (Figure 3.5). SST varied between 18°C - 30°C and decreased with depth. The salinity showed little variation off shore throughout the water column. The oxygen concentration at the surface, between 5 – 50 m, ranged from 4 - 5 ml/l, with an anoxic layer (<1ml/l) observed inshore below 70 m depth. High fluorescence (0.5µg/l)) was observed between 5 – 80 m depth.

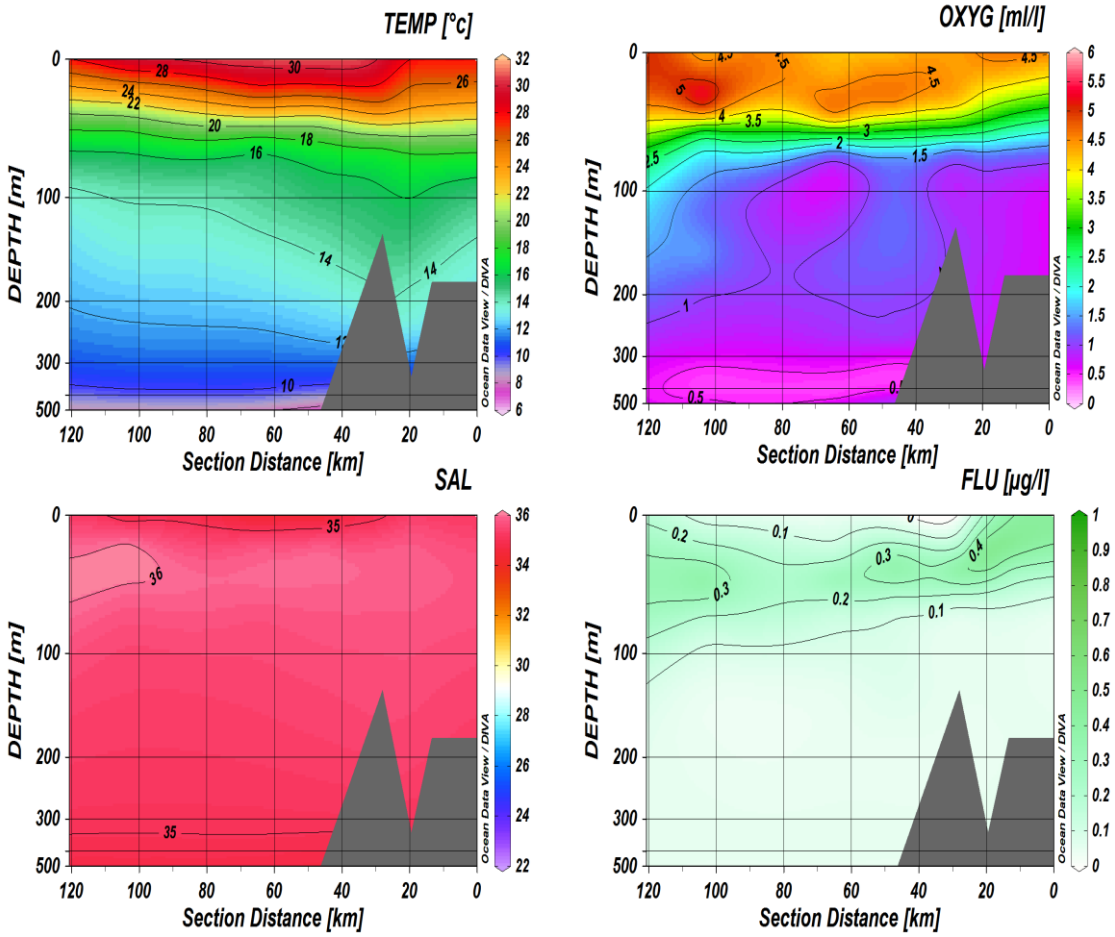


Figure 3.5 Vertical sections of temperature, salinity, oxygen and fluorescence off Namibe.

Lobito

The salinity in the surface layer off Lobito was low due to discharge of freshwater from the river Longa and Kwanza. The surface temperature was between 16°C - 30°C and decreased to below 7°C in depth deeper than 400 m. Surface salinity was between 30 – 36. The oxygen values in surface waters near the coast and offshore was only 4ml/l and the layer with low levels of oxygen (<1ml/l) were found below 100m depth. Low values of fluorescence (0.1 - 0.4 µg/l) in open sea were registed in this section (Figure 3.6).

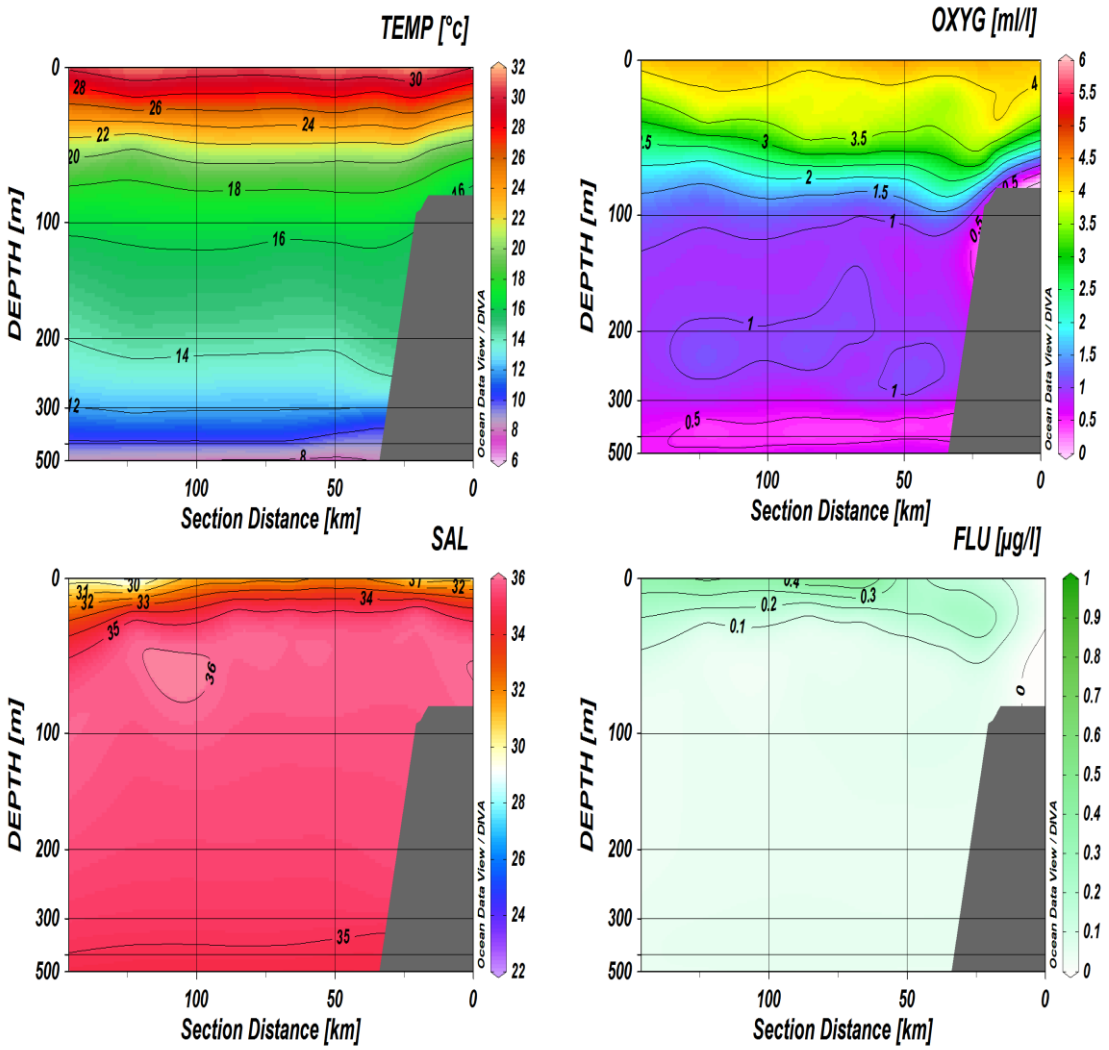


Figure 3.6 Vertical sections of temperature, salinity, oxygen and fluorescence off Lobito.

Ponta das Palmeirinhas

On the Ponta das Palmeirinhas section (Figure 3.7), the water column was stratified and defined in clear layers with increasing depth. The temperature fluctuated between 16°C - 32°C to 100 m depth. The salinity varied from 31-36. The presence of less saline water (≤32) further offshore is a result of freshwater from the Kwanza River being transported southwards. High oxygen values (4ml/l) were observed in the surface layer (0 – 30 m) in the coastal zone and offshore, gradually decreasing with depth. The minimum oxygen zone was located below 300 m. Low values of fluorescence (0.2 µg / l) were observed along the area.

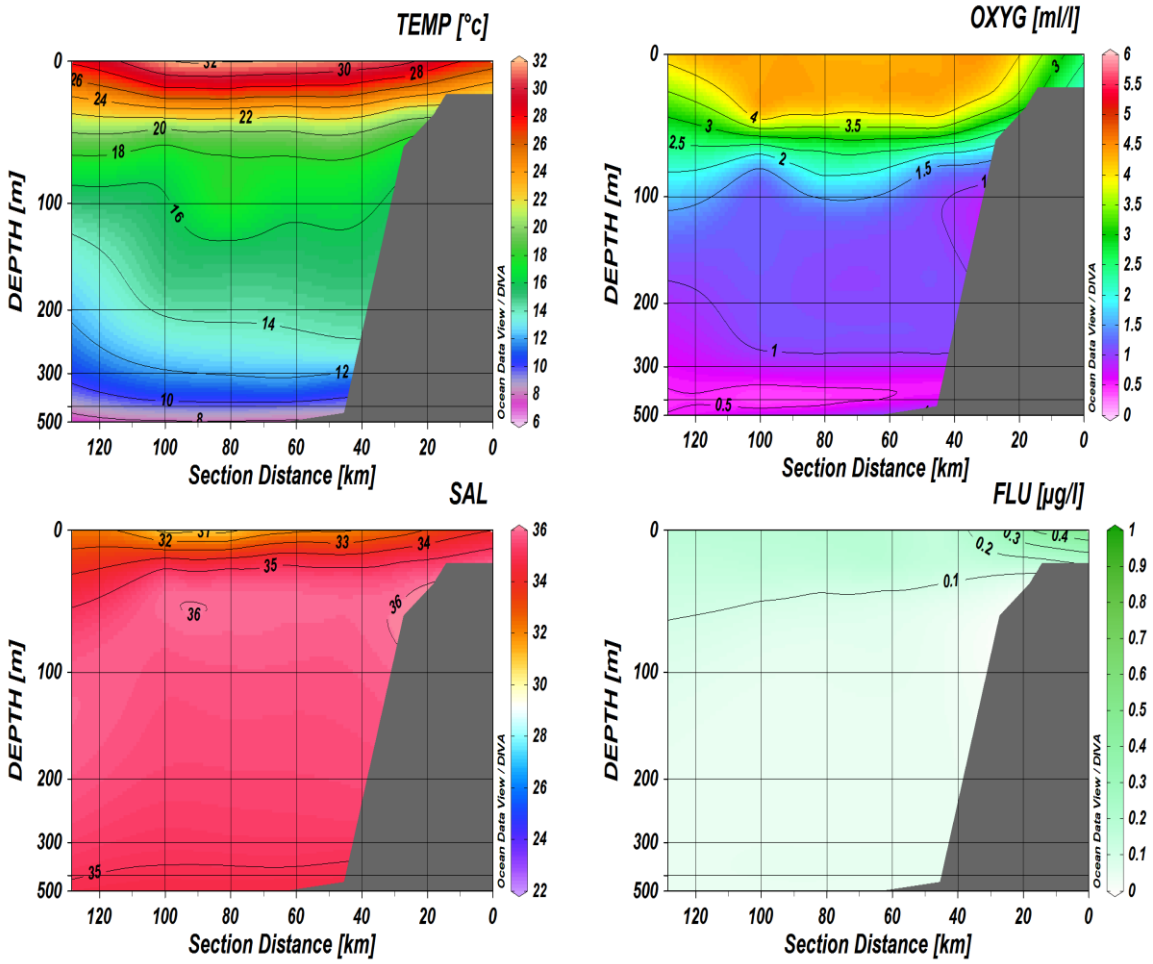


Figure 3.7 Vertical sections of temperature, salinity, oxygen and fluorescence off Ponta das Palmeirinhas.

Congo River

In the Congo River section we observe a high stratification of the watermasses in the upper 25 m. This could be seen in the values from temperature, salinity and fluorescence. The temperature ranged from 24 ° C to 30 ° C. Oxygen levels were between 4 ml / l to 4.5 ml, and the minimum oxygen zone occurred below 200 m depth. Salinity varied widely due to discharge of water from the Congo River, and the minimum concentration (28) at the mouth of the river, increased gradually with depth. Fluorescence varied between 0.1µg/l 0. 3 µg/l. These low values indicates low biological activity over the whole transect (Figure 3.7).

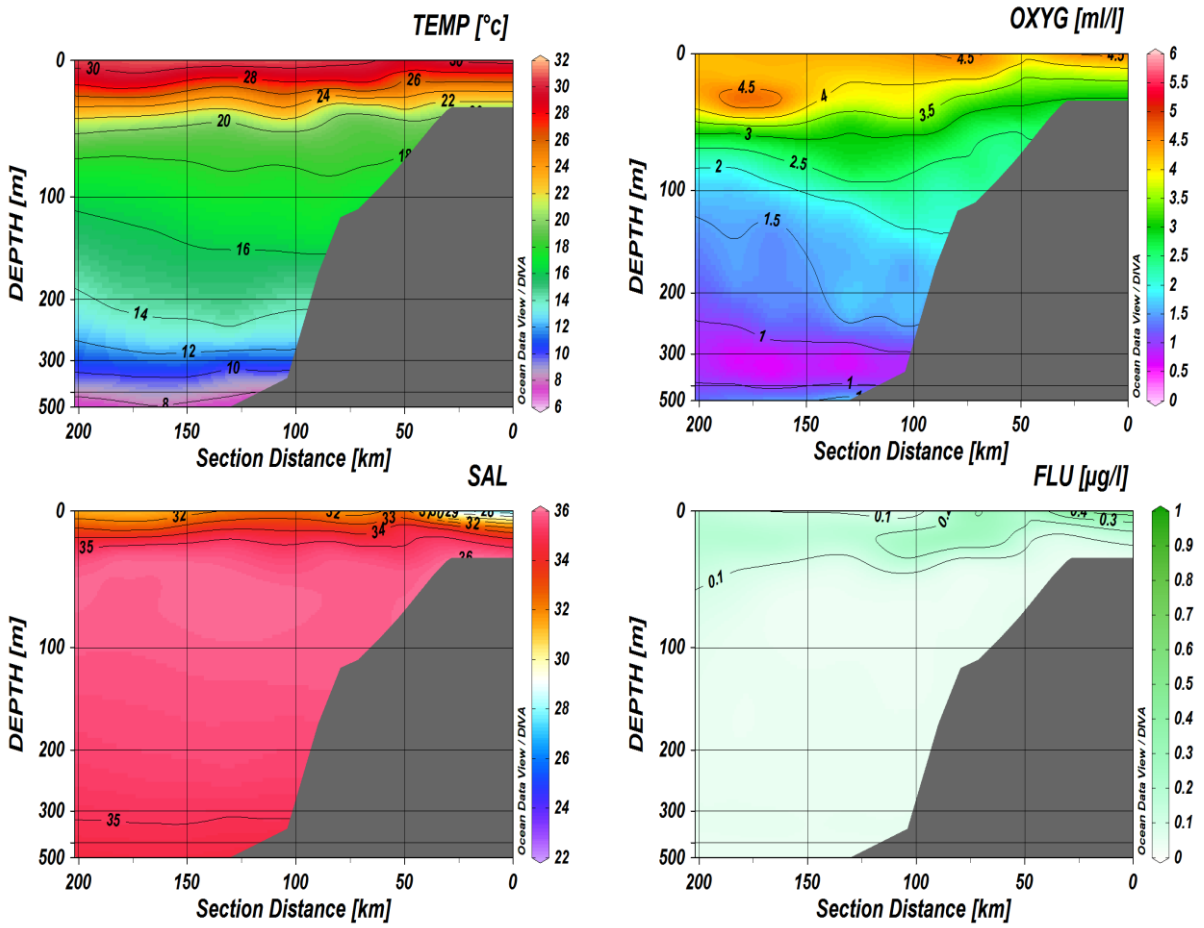


Figure 3.7 Vertical sections of temperature, salinity, oxygen and fluorescence off Congo River.

CHAPTER 4 CATCH RATES, DISTRIBUTION, COMPOSITION AND BIOMASS ESTIMATES OF DEMERSAL RESOURCES ON THE SHELF

The inner shelf is defined as the area between 20 and 70m bottom depth and the outer shelf from 71 to 200m depth. Several of the species which inhabit the shelf, particularly the seabreams (Sparidae) and hakes (Merlucidae), are also found in deeper waters, but usually in lower density, These are presented in Chapter 5.

Trawl positions are mapped in Figures 2.1-2.3, and the station information and catch by species are presented in ANNEX I. Pooled length distributions, weighted by the catch of the main species by region, are shown in ANNEX II. Further, the mean densities (tonnes/NM^{-2}) and the frequency of occurrence of the most important species are shown in ANNEX III. ANNEX V shows the various Nansis species codes used for species and groups of species, and ANNEX VI presents the catch rates of these species and species groups.

Congo River - Ponta das Palmerinhas shelf

The survey covered the northern region of Angolan waters from Luanda to Mouth of Congo River. The area north of Congo River is inaccessible to fisheries research surveys due to the restricted oil exploitation area. During some of the previous surveys, this area (Cabinda) has been covered, but to make plausible comparisons the biomass estimates in Table 4.1 only include trawl stations south of Congo River. A total of 51 successful swept-area trawl stations were accomplished on the shelf area in 2016 (Table 2.1).

The total average catch per hour was 635 kg/h on the inner shelf and 434 kg/h on the outer shelf (Annex VI). On the inner shelf the demersal group had an average catch rate of 237 kg/h, contributing with 37 % to the total average catch. Cephalopods and shrimps contributed with less than 1 % on the inner shelf. The pelagic group had an average catch rate of 250 kg/h (39 %).

On the outer shelf, the demersal group contributed with 29 % to the mean catch rate, while the pelagic group contributed with 25 %. Shrimps, sharks and cephalopods combined contributed less than 2 %.

On the inner shelf stations seabreams were caught on all but two stations and had a mean catch rate of 34 kg/h (5 % of the total). Grunts (except *Brachydeuterus auritus*, big eye grunt) had an average catch rate of 16 kg/h, contributing 3 % of the total. Bigeye grunt was the dominating species on the inner shelf with an average catch rate of about 170 kg/h. Catch rate of croakers was 11 kg/h or 1.7 % of the total on the inner shelf, and groupers had a mean catch rate of 2,9 kg/h (less than 1 %), while snappers were not caught.

Seabreams were caught on all stations on the outer shelf with an average catch rate of 69 kg/h (16%). *Dentex angolensis* was the most abundant seabream with a catch rate of 26 kg/h. Croakers were less abundant on the outer shelf with a mean catch rate of 3,7 kg/h (1 %) and canary drum (*Umbrina canariensis*) was the dominating species of this group.

The most common pelagic group caught on the inner and outer shelf was carangids with 216 kg/h and 68 kg/h respectively, and contributed 34 % and 16% of the total average catch rate respectively. *Chloroscombrus chrysurus* was the main species on the inner shelf, while *Trachurus trecae* had a high catch rates on the outer shelf. Clupeoids were encountered less frequently with a mean catch rate of 3 kg/h (0,5 %) on the inner shelf.

Parapeneus longirostris was the only shrimp species caught on the outer shelf, occurring in six stations, with a mean catch rate of 1,4 kg/h.

Biomass estimates

Table 4.1 shows swept-area biomass estimates from 1985 to 2016 for the commercial species and fish groups found on the shelf off northern Angola. The biomass estimates were calculated for three depth strata (20-50m, 51-100m and 101-200m). The biomass estimates presented for the pelagic species cannot be relied on as being a realistic reflection of the true biomass as the species are often unavailable to the bottom trawl. Some of the biomass estimates in Table 4.1 have a high coefficient of variations (CV), e.g. *M. Polli* and clupeids, indicating that the trends in the time series should be interpreted with care.

The biomass estimate of seabreams in 2016 is 9 070 tonnes, which is lower compared to 2015, and a 50% reduction in biomass compared to 2014. Although the 2016 estimate lies below the last 10 years average (12 200t), the stock seems to be fairly stable when disregarding the high 2014 estimate. Similar to previous years, *Dentex angolensis* was the dominant seabream species in the northern shelf, contributing 63 % of the combined seabream biomass.

The estimated 2016 croaker biomass of 1 034 tonnes is the lowest in the time series. The estimate is about a fith of the 10 year average of 5 500 tonnes. As in previous years *U. Canariensis* was the most common croaker species, and its contribution to the biomass was app 37 % (387 t). The biomass has dropped considerably the last two years, similar to the decline observed in 2000-2001.

The biomass estimate of grunts (*Pomadasys incisus*, *P. jubelini*, *P. rogeri* and *P. peroteti*) was 1 223 tonnes, which is the second lowest since 2003, and a third of the 10 year average (3 547 t).

The grouper biomass estimate for 2016 is 226 tonnes, which is below the 10 year average of 383 tonnes and the second lowest in the time series. Considering the entire times series the estimates show a downward trend in biomass.

Snappers are rarely caught as they are rocky dwellers and often unavailable areas. No snappers were caught in 2016.

The biomass estimate of *Parapenaeus longirostris* in 2016 is 148 tonnes, approximately four times higher than in 2015. The estimate is similar to the average of the last ten years (135 t).

The 2016 biomass estimate of Sepiidae was 258 tonnes, higher than in 2015 (149t), but much lower than the ten year average.
The Ommastrephidae biomass estimate is 88 tonnes, the lowest since 2012, and about a third of the ten year average (215 t).

The biomass estimate of *Trachurus trecae* is 4 420 tonnes, lower than last years estimate (13 700t) and below the 10 year average.

Table 4.1. Biomass estimates (tonnes) of important species on the shelf (20-200m) in the northern region. CV values are indicated in brackets

Survey	M.polli		T.treace		Shrimps		Cephalopod		Sharks		Clupeids		Carangids		Scombrids	
1985.1	9	(1.00)	4,496	(0.68)	302	(0.47)	10,463	(0.76)	498	(0.49)	364	(0.59)	9,986	(0.50)	44	(1.00)
1985.2	0		3,324	(0.71)	139	(0.96)	694	(0.35)	451	(0.39)	3,907	(0.98)	3,740	(0.63)	30	(1.00)
1985.3	3,459	(1.00)	16,486	(0.73)	1,448	(0.83)	2,046	(0.41)	870	(0.74)	205	(0.99)	17,742	(0.67)	146	(0.77)
1985.4	7,415	(1.00)	36,044	(0.70)	107	(0.70)	436	(0.44)	78	(0.94)	483	(0.64)	42,506	(0.61)	88	(0.76)
1986.1	56	(1.00)	13,438	(0.49)	1,445	(0.48)	2,853	(0.53)	496	(0.46)	2,053	(0.42)	17,950	(0.38)	30	(1.00)
1986.2	290	(0.74)	8,053	(0.23)	486	(0.37)	1,179	(0.23)	825	(0.31)	1,365	(0.35)	10,364	(0.19)	210	(0.51)
1989.1	62	(0.88)	12,681	(0.55)	92	(0.62)	931	(0.32)	497	(0.59)	1,578	(0.96)	13,264	(0.52)	97	(0.72)
1989.2	250	(1.00)	11,535	(0.40)	509	(0.36)	549	(0.23)	729	(0.47)	1,924	(0.27)	13,966	(0.34)	220	(0.59)
1989.3	1,029	(0.98)	39,959	(0.36)	256	(0.53)	1,715	(0.55)	15,984	(0.67)	5,043	(0.44)	46,704	(0.36)	208	(0.36)
1991.1	0		21,484	(0.35)	381	(0.87)	935	(0.23)	705	(0.36)	1,841	(0.49)	43,605	(0.41)	96	(0.70)
1991.2	312	(0.69)	14,727	(0.43)	2,554	(0.92)	4,225	(0.36)	107	(0.50)	55	(0.46)	14,928	(0.42)	318	(0.45)
1992	1,304	(0.63)	15,520	(0.39)	79	(0.69)	3,114	(0.21)	298	(0.57)	8	(1.00)	17,942	(0.36)	158	(0.53)
1994	51	(0.73)	14,309	(0.49)	478	(0.85)	3,643	(0.28)	52	(0.67)	184	(1.00)	21,225	(0.37)	337	(0.53)
1995.1	127	(0.71)	305	(0.49)	951	(0.53)	451	(0.24)	679	(0.37)	1,369	(0.40)	7,078	(0.36)	181	(0.44)
1996	0		32,155	(0.30)	347	(0.33)	2,203	(0.19)	256	(0.39)	782	(0.83)	33,700	(0.28)	137	(0.69)
1997.1	25	(0.91)	37,094	(0.30)	474	(0.47)	6,218	(0.28)	758	(0.40)	6,391	(0.58)	130,055	(0.52)	288	(0.68)
1999	6	(0.71)	4,106	(0.28)	326	(0.50)	1,202	(0.21)	1,297	(0.32)	6,392	(0.32)	16,570	(0.30)	36	(0.85)
2000	12	(1.00)	6,583	(0.34)	150	(0.53)	609	(0.39)	3,302	(0.87)	619	(0.79)	22,483	(0.46)	69	(0.61)
2001	6	(1.00)	5,502	(0.53)	212	(0.43)	866	(0.54)	391	(0.40)	517	(0.37)	9,560	(0.40)	37	(0.53)
2002	0		9,765	(0.32)	52	(0.30)	956	(0.31)	178	(0.33)	1,442	(0.29)	13,125	(0.25)	75	(0.33)
2003	0		9,766	(0.32)	497	(0.42)	481	(0.34)	243	(0.29)	2,816	(0.31)	28,286	(0.58)	81	(0.84)
2004	0	(1.00)	9,146	(0.30)	196	(0.58)	1,059	(0.15)	492	(0.24)	1,567	(0.38)	12,764	(0.24)	22	(0.60)
2005	0		3,792	(0.29)	146	(0.34)	1,674	(0.19)	734	(0.18)	599	(0.40)	10,292	(0.33)	116	(0.68)
2006	0		5,078	(0.25)	320	(0.56)	1,024	(0.20)	556	(0.43)	2,388	(0.46)	11,445	(0.21)	50	(0.46)
2007	37	(0.99)	2,983	(0.23)	243	(0.43)	703	(0.15)	432	(0.28)	1,797	(0.33)	9,442	(0.24)	195	(0.49)
2008	0	NA	1,938	(0.30)	331	(0.64)	1,204	(0.22)	464	(0.25)	1,754	(0.45)	17,154	(0.39)	151	(0.42)
2009	0	NA	4,412	(0.22)	108	(0.52)	1,010	(0.16)	381	(0.43)	2,961	(0.65)	9,792	(0.37)	100	(0.46)
2010	26	(1.00)	2,073	(0.36)	638	(0.75)	906	(0.19)	316	(0.26)	1,818	(0.86)	5,966	(0.24)	85	(0.65)
2011	0	NA	4,108	(0.55)	106	(0.35)	970	(0.15)	510	(0.33)	3,639	(0.41)	10,792	(0.38)	76	(0.50)
2012	0	NA	7,164	(0.29)	71	(0.64)	2,484	(0.24)	97	(0.36)	39,588	(0.84)	13,824	(0.24)	52	(0.63)
2013	55	(0.69)	2,050	(0.37)	104	(0.39)	465	(0.16)	345	(0.27)	1,452	(0.85)	14,075	(0.41)	6	(1.00)
2014	402	(0.98)	24,612	(0.31)	332	(0.42)	1,542	(0.18)	87	(0.55)	1,955	(0.36)	31,239	(0.25)	302	(0.32)
2015	187	(1.00)	13,700	(0.32)	64	(0.42)	896	(0.27)	105	(0.47)	4,727	(0.86)	23,049	(0.29)	49	(0.77)
2016	175	(0.69)	4,420	(0.27)	280	(0.39)	503	(0.22)	19	(1.00)	224	(0.49)	19,885	(0.28)	19	(0.56)

Table 4.1 Biomass estimates (tonnes) of important species on the shelf (20-200m) in the northern region. CV values are indicated in brackets CONTINUED

Survey	Hairtails		Barracudas		Snappers		Groupers		Grunts		Croakers		Seabreams		P.longirostris	
1985.1	15,711	(0.53)	254	(0.54)	0		479	(0.66)	248	(0.52)	1,519	(0.61)	14,690	(0.34)	117	(0.84)
1985.2	1,200	(0.85)	75	(0.42)	63	(0.72)	1,771	(0.48)	381	(0.67)	1,302	(0.59)	12,881	(0.20)	0	
1985.3	2,709	(0.41)	26	(1.00)	62	(1.00)	1,978	(0.46)	3,629	(0.48)	8,695	(0.52)	20,897	(0.40)	0	
1985.4	3,608	(0.42)	780	(0.89)	0		3,054	(0.37)	14,806	(0.58)	3,692	(0.48)	31,078	(0.24)	10	(1.00)
1986.1	8,078	(0.67)	2,080	(0.34)	434	(1.00)	676	(0.41)	1,231	(0.50)	2,307	(0.50)	17,193	(0.22)	521	(0.66)
1986.2	8,640	(0.50)	756	(0.26)	0		1,515	(0.31)	1,694	(0.31)	5,049	(0.20)	25,098	(0.17)	0	
1989.1	2,277	(0.41)	345	(0.44)	0		989	(0.71)	135	(0.59)	4,469	(0.52)	12,958	(0.22)	60	(0.79)
1989.2	3,712	(0.28)	2,973	(0.46)	33	(1.00)	841	(0.38)	1,102	(0.38)	3,231	(0.18)	7,283	(0.20)	22	(0.55)
1989.3	21,132	(0.67)	364	(0.62)	316	(1.00)	315	(0.44)	1,788	(0.51)	4,214	(0.39)	15,344	(0.35)	31	(0.91)
1991.1	11,448	(0.53)	2,739	(0.72)	0		642	(0.56)	822	(0.51)	3,797	(0.43)	4,769	(0.14)	0	
1991.2	4,949	(0.31)	79	(0.65)	0		1,022	(0.40)	860	(0.62)	6,450	(0.55)	15,741	(0.23)	129	(0.57)
1992	4,588	(0.28)	14	(0.76)	0		1,844	(0.48)	932	(0.46)	2,778	(0.31)	14,551	(0.13)	49	(1.00)
1994	4,423	(0.26)	325	(0.53)	0		2,474	(0.45)	612	(0.50)	4,095	(0.48)	19,599	(0.25)	478	(0.85)
1995.1	7,208	(0.35)	2,109	(0.56)	481	(0.77)	807	(0.42)	2,921	(0.64)	2,882	(0.38)	8,341	(0.17)	477	(0.69)
1996	3,939	(0.23)	89	(0.69)	0		2,002	(0.50)	5,161	(0.46)	9,292	(0.25)	19,985	(0.35)	10	(0.97)
1997.1	6,323	(0.24)	57	(0.87)	73	(1.00)	549	(0.42)	4,836	(0.54)	12,451	(0.30)	9,009	(0.16)	124	(0.83)
1999	14,001	(0.24)	2,712	(0.36)	5	(1.00)	1,011	(0.36)	5,600	(0.42)	8,528	(0.55)	13,304	(0.15)	113	(0.48)
2000	4,216	(0.46)	1,231	(0.70)	196	(1.00)	620	(0.28)	388	(0.58)	2,450	(0.40)	13,424	(0.21)	18	(0.55)
2001	17,036	(0.57)	856	(0.44)	723	(0.98)	793	(0.58)	2,271	(0.54)	1,458	(0.42)	8,927	(0.24)	101	(0.52)
2002	19,374	(0.37)	1,651	(0.41)	63	(1.00)	509	(0.53)	241	(0.29)	2,835	(0.31)	9,187	(0.21)	21	(0.61)
2003	6,716	(0.31)	2,344	(0.68)	142	(1.00)	334	(0.38)	1,375	(0.34)	8,078	(0.36)	11,346	(0.20)	62	(0.86)
2004	4,668	(0.28)	1,455	(0.59)	37	(0.96)	502	(0.38)	3,316	(0.47)	5,545	(0.38)	11,924	(0.17)	6	(0.77)
2005	5,632	(0.32)	705	(0.69)	278	(0.65)	568	(0.23)	5,754	(0.58)	7,949	(0.32)	18,282	(0.15)	5	(0.53)
2006	11,299	(0.22)	1,570	(0.31)	16	(0.93)	372	(0.38)	2,839	(0.42)	4,087	(0.33)	10,872	(0.15)	176	(0.86)
2007	9,102	(0.33)	1,587	(0.59)	83	(0.69)	460	(0.28)	7,966	(0.72)	3,901	(0.33)	12,758	(0.15)	135	(0.73)
2008	10,986	(0.32)	428	(0.27)	79	(1.00)	614	(0.31)	1,485	(0.38)	8,771	(0.35)	12,833	(0.17)	40	(0.54)
2009	7,272	(0.39)	1,591	(0.45)	168	(0.68)	586	(0.33)	3,209	(0.51)	3,936	(0.32)	9,974	(0.20)	84	(0.65)
2010	2,984	(0.27)	852	(0.48)	0	NA	358	(0.38)	3,197	(0.49)	5,518	(0.38)	13,161	(0.14)	596	(0.79)
2011	4,827	(0.28)	2,919	(0.42)	78	(1.00)	261	(0.51)	6,039	(0.32)	7,243	(0.37)	9,832	(0.12)	11	(0.57)
2012	1,805	(0.43)	954	(0.56)	8	(1.00)	258	(0.35)	5,022	(0.50)	4,703	(0.36)	11,479	(0.16)	42	(0.95)
2013	2,087	(0.25)	2,647	(0.54)	0	NA	134	(0.55)	934	(0.34)	12,598	(0.73)	11,663	(0.16)	36	(0.74)
2014	3,179	(0.63)	743	(0.37)	222	(1.00)	437	(0.38)	1,804	(0.36)	2,635	(0.36)	19,302	(0.16)	196	(0.66)
2015	2,194	(0.32)	1,168	(0.40)	0	NA	350	(0.41)	2,979	(0.41)	1,576	(0.25)	10,249	(0.17)	36	(0.69)
2016	3,529	(0.61)	1,348	(0.28)	0	NA	226	(0.41)	1,223	(0.35)	1,034	(0.29)	9,064	(0.21)	148	(0.63)

Survey	Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis		B.auritus	
1985.1	10,273	(0.77)	13		200	(1.00)	2,196	(0.33)	1,132	(0.74)	40,729	(0.70)
1985.2	0		0		0		2,495	(0.34)	521	(0.89)	6,842	(0.73)
1985.3	0		154	(0.59)	0		2,949	(0.42)	602	(0.68)	9,182	(0.66)
1985.4	84	(0.81)	215	(0.78)	125	(1.00)	6,371	(0.59)	2,650	(0.50)	64,007	(0.62)
1986.1	1,847	(0.76)	808	(0.43)	2,058	(0.34)	3,814	(0.33)	279	(0.45)	95,679	(0.19)
1986.2	0		734	(0.33)	1,483	(0.29)	11,220	(0.21)	1,350	(0.29)	15,408	(0.25)
1989.1	506	(0.52)	288	(0.56)	0		1,612	(0.21)	542	(0.48)	5,450	(0.58)
1989.2	161	(0.32)	272	(0.44)	222	(0.53)	2,299	(0.35)	172	(0.33)	14,252	(0.28)
1989.3	1,661	(0.56)	45	(0.60)	100	(0.58)	2,614	(0.28)	1,194	(0.83)	51,225	(0.36)
1991.1	368	(0.32)	282	(0.46)	158	(0.64)	1,317	(0.23)	496	(0.44)	28,701	(0.43)
1991.2	2,718	(0.53)	229	(0.44)	690	(0.55)	3,198	(0.25)	4,375	(0.80)	1,661	(0.89)
1992	1,071	(0.24)	901	(0.37)	1,532	(0.66)	5,112	(0.16)	680	(0.37)	7,599	(0.70)
1994	441	(0.21)	1,910	(0.24)	1,740	(0.47)	3,451	(0.23)	2,740	(0.68)	7,572	(0.58)
1995.1	72	(0.35)	268	(0.28)	197	(0.68)	2,143	(0.23)	342	(0.70)	12,801	(0.45)
1996	589	(0.17)	929	(0.31)	2,169	(0.48)	4,303	(0.24)	2,073	(0.59)	26,804	(0.62)
1997.1	1,017	(0.43)	5,148	(0.33)	324	(0.47)	2,837	(0.25)	1,161	(0.48)	39,107	(0.27)
1999	391	(0.27)	411	(0.25)	146	(0.46)	2,881	(0.12)	3,582	(0.88)	37,727	(0.24)
2000	214	(0.50)	344	(0.61)	65	(0.52)	4,053	(0.47)	1,271	(0.66)	23,205	(0.42)
2001	176	(0.31)	679	(0.69)	417	(0.52)	1,228	(0.24)	188	(0.83)	13,842	(0.36)
2002	660	(0.44)	97	(0.28)	102	(0.72)	2,089	(0.32)	835	(0.50)	15,791	(0.39)
2003	115	(0.49)	255	(0.64)	16	(0.49)	3,491	(0.17)	3,239	(0.77)	66,410	(0.54)
2004	344	(0.25)	494	(0.24)	79	(0.68)	5,214	(0.24)	1,236	(0.32)	24,512	(0.52)
2005	146	(0.20)	1,307	(0.22)	136	(0.51)	6,727	(0.11)	3,640	(0.46)	52,045	(0.53)
2006	183	(0.45)	418	(0.25)	7	(0.81)	4,630	(0.12)	2,151	(0.56)	61,138	(0.40)
2007	42	(0.35)	429	(0.19)	11	(0.83)	5,980	(0.15)	622	(0.44)	12,523	(0.35)
2008	226	(0.30)	610	(0.33)	0	NA	4,809	(0.17)	3,171	(0.39)	52,481	(0.50)
2009	163	(0.25)	435	(0.21)	8	(0.79)	4,418	(0.17)	985	(0.35)	23,822	(0.72)
2010	137	(0.25)	538	(0.30)	20	(0.67)	7,293	(0.15)	3,389	(0.52)	16,682	(0.45)
2011	44	(0.18)	746	(0.18)	1	(1.00)	5,888	(0.13)	1,975	(0.54)	25,797	(0.52)
2012	212	(0.42)	2,000	(0.30)	46	(1.00)	5,571	(0.19)	1,474	(0.54)	32,819	(0.42)
2013	149	(0.18)	129	(0.36)	5	(0.58)	7,008	(0.22)	11,640	(0.79)	27,898	(0.40)
2014	489	(0.32)	737	(0.24)	0	NA	8,045	(0.19)	1,400	(0.42)	44,915	(0.29)
2015	503	(0.49)	149	(0.28)	2	(1.00)	3,299	(0.16)	853	(0.37)	14,086	(0.47)
2016	88	(0.38)	258	(0.27)	0	NA	2,888	(0.17)	387	(0.31)	12,900	(0.39)

Distribution

Dentex angolensis was distributed along the whole northern shelf (Figure 4.1). Lower densities (0-1 tonnes/NM^2) were observed in most of the area of distribution, with a narrow belt of higher densities (2-5 tonnes/NM^2) on the outer shelf between Cabeça da Cobra to N'Zeto and south of Ambriz.

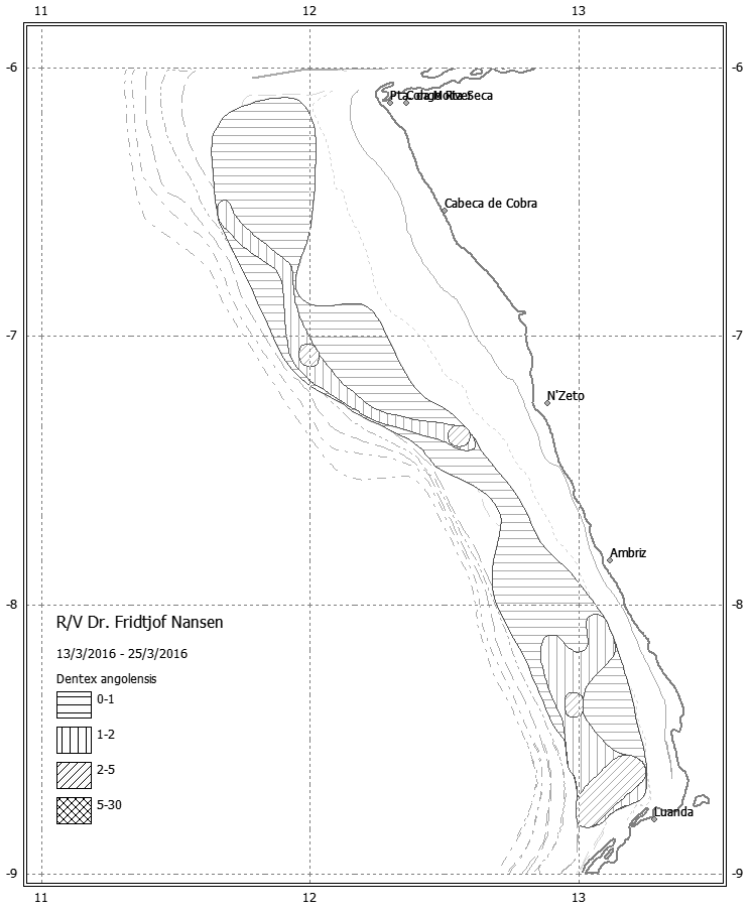


Figure 4.1 Distribution of *Dentex angolensis* (tonnes/nm2)in the northern region, Ponta das Palmerinhas - Congo River. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

Ponta das Palmeirinhas / Luanda - Benguela shelf

The central region covers the area from Ponta das Palmeirinhas (Luanda) to Benguela. A total of 41 successful swept-area trawl stations were completed in this region (Table 2.1).

The average catch rates were 772 kg/h (1 023 kg/h in 2015) on the inner shelf and 764,9 kg/h (1 169 kg/h in 2015) on the outer shelf (ANNEX VI). On the inner shelf, the demersal group contributed with 52% to the mean total catch rate, while shrimps and sharks contributed with less than 1%. The pelagic group contributed with 29 % to the overall catch.

Seabreams were caught on most stations (except four) on the inner shelf and contributed 9,7 % (75 kg /h) to the total catch rate (52 kg/h in 2015). The most common Seabreams on the inner shelf were *Pagellus bellottii* and *Dentex barnardi.*

Croakers were caught with an average catch rate of 28 kg/h on the inner shelf. The grunts (*Pomadasys* spp.) were caught with a average catch rate of 83,6 kg/h (162 kg/h in 2015). Groupers had an average catch rate of 2,4 kg/h. Snappers were not found on the inner shelf.

On the outer shelf, the demersal group had a mean catch rate of 152 kh7h or 20% of the total catch (207 kg/h in 2015). Similar to the inner shelf, shrimps had low catch rates (< 1%) and sharks was not caught at all.

Seabreams were caught on all stations and were dominant among the commercial demersal fishes with an average catch rate of 54,9 kh/h (74 kg/h in 2015 and a third of previous years catch rarte). *Dentex angolensis* was the most abundant seabream, followed by *D. macrophthalmus*. Grunts were caught at only five stations on the outer shelf. Croakers had a mean catch rate of 12 kg/h, while groupers were not caught at all. This is a continuous decrease in trend since 2014.

Biomass estimates

Table 4.2 shows the time series (1985 to 2016) of swept-area biomass estimates for commercial species and groups of species on the central shelf off Angola. The biomass estimates were calculatd as previously described for the shelf off northern Angola.

Meluccius polli was the only hake species caught on the central shelf. The biomass estimate of 216 tonnes is slightly lower than in 2015 (240 t), which was the highest since 2004. The bi-modal length distribution consisted of a seemingly strong year class with a 19 cm mode and a weaker year class with a 34 cm mode (Annex II).

The combined biomass estimate of seabreams for the central shelf in 2016 was 8 700 tonnes, which is similar to the 2015 estimate, but about half the 2014 estimate (16 500 t). *D. macrophthalmus* and *D. angolensis* had a similar contribution(13 and 15% respectively) to the total biomass. The average length of *D. macrophthalmus* was 18,9 cm (21,3 cm in 2015). *D. angolensis* had an average length of 18,6 cm, similar to 2015, and *Pagellus bellotti* of 20,9 cm (19,8 cm in 2015).

The biomass estimated for the croakers does not include all the commercial species of this group. Due to the size of the vessel, a part of the distribution area (< 20 m), which includes most species of this group, is not covered.

The biomass estimate of croakers decreased from 4 300 tonnes in 2014 to 2 350 tonnes this year, which is about 1 800 tonnes below the ten year average. *Umbrina canariensis* was the most abundant croaker, and contributed 38 % to the total croakers biomass, which is less than in 2014-2015. The average length of this species was 28,76cm, which is higher than in 2015..

The 2016 biomass estimate of grunts (*Pomadasys incisus, P. jubelini, P. rogeri* and *P. peroteti*) is 6 080 tonnes, which is lower thanthe 2015 estimate (9 700t), but similar to the 2013-2014 estimates. The biomass estimate of big eye grunt (*Brachydeuterus auritus*) is 13 860 tonnes. The average length of *P. incisus* was 20,3 cm, similar to last year's mean length (19,7 cm).)

The estimate for Groupers (149 t) is higher than in 2015 (74 t), which was the lowest in the time series. The estimate time series shows a decreasing trend since 2011.

The 2016 biomass estimate for *Parapenaeus longirostris* (deep rose shrimp) is 141 tonnes, the highest since 2011 and ten times higher than the 2015 estimate. *P. longirostris* is mainly distributed on the upper slope, and on the shelf, the biomass estimates can fluctuated and show a decreasing trend in the time serie, with a significant reduction of 97% in the last 8 years fluctuate.

Table 4.2 Biomass estimates (tonnes) of important species on the shelf (20-200 m) in the central region. CV values are indicated in brackets.

Survey	M.polli		T.treace		Shrimps		Cephalopod		Sharks		Clupeids		Carangids		Scombrids	
1985.4	124	(0.58)	74,892	(0.59)	58	(1.00)	5,372	(0.46)	0	-	423	(0.72)	75,408	(0.58)	0	-
1986.1	276	(0.60)	17,875	(0.39)	1,632	(0.55)	1,439	(0.28)	228	(0.87)	717	(0.37)	20,440	(0.33)	34	(0.66)
1986.2	207	(0.58)	22,596	(0.48)	371	(0.67)	1,423	(0.47)	0	-	328	(0.47)	24,625	(0.43)	16	(1.00)
1989.1	121	(0.96)	6,999	(0.25)	237	(0.62)	1,864	(0.35)	148	(0.56)	560	(0.79)	12,736	(0.26)	155	(0.40)
1989.2	1,013	(0.47)	21,473	(0.31)	677	(0.44)	2,206	(0.20)	105	(0.62)	359	(0.48)	26,453	(0.28)	95	(0.30)
1989.3	480	(0.65)	9,579	(0.48)	453	(0.88)	2,015	(0.47)	285	(0.78)	1,707	(0.49)	12,816	(0.46)	310	(0.75)
1991.1	0	(1.00)	86,136	(0.46)	39	(0.58)	850	(0.18)	746	(0.62)	508	(0.48)	87,396	(0.45)	277	(0.50)
1991.2	618	(0.71)	47,927	(0.53)	125	(0.62)	2,021	(0.29)	115	(1.00)	36	(1.00)	48,814	(0.52)	126	(0.81)
1992	1,641	(0.37)	32,878	(0.26)	106	(0.67)	2,597	(0.18)	483	(0.66)	70	(0.60)	35,314	(0.25)	64	(0.53)
1994	2,393	(0.80)	61,886	(0.32)	292	(0.48)	2,696	(0.23)	269	(0.50)	22	(0.58)	63,569	(0.31)	580	(0.48)
1995.1	167	(0.46)	4,875	(0.59)	323	(0.48)	807	(0.25)	121	(0.49)	245	(0.31)	12,635	(0.29)	213	(0.56)
1996	713	(0.65)	51,220	(0.42)	116	(0.51)	2,402	(0.24)	496	(0.57)	589	(0.45)	55,750	(0.39)	53	(0.91)
1997.1	4,557	(0.71)	27,729	(0.46)	1,088	(0.56)	3,268	(0.24)	208	(0.60)	3,442	(0.97)	38,605	(0.36)	46	(1.00)
1997	7,635	-	68,984	-	1,391	-	2,531	-	149	-	125	-	70,873	-	279	-
1998	375	(0.86)	4,630	(0.55)	365	(0.45)	2,587	(0.21)	310	(0.50)	2,860	(0.80)	7,606	(0.39)	52	(0.80)
1999	15	(1.00)	12,977	(0.32)	15	(0.41)	890	(0.22)	107	(0.61)	1,961	(0.53)	20,379	(0.26)	34	(0.78)
2000	240	(0.91)	19,114	(0.29)	314	(0.54)	1,744	(0.17)	560	(0.51)	1,594	(0.46)	25,052	(0.24)	275	(0.71)
2001	123	(0.68)	16,510	(0.29)	212	(0.76)	1,374	(0.63)	343	(0.46)	80	(0.53)	20,942	(0.25)	97	(0.47)
2002	1,189	(0.49)	78,646	(0.25)	531	(0.43)	2,930	(0.34)	120	(0.48)	1,625	(0.33)	85,797	(0.23)	745	(0.89)
2003	1,774	(0.51)	25,494	(0.33)	515	(0.42)	1,327	(0.27)	266	(0.43)	1,439	(0.33)	29,369	(0.28)	55	(0.51)
2004	174	(0.90)	12,263	(0.36)	974	(0.66)	1,026	(0.20)	586	(0.44)	2,193	(0.41)	15,324	(0.29)	41	(0.56)
2005	44	(0.84)	7,137	(0.32)	84	(0.41)	1,427	(0.10)	201	(0.40)	1,535	(0.51)	9,357	(0.27)	216	(0.80)
2006	44	(0.63)	9,622	(0.22)	188	(0.60)	1,674	(0.15)	475	(0.44)	2,275	(0.44)	13,434	(0.20)	134	(0.41)
2007	55	(0.50)	7,649	(0.30)	54	(0.34)	1,822	(0.18)	802	(0.74)	2,078	(0.35)	13,485	(0.35)	18	(0.62)
2008	22	(0.72)	3,703	(0.32)	257	(0.56)	1,295	(0.13)	132	(0.42)	945	(0.56)	5,636	(0.23)	17	(0.71)
2009	4	(0.89)	10,073	(0.28)	195	(0.68)	1,678	(0.23)	94	(0.50)	8,854	(0.64)	14,765	(0.24)	21	(0.81)
2010	22	(1.00)	2,354	(0.35)	204	(0.50)	1,628	(0.17)	157	(0.42)	1,420	(0.74)	13,526	(0.69)	79	(0.44)
2011	0	-	10,895	(0.76)	42	(0.45)	1,956	(0.21)	74	(1.00)	268	(0.56)	13,231	(0.63)	48	(0.80)
2012	13	(0.57)	17,295	(0.28)	434	(0.64)	2,983	(0.13)	21	(0.71)	35,480	(0.39)	21,586	(0.25)	3,086	(0.90)
2013	1	(0.82)	2,550	(0.48)	185	(0.46)	1,235	(0.12)	104	(0.72)	1,265	(0.31)	10,759	(0.36)	161	(0.48)
2014	113	(0.54)	7,446	(0.35)	113	(0.61)	2,677	(0.20)	86	(0.81)	9,366	(0.64)	9,896	(0.28)	4,732	(0.67)
2015	242	(0.80)	15,757	(0.25)	28	(0.54)	1,170	(0.26)	36	(1.00)	21,774	(0.36)	21,067	(0.19)	121	(0.51)
2016	216	(0.85)	5,079	(0.35)	178	(0.37)	950	(0.19)	19	(0.72)	1,706	(0.36)	9,314	(0.21)	69	(0.75)

Table 4.2 Continued Biomass estimates (tonnes) of important species on the shelf (20-200 m) in the central region. CV values are indicated in brackets.

Survey	Hairtails		Barracudas		Snappers		Groupers		Grunts		Croakers		Seabreams		P.longirostris	
1985.4	2,568	(0.67)	253	(0.66)	0	-	1,253	(0.59)	5,706	(0.70)	10,235	(0.74)	18,407	(0.44)	58	(1.00)
1986.1	15,125	(0.40)	1,019	(0.34)	36	(1.00)	411	(0.50)	2,237	(0.41)	4,649	(0.31)	9,161	(0.28)	1,483	(0.60)
1986.2	1,089	(0.39)	1,117	(0.44)	0	-	518	(0.67)	5,301	(0.41)	4,510	(0.45)	13,819	(0.28)	0	-
1989.1	9,992	(0.33)	1,936	(0.68)	0	-	580	(0.46)	3,681	(0.52)	1,395	(0.40)	11,443	(0.30)	235	(0.62)
1989.2	2,128	(0.48)	701	(0.31)	20	(1.00)	3,093	(0.92)	1,126	(0.54)	2,972	(0.44)	12,167	(0.22)	667	(0.45)
1989.3	8,488	(0.74)	704	(0.38)	0	-	660	(0.96)	82	(0.60)	595	(0.71)	4,531	(0.33)	445	(0.89)
1991.1	7,664	(0.44)	583	(0.37)	106	(1.00)	176	(0.60)	425	(0.27)	2,048	(0.50)	9,068	(0.19)	10	(0.74)
1991.2	3,174	(0.27)	82	(0.46)	0	-	1,021	(0.57)	1,882	(0.52)	20,081	(0.83)	25,675	(0.21)	117	(0.66)
1992	11,105	(0.36)	89	(0.66)	0	-	1,140	(0.53)	765	(0.58)	1,546	(0.42)	25,033	(0.26)	106	(0.67)
1994	24,185	(0.90)	4	(1.00)	262	(1.00)	417	(0.37)	68	(0.49)	10,292	(0.59)	29,548	(0.22)	168	(0.42)
1995.1	3,885	(0.26)	2,113	(0.34)	113	(1.00)	376	(0.41)	3,105	(0.70)	15,510	(0.64)	14,161	(0.28)	258	(0.56)
1996	3,443	(0.23)	946	(0.44)	109	(1.00)	690	(0.47)	3,095	(0.33)	5,866	(0.27)	18,323	(0.16)	25	(0.80)
1997.1	21,454	(0.36)	496	(0.92)	0	-	233	(0.66)	1,592	(0.79)	9,033	(0.33)	21,952	(0.35)	1,087	(0.56)
1997.2	13,839	-	0	-	0	-	1,023	-	293	-	7,099	-	31,763	-	1,265	-
1998	29,020	(0.78)	454	(0.42)	0	-	198	(0.63)	9,117	(0.48)	8,609	(0.53)	63,225	(0.72)	186	(0.51)
1999	8,210	(0.41)	1,605	(0.31)	526	(0.95)	631	(0.46)	3,289	(0.54)	9,891	(0.53)	17,435	(0.23)	9	(0.54)
2000	11,002	(0.26)	3,321	(0.34)	98	(0.76)	882	(0.45)	6,824	(0.31)	5,391	(0.24)	19,310	(0.18)	290	(0.58)
2001	5,595	(0.33)	957	(0.25)	3	(1.00)	64	(0.66)	1,329	(0.33)	1,744	(0.41)	12,617	(0.32)	198	(0.81)
2002	8,190	(0.27)	667	(0.36)	0	(1.00)	233	(0.63)	2,982	(0.31)	6,334	(0.26)	22,198	(0.36)	402	(0.52)
2003	12,067	(0.32)	480	(0.32)	44	(1.00)	702	(0.45)	8,649	(0.70)	5,369	(0.21)	5,595	(0.19)	449	(0.47)
2004	12,405	(0.53)	401	(0.43)	42	(1.00)	175	(0.51)	3,494	(0.57)	6,602	(0.67)	9,583	(0.33)	969	(0.66)
2005	31,672	(0.52)	258	(0.39)	6	(1.00)	608	(0.50)	5,980	(0.48)	5,530	(0.33)	7,752	(0.19)	50	(0.52)
2006	6,453	(0.29)	991	(0.57)	35	(1.00)	446	(0.49)	4,082	(0.50)	4,850	(0.35)	11,187	(0.19)	178	(0.63)
2007	22,472	(0.57)	749	(0.24)	31	(0.88)	491	(0.51)	9,275	(0.53)	8,081	(0.66)	8,013	(0.22)	36	(0.47)
2008	5,098	(0.38)	1,224	(0.65)	11	(1.00)	151	(0.41)	5,926	(0.57)	3,668	(0.40)	5,763	(0.19)	233	(0.61)
2009	20,812	(0.51)	152	(0.55)	124	(1.00)	192	(0.33)	4,983	(0.32)	2,104	(0.32)	7,443	(0.18)	195	(0.68)
2010	7,315	(0.24)	350	(0.44)	69	(0.43)	284	(0.47)	7,676	(0.35)	2,661	(0.32)	8,732	(0.15)	183	(0.55)
2011	4,875	(0.74)	313	(0.41)	190	(1.00)	444	(0.33)	8,638	(0.66)	6,496	(0.50)	9,550	(0.22)	24	(0.47)
2012	8,349	(0.54)	132	(0.54)	0	-	992	(0.83)	15,517	(0.70)	3,315	(0.31)	7,297	(0.15)	386	(0.72)
2013	3,707	(0.33)	1,144	(0.59)	0	-	373	(0.63)	6,362	(0.27)	3,012	(0.32)	8,380	(0.27)	103	(0.68)
2014	3,079	(0.31)	167	(0.38)	0	-	655	(0.41)	5,426	(0.35)	4,332	(0.27)	16,519	(0.31)	75	(0.87)
2015	6,828	(0.41)	472	(0.72)	0	-	74	(0.52)	9,686	(0.36)	2,770	(0.26)	7,259	(0.19)	11	(0.73)
2016	3,064	(0.32)	1,152	(0.26)	0	-	149	(0.55)	6,080	(0.45)	2,352	(0.27)	8,691	(0.22)	141	(0.44)

Survey	Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis		B.auritus	
1985.4	0	-	0		6,123	(0.82)	2,697	(0.19)	6,271	(0.94)	5,065	(0.58)
1986.1	601	(1.00)	525	(0.37)	220	(0.77)	1,314	(0.69)	2,327	(0.53)	38,045	(0.30)
1986.2	0	-	1,252	(0.53)	1,268	(0.86)	4,010	(0.24)	2,018	(0.68)	21,342	(0.34)
1989.1	1,236	(0.51)	65	(0.57)	6,498	(0.40)	956	(0.28)	885	(0.52)	15,038	(0.46)
1989.2	750	(0.30)	1,242	(0.23)	1,115	(0.56)	3,628	(0.29)	1,130	(0.51)	50,016	(0.49)
1989.3	1,476	(0.58)	124	(0.64)	1,530	(0.89)	1,667	(0.33)	0	-	37,091	(0.29)
1991.1	344	(0.37)	237	(0.27)	2,210	(0.52)	1,212	(0.24)	1,160	(0.86)	19,833	(0.35)
1991.2	693	(0.42)	561	(0.52)	17,098	(0.32)	956	(0.24)	18,422	(0.91)	1,862	(0.44)
1992	2,163	(0.21)	159	(0.60)	18,182	(0.35)	1,514	(0.19)	1,023	(0.59)	27,200	(0.67)
1994	1,041	(0.34)	1,192	(0.37)	20,365	(0.31)	2,383	(0.27)	3,280	(0.76)	2,633	(0.68)
1995.1	2	(1.00)	590	(0.28)	7,719	(0.48)	1,877	(0.47)	11,538	(0.71)	27,645	(0.35)
1996	210	(0.31)	1,392	(0.22)	11,195	(0.26)	1,546	(0.26)	1,077	(0.59)	18,842	(0.36)
1997.1	1,324	(0.28)	1,411	(0.45)	12,220	(0.62)	1,497	(0.23)	4,599	(0.37)	6,964	(0.46)
1997.2	418	-	1,251	-	24,404	-	1,260	-	4,995	-	1,953	-
1998	377	(0.38)	1,315	(0.35)	50,924	(0.89)	1,990	(0.23)	2,239	(0.48)	22,014	(0.49)
1999	201	(0.76)	307	(0.29)	5,178	(0.47)	1,163	(0.24)	7,999	(0.64)	93,522	(0.38)
2000	586	(0.36)	575	(0.29)	6,060	(0.45)	1,639	(0.35)	2,499	(0.31)	56,245	(0.53)
2001	186	(0.57)	220	(0.45)	5,680	(0.43)	1,670	(0.26)	1,076	(0.61)	41,122	(0.43)
2002	2,363	(0.41)	275	(0.37)	11,512	(0.69)	923	(0.28)	3,492	(0.33)	66,053	(0.40)
2003	489	(0.58)	370	(0.36)	557	(0.40)	1,046	(0.30)	1,001	(0.31)	38,312	(0.28)
2004	310	(0.53)	261	(0.30)	3,525	(0.75)	1,015	(0.25)	5,700	(0.75)	26,743	(0.24)
2005	233	(0.36)	768	(0.12)	879	(0.35)	991	(0.23)	2,279	(0.39)	36,621	(0.43)
2006	136	(0.31)	905	(0.27)	2,802	(0.25)	1,982	(0.23)	4,329	(0.39)	33,546	(0.51)
2007	43	(0.32)	1,195	(0.24)	1,532	(0.53)	1,312	(0.38)	5,224	(0.86)	40,402	(0.32)
2008	327	(0.28)	285	(0.27)	1,496	(0.52)	1,135	(0.20)	1,801	(0.57)	17,736	(0.23)
2009	110	(0.49)	1,018	(0.34)	699	(0.37)	1,756	(0.33)	1,419	(0.32)	22,188	(0.50)
2010	179	(0.39)	776	(0.21)	572	(0.47)	2,250	(0.24)	1,097	(0.47)	8,156	(0.41)
2011	28	(0.71)	1,280	(0.24)	497	(0.71)	2,805	(0.30)	4,003	(0.71)	10,841	(0.46)
2012	477	(0.52)	1,713	(0.20)	887	(0.73)	1,725	(0.25)	2,652	(0.37)	18,724	(0.32)
2013	130	(0.30)	655	(0.21)	2,918	(0.71)	1,990	(0.24)	1,031	(0.36)	17,728	(0.33)
2014	414	(0.51)	1,181	(0.24)	8,145	(0.62)	3,744	(0.37)	2,295	(0.38)	10,332	(0.40)
2015	258	(0.59)	400	(0.32)	962	(0.34)	2,591	(0.37)	1,233	(0.29)	17,796	(0.31)
2016	218	(0.44)	500	(0.28)	1,170	(0.56)	1,280	(0.29)	898	(0.50)	13,863	(0.50)

The biomass estimate of Sepiidae has compared to 2014 dropped (to 500 tonnes), which is similar to the 2015 estimate (400 t). However, the inadequate sampling gear used (bottom trawl) may indicate that the estimates do not accurately reflect the state of the group.

For Ommastrephidae, mainly dominated by *Allotethus africanus* on the inner shelf and *Illex coindetti* outer shelf, the biomass estimate is 220 tonnes in 2016. This is somewhat lower than in 2014, but higher than most estimates in the time series since 2006.

Trachurus trecae is the only horse mackerel species caught in the central region in 2016. The biomass estimate for 2016 is 5 080 tonnes, about a third of the 2015 estimate. The biomass on the central shelf has been below 30 000 tonnes since 2003, preceeded by a very high estimate of 78 00 tonnes in 2002.

Distribution

Figure 4.2 shows the distribution of *Dentex angolensis* and *Dentex macrophthalmus* in the central region of the Angolan coast *D. angolensis* was found along the entire central shelf, with the highest densities on the outer shelf in the central and northern parts of its distribution. *D. macrophthalmus* had apatchy distribution and was prevalent in lower densities in the southern area of the central region.

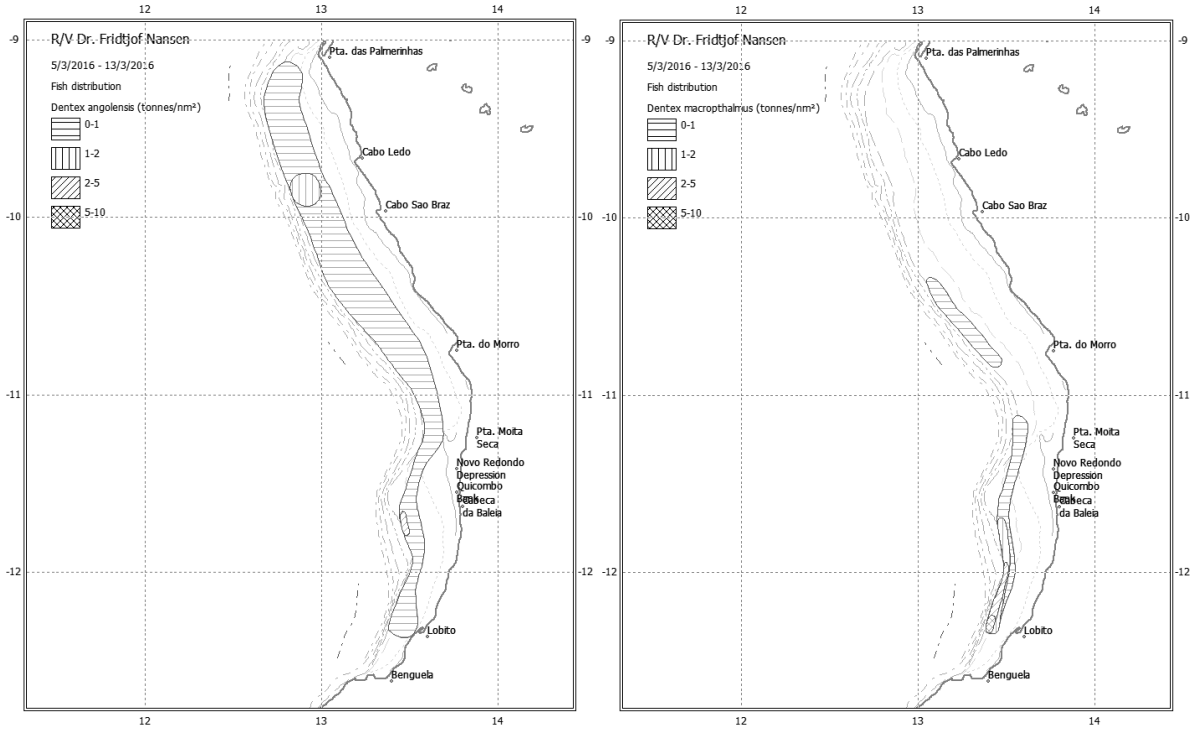


Figure 4.2 Distribution of *Dentex angolensis* (left) and *D. macrophthalmus* (right) in the central region, Ponta das Palmerinhas - Benguela. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600m.

Tombua - Cunene shelf

A total of 25 valid trawl stations were sampled on the southern shelf. The southern region has been regularly sampled throughout the years 2000 and 2003-2015 surveys. Other survey results from the time series should therefore be interpreted with caution, as the strategy and design of these surveys were not standardized.

The total average catch per hour on the inner shelf was 2 012 kg/h and 1671 kg/h on the outer shelf (ANNEX VI), which is less than 500 and 100 kg, respectively, compared to 2015. The "other" group dominated with 47 % of the mean catch rate on the inner shelf (958 kg/h) while the pelagic group dominated on the outher shelf with and 51 % of the mean catch rate (860 kg/h), which is at the same level as last year. The mean catch rates of the demersal group were 359 kg/h (18 %) on the inner shelf and 366 kg/h (21 %) on outer shelf, which is half the catch rate of 2015. Shrimps were caught in two stations on the inner shelf and only in a single tow on the outer shelf. On the inner shelf the mean catch rates of sharks were 115 kg/h, while on the outer shelf they were 46kg/h. The average catch rate of the "other" species group on the inner shelf was 957 kg/h (164 kg/h in 2015), contributing 47 % of the total catch, and 396.5 kg/h (95 kg/h in 2015), contributiong 23 % on the outer shelf.

Among the demersal group species found on both the inner and outer shelf, "other" dominated with 87 and 78% of the catches. Seabreams were only the second most abundant group, dominated by *D. macrophthalmus,* and *Pagellus bellottii*, but with a drastic reduction in catch rate compared to 2015. This group had an average catch rate of 139 kg/h (673 kg/h in 2015) on the inner shelf and 284 kg/h (506 kg/h in 2015) on the outer shelf. Cape hake (*Merluccius capensis*) was caught on one station on the inner shelf (0,8kg/h) and had an average catch rate of 93,8 kg/h on the outer shelf, while *Merluccius polli* was not caught on the outer shelf. The average catch rate of croakers (mainly *Argyrosomus sp.* and *Atractoscion aequidens*) was 120.8 kg/h (71 kg/h in 2015) on the inner shelf and 10.4 kg/h (26 kg/h in 2015) on the outer shelf. Grunts were found on one station on inner shelf with a mean catch rate of 2 kg/h, while no grunts were caught on the outer shelf. Neither Snappers, grunts nor Groupers were caught on the outher shelf.

The pelagic group was the most predominant group on the outher shelf. "Other", mainly *Synagrops microlepis,* dominated with a mean catch rate of 1 430 kg/h (71 %) of the total on the inner shelf and 811 kg/h (48,5 %) on outer shelf. Clupeoids had a mean catch rate of 126 kg/h on inner shelf, while it was not caught on the outer shelf. Scombrids catch rate was 5 kg/h, which is higher than in 2015, on the inner shelf. On the outer shelf the catch rate was 1,2 kg/h. Barracuda were only caught in one station on the inner shelf (3 kg/h). Hairtails were caught in low numbers on both the inner (1,8 kg/h) and outer shelf 2.7 kg/h).

Biomass estimates

The biomass estimates were calculated the same way as described for the cental region. The sampling intensity in the southern region has been variable throughout the years and only strata with at least two stations are included in Table 4.3.

The total biomass of hakes is estimated at 3 010 tonnes, with *Merluccius capensis* the only species caught. The estimate is much lower than the 2014 estimate (18 429 t) and below the 10 year average (7 485 tonnes). However the 10 year average is driven by two high estimates

Table 4.3 Biomass estimates (tonnes) of important species on the shelf (20-200 m) in the southern region. CV values are indicated in brackets.

Survey	Hake		T.treace		Horsemackerel		Cephalopod		Sharks		Clupeoids		Carangids		Scombrids		M. capensis	
1986.1	1099	(0.32)	14235	(0.35)	23059	(0.26)	1188	(0.55)	618	(0.38)	51	(1.00)	23059	(0.26)	43	(0.58)	303	(0.79)
1986.2	3709	(0.48)	69542	(0.29)	78132	(0.31)	1555	(0.27)	2593	(0.54)	0	NA	78165	(0.31)	173	(0.53)	2670	(0.66)
1989.1	349	(0.52)	2883	(0.61)	15681	(0.53)	776	(0.35)	188	(0.48)	0	NA	15681	(0.53)	60	(0.45)	110	(0.42)
1989.2	1121	(0.77)	979	(0.52)	13706	(0.44)	6114	(0.45)	12200	(0.81)	0	NA	13706	(0.44)	35	(0.62)	96	(0.44)
1989.3	6739	NA	11636	NA	39225	NA	2087	NA	551	NA	0	NA	39225	NA	155	NA	3861	NA
1991.1	2920	(0.76)	21429	(0.35)	50458	(0.30)	732	(0.25)	4005	(0.81)	6	(0.93)	50459	(0.30)	106	(0.80)	2716	(0.82)
1991.2	4385	(0.40)	25595	(0.33)	62961	(0.34)	2192	(0.93)	957	(0.31)	444	(0.95)	62961	(0.34)	0	NA	4378	(0.40)
1992	6756	(0.27)	8106	(0.50)	95433	(0.24)	744	(0.35)	2220	(0.38)	70	(0.91)	95436	(0.24)	0	NA	6684	(0.28)
1993	4023	(0.24)	52839	(0.52)	64235	(0.43)	2501	(0.44)	2278	(0.42)	8	(0.85)	64235	(0.43)	347	(0.61)	3773	(0.22)
2000	3559	(0.47)	185345	(0.62)	218410	(0.51)	1934	(0.17)	2051	(0.28)	43	(0.97)	218473	(0.51)	28	(0.48)	350	(0.48)
2002	3779	(0.48)	116985	(0.71)	237050	(0.35)	1937	(0.57)	69	(0.55)	1217	(1.00)	237058	(0.35)	711	(0.96)	3779	(0.48)
2003	7014	(0.38)	76533	(0.44)	113879	(0.42)	1630	(0.47)	1163	(0.69)	3601	(0.85)	114293	(0.42)	546	(1.00)	6744	(0.39)
2004	11860	(0.38)	72982	(0.31)	237659	(0.47)	2547	(0.42)	348	(0.43)	12998	(1.00)	237659	(0.47)	5	(1.00)	11850	(0.38)
2005	5067	(0.39)	114	(1.00)	129070	(0.31)	2309	(0.36)	1067	(0.22)	2410	(0.44)	129088	(0.31)	1	(1.00)	5067	(0.39)
2006	3713	(0.23)	126892	(0.27)	184129	(0.28)	1545	(0.37)	3630	(0.77)	308909	(0.58)	184129	(0.28)	2221	(0.98)	3263	(0.28)
2007	3006	(0.31)	100468	(0.32)	107896	(0.30)	1459	(0.28)	2016	(0.28)	1747	(0.44)	107918	(0.30)	95	(0.80)	1674	(0.45)
2008	1722	(0.62)	169349	(0.34)	215813	(0.29)	3235	(0.32)	278	(0.66)	43	(0.73)	215813	(0.29)	1124	(0.50)	607	(0.52)
2009	31018	(0.19)	322270	(0.45)	322460	(0.45)	1017	(0.29)	271	(0.35)	2148	(1.00)	322460	(0.45)	50	(1.00)	30921	(0.19)
2010	2495	(0.49)	76870	(0.41)	286228	(0.29)	1732	(0.40)	190	(0.59)	100656	(0.68)	286240	(0.29)	605	(0.61)	2495	(0.49)
2011	4827	(0.32)	32076	(0.31)	104890	(0.39)	1683	(0.29)	2054	(0.35)	65380	(0.53)	104890	(0.39)	485	(0.40)	4827	(0.32)
2012	3551	(0.52)	29627	(0.40)	30978	(0.38)	1532	(0.32)	2616	(0.41)	27011	(0.91)	35345	(0.45)	52	(0.82)	3551	(0.52)
2013	2297	(0.58)	64782	(0.37)	74092	(0.34)	3410	(0.38)	1931	(0.52)	5351	(0.49)	74092	(0.34)	290	(0.87)	2297	(0.58)
2014	18432	(0.30)	72569	(0.21)	73178	(0.21)	4741	(0.25)	3233	(0.28)	2168	(0.95)	73178	(0.21)	365	(0.78)	18429	(0.30)
2015	3786	(0.32)	72897	(0.41)	84776	(0.34)	2116	(0.30)	3186	(0.60)	128	(0.54)	84776	(0.34)	16	(0.75)	3764	(0.32)
2016	3012	(0.57)	36829	(0.28)	37035	(0.28)	2511	(0.25)	4254	(0.44)	3213	(0.66)	37503	(0.28)	170	(0.71)	3012	(0.57)

	Hairtails		Croakers		Seabreams		Ommastrephidae		Sepiidae		D.macrophthalamus		D.angolensis		U.canariensis	
1986.1	334	(0.51)	1560	(0.51)	9736	(0.20)	31	(0.38)	138	(0.49)	8304	(0.20)	81	(0.68)	135	(0.74)
1986.2	1694	(0.77)	3960	(0.57)	19201	(0.29)	0	NA	886	(0.33)	17054	(0.32)	5	(1.00)	86	(0.82)
1989.1	965	(0.81)	1492	(0.37)	17853	(0.28)	61	(0.32)	159	(0.64)	17020	(0.28)	139	(0.94)	361	(0.61)
1989.2	510	(0.58)	3601	(0.55)	32669	(0.26)	7	(1.00)	3946	(0.52)	31615	(0.26)	16	(1.00)	442	(0.45)
1989.3	1746	NA	1443	NA	15594	NA	192	NA	17	NA	15509	NA	27	NA	86	NA
1991.1	1335	(0.40)	1341	(0.30)	22333	(0.20)	25	(0.65)	59	(0.38)	20180	(0.22)	6	(1.00)	118	(0.51)
1991.2	255	(0.36)	567	(0.30)	22536	(0.25)	25	(0.54)	31	(0.58)	21994	(0.26)	7	(1.00)	102	(0.65)
1992	13	(0.78)	576	(0.54)	32666	(0.32)	428	(0.64)	150	(0.39)	31822	(0.33)	118	(1.00)	30	(0.58)
1993	361	(0.82)	2744	(0.35)	58399	(0.31)	145	(0.23)	182	(0.67)	57722	(0.30)	238	(0.94)	496	(0.51)
2000	1008	(0.86)	3623	(0.36)	61693	(0.56)	9	(1.00)	514	(0.20)	58636	(0.60)	63	(0.76)	305	(0.43)
2002	0	NA	1046	(0.65)	24802	(0.59)	21	(1.00)	1378	(0.71)	23819	(0.58)	0	NA	12	(1.00)
2003	48	(0.64)	1115	(0.23)	15856	(0.22)	397	(0.41)	1166	(0.64)	13313	(0.22)	0	NA	172	(0.48)
2004	1	(1.00)	518	(0.69)	26946	(0.41)	549	(0.47)	937	(0.89)	24702	(0.44)	1	(1.00)	8	(1.00)
2005	274	(0.84)	6164	(0.40)	12654	(0.30)	1655	(0.51)	327	(0.38)	12121	(0.30)	221	(1.00)	330	(0.71)
2006	26	(0.95)	923	(0.32)	11470	(0.18)	98	(0.54)	1182	(0.48)	11058	(0.19)	0	NA	229	(0.63)
2007	93	(0.73)	4168	(0.66)	15520	(0.21)	555	(0.61)	722	(0.28)	14579	(0.22)	70	(1.00)	563	(0.54)
2008	85	(0.43)	404	(0.54)	9147	(0.22)	6	(1.00)	1561	(0.43)	7276	(0.26)	113	(1.00)	44	(0.56)
2009	27	(0.42)	695	(0.40)	9804	(0.31)	371	(0.51)	315	(0.39)	9618	(0.31)	1	(1.00)	118	(0.71)
2010	148	(0.76)	321	(0.51)	9218	(0.22)	46	(0.60)	659	(0.38)	8118	(0.23)	0	NA	99	(0.83)
2011	649	(0.39)	768	(0.62)	15964	(0.22)	57	(0.76)	305	(0.47)	15671	(0.23)	3	(1.00)	179	(0.56)
2012	659	(0.31)	3713	(0.93)	8704	(0.33)	136	(0.65)	996	(0.25)	5151	(0.42)	0	NA	13	(0.61)
2013	246	(0.61)	3087	(0.40)	8363	(0.28)	1619	(0.37)	358	(0.55)	6859	(0.33)	22	(1.00)	82	(0.45)
2014	14	(1.00)	4050	(0.29)	25168	(0.20)	53	(1.00)	2103	(0.42)	17747	(0.22)	0	NA	72	(0.54)
2015	22	(0.69)	2326	(0.37)	29972	(0.38)	401	(0.48)	743	(0.44)	24526	(0.43)	0	NA	339	(0.97)
2016	137	(0.49)	3407	(0.41)	12822	(0.37)	251	(0.78)	1451	(0.43)	8311	(0.50)	0	NA	417	(0.65)

in 2009 (31 000 t) and 2014 (18 430 t), and when disregarding these two estimates, the 2015 biomass is similar to the other estimates in this period. Mean length of *M. capensis* in 2016 was 29,1 cm, which is higher than in 2013 (25 cm) and 2014 (26 cm; Annex II).

The biomass of seabreams is estimated at 12 822 tonnes, of which *D. macrophthalmus* contributed 65 %. The 2016 estimate of seabreams is lower than the high estimate in 2015 (29 972 t), but is higher than most estimates from 2008 - 2013. The difference in mean size between 2016 (9 cm), and 2014 (14 cm) and 2013 (15cm), is because of the absence of large fish (>14 cm) in 2016. This may either be the result of undersampling the 200-300m depth strata, and changes in distribution or increased mortality of larger fish.

Estimates of croakers have varied considerably between previous surveys. The 2016 estimate of 3 407 is higher than the 2015 estimate and above the ten year average (2 045 tonnes).

The 2016 horse mackerel (*T. trachurus*) estimate of 37 035 tonnes is the lowest since 2013 (74 092 t). *T. trecae* biomass is estimated at 36 830 tonnes, which is half of the 2015 estimate. The swept-area estimates of pelagic fish species are typically unreliable as the bottom trawl predominantly catches fish close to the seabed.

The biomass estimate for cephalopods is 2 511 tonnes, which is similar to the 10 year average (2 266 t).

The biomass estimated for sharks (which includes Chimaeriformes) is 4 254 tonnes, which is the highest since 1989.

Distribution

Figure 4.3 shows the distribution of *Dentex macrophthalmus* in the southern survey area. Most of the survey area shallower than 200m was covered by low density registrations, with higher densities in the area close to Pta. Albina.

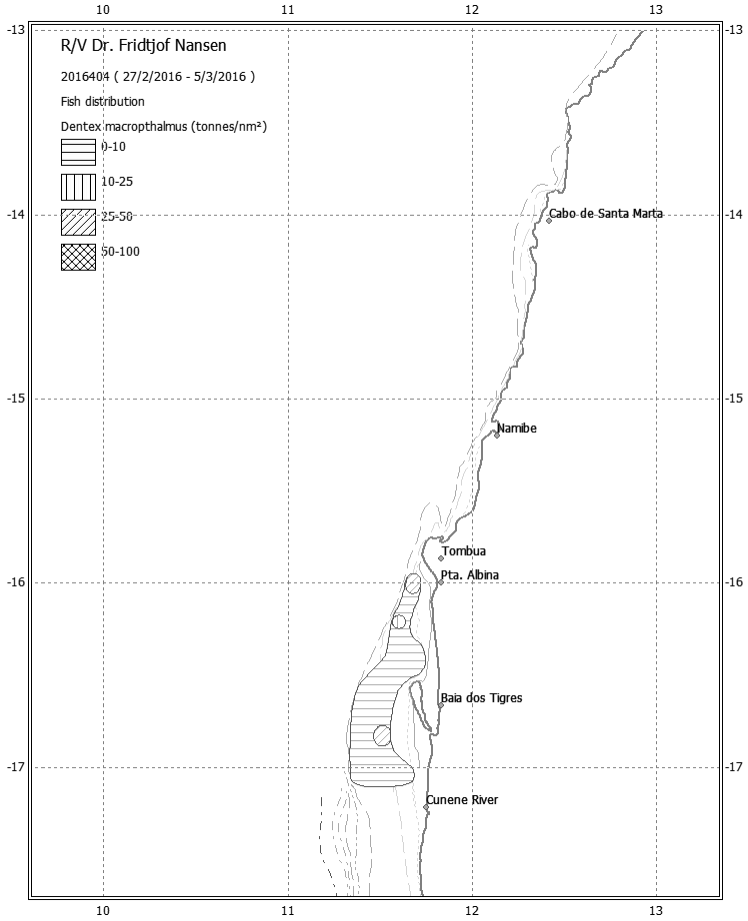


Figure 4.3 Distribution of *Dentex macrophthalmus* in the southern region, Cunene-Tombua. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

CHAPTER 5 CATCH RATES, DISTRIBUTION, COMPOSITION AND BIOMASS ESTIMATES OF DEEP-WATER SPECIES ON THE SLOPE

The slope is defined in the report, to be between 201 and 800m bottom depth. The trawl positions are mapped in Figures 2.1-2.3 and station information and catch by species are presented in Annex I.

Congo River - Ponta das Palmeirinhas / Luanda slope

The survey covered the northern region of Angolan waters from Luanda to mouth Congo River, with a total of 37successful swept-area trawl stations on the slope (Table 2.1).

The average catch rate for all species was 672 kg/h (Annex VI). The contributions to the total mean catch rate by groups were 15 % for the demersal group, 18 % for shrimps, 1.7% for the pelagic group, and less than 1% for cephalopods and sharks. The "other" species group dominated the catches and contributed with 64 % to the total mean catch rate. *Merluccius polli* was frequently caught on the upper and lower slope with an average catch rate of 50 kg/h. Seabreams were caught in five stations (mostly *Dentex angolensis*) with an average catch rate of 5 kg/h.

The average catch rates of the three shrimp species *Nematocarcinus africana, Parapenaeus longirostris, Aristeus varidens* and were 106, 6 and 5 kg/h respectively. *A. varidens* was caught most frequently, but with the lowest catch rates.

Biomass estimates

Biomass estimates in tonnes of the most important species groups are presented in Table 5.1.

The biomass estimate of Seabreams was about 426 tonnes, a third of the 2015 estimate and above the 10 year average of 826 tonnes. As for previous estimates *Dentex angolensis* was the dominating seabream caught on the upper slope (403t).

This year the biomass estimate for *Merluccius polli* was 4 427 tonnes, which is below the 10 year average of 5 167 tonnes, and lower than the 2015 estimate (7 594t)

The estimate of *Parapenaeus longirostris* of 531 tonnes is about half the 2014 estimate and the 10 year average (827 tonnes), and well below last years estimate. Between 2005 and 2014 the biomass estimates were stable at approximately 1 000 tonnes, with the exception of 2010, 2012 and 2013.

The 2016 biomass estimate of *Aristeus varidens* was about 553 tonnes, which is the same as in 2015, and close to the 10 year average (563 t).

Nematocarcinus africana is not a commercially important species. The 2016 biomass estimate was 11 472 tonnes, the highest since 2009.

The biomass estimate of Ommastrephidae in 2016 was 279 tonnes, which is close to the 10 year average (260t).

Table 5.1 Biomass estimates (tonnes) of important species on the slope (200-800m) in the northern region.cv values are indicated in brackets.

Survey	M.polli		Shrimps		Cephalopod		Sharks		Hairtails		Croakers	
1985.1	202	(0.00)	21	(0.00)	976	(0.00)	344	(0.00)	0		0	
1985.3	3,065	(0.36)	767	(0.48)	251	(0.28)	209	(0.55)	511	(1.00)	285	(0.37)
1985.4	28,753	(0.36)	11,989	(0.19)	260	(0.55)	0		1,342	(0.29)	8	(1.00)
1986.1	11,409	(0.15)	14,960	(0.10)	1,630	(0.29)	3,724	(0.52)	3,383	(0.26)	0	
1986.2	27,562	(0.27)	7,854	(0.22)	277	(0.36)	4,431	(0.29)	3,228	(0.26)	19	(1.00)
1989.1	13,518	(0.31)	7,772	(0.50)	1,631	(0.52)	2,376	(0.60)	795	(0.33)	0	
1989.2	8,168	(0.17)	4,370	(0.26)	166	(0.48)	375	(0.57)	352	(0.64)	1,624	(0.53)
1989.3	11,265	(0.39)	5,137	(0.14)	657	(0.46)	2,372	(0.24)	1,579	(0.87)	3	(1.00)
1991.1	19,597	(0.25)	8,671	(0.28)	135	(0.64)	1,376	(0.53)	65	(0.45)	3	(1.00)
1991.2	19,498	(0.28)	2,732	(0.14)	991	(0.42)	2,381	(0.31)	699	(0.26)	64	(0.80)
1992	13,290	(0.18)	8,992	(0.28)	209	(0.28)	1,462	(0.42)	1,148	(0.24)	244	(0.62)
1994	4,096	(0.20)	7,529	(0.23)	328	(0.20)	841	(0.28)	1,753	(0.16)	134	(0.60)
1995.1	5,892	(0.42)	9,641	(0.22)	316	(0.73)	1,367	(0.21)	2,284	(0.30)	0	
1996	5,065	(0.13)	4,435	(0.17)	566	(0.49)	307	(0.27)	1,627	(0.30)	34	(0.60)
1997.1	6,954	(0.12)	14,107	(0.15)	659	(0.15)	824	(0.44)	3,399	(0.52)	0	
1997.2	8,101	(0.17)	5,676	(0.70)	330	(0.79)	10	(1.00)	1,972	(0.60)	35	(1.00)
1999	3,624	(0.21)	11,539	(0.19)	1,142	(0.66)	1,060	(0.16)	3,088	(0.35)	113	(0.47)
2000	4,385	(0.23)	4,683	(0.19)	709	(0.19)	597	(0.34)	1,978	(0.45)	0	
2001	4,840	(0.28)	8,283	(0.27)	1,477	(0.56)	1,966	(0.52)	1,531	(0.29)	0	
2002	3,479	(0.26)	6,415	(0.31)	625	(0.39)	118	(0.33)	3,022	(0.44)	27	(0.76)
2003	5,310	(0.29)	7,986	(0.15)	421	(0.24)	1,305	(0.49)	1,237	(0.48)	27	(0.75)
2004	15,327	(0.50)	12,343	(0.13)	871	(0.27)	1,571	(0.34)	1,695	(0.23)	49	(0.84)
2005	10,994	(0.26)	10,285	(0.14)	382	(0.22)	1,180	(0.39)	1,468	(0.19)	19	(0.46)
2006	7,553	(0.21)	12,526	(0.15)	407	(0.23)	931	(0.60)	2,143	(0.32)	18	(0.79)
2007	4,117	(0.22)	14,856	(0.19)	316	(0.26)	501	(0.40)	749	(0.21)	9	(1.00)
2008	5,925	(0.15)	16,979	(0.16)	716	(0.33)	846	(0.25)	1,365	(0.31)	246	(0.55)
2009	2,814	(0.32)	15,238	(0.16)	984	(0.24)	1,152	(0.31)	1,077	(0.19)	24	(0.66)
2010	3,166	(0.32)	10,135	(0.17)	502	(0.23)	382	(0.31)	2,202	(0.36)	7	(1.00)
2011	2,433	(0.31)	11,151	(0.21)	609	(0.36)	669	(0.39)	1,062	(0.31)	146	(0.63)
2012	9,696	(0.31)	12,707	(0.19)	534	(0.28)	313	(0.32)	1,088	(0.45)	55	(0.81)
2013	3,579	(0.27)	10,060	(0.15)	801	(0.58)	784	(0.45)	762	(0.26)	158	(0.48)
2014	4,794	(0.25)	8,223	(0.16)	902	(0.15)	528	(0.39)	799	(0.30)	2	(1.00)
2015	7,594	(0.45)	12,586	(0.18)	777	(0.21)	482	(0.26)	449	(0.15)	42	(0.81)
2016	4,427	(0.30)	12,719	(0.19)	608	(0.32)	325	(0.44)	1,038	(0.52)	91	(0.53)

Survey	Seabreams		P.longirostris		A.varidens		N.africanus		Ommastrephidae		D.angolensis	
1985.1	0		21	(0.00)	0		0		976	(0.00)	0	
1985.3	1,541	(0.00)	0		0		0		0		1,541	(0.00)
1985.4	0		2,108	(0.38)	6,691	(0.26)	2,864	(0.37)	142	(0.78)	0	
1986.1	108	(0.89)	1,166	(0.57)	538	(0.76)	12,631	(0.09)	1,618	(0.30)	98	(1.00)
1986.2	288	(1.00)	0		1,008	(0.20)	4,643	(0.34)	0		269	(1.00)
1989.1	66	(1.00)	419	(0.51)	204	(0.18)	6,953	(0.55)	1,429	(0.59)	0	
1989.2	4,061	(0.99)	366	(0.44)	164	(0.43)	3,682	(0.31)	135	(0.60)	4,038	(0.99)
1989.3	497	(0.79)	243	(0.29)	91	(0.15)	4,699	(0.15)	645	(0.47)	496	(0.79)
1991.1	49	(0.73)	88	(0.44)	70	(0.51)	8,315	(0.29)	129	(0.64)	49	(0.73)
1991.2	527	(0.29)	205	(0.43)	15	(1.00)	2,445	(0.16)	631	(0.48)	510	(0.29)
1992	510	(0.39)	170	(0.46)	272	(0.30)	8,439	(0.30)	143	(0.31)	465	(0.38)
1994	1,045	(0.40)	532	(0.25)	370	(0.27)	6,602	(0.26)	304	(0.22)	1,045	(0.40)
1995.1	506	(0.43)	860	(0.39)	326	(0.26)	7,269	(0.28)	61	(0.44)	449	(0.47)
1996	597	(0.63)	162	(0.27)	267	(0.18)	3,859	(0.20)	228	(0.29)	345	(0.66)
1997.1	871	(0.48)	605	(0.50)	333	(0.14)	13,096	(0.16)	622	(0.16)	826	(0.50)
1997.2	878	(1.00)	1,317	(0.60)	0		4,088	(0.81)	317	(0.81)	876	(1.00)
1999	389	(0.26)	542	(0.19)	237	(0.16)	10,540	(0.21)	1,121	(0.67)	339	(0.30)
2000	1,650	(0.90)	497	(0.18)	222	(0.19)	3,777	(0.24)	509	(0.25)	1,588	(0.94)
2001	494	(1.00)	535	(0.23)	243	(0.20)	6,746	(0.34)	1,001	(0.79)	481	(1.00)
2002	213	(0.64)	800	(0.46)	127	(0.25)	5,337	(0.37)	364	(0.56)	200	(0.68)
2003	141	(0.48)	629	(0.44)	383	(0.30)	6,873	(0.16)	220	(0.34)	135	(0.47)
2004	299	(0.30)	749	(0.43)	359	(0.16)	10,930	(0.15)	316	(0.23)	284	(0.31)
2005	562	(0.36)	984	(0.28)	639	(0.19)	8,535	(0.17)	330	(0.23)	547	(0.37)
2006	343	(0.42)	923	(0.29)	391	(0.16)	11,073	(0.18)	184	(0.20)	340	(0.42)
2007	612	(0.32)	981	(0.34)	373	(0.12)	13,285	(0.21)	125	(0.35)	595	(0.34)
2008	629	(0.29)	933	(0.31)	615	(0.12)	15,267	(0.18)	207	(0.34)	593	(0.28)
2009	523	(0.38)	971	(0.30)	914	(0.13)	13,121	(0.18)	131	(0.40)	523	(0.38)
2010	1,404	(0.42)	389	(0.27)	388	(0.17)	9,207	(0.19)	96	(0.33)	1,404	(0.42)
2011	1,215	(0.39)	1,138	(0.47)	653	(0.12)	8,793	(0.26)	122	(0.36)	1,211	(0.39)
2012	205	(0.73)	1,980	(0.45)	448	(0.17)	10,197	(0.23)	303	(0.34)	205	(0.73)
2013	982	(0.18)	364	(0.27)	526	(0.13)	9,075	(0.16)	91	(0.34)	973	(0.18)
2014	978	(0.29)	1,097	(0.33)	771	(0.21)	5,949	(0.21)	770	(0.16)	910	(0.31)
2015	1,382	(0.65)	997	(0.21)	550	(0.27)	10,802	(0.20)	572	(0.28)	1,379	(0.65)
2016	426	(0.28)	531	(0.23)	553	(0.20)	11,472	(0.21)	279	(0.38)	403	(0.28)

Distribution

Figure 5.1 shows the estimated distribution of hake (*Merluccius polli*) in the northern region. The distribution covers the slope between Ponta das Palmerinhas/Luanda to Congo River, mainly with densities <1 tonnes/ nm^2, but with a narrow belt of denisities from > 5 tonnes/nm^2 on the upper slope from south of Ambriz to Ponta das Palmeirinhas.

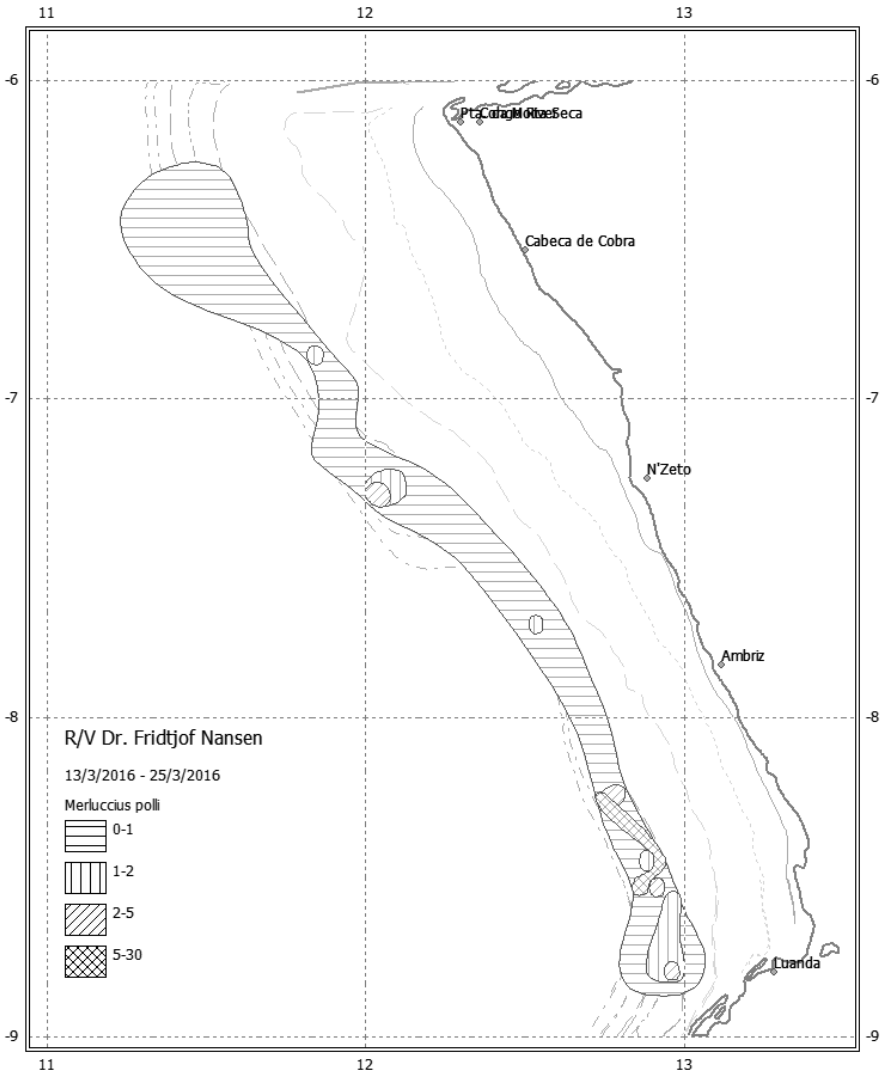


Figure 5.1 Distribution of of hake (*Merluccius polli*) in the northern region, Ponta das Palmerinhas / Luanda–Congo River. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600m.

P. longirostris was homogenously distributed on the upper slope, whiel *A. varidens* was more common on the lower slope and also evenly distributed (Figure 5.2).

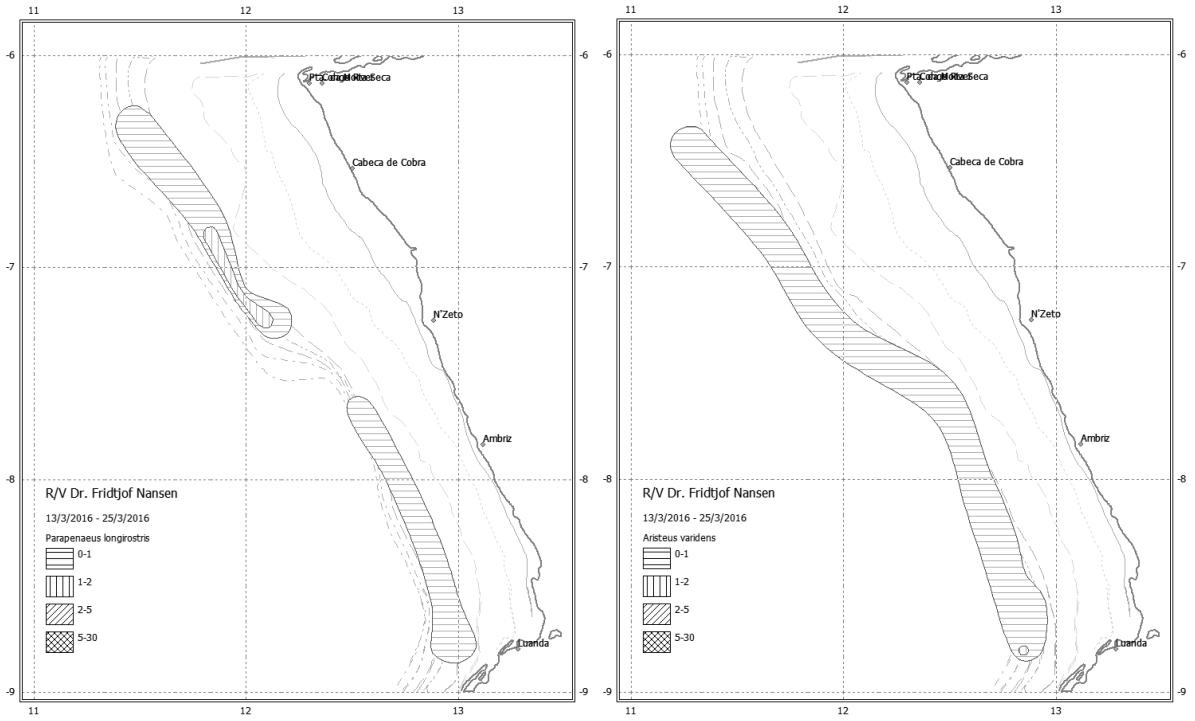


Figure 5.2 Distribution of *P. longirostris* and *A. varidens* in the northern region, Ponta das Palmerinhas / Luanda – Congo River. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600m

Ponta das Palmeirinhas – Benguela slope

A total of 37 valid swept-area trawl stations were done on the central slope (Table 2.1).

The average catch rate on the slope was 737 kg/h (ANNEX VI), which is lower than in 2015 and 2014, but higher than in 2013 (625 kg/h). The demersal group contributed 186 kg/h, representing 25% of the total mean catch rate, while the pelagic group had an average catch rate of 7 kg/h and contributed app. 1%. Shrimps had a mean catch rate of 138 kg/h (18 %) and sharks 7 kg/h (0.9%). The "other" group, dominated the catches and contributed with 399 kg/h (54%) to the total mean catch rate.

Merluccius polli was the only hake species caught, and had an average catch rate of 110 kg/h. Seabreams were only caught in five stations with a mean catch rate of 3,1 kg/h, which is 10 kg less than in 2015. The average catch rates of *Parapenaeus longirostris* and *Aristeus varidens*, which are the two most commercially important deep-water shrimp species, were 13 kg/h and 7 kg/h, respectively, for the 8 kg/h and 11 kg/h of the 2015 for both species. *Nematocarcinus africana*, a non-commercial shrimp species, was caught on most stations, and had a relatively high catch rate of 115 kg/h in average, which is the same as 2015.

Biomass estimates

Biomass estimates of the most important groups are presented in Table 5.2.
The 2016 biomass estimate for hake (*M. polli*) is 6 385tonnes, which is lower than the 2015 estimate (7 435 tonnes) but above the 10 year average (5 668t). The length distribution of *M. polli* on the central slope is, compared to 2015 when the biomass was composed mainly of fish > 25 cm, dominated by fish < 25 cm, with a mode at 19 cm.

The combined seabream biomass is estimated at 196 tonnes, the lowest since 2009 (168 t), and clearly below the ten year average (1 355 t). Estimates have fluctuated considerably since 2001, and most estimates also had a relatively high CV. This may be the result of either undersampling the depth strata where seabreams are expected, and patchiness or changes in the distribution of the main seabream species.

The *Parapenaeus longirostris* biomass estimate of 413 tonnes is less than in 2015 (616 t) and below the ten year average of 756 t. Several estimates have very high CVs and the time series should therefore be interpreted with care.

The biomass estimated for *Aristeus varidens* in 2016 is 942 tonnes, which is less compared to 2013-2014, but the same as the 10 year average is 973 tonnes. The timeseries of estimates shows an increasing trend since 2002.

Table 5.2 Biomass estimates (tonnes) of important species on the slope (200-800m) in the central region. CV values are indicated in brackets.

Survey	M.polli		Shrimps		Cephalopod		Sharks		Hairtails		Seabreams	
1985.4	18,790	(0.42)	2,915	(0.49)	301	(0.47)	17	(1.00)	420	(0.69)	253	(0.55)
1986.1	17,757	(0.30)	6,306	(0.29)	1,003	(0.34)	557	(0.36)	16	(1.00)	972	(0.94)
1986.2	24,611	(0.00)	13,247	(0.00)	57	(0.00)	-		498,917	(0.00)	6,446	(0.00)
1989.1	2,803	(0.55)	1,008	(0.39)	39	(0.33)	65	(0.30)	60	(0.91)	804	(0.96)
1989.2	4,940	(0.33)	1,963	(0.34)	277	(0.59)	263	(0.51)	142	(0.24)	58	(0.71)
1989.3	12,633	(0.41)	1,546	(0.23)	410	(0.34)	3,247	(0.15)	35,703	(0.01)	435	(0.43)
1991.1	11,939	(0.14)	4,950	(0.14)	315	(0.20)	732	(0.23)	2,606	(0.90)	780	(0.91)
1991.2	10,540	(0.22)	3,016	(0.23)	114	(0.35)	1,487	(0.37)	395	(0.53)	488	(0.50)
1992	6,999	(0.12)	4,436	(0.24)	189	(0.22)	2,920	(0.38)	410	(0.56)	496	(0.45)
1994	3,803	(0.31)	3,457	(0.28)	219	(0.25)	707	(0.25)	1,213	(0.36)	1,188	(0.66)
1995.1	4,391	(0.16)	4,480	(0.27)	214	(0.31)	1,216	(0.39)	1,145	(0.22)	6,264	(0.55)
1995.2	4,781	(0.16)	4,295	(0.10)	153	(0.19)	1,064	(0.19)	2,234	(0.53)	1,291	(0.29)
1996	6,440	(0.31)	6,457	(0.25)	97	(0.35)	1,581	(0.37)	244	(0.25)	1,016	(0.21)
1997.1	10,375	(0.25)	6,969	(0.15)	538	(0.27)	1,214	(0.36)	902	(0.44)	1,858	(0.50)
1997.2	8,363	(0.15)	2,690	(0.24)	166	(0.12)	42	(0.54)	1,013	(0.09)	5,045	(0.55)
1998	9,991	(0.21)	9,048	(0.16)	428	(0.33)	812	(0.25)	1,840	(0.62)	1,643	(0.47)
1999	2,995	(0.31)	1,806	(0.20)	344	(0.27)	728	(0.37)	728	(0.26)	2,900	(0.36)
2000	5,482	(0.26)	2,445	(0.18)	717	(0.21)	639	(0.29)	871	(0.39)	2,059	(0.45)
2001	4,763	(0.34)	2,575	(0.30)	623	(0.29)	818	(0.78)	297	(0.43)	767	(0.63)
2002	3,012	(0.28)	3,749	(0.25)	469	(0.27)	212	(0.38)	269	(0.23)	2,418	(0.88)
2003	7,155	(0.39)	4,087	(0.34)	420	(0.28)	104	(0.37)	178	(0.54)	606	(0.69)
2004	16,127	(0.32)	7,350	(0.17)	444	(0.36)	476	(0.63)	1,581	(0.44)	10,840	(0.88)
2005	10,074	(0.24)	7,135	(0.15)	578	(0.46)	307	(0.19)	2,655	(0.68)	6,468	(0.93)
2006	6,967	(0.31)	7,180	(0.16)	623	(0.41)	366	(0.36)	954	(0.36)	2,422	(0.81)
2007	6,947	(0.41)	8,939	(0.14)	446	(0.49)	1,054	(0.38)	185	(0.42)	808	(0.18)
2008	6,032	(0.27)	6,490	(0.13)	363	(0.40)	389	(0.56)	762	(0.21)	2,003	(0.61)
2009	5,302	(0.20)	8,079	(0.14)	644	(0.50)	1,382	(0.50)	1,947	(0.34)	168	(0.00)
2010	3,837	(0.23)	8,072	(0.22)	179	(0.17)	350	(0.52)	2,387	(0.84)	2,416	(0.48)
2011	4,318	(0.59)	4,416	(0.31)	223	(0.39)	229	(0.14)	626	(0.80)	274	(0.00)
2012	4,230	(0.40)	9,063	(0.13)	741	(0.50)	228	(0.45)	883	(0.77)	2,738	(1.00)
2013	2,836	(0.18)	9,056	(0.16)	416	(0.30)	889	(0.44)	350	(0.33)	997	(0.46)
2014	8,775	(0.26)	9,627	(0.12)	461	(0.26)	407	(0.27)	125	(0.26)	426	(0.36)
2015	7,435	(0.37)	9,136	(0.17)	243	(0.22)	477	(0.24)	499	(0.44)	1,300	(0.72)
2016	6,385	(0.21)	9,191	(0.09)	551	(0.20)	387	(0.31)	291	(0.54)	196	(0.54)

Survey	P.longirostris		A.varidens		N.africanus		Ommastrephidae		D.macrophthalamus		D.angolensis	
1985.4	886	(0.62)	942	(0.84)	714	(0.49)	0	-	39	(1.00)	215	(0.62)
1986.1	653	(0.39)	492	(0.37)	3,173	(0.51)	971	(0.37)	499	(0.93)	474	(0.96)
1986.2	0	-	0	-	0	-	0	-	6,446	(0.00)	0	-
1989.1	181	(0.54)	194	(0.46)	592	(0.75)	39	(0.33)	804	(0.96)	0	-
1989.2	505	(0.36)	228	(0.30)	1,020	(0.59)	240	(0.73)	26	(1.00)	33	(1.00)
1989.3	375	(0.14)	194	(0.28)	958	(0.41)	409	(0.34)	324	(0.50)	110	(0.94)
1991.1	204	(0.33)	653	(0.09)	3,879	(0.18)	195	(0.33)	706	(0.92)	74	(0.79)
1991.2	190	(0.25)	105	(0.62)	2,659	(0.26)	114	(0.35)	249	(0.79)	239	(0.83)
1992	610	(0.42)	366	(0.25)	3,224	(0.31)	141	(0.27)	358	(0.63)	138	(0.82)
1994	579	(0.37)	647	(0.28)	2,199	(0.44)	168	(0.25)	1,113	(0.68)	40	(1.00)
1995.1	425	(0.41)	753	(0.19)	2,460	(0.51)	30	(0.59)	6,037	(0.57)	226	(0.43)
1995.2	479	(0.19)	698	(0.10)	2,763	(0.15)	85	(0.26)	1,196	(0.32)	95	(0.63)
1996	114	(0.23)	671	(0.15)	4,971	(0.30)	41	(0.28)	974	(0.21)	42	(1.00)
1997.1	685	(0.22)	305	(0.23)	4,093	(0.28)	476	(0.28)	1,700	(0.57)	158	(0.71)
1997.2	2,679	(0.24)	0	-	11	(1.00)	134	(0.11)	4,864	(0.55)	180	(0.48)
1998	556	(0.28)	1,192	(0.45)	7,000	(0.21)	389	(0.37)	1,549	(0.51)	94	(0.98)
1999	214	(0.37)	337	(0.43)	1,206	(0.30)	315	(0.26)	2,806	(0.38)	94	(0.70)
2000	455	(0.43)	379	(0.15)	1,043	(0.40)	426	(0.25)	1,954	(0.45)	105	(0.64)
2001	186	(0.19)	456	(0.25)	517	(0.95)	339	(0.47)	663	(0.75)	102	(1.00)
2002	341	(0.54)	243	(0.21)	3,039	(0.30)	261	(0.32)	2,307	(0.97)	111	(1.00)
2003	223	(0.19)	498	(0.43)	3,284	(0.41)	409	(0.28)	514	(0.87)	92	(1.00)
2004	419	(0.48)	576	(0.17)	6,204	(0.19)	350	(0.43)	10,265	(0.99)	572	(1.00)
2005	574	(0.30)	792	(0.17)	5,640	(0.19)	536	(0.47)	6,260	(0.97)	208	(0.63)
2006	1,330	(0.60)	359	(0.14)	5,351	(0.16)	457	(0.44)	2,138	(0.98)	284	(1.00)
2007	191	(0.58)	653	(0.07)	7,913	(0.16)	138	(0.57)	612	(0.48)	196	(1.00)
2008	415	(0.59)	880	(0.11)	5,085	(0.18)	138	(0.33)	1,681	(0.92)	322	(1.00)
2009	182	(0.43)	1,290	(0.16)	6,009	(0.21)	37	(0.48)	168	(0.00)	0	-
2010	479	(0.45)	746	(0.22)	6,806	(0.25)	40	(0.55)	1,803	(0.98)	613	(1.00)
2011	319	(0.09)	619	(0.08)	3,413	(0.39)	44	(0.14)	274	(0.00)	0	-
2012	1,563	(0.25)	1,077	(0.25)	6,086	(0.18)	675	(0.55)	2,738	(1.00)	0	-
2013	1,647	(0.66)	1,418	(0.23)	5,877	(0.15)	101	(0.26)	481	(0.70)	516	(0.72)
2014	816	(0.34)	1,615	(0.17)	6,810	(0.16)	364	(0.32)	229	(0.57)	197	(0.50)
2015	616	(0.37)	1,076	(0.28)	7,304	(0.21)	105	(0.30)	1,057	(1.00)	243	(0.55)
2016	413	(0.18)	942	(0.13)	7,549	(0.11)	106	(0.40)	113	(0.93)	83	(0.63)

The biomass estimate of the non-commercially shrimp species *Nematocarcinus africana* increased to 7 550 tonnes, which is the highest estimate since 2007.

Distribution

Figure 5.3 shows the distribution of hake (*M. polli*) in the central region. The distribution covered large parts of the central slope with the highest densities (<10 t/NM^2) north of Cabo São Braz and north of Lobito.

Figure 5.4 shows that the distribution of *A. varidens* and *P. longirostris* in the central region is quite uniform along the slope. In the southern part of the central area *P. longirostris* was also found all the way to the inner shelf. The highest consentrations of both shrimp species were found just outside Pta. Moita Seca.

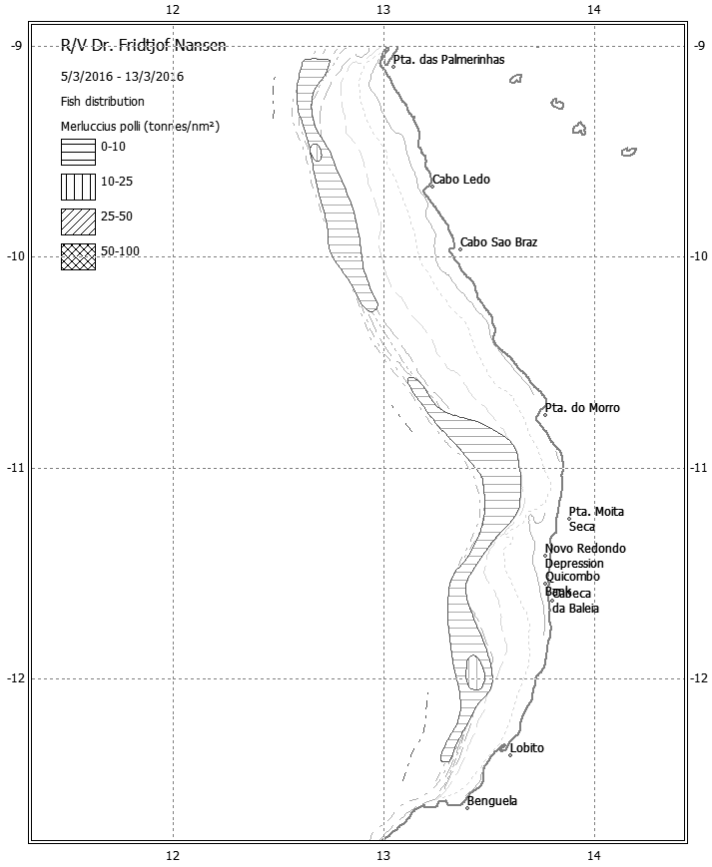


Figure 5.3 Distribution of Benguela hake (*M. polli*) in the central region, Benguela-Ponta das Palmerinhas / Luanda. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600m.

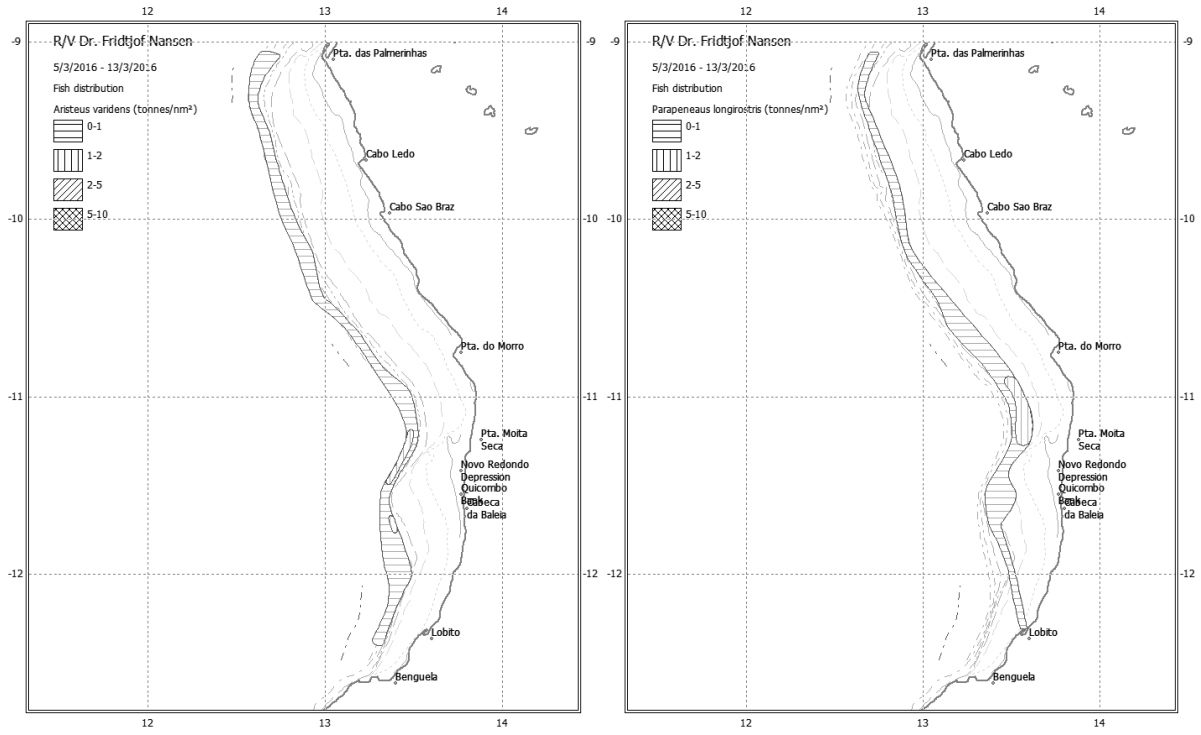


Figure 5.4 Distribution of *A. varidens* and *P. longirostris* in the central region, Benguela-Ponta das Palmerinhas / Luanda. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600m.

Tombua – Cunene slope

The slope is very steep, uneven and rocky in the south, making it difficult to have long 30 minutes trawls. Five trawl stations were carried out on the southern slope in depths between 300 and 700 meters (ANNEX VI). The 200-300m depth strata was not sampled in 2015, nor in 2016. The total average catch rate in 2016 was 1500 kg/h, but this high value was mainly due to one big catch of 12330 kg/h. If this catch is excluded from the calculations, the average was slightly above 1300 kg/h. At the inner shelf, the demersal group contributed 17.8 % and the "other" group (non-commercial species) dominated the catches and contributed with 47% to the total mean catch rate. Sharks contributed with 5 %. The pelagic group contributed less than 30 %.

Merlucius paradoxus (Deepwater Cape hake) were only caught in low numbers at four separate stations deeper than 300 m. *M. capensiss* (Cape hake) was caught at six out of twelve stations with a mean catch rate of 70.4kg/h, which is almost half the size of the catch rate fromlast year. Deep water rose shrimp (*Parapenaeus longirostris*) was registered at one station with a catch rate of 21 kg/h.

Biomass estimates

Table 5.3 shows the time series from 2000 to 2016 of the swept-area biomass estimates for different species and species groups on the southern slope. The estimates are based on 6 stations taken in three depth ranges (300-400 m, 400-500 m, and 500-600 m), but are however calculated using the entire area between the 200 and 600 m depth contour. The CV for each of the estimates is high due to the relatively low number of stations, and the estimates must as such be interpreted with care.

In 2016 the combined biomass estimated for hakes is 622 tonnes, and is dominated by deep-water hake *M. paradoxus* (518 t). The combined biomass is lower than the 10 year average (2 052 t). The lack of a clear trend in the time series is likely a result of the low sampling effort on the southern slope between 200 and 600 meters, as well as of the varying environmental conditions created by the dynamic Angola-Benguela front. Mean size of *M. paradoxus* was 45,5 cm.

The biomass of horse mackerel (*Trachurus trecae*) have fluctuated in this region mainly due to the low number of stations as well as the variability in the distribution pattern of this species. The 2016 estimate was 0 tonnes.

The biomass for *Aristeus varidens* is estimated at 269 tonnes in 2016, which is the second highes since 2010, and above the 10 year average.

The total cephalopod biomass for 2016 is estimated to 12 tonnes. This is lower than in 2015 (48 tonns), and the same level of the 2013 estimation (10 tonns).

Sharks biomass was estimated to 468 tonnes, higher than last year's estimate of 386 tonnes. The highest biomass was estimated in 2008 at 4 323 tonnes..

Table 5.3 Biomass estimates (tonnes) of important species group on the slope (200-600m) in the southern region.cv values are indicated in brackets.

Survey	Hake		Horse mackerel		Shrimps		Cephalopod		Sharks		Seabreams		P.longirostris		A.varidens	
1986.1	2754	(0.84)	26	(1.00)	182	(0.16)	15	(1.00)	66	(0.40)	1261	(0.95)	0	NA	106	(1.00)
1991.1	3285	(0.52)	62	(0.02)	47	(0.43)	43	(0.14)	463	(0.33)	325	(0.83)	21	(0.77)	0	NA
1991.2	19798	(0.62)	549	(0.48)	0	NA	0	NA	506	(0.68)	2669	(0.08)	0	NA	0	NA
1992	10793	(0.82)	58	(1.00)	235	(0.88)	0	NA	49	(0.19)	2035	(1.00)	15	(1.00)	161	(1.00)
1997.2	3411	NA	13	NA	13	NA	0	NA	917	NA	413	NA	13	NA	0	NA
2000	3358	(0.86)	0	NA	44	(0.84)	0	NA	73	(0.47)	0	NA	44	(0.84)	0	NA
2002	1245	NA	0	NA	20	NA	14	NA	104	NA	0	NA	0	NA	0	NA
2003	454	(1.00)	0	NA	156	(0.91)	0	NA	226	(0.34)	0	NA	79	(1.00)	0	NA
2004	5749	(0.53)	50	(0.62)	97	(0.40)	34	(0.93)	40	(0.97)	579	(0.57)	57	(0.75)	30	(1.00)
2005	882	(0.48)	24	(0.84)	134	(0.71)	15	(1.00)	56	(0.62)	0	NA	3	(0.55)	57	(0.87)
2006	4507	(0.96)	169	(0.66)	72	(1.00)	0	NA	5	(1.00)	0	NA	0	NA	0	NA
2007	1528	NA	0	NA	27	NA	0	NA	4323	NA	0	NA	0	NA	0	NA
2008	964	(0.38)	563	(1.00)	280	(0.61)	9	(1.00)	188	(0.42)	232	(1.00)	45	(1.00)	225	(1.00)
2009	2751	(0.69)	0	NA	705	(0.03)	51	(0.38)	192	(0.93)	0	NA	0	NA	607	(0.13)
2010	2336	(0.36)	921	(1.00)	729	(1.00)	36	(0.55)	4	(1.00)	0	NA	0	NA	196	(1.00)
2011	3902	(0.09)	48	(0.06)	198	(0.41)	5	(1.00)	104	(0.79)	45	(0.47)	12	(1.00)	0	NA
2012	1959	(0.80)	0	NA	33	(1.00)	30	(1.00)	47	(1.00)	0	NA	0	NA	25	(1.00)
2013	229	(0.47)	12	(1.00)	411	(0.44)	10	(1.00)	43	(0.40)	0	NA	21	(0.86)	362	(0.55)
2014	1666	(0.22)	22	(1.00)	80	(0.77)	62	(0.54)	116	(0.74)	6	(1.00)	0	(1.00)	66	(1.00)
2015	680	(0.53)	41	(1.00)	159	(0.60)	48	(0.54)	386	(0.69)	0	(1.00)	0	(1.00)	51	(1.00)
2016	622	(0.73)	0	NA	282	(0.93)	12	(1.00)	468	(0.95)	0	NA	0	NA	269	(0.98)

Distribution

Figure 5.5 shows the distribution of Cape hake (*Merluccius capensis*) and deep-water hake (*M. paradoxus*) in the southern slope region. The Cape hake hake (*M. capensis*) was distributed over large areas of the inner and outer shelf in low densities. The deep water hake (*M. paradoxus*) was caught on the slope deeper than 300 m from the Cunene River northwards to off Baía dos Tigres.

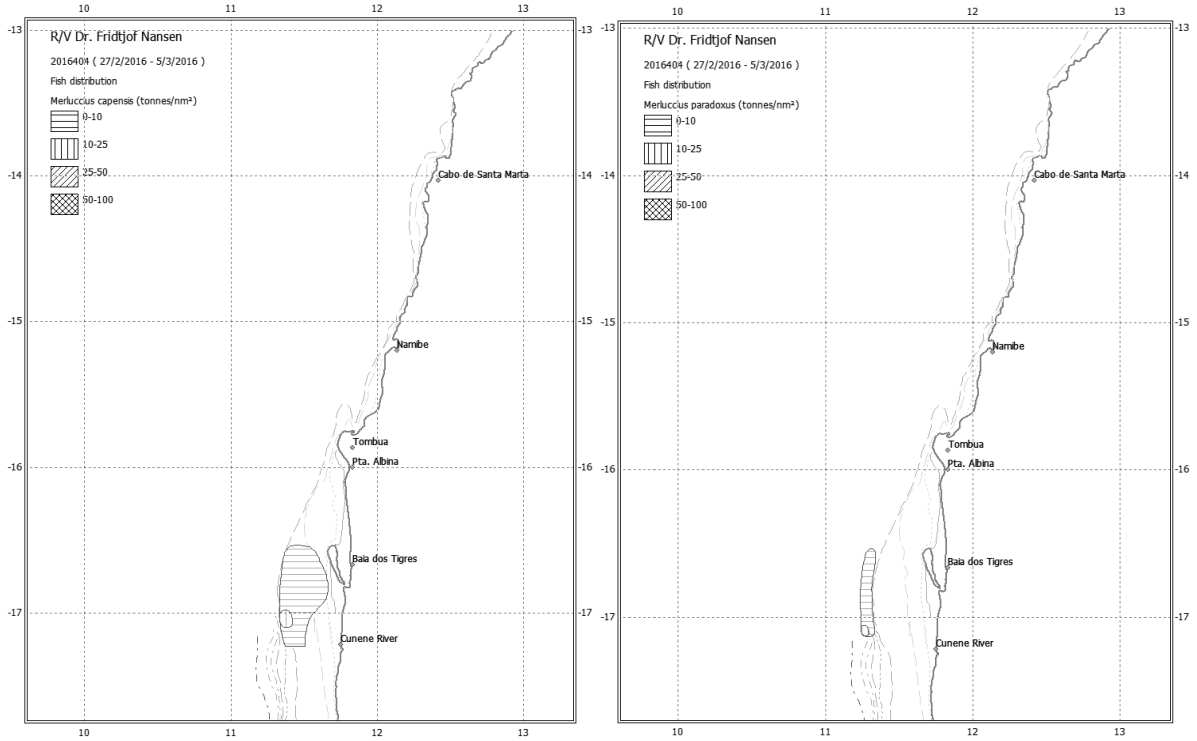


Figure 5.5 Distribution of Cape hake (*Merluccius capensis*; left) and deep-water hake (*M.* Paradoxus) in the southern region,Tombua - Cunene. Depth contours at 20, 50, 100, 200, 300, 400, 500 and 600 m.

CHAPTER 6 SUMMARY

From 25th February to 26th March 2016 the demersal resource survey off Angola was successfully carried out using R/V "Dr. Fridtjof Nansen". During this survey, the shelf and upper slope (20-800m) from Cunene River to Congo River was covered. In total 196 trawl stations were carried out, of which 193 were valid and used in the biomass estimation of the demersal stocks. To map the oceanographic conditions 240 CTD stations were taken.

Hydrographical conditions

The demersal surveys in March coincide with the late phase of the wet season, which causes low salinity in the surface waters on the shelf off northern and central Angola due to the freshwater coming from the coastal rivers.

In southern Angola the intensity of oceanographic process was more evident, and the surface temperature ranged from 20 to 29° C. The salinity values varied throughout the region, and were lowest (<34) between west of Namibe and Cabo Santa Marta offshore. The area of the Angola - Benguela Front (ABF) was located to 16°12`S. During this cruise, the oceanographic parameters suggested a downwelling process. On the Cunene River transect the oxygen content at the surface varied from 4.5 to 5 ml/l, and the fluorescence peak (0.5 – 0.9 µg/l) occurred between 0 - 50m depth near the river mouth.

In the entire central region the variation in surface temperature was between 28° C and 30° C. The salinity varied between 29 and 33.5. On the Lobito transect, due to high precipitation, salinity reached values of around 29. Here oxygen content shows a homogeneous pattern (4 ml/l) at the surface and oxygen minimum zone (OMZ; 0.1 – 0.4 µ/l) was located below at 100m depth. From the surface to 25m depth low fluorescence values were recorded, ranging from 0.1 to 0.4 µg/l, indicating a low productivity.

In the northern region, the temperatures ranged between 27 and 30°C, and salinity varied from 31 to 35. The highest salinity (> 34.5) was recorded in the Ambriz area, and a minimum level was (> 34.5) recorded at the mouth of the Congo River. On the Congo River transect, the oxygen content in the surface layer remained stable (4 4.5 ml/l. The minimum oxygen zone (OMZ) was recorded below 200m. In terms of fluorescence, biological activity occurred along the coast, with values around 0.1 - 0.3 µg/l.

Biomass estimates

Table 6.1 presents the time series from 1985 to 2016 of the biomass estimates for the most important species on the shelf and slope in the northern and central regions off Angola. The estimates on the southern slope are less reliable as the number of tows is very low due to difficult trawling conditions. Tables 4.3 and 5.3 show the biomass estimates of the important species on the southern shelf and slope, respectively.

General trend

The Angolan shelf and slope waters harbour a great diversity of fish and invertebrate marine species, which on their own have a relatively low biomass, but together form an important fishery. Abundance trends of stocks with low and patchy densities may show great variation

from year to year due to low sampling frequency and large variability in catch rates that consequently are reflected in high coefficients of variability (CV) of the biomass estimate. Low biomass estimates with large CV's may at times obscure the greater picture. As in previous years catch rates of the current survey are seen in context of the overall trend and compared with the catch trends of the last ten years when the survey methodology has been kept reasonably constant.

As describe below, the 2016 estimates for all the most important commercial demersal species show lower biomass values compared to last years estimates. This result could be related to the variability of the oceanographic conditions or due to increased fishing mortality.

Seabreams

Seabreams are one of the most important commercial demersal fish group in Angola. The biomass estimate for the northern and central regions in 2016 was 18 400 tonnes. This is 50% lower than the 2014 high estimate of 37 000 tonnes, and also below the last ten year average of 22 700 tonnes. As in previous years, *Dentex angolensis* was the dominant seabream species on the shelf in the northern and central region, whereas in the southern regions *D. macrophthalmus* and *Paguellus bellotii* dominated.

Hakes

Merluccius polli was mostly found in juvenile stage on the shelf of the northern and central regions. The total biomass estimate for this species on the shelf and slope of northern and central regions was 11 200 tonnes, which is 27% lower than the 2015 estimate, but almost double the 2013 biomass. The central-northern stock is composed of a high proportion of fish in the length classes between 10 – 32 cm, and few fish larger than 40 cm. The mean length was lower than in 2015 (24 - 28 cm). The total biomass of hakes on the southern shelf was 3 740 tonnes, of which *Merluccius capensis* contributed 2 969 tonnes. This is much lower than the 2014 estimate (18 429t) and below the 10 year average (7 163 t). Variations in *M. capensis* are very likely related to the dynamics of the Angola-Benguela front.

Shrimps

The two commercially important shrimp species *P. longirostris* and *A. varidens* are caught in higher densities in the northern and central regions compared to the southern region. *P. longirostris* is mainly distributed on the upper slope and *A. varidens* on the lower slope. The 2016 biomass estimate of *P. longirostris* was about 1 200 tonnes in the northern and central regions, which is slightly lower to last year's estimate and just below the average value for the last ten years (1900 tonnes). The estimated biomass of *A. varidens* was about 1 495 tonnes, which is 37% decrease compared to the 2014 estimate and below the average of the ten last years (1 680 t).

Grunts

The biomass estimate of grunts (*Pomadasys incisus, P. jubelini, P. rogeri* and *P. peroteti*) in the central and northern regions was 7 300 tonnes, 40% lower than the 2015 estimate but similar to the 2013 and 2014 estimations (7 200 tonnes). The 2012 estimate of 20 500 tonnes is the highest ever recorded for this fish group.
The 2016 biomass estimate of big eye grunt (*Brachydeuterus auritus*) in the central and northern regions was 26 700 tonnes, which is lower than the last five years estimates (30 - 55 000 t) and also two time less than the average of the last ten years (59 700 tonnes).

Croakers

The estimated biomass of croakers in 2016 was about 3 477 tonnes in the central and northern regions, which is similar of the 2001 estimate and a quarter of the 2013 estimate (16 400 t). *Umbrina canariensis* was the most common croaker in the central and northern regions and contributed 38 % to the total croaker biomass. The 2016 estimate of this species was 1 331 tonnes, the lowest since 2001.

Groupers and snappers

The trend in the biomass of groupers has been decreasing since 2000 , and the 2016 survey gave an estimated biomass of 3 477 tonnes for this group of fish, represented mainly by *Epinephelus aeneus.* This is the lowest estimate for this group since 1998. Groupers are coastal dwellers and prefer rocky shore and since their entire distribution is not covered, the biomass estimates of this species group may not adequately reflect the state of the stock.

As in 2015, no snappers were caught in this survey. This group of fish are rarely caught as they are rocky dwellers, hence the biomass estimates of snappers does not adequately reflect the state of the stock.

Pelagic species

The pelagic species *Trachurus trecae, T. capensis, Sardinella aurita, S. maderensis, Sardina pilchardus* and *Engraulis capensis* are schooling pelagic species and may be caught in great abundance, and may therefore obscure the overall tendency for the demersal species.

In the northern and central regions, the biomass estimate of *T. trecae* was 9 681 tonnes, representing a drastic reduction compared to the 2015 estimate (35 800 tonns). The estimates have fluctuated due to the relatively low number of stations as well as the variability in the distribution pattern of this species. The carangids biomass estimate was 29 380 tonnes in 2016, 42% lower than the last year estimate (50 270 tonnes). The Hairtails estimate was 7 900 tonnes in 2016, similar to the 2014 estimate, which a decreasing trend in the hairtails biomass index since 2005.

Table 6.1 Biomass estimates (tonnes) of important species in the central and northern regions. CVs are in brackets.

Survey	M.polli		T.treace		Shrimps		Cephalopod		Sharks		Clupeids		Carangids		Scombrids	
1985.1	211	(0.04)	4,496	(0.68)	323	(0.44)	11,438	(0.69)	841	(0.29)	364	(0.59)	9,986	(0.50)	44	(1.00)
1985.2	0		3,324	(0.71)	139	(0.96)	694	(0.35)	451	(0.39)	3,907	(0.98)	3,740	(0.63)	30	(1.00)
1985.3	6,524	(0.56)	16,486	(0.73)	2,215	(0.57)	2,297	(0.36)	1,079	(0.61)	205	(0.99)	17,742	(0.67)	146	(0.77)
1985.4	55,083	(0.27)	110,950	(0.45)	15,069	(0.18)	6,369	(0.39)	96	(0.79)	906	(0.48)	117,929	(0.43)	88	(0.76)
1986.1	29,498	(0.19)	31,313	(0.31)	24,342	(0.11)	6,925	(0.24)	5,004	(0.39)	2,770	(0.33)	38,390	(0.25)	64	(0.59)
1986.2	52,670	(0.14)	30,649	(0.36)	21,957	(0.08)	2,935	(0.25)	5,256	(0.25)	1,693	(0.30)	34,989	(0.31)	226	(0.48)
1989.1	16,503	(0.27)	19,681	(0.36)	9,110	(0.43)	4,465	(0.25)	3,086	(0.47)	2,137	(0.74)	26,000	(0.30)	252	(0.37)
1989.2	14,371	(0.15)	33,008	(0.25)	7,519	(0.18)	3,198	(0.15)	1,472	(0.29)	2,282	(0.24)	40,419	(0.22)	333	(0.41)
1989.3	25,407	(0.27)	49,538	(0.30)	7,393	(0.13)	4,797	(0.29)	21,887	(0.49)	6,749	(0.35)	59,519	(0.30)	518	(0.47)
1991.1	31,536	(0.17)	107,626	(0.37)	14,041	(0.18)	2,235	(0.13)	3,559	(0.26)	2,349	(0.40)	131,007	(0.33)	373	(0.41)
1991.2	30,968	(0.19)	62,772	(0.41)	8,426	(0.29)	7,351	(0.23)	4,090	(0.23)	91	(0.48)	63,901	(0.41)	444	(0.40)
1992	23,233	(0.12)	48,453	(0.21)	13,613	(0.20)	6,109	(0.13)	5,163	(0.25)	82	(0.52)	53,311	(0.21)	223	(0.41)
1994	10,343	(0.23)	77,944	(0.27)	11,756	(0.17)	6,886	(0.17)	1,869	(0.17)	206	(0.90)	86,549	(0.24)	926	(0.36)
1995.1	10,577	(0.25)	5,224	(0.55)	15,395	(0.16)	1,789	(0.19)	3,382	(0.18)	1,679	(0.33)	19,756	(0.23)	393	(0.36)
1995.2	6,880	(0.17)	11,258	(0.37)	4,499	(0.10)	979	(0.33)	1,289	(0.18)	0		11,370	(0.36)	201	(0.59)
1996	12,219	(0.18)	83,774	(0.28)	11,356	(0.16)	5,268	(0.15)	2,641	(0.25)	1,371	(0.51)	89,864	(0.27)	190	(0.56)
1997.1	21,911	(0.19)	64,832	(0.26)	22,638	(0.11)	10,684	(0.18)	3,004	(0.22)	9,833	(0.51)	168,669	(0.41)	335	(0.60)
1997.2	25,581	(0.20)	97,858	(0.20)	9,977	(0.41)	6,260	(0.14)	500	(0.62)	132	(0.81)	99,747	(0.19)	289	(0.69)
1998	10,366	(0.20)	4,630	(0.55)	9,412	(0.15)	3,016	(0.18)	1,122	(0.23)	2,860	(0.80)	7,606	(0.39)	52	(0.80)
1999	6,640	(0.18)	17,083	(0.26)	13,687	(0.16)	3,577	(0.23)	3,192	(0.17)	8,353	(0.27)	36,949	(0.20)	69	(0.58)
2000	10,118	(0.17)	25,701	(0.24)	7,592	(0.13)	3,778	(0.11)	5,098	(0.57)	2,215	(0.40)	47,540	(0.25)	349	(0.57)
2001	9,732	(0.22)	22,012	(0.25)	11,282	(0.21)	4,340	(0.30)	3,519	(0.35)	598	(0.33)	30,501	(0.21)	139	(0.35)
2002	7,680	(0.18)	88,411	(0.22)	10,747	(0.20)	4,980	(0.21)	629	(0.19)	3,067	(0.22)	98,922	(0.20)	820	(0.81)
2003	14,240	(0.23)	35,260	(0.25)	13,086	(0.14)	2,649	(0.16)	1,917	(0.34)	4,255	(0.23)	57,659	(0.32)	137	(0.54)
2004	31,628	(0.29)	21,409	(0.24)	20,863	(0.10)	3,400	(0.11)	3,125	(0.22)	3,760	(0.29)	28,088	(0.19)	63	(0.42)
2005	21,112	(0.18)	10,931	(0.23)	17,650	(0.10)	4,061	(0.11)	2,421	(0.20)	2,134	(0.38)	20,025	(0.21)	332	(0.57)
2006	14,563	(0.18)	14,925	(0.17)	20,214	(0.11)	3,728	(0.11)	2,328	(0.28)	4,663	(0.32)	25,200	(0.14)	183	(0.32)
2007	11,157	(0.27)	10,633	(0.23)	24,092	(0.13)	3,287	(0.13)	2,789	(0.27)	3,875	(0.24)	22,928	(0.23)	214	(0.45)
2008	11,979	(0.15)	5,640	(0.23)	24,057	(0.12)	3,577	(0.12)	1,831	(0.18)	2,700	(0.35)	22,856	(0.30)	168	(0.39)
2009	8,120	(0.17)	14,485	(0.21)	23,619	(0.12)	4,317	(0.13)	3,009	(0.27)	11,816	(0.51)	24,557	(0.21)	121	(0.41)
2010	7,051	(0.19)	4,427	(0.25)	19,050	(0.13)	3,215	(0.11)	1,205	(0.20)	3,238	(0.58)	19,492	(0.48)	164	(0.39)
2011	6,751	(0.39)	15,045	(0.57)	15,715	(0.17)	3,757	(0.13)	1,482	(0.22)	3,907	(0.38)	24,065	(0.39)	124	(0.44)
2012	13,939	(0.25)	24,458	(0.21)	22,275	(0.12)	6,742	(0.12)	659	(0.23)	75,068	(0.48)	35,799	(0.18)	3,138	(0.88)
2013	6,471	(0.17)	4,985	(0.30)	19,405	(0.11)	2,917	(0.17)	2,122	(0.25)	2,718	(0.47)	25,219	(0.28)	166	(0.46)
2014	14,084	(0.19)	32,060	(0.25)	18,296	(0.09)	5,583	(0.11)	1,107	(0.23)	11,321	(0.53)	41,137	(0.20)	5,036	(0.63)
2015	15,441	(0.28)	35,803	(0.22)	21,814	(0.13)	3,131	(0.13)	1,096	(0.16)	26,633	(0.31)	50,276	(0.19)	162	(0.43)
2016	11,202	(0.17)	9,681	(0.22)	22,369	(0.12)	2,612	(0.12)	750	(0.25)	1,931	(0.33)	29,380	(0.20)	89	(0.60)

Survey	Hairtails		Barracudas		Snappers		Groupers		Grunts		Croakers		Seabreams		P.longirostris	
1985.1	15,711	(0.53)	254	(0.54)	0		479	(0.66)	248	(0.52)	1,519	(0.61)	14,690	(0.34)	138	(0.71)
1985.2	1,200	(0.85)	75	(0.42)	63	(0.72)	1,771	(0.48)	381	(0.67)	1,302	(0.59)	12,881	(0.20)	0	
1985.3	3,219	(0.38)	26	(1.00)	62	(1.00)	1,978	(0.46)	3,629	(0.48)	8,979	(0.50)	22,438	(0.38)	0	
1985.4	7,937	(0.30)	1,033	(0.69)	0	NA	4,307	(0.31)	20,511	(0.46)	13,935	(0.56)	49,738	(0.22)	3,062	(0.32)
1986.1	26,602	(0.31)	3,099	(0.26)	470	(0.93)	1,087	(0.32)	3,468	(0.32)	6,956	(0.26)	27,435	(0.17)	3,823	(0.31)
1986.2	511,874	(0.01)	1,874	(0.28)	0		2,033	(0.28)	6,995	(0.32)	9,578	(0.23)	45,651	(0.12)	0	
1989.1	13,125	(0.26)	2,281	(0.58)	0		1,569	(0.48)	3,816	(0.51)	5,864	(0.41)	25,271	(0.18)	895	(0.31)
1989.2	6,333	(0.23)	3,674	(0.38)	53	(0.73)	3,937	(0.73)	2,228	(0.33)	7,826	(0.21)	23,569	(0.21)	1,559	(0.25)
1989.3	66,901	(0.23)	1,068	(0.33)	316	(1.00)	1,107	(0.60)	1,870	(0.49)	4,812	(0.35)	20,807	(0.27)	1,094	(0.37)
1991.1	21,783	(0.34)	3,322	(0.59)	106	(1.00)	817	(0.46)	1,247	(0.35)	5,848	(0.33)	14,666	(0.13)	302	(0.26)
1991.2	9,218	(0.19)	161	(0.40)	0		2,043	(0.35)	2,742	(0.41)	26,595	(0.64)	42,431	(0.16)	640	(0.23)
1992	17,251	(0.24)	103	(0.58)	0		3,359	(0.33)	1,698	(0.36)	4,772	(0.23)	40,589	(0.17)	935	(0.30)
1994	31,574	(0.69)	329	(0.52)	262	(1.00)	2,908	(0.38)	680	(0.45)	18,320	(0.38)	51,379	(0.16)	1,757	(0.28)
1995.1	14,521	(0.19)	4,222	(0.33)	594	(0.65)	1,397	(0.29)	6,027	(0.47)	18,472	(0.54)	29,271	(0.18)	2,020	(0.26)
1995.2	5,112	(0.35)	0		45	(1.00)	348	(1.00)	0		245	(0.59)	11,363	(0.27)	680	(0.23)
1996	9,254	(0.14)	1,035	(0.41)	109	(1.00)	2,692	(0.39)	8,256	(0.31)	15,215	(0.19)	39,921	(0.19)	310	(0.18)
1997.1	32,077	(0.25)	554	(0.83)	73	(1.00)	781	(0.35)	6,427	(0.45)	21,483	(0.22)	33,690	(0.23)	2,501	(0.28)
1997.2	23,555	(0.18)	0		0		2,840	(0.46)	500	(0.31)	36,999	(0.66)	49,236	(0.18)	5,481	(0.22)
1998	30,861	(0.73)	454	(0.42)	0		198	(0.63)	9,117	(0.48)	8,609	(0.53)	64,867	(0.70)	742	(0.24)
1999	26,027	(0.19)	4,317	(0.26)	531	(0.94)	1,642	(0.28)	8,888	(0.33)	18,534	(0.38)	34,029	(0.14)	878	(0.16)
2000	18,068	(0.20)	4,556	(0.31)	294	(0.71)	1,647	(0.27)	7,213	(0.29)	7,842	(0.21)	36,443	(0.13)	1,259	(0.22)
2001	24,459	(0.41)	1,818	(0.24)	726	(0.97)	859	(0.54)	3,600	(0.36)	3,203	(0.29)	22,805	(0.20)	1,020	(0.21)
2002	30,855	(0.25)	2,318	(0.31)	251	(0.79)	742	(0.41)	3,223	(0.29)	9,196	(0.20)	34,016	(0.25)	1,565	(0.29)
2003	20,199	(0.22)	2,824	(0.57)	186	(0.80)	1,037	(0.33)	10,025	(0.60)	13,474	(0.23)	17,687	(0.14)	1,363	(0.26)
2004	20,349	(0.33)	1,856	(0.47)	79	(0.70)	681	(0.31)	6,810	(0.37)	12,196	(0.40)	32,647	(0.31)	2,143	(0.35)
2005	41,427	(0.40)	963	(0.52)	284	(0.64)	1,176	(0.28)	11,735	(0.37)	13,501	(0.23)	33,064	(0.20)	1,613	(0.20)
2006	20,849	(0.15)	2,561	(0.29)	51	(0.74)	819	(0.32)	6,921	(0.34)	8,956	(0.24)	24,824	(0.13)	2,607	(0.33)
2007	32,508	(0.40)	2,336	(0.41)	113	(0.56)	950	(0.30)	17,242	(0.44)	11,991	(0.46)	22,191	(0.12)	1,342	(0.27)
2008	18,211	(0.22)	1,652	(0.48)	90	(0.88)	1,187	(0.31)	7,411	(0.46)	12,684	(0.27)	21,227	(0.13)	1,622	(0.25)
2009	31,108	(0.35)	1,743	(0.42)	292	(0.58)	779	(0.26)	8,192	(0.28)	6,064	(0.23)	18,108	(0.13)	1,432	(0.23)
2010	14,888	(0.19)	1,202	(0.37)	69	(0.43)	643	(0.30)	10,873	(0.29)	8,256	(0.27)	25,714	(0.10)	1,648	(0.33)
2011	11,390	(0.34)	3,232	(0.38)	267	(0.77)	705	(0.28)	14,677	(0.41)	13,884	(0.31)	20,872	(0.12)	1,492	(0.36)
2012	12,125	(0.38)	1,086	(0.49)	8	(1.00)	1,249	(0.66)	20,538	(0.54)	8,073	(0.25)	21,719	(0.16)	3,971	(0.26)
2013	6,906	(0.19)	3,791	(0.41)	0	NA	760	(0.38)	7,297	(0.24)	16,442	(0.56)	22,022	(0.13)	2,149	(0.51)
2014	7,182	(0.31)	910	(0.31)	222	(1.00)	1,092	(0.29)	7,230	(0.28)	6,975	(0.22)	37,225	(0.16)	2,183	(0.22)
2015	9,458	(0.28)	1,636	(0.35)	0	NA	435	(0.34)	12,172	(0.29)	4,292	(0.18)	19,766	(0.13)	1,661	(0.19)
2016	7,922	(0.31)	2,500	(0.19)	0	NA	375	(0.33)	7,303	(0.38)	3,477	(0.20)	18,376	(0.15)	1,232	(0.15)

Table 6.2 Biomass estimates (tonnes) of important species in the central and northern regions. CVs are in brackets.

Survey	A.varidens	N.africanus	Ommastrephidae	Sepiidae	B.auritus	D.angolensis	U.canariensis	D.macrophthalamus
1985.1	0	0	11,249 (0.70)	13	40,729 (0.70)	2,196 (0.33)	1,132 (0.74)	200 (1.00)
1985.2	0	0	0	0	6,842 (0.73)	2,495 (0.34)	521 (0.89)	0
1985.3	0	0	0	154 (0.59)	9,182 (0.66)	4,490 (0.28)	602 (0.68)	0
1985.4	7,633 (0.25)	3,578 (0.31)	225 (0.58)	215 (0.78)	69,072 (0.58)	9,283 (0.41)	8,921 (0.67)	6,286 (0.79)
1986.1	1,030 (0.43)	15,804 (0.12)	5,037 (0.33)	1,334 (0.30)	133,723 (0.16)	5,700 (0.28)	2,606 (0.48)	2,787 (0.31)
1986.2	1,485 (0.23)	4,643 (0.34)	0	2,040 (0.35)	36,750 (0.22)	15,499 (0.17)	3,387 (0.42)	9,215 (0.13)
1989.1	397 (0.24)	7,545 (0.51)	3,209 (0.34)	356 (0.46)	20,488 (0.37)	2,568 (0.17)	1,427 (0.37)	7,302 (0.37)
1989.2	400 (0.25)	4,702 (0.28)	1,286 (0.23)	1,529 (0.20)	64,268 (0.39)	9,997 (0.42)	1,302 (0.44)	1,386 (0.46)
1989.3	285 (0.19)	5,657 (0.14)	4,191 (0.31)	170 (0.49)	88,316 (0.24)	4,888 (0.20)	1,194 (0.83)	1,956 (0.70)
1991.1	723 (0.09)	12,194 (0.21)	1,036 (0.20)	528 (0.27)	48,534 (0.29)	2,651 (0.16)	1,657 (0.61)	3,075 (0.43)
1991.2	119 (0.56)	5,104 (0.16)	4,156 (0.36)	797 (0.39)	3,524 (0.48)	4,903 (0.17)	22,849 (0.75)	18,054 (0.31)
1992	638 (0.19)	11,662 (0.23)	3,519 (0.15)	1,074 (0.32)	34,799 (0.55)	7,229 (0.12)	1,719 (0.38)	20,117 (0.32)
1994	1,017 (0.20)	8,801 (0.22)	1,954 (0.19)	3,167 (0.20)	10,205 (0.47)	6,918 (0.16)	6,075 (0.51)	23,219 (0.27)
1995.1	1,078 (0.15)	9,729 (0.25)	164 (0.25)	881 (0.20)	40,468 (0.28)	4,695 (0.22)	11,929 (0.69)	14,010 (0.36)
1995.2	698 (0.10)	2,763 (0.15)	730 (0.26)	222 (0.74)	0	1,280 (0.22)	209 (0.70)	10,083 (0.31)
1996	938 (0.12)	8,830 (0.19)	1,069 (0.13)	2,342 (0.18)	45,646 (0.39)	6,236 (0.18)	3,150 (0.44)	14,591 (0.21)
1997.1	639 (0.13)	17,189 (0.14)	3,439 (0.17)	6,612 (0.27)	46,071 (0.24)	5,318 (0.17)	5,760 (0.31)	14,289 (0.53)
1997.2	0	4,098 (0.81)	2,491 (0.28)	1,885 (0.12)	1,966 (0.21)	5,712 (0.23)	33,214 (0.74)	31,595 (0.27)
1998	1,192 (0.45)	7,000 (0.21)	766 (0.27)	1,335 (0.34)	22,014 (0.49)	2,084 (0.22)	2,239 (0.48)	52,473 (0.86)
1999	574 (0.26)	11,746 (0.19)	2,028 (0.38)	760 (0.18)	131,249 (0.28)	4,476 (0.10)	11,581 (0.52)	8,181 (0.32)
2000	601 (0.11)	4,820 (0.21)	1,735 (0.17)	960 (0.28)	79,452 (0.39)	7,385 (0.34)	3,771 (0.30)	8,086 (0.36)
2001	699 (0.18)	7,263 (0.32)	1,702 (0.48)	944 (0.50)	54,964 (0.33)	3,482 (0.21)	1,264 (0.54)	6,772 (0.37)
2002	371 (0.16)	8,375 (0.26)	3,648 (0.29)	372 (0.28)	81,844 (0.33)	3,323 (0.22)	4,326 (0.29)	13,935 (0.59)
2003	881 (0.28)	10,157 (0.17)	1,233 (0.26)	625 (0.34)	104,721 (0.35)	4,765 (0.14)	4,260 (0.59)	1,092 (0.46)
2004	935 (0.12)	17,133 (0.12)	1,319 (0.19)	762 (0.19)	51,255 (0.28)	7,084 (0.20)	6,977 (0.62)	13,884 (0.75)
2005	1,431 (0.12)	14,188 (0.13)	1,246 (0.22)	2,075 (0.15)	88,667 (0.36)	8,473 (0.09)	5,933 (0.32)	7,290 (0.83)
2006	750 (0.11)	16,424 (0.13)	961 (0.23)	1,324 (0.20)	94,684 (0.31)	7,236 (0.11)	6,483 (0.32)	4,950 (0.45)
2007	1,026 (0.06)	21,198 (0.15)	347 (0.26)	1,624 (0.18)	52,925 (0.26)	8,083 (0.13)	5,846 (0.77)	2,157 (0.40)
2008	1,508 (0.08)	20,352 (0.15)	898 (0.16)	895 (0.24)	70,217 (0.38)	6,860 (0.14)	5,058 (0.32)	3,176 (0.54)
2009	2,204 (0.11)	19,130 (0.14)	441 (0.20)	1,452 (0.25)	46,010 (0.44)	6,697 (0.15)	2,409 (0.24)	876 (0.30)
2010	1,134 (0.16)	16,013 (0.15)	452 (0.19)	1,316 (0.17)	24,838 (0.33)	11,561 (0.13)	4,493 (0.41)	2,395 (0.75)
2011	1,272 (0.07)	12,206 (0.22)	238 (0.21)	2,026 (0.17)	36,639 (0.39)	9,905 (0.13)	6,038 (0.50)	777 (0.45)
2012	1,525 (0.18)	16,284 (0.16)	1,667 (0.28)	3,713 (0.18)	51,544 (0.29)	7,501 (0.16)	4,125 (0.30)	3,671 (0.77)
2013	1,944 (0.17)	14,952 (0.12)	472 (0.13)	784 (0.19)	45,625 (0.28)	10,486 (0.16)	13,137 (0.70)	3,413 (0.62)
2014	2,387 (0.13)	12,759 (0.13)	2,037 (0.15)	1,919 (0.17)	55,248 (0.25)	12,896 (0.16)	3,698 (0.28)	8,443 (0.60)
2015	1,626 (0.21)	18,106 (0.15)	1,442 (0.23)	372 (0.26)	30,924 (0.27)	7,362 (0.19)	2,066 (0.22)	1,955 (0.56)
2016	1,495 (0.11)	19,021 (0.14)	691 (0.22)	769 (0.20)	26,763 (0.32)	4,654 (0.13)	1,331 (0.35)	1,306 (0.51)

ANNEX I Records of fishing stations

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 1
DATE :27/02/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 17°11.34
start stop duration Lon E 11°44.11
TIME :07:12:22 07:42:23 30.0 (min) Purpose : 3
LOG : 1557.95 1559.74 1.8 Region : 4050
FDEPTH: 23 23 Gear cond.: 0
BDEPTH: 23 23 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.6 kn
Sorted : 0 Total catch: 6167.24 Catch/hour: 12330.37

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
JELLYFISH	4423.29	44967	35.87	
Pomatomus saltatrix	3001.88	8667	24.35	
Trachurus trecae	1584.55	43030	12.85	1
Arius parkii	1119.59	4588	9.08	
Engraulis encrasicolus	1029.86	257464	8.35	
Argyrosomus inodorus	595.52	160	4.83	2
Selene dorsalis, juvenile	222.29	44457	1.80	
Sea cucumber - purple	145.81	102	1.18	
Maja squinado	45.94	4487	0.37	
Sardinella maderensis	32.63	408	0.26	
Atractoscion aequidens	30.59	408	0.25	
Dicologoglossa cuneata	23.45	408	0.19	
Dasyatis marmorata	21.39	2	0.17	
Nematopalaemon hastatus	12.24	7342	0.10	
Trichiurus lepturus	11.22	7342	0.09	
Mustelus mustelus	8.60	2	0.07	
Starfish	8.16	1122	0.07	
Rhinobatos blochii	7.80	2	0.06	
Myliobatis aquila	5.64	2	0.05	
Total	12330.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 2
DATE :27/02/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 17°11.21
start stop duration Lon E 11°23.56
TIME :14:54:16 15:24:04 29.8 (min) Purpose : 3
LOG : 1590.36 1592.01 1.6 Region : 4050
FDEPTH: 194 181 Gear cond.: 0
BDEPTH: 194 181 Validity : 0
Towing dir: 0° Wire out : 500 m Speed : 3.3 kn
Sorted : 0 Total catch: 567.51 Catch/hour: 1142.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	443.76	21920	38.84	
Chlorophthalmus atlanticus	271.99	26301	23.80	
Munida sp.	103.29	7327	9.04	
Dicologoglossa cuneata	95.83	4782	8.39	
Octopus vulgaris	45.14	115	3.95	
Bathynectes piperitus	31.37	1568	2.75	
Merluccius capensis	21.70	95	1.90	3
Synagrops microlepis	16.83	1148	1.47	
Trachurus capensis	15.88	38	1.39	
Parapenaeus longirostris, female	12.05	161	1.05	
Squilla mantis	11.29	191	0.99	
Trigla lyra	10.71	58	0.94	
Parapenaeus longirostris, male	9.56	880	0.84	
Echelus myrus	8.22	38	0.72	
Batrachoides liberiensis	7.46	20	0.65	
Zenopsis conchifer	7.27	58	0.64	
Bembrops greyi	6.50	58	0.57	
Scyllarides herklotsii	6.31	479	0.55	
Malacocephalus occidentalis	4.78	20	0.42	
Hymenocephalus italicus	4.59	77	0.40	
MYCTOPHIDAE	4.21	58	0.37	
Squalus megalops	3.02	2	0.26	
Merluccius capensis, juvenile	0.86	58	0.08	4
Total	1142.63		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 3
DATE :27/02/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 17°13.78
start stop duration Lon E 11°21.06
TIME :18:10:28 18:41:16 30.8 (min) Purpose : 3
LOG : 1602.35 1603.89 1.5 Region : 4050
FDEPTH: 356 357 Gear cond.: 0
BDEPTH: 356 357 Validity : 0
Towing dir: 0° Wire out : 850 m Speed : 3.0 kn
Sorted : 0 Total catch: 328.70 Catch/hour: 640.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Helicolenus dactylopterus	223.95	4208	34.97	
Chlorophthalmus atlanticus	145.17	4769	22.67	
Laemonema laureysi	84.62	1438	13.22	
Bathynectes piperitus	42.58	947	6.65	
SALPS	31.56	1216	4.93	
Malacocephalus occidentalis	29.69	783	4.64	
Coelorinchus caelorhincus	25.71	1286	4.02	
Nezumia aequalis	20.45	1555	3.19	
Triplophos hemingi	9.94	105	1.55	
Galeus polli	5.73	58	0.89	
Lepidopus caudatus	3.97	82	0.62	
Octopus sp.	3.74	12	0.58	
SPONDYLIDAE	3.51	105	0.55	
Pleslonika heterocarpus	3.04	888	0.47	
Aristeus varidens	1.34	164	0.21	
Munida sp.	1.05	117	0.16	
Lestrolepis intermedia	0.99	94	0.16	
Dicologoglossa cuneata	0.94	105	0.15	
Leptocephalus	0.47	12	0.07	
Squilla acuelata calmani	0.47	70	0.07	
Myctophid sp. A	0.41	140	0.06	
HISTIOTEUTHIDAE	0.35	12	0.05	
Symphurus sp.	0.29	47	0.05	
Squilla mantis	0.23	35	0.04	
Macropipus rugosus**	0.12	23	0.02	
Total	640.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 4
DATE :02/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 17°5.14
start stop duration Lon E 11°16.27
TIME :00:05:12 00:35:19 30.1 (min) Purpose : 3
LOG : 2418.14 2419.62 1.5 Region : 4050
FDEPTH: 688 674 Gear cond.: 0
BDEPTH: 688 674 Validity : 0
Towing dir: 0° Wire out : 1550 m Speed : 2.9 kn
Sorted : 0 Total catch: 686.74 Catch/hour: 1368.01

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius paradoxus	342.51	420	25.04	5
Trachyrincus scabrus	316.81	1355	23.16	
Nezumia aequalis	214.18	4685	15.66	
Anemone - purple	78.57	175	5.74	
Lophiodes kempi	52.63	8	3.85	
Hoplostethus cadenati	47.17	1259	3.45	
Alepocephalus rostratus	41.91	223	3.06	
Yarrella blackfordi	40.32	1450	2.95	
Ebinania costaecanariae	32.51	32	2.38	
Rajella barnardi	24.22	112	1.77	
Sea anemone sp	22.63	96	1.65	
Chaceon maritae, male ***	21.39	32	1.56	
Heterocarpus grimaldii	21.35	159	1.56	
Todarodes sagittatus	19.92	32	1.46	
Bathyuroconger vicinus	18.80	207	1.37	
Sea cucumber (bread like)	18.65	64	1.36	
Zameus (Scymnodon) squamulosus	16.57	64	1.21	
Aristeus varidens, female ***	14.18	637	1.04	
Selachophidium guentheri	12.43	159	0.91	
Chaceon maritae, female ***	2.31	12	0.17	
Notacanthus sexspinis	1.91	32	0.14	
Stomias boa boa	1.91	48	0.14	
Talismania longifilis	1.59	64	0.12	
Aristeus varidens, male ***	1.12	207	0.08	
Centroscymnus crepidater	1.12	16	0.08	
Lamprogrammus exutus	0.96	16	0.07	
Triplophos hemingi	0.32	32	0.02	
Total	1368.01		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 5
DATE :02/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 17°3.60
start stop duration Lon E 11°17.50
TIME :02:16:46 02:46:52 30.1 (min) Purpose : 3
LOG : 2423.59 2425.07 1.5 Region : 4050
FDEPTH: 444 443 Gear cond.: 0
BDEPTH: 444 443 Validity : 0
Towing dir: 0° Wire out : 1050 m Speed : 3.0 kn
Sorted : 0 Total catch: 804.31 Catch/hour: 1603.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pontinus accraensis	1350.70	59	84.25	
Merluccius paradoxus	168.64	363	10.52	6
Chaceon maritae, male ***	28.58	42	1.78	
Chlorophthalmus atlanticus	22.33	558	1.39	
Epigonus telescopus**	9.09	351	0.57	
Hoplostethus cadenati	9.09	494	0.57	
Chaceon maritae, female ***	6.38	40	0.40	
Lithodes ferox	3.05	4	0.19	
Laemonema laureysi	3.03	48	0.19	
Bathynectes piperitus	2.39	32	0.15	
Total	1603.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 6
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 17°2.46
start stop duration Lon E 11°22.58
TIME :06:57:33 07:27:37 30.1 (min) Purpose : 3
LOG : 2436.10 2437.73 1.6 Region : 4050
FDEPTH: 146 142 Gear cond.: 0
BDEPTH: 146 142 Validity : 0
Towing dir: 0° Wire out : 420 m Speed : 3.3 kn
Sorted : 0 Total catch: 1715.02 Catch/hour: 3422.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	2071.65	20364	60.54	
Trachurus trecae	633.14	10749	18.50	11
Merluccius capensis	504.92	4358	14.75	7
Trachurus capensis	40.85	104	1.19	9
Scorpaena elongata	33.52	964	0.98	
Octopus vulgaris	29.75	42	0.87	
Dentex macrophthalmus	17.60	188	0.51	8
Dicologoglossa cuneata	12.15	313	0.36	
Batrachoides liberiensis	11.09	62	0.32	
Zenopsis conchifer	10.99	168	0.32	
Zeus faber	10.89	42	0.32	
Trigla lyra	10.70	104	0.31	
Trichiurus lepturus	10.27	148	0.30	
G A S T R O P O D S	6.09	880	0.18	
Umbrina canariensis	5.65	20	0.17	10
Mystriophis rostellatus	3.77	20	0.11	
Scomber japonicus	3.15	22	0.09	
Illex coindetii	2.93	20	0.09	
Pterothrissus belloci	2.10	20	0.06	
Syacium micrurum	0.42	42	0.01	
Chlorophthalmus atlanticus	0.30	62	0.01	
Squilla mantis	0.10	20	0.00	
Total	3422.04		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 7
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 17°1.67
start stop duration Lon E 11°29.42
TIME :09:09:16 09:25:10 15.9 (min) Purpose : 3
LOG : 2446.21 2446.97 0.8 Region : 4050
FDEPTH: 110 112 Gear cond.: 0
BDEPTH: 110 112 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 2.9 kn
Sorted : 0 Total catch: 311.88 Catch/hour: 1176.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	948.68	47434	80.61	13
Dentex macrophthalmus	116.38	1200	9.89	14
Illex coindetii	47.77	340	4.06	
Merluccius capensis	17.66	91	1.50	12
Zeus faber	17.32	34	1.47	
Galeichthys feliceps	8.38	23	0.71	
Chelidonichthys capensis	6.00	23	0.51	
Dicologoglossa cuneata	4.53	102	0.38	
G A S T R O P O D S	3.51	679	0.30	
Umbrina canariensis	2.49	23	0.21	
Pontinus accraensis	1.81	11	0.15	
Trigla lyra	1.70	11	0.14	
Anthias anthias**	0.68	23	0.06	
Total	1176.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 9
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 17°1.36
start stop duration Lon E 11°39.38
TIME :11:51:48 12:11:50 20.0 (min) Purpose : 3
LOG : 2459.60 2460.68 1.1 Region : 4050
FDEPTH: 60 61 Gear cond.: 0
BDEPTH: 60 61 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.2 kn
Sorted : 52 Total catch: 319.32 Catch/hour: 956.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Callorhinchus capensis	424.55	168	44.41	
Atractoscion aequidens	101.20	144	10.58	16
Argyrosomus inodorus	80.30	42	8.40	15
Mustelus mustelus	68.56	24	7.17	
Raja miraletus	48.86	162	5.11	
Raja straeleni	46.83	3	4.90	
Pomatomus saltatrix	34.13	66	3.57	
Galeichthys feliceps	31.86	102	3.33	
Sepia officinalis	22.75	54	2.38	
Umbrina canariensis	20.78	216	2.17	17
Myliobatis aquila	19.70	6	2.06	
Dicologoglossa cuneata	19.46	413	2.04	
Chelidonichthys capensis	18.14	36	1.90	
Trichiurus lepturus	5.39	90	0.56	
Sphyrna zygaena	5.09	3	0.53	
Trachurus trecae	4.91	1036	0.51	18
Loligo vulgaris	1.86	12	0.19	
Sardinella aurita	0.96	6	0.10	
Dentex macrophthalmus	0.72	234	0.08	19
Total	956.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 10
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°59.79
start stop duration Lon E 11°40.95
TIME :13:01:44 13:22:21 20.6 (min) Purpose : 3
LOG : 2464.46 2465.61 1.1 Region : 4050
FDEPTH: 36 35 Gear cond.: 0
BDEPTH: 36 35 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.3 kn
Sorted : 0 Total catch: 504.12 Catch/hour: 1467.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	633.48	167424	43.16	22
Pomatomus saltatrix	338.86	961	23.09	
Argyrosomus inodorus	333.51	125	22.72	20
Atractoscion aequidens	36.39	73	2.48	21
Callorhinchus capensis	33.13	9	2.26	
Loligo vulgaris	26.20	990	1.79	
Mustelus mustelus	19.97	12	1.36	
Engraulis encrasicolus	11.50	2562	0.78	
Dasyatis marmorata	9.26	3	0.63	
Pagellus bellottii	8.73	15	0.60	
Myliobatis aquila	4.89	3	0.33	
Sardinella aurita	2.77	15	0.19	
JELLYFISH	2.77	29	0.19	
Raja miraletus	2.21	3	0.15	
Starfish	2.18	58	0.15	
Selene dorsalis	0.87	87	0.06	
Dicologoglossa cuneata	0.58	15	0.04	
Sea cucumber	0.29	15	0.02	
Total	1467.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 11
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°50.42
start stop duration Lon E 11°41.06
TIME :14:43:20 15:08:26 25.1 (min) Purpose : 3
LOG : 2474.28 2475.66 1.4 Region : 4050
FDEPTH: 24 26 Gear cond.: 0
BDEPTH: 24 26 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.3 kn
Sorted : 0 Total catch: 1717.05 Catch/hour: 4104.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	1776.96	280288	43.29	24
JELLYFISH	1253.55	9841	30.54	
Mustelus mustelus	633.37	550	15.43	
Pomatomus saltatrix	215.52	110	5.25	
Sepia officinalis	106.11	165	2.59	
Sarda sarda	55.53	55	1.35	
Sea cucumber	17.59	110	0.43	
Argyrosomus inodorus	16.73	5	0.41	23
Pagellus bellottii	15.39	165	0.38	
Dicologoglossa cuneata	13.75	110	0.33	
Total	4104.50		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 12
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°49.30
start stop duration Lon E 11°38.43
TIME :15:49:39 16:18:14 28.6 (min) Purpose : 3
LOG : 2479.12 2480.51 1.4 Region : 4050
FDEPTH: 63 64 Gear cond.: 0
BDEPTH: 63 64 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 2.9 kn
Sorted : 0 Total catch: 199.84 Catch/hour: 419.68

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dasyatis marmorata	127.22	15	30.31	
Chelidonichthys capensis	111.73	256	26.62	
Callorhinchus capensis	40.78	82	9.72	
Trachurus trecae	28.81	246	6.87	27
Mustelus mustelus	17.05	8	4.06	
Umbrina canariensis	14.78	174	3.52	25
Myliobatis aquila	14.07	4	3.35	
Pomatomus saltatrix	11.05	11	2.63	
JELLYFISH	8.90	13	2.12	
Atractoscion aequidens	6.91	17	1.65	
Pagellus bellottii	5.88	36	1.40	26
Sepia bertheloti	5.88	19	1.40	
Trichiurus lepturus	4.89	53	1.17	
Algaes	4.20	2	1.00	
Waste General	4.20	0	1.00	
Dicologoglossa cuneata	4.16	134	0.99	
Loligo vulgaris	2.69	120	0.64	
Galeichthys feliceps	2.39	6	0.57	
Argyrosomus inodorus	1.81	2	0.43	
Merluccius capensis	0.80	4	0.19	29
Spondyliosoma cantharus	0.55	2	0.13	
Starfish	0.53	76	0.13	
Trachurus trecae	0.15	53	0.04	28
Maja squinado	0.13	13	0.03	
GOBIIDAE	0.08	32	0.02	
Selene dorsalis	0.04	13	0.01	
Total	419.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 13
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°50.10
start stop duration Lon E 11°30.74
TIME :17:16:12 17:46:18 30.1 (min) Purpose : 3
LOG : 2488.32 2489.95 1.6 Region : 4050
FDEPTH: 108 110 Gear cond.: 0
BDEPTH: 108 110 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 3.2 kn
Sorted : 0 Total catch: 1147.68 Catch/hour: 2287.73

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex macrophthalmus	895.22	20290	39.13	31
Trachurus trecae	869.38	15985	38.00	30
Merluccius capensis	195.19	1023	8.53	32
Pterothrissus belloci	75.17	1041	3.29	
Chelidonichthys capensis	47.72	233	2.09	
Synagrops microlepis	39.65	6781	1.73	
Pomatomus saltatrix	31.75	36	1.39	
Sepia orbignyana	31.40	90	1.37	
Loligo vulgaris	22.07	144	0.96	
GOBIIDAE	17.94	2440	0.78	
Zeus faber	14.71	54	0.64	
Squalus megalops	13.10	18	0.57	
Dicologoglossa cuneata	8.25	269	0.36	
Pagellus bellottii	7.18	54	0.31	34
Starfish	6.64	1202	0.29	
Umbrina canariensis	5.74	72	0.25	33
Trigla lyra	1.79	18	0.08	
G A S T R O P O D S	1.79	161	0.08	
Brotula barbata	1.61	18	0.07	
Citharus linguatula	1.44	90	0.06	
Total	2287.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 14
DATE :02/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°51.42
start stop duration Lon E 11°17.51
TIME :20:12:59 20:43:03 30.1 (min) Purpose : 3
LOG : 2505.92 2507.53 1.6 Region : 4050
FDEPTH: 377 373 Gear cond.: 0
BDEPTH: 377 373 Validity : 0
Towing dir: 0° Wire out : 850 m Speed : 3.2 kn
Sorted : 0 Total catch: 744.38 Catch/hour: 1485.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pontinus accraensis	519.83	6433	35.00	
Laemonema laureysi	226.19	3216	15.23	
Galeus polli	132.29	1115	8.91	
Chlorophthalmus atlanticus	125.55	3398	8.45	
Lophius vomerinus	109.98	26	7.40	
Aristeus varidens, female ***	89.75	10142	6.04	
Merluccius polli	37.87	26	2.55	
Nezumia milleri	37.35	846	2.51	
Coelorinchus caelorhincus	35.80	597	2.41	
Zenopsis conchifer	30.61	26	2.06	
Etmopterus pusillus	24.64	208	1.66	
Rajella barnardi	21.01	26	1.41	
Benthodesmus tenuis	19.45	52	1.31	
Chaceon maritae	18.96	72	1.28	
Bathynectes piperitus	11.93	233	0.80	
Malacocephalus laevis	8.04	156	0.54	
Hoplostethus cadenati	7.52	467	0.51	
Centrophorus squamosus	7.50	2	0.51	
Aristeus varidens, male ***	7.00	1141	0.47	
Merluccius paradoxus	5.45	26	0.37	
Peristedion cataphractum	2.59	26	0.17	
Nemichthys scolopaceus	2.59	52	0.17	
Small shrimps	1.30	700	0.09	
Dicologoglossa cuneata	0.78	26	0.05	
MYCTOPHIDAE	0.52	156	0.03	
Triplophos hemingi	0.52	104	0.03	
Stomias boa boa	0.26	26	0.02	
Total	1485.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 15
DATE :03/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 16°36.09
start stop duration Lon E 11°18.09
TIME :02:04:10 02:34:35 30.4 (min) Purpose : 3
LOG : 2538.87 2540.38 1.5 Region : 4050
FDEPTH: 603 605 Gear cond.: 0
BDEPTH: 603 605 Validity : 0
Towing dir: 0° Wire out : 1390 m Speed : 3.0 kn
Sorted : 0 Total catch: 730.23 Catch/hour: 1440.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Hoplostethus cadenati	390.84	23396	27.13	
Trachyrincus scabrus	352.92	1908	24.50	
Merluccius paradoxus	148.37	176	10.30	35
Chaceon maritae, female ***	128.14	183	8.89	
Nezumia aequalis	103.67	2111	7.20	
**	67.89	979	4.71	
Alepocephalus rostratus	55.05	1071	3.82	
Pontinus accraensis	38.53	337	2.67	
Yarrella blackfordi	25.99	1622	1.80	
Anemones, white	25.38	61	1.76	
Triplophos hemingi	24.77	2569	1.72	
Todarodes sagittatus	19.57	32	1.36	
Aristeus varidens, female ***	14.68	1316	1.02	
Lithodes ferox	14.07	32	0.98	
Lamprogrammus exutus	8.56	245	0.59	
Zameus (Scymnodon) squamulosus	6.12	32	0.42	
HISTIOTEUTHIDAE	6.12	32	0.42	
Benthodesmus tenuis	5.20	93	0.36	
Bathyuroconger vicinus	2.14	32	0.15	
Halosaurus ovenii	1.83	61	0.13	
Plesiopenaeus edwardsianus	0.92	32	0.06	
Total	1440.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 16
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°37.55
start stop duration Lon E 11°24.12
TIME :07:07:26 07:37:25 30.0 (min) Purpose : 3
LOG : 2556.78 2558.27 1.5 Region : 4050
FDEPTH: 124 126 Gear cond.: 0
BDEPTH: 124 126 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 3.0 kn
Sorted : 0 Total catch: 92.71 Catch/hour: 185.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex macrophthalmus	96.42	2013	51.97	36
Merluccius capensis	28.50	96	15.36	37
Pterothrissus belloci	21.93	172	11.82	
Scorpaena normani	7.36	96	3.97	
Dicologoglossa cuneata	4.42	68	2.38	
Citharus linguatula	4.04	162	2.18	
Octopus vulgaris	3.52	4	1.90	
Squalus megalops	3.38	4	1.82	
Trigla lyra	3.12	28	1.68	
Zeus faber	3.04	4	1.64	
Chelidonichthys capensis	1.92	4	1.04	
G A S T R O P O D S	1.86	176	1.00	
Echinus gilchristi ?	1.74	74	0.94	
Scorpaena elongata	1.70	8	0.92	
Lepidotrigla cadmani	1.16	14	0.63	
Todaropsis eblanae	0.48	6	0.26	
Illex coindetii	0.32	6	0.17	
Pagellus bellottii	0.26	2	0.14	38
Sphoeroides cf. pachygaster	0.16	2	0.09	
Squilla acuelata calmani	0.10	2	0.05	
Spicara alta	0.06	2	0.03	
Microchirus boscanion	0.02	4	0.01	
G A S T R O P O D S	0.00	0	0.00	0
Total	185.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 17
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°37.09
start stop duration Lon E 11°33.48
TIME :08:55:38 09:23:05 27.4 (min) Purpose : 3
LOG : 2568.04 2569.44 1.4 Region : 4050
FDEPTH: 99 99 Gear cond.: 0
BDEPTH: 99 99 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 0 Total catch: 1819.61 Catch/hour: 3977.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	2701.16	59132	67.91	40
Mustelus mustelus	327.91	114	8.24	
Sepia orbignyana	252.33	455	6.34	
Dentex macrophthalmus	157.42	5342	3.96	42
Chelidonichthys capensis	77.86	341	1.96	
Pterothrissus belloci	77.01	852	1.94	
Merluccius capensis	75.30	426	1.89	39
Synagrops microlepis	62.80	5001	1.58	
Squalus megalops	59.67	57	1.50	
Dicologoglossa cuneata	35.80	1108	0.90	
Zeus faber	33.53	85	0.84	
Pagellus bellottii	23.87	142	0.60	41
Trichiurus lepturus	21.60	227	0.54	
Lepidotrigla cadmani	11.65	284	0.29	
Atractoscion aequidens	8.24	28	0.21	43
Calappa pelii	7.39	227	0.19	
G A S T R O P O D S	7.10	1762	0.18	
Illex coindetii	6.54	85	0.16	
Umbrina canariensis	5.97	85	0.15	45
Scomber japonicus	5.97	28	0.15	44
Citharus linguatula	5.97	313	0.15	
B I V A L V E S	4.55	767	0.11	
Scorpaena normani	3.98	114	0.10	
GOBIIDAE	1.99	426	0.05	
Arnoglossus imperialis	1.70	114	0.04	
Total	3977.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 19
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°35.62
start stop duration Lon E 11°39.71
TIME :11:31:01 11:51:29 20.5 (min) Purpose : 3
LOG : 2579.36 2580.42 1.1 Region : 4050
FDEPTH: 24 23 Gear cond.: 0
BDEPTH: 24 23 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.1 kn
Sorted : 0 Total catch: 543.19 Catch/hour: 1592.15

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lithognathus mormyrus	533.79	4449	33.53	
Trachurus trecae	510.98	14181	32.09	46
Engraulis encrasicolus	310.56	46584	19.51	
Pomatomus saltatrix	117.20	557	7.36	
Dasyatis marmorata	61.38	15	3.86	
Myliobatis aquila	15.10	132	0.95	
Argyrosomus inodorus	9.03	100	0.57	
Sardinella aurita	7.55	50	0.47	47

Sarda sarda	6.24	18	0.39
Sphyrna zygaena	6.18	3	0.39
Mustelus mustelus	5.28	9	0.33
JELLYFISH	4.10	82	0.26
Rhinobatos blochii	2.96	3	0.19
MAJIDAE	1.64	18	0.10
Dicologoglossa cuneata	0.16	50	0.01
Total	1592.15		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 20
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°26.41
start stop duration Lon E 11°45.76
TIME :13:17:40 13:47:31 29.9 (min) Purpose : 3
LOG : 2591.74 2593.32 1.6 Region : 4050
FDEPTH: 20 21 Gear cond.: 0
BDEPTH: 20 21 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.2 kn
Sorted : 0 Total catch: 612.81 Catch/hour: 1231.78

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	818.77	43345	66.47	49
Trachurus trecae	239.52	9226	19.44	48
Pseudupeneus prayensis	68.38	1520	5.55	
Loligo vulgaris	64.40	289	5.23	
Spondyliosoma cantharus	11.76	235	0.95	
Sepia officinalis	10.13	109	0.82	
Caranx rhonchus	6.69	36	0.54	
Chelidonichthys capensis	5.97	18	0.48	
Sardinella aurita	2.89	199	0.23	50
Lagocephalus laevigatus	1.99	18	0.16	
Boops boops	0.72	18	0.06	
Scomber japonicus	0.54	18	0.04	
Total	1231.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 21
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°23.97
start stop duration Lon E 11°43.12
TIME :14:33:56 15:03:55 30.0 (min) Purpose : 3
LOG : 2596.88 2598.53 1.6 Region : 4050
FDEPTH: 52 53 Gear cond.: 0
BDEPTH: 52 53 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.3 kn
Sorted : 0 Total catch: 148.86 Catch/hour: 297.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chelidonichthys capensis	134.87	242	45.27	
Sepia officinalis	47.91	112	16.08	
Trachurus trecae	38.69	10761	12.99	51
JELLYFISH	26.19	58	8.79	
Pagellus bellottii	17.00	166	5.71	52
Dentex barnardi	9.15	152	3.07	
Loligo vulgaris	8.72	86	2.93	
Pomatomus saltatrix	4.21	8	1.41	
Dentex macrophthalmus	3.45	422	1.16	53
Starfish	2.16	746	0.73	
Raja miraletus	1.30	8	0.44	
Citharus linguatula	1.26	4	0.42	
Sardinella maderensis	0.97	4	0.33	
Sardinella aurita	0.76	4	0.25	
Lagocephalus laevigatus	0.54	8	0.18	
Spondyliosoma cantharus	0.29	8	0.10	
Zeus faber	0.14	4	0.05	
Dicologoglossa cuneata	0.11	4	0.04	
Fistularia petimba	0.11	4	0.04	
GOBIIDAE	0.04	44	0.01	
Arnoglossus imperialis	0.04	4	0.01	
Total	297.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 22
DATE :03/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°22.80
start stop duration Lon E 11°35.28
TIME :16:09:36 16:30:09 20.6 (min) Purpose : 3
LOG : 2607.16 2608.26 1.1 Region : 4050
FDEPTH: 85 84 Gear cond.: 0
BDEPTH: 85 84 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 0 Total catch: 70.76 Catch/hour: 206.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Spondyliosoma cantharus	44.85	172	21.71	55
Dentex barnardi	43.33	242	20.97	54
Loligo vulgaris	14.01	219	6.78	
Raja miraletus	13.49	26	6.53	
Sepia officinalis	13.20	20	6.39	
Dentex gibbosus	12.55	76	6.08	59
Pagellus bellottii	8.99	67	4.35	57
Chelidonichthys capensis	7.94	23	3.84	
Trigla lyra	7.82	41	3.79	
Trachurus trecae	7.47	53	3.62	58
G A S T R O P O D S	6.19	426	3.00	
Dentex macrophthalmus	5.72	29	2.77	56
Lepidotrigla cadmani	5.26	85	2.54	
Squalus megalops	4.88	9	2.36	
Zeus faber	4.09	6	1.98	
Priacanthus arenatus	2.57	9	1.24	
Sepia orbignyana	1.52	79	0.73	
Illex coindetii	0.88	12	0.42	
Starfish	0.70	164	0.34	
Octopus vulgaris	0.61	3	0.30	
Priacanthus arenatus	0.29	3	0.14	0
Citharus linguatula	0.23	6	0.11	
Total	206.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 23
DATE :04/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°9.80
start stop duration Lon E 11°45.74
TIME :05:46:00 06:16:49 30.8 (min) Purpose : 3
LOG : 2650.29 2651.97 1.7 Region : 4050
FDEPTH: 37 37 Gear cond.: 0
BDEPTH: 37 37 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.3 kn
Sorted : 0 Total catch: 649.61 Catch/hour: 1264.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	301.71	5132	23.86	61
Pagellus bellottii	157.40	1522	12.45	63
Umbrina canariensis	120.00	1003	9.49	60
Dasyatis marmorata	100.53	35	7.95	
Sardinella aurita	92.61	419	7.32	66
Starfish	85.66	21187	6.77	
Raja miraletus	62.76	113	4.96	
Atractoscion aequidens	56.01	154	4.43	62
Sepia officinalis	52.95	173	4.19	
Lithognathus mormyrus	52.23	144	4.13	67
Argyrosomus sp.	25.85	82	2.04	68
Pomadasys incisus	22.99	430	1.82	69
Engraulis encrasicolus	21.98	2085	1.74	
Pomatomus saltatrix	20.13	21	1.59	
Dentex barnardi	15.13	971	1.20	64
Chelidonichthys capensis	13.30	21	1.05	
Loligo vulgaris	11.54	72	0.91	
Stromateus fiatola	10.73	10	0.85	
Rhinobatos blochii	8.99	12	0.71	
Mustelus mustelus	8.99	10	0.71	
Sphyrna zygaena	5.37	4	0.42	
Dicologoglossa cuneata	4.40	195	0.35	
Sardinella maderensis	3.17	10	0.25	
Sphyraena sphyraena	3.08	10	0.24	
Pseudupeneus prayensis	2.04	41	0.16	
Torpedo torpedo	1.95	10	0.15	
Spondyliosoma cantharus	1.32	21	0.10	
Trachurus trecae, juvenile	1.03	286	0.08	65
Brachydeuterus auritus	0.61	173	0.05	70
MAJIDAE	0.14	154	0.01	
Penaeus notialis	0.06	10	0.00	
GOBIIDAE	0.06	214	0.00	
Selene dorsalis, juvenile	0.02	31	0.00	
Total	1264.76		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 24
DATE :04/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°12.32
start stop duration Lon E 11°42.13
TIME :07:05:33 07:35:36 30.1 (min) Purpose : 3
LOG : 2656.94 2658.55 1.6 Region : 4050
FDEPTH: 54 53 Gear cond.: 0
BDEPTH: 54 53 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.2 kn
Sorted : 0 Total catch: 84.21 Catch/hour: 168.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Loligo vulgaris	38.34	14759	22.80	
Dasyatis marmorata	23.08	6	13.73	
Sepia officinalis	20.13	48	11.97	
Starfish	17.57	4351	10.45	
Raja miraletus	16.09	24	9.57	
Trachurus trecae	16.03	268	9.54	71
Chelidonichthys capensis	15.93	34	9.48	
Rhinobatos blochii	3.39	6	2.02	
Dentex barnardi	3.19	12	1.90	74
Lagocephalus laevigatus	2.78	4	1.65	
Pagellus bellottii	2.78	36	1.65	73
Sardinella aurita	2.64	12	1.57	72
Dicologoglossa cuneata	1.26	46	0.75	
Zeus faber	1.10	2	0.65	
Jellyfish	0.98	2	0.58	
Priacanthus arenatus	0.46	2	0.27	
Pomadasys incisus	0.46	2	0.27	75
Fistularia petimba	0.44	8	0.26	
GOBIIDAE	0.40	419	0.24	
Octopus vulgaris	0.40	2	0.24	
Maja squinado	0.36	50	0.21	
G A S T R O P O D S	0.14	28	0.08	
Syacium micrurum	0.10	6	0.06	
Trigla lyra	0.10	2	0.06	
Total	168.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 25
DATE :04/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°12.54
start stop duration Lon E 11°36.22
TIME :08:37:58 09:07:53 29.9 (min) Purpose : 3
LOG : 2665.99 2667.59 1.6 Region : 4050
FDEPTH: 73 72 Gear cond.: 0
BDEPTH: 73 72 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 71 Total catch: 1920.78 Catch/hour: 3853.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	3115.43	100146	80.85	76
Dentex macrophthalmus	354.22	45713	9.19	77
Squalus megalops	106.16	162	2.76	
Atractoscion aequidens	96.95	54	2.52	
Pagellus bellottii	45.50	271	1.18	78
Raja miraletus	38.46	54	1.00	
Sepia officinalis	34.66	108	0.90	
Loligo vulgaris	20.58	758	0.53	
Scorpaena scrofa	11.37	108	0.30	
Illex coindetii	9.21	487	0.24	
Sea urchin, weak spines	8.12	217	0.21	
Chelidonichthys capensis	8.12	162	0.21	
G A S T R O P O D S	4.33	217	0.11	
Total	3853.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 26
DATE :04/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°3.11
start stop duration Lon E 11°46.53
TIME :10:35:51 11:05:31 29.7 (min) Purpose : 3
LOG : 2680.53 2682.36 1.8 Region : 4050
FDEPTH: 27 24 Gear cond.: 0
BDEPTH: 27 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.7 kn
Sorted : 0 Total catch: 65.70 Catch/hour: 132.86

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyrna zygaena	44.00	22	33.12	
Dasyatis marmorata	21.27	12	16.01	
Myliobatis aquila	20.22	14	15.22	
Mustelus mustelus	17.23	18	12.97	
Lagocephalus laevigatus	7.77	22	5.84	
Fistularia petimba	7.28	117	5.48	
Pagellus bellottii	6.81	113	5.13	79
Sepia officinalis	4.17	4	3.14	
Sarda sarda	2.12	2	1.60	
Raja miraletus	1.40	2	1.05	
Dentex barnardi	0.26	2	0.20	
Trachinotus ovatus	0.20	16	0.15	
Dicologoglossa cuneata	0.08	2	0.06	
Penaeus kerathurus	0.04	2	0.03	
Total	132.86		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 27
DATE :04/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 16°0.81
start stop duration Lon E 11°40.45
TIME :12:09:12 12:34:02 24.8 (min) Purpose : 3
LOG : 2689.72 2691.01 1.3 Region : 4050
FDEPTH: 77 72 Gear cond.: 0
BDEPTH: 77 72 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.1 kn
Sorted : 0 Total catch: 1075.31 Catch/hour: 2598.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex macrophthalmus	1215.27	128404	46.77	80
Trachurus trecae	1078.91	27472	41.52	82
Pagellus bellottii	93.30	839	3.59	81
Raja miraletus	53.83	99	2.07	
Dicologoglossa cuneata	38.67	957	1.49	
Citharus linguatula	33.69	1694	1.30	
Spondyliosoma cantharus	20.33	80	0.78	
B I V A L V E S	17.94	159	0.69	
Chelidonichthys gabonensis	13.36	60	0.51	
Calappa pelii	8.97	539	0.35	
Loligo vulgaris	5.98	201	0.23	
Arnoglossus imperialis	4.59	300	0.18	
Sepia officinalis	4.39	19	0.17	
Lepidotrigla cadmani	3.99	60	0.15	
Pythonichthys microphthalmus	2.39	41	0.09	
Boops boops	1.59	41	0.06	
Scomber japonicus	0.60	19	0.02	
G A S T R O P O D S	0.40	19	0.02	
MAJIDAE	0.20	19	0.01	
Total	2598.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 30
DATE :06/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 12°17.19
start stop duration Lon E 13°24.45
TIME :16:10:16 16:39:37 29.3 (min) Purpose : 3
LOG : 3064.91 3066.49 1.6 Region : 4040
FDEPTH: 108 110 Gear cond.: 0
BDEPTH: 108 110 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.2 kn
Sorted : 0 Total catch: 380.98 Catch/hour: 779.10

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP

	weight	numbers		
Dentex macrophthalmus	178.51	1820	22.91	91
Umbrina canariensis	117.40	352	15.07	92
Sardinella aurita	100.43	922	12.89	90
Boops boops	99.71	957	12.80	
Zeus faber	97.79	112	12.55	
Sphoeroides lobatus	57.96	96	7.44	
Zenopsis conchifer	33.15	16	4.25	
Lepidotrigla cadmani	23.31	211	2.99	
Dentex barnardi	12.58	45	1.61	89
Scorpaena elongata	11.08	25	1.42	
Gephyroberyx darwini	6.50	16	0.83	
Cynoponticus ferox	5.81	2	0.75	
Ariomma bondi	5.28	61	0.68	
Chaetodon hoefleri	4.31	25	0.55	
Anthias anthias**	4.05	25	0.52	
Physiculus cyanostrophus	3.97	51	0.51	
Dentex angolensis	3.60	18	0.46	88
G A S T R O P O D S	3.15	352	0.40	
Octopus vulgaris	2.54	8	0.33	
Perulibatrachus rossignoli	2.37	16	0.30	
B I V A L V E S	1.04	200	0.13	
Citharus linguatula	0.88	16	0.11	
Pagellus bellottii	0.80	8	0.10	93
Pontinus accraensis	0.76	8	0.10	
NEPHROPIDAE	0.61	8	0.08	
Microchirus frechkopi	0.49	8	0.06	
Sepia bertheloti	0.43	8	0.06	
Syacium micrurum	0.43	8	0.06	
Arnoglossus imperialis	0.16	8	0.02	
Total	779.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 31
DATE :06/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°17.00
start stop duration Lon E 13°26.97
TIME :17:21:24 17:43:06 21.7 (min) Purpose : 3
LOG : 3069.78 3070.97 1.2 Region : 4040
FDEPTH: 97 96 Gear cond.: 0
BDEPTH: 97 96 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.3 kn
Sorted : 0 Total catch: 244.34 Catch/hour: 675.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	356.46	18097	52.76	94
Pagellus bellottii	86.43	653	12.79	95
Dentex macrophthalmus	45.46	498	6.73	97
Zeus faber	35.83	44	5.30	
Lepidotrigla cadmani	32.69	276	4.84	
Umbrina canariensis	25.22	77	3.73	96
Sphyraena sphyraena	18.80	66	2.78	
Scorpaena normani	15.71	199	2.32	
Dentex barnardi	15.15	66	2.24	98
Boops boops	14.49	188	2.14	
Sphoeroides lobatus	6.75	33	1.00	
Sepia officinalis	5.59	22	0.83	
Uranoscopus albesca	5.14	11	0.76	
Citharus linguatula	3.98	122	0.59	
Branchiostegus semifasciatus	3.04	11	0.45	
Chaetodon hoefleri	1.82	11	0.27	
Lepidotrigla carolae	1.66	44	0.25	
Sardinella aurita	0.72	22	0.11	
Urchin	0.55	55	0.08	
Saurida brasiliensis	0.11	55	0.02	
Total	675.61		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 32
DATE :06/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°20.43
start stop duration Lon E 13°18.11
TIME :19:49:30 20:19:37 30.1 (min) Purpose : 3
LOG : 3081.76 3083.10 1.3 Region : 4040
FDEPTH: 715 704 Gear cond.: 0
BDEPTH: 715 704 Validity : 0
Towing dir: 0° Wire out : 1450 m Speed : 2.7 kn
Sorted : 0 Total catch: 180.54 Catch/hour: 359.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Yarrella blackfordi	97.53	2871	27.12	
Hoplostethus cadenati	79.36	2187	22.07	
Lamprogrammus exutus	25.34	155	7.05	
Borostomias elusens	24.26	633	6.75	
Talismania longifilis	14.70	430	4.09	
Chaceon maritae	12.31	60	3.42	
Aristeus varidens, female ***	11.47	741	3.19	
Aristeus varidens, male ***	10.88	1530	3.02	
OPISTHOTEUTHIDAE	10.76	12	2.99	
JELLYFISH	8.01	191	2.23	
Bathyuroconger vicinus	7.53	60	2.09	
Triplophos hemingi	6.10	765	1.69	
Melanonus zugmayeri	5.98	72	1.66	
Merluccius polli	5.34	6	1.48	99
Bufoceratias wedli	5.26	96	1.46	
Octopoteuthis sicula	4.90	36	1.36	
Xenodermichthys copei	4.30	263	1.20	
Glyphus marsupialis	2.99	789	0.83	
Nezumia aequalis	2.99	84	0.83	
Plesiopenaeus edwardsianus	2.99	251	0.83	
Stereomastis sp.	2.63	179	0.73	
OMMASTREPHIDAE	2.51	12	0.70	
Ebinania costaecanariae	1.95	6	0.54	
Photonectes braueri	1.91	36	0.53	
Chlorophthalmus atlanticus	1.79	36	0.50	
Halosaurus ovenii	1.55	36	0.43	
Dibranchus atlanticus	1.20	72	0.33	
Scopelosaurus meadi	1.08	36	0.30	
Laemonema laureysi	0.96	24	0.27	
Etmopterus sp.	0.48	12	0.13	
Nemichthys scolopaceus	0.36	24	0.10	
MICROSTOMATIDAE	0.12	215	0.03	
Monomitopus metriostoma	0.12	24	0.03	
Total	359.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 33
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°16.94
start stop duration Lon E 13°33.94
TIME :05:52:33 06:23:03 30.5 (min) Purpose : 3
LOG : 3123.59 3125.24 1.6 Region : 4040
FDEPTH: 55 56 Gear cond.: 0
BDEPTH: 55 56 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.3 kn
Sorted : 0 Total catch: 723.98 Catch/hour: 1424.22

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys incisus	552.75	5268	38.81	101
Pomadasys jubelini	173.10	393	12.15	102
Brachydeuterus auritus	123.93	2335	8.70	104
Rhinobatos albomaculatus	92.12	83	6.47	
Trichiurus lepturus	87.38	991	6.14	
Galeoides decadactylus	72.51	413	5.09	106
Pagellus bellottii	59.29	454	4.16	100
Raja miraletus	49.16	63	3.45	
Brachydeuterus auritus, juvenile	38.42	7582	2.70	108
Epinephelus aeneus	26.44	22	1.86	
Pseudupeneus prayensis	22.94	248	1.61	
Torpedo torpedo	22.31	41	1.57	
Dentex barnardi	13.44	165	0.94	107
Syacium micrurum	13.44	848	0.94	
Chaetodon hoefleri	11.57	63	0.81	
Trachurus trecae	10.96	600	0.77	105
Lagocephalus laevigatus	9.30	41	0.65	
Selene dorsalis	8.68	83	0.61	
Chloroscombrus chrysurus	8.26	63	0.58	
Scorpaena scrofa	7.44	83	0.52	
Grammoplites gruveli	6.20	228	0.44	
Umbrina canariensis	4.54	63	0.32	103
Pteroscion peli	2.70	22	0.19	109
Parapenaeus longirostris,f **	2.48	600	0.17	
Sepia bertheloti	1.24	41	0.09	
Dicologoglossa cuneata	1.04	22	0.07	
Saurida brasiliensis	0.83	146	0.06	
Alloteuthis africana	0.63	41	0.04	
Parapenaeus longirostris, m **	0.63	207	0.04	
Sphoeroides marmoratus	0.41	41	0.03	
GOBIIDAE	0.22	83	0.02	
Total	1424.34		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 34
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°17.02
start stop duration Lon E 13°31.46
TIME :07:09:41 07:39:54 30.2 (min) Purpose : 3
LOG : 3128.36 3129.97 1.6 Region : 4040
FDEPTH: 75 74 Gear cond.: 0
BDEPTH: 75 74 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.2 kn
Sorted : 0 Total catch: 321.24 Catch/hour: 637.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trichiurus lepturus	206.33	1418	32.35	
Pomadasys jubelini	111.98	167	17.56	114
Pomadasys incisus	54.20	798	8.50	113
Raja miraletus	45.03	71	7.06	
Brachydeuterus auritus	41.93	334	6.57	112
Pagellus bellottii	38.12	322	5.98	115
Umbrina canariensis	31.09	48	4.87	110
Fistularia petimba	20.49	36	3.21	
Trachurus trecae	17.15	1334	2.69	111
Dentex barnardi	16.32	83	2.56	116
Dentex angolensis	14.06	48	2.20	117
Lepidotrigla cadmani	10.36	71	1.62	
Pseudupeneus prayensis	9.89	131	1.55	
Citharus linguatula	7.98	405	1.25	
Sphyraena sphyraena	3.45	12	0.54	
Chaetodon hoefleri	3.22	4	0.50	
Sardinella maderensis	2.86	12	0.45	
Octopus vulgaris	1.91	12	0.30	
Serranus accraensis	0.60	12	0.09	
Alloteuthis africana	0.48	143	0.07	
Saurida brasiliensis	0.24	48	0.04	
Dentex macrophthalmus	0.12	12	0.02	
Total	637.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 35
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 12°6.42
start stop duration Lon E 13°40.45
TIME :09:14:26 09:44:53 30.4 (min) Purpose : 3
LOG : 3142.16 3143.95 1.8 Region : 4040
FDEPTH: 30 27 Gear cond.: 0
BDEPTH: 30 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.5 kn
Sorted : 0 Total catch: 332.11 Catch/hour: 654.62

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	141.72	3587	21.65	118
Galeoides decadactylus	82.00	976	12.53	123
Gymnura micrura	79.55	20	12.15	
Pseudotolithus senegalensis	46.22	158	7.06	119
Lithognathus mormyrus	40.60	237	6.20	122
Selene dorsalis	32.92	1035	5.03	
Trichiurus lepturus	30.55	394	4.67	
Sphyraena guachancho	29.57	404	4.52	
Pomadasys incisus	27.00	365	4.13	121
Pomadasys jubelini	25.72	49	3.93	125
Ilisha africana	23.26	1902	3.55	
Rhinobatos albomaculatus	15.14	10	2.31	
Dicologoglossa cuneata	12.52	207	1.91	
Pseudupeneus prayensis	9.56	69	1.46	
Sepia officinalis	7.88	59	1.20	
Lagocephalus laevigatus	6.60	49	1.01	
Raja miraletus	6.60	10	1.01	
Dasyatis marmorata	6.54	2	1.00	
Pteroscion peli	5.72	79	0.87	124
Pagellus bellottii	5.03	39	0.77	120
Drepane africana	4.63	10	0.71	
Eucinostomus melanopterus	4.34	49	0.66	
Penaeus notialis, female	2.25	65	0.34	
Grammoplites gruveli	1.97	69	0.30	
Syacium micrurum	1.87	20	0.29	
Penaeus notialis, male	1.60	73	0.24	
Chloroscombrus chrysurus	1.48	20	0.23	
Argyrosomus sp.	0.89	10	0.14	
Dentex barnardi	0.69	20	0.11	
Citharus linguatula	0.20	20	0.03	
Plastic	0.00	0	0.00	
Total	654.62		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 36
DATE :07/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 12°2.37
start stop duration Lon E 13°38.99
TIME :10:28:37 10:51:26 22.8 (min) Purpose : 3
LOG : 3147.84 3149.08 1.2 Region : 4040
FDEPTH: 53 59 Gear cond.: 0
BDEPTH: 53 59 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.3 kn
Sorted : 0 Total catch: 326.04 Catch/hour: 857.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	166.96	7993	19.48	127
Pagellus bellottii	152.23	1578	17.76	130
Trachurus trecae	101.49	2866	11.84	126
Pomadasys incisus	86.50	631	10.09	128
Pseudupeneus prayensis	68.62	684	8.01	
Raja miraletus	55.21	105	6.44	
Selene dorsalis	26.03	381	3.04	
Dasyatis marmorata	21.98	5	2.56	
Chloroscombrus chrysurus	19.59	131	2.28	
Trichiurus lepturus	19.06	723	2.22	
Citharus linguatula	18.80	855	2.19	
Grammoplites gruveli	18.14	526	2.12	
Dasyatis margarita	13.67	11	1.59	
Galeoides decadactylus	10.91	105	1.27	131
Sphyraena sphyraena	10.65	145	1.24	
Boops boops	9.33	118	1.09	
Dentex barnardi	8.55	210	1.00	
Pomadasys perotaei	8.28	13	0.97	
Rhinobatos blochii	7.57	11	0.88	
Torpedo marmorata	7.23	39	0.84	
Sepia officinalis	4.47	39	0.52	
Arius parkii	4.21	13	0.49	
Chilomycterus spinosus mauretanicus	4.08	26	0.48	
Lagocephalus laevigatus	4.08	26	0.48	
Sardinella maderensis	3.29	26	0.38	132
Dicologoglossa cuneata	2.10	39	0.25	
Sardinella aurita	1.97	26	0.23	129
Torpedo torpedo	1.18	13	0.14	
Scorpaena stephanica	0.92	13	0.11	
Arnoglossus imperialis	0.13	13	0.02	
Total	857.25		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 37
DATE :07/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°59.82
start stop duration Lon E 13°36.98
TIME :11:35:50 12:06:27 30.6 (min) Purpose : 3
LOG : 3152.61 3154.24 1.6 Region : 4040
FDEPTH: 72 73 Gear cond.: 0
BDEPTH: 72 73 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 62 Total catch: 186.45 Catch/hour: 365.47

SPECIES	CATCH/HOUR	% OF TOT. C	SAMP

	weight	numbers		
Dentex barnardi	81.97	488	22.43	135
Pseudupeneus prayensis	79.74	1053	21.82	
Pagellus bellottii	54.22	341	14.84	136
Trachurus trecae	31.05	2823	8.50	133
Pomadasys incisus	27.93	206	7.64	134
Sepia officinalis	13.64	24	3.73	
Lepidotrigla cadmani	13.23	182	3.62	
Zeus faber	12.64	12	3.46	
Sphyraena sphyraena	11.47	129	3.14	
Citharus linguatula	8.94	165	2.45	
Raja miraletus	8.41	12	2.30	
Chaetodon hoefleri	6.64	61	1.82	
Torpedo torpedo	4.94	6	1.35	
Lagocephalus laevigatus	2.59	12	0.71	
Grammoplites gruveli	2.47	41	0.68	
Sardinella maderensis	2.23	12	0.61	
Priacanthus arenatus	1.00	12	0.27	
Sepia orbignyana	0.71	12	0.19	
Alloteuthis africana	0.65	182	0.18	
Prognathodes marcellae	0.59	18	0.16	
Sphoeroides marmoratus	0.24	6	0.06	
Arnoglossus imperialis	0.12	6	0.03	
Saurida brasiliensis	0.06	18	0.02	
Total	365.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 38
DATE :07/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°59.48
start stop duration Lon E 13°31.75
TIME :13:06:28 13:37:18 30.8 (min) Purpose : 3
LOG : 3160.35 3161.96 1.6 Region : 4040
FDEPTH: 104 103 Gear cond.: 0
BDEPTH: 104 103 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.1 kn
Sorted : 0 Total catch: 38.15 Catch/hour: 74.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Boops boops	17.75	173	23.91	
Sphoeroides pachgaster	13.00	16	17.51	
Zeus faber	9.54	14	12.84	
Raja miraletus	7.22	12	9.72	
Dentex macrophthalmus	6.85	27	9.23	137
Erythrocles monodi	6.13	68	8.26	
Dentex barnardi	5.60	21	7.55	138
Dentex angolensis	2.72	12	3.67	139
Lepidotrigla cadmani	1.87	16	2.52	
Sepia officinalis	1.48	2	1.99	
Sphyraena sphyraena	0.90	6	1.21	
Anthias anthias	0.33	4	0.45	
Pseudupeneus prayensis	0.25	2	0.34	
Fistularia petimba	0.23	2	0.31	
Chelidonichthys gabonensis	0.23	2	0.31	
Citharus linguatula	0.14	4	0.18	
Total	74.25		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 39
DATE :07/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°58.66
start stop duration Lon E 13°31.75
TIME :14:34:18 15:14:18 30.0 (min) Purpose : 3
LOG : 3165.97 3167.47 1.5 Region : 4040
FDEPTH: 268 268 Gear cond.: 0
BDEPTH: 270 270 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 3.0 kn
Sorted : 0 Total catch: 914.90 Catch/hour: 1829.80

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	589.16	1034	32.20	
Zeus faber	464.20	1386	25.37	
Merluccius polli	267.60	1936	14.62	141
Laemonema laureysi	96.36	1276	5.27	
Synagrops microlepis	64.02	4048	3.50	
Dentex macrophthalmus	62.76	248	3.43	140
MYCTOPHIDAE	53.46	26136	2.92	
Brotula barbata	52.80	22	2.89	
Bembrops heterurus	39.60	418	2.16	
Malacocephalus occidentalis	31.90	308	1.74	
Nezumia aequalis	27.50	484	1.50	
Rajella barnardi	21.92	10	1.20	
Pontinus accraensis	16.72	110	0.91	
Parapenaeus longirostris, female	16.28	1694	0.89	
Parapenaeus longirostris, male	11.44	1804	0.63	
Dosidicus gigas	4.40	22	0.24	
Pterothrissus belloci	4.18	22	0.23	
Trigla lyra	3.96	22	0.22	
Monolene microstoma	1.54	88	0.08	
Total	1829.80		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 40
DATE :07/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°59.10
start stop duration Lon E 13°27.65
TIME :17:00:09 17:30:44 30.6 (min) Purpose : 3
LOG : 3172.49 3174.12 1.6 Region : 4040
FDEPTH: 353 354 Gear cond.: 0
BDEPTH: 353 354 Validity : 0
Towing dir: 0° Wire out : 810 m Speed : 3.2 kn
Sorted : 0 Total catch: 361.78 Catch/hour: 709.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	547.04	4229	77.09	142
Laemonema laureysi	39.03	528	5.50	
Pterothrissus belloci	18.34	108	2.58	
Bathyuroconger vicinus	16.71	269	2.36	
Hymenocephalus italicus	16.50	6031	2.32	
Lophiodes kempi	9.28	96	1.31	
Aristeus varidens, male ***	8.08	312	1.14	
Nezumia aequalis	8.08	204	1.14	
Etmopterus polli	6.04	539	0.85	
Zenopsis conchifer	4.96	12	0.70	
Trichiurus lepturus	4.84	259	0.68	
Chaunax pictus	4.75	194	0.67	
Synagrops microlepis	4.20	367	0.59	
JELLYFISH	3.88	65	0.55	
Halosaurus ovenii	3.45	755	0.49	
Aristeus varidens, female ***	2.80	496	0.40	
Bathynectes piperitus	2.80	65	0.40	
Chlorophthalmus atlanticus	2.16	65	0.30	
MYCTOPHIDAE	2.04	194	0.29	
Peristedion cataphractum	1.94	312	0.27	
Parapenaeus longirostris,f **	1.51	339	0.21	
Parapenaeus longirostris, m **	0.31	86	0.04	
Lestrolepis intermedia	0.31	12	0.04	
Calappa pelii	0.31	12	0.04	
Saurida brasiliensis	0.22	118	0.03	
Total	709.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 41
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°57.64
start stop duration Lon E 13°24.55
TIME :18:25:43 18:55:50 30.1 (min) Purpose : 3
LOG : 3178.50 3179.93 1.4 Region : 4040
FDEPTH: 438 439 Gear cond.: 0
BDEPTH: 438 439 Validity : 0
Towing dir: 0° Wire out : 950 m Speed : 2.9 kn
Sorted : 0 Total catch: 448.04 Catch/hour: 892.51

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	322.87	622	36.18	143
Nematocarcinus africanus	202.51	56689	22.69	
Hymenocephalus italicus	101.59	9651	11.38	
Etmopterus polli	63.67	1592	7.13	
Laemonema laureysi	60.28	474	6.75	
Raja miraletus	35.90	68	4.02	
Parapandalus narval	31.49	16526	3.53	
Aristeus varidens, female ***	13.55	745	1.52	
Chlorophthalmus atlanticus	12.87	305	1.44	
Chaceon maritae	8.13	34	0.91	
Dibranchus atlanticus	7.45	474	0.83	
Chaunax pictus	6.77	135	0.76	
Halosaurus ovenii	5.76	508	0.65	
Galeus polli	4.06	102	0.46	
JELLYFISH	4.06	102	0.46	
Triplophos hemingi	2.03	745	0.23	
Aristeus varidens, male ***	1.69	102	0.19	
Bathynectes piperitus	1.69	34	0.19	
Stomias boa boa	1.35	68	0.15	
Lophius vaillanti	1.06	2	0.12	
Hoplostethus cadenati	1.02	34	0.11	
MICROSTOMATIDAE	1.02	711	0.11	
Laemonema laureysi	1.02	34	0.11	0
Glyphus marsupialis	0.68	34	0.08	
Total	892.51		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 42
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°55.39
start stop duration Lon E 13°22.41
TIME :19:59:41 20:29:14 29.6 (min) Purpose : 3
LOG : 3183.64 3185.07 1.4 Region : 4040
FDEPTH: 513 506 Gear cond.: 0
BDEPTH: 513 506 Validity : 0
Towing dir: 0° Wire out : 1000 m Speed : 2.9 kn
Sorted : 0 Total catch: 436.72 Catch/hour: 886.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	252.59	9064	28.49	
Stomias boa boa	243.25	6920	27.43	
Nematocarcinus africanus	180.30	3218	20.33	
Merluccius polli	71.68	114	8.08	144
Lamprogrammus exutus	63.55	1673	7.17	
Yarrella blackfordi	17.06	747	1.92	
Centrophorus granulosus	9.02	2	1.02	
Aristeus varidens, female	8.61	585	0.97	
Dibranchus atlanticus	7.11	455	0.80	
Aristeus varidens, male	5.36	763	0.60	
Chlorophthalmus atlanticus	5.20	130	0.59	0
Benthodesmus tenuis	4.67	260	0.53	
Etmopterus polli	3.09	97	0.35	
Triplophos hemingi	2.27	325	0.26	
Nezumia aequalis	1.95	97	0.22	
Ariomma bondi	1.95	49	0.22	
Xenodermichthys copei	1.62	130	0.18	
Galeus polli	1.30	49	0.15	
Hymenocephalus italicus	0.97	97	0.11	
Neobythites analis	0.97	130	0.11	
Bathyuroconger vicinus	0.65	32	0.07	
Nemichthys scolopaceus	0.65	32	0.07	
Stereomastis sp.	0.65	61	0.07	
Bathynectes piperitus	0.65	16	0.07	
NOTOSUDIDAE	0.49	16	0.05	
Bufoceratias wedli	0.49	32	0.05	
Symphurus sp.	0.32	16	0.04	
Melanocetus johnsoni	0.16	16	0.02	
MYCTOPHIDAE	0.16	81	0.02	
Total	886.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 43
DATE :07/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°53.73
start stop duration Lon E 13°20.43
TIME :21:29:09 22:00:12 31.1 (min) Purpose : 3
LOG : 3188.75 3190.16 1.4 Region : 4040
FDEPTH: 619 618 Gear cond.: 0
BDEPTH: 619 618 Validity : 0
Towing dir: 0° Wire out : 1100 m Speed : 2.7 kn
Sorted : 27 Total catch: 189.56 Catch/hour: 366.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	86.57	21156	23.63	
Stomias boa boa	77.37	2408	21.12	
Lamprogrammus exutus	69.66	352	19.02	
Hoplostethus cadenati	29.89	1001	8.16	
Yarrella blackfordi	27.46	1069	7.50	
Merluccius polli	16.10	27	4.39	
Chlorophthalmus atlanticus	14.47	433	3.95	
Chaceon maritae, female ***	7.71	27	2.10	
Benthodesmus tenuis	5.68	203	1.55	
Chaceon maritae, male ***	5.68	14	1.55	
Aristeus varidens, female ***	5.55	379	1.51	
Illex coindetii	2.30	14	0.63	
Stereomastis sp.	2.16	379	0.59	
Melanonus sp.	2.16	41	0.59	
Bathyuroconger vicinus	1.89	81	0.52	
Sudis sp.	1.62	54	0.44	
Etmopterus polli	1.49	14	0.41	
Xenodermichthys copei	1.22	68	0.33	
Melanocetus johnsoni	1.22	14	0.33	
Laemonema laureysi	1.22	14	0.33	
Neobythites analis	1.22	230	0.33	
Triplophos hemingi	1.08	176	0.30	
Avocettina acuticeps	0.81	27	0.22	
Nezumia aequalis	0.68	27	0.18	
Aristeus varidens, male ***	0.41	81	0.11	
Lestrolepis intermedia	0.27	14	0.07	
Diceratias pileatus	0.14	14	0.04	
Dibranchus atlanticus	0.14	14	0.04	
MYCTOPHIDAE	0.14	41	0.04	
Total	366.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 44
DATE :08/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°43.13
start stop duration Lon E 13°19.51
TIME :00:11:58 00:41:10 29.2 (min) Purpose : 3
LOG : 3199.45 3200.94 1.5 Region : 4040
FDEPTH: 539 541 Gear cond.: 0
BDEPTH: 539 541 Validity : 0
Towing dir: 0° Wire out : 1150 m Speed : 3.1 kn
Sorted : 31 Total catch: 217.80 Catch/hour: 447.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	218.13	37942	48.72	
Stomias boa boa	49.35	1396	11.02	
Lamprogrammus exutus	39.28	518	8.77	
Chaceon maritae, female ***	37.84	158	8.45	
Yarrella blackfordi	34.96	1180	7.81	
Hoplostethus cadenati	23.02	935	5.14	
Chaceon maritae, male ***	18.56	58	4.15	
Aristeus varidens, female	11.51	576	2.57	
Halosaurus ovenii	3.31	101	0.74	
Benthodesmus tenuis	2.73	144	0.61	
Aristeus varidens, male	2.01	288	0.45	
Laemonema laureysi	1.29	14	0.29	
Merluccius polli	1.21	2	0.27	
Etmopterus spinax	1.15	29	0.26	
Stereomastis sp.	0.86	101	0.19	
Etmopterus polli	0.72	14	0.16	
Gadella imberbis	0.58	29	0.13	
Avocettina acuticeps	0.43	29	0.10	
Triplophos hemingi	0.29	72	0.06	
Melanonus sp.	0.14	14	0.03	
Glyphus marsupialis	0.14	14	0.03	
MYCTOPHIDAE	0.14	14	0.03	
Total	447.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 45
DATE :08/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°41.67
start stop duration Lon E 13°20.93
TIME :01:58:37 02:31:03 32.4 (min) Purpose : 3

LOG : 3204.70 3206.37 1.7 Region : 4040
FDEPTH: 428 426 Gear cond.: 0
BDEPTH: 428 426 Validity : 0
Towing dir: 0° Wire out : 980 m Speed : 3.1 kn
Sorted : 22 Total catch: 163.38 Catch/hour: 302.28

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	193.23	61750	63.92	
Laemonema laureysi	29.92	233	9.90	
Hoplostethus cadenati	14.38	596	4.76	
Merluccius polli	12.95	17	4.28	145
Aristeus varidens, female	11.53	733	3.81	
Stomias boa boa	7.12	220	2.36	
Yarrella blackfordi	6.73	194	2.23	
Hymenocephalus italicus	6.35	764	2.10	
Malacocephalus occidentalis	5.83	13	1.93	
Halosaurus ovenii	3.50	207	1.16	
Illex coindetii	2.59	13	0.86	
Dibranchus atlanticus	1.42	78	0.47	
Chaunax pictus	1.42	65	0.47	
Gadella imberbis	1.04	52	0.34	
Nezumia aequalis	1.04	26	0.34	
Galeus polli	1.04	13	0.34	
Aristeus varidens, male	0.91	150	0.30	
Etmopterus spinax	0.52	26	0.17	
Lophiodes kempi	0.26	13	0.09	
Small shrimps	0.26	194	0.09	
MYCTOPHIDAE	0.26	803	0.09	
Total	302.28		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 46
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°42.90
start stop duration Lon E 13°22.89
TIME :03:54:44 04:24:44 30.0 (min) Purpose : 3
LOG : 3211.26 3212.87 1.6 Region : 4040
FDEPTH: 341 341 Gear cond.: 0
BDEPTH: 341 341 Validity : 0
Towing dir: 0° Wire out : 785 m Speed : 3.2 kn
Sorted : 0 Total catch: 203.33 Catch/hour: 406.66

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	245.28	1836	60.32	146
Nematocarcinus africanus	24.72	9510	6.08	
Aristeus varidens, male	19.44	426	4.78	
Centrophorus granulosus	18.84	6	4.63	
Aristeus varidens, female	18.48	996	4.54	
Etmopterus polli	16.98	882	4.18	
Hymenocephalus italicus	16.92	1836	4.16	
Laemonema laureysi	13.44	312	3.30	
Lophius vaillanti	8.70	108	2.14	
Glyphus marsupialis	4.32	1896	1.06	
Chaceon maritae	4.26	12	1.05	
Bathynectes piperitus	3.66	66	0.90	
Squat lobster	3.06	474	0.75	
MYCTOPHIDAE	1.44	1116	0.35	
Nezumia aequalis	1.32	30	0.32	
Calappa pelii	1.06	18	0.26	
Bathyuroconger vicinus	1.02	60	0.25	
Chaunax pictus	0.96	54	0.24	
Gadella imberbis	0.72	24	0.18	
Parapenaeus longirostris, female	0.48	108	0.12	
Helicolenus dactylopterus ***	0.48	18	0.12	
Peristedion cataphractum	0.30	78	0.07	
JELLYFISH	0.30	18	0.07	
Chlorophthalmus atlanticus	0.18	6	0.04	
Parapenaeus longirostris, male	0.12	30	0.03	
Solenocera africana	0.12	18	0.03	
Trichiurus lepturus	0.06	18	0.01	
Total	406.66		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 47
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°43.02
start stop duration Lon E 13°24.89
TIME :05:56:01 06:26:04 30.1 (min) Purpose : 3
LOG : 3217.53 3219.07 1.6 Region : 4040
FDEPTH: 255 261 Gear cond.: 0
BDEPTH: 255 261 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 3.1 kn
Sorted : 0 Total catch: 765.80 Catch/hour: 1529.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	337.84	29383	22.09	
Zenopsis conchifer	237.20	857	15.51	
Chlorophthalmus atlanticus	208.65	4516	13.65	
Merluccius polli	184.69	5295	12.08	147
Pterothrissus belloci	131.18	805	8.58	
Brotula barbata	131.18	78	8.58	
Laemonema laureysi	70.48	727	4.61	
Bembrops heterurus	59.96	597	3.92	
Malacocephalus occidentalis	48.12	260	3.15	
Illex coindetii	24.14	363	1.58	
Pontinus accraensis	22.76	130	1.49	
Parasudis fraserbrunneri	18.57	286	1.21	
Coelorinchus caelorhincus	17.77	519	1.16	
Parapenaeus longirostris, female	11.78	1402	0.77	
Monolene microstoma	7.59	26	0.50	
Parapenaeus longirostris, male	7.01	1012	0.46	
Mystriophis rostellatus	3.37	52	0.22	0
Gadella imberbis	2.86	52	0.19	
Syacium micrurum	1.82	208	0.12	
Mystriophis rostellatus	1.30	26	0.08	
Lophiodes kempi	0.52	26	0.03	
MYCTOPHIDAE	0.26	441	0.02	
Total	1529.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 48
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°43.74
start stop duration Lon E 13°27.93
TIME :07:32:55 08:02:58 30.1 (min) Purpose : 3
LOG : 3223.88 3225.49 1.6 Region : 4040
FDEPTH: 164 159 Gear cond.: 0
BDEPTH: 164 159 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.2 kn
Sorted : 0 Total catch: 1687.38 Catch/hour: 3369.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	2848.05	4724	84.53	
Dentex angolensis	97.04	234	2.88	149
Zenopsis conchifer	91.05	188	2.70	
Trichiurus lepturus	90.05	1641	2.67	
Lagocephalus laevigatus	56.71	142	1.68	
Brotula barbata	55.71	140	1.65	
Dentex macrophthalmus	34.54	140	1.03	148
Citharus linguatula	24.76	327	0.73	
Illex coindetii	23.16	142	0.69	
G A S T R O P O D S	16.89	1877	0.50	
Pterothrissus belloci	7.99	48	0.24	
Chelidonichthys gabonensis	7.51	46	0.22	
Bembrops heterurus	6.57	48	0.19	
Saurida brasiliensis	4.21	329	0.13	
Trachurus trecae	3.75	234	0.11	150
Syacium micrurum	1.16	48	0.03	
Total	3369.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 49
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°47.76
start stop duration Lon E 13°40.62
TIME :10:01:33 10:32:01 30.5 (min) Purpose : 3
LOG : 3241.51 3243.18 1.7 Region : 4040
FDEPTH: 66 61 Gear cond.: 0
BDEPTH: 66 61 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.3 kn
Sorted : 63 Total catch: 251.04 Catch/hour: 494.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sardinella maderensis	104.44	606	21.13	156
Trachurus trecae	74.67	4253	15.11	152
Brachydeuterus auritus	46.94	2064	9.50	155
Pseudupeneus prayensis	44.42	394	8.99	
Pagellus bellottii	36.15	260	7.31	154
Lagocephalus laevigatus	31.66	63	6.41	
Selene dorsalis	25.91	347	5.24	
Raja miraletus	24.57	95	4.97	
Citharus linguatula	22.45	1008	4.54	
Grammoplites gruveli	20.72	630	4.19	
Trichiurus lepturus	14.02	339	2.84	
Pomadasys incisus	12.60	79	2.55	151
Rhinobatos albomaculatus	11.34	16	2.29	
Lithognathus mormyrus	4.65	8	0.94	
G A S T R O P O D S	3.62	473	0.73	
Sepia orbignyana	2.44	32	0.49	
Dasyatis margarita	2.36	8	0.48	
Serranus accraensis	2.36	63	0.48	
Octopus vulgaris	1.97	8	0.40	
Dentex barnardi	1.34	16	0.27	153
Lepidotrigla cadmani	1.18	8	0.24	
Saurida brasiliensis	1.02	433	0.21	
Argyrosomus sp.	0.87	8	0.18	
Sphyraena sphyraena	0.63	8	0.13	
Torpedo torpedo	0.55	8	0.11	
Dicologoglossa hexophthalma	0.47	8	0.10	
Sea urchin, weak spines	0.47	55	0.10	
Arnoglossus imperialis	0.32	8	0.06	
Boops boops	0.16	8	0.03	
Total	494.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 50
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°44.76
start stop duration Lon E 13°44.42
TIME :11:18:12 11:48:08 29.9 (min) Purpose : 3
LOG : 3247.46 3249.03 1.6 Region : 4040
FDEPTH: 31 33 Gear cond.: 0
BDEPTH: 31 33 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 132 Total catch: 274.33 Catch/hour: 549.76

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus laevigatus	91.62	533	16.67	
Chloroscombrus chrysurus	80.00	806	14.55	
Galeoides decadactylus	70.78	822	12.88	163
Pagellus bellottii	60.20	417	10.95	157
Pseudupeneus prayensis	46.89	389	8.53	
Selene dorsalis	25.57	321	4.65	
Pomadasys incisus	23.25	224	4.23	159
Sardinella aurita	21.68	465	3.94	160
Ephippion guttifer	18.20	8	3.31	
Sphyraena sphyraena	15.55	44	2.83	
Balistes capriscus	14.07	32	2.56	
Lithognathus mormyrus	13.43	88	2.44	164
Pseudotolithus senegalensis	8.94	8	1.63	167
Raja miraletus	7.05	12	1.28	
Decapterus rhonchus**	6.85	128	1.25	
Brachydeuterus auritus	6.17	337	1.12	158
Sardinella maderensis	5.97	64	1.09	161
Sphyraena guachancho	5.93	88	1.08	
Gymnura micrura	5.33	2	0.97	
Rhinobatos albomaculatus	3.69	4	0.67	
Caranx crysos	3.61	4	0.66	
Syacium micrurum	3.21	40	0.58	
Trachurus trecae	2.53	48	0.46	162
Chilomycterus reticulatus	1.98	2	0.36	
Grammoplites gruveli	1.80	48	0.33	
Pomadasys jubelini	1.56	8	0.28	166
Pomadasys rogeri	1.36	76	0.25	165
Arius parkii	1.24	28	0.23	
Eucinostomus melanopterus	0.80	12	0.15	
Citharus linguatula	0.48	20	0.09	
Total	549.76		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 51
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°31.86
start stop duration Lon E 13°38.89
TIME :13:27:03 13:57:02 30.0 (min) Purpose : 3
LOG : 3262.26 3263.91 1.6 Region : 4040
FDEPTH: 43 43 Gear cond.: 0
BDEPTH: 43 43 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.3 kn
Sorted : 0 Total catch: 108.41 Catch/hour: 217.04

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pseudupeneus prayensis	88.97	795	40.99	
Alectis alexandrinus	28.79	38	13.26	
Raja miraletus	27.95	46	12.88	
Decapterus rhonchus**	13.01	230	6.00	
Chloroscombrus chrysurus	12.49	78	5.76	
Parapristipoma octolineatum	7.61	16	3.51	
Lagocephalus laevigatus	6.89	6	3.17	
Dasyatis margarita	4.96	4	2.29	
Cynoglossus canariensis	4.58	2	2.11	
Dasyatis marmorata	2.88	4	1.33	
Bodianus speciosus	2.80	4	1.29	
Syacium micrurum	2.76	50	1.27	
Sepia officinalis	2.18	2	1.01	
Selene dorsalis	2.04	10	0.94	
Epinephelus aeneus	1.50	2	0.69	
Acanthurus monroviae	1.48	2	0.68	
Dentex barnardi	1.18	26	0.54	168
Boops boops	1.10	22	0.51	
Arius parkii	0.70	2	0.32	
Chaetodon hoefleri	0.70	4	0.32	
Eucinostomus melanopterus	0.42	4	0.19	
Grammoplites gruveli	0.40	8	0.18	
Scorpaena scrofa	0.34	6	0.16	
Fistularia petimba	0.30	4	0.14	
Pagellus bellottii	0.26	2	0.12	
Chaetodon robustus	0.20	4	0.09	
Chromis cadenati	0.18	2	0.08	
Alloteuthis africana	0.14	64	0.06	
Torpedo torpedo	0.14	2	0.06	
Prognathodes marcellae	0.06	2	0.03	
Total	217.04		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 52
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°30.93
start stop duration Lon E 13°34.49
TIME :14:58:48 15:28:54 30.1 (min) Purpose : 3
LOG : 3269.55 3271.03 1.5 Region : 4040
FDEPTH: 62 63 Gear cond.: 0
BDEPTH: 62 63 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 2.9 kn
Sorted : 132 Total catch: 675.93 Catch/hour: 1346.92

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys incisus	544.01	2591	40.39	171
Pagellus bellottii	400.13	2710	29.71	169
Pseudupeneus prayensis	110.59	757	8.21	
Sardinella maderensis	84.69	468	6.29	173
Raja miraletus	36.57	80	2.71	
Lithognathus mormyrus	33.28	60	2.47	172
Dentex barnardi	32.28	169	2.40	170
Rhinobatos albomaculatus	31.64	20	2.35	
Octopus vulgaris	30.69	20	2.28	
Selene dorsalis	14.05	90	1.04	
Citharus linguatula	6.48	329	0.48	
Grammoplites gruveli	5.48	159	0.41	
Chelidonichthys gabonensis	3.89	40	0.29	

Saurida brasiliensis	3.39	1156	0.25
Sphyraena sphyraena	2.79	10	0.21
Serranus accraensis	2.49	60	0.18
Chloroscombrus chrysurus	1.79	10	0.13
Sepia orbignyana	1.59	10	0.12
Trachurus trecae	1.10	40	0.08
Total	1346.92		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 53
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°32.64
start stop duration Lon E 13°30.24
TIME :16:23:15 16:43:10 19.9 (min) Purpose : 3
LOG : 3276.55 3277.53 1.0 Region : 4040
FDEPTH: 104 104 Gear cond.: 0
BDEPTH: 104 104 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.0 kn
Sorted : 0 Total catch: 108.74 Catch/hour: 327.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla cadmani	111.14	886	33.92	
Pterothrissus belloci	36.89	283	11.26	
Brachydeuterus auritus	21.13	139	6.45	176
Citharus linguatula	18.35	289	5.60	
Brotula barbata	17.72	18	5.41	
Trachurus trecae	17.06	1184	5.21	175
Raja miraletus	15.85	21	4.84	
Sepia orbignyana	14.31	30	4.37	
Dentex angolensis	13.05	54	3.98	174
Sphoeroides cf. pachygaster	12.90	18	3.94	
Saurida brasiliensis	9.97	2203	3.04	
Zeus faber	6.60	18	2.01	
Pontinus accraensis	5.94	57	1.81	
Boops boops	5.09	42	1.55	
Octopus vulgaris	3.74	15	1.14	
Parapenaeus longirostris, female	3.44	130	1.05	
Torpedo torpedo	3.41	12	1.04	
Branchiostegus semifasciatus	2.71	3	0.83	
Peristedion cataphractum	1.87	33	0.57	
Lepidotrigla carolae	1.84	51	0.56	
G A S T R O P O D S	1.30	160	0.40	
Trichiurus lepturus	1.05	15	0.32	
Pomadasys incisus	0.84	3	0.26	
Priacanthus arenatus	0.75	3	0.23	
Illex coindetii	0.39	12	0.12	
Dentex macrophthalmus	0.18	3	0.06	
GOBIIDAE	0.12	39	0.04	
Dentex congoensis	0.03	3	0.01	
Parapenaeus longirostris, male	0.03	15	0.01	
Total	327.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 54
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°29.40
start stop duration Lon E 13°24.10
TIME :17:33:42 17:53:52 20.2 (min) Purpose : 3
LOG : 3284.14 3285.08 0.9 Region : 4040
FDEPTH: 263 267 Gear cond.: 0
BDEPTH: 263 267 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 2.8 kn
Sorted : 0 Total catch: 141.37 Catch/hour: 420.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pterothrissus belloci	91.62	559	21.79	
Synagrops microlepis	63.81	4040	15.17	
Brotula barbata	55.39	65	13.17	
Laemonema laureysi	46.41	500	11.03	
Zenopsis conchifer	43.73	68	10.40	
Bembrops heterurus	34.80	446	8.28	
Pontinus accraensis	28.11	277	6.68	
Merluccius polli	22.01	134	5.23	177
Chlorophthalmus atlanticus	6.48	158	1.54	
Coelorinchus caelorhincus	5.89	149	1.40	
Monolene microstoma	2.92	178	0.69	
Illex coindetii	2.77	24	0.66	
Malacocephalus occidentalis	2.47	119	0.59	
Parapenaeus longirostris, male	2.08	372	0.50	
Parapenaeus longirostris, female	2.08	446	0.50	
Bathyuroconger vicinus	2.02	59	0.48	
MYCTOPHIDAE	1.93	1377	0.46	
Acanthocarpus brevipinnis	1.73	45	0.41	
Gephyroberyx darwini	1.28	9	0.30	
Shrimps, small, non comm.	1.04	1071	0.25	
Trichiurus lepturus	1.04	98	0.25	
Peristedion cataphractum	0.59	9	0.14	
PARALEPIDIDAE	0.45	15	0.11	
Total	420.65		100.03	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 55
DATE :08/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°30.67
start stop duration Lon E 13°22.59
TIME :18:43:45 19:14:06 30.4 (min) Purpose : 3
LOG : 3286.82 3288.34 1.5 Region : 4040
FDEPTH: 310 308 Gear cond.: 0
BDEPTH: 310 308 Validity : 0
Towing dir: 0° Wire out : 650 m Speed : 3.0 kn
Sorted : 44 Total catch: 428.33 Catch/hour: 846.79

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Laemonema laureysi	261.81	3213	30.92	
Merluccius polli	235.51	2349	27.81	178
Helicolenus dactylopterus	92.78	1465	10.96	
Chlorophthalmus atlanticus	43.01	939	5.08	
Scyliorhinus cervigoni	33.81	20	3.99	
Coelorinchus caelorhincus	25.17	826	2.97	
Hymenocephalus italicus	23.10	3606	2.73	
Hoplostethus cadenati	18.22	7700	2.15	
Malacocephalus occidentalis	16.53	208	1.95	
Zenopsis conchifer	15.02	20	1.77	
Lophius vaillanti	12.40	20	1.46	
Pterothrissus belloci	10.52	57	1.24	
Epigonus telescopus	10.52	283	1.24	
Mystriophis rostellatus	5.45	38	0.64	
Bathyuroconger vicinus	4.88	225	0.58	
Parapenaeus longirostris	4.84	901	0.57	
**	4.70	95	0.55	
Synagrops microlepis	4.13	283	0.49	
Aequorea forskalea	4.13	38	0.49	
Myctophid sp. A	4.13	2762	0.49	
Illex coindetii	4.13	38	0.49	
Aristeus varidens, female	3.57	376	0.42	
Aristeus varidens, male	1.31	57	0.16	
Etmopterus sp.	1.13	320	0.13	
Trichiurus lepturus	1.13	132	0.13	
Peristedion cataphractum	1.13	38	0.13	
Calappa pelii	0.94	20	0.11	
Gadella imberbis	0.94	38	0.11	
Parapenaeopsis atlantica	0.94	225	0.11	
GALATHEIDAE	0.75	38	0.09	
Pasipheaid	0.19	395	0.02	
Total	846.79		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 56
DATE :08/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°31.09
start stop duration Lon E 13°20.46
TIME :20:06:01 20:36:19 30.3 (min) Purpose : 3
LOG : 3291.82 3293.17 1.4 Region : 4040
FDEPTH: 444 460 Gear cond.: 0
BDEPTH: 444 460 Validity : 0
Towing dir: 0° Wire out : 900 m Speed : 2.7 kn
Sorted : 0 Total catch: 618.56 Catch/hour: 1224.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Hoplostethus cadenati	511.59	20716	41.78	
Nematocarcinus africanus	454.46	124476	37.12	
Lamprogrammus exutus	70.25	1871	5.74	
Borostomias antarcticus	56.10	1415	4.58	
Merluccius polli	41.95	77	3.43	179
Yarrella blackfordi	38.86	1415	3.17	
Aristeus varidens, female	16.47	1055	1.35	
Xenodermichthys copei	8.75	1029	0.71	
Gadella imberbis	5.66	206	0.46	
THYSANOTEUTHIDAE	4.12	26	0.34	
Aristeus varidens, male	4.12	540	0.34	
Neoharriotta pinnata	2.61	2	0.21	
Coelorinchus caelorhincus	2.06	77	0.17	
Chaunax pictus	1.80	51	0.15	
Triplophos hemingi	1.03	129	0.08	
Bassanago albescens	1.03	77	0.08	
Acanthephyra sp.	1.03	129	0.08	
Benthodesmus tenuis	0.77	26	0.06	
Halosaurus ovenii	0.51	51	0.04	
Dibranchus atlanticus	0.51	51	0.04	
Glyphus marsupialis	0.26	103	0.02	
Nemichthys scolopaceus	0.26	26	0.02	
MYCTOPHIDAE	0.26	335	0.02	
Total	1224.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 57
DATE :08/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°27.67
start stop duration Lon E 13°21.57
TIME :21:32:14 22:02:24 30.2 (min) Purpose : 3
LOG : 3295.49 3296.88 1.4 Region : 4040
FDEPTH: 522 526 Gear cond.: 0
BDEPTH: 522 526 Validity : 0
Towing dir: 0° Wire out : 1030 m Speed : 2.7 kn
Sorted : 27 Total catch: 349.70 Catch/hour: 695.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	331.03	12155	47.58	
Nematocarcinus africanus	163.45	38586	23.49	
Hoplostethus cadenati	63.88	2302	9.18	
Stomias boa boa	43.45	1112	6.25	
Aristeus varidens, female	39.31	2431	5.65	
Yarrella blackfordi	38.79	1500	5.58	
Xenodermichthys copei	6.98	853	1.00	
Aristeus varidens, male	6.72	853	0.97	
Nezumia aequalis	1.03	103	0.15	
Chaunax pictus	0.78	26	0.11	
Avocettina acuticeps	0.26	26	0.04	
Total	695.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 58
DATE :09/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°14.58
start stop duration Lon E 13°27.74
TIME :00:43:54 01:05:08 21.2 (min) Purpose : 3
LOG : 3310.63 3311.68 1.1 Region : 4040
FDEPTH: 520 519 Gear cond.: 0
BDEPTH: 520 519 Validity : 0
Towing dir: 0° Wire out : 1060 m Speed : 3.0 kn
Sorted : 28 Total catch: 249.03 Catch/hour: 703.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	374.92	81239	53.27	
Lamprogrammus exutus	180.08	4095	25.59	
Hoplostethus cadenati	31.79	1094	4.52	
Aristeus varidens, female ***	27.98	1653	3.98	
Stomias boa boa	21.87	534	3.11	
Chaceon maritae, male ***	16.02	51	2.28	
Gadella imberbis	13.48	560	1.92	
Yarrella blackfordi	7.89	356	1.12	
Chlorophthalmus atlanticus	7.12	153	1.01	
Todarodes sp.	7.12	25	1.01	
Aristeus varidens, male ***	4.32	636	0.61	
Stereomastis sp.	3.82	382	0.54	
Malacocephalus occidentalis	3.56	25	0.51	
Chaunax pictus	2.03	51	0.29	
Bathyuroconger vicinus	1.02	102	0.14	
Avocettina acuticeps	0.25	25	0.04	
Halosaurus ovenii	0.25	25	0.04	
Triplophos hemingi	0.25	25	0.04	
Total	703.81		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 59
DATE :09/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°13.75
start stop duration Lon E 13°29.30
TIME :02:21:04 02:41:35 20.5 (min) Purpose : 3
LOG : 3315.70 3316.72 1.0 Region : 4040
FDEPTH: 427 425 Gear cond.: 0
BDEPTH: 427 425 Validity : 0
Towing dir: 0° Wire out : 945 m Speed : 3.0 kn
Sorted : 25 Total catch: 243.07 Catch/hour: 711.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	414.71	119427	58.32	
Merluccius polli	121.93	181	17.15	180
Aristeus varidens, female	27.38	1357	3.85	
Yarrella blackfordi	22.00	749	3.09	
Laemonema laureysi	21.76	398	3.06	
Chaunax pictus	15.45	328	2.17	
Hymenocephalus italicus	12.87	1802	1.81	
Neoharriotta pinnata	11.32	9	1.59	
Stomias boa boa	9.60	257	1.35	
Etmopterus polli	9.13	234	1.28	
Halosaurus ovenii	7.72	515	1.09	
Lamprogrammus exutus	5.15	23	0.72	
Coloconger cadenati	5.15	23	0.72	
Chaceon maritae	5.15	23	0.72	
Hoplostethus cadenati	4.91	257	0.69	
Chlorophthalmus atlanticus	4.45	94	0.63	
Aristeus varidens, male	3.51	491	0.49	
Pontinus accraensis	2.57	23	0.36	
JELLYFISH	1.87	0	0.26	
Gadella imberbis	1.64	47	0.23	
MYCTOPHIDAE	1.64	843	0.23	
Triplophos hemingi	0.70	47	0.10	
Bathyuroconger vicinus	0.47	70	0.07	
Total	711.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 60
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°14.21
start stop duration Lon E 13°30.20
TIME :03:54:40 04:24:10 29.5 (min) Purpose : 3
LOG : 3320.47 3322.03 1.6 Region : 4040
FDEPTH: 381 387 Gear cond.: 0
BDEPTH: 381 387 Validity : 0
Towing dir: 0° Wire out : 835 m Speed : 3.2 kn
Sorted : 0 Total catch: 142.98 Catch/hour: 290.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	127.73	37464	43.92	
Merluccius polli	68.71	163	23.63	181
Aristeus varidens, female	13.53	742	4.65	
Laemonema laureysi	12.41	122	4.27	
Hymenocephalus italicus	11.19	1586	3.85	
Halosaurus ovenii	10.27	722	3.53	
Yarrella blackfordi	9.56	437	3.29	
Chaunax pictus	6.41	346	2.20	
Bathyuroconger vicinus	4.78	153	1.64	
Etmopterus polli	4.68	346	1.61	
Neoharriotta pinnata	4.68	2	1.61	
Aristeus varidens, male	3.36	498	1.15	
Chaceon maritae	2.85	10	0.98	
Parapenaeus longirostris, female	2.54	508	0.87	
MYCTOPHIDAE	1.73	915	0.59	
Coelorinchus caelorhincus	0.81	31	0.28	

Lophius vaillanti	0.81	20	0.28
Gadella imberbis	0.71	20	0.24
Bathynectes piperitus	0.71	20	0.24
GALATHEIDAE	0.51	20	0.17
Peristedion cataphractum	0.51	20	0.17
Glyphus marsupialis	0.51	173	0.17
Helicolenus dactylopterus	0.41	20	0.14
Chlorophthalmus atlanticus	0.41	20	0.14
Solenocera africana	0.31	20	0.10
Hoplostethus mediterraneus	0.31	102	0.10
Trichiurus lepturus	0.20	20	0.07
Hoplostethus cadenati	0.10	2	0.03
Pasipheaid	0.10	71	0.03
Total	290.81		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 61
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°11.77
start stop duration Lon E 13°32.81
TIME :06:04:04 06:30:19 26.3 (min) Purpose : 3
LOG : 3327.53 3328.83 1.3 Region : 4040
FDEPTH: 250 248 Gear cond.: 0
BDEPTH: 250 248 Validity : 0
Towing dir: 0° Wire out : 550 m Speed : 3.0 kn
Sorted : 0 Total catch: 518.06 Catch/hour: 1184.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Bembrops heterurus	322.42	3369	27.23	
Brotula barbata	192.69	210	16.27	183
Synagrops microlepis	180.34	10354	15.23	
Pontinus accraensis	118.63	1038	10.02	
Pterothrissus belloci	78.17	402	6.60	
Zenopsis conchifer	51.89	155	4.38	
Merluccius polli	50.97	1141	4.30	182
Laemonema laureysi	42.06	363	3.55	
Trichiurus lepturus	28.11	1063	2.37	
Parapenaeus longirostris, male	20.34	3550	1.72	
Lophiodes kempi	18.74	39	1.58	
Parapenaeus longirostris, female	15.31	2281	1.29	
JELLYFISH	13.49	311	1.14	
Monolene microstoma	10.51	608	0.89	
OPHIDIIDAE	8.69	297	0.73	
Coelorinchus caelorhincus	6.99	530	0.59	
Mystriophis rostellatus	4.91	14	0.42	
Cynoponticus ferox	4.30	2	0.36	
Dentex macrophthalmus	3.89	14	0.33	
Acanthocarpus brevipinnis	3.11	117	0.26	
Bassanago albescens	2.19	64	0.19	
Sepia officinalis	1.94	14	0.16	
Dicologoglossa cuneata	1.37	14	0.12	
Bathynectes piperitus	1.14	14	0.10	
Gadella imberbis	0.89	25	0.08	
G A S T R O P O D S	0.64	91	0.05	
Lestrolepis intermedia	0.39	14	0.03	
Total	1184.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 62
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°13.14
start stop duration Lon E 13°35.66
TIME :07:27:50 07:58:50 31.0 (min) Purpose : 3
LOG : 3332.66 3334.24 1.6 Region : 4040
FDEPTH: 155 155 Gear cond.: 0
BDEPTH: 155 155 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.1 kn
Sorted : 0 Total catch: 813.41 Catch/hour: 1574.34

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1185.60	299973	75.31	
Brotula barbata	112.47	126	7.14	188
Pterothrissus belloci	72.21	528	4.59	
Merluccius polli	47.55	1208	3.02	184
Bembrops heterurus	30.19	201	1.92	
Umbrina canariensis	28.18	50	1.79	187
Trichiurus lepturus	22.14	478	1.41	
Dentex macrophthalmus	15.60	126	0.99	186
Pontinus accraensis	12.58	151	0.80	
Sepia officinalis	7.05	50	0.45	
Dentex angolensis	6.79	25	0.43	185
Parapenaeus longirostris, female	6.04	2088	0.38	
Monolene microstoma	4.78	201	0.30	
GOBIIDAE	4.78	377	0.30	
Brachydeuterus auritus	3.77	25	0.24	190
Sepia orbignyana	3.02	25	0.19	
Parapenaeus longirostris, male	3.02	1032	0.19	
Illex coindetii	2.26	25	0.14	
Trachurus trecae	2.01	101	0.13	189
Physiculus cyanostrophus	1.51	25	0.10	
Zenopsis conchifer	1.01	25	0.06	
Chlorophthalmus atlanticus	1.01	25	0.06	
Munida sp.	0.75	126	0.05	
Total	1574.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 63
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°13.76
start stop duration Lon E 13°40.27
TIME :09:00:39 09:30:46 30.1 (min) Purpose : 3
LOG : 3340.74 3342.34 1.6 Region : 4040
FDEPTH: 65 59 Gear cond.: 0
BDEPTH: 65 59 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 0 Total catch: 235.62 Catch/hour: 469.21

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	134.24	1185	28.61	191
Raja miraletus	84.47	237	18.00	
Lagocephalus laevigatus	74.72	112	15.92	
Trachurus trecae	31.36	4307	6.68	193
Pseudupeneus prayensis	26.07	195	5.56	
Octopus vulgaris	20.21	14	4.31	
Stromateus fiatola	16.59	14	3.54	
Rhinobatos albomaculatus	15.89	8	3.39	
Torpedo torpedo	12.55	28	2.67	
Grammoplites gruveli	10.32	404	2.20	
Seriola carpenteri	9.06	14	1.93	
Sphyraena sphyraena	5.85	28	1.25	
Serranus accraensis	5.58	112	1.19	
Citharus linguatula	5.16	1129	1.10	
Arnoglossus imperialis	3.62	42	0.77	
Chaetodon hoefleri	3.48	14	0.74	
Sardinella maderensis	2.37	14	0.51	
Alloteuthis africana	2.23	1115	0.48	
Selene dorsalis	2.23	14	0.48	
Saurida brasiliensis	0.56	195	0.12	
B I V A L V E S	0.56	84	0.12	
Dentex angolensis	0.42	42	0.09	192
Sepia bertheloti	0.42	42	0.09	
Dentex barnardi	0.42	14	0.09	
Munida sp.	0.28	56	0.06	
Epinephelus aeneus, juvenile	0.28	14	0.06	
Sphoeroides marmoratus	0.14	14	0.03	
Scorpaena scrofa	0.14	0	0.03	
Total	469.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 64
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°16.39
start stop duration Lon E 13°41.88
TIME :10:13:18 10:40:19 27.0 (min) Purpose : 3
LOG : 3346.14 3347.70 1.6 Region : 4040
FDEPTH: 22 22 Gear cond.: 0
BDEPTH: 22 22 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.5 kn
Sorted : 0 Total catch: 70.74 Catch/hour: 157.20

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus laevigatus	48.49	227	30.85	
Balistes capriscus	47.82	107	30.42	
Pagellus bellottii	22.16	151	14.09	194
Ephippion guttifer	9.42	4	5.99	
Alectis alexandrinus	8.31	18	5.29	
Raja miraletus	6.56	13	4.17	
Fistularia petimba	4.31	67	2.74	
Aluterus heudelotii	2.78	11	1.77	
Sepia bertheloti	2.00	2	1.27	
Caranx crysos	1.33	13	0.85	
Pseudupeneus prayensis	1.27	7	0.81	
Pomadasys perotaei	1.20	2	0.76	
Eucinostomus melanopterus	0.64	4	0.41	
Trachinocephalus myops	0.40	4	0.25	
Citharus linguatula	0.27	18	0.17	
Rypticus saponaceus	0.13	2	0.08	
Decapterus rhonchus**	0.04	2	0.03	
Grammoplites gruveli	0.04	2	0.03	
Scorpaena normani	0.02	2	0.01	
Total	157.20		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 65
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 11°0.09
start stop duration Lon E 13°49.10
TIME :12:31:22 13:01:15 29.9 (min) Purpose : 3
LOG : 3364.24 3365.89 1.7 Region : 4040
FDEPTH: 35 36 Gear cond.: 0
BDEPTH: 35 36 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.3 kn
Sorted : 0 Total catch: 210.01 Catch/hour: 421.71

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pseudotolithus senegalensis	73.90	203	17.52	195
Pteroscion peli	49.80	940	11.81	
Brachydeuterus auritus	48.35	4956	11.47	197
Trichiurus lepturus	35.26	434	8.36	
Raja miraletus	33.17	48	7.87	
Pomadasys perotaei	32.93	185	7.81	198
Chloroscombrus chrysurus	31.81	209	7.54	
Ilisha africana ***	23.86	402	5.66	
Galeoides decadactylus	21.93	538	5.20	199
Pomadasys incisus	16.22	193	3.85	196
Selene dorsalis	10.68	313	2.53	
Sphyraena guachancho	6.99	40	1.66	
Penaeus notialis, female	5.94	96	1.41	
Grammoplites gruveli	5.06	104	1.20	
Dasyatis margarita	4.46	6	1.06	
Rhinobatos albomaculatus	3.98	2	0.94	
Sepia bertheloti	3.94	40	0.93	
Trachurus trecae	3.69	48	0.88	200
Eucinostomus melanopterus	2.65	24	0.63	
Penaeus notialis, male	2.17	96	0.51	
Chilomycterus spinosus mauretanicus	1.12	8	0.27	
Arius parkii	0.98	2	0.23	
Dicologoglossa cuneata	0.80	24	0.19	
Pseudupeneus prayensis	0.72	8	0.17	
Umbrina canariensis	0.64	8	0.15	
Citharus linguatula	0.64	16	0.15	
Total	421.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 66
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°59.22
start stop duration Lon E 13°44.50
TIME :13:49:18 14:15:02 25.7 (min) Purpose : 3
LOG : 3370.99 3372.33 1.3 Region : 4040
FDEPTH: 59 59 Gear cond.: 0
BDEPTH: 59 59 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.1 kn
Sorted : 91 Total catch: 459.77 Catch/hour: 1072.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	353.05	2693	32.93	202
Trichiurus lepturus	216.87	1096	20.23	
Brachydeuterus auritus	126.62	9199	11.81	201
Raja miraletus	64.01	152	5.97	
Galeoides decadactylus	57.48	175	5.36	205
Selene dorsalis	50.37	583	4.70	
Dicologoglossa cuneata	40.46	816	3.77	
Citharus linguatula	37.19	1877	3.47	
Torpedo torpedo	22.15	93	2.07	
Trachurus trecae	18.54	2647	1.73	206
Grammoplites gruveli	16.91	466	1.58	
Pseudotolithus senegalensis	10.54	21	0.98	207
Alectis alexandrinus	10.03	12	0.94	
Lagocephalus laevigatus	9.79	47	0.91	
Chloroscombrus chrysurus	7.00	58	0.65	
GOBIIDAE	5.36	723	0.50	
Sepia officinalis	5.25	12	0.49	
Serranus accraensis	3.73	93	0.35	
Umbrina canariensis	3.61	35	0.34	203
Pseudupeneus prayensis	3.61	58	0.34	
Dentex barnardi	2.91	82	0.27	204
Atractoscion aequidens	1.98	12	0.18	
Torpedo marmorata	1.87	12	0.17	
Brotula barbata	1.87	23	0.17	
Penaeus notialis, female	0.93	140	0.09	
Total	1072.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 67
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°55.90
start stop duration Lon E 13°35.70
TIME :15:28:08 15:58:25 30.3 (min) Purpose : 3
LOG : 3381.39 3382.99 1.6 Region : 4040
FDEPTH: 115 116 Gear cond.: 0
BDEPTH: 115 116 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 3.2 kn
Sorted : 0 Total catch: 208.70 Catch/hour: 413.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	114.57	856	27.71	208
Pontinus accraensis	58.47	594	14.14	
Pterothrissus belloci	45.40	398	10.98	
Synagrops microlepis	41.72	7389	10.09	
Uranoscopus albesca	35.42	250	8.57	
Dentex angolensis	20.32	125	4.92	210
Bembrops heterurus	14.86	160	3.59	
Brotula barbata	14.50	24	3.51	
Trachurus trecae	11.47	1260	2.77	209
Zeus faber	10.22	196	2.47	
Citharus linguatula	9.86	172	2.39	
Pagellus bellottii	6.48	42	1.57	213
Raja miraletus	6.24	12	1.51	
Zenopsis conchifer	5.17	12	1.25	
Merluccius polli	3.68	113	0.89	211
Umbrina canariensis	3.51	12	0.85	212
Lepidotrigla cadmani	2.50	18	0.60	
Dentex barnardi	2.26	2	0.55	
Illex coindetii	1.84	12	0.45	
Sphoeroides lobatus	1.55	6	0.37	
Argyrosomus sp.	1.53	2	0.37	
Sardinella aurita	0.83	6	0.20	
Trichiurus lepturus	0.48	12	0.11	
B I V A L V E S	0.30	12	0.07	
Saurida brasiliensis	0.12	18	0.03	
Calappa pelii	0.12	6	0.03	
Total	413.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 68
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°55.91
start stop duration Lon E 13°29.91
TIME :16:56:56 17:27:32 30.6 (min) Purpose : 3
LOG : 3389.78 3391.30 1.5 Region : 4040

FDEPTH: 203 219 Gear cond.: 0
BDEPTH: 203 219 Validity : 0
Towing dir: 0° Wire out : 480 m Speed : 3.0 kn
Sorted : 0 Total catch: 342.44 Catch/hour: 671.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brotula barbata	154.04	194	22.94	214
Bembrops heterurus	141.73	1096	21.11	
Trichiurus lepturus	94.31	1390	14.05	
Synagrops microlepis	77.75	6106	11.58	
Pterothrissus belloci	54.94	371	8.18	
Merluccius polli	48.69	931	7.25	215
Pontinus accraensis	36.08	269	5.37	
Parapenaeus longirostris, female	26.14	3194	3.89	
Parapenaeus longirostris, male	14.27	3124	2.13	
Dicologoglossa cuneata	6.88	255	1.02	
Dentex angolensis	6.76	25	1.01	216
MYCTOPHIDAE	2.29	994	0.34	
Coelorinchus caelorhincus	2.18	25	0.32	
Malacocephalus occidentalis	1.67	65	0.25	
Bassanago albescens	1.27	25	0.19	
Acanthocarpus brevipinnis	1.16	14	0.17	
Chlorophthalmus atlanticus	0.51	102	0.08	
JELLYFISH	0.39	14	0.06	
Zenopsis conchifer	0.39	14	0.06	
Total	671.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 69
DATE :09/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°58.46
start stop duration Lon E 13°28.01
TIME :18:39:31 19:09:54 30.4 (min) Purpose : 3
LOG : 3395.36 3396.91 1.6 Region : 4040
FDEPTH: 370 366 Gear cond.: 0
BDEPTH: 370 366 Validity : 0
Towing dir: 0° Wire out : 800 m Speed : 3.1 kn
Sorted : 0 Total catch: 241.72 Catch/hour: 477.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	131.73	41801	27.59	
Merluccius polli	108.43	369	22.71	217
Hymenocephalus italicus	37.33	4080	7.82	
Laemonema laureysi	36.54	646	7.65	
Chaunax pictus	35.75	1351	7.49	
Bassanago albescens	23.11	387	4.84	
Lamprogrammus exutus	18.37	118	3.85	
Hoplostethus cadenati	18.37	387	3.85	
Etmopterus sp.	10.86	589	2.28	
Lophiodes kempi	7.50	59	1.57	
Parapenaeus longirostris, female	6.87	948	1.44	
Yarrella blackfordi	6.71	253	1.41	
Zenopsis conchifer	6.52	8	1.37	
Aristeus varidens, female	5.73	387	1.20	
Malacocephalus occidentalis	3.75	51	0.79	
Aristeus varidens, male	3.16	436	0.66	
Coelorinchus caelorhincus	2.96	118	0.62	
Halosaurus ovenii	2.76	243	0.58	
Gadella imberbis	2.51	93	0.53	
Benthodesmus tenuis	2.43	101	0.51	
Bathynectes piperitus	2.35	51	0.49	
Borostomias antarcticus	1.18	34	0.25	
Acanthephyra sp.	0.83	369	0.17	
MYCTOPHIDAE	0.75	579	0.16	
Helicolenus dactylopterus	0.39	8	0.08	
Monolene microstoma	0.34	18	0.07	
Parapenaeus longirostris, male	0.08	8	0.02	
Munida sp.	0.08	8	0.02	
Total	477.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 70
DATE :09/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 11°3.06
start stop duration Lon E 13°24.66
TIME :20:44:57 21:14:58 30.0 (min) Purpose : 3
LOG : 3406.83 3408.18 1.4 Region : 4040
FDEPTH: 738 737 Gear cond.: 0
BDEPTH: 738 737 Validity : 0
Towing dir: 0° Wire out : 1400 m Speed : 2.7 kn
Sorted : 34 Total catch: 271.52 Catch/hour: 542.68

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	243.68	1503	44.90	
Coelorinchus caelorhincus	48.77	1199	8.99	
Opisthoteuthis agassizi	35.82	32	6.60	
Bathyuroconger vicinus	35.18	656	6.48	
Yarrella blackfordi	27.34	736	5.04	
Chaceon maritae, male	24.62	48	4.54	
Stereomastis sp.	17.43	815	3.21	
Rostroraja alba	12.79	32	2.36	
Monomitopus metriostoma	11.35	192	2.09	
Chaceon maritae, female	9.75	112	1.80	
Hoplostethus cadenati	9.11	336	1.68	
Small shrimps	8.15	2015	1.50	
OMMASTREPHIDAE	7.83	32	1.44	
Borostomias antarcticus	7.04	208	1.30	
Dibranchus atlanticus	6.40	304	1.18	
Talismania longifilis	6.24	144	1.15	
Aristeus varidens, female	6.08	368	1.12	
Dicrolene intronigra	4.64	975	0.85	
Luciobrotula nolfi	4.32	16	0.80	
**	2.72	32	0.50	
Plesiopenaeus edwardsianus	2.40	192	0.44	
Sepia sp.	1.92	16	0.35	
Halosaurus ovenii	1.76	208	0.32	
Triplophos hemingi	1.60	176	0.29	
Aristeus varidens, male	1.60	208	0.29	
Bristle worms (straws)	1.28	128	0.24	
MYCTOPHIDAE	0.80	192	0.15	
Gadella imberbis	0.80	16	0.15	
Photonectes braueri	0.48	16	0.09	
Diastobranchus capensis	0.32	16	0.06	
Heterocarpus sp.	0.16	16	0.03	
Cynoglossus lida	0.16	16	0.03	
Bufoceratias wedli	0.16	16	0.03	
Total	542.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 71
DATE :09/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°50.05
start stop duration Lon E 13°17.04
TIME :23:51:20 00:21:21 30.0 (min) Purpose : 3
LOG : 3422.12 3423.68 1.6 Region : 4040
FDEPTH: 510 510 Gear cond.: 0
BDEPTH: 510 510 Validity : 0
Towing dir: 0° Wire out : 1090 m Speed : 3.1 kn
Sorted : 29 Total catch: 289.00 Catch/hour: 577.61

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	275.42	57761	47.68	
Lamprogrammus exutus	143.50	4597	24.84	
Stomias boa boa	69.95	1659	12.11	
Hoplostethus cadenati	30.18	1279	5.22	
Yarrella blackfordi	16.19	460	2.80	
Aristeus varidens, female	10.19	580	1.76	
Gadella imberbis	7.99	40	1.38	
Trachipterus trachypterus	4.60	20	0.80	
Aristeus varidens, male	3.00	340	0.52	
Chaunax pictus	2.80	40	0.48	
Chlorophthalmus atlanticus	2.20	60	0.38	
Dibranchus atlanticus	2.20	120	0.38	
Triplophos hemingi	1.80	240	0.31	
Borostomias mononema	1.80	20	0.31	
Rajella barnardi	1.60	20	0.28	
Bathyuroconger vicinus	1.40	60	0.24	
Benthodesmus tenuis	1.20	40	0.21	
Stereomastis sp.	1.00	60	0.17	
Halosaurus ovenii	0.20	20	0.03	
Symphurus sp.	0.20	20	0.03	
Xenodermichthys copei	0.20	20	0.03	
Total	577.61		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 72
DATE :10/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°48.83
start stop duration Lon E 13°17.61
TIME :02:06:19 02:36:09 29.8 (min) Purpose : 3
LOG : 3427.98 3429.57 1.6 Region : 4040
FDEPTH: 429 429 Gear cond.: 0
BDEPTH: 429 429 Validity : 0
Towing dir: 0° Wire out : 980 m Speed : 3.2 kn
Sorted : 31 Total catch: 427.16 Catch/hour: 859.19

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	273.71	5720	31.86	
Nematocarcinus africanus	249.57	90175	29.05	
Merluccius polli	103.47	201	12.04	218
Hoplostethus cadenati	77.48	3258	9.02	
Chaunax pictus	30.17	483	3.51	
Dibranchus atlanticus	27.76	1738	3.23	
Aristeus varidens, female	26.79	1472	3.12	
Laemonema laureysi	16.90	121	1.97	
Stomias boa boa	13.03	314	1.52	
Halosaurus ovenii	8.45	362	0.98	
Yarrella blackfordi	7.00	241	0.81	
Bathyuroconger vicinus	6.52	145	0.76	
Gadella imberbis	6.03	217	0.70	
Malacocephalus occidentalis	4.83	72	0.56	
Aristeus varidens, male	4.10	555	0.48	
Plesiopenaeus edwardsianus	1.69	72	0.20	
Nezumia aequalis	1.21	24	0.14	
Benthodesmus tenuis	0.48	24	0.06	
Total	859.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 73
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°48.53
start stop duration Lon E 13°21.38
TIME :06:05:11 06:27:37 22.4 (min) Purpose : 3
LOG : 3440.95 3442.11 1.2 Region : 4040
FDEPTH: 275 278 Gear cond.: 0
BDEPTH: 275 278 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 3.1 kn
Sorted : 0 Total catch: 751.91 Catch/hour: 2011.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	984.13	18918	48.93	
Merluccius polli	350.53	5738	17.43	219
Synagrops microlepis	230.91	10224	11.48	
Pontinus accraensis	162.75	2573	8.09	
Bembrops heterurus	54.60	765	2.71	
Laemonema laureysi	42.40	522	2.11	
Chaceon maritae	41.38	139	2.06	
Pterothrissus belloci	35.47	209	1.76	
Parapenaeus longirostris, female	33.04	3686	1.64	
Parapenaeus longirostris	16.69	2782	0.83	
Mystriophis rostellatus	14.61	35	0.73	
Trichiurus lepturus	9.39	313	0.47	
Lestrolepis intermedia	8.35	417	0.41	
Nezumia aequalis	4.87	35	0.24	
Gadella imberbis	4.17	139	0.21	
Malacocephalus occidentalis	3.83	104	0.19	
Plesionika heterocarpus	3.83	1669	0.19	
Zenopsis conchifer	3.48	35	0.17	
Illex coindetii	2.78	35	0.14	
Acanthocarpus brevipinnis	1.39	35	0.07	
Bathyuroconger vicinus	1.04	35	0.05	
MYCTOPHIDAE	1.04	452	0.05	
Peristedion cataphractum	0.35	35	0.02	
Syacium micrurum	0.35	35	0.02	
Total	2011.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 74
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°48.00
start stop duration Lon E 13°24.65
TIME :07:26:50 07:57:20 30.5 (min) Purpose : 3
LOG : 3446.43 3447.99 1.6 Region : 4040
FDEPTH: 157 154 Gear cond.: 0
BDEPTH: 157 154 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.0 kn
Sorted : 0 Total catch: 1029.30 Catch/hour: 2024.85

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1524.39	24624	75.28	
Brotula barbata	146.07	118	7.21	221
Zenopsis conchifer	79.08	944	3.91	
Trichiurus lepturus	77.02	354	3.80	
Pterothrissus belloci	36.00	236	1.78	
Trachurus trecae	31.28	2538	1.54	222
Chlorophthalmus atlanticus	21.25	3187	1.05	
Dentex angolensis	19.18	59	0.95	220
Dentex macrophthalmus	19.18	177	0.95	224
Citharus linguatula	13.57	266	0.67	
Illex coindetii	11.80	59	0.58	
Torpedo torpedo	10.62	30	0.52	
Calappa pelii	9.15	207	0.45	
Bembrops heterurus	7.67	148	0.38	
Parapenaeus longirostris, female	6.20	826	0.31	
Merluccius polli	4.13	118	0.20	223
Bathyuroconger vicinus	3.84	30	0.19	
Octopus vulgaris	1.77	30	0.09	
Gadella imberbis	1.48	30	0.07	
Parapenaeus longirostris, male	0.89	236	0.04	
B I V A L V E S	0.30	30	0.01	
Total	2024.85		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 75
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°42.99
start stop duration Lon E 13°31.06
TIME :09:17:43 09:47:59 30.3 (min) Purpose : 3
LOG : 3457.61 3459.15 1.6 Region : 4040
FDEPTH: 89 89 Gear cond.: 0
BDEPTH: 89 89 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 52 Total catch: 346.72 Catch/hour: 687.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	264.98	2141	38.56	226
Pomadasys jubelini	80.24	71	11.68	225
Raja miraletus	59.94	83	8.72	
Pontinus accraensis	53.28	666	7.75	
Trachurus trecae	38.30	404	5.57	227
Lepidotrigla cadmani	34.25	274	4.98	
Dentex angolensis	23.79	285	3.46	228
Citharus linguatula	22.00	714	3.20	
Pagellus bellottii	20.93	190	3.05	229
Brotula barbata	16.65	36	2.42	
Zenopsis conchifer	13.68	36	1.99	
Pterothrissus belloci	10.70	238	1.56	
Umbrina canariensis	9.40	24	1.37	230
Saurida brasiliensis	6.54	1855	0.95	
Sphyraena sphyraena	5.95	59	0.87	232
Fistularia petimba	5.71	12	0.83	
Uranoscopus polli	5.47	12	0.80	
Sepia officinalis	3.45	83	0.50	
Dentex barnardi	2.97	12	0.43	231
Chelidonichthys gabonensis	2.62	24	0.38	
Dicologoglossa cuneata	2.38	12	0.35	
Urchin	1.67	131	0.24	
Illex coindetii	1.43	12	0.21	
Lagocephalus laevigatus	0.71	12	0.10	
Alloteuthis africana	0.24	178	0.03	

Total	687.25	100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 76
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°42.17
start stop duration Lon E 13°39.25
TIME :10:59:00 11:29:09 30.1 (min) Purpose : 3
LOG : 3467.41 3468.90 1.5 Region : 4040
FDEPTH: 47 46 Gear cond.: 0
BDEPTH: 47 46 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.0 kn
Sorted : 89 Total catch: 395.46 Catch/hour: 786.99

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	226.87	9385	28.83	233
Ilisha africana ***	91.54	1528	11.63	
Rhinobatos albomaculatus	64.04	40	8.14	
Raja miraletus	58.43	103	7.42	
Galeoides decadactylus	52.38	780	6.66	235
Pomadasys incisus	35.98	326	4.57	237
Sphyraena guachancho	30.73	96	3.90	
Pteroscion peli	27.38	88	3.48	
Pagellus bellottii	25.00	151	3.18	234
Grammoplites gruveli	24.12	581	3.06	
Alectis alexandrinus	23.72	32	3.01	
Citharus linguatula	22.61	756	2.87	
Dicologoglossa cuneata	19.10	406	2.43	
Stromateus fiatola	15.92	48	2.02	
Pseudupeneus prayensis	10.11	96	1.28	
Chloroscombrus chrysurus	9.95	88	1.26	
Pseudotolithus senegalensis	8.76	24	1.11	236
Selene dorsalis	7.40	175	0.94	
Dasyatis margarita	6.13	24	0.78	
Trichiurus lepturus	5.25	111	0.67	
Arius parkii	4.54	4	0.58	
Eucinostomus melanopterus	4.38	48	0.56	
Sardinella aurita	2.87	32	0.36	
Serranus accraensis	2.39	48	0.30	
Lagocephalus laevigatus	1.99	8	0.25	
Sepia bertheloti	1.19	8	0.15	
Trachurus trecae	1.11	103	0.14	238
Penaeus notialis	0.96	16	0.12	
Dentex barnardi	0.72	16	0.09	
Bassanago albescens**	0.56	8	0.07	
Umbrina canariensis	0.48	8	0.06	
Torpedo torpedo	0.24	16	0.03	
Decapterus rhonchus**	0.16	8	0.02	
Total	786.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 77
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°32.44
start stop duration Lon E 13°36.43
TIME :12:45:59 13:16:06 30.1 (min) Purpose : 3
LOG : 3477.68 3479.26 1.6 Region : 4040
FDEPTH: 27 29 Gear cond.: 0
BDEPTH: 27 29 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.2 kn
Sorted : 59 Total catch: 356.53 Catch/hour: 710.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	214.73	8871	30.22	
Galeoides decadactylus	133.67	1985	18.81	
Chloroscombrus chrysurus	81.06	897	11.41	
Alectis alexandrinus	75.80	108	10.67	
Sphyraena guachancho	50.69	167	7.14	
Pseudotolithus senegalensis	29.41	84	4.14	
Sardinella maderensis	25.47	275	3.58	
Eucinostomus melanopterus	17.93	191	2.52	
Ilisha africana ***	12.20	227	1.72	
Drepane africana	10.64	96	1.50	
Lagocephalus laevigatus	10.40	84	1.46	
Pomadasys incisus	9.09	120	1.28	239
Raja miraletus	8.49	12	1.19	
Pomadasys perotaei	8.49	24	1.19	
Pseudupeneus prayensis	6.34	48	0.89	
Arius parkii	5.02	24	0.71	
Cynoglossus senegalensis	4.10	4	0.58	
Selene dorsalis	3.35	48	0.47	
Sardinella aurita	2.51	24	0.35	
Epinephelus aeneus	0.68	2	0.10	
Cynoglossus canariensis	0.38	2	0.05	
Total	710.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 78
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°33.10
start stop duration Lon E 13°22.44
TIME :14:58:29 15:18:33 20.1 (min) Purpose : 3
LOG : 3492.45 3493.45 1.0 Region : 4040
FDEPTH: 95 95 Gear cond.: 0
BDEPTH: 95 95 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.0 kn
Sorted : 0 Total catch: 98.56 Catch/hour: 294.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla cadmani	100.93	1139	34.25	
Trachurus trecae	35.81	496	12.16	240
Dentex angolensis	28.52	481	9.68	241
Citharus linguatula	25.95	1256	8.81	
Raja miraletus	21.41	33	7.26	
Zeus faber	14.80	33	5.02	
Uranoscopus albesca	11.45	51	3.89	
Umbrina canariensis	8.16	18	2.77	242
Torpedo marmorata	6.16	15	2.09	
Sphyraena guachancho	5.38	15	1.83	
Pagellus bellottii	4.93	36	1.67	243
Lagocephalus laevigatus	4.51	36	1.53	
Sepia bertheloti	3.11	45	1.06	
Scorpaena normani	2.93	87	0.99	
Trichiurus lepturus	2.81	3	0.95	
Dicologoglossa cuneata	2.69	9	0.91	
Sphoeroides lobatus	2.54	3	0.86	
Saurida brasiliensis	2.15	380	0.73	
Octopus vulgaris	2.06	9	0.70	
Pterothrissus belloci	1.49	36	0.51	
Dicologoglossa hexophthalma	1.43	27	0.49	
Torpedo torpedo	1.32	3	0.45	
Sepia officinalis	1.26	3	0.43	
Fistularia petimba	0.78	3	0.26	
Urchin	0.75	63	0.25	
Dentex barnardi	0.42	3	0.14	
Illex coindetii	0.42	6	0.14	
Peristedion cataphractum	0.42	9	0.14	
GOBIIDAE	0.06	3	0.02	
Total	294.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 79
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°36.34
start stop duration Lon E 13°15.69
TIME :16:35:20 17:03:59 28.7 (min) Purpose : 3
LOG : 3502.17 3503.76 1.6 Region : 4040
FDEPTH: 133 132 Gear cond.: 0
BDEPTH: 133 132 Validity : 0
Towing dir: 0° Wire out : 350 m Speed : 3.3 kn
Sorted : 0 Total catch: 375.18 Catch/hour: 785.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	430.59	70656	54.82	
Trachurus trecae	135.16	12787	17.21	245
Brotula barbata	54.77	63	6.97	249
Trichiurus lepturus	39.57	75	5.04	
Pterothrissus belloci	17.33	176	2.21	
Dentex macrophthalmus	15.70	163	2.00	247
Dentex angolensis	13.94	88	1.78	244
Illex coindetii	12.44	126	1.58	
Citharus linguatula	10.93	276	1.39	
Torpedo marmorata	10.68	13	1.36	
Uranoscopus albesca	10.30	38	1.31	
Zeus faber	7.91	13	1.01	
Zenopsis conchifer	6.41	63	0.82	
Umbrina canariensis	5.90	38	0.75	246
B I V A L V E S	4.15	553	0.53	
Lepidotrigla cadmani	3.27	38	0.42	
Syacium micrurum	2.39	100	0.30	
Pagellus bellottii	1.76	13	0.22	248
Sepia officinalis	1.13	25	0.14	
Parapenaeus longirostris, female	0.50	151	0.06	
Saurida brasiliensis	0.38	75	0.05	
Bembrops heterurus	0.25	13	0.03	
Total	785.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 80
DATE :10/03/16 GEAR TYPE: BT NO: 26 POSITION:Lat S 10°38.71
start stop duration Lon E 13°11.07
TIME :18:47:40 19:17:48 30.1 (min) Purpose : 3
LOG : 3511.66 3513.12 1.4 Region : 4040
FDEPTH: 391 392 Gear cond.: 0
BDEPTH: 391 392 Validity : 0
Towing dir: 0° Wire out : 850 m Speed : 2.9 kn
Sorted : 0 Total catch: 238.60 Catch/hour: 475.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	129.36	574	27.23	250
Hymenocephalus italicus	78.70	7217	16.56	
Laemonema laureysi	75.51	574	15.89	
Lophius vaillanti	64.92	18	13.66	
Nematocarcinus africanus	54.48	17333	11.47	
Etmopterus sp.	17.36	526	3.65	
Chaunax pictus	13.70	119	2.88	
Malacocephalus occidentalis	10.04	64	2.11	
Dibranchus atlanticus	4.46	303	0.94	
Bassanago albescens	4.46	143	0.94	
Aristeus varidens, female	3.50	223	0.74	
Plesiopenaeus edwardsianus	3.50	16	0.74	
Parapenaeus longirostris, female	3.03	271	0.64	
Illex coindetii	2.23	16	0.47	
Chaceon maritae	1.91	22	0.40	
Coelorinchus caelorhincus	1.91	48	0.40	
Epigonus telescopus	1.59	16	0.34	
Aristeus varidens, male	1.27	191	0.27	
Gadella imberbis	1.12	48	0.23	
Nessorhamphus ingolfianus	0.64	48	0.13	
Yarrella blackfordi	0.48	16	0.10	
MYCTOPHIDAE	0.32	494	0.07	
Glyphus marsupialis	0.32	64	0.07	
Solenocera africana	0.16	16	0.03	
Benthodesmus tenuis	0.16	32	0.03	
Total	475.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 81
DATE :10/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°40.04
start stop duration Lon E 13°10.57
TIME :20:29:42 20:59:51 30.2 (min) Purpose : 3
LOG : 3516.80 3518.28 1.5 Region : 4040
FDEPTH: 457 452 Gear cond.: 0
BDEPTH: 457 452 Validity : 0
Towing dir: 0° Wire out : 950 m Speed : 3.0 kn
Sorted : 0 Total catch: 207.85 Catch/hour: 413.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	176.86	47188	42.77	
Merluccius polli	50.77	151	12.28	251
Laemonema laureysi	33.62	1034	8.13	
Yarrella blackfordi	28.65	933	6.93	
Aristeus varidens, female	23.28	1369	5.63	
Chaunax pictus	20.29	509	4.91	
Hoplostethus cadenati	20.05	637	4.85	
Lamprogrammus exutus	16.07	95	3.89	
Gadella imberbis	6.68	271	1.62	
Aristeus varidens, male	6.05	939	1.46	
Halosaurus ovenii	5.89	302	1.42	
Malacocephalus occidentalis	3.50	32	0.85	
Hymenocephalus italicus	2.86	255	0.69	
Stomias boa boa	2.71	64	0.65	
Illex coindetii	2.71	16	0.65	
Dibranchus atlanticus	2.71	191	0.65	
JELLYFISH	2.39	80	0.58	
Bathyuroconger vicinus	2.39	95	0.58	
Plesiopenaeus edwardsianus	1.75	637	0.42	
Benthodesmus tenuis	1.59	64	0.38	
Sergestes sp.	0.80	143	0.19	
MYCTOPHIDAE	0.80	334	0.19	
Coelorinchus caelorhincus	0.48	16	0.12	
Etmopterus sp.	0.30	48	0.07	
Stereomastis sp.	0.16	32	0.04	
Xenodermichthys copei	0.16	48	0.04	
Total	413.49		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 82
DATE :11/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 9°26.36
start stop duration Lon E 12°55.95
TIME :01:18:39 01:50:34 31.9 (min) Purpose : 3
LOG : 3540.90 3542.55 1.6 Region : 4040
FDEPTH: 641 644 Gear cond.: 0
BDEPTH: 641 644 Validity : 0
Towing dir: 0° Wire out : 1310 m Speed : 3.1 kn
Sorted : 26 Total catch: 205.76 Catch/hour: 386.77

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	231.88	48481	59.95	
Stomias boa boa	74.59	1835	19.28	
Lamprogrammus exutus	30.38	165	7.85	
Hoplostethus cadenati	16.54	481	4.28	
Yarrella blackfordi	8.42	361	2.18	
Triplophos hemingi	5.86	947	1.52	
Aristeus varidens, female	5.41	286	1.40	
Chlorophthalmus atlanticus	5.26	105	1.36	
Stereomastis sp.	2.41	135	0.62	
Glyphus marsupialis	2.26	150	0.58	
Nezumia aequalis	0.90	15	0.23	
Dibranchus atlanticus	0.75	15	0.19	
Benthodesmus tenuis	0.60	15	0.16	
Aristeus varidens, male	0.60	60	0.16	
Acanthephyra sp.	0.60	75	0.16	
Chaunax pictus	0.15	15	0.04	
Monomitopus metriostoma	0.15	45	0.04	
Total	386.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 83
DATE :11/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°26.75
start stop duration Lon E 12°58.12
TIME :03:24:10 03:55:22 31.2 (min) Purpose : 3
LOG : 3547.36 3548.87 1.5 Region : 4040
FDEPTH: 547 545 Gear cond.: 0
BDEPTH: 547 545 Validity : 0
Towing dir: 0° Wire out : 1130 m Speed : 2.9 kn
Sorted : 0 Total catch: 175.70 Catch/hour: 337.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	234.42	44412	69.38	
Lamprogrammus exutus	50.96	508	15.08	
Stomias boa boa	8.88	265	2.63	
Aristeus varidens, female	8.31	369	2.46	
Chaceon maritae, male	6.81	23	2.01	
Stereomastis sp.	6.12	427	1.81	
Hoplostethus cadenati	5.31	208	1.57	

Chaceon maritae, female	4.73	12	1.40
Chlorophthalmus atlanticus	1.96	46	0.58
Zameus (Scymnodon) squamulosus	1.85	12	0.55
Aristeus varidens, male	1.50	173	0.44
Parexocoetus brachypterus	1.38	35	0.41
Yarrella blackfordi	1.04	46	0.31
Etmopterus pusillus	0.81	2	0.24
Triplophos hemingi	0.69	127	0.20
Glyphus marsupialis	0.58	35	0.17
Melanonus zugmayeri	0.58	12	0.17
Ebinania costaecanariae	0.58	12	0.17
Sudis hyalina	0.58	12	0.17
MYCTOPHIDAE	0.35	150	0.10
Acanthephyra sp.	0.23	35	0.07
Chaunax pictus	0.23	12	0.07
Total	337.88		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 84
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°23.56
start stop duration Lon E 13°4.93
TIME :06:02:42 06:31:38 28.9 (min) Purpose : 3
LOG : 3557.36 3558.74 1.4 Region : 4040
FDEPTH: 171 168 Gear cond.: 0
BDEPTH: 171 168 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 2.9 kn
Sorted : 0 Total catch: 641.84 Catch/hour: 1331.16

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1059.22	93194	79.57	
Erythrocles monodi	36.06	39	2.71	254
Zenopsis conchifer	26.01	158	1.95	
Scorpaena maderensis	25.02	60	1.88	
Malacocephalus occidentalis	24.63	197	1.85	
Uranoscopus polli	19.31	118	1.45	
Pterothrissus belloci	18.32	236	1.38	
Chlorophthalmus atlanticus	17.93	2916	1.35	
Brotula barbata	16.55	21	1.24	255
Bembrops heterurus	13.99	197	1.05	
Torpedo torpedo	10.44	21	0.78	
Miracorvina angolensis	10.44	39	0.78	256
Dentex angolensis	8.87	39	0.67	252
Parapenaeus longirostris, female	8.67	1576	0.65	
Mystriophis rostellatus	7.49	60	0.56	
Umbrina canariensis	6.90	21	0.52	253
Dentex macrophthalmus	4.93	21	0.37	257
Trichiurus lepturus	4.33	79	0.33	
Parapenaeus longirostris, male	3.74	1064	0.28	
Cynoponticus ferox	2.41	2	0.18	
Microchirus frechkopi	2.17	39	0.16	
Saurida brasiliensis	1.77	158	0.13	
Syacium micrurum	1.18	158	0.09	
OPHIDIIDAE	0.59	39	0.04	
Cyttus traversi	0.20	21	0.01	
Total	1331.16		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 85
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°18.30
start stop duration Lon E 13°14.31
TIME :08:09:32 08:39:35 30.1 (min) Purpose : 3
LOG : 3570.38 3571.99 1.6 Region : 4040
FDEPTH: 89 89 Gear cond.: 0
BDEPTH: 89 89 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.2 kn
Sorted : 0 Total catch: 474.22 Catch/hour: 946.86

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	329.85	2614	34.84	261
Brachydeuterus auritus	174.99	1523	18.48	259
Trachurus trecae, juvenile	171.91	25983	18.16	265
Raja miraletus	76.07	126	8.03	
Lepidotrigla cadmani	27.55	447	2.91	
Trichiurus lepturus	27.55	56	2.91	
Pomadasys incisus	19.15	84	2.02	260
Selene dorsalis	17.61	98	1.86	262
Pagellus bellottii	15.93	140	1.68	258
Sphyraena sphyraena	15.93	70	1.68	
Sardinella maderensis	13.98	14	1.48	
Lagocephalus laevigatus	11.18	84	1.18	
Argyrosomus sp.	8.67	14	0.92	264
Pseudupeneus prayensis	7.97	70	0.84	
Citharus linguatula	7.55	489	0.80	
Sepia officinalis	5.45	28	0.58	
Dentex angolensis	3.91	98	0.41	263
Pterothrissus belloci	3.35	84	0.35	
Chaetodon hoefleri	3.21	14	0.34	
Uranoscopus albesca	3.21	14	0.34	
Saurida brasiliensis	1.40	321	0.15	
Alloteuthis africana	0.42	98	0.04	
Total	946.86		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 86
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°16.30
start stop duration Lon E 13°22.00
TIME :09:49:43 10:20:06 30.4 (min) Purpose : 3
LOG : 3580.22 3581.82 1.6 Region : 4040
FDEPTH: 47 49 Gear cond.: 0
BDEPTH: 47 49 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.2 kn
Sorted : 59 Total catch: 197.62 Catch/hour: 390.30

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	239.49	6215	61.36	266
Rhinobatos albomaculatus	41.08	39	10.53	
Selene dorsalis	32.94	332	8.44	
Pagellus bellottii	15.88	107	4.07	269
Galeoides decadactylus	12.56	107	3.22	270
Pseudotolithus senegalensis	12.15	24	3.11	268
Raja miraletus	9.66	12	2.47	
Pomadasys jubelini	4.80	6	1.23	
Chloroscombrus chrysurus	4.44	30	1.14	
Alectis alexandrinus	4.21	6	1.08	
Pomadasys perotaei	3.08	6	0.79	267
Epinephelus aeneus	2.55	6	0.65	
Pseudupeneus prayensis	2.13	12	0.55	
Caranx rhonchus	1.60	41	0.41	
Sphyraena guachancho	1.13	59	0.29	
Eucinostomus melanopterus	0.71	6	0.18	
Lagocephalus laevigatus	0.71	6	0.18	
Lepidotrigla cadmani	0.53	6	0.14	
Citharus linguatula	0.53	36	0.14	
Grammoplites gruveli	0.12	6	0.03	
Total	390.30		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 87
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°13.04
start stop duration Lon E 13°25.73
TIME :11:19:27 11:49:07 29.7 (min) Purpose : 3
LOG : 3588.36 3590.03 1.7 Region : 4040
FDEPTH: 22 23 Gear cond.: 0
BDEPTH: 22 23 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.4 kn
Sorted : 68 Total catch: 450.12 Catch/hour: 910.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	237.09	1371	26.05	272
Pseudotolithus senegalensis	144.75	497	15.90	273
Drepane africana	131.77	170	14.48	
Chloroscombrus chrysurus	72.32	959	7.94	
Sphyraena guachancho	66.25	279	7.28	
Gymnura micrura	43.88	4	4.82	
Brachydeuterus auritus	43.20	1068	4.75	271
Ilisha africana ***	36.76	1019	4.04	
Ephippion guttifer	16.18	12	1.78	
Sardinella maderensis	13.71	388	1.51	274
JELLYFISH	13.23	12	1.45	
Pteroscion peli	12.86	425	1.41	
Pomadasys perotaei	10.56	49	1.16	
Stromateus fiatola	9.95	61	1.09	
Dasyatis margarita	9.71	12	1.07	
Alectis alexandrinus	8.66	8	0.95	
Selene dorsalis	7.52	340	0.83	
Trichiurus lepturus	5.22	121	0.57	
Portunus validus	4.97	36	0.55	
Arius gigas	4.71	2	0.52	
Rhinobatos albomaculatus	3.56	6	0.39	
Lagocephalus laevigatus	3.15	24	0.35	
Eucinostomus melanopterus	2.79	36	0.31	
Rhizoprionodon acutus	2.67	2	0.29	
Trachinotus ovatus	1.46	12	0.16	
Arius heudelotii**	1.33	24	0.15	
Caranx crysos	1.09	12	0.12	
Cynoglossus canariensis	0.91	2	0.10	
Total	910.25		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 88
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°0.50
start stop duration Lon E 13°13.30
TIME :13:43:32 14:14:36 31.1 (min) Purpose : 3
LOG : 3606.10 3607.77 1.7 Region : 4040
FDEPTH: 34 36 Gear cond.: 0
BDEPTH: 34 36 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 97 Total catch: 2125.61 Catch/hour: 4104.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	2722.42	34965	66.32	275
Galeoides decadactylus	690.80	19161	16.83	276
Alectis alexandrinus	114.71	170	2.79	
Sphyraena guachancho	104.51	977	2.55	
Pseudotolithus senegalensis	93.89	127	2.29	277
Pomadasys rogeri	72.22	127	1.76	278
Drepane africana	70.10	127	1.71	
Selene dorsalis	56.50	850	1.38	
Rhinobatos albomaculatus	48.86	42	1.19	
Chloroscombrus chrysurus	39.51	340	0.96	
Raja miraletus	30.16	42	0.73	
Scomberomorus tritor	20.39	42	0.50	
Arius gigas	16.57	42	0.40	
Eucinostomus melanopterus	10.62	127	0.26	
Caranx rhonchus	7.22	297	0.18	
Rhizoprionodon acutus	5.04	2	0.12	
Penaeus notialis	1.27	42	0.03	
Total	4104.81		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 89
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°1.89
start stop duration Lon E 13°5.13
TIME :15:38:33 16:09:36 31.1 (min) Purpose : 3
LOG : 3617.20 3618.85 1.6 Region : 4040
FDEPTH: 86 86 Gear cond.: 0
BDEPTH: 86 86 Validity : 0
Towing dir: 0° Wire out : 220 m Speed : 3.2 kn
Sorted : 0 Total catch: 207.50 Catch/hour: 400.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	105.97	13588	26.43	279
Lepidotrigla cadmani	105.04	1090	26.20	
Brachydeuterus auritus	96.81	800	24.14	280
Sepia officinalis	27.48	58	6.85	
Lagocephalus laevigatus	10.78	23	2.69	
Trichiurus lepturus	9.74	23	2.43	
Sphyraena guachancho	9.62	70	2.40	
Citharus linguatula	6.26	267	1.56	
Zeus faber	5.22	12	1.30	
Pseudupeneus prayensis	5.10	58	1.27	
Dentex angolensis	5.10	116	1.27	281
Selene dorsalis	3.98	267	0.99	
Pagellus bellottii	3.83	46	0.95	282
Uranoscopus albesca	2.32	12	0.58	
Dicologoglossa hexophthalma	1.51	23	0.38	
Illex coindetii	1.04	12	0.26	
Grammoplites gruveli	0.81	12	0.20	
Urchin	0.35	23	0.09	
Total	400.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 90
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°6.21
start stop duration Lon E 13°0.24
TIME :17:12:04 17:42:16 30.2 (min) Purpose : 3
LOG : 3626.75 3628.22 1.5 Region : 4040
FDEPTH: 106 106 Gear cond.: 0
BDEPTH: 106 106 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 2.9 kn
Sorted : 0 Total catch: 164.15 Catch/hour: 326.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Zenopsis conchifer	66.75	50	20.47	
Lepidotrigla cadmani	44.30	358	13.59	
Pagellus bellottii	43.81	358	13.43	283
Boops boops	36.75	417	11.27	
Zeus faber	24.74	60	7.58	
Citharus linguatula	23.74	894	7.28	
Sepia officinalis	23.64	40	7.25	
Dentex congoensis	19.07	417	5.85	284
Lepidotrigla carolae	15.00	517	4.60	
Uranoscopus albesca	8.05	40	2.47	
Fistularia petimba	5.26	10	1.61	
Dentex angolensis	4.77	79	1.46	285
Umbrina canariensis	4.27	20	1.31	286
Urchin	1.89	149	0.58	
Saurida brasiliensis	1.59	377	0.49	
Microchirus frechkopi	1.09	20	0.34	
Arnoglossus imperialis	0.89	60	0.27	
G A S T R O P O D S	0.50	70	0.15	
Total	326.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 91
DATE :11/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 10°9.89
start stop duration Lon E 12°54.48
TIME :19:27:26 19:58:28 31.0 (min) Purpose : 3
LOG : 3637.65 3639.23 1.6 Region : 4040
FDEPTH: 313 321 Gear cond.: 0
BDEPTH: 313 321 Validity : 0
Towing dir: 0° Wire out : 700 m Speed : 3.1 kn
Sorted : 0 Total catch: 463.08 Catch/hour: 895.42

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	459.74	10658	51.34	0
Merluccius polli	219.97	1392	24.57	287
Laemonema goodebeyi	40.53	480	4.53	
Zenopsis conchifer	38.21	248	4.27	
Pontinus accraensis	34.19	356	3.82	
Pterothrissus belloci	18.79	108	2.10	
Lophius vaillanti	13.61	15	1.52	
Parapenaeus longirostris, female	13.61	1470	1.52	
Raja miraletus	12.53	15	1.40	
Chlorophthalmus atlanticus	9.44	108	1.05	
Synagrops microlepis	7.73	402	0.86	
Bembrops greyi	6.34	124	0.71	
Hymenocephalus italicus	4.64	449	0.52	
Aristeus varidens, male	3.09	402	0.35	
Gadella imberbis	2.48	77	0.28	
Coelorinchus caelorhincus	1.70	46	0.19	
Epigonus telescopus	1.55	15	0.17	

Aristeus varidens, female	1.55	201	0.17
Nematocarcinus africanus	1.55	526	0.17
JELLYFISH	1.39	31	0.16
Malacocephalus occidentalis	0.93	15	0.10
Bassanago albescens	0.46	15	0.05
Parapenaeus longirostris, male	0.46	31	0.05
MYCTOPHIDAE	0.31	248	0.03
Solenocera africana	0.31	62	0.03
G A S T R O P O D S	0.15	31	0.02
Munida sp.	0.15	15	0.02
Total	895.42		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 92
DATE :11/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 10°10.84
start stop duration Lon E 12°51.02
TIME :21:14:31 21:44:31 30.0 (min) Purpose : 3
LOG : 3646.17 3647.51 1.3 Region : 4040
FDEPTH: 665 662 Gear cond.: 0
BDEPTH: 665 662 Validity : 0
Towing dir: 0° Wire out : 1300 m Speed : 2.7 kn
Sorted : 27 Total catch: 212.64 Catch/hour: 425.28

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Nematocarcinus africanus	171.52	46096	40.33
Lamprogrammus exutus	84.80	896	19.94
Yarrella blackfordi	61.60	1984	14.48
Hoplostethus cadenati	20.64	928	4.85
Chaceon maritae, female	15.84	48	3.72
Stereomastis sp.	14.88	1712	3.50
Stomias boa boa	9.12	224	2.14
Aristeus varidens, female	8.00	480	1.88
Chlorophthalmus atlanticus	5.44	0	1.28
Zameus (Scymnodon) squamulosus	4.64	16	1.09
Chaceon maritae, male	4.64	16	1.09
JELLYFISH	4.48	64	1.05
Monomitopus metriostoma	4.32	288	1.02
Triplophos hemingi	3.36	352	0.79
Coelorinchus caelorhincus	3.20	96	0.75
Plesiopenaeus edwardsianus	2.56	288	0.60
Halosaurus ovenii	1.28	16	0.30
Xenodermichthys copei	1.28	80	0.30
Aristeus varidens, male	1.28	192	0.30
Lucifobrotula nolfi	0.80	16	0.19
Malacocephalus occidentalis	0.48	16	0.11
Sudis sp.	0.48	16	0.11
ARISTEIDAE	0.32	16	0.08
Avocettina acuticeps	0.16	32	0.04
Talismania longifilis	0.16	32	0.04
Total	425.28		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 93
DATE :12/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 9°58.31
start stop duration Lon E 12°45.65
TIME :00:07:45 00:37:09 29.4 (min) Purpose : 3
LOG : 3660.28 3661.76 1.5 Region : 4040
FDEPTH: 748 747 Gear cond.: 0
BDEPTH: 748 747 Validity : 0
Towing dir: 0° Wire out : 1530 m Speed : 3.0 kn
Sorted : 35 Total catch: 292.08 Catch/hour: 595.88

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Lamprogrammus exutus	248.73	1942	41.74
Yarrella blackfordi	50.43	1485	8.46
Stomias boa boa	49.78	1208	8.35
Octopoteuthis sicula	37.21	163	6.24
Hoplostethus cadenati	35.42	1404	5.94
Coelorinchus caelorhincus	24.97	898	4.19
Stereomastis sp.	18.44	685	3.10
Small shrimps	18.12	2375	3.04
Lophiodes kempi	13.14	2	2.20
Anemones, white	12.73	49	2.14
Anemone - purple	11.10	16	1.86
Aristeus varidens, female	10.77	522	1.81
Talismania longifilis	7.83	277	1.31
JELLYFISH	7.83	16	1.31
Sudis hyalina	6.85	212	1.15
Merluccius polli	6.77	6	1.14 288
Gadella imberbis	4.73	163	0.79
Bufoceratias wedli	3.92	65	0.66
Bathyuroconger vicinus	3.59	82	0.60
S H R I M P S	3.26	245	0.55
Xenodermichthys copei	2.94	212	0.49
Triplophos hemingi	2.12	245	0.36
Monomitopus metriostoma	1.80	114	0.30
Dibranchus atlanticus	1.80	49	0.30
Etmopterus polli	1.47	16	0.25
Lampadena pontifex	1.31	49	0.22
OPHICHTHIDAE	1.14	33	0.19
Rajella barnardi	1.14	33	0.19
Avocettina acuticeps	0.98	33	0.16
Aristeus varidens, male	0.98	98	0.16
Glyphus marsupialis	0.98	33	0.16
Bathypterois phenax *	0.98	114	0.16
Melanonus zugmayeri	0.82	33	0.14
Stomias sp.	0.65	33	0.11
Diastobranchus capensis	0.65	33	0.11
Gnatophausia zoea	0.49	49	0.08
Total	595.88		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 94
DATE :12/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 9°55.95
start stop duration Lon E 12°46.97
TIME :02:29:31 03:00:08 30.6 (min) Purpose : 3
LOG : 3667.66 3669.17 1.5 Region : 4040
FDEPTH: 466 463 Gear cond.: 0
BDEPTH: 466 463 Validity : 0
Towing dir: 0° Wire out : 980 m Speed : 3.0 kn
Sorted : 27 Total catch: 82.98 Catch/hour: 162.60

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Nematocarcinus africanus	34.92	11034	21.48
Lamprogrammus exutus	25.28	341	15.55
Aristeus varidens, female	19.58	899	12.04
Chaunax pictus	14.58	200	8.97
Hoplostethus cadenati	10.23	406	6.29
Aristeus varidens, male	9.64	917	5.93
Gadella imberbis	7.05	259	4.34
Laemonema laureysi	6.11	723	3.76
Stomias boa boa	4.94	165	3.04
Merluccius polli	4.59	10	2.82 289
Yarrella blackfordi	4.23	135	2.60
Pterothrissus belloci	2.94	12	1.81
Stereomastis sp.	2.47	317	1.52
Malacocephalus occidentalis	2.23	18	1.37
Chlorophthalmus atlanticus	2.12	47	1.30
Benthodesmus tenuis	1.53	71	0.94
Nezumia aequalis	1.18	18	0.72
Illex coindetii	0.94	6	0.58
Malacocephalus laevis	0.94	24	0.58
Small shrimps	0.82	235	0.51
Etmopterus polli	0.71	12	0.43
Plesiopenaeus edwardsianus	0.59	12	0.36
Coloconger cadenati	0.53	12	0.33
Bathyuroconger vicinus	0.41	24	0.25
Rajella barnardi	0.41	6	0.25
Hymenocephalus italicus	0.41	41	0.25
Halosaurus ovenii	0.41	12	0.25
Coelorinchus caelorhincus	0.35	12	0.22
Parexocoetus brachypterus	0.35	6	0.22
Sudis sp.	0.35	6	0.22
Avocettina acuticeps	0.29	6	0.18
Stomias sp.	0.29	12	0.18
Lophiodes kempi	0.29	6	0.18
Synaphobranchus kaupii	0.29	6	0.18
Xenodermichthys copei	0.29	12	0.18
Triplophos hemingi	0.29	59	0.18
Total	162.60		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 95
DATE :12/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 9°51.83
start stop duration Lon E 12°51.14
TIME :06:04:20 06:29:04 24.7 (min) Purpose : 3
LOG : 3677.32 3678.57 1.3 Region : 4040
FDEPTH: 202 212 Gear cond.: 0
BDEPTH: 202 212 Validity : 0
Towing dir: 0° Wire out : 500 m Speed : 3.0 kn
Sorted : 0 Total catch: 355.04 Catch/hour: 861.40

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Synagrops microlepis	413.81	45389	48.04
Trachurus trecae	108.01	129	12.54 291
Zenopsis conchifer	102.75	272	11.93
Uranoscopus cadenati	55.41	211	6.43
Bembrops greyi	40.27	383	4.68
Brotula barbata	31.64	39	3.67 292
Dentex angolensis	31.06	104	3.61 290
Coelorinchus caelorhincus	10.51	102	1.22
Mystriophis rostellatus	9.68	61	1.12
Pterothrissus belloci	9.39	80	1.09
Malacocephalus occidentalis	8.88	90	1.03
Merluccius polli	7.76	80	0.90 293
Trichiurus lepturus	6.26	112	0.73
Lophiodes kempi	5.65	10	0.66
Parapenaeus longirostris, male	4.95	1322	0.57
Torpedo torpedo	4.76	10	0.55
Gephyroberyx darwini	3.83	10	0.45
Parapenaeus longirostris, female	2.94	514	0.34
Chlorophthalmus atlanticus	2.01	252	0.23
Syacium micrurum	1.82	61	0.21
Total	861.40		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 96
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°49.43
start stop duration Lon E 12°57.89
TIME :07:50:30 08:20:20 29.8 (min) Purpose : 3
LOG : 3686.86 3688.45 1.6 Region : 4040
FDEPTH: 108 109 Gear cond.: 0
BDEPTH: 108 109 Validity : 0
Towing dir: 0° Wire out : 270 m Speed : 3.2 kn
Sorted : 0 Total catch: 220.18 Catch/hour: 442.87

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Selene dorsalis	183.00	605	41.32 298
Lepidotrigla cadmani	96.47	684	21.78
Dentex angolensis	49.24	475	11.12 294
Trichiurus lepturus	19.43	52	4.39
Scorpaena normani	16.21	173	3.66
Dentex barnardi	12.81	48	2.89 297
Zeus faber	12.79	24	2.89
Dentex congoensis	6.82	111	1.54 295
Citharus linguatula	6.46	284	1.46
Rhinobatos albomaculatus	6.20	2	1.40
Uranoscopus cadenati	6.17	22	1.39
Raja miraletus	4.63	6	1.04
Zenopsis conchifer	4.57	6	1.03
Pagellus bellottii	4.36	30	0.99 296
Umbrina canariensis	3.44	12	0.78 299
Lepidotrigla carolae	2.68	72	0.60
Sepia officinalis	2.31	4	0.52
Sphoeroides pachgaster	2.13	4	0.48
Pontinus accraensis	1.15	4	0.26
Illex coindetii	0.76	6	0.17
Microchirus frechkopi	0.46	8	0.10
G A S T R O P O D S	0.36	36	0.08
Pseudupeneus prayensis	0.32	4	0.07
Saurida brasiliensis	0.08	32	0.02
Alloteuthis africana	0.02	4	0.00
Total	442.87		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 97
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°51.03
start stop duration Lon E 13°1.47
TIME :09:10:58 09:42:10 31.2 (min) Purpose : 3
LOG : 3693.31 3694.92 1.6 Region : 4040
FDEPTH: 91 93 Gear cond.: 0
BDEPTH: 91 93 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.1 kn
Sorted : 38 Total catch: 227.46 Catch/hour: 437.42

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Rhinobatos albomaculatus	121.85	58	27.86
Brachydeuterus auritus	77.31	669	17.67 300
Lepidotrigla cadmani	64.85	542	14.82
Raja miraletus	51.92	104	11.87
Trichiurus lepturus	24.23	35	5.54
Dentex angolensis	21.23	358	4.85 303
Seriola carpenteri	18.58	12	4.25
Dentex barnardi	16.38	69	3.75 301
Citharus linguatula	13.04	542	2.98
Lepidotrigla carolae	10.15	254	2.32
Fistularia petimba	5.42	12	1.24
Sardinella maderensis	4.73	23	1.08
Saurida brasiliensis	2.65	669	0.61
Pagellus bellottii	1.62	35	0.37 302
Dentex congoensis	1.50	35	0.34 304
Illex coindetii	0.92	12	0.21
Sepia bertheloti	0.46	12	0.11
Arnoglossus imperialis	0.23	12	0.05
G A S T R O P O D S	0.23	46	0.05
Alloteuthis africana	0.12	92	0.03
Total	437.42		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 98
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°43.77
start stop duration Lon E 13°9.70
TIME :11:12:00 11:42:20 30.3 (min) Purpose : 3
LOG : 3706.00 3707.71 1.7 Region : 4040
FDEPTH: 31 31 Gear cond.: 0
BDEPTH: 31 31 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.4 kn
Sorted : 0 Total catch: 189.57 Catch/hour: 375.14

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	134.64	2497	35.89 305
Galeoides decadactylus	69.95	536	18.65 306
Chloroscombrus chrysurus	58.38	400	15.56
Caranx rhonchus	23.94	580	6.38
Selene dorsalis	21.73	251	5.79
Pseudotolithus senegalensis	15.91	14	4.24 308
Raja miraletus	10.77	18	2.87
Sphyraena guachancho	6.53	14	1.74
Pagellus bellottii	4.85	26	1.29 307
Scomberomorus tritor	4.61	2	1.23
Pomadasys perotaei	4.49	10	1.20 309
Dasyatis marmorata	2.89	4	0.77
Pteroscion peli	2.41	24	0.64
Eucinostomus melanopterus	2.18	30	0.58
Pseudupeneus prayensis	2.12	12	0.56
Arius parkii	1.84	6	0.49
Alectis alexandrinus	1.80	2	0.48
Sardinella maderensis	1.42	8	0.38 310
Lagocephalus laevigatus	1.39	10	0.37
Balistes capriscus	1.29	2	0.34
Chilomycterus spinosus mauretanicus	0.49	2	0.13
Dasyatis margarita	0.46	2	0.12
Pomadasys incisus	0.36	2	0.09
Trachinocephalus myops	0.30	4	0.08

Seriola carpenteri	0.20	4	0.05
Grammoplites gruveli	0.12	2	0.03
Saurida brasiliensis	0.04	6	0.01
Bothus podas	0.02	2	0.01
Caranx crysos	0.02	2	0.01
Total	375.14		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 99
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°31.82
start stop duration Lon E 13°5.26
TIME :13:16:57 13:41:15 24.3 (min) Purpose : 3
LOG : 3720.51 3721.78 1.3 Region : 4040
FDEPTH: 32 29 Gear cond.: 0
BDEPTH: 32 29 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.1 kn
Sorted : 0 Total catch: 123.82 Catch/hour: 305.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Balistes capriscus	68.76	143	22.50	
Alectis alexandrinus	62.64	49	20.50	
Pagellus bellottii	58.99	304	19.30	311
Chloroscombrus chrysurus	28.14	116	9.21	
Sphyraena guachancho	18.98	49	6.21	
Caranx crysos	17.65	30	5.77	
Pomadasys rogeri	15.35	20	5.02	312
Ephippion guttifer	12.56	25	4.11	
Chaetodipterus lippei	6.66	7	2.18	
Caranx rhonchus	1.97	39	0.65	
Dentex barnardi	1.95	5	0.64	314
Dasyatis margarita	1.58	2	0.52	
Raja miraletus	1.53	2	0.50	
Scomberomorus tritor	1.51	2	0.49	
Lagocephalus laevigatus	1.28	5	0.42	
Syacium micrurum	1.09	7	0.36	
Trachinocephalus myops	1.06	2	0.35	
Caranx hippos	1.04	2	0.34	
Aluterus heudelotii	1.01	2	0.33	
Eucinostomus melanopterus	0.79	0	0.26	
Galeoides decadactylus	0.52	12	0.17	313
Pagrus caeruleostictus	0.47	7	0.15	315
Pseudupeneus prayensis	0.07	2	0.02	
Total	305.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 100
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°28.32
start stop duration Lon E 12°58.93
TIME :14:40:26 15:10:56 30.5 (min) Purpose : 3
LOG : 3728.93 3730.70 1.8 Region : 4040
FDEPTH: 54 53 Gear cond.: 0
BDEPTH: 54 53 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.5 kn
Sorted : 0 Total catch: 65.63 Catch/hour: 129.11

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Alectis alexandrinus	50.40	39	39.04	
Lagocephalus laevigatus	25.10	39	19.44	
Pagellus bellottii	16.07	94	12.45	316
Raja miraletus	7.77	14	6.02	
Rachycentron canadum	7.69	2	5.96	
Cynoglossus canariensis	5.10	4	3.95	
Sphyraena sphyraena	4.45	16	3.44	
Aluterus heudelotii	3.52	4	2.73	
Pomadasys rogeri	1.99	2	1.54	
Seriola carpenteri	1.91	4	1.48	
Dentex barnardi	1.61	10	1.25	317
Balistes capriscus	1.02	2	0.79	
Sepia officinalis	0.98	0	0.76	
Pseudupeneus prayensis	0.83	4	0.64	
Cheilonichthys gabonensis	0.35	2	0.27	
Grammoplites gruveli	0.16	4	0.12	
Saurida brasiliensis	0.10	30	0.08	
Arnoglossus imperialis	0.06	2	0.05	
Total	129.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 101
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°29.34
start stop duration Lon E 12°43.05
TIME :17:12:00 17:33:07 21.1 (min) Purpose : 3
LOG : 3747.59 3748.61 1.0 Region : 4040
FDEPTH: 208 210 Gear cond.: 0
BDEPTH: 208 210 Validity : 0
Towing dir: 0° Wire out : 500 m Speed : 2.9 kn
Sorted : 0 Total catch: 599.52 Catch/hour: 1703.18

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	1046.76	68869	61.46	
Zenopsis conchifer	242.76	670	14.25	
Bembrops heterurus	98.35	898	5.77	
Merluccius polli	71.05	636	4.17	319
Brotula barbata	67.64	65	3.97	318
Pterothrissus belloci	50.65	392	2.97	
Cynoponticus ferox	24.52	17	1.44	
Malacocephalus occidentalis	21.39	114	1.26	
Parapenaeus longirostris, female	20.91	3153	1.23	
Dentex angolensis	11.11	34	0.65	320
Coelorinchus caelorhincus	8.32	165	0.49	
Chlorophthalmus atlanticus	8.18	898	0.48	
Mystriophis rostellatus	7.36	48	0.43	
Uranoscopus cadenati	6.53	17	0.38	
Syacium micrurum	6.36	310	0.37	
Todaropsis eblanae	5.40	34	0.32	
Parapenaeus longirostris, male	4.74	849	0.28	
Bassanago albescens	1.14	17	0.07	
Total	1703.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 102
DATE :12/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°30.27
start stop duration Lon E 12°40.44
TIME :19:02:17 19:32:19 30.0 (min) Purpose : 3
LOG : 3754.19 3755.62 1.4 Region : 4040
FDEPTH: 410 409 Gear cond.: 0
BDEPTH: 410 409 Validity : 0
Towing dir: 0° Wire out : 850 m Speed : 2.9 kn
Sorted : 0 Total catch: 543.29 Catch/hour: 1085.49

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	706.49	1682	65.08	321
Chaunax pictus	150.99	2633	13.91	
Nematocarcinus africanus	74.73	9970	6.88	
Laemonema laureysi	38.38	460	3.54	
Hymenocephalus italicus	31.93	2989	2.94	
Dibranchus atlanticus	22.76	1155	2.10	
Etmopterus polli	9.01	238	0.83	
Coelorinchus caelorhincus	8.83	154	0.81	
Bassanago albescens	6.29	34	0.58	
Anemones, white	5.95	52	0.55	
Aristeus varidens, female	5.09	426	0.47	
Pleslopenaeus edwardsianus	4.42	102	0.41	
Chaceon maritae, female	4.08	18	0.38	
Halosaurus ovenii	3.58	170	0.33	
Malacocephalus occidentalis	2.72	18	0.25	
Gadella imberbis	2.38	102	0.22	
Epigonus telescopus	2.04	18	0.19	
Aristeus varidens, male	1.20	154	0.11	
MYCTOPHIDAE	1.02	985	0.09	
Galeus polli	1.02	18	0.09	
Bathynectes piperitus	0.86	18	0.08	
NETTASTOMATIDAE	0.52	52	0.05	
Glyphus marsupialis	0.52	204	0.05	
Coloconger cadenati	0.34	68	0.03	
Stomias boa boa	0.18	18	0.02	
Avocettina acuticeps	0.18	18	0.02	
Total	1085.49		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 103
DATE :13/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 9°5.84
start stop duration Lon E 12°37.56
TIME :07:12:19 07:42:49 30.5 (min) Purpose : 3
LOG : 3821.64 3823.09 1.4 Region : 4040
FDEPTH: 651 645 Gear cond.: 0
BDEPTH: 651 645 Validity : 0
Towing dir: 0° Wire out : 1300 m Speed : 2.8 kn
Sorted : 0 Total catch: 276.56 Catch/hour: 544.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	177.76	39995	32.67	
Yarrella blackfordi	83.39	2372	15.33	
Xenodermichthys copei	44.09	3630	8.10	
Lamprogrammus exutus	35.76	460	6.57	
Stomias boa boa	28.68	779	5.27	
Hoplostethus cadenati	21.07	761	3.87	
Aristeus varidens, female	20.01	1045	3.68	
Stereomastis sp.	14.87	991	2.73	
Schedophilus cf huttoni	12.39	35	2.28	
Talismania longifilis	11.51	531	2.12	
Dibranchus atlanticus	10.62	744	1.95	
Coelorinchus caelorhincus	10.62	319	1.95	
JELLYFISH	10.62	195	1.95	
Neolithodes asperrimus	9.91	4	1.82	
Aristeus varidens, male	8.68	1115	1.59	
Merluccius polli	7.83	8	1.44	322
Scopelosaurus meadi	4.25	124	0.78	
Small shrimps	3.90	797	0.72	
Triplophos hemingi	3.72	0	0.68	
Rajella barnardi	3.66	12	0.67	
Gadella imberbis	3.01	124	0.55	
Halosaurus ovenii	2.83	106	0.52	
MYCTOPHIDAE	2.66	266	0.49	
Illex coindetii	2.66	18	0.49	
Sergestes sp.	1.95	443	0.36	
Dicrolene intronigra	1.95	230	0.36	
Chaceon maritae, male	1.65	4	0.30	
Chaceon maritae, female	1.59	6	0.29	
Avocettina acuticeps	0.89	35	0.16	
Chlorophthalmus atlanticus	0.53	53	0.10	
Diastobranchus capensis	0.53	18	0.10	
Galeus polli	0.28	2	0.05	
Etmopterus polli	0.20	2	0.04	
Total	544.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 104
DATE :13/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°6.25
start stop duration Lon E 12°42.36
TIME :10:02:21 10:27:34 25.2 (min) Purpose : 3
LOG : 3831.38 3832.64 1.3 Region : 4040
FDEPTH: 362 360 Gear cond.: 0
BDEPTH: 362 360 Validity : 0
Towing dir: 0° Wire out : 850 m Speed : 3.0 kn
Sorted : 48 Total catch: 185.68 Catch/hour: 441.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Hymenocephalus italicus	66.99	11220	15.17	
Merluccius polli	61.38	333	13.89	323
Chaunax pictus	48.25	628	10.92	
Chlorophthalmus atlanticus	46.92	685	10.62	
Laemonema laureysi	42.25	352	9.56	
Coelorinchus caelorhincus	31.40	561	7.11	
Synagrops microlepis	30.83	1180	6.98	
Helicolenus dactylopterus	26.26	95	5.95	
Zenopsis conchifer	24.46	29	5.54	
Malacocephalus occidentalis	11.13	76	2.52	
Halosaurus ovenii	7.42	381	1.68	
Lophius vaillanti	6.57	19	1.49	
Pterothrissus belloci	6.28	29	1.42	
Epigonus telescopus	5.33	95	1.21	
Parapenaeus longirostris, female	3.24	324	0.73	
MYCTOPHIDAE	3.24	1218	0.73	
Mystriophis rostellatus	2.85	19	0.65	
Dibranchus atlanticus	2.00	133	0.45	
Bembrops greyi	1.90	38	0.43	
Chlorotocus crassicornis	1.90	295	0.43	
Nezumia aequalis	1.52	76	0.34	
Todaropsis eblanae	1.52	10	0.34	
Anemones, white	1.43	10	0.32	
Benthodesmus tenuis	1.43	48	0.32	
Gadella imberbis	1.43	48	0.32	
Bathynectes piperitus	1.14	19	0.26	
Aristeus varidens, male	0.95	114	0.22	
Aristeus varidens, female	0.48	29	0.11	
Lestrolepis intermedia	0.38	19	0.09	
Setarches guentheri	0.38	10	0.09	
Parapenaeus longirostris, male	0.29	57	0.06	
Peristedion cataphractum	0.19	10	0.04	
Total	441.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 105
DATE :13/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°12.80
start stop duration Lon E 12°46.50
TIME :11:39:53 12:10:09 30.3 (min) Purpose : 3
LOG : 3840.72 3842.44 1.7 Region : 4040
FDEPTH: 117 115 Gear cond.: 0
BDEPTH: 117 115 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.4 kn
Sorted : 0 Total catch: 20.29 Catch/hour: 40.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lepidotrigla cadmani	16.78	175	41.70	
Dentex angolensis	12.69	61	31.54	324
Sphoeroides cf. pachygaster	4.80	6	11.93	
Todaropsis eblanae	2.14	12	5.32	
Zeus faber	1.37	8	3.40	
Dentex congoensis	0.69	10	1.72	325
Uranoscopus albesca	0.54	2	1.33	
Ariomma bondi	0.44	4	1.08	
Citharus linguatula	0.28	10	0.69	
Pagellus bellottii	0.28	2	0.69	
Scorpaena normani	0.18	2	0.44	
Trachurus trecae	0.04	2	0.10	
Arnoglossus imperialis	0.02	2	0.05	
Total	40.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 106
DATE :13/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°14.14
start stop duration Lon E 12°51.12
TIME :13:00:49 13:30:29 29.7 (min) Purpose : 3
LOG : 3848.59 3850.17 1.6 Region : 4040
FDEPTH: 76 81 Gear cond.: 0
BDEPTH: 76 81 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.2 kn
Sorted : 0 Total catch: 63.02 Catch/hour: 127.48

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	80.11	5939	62.84	328
Brachydeuterus auritus	17.96	192	14.09	327
Selene dorsalis	5.81	28	4.55	
Lagocephalus laevigatus	5.46	10	4.28	
Trichiurus lepturus	4.57	245	3.59	
Dentex angolensis	3.90	16	3.06	326
Fistularia petimba	3.38	10	2.65	
GOBIIDAE	2.61	1637	2.05	
Brotula barbata	1.44	4	1.13	
Sardinella maderensis	0.93	4	0.73	
Pagellus bellottii	0.77	6	0.60	329
Sepia officinalis	0.32	2	0.25	

Citharus linguatula	0.12	4	0.10
Saurida brasiliensis	0.10	22	0.08
Total	127.48		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 107
DATE :13/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 9°11.95
start stop duration Lon E 12°55.67
TIME :14:19:03 14:49:21 30.3 (min) Purpose : 3
LOG : 3856.33 3858.41 2.1 Region : 4040
FDEPTH: 21 23 Gear cond.: 0
BDEPTH: 21 23 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 4.1 kn
Sorted : 0 Total catch: 32.04 Catch/hour: 63.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Balistes capriscus	13.59	32	21.41	
Caranx rhonchus	13.07	349	20.60	
Alectis alexandrinus	9.86	14	15.54	
Ephippion guttifer	7.61	4	11.99	
Caranx crysos	6.89	10	10.86	
Lagocephalus laevigatus	4.10	26	6.46	
Rhinobatos annulatus	2.20	2	3.46	
Eucinostomus melanopterus	1.94	42	3.06	
Scomberomorus tritor	1.11	2	1.75	
Trachinotus goreensis	0.67	2	1.06	
Decapterus punctatus	0.65	18	1.03	
Dasyatis margarita	0.52	2	0.81	
Sepia officinalis	0.40	2	0.62	
Chloroscombrus chrysurus	0.34	2	0.53	
Pagellus bellottii	0.30	2	0.47	
Selene dorsalis	0.22	2	0.34	
Total	63.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 108
DATE :13/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°46.95
start stop duration Lon E 12°49.82
TIME :20:42:10 21:05:11 23.0 (min) Purpose : 3
LOG : 3893.37 3894.43 1.1 Region : 4054
FDEPTH: 525 520 Gear cond.: 0
BDEPTH: 525 520 Validity : 0
Towing dir: 0° Wire out : 1030 m Speed : 2.8 kn
Sorted : 0 Total catch: 263.30 Catch/hour: 686.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	429.02	88775	62.51	
Stomias boa boa	48.48	1147	7.06	
Laemonema laureysi	41.96	287	6.11	
Hoplostethus cadenati	28.41	1095	4.14	
Triplophos hemingi	21.11	3180	3.08	
Lamprogrammus exutus	17.46	756	2.54	
Benthodesmus tenuis	11.73	495	1.71	
Lophiodes kempi	11.73	26	1.71	
Aristeus varidens, female	11.47	704	1.67	
Bassanago albescens	8.60	209	1.25	
Yarrella blackfordi	8.08	209	1.18	
Stereomastis sp.	7.56	782	1.10	
Cataetyx laticeps	5.47	808	0.80	
Xenodermichthys copei	5.21	443	0.76	
Chaunax pictus	4.69	52	0.68	
Aristeus varidens, male	4.43	599	0.65	
Merluccius polli	3.36	5	0.49	
JELLYFISH	2.09	26	0.30	
Rajella barnardi	1.56	26	0.23	
Symphurus sp.	1.56	125	0.23	
Photonectes braueri	1.56	52	0.23	
Glyphus marsupialis	1.56	521	0.23	
Chaceon maritae, male	1.33	3	0.19	
Bristle worms (straws)	1.30	182	0.19	
Avocettina acuticeps	1.04	78	0.15	
Chaceon maritae, female	0.86	5	0.13	
G A S T R O P O D S	0.78	261	0.11	
Coelorinchus caelorhincus	0.78	130	0.11	
Scopelosaurus meadi	0.78	26	0.11	
Dibranchus atlanticus	0.52	26	0.08	
MYCTOPHIDAE	0.52	26	0.08	
Halosaurus ovenii	0.52	78	0.08	
Etmopterus sp.	0.44	3	0.06	
Hymenocephalus italicus	0.13	26	0.02	
Bathynectes piperitus	0.13	26	0.02	
Total	686.27		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 109
DATE :13/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°47.48
start stop duration Lon E 12°50.34
TIME :23:24:44 23:55:12 30.5 (min) Purpose : 3
LOG : 3901.45 3902.97 1.5 Region : 4054
FDEPTH: 490 483 Gear cond.: 0
BDEPTH: 490 483 Validity : 0
Towing dir: 0° Wire out : 1050 m Speed : 3.0 kn
Sorted : 0 Total catch: 173.60 Catch/hour: 341.84

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	127.84	36473	37.40	
Hoplostethus cadenati	40.41	1524	11.82	
Triplophos hemingi	30.13	4844	8.81	
Aristeus varidens, female	28.83	1217	8.43	
Chaunax pictus	19.26	201	5.63	
Yarrella blackfordi	15.48	461	4.53	
Lamprogrammus exutus	14.30	366	4.18	
Stomias boa boa	10.75	307	3.15	
Stereomastis sp.	9.92	1075	2.90	
Aristeus varidens, male	9.69	1134	2.83	
Merluccius polli	7.96	12	2.33	330
Centrophorus squamosus	7.68	2	2.25	
Halosaurus ovenii	4.96	284	1.45	
Benthodesmus tenuis	3.07	106	0.90	
Plesiopenaeus edwardsianus	2.24	47	0.66	
Bassanago albescens	1.42	24	0.41	
Dicrolene intronigra	1.42	260	0.41	
Xenodermichthys copei	1.30	201	0.38	
Bathyuroconger vicinus	1.30	118	0.38	
Hymenocephalus italicus	0.83	201	0.24	
Bathynectes piperitus	0.59	12	0.17	
Lampadena pontifex	0.47	12	0.14	
Malacocephalus laevis	0.47	24	0.14	
Gadella imberbis	0.47	24	0.14	
Galeus polli	0.35	12	0.10	
Nezumia aequalis	0.24	24	0.07	
Chlorophthalmus atlanticus	0.12	12	0.03	
Shrimps, small, non comm.	0.12	83	0.03	
MYCTOPHIDAE	0.12	24	0.03	
Ebinania costaecanariae	0.12	12	0.03	
Total	341.84		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 110
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°46.76
start stop duration Lon E 12°54.67
TIME :01:46:51 02:19:36 32.8 (min) Purpose : 3
LOG : 3913.31 3915.00 1.7 Region : 4054
FDEPTH: 365 368 Gear cond.: 0
BDEPTH: 365 368 Validity : 0
Towing dir: 0° Wire out : 790 m Speed : 3.1 kn
Sorted : 24 Total catch: 204.54 Catch/hour: 374.73

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	135.17	64212	36.07	
Chaunax pictus	71.95	4283	19.20	
Merluccius polli	42.98	125	11.47	331
Laemonema laureysi	42.19	616	11.26	
Lophiodes kempi	22.42	13	5.98	
Bassanago albescens	17.83	231	4.76	
Parapenaeus longirostris, female	15.00	1526	4.00	
Dibranchus atlanticus	5.64	564	1.51	
Munida sp.	3.72	872	0.99	
Hymenocephalus italicus	3.08	782	0.82	
Halosaurus ovenii	2.69	180	0.72	
Aristeus varidens, male	2.18	244	0.58	
Etmopterus polli	2.18	385	0.58	
Pterothrissus belloci	2.05	13	0.55	
Chlorophthalmus atlanticus	1.03	26	0.27	
Gadella imberbis	0.90	26	0.24	
Trichiurus lepturus	0.64	26	0.17	
Bathynectes piperitus	0.64	13	0.17	
Parapenaeus longirostris, male	0.64	51	0.17	
Dicrolene intronigra	0.51	90	0.14	
Aristeus varidens, female	0.51	26	0.14	
Solenocera africana	0.38	51	0.10	
Galeus polli	0.26	26	0.07	
MYCTOPHIDAE	0.13	51	0.03	
Total	374.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 111
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°47.61
start stop duration Lon E 12°57.24
TIME :06:02:50 06:32:38 29.8 (min) Purpose : 3
LOG : 3925.22 3926.74 1.5 Region : 4054
FDEPTH: 265 266 Gear cond.: 0
BDEPTH: 265 266 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 3.1 kn
Sorted : 0 Total catch: 514.11 Catch/hour: 1035.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	287.76	165370	27.80	
Chlorophthalmus atlanticus	202.59	3298	19.57	
Zenopsis conchifer	130.65	217	12.62	
Brotula barbata	124.31	101	12.01	334
Bembrops heterurus	66.50	517	6.42	
Merluccius polli	42.50	155	4.11	332
Laemonema laureysi	38.60	344	3.73	
Merluccius polli, juvenile	30.36	834	2.93	333
Parapenaeus longirostris, female	19.85	2156	1.92	
Coelorinchus caelorhincus	17.21	554	1.66	
Pterothrissus belloci	16.13	127	1.56	
Trichiurus lepturus	12.60	54	1.22	
Illex coindetii	11.52	10	1.11	
MYCTOPHIDAE	9.16	8154	0.89	
Mystriophis rostellatus	6.26	18	0.60	
Pontinus accraensis	5.98	54	0.58	
Parapenaeus longirostris, male	4.53	807	0.44	
Monolene microstoma	2.72	127	0.26	
Dibranchus atlanticus	2.09	300	0.20	
Gadella imberbis	0.83	28	0.08	
Loligo vulgaris	0.83	282	0.08	
Lophiodes kempi	0.64	18	0.06	
Bassanago albescens	0.46	10	0.04	
Malacocephalus occidentalis	0.36	18	0.04	
Chaunax pictus	0.28	36	0.03	
Coloconger cadenati	0.28	10	0.03	
Epigonus telescopus	0.10	10	0.01	
Total	1035.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 112
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°45.87
start stop duration Lon E 13°1.35
TIME :07:38:55 08:08:58 30.1 (min) Purpose : 3
LOG : 3931.74 3933.30 1.6 Region : 4054
FDEPTH: 162 164 Gear cond.: 0
BDEPTH: 162 164 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.1 kn
Sorted : 0 Total catch: 699.80 Catch/hour: 1397.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	760.73	172552	54.44	
Pterothrissus belloci	148.95	1108	10.66	
Trichiurus lepturus	89.25	719	6.39	
Dentex angolensis	69.38	260	4.97	335
Stromateus fiatola	56.31	60	4.03	
Brotula barbata	54.51	40	3.90	338
Zeus faber	36.14	120	2.59	
Bembrops heterurus	34.54	359	2.47	
Lepidotrigla cadmani	18.97	130	1.36	
Pagellus bellottii	18.07	70	1.29	340
Saurida brasiliensis	16.47	2686	1.18	
Trachurus trecae	16.27	20	1.16	
Merluccius polli	14.48	140	1.04	336
Umbrina canariensis	9.68	30	0.69	339
Parapenaeus longirostris, female	8.39	2146	0.60	
Illex coindetii	7.19	40	0.51	
Merluccius polli, juvenile	6.99	150	0.50	337
Zenopsis conchifer	5.89	80	0.42	
Octopus vulgaris	5.59	10	0.40	
Pontinus accraensis	5.29	50	0.38	
Citharus linguatula	2.90	60	0.21	
G A S T R O P O D S	2.70	190	0.19	
Parapenaeus longirostris, male	2.70	739	0.19	
Rochinia sp.	2.60	30	0.19	
Miracorvina angolensis	1.80	10	0.13	
Calappa pelii	1.20	10	0.09	
GOBIIDAE	0.30	20	0.02	
Total	1397.27		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 113
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°37.58
start stop duration Lon E 13°18.45
TIME :10:45:12 11:15:30 30.3 (min) Purpose : 3
LOG : 3955.86 3957.57 1.7 Region : 4054
FDEPTH: 35 31 Gear cond.: 0
BDEPTH: 35 31 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn
Sorted : 100 Total catch: 896.94 Catch/hour: 1776.71

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selene dorsalis	881.04	15189	49.59	
Brachydeuterus auritus	359.05	29273	20.21	342
Galeoides decadactylus	209.30	820	11.78	343
Sphyraena guachancho	63.47	784	3.57	
Pagellus bellottii	54.37	357	3.06	341
Selene dorsalis	51.88	1908	2.92	0
Galeoides decadactylus, juvenile	34.59	909	1.95	344
Sardinella maderensis	30.84	250	1.74	345
Pteroscion peli	16.76	232	0.94	
Penaeus notialis, female	12.48	357	0.70	
Raja miraletus	12.12	18	0.68	
Eucinostomus melanopterus	10.16	160	0.57	
Pseudotolithus senegalensis	9.45	18	0.53	
Citharus linguatula	8.38	499	0.47	
Penaeus notialis, male	7.13	499	0.40	
Dentex barnardi	6.77	196	0.38	346
Ilisha africana ***	2.67	53	0.15	
Sepia officinalis	2.32	18	0.13	
Trichiurus lepturus	1.60	160	0.09	
Grammoplites gruveli	0.89	53	0.05	
Pseudupeneus prayensis	0.71	18	0.04	
Argyrosomus sp.	0.71	18	0.04	
Plastic	0.00	0	0.00	
Total	1776.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 114
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°36.58
start stop duration Lon E 13°11.26
TIME :12:26:36 12:56:36 30.0 (min) Purpose : 3
LOG : 3965.86 3967.48 1.6 Region : 4054
FDEPTH: 74 77 Gear cond.: 0
BDEPTH: 74 77 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.2 kn

Sorted : 64 Total catch: 324.21 Catch/hour: 648.42

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	227.40	5870	35.07	349
Pagellus bellottii	130.00	1290	20.05	348
Dentex angolensis	69.40	350	10.70	347
Pomadasys incisus	42.70	290	6.59	350
Sphyraena guachancho	38.40	240	5.92	
Selene dorsalis	32.50	700	5.01	
Trachurus trecae	20.20	210	3.12	352
Sepia officinalis	13.40	50	2.07	
Lagocephalus laevigatus	11.50	80	1.77	
Galeoides decadactylus	11.30	90	1.74	351
Chloroscombrus chrysurus	8.50	70	1.31	
Raja miraletus	7.10	10	1.09	
Stromateus fiatola	6.10	10	0.94	
Citharus linguatula	5.90	160	0.91	
Dicologoglossa cuneata	4.50	30	0.69	
Octopus vulgaris	4.02	2	0.62	
Pseudupeneus prayensis	3.40	40	0.52	
Umbrina canariensis	3.20	50	0.49	353
Argyrosomus sp.	2.50	10	0.39	
Chaetodon hoefleri	2.30	20	0.35	
Sardinella aurita	1.90	10	0.29	
Pteroscion peli	1.50	10	0.23	
Fistularia petimba	0.70	10	0.11	
Plastic	0.00	0	0.00	
Total	648.42		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 115
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°35.43
start stop duration Lon E 13°1.39
TIME :15:27:08 15:52:28 25.3 (min) Purpose : 3
LOG : 3979.11 3980.59 1.5 Region : 4054
FDEPTH: 141 146 Gear cond.: 0
BDEPTH: 141 146 Validity : 0
Towing dir: 0° Wire out : 400 m Speed : 3.5 kn
Sorted : 52 Total catch: 388.27 Catch/hour: 919.71

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trichiurus lepturus	660.59	3930	71.83	
Pterothrissus belloci	93.52	746	10.17	
Spicara alta	39.13	232	4.25	
Dentex angolensis	37.24	149	4.05	354
Uranoscopus albesca	17.24	50	1.87	
Selene dorsalis	16.75	33	1.82	
Brotula barbata	13.12	14	1.43	
Lepidotrigla cadmani	11.11	66	1.21	
Bembrops heterurus	9.12	99	0.99	
Octopus vulgaris	8.29	33	0.90	
Umbrina canariensis	7.79	33	0.85	355
Monolene microstoma	4.81	199	0.52	
Pontinus accraensis	0.66	66	0.07	
GOBIIDAE	0.17	33	0.02	
Saurida brasiliensis	0.17	17	0.02	
Total	919.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 116
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°34.46
start stop duration Lon E 12°58.37
TIME :16:51:11 17:21:27 30.3 (min) Purpose : 3
LOG : 3985.47 3987.18 1.7 Region : 4054
FDEPTH: 203 205 Gear cond.: 0
BDEPTH: 203 205 Validity : 0
Towing dir: 0° Wire out : 500 m Speed : 3.4 kn
Sorted : 0 Total catch: 412.05 Catch/hour: 816.75

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Synagrops microlepis	442.01	21290	54.12	
Zenopsis conchifer	139.42	377	17.07	
Pterothrissus belloci	59.05	478	7.23	
Merluccius polli	40.96	256	5.01	357
Dentex angolensis	38.41	133	4.70	356
Trichiurus lepturus	23.53	34	2.88	
Merluccius polli, juvenile	18.98	278	2.32	358
Bembrops heterurus	17.32	133	2.12	
Brotula barbata	13.76	34	1.69	359
Zeus faber	11.66	22	1.43	
Monolene microstoma	2.66	99	0.33	
Umbrina canariensis	2.33	12	0.29	
Pontinus accraensis	2.22	22	0.27	
Illex coindetii	1.11	12	0.14	
Chlorophthalmus atlanticus	0.89	99	0.11	
Parapenaeus longirostris, female	0.78	188	0.10	
MYCTOPHIDAE	0.67	355	0.08	
Bassanago albescens	0.56	12	0.07	
Parapenaeus longirostris, male	0.22	56	0.03	
Hymenocephalus italicus	0.22	22	0.03	
Total	816.75		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 117
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°31.96
start stop duration Lon E 12°54.51
TIME :18:45:15 19:15:17 30.0 (min) Purpose : 3
LOG : 3992.90 3994.47 1.6 Region : 4054
FDEPTH: 352 340 Gear cond.: 0
BDEPTH: 352 340 Validity : 0
Towing dir: 0° Wire out : 800 m Speed : 3.1 kn
Sorted : 0 Total catch: 151.69 Catch/hour: 303.08

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius polli	128.67	587	42.46	360
Nematocarcinus africanus	54.83	17916	18.09	
Laemonema laureysi	22.80	210	7.52	
Parapenaeus longirostris, female	15.38	1678	5.08	
Merluccius polli, juvenile	15.24	294	5.03	365
Lophius vaillanti	10.49	4	3.46	
Bembrops heterurus	10.35	182	3.41	
Synagrops microlepis	10.35	336	3.41	
Bassanago albescens	9.37	126	3.09	
Malacocephalus occidentalis	8.67	70	2.86	
Chaunax pictus	3.22	182	1.06	
Coelorinchus caelorhincus	2.94	70	0.97	
Trichiurus lepturus	2.66	126	0.88	
Parapenaeus longirostris, male	2.38	364	0.78	
Dibranchus atlanticus	1.40	336	0.46	
Gadella imberbis	1.12	42	0.37	
Benthodesmus tenuis	0.84	42	0.28	
Hymenocephalus italicus	0.70	182	0.23	
Bathynectes piperitus	0.56	14	0.18	
Halosaurus ovenii	0.56	42	0.18	
Aristeus varidens	0.28	28	0.09	
MYCTOPHIDAE	0.28	168	0.09	
Total	303.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 118
DATE :14/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°31.60
start stop duration Lon E 12°52.10
TIME :20:41:50 21:11:53 30.1 (min) Purpose : 3
LOG : 3999.97 4001.41 1.4 Region : 4054
FDEPTH: 421 416 Gear cond.: 0
BDEPTH: 421 416 Validity : 0
Towing dir: 0° Wire out : 900 m Speed : 2.9 kn
Sorted : 0 Total catch: 589.70 Catch/hour: 1177.44

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius polli	488.15	1789	41.46	362
Nematocarcinus africanus	297.10	80889	25.23	
Lophiodes kempi	189.12	64	16.06	
Dibranchus atlanticus	40.89	2715	3.47	
Chaunax pictus	40.89	831	3.47	
Zenopsis conchifer	36.74	32	3.12	
Hymenocephalus italicus	20.45	2843	1.74	
Laemonema laureysi	17.25	256	1.47	
Etmopterus polli	9.90	224	0.84	
Malacocephalus occidentalis	7.35	64	0.62	
Bassanago albescens	5.11	160	0.43	
Guentherus altivela	4.99	2	0.42	
Yarrella blackfordi	3.83	96	0.33	
Plesiopenaeus edwardsianus	2.56	32	0.22	
Illex coindetii	2.24	32	0.19	
Halosaurus ovenii	1.92	160	0.16	
Xenodermichthys copei	1.60	32	0.14	
Triplophos hemingi	1.60	32	0.14	
Benthodesmus tenuis	1.60	64	0.14	
Gadella imberbis	1.28	32	0.11	
Aristeus varidens	1.28	64	0.11	
Nezumia aequalis	0.64	64	0.05	
Coloconger cadenati	0.64	64	0.05	
Parapenaeus longirostris	0.32	32	0.03	
Total	1177.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 119
DATE :14/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°35.34
start stop duration Lon E 12°51.27
TIME :22:29:45 22:59:45 30.0 (min) Purpose : 3
LOG : 4006.01 4007.34 1.3 Region : 4054
FDEPTH: 525 533 Gear cond.: 0
BDEPTH: 525 533 Validity : 0
Towing dir: 0° Wire out : 1020 m Speed : 2.6 kn
Sorted : 27 Total catch: 431.50 Catch/hour: 863.00

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	475.52	136736	55.10	
Lamprogrammus exutus	247.04	4032	28.63	
Hoplostethus cadenati	91.84	2752	10.64	
Aristeus varidens	12.16	928	1.41	
Dibranchus atlanticus	8.96	736	1.04	
Aristeus varidens, male	5.12	608	0.59	
Yarrella blackfordi, female	3.84	128	0.44	
Bathyuroconger vicinus	3.20	160	0.37	
Stomias boa boa	2.88	64	0.33	
Stereomastis sp.	2.24	192	0.26	
Triplophos hemingi	2.24	320	0.26	
Chaunax pictus	1.92	32	0.22	
Coelorinchus caelorhincus	1.60	32	0.19	
Malacocephalus laevis	1.28	32	0.15	
Merluccius polli	0.92	2	0.11	
Gadella imberbis	0.64	32	0.07	
Dicrolene intronigra	0.32	0	0.04	
Avocettina acuticeps	0.32	32	0.04	
Xenodermichthys copei	0.32	64	0.04	
Nezumia aequalis	0.32	32	0.04	
Hymenocephalus italicus	0.32	64	0.04	
Total	863.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 120
DATE :15/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°35.66
start stop duration Lon E 12°49.69
TIME :00:53:52 01:25:31 31.6 (min) Purpose : 3
LOG : 4013.45 4015.07 1.6 Region : 4054
FDEPTH: 709 706 Gear cond.: 0
BDEPTH: 709 706 Validity : 0
Towing dir: 0° Wire out : 1450 m Speed : 3.1 kn
Sorted : 26 Total catch: 285.45 Catch/hour: 541.14

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	291.94	78449	53.95	
Yarrella blackfordi	61.93	1501	11.45	
Stereomastis sp.	58.81	2690	10.87	
Stomias boa boa	28.78	667	5.32	
Lamprogrammus exutus	21.48	209	3.97	
Hoplostethus cadenati	15.85	438	2.93	
Talismania longifilis	14.60	334	2.70	
Triplophos hemingi	9.18	1147	1.70	
Xenodermichthys copei	7.51	438	1.39	
Aristeus varidens, female	5.84	250	1.08	
Octopoteuthis sicula	5.42	21	1.00	
Monomitopus metriostoma	4.59	188	0.85	
**	4.17	42	0.77	
Nezumia aequalis	2.29	42	0.42	
Bathypterois guentheri	2.09	188	0.39	
Dibranchus atlanticus	1.46	63	0.27	
Heterocarpus grimaldii	1.25	42	0.23	
Bathyuroconger vicinus	1.25	21	0.23	
Photonectes braueri	1.04	21	0.19	
Glyphus marsupialis	0.83	21	0.15	
MYCTOPHIDAE	0.83	21	0.15	
Total	541.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 121
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°7.84
start stop duration Lon E 12°7.02
TIME :05:42:56 06:13:14 30.3 (min) Purpose : 3
LOG : 4232.15 4233.70 1.6 Region : 4054
FDEPTH: 32 33 Gear cond.: 0
BDEPTH: 32 33 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
Sorted : 0 Total catch: 7.62 Catch/hour: 15.09

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Selene dorsalis	4.50	22	29.79	363
Caranx crysos	3.56	4	23.62	
Rhinobatos albomaculatus	2.28	2	15.09	
Lagocephalus laevigatus	1.86	6	12.34	
Brachydeuterus auritus	1.01	24	6.69	364
Uranoscopus polli	0.71	2	4.72	
Pagrus caeruleostictus	0.59	2	3.94	
Alloteuthis africana	0.26	293	1.71	
Chloroscombrus chrysurus	0.26	2	1.71	
Ilisha africana	0.06	2	0.39	
Total	15.09		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 122
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°11.73
start stop duration Lon E 12°3.78
TIME :07:23:42 07:54:04 30.4 (min) Purpose : 3
LOG : 4241.60 4243.10 1.5 Region : 4054
FDEPTH: 45 45 Gear cond.: 0
BDEPTH: 45 45 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 2.9 kn
Sorted : 0 Total catch: 92.00 Catch/hour: 181.76

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Selene dorsalis	46.70	148	25.70	366
Stromateus fiatola	37.97	38	20.89	
Pagrus caeruleostictus	28.17	55	15.50	367
Galeoides decadactylus	20.07	117	11.04	368
Pseudotolithus senegalensis	14.98	14	8.24	388
Lagocephalus laevigatus	9.98	20	5.49	
Brachydeuterus auritus	4.46	51	2.46	369
Torpedo torpedo	3.18	4	1.75	
Pomadasys rogeri	3.02	2	1.66	
Rhinobatos albomaculatus	2.35	2	1.29	
Panulirus regius	2.15	2	1.18	
Raja miraletus	1.38	2	0.76	
Uranoscopus polli	1.32	4	0.73	
Dentex barnardi	0.93	2	0.51	
Sphyraena guachancho	0.93	2	0.51	
Trichiurus lepturus	0.81	2	0.45	
Epinephelus aeneus	0.79	2	0.43	
Pomadasys incisus	0.73	2	0.40	
Trachinus armatus	0.45	8	0.25	

Chloroscombrus chrysurus	0.38	2	0.21
Syacium micrurum	0.38	2	0.21
Ilisha africana	0.14	2	0.08
Grammoplites gruveli	0.12	2	0.07
Trachinocephalus myops	0.10	2	0.05
Citharus linguatula	0.10	6	0.05
Penaeus notialis	0.10	2	0.05
Arnoglossus imperialis	0.06	2	0.03
Total	181.76		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 123
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°10.74
start stop duration Lon E 11°55.14
TIME :09:12:21 09:42:25 30.1 (min) Purpose : 3
LOG : 4253.72 4255.24 1.5 Region : 4054
FDEPTH: 73 74 Gear cond.: 0
BDEPTH: 73 74 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.0 kn
Sorted : 0 Total catch: 76.63 Catch/hour: 152.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	37.67	2215	24.64	373
Selene dorsalis	22.23	146	14.54	374
Dentex angolensis	20.17	98	13.19	370
Brotula barbata	15.04	24	9.84	375
Umbrina canariensis	13.37	20	8.74	372
Dentex barnardi	12.51	56	8.18	371
Pagellus bellottii	8.48	58	5.55	376
Raja miraletus	4.97	6	3.25	
Dentex congoensis	4.67	82	3.05	377
Pagrus caeruleostictus	3.23	6	2.11	
Branchiostegus semifasciatus	3.21	6	2.10	
Pseudupeneus prayensis	1.88	16	1.23	
Cynoglossus canariensis	1.32	44	0.86	
Sepia orbignyana	1.18	6	0.77	
Sardinella aurita	0.86	6	0.56	
Chaetodon hoefleri	0.78	6	0.51	
Zeus faber	0.68	2	0.44	
Grammoplites gruveli	0.14	2	0.09	
Citharus linguatula	0.12	8	0.08	
Prognathodes marcellae	0.10	2	0.07	
Boops boops	0.10	2	0.07	
Trichiurus lepturus	0.08	2	0.05	
Lepidotrigla cadmani	0.06	2	0.04	
Saurida brasiliensis	0.04	18	0.03	
Arnoglossus imperialis	0.02	6	0.01	
Total	152.90		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 124
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°13.62
start stop duration Lon E 11°50.11
TIME :11:51:02 12:21:28 30.4 (min) Purpose : 3
LOG : 4266.99 4268.60 1.6 Region : 4054
FDEPTH: 92 92 Gear cond.: 0
BDEPTH: 92 92 Validity : 0
Towing dir: 0° Wire out : 325 m Speed : 3.2 kn
Sorted : 0 Total catch: 207.41 Catch/hour: 408.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	230.94	9253	56.51	382
Selene dorsalis	63.37	300	15.51	384
Trichiurus lepturus	35.78	47	8.76	
Brotula barbata	14.74	16	3.61	378
Brachydeuterus auritus	14.19	158	3.47	383
Dentex congoensis	13.08	189	3.20	380
Zeus faber	8.67	24	2.12	
Pagellus bellottii	5.44	47	1.33	379
Miracorvina angolensis	4.97	8	1.21	
Dentex angolensis	4.93	24	1.21	381
Dentex barnardi	3.63	16	0.89	387
Pagrus caeruleostictus	3.31	8	0.81	
Sardinella maderensis	1.81	8	0.44	385
Sardinella aurita	1.50	8	0.37	386
Lagocephalus laevigatus	1.32	2	0.32	
Citharus linguatula	0.55	8	0.13	
Saurida brasiliensis	0.32	95	0.08	
Parapenaeus longirostris, male	0.08	16	0.02	
GOBIIDAE	0.08	16	0.02	
Total	408.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 125
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°16.45
start stop duration Lon E 11°45.72
TIME :13:50:10 14:20:34 30.4 (min) Purpose : 3
LOG : 4276.31 4278.06 1.8 Region : 4054
FDEPTH: 110 109 Gear cond.: 0
BDEPTH: 110 109 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 3.5 kn
Sorted : 0 Total catch: 186.83 Catch/hour: 368.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	138.95	6564	37.68	392
Selene dorsalis	92.98	387	25.22	389
Trachurus trecae	30.59	30	8.30	393
Brachydeuterus auritus	30.34	286	8.23	391
Dentex angolensis	23.84	120	6.47	390
Brotula barbata	20.45	22	5.55	394
Umbrina canariensis	6.00	20	1.63	395
Dentex congoensis	5.76	71	1.56	396
Chelidonichthys capensis	4.32	30	1.17	
Trichiurus lepturus	3.77	6	1.02	
Torpedo marmorata	2.39	2	0.65	
Sphoeroides cf. pachygaster	2.05	2	0.56	
Citharus linguatula	1.48	43	0.40	
Pterothrissus belloci	1.42	8	0.39	
Saurida brasiliensis	1.26	420	0.34	
Priacanthus arenatus	0.83	4	0.22	
Dentex barnardi	0.61	2	0.17	
Illex coindetii	0.38	8	0.10	
G A S T R O P O D S	0.38	43	0.10	
Bristle worms (straws)	0.26	8	0.07	
Ariomma bondi	0.22	6	0.06	
Syacium micrurum	0.18	8	0.05	
Boops boops	0.18	2	0.05	
Arnoglossus imperialis	0.06	6	0.02	
B I V A L V E S	0.04	32	0.01	
Bembrops greyi	0.02	2	0.01	
Total	368.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 126
DATE :18/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°17.52
start stop duration Lon E 11°41.22
TIME :15:18:32 15:49:04 30.5 (min) Purpose : 3
LOG : 4283.65 4285.41 1.8 Region : 4054
FDEPTH: 118 119 Gear cond.: 0
BDEPTH: 118 119 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 3.4 kn
Sorted : 0 Total catch: 55.45 Catch/hour: 108.96

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	50.59	867	46.42	399
Dentex angolensis	16.06	96	14.74	398
Selene dorsalis	12.93	39	11.87	397
Brotula barbata	12.07	20	11.07	400
Lepidotrigla carolae	3.09	65	2.83	
Spicara alta	2.22	55	2.04	
Octopus vulgaris	1.83	4	1.68	
Trachurus trecae	1.79	31	1.64	401
Sphoeroides cf. pachygaster	1.30	22	1.19	
Branchiostegus semifasciatus	1.26	4	1.15	
Saurida brasiliensis	1.22	454	1.12	
Citharus linguatula	1.10	41	1.01	
Monolene microstoma	0.59	47	0.54	
Priacanthus arenatus	0.57	2	0.52	
Uranoscopus albesca	0.49	2	0.45	
G A S T R O P O D S	0.45	47	0.41	
Trichiurus lepturus	0.45	2	0.41	
Pterothrissus belloci	0.43	2	0.40	
Boops boops	0.19	20	0.17	
Illex coindetii	0.14	4	0.13	
Microchirus frechkopi	0.10	2	0.09	
Arnoglossus imperialis	0.08	10	0.07	
Serranus accraensis	0.04	2	0.04	
Total	108.96		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 127
DATE :18/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°20.85
start stop duration Lon E 11°28.24
TIME :19:26:26 19:56:31 30.1 (min) Purpose : 3
LOG : 4303.24 4304.77 1.5 Region : 4054
FDEPTH: 351 353 Gear cond.: 0
BDEPTH: 351 353 Validity : 0
Towing dir: 0° Wire out : 880 m Speed : 3.1 kn
Sorted : 0 Total catch: 203.95 Catch/hour: 406.82

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	192.45	41	47.31	
Laemonema laureysi	57.61	750	14.16	
Hoplunnis punctata	24.41	1069	6.00	
Merluccius polli	21.70	150	5.33	402
Synagrops bellus	21.06	255	5.18	
Malacocephalus laevis	15.96	96	3.92	
Parapenaeus longirostris, female	15.48	1277	3.80	
Parasudis fraserbrunneri	11.33	144	2.78	
Hymenocephalus italicus	11.01	1564	2.71	
Chaunax pictus	9.41	319	2.31	
Diastobranchus capensis	6.06	48	1.49	
Bembrops heterurus	4.95	96	1.22	
Chascanopsetta lugubris	3.19	32	0.78	
Nezumia aequalis	2.71	96	0.67	
Zeus faber	2.23	32	0.55	
Mystriophis rostellatus	1.66	2	0.41	
Glyphus marsupialis	1.44	223	0.35	
Synagrops microlepis	1.44	32	0.35	
Dibranchus atlanticus	1.12	343	0.27	
Solenocera africana	0.80	96	0.20	
Lophius vaillanti	0.64	16	0.16	
Munida sp.	0.16	16	0.04	
Total	406.82		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 128
DATE :18/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°26.00
start stop duration Lon E 11°16.79
TIME :21:51:32 22:22:02 30.5 (min) Purpose : 3
LOG : 4319.24 4320.67 1.4 Region : 4054
FDEPTH: 753 757 Gear cond.: 0
BDEPTH: 753 757 Validity : 0
Towing dir: 0° Wire out : 1530 m Speed : 2.8 kn
Sorted : 0 Total catch: 212.63 Catch/hour: 418.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
JELLYFISH	178.94	189	42.78	
Yarrella blackfordi	58.70	834	14.03	
Bathyuroconger vicinus	45.40	220	10.85	
Coelorinchus caelorhincus	29.98	732	7.17	
Stereomastis sp.	15.82	708	3.78	
Etmopterus pusillus	15.27	63	3.65	
Hoplostethus cadenati	12.83	181	3.07	
Ebinania costaecanariae	12.04	16	2.88	
Deania calcea	10.15	16	2.43	
Talismania longifilis	5.98	55	1.43	
Anemones, pink	4.64	24	1.11	
Halosaurus ovenii	2.99	79	0.71	
Xenodermichthys copei	2.60	55	0.62	
Lamprogrammus exutus	2.52	8	0.60	
Merluccius polli	2.50	4	0.60	
Aristeus varidens, female	2.20	87	0.53	
CARISTIIDAE	2.05	8	0.49	
Illex coindetii	1.89	8	0.45	
Monomitopus metriostoma	1.89	39	0.45	
Stomias boa boa	1.73	39	0.41	
Benthodesmus tenuis	1.57	39	0.38	
Synaphobranchus affinis	1.50	24	0.36	
Plesiopenaeus edwardsianus	1.42	79	0.34	
Chlorophthalmus atlanticus	1.10	16	0.26	
Rajella barnardi	0.87	8	0.21	
Melanonus zugmayeri	0.79	8	0.19	
Ectreposebastes imus	0.63	8	0.15	
MYCTOPHIDAE	0.24	8	0.06	
Dibranchus atlanticus	0.08	8	0.02	
Total	418.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 129
DATE :19/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°32.43
start stop duration Lon E 11°40.71
TIME :12:59:21 13:15:54 16.6 (min) Purpose : 3
LOG : 4419.52 4420.30 0.8 Region : 4054
FDEPTH: 223 226 Gear cond.: 0
BDEPTH: 223 226 Validity : 0
Towing dir: 0° Wire out : 555 m Speed : 2.8 kn
Sorted : 0 Total catch: 56.20 Catch/hour: 203.62

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	90.65	11793	44.52	
Brotula barbata	33.62	29	16.51	403
Dentex angolensis	28.66	91	14.07	404
Zenopsis conchifer	10.18	69	5.00	
Trichiurus lepturus	8.59	22	4.22	
Chlorophthalmus atlanticus	8.08	913	3.97	
Pterothrissus belloci	7.79	62	3.83	
Illex coindetii	4.17	33	2.05	
Uranoscopus albesca	2.90	11	1.42	
Bembrops heterurus	2.75	33	1.35	
Parapenaeus longirostris, female	1.23	178	0.60	
Miracorvina angolensis	0.98	11	0.48	405
Spicara alta	0.98	4	0.48	
Parapenaeus longirostris, male	0.83	196	0.41	
Monolene microstoma	0.72	47	0.36	
G A S T R O P O D S	0.65	72	0.32	
Ariomma bondi	0.29	14	0.14	
Peristedion cataphractum	0.29	4	0.14	
JELLYFISH	0.25	43	0.12	
Total	203.62		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 130
DATE :19/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°29.51
start stop duration Lon E 11°52.32
TIME :14:52:14 15:07:19 15.1 (min) Purpose : 3
LOG : 4432.81 4433.54 0.7 Region : 4054
FDEPTH: 114 114 Gear cond.: 0
BDEPTH: 114 114 Validity : 0
Towing dir: 0° Wire out : 275 m Speed : 2.9 kn
Sorted : 0 Total catch: 37.03 Catch/hour: 147.33

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	74.88	5825	50.82	406
Selene dorsalis	36.68	135	24.90	407
Trichiurus lepturus	9.67	20	6.56	
Dentex angolensis	6.60	36	4.48	408
Lepidotrigla cadmani	2.90	16	1.97	
Zeus faber	2.19	12	1.49	
Pterothrissus belloci	1.79	12	1.22	
Citharus linguatula	1.71	40	1.16	
Saurida brasiliensis	1.71	251	1.16	

Pagellus bellottii	1.59	12	1.08	410
Brachydeuterus auritus	1.55	12	1.05	411
Uranoscopus albesca	1.39	4	0.95	
Dentex congoensis	1.35	20	0.92	409
Sepia officinalis	1.19	8	0.81	
Illex coindetii	0.68	24	0.46	
Spicara alta	0.56	4	0.38	
G A S T R O P O D S	0.44	64	0.30	
GOBIIDAE	0.20	72	0.14	
Monolene microstoma	0.08	28	0.05	
Arnoglossus imperialis	0.08	12	0.05	
Lepidotrigla carolae	0.08	8	0.05	
Total	147.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 131
DATE :19/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°27.57
start stop duration Lon E 11°58.58
TIME :16:01:36 16:16:42 15.1 (min) Purpose : 3
LOG : 4440.99 4441.80 0.8 Region : 4054
FDEPTH: 95 94 Gear cond.: 0
BDEPTH: 95 94 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.2 kn
Sorted : 0 Total catch: 93.11 Catch/hour: 370.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	181.27	2692	48.96	412
Trachurus trecae	44.53	3563	12.03	413
Trichiurus lepturus	34.99	72	9.45	
Brotula barbata	34.99	32	9.45	
Selene dorsalis	21.63	60	5.84	415
Octopus vulgaris	17.69	12	4.78	
Raja miraletus	6.48	12	1.75	
Saurida brasiliensis	5.61	1905	1.51	
Sepia officinalis	5.59	12	1.51	
Uranoscopus albesca	5.25	48	1.42	
Dentex angolensis	3.18	16	0.86	417
Citharus linguatula	2.50	64	0.68	
Zeus faber	2.35	4	0.63	
Dentex barnardi	1.31	4	0.35	
Pagellus bellottii	0.99	8	0.27	416
GOBIIDAE	0.56	457	0.15	
Parapenaeus longirostris, female	0.36	68	0.10	
G A S T R O P O D S	0.32	40	0.09	
Dicologoglossa hexophthalma	0.24	4	0.06	
Dentex congoensis	0.24	4	0.06	
Parapenaeus longirostris, male	0.16	52	0.04	
Total	370.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 132
DATE :19/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°24.74
start stop duration Lon E 12°5.45
TIME :17:12:27 17:27:33 15.1 (min) Purpose : 3
LOG : 4449.85 4450.69 0.8 Region : 4054
FDEPTH: 53 52 Gear cond.: 0
BDEPTH: 53 52 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.3 kn
Sorted : 10 Total catch: 10.23 Catch/hour: 40.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus laevigatus	17.96	24	44.18	
Chelidonichthys gabonensis	6.12	32	15.05	
Pagellus bellottii	3.97	32	9.78	418
Raja miraletus	2.15	4	5.28	
Dactylopterus volitans	1.99	4	4.89	
Bothus podas	1.87	36	4.59	
Pagrus caeruleostictus	1.87	8	4.59	
Trachinus radiatus	1.43	4	3.52	
Trachinus armatus	0.87	12	2.15	
Pseudupeneus prayensis	0.87	4	2.15	
Uranoscopus polli	0.56	4	1.37	
Alloteuthis africana	0.56	143	1.37	
Macropipus rugosus**	0.16	32	0.39	
G A S T R O P O D S	0.08	24	0.20	
Starfish	0.08	4	0.20	
Arnoglossus imperialis	0.08	8	0.20	
Saurida brasiliensis	0.04	8	0.10	
Total	40.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 133
DATE :19/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°34.02
start stop duration Lon E 11°37.72
TIME :20:53:02 21:13:10 20.1 (min) Purpose : 3
LOG : 4482.36 4483.48 1.1 Region : 4054
FDEPTH: 317 318 Gear cond.: 0
BDEPTH: 317 318 Validity : 0
Towing dir: 0° Wire out : 870 m Speed : 3.3 kn
Sorted : 0 Total catch: 74.13 Catch/hour: 220.95

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	102.47	2405	46.38	
Laemonema laureysi	33.98	590	15.38	
Coelorinchus caelorhincus	23.07	572	10.44	
Synagrops microlepis	12.79	429	5.79	
Parapenaeus longirostris, female	9.66	1297	4.37	
Parasudis fraserbrunneri	6.89	170	3.12	
Munida sp.	6.44	706	2.91	
Merluccius polli, juvenile	6.08	152	2.75	419
Malacocephalus occidentalis	4.20	45	1.90	
Pontinus accraensis	3.58	63	1.62	
Echelus myrus	2.77	9	1.25	
Bathyuroconger vicinus	2.50	18	1.13	
Gadella imberbis	1.70	54	0.77	
Hymenocephalus italicus	1.16	116	0.53	
Cyttus traversi	1.07	18	0.49	
Stereomastis sp.	0.63	27	0.28	
Bassanago albescens	0.54	18	0.24	
Parapenaeus longirostris, male	0.45	80	0.20	
Synagrops bellus	0.36	18	0.16	
Benthodesmus tenuis	0.18	9	0.08	
Zenion hololepis	0.18	9	0.08	
Aristeus varidens	0.09	18	0.04	
GALATHEIDAE *	0.09	197	0.04	
Peristedion cataphractum	0.09	9	0.04	
Total	220.95		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 134
DATE :19/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°37.54
start stop duration Lon E 11°28.69
TIME :23:12:52 23:33:04 20.2 (min) Purpose : 3
LOG : 4495.18 4496.08 0.9 Region : 4054
FDEPTH: 643 641 Gear cond.: 0
BDEPTH: 643 641 Validity : 0
Towing dir: 0° Wire out : 1350 m Speed : 2.7 kn
Sorted : 0 Total catch: 161.59 Catch/hour: 479.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	94.16	356	19.62	
Triplophos hemingi	79.31	10099	16.52	
Yarrella blackfordi	72.77	1351	15.16	
Nematocarcinus africanus	59.41	10485	12.38	
Stereomastis sp.	34.01	1767	7.09	
Xenodermichthys copei	27.62	1054	5.76	
Monomitopus metriostoma	16.19	1054	3.37	
Stomias boa boa	15.00	371	3.13	
Hoplostethus cadenati	13.07	490	2.72	
Chlorophthalmus atlanticus	12.18	252	2.54	
Coelorinchus caelorhincus	8.47	223	1.76	
Aristeus varidens, female	7.57	371	1.58	
Bassanago albescens	6.98	104	1.45	
Merluccius polli	5.32	6	1.11	
Halosaurus ovenii	4.31	59	0.90	
Zameus (Scymnodon) squamulosus	3.71	15	0.77	
Todaropsis eblanae	2.82	15	0.59	
Diastobranchus capensis	2.67	74	0.56	
Priacanthus arenatus	2.38	15	0.50	
Dibranchus atlanticus	2.08	119	0.43	
Bristle worms (straws)	1.78	149	0.37	
Echiostoma barbartum	1.63	15	0.34	
JELLYFISH	1.34	134	0.28	
Munida sp.	1.19	89	0.25	
Peristedion cataphractum	1.04	15	0.22	
MYCTOPHIDAE	1.04	297	0.22	
Aristeus varidens, male	0.89	74	0.19	
Benthodesmus tenuis	0.89	59	0.19	
Plesiopenaeus edwardsianus	0.15	45	0.03	
Total	479.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 135
DATE :20/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°38.47
start stop duration Lon E 11°24.41
TIME :00:57:22 01:18:28 21.1 (min) Purpose : 3
LOG : 4502.61 4503.47 0.9 Region : 4054
FDEPTH: 710 712 Gear cond.: 0
BDEPTH: 710 712 Validity : 0
Towing dir: 0° Wire out : 1450 m Speed : 2.4 kn
Sorted : 0 Total catch: 154.17 Catch/hour: 438.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	92.70	284	21.15	
Hoplostethus cadenati	55.73	1649	12.71	
Lophius vaillanti	51.04	28	11.64	
Sudis hyalina	37.54	57	8.56	
Yarrella blackfordi	30.85	483	7.04	
Ebinania costaecanariae	29.57	14	6.75	
Bathyuroconger vicinus	24.88	185	5.68	
Coelorinchus caelorhincus	23.46	526	5.35	
Stereomastis sp.	13.65	796	3.11	
Monomitopus metriostoma	12.09	924	2.76	
Xenodermichthys copei	10.09	242	2.30	
Anemones, white	10.09	28	2.30	
Merluccius polli	9.44	11	2.15	420
Halosaurus ovenii	7.96	128	1.82	
Triplophos hemingi	5.26	611	1.20	
CARISTIIDAE	4.69	14	1.07	
Todaropsis eblanae	3.41	14	0.78	
Stomias boa boa	3.13	71	0.71	
JELLYFISH	2.99	114	0.68	
Aristeus varidens, female	2.27	57	0.52	
Plesiopenaeus edwardsianus	1.85	57	0.42	
Gonostoma elongatum	1.71	43	0.39	
Pasiphaea multidentata	1.28	213	0.29	
Dibranchus atlanticus	0.85	14	0.19	
Gymnoscopelus sp.**	0.85	142	0.19	
Rajella barnardi	0.57	14	0.13	
MYCTOPHIDAE	0.43	28	0.10	
Total	438.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 136
DATE :20/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 6°53.92
start stop duration Lon E 11°43.04
TIME :04:20:45 04:41:37 20.9 (min) Purpose : 3
LOG : 4527.19 4528.11 0.9 Region : 4054
FDEPTH: 508 509 Gear cond.: 0
BDEPTH: 508 509 Validity : 0
Towing dir: 0° Wire out : 1050 m Speed : 2.7 kn
Sorted : 0 Total catch: 72.67 Catch/hour: 209.03

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selachophidium guentheri	73.98	805	35.39	
Lamprogrammus exutus	31.96	104	15.29	
Chlamydoselachus anguineus	17.72	6	8.48	
Yarrella blackfordi	12.66	316	6.05	
Nematocarcinus africanus	10.76	14	5.15	
Aristeus varidens, female	8.86	736	4.24	
Diplophos taenia	7.71	2105	3.69	
GALATHEIDAE	6.87	512	3.29	
Chaunax pictus	5.64	40	2.70	
Photonectes braueri	4.92	144	2.35	
Nezumia aequalis	3.45	132	1.65	
Benthodesmus tenuis	3.22	109	1.54	
Malacocephalus laevis	2.99	17	1.43	
Etmopterus pusillus	2.50	17	1.20	
Hoplostethus cadenati	2.01	58	0.96	
Aristeus varidens, male	1.98	86	0.95	
Chaceon maritae	1.98	6	0.95	
Gadella imberbis	1.84	121	0.88	
Glyphus marsupialis	0.81	414	0.39	
Onychoteuthis banksi	0.81	6	0.39	
Synagrops bellus	0.78	6	0.37	
Chromis cadenati	0.72	12	0.34	
Zameus (Scymnodon) squamulosus	0.69	12	0.33	
Lophius vaillanti	0.63	6	0.30	
Plesiopenaeus edwardsianus	0.55	46	0.26	
Munida sp.	0.52	414	0.25	
Idiacanthus atlanticus	0.49	29	0.23	
Halosaurus ovenii	0.43	17	0.21	
Zenion hololepis	0.29	6	0.14	
JELLYFISH	0.23	6	0.11	
Dibranchus atlanticus	0.17	6	0.08	
OPHIDIIDAE	0.17	12	0.08	
Symphurus sp.	0.12	12	0.06	
Starfish	0.12	6	0.06	
Stomias boa boa	0.09	6	0.04	
Heterocarpus grimaldii	0.09	29	0.04	
DERICHTHYDAE	0.09	6	0.04	
MYCTOPHIDAE	0.06	40	0.03	
Ectreposebastes imus	0.06	6	0.03	
CONGRIDAE	0.06	23	0.03	
Nemichthys scolopaceus	0.04	17	0.02	
Synaphobranchus kaupii	0.01	6	0.00	
Total	209.03		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 137
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°51.75
start stop duration Lon E 11°50.18
TIME :06:42:12 07:02:18 20.1 (min) Purpose : 3
LOG : 4537.87 4538.95 1.1 Region : 4054
FDEPTH: 265 270 Gear cond.: 0
BDEPTH: 265 270 Validity : 0
Towing dir: 0° Wire out : 715 m Speed : 3.2 kn
Sorted : 0 Total catch: 237.50 Catch/hour: 708.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	318.31	16640	44.94	
Chlorophthalmus atlanticus	68.71	1357	9.70	
Coelorinchus caelorhincus	55.71	1142	7.87	
Pterotrissus belloci	52.87	349	7.47	
Merluccius polli	45.78	993	6.46	422
Parapenaeus longirostris, female	27.52	3289	3.89	
Parasudis fraserbrunneri	20.01	552	2.83	
URCHINS	17.45	69	2.46	
Rajella leopardus	15.15	12	2.14	
Parapenaeus longirostris, male	12.76	2389	1.80	
Pontinus accraensis	11.96	95	1.69	
Brotula barbata	11.57	15	1.63	423
Zenopsis conchifer	10.74	42	1.52	
Bembrops heterurus	9.81	149	1.39	
Ariomma bondi	6.05	107	0.85	
Dentex angolensis	4.41	15	0.62	421
Chascanopsetta lugubris	4.29	27	0.61	
Rajella barnardi	3.28	3	0.46	
Malacocephalus occidentalis	3.22	42	0.45	
Illex coindetii	2.68	27	0.38	
Raja miraletus	1.43	9	0.20	
Lophiodes kempi	1.28	3	0.18	
Trigla lyra	1.07	15	0.15	
OPHICHTHIDAE	0.81	15	0.11	

Monolene microstoma	0.69	54	0.10
Dicologoglossa cuneata	0.54	15	0.08
Solenocera africana	0.15	15	0.02
Total	708.25		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 138
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°47.33
start stop duration Lon E 11°52.53
TIME :08:08:18 08:28:25 20.1 (min) Purpose : 3
LOG : 4545.31 4546.44 1.1 Region : 4054
FDEPTH: 142 147 Gear cond.: 0
BDEPTH: 142 147 Validity : 0
Towing dir: 0° Wire out : 370 m Speed : 3.4 kn
Sorted : 0 Total catch: 34.92 Catch/hour: 104.19

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Zenopsis conchifer	18.32	21	17.58	
Dentex angolensis	17.10	72	16.41	424
Selene dorsalis	11.67	21	11.20	435
Trachurus trecae, juvenile	11.64	773	11.17	425
Brotula barbata	8.47	9	8.13	
Pterothrissus belloci	7.40	48	7.10	
Trachurus trecae	6.12	75	5.87	426
Monolene microstoma	4.95	27	4.75	
Ariomma bondi	4.77	134	4.58	
Rajella leopardus	4.00	6	3.84	
Lepidotrigla cadmani	2.12	15	2.03	
Saurida brasiliensis	2.00	683	1.92	
Spicara alta	1.46	15	1.40	
Citharus linguatula	1.34	30	1.29	
Illex coindetii	0.66	18	0.63	
Parapenaeus longirostris, female	0.54	143	0.52	
Todaropsis eblanae	0.39	3	0.37	
Sepia orbignyana	0.33	9	0.32	
Peristedion cataphractum	0.30	9	0.29	
Dicologoglossa cuneata	0.18	3	0.17	
Pontinus accraensis	0.12	3	0.11	
Parapenaeus longirostris, male	0.06	39	0.06	
GOBIIDAE	0.06	15	0.06	
Starfish	0.06	6	0.06	
Unidentified	0.06	3	0.06	
G A S T R O P O D S	0.06	63	0.06	
Alloteuthis africana	0.03	15	0.03	
Total	104.19		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 139
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°44.95
start stop duration Lon E 11°54.32
TIME :09:16:41 09:36:48 20.1 (min) Purpose : 3
LOG : 4550.55 4551.57 1.0 Region : 4054
FDEPTH: 118 114 Gear cond.: 0
BDEPTH: 118 114 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 3.1 kn
Sorted : 0 Total catch: 77.48 Catch/hour: 231.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	54.51	4088	23.59	429
Selene dorsalis	49.20	125	21.30	428
Dentex congoensis, juvenile	33.04	787	14.30	431
Dentex angolensis	29.11	250	12.60	427
Dentex congoensis	17.18	182	7.43	432
Dentex angolensis, juvenile	9.90	170	4.28	433
Pagellus bellottii	9.75	66	4.22	430
Lepidotrigla cadmani	5.84	51	2.53	
Sphoeroides cf. pachygaster	4.71	6	2.04	
Zeus faber	2.77	12	1.20	
Trachurus trecae	2.56	36	1.11	434
Trichiurus lepturus	2.27	3	0.98	
Citharus linguatula	1.64	83	0.71	
Scorpaena stephanica	1.55	6	0.67	
Dentex barnardi	1.31	3	0.57	
Umbrina canariensis	0.92	3	0.40	
Chelidonichthys gabonensis	0.89	6	0.39	
Monolene microstoma	0.78	72	0.34	
Sepia orbignyana	0.69	36	0.30	
Lepidotrigla carolae	0.69	60	0.30	
Saurida brasiliensis	0.60	236	0.26	
Arnoglossus imperialis	0.33	75	0.14	
G A S T R O P O D S	0.33	48	0.14	
Todaropsis eblanae	0.30	18	0.13	
Spicara alta	0.09	6	0.04	
Parapenaeus longirostris	0.09	15	0.04	
Total	231.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 140
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°47.10
start stop duration Lon E 12°0.14
TIME :10:39:55 11:00:25 20.5 (min) Purpose : 3
LOG : 4558.31 4559.38 1.1 Region : 4054
FDEPTH: 88 90 Gear cond.: 0
BDEPTH: 88 90 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.1 kn
Sorted : 0 Total catch: 22.78 Catch/hour: 66.67

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	23.50	170	35.25	437
Chelidonichthys gabonensis	17.18	76	25.77	
Dentex barnardi	10.68	26	16.02	436
Lagocephalus laevigatus	6.73	6	10.10	
Epinephelus aeneus	3.25	3	4.87	
Lepidotrigla cadmani	2.25	18	3.38	
Trichiurus lepturus	1.73	3	2.59	
Zeus faber	1.11	3	1.67	
Dentex congoensis	0.15	9	0.22	
Grammoplites gruveli	0.06	3	0.09	
Arnoglossus imperialis	0.03	3	0.04	
Total	66.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 141
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°43.79
start stop duration Lon E 12°9.46
TIME :12:26:05 12:46:17 20.2 (min) Purpose : 3
LOG : 4570.50 4571.59 1.1 Region : 4054
FDEPTH: 70 69 Gear cond.: 0
BDEPTH: 70 69 Validity : 0
Towing dir: 0° Wire out : 225 m Speed : 3.2 kn
Sorted : 0 Total catch: 141.76 Catch/hour: 421.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selene dorsalis	347.23	1129	82.46	438
Epinephelus aeneus	15.50	3	3.68	
Umbrina canariensis	14.91	15	3.54	439
Pagrus caeruleostictus	11.29	18	2.68	441
Pagellus bellottii	7.49	71	1.78	440
Lagocephalus laevigatus	5.85	12	1.39	
Trachinus radiatus	2.55	12	0.61	
Chelidonichthys gabonensis	2.52	18	0.60	
Raja miraletus	2.14	3	0.51	
Dactylopterus volitans	1.66	3	0.40	
Sepia officinalis	1.66	15	0.40	
Balistes capriscus	1.66	3	0.40	
Chaetodon hoefleri	1.57	9	0.37	
Dentex barnardi	1.57	3	0.37	
Torpedo torpedo	1.54	3	0.37	
Urchin	0.95	585	0.23	
Starfish	0.39	116	0.09	
Citharus linguatula	0.21	3	0.05	
Trachinus araneus	0.18	3	0.04	
Alloteuthis africana	0.06	21	0.01	
Grammoplites gruveli	0.06	3	0.01	
Saurida brasiliensis	0.03	6	0.01	
Arnoglossus imperialis	0.03	18	0.01	
Total	421.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 142
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°39.07
start stop duration Lon E 12°14.89
TIME :13:49:51 14:05:16 15.4 (min) Purpose : 3
LOG : 4579.19 4580.07 0.9 Region : 4054
FDEPTH: 46 46 Gear cond.: 0
BDEPTH: 46 46 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 3.4 kn
Sorted : 0 Total catch: 10.06 Catch/hour: 39.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus laevigatus	6.89	8	17.59	
Pomadasys rogeri	5.41	4	13.82	
Pagrus caeruleostictus	4.51	12	11.53	443
Selene dorsalis	4.44	23	11.33	444
Balistes capriscus	4.05	8	10.34	
Pagellus bellottii	3.04	31	7.75	442
Alectis alexandrinus	2.88	4	7.36	
Raja miraletus	2.02	4	5.17	
Galeoides decadactylus	1.95	4	4.97	
Trachinus radiatus	1.91	4	4.87	
Syacium micrurum	1.21	8	3.08	
Caranx rhonchus	0.74	19	1.89	
Alloteuthis africana	0.08	12	0.20	
Grammoplites gruveli	0.04	4	0.10	
Total	39.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 143
DATE :20/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°34.74
start stop duration Lon E 12°21.22
TIME :15:12:25 15:32:29 20.1 (min) Purpose : 3
LOG : 4588.27 4589.42 1.1 Region : 4054
FDEPTH: 24 23 Gear cond.: 0
BDEPTH: 24 23 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.5 kn
Sorted : 0 Total catch: 23.11 Catch/hour: 69.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Alectis alexandrinus	17.83	6	25.79	
Balistes capriscus	10.62	21	15.36	
Brachydeuterus auritus	9.66	105	13.98	446
Galeoides decadactylus	5.53	15	8.01	445
Ephippion guttifer	4.49	3	6.49	
Raja miraletus	3.68	6	5.32	
Lagocephalus laevigatus	3.11	6	4.50	
Pagrus caeruleostictus	2.42	6	3.50	
Caranx crysos	2.42	3	3.50	
Arius parkii	2.09	3	3.03	
Elops lacerta	2.00	6	2.90	
Caranx rhonchus	1.41	36	2.03	
Selene dorsalis	1.17	12	1.69	447
Pagellus bellottii	0.96	3	1.38	
Trachinocephalus myops	0.90	3	1.30	
Syacium micrurum	0.24	3	0.35	
Eucinostomus melanopterus	0.21	3	0.30	
Trachinus armatus	0.21	3	0.30	
Dicologoglossa hexophthalma	0.18	3	0.26	
Total	69.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 144
DATE :20/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°9.91
start stop duration Lon E 11°48.12
TIME :21:06:57 21:27:15 20.3 (min) Purpose : 3
LOG : 4639.38 4640.36 1.0 Region : 4054
FDEPTH: 766 768 Gear cond.: 0
BDEPTH: 766 768 Validity : 0
Towing dir: 0° Wire out : 1590 m Speed : 2.9 kn
Sorted : 0 Total catch: 123.90 Catch/hour: 366.21

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Yarrella blackfordi	151.33	3630	41.32	
HOLUTHUROIDEA	32.16	59	8.78	
Coelorinchus caelorhincus	26.48	674	7.23	
Stereomastis sp.	26.48	2282	7.23	
Bathyuroconger vicinus	20.81	106	5.68	
JELLYFISH	20.81	35	5.68	
Hoplostethus cadenati	11.94	189	3.26	
Xenodermichthys copei	11.70	497	3.20	
Stomias boa boa	10.52	236	2.87	
Triplophos hemingi	7.80	910	2.13	
Glyphus marsupialis	6.03	449	1.65	
Bufoceratias wedli	5.67	24	1.55	
Talismania longifilis	5.56	95	1.52	
Idiacanthus fasciola	5.44	449	1.49	
Lophius vaillanti	3.90	12	1.07	
Zameus (Scymnodon) squamulosus	3.43	24	0.94	
Monomitopus sp.	3.43	189	0.94	
Munida sp.	2.96	35	0.81	
Penaeopsis serrata	2.72	378	0.74	
Octopoteuthis sicula	2.66	12	0.73	
Aristeus varidens, female	1.54	59	0.42	
Halosaurus ovenii	0.83	95	0.23	
CALLIONYMIDAE	0.71	24	0.19	
Avocettina acuticeps	0.47	12	0.13	
MYCTOPHIDAE	0.47	177	0.13	
Bathypterois phenax	0.24	47	0.06	
Aristeus varidens, male	0.12	12	0.03	
Total	366.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 145
DATE :20/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°10.50
start stop duration Lon E 11°51.82
TIME :23:37:18 00:07:13 29.9 (min) Purpose : 3
LOG : 4645.77 4647.10 1.3 Region : 4054
FDEPTH: 614 622 Gear cond.: 0
BDEPTH: 614 622 Validity : 0
Towing dir: 0° Wire out : 1250 m Speed : 2.7 kn
Sorted : 0 Total catch: 151.00 Catch/hour: 302.91

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Stomias boa boa	52.06	893	17.19	
Hoplostethus cadenati	39.92	1575	13.18	
Diplophos taenia	39.62	5777	13.08	
Yarrella blackfordi	37.41	983	12.35	
Nematocarcinus africanus	36.51	10221	12.05	
Lamprogrammus exutus	26.68	421	8.81	
Stereomastis sp.	24.67	1675	8.15	
Coelorinchus caelorhincus	8.22	201	2.72	
Octopoteuthis sicula	7.22	20	2.38	
Monomitopus metriostoma	7.12	100	2.35	
Aristeus varidens, female	4.91	191	1.62	
Todarodes sagittatus	4.71	20	1.56	
Zameus (Scymnodon) squamulosus	3.11	50	1.03	
Merluccius polli	2.81	4	0.93	
Gadella imberbis	2.41	80	0.79	
Xenodermichthys copei	1.50	130	0.50	
Coloconger scholesi	1.20	10	0.40	
Bathyuroconger vicinus	0.80	60	0.26	
Aristeus varidens, male	0.50	50	0.17	
Avocettina acuticeps	0.40	20	0.13	
MYCTOPHIDAE	0.40	30	0.13	
Selachophidium guentheri	0.20	10	0.07	
Heterocarpus ensifer	0.20	10	0.07	
Diastobranchus capensis	0.20	10	0.07	
Ectreposebastes imus	0.10	10	0.03	
Total	302.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 146

DATE :21/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°9.70
start stop duration Lon E 11°53.85
TIME :01:41:52 02:11:55 30.1 (min) Purpose : 3
LOG : 4651.76 4653.23 1.5 Region : 4054
FDEPTH: 487 492 Gear cond.: 0
BDEPTH: 487 492 Validity : 0
Towing dir: 0° Wire out : 1100 m Speed : 2.9 kn
Sorted : 0 Total catch: 71.84 Catch/hour: 143.39

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Merluccius polli	23.27	60	16.23	448
Stereomastis sp.	12.89	1018	8.99	
Lepidopus caudatus	10.58	379	7.38	
Nematocarcinus africanus	9.50	2747	6.63	
Laemonema laureysi	9.50	471	6.63	
Chaunax pictus	9.18	52	6.40	
Aristeus varidens	7.74	283	5.40	
Stomias boa boa	7.54	172	5.26	
Chaceon maritae, male	7.50	12	5.23	
Yarrella blackfordi	7.11	180	4.96	
Zenopsis conchifer	7.11	4	4.96	
Triplophos hemingi	4.63	862	3.23	
Monomitopus metriostoma	4.23	291	2.95	
Octopoteuthis sicula	3.59	32	2.51	
Hymenocephalus italicus	3.31	299	2.31	
Malacocephalus occidentalis	2.75	36	1.92	
Chaceon maritae, female	2.20	8	1.53	
Aristeus varidens, male	1.96	204	1.36	
Hoplostethus cadenati	1.48	52	1.03	
Lamprogrammus exutus	1.28	4	0.89	
Zameus (Scymnodon) squamulosus	1.20	52	0.84	
NETTASTOMATIDAE	0.64	8	0.45	
Gadella imberbis	0.60	20	0.42	
Halosaurus ovenii	0.48	8	0.33	
Avocettina acuticeps	0.44	24	0.31	
Nezumia aequalis	0.40	8	0.28	
Plesiopenaeus edwardsianus	0.32	4	0.22	
Synaphobranchus affinis	0.24	16	0.17	
MYCTOPHIDAE	0.24	120	0.17	
Borostomias antarcticus	0.24	8	0.17	
Galeus polli	0.24	4	0.17	
Lophius vaillanti	0.24	4	0.17	
Raja straeleni	0.24	4	0.17	
Dibranchus atlanticus	0.16	4	0.11	
Rajella barnardi	0.16	8	0.11	
Leptocephalus	0.12	4	0.08	
Diceratias pileatus	0.08	8	0.06	
Total	143.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 147
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°4.72
start stop duration Lon E 11°56.77
TIME :05:44:52 06:05:02 20.2 (min) Purpose : 3
LOG : 4661.99 4663.18 1.2 Region : 4054
FDEPTH: 259 250 Gear cond.: 0
BDEPTH: 259 250 Validity : 0
Towing dir: 0° Wire out : 700 m Speed : 3.5 kn
Sorted : 0 Total catch: 192.55 Catch/hour: 572.78

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Synagrops microlepis	289.68	188725	50.57	
Zenopsis conchifer	41.59	125	7.26	
Dentex angolensis	39.98	86	6.98	449
Brotula barbata	29.33	27	5.12	451
Bembrops heterurus	27.07	393	4.73	
Parapenaeus longirostris, female	23.89	3617	4.17	
Merluccius polli	21.92	140	3.83	450
Miracorvina angolensis	17.79	15	3.11	452
Pterothrissus belloci	15.71	140	2.74	
Parapenaeus longirostris, male	12.11	1806	2.11	
Chlorophthalmus atlanticus	11.87	1309	2.07	
Merluccius polli, juvenile	8.83	181	1.54	453
Pontinus accraensis	8.36	65	1.46	
Ariomma bondi	7.62	173	1.33	
Coelorinchus caelorhincus	5.80	140	1.01	
Todaropsis eblanae	1.93	12	0.34	
Raja miraletus	1.67	3	0.29	
Trichiurus lepturus	1.49	6	0.26	
Coloconger cadenati	1.31	24	0.23	
Peristedion cataphractum	1.16	24	0.20	
Monolene microstoma	0.98	98	0.17	
Malacocephalus occidentalis	0.65	9	0.11	
Gephyroberyx darwini	0.57	9	0.10	
G A S T R O P O D S	0.51	33	0.09	
Illex coindetii	0.48	6	0.08	
Parasudis fraserbrunneri	0.33	65	0.06	
Solenocera africana	0.18	33	0.03	
Total	572.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 148
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°4.01
start stop duration Lon E 11°59.63
TIME :07:16:27 07:36:49 20.4 (min) Purpose : 3
LOG : 4668.35 4669.52 1.2 Region : 4054
FDEPTH: 149 150 Gear cond.: 0
BDEPTH: 149 150 Validity : 0
Towing dir: 0° Wire out : 360 m Speed : 3.4 kn
Sorted : 0 Total catch: 46.95 Catch/hour: 138.29

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dentex angolensis	69.69	236	50.39	454
Sphoeroides cf. pachygaster	26.69	24	19.30	
Chelidonichthys gabonensis	12.49	82	9.03	
Zenopsis conchifer	7.60	21	5.50	
Rajella leopardus	4.30	6	3.11	
Trachurus trecae	3.80	44	2.75	456
Trachurus trecae, juvenile	2.74	138	1.98	455
Citharus linguatula	2.18	32	1.58	
Brotula barbata	1.44	3	1.04	
Dentex barnardi	1.35	3	0.98	
Zeus faber	1.18	12	0.85	
Peristedion cataphractum	0.94	15	0.68	
Ariomma bondi	0.91	12	0.66	
Syacium micrurum	0.74	6	0.53	
Saurida brasiliensis	0.53	32	0.38	
Illex coindetii	0.38	9	0.28	
Dentex congoensis	0.32	6	0.23	
Todaropsis eblanae	0.32	3	0.23	
G A S T R O P O D S	0.29	53	0.21	
Dicologoglossa cuneata	0.18	3	0.13	
Starfish red	0.15	3	0.11	
Spicara alta	0.06	3	0.04	
Total	138.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 149
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°2.74
start stop duration Lon E 12°4.60
TIME :08:37:36 08:57:43 20.1 (min) Purpose : 3
LOG : 4675.64 4676.75 1.1 Region : 4054
FDEPTH: 118 117 Gear cond.: 0
BDEPTH: 118 117 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 3.3 kn
Sorted : 0 Total catch: 73.93 Catch/hour: 220.47

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	92.50	6656	41.96	457
Selene dorsalis	84.93	140	38.52	458
Lepidotrigla cadmani	8.32	72	3.77	
Zenopsis conchifer	6.38	6	2.89	
Dentex angolensis	5.40	36	2.45	461
Zeus faber	3.34	21	1.51	
Priacanthus arenatus	2.89	9	1.31	
Trichiurus lepturus	2.45	3	1.11	
Dentex angolensis, juvenile	1.85	33	0.84	460
Citharus linguatula	1.82	36	0.83	
Dentex congoensis	1.79	66	0.81	459
Trachurus trecae	1.70	15	0.77	462
Rajella leopardus	1.64	3	0.74	
Uranoscopus albesca	1.34	3	0.61	
Brotula barbata	0.98	3	0.45	
Illex coindetii	0.66	18	0.30	
Sepia orbignyana	0.66	12	0.30	
Peristedion cataphractum	0.45	6	0.20	
Pterothrissus belloci	0.39	6	0.18	
Bembrops heterurus	0.30	3	0.14	
Ariomma bondi	0.24	3	0.11	
Saurida brasiliensis	0.21	78	0.09	
Monolene microstoma	0.12	18	0.05	
Arnoglossus imperialis	0.09	18	0.04	
Spicara alta	0.03	3	0.01	
Plastic	0.00	6	0.00	
Total	220.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 150
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 6°56.82
start stop duration Lon E 12°10.82
TIME :10:17:59 10:38:44 20.8 (min) Purpose : 3
LOG : 4686.88 4688.02 1.1 Region : 4054
FDEPTH: 86 86 Gear cond.: 0
BDEPTH: 86 86 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.3 kn
Sorted : 0 Total catch: 101.32 Catch/hour: 292.97

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Selene dorsalis	204.67	680	69.86	463
Dentex angolensis	17.52	101	5.98	464
Pagellus bellottii	14.69	78	5.01	466
Lagocephalus laevigatus	10.58	12	3.61	
Dentex congoensis	9.14	179	3.12	465
Lepidotrigla cadmani	6.33	61	2.16	
Zeus faber	5.09	9	1.74	
Squatina aculeata	3.38	3	1.15	
Chelidonichthys capensis	3.30	17	1.13	
Pagrus caeruleostictus	3.21	6	1.10	
Sepia orbignyana	2.69	3	0.92	
Mustelus mustelus	2.52	3	0.86	
Dentex barnardi	2.00	9	0.68	467
Brachydeuterus auritus	1.53	9	0.52	468
Raja miraletus	1.36	6	0.46	
Fistularia petimba	1.10	3	0.38	
Cynoglossus canariensis	0.93	3	0.32	
Pomadasys jubelini	0.72	3	0.25	
Priacanthus arenatus	0.64	3	0.22	
Octopus vulgaris	0.43	3	0.15	
Sepia officinalis	0.38	17	0.13	
Pseudupeneus prayensis	0.32	3	0.11	
Citharus linguatula	0.23	12	0.08	
Grammoplites gruveli	0.20	3	0.07	
Saurida brasiliensis	0.03	6	0.01	
Plastic	0.00	3	0.00	
Total	292.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 151
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°10.85
start stop duration Lon E 12°16.84
TIME :12:36:16 12:57:17 21.0 (min) Purpose : 3
LOG : 4702.40 4703.51 1.1 Region : 4054
FDEPTH: 119 119 Gear cond.: 0
BDEPTH: 119 119 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.2 kn
Sorted : 0 Total catch: 102.72 Catch/hour: 293.21

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	141.18	11058	48.15	469
Selene dorsalis	64.94	120	22.15	473
Umbrina canariensis	23.24	60	7.92	474
Brachydeuterus auritus	15.76	114	5.37	475
Fistularia petimba	5.17	11	1.76	
Trichiurus lepturus	4.85	9	1.65	
Raja straeleni	3.82	3	1.30	0
Lagocephalus laevigatus	3.71	3	1.27	
Octopus vulgaris	3.63	6	1.24	
Dentex barnardi	3.45	11	1.18	471
Brotula barbata	3.28	6	1.12	
Zeus faber	3.23	20	1.10	
Alectis alexandrinus	3.00	3	1.02	
Dentex angolensis	2.77	23	0.94	470
Citharus linguatula	2.71	51	0.92	
Lepidotrigla cadmani	1.97	34	0.67	
Scorpaena stephanica	1.94	3	0.66	
Pagellus bellottii	1.28	9	0.44	476
Dentex congoensis	1.11	23	0.38	472
Illex coindetii	0.74	11	0.25	
Raja straeleni	0.63	3	0.21	
Sepia officinalis	0.29	3	0.10	
Saurida brasiliensis	0.29	100	0.10	
G A S T R O P O D S	0.20	29	0.07	
Arnoglossus imperialis	0.03	3	0.01	
Total	293.21		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 152
DATE :21/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°14.26
start stop duration Lon E 12°8.45
TIME :14:28:43 14:49:00 20.3 (min) Purpose : 3
LOG : 4714.49 4715.68 1.2 Region : 4054
FDEPTH: 224 224 Gear cond.: 0
BDEPTH: 224 224 Validity : 0
Towing dir: 0° Wire out : 580 m Speed : 3.5 kn
Sorted : 0 Total catch: 103.65 Catch/hour: 306.66

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Zenopsis conchifer	75.74	219	24.70	
Synagrops microlepis	60.95	5707	19.87	
Pterothrissus belloci	47.63	411	15.53	
Dentex angolensis	39.29	121	12.81	477
Brotula barbata	33.55	47	10.94	478
Bembrops heterurus	11.45	118	3.73	
Trichiurus lepturus	8.82	21	2.88	
Nezumia duodecim	5.65	115	1.84	
Parapenaeus longirostris, female	3.93	429	1.28	
Uranoscopus albesca	3.55	12	1.16	
Illex coindetii	2.43	27	0.79	
Miracorvina angolensis	1.98	9	0.65	479
Ariomma bondi	1.95	65	0.64	
Squatina oculata	1.83	3	0.60	
Torpedo torpedo	1.45	3	0.47	
Chlorophthalmus atlanticus	1.27	320	0.41	
Todaropsis eblanae	1.09	6	0.36	
Monolene microstoma	0.95	65	0.31	
Umbrina canariensis	0.92	6	0.30	
Octopus vulgaris	0.68	3	0.22	
G A S T R O P O D S	0.38	12	0.13	
Parapenaeus longirostris, male	0.38	89	0.13	
Merluccius polli	0.27	3	0.09	
Peristedion cataphractum	0.21	3	0.07	
Bathyuroconger vicinus	0.18	3	0.06	
GOBIIDAE	0.06	3	0.02	
Antigonia capros	0.06	3	0.02	
Total	306.66		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 153
DATE :21/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°14.97
start stop duration Lon E 12°5.09
TIME :16:07:20 16:27:40 20.3 (min) Purpose : 3
LOG : 4721.41 4722.46 1.1 Region : 4054
FDEPTH: 307 308 Gear cond.: 0
BDEPTH: 307 308 Validity : 0

Towing dir: 0° Wire out : 750 m Speed : 3.1 kn
Sorted : 0 Total catch: 783.36 Catch/hour: 2311.93

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	1410.13	29185	60.99	
Synagrops microlepis	512.05	30354	22.15	
Zenopsis conchifer	99.99	162	4.32	
Pterothrissus belloci	65.58	422	2.84	
Merluccius polli, juvenile	45.77	909	1.98	481
Parapenaeus longirostris, female	27.92	3182	1.21	
Lophius vaillanti	17.53	32	0.76	
Brotula barbata	16.88	32	0.73	
Gadella imberbis	14.61	292	0.63	
Nezumia aequalis	11.04	260	0.48	
Parapenaeus longirostris, male	9.74	1526	0.42	
Chaceon maritae, female	8.12	32	0.35	
Parasudis fraserbrunneri	7.79	162	0.34	
Todaropsis eblanae	6.82	32	0.29	
Synagrops bellus	6.17	227	0.27	
MYCTOPHIDAE	5.52	3279	0.24	
Malacocephalus laevis	5.52	65	0.24	
Bembrops heterurus	5.52	130	0.24	
Pontinus accraensis	5.52	65	0.24	
Illex coindetii	5.19	32	0.22	
Trichiurus lepturus	4.57	6	0.20	
ACROPOMATIDAE	4.55	195	0.20	
Parapandalus narval	3.90	877	0.17	
Stereomastis sp.	1.95	162	0.08	
Zenion hololepis	1.95	422	0.08	
Bathynectes piperitus	1.95	32	0.08	
Grammicolepis brachiusculus	1.62	97	0.07	
Benthodesmus tenuis	1.30	65	0.06	
Merluccius polli	1.30	3	0.06	480
Solenocera africana	0.80	162	0.03	
OMMASTREPHIDAE	0.50	130	0.02	
Peristedion cataphractum	0.15	32	0.01	
Total	2311.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 154
DATE :21/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°18.21
start stop duration Lon E 12°2.19
TIME :18:04:41 18:25:07 20.4 (min) Purpose : 3
LOG : 4730.72 4731.78 1.1 Region : 4054
FDEPTH: 429 425 Gear cond.: 0
BDEPTH: 429 425 Validity : 0
Towing dir: 0° Wire out : 1000 m Speed : 3.1 kn
Sorted : 0 Total catch: 79.83 Catch/hour: 234.43

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Merluccius polli	86.23	297	36.78	482
Nematocarcinus africanus	28.78	7530	12.28	
Lophius vaillanti	18.97	15	8.09	
Hymenocephalus italicus	17.33	1410	7.39	
Laemonema laureysi	14.98	302	6.39	
Stephanolepis sp.	14.63	896	6.24	
Chaunax pictus	13.01	250	5.55	
Benthodesmus tenuis	9.25	352	3.95	
Coloconger cadenati	5.58	53	2.38	
Aristeus varidens, female	5.58	493	2.38	
Malacocephalus occidentalis	4.70	23	2.00	
Dibranchus atlanticus	3.96	264	1.69	
Zenopsis conchifer	2.64	15	1.13	
Halosaurus ovenii	1.76	88	0.75	
Nezumia aequalis	1.17	23	0.50	
Plesiopenaeus edwardsianus	0.88	15	0.38	
JELLYFISH	0.81	15	0.34	
Malacocephalus laevis	0.73	15	0.31	
Etmopterus sp.	0.59	53	0.25	
Coelorinchus caelorhincus	0.59	44	0.25	
NETTASTOMATIDAE	0.44	23	0.19	
Aristeus varidens, male	0.35	455	0.15	
Bathynectes piperitus	0.29	9	0.13	
MICROSTOMATIDAE	0.29	156	0.13	
Dicrolene intronigra	0.15	9	0.06	
Gadella imberbis	0.15	9	0.06	
OMMASTREPHIDAE	0.15	15	0.06	
Stomias boa boa	0.15	23	0.06	
Triplophos hemingi	0.15	23	0.06	
Phosichthys argenteus	0.15	9	0.06	
Total	234.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 155
DATE :21/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°29.04
start stop duration Lon E 12°18.25
TIME :21:28:07 21:48:20 20.2 (min) Purpose : 3
LOG : 4753.37 4754.40 1.0 Region : 4054
FDEPTH: 510 513 Gear cond.: 0
BDEPTH: 510 513 Validity : 0
Towing dir: 0° Wire out : 1160 m Speed : 3.1 kn
Sorted : 0 Total catch: 36.10 Catch/hour: 107.12

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	15.49	7926	14.46	
Merluccius polli	11.63	21	10.86	483
Stereomastis sp.	10.80	1258	10.08	
Lamprogrammus exutus	9.64	62	9.00	
Stomias boa boa	9.64	223	9.00	
Centrophorus squamosus	7.77	3	7.26	
Triplophos hemingi	4.69	789	4.38	
Aristeus varidens, female	4.42	309	4.13	
Gadella imberbis	3.71	125	3.46	
Lophius vaillanti	3.35	3	3.13	
Chaunax pictus	2.46	21	2.30	
Hymenocephalus italicus	2.43	80	2.27	
Aristeus varidens, male	2.34	620	2.19	
Coelorinchus caelorhincus	1.99	74	1.86	
Benthodesmus tenuis	1.90	89	1.77	
Bathyuroconger vicinus	1.84	139	1.72	
Aristeus sp.	1.78	276	1.66	
Dibranchus atlanticus	1.63	142	1.52	
Histioteuthis meleagroteuthis	1.28	9	1.19	
Hoplostethus cadenati	1.22	56	1.14	
Yarrella blackfordi	1.07	30	1.00	
Laemonema laureysi	1.04	50	0.97	
Plesiopenaeus edwardsianus	1.01	15	0.94	
Malacocephalus laevis	0.83	15	0.78	
Chaceon maritae	0.77	3	0.72	
Zameus (Scymnodon) squamulosus	0.68	9	0.64	
Photonectes braueri	0.59	6	0.55	
Nezumia duodecim	0.45	18	0.42	
Ebinania costaecanariae	0.36	3	0.33	
Bathynectes piperitus	0.24	6	0.22	
Coloconger cadenati	0.03	6	0.03	
Xenodermichthys copei	0.03	6	0.03	
Total	107.12		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 156
DATE :22/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°32.93
start stop duration Lon E 12°14.21
TIME :01:08:13 01:30:15 22.0 (min) Purpose : 3
LOG : 4767.93 4768.98 1.1 Region : 4054
FDEPTH: 703 685 Gear cond.: 0
BDEPTH: 703 685 Validity : 0
Towing dir: 0° Wire out : 1450 m Speed : 2.8 kn
Sorted : 0 Total catch: 280.98 Catch/hour: 765.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lamprogrammus exutus	167.17	613	21.84	
Triplophos hemingi	140.70	19561	18.39	
Hoplostethus cadenati	115.94	3162	15.15	
Stomias boa boa	81.87	1593	10.70	
Yarrella blackfordi	70.10	1936	9.16	
Stereomastis sp.	36.77	3579	4.80	
Lophius vaillanti	24.76	49	3.24	
Aristeus varidens	17.40	4167	2.27	
Chrysaora hysoscella	16.18	25	2.11	
Coelorinchus caelorhincus	15.69	417	2.05	
Abraliopsis gilchristi	13.48	49	1.76	
Aristeus varidens, female	9.56	319	1.25	
Gonostoma elongatum	6.62	196	0.86	
Talismania longifilis	6.13	74	0.80	
Xenodermichthys copei	5.64	294	0.74	
Anemones, white	5.15	25	0.67	
Aequorea forskalea	4.90	49	0.64	
Dicrolene intronigra	4.90	270	0.64	
Benthodesmus tenuis	3.92	147	0.51	
Bathyuroconger vicinus	3.68	49	0.48	
Dibranchus atlanticus	2.70	14	0.35	
Halosaurus ovenii	2.70	25	0.35	
Synaphobranchus affinis	1.96	49	0.26	
CARISTIIDAE	1.72	25	0.22	
Etmopterus pusillus	1.72	25	0.22	
Starfish	0.98	25	0.13	
Glyphus marsupialis	0.98	98	0.13	
Apogonidae - juvenile	0.74	25	0.10	
MYCTOPHIDAE	0.74	49	0.10	
Bathypterois guentheri	0.49	25	0.06	
Total	765.27		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 157
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°25.58
start stop duration Lon E 12°27.57
TIME :05:35:14 05:55:21 20.1 (min) Purpose : 3
LOG : 4787.06 4788.24 1.2 Region : 4054
FDEPTH: 115 115 Gear cond.: 0
BDEPTH: 115 115 Validity : 0
Towing dir: 0° Wire out : 340 m Speed : 3.5 kn
Sorted : 0 Total catch: 73.94 Catch/hour: 220.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	56.51	724	25.64	487
Selene dorsalis	40.89	80	18.56	490
Dentex angolensis	30.73	209	13.94	486
Brotula barbata	18.30	15	8.30	485
Rhinobatos albomaculatus	13.95	6	6.33	
Umbrina canariensis	12.91	51	5.86	484
Spicara alta	11.42	92	5.18	488
Zenopsis conchifer	9.66	12	4.38	
Lepidotrigla cadmani	6.56	51	2.98	
Boops boops	5.01	54	2.27	
Trachurus trecae, juvenile	2.03	128	0.92	489
Zeus faber	2.03	6	0.92	
Raja miraletus	1.91	6	0.87	
Citharus linguatula	1.82	60	0.82	
Pagellus bellottii	0.92	6	0.42	
Lepidotrigla carolae	0.86	24	0.39	
Uranoscopus albesca	0.80	6	0.37	
Monolene microstoma	0.66	48	0.30	
Dentex barnardi	0.63	3	0.28	
G A S T R O P O D S	0.60	122	0.27	
Serranus cabrilla	0.48	3	0.22	
Chelidonichthys capensis	0.39	6	0.18	
Trichiurus lepturus	0.33	3	0.15	
Microchirus frechkopi	0.27	3	0.12	
Parapandalus narval	0.27	319	0.12	
Ariomma bondi	0.24	3	0.11	
Saurida brasiliensis	0.09	39	0.04	
Serranus africanus	0.09	3	0.04	
Sepia orbignyana	0.06	3	0.03	
Total	220.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 158
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°21.80
start stop duration Lon E 12°33.05
TIME :07:06:25 07:26:38 20.2 (min) Purpose : 3
LOG : 4796.52 4797.64 1.1 Region : 4054
FDEPTH: 86 85 Gear cond.: 0
BDEPTH: 86 85 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.3 kn
Sorted : 0 Total catch: 251.57 Catch/hour: 747.24

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	234.18	2094	31.34	492
Dentex congoensis, juvenile	110.97	2480	14.85	496
Pagellus bellottii	90.45	790	12.10	495
Dentex angolensis	83.73	463	11.21	491
Brachydeuterus auritus	64.16	226	8.59	
Dentex barnardi	39.27	92	5.25	493
Pagrus caeruleostictus	23.38	33	3.13	494
Sphyraena sphyraena	19.57	68	2.62	
Chelidonichthys capensis	19.34	134	2.59	
Brotula barbata	11.94	9	1.60	
Raja miraletus	9.92	18	1.33	
Trichiurus lepturus	9.33	18	1.25	
Sepia orbignyana	8.82	68	1.18	
Zeus faber	5.94	24	0.80	
Lagocephalus laevigatus	5.55	9	0.74	
Pseudupeneus prayensis	3.71	42	0.50	
Citharus linguatula	2.94	101	0.39	
G A S T R O P O D S	2.52	276	0.34	
Chaetodon hoefleri	1.51	9	0.20	
Total	747.24		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 159
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°22.28
start stop duration Lon E 12°39.80
TIME :08:23:56 08:44:28 20.5 (min) Purpose : 3
LOG : 4805.14 4806.19 1.1 Region : 4054
FDEPTH: 62 61 Gear cond.: 0
BDEPTH: 62 61 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.1 kn
Sorted : 0 Total catch: 73.60 Catch/hour: 215.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	157.17	1455	73.07	497
Lagocephalus laevigatus	10.40	23	4.84	
Pagellus bellottii, juvenile	8.15	161	3.79	498
Rhinobatos albomaculatus	6.31	6	2.93	
Sphyraena sphyraena	5.67	26	2.64	
Seriola fasciata	5.67	9	2.64	
Sea urchin, not spines	3.68	1607	1.71	
Alectis alexandrinus	3.42	3	1.59	
Dactylopterus volitans	3.24	6	1.51	
Pagrus caeruleostictus	2.31	6	1.07	
Raja miraletus	1.78	9	0.83	
Brachydeuterus auritus	1.55	18	0.72	499
Trichiurus lepturus	1.40	3	0.65	
Chelidonichthys capensis	1.29	12	0.60	
Fistularia petimba	1.23	3	0.57	
Alloteuthis africana	0.99	357	0.46	
Psettodes belcheri	0.56	3	0.26	
Dentex congoensis, juvenile	0.26	29	0.12	
Total	215.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 160
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°18.12
start stop duration Lon E 12°42.48
TIME :09:35:15 09:55:35 20.3 (min) Purpose : 3
LOG : 4812.04 4813.18 1.1 Region : 4054
FDEPTH: 40 41 Gear cond.: 0
BDEPTH: 40 41 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.4 kn
Sorted : 0 Total catch: 44.73 Catch/hour: 132.03

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	113.51	859	85.97	500

Sphyraena sphyraena	4.55	18	3.44
Raja miraletus	4.28	12	3.24
Chelidonichthys capensis	2.12	12	1.61
Alectis alexandrinus	1.86	3	1.41
Dasyatis marmorata	1.36	6	1.03
Rhinobatos albomaculatus	1.21	3	0.92
Syacium micrurum	0.89	9	0.67
Pagrus caeruleostictus	0.71	3	0.54
Lagocephalus laevigatus	0.71	3	0.54
Alloteuthis africana	0.41	254	0.31
Bothus podas	0.38	6	0.29
Arnoglossus imperialis	0.04	6	0.03
Total	132.03		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 161
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°14.53
start stop duration Lon E 12°45.54
TIME :10:54:39 11:13:50 19.2 (min) Purpose : 3
LOG : 4818.78 4819.81 1.0 Region : 4054
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn
Sorted : 0 Total catch: 40.62 Catch/hour: 127.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagrus caeruleostictus	20.71	38	16.30	501
Rhinobatos annulatus	18.46	6	14.52	
Balistes punctatus	18.02	16	14.18	
Epinephelus aeneus	17.89	6	14.08	
Pomadasys rogeri	8.16	6	6.43	
Dasyatis marmorata	7.07	13	5.56	
Panulirus regius	7.01	6	5.51	
Aluterus heudelotii	6.82	13	5.37	
Dentex barnardi	5.19	9	4.09	
Raja miraletus	4.85	9	3.82	
Chaetodipterus lippei	4.79	9	3.77	
Scyllarides herklotsii	1.75	3	1.38	
Pagellus bellottii	1.69	13	1.33	502
Scomberomorus tritor	1.63	3	1.28	
Zanobatus shoenleinii	1.16	3	0.91	
Chaetodon hoefleri	0.88	13	0.69	
Fistularia petimba	0.56	3	0.44	
Pseudupeneus prayensis	0.44	3	0.34	
Total	127.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 162
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°33.62
start stop duration Lon E 12°57.27
TIME :13:30:27 13:50:30 20.1 (min) Purpose : 3
LOG : 4841.06 4842.22 1.1 Region : 4054
FDEPTH: 23 24 Gear cond.: 0
BDEPTH: 23 24 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.5 kn
Sorted : 0 Total catch: 225.42 Catch/hour: 674.57

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	217.14	1095	32.19	503
Brachydeuterus auritus	176.68	2161	26.19	504
Sphyraena guachancho	83.79	293	12.42	
Ilisha africana	31.36	862	4.65	
Drepane africana	29.45	72	4.37	
Ephippion guttifer	26.93	30	3.99	
Pomadasys perotaei	19.63	60	2.91	506
Pseudotolithus senegalensis	18.79	42	2.79	505
Chloroscombrus chrysurus	18.25	174	2.71	
Gymnura altavela	13.47	3	2.00	
Alectis alexandrinus	9.04	12	1.34	
Pomadasys rogeri	7.36	6	1.09	
Raja miraletus	6.52	12	0.97	
Selene dorsalis	4.31	30	0.64	507
Zanobatus shoenleinii	3.77	6	0.56	
Torpedo marmorata	3.35	6	0.50	
Pteroscion peli	2.75	36	0.41	
Sardinella maderensis	0.84	6	0.12	
Penaeus notialis	0.60	9	0.09	
Eucinostomus melanopterus	0.54	6	0.08	
Total	674.57		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 163
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°35.66
start stop duration Lon E 12°56.52
TIME :14:25:23 14:45:34 20.2 (min) Purpose : 3
LOG : 4845.09 4846.20 1.1 Region : 4054
FDEPTH: 32 33 Gear cond.: 0
BDEPTH: 32 33 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.3 kn
Sorted : 0 Total catch: 508.25 Catch/hour: 1511.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chloroscombrus chrysurus	677.81	6461	44.85	512
Brachydeuterus auritus	532.32	6068	35.23	509
Sphyraena guachancho	96.42	169	6.38	
Selene dorsalis	64.61	464	4.28	511
Galeoides decadactylus	42.61	449	2.82	510
Pagellus bellottii	32.66	223	2.16	508
Alectis alexandrinus	22.12	9	1.46	
Arius parkii	18.22	15	1.21	
Chaetodipterus lippei	5.74	15	0.38	
Gymnura micrura	4.77	15	0.32	
Rhinobatos albomaculatus	3.69	3	0.24	
Pagrus caeruleostictus	3.65	15	0.24	
Sardinella maderensis	2.52	15	0.17	
Caranx rhonchus	1.81	181	0.12	
Pseudupeneus prayensis	1.68	15	0.11	
Panulirus regius	0.51	3	0.03	
Total	1511.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 164
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°37.72
start stop duration Lon E 12°48.48
TIME :15:45:44 16:05:29 19.8 (min) Purpose : 3
LOG : 4855.02 4856.14 1.1 Region : 4054
FDEPTH: 72 72 Gear cond.: 0
BDEPTH: 72 72 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.4 kn
Sorted : 0 Total catch: 65.87 Catch/hour: 200.11

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	60.27	155	30.12	513
Sphyraena guachancho	34.45	12	17.22	
Lagocephalus laevigatus	33.60	27	16.79	
Pagellus bellottii	20.23	255	10.11	514
Raja miraletus	15.98	27	7.99	
Pomadasys jubelini	13.94	39	6.97	515
Alectis alexandrinus	6.56	6	3.28	
Lepidotrigla cadmani	6.44	64	3.22	
Caranx rhonchus	2.22	6	1.11	
Trichiurus lepturus	2.22	6	1.11	
Epinephelus aeneus	1.64	3	0.82	
Fistularia petimba	1.55	6	0.77	
Citharus linguatula	0.27	12	0.14	
Grammoplites gruveli	0.24	3	0.12	
Dentex congoensis	0.24	6	0.12	
Starfish	0.09	30	0.05	
G A S T R O P O D S	0.09	12	0.05	
Saurida brasiliensis	0.06	15	0.03	
Total	200.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 165
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°38.15
start stop duration Lon E 12°45.05
TIME :16:41:34 17:03:35 22.0 (min) Purpose : 3
LOG : 4860.25 4861.52 1.3 Region : 4054
FDEPTH: 88 87 Gear cond.: 0
BDEPTH: 88 87 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.4 kn
Sorted : 0 Total catch: 157.85 Catch/hour: 430.11

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae, juvenile	200.76	19553	46.68	518
Lepidotrigla cadmani	78.47	654	18.25	
Pomadasys jubelini	25.23	44	5.87	517
Selene dorsalis	22.67	52	5.27	516
Dentex congoensis, juvenile	21.91	523	5.09	523
Trichiurus lepturus	20.05	52	4.66	
Raja miraletus	11.20	16	2.60	
Lagocephalus laevigatus	9.16	25	2.13	
Fistularia petimba	7.63	19	1.77	
Dentex congoensis	6.38	82	1.48	519
Citharus linguatula	4.82	188	1.12	
Pagellus bellottii	4.66	33	1.08	520
Sphyraena guachancho	3.00	16	0.70	
Dentex angolensis, juvenile	2.53	65	0.59	521
Saurida brasiliensis	2.37	654	0.55	
Uranoscopus albesca	2.13	8	0.49	
Cynoglossus canariensis	2.13	8	0.49	
Sardinella aurita	1.42	8	0.33	
Sepia orbignyana	1.39	41	0.32	
Pagellus bellottii, juvenile	0.98	57	0.23	522
Lepidotrigla carolae	0.74	57	0.17	
Brotula barbata	0.49	8	0.11	
Total	430.11		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 166
DATE :22/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°43.90
start stop duration Lon E 12°33.76
TIME :19:14:59 19:35:26 20.4 (min) Purpose : 3
LOG : 4876.52 4877.60 1.1 Region : 4054
FDEPTH: 283 282 Gear cond.: 0
BDEPTH: 283 282 Validity : 0
Towing dir: 0° Wire out : 720 m Speed : 3.2 kn
Sorted : 0 Total catch: 107.96 Catch/hour: 316.75

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	170.17	4835	53.72	
Synagrops microlepis	27.23	1338	8.60	
Laemonema laureysi	20.54	246	6.48	
Pontinus accraensis	18.78	223	5.93	
Merluccius polli, juvenile	17.60	446	5.56	525
Brotula barbata	12.06	9	3.81	524
Pterothrissus belloci	11.27	70	3.56	
Bembrops heterurus	8.22	106	2.59	
Trichiurus lepturus	7.04	41	2.22	
Bassanago albescens	5.16	94	1.63	
Parapenaeus longirostris, female	3.64	469	1.15	
GALATHEIDAE	3.17	1620	1.00	
Gadella imberbis	2.70	94	0.85	
Torpedo torpedo	1.94	3	0.61	
Physiculus cyanostrophus	1.64	12	0.52	
Parapenaeus longirostris, male	1.29	211	0.41	
Lophiodes kempi	1.26	3	0.40	
MYCTOPHIDAE	0.94	387	0.30	
Gephyroberyx darwini	0.70	23	0.22	
Solenocera africana	0.59	12	0.19	
Stereomastis sp.	0.59	23	0.19	
Aristeus varidens	0.23	23	0.07	
Total	316.75		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 167
DATE :22/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 7°42.43
start stop duration Lon E 12°31.99
TIME :20:43:38 21:03:55 20.3 (min) Purpose : 3
LOG : 4881.16 4882.23 1.1 Region : 4054
FDEPTH: 363 360 Gear cond.: 0
BDEPTH: 363 360 Validity : 0
Towing dir: 0° Wire out : 920 m Speed : 3.2 kn
Sorted : 0 Total catch: 195.10 Catch/hour: 577.22

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chaunax pictus	207.99	719	36.03	
Nematocarcinus africanus	183.73	49464	31.83	
Merluccius polli	42.34	249	7.33	526
Laemonema laureysi	42.25	515	7.32	
Bathyuroconger vicinus	28.67	328	4.97	
Zenopsis conchifer	15.53	9	2.69	
Hymenocephalus italicus	10.83	1704	1.88	
Merluccius polli, juvenile	7.90	98	1.37	527
Malacocephalus occidentalis	6.66	53	1.15	
Bathynectes piperitus	5.06	107	0.88	
Pontinus accraensis	4.70	9	0.81	
Physiculus cyanostrophus	3.99	9	0.69	
Trichiurus lepturus	3.37	142	0.58	
Gadella imberbis	2.93	98	0.51	
Dibranchus atlanticus	2.31	213	0.40	
Aristeus varidens, male	2.22	266	0.38	
Parapenaeus longirostris, female	2.04	195	0.35	
Caelorinchus braueri	1.78	53	0.31	
Epigonus telescopus	0.98	27	0.17	
Aristeus varidens, female	0.80	27	0.14	
Illex coindetii	0.53	9	0.09	
Todaropsis eblanae	0.44	9	0.08	
Parapenaeus longirostris, male	0.18	18	0.03	
Total	577.22		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 168
DATE :23/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°0.44
start stop duration Lon E 12°37.72
TIME :00:37:31 00:57:39 20.1 (min) Purpose : 3
LOG : 4908.09 4909.10 1.0 Region : 4054
FDEPTH: 536 538 Gear cond.: 0
BDEPTH: 536 538 Validity : 0
Towing dir: 0° Wire out : 1250 m Speed : 3.0 kn
Sorted : 0 Total catch: 264.15 Catch/hour: 787.33

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	391.12	82382	49.68	
Hoplostethus cadenati	159.34	6331	20.24	
Lamprogrammus exutus	92.55	4936	11.75	
Stomias boa boa	46.41	1154	5.89	
Todarodes sp.	33.00	27	4.19	
Chaceon maritae, male	18.51	27	2.35	
Yarrella blackfordi	10.19	107	1.29	
Gadella imberbis	9.66	429	1.23	
Stereomastis sp.	4.83	563	0.61	
Aristeus varidens, female	4.02	376	0.51	
Xenodermichthys copei	3.22	456	0.41	
Benthodesmus tenuis	2.41	107	0.31	
Dibranchus atlanticus	2.41	376	0.31	
Aristeus sp.	1.88	241	0.24	
JELLYFISH	1.61	27	0.20	
Triplophos hemingi	1.61	215	0.20	
Selachophidium guentheri	1.34	349	0.17	
Lagocephalus laevigatus	1.07	54	0.14	
Etmopterus polli	1.07	27	0.14	
Plesiopenaeus edwardsianus	0.54	27	0.07	
Avocettina acuticeps	0.27	27	0.03	
Bathyuroconger vicinus	0.27	27	0.03	
Total	787.33		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 169
DATE :23/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°1.84
start stop duration Lon E 12°36.86

TIME :02:08:58 02:29:23 20.4 (min) Purpose : 3
LOG : 4913.88 4914.73 0.8 Region : 4054
FDEPTH: 621 619 Gear cond.: 0
BDEPTH: 621 619 Validity : 0
Towing dir: 0° Wire out : 1230 m Speed : 2.5 kn
Sorted : 0 Total catch: 167.22 Catch/hour: 491.58

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	232.47	42262	47.29	
Lamprogrammus exutus	99.48	1834	20.24	
Hoplostethus cadenati	54.50	2064	11.09	
Stomias boa boa	52.21	1217	10.62	
Stereomastis sp.	11.46	1376	2.33	
Yarrella blackfordi	10.76	300	2.19	
Xenodermichthys copei	5.29	600	1.08	
Chaunax pictus	4.94	18	1.00	
Aristeus varidens, female	4.23	159	0.86	
Triplophos hemingi	3.88	582	0.79	
Plesiopenaeus edwardsianus	2.12	106	0.43	
Benthodesmus tenuis	1.76	71	0.36	
Glyphus marsupialis	1.59	229	0.32	
Bathynectes piperitus	1.23	18	0.25	
Gadella imberbis	1.06	71	0.22	
Ectreposebastes imus	1.06	18	0.22	
Dicrolene intronigra	0.88	71	0.18	
Heterocarpus ensifer	0.71	18	0.14	
Coelorinchus caelorhincus	0.53	18	0.11	
Photonectes braueri	0.53	18	0.11	
Dibranchus atlanticus	0.53	18	0.11	
Bathyuroconger vicinus	0.35	18	0.07	
Total	491.58		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 170
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°0.62
start stop duration Lon E 12°43.48
TIME :05:33:10 05:53:22 20.2 (min) Purpose : 3
LOG : 4925.33 4926.50 1.2 Region : 4054
FDEPTH: 196 196 Gear cond.: 0
BDEPTH: 196 196 Validity : 0
Towing dir: 0° Wire out : 530 m Speed : 3.5 kn
Sorted : 0 Total catch: 316.32 Catch/hour: 939.56

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	417.89	921	44.48	
Zenopsis conchifer	222.21	460	23.65	
Brotula barbata	65.94	98	7.02	529
Bembrops heterurus	53.26	653	5.67	
Chlorophthalmus atlanticus	43.84	2929	4.67	
Merluccius polli, juvenile	29.20	609	3.11	535
Parapenaeus longirostris, female	21.80	4227	2.32	
Uranoscopus albesca	20.44	95	2.18	
Pterothrissus belloci	12.62	74	1.34	
Trichiurus lepturus	9.95	12	1.06	
Monolene microstoma	6.53	609	0.70	
Coelorinchus caelorhincus	6.30	160	0.67	
Illex coindetii	5.88	53	0.63	
Lophiodes kempi	4.93	9	0.52	
Parapenaeus longirostris, male	4.81	1004	0.51	
Dentex angolensis	4.25	18	0.45	528
BATRACHOIDIDAE	3.42	193	0.36	
Pontinus accraensis	3.09	33	0.33	
Synagrops bellus	0.86	53	0.09	
G A S T R O P O D S	0.74	140	0.08	
Calappa pelii	0.74	12	0.08	
Squilla mantis	0.65	21	0.07	
Solenocera africana	0.21	12	0.02	
Total	939.56		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 171
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°57.97
start stop duration Lon E 12°50.40
TIME :07:33:06 07:53:08 20.0 (min) Purpose : 3
LOG : 4936.84 4937.90 1.1 Region : 4054
FDEPTH: 109 109 Gear cond.: 0
BDEPTH: 109 109 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.2 kn
Sorted : 0 Total catch: 114.80 Catch/hour: 343.71

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	151.50	1443	44.08	531
Lepidotrigla cadmani	50.30	425	14.63	
Dentex angolensis	30.12	251	8.76	530
Sea urchin, weak spines	21.02	30251	6.11	
Citharus linguatula	12.63	539	3.68	
Trichiurus lepturus	10.54	24	3.07	
Dentex barnardi	7.25	30	2.11	532
Rhinobatos albomaculatus	7.07	3	2.06	
Sardinella maderensis	6.29	30	1.83	
Zeus faber	5.57	18	1.62	
BATRACHOIDIDAE	5.03	102	1.46	
Trachurus trecae	4.67	180	1.36	534
Brotula barbata	4.37	6	1.27	
Pagellus bellottii	4.19	30	1.22	536
Scorpaena normani	3.35	42	0.98	
Uranoscopus albesca	2.69	12	0.78	
Chelidonichthys capensis	2.46	12	0.71	
Dentex congoensis, juvenile	2.40	132	0.70	533
Branchiostegus semifasciatus	1.86	6	0.54	
Lepidotrigla carolae	1.74	72	0.51	
Sepia orbignyana	1.68	66	0.49	
Priacanthus arenatus	1.62	6	0.47	
Serranus cabrilla	1.56	12	0.45	
Selene dorsalis	1.50	12	0.44	
Umbrina canariensis	1.02	6	0.30	
Pontinus accraensis	0.96	24	0.28	
Saurida brasiliensis	0.36	108	0.10	
Total	343.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 172
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°56.64
start stop duration Lon E 12°54.49
TIME :09:03:57 09:24:10 20.2 (min) Purpose : 3
LOG : 4944.23 4945.26 1.0 Region : 4054
FDEPTH: 87 87 Gear cond.: 0
BDEPTH: 87 87 Validity : 0
Towing dir: 0° Wire out : 245 m Speed : 3.1 kn
Sorted : 0 Total catch: 97.27 Catch/hour: 288.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	116.32	1338	40.30	538
Brachydeuterus auritus	32.05	318	11.10	541
Lepidotrigla cadmani	27.60	264	9.56	
Lagocephalus laevigatus	21.07	47	7.30	
Raja miraletus	19.17	33	6.64	
Dentex congoensis	15.91	214	5.51	539
Dentex barnardi	13.29	53	4.61	540
Dentex angolensis	8.96	258	3.10	537
Sepia orbignyana	6.77	45	2.34	
Chelidonichthys capensis	4.99	172	1.73	
Rhinobatos annulatus	4.63	6	1.60	
Pseudupeneus prayensis	2.34	50	0.81	
Uranoscopus albesca	2.28	12	0.79	
Dentex congoensis, juvenile	2.17	142	0.75	542
Citharus linguatula	2.17	157	0.75	
Fistularia petimba	2.05	6	0.71	
Trichiurus lepturus	1.99	3	0.69	
Sorsogona prionota	1.10	15	0.38	
Dasyatis marmorata	0.98	3	0.34	
BATRACHOIDIDAE	0.77	42	0.27	
Zeus faber	0.62	3	0.22	
Serranus cabrilla	0.53	9	0.19	
Chaetodon hoefleri	0.39	3	0.13	
Octopus vulgaris	0.33	3	0.11	
Saurida brasiliensis	0.18	30	0.06	
Total	288.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 173
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°53.51
start stop duration Lon E 12°56.60
TIME :10:46:29 11:10:31 24.0 (min) Purpose : 3
LOG : 4952.98 4954.11 1.1 Region : 4054
FDEPTH: 71 71 Gear cond.: 0
BDEPTH: 71 71 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 2.8 kn
Sorted : 0 Total catch: 36.90 Catch/hour: 92.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	26.67	232	28.94	545
Dentex congoensis	11.56	197	12.55	543
Rhinobatos annulatus	10.14	5	11.00	
Lagocephalus laevigatus	9.66	17	10.49	
Pseudupeneus prayensis	8.14	110	8.83	
Raja miraletus	7.52	12	8.16	
Dentex barnardi	4.79	30	5.20	544
Triglloporus lastoviza	3.55	60	3.85	
Arnoglossus imperialis	2.52	2	2.74	
Epinephelus marginatus	1.22	2	1.33	
Auxis thazard thazard	0.97	2	1.06	
Chaetodon hoefleri	0.85	5	0.92	
Serranus accraensis	0.70	12	0.76	
Grammoplites gruveli	0.65	15	0.70	
Citharus linguatula	0.62	42	0.68	
Sepia officinalis	0.50	5	0.54	
Lepidotrigla cadmani	0.45	2	0.49	
Pagrus caeruleostictus	0.45	2	0.49	
Dentex angolensis	0.37	5	0.41	
Loligo vulgaris	0.20	57	0.22	
Brachydeuterus auritus	0.17	2	0.19	
Trachurus trecae	0.12	10	0.14	
Starfish	0.12	7	0.14	
Saurida brasiliensis	0.10	7	0.11	
Synchiropus phaeton	0.07	7	0.08	
Total	92.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 174
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°51.96
start stop duration Lon E 12°58.88
TIME :11:56:58 12:17:17 20.3 (min) Purpose : 3
LOG : 4959.00 4960.20 1.2 Region : 4054
FDEPTH: 56 59 Gear cond.: 0
BDEPTH: 56 59 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.5 kn
Sorted : 0 Total catch: 170.46 Catch/hour: 503.09

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys jubelini	123.03	298	24.45	547
Stromateus fiatola	67.85	80	13.49	
Chloroscombrus chrysurus	64.34	472	12.79	
Selene dorsalis	59.89	422	11.90	548
Galeoides decadactylus	45.31	360	9.01	549
Raja miraletus	45.20	112	8.98	
Pagellus bellottii	42.50	336	8.45	546
Dasyatis margarita	13.23	12	2.63	
Rhinobatos annulatus	9.21	3	1.83	
Pseudupeneus prayensis	8.52	80	1.69	
Caranx rhonchus	5.83	74	1.16	
Sphyraena guachancho	4.71	24	0.94	
Torpedo torpedo	4.15	18	0.82	
Sardinella maderensis	2.30	12	0.46	
Grammoplites gruveli	1.86	12	0.37	
Pagrus caeruleostictus	1.74	6	0.35	
Lagocephalus laevigatus	1.18	6	0.23	
Pomadasys incisus	0.95	6	0.19	
Dentex barnardi	0.67	6	0.13	
Citharus linguatula	0.62	50	0.12	
Total	503.09		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 175
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°51.15
start stop duration Lon E 13°1.72
TIME :13:09:01 13:29:45 20.7 (min) Purpose : 3
LOG : 4965.16 4966.46 1.3 Region : 4054
FDEPTH: 40 41 Gear cond.: 0
BDEPTH: 40 41 Validity : 0
Towing dir: 0° Wire out : 185 m Speed : 3.8 kn
Sorted : 0 Total catch: 900.18 Catch/hour: 2605.44

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	1950.51	36802	74.86	550
Galeoides decadactylus	190.88	1036	7.33	551
Chloroscombrus chrysurus	164.57	2518	6.32	
Illisha africana	64.65	1230	2.48	
Sphyraena guachancho	50.94	281	1.96	
Stromateus fiatola	41.16	75	1.58	
Caranx crysos	32.19	55	1.24	
Pomadasys incisus	29.67	168	1.14	552
Selene dorsalis	26.31	420	1.01	553
Pomadasys perotaei	14.55	29	0.56	
Rhinobatos annulatus	9.90	3	0.38	
Cynoglossus canariensis	7.00	29	0.27	
Penaeus notialis, female	6.44	139	0.25	
Drepane africana	4.49	3	0.17	
Pagellus bellottii	4.20	29	0.16	
Scomberomorus tritor	3.79	3	0.15	
Penaeus notialis, male	2.24	113	0.09	
Dicologoglossa cuneata	1.68	29	0.06	
Trichiurus lepturus	0.28	29	0.01	
Total	2605.44		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 176
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 7°49.37
start stop duration Lon E 13°2.83
TIME :14:05:34 14:25:40 20.1 (min) Purpose : 3
LOG : 4969.24 4970.29 1.1 Region : 4054
FDEPTH: 24 25 Gear cond.: 0
BDEPTH: 24 25 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.1 kn
Sorted : 0 Total catch: 948.90 Catch/hour: 2832.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chloroscombrus chrysurus	1380.90	19119	48.75	
Galeoides decadactylus	840.90	7209	29.69	555
Brachydeuterus auritus	358.21	4119	12.65	554
Selene dorsalis, juvenile	106.12	2687	3.75	556
Alectis alexandrinus, juvenile	34.03	493	1.20	
Ephippion guttifer	29.55	12	1.04	
Pagellus bellottii	22.84	134	0.81	557
Sardinella maderensis	21.94	179	0.77	558
Lagocephalus laevigatus	14.78	45	0.52	
Sphyraena guachancho	12.99	90	0.46	
Pseudupeneus prayensis	4.48	45	0.16	
Euclinostomus melanopterus	2.69	45	0.09	
Penaeus notialis	1.79	45	0.06	
Squilla acuelata calmani	1.34	45	0.05	
Total	2832.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 177
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°2.65
start stop duration Lon E 13°9.63
TIME :16:12:07 16:29:03 16.9 (min) Purpose : 3
LOG : 4985.52 4986.48 0.9 Region : 4054
FDEPTH: 28 28 Gear cond.: 0
BDEPTH: 28 28 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.4 kn

Sorted : 0 Total catch: 121.33 Catch/hour: 429.99

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Galeoides decadactylus	150.55	702	35.01	562
Ilisha africana	68.12	3849	15.84	
Pseudotolithus senegalensis	44.73	198	10.40	560
Pteroscion peli	42.60	773	9.91	563
Drepane africana	18.25	35	4.24	
Pomadasys rogeri	18.07	110	4.20	559
Pomadasys incisus	12.86	82	2.99	564
Panulirus regius	10.14	32	2.36	
Dasyatis margarita	9.25	7	2.15	
Pseudotolithus senegalensis, juvenile	8.93	223	2.08	561
Sphyraena guachancho	8.43	305	1.96	
Sphyraena guachancho	6.98	28	1.62	0
Chloroscombrus chrysurus	5.14	64	1.20	
Brachydeuterus auritus	5.00	663	1.16	565
Dicologoglossa cuneata	4.29	71	1.00	
Cynoglossus canariensis	3.33	4	0.77	
Lagocephalus laevigatus	3.05	4	0.71	
Penaeus notialis, female	2.62	209	0.61	
Rhinobatos blochii	1.95	4	0.45	
Grammoplites gruveli	1.67	32	0.39	
Penaeus notialis, male	1.49	78	0.35	
Selene dorsalis	1.49	46	0.35	566
Torpedo marmorata	1.06	7	0.25	
Total	429.99		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 178
DATE :23/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°4.55
start stop duration Lon E 13°7.84
TIME :16:56:41 17:17:11 20.5 (min) Purpose : 3
LOG : 4989.80 4990.94 1.1 Region : 4054
FDEPTH: 43 43 Gear cond.: 0
BDEPTH: 43 43 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.3 kn
Sorted : 0 Total catch: 107.86 Catch/hour: 315.69

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Galeoides decadactylus	131.36	427	41.61	567
Brachydeuterus auritus, juvenile	54.32	8740	17.21	570
Stromateus fiatola	18.56	20	5.88	
Pagellus bellottii	17.74	152	5.62	571
Pseudotolithus senegalensis	17.56	23	5.56	574
Brachydeuterus auritus	9.66	94	3.06	569
Pomadasys jubelini	8.96	29	2.84	573
Dasyatis thetidis	8.37	6	2.65	
Raja miraletus	7.38	12	2.34	
Dasyatis marmorata	7.38	9	2.34	
Cynoglossus canariensis	5.30	26	1.68	
Sphyraena guachancho	3.75	47	1.19	
Ilisha africana	3.66	47	1.16	
Galeoides decadactylus, juvenile	2.87	76	0.91	568
Penaeus notialis, male	2.43	82	0.77	
Ephippion guttifer	2.02	3	0.64	
Citharus linguatula	1.87	70	0.59	
Sardinella aurita	1.58	9	0.50	
Pisodonophis semicinctus	1.52	9	0.48	
Selene dorsalis	1.38	26	0.44	572
Mystriophis rostellatus	1.35	3	0.43	
Dicologoglossa cuneata	1.20	18	0.38	
Alectis alexandrinus	1.17	3	0.37	
Grammoplites gruveli	0.88	15	0.28	
Torpedo torpedo	0.61	23	0.19	
Penaeus notialis, female	0.56	170	0.18	
Trichiurus lepturus	0.53	32	0.17	
Ilisha africana	0.47	12	0.15	0
Torpedo marmorata	0.44	3	0.14	
Penaeus notialis, juvenile	0.41	85	0.13	
Panulirus regius	0.38	9	0.12	
GOBIIDAE	0.06	59	0.02	
Total	315.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 179
DATE :23/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°14.14
start stop duration Lon E 12°46.86
TIME :20:13:55 20:34:30 20.6 (min) Purpose : 3
LOG : 5015.83 5016.84 1.0 Region : 4054
FDEPTH: 311 312 Gear cond.: 0
BDEPTH: 311 312 Validity : 0
Towing dir: 0° Wire out : 700 m Speed : 2.9 kn
Sorted : 0 Total catch: 245.45 Catch/hour: 715.60

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	365.89	6901	51.13	
Merluccius polli, juvenile	64.96	1327	9.08	576
Pontinus accraensis	61.66	461	8.62	
Laemonema laureysi	54.46	487	7.61	
Gephyroberyx darwini	48.10	146	6.72	
Merluccius polli	42.77	236	5.98	575
Lophiodes kempi	12.36	9	1.73	
Bembrops heterurus	12.33	277	1.72	
Trichiurus lepturus	11.17	26	1.56	
Parapenaeus longirostris, female	10.12	1233	1.41	
Coelorinchus caelorhincus	4.72	105	0.66	
Zenopsis conchifer	4.34	15	0.61	
Coloconger scholesi	3.94	3	0.55	
Gadella imberbis	3.29	131	0.46	
Raja straeleni	3.21	3	0.45	
Malacocephalus occidentalis	2.10	26	0.29	
Mystriophis rostellatus	1.57	3	0.22	
Parapenaeus longirostris, male	1.46	172	0.20	
Chaunax pictus	1.20	15	0.17	
Parapandalus narval	1.20	420	0.17	
Peristedion cataphractum	1.05	52	0.15	
Epigonus telescopus	0.93	26	0.13	
MYCTOPHIDAE	0.79	708	0.11	
Hymenocephalus italicus	0.79	262	0.11	
Acanthocarpus brevipinnis	0.67	26	0.09	
Aristeus varidens	0.26	15	0.04	
NETTASTOMATIDAE	0.26	15	0.04	
Total	715.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 180
DATE :23/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°15.75
start stop duration Lon E 12°44.35
TIME :21:55:26 22:15:38 20.2 (min) Purpose : 3
LOG : 5022.66 5023.73 1.1 Region : 4054
FDEPTH: 420 421 Gear cond.: 0
BDEPTH: 420 421 Validity : 0
Towing dir: 0° Wire out : 1000 m Speed : 3.2 kn
Sorted : 0 Total catch: 306.80 Catch/hour: 911.29

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	323.17	2079	35.46	
Benthodesmus tenuis	237.03	10812	26.01	
Merluccius polli	211.49	594	23.21	577
Chaunax pictus	65.64	713	7.20	
Laemonema laureysi	14.85	149	1.63	
Yarrella blackfordi	10.99	327	1.21	
Bathyuroconger vicinus	10.69	89	1.17	
Dibranchus atlanticus	9.50	624	1.04	
Hymenocephalus italicus	7.13	653	0.78	
Aristeus varidens	6.83	297	0.75	
Halosaurus ovenii	3.86	119	0.42	
Coelorinchus caelorhincus	2.67	59	0.29	
Hoplostethus cadenati	2.67	59	0.29	
Stomias boa boa	1.78	59	0.20	
Etmopterus pusillus	1.19	30	0.13	
Aristeus varidens, male	1.19	119	0.13	
Stereomastis sp.	0.59	59	0.07	
Total	911.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 181
DATE :24/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°15.93
start stop duration Lon E 12°41.65
TIME :00:18:07 00:48:33 30.4 (min) Purpose : 3
LOG : 5030.34 5031.78 1.4 Region : 4054
FDEPTH: 610 617 Gear cond.: 0
BDEPTH: 610 617 Validity : 0
Towing dir: 0° Wire out : 1350 m Speed : 2.8 kn
Sorted : 0 Total catch: 217.12 Catch/hour: 428.10

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	258.06	58537	60.28	
Lamprogrammus exutus	82.18	2003	19.20	
Hoplostethus cadenati	20.66	741	4.83	
Stomias boa boa	19.24	457	4.50	
Stereomastis sp.	13.25	820	3.10	
Benthodesmus tenuis	7.89	426	1.84	
Yarrella blackfordi	6.63	189	1.55	
Hyperoglyphe moselii ***	6.47	16	1.51	
Scopelosaurus sp.	2.84	79	0.66	
Xenodermichthys copei	2.68	237	0.63	
Triplophos hemingi	2.21	237	0.52	
Dibranchus atlanticus	2.05	158	0.48	
Avocettina acuticeps	1.42	32	0.33	
Halosaurus ovenii	1.10	16	0.26	
Glyphus marsupialis	0.47	32	0.11	
Aristeus varidens, female	0.32	95	0.07	
Gadella imberbis	0.32	16	0.07	
Coelorinchus caelorhincus	0.32	12	0.07	
Total	428.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 182
DATE :24/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°16.58
start stop duration Lon E 12°40.93
TIME :02:35:41 02:56:15 20.6 (min) Purpose : 3
LOG : 5037.27 5038.26 1.0 Region : 4054
FDEPTH: 710 711 Gear cond.: 0
BDEPTH: 710 711 Validity : 0
Towing dir: 0° Wire out : 1480 m Speed : 2.9 kn
Sorted : 0 Total catch: 188.88 Catch/hour: 550.67

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	168.16	42796	30.54	
Lamprogrammus exutus	61.43	388	11.16	
Hoplostethus cadenati	58.57	1980	10.64	
Stereomastis sp.	58.57	2633	10.64	
Yarrella blackfordi	41.43	1204	7.52	
Anemone - purple	30.20	41	5.48	
Opisthoteuthis agassizi	24.29	20	4.41	
Stomias boa boa	19.80	429	3.59	
Coelorinchus caelorhincus	16.53	408	3.00	
Chaceon maritae	10.00	20	1.82	
Dicrolene intronigra	9.39	592	1.70	
Rossia enigmatica	7.96	20	1.45	
Bathyuroconger vicinus	7.76	163	1.41	
Triplophos hemingi	6.12	755	1.11	
Bathyraja smithii	4.55	6	0.83	
Benthodesmus tenuis	3.67	163	0.67	
Diceratias pileatus	3.06	20	0.56	
Bristle worms (straws)	2.86	224	0.52	
Dibranchus atlanticus	2.86	163	0.52	
Xenodermichthys copei	2.65	184	0.48	
Aristeus varidens	2.65	102	0.48	
Scopelosaurus sp.	2.45	61	0.44	
Photonectes braueri	1.84	20	0.33	
MYCTOPHIDAE	1.22	20	0.22	
Plesiopenaeus edwardsianus	1.02	41	0.19	
Avocettina acuticeps	0.82	20	0.15	
Lophius vaillanti	0.82	20	0.15	
Total	550.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 183
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°12.07
start stop duration Lon E 12°49.07
TIME :06:08:53 06:24:15 15.4 (min) Purpose : 3
LOG : 5053.39 5054.19 0.8 Region : 4054
FDEPTH: 172 169 Gear cond.: 0
BDEPTH: 172 169 Validity : 0
Towing dir: 0° Wire out : 460 m Speed : 3.2 kn
Sorted : 0 Total catch: 692.08 Catch/hour: 2701.68

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Synagrops microlepis	2549.12	309908	94.35	
Uranoscopus albesca	35.99	215	1.33	
Zenopsis conchifer	35.91	70	1.33	
Brotula barbata	23.89	31	0.88	585
Zeus faber	12.69	31	0.47	
Pterothrissus belloci	10.54	101	0.39	
Dentex angolensis	10.50	39	0.39	584
Chlorophthalmus atlanticus	9.17	1901	0.34	
Illex coindetii	5.43	66	0.20	
Citharus linguatula	2.73	35	0.10	
Pentheroscion mbizi	2.62	12	0.10	
Monolene microstoma	1.72	101	0.06	
Parapenaeus longirostris	1.37	441	0.05	
Total	2701.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 184
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°10.38
start stop duration Lon E 12°54.72
TIME :07:36:31 07:56:45 20.2 (min) Purpose : 3
LOG : 5061.81 5062.90 1.1 Region : 4054
FDEPTH: 115 116 Gear cond.: 0
BDEPTH: 115 116 Validity : 0
Towing dir: 0° Wire out : 300 m Speed : 3.2 kn
Sorted : 0 Total catch: 133.57 Catch/hour: 396.15

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	169.83	1317	42.87	580
Trichiurus lepturus	65.31	95	16.49	
Trachurus trecae, juvenile	59.91	4567	15.12	583
Dentex angolensis	49.06	347	12.38	578
Umbrina canariensis	13.82	68	3.49	579
Zenopsis conchifer	9.19	12	2.32	
Lepidotrigla cadmani	4.36	33	1.10	
Brotula barbata	3.68	3	0.93	
G A S T R O P O D S	3.29	825	0.83	
Citharus linguatula	2.97	62	0.75	
Boops boops	2.91	44	0.73	
Pontinus accraensis	1.87	12	0.47	
Pagellus bellottii	1.48	15	0.37	581
Zeus faber	1.39	9	0.35	
Illex coindetii	1.36	9	0.34	
Ariomma bondi	1.16	12	0.29	
Uranoscopus albesca	1.10	6	0.28	
Epinephelus marginatus	0.92	3	0.23	
Trachurus trecae	0.83	6	0.21	
Dentex barnardi	0.65	3	0.16	
Spicara alta	0.65	21	0.16	582
Microchirus frechkopi	0.21	3	0.05	
Dentex congoensis	0.15	6	0.04	
Arnoglossus imperialis	0.06	3	0.01	
Total	396.15		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 185
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°7.62
start stop duration Lon E 12°59.62
TIME :09:02:23 09:22:37 20.2 (min) Purpose : 3
LOG : 5069.89 5070.97 1.1 Region : 4054
FDEPTH: 94 94 Gear cond.: 0
BDEPTH: 94 94 Validity : 0

Towing dir: 0° Wire out : 250 m Speed : 3.2 kn
Sorted : 0 Total catch: 14.46 Catch/hour: 42.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	12.34	89	28.77	587
Sepia officinalis	6.11	12	14.25	
Citharus linguatula	4.75	107	11.07	
Lepidotrigla cadmani	3.80	27	8.85	
Caranx rhonchus	3.32	3	7.75	
Uranoscopus polli	2.79	12	6.50	
Uranoscopus albesca	2.70	12	6.29	
Dentex barnardi	2.64	9	6.15	
Pagellus bellottii	2.25	21	5.26	586
Zeus faber	1.19	3	2.77	
Lepidotrigla carolae	0.47	12	1.11	
Octopus vulgaris	0.42	3	0.97	
G A S T R O P O D S	0.12	30	0.28	
Total	42.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 186
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°4.07
start stop duration Lon E 13°3.99
TIME :10:21:54 10:52:13 30.3 (min) Purpose : 3
LOG : 5077.94 5079.55 1.6 Region : 4054
FDEPTH: 64 65 Gear cond.: 0
BDEPTH: 64 65 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.2 kn
Sorted : 0 Total catch: 165.21 Catch/hour: 326.93

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	52.80	330	16.15	592
Brachydeuterus auritus	51.77	625	15.83	590
Pomadasys jubelini	44.68	129	13.67	591
Raja miraletus	29.68	51	9.08	
Trachurus trecae	23.71	97	7.25	593
Epinephelus goreensis	18.17	2	5.56	
Dentex barnardi	17.30	55	5.29	589
Galeoides decadactylus	17.10	103	5.23	595
Sphyraena sphyraena	10.21	42	3.12	
Brotula barbata	7.42	6	2.27	597
Dasyatis marmorata	6.77	4	2.07	
Lagocephalus laevigatus	5.98	10	1.83	
Pagellus bellottii	5.52	51	1.69	588
Pseudotolithus senegalensis	4.51	6	1.38	596
Torpedo torpedo	4.04	18	1.23	
Trachurus trecae, juvenile	3.90	135	1.19	594
Grammoplites gruveli	2.95	51	0.90	
Sepia officinalis	2.47	14	0.76	
Lepidotrigla cadmani	2.10	22	0.64	
Citharus linguatula	1.90	73	0.58	
Octopus vulgaris	1.80	2	0.55	
Saurida brasiliensis	1.62	178	0.50	
Pseudupeneus prayensis	1.56	10	0.48	
Zeus faber	1.23	2	0.38	
Epinephelus aeneus	1.21	2	0.37	
Cynoglossus canariensis	1.15	2	0.35	
Priacanthus arenatus	0.87	2	0.27	
Dicologoglossa cuneata	0.83	2	0.25	
Pomadasys incisus	0.79	2	0.24	
Selene dorsalis	0.73	4	0.22	
Chaetodon hoefleri	0.71	2	0.22	
B I V A L V E S	0.69	26	0.21	
Antennarius striatus	0.51	2	0.16	
Caranx rhonchus	0.14	2	0.04	
Alloteuthis africana	0.12	18	0.04	
Total	326.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 187
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°15.42
start stop duration Lon E 13°15.45
TIME :12:39:29 13:10:18 30.8 (min) Purpose : 3
LOG : 5094.41 5096.20 1.8 Region : 4054
FDEPTH: 29 30 Gear cond.: 0
BDEPTH: 29 30 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.5 kn
Sorted : 0 Total catch: 161.03 Catch/hour: 313.48

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Ilisha africana	79.72	2566	25.43	
Galeoides decadactylus	56.36	243	17.98	598
Chloroscombrus chrysurus	35.33	526	11.27	
Pseudotolithus senegalensis	25.45	107	8.12	601
Brachydeuterus auritus	21.03	785	6.71	600
Trichiurus lepturus	19.32	253	6.16	
Sphyraena guachancho	15.18	45	4.84	
Pteroscion peli	11.39	522	3.63	
Penaeus notialis, female	7.88	142	2.52	
Raja miraletus	7.45	16	2.38	
Cynoponticus ferox	5.84	2	1.86	
Drepane africana	4.28	19	1.37	
Dicologoglossa cuneata	4.28	39	1.37	
Selene dorsalis	4.14	68	1.32	599
Penaeus notialis, male	2.82	113	0.90	
JELLYFISH	2.58	10	0.82	
Sphyraena sphyraena	2.34	35	0.75	
Ephippion guttifer	1.65	10	0.53	
Pomadasys perotaei	1.31	6	0.42	
Pomadasys incisus	1.17	6	0.37	
Cynoglossus canariensis	1.12	6	0.36	
Pisodonophis semicinctus	1.02	6	0.33	
Grammoplites gruveli	0.73	16	0.23	
Sardinella maderensis	0.58	6	0.19	
Torpedo marmorata	0.34	6	0.11	
Argyrosomus sp.	0.15	6	0.05	
Total	313.48		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 188
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°16.78
start stop duration Lon E 13°11.99
TIME :14:04:45 14:35:08 30.4 (min) Purpose : 3
LOG : 5101.93 5103.62 1.7 Region : 4054
FDEPTH: 48 46 Gear cond.: 0
BDEPTH: 48 46 Validity : 0
Towing dir: 0° Wire out : 150 m Speed : 3.3 kn
Sorted : 0 Total catch: 96.44 Catch/hour: 190.47

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	40.17	363	21.09	602
Pomadasys jubelini	20.14	77	10.58	606
Raja miraletus	16.71	49	8.77	
Galeoides decadactylus	14.34	91	7.53	608
Pomadasys incisus	13.51	69	7.09	609
Pseudupeneus prayensis	11.93	118	6.26	
Chloroscombrus chrysurus	10.90	109	5.72	
Dasyatis marmorata	8.29	8	4.36	
Trachurus trecae, juvenile	8.14	533	4.27	607
Brachydeuterus auritus, juvenile	6.20	237	3.26	605
Dentex barnardi	5.21	32	2.74	603
Pagrus caeruleostictus	5.02	12	2.63	611
Selene dorsalis	3.59	73	1.89	610
Alectis alexandrinus	3.26	4	1.71	
Torpedo torpedo	3.12	12	1.64	
Sphyraena sphyraena	2.69	39	1.41	
Pomadasys rogeri	2.55	120	1.34	
Eucinostomus melanopterus	2.45	38	1.29	
Sepia orbignyana	2.11	4	1.11	
Lagocephalus laevigatus	2.09	10	1.10	
Cynoglossus canariensis	2.01	10	1.06	
Brachydeuterus auritus	1.32	12	0.69	604
Ephippion guttifer	1.18	6	0.62	
Epinephelus aeneus	0.85	2	0.45	
Citharus linguatula	0.85	36	0.45	
Grammoplites gruveli	0.63	12	0.33	
Syacium micrurum	0.36	2	0.19	
Chaetodon hoefleri	0.30	4	0.16	
Dicologoglossa cuneata	0.26	2	0.13	
Sardinella maderensis	0.18	2	0.09	
Penaeus notialis	0.10	2	0.05	
Total	190.47		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 189
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°16.21
start stop duration Lon E 13°9.20
TIME :15:14:56 15:45:26 30.5 (min) Purpose : 3
LOG : 5107.31 5108.98 1.7 Region : 4054
FDEPTH: 62 65 Gear cond.: 0
BDEPTH: 62 65 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.3 kn
Sorted : 0 Total catch: 312.69 Catch/hour: 615.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chloroscombrus chrysurus	147.15	2036	23.92	
Selene dorsalis	144.79	1515	23.54	615
Trachurus trecae	45.25	325	7.36	612
Stromateus fiatola	42.79	49	6.96	
Trichiurus lepturus	35.21	167	5.72	
Dentex angolensis	28.33	334	4.61	617
Brachydeuterus auritus	26.26	708	4.27	616
Trachurus trecae, juvenile	21.15	1987	3.44	614
Brotula barbata	18.55	2	3.02	
Sepia orbignyana	17.80	49	2.89	
Alectis alexandrinus	16.72	20	2.72	
Raja miraletus	13.48	20	2.19	
Sphyraena sphyraena	10.98	69	1.78	
Pseudupeneus prayensis	8.75	187	1.42	
Grammoplites gruveli	8.46	167	1.38	
Zeus faber	6.79	10	1.10	
Serranus accraensis	6.10	118	0.99	
Rhinobatos albomaculatus	5.17	4	0.84	
Pagellus bellottii	4.62	69	0.75	618
Pomadasys incisus	2.85	20	0.46	
Citharus linguatula	1.57	118	0.26	
Dicologoglossa cuneata	1.28	10	0.21	
Torpedo torpedo	0.98	10	0.16	
Arnoglossus imperialis	0.10	39	0.02	
Total	615.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 190
DATE :24/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°20.36
start stop duration Lon E 13°6.77
TIME :16:31:16 17:01:29 30.2 (min) Purpose : 3
LOG : 5113.35 5114.98 1.6 Region : 4054
FDEPTH: 83 88 Gear cond.: 0
BDEPTH: 83 88 Validity : 0
Towing dir: 0° Wire out : 240 m Speed : 3.2 kn
Sorted : 0 Total catch: 176.32 Catch/hour: 350.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	188.30	3887	53.79	620
Trichiurus lepturus	40.66	266	11.62	
Dentex angolensis	27.95	199	7.99	619
Selene dorsalis	20.53	187	5.86	621
Pterothrissus belloci	9.77	206	2.79	
Lagocephalus laevigatus	7.78	36	2.22	
Trachurus trecae, juvenile	7.31	723	2.09	622
Raja miraletus	7.15	12	2.04	
Umbrina canariensis	5.76	83	1.64	623
Citharus linguatula	5.52	131	1.58	
Zeus faber	5.00	12	1.43	
Uranoscopus albesca	4.41	32	1.26	
Dicologoglossa cuneata	2.70	16	0.77	
Pagellus bellottii	2.42	20	0.69	624
Sepia orbignyana	2.22	20	0.64	
Chloroscombrus chrysurus	1.71	20	0.49	
Saurida brasiliensis	1.67	409	0.48	
Sea cucumber A	1.67	44	0.48	
Brotula barbata	1.51	4	0.43	
Chelidonichthys capensis	1.47	8	0.42	
Trachurus trecae	1.03	8	0.29	
Lepidotrigla carolae	0.83	8	0.24	
Priacanthus arenatus	0.71	4	0.20	
Epinephelus marginatus	0.71	2	0.20	
Pontinus kuhlii	0.68	8	0.19	
Parapenaeus longirostris, female	0.24	71	0.07	
Grammoplites gruveli	0.24	4	0.07	
Munida sp.	0.08	95	0.02	
Parapenaeus longirostris, male	0.04	4	0.01	
Total	350.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 191
DATE :24/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°26.75
start stop duration Lon E 12°53.05
TIME :19:06:04 19:36:30 30.4 (min) Purpose : 3
LOG : 5131.20 5132.72 1.5 Region : 4054
FDEPTH: 305 312 Gear cond.: 0
BDEPTH: 305 312 Validity : 0
Towing dir: 0° Wire out : 750 m Speed : 3.0 kn
Sorted : 0 Total catch: 393.75 Catch/hour: 776.37

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlorophthalmus atlanticus	547.75	11302	70.55	
Gephyroberyx darwini	68.62	110	8.84	
Pontinus accraensis	35.96	371	4.63	
Merluccius polli	29.42	114	3.79	625
Bembrops heterurus	17.35	394	2.23	
Laemonema laureysi	16.01	158	2.06	
Merluccius polli, juvenile	10.88	244	1.40	626
Pterothrissus belloci	10.25	79	1.32	
Lophius vaillanti	9.56	8	1.23	
Bassanago albescens	7.49	16	0.97	
Parapenaeus longirostris, female	4.26	505	0.55	
Gadella imberbis	3.31	142	0.43	
Synagrops microlepis	3.15	118	0.41	
Raja clavata	3.04	2	0.39	
Malacocephalus occidentalis	2.37	8	0.30	
Trichiurus lepturus	1.74	55	0.22	
Parapenaeus longirostris, male	1.26	197	0.16	
Bathynectes piperitus	1.26	24	0.16	
Coelorinchus caelorhincus	1.03	24	0.13	
Stereomastis sp.	0.55	39	0.07	
NETTASTOMATIDAE	0.47	16	0.06	
Solenocera africana	0.32	79	0.04	
Todaropsis eblanae	0.16	8	0.02	
Peristedion cataphractum	0.16	8	0.02	
Total	776.37		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 192
DATE :25/03/16 GEAR TYPE: BT NO: 27 POSITION:Lat S 8°28.62
start stop duration Lon E 12°49.67
TIME :00:44:12 01:15:04 30.9 (min) Purpose : 3
LOG : 5145.73 5147.38 1.6 Region : 4054
FDEPTH: 453 454 Gear cond.: 0
BDEPTH: 453 454 Validity : 0
Towing dir: 0° Wire out : 1100 m Speed : 3.2 kn
Sorted : 0 Total catch: 336.62 Catch/hour: 654.27

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Nematocarcinus africanus	403.23	92511	61.63	
Chaunax pictus	77.82	342	11.89	
Laemonema laureysi	28.22	278	4.31	
Merluccius polli	27.79	58	4.25	627
Lophius vaillanti	21.63	21	3.31	
Chaceon maritae, male	14.75	21	2.25	
Yarrella blackfordi	12.19	342	1.86	
Stomias boa boa	10.69	257	1.63	
B I V A L V E S	9.41	43	1.44	

Benthodesmus tenuis	7.06	299	1.08
Aristeus varidens, female	5.99	299	0.91
Stereomastis sp.	5.56	513	0.85
Hoplostethus cadenati	4.92	192	0.75
Anemones, white	4.28	21	0.65
Malacocephalus occidentalis	2.35	21	0.36
Halosaurus ovenii	2.14	86	0.33
Triplophos hemingi	2.14	342	0.33
Dibranchus atlanticus	2.14	86	0.33
Chlorophthalmus atlanticus	2.14	43	0.33
Histioteuthis meleagroteuthis	1.71	21	0.26
Bathyuroconger vicinus	1.50	43	0.23
Gadella imberbis	1.50	43	0.23
Nezumia aequalis	1.07	21	0.16
Aristeus varidens	1.07	107	0.16
Etmopterus pollii	0.86	43	0.13
Glyphus marsupialis	0.64	41	0.10
Hymenocephalus italicus	0.64	6	0.10
Bathynectes piperitus	0.64	21	0.10
Xenodermichthys copei	0.21	6	0.03
Total	654.27		100.00

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 194
DATE :25/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°22.53
start stop duration Lon E 12°58.32
TIME :06:43:07 07:13:49 30.7 (min) Purpose : 3
LOG : 5163.78 5165.49 1.7 Region : 4054
FDEPTH: 121 122 Gear cond.: 0
BDEPTH: 121 122 Validity : 0
Towing dir: 0° Wire out : 320 m Speed : 3.3 kn
Sorted : 0 Total catch: 116.86 Catch/hour: 228.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	79.86	553	34.96	631
Dentex angolensis	69.07	489	30.24	628
Spicara alta	26.35	180	11.54	632
Trachurus trecae	24.37	82	10.67	629
Zeus faber	6.45	18	2.82	
Sphoeroides pachgaster	4.40	14	1.93	
G A S T R O P O D S	3.81	602	1.67	
Lepidotrigla cadmani	2.46	20	1.08	
Dentex barnardi	2.19	8	0.96	630
Zenopsis conchifer	1.84	2	0.80	
Uranoscopus albesca	1.78	12	0.78	
Citharus linguatula	1.56	59	0.68	
Octopus vulgaris	0.88	4	0.39	
Pagellus bellottii	0.78	6	0.34	
Umbrina canariensis	0.64	2	0.28	
Scomber japonicus	0.59	2	0.26	
Lepidotrigla carolae	0.49	14	0.21	
Pterothrissus belloci	0.25	2	0.11	
Boops boops	0.23	2	0.10	
Anthias anthias	0.16	2	0.07	
Microchirus frechkopi	0.12	4	0.05	
Sea urchin, weak spines	0.10	6	0.04	
Arnoglossus imperialis	0.02	2	0.01	
Total	228.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 195
DATE :25/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°22.99
start stop duration Lon E 12°56.13
TIME :08:10:08 08:40:33 30.4 (min) Purpose : 3
LOG : 5168.94 5170.39 1.4 Region : 4054
FDEPTH: 163 164 Gear cond.: 0
BDEPTH: 163 164 Validity : 0
Towing dir: 0° Wire out : 390 m Speed : 2.9 kn
Sorted : 0 Total catch: 93.76 Catch/hour: 185.05

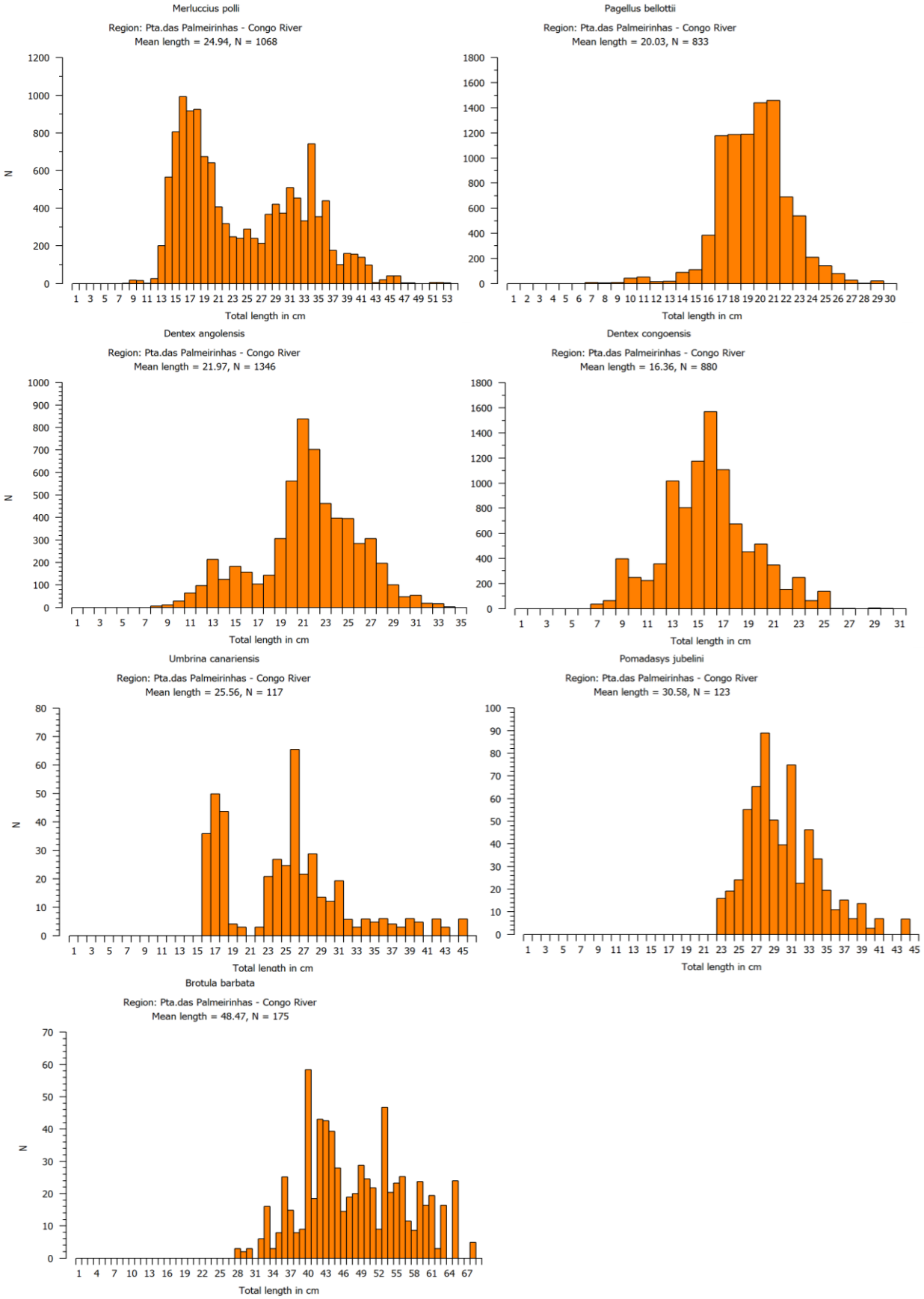
SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	38.33	136	20.71	633
Pterothrissus belloci	37.82	383	20.44	
Bembrops heterurus	37.82	401	20.44	
Brotula barbata	30.04	30	16.23	634
Monolene microstoma	10.09	446	5.45	
Uranoscopus albesca	5.51	24	2.98	
Lepidotrigla cadmani	4.28	39	2.31	
Sphoeroides pachgaster	3.55	12	1.92	
G A S T R O P O D S	2.88	428	1.56	
Lophiodes kempi	2.35	6	1.27	
Zenopsis conchifer	2.25	2	1.22	
Zeus faber	2.25	14	1.22	
Pontinus accraensis	1.99	14	1.08	
Parapenaeus longirostris, female	1.62	452	0.87	
Torpedo torpedo	1.54	2	0.83	
Parapenaeus longirostris, male	0.79	43	0.43	
Peristedion cataphractum	0.65	14	0.35	
Spicara alta	0.45	4	0.25	
Illex coindetii	0.26	2	0.14	
GOBIIDAE	0.18	36	0.10	
Dicologoglossa cuneata	0.12	2	0.06	
Todaropsis eblanae	0.10	1	0.05	
Sepia officinalis	0.08	12	0.04	
Saurida brasiliensis	0.04	8	0.02	
MAJIDAE	0.04	14	0.02	
Small crabs	0.04	41	0.02	
Total	185.05		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016404 STATION: 196
DATE :25/03/16 GEAR TYPE: BT NO: 21 POSITION:Lat S 8°25.98
start stop duration Lon E 12°54.84
TIME :09:39:27 10:09:41 30.2 (min) Purpose : 3
LOG : 5174.93 5176.52 1.6 Region : 4054
FDEPTH: 229 227 Gear cond.: 0
BDEPTH: 229 227 Validity : 0
Towing dir: 0° Wire out : 600 m Speed : 3.2 kn
Sorted : 0 Total catch: 2182.28 Catch/hour: 4331.35

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Synagrops microlepis	3206.77	218850	74.04	
Zenopsis conchifer	297.36	742	6.87	
Merluccius polli	262.86	917	6.07	637
Brotula barbata	185.46	147	4.28	635
Bembrops heterurus	98.68	786	2.28	
Lophiodes kempi	54.58	87	1.26	
Trichiurus lepturus	37.55	87	0.87	
Pterothrissus belloci	31.44	175	0.73	
Scorpaena normani	30.13	218	0.70	
Dentex angolensis	25.64	67	0.59	636
Octopus vulgaris	20.52	44	0.47	
Umbrina canariensis	16.16	44	0.37	
Merluccius polli, juvenile	13.54	262	0.31	638
Todaropsis eblanae	13.10	87	0.30	
Nezumia aequalis	11.35	131	0.26	
Dentex macrophthalmus	9.61	44	0.22	
Illex coindetii	4.37	44	0.10	
Parapenaeus longirostris, female	4.37	611	0.10	
Monolene microstoma	3.93	262	0.09	
Chlorophthalmus atlanticus	3.06	44	0.07	
Parapenaeus longirostris, male	0.87	131	0.02	
Total	4331.35		100.00	

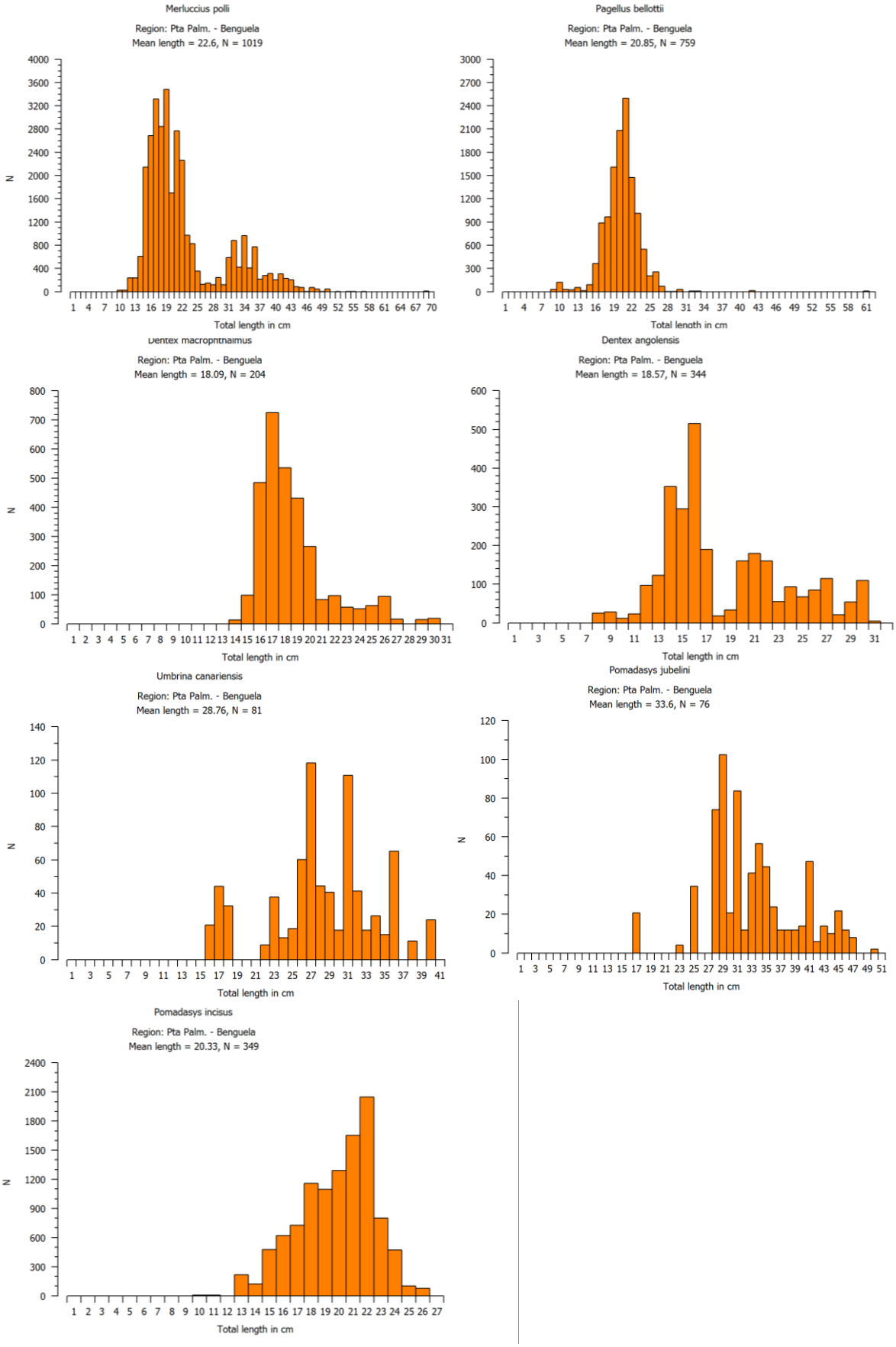
ANNEX II Length distribution of main species

Northern Angola: Pooled length frequency distribution of the main species weighted by the catch



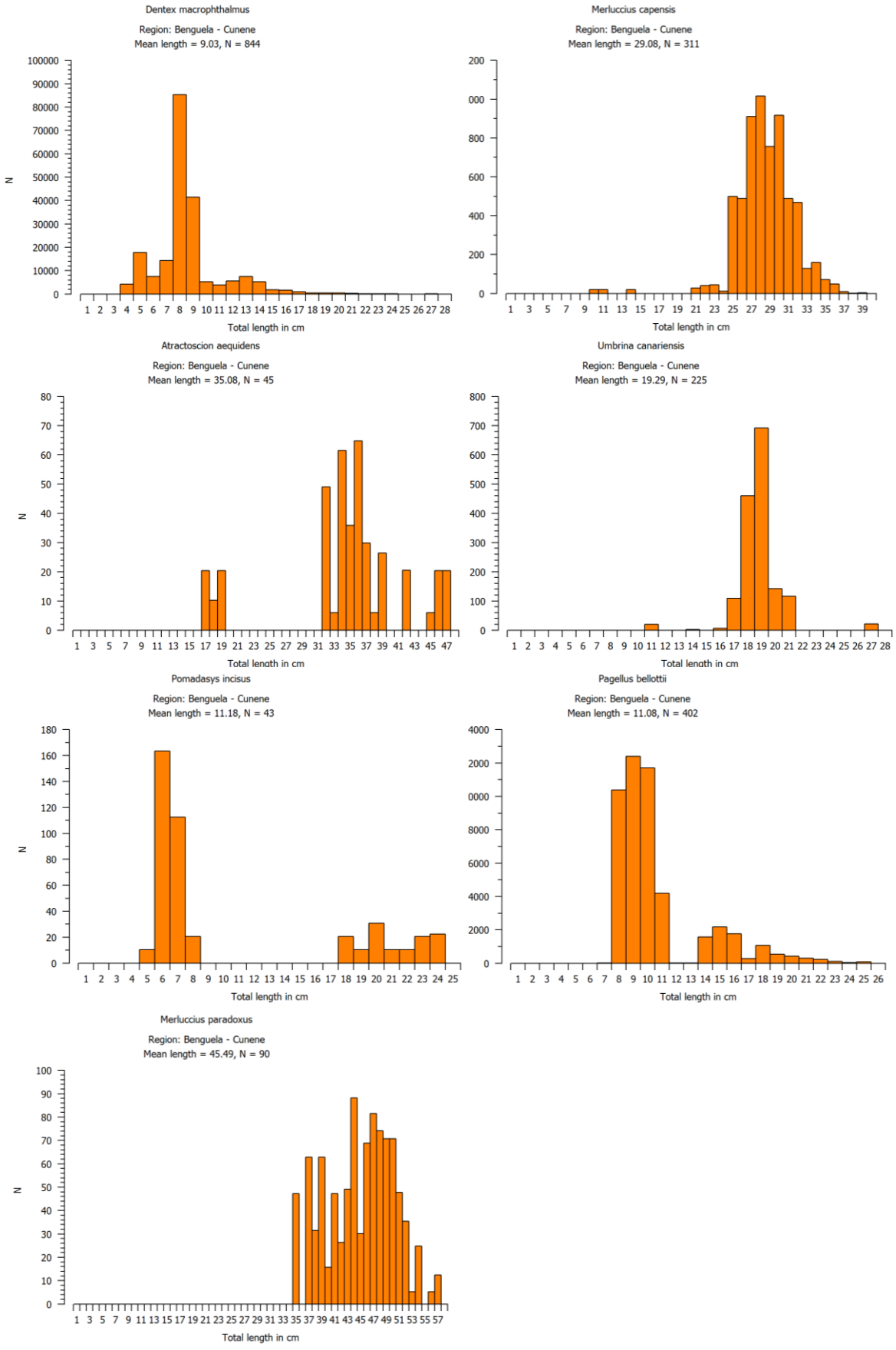
ANNEX II Length distribution of main species

Central Angola: Pooled length frequency distribution of the main species weighted by the catch



ANNEX II Length distribution of main species

Southern Angola: Pooled length frequency distribution of the main species weighted by the catch



ANNEX III Swept area estimates

North: Congo River - Palmerinhas shelf (20-200m)

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-	Mean	Mean densities by bottom depth strata			
	Lower lim	Kg/nm					dence	dens.	t/nm²			
	>0	10	30	100	300	1000		t/nm²	0-30m	30-50m	50-100m	100-200m
Brachydeuterus auritus	15	4	6	3	1		56.86	2.633	2.933	8.988	1.284	0.671
Synagrops microlepis				2	1		5.88	2.295				6.886
Chloroscombrus chrysurus	7	2	2	1	1		25.49	1.522	7.626	2.807	0.348	
Selene dorsalis	18	12	3	2			68.63	1.515	0.618	3.579	1.514	0.741
Galeoides decadactylus	7	5	5	1			35.29	1.217	6.565	2.084	0.207	
Trachurus trecae	17	7	4				54.9	0.795		0.027	1.028	1.222
Trichiurus lepturus	21	6		1			54.9	0.618	0.092	0.011	0.297	1.485
Pagellus bellottii	30	4	4				74.51	0.612	0.135	0.878	1.12	0.072
Dentex angolensis	21	9					58.82	0.514			0.539	0.94
Dentex congoensis	18	4	1				45.1	0.401			0.683	0.441
Sphyraena guachancho	7	6					25.49	0.244	0.624	0.699	0.127	
Brotula barbata	18	4					43.14	0.22			0.172	0.469
Pterothrissus belloci	9	2	1				23.53	0.199			0.016	0.579
Zenopsis conchifer	8	1	1				19.61	0.184				0.551
Stromateus fiatola	2	5					13.73	0.16		0.327	0.179	0.106
Raja miraletus	26	1					52.94	0.15	0.11	0.146	0.297	0.003
Lepidotrigla cadmani	19	2					41.18	0.148			0.201	0.218
Ilisha africana	4	3					13.73	0.139	0.87	0.205		
Pomadasys jubelini	5	1	1				13.73	0.135		0.097	0.318	
Lagocephalus laevigatus	24						47.06	0.125	0.109	0.076	0.258	0.007
Dentex barnardi	23	1					47.06	0.089	0.027	0.043	0.181	0.032
Pseudotolithus senegalensis	7	1					15.69	0.085	0.478	0.146	0.007	
Bembrops heterurus	2	3					9.8	0.083				0.249
Alectis alexandrinus	11	1					23.53	0.073	0.311	0.105	0.043	0.006
Zeus faber	22	1					45.1	0.073			0.063	0.148
Pagrus caeruleostictus	17						33.33	0.072	0.119	0.154	0.082	
Umbrina canariensis	13						25.49	0.069			0.062	0.136
Uranoscopus albesca	15	1					31.37	0.063			0.027	0.159
Pomadasys incisus	8	1					17.65	0.061	0.069	0.135	0.077	
Citharus linguatula	34						66.67	0.051		0.037	0.056	0.07
Spicara alta	10	1					21.57	0.047				0.141
Pteroscion peli	4	1					9.8	0.043	0.279	0.055	0.002	
Sardinella maderensis	9						17.65	0.04	0.124	0.11	0.006	0.012
Ephippion guttifer	6						11.76	0.039	0.317	0.011		
Pseudupeneus prayensis	15						29.41	0.036	0.026	0.048	0.065	
Sphyraena sphyraena	7						13.73	0.033	0.011	0.024	0.075	
Drepane africana	4						7.84	0.032	0.253	0.013		
Rhinobatos annulatus	5						9.8	0.031	0.095	0.029	0.04	
Chlorophthalmus atlanticus	1	1					3.92	0.03				0.091
Merluccius polli	2						3.92	0.03				0.09
Sepia orbignyana	13						25.49	0.028		0.007	0.066	0.006
Penaeus notialis	9						17.65	0.028	0.084	0.102		
Octopus vulgaris	11						21.57	0.027			0.04	0.036
Pomadasys rogeri	6						11.76	0.026	0.167	0.037		
Parapenaeus longirostris	9						17.65	0.025			0.001	0.075
Rhinobatos albomaculatus	8						15.69	0.025		0.033	0.019	0.036
Epinephelus aeneus	7						13.73	0.025	0.093	0.006	0.035	
Chelidonichthys gabonensis	5						9.8	0.024			0.043	0.023
Chelidonichthys capensis	9						17.65	0.024		0.007	0.049	0.013
Saurida brasiliensis	25						49.02	0.023			0.019	0.046
Sepia officinalis	11						21.57	0.021		0.008	0.049	0.003
Caranx crysos	3						5.88	0.02	0.012	0.108		
Sphoeroides cf. pachygaster	4						7.84	0.02				0.06
Pomadasys perotaei	3						5.88	0.02	0.101	0.043		
Dasyatis marmorata	6						11.76	0.019	0.037	0.057	0.013	
Monolene microstoma	10						19.61	0.019				0.056
Sea urchin	3						5.88	0.015			0.006	0.039
Illex coindetii	12						23.53	0.014				0.043
Cynoglossus canariensis	9						17.65	0.014	0.022	0.045	0.009	
Dasyatis margarita	2						3.92	0.013	0.046		0.02	
Dicologoglossa cuneata	12						23.53	0.013	0.042	0.01	0.015	0.001
Panulirus regius	5						9.8	0.012	0.086	0.011		
Arius parkii	2						3.92	0.012	0.01	0.061		
Fistularia petimba	8						15.69	0.012	0.003		0.023	0.01
G A S T R O P O D S	18						35.29	0.012			0.005	0.03
Torpedo torpedo	8						15.69	0.012		0.024	0.017	0.003
Epinephelus goreensis	1						1.96	0.011			0.03	
Balistes punctatus	1						1.96	0.011	0.093			
Parapandalus narval	1						1.96					
Solenocera africana	1						1.96					
Other fish								0.215	0.362	0.204	0.186	0.203
Sum all species								15.647	22.949	21.597	10.02	16.21
Sum SNAPPERS	JOBFISHES											
Sum GROUPERS	SEABASSES							0.044	0.093	0.006	0.081	0.006
Sum POD												
Sum CROAKERS	DRUMS	WEAKF.	KOBS					0.205	0.758	0.203	0.084	0.145
Sum PANDORAS	PORGIES	SEABREAMS						1.688	0.281	1.075	2.604	1.485
Sum SHARKS	CHIMAERAS								0.004			0.009
Sum BATOID FISHES	RAYS							0.283	0.41	0.335	0.405	0.072
Sum CEPHALOPODS								0.092		0.017	0.159	0.091
Numbers of stations included in analysis	total and by depth strata							51	6	9	19	17

ANNEX III Swept area estimates

North: Congo River - Palmerinhas slope (200-500 m)

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES							% inci-	Mean	Mean densities by bottom		
		Lower lim	Kg/nm					dence	dens.	depth strata t/nm²		
		>0	10	30	100	300	1000		t/nm²	200-300m	300-400m	400-500m
Synagrops microlepis		5	1	4	2		1	59.09	7.52	18.508	2.174	
Chlorophthalmus atlanticus		8	1	4	2	1		72.73	4.57	1.857	10.702	0.012
Merluccius polli		15	8	3	1			122.73	2.691	1.972	1.872	4.741
Nematocarcinus africanus		2	1	3	3			40.91	2.299		1.49	6.444
Zenopsis conchifer		6	3	4				59.09	1.243	2.732	0.483	0.269
Chaunax pictus		7	4	1				54.55	0.757	0.001	1.168	1.216
Brotula barbata		6	1	2				40.91	0.664	1.758	0.068	
Laemonema laureysi		8	6					63.64	0.608	0.238	1.089	0.459
Pterothrissus belloci		7	4					50	0.449	0.918	0.316	
Lophiodes kempi		5	1	1				31.82	0.436	0.229	0.143	1.104
Bembrops heterurus		11	1	1				59.09	0.42	0.946	0.208	
Benthodesmus tenuis		7		1				36.36	0.373		0.009	1.356
Parapenaeus longirostris		17						77.27	0.335	0.452	0.468	0.002
Dentex angolensis		2	4					27.27	0.244	0.67		
Pontinus accraensis		8	2					45.45	0.236	0.182	0.466	
Gephyroberyx darwini		2	2					18.18	0.18	0.005	0.49	
Trichiurus lepturus		12	1					59.09	0.178	0.39	0.1	
Coelorinchus caelorhincus		8	1					40.91	0.161	0.307	0.122	0.017
Hymenocephalus italicus		13						59.09	0.116	0.001	0.111	0.276
Aristeus varidens		12						54.55	0.115	0.001	0.025	0.388
Lophius vaillanti		7						31.82	0.115		0.155	0.215
Dibranchus atlanticus		9	1					45.45	0.106	0.009	0.042	0.322
Hoplostethus cadenati		3	1					18.18	0.074			0.273
Yarrella blackfordi		5						22.73	0.074			0.27
Bassanago albescens		9						40.91	0.071	0.024	0.143	0.038
Malacocephalus occidentalis		12						54.55	0.067	0.016	0.095	0.096
Parasudis fraserbrunneri		5						22.73	0.066	0.079	0.104	
Bathyuroconger vicinus		6						27.27	0.064	0.001	0.123	0.071
Triplophos hemingi		4	1					22.73	0.059			0.215
Gadella imberbis		14						63.64	0.052	0.014	0.113	0.022
Illex coindetii		10						45.45	0.051	0.108	0.023	0.013
Stereomastis sp.		8						36.36	0.049	0.002	0.013	0.161
Chaceon maritae		3						13.64	0.048		0.033	0.132
Stomias boa boa		5						22.73	0.046			0.168
Scorpaena normani		1						4.55	0.043	0.119		
Nezumia aequalis		8						36.36	0.042	0.045	0.056	0.019
Synagrops bellus		3						13.64	0.041		0.112	
Hoplunnis punctata		1						4.55	0.036		0.1	
Todaropsis eblanae		6						27.27	0.034	0.063	0.03	
Malacocephalus laevis		4						18.18	0.034		0.088	0.007
Octopus vulgaris		2						9.09	0.03	0.084		
Umbrina canariensis		3						13.64	0.028	0.076		
Halosaurus ovenii		8						36.36	0.027		0.013	0.082
Miracorvina angolensis		3						13.64	0.027	0.075		
MYCTOPHIDAE		9						40.91	0.026	0.044	0.027	0.002
URCHINS		1						4.55	0.025	0.068		
Lamprogrammus exutus		2						9.09	0.024			0.087
Ariomma bondi		4						18.18	0.021	0.059		
Rajella leopardus		1						4.55	0.021	0.059		
Stephanolepis sp.		1						4.55	0.021			0.078
Etmopterus polli		3						13.64	0.02		0.009	0.062
Zeus faber		2						9.09	0.019	0.043	0.009	
Monolene microstoma		7						31.82	0.018	0.049		
Lepidopus caudatus		1						4.55	0.016			0.06
Bathynectes piperitus		8						36.36	0.016		0.038	0.008
Munida sp.		3						13.64	0.014		0.04	
Mystriophis rostellatus		3						13.64	0.014	0.026	0.013	
Dentex macrophthalmus		1						4.55	0.014	0.038		
B I V A L V E S		1						4.55	0.013			0.049
Centrophorus squamosus		1						4.55	0.012			0.043
Coloconger cadenati		4						18.18	0.011	0.006		0.034
Chascanopsetta lugubris		2						9.09	0.011	0.017	0.013	
Plesiopenaeus edwardsianus		4						18.18	0.009			0.034
Parapandalus narval		2						9.09	0.008		0.021	
Solenocera africana		7						31.82	0.005	0.004	0.009	
Glyphus marsupialis		2						9.09	0.003		0.006	0.003
Shrimps	small	1						4.55				0.001
Other fish								0.158	0.139	0.164	0.176	0
Sum all species								25.38	32.43	23.095	19.025	0
Sum SNAPPERS	JOBFISHES											
Sum GROUPERS	SEABASSES											
Sum POD												
Sum CROAKERS	DRUMS	WEAKF.	KOBS								0.055	0.151
Sum PANDORAS	PORGIES	SEABREAMS									0.257	0.708
Sum SHARKS	CHIMAERAS								0.04	0.007	0.01	0.125
Sum BATOID FISHES	RAYS								0.045	0.096	0.026	0.002
Sum CEPHALOPODS									0.125	0.257	0.055	0.043
Numbers of stations included in analysis	total and by depth strata							22	8	8	6	0

ANNEX III Swept area estimates

North: Congo River - Palmerinhas slope (500-800 m)

SPECIES NAME	SAMPLE DISTRIB. BY CATCH CLASSES						% inci-	Mean	Mean densities by bottom		
	Lower lim	Kg/nm					dence	dens.	depth strata t/nm²		
	>0	10	30	100	300	1000		t/nm²	500-600m	600-700m	700-800m
Nematocarcinus africanus	2	2	4	3			73.33	5.645	9.462	4.395	3.078
Lamprogrammus exutus	5	3	6				93.33	2.565	2.903	3.447	1.346
Hoplostethus cadenati	7	5	3				100	1.636	1.978	1.787	1.143
Yarrella blackfordi	7	7	1				100	1.371	0.258	1.446	2.408
Stomias boa boa	10	5					100	0.936	0.745	1.626	0.437
Stereomastis sp.	10	4					93.33	0.751	0.174	0.88	1.2
Triplophos hemingi	10	1	1				80	0.678	0.211	1.624	0.2
JELLYFISH	6		1				46.67	0.493	0.028	0.01	1.44
Coelorinchus caelorhincus	11	1					80	0.325	0.031	0.241	0.704
Aristeus varidens	15						100	0.276	0.398	0.328	0.102
Bathyuroconger vicinus	9	2					73.33	0.268	0.038	0.035	0.732
Lophius vaillanti	5	1					40	0.217	0.027	0.173	0.45
Xenodermichthys copei	13	1					93.33	0.21	0.062	0.319	0.249
Selachophidium guentheri	2	1					20	0.19	0.568	0.001	
Diplophos taenia	1	1					13.33	0.118	0.058	0.295	
Ebinania costaecanariae	2	1					20	0.11	0.002		0.327
Monomitopus metriostoma	5						33.33	0.105		0.174	0.142
Laemonema laureysi	1	1					13.33	0.104	0.311		
Sudis hyalina		1					6.67	0.102			0.307
Benthodesmus tenuis	10						66.67	0.093	0.138	0.104	0.037
Merluccius polli	7						46.67	0.088	0.107	0.061	0.095
Chaceon maritae	5						33.33	0.076	0.159		0.07
HOLUTHUROIDEA		1					6.67	0.074			0.222
Todarodes sp.		1					6.67	0.073	0.219		
Talismania longifilis	4						26.67	0.073		0.043	0.176
Anemone - purple		1					6.67	0.07			0.211
Dibranchus atlanticus	13						86.67	0.063	0.099	0.053	0.037
Opisthoteuthis agassizi	1						6.67	0.057			0.17
Halosaurus ovenii	8						53.33	0.053	0.007	0.059	0.092
Chaunax pictus	5						33.33	0.049	0.107	0.04	
Etmopterus pusillus	3						20	0.046	0.019	0.012	0.109
Gadella imberbis	7						46.67	0.045	0.107	0.029	
Chlamydoselachus anguineus	1						6.67	0.045	0.134		
Anemones	2						13.33	0.04		0.036	0.083
Bassanago albescens	2						13.33	0.038	0.062	0.052	
Chrysaora hysoscella	1						6.67	0.038		0.113	
Dicrolene intronigra	4						26.67	0.036	0.002	0.041	0.066
Octopoteuthis sicula	3						20	0.036		0.054	0.054
Chlorophthalmus atlanticus	2						13.33	0.033		0.091	0.008
Abraliopsis gilchristi	1						6.67	0.031		0.094	
Glyphus marsupialis	7						46.67	0.029	0.017	0.023	0.047
Lophiodes kempi	1						6.67	0.028	0.085		
Zameus (Scymnodon) squamulosus	5						33.33	0.028	0.01	0.051	0.024
Photonectes braueri	6						40	0.025	0.052	0.004	0.02
Deania calcea	1						6.67	0.024			0.072
CARISTIIDAE	3						20	0.022		0.012	0.053
Plesiopenaeus edwardsianus	8						53.33	0.022	0.014	0.018	0.032
Gonostoma elongatum	2						13.33	0.02		0.046	0.014
Rossia enigmatica	1						6.67	0.019			0.056
GALATHEIDAE	1						6.67	0.017	0.052		
Centrophorus squamosus	1						6.67	0.017	0.051		
Todaropsis eblanae	2						13.33	0.016		0.021	0.028
Hyperoglyphe moselii ***	1						6.67	0.015		0.046	
Nezumia aequalis	3						20	0.014	0.028		0.015
Bristle worms (straws)	3						20	0.014	0.009	0.013	0.02
MYCTOPHIDAE	10						66.67	0.014	0.004	0.016	0.022
Cataetyx laticeps	1						6.67	0.013	0.04		
Bufoceratias wedli	1						6.67	0.013			0.039
Malacocephalus laevis	3						20	0.013	0.038		
Idiacanthus fasciola	1						6.67	0.013			0.038
Scopelosaurus sp.	2						13.33	0.012		0.02	0.017
Todarodes sagittatus	1						6.67	0.012		0.035	
Aequorea forskalea	1						6.67	0.011		0.034	
Avocettina acuticeps	7						46.67	0.011	0.012	0.013	0.009
Munida sp.	3						20	0.011	0.004	0.009	0.02
Anemones	1						6.67	0.011			0.033
Bathyraja smithii	1						6.67	0.011			0.032
Aristeus sp.	2						13.33	0.008	0.024		
Penaeopsis serrata	1						6.67	0.006			0.019
Pasiphaea multidentata	1						6.67	0.003			0.01
Heterocarpus grimaldii	2						13.33	0.003	0.001		0.008
Heterocarpus ensifer	2						13.33	0.002		0.007	
Other fish							0.125	0.113	0.116	0.144	0
Sum all species							17.86	18.968	18.147	16.467	0
Sum SNAPPERS	JOBFISHES										
Sum GROUPERS	SEABASSES										
Sum POD											
Sum CROAKERS	DRUMS	WEAKF.	KOBS								
Sum PANDORAS	PORGIES	SEABREAMS									
Sum SHARKS	CHIMAERAS							0.164	0.224	0.063	0.204
Sum BATOID FISHES	RAYS							0.018	0.011		0.043
Sum CEPHALOPODS								0.253	0.234	0.204	0.321
Numbers of stations included in analysis	total and by depth strata						15	5	5	5	0

ANNEX III Swept area estimates:

Central: Palmerinhas - Benguela. Shelf (20-200 m)

	Lower limits, Kg/nm						% inci-	Mean	Mean densities by bottom depth strata t/nm²			
SPECIES NAME	>0	10	30	100	300	1000	dence	dens. t/nm²	0-30m	30-50m	50-100m	100-200m
Synagrops microlepis		1		1	4		14.63	5.57				19.032
Brachydeuterus auritus	4	6	12		1		56.1	3.874	2.41	13.159	2.316	0.373
Pagellus bellottii	19	8	2	2			75.61	1.275	0.158	0.66	2.767	0.161
Trachurus trecae	14	5	4	2			60.98	1.218		0.029	2.717	0.518
Galeoides decadactylus	4	6	2	1			31.71	1.135	2.71	3.572	0.276	
Pomadasys incisus	9	3		2			34.15	1.106	0.21	0.306	2.613	0.002
Trichiurus lepturus	15	5	2				53.66	0.721	0.203	0.154	1.205	0.67
Raja miraletus	18	10					68.29	0.631	0.129	0.705	1.155	0.092
Lepidotrigla cadmani	11	3	4				43.9	0.543		0.002	0.781	0.812
Pseudupeneus prayensis	17	5	1				56.1	0.423	0.101	0.585	0.758	0.002
Selene dorsalis	17	3	1				51.22	0.408	0.252	0.61	0.304	0.477
Rhinobatos albomaculatus	7	5	1				31.71	0.357	0.106	0.651	0.544	0.016
Brotula barbata	6	2	2				24.39	0.344			0.04	1.122
Chloroscombrus chrysurus	11	5					39.02	0.343	0.95	1.024	0.071	
Pseudotolithus senegalensis	6	3	1				24.39	0.327	1.303	0.82	0.021	
Lagocephalus laevigatus	20	4					58.54	0.318	0.421	0.411	0.366	0.147
Pomadasys jubelini	3	1	2				14.63	0.302	0.145	0.025	0.715	
Alectis alexandrinus	8	3	1				29.27	0.3	0.626	0.925	0.111	
Dentex angolensis	18	1	1				48.78	0.274			0.204	0.663
Zenopsis conchifer	6	4					24.39	0.259			0.028	0.848
Sphyraena guachancho	8	3	1				29.27	0.253	0.879	0.688	0.03	
Citharus linguatula	29	1					73.17	0.251	0.003	0.102	0.37	0.294
Dentex macrophthalmus	7	2	1				24.39	0.244			0.087	0.717
Sardinella maderensis	11	1	1				31.71	0.207	0.242	0.029	0.44	
Pterothrissus belloci	6	4					24.39	0.198			0.031	0.636
Umbrina canariensis	14		1				36.59	0.194		0.004	0.161	0.444
Zeus faber	10	1	1				29.27	0.184			0.134	0.45
Dentex barnardi	19	2					51.22	0.179	0.004	0.015	0.385	0.087
Drepane africana	2	1	1				9.76	0.16	0.874	0.272		
Ilisha africana ***	2	1	1				9.76	0.129	0.295	0.475		
Balistes capriscus	4	2					14.63	0.107	0.342	0.333	0.002	
Pontinus accraensis	4	2					14.63	0.104			0.108	0.21
Sardinella aurita	6		1				17.07	0.1	0.016	0.098	0.005	0.261
Gymnura micrura	1	2					7.32	0.091	0.708	0.021		
Sepia officinalis	18						43.9	0.088	0.046	0.008	0.133	0.099
Grammoplites gruveli	16						39.02	0.084	0.011	0.13	0.147	
Pteroscion peli	5	1					14.63	0.076	0.108	0.311	0.005	
Sphyraena sphyraena	12						29.27	0.073		0.062	0.155	0.002
Torpedo torpedo	12						29.27	0.07		0.002	0.128	0.069
Lithognathus mormyrus	2	2					9.76	0.069	0.229	0.053	0.08	
Pomadasys rogeri	3	1					9.76	0.069		0.346	0.004	
Dicologoglossa cuneata	7	1					19.51	0.063	0.071	0.084	0.097	
Uranoscopus albesca	7	1					19.51	0.059			0.044	0.144
Bembrops heterurus	6						14.63	0.059				0.2
Sphoeroides lobatus	3	1					9.76	0.052			0.018	0.154
Octopus vulgaris	7	1					19.51	0.052			0.117	0.022
Pomadasys perotaei	7						17.07	0.051	0.123	0.152	0.016	
Ephippion guttifer	5						12.2	0.047	0.187	0.122		
Merluccius polli	2	1					7.32	0.044				0.15
Illex coindetii	11						26.83	0.043			0.008	0.138
Eucinostomus melanopterus	13						31.71	0.038	0.167	0.088		
Erythrocles monodi	1	1					4.88	0.035				0.121
Fistularia petimba	9						21.95	0.035	0.025	0.001	0.071	0.016
Caranx rhonchus	5						12.2	0.033	0.063	0.131		
Chlorophthalmus atlanticus	3						7.32	0.033				0.113
Stromateus fiatola	3						7.32	0.033	0.059	0.067	0.032	
Dasyatis margarita	9						21.95	0.033	0.06	0.069	0.031	
Saurida brasiliensis	21						51.22	0.03			0.039	0.05
Parapenaeus longirostris	5						12.2	0.027				0.091
Scorpaena normani	5						12.2	0.027			0.036	0.043
Chaetodon hoefleri	8						19.51	0.026		0.003	0.058	0.011
Lepidotrigla carolae	5						12.2	0.025			0.024	0.055
Dasyatis marmorata	4						9.76	0.025	0.037	0.022	0.042	
Epinephelus aeneus	5						12.2	0.024	0.004	0.016	0.051	
Seriola carpenteri	4						9.76	0.023		0.001	0.059	
Dentex congoensis	5						12.2	0.023			0.003	0.074
Caranx crysos	6						14.63	0.022	0.048	0.084		
Scorpaena maderensis	1						2.44	0.021				0.073
Malacocephalus occidentalis	1						2.44	0.021				0.072
Uranoscopus polli	2						4.88	0.021			0.011	0.056
Syacium micrurum	9						21.95	0.021	0.011	0.027	0.026	0.014
Scomberomorus tritor	4						9.76	0.021	0.005	0.102		
G A S T R O P O D S	7						17.07	0.02			0.007	0.058
Torpedo marmorata	4						9.76	0.02			0.03	0.027
Sepia orbignyana	5						12.2	0.018			0.009	0.049

Ilisha africana	1	2.44	0.016	0.131			
Arius gigas	2	4.88	0.016	0.028	0.064		
Decapterus rhonchus**	4	9.76	0.015		0.077		
Arius parkii	7	17.07	0.014	0.032	0.037	0.008	
Sphoeroides cf. pachygaster	2	4.88	0.014				0.048
Serranus accraensis	6	14.63	0.013		0.01	0.029	
Sphoeroides pachgaster	2	4.88	0.012				0.04
Chelidonichthys gabonensis	5	12.2	0.011			0.014	0.02
Penaeus notialis	5	12.2	0.011	0.022	0.039	0.002	
GOBIIDAE	6	14.63	0.01			0.016	0.013
Parapenaeus longirostris,f **	1	2.44	0.002			0.005	
Parapenaeus longirostris, m **	1	2.44				0.001	
Other fish			0.209	0.227	0.163	0.158	0.301
Sum all species			24.127	14.78	27.949	20.463	30.358
Sum SNAPPERS, JOBFISHES							
Sum GROUPERS, SEABASSES			0.037	0.005	0.026	0.081	0.001
Sum POD							
Sum CROAKERS, DRUMS, WEAKF., KOBS			0.616	1.417	1.136	0.209	0.479
Sum PANDORAS, PORGIES, SEABREAMS,			2.064	0.39	0.73	3.526	1.701
Sum SHARKS, CHIMAERAS			0.006	0.016	0.02		
Sum BATOID FISHES, RAYS			1.234	1.051	1.47	1.944	0.204
Sum CEPHALOPODS			0.216	0.058	0.029	0.287	0.314
Numbers of stations included in analysis, total and by depth strata			41	5	8	16	12

ANNEX III Swept area estimates:

Central: Palmerinhas - Benguela. Slope (200-500 m)

	Lower limits, Kg/nm						% inci-	Mean	Mean densities by bottom depth strata t/nm²		
							dence	dens.			
SPECIES NAME	>0	10	30	100	300	1000		t/nm²	200-300m	300-400m	400-500m
Merluccius polli	4	7	9	4			100	5.512	4.129	6.5	5.909
Synagrops microlepis	3	4	2	2	1		50	3.449	10.152	0.194	
Chlorophthalmus atlanticus	11	2	1	2	1		70.83	3.242	7.337	2.305	0.084
Nematocarcinus africanus	2	3	6	2			54.17	3.037		1.379	7.731
Laemonema laureysi	7	12	2				87.5	1.429	1.241	2.161	0.884
Zenopsis conchifer	6	3	3				50	1.075	2.858	0.367	
Bembrops heterurus		4	2	1			29.17	1.053	3.158		
Hoplostethus cadenati	8	1		1			41.67	1.014		0.151	2.889
Brotula barbata		4	3				29.17	0.959	2.876		
Pterothrissus belloci	7	4	2				54.17	0.716	1.916	0.219	0.012
Zeus faber				1			4.17	0.645	1.934		
Pontinus accraensis	3	3	2				33.33	0.581	1.593	0.14	0.011
Hymenocephalus italicus	9	4	1				58.33	0.58		1.062	0.679
Lamprogrammus exutus	4	1	1				25	0.556		0.075	1.592
Chaunax pictus	11	2	1				58.33	0.496		0.454	1.035
Aristeus varidens	14						58.33	0.329		0.316	0.672
Parapenaeus longirostris	14	1					62.5	0.301	0.757	0.146	
Malacocephalus occidentalis	15	2					70.83	0.249	0.49	0.178	0.079
Trichiurus lepturus	8		1				37.5	0.202	0.582	0.025	
Yarrella blackfordi	8	1					37.5	0.178		0.067	0.467
Coelorinchus caelorhincus	15	1					66.67	0.178	0.216	0.266	0.052
Helicolenus dactylopterus	3		1				16.67	0.166		0.499	
Etmopterus polli	6	1					29.17	0.156		0.108	0.36
Lophius vaillanti	6	1					29.17	0.152		0.453	0.005
Trachurus trecae			1				4.17	0.148	0.445		
MYCTOPHIDAE	16	1					70.83	0.101	0.246	0.04	0.017
Dibranchus atlanticus	8						33.33	0.096		0.028	0.26
Chaceon maritae	6	1					29.17	0.093	0.167	0.036	0.075
Dentex macrophthalmus	1	1					8.33	0.093	0.278		
Borostomias antarcticus	1	1					8.33	0.088		0.005	0.26
Uranoscopus cadenati	1	1					8.33	0.086	0.257		
Halosaurus ovenii	12						50	0.082		0.096	0.15
Raja miraletus	1	1					8.33	0.07		0.051	0.158
Mystriophis rostellatus	7						29.17	0.068	0.17	0.035	
Dentex angolensis	2	1					12.5	0.068	0.204		
Gadella imberbis	17						70.83	0.067	0.032	0.041	0.129
Bembrops greyi	2	1					12.5	0.067	0.166	0.034	
Nezumia aequalis	8						33.33	0.064	0.134	0.043	0.014
Illex coindetii	8						33.33	0.058	0.121	0.027	0.026
Lophiodes kempi	7						29.17	0.058	0.104	0.067	0.002
Bassanago albescens	8						33.33	0.056	0.019	0.116	0.032
Bathyuroconger vicinus	10						41.67	0.054	0.013	0.108	0.039
Stomias boa boa	7						29.17	0.053			0.159
Scyliorhinus cervigoni		1					4.17	0.047		0.141	
Parapandalus narval		1					4.17	0.046			0.138
Etmopterus sp.	4						16.67	0.042		0.124	0.001
Cynoponticus ferox	2						8.33	0.041	0.124		
JELLYFISH	8						33.33	0.039	0.058	0.022	0.036
Monolene microstoma	5						20.83	0.032	0.094	0.001	
Rajella barnardi	2						8.33	0.031	0.091		0.002
Epigonus telescopus	5						20.83	0.029		0.079	0.009
Neoharriotta pinnata	3						12.5	0.026		0.018	0.06
Parasudis fraserbrunneri	1						4.17	0.025	0.075		
Parapenaeus longirostris,f **	2						8.33	0.025	0.068	0.006	
Centrophorus granulosus	1						4.17	0.024		0.073	
Aristeus varidens, female ***	2						8.33	0.023		0.011	0.059
Bathynectes piperitus	8						33.33	0.019	0.005	0.042	0.011
Plesiopenaeus edwardsianus	5						20.83	0.017		0.015	0.036
Parapenaeus longirostris, m **	2						8.33	0.016	0.048	0.001	
Syacium micrurum	4						16.67	0.015	0.044		
Xenodermichthys copei	3						12.5	0.014			0.043
Aristeus varidens, male ***	2						8.33	0.013		0.032	0.007
Lestrolepis intermedia	4						16.67	0.013	0.035	0.003	
OPHIDIIDAE	1						4.17	0.012	0.037		
Benthodesmus tenuis	7						29.17	0.012		0.017	0.019
Dicologoglossa cuneata	2						8.33	0.012	0.035		
Anemones, white	2						8.33	0.011		0.006	0.026
Acanthocarpus brevipinnis	4						16.67	0.01	0.031		
Glyphus marsupialis	6						25	0.009		0.02	0.006
Plesionika heterocarpus	1						4.17	0.005	0.015		
Acanthephyra sp.	2						8.33	0.003		0.003	0.005
Chlorotocus crassicornis	1						4.17	0.003		0.008	
Shrimps, small, non comm.	1						4.17	0.002	0.005		
Small shrimps	2						8.33	0.002			0.005

Parapenaeopsis atlantica	1	4.17	0.001		0.004	
Solenocera africana	4	16.67	0.001		0.004	
Sergestes sp.	1	4.17	0.001			0.003
Other fish			0.117	0.116	0.114	0.122
Sum all species			28.461	42.478	18.533	24.371
Sum SNAPPERS, JOBFISHES						
Sum GROUPERS, SEABASSES						
Sum POD						
Sum CROAKERS, DRUMS, WEAKF., KOBS						
Sum PANDORAS, PORGIES, SEABREAMS,			0.161	0.482		
Sum SHARKS, CHIMAERAS			0.305		0.464	0.45
Sum BATOID FISHES, RAYS			0.107	0.111	0.051	0.159
Sum CEPHALOPODS			0.083	0.171	0.033	0.045
Numbers of stations included in analysis, total and by depth strata			24	8	8	8

ANNEX III Swept area estimates:

Central: Palmerinhas - Benguela. Slope (500-800 m)

	Lower limits, Kg/nm						% inci-	Mean	Mean densities by bottom depth strata t/nm²		
SPECIES NAME	>0	10	30	100	300	1000	dence	dens. t/nm²	500-600m	600-700m	700-800m
Nematocarcinus africanus			9	1			76.92	5.547	8.138	5.821	
Lamprogrammus exutus	2	5	5	1			100	4.159	4.659	1.989	6.051
Stomias boa boa	3	7	1				84.62	1.777	2.476	1.648	0.55
Yarrella blackfordi	5	7	1				100	1.292	0.66	1.625	2.11
Hoplostethus cadenati	7	5					92.31	0.994	0.883	0.785	1.494
Chlorophthalmus atlanticus	9		1				76.92	0.788	1.543	0.231	0.022
Aristeus varidens	10	1					84.62	0.429	0.56	0.386	0.224
Merluccius polli	5	1					46.15	0.292	0.418	0.216	0.141
Coelorinchus caelorhincus	3	1					30.77	0.239		0.123	0.874
Stereomastis sp.	12						92.31	0.231	0.07	0.308	0.45
Chaceon maritae	5						38.46	0.231	0.066	0.219	0.575
Xenodermichthys copei	7	1					61.54	0.17	0.053	0.409	0.086
Bathyuroconger vicinus	6	1					53.85	0.144	0.017	0.017	0.565
Aristeus varidens, female ***	3						23.08	0.121	0.157	0.051	0.143
Chaceon maritae, female ***	1	1					15.38	0.117	0.206	0.071	
Talismania longifilis	5						38.46	0.111		0.102	0.347
Octopoteuthis sicula	1	1					15.38	0.109			0.472
Chaceon maritae, male ***	3						23.08	0.104	0.191	0.052	
Opisthoteuthis agassizi		1					7.69	0.101			0.439
JELLYFISH	4						30.77	0.085		0.135	0.186
Dibranchus atlanticus	8						61.54	0.081	0.053	0.1	0.113
Small shrimps	3						23.08	0.08		0.034	0.3
Gadella imberbis	6						46.15	0.079	0.122	0.026	0.062
Triplophos hemingi	12						92.31	0.078	0.03	0.121	0.119
Borostomias elusens	1						7.69	0.07			0.303
Monomitopus metriostoma	5						38.46	0.05		0.042	0.161
Aristeus varidens, male ***	3						23.08	0.044	0.024	0.004	0.136
Benthodesmus tenuis	5						38.46	0.04	0.048	0.057	
Rostroraja alba	1						7.69	0.036			0.157
Lophiodes kempi	1						7.69	0.033			0.145
Schedophilus cf huttoni	1						7.69	0.033		0.109	
Anemones, white	1						7.69	0.032			0.141
OPISTHOTEUTHIDAE	1						7.69	0.031			0.134
Halosaurus ovenii	7						53.85	0.03	0.021	0.037	0.041
OMMASTREPHIDAE	2						15.38	0.029			0.127
Anemone - purple	1						7.69	0.028			0.123
Bufoceratias wedli	4						30.77	0.027	0.003		0.111
Neolithodes asperrimus	1						7.69	0.027		0.087	
Centrophorus granulosus	1						7.69	0.024	0.052		
Plesiopenaeus edwardsianus	3						23.08	0.023		0.024	0.067
Melanonus zugmayeri	3						23.08	0.021	0.003		0.084
Nezumia aequalis	5						38.46	0.021	0.017	0.013	0.037
Borostomias antarcticus	1						7.69	0.02			0.086
Sudis hyalina	2						15.38	0.019	0.003		0.076
Glyphus marsupialis	5						38.46	0.019	0.004	0.018	0.048
Todarodes sp.	1						7.69	0.018	0.04		
Etmopterus polli	5						38.46	0.018	0.022	0.015	0.016
Dicrolene intronigra	2						15.38	0.018		0.017	0.057
Zameus (Scymnodon) squamulosus	2						15.38	0.018	0.011	0.043	
Rajella barnardi	3						23.08	0.017	0.009	0.032	0.013
Chaunax pictus	5						38.46	0.015	0.032	0.001	
Scopelosaurus meadi	2						15.38	0.015		0.037	0.013
Luciobrotula nolfi	2						15.38	0.015		0.007	0.053
Illex coindetii	2						15.38	0.014		0.044	
MYCTOPHIDAE	6						46.15	0.012	0.004	0.025	0.01
Trachipterus trachypterus	1						7.69	0.011	0.025		
Malacocephalus occidentalis	2						15.38	0.011	0.02	0.004	
Avocettina acuticeps	7						53.85	0.01	0.005	0.017	0.011
S H R I M P S	1						7.69	0.008			0.036
Sergestes sp.	1						7.69	0.005		0.017	
Acanthephyra sp.	2						15.38	0.002	0.001	0.005	
Gnatophausia zoea	1						7.69	0.001			0.005
ARISTEIDAE	1						7.69	0.001		0.003	
Heterocarpus sp.	1						7.69				0.002
Other fish								0.112	0.084	0.084	0.209
Sum all species								18.339	20.729	15.214	17.724
Sum SNAPPERS, JOBFISHES											
Sum GROUPERS, SEABASSES											
Sum POD											
Sum CROAKERS, DRUMS, WEAKF., KOBS											
Sum PANDORAS, PORGIES, SEABREAMS,											
Sum SHARKS, CHIMAERAS								0.071	0.102	0.061	0.022
Sum BATOID FISHES, RAYS								0.053	0.009	0.032	0.169
Sum CEPHALOPODS								0.308	0.04	0.044	1.197
Numbers of stations included in analysis, total and by depth strata								13	6	4	3

ANNEX III Swept area estimates:
South: Tombua - Cunene. Shelf (20-200 m)

	Lower limits, Kg/nm						% inci-	Mean	Mean densities by bottom depth strata t/nm²		
							dence	dens.			
SPECIES NAME	>0	10	30	100	300	1000		t/nm²	0-50m	50-100m	100-200m
Trachurus trecae	5	1	2	4	6		90	22.636	21.49	27.874	15.861
JELLYFISH	4				1	1	30	8.146	23.12	0.137	
Pomatomus saltatrix	4	1	2	1	1		45	5.375	14.99	0.195	0.195
Dentex macrophthalmus	4		3	2	1		50	4.543		6.934	7.077
Synagrops microlepis	1	2			1		20	3.374		0.257	13.085
Engraulis encrasicolus	2			2			20	1.994	5.698		
Pagellus bellottii	10	2	1	1			70	1.892	4.478	0.784	0.046
Mustelus mustelus	6	1		2			45	1.718	2.993	1.678	
Arius parkii					1		5	1.564	4.469		
Argyrosomus inodorus	3	1	1	1			30	1.497	3.915	0.318	
Merluccius capensis	4	1	1	1			35	1.314		0.311	4.757
Lithognathus mormyrus		1		1			10	0.947	2.706		
Callorhinchus capensis	1	1		1			15	0.776	0.141	1.816	
Chelidonichthys capensis	8	2	2				60	0.717	0.085	1.502	0.348
Helicolenus dactylopterus				1			5	0.668			2.672
Dasyatis marmorata	4	1	2				35	0.58	0.931	0.635	
Atractoscion aequidens	3	2	2				35	0.516	0.522	0.832	
Sepia officinalis	6	3	1				50	0.484	0.752	0.552	
Sepia orbignyana	2		1				15	0.463		1.037	0.193
Dicologoglossa cuneata	14	3					85	0.412	0.176	0.4	0.764
Chlorophthalmus atlanticus	1		1				10	0.41			1.639
Raja miraletus	5	4					45	0.371	0.289	0.674	
Loligo vulgaris	9	2					55	0.335	0.45	0.359	0.136
Selene dorsalis	3		1				20	0.312	0.891		
Squalus megalops	4	1	1				30	0.301		0.676	0.121
Pterothrissus belloci	2	2					20	0.281		0.315	0.623
Umbrina canariensis	6		1				35	0.273	0.524	0.168	0.087
Sea cucumber - purple			1				5	0.204	0.582		
Starfish	7	1					40	0.188	0.416	0.081	0.041
Sardinella aurita	6	1					35	0.169	0.464	0.017	
Munida sp.			1				5	0.155			0.622
Zeus faber	7	1					40	0.138		0.158	0.299
Spondyliosoma cantharus	5	1					30	0.124	0.058	0.26	
Myliobatis aquila	6						30	0.122	0.192	0.136	
Octopus vulgaris	4	1					25	0.121		0.004	0.478
Illex coindetii	5	1					30	0.115		0.066	0.353
Pseudupeneus prayensis	1	1					10	0.11	0.315		
Dentex barnardi	4	1					25	0.11	0.067	0.216	
Sarda sarda	2	1					15	0.097	0.278		
Trachurus capensis	1	1					10	0.087			0.347
Sphyrna zygaena	3	1					20	0.086	0.222	0.02	
Trichiurus lepturus	5						25	0.083	0.045	0.13	0.063
Citharus linguatula	5	1					30	0.075		0.165	0.036
Raja straeleni		1					5	0.072		0.181	
Galeichthys feliceps	3						15	0.068		0.133	0.058
Maja squinado	2	1					15	0.065	0.183	0.002	
Trigla lyra	7						35	0.056		0.031	0.174
Scorpaena elongata	1	1					10	0.054			0.218
Sardinella maderensis	3						15	0.052	0.144	0.004	
G A S T R O P O D S	9						45	0.05		0.072	0.085
Bathynectes piperitus	1						5	0.047			0.189
Argyrosomus sp.	1						5	0.04	0.113		
B I V A L V E S	2						10	0.036		0.091	
Pomadasys incisus	2						10	0.036	0.1	0.002	
Lepidotrigla cadmani	4						20	0.036		0.084	0.008
Rhinobatos blochii	4						20	0.035	0.084	0.013	
Parapenaeus longirostris	1						5	0.033			0.13
GOBIIDAE	6						30	0.032		0.01	0.11
Batrachoides liberiensis	2						10	0.028			0.113
Zenopsis conchifer	2						10	0.028			0.111
Sea cucumber	2						10	0.027	0.077		
Calappa pelii	2						10	0.026		0.066	
Chelidonichthys gabonensis	1						5	0.021		0.054	
Dentex gibbosus	1						5	0.02		0.049	
Scorpaena normani	2						10	0.019		0.016	0.049
Lagocephalus laevigatus	4						20	0.019	0.039	0.013	
Scorpaena scrofa	1						5	0.018		0.044	
Squilla mantis	2						10	0.017			0.069
Nematopalaemon hastatus	1						5	0.017	0.049		
Scomber japonicus	4						20	0.016	0.002	0.027	0.019
Stromateus fiatola	1						5	0.016	0.047		
Sea urchin, weak spines	1						5	0.013		0.032	
Echelus myrus	1						5	0.012			0.05
Fistularia petimba	3						15	0.011	0.028	0.002	
Caranx rhonchus	1						5	0.01	0.03		

Arnoglossus imperialis	3	15	0.01		0.025		
Sepia bertheloti	1	5	0.01		0.025		
Penaeus notialis	1	5					
Penaeus kerathurus	1	5					
Other fish			0.094	0.034	0.063	0.229	0
Sum all species			65.027	92.19	49.744	51.456	0
Sum SNAPPERS, JOBFISHES							
Sum GROUPERS, SEABASSES							
Sum POD							
Sum CROAKERS, DRUMS, WEAKF., KOBS			2.325	5.074	1.318	0.087	
Sum PANDORAS, PORGIES, SEABREAMS,			7.636	7.309	8.242	7.123	
Sum SHARKS, CHIMAERAS			2.881	3.356	4.189	0.121	
Sum BATOID FISHES, RAYS			1.182	1.504	1.64		
Sum CEPHALOPODS			1.529	1.202	2.043	1.164	
Numbers of stations included in analysis, total and by depth strata			20	7	8	5	0

ANNEX III Swept area estimates:_

South: Tombua - Cunene. Slope (200-800 m)

	Lower limits, Kg/nm						% inci-	Mean	Mean densities by bottom depth strata t/nm²			
							dence	dens.				
SPECIES NAME	>0	10	30	100	300	1000		t/nm²	201-300m	300-400m	400-500m	500-900m
Pontinus accraensis		1		1	1		60	12.652		8.091	45.784	0.647
Trachyrincus scabrus				2			40	4.518				11.296
Merluccius paradoxus	1		2	1			80	4.497		0.085	5.716	8.299
Hoplostethus cadenati	2	1		1			80	3.052		0.117	0.308	7.359
Nezumia aequalis	1		2				60	2.285		0.341		5.372
Laemonema laureysi	1	1	1				60	1.993		4.931	0.103	
Chlorophthalmus atlanticus	1		2				60	1.901		4.374	0.757	
Helicolenus dactylopterus			1				20	1.493		3.732		
Chaceon maritae, female ***	2		1				60	0.919			0.216	2.19
Galeus polli	1		1				40	0.862		2.154		
Aristeus varidens, female ***	2	1					60	0.754		1.397		0.487
Lophius vomerinus			1				20	0.685		1.712		
Alepocephalus rostratus		2					40	0.654				1.635
Anemone - purple		1					20	0.533				1.332
**		1					20	0.456				1.139
Yarrella blackfordi	1	1					40	0.448				1.12
Coelorinchus caelorhincus	1	1					40	0.394		0.986		
Bathynectes piperitus	2	1					60	0.374		0.895	0.081	
Lophiodes kempi		1					20	0.357				0.893
Chaceon maritae, male ***	2						40	0.339			0.969	0.363
Rajella barnardi	2						40	0.295		0.327		0.411
Todarodes sagittatus	2						40	0.267				0.666
Triplophos hemingi	4						80	0.238		0.174		0.421
Merluccius polli		1					20	0.236		0.589		
Nezumia milleri		1					20	0.233		0.581		
Ebinania costaecanariae		1					20	0.221				0.551
SALPS		1					20	0.21		0.526		
Malacocephalus occidentalis	1						20	0.198		0.495		
Zenopsis conchifer	1						20	0.191		0.476		
Anemones, white	1						20	0.17				0.426
Benthodesmus tenuis	2						40	0.156		0.303		0.087
Sea anemone sp	1						20	0.154				0.384
Zameus (Scymnodon) squamulosus	2						40	0.153				0.384
Etmopterus pusillus	1						20	0.153		0.384		
Heterocarpus grimaldii	1						20	0.145				0.362
Bathyuroconger vicinus	2						40	0.142				0.355
Sea cucumber (bread like)	1						20	0.126				0.316
Chaceon maritae	1						20	0.118		0.295		
Lithodes ferox	2						40	0.115			0.103	0.236
Selachophidium guentheri	1						20	0.084				0.211
Lamprogrammus exutus	2						40	0.064				0.16
Epigonus telescopus**	1						20	0.062			0.308	
Aristeus varidens, male ***	2						40	0.051		0.109		0.019
Malacocephalus laevis	1						20	0.05		0.125		
Centrophorus squamosus	1						20	0.047		0.117		
HISTIOTEUTHIDAE	2						40	0.043		0.006		0.103
Lepidopus caudatus	1						20	0.026		0.066		
Octopus sp.	1						20	0.025		0.062		
SPONDYLIDAE	1						20	0.023		0.058		
Plesionika heterocarpus	1						20	0.02		0.051		
Nemichthys scolopaceus	1						20	0.016		0.04		
Peristedion cataphractum	1						20	0.016		0.04		
Stomias boa boa	2						40	0.015		0.004		0.032
Notacanthus sexspinis	1						20	0.013				0.032
Halosaurus ovenii	1						20	0.012				0.031
Dicologoglossa cuneata	2						40	0.011		0.028		
Talismania longifilis	1						20	0.011				0.027
Aristeus varidens	1						20	0.009		0.022		
Small shrimps	1						20	0.008		0.02		
Plesiopenaeus edwardsianus	1						20	0.006				0.015
Other fish								0.038	0	0.075	0	0.019
Sum all species								43.337	0	33.789	54.345	47.38
Sum SNAPPERS, JOBFISHES												
Sum GROUPERS, SEABASSES												
Sum POD												
Sum CROAKERS, DRUMS, WEAKF., KOBS												
Sum PANDORAS, PORGIES, SEABREAMS,												
Sum SHARKS, CHIMAERAS								1.223		2.655		0.403
Sum BATOID FISHES, RAYS								0.295		0.327		0.411
Sum CEPHALOPODS								0.335		0.068		0.769
Numbers of stations included in analysis, total and by depth strata								8	5	0	2	1

ANNEX IV Equations

Biomass estimates

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

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

where

L is the number of strata,

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

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

$y_{i,k}$ is the density [tonnes/NM^2] by the k^{th} tow in stratum i

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

The total biomass in the area is calculated by

$$B = \bar{y}_{st} \cdot total\ area \tag{2}$$

The estimated variance of the biomass (var(biomass)) was calculated by:

$$\text{var}(biomass) = \left(\sum \frac{W_i^2 s_i^2}{n_i} \right) A^2 \tag{3}$$

where

$s_i^2 = \dfrac{\sum_{k=1}^{n_i} (y_{i,k} - \bar{y}_i)^2}{n_i - 1}$, and A is total area

The standard error (SE) of the stra tified mean was calculated as (Cochran 1977):

$$SE = \sqrt{\text{var}(biomass)} \tag{4}$$

The precision for the estimates (CV) was calculated by (Zar 1999[1]):

$$CV = \frac{SE}{biomass} \tag{5}$$

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 is in the interval (see Cochran[2], 1977)

$$biomass \pm t_{(n-1)} SE \tag{6}$$

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

[1] Zar JH, 1999, Biostatistical analysis. Prentice Hall, New Jersey, 4. ed., 663 pp.
[2] Cochran, W.G.1977. Sampling Techniques, 3rd ed. John Wiley and Sons, N.Y. 228 pp.

ANNEX V Species codes

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

MAIN GROUP	Demersal	Pelagic	Shrimp	Cephalopod	Sharks
	SPA0000 POD0000 SCI0000 ARD0000 SER0000 LUT0000 OPDAA00 MERME00	ENG0000 CLU0000 CAR0000 SCM0000 SPH0000 TRI0000 STR0000	SHR0000	SQU0000	SHA0000

PELAGIC	Clupeoids	Carangids	Scombrids	Hairtails	Barracudas
	ENG0000 CLU0000 DUS0000	CAR0000	SCM0000	TRI0000	SPH0000

DEMERSAL	Seabream	Snappers	Groupers	Grunts	Croakers
	SPADE00 SPADI00 SPALI00 SPAPA00 SPAPR00 SPASA00 SPASP00	LUT0000	SER0000	HAE0000 (all species) HAEP000 (commercial species)	SCI0000

DEEP-WATER	Seabream	Hake	*P.longirostris*	*A.varidens*	*N.africanus*
	SPADE00 SPADI00 SPALI00 SPAPA00 SPAPR00 SPASA00 SPASP00	MERME03 MERME04	SHRPE31 (SHRPEP1) (SHRPEP2)	SHRAR22 (SHRARA1) (SHRARA2)	SHRNE21

ANNEX VI Catch rates

Families included under each group:
Demersal: Sciaenidae, Sparidae, Pomadasyidae, Ariidae, Serranidae, Lutjanidae, Merlucciidae, Ophidiidae, Lethrinidae.
Pelagic: Scombridae, Sphyrnidae, Trichiuridae, Clupeidae, Engraulidae, Carangidae.
Cephalopods: squids and octopuses.

Angola north: catch rates (kg/hour) by **main groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 21								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
113	33	0.1	25.2	58.1	0	1.1	15.5	1776.7
121	32.5	1.7	10.6	55.1	0	0	32.5	15.1
122	45	0	29.2	47.7	0	0.1	23	181.8
132	52.5	1.4	14.4	0	0	0	84.3	40.6
141	69.5	0.4	12.1	82.5	0	0	5.1	421.1
142	46	0.2	33.1	20.6	0	0	46.1	39.1
143	23.5	0	21.9	33	0	0	45.1	69.1
159	61.5	0.5	78.8	7.5	0	0	13.2	215.1
160	40.5	0.3	86.5	4.9	0	0	8.3	132
161	27.5	0	42.2	1.3	0	0	56.5	127.1
162	23.5	0	33.4	17.2	0	0.1	49.3	674.6
163	32.5	0	38.8	57.3	0	0	3.9	1511.1
174	57.5	0	33.6	40.7	0	0	25.7	503.1
175	40.5	0	76.7	12.3	0	0.3	10.7	2605.4
176	24.5	0	13.5	54.9	0	0.1	31.6	2832.5
177	28	0	30.7	5.1	0	1	63.2	430
178	43	0	34.3	8.5	0	1.1	56.1	315.7
186	64.5	1.3	62.4	11.8	0	0	24.4	326.9
187	29.5	0	19.3	24.5	0	3.4	52.8	313.5
188	47	1.1	49.9	15.1	0	0.1	33.9	190.5
189	63.5	2.9	14.1	75.4	0	0	7.6	615.1
Mean	42.2	1.5	236.7	249.9	0	2.3	144.6	635.1
Std dev	14.7	3.9	431.8	414.3	0	5	200	827.4
% Catch		0.2	37.3	39.3	0.0	0.4	22.8	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main groups** caught in valid swept area bottom trawl hauls.

Outer shelf (71-200 m).

Number of stations: 30								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
112	163	0.9	12.5	11.6	0	0.8	74.2	1397.3
114	75.5	2.7	73.5	16.6	0	0	7.2	648.4
115	143.5	0.9	6.3	73.6	0	0	19.1	919.7
123	73.5	0.8	50.7	39.8	0	0	8.7	152.9
124	92	0	15.7	81.6	0	0	2.7	408.7
125	109.5	0.1	23.6	72.2	0	0	4	368.7
126	118.5	1.8	72.4	13.9	0	0	11.8	109
130	114	1.3	7.5	82.3	0	0	8.9	147.3
131	94.5	6.3	60	27.3	0	0.1	6.3	370.2
138	144.5	1.3	24.5	28.2	0	0.6	45.3	104.2
139	116	0.4	43.8	47	0	0	8.8	231.1
140	89	0	56.4	2.6	0	0	41	66.7
148	149.5	0.5	52.7	4.7	0	0	42.1	138.3
149	117.5	0.6	4.5	82.4	0	0	12.5	220.5
150	86	1.2	16.7	69.9	2	0	10.3	293
151	119	1.6	17.4	73	0	0	8.1	293.2
157	115	0	57	19.6	0	0.1	23.2	220.4
158	85.5	1.2	88.1	3.9	0	0	6.9	747.2
164	72	0	18	22.7	0	0	59.3	200.1
165	87.5	0.3	14.5	57.6	0	0	27.6	430.1
170	196	0.6	10.6	1.1	0	2.9	84.9	939.6
171	109	0.5	58.9	6.7	0	0	33.9	343.7
172	87	2.5	65.6	0.7	0	0	31.3	288.6
173	71	0.8	49.9	1.2	0	0	48.2	92.1
183	170.5	0.2	1.4	0	0	0.1	98.4	2701.7
184	115.5	0.3	61.2	31.8	0	0	6.6	396.2
185	94	15.2	40.2	7.7	0	0	36.9	42.9
190	85.5	0.6	64.7	20.3	0	0.1	14.2	350.1
194	121.5	0.4	67	10.9	0	0	21.7	228.4
195	163.5	0.2	36.9	0	0	1.3	61.5	185.1
Mean	112.6	4.1	125.4	107.3	0.2	1.5	196.1	434.5
Std dev	32.4	5.5	140	141.9	1.1	5.2	516.6	523.6
% Catch		0.9	28.9	24.7	0.0	0.3	45.1	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main groups** caught in valid swept area bottom trawl hauls.

Slope (201-800 m).

Number of stations: 37								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
108	522.5	0	3	1.7	0.1	65.1	30.1	686.3
109	486.5	0	6.9	0.9	2.4	49.4	40.5	341.8
110	366.5	0	11.6	0.2	0.7	41.1	46.5	374.7
111	265.5	1.2	19	1.2	0	2.4	76.2	1035.1
116	204	0.1	14	2.9	0	0.1	82.8	816.7
117	346	0	47.5	1.2	0	24	27.3	303.1
118	418.5	0.2	41.5	0.1	0.8	25.6	31.8	1177.4
119	529	0	28.8	0	0	57.1	14.1	863
120	707.5	1	4.8	0	0	55.4	38.8	541.1
127	352	0	5.3	0	0	4.4	90.3	406.8
128	755	0.5	1.7	0.4	6.1	0.9	90.6	418.3
129	224.5	2	31.1	4.2	0	1	61.7	203.6
133	317.5	0	2.8	0.1	0	4.6	92.6	221
134	642	0.6	24.1	0.2	0.8	14.2	60.2	480
135	711	0.8	26.1	0	0	1.2	71.9	438.4
136	508.5	0.4	50.8	1.5	10	11	26.3	209
137	267.5	0.4	8.7	0	0	5.7	85.2	708.3
144	767	0.7	0.9	0	0.9	2.8	94.6	366.2
145	618	3.9	12.2	0	1	13.9	69	302.9
146	489.5	2.5	20.1	7.4	1	13.6	55.4	143.4
147	254.5	0.4	20.6	0.3	0	6.3	72.4	572.8
152	224	1.4	24.8	2.9	0.6	1.4	69	306.7
153	307.5	0.5	2.8	0.3	0	1.8	94.6	2311.9
154	427	0.1	36.8	3.9	0.3	15.2	43.7	234.4
155	511.5	1.2	19.9	1.8	7.9	23.4	45.9	107.1
156	694	1.8	22.5	0.5	0.2	3.7	71.4	765.3
166	282.5	0	9.4	2.2	0	1.8	86.6	316.8
167	361.5	0.2	8.7	0.6	0	32.7	57.8	577.2
168	537	4.2	11.9	0.3	0.1	50.5	32.9	787.3
169	620	0	20.4	0.4	0	49	30.2	491.6
179	311.5	0	15.1	1.6	0	1.8	81.6	715.6
180	420.5	0	23.2	26	0.1	36.3	14.3	911.3
181	613.5	0	19.2	1.8	0	60.5	18.5	428.1
182	710.5	5.9	12.9	0.7	0	31.2	49.4	550.7
191	308.5	0	5.2	0.2	0	0.8	93.8	776.4
192	453.5	0.3	4.2	1.1	0.1	62.8	31.5	654.3
196	228	0.9	11.8	0.9	0	0.1	86.3	4331.4
Mean	453.1	5.3	101	11.7	2.6	119.1	432.7	672.3
Std dev	172	9.6	113.6	38.8	5.6	149	668.2	731
% Catch		0.8	15.0	1.7	0.4	17.7	64.4	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main demersal** groups caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 21									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
113	33	1.5	0	0	0	3.4	0	95	1776.7
121	32.5	0	0	0	0	3.9	0	96.1	15.1
122	45	8.2	0.4	2.1	0	16	0	73.2	181.8
132	52.5	0	0	0	0	14.4	0	85.6	40.6
141	69.5	3.5	3.7	0	0	4.8	0	87.9	421.1
142	46	0	0	13.8	0	19.3	0	66.9	39.1
143	23.5	0	0	0	0	4.9	0	95.1	69.1
159	61.5	0	0	0	0	78.1	0	21.9	215.1
160	40.5	0	0	0	0	86.5	0	13.5	132
161	27.5	0	14.1	6.4	0	21.7	0	57.8	127.1
162	23.5	3.2	0	4	0	0	0	92.8	674.6
163	32.5	0	0	0	0	2.4	0	97.6	1511.1
174	57.5	0	0	24.6	0	8.9	0	66.4	503.1
175	40.5	0	0	1.7	0	0.2	0	98.1	2605.4
176	24.5	0	0	0	0	0.8	0	99.2	2832.5
177	28	22.4	0	7.2	0	0	0	70.4	430
178	43	5.6	0	2.8	0	5.6	0	86	315.7
186	64.5	1.4	5.9	13.9	0	23.1	0	55.7	326.9
187	29.5	11.8	0	0.8	0	0	0	87.4	313.5
188	47	0	0.4	19	0	26.5	0	54.1	190.5
189	63.5	0	1	0.5	0	5.4	0	93.2	615.1
Mean	42.2	11.1	2.9	16.2	0	34.4	0	570.5	635.1
Std dev	14.7	22.4	6.3	29.2	0	42.3	0	834	827.4
% Catch		1.7	0.5	2.6	0.0	5.4	0.0	89.8	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main demersal** groups caught in valid swept area bottom trawl hauls.

B. Outer shelf (71-200 m).

Number of stations: 30									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
112	163	0.8	0	0	1.5	6.3	0	91.4	1397.3
114	75.5	1.1	0	6.6	0	30.8	0	61.6	648.4
115	143.5	0.8	0	0	0	4	0	95.1	919.7
123	73.5	8.7	0	0	0	32.1	0	59.2	152.9
124	92	1.2	0	0	0	7.4	0	91.4	408.7
125	109.5	1.6	0	0	0	8.2	0	90.2	368.7
126	118.5	0	0	0	0	61.2	0	38.8	109
130	114	0	0	0	0	6.5	0	93.5	147.3
131	94.5	0	0	0	0	1.5	0	98.5	370.2
138	144.5	0	0	0	0	16.4	0	83.6	104.2
139	116	0.4	0	0	0	43.4	0	56.2	231.1
140	89	0	4.9	0	0	51.5	0	43.6	66.7
148	149.5	0	0	0	0	51.6	0	48.4	138.3
149	117.5	0	0	0	0	4.1	0	95.9	220.5
150	86	0	0	0.2	0	15.9	0	83.9	293
151	119	7.9	0	0	0	2.9	0	89.1	293.2
157	115	5.9	0.3	0	0	40.3	0	53.6	220.4
158	85.5	0	0	0	0	77.9	0	22.1	747.2
164	72	0	0.8	7	0	10.2	0	82	200.1
165	87.5	0	0	5.9	0	8.5	0	85.7	430.1
170	196	0	0	0	3.1	0.5	0	96.4	939.6
171	109	0.3	0.5	0	0	12.8	0	86.5	343.7
172	87	0	0.2	0	0	54.3	0	45.5	288.6
173	71	0	2.1	0	0	47.6	0	50.3	92.1
183	170.5	0.1	0	0	0	0.4	0	99.5	2701.7
184	115.5	3.5	0.2	0	0	13	0	83.3	396.2
185	94	0	0	0	0	40.2	0	59.8	42.9
190	85.5	1.6	0.2	0	0	8.7	0	89.5	350.1
194	121.5	0.3	0.1	0	0	66.5	0	33.1	228.4
195	163.5	0	0	0	0	20.7	0	79.3	185.1
Mean	112.6	3.7	0.4	2.8	1.7	69.3	0	356.7	434.5
Std dev	32.4	5.9	0.8	9.1	6.5	107.9	0	523.6	523.6
% Catch		0.9	0.1	0.6	0.4	15.9	0.0	82.1	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main pelagic groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 21								
Station	Gear depth	Barracuda	Carangids	Clupeoids	Hairtails	Scombrids	Other	Total
113	33	3.6	52.5	1.9	0.1	0	41.9	1776.7
121	32.5	0	55.1	0	0	0	44.9	15.1
122	45	0.5	25.9	0	0.4	0	73.1	181.8
132	52.5	0	0	0	0	0	100	40.6
141	69.5	0	82.5	0	0	0	17.5	421.1
142	46	0	20.6	0	0	0	79.4	39.1
143	23.5	0	33	0	0	0	67	69.1
159	61.5	2.6	4.2	0	0.7	0	92.5	215.1
160	40.5	3.4	1.4	0	0	0	95.1	132
161	27.5	0	0	0	0	1.3	98.7	127.1
162	23.5	12.4	4.7	0.1	0	0	82.8	674.6
163	32.5	6.4	50.7	0.2	0	0	42.7	1511.1
174	57.5	0.9	25.9	0.5	0	0	72.8	503.1
175	40.5	2	8.6	0	0	0.1	89.3	2605.4
176	24.5	0.5	53.7	0.8	0	0	45.1	2832.5
177	28	3.6	1.5	0	0	0	94.9	430
178	43	1.2	0.8	0.5	0.2	0	97.3	315.7
186	64.5	3.1	8.7	0	0	0	88.2	326.9
187	29.5	5.6	12.6	0.2	6.2	0	75.5	313.5
188	47	1.4	13.6	0.1	0	0	84.9	190.5
189	63.5	1.8	61	0	5.7	0	31.5	615.1
Mean	42.2	18.3	215.6	3	2.8	0.3	395.1	635.1
Std dev	14.7	29.1	395.6	8.5	8.5	0.9	536.2	827.4
% Catch		2.9	33.9	0.5	0.4	0.0	62.2	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main pelagic groups** caught in valid swept area bottom trawl hauls.

Outer shelf (71-200 m).

Number of stations: 30								
Station	Gear depth	Barracuda	Carangids	Clupeoids	Hairtails	Scombrids	Other	Total
112	163	0	1.2	0	6.4	0	92.4	1397.3
114	75.5	5.9	9.4	0.3	0	0	84.3	648.4
115	143.5	0	1.8	0	71.8	0	26.4	919.7
123	73.5	0	39.2	0.6	0.1	0	60.2	152.9
124	92	0	72	0.8	8.8	0	18.4	408.7
125	109.5	0	71.2	0	1	0	27.8	368.7
126	118.5	0	13.5	0	0.4	0	86.1	109
130	114	0	75.7	0	6.6	0	17.7	147.3
131	94.5	0	17.9	0	9.5	0	72.7	370.2
138	144.5	0	28.2	0	0	0	71.8	104.2
139	116	0	46	0	1	0	53	231.1
140	89	0	0	0	2.6	0	97.4	66.7
148	149.5	0	4.7	0	0	0	95.3	138.3
149	117.5	0	81.3	0	1.1	0	17.6	220.5
150	86	0	69.9	0	0	0	30.1	293
151	119	0	71.3	0	1.7	0	27	293.2
157	115	0	19.5	0	0.1	0	80.4	220.4
158	85.5	2.6	0	0	1.2	0	96.1	747.2
164	72	17.2	4.4	0	1.1	0	77.3	200.1
165	87.5	0.7	51.9	0.3	4.7	0	42.4	430.1
170	196	0	0	0	1.1	0	98.9	939.6
171	109	0	1.8	1.8	3.1	0	93.3	343.7
172	87	0	0	0	0.7	0	99.3	288.6
173	71	0	0.1	0	0	1.1	98.8	92.1
183	170.5	0	0	0	0	0	100	2701.7
184	115.5	0	15.3	0	16.5	0	68.2	396.2
185	94	0	7.7	0	0	0	92.3	42.9
190	85.5	0	8.7	0	11.6	0	79.7	350.1
194	121.5	0	10.7	0	0	0.3	89.1	228.4
195	163.5	0	0	0	0	0	100	185.1
Mean	112.6	3.2	68	0.5	33.5	0.1	329.3	434.5
Std dev	32.4	9.7	88.8	1.3	120.3	0.2	529.4	523.6
% Catch		0.7	15.7	0.1	7.7	0.0	75.8	100.0

ANNEX VI Catch rates

Angola north: catch rates (kg/hour) by **main deep-water groups** caught in valid swept area bottom trawl hauls.

Slope (200-800 m).

Number of stations: 37								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirostris	Seabream	Other	Total
108	522.5	2.3	0.5	62.5	0	0	34.7	686.3
109	486.5	11.3	2.3	37.4	0	0	49	341.8
110	366.5	0.7	11.5	36.1	4.2	0	47.6	374.7
111	265.5	0	7	0	2.4	0	90.6	1035.1
116	204	0	7.3	0	0.1	4.7	87.8	816.7
117	346	0.1	47.5	18.1	5.9	0	28.5	303.1
118	418.5	0.1	41.5	25.2	0	0	33.2	1177.4
119	529	2	0.1	55.1	0	0	42.8	863
120	707.5	1.1	0	53.9	0	0	45	541.1
127	352	0	5.3	0	3.8	0	90.9	406.8
128	755	0.5	0.6	0	0	0	98.9	418.3
129	224.5	0	0	0	1	14.1	84.9	203.6
133	317.5	0	2.8	0	4.6	0	92.6	221
134	642	1.8	1.1	12.4	0	0	84.8	480
135	711	0.5	2.2	0	0	0	97.3	438.4
136	508.5	5.2	0	5.1	0	0	89.7	209
137	267.5	0	6.5	0	5.7	0.6	87.2	708.3
144	767	0.5	0	0	0	0	99.5	366.2
145	618	1.8	0.9	12.1	0	0	85.2	302.9
146	489.5	6.8	16.2	6.6	0	0	70.4	143.4
147	254.5	0	5.4	0	6.3	7	81.4	572.8
152	224	0	0.1	0	1.4	12.8	85.7	306.7
153	307.5	0	2	0	1.6	0	96.3	2311.9
154	427	2.5	36.8	12.3	0	0	48.4	234.4
155	511.5	6.3	10.9	14.5	0	0	68.4	107.1
156	694	3.5	0	0	0	0	96.5	765.3
166	282.5	0.1	5.6	0	1.6	0	92.8	316.8
167	361.5	0.5	8.7	31.8	0.4	0	58.6	577.2
168	537	0.5	0	49.7	0	0	49.8	787.3
169	620	0.9	0	47.3	0	0	51.8	491.6
179	311.5	0	15.1	0	1.6	0	83.3	715.6
180	420.5	0.9	23.2	35.5	0	0	40.4	911.3
181	613.5	0.1	0	60.3	0	0	39.6	428.1
182	710.5	0.5	0	30.5	0	0	69	550.7
191	308.5	0	5.2	0	0.7	0	94.1	776.4
192	453.5	1.1	4.2	61.6	0	0	33	654.3
196	228	0	6.4	0	0.1	0.8	92.7	4331.4
Mean	453.1	5.2	49.9	106.3	6.3	5	499.7	672.3
Std dev	172	8.1	95.7	150.2	11.3	12.7	698.7	731
% Catch		0.8	7.2	15.3	0.9	0.7	71.8	96.6

ANNEX VI Catch rates

Angola central: Catch rates (kg/hour) by **main groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m)

Number of stations: 20								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
33	55.5	0.1	69.8	8.1	0	0.2	21.7	1424.3
35	28.5	1.2	44.8	14.4	0	0.6	38.9	654.6
36	56	0.5	50.9	21.2	0	0	27.4	857.2
49	63.5	0.9	21.3	44.4	0	0	33.4	494.3
50	32	0	21.1	30.5	0	0	48.4	549.8
51	43	1.1	5.7	26	0	0	67.3	217
52	62.5	2.4	75.1	7.8	0	0	14.7	1346.9
63	62	4.9	30	14.4	0	0	50.7	469.2
64	22	1.3	14.9	6.2	0	0	77.6	157.2
65	35.5	0.9	52.8	26.6	0	1.9	17.7	421.7
66	59	0.5	47	28.2	0	0.1	24.1	1072.1
76	46.5	0.2	42.2	24	0	0.1	33.6	787
77	28	0	37.6	35.3	0	0	27	710.5
86	48	0	71.2	11.4	0	0	17.4	390.3
87	22.5	0	23.9	24.5	0.3	0	51.3	910.3
88	35	0	70.8	8.4	0.1	0	20.7	4104.8
98	31	0	43.9	31.6	0	0	24.5	375.1
99	30.5	0	25.1	43.2	0	0	31.7	305.6
100	53.5	0.8	15.2	44	0	0	40	129.1
107	22	0.6	0.5	51.7	0	0	47.2	63.5
Mean	41.8	4.5	406.1	141.1	0.4	0.9	219	772
Std dev	14.8	8.3	653.7	91.8	1.2	2	182.6	872.4
% Catch		0.6	52.6	18.3	0.1	0.1	28.4	100.0

ANNEX VI Catch rates

Angola central: Catch rates (kg/hour) by **main groups** .

Outer shelf (71-200 m).

Number of stations: 21								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
30	109	0.4	53	12.9	0	0	33.8	779.1
31	96.5	0.8	27.6	55.7	0	0	15.9	675.6
34	74.5	0.4	48.4	36	0	0	15.2	637.8
37	72.5	4.1	44.9	12.2	0	0	38.7	365.5
38	103.5	2	44.8	1.2	0	0	52	74.2
48	161.5	0.7	5.6	2.8	0	0	91	3369.1
53	104	5.6	17.7	5.5	0	1.1	70.1	327.7
62	155	0.8	13.6	1.5	0	0.6	83.5	1574.3
67	115.5	0.4	40.4	3.1	0	0	56.1	413.4
74	155.5	0.7	9.3	5.3	0	0.3	84.3	2024.9
75	89	0.7	61	6.4	0	0	31.9	687.3
78	95	2.3	14.3	14.9	0	0	68.5	294.6
79	132.5	1.7	11.7	22.2	0	0.1	64.2	785.4
84	169.5	0	3.6	0.3	0	0.9	95.1	1331.2
85	89	0.6	23.5	60.9	0	0	14.9	946.9
89	86	7.1	26.4	32.3	0	0	34.3	401
90	106	7.2	33.3	0	0	0	59.4	326.1
96	108.5	0.7	17.3	45.7	0	0	36.3	442.9
97	92	0.3	27	10.9	0	0	61.8	437.4
105	116	5.3	34	0.1	0	0	60.6	40.2
106	78.5	0.3	18.9	71.7	0	0	9.2	127.5
Mean	110	8.9	152	110.7	0	1.5	491.8	764.9
Std dev	29	8.7	116.7	142.5	0	3.5	751.6	776.2
% Catch		1.2	19.9	14.5	0.0	0.2	64.3	100.0

ANNEX VI Catch rates

Angola central: Catch rates (kg/hour) by **main groups** .

Slope (201-800 m).

Number of stations: 37								
Station	Gear depth	Cephalopoda	Demersal	Pelagic	Sharks	Shrimps	Other	Total
32	709.5	5.1	8.6	0	0.1	7.9	78.4	359.6
39	268	0.2	20.9	0	0	1.5	77.3	1829.8
40	353.5	0	77.1	0.7	0.9	1.8	19.6	709.6
41	438.5	0	36.2	0	7.6	28	28.2	892.5
42	509.5	0	15.4	0.5	1.5	21.9	60.7	886.7
43	618.5	0.6	23.7	1.6	0.4	25.3	48.4	366.3
44	540	0	9	0.6	0.4	51.8	38.1	447.7
45	427	0.9	4.3	0	0.5	68.1	26.2	302.3
46	341	0	60.3	0	8.8	16.6	14.2	406.7
47	258	1.6	20.7	0	0	1.2	76.5	1529.1
54	265	0.7	18.4	0.2	0	1.2	79.5	420.7
55	309	0.5	27.8	0.1	4.1	1.3	66.2	846.8
56	452	0.3	9.2	0.1	0.2	38.9	51.3	1224.5
57	524	0	47.6	0	0	30.1	22.3	695.7
58	519.5	1	25.6	0	0	57.9	15.5	703.8
59	426	0	17.9	0	2.9	62.7	16.6	711.1
60	384	0	23.6	0.1	3.2	50.9	22.2	290.8
61	249	0.2	21.6	2.4	0	3	72.8	1184.1
68	211	0	31.2	14	0	6	48.7	671.5
69	368	0	26.6	0.5	2.3	31.1	39.6	477.4
70	737.5	8.4	48.6	0	0	3.4	39.6	542.7
71	510	0	24.8	0.2	0	50	25	577.6
72	429	0	43.9	0.1	0	32.8	23.2	859.2
73	276.5	0.1	17.4	0.5	0	2.7	79.3	2011.4
80	391.5	0.5	27.2	0	3.7	13.9	54.7	475.1
81	454.5	0.7	16.2	0.4	0.1	50.5	32.2	413.5
82	642.5	0	7.9	0.2	0	62.2	29.7	386.8
83	546	0	15.1	0	0.8	72.5	11.6	337.9
91	317	0	24.6	0	0	2.3	73.1	895.4
92	663.5	0	21.1	0	1.1	43.2	34.6	425.3
93	747.5	6.2	43.2	0	0.2	5.8	44.5	595.9
94	464.5	0.6	18.4	0.9	0.4	40.3	39.4	162.6
95	207	0	8.2	13.3	0	0.9	77.6	861.4
101	209	0.3	8.8	0	0	1.5	89.4	1703.2
102	409.5	0	65.1	0	0.9	7.9	26.1	1085.5
103	648	0.5	8.4	0.0	0.1	39.0	52.0	544.1
104	361	0.3	13.9	0.3	0	1.6	83.9	441.7
Mean	437.4	4.7	186.2	7.5	6.6	137.9	394.3	737.2
Std dev	153.8	10.2	154.1	24.1	13.7	130.7	416.3	446.6
% Catch		0.6	25.3	1.0	0.9	18.7	53.5	100.0

ANNEX VI Catch rates

Angola central: Catch rates (kg/hour) by **main demersal groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 20									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
33	55.5	0.5	1.9	51	0	5.1	0	41.6	1424.3
35	28.5	8.1	0	8.1	0	7.1	0	76.8	654.6
36	56	0	0	11.1	0	18.8	0	70.2	857.2
49	63.5	0.2	0.5	2.5	0	8.5	0	88.3	494.3
50	32	1.6	0	4.8	0	13.4	0	80.2	549.8
51	43	0	0.7	0	0	0.7	0	98.6	217
52	62.5	0	0.2	40.4	0	34.6	0	24.9	1346.9
63	62	0	1.2	0	0	28.8	0	70	469.2
64	22	0	0.1	0.8	0	14.1	0	85.1	157.2
65	35.5	29.5	0	11.7	0	0	0	58.9	421.7
66	59	1.5	0.3	0	0	33.2	0	64.9	1072.1
76	46.5	4.7	0.3	4.6	0	3.3	0	87.2	787
77	28	4.1	0.1	2.5	0	0	0	93.3	710.5
86	48	3.1	0.7	2	0	4.1	0	90.1	390.3
87	22.5	17.3	0	1.2	0	0	0	81.5	910.3
88	35	2.3	0	1.8	0	0	0	96	4104.8
98	31	4.9	0	1.3	0	1.3	0	92.5	375.1
99	30.5	0	0	5	0	20.1	0	74.9	305.6
100	53.5	0	0	1.5	0	13.7	0	84.8	129.1
107	22	0	0	0	0	0.5	0	99.5	63.5
Mean	41.8	27.9	2.4	83.6	0	75.1	0	583	772
Std dev	14.8	45.5	5.9	192.6	0	124.6	0	816.6	872.4
% Catch		3.6	0.3	10.8		9.7	0.0	75.5	100

ANNEX VI Catch rates

Angola central Catch rates (kg/hour) by **main demersal** groups:.

Outer shelf (71-200 m).

Number of stations: 21									
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Seabream	Snappers	Other	Total
30	109	15.1	0	0	0	25.1	0	59.8	779.1
31	96.5	3.7	0	0	0	21.8	0	74.5	675.6
34	74.5	4.9	0.1	26.1	0	10.8	0	58.2	637.8
37	72.5	0	0	7.6	0	37.3	0	55.1	365.5
38	103.5	0	0.4	0	0	20.4	0	79.1	74.2
48	161.5	0	0	0	0	3.9	0	96.1	3369.1
53	104	0	0	0.3	0	4	0	95.7	327.7
62	155	1.8	0	0	3	1.4	0	93.8	1574.3
67	115.5	1.2	0	0	0.9	7	0	90.9	413.4
74	155.5	0	0	0	0.2	1.9	0	97.9	2024.9
75	89	1.4	0	11.7	0	6.9	0	80	687.3
78	95	2.8	0	0	0	11.5	0	85.7	294.6
79	132.5	0.8	0	0	0	4	0	95.3	785.4
84	169.5	1.3	0	0	0	1	0	97.7	1331.2
85	89	0.9	0	2	0	2.1	0	95	946.9
89	86	0	0	0	0	2.2	0	97.8	401
90	106	1.3	0	0	0	20.7	0	77.9	326.1
96	108.5	0.8	0	0	0	16.5	0	82.7	442.9
97	92	0	0	0	0	9.3	0	90.7	437.4
105	116	0	0	0	0	34	0	66	40.2
106	78.5	0	0	0	0	3.7	0	96.3	127.5
Mean	110	12.6	0	14	2.6	54.9	0	680.7	764.9
Std dev	29	26	0.1	39.4	10.4	53.5	0	764.9	776.2
% Catch		1.6	0.0	1.8	0.3	7.2	0.0	89.0	100

ANNEX VI Catch rates

Angola central Catch rates (kg/hour) by main **deep-water groups** caught in valid swept area bottom trawl hauls .

Slope (201-800 m).

Number of stations: 37								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirostris	Seabream	Other	Total
32	709.5	6.2	1.5	0	0	0	92.3	359.6
39	268	0	14.6	0	1.5	3.4	80.4	1829.8
40	353.5	1.5	77.1	0	0.3	0	21.1	709.6
41	438.5	1.7	36.2	22.7	0	0	39.4	892.5
42	509.5	1.6	8.1	20.3	0	0	70	886.7
43	618.5	1.6	4.4	23.6	0	0	70.3	366.3
44	540	3	0.3	48.7	0	0	48	447.7
45	427	4.1	4.3	63.9	0	0	27.7	302.3
46	341	9.3	60.3	6.1	0.1	0	24.1	406.7
47	258	0	12.1	0	1.2	0	86.7	1529.1
54	265	0	5.2	0	1	0	93.8	420.7
55	309	0.6	27.8	0	0.6	0	71	846.8
56	452	1.7	3.4	37.1	0	0	57.8	1224.5
57	524	6.6	0	23.5	0	0	69.9	695.7
58	519.5	4.6	0	53.3	0	0	42.1	703.8
59	426	4.3	17.1	58.3	0	0	20.2	711.1
60	384	5.8	23.6	43.9	0.9	0	25.8	290.8
61	249	0	4.3	0	3	0.3	92.4	1184.1
68	211	0	7.3	0	6	1	85.7	671.5
69	368	1.9	22.7	27.6	1.5	0	46.4	477.4
70	737.5	1.4	0	0	0	0	98.6	542.7
71	510	2.3	0	47.7	0	0	50	577.6
72	429	3.6	12	29	0	0	55.3	859.2
73	276.5	0	17.4	0	2.5	0	80.1	2011.4
80	391.5	1	27.2	11.5	0.6	0	59.7	475.1
81	454.5	7.1	12.3	42.8	0	0	37.9	413.5
82	642.5	1.6	0	60	0	0	38.5	386.8
83	546	2.9	0	69.4	0	0	27.7	337.9
91	317	0.5	24.6	0.2	1.6	0	73.2	895.4
92	663.5	2.2	0	40.3	0	0	57.5	425.3
93	747.5	2	1.1	0	0	0	96.9	595.9
94	464.5	18	2.8	21.5	0	0	57.7	162.6
95	207	0	0.9	0	0.9	3.6	94.6	861.4
101	209	0	4.2	0	1.5	0.7	93.7	1703.2
102	409.5	0.6	65.1	6.9	0	0	27.5	1085.5
103	648	5.3	1.4	32.7	0	0	60.6	544.1
104	361	0.3	13.9	0	0.8	0	85	441.7
Mean	437.4	13.1	110.6	115	6.7	3.1	488.6	737.2
Std dev	153.8	12.4	160.4	129.7	12.8	11.5	425.3	446.6
% Catch		1.8	15.0	15.6	0.9	0.4	66.3	100

ANNEX VI Catch rates

Angola south: Catch rates (kg/hour) by **main groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 12							
Station	Gear depth	Demersal	Pelagic	Sharks	Shrimps	Other	Total
1	23	1745.7	2880.5	8.6	12.2	0	12330.4
9	60.5	234.9	11.3	498.2	0	0	956
10	35.5	378.6	648.6	53.1	0	0	1467.6
11	25	32.1	1832.5	633.4	0	0	4104.5
12	63.5	33.1	33.9	57.8	0	0	419.7
19	23.5	542.8	835.3	11.5	0	0	1592.1
20	20.5	831.3	249.6	0	0	0	1231.8
21	52.5	29.9	40.4	0	0	0	297.9
23	37	451.5	434.3	14.4	0.1	0	1264.8
24	53.5	6.4	18.7	0	0	0	168.1
26	25.5	7.1	2.3	61.2	0	0	132.9
28	31.5	12.2	8.7	0	0	0	179.7
Mean	37.6	358.8	583	111.5	1	0	2012.1
Std dev	15.7	512.9	902	215.4	3.5	1353.5	3429.4
% Catch		17.8 %	29.0 %	5.5 %	0.0 %	0.0 %	100.0 %

Outer shelf (71-200 m).

Number of stations: 12							
Station	Gear depth	Demersal	Pelagic	Sharks	Shrimps	Other	Total
2	187.5	22.6	15.9	3	21.6	0	1142.6
6	144	528.2	687.4	0	0	0	3422
7	111	144.9	948.7	0	0	0	1176.9
8	95.5	0	0	0	0	0	0
13	109	1104.9	869.4	13.1	0	0	2287.7
16	125	125.2	0	3.4	0	0	185.5
17	99	270.8	2728.7	387.6	0	0	3977.3
18	76.5	0	0	0	0	0	0
22	84.5	115.4	7.5	4.9	0	0	206.6
25	72.5	496.7	3115.4	106.2	0	0	3853.1
27	74.5	1330.5	1079.5	0	0	0	2598.4
29	95.5	258.2	875.4	34.8	0	0	1207
Mean	106.2	366.4	860.7	46.1	1.8	0	1671.4
Std dev	33.3	436.5	1058.4	111.8	6.2	0	1509.4
% Catch		21.9 %	51.5 %	2.8 %	0.1 %	0.0 %	100.0 %

Slope (201-800 m).

Number of stations: 5							
Station	Gear depth	Demersal	Pelagic	Sharks	Shrimps	Other	Total
3	356.5	0	4	5.7	4.4	0	640.3
4	681	355.9	0	17.7	36.7	0	1368
5	443.5	168.6	0	0	0	0	1603.3
14	375	43.3	19.5	164.4	98.1	0	1485.3
15	604	156.9	5.2	6.1	15.6	0	1440.8
Mean	492	145	5.7	38.8	30.9	0	1307.5
Std dev	143.8	138.3	8	70.5	40.1	0	382.6
% Catch		11.1 %	0.4 %	3.0 %	2.4 %	0.0 %	100.0 %

ANNEX VI Catch rates

Angola south: Catch rates (kg/hour) by **main demersal groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 12										
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Mullidae	Seabream	Snappers	Other	Total
1	23	626.1	0	0	0	0	0	0	11704.3	12330.4
9	60.5	202.3	0	0	0	0	0.7	0	753.1	956
10	35.5	369.9	0	0	0	0	8.7	0	1089	1467.6
11	25	16.7	0	0	0	0	15.4	0	4072.4	4104.5
12	63.5	23.5	0	0	0.8	0	6.4	0	389	419.7
19	23.5	9	0	0	0	0	533.8	0	1049.3	1592.1
20	20.5	0	0	0	0	68.4	830.5	0	332.9	1231.8
21	52.5	0	0	0	0	0	29.9	0	268	297.9
23	37	201.9	0	23	0	2	226.1	0	811.8	1264.8
24	53.5	0.0 %	0.0 %	50.0 %	0.0 %	0.0 %	600.0 %	0	161.7	168.1
26	25.5	0	0	0	0	0	7.1	0	125.8	132.9
28	31.5	0	0	0	0	0	12.2	0	167.5	179.7
Mean	37.6	120.8	0	2	0.1	5.9	139.7	0	1743.7	2012.1
Std dev	15.7	199.2	0	6.6	0.2	19.7	268.5	0	3316.7	3429.4
% Catch		6.0 %	0.0 %	0.1 %	0.0 %	0.3 %	6.9 %	0.0 %	86.7 %	100.0 %

Outer shelf (71-200 m).

Number of stations: 12										
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Mullidae	Seabream	Snappers	Other	Total
2	187.5	0	0	0	22.6	0	0	0	1120.1	1142.6
6	144	5.6	0	0	504.9	0	17.6	0	2893.9	3422
7	111	2.5	0	0	17.7	0	116.4	0	1040.4	1176.9
8	95.5	0	0	0	0	0	0	0	0	0
13	109	5.7	0	0	195.2	0	902.4	0	1184.4	2287.7
16	125	0	0	0	28.5	0	96.7	0	60.4	185.5
17	99	14.2	0	0	75.3	0	181.3	0	3706.5	3977.3
18	76.5	0	0	0	0	0	0	0	0	0
22	84.5	0	0	0	0	0	115.4	0	91.2	206.6
25	72.5	97	0	0	0	0	399.7	0	3356.4	3853.1
27	74.5	0	0	0	0	0	1328.9	0	1269.5	2598.4
29	95.5	0	0	0	0	0	255.5	0	951.5	1207
Mean	106.2	10.4	0	0	70.3	0	284.5	0	1306.2	1671.4
Std dev	33.3	27.6	0	0	148	0	416	0	1320.3	1509.4
% Catch		0.6 %	0.0 %	0.0 %	4.2 %	0.0 %	17.0 %	0.0 %	78.2 %	100.0 %

Slope (201-800 m).

Number of stations: 5										
Station	Gear depth	Croakers	Groupers	Grunts	Hake	Mullidae	Seabream	Snappers	Other	Total
3	356.5	0	0	0	0	0	0	0	640.3	640.3
4	681	0	0	0	342.5	0	0	0	1025.5	1368
5	443.5	0	0	0	168.6	0	0	0	1434.6	1603.3
14	375	0	0	0	43.3	0	0	0	1442	1485.3
15	604	0	0	0	148.4	0	0	0	1292.4	1440.8
Mean	492	0	0	0	140.6	0	0	0	1167	1307.5
Std dev	143.8	0	0	0	133.1	0	0	0	339.3	382.6
% Catch		0.0 %	0.0 %	0.0 %	10.8 %	0.0 %	0.0 %	0.0 %	89.3 %	100.0 %

ANNEX VI Catch rates

Angola south: Catch rates (kg/hour) by **main pelagic groups** caught in valid swept area bottom trawl hauls.

Inner shelf (20-70 m).

Number of stations: 12								
Station	Gear depth	Barracuda	Carangids	Clupeoids	Hairtails	Scombrids	Other	Total
1	23	0	1806.8	1062.5	11.2	0	9449.9	12330.4
9	60.5	0	4.9	1	5.4	0	944.8	956
10	35.5	0	634.4	14.3	0	0	819	1467.6
11	25	0	1777	0	0	55.5	2272	4104.5
12	63.5	0	29	0	4.9	0	385.8	419.7
19	23.5	0	511	318.1	0	6.2	756.8	1592.1
20	20.5	0	246.2	2.9	0	0.5	982.1	1231.8
21	52.5	0	38.7	1.7	0	0	257.5	297.9
23	37	3.1	302.8	117.8	0	0	841.2	1264.8
24	53.5	0	16	2.6	0	0	149.5	168.1
26	25.5	0	0.2	0	0	2.1	130.5	132.9
28	31.5	0	8.7	0	0	0	171	179.7
Mean	37.6	0.3	448	126.7	1.8	5.4	1430	2012.1
Std dev	15.7	0.9	662.8	309.2	3.6	15.9	2594	3429.4
% Catch		0.0 %	22.3 %	6.3 %	0.1 %	0.3 %	71.1 %	100.0 %

Outer shelf (71-200 m).

Number of stations: 12								
Station	Gear depth	Barracuda	Carangids	Clupeoids	Hairtails	Scombrids	Other	Total
2	187.5	0	15.9	0	0	0	1126.8	1142.6
6	144	0	674	0	10.3	3.2	2734.6	3422
7	111	0	948.7	0	0	0	228.2	1176.9
8	95.5	0	0	0	0	0	0	0
13	109	0	869.4	0	0	0	1418.4	2287.7
16	125	0	0	0	0	0	185.5	185.5
17	99	0	2701.2	0	21.6	6	1248.6	3977.3
18	76.5	0	0	0	0	0	0	0
22	84.5	0	7.5	0	0	0	199.1	206.6
25	72.5	0	3115.4	0	0	0	737.7	3853.1
27	74.5	0	1078.9	0	0	0.6	1518.9	2598.4
29	95.5	0	871	0	0	4.4	331.6	1207
Mean	106.2	0	856.8	0	2.7	1.2	810.8	1671.4
Std dev	33.3	0	1054.2	0	6.7	2.1	826.7	1509.4
% Catch		0.0 %	51.3 %	0.0 %	0.2 %	0.1 %	48.5 %	100.0 %

Slope (201-800 m).

Number of stations: 5								
Station	Gear depth	Barracuda	Carangids	Clupeoids	Hairtails	Scombrids	Other	Total
3	356.5	0	0	0	4	0	636.4	640.3
4	681	0	0	0	0	0	1368	1368
5	443.5	0	0	0	0	0	1603.3	1603.3
14	375	0	0	0	19.5	0	1465.8	1485.3
15	604	0	0	0	5.2	0	1435.6	1440.8
Mean	492	0	0	0	5.7	0	1301.8	1307.5
Std dev	143.8	0	0	0	8	0	381.7	382.6
% Catch		0.0 %	0.0 %	0.0 %	0.4 %	0.0 %	99.6 %	100.0 %

ANNEX VI Catch rates

Angola south: Catch rates (kg/hour) by **main deep-water groups** caught in valid swept area bottom trawl hauls.

Outer shelf (71-200 m).

Number of stations: 12								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirostris	Seabream	Other	Total
2	187.5	0	22.6	0	21.6	0	1098.5	1142.6
6	144	0	504.9	0	0	17.6	2899.5	3422
7	111	0	17.7	0	0	116.4	1042.9	1176.9
8	95.5	0	0	0	0	0	0	0
13	109	0	195.2	0	0	902.4	1190.2	2287.7
16	125	0	28.5	0	0	96.7	60.4	185.5
17	99	0	75.3	0	0	181.3	3720.7	3977.3
18	76.5	0	0	0	0	0	0	0
22	84.5	0	0	0	0	115.4	91.2	206.6
25	72.5	0	0	0	0	399.7	3453.4	3853.1
27	74.5	0	0	0	0	1328.9	1269.5	2598.4
29	95.5	0	0	0	0	255.5	951.5	1207
Mean	106.2	0	70.3	0	1.8	284.5	1314.8	1671.4
Std dev	33.3	0	148	0	6.2	416	1337.3	1509.4
% Catch		0.0 %	4.2 %	0.0 %	0.1 %	17.0 %	78.7 %	100.0 %

Slope (201-800 m).

Number of stations: 5								
Station	Gear depth	A.varidens	Hake	N.africana	P.longirostris	Seabream	Other	Total
3	356.5	1.3	0	0	0	0	639	640.3
4	681	15.3	342.5	0	0	0	1010.2	1368
5	443.5	0	168.6	0	0	0	1434.6	1603.3
14	375	96.8	43.3	0	0	0	1345.2	1485.3
15	604	14.7	148.4	0	0	0	1277.7	1440.8
Mean	492	25.6	140.6	0	0	0	1141.4	1307.5
Std dev	143.8	40.4	133.1	0	0	0	322.4	382.6
% Catch		2.0 %	10.8 %	0.0 %	0.0 %	0.0 %	87.3 %	100.0 %

ANNEX VII Instruments and fishing gear used

The Simrad ER-60 scientific echo sounder is equipped with keel-mounted transducers with nominal operating frequencies of 18, 38, 120 and 200 kHz. All frequencies were run during the survey only for observation of fish and bottom conditions. No scrutinizing of the recordings was done.

Last standard sphere calibrations were carried out 14.12.2013 in Kyunn Phi Lar, MynMar, using Cu-64, Cu-60, WC-38.1 and WC-38.1 spheres for 18, 38,120 and 200 kHz, respectively. The details of the settings of the 38 kHz echo sounder where as follows:

Transceiver-2 menu (38 kHz)	
Transducer depth	5.50 m
Absorbtion coeff.	9,5 dB/km
Pulse duration	medium (1,024ms)
Bandwidth	2,43 kHz
Max power	2000 Watt
2-way beam angle	-20,6dB
gain	26.13 dB
SA correction	-0,71 dB
Angle sensitivity	21.9
3 dB beamwidth	6,75º along ship
6,95º athwardship	
Alongship offset	-0.11º
Athwardship offset	0.05º

Bottom detection menu Minimum level -40 dB

Fishing gear

The vessel has two different sized "Åkrahamn" pelagic trawls and one "Gisund super bottom trawl". During the present survey only the bottom trawl was used.

The bottom trawl has a headline of 31 m, footrope 47 m and 20 mm mesh size in the codend with an inner net of 10 mm mesh size. The trawl height was about 4.5 m and distance between wings during towing about 21 m. The sweeps are 40 m long. The trawl is equipped with a 12" rubber bobbins gear. Since 19.02.08 new and heavier “Thyborøn” combi trawl doors (7.41 m2, 1720 kg) have been in used. During the present survey the door distance was kept nearly constant at about 50 m at all depths by the use of a 9 m strap between the wires at 120 m distance from the doors (normally applied at depths greater than 80 m). At depths greater than 300 m the trawl was equipped with a tickler chain, which improves the catchability of bottom living and borrowing species, particularly shrimps.

The SCANMAR system was used on all trawl hauls. This equipment consists of sensors, a hydrophone, a receiver, a display unit and a battery charger. Communication between sensors and ship is based on acoustic transmission. The doors are fitted with sensors to provide information on their distance, and the trawl was equipped with a trawl eye that provides information about the trawl opening. A catch sensor on the cod-end indicated the size of the catch.

ANNEX VIII Hydrographic / monitoring line stations

Main Monitoring lines of highest priority (red): Multinet, bottles and CDT
Local monitoring lines (green) of next highest priority: Multinet, bottles and CDT
Standard Transect (yellow): CDT only

Line #	Sample	Location	Abbreviation	Latitude (S)	Longitude (E)	Depth (multinet)	Depth (bottles)	CTD	Depth CTD	Comments
THE NORTHERN ANGOLA										
1	1	Congo River	CRML	06º30.59’	10º46.12’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	2006	
1	2	Congo River	CRML	06º28.65’	10º56.55’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1527	
1	3	Congo River	CRML	06º26.25’	11º06.79’					Platform
1	3	Congo River	CRML	06º24.19’	11º16.47’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	745	
1	4	Congo River	CRML	06º21.92’	11º26.55’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	383	
1	5	Congo River	CRML	06º19.67’	11º36.26’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	166	
1	6	Congo River	CRML	06º17.71’	11º45.80’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	111	
1	7	Congo River	CRML	06º15.43’	11º55.58’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	65	
1	8	Congo River	CRML	06º13.35’	12º04.53’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	46	
1	9	Congo River	CRML	06º12.45’	12º07.97’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	35	
5		N’Zeto	St	7º37.44’	12º00.25’					Platform
5	1	N’Zeto	St	7º28.00’	12º21.21’	No multinet	No bottles	Yes	500	
5	2	N’Zeto	St	7º26.50’	12º24.01’	No multinet	No bottles	Yes	200	
5	3	N’Zeto	St	7º22.60’	12º31.00’	No multinet	No bottles	Yes	100	
5	4	N’Zeto	St	7º17.90’	12º39.00’	No multinet	No bottles	Yes	50	
5	5	N’Zeto	St	7º19.90’	12º47.10’	No multinet	No bottles	Yes	25	
7	1	Ambriz	St	8º00.41’	12º39.380’	No multinet	No bottles	Yes	500	
7	2	Ambriz	St	7º58.99’	12º42.650’	No multinet	No bottles	Yes	200	
7	3	Ambriz	St	7º57.30’	12º46.180’	No multinet	No bottles	Yes	120	
7	4	Ambriz	St	7º55.48’	12º50.260’	No multinet	No bottles	Yes	100	
7	5	Ambriz	St	7º53.69’	12º54.680’	No multinet	No bottles	Yes	80	
7	6	Ambriz	St	7º51.92’	12º58.820’	No multinet	No bottles	Yes	60	
7	7	Ambriz	St	7º50.03’	13º02.940’	No multinet	No bottles	Yes	25	
THE CENTRAL ANGOLA										
11	1	Palmerinhas	LDML	9º05.00’	12º58.314’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	21	
11	2	Palmerinhas	LDML	9º05.00	12º56.52’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	36	

11	3	Palmerinhas	LDML	9º05.00’	12º51.26’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	59	
11	4	Palmerinhas	LDML	9º05.00’	12º41.52’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	425	
11	5	Palmerinhas	LDML	9º05.00’	12º31.52’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	953	
11	6	Palmerinhas	LDML	9º05.00’	12º21.52’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1353	
11	7	Palmerinhas	LDML	9º05.00’	12º11.52’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1734	
13	1	Cabo Ledo	St	9º36.10’	13º09.15’	No multinet	No bottles	Yes	20	
13	2	Cabo Ledo	St			No multinet	No bottles	Yes	50	
13	3	Cabo Ledo	St			No multinet	No bottles	Yes	100	
13	4	Cabo Ledo	St			No multinet	No bottles	Yes	200	
13	5	Cabo Ledo	St	9º43.77’	12º42.76’	No multinet	No bottles	Yes	500	
15	1	Cabo S. Braz	St			No multinet	No bottles	Yes	20	
15	2	Cabo S. Braz	St			No multinet	No bottles	Yes	50	
15	3	Cabo S. Braz	St			No multinet	No bottles	Yes	100	
15	4	Cabo S. Braz	St			No multinet	No bottles	Yes	200	
15	5	Cabo S. Braz	St	10º13.21’	12º53.88’	No multinet	No bottles	Yes	500	
18	1	Benguela Velha	St	10º46.75’	13º42.72’	No multinet	No bottles	Yes	50	
18	2	Benguela Velha	St			No multinet	No bottles	Yes	100	
18	3	Benguela Velha	St			No multinet	No bottles	Yes	200	
18	4	Benguela Velha	St	10º53.83’	13º19.45’	No multinet	No bottles	Yes	500	
23	1	Lobito	LBML	12º20.91’	13º28.60’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	81	
23	2	Lobito	LBML	12º20.15’	13º27.16’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	90	
23	3	Lobito	LBML	12º17.90’	13º22.20’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	370	
23	4	Lobito	LBML	12º13.00’	13º13.02’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	997	
23	5	Lobito	LBML	12º08.80’	13º04.00’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1259	
23	6	Lobito	LBML	12º04.80’	12º54.80’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1483	
23	7	Lobito	LBML	11º58.75’	12º45.45’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1837	
23	8	Lobito	LBML	11º54.80’	12º36.66’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1846	
THE SOUTHERN ANGOLA										
30	1	Santa Marta	St	13º55.92’	12º24.40’	No multinet	No bottles	Yes	20	
30	2	Santa Marta	St			No multinet	No bottles	Yes	50	
30	3	Santa Marta	St			No multinet	No bottles	Yes	100	
30	4	Santa Marta	St			No multinet	No bottles	Yes	200	
30	5	Santa Marta	St	13º55.93’	12º13.22’	No multinet	No bottles	Yes	500	
35	1	Namibe	NML	15°09.381	12°07.827’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	130	

35	2	Namibe	NML	15°09.381	12°04.725’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	322	
35	3	Namibe	NML	15°09.381	11°59.554’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	133	
35	4	Namibe	NML	15°09.381	11°49.216’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1133	
35	5	Namibe	NML	15°09.381	11°39.000’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1780	
35	6	Namibe	NML	15°09.381	11°17.360’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	2599	
41	1	Ponta Albina	St	16º12.800	11º45.75’	No multinet	No bottles	Yes	20	
41	2	Ponta Albina	St	16º12.800	11º45.850’	No multinet	No bottles	Yes	36	
41	3	Ponta Albina	St	16º12.800	11º44.920’	No multinet	No bottles	Yes	42	
41	4	Ponta Albina	St	16º12.800	11º43.110’	No multinet	No bottles	Yes	50	
41	5	Ponta Albina	St	16º12.800	11º39.810’	No multinet	No bottles	Yes	61	
41	6	Ponta Albina	St	16º12.800	11º37.030’	No multinet	No bottles	Yes	72	
41	7	Ponta Albina	St	16º12.800	11º34.230’	No multinet	No bottles	Yes	82	
41	8	Ponta Albina	St	16º12.800	11º32.920’	No multinet	No bottles	Yes	100	
41	9	Ponta Albina	St	16º12.800	11º31.820’	No multinet	No bottles	Yes	200	
41	10	Ponta Albina	St	16º12.800	11º31.340’	No multinet	No bottles	Yes	347	
41	11	Ponta Albina	St	16º12.800	11º45.75’	No multinet	No bottles	Yes	500	
41	12	Ponta Albina	St	16º12.800	11º30.610’	No multinet	No bottles	Yes	570	
41	13	Ponta Albina	St	16º12.800	11º30.610’	No multinet	No bottles	Yes	708	
41	14	Ponta Albina	St	16º12.800	11º29.390’	No multinet	No bottles	Yes	850	
41	15	Ponta Albina	St	16º12.800	11º28.240’	No multinet	No bottles	Yes	964	
40	1	Baia Tigres	St	16º36.870	11º39.870’	No multinet	No bottles	Yes	22	
40	2	Baia Tigres	St	16º36.870	11º39.180’	No multinet	No bottles	Yes	44	
40	3	Baia Tigres	St	16º36.870	11º37.780’	No multinet	No bottles	Yes	80	
40	4	Baia Tigres	St	16º36.870	11º32.370’	No multinet	No bottles	Yes	101	
40	5	Baia Tigres	St	16º36.870	11º24.820’	No multinet	No bottles	Yes	122	
40	6	Baia Tigres	St	16º36.870	11º21.920’	No multinet	No bottles	Yes	130	
40	7	Baia Tigres	St	16º36.870	11º21.320’	No multinet	No bottles	Yes	163	
40	8	Baia Tigres	St	16º36.870	11º20.920’	No multinet	No bottles	Yes	196	
40	9	Baia Tigres	St	16º36.870	11º20.320	No multinet	No bottles	Yes	260	
40	10	Baia Tigres	St	16º36.870	11º18.940’	No multinet	No bottles	Yes	423	
40	11	Baia Tigres	St	16º36.870	11º18.560’	No multinet	No bottles	Yes	489	
40	12	Baia Tigres	St	16º36.870	11º17.670’	No multinet	No bottles	Yes	667	
40	13	Baia Tigres	St	16º36.870	11º11.150’	No multinet	No bottles	Yes	1330	
40	14	Baia Tigres	St	16º36.870	11º06.170’	No multinet	No bottles	Yes	1622	
43	1	Cunene River	GML	17º12.160	11º44.110’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	22	
43	2	Cunene River	GML	17º12.160	11º41.210’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	50	
43	3	Cunene River	GML	17º12.160	11º38.880’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	77	

43	4	Cunene River	GML	17º12.160	11º35.870’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	100	
43	5	Cunene River	GML	17º12.160	11º33.320’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	115	
43	6	Cunene River	GML	17º12.160	11.28.180’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	150	
43	7	Cunene River	GML	17º12.160	11º23.530’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	202	
43	8	Cunene River	GML	17º12.160	11º22.210’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	263	
43	9	Cunene River	GML	17º12.160	11º20.510’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	365	
43	10	Cunene River	GML	17º12.160	11º18.530’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	500	
43	11	Cunene River	GML	17º12.160	11º14.110’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	721	
43	12	Cunene River	GML	17º12.160	11º10.630’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	989	
43	13	Cunene River	GML	17º12.160	11º04.050’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	1499	
43	14	Cunene River	GML	17º12.160	10º59.860’	0-25; 25-50; 50-75; 75-100; 100-200	5; 15; 25; 50; 75	Yes	2104	

ANNEX IX Numbers of valid bottom trawl stations allocated by survey and depth strata. Angolan demersal surveys 2000-2016.

	1995	1995	1996	1997	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
OUTSIDE	16	0	5	1	62	0	0	1	0	0	1	0	3	0	1	0	0	0	0	0	0	0	0	0
20-50south	0	0	0	0	0	0	0	8	0	2	4	8	7	8	5	6	9	8	0	6	10	8	6	7
50-100south	0	0	0	0	4	0	0	9	0	5	7	7	5	5	8	8	6	6	0	8	11	8	8	8
100-200south	0	0	0	0	6	0	0	7	0	3	7	5	7	7	7	7	7	7	0	7	10	5	6	5
200-300south	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	1	0	1	0	0
300-400south	0	0	0	0	1	0	0	1	0	1	2	2	1	1	1	2	2	2	0	1	2	1	3	2
400-500south	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1
500-600south	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	2	0	1	0
600-700south	0	0	0	0	0	0	0	2	0	1	2	3	1	2	2	1	1	1	0	2	1	0	2	2
700-800south	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	2	2	2	0	1	0	0	0	0
20-50central	14	0	10	6	1	9	14	23	12	16	16	17	16	16	15	17	16	16	11	18	16	14	11	13
50-100central	13	0	12	9	10	17	19	27	18	18	19	18	20	18	20	18	18	18	15	19	19	18	18	16
100-200central	15	12	12	8	13	12	14	22	16	15	13	14	14	16	15	14	14	13	9	16	15	14	14	12
200-300central	9	21	9	7	11	8	8	12	4	2	3	2	6	3	2	2	1	2	2	2	5	8	3	8
300-400central	11	15	10	7	1	6	6	10	4	6	4	6	6	6	6	6	6	6	3	6	8	7	6	8
400-500central	9	18	9	7	0	4	6	8	6	2	3	3	4	3	2	3	3	3	2	4	6	6	3	8
500-600central	7	14	8	7	0	7	5	9	3	5	3	3	5	4	5	4	4	4	4	5	8	7	4	6
600-700central	3	10	3	0	0	5	1	6	3	4	4	4	6	4	4	3	1	3	0	4	4	3	3	4
700-800central	4	1	4	0	0	3	0	7	4	4	4	4	6	4	5	5	6	4	4	4	3	4	3	3
20-50north	9	0	9	8	0	0	14	11	11	16	13	15	14	14	17	17	17	19	13	11	18	19	13	15
50-100north	12	0	12	10	4	0	24	24	14	23	20	24	20	18	21	19	20	20	18	14	20	20	20	19
100-200north	11	0	12	11	8	0	29	24	18	23	20	21	21	17	23	23	20	19	17	13	21	9	17	17
200-300north	7	0	10	9	3	0	12	11	7	7	7	8	7	6	7	7	7	5	7	4	5	9	7	8
300-400north	8	0	9	8	2	0	12	10	11	6	6	6	6	5	5	4	5	6	4	4	8	9	7	8
400-500north	4	0	8	7	0	0	7	8	5	6	6	6	6	5	6	6	6	6	6	5	6	7	5	6
500-600north	5	0	10	8	0	0	6	7	8	6	6	6	7	4	6	6	7	5	6	3	5	6	5	6
600-700north	3	0	0	0	0	0	1	7	5	6	6	7	8	4	8	6	6	5	4	5	5	5	4	4
700-800north	2	0	5	5	0	0	0	8	3	9	9	8	9	7	6	7	7	8	6	7	7	4	6	5
TOTAL	162	91	157	118	126	71	178	264	152	186	185	200	208	179	198	193	191	188	131	171	215	193	176	191