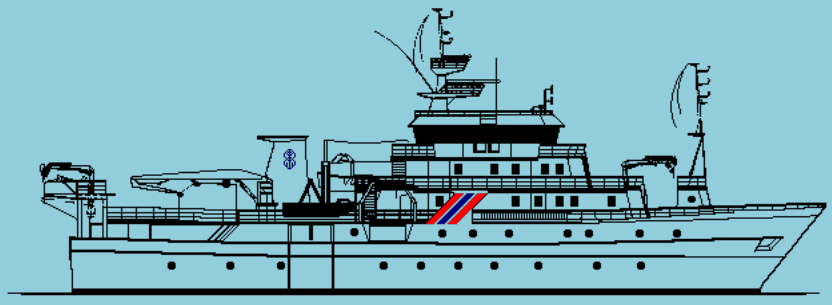

SURVEYS OF THE FISH RESOURCES AND ECOLOGY OF GHANA

Survey of the pelagic and demersal resources, plankton and hydrography

1 – 20 April 2016

Fisheries Scientific Survey Division
Tema
Ghana

Institute of Marine Research (IMR)
Bergen
Norway

Bergen, October 2016

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.

LE PROJET EAF-NANSEN

La FAO a initié la mise en oeuvre du projet "Renforcement de la base des connaissances pour mettre en œuvre une approche écosystémique des pêcheries marines dans les pays en développement (EAF-Nansen GCP/INT/003/NOR)" en décembre 2006. Le projet est financé par de l'Agence norvégienne de coopération pour le développement (Norad). Le projet EAF-Nansen fait suite aux précédents projets/ programmes dans le cadre du partenariat entre la FAO, Norad et l'Institut de recherche marine (IMR) de Bergen en Norvège, sur l'évaluation et l’aménagement des ressources halieutiques dans les pays en développement. Le projet est mis en oeuvre en partenariat avec les gouvernements et en collaboration avec les projets grands écosystèmes marins (GEM) soutenus par le Fonds pour l’Environnement Mondial (FEM) et d'autres projets régionaux qui ont le potentiel de contribuer à certains éléments du projet EAF-Nansen.

Le projet EAF-Nansen offre l’opportunité aux pays côtiers de l'Afrique subsaharienne partenaires de recevoir un appui technique de la FAO pour le développement de cadres nationaux et régionaux visant une approche écosystémique de l’aménagement des pêches et la possibilité d'acquérir des connaissances complémentaires sur leurs écosystèmes marins. Ces éléments seront utilisés pour la planification et le suivi des pêcheries et de leurs écosystèmes. Le projet contribue à renforcer les capacités des administrations nationales responsables de l’aménagement des pêches en introduisant des méthodes d'évaluation des risques écologiques pour identifier les questions d’aménagement d’importance majeure ainsi que la préparation, la mise en œuvre et le suivi des progrès de la mise en œuvre de plans d’aménagement des ressources marines conformes à l'approche écosystémique des pêches.

The programme has previously focused on the mid to western Gulf of Guinea. In the period 2004 to 2007 the surveys covered the area from Côte d'Ivoire to Benin and Nigeria to Gabon. The present survey covers the EEZ of Ghana.

Area	**Period**
Cape Verga (Rep. of Guinea) to Cape St. Paul (Ghana)	02 - 25 June 1981
Togo to Cameroon	07 - 20 August 1981
Côte d'Ivoire and Ghana	12 - 20 October 1989
Benin, Togo, Ghana and Côte d'Ivoire	19 April - 06 May 1999
Benin, Togo, Ghana and Côte d'Ivoire	29 Aug. - 17 Sept. 2000
Benin, Togo, Ghana and Côte d'Ivoire	6 July - 09 August 2002
Benin, Togo, Ghana and Côte d'Ivoire (Gulf of Guinea Part I)	14 May - 08 June 2004
Nigeria, Cameroon, São Tomé & Principe (Gulf of Guinea Part II)	11 June - 13 July 2004
Benin, Togo, Ghana and Côte d'Ivoire (Gulf of Guinea Part I)	03 May - 29 May 2005
Nigeria, Cameroon, São Tomé & Principe, Gabon and Congo (GoG Part II)	04 June - 15 July 2005
Guinea Bissau, Guinea, Sierra Leone and Liberia (Gulf of Guinea Part I)	29 April - 16 May 2006
Côte d'Ivoire, Ghana, Togo, Benin, Cameroon, São Tomé & Principe, Gabon Congo	03 June – 06 July 2007
Ghana	1 – 20 April 2016

CRUISE REPORTS "DR. FRIDTJOF NANSEN"

SURVEYS OF THE FISH RESOURCES AND ECOLOGY OF GHANA

Survey of the pelagic and demersal resources, plankton and hydrography

1 – 20 April 2016

by

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CHAPTER 1 INTRODUCTION

Following a request from the Government of Ghana, Institute of Marine Research (IMR) and Food and Agriculture Organisation of the United Nations (FAO) agreed to conduct a survey of fisheries resources in Ghana. The survey with R/V "Dr. Fridtjof Nansen" covers the EEZ of Ghana.

The objectives of the survey was discussed and agreed upon during a pre-survey meeting held in Tema, Ghana on 30 March 2016 where cruise participants and representatives of the authorities of Ghana, representatives from FAO and IMR participated.

1.1 Objectives

The main objectives of the survey were:

to map the distribution and estimate the abundance of the main pelagic species/groups by acoustic methodology
to describe the distribution, composition and estimate the abundance of the main demersal species on the shelf by a swept-area trawl programme
to characterize the macrofauna in terms of species richness (S), species diversity (H') and relative importance (%IRI)
to collect zooplankton samples for distribution and abundance estimation
to map the general hydrographic regime by using a CTD-sonde for temperature, salinity and oxygen at bottom trawl stations and in two hydrographical transects
to do training on the main fisheries research and sampling routines
other objectives:

- ✓ to collect bottom sediment samples
- ✓ to collect surface samples for plastic debris

1.2 Participation

Fisheries Scientific Survey Division (Fisheries Commission), Ghana

Jones Tetteh
Eunice Ofoli-Anum
Ebenezer Ato Ekuban
Richmond Quartey

Vida Samantha Osei
Abena Serwah Asante (co-cruise leader)
Ernest Ansong

University of Ghana, Department of Marine and Fisheries Sciences

Edna Quansah

University of Cape Coast, Department of Fisheries and Aquatic Sciences

Pearl Sakyi-Djan

FAO, Marine and Inland Fisheries Branch, Rome, Italy

Peter N. Psomadakis
Fabio Carocci

Institute of Marine Research, Bergen, Norway

Magne Olsen
Merete Kvalsund
Reidar Toresen (cruise leader)

1.3 Narrative

The vessel left Tema on the 1st April 2016 at 1800 hrs GMT and steamed to the eastern part of Ghana where the survey started on the 2nd April 2016.

The survey of the shelf was divided in two parts. The first part was a trawl survey for the coverage of the shelf for demersal fish, while the second coverage was an acoustic coverage aiming for the mapping of pelagic fish, plankton and environmental conditions.

The survey was completed at the eastern border of Ghana on the 19th April and the vessel arrived in Tema on the 20th of April at 1000 hrs GMT.

Fisheries survey

The shelf was surveyed for demersal fish from the east to west, during daytime (0600 to 1800) by parallel course tracks about 15 NM (nautical miles) apart (Figures 1.1a-b). Semi-random swept-area hauls were carried out on the shelf within the depth zones 0-30 m, 31-50 m and 51-100 m to determine the abundance and map the distribution of fish resources.

For the estimation of pelagic resources, continuous acoustic registrations were carried out from the west to east. This coverage started on the 12th April at 1600 hrs, and ended at the east on the 19th April at 16 00 hrs. The distance between the transects were 8 – 10 NM . Pelagic trawling was carried out throughout the day (24 hours), either as random blind trawl hauls close to the surface with pelagic trawl or bottom trawl gear equipped with large floats, or on registrations.

Hydrography

CTD-stations were taken at every bottom trawl station during the coverage of the demersal fish (Figures 1c). During the coverage for pelagic fish and plankton, CTD casts were done on the zooplankton stations and on two hydrographic profiles. The hydrographical profiles were made with CTD from the surface down to the bottom or 500 m depth.

Plankton

Zooplankton samples were taken at two stations on every forth transect. One in shallow waters and one at the outer part of the shelf (Figures 1c).

Benthos

Samples of benthos were taken at ten stations on the shelf, during the coverage of demersal fish (Figures 1c). These samples are for education purpose only.

Manta trawl samples

Manta trawl samples were taken during the pelagic coverage. The Manta trawl is a neuston net especially designed for sampling the surface for plastic particles. The net was towed once per day, - three repetitions of 15 minutes each (Figure 1c).

1.4 Survey effort

Figures 1a-b show cruise tracks of the two coverages, Figures 1c show hydrographic stations, plankton and benthos stations. Table 1 summarises the survey effort

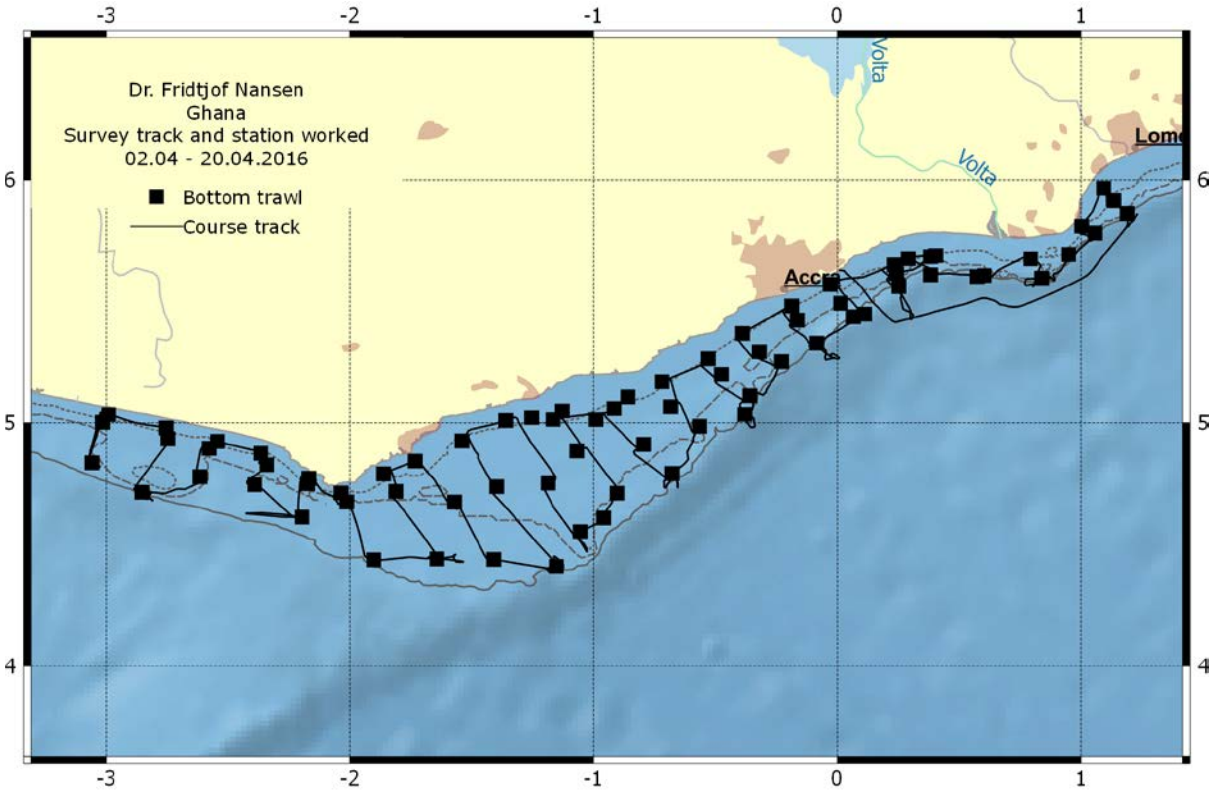


Figure 1a Course track with fishing stations for the demersal coverage. Depth contours at 20 m, 50 m, 100 m, 200 m and 500 m are indicated.

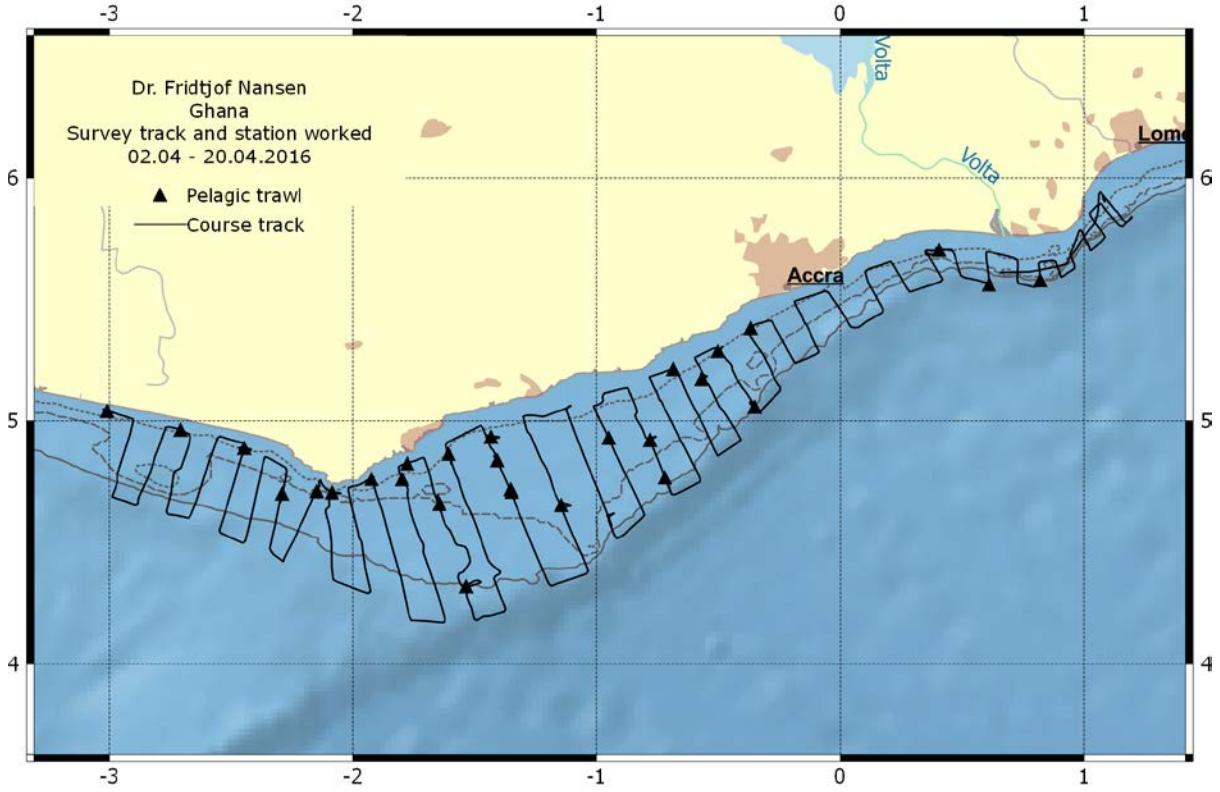


Figure 1b Course tracks for the pelagic coverage. Depth contours at 20 m, 50 m, 100 m, 200 m and 500 m are indicated.

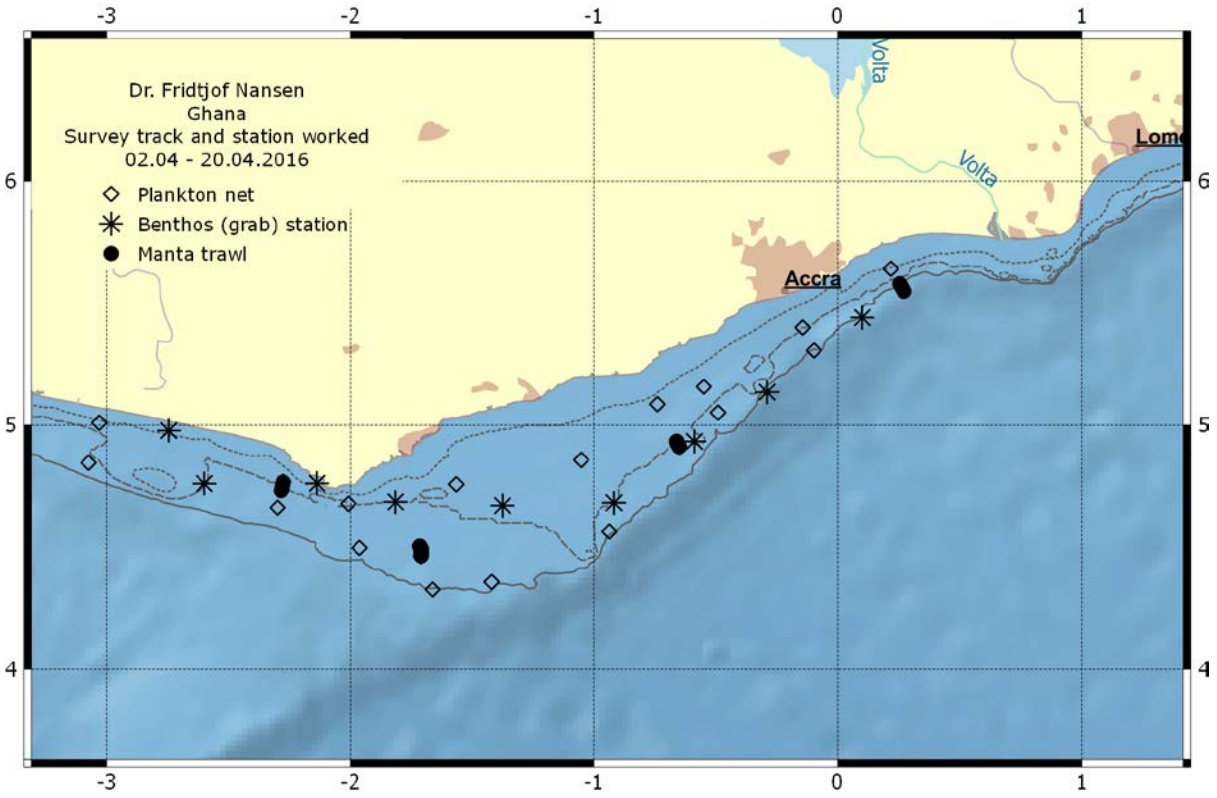


Figure 1c Course track with hydrographic stations, plankton, benthos and Manta stations. Depth contours at 20 m, 50 m, 100 m, 200 m and 500 m are indicated.

Table 1 Number of hydrographic (CTD), plankton (P), manta (M), benthos (B), pelagic trawl (PT) and bottom trawl (BT) stations, successful swept-area hauls, distance surveyed (NM) and size of survey area (NM^2).

							Swept-area hauls			Distance surveyed
Region	CTD	P	M	B	PT	BT	0-30 m	31-50m	51-100 m	
Ghana	103	24	14	9	28	75	23	22	21	12410
Area (NM^2)							1412	2064	2751	

CHAPTER 2 METHODS

2.1 Meteorological and hydrographical sampling

Temperature, salinity and oxygen

CTD stations were taken in connection with the bottom trawl stations and at two hydrographic transects. A Seabird 911 CTD plus was used to obtain vertical profiles of temperature, salinity and oxygen. Real time plotting and logging was done using the Seabird Seasave software installed on a PC. The profiles were usually taken down to a few metres above the bottom, but not deeper than 500 m. At the plankton stations, Niskin bottles were triggered in standard depths (0, 5, 10, 20, 30, 50, 75 100) to collect samples for chlorophyll measurements.

Termosalinograph

The SBE 21 Seacat thermosalinograph was running routinely during the survey. Obtaining samples of sea surface salinity and relative temperature (5 m depth) every 10 sec during the survey.

Meteorological observations

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

Chlorophyll

Chlorophyll a is a plant pigment, which in oceanography typically is used as an indirect measure for phytoplankton biomass. Seawater samples for analysis of chlorophyll *a* and phaeopigment concentrations were collected at predefined depths with rosette-mounted Niskin bottles attached to the CTD at the plankton stations. In addition, surface-samples were collected manually by bucket. Seawater samples (263 ml) were collected from the standardized depths of ca. 0, 5, 10, 20, 30, 50, 75 and100 m, with bottom-depth restricting the number of samples collected from a given station. The seawater samples were filtered on Munktell glass-fibre filters (GF/C, 25 mm diameter) using a custom-made filtration system. The filter-samples were stored in the dark at –18 until subsequent analysis on shore in the IMR laboratory in Norway. The pigments were extracted with 90% acetone in darkness over-night, and the extracts centrifuged and analysed using a Turner Design fluorometer model 10 AU calibrated with pure chlorophyll a (Sigma Inc). Interference from phaeopigments was corrected for by measuring the amount of pigments once

again, after having added a weak acid (10% HCl). The method of determining the amount of chlorophyll *a* and phaeopigments extracted in 90% acetone was launched in the early nineteen-sixties (Yentsch & Menzel 1963), but the method itself and the calibration-factors have later been changes several times (e.g. Holm-Hansen et al. 1965, Jeffrey & Humphrey 1975, Welschmeyer 1994, Humphrey & Jeffrey 1997, Jeffrey & Welshmeyer 1997). The fluorometric measurement of chlorophyll *a* and phaeopigments was performed according to the guidelines of the producer (Turner Designs 1992), and the present version of the method was first described by Holm-Hansen & Riemann (1978). As part of the post-analysis quality control, the within-station depth profiles for chlorophyll as well as the chlorophyll/phaeopigment ratios were evaluated. The results of the chlorophyll/phaeopigment analysis are presented in Annex V.

2.2 Zooplankton sampling

Zooplankton were sampled with the WP2 plankton-net (56 cm in diameter, mesh-size 180 µm) (Fraser 1966, Anonymous 1968), as rule from near the bottom to the surface. However, in one case the bottom-depth was ca. 465 m, and lower sampling depth was then limited to 100m. All WP2-hauls were made vertically with a velocity of ~ 0.5 m s-1. Once a sample was on deck, it was split into two equal parts by use of the Motoda plankton-splitter (Motoda 1959). One half was preserved with borax-buffered formalin resulting in a 4% final concentration to allow for subsequent taxonomic identification of zooplankton on shore. The other half of the sample – unpreserved - was sequentially sieved through three filters to obtain the zooplankton biomass representing the size-fractions >2000 µm, 2000-1000 µm, and 1000-180 µm. All visible jellyfish (or remains of such) were removed from the samples and their volume measured before size-fractioning. The biomass samples were stored on pre-weighed aluminium dishes, and dried at ~65 °C for periods of 6–24 h. The biomass samples were thereafter kept frozen at -18°C for subsequent weighing of dry-weight (following a second drying period) in the laboratory of IMR (Norway). All biomasses, for each size-fraction as well as the total, are reported as grams of dry-weight per square meter of surface.

Zooplankton samples were taken at 34 locations at about 40-60 m depth (Figures 1c) with a WP-2 net. Flow meter readings were done before and after the tow. The samples were then rinsed into the cod end and divided in two fractions, - one preserved in buffered formaldehyde, and the other dried and frozen. The samples were sent to the GCLME plankton laboratory at the Department of Oceanography & Fisheries, Department of Marine and Fisheries Science for analyses. The results of the zooplankton biomass analysis is given in Annex V.

2.3 Benthos grab sampling

The soft-bottom benthic macrofauna sampling was carried out using a Van Veen grab with a surface area of 0.10 m^2. At each of the stations the Van Veen grab was deployed from an operated winch onto the seafloor. One sample was taken at each station. The sediment replicates were fixed in 10% borax pre-buffered formaldehyde and another fraction were put in plastic bags.

2.4 Sampling by Manta trawl

The sampling for plastic debris was done by the use of a Manta trawl. The sampling was done on five stations. At four of these stations, three hauls were done, while on one of them two hauls were done (Figure 1c). In addition to the Manta trawl sampling, plastic debris was visually recorded during daytime along three transects near the city of Accra.

2.5 Biological sampling

The trawl catches were sampled for species composition by weight and numbers. Length measurements (total length) were taken for target species. The length of each fish was recorded to the nearest 1 cm below. The carapace length was measured to the nearest 0.5 cm below for shrimp. The mantle length was measured to the nearest 1 cm below for Sepia spp. Biological samples of target species were taken at some trawl stations, preferably near the zooplankton/benthos locations, and included total length (cm) and body weight (g).

In addition, at a few stations total length and body weight (g) were recorded for the target species in the acoustic survey. Basic information recorded at each fishing stations, i.e. trawl hauls, is presented in Annex I. Pooled length frequency distributions, raised to catch per hour, of selected species by area are shown in Annex II. A description of the fishing gears used, acoustic instruments and their standard settings is given in Annex III.

2.6 Sampling for taxonomic studies

Given that the taxonomy of some fish taxa in the region is still ongoing, specimens of *Torpedo*, *Scorpaena*, *Halobatrachus*, *Sphoeroides*, *Coris* were collected for post-survey studies. The latter were photographed, tissue sampled, packed and sent to relevant taxonomists for expert identification.

2.7 Biomass estimates

Acoustic abundance estimation

Acoustic data were recorded using a Simrad ER60 scientific echo sounder equipped with keel-mounted transducers at nominal operating frequencies of 18, 38, 120 and 200 kHz. The survey was started without a priori calibration.

Acoustic data were logged and post-processed using the acoustic data processing software Large Scale Survey System (LSSS) Version 1.6.1. The technical specifications and operational settings of the echo sounder used during the survey are given in Annex II.

Allocation of acoustic energy to species group

The acoustic data were scrutinized using the LSSS version 1.6.1. Scatters were displayed at 38 kHz. The 1 nautical mile (NM) area backscattering coefficient s_A (m^2/NM^2) was allocated to a predefined set of species groups on the basis of established echogram features. Verification of the species composition and estimation of mean length and weight were accomplished by means of targeted pelagic trawling.

The following target groups were used:

- Plankton
- sardinellas (*Sardinella aurita* and *S. maderensis*)
- anchovy (*Engraulis encrasicolus*)
- PEL 1 (other clupeids than sardinellas and anchovy)

- PEL 2 (carangids, scombrids, barracudas, hairtail)
- mesopelagic fish
- demersal fish

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

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

or in the form

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

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

NM^2) the following formula was used

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

where: N_i = number of fish in length group i
A = area (NM^2) of fish concentration
s_A = mean integrator value (echo density) in area A (m^2/NM^2)
p_i = proportion of fish in length group i in samples from the area
C_{Fi} = fish conversion factor for length group i

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

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

The length distribution of a given species within an area was computed by simple adding of the length frequencies obtained in representative trawl samples within the area. In the case of co-occurrence of target species, the s_A value was split in accordance with length distribution and catch rate in numbers in the trawl catches. Biomass per length group (B_i) was estimated by applying measured weights by length (W_i) when available or theoretical weights (calculated by using condition factors), multiplied with number of fish in the same length group (N_i). The total biomass in each area was obtained by summing the biomass of each length group. The number and biomass per length group in each concentration were then added up to obtain totals for each region. For carangids and other species (P2), a mean length of 22 cm was used in the biomass calculations.

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

Biomass estimates based on swept-area method

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

$$B = \frac{A}{a} . \frac{\overline{X}}{\mathrm{q}} \qquad (6)$$

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

$$\overline{X}_{st} = \frac{1}{N} \sum_{i=1}^{k} N_i \overline{X_i} = \sum_{i=1}^{k} W_i \overline{X_i} \qquad (7)$$

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

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

where n_i is number of hauls in the i^{th} stratum and n is the total number of hauls in the survey.
Table 1.1 shows the areas used in the swept-area method to estimate biomass for the different regions. A stratified semi-random design was used with depth and country as stratification factors. Estimated total biomass by species/group was obtained by summing estimates for each depth stratum.

For conversion of catch rates (kg/hour) to fish densities (t/NM²), the effective fishing area was considered as the product of the wing spread and the haul length, or distance over the bottom, as measured by means of the SCANMAR® equipment based on GPS readings. The area swept for each haul was thus 18.5 times the distance trawled, raised to NM²/hour. The catchability coefficient (q), i.e the fraction of the fish encountered by the trawl that was actually caught, was conservatively (and for comparison with previous surveys) assumed equal to 1. Mean fish densities by species and strata were calculated by the swept-area module in NAN-SIS.

Total biomass estimates by species and their confidence intervals were obtained from a stratified mean density estimator and raised to total area. Since NAN-SIS does not produce variance estimates of the mean densities, the 95% confidence limits for the biomass estimates were calculated with the underlying assumption that the coefficient of variation (CV = SD/mean) is constant when catch rates in kg/hour are converted to densities (t/NM²). In other words the area swept (normalised per hour) was approximately constant for each haul. Variance of the densities were estimated from the mean and the CV were used to calculate standard error (SE) on the arithmetic mean and confidence intervals.

2.8 Biodiversity estimates

Specific richness and species diversity index H' values were computed for the whole surveyed area and for the three subareas (East, Central, West) in which the surveyed area was arbitrarily divided (Figure 1d).

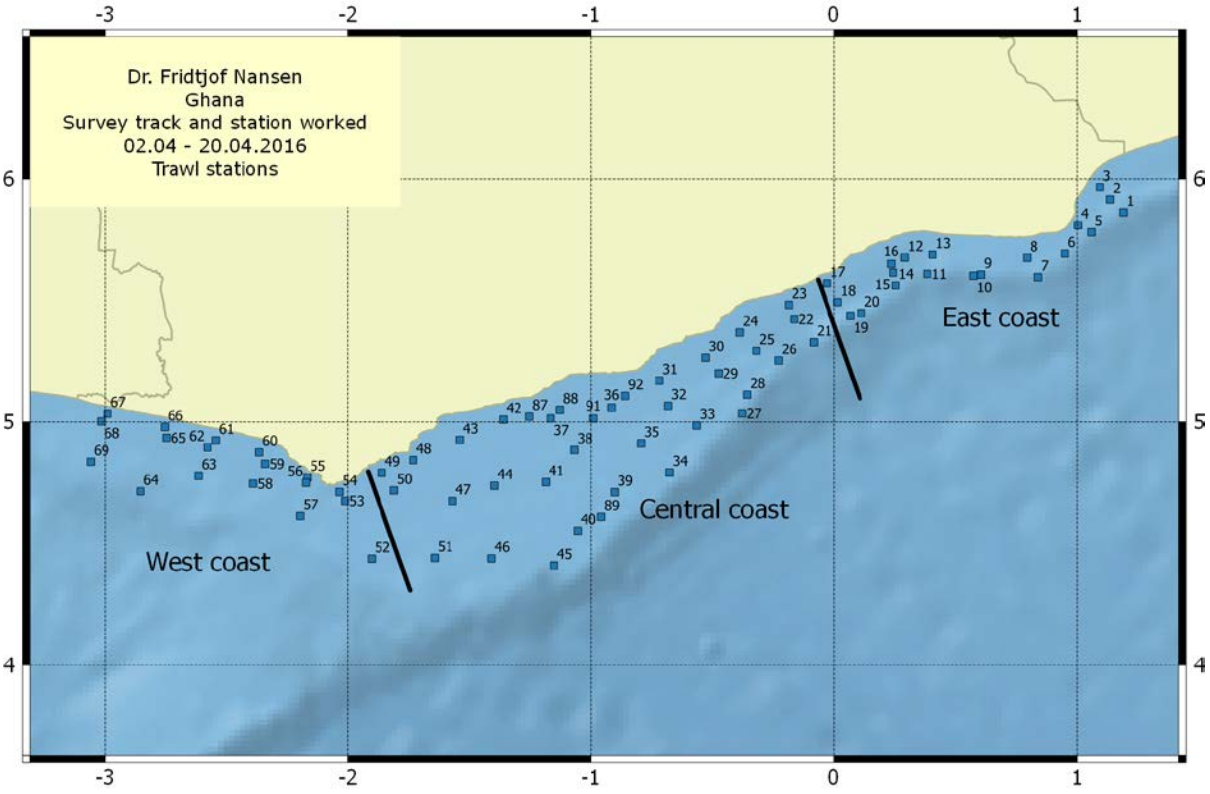


Figure 1d. Map showing the surveyed area. Black lines indicate the limits of the three subareas.

Species richness (S) is here intended as the number of species occurring in a well defined area. "Species diversity" index (H') was calculated using the Shannon-Wiener equation: $H' = -\Sigma p_i \log_n p_i$, where p_i is the proportion of individuals in a given species.

The relative importance of each species in the trawl catches within each depth stratum and subarea was assessed by calculating the IRI index:

Equation 1: $IRI = (\%N + \%W) * \%F$ (Pinkas et al. 1971)

Where

$\%N_i$ = number of individuals of species i divided by the total number of individuals in the given depth stratum and subarea, expressed as a percentage;

$\%W_i$ = weight of species i divided by the total weight of individuals in the given depth stratum and subarea, expressed as a percentage;

$\%F_i$ = number of hauls in which species i occurs divided by the total number of hauls in the given depth stratum and subarea, expressed as a percentage;

The values of the IRI were then standardized using the following equation:

Equation 2: $\%IRI_i = \frac{IRI_i}{\sum_{j=1}^{S} IRI_j}$ (Kolding 1989)

Where S is the total number of species in all trawl hauls in the given depth stratum and subarea.

Due to dis-homogeneity between fishing gears, data deriving from Pelagic and Manta trawl stations were excluded from the species diversity (H') and IRI analyses.

Catches were sorted to species (or lowest taxon possible) using taxonomic identification sheets (Carpenter and De Angelis, 2014, 2016). No author names or year of description appear with species names that are included in the present report. These are easily obtainable from the California Academy of Sciences' Catalog of Fishes (http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp) and World Register of Marine Species (http://www.marinespecies.org/) websites.

CHAPTER 3 OCEANOGRAPHIC CONDITIONS

Surface distribution

The surface layer temperature was continuously recorded during the cruise. Figures 2a shows the horizontal distribution of sea surface temperature (SST). In most of the area the temperature ranged between 28-29° C.

The surface salinity (Figures 2 b) ranged between 35.0 psu and 35.2 psu in most of the survey area.

Vertical sections

Figures 3a-b show the vertical distribution of temperature, salinity, dissolved oxygen and fluorecence as recorded on the two hydrographic transects worked during the survey. There were only small differences between the profiles. The thermocline was found between 25 and 50 m depth. A relatively flat structure was observed in most sections with no clear signs of vertical water displacement and upwelling.

Surface temperature ranged from 27.3 – 28.9° C off Accra and 28.1 – 28.6° C off Cape Three Points. In all areas temperature at 400-500 m depth was 8-9° C. Salinity ranged from 34.3 – 34.4 psu at the surface off Accra and 34.5 – 35.0 psu off Cape Three Points. At 400-500 m depth the salinity was 34.8 psu. Dissolved oxygen values ranged between 2 ml/l at the bottom and 4 ml/l at the surface in all areas. There was no sign of low bottom oxygen content on the shelf.

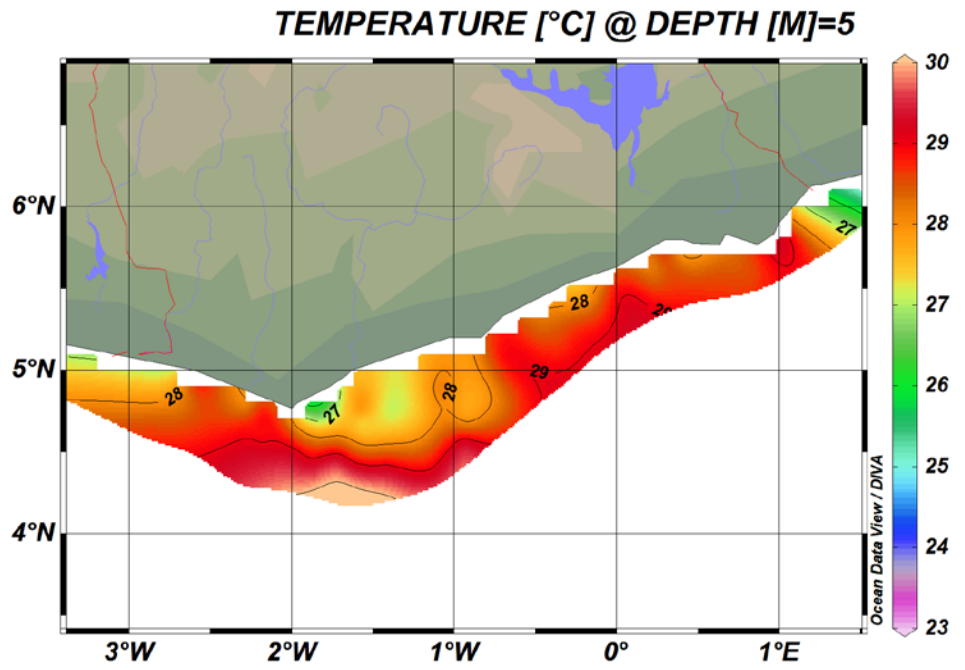


Figure 2a. Horizontal distribution of surface temperature (5 m depth).

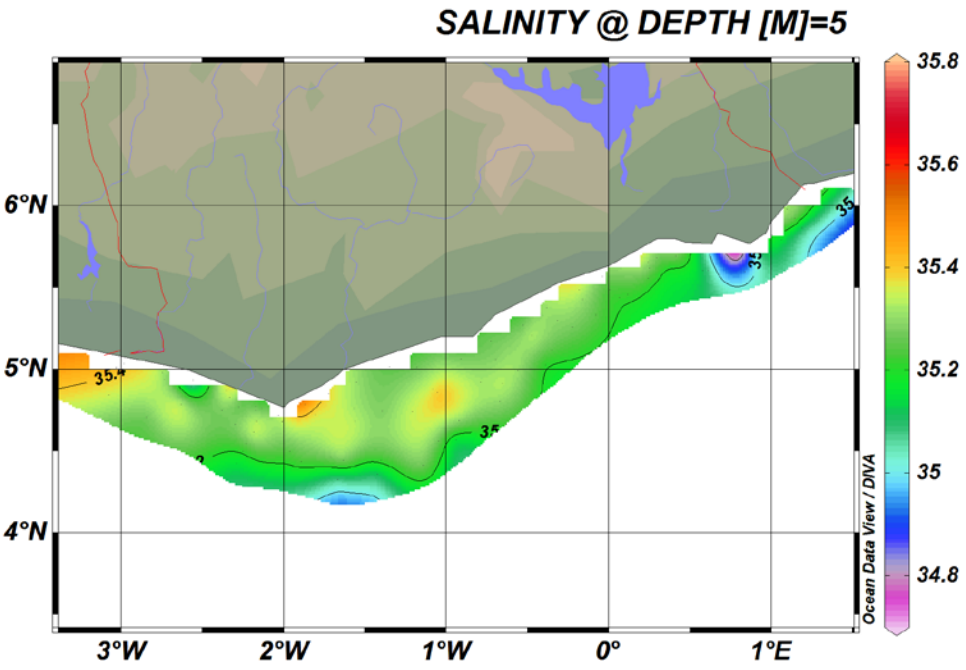


Figure 2b. Horizontal distribution of salinity (5 m depth).

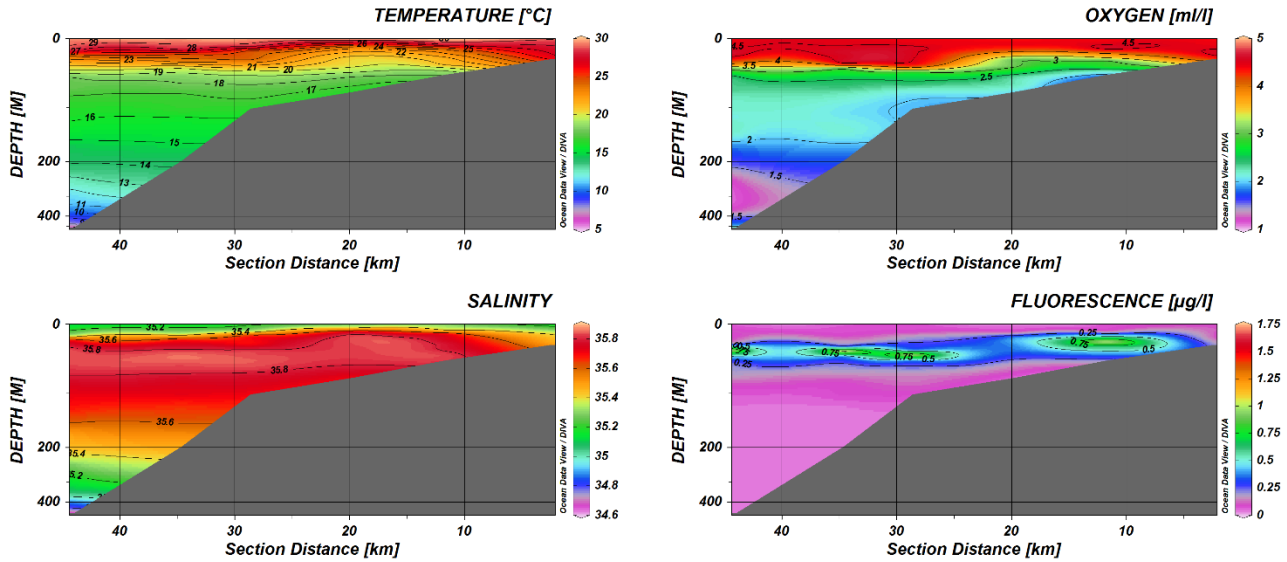
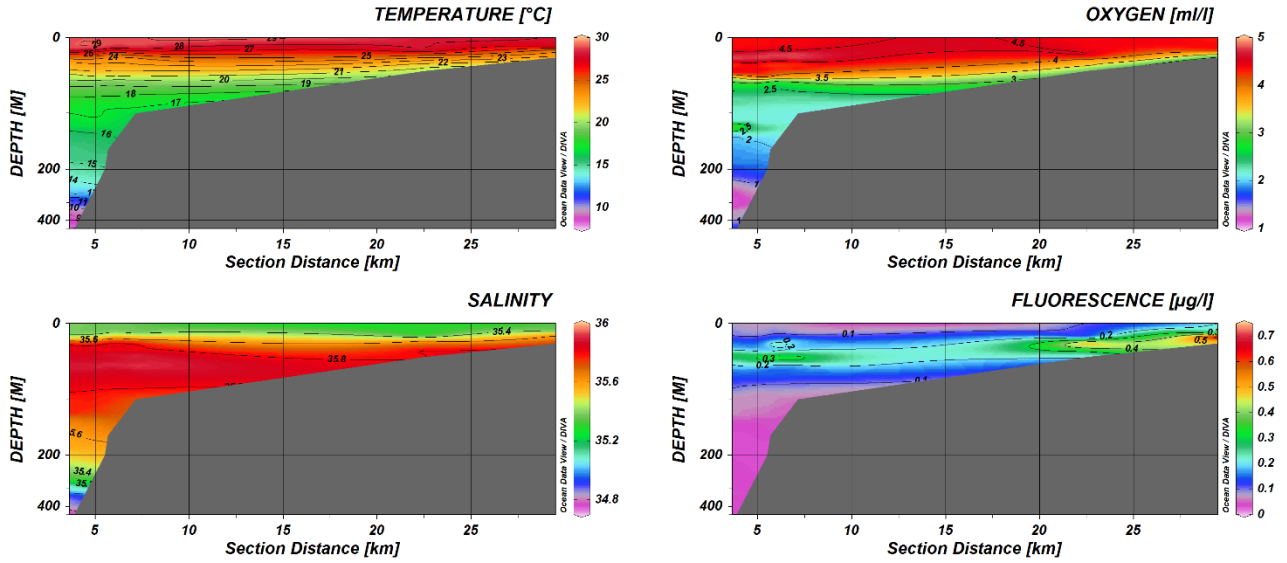


Figure 3 a). Vertical sections of temperature, salinity and oxygen at Cape Three Points



b)

Figure 3 b). Vertical sections of temperature, salinity and oxygen at Accra.

CHAPTER 4 PLANKTON

Of all eleven zooplankton groups identified, Calanoida were dominating in terms of both abundance and diversity, thirty-one (31) species and four hundred and twenty-three (423) individuals. Then Cyclopoida and Harpacticoida were the next in order of high diversified and numbers. The Cyclopoida had fourteen (14) species and, three hundred and six entities (306). The large numbers of Harpacticoida, one hundred and five (105) with four (4) species appears bewildering, though the least among the copepods. The least among the groups were the Gastropoda with two (2) entities. Large numbers of calanoid copepodites (1754) were also encountered and enumerated as well as fish eggs (91) and larvae (22), however only six (6) *Sardinella* eggs and one (1) larva were enumerated. While only four (4) anchovy eggs and five (5) larvae were encounter and enumerated, Figure 4.

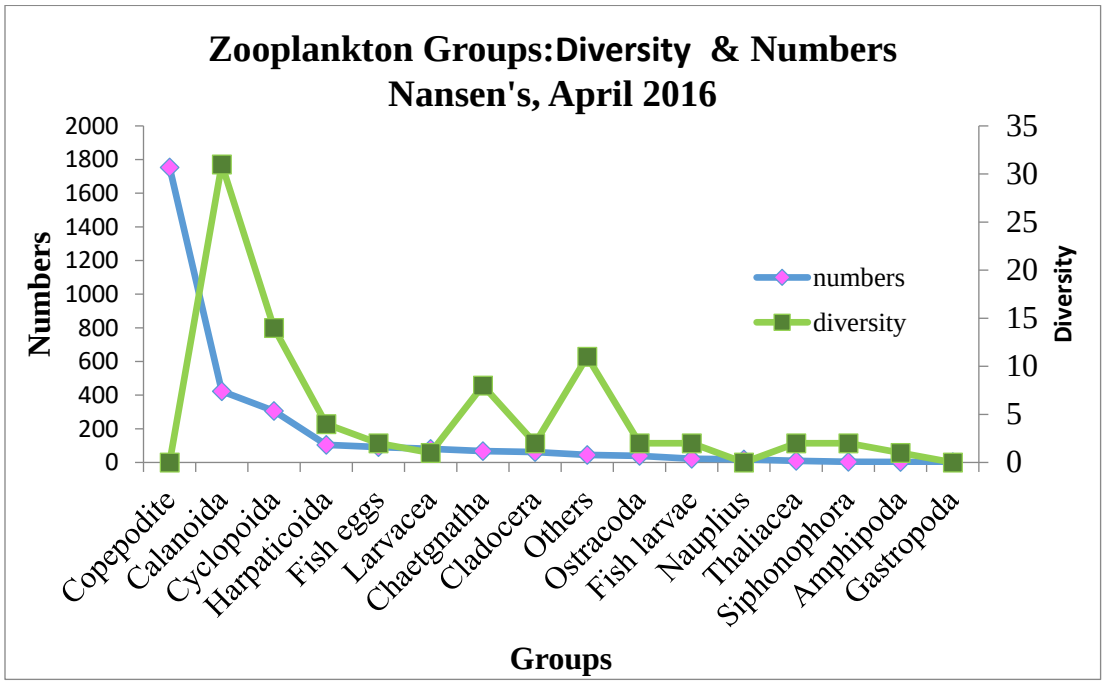


Figure 4. Number of main groups and biodiversity of the groups in the samples.

Alltogether, sixty-seven (67) species with 1148 individuals were encountered, identified and counted. However, only the first twenty-five (25) species with up to ten (10) entities have been considered for, in plotting the graph. *Temora stylifera* dominating as usual with one hundred (100) entities, then *Oikopleura logicauda* and *Oncaea venusta* with eighty-one (81) and seventy-seven (77) individuals respectively. *Corycaeus speciosus* and *Sagitta enflata* were the least among the species considered with ten (10) entities each. The higher numbers of *Microsetella rosea* (67) and *Macrosetella gracillis* (36) are very interesting (see Figure 5).

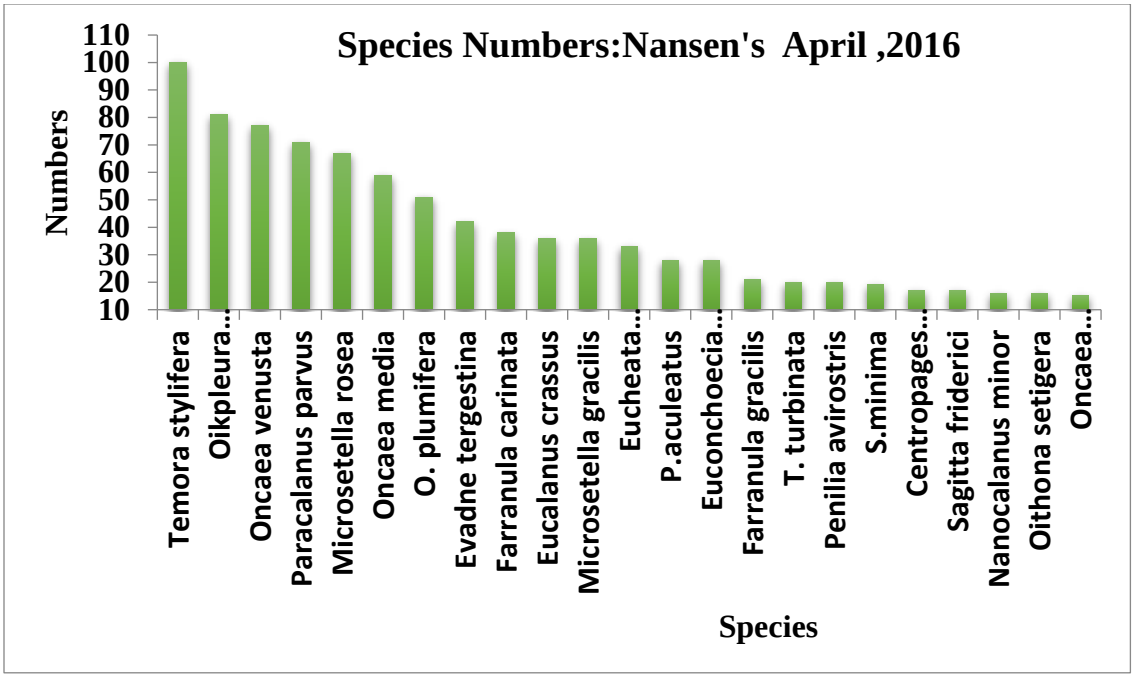


Figure 5. Main species in the samples.

Discussions and Conclusions

Low numbers of fish eggs and larvae in particular anchovy could be an indication of dwindling fishery since environmental conditions should be favouring for high production of anchovy eggs and larvae. However, the analysis of anchovy eggs and larvae data from FSSD on seasonal variations between 1970 and 1995 indicates that the eggs peak in May, the peak of the major thermal period whiles the larvae peak in June, the transitional period from the major thermal to major upwelling periods. But then numbers are just not acceptable. The least ever recorded for the eggs and larvae was in 1985 and 1984 with eight (8) and seventy-five (75) individuals respectively. The higher abundance of calanoid copepodites confirms the existence of the major thermal period where the copepodites are yet to mature to adult to coincide with the major upwelling. Most of them were of the *Temora* genus. This makes enough food available to fishes especially *Sardinella* species, which feed on copepods in particular the *Calanoides carinatus* even as adult. The dominance of *T. stylifera* is normal since it's a warmer species , however the over dominance of *T. stylifera* as temperatures warm up as result of global warming from climate change could cause a shift in the zooplankton community structure. Its dominance in even upwelling zooplankton samples is overwhelming and this may cause the overtaking of the colder species - *Calanoides carinatus* and cause food shortage for *Sardinella* species . This is already being experience in our waters in a way.

The higher numbers of Harpacticoida species such as *M. rosea* and *M. gracillis* is very interesting and needs further investigation. Over the years in the records of zooplankton groups and species identification, it's the first time the Harpacticoida have recoded higher number of individuals. This

concides with the fact that, its the first time the WP-2 net of 180µm had been used to sample zooplankton in our waters and the Gulf of Guinea as a whole.

Chaetgnatha are fish eggs and larvae predators and great number of them pose a threat to the fisheries as they prey on their eggs and larvae.

CHAPTER 5 PELAGIC FISH

The maps of the main groups of pelagic fish (Figure 6 a-c), i.e. sardinellas, anchovies and PEL 2 (mainly carangids), show the distribution as observed with the acoustic integration system. The acoustic densities (in m^2/NM^2) are illustrated by a scale used on acoustic surveys with "Dr. Fridtjof Nansen".

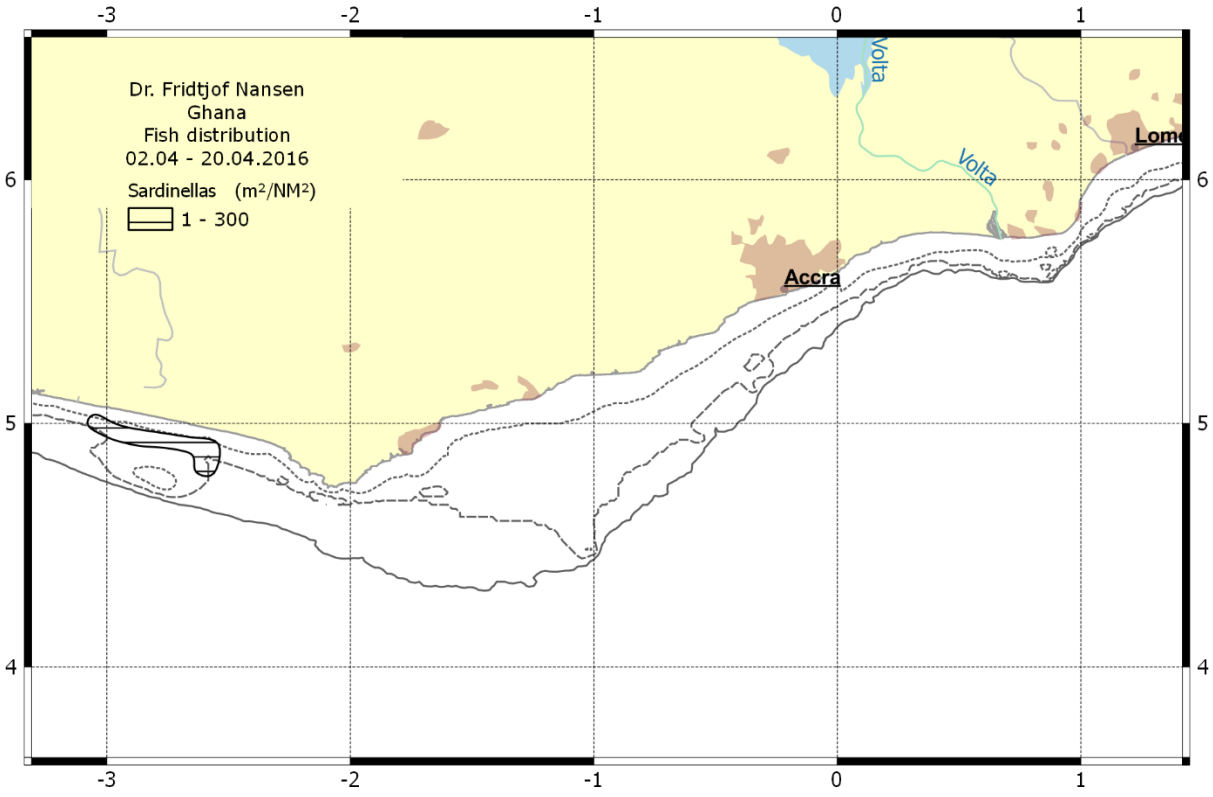


Figure 6a. Distribution of *Sardinella* spp. Depth contours as in Fig. 1.

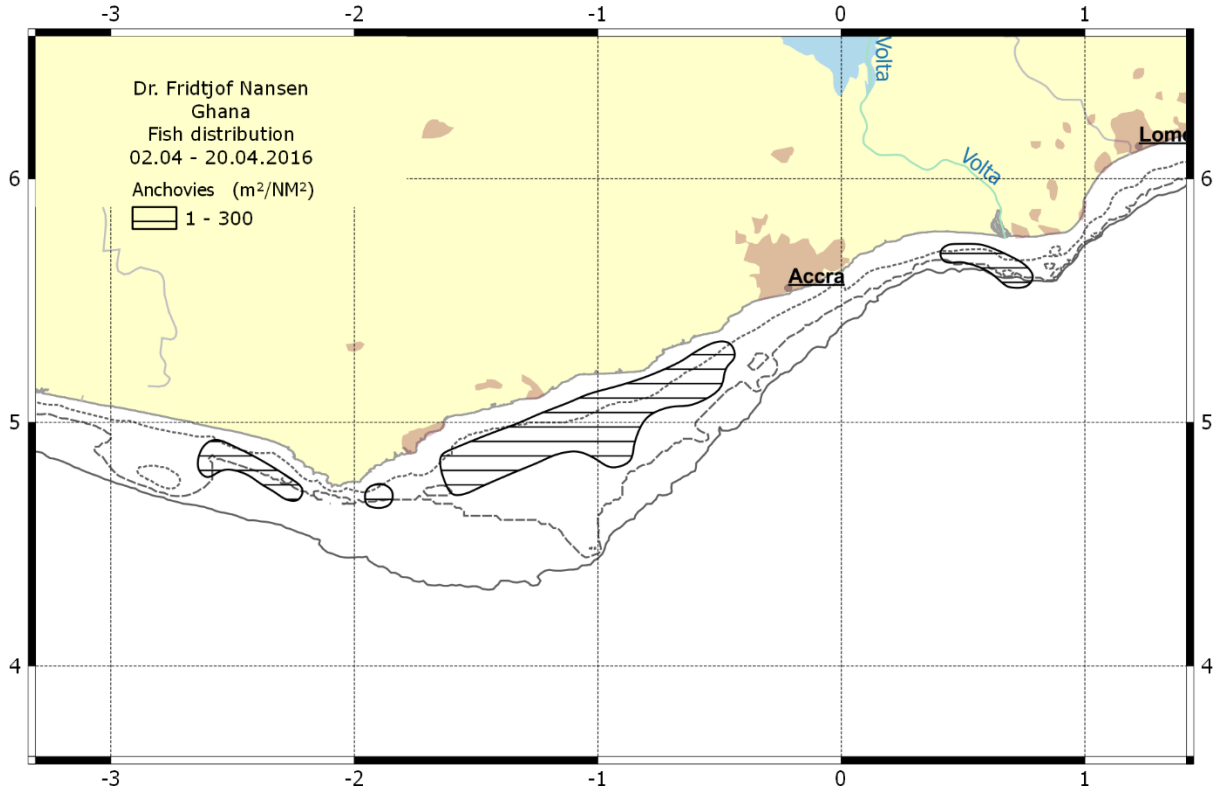


Figure 6b. Distribution of anchovy (*Engraulis encrasicolus*) . Depth contours as in Fig. 1.

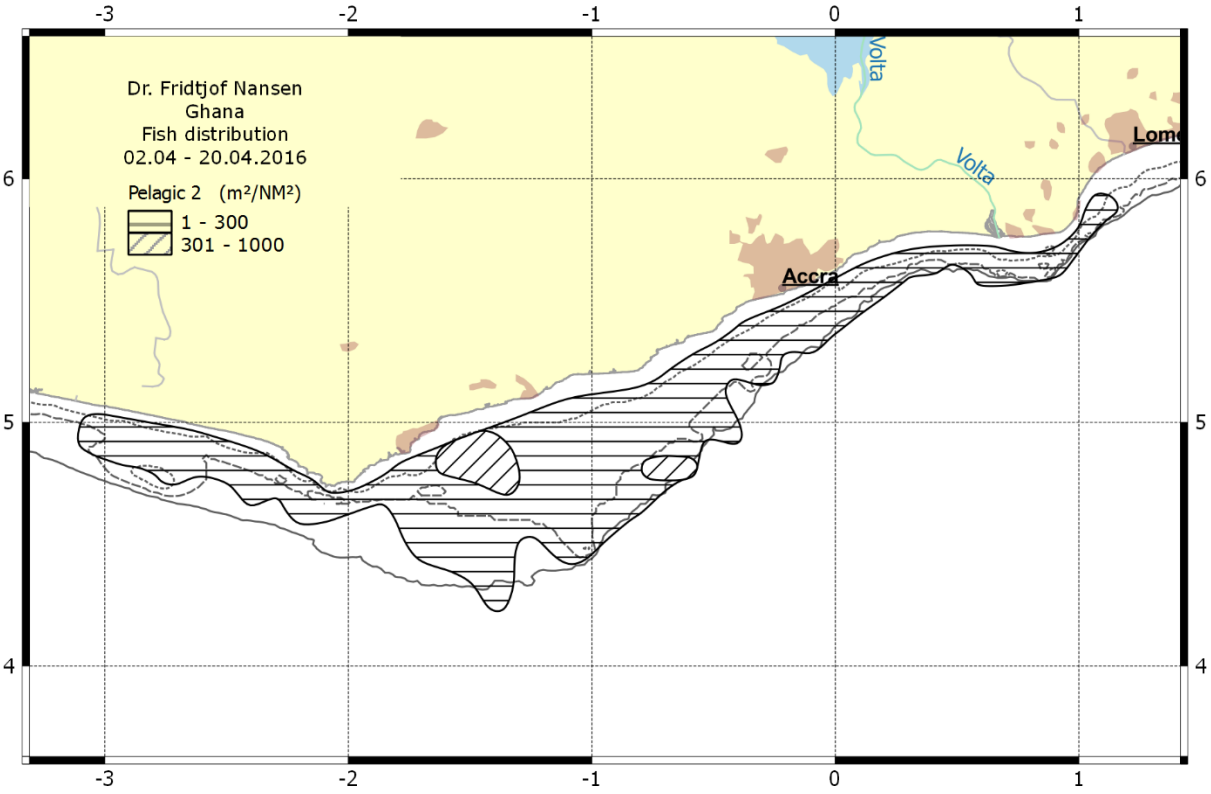


Figure 6c. Distribution of PEL 2 (carangids, scombrids, barracudas and hairtail). Depth contours as in Fig. 1.

5.1 Distribution and abundance of pelagic fish

Clupeids

Sardinellas occurred in trawl hauls only a few places on the inner shelf west of Cape Three Points (Figure 6a). A few schools of low density were allocated to sardinellas in this area (Fig. 6a). The total biomass of sardinellas was estimated to be about 500 tonnes, applying pooled and non-weighted length distributions from pelagic trawl hauls and a condition factor of 0.83 for *S. maderensis*.

Anchovy

Many schools of *Engraulis encrasicolus* were recorded on the inner shelf in Ghanaian waters. In shallow waters, mostly at depths between 20 and 30 m schools schools of various density appeared both at day and nighttime. (Figure 6b). Catches of anchovy (4 – 7 cm) were obtained both by pelagic and bottom trawl hauls in the areas of acoustic registrations. The biomass of anchovy was estimated to be about 25 000 tonnes, applying the estimated factors, a = 0.0156 and b= 2.58 in the relationship $w = a*L^b$.

PEL 2 (carangids, scombrids, barracudas and hairtail)

This group consisted mainly of carangids. *Chloroscombrus chrysurus* (3-28 cm) and *Decapterus punctatus* (4-26 cm) were the most abundant species in the trawl catches, caught on the whole shelf area. *Scomber japonicus* and *Scomberomorus tritor* were the most abundant scombrids in the trawl hauls. The barracudas, *Sphyraena guachancho* and *S. sphyraena,* were also quite abundant, mainly at the inner shelf. The hairtail *Trichiurus lepturus* was also caught at some pelagic trawl stations. Small low-density schools of PEL 2 species were detected all over the shelf, both the inner and outer part (Figure. 6c). The biomass of PEL 2 was estimated to be 107 000 tonnes, applying a decided length (assumed average) of 22 cm and a condition factor of 0.88.

5.2 Review of pelagic fish biomass results

In this period of the year, it is not expected to find a larger abundance of pelagic fish in Ghana. For sardinella, only few specimens were caught in the trawl hauls, and sardinella were only detected in a very restricted area west of Cape There Points.

Anchovy was detected in schools in the inner parts of the shelf, shallower than 30 m. The anchovy had a modal length of 7 cm and the total biomass was estimated at 25 000 tonnes.

Carangids and associated species was found over more or less the entire shelf. The total biomass estimate of PEL 2 of 107 000 tonnes is the highest in the time series.

Table 2. Acoustic biomass estimates of main pelagic groups (tonnes) a) Sardinellas and anchovies (PEL 1) and b) carangids, scombrids, barracudas and hairtail (PEL 2) from surveys with "Dr. Fridtjof Nansen" off Côte d'Ivoire, Ghana, and Benin-Togo in 1981, 1989, 1999, 2000, 2002, 2004, 2005 and 2006.

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin – Togo	Benin (765)	Togo (327)	Total
1981	June	39 000	40 000	[1]			79 000
1989	12.10 – 20.10	6 000	41 000	not covered			47 000
1999	19.4 – 8.5	42 000	40 000	5 000[3]	3 500	1 500	87 000
2000 [2]	29.8 – 15. 9	111 000	56 500		1 700	6 500	175 700
2002[2]	16.7 – 9.8	34 000	73 000		1 500	-	108 500
2004	16.5 – 9.6	68 000	68 000		18 600	3 200	157 800
2005	4.5 – 27.5	37 000	54 000		3 300	500	94 800
2006	19.5 - 5.6	62 000	57 000		1 000	1 000	121 000
2007[4]	6.6 – 11.6	1 000	20 000		-	-	21 000
2016	01.04 – 20.04	Not covered	25 000		Not covered	Not covered	

Table 2 cont. b) Carangids, scombrids, barracudas and hairtail (PEL 2)

Survey Year	Survey period	Côte d'Ivoire	Ghana	Benin – Togo	Benin (765)	Togo (327)	Total
1981	June	2 000	10 000	[1]			12 000
1989	12.10 - 20.10	33 000	57 000	not covered			90 000
1999	19.4 - 8.5	30 000	50 000	4 000[3]	2 800	1 200	84 000
2000[2]	29.8 - 15. 9	18 000	61 000		1 500	2 500	83 000
2002[2]	16.7 - 12.8	10 500	52 000		2 600	100	65 200
2004	16.5 - 9.6	19 000	37 000		1 900	200	58 100
2005	4.5 - 27.5	30 000	46 000		4 700	500	81 200
2006	19.5 - 5.6	19 000	37 000		3 900	700	60 600
2007[4]	6.6 – 11.6	2 000	20 000		-	-	22 000
2016	1.04 – 20.04		107 000				

[1)]The estimated biomass for pelagic species (PEL 1 + PEL 2) was 14 000 tonnes (Strømme, T., Føyn, L. and Sætersdal, G. 1983). [2)] Upwelling season

[3)] 1999 values are splitted proportional to the shelf area (in parenthesis in NM^2).

[4)] The survey in Cote d'Ivoire and Ghana covered only the area between Abidjan and Tema and data are not directly comparable to previous surveys.

CHAPTER 6 DEMERSAL FISH

The composition of the fish fauna on the continental shelf and slope of the western Gulf of Guinea changes with depth (Williams 1968). The catch-distribution analyses were therefore performed for two depth strata on the shelf, 0-50 m (inner shelf) and 51-100 m (outer shelf). In the analyses the "Demersal" group includes commercially important families as Sciaenidae, Haemulidae/Pomadasyidae, Serranidae, Sparidae, Lutjanidae, Lethrinidae, Ophidiidae, while the "Pelagic" group includes Engraulidae, Clupeidae, Carangidae, Scombridae, Sphyraenidae and Trichiuridae (the latter family is actually mainly benthopelagic). For the different analysis the "other" group includes all species not accounted for in the groups listed. Therefore, the content of "other" will change from table to table.

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

In the swept-area biomass estimates, only the shelf area down to depths of 100 m was included, divided into 0-30 m, 30-50 m and 51-100 m.

6.1 Results of the swept area survey

A total of 66 swept-area trawl hauls (3 deeper than 100 m are not included in the biomass estimations) were made on the shelf off Ghana. Table 3 a-b present catch rates by main groups for the inner (0-50 m) and outer (51-100 m) shelf, respectively. The pelagic species group had the highest average catch rate on the inner shelf with a relative contribution of 49 %, closely followed by the demersal group (30 %). The group "other" contributed 19 %. cephalopods made up 2.0 % of the catch, while shrimps and sharks contributed less than 1% to the catch rates. On the outer shelf the demersal group dominated the catches, contributing 47% to the total. The pelagic group had a relative contribution of 28 % and others 18 %. cephalopods with 6 % of the catch had higher catch rates than on the inner shelf, and sharks contributed with only 1% .

Table 4 a-b shows catch rates of the most important pelagic families caught in the bottom-trawl hauls. Carangids dominated the inner shelf with a mean catch rate of 105 kg/h. The most frequently occurring species of carangids were *Decapterus punctatus*, *Chloroscombrus chrysurus*, *Alectis*

alexandrinus, *Selene dorsalis*, *Selar crumenophthalmus*, and *Caranx crysos*. The second most important group was the barracudas (19 kg/h). Clupeids had a very low catch rate of only 3 kg/h. Carangids were also the most abundant group on the outer shelf (70 kg/h) and clupeids where also here represented by a very low number (2 kg/h). Barracudas had lower average catch rate on the outer shelf (5 kg/h), while scombrids and hairtails (*Trichiurus lepturus*) were scarce on both the inner and outer shelf.

Table 3. Catch rates (kg/h) by main groups in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0 – 50m

Station	Depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Other	Total
2	46.5	177.5	53.9	0.2	38.8	0	48.6	319
3	28	38.1	376.8	0	2.7	0	55.8	473.4
4	28.5	26.5	54.7	0.3	9.2	0	69.7	160.4
5	49	66.8	60.1	0	4.5	0	27.7	159.1
6	17.5	61.1	8.9	0	0.6	0	50.9	121.5
7	35.5	73.6	1.4	0	3.3	0	49.6	127.9
8	21.5	107.5	67.4	16.2	5.8	0	167.8	364.7
9	46.5	24	27.4	0.1	8	0	11.1	70.6
12	27.5	62.6	0	0	17.7	0	146.8	227.1
13	27	151.4	9.1	0	12.9	0	204.1	377.5
16	41.5	97.9	4.7	0.1	13.4	0	25.8	141.9
17	29	369.5	1079.4	1.1	0	0	129.2	1579.2
18	48.5	99.1	5.6	0	3.8	0	53.8	162.3
22	43.5	106.9	339.7	0	7	0	79.3	532.9
23	27	65.6	18	0	3.4	0	37.6	124.6
24	27	92.2	31.2	0	0.2	0	158.1	281.7
25	47.5	101.9	3376.8	0	0	0	63.5	3542.2
29	39	13.5	4.1	0	0.6	0	20.5	38.7
30	28	84	34	0	0.1	0	164	282.1
31	27.5	7.8	21.2	0	2.5	0	25.3	56.8
32	38	16.8	21.5	0	0	0	32.4	70.7
35	41	28.9	13.1	0	2.9	0	67.6	112.5
36	27.5	21.4	1.8	0	4.4	0	458.8	486.4
37	29	5.2	78.7	0	14.7	0	52	150.6
38	39	1.1	26.9	0	0	0	1.6	29.6
41	43.5	26.4	14.7	0	4.4	0	27	72.5
42	23.5	128.5	218.3	0	0.9	0	21.3	369
43	29	197.1	191.5	0.9	0.4	0	6.3	396.2

44	46.5	2.1	0.3	0	13.1	0	30.1	45.6
47	48.5	281.1	981.9	0	64.9	0	87.5	1415.4
48	27.5	43.3	78.7	3	1.2	0	13	139.2
49	28	99.6	72.8	2.3	2.7	0	38.1	215.5
50	46.5	424.9	329.8	0	14.9	0	293.4	1063
53	46.5	8.2	9	0	4.7	0	5.6	27.5
54	28.5	137.7	25.8	2.3	7	0	21.3	194.1
55	29	76.3	78.5	5.5	9.5	0	102.3	272.1
56	37	130.5	68.5	2.6	1.6	0	21.2	224.4
59	39.5	39.6	87	0	11.2	0	168.1	305.9
60	27.5	37.8	23	4	1.9	0	17.9	84.6
61	27.5	322.4	43.8	0	49.7	0	63.5	479.4
62	40.5	19	422.4	0.7	0.6	0	11.4	454.1
65	41	172.2	72.5	0	1.9	7.7	21.7	276
66	27.5	14	28.1	0	3.3	0	16.3	61.7
67	24	232.9	62.7	0.2	0.8	0	145.7	442.3
68	40	986.3	53.7	0	0	1.9	13.6	1055.5
Mean	34.7	117.4	190.7	0.9	7.8	0.2	73.9	390.8
SE		24.6	79.8	0.4	1.9	0.2	12.9	87.9
% Catch		30.0	48.8	0.2	2.0	0.1	18.9	

b) Outer shelf, 51 – 100m

Station	Depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Other	Total
1	86.5	230	35	0	329	68.6	110.1	772.7
10	58	218.3	672	0	56.4	16.3	88.9	1051.9
11	86.5	267.3	6.6	0	27.4	2.3	47.2	350.8
15	56.5	29.1	96.3	0	18.4	0	26.9	170.7
19	86.5	185.3	154.4	0	5.3	3.7	62.5	411.2
21	76	206.2	70.3	0	1.8	1.9	74.3	354.5
26	80.5	91.3	46.4	0	0.9	8.1	54.2	200.9
28	67	7.2	34.1	0	4.5	0	22.6	68.4
33	54.5	33.6	43.6	0	6.3	0	52.2	135.7
34	77	138.6	566.9	0	21.3	6.4	234.5	967.7
39	56	118.4	94.5	0	14.1	3.4	44.5	274.9
40	59.5	435.6	9.9	0	14	0	69	528.5
45	86	257.3	68.5	0	4.8	0	71.9	402.5
46	63.5	19.4	58.4	0	1.1	0	11.2	90.1
51	69.5	14	27.6	0	2.9	0	296.4	340.9
52	88	100.4	18.9	0	6.4	8.6	14.1	148.4
57	76.5	18.3	44.3	0.1	7.1	0	41.5	111.3
58	63	960.8	158.4	1	8.3	0	124.1	1252.6
63	67	270.6	34.3	0	14.3	0	42.2	361.4

64	87	385.2	2.4	0	4	0	36.2	427.8
69	82.5	10.4	132.7	0	0.7	0	20.3	164.1
Mean	72.7	190.3	113.1	0.1	26.1	5.7	73.6	408.9
SE		47.4	38.2	0.0	15.4	3.3	15.5	72.8
% Catch		46.6	27.7	0.0	6.4	1.4	18.0	

Table 4. Catch rates (kg/h) by main pelagic families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (51-100 m).

a) Inner shelf, 0 – 50m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
2	46.5	0	52.3	0	0	1.7	265	319
3	28	36.9	128.9	0	0	0	307.6	473.4
4	28.5	0	36.5	0	0	11.5	112.4	160.4
5	49	0	57.8	0	1	1.3	99	159.1
6	17.5	0	2.2	0.5	0.1	6.1	112.6	121.5
7	35.5	0	1.4	0	0	0	126.5	127.9
8	21.5	0.1	43.9	0.8	0	22.5	297.4	364.7
9	46.5	0	9.6	0	3.7	0	57.3	70.6
12	27.5	0	0	0	0	0	227.1	227.1
13	27	0	9.1	0	0	0	368.4	377.5
16	41.5	0	3.2	0	0	1.6	137.1	141.9
17	29	6.3	355.4	0	0	284.9	932.6	1579.2
18	48.5	0	5.6	0	0	0	156.7	162.3
22	43.5	0	332.3	0	0	7.4	193.2	532.9
23	27	0	16.4	0	0	1.6	106.6	124.6
24	27	0	15.2	16	0	0	250.5	281.7
25	47.5	78.2	1787.6	14	0	0	1662.4	3542.2
29	39	0	4.1	0	0	0	34.6	38.7
30	28	0	34	0	0	0	248.1	282.1
31	27.5	0	13.5	7.7	0	0	35.6	56.8
32	38	0	21.5	0	0	0	49.2	70.7
35	41	0	13.1	0	0	0	99.4	112.5
36	27.5	0	1.8	0	0	0	484.6	486.4
37	29	0.4	69.2	9.1	0	0	71.9	150.6
38	39	0.9	25.9	0	0	0	2.8	29.6
41	43.5	0	14.7	0	0	0	57.8	72.5

42	23.5	1.3	202.5	14.6	0	0	150.6	369
43	29	2.5	132.9	16.7	0	0.8	243.3	396.2
44	46.5	0	0.2	0	0	0	45.4	45.6
47	48.5	0	981.9	0	0	0	433.5	1415.4
48	27.5	2.2	32.9	0	3.1	37.5	63.5	139.2
49	28	0.4	33.5	0	0.4	38.6	142.6	215.5
50	46.5	0	13.4	0	0	312.2	737.4	1063
53	46.5	0	1.4	0	0	5	21.1	27.5
54	28.5	0	19.8	0	0	1.5	172.8	194.1
55	29	0	13.3	0	61.1	2.4	195.3	272.1
56	37	0.1	28.1	0	0	29	167.2	224.4
59	39.5	0	17.8	0	45.8	0	242.3	305.9
60	27.5	0	15	0.2	1.3	6.5	61.6	84.6
61	27.5	0	40.7	0	0	3.1	435.6	479.4
62	40.5	0.4	16.1	1.3	0	4.7	431.6	454.1
65	41	0.7	21.6	0	4.9	41.7	207.1	276
66	27.5	0	14	0	0	14	33.7	61.7
67	24	0.9	54.5	0.9	0	6.3	379.7	442.3
68	40	0	12.6	9.5	0	24.8	1008.6	1055.5
Mean	34.7	2.9	104.6	2.0	2.7	19.3	259.3	390.8
SE		1.9	45.0	0.7	1.7	9.2	45.8	87.9
% Catch		0.7	26.8	0.5	0.7	4.9	66.4	

b) Outer shelf, 51 – 100m

Station	Depth	Clupeids	Carangids	Scombrids	Hairtails	Barracudas	Other	Total
1	86.5	1.8	33.1	0	0	0	737.8	772.7
10	58	0	9.2	0	5.7	0	1037	1051.9
11	86.5	0	6.6	0	0	0	344.2	350.8
15	56.5	0	0	0	0	1.2	169.5	170.7
19	86.5	0	154.4	0	0	0	256.8	411.2
21	76	0	70.3	0	0	0	284.2	354.5
26	80.5	0	26.8	0	0	19.6	154.5	200.9
28	67	0.5	33.6	0	0	0	34.3	68.4
33	54.5	0	43.1	0	0	0.5	92.1	135.7
34	77	2.4	563.3	0	0	1	401	967.7
39	56	1.4	93.1	0	0	0	180.4	274.9
40	59.5	0	3.6	6.3	0	0	518.6	528.5
45	86	0	68.5	0	0	0	334	402.5
46	63.5	16.2	42.2	0	0	0	31.7	90.1
51	69.5	0	27.6	0	0	0	313.3	340.9
52	88	0	18.9	0	0	0	129.5	148.4
57	76.5	1.5	29.2	1.3	3.7	6.9	68.7	111.3
58	63	5.8	84.7	0	3	64.9	1094.2	1252.6

63	67	5.3	22.2	0	0	6.7	327.2	361.4
64	87	0	0.3	0	0	2.1	425.4	427.8
69	82.5	0	131.2	0	0	1.5	31.4	164.1
Mean	72.7	1.7	69.6	0.4	0.6	5.0	331.7	408.9
SE		0.8	26.3	0.3	0.3	3.2	65.8	72.8
% Catch		0.4	17.0	0.1	0.1	1.2	81.1	

Catch rates of some of the most commercially important demersal species on the shelf down to 100 m, grouped as seabreams (Sparidae except *Boops boops*), snappers (Lutjanidae), groupers (Serranidae), grunts (Haemulidae except *Brachydeuterus auritus*) and croakers (Sciaenidae) are presented in Table 5 a-b. Seabreams had the highest catch rates both on the inner and outer shelf with average catch rates of 34 kg/h and 100 kg/h, respectively. The most common species of seabreams were *Pagellus bellottii*, *Dentex canariensis*, *Pagrus caeruleostictus*, *D. congoensis*, *D. angolensis* and *D. gibbosus*. The second most important group was the snappers with average catch rates of 1.4 and 13.9 kg/h, respectively. Then came grunts (7.8 and 0 kg/h), croakers (6.1 and 0 kg/h) and groupers (2.7 and 1.3 kg/h).

Table 5. Catch rates (kg/h) of commercially important demersal species grouped by families in swept-area bottom-trawl hauls on the a) inner shelf (0-50 m) and b) outer shelf (50-100 m).

a) Inner shelf, 0 – 50m

Station	Depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
2	46.5	0	7.2	0	57.3	0	254.5	319
3	28	0	4.2	0	23.1	0	446.1	473.4
4	28.5	0	7.5	5.6	4.4	3.2	139.7	160.4
5	49	0	7.9	0	29.3	0	121.9	159.1
6	17.5	28.7	0.7	0	0	6.8	85.3	121.5
7	35.5	0	3.6	0	67.1	0	57.2	127.9
8	21.5	43.1	4.6	0	2.3	0.1	314.6	364.7
9	46.5	0	2.2	0	6.1	0	62.3	70.6
12	27.5	0	0	0	53	0	174.1	227.1
13	27	0	0	0	129.2	18.5	229.8	377.5
16	41.5	0	0.1	0	97.7	0	44.1	141.9
17	29	48.3	2.1	0	23.2	1	1504.6	1579.2
18	48.5	0	5.9	0	92.8	0	63.6	162.3
22	43.5	0	1.7	0	102.2	1.4	427.6	532.9
23	27	0	11	0	53.6	1	59	124.6
24	27	0	1.8	0	54.4	3.4	222.1	281.7
25	47.5	0	11.2	0	90.8	0	3440.2	3542.2
29	39	0	0	0	13.4	0	25.3	38.7
30	28	0	0.6	0	69.6	2	209.9	282.1
31	27.5	0	3.4	0	3.5	0	49.9	56.8
32	38	0	0	0	12.6	2	56.1	70.7
35	41	0	1.7	0	19.8	6.6	84.4	112.5

36	27.5	0	1.7	0	16.7	0	468	486.4
37	29	0	0	0	5.2	0	145.4	150.6
38	39	0	0	0	1.1	0	28.5	29.6
41	43.5	0	0	0	18.9	7.5	46.1	72.5
42	23.5	0	0	0	41.3	0.9	326.8	369
43	29	12.7	0.6	0	12.2	0	370.7	396.2
44	46.5	0	0	0	2	0	43.6	45.6
47	48.5	0	25.6	0	255.5	0	1134.3	1415.4
48	27.5	1.9	0	0	0	0	137.3	139.2
49	28	8.5	0.2	1.8	0	0	205	215.5
50	46.5	0	4.2	1.4	76.6	10.7	970.1	1063
53	46.5	2.3	2.3	0	3.1	0	19.8	27.5
54	28.5	37.7	0	2.1	0	0	154.3	194.1
55	29	37.6	0.2	5.2	0	0	229.1	272.1
56	37	1.9	0	0	0	0	222.5	224.4
59	39.5	14.3	0	3.3	0	0	288.3	305.9
60	27.5	12.3	3.4	0	0	0	68.9	84.6
61	27.5	6.1	0	282.5	27.8	0	163	479.4
62	40.5	5.9	0	0	9.6	0	438.6	454.1
65	41	4.2	2.6	0.4	23.2	0	245.6	276
66	27.5	0.4	4.7	3	2.9	0	50.7	61.7
67	24	2.9	0	37.3	10	0	392.1	442.3
68	40	3.6	0	6.7	29	0	1016.2	1055.5
Mean	34.7	6.1	2.7	7.8	34.2	1.4	338.6	390.8
SE		1.9	0.7	6.3	7.1	0.5	84.7	87.9
% Catch		1.5	0.7	2.0	8.8	0.4	86.6	

b) Outer shelf, 51 – 100m

Station	Depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
1	86.5	0	0.5	0	222.7	0	549.5	772.7
10	58	0	1.9	0	12.2	0	1037.8	1051.9
11	86.5	0	0.6	0	261.8	0	88.4	350.8
15	56.5	0	0	0	29.1	0	141.6	170.7
19	86.5	0	0	0	140	0	271.2	411.2
21	76	0	0	0	204.2	1.9	150.3	354.5
26	80.5	0	1.9	0	76.5	0	122.5	200.9
28	67	0	0	0	6.4	0	62	68.4
33	54.5	0	7.4	0	20.7	0	107.6	135.7
34	77	0	0	0	104	0	863.7	967.7
39	56	0	14.8	0	98.7	0	161.4	274.9
40	59.5	0	0.7	0	145.4	289.3	382.4	528.5
45	86	0	0.5	0	239.4	0	162.6	402.5
46	63.5	0	0	0	18.7	0	71.4	90.1

51	69.5	0	0	0	12.4	0	328.5	340.9
52	88	0.5	0.1	0	97.6	0	50.2	148.4
57	76.5	0	0	0	5	0	106.3	111.3
58	63	0	0	0	2.9	0	1249.7	1252.6
63	67	0	0.4	0	9.4	0	351.6	361.4
64	87	0	0.1	0	384.5	0	43.2	427.8
69	82.5	0	0	0	8.7	0	155.4	164.1
Mean	72.74	0.02	1.38	0.00	100.01	13.87	307.49	408.90
SE		0.0	0.8	0.0	23.6	13.8	74.5	72.8
% Catch		0.0	0.3	0.0	24.5	3.4	75.2	

Table 6 presents swept-area biomass estimates for the valuable demersal groups and some other groups that occur in sizeable quantities. The estimated total biomass of valuable demersal groups was 16 048 tonnes, of which seabreams made up 81 % (12 959 t). The highest biomass of seabreams was found between depths of 51 and 100 m. Snappers had the second highest biomass with 1 450 tonnes. Of the pelagic and semi-pelagic groups, carangids had an estimated biomass of 19 403 tonnes, bigeye grunt (*B. auritus*) 12 301 tonnes, cephalopods 3 314 tonnes and barracudas and 2 522 tonnes.

Table 6. Biomass estimates (tonnes) of important species/groups on the shelf, by depth.

GHANA		Biomass				
Group/species	**0-30**	**30-50**	**50-100**	**Sum**	**Confidence limits**	
Seabreams	1056	3069	8833	12959	8426	17492
Grunts	587	33	0	620	-363	1604
Croakers	473	91	3	567	248	885
Groupers	90	235	127	452	226	678
Snappers	76	80	1293	1450	0	4020
Sum dem.val	2283	3509	10256	16048	8604	23491
Bigeye grunt	1426	4892	5983	12301	2422	22181
Carangids	2450	10733	6220	19403	6014	32792

Barracudas	825	1265	432	2522	329	4715
Cephalopods	289	607	2418	3314	426	6203

6.2 Review of demersal fish biomass results

Some of the 1999 and 2000 catch rates and biomass estimates were corrected in 2002. The new values are included in revised editions of the 1999 and 2000 reports and in the time series of later reports.

The "Demersal" group had quite similar mean catch rates in all surveys since 2002. Pelagic fish had high mean catch rates in 2000 and 2002, but much lower in the four other years.

Figure 7 shows the time series of biomass estimates of the valuable demersal groups through the years 2000, 2002, 2004, 2005, 2006, 2007 and 2016. The current estimate is similar to the estimate in 2007.

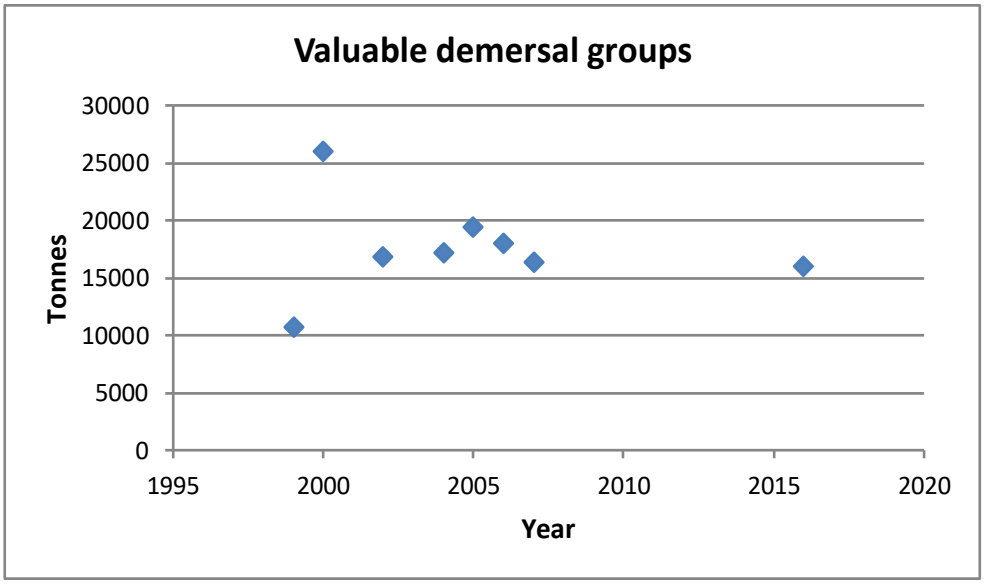


Figure 7. Time series of biomass estimates of demersal valuable fish in Ghana, 2000 – 2016.

Tables 7 summarize more details on mean catch rates and swept area biomass estimates of valuable demersal groups and a few other common groups covered during the present and five previous surveys in the Ghanaian waters. Seabreams had the highest average catch rate in 2004, while most of the other valuable demersal species had high average catch rates in 2000 and in general low in 1999. The time series of biomass estimates show the same trend. The estimated biomass of seabreams has been quite stable in the five last surveys. Bigeye grunt had much higher catch rate and estimated biomass in 1999 due to one large catch. Carangids were most abundant in 2000 and 2002.

Table 7. Mean catch rates (kg/h) of valuable demersal species and some other groups from swept-area bottom trawl hauls on the shelf (0 – 100 m) from the 1999-2006 surveys and survey 2016. 2000 and 2002 surveys are in the upwelling season.

Group/Species	**Mean catch rates** (kg/h)							
	1999	**2000**	**2002**	**2004**	**2005**	**2006**	**2007**	**2016**
Seabreams	32.8[1]	58.3	60.7	72.5	60.7	64.0	90	55,2
Grunts	7.1	14.6	6.5	1.7	10.3	0.7	5	5,3
Croakers	0.7	3.2	4.4	1.7	4.4	3.1	6.8	4,1
Groupers	2.5	7.6	1.0	1.1	1.1	3.0	1	2,3
Snappers	0.7	22.5	1.9	0.9	1.8	5.6	7.8	5,4
Sum dem. val.	**43.8[1]**	**106.2**	**74.5**	**77.9**	**77.7**	**76.4**	**110.6**	**72,3**
Bigeye grunt	213.4	39.1	110.3	69.1	112.7	44.7	36.8	60
Carangids	33.3	187.7	205.4	35.3	81.8	56.7	63.4	93,5
Barracudas	5.9	5.6	11.1	8.9	11.6	14.1	9.8	14,7
Cephalopods	18.0	28.1	9.8	11.6	9.4	14.1	7.2	13,6

[1)] 1999 estimate corrected

Table 8. Biomass estimates (tonnes) of valuable demersal species and some other groups from swept-area bottom trawl hauls on the shelf (0 – 100 m) from the 1999-2007 surveys and 2016 survey. 2000 and 2002 surveys are in the upwelling season

Group/ Species	**Biomass** (tonnes)							
	1999	**2000[1]**	**2002**	**2004**	**2005**	**2006**	**2007**	**2016**
Seabreams	8 478	13 346	14 181	16 187	15 690	15 166	13604	12959
Grunts	1 431	4 397	1 168	326	2 261	140	806	620
Croakers	125	1 046	850	286	821	664	1011	567
Groupers	557	1 921	254	220	235	674	169	452
Snappers	151	5 322	422	200	413	1 366	771	1450
Sum dem. val.	**10 743**	**26 032**	**16 876**	**17 219**	**19 420**	**18 010**	**16361**	**16 048**
Bigeye grunt	70 314	9 120	21 182	13 866	27 896	7 296	5121	12301
Carangids	6 860	47 054	45 332	7 405	19 226	11 831	8702	19403
Barracudas	1 084	915	1 999	1 589	2 201	2 554	1333	2522
Cephalopods	4 400	4 900	2 000	2 600	2 181	3 208	1067	3314

[1)] 2000 estimates corrected

CHAPTER 7 BIODIVERSITY

7.1 Faunistic characterization, species richness (S), species diversity (H')

A total of 213 species (fish and invertebrates) belonging to 109 families were recorded during the survey. One hundred and ninety-one species were recorded during bottom trawls, 64 were recorded during pelagic trawls and 1 species during manta trawls (see Annex IV). Bony fishes (Osteichthyes) were by far the most represented taxonomic group with 162 species followed by Crustacea (22), cartilaginous fishes (Chondrichthyes) (10) and Cephalopoda (8) species. Species belonging to other recorded taxonomic groups were poorly represented and accounted for the remaining 5.2% of the total number of species.

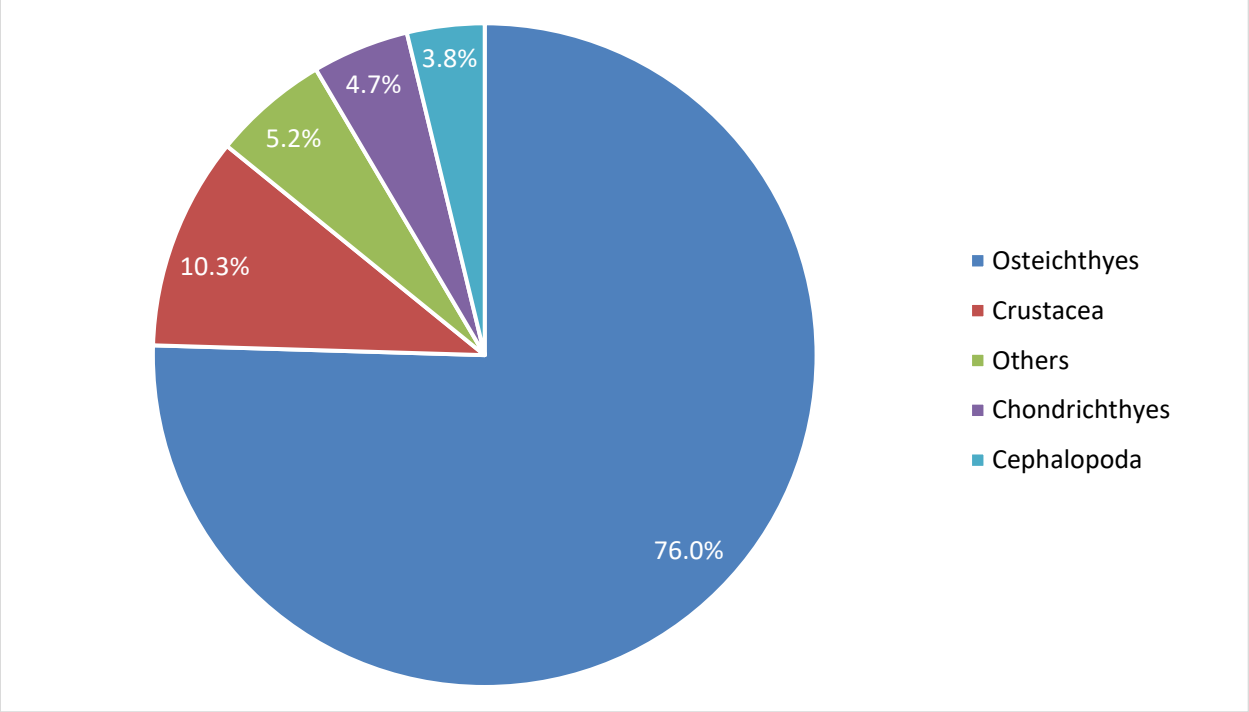


Figure 8. Number of species by major taxonomic groups (% over total).

One hundred and thirty-six species were recorded in the East coast (delta area), while 147 and 130 species were identified in the Central and West coast, respectively. **Error! Reference source not found.** shows the number of different species caught by bottom trawl in each depth stratum. The table also shows that species richness is highest in the Central coast (148) and that the most species rich area was the 0-30 m depth stratum in the Central coast (91).

Table 9. Number of different species (i.e. species richness) caught by bottom trawl in each depth stratum by subarea.

Depth/areas	East coast	Central coast	West coast
0-30	71	91	71
30-50	66	70	72
50-100	55	74	60
All depths	138	148	131

The number of species recorded at each station ranged from 5 to 36 (Figure 9), with an average of about 20 species per station (bottom and pelagic trawls combined). The ten most speciose stations are indicated in **Error! Reference source not found.**0.

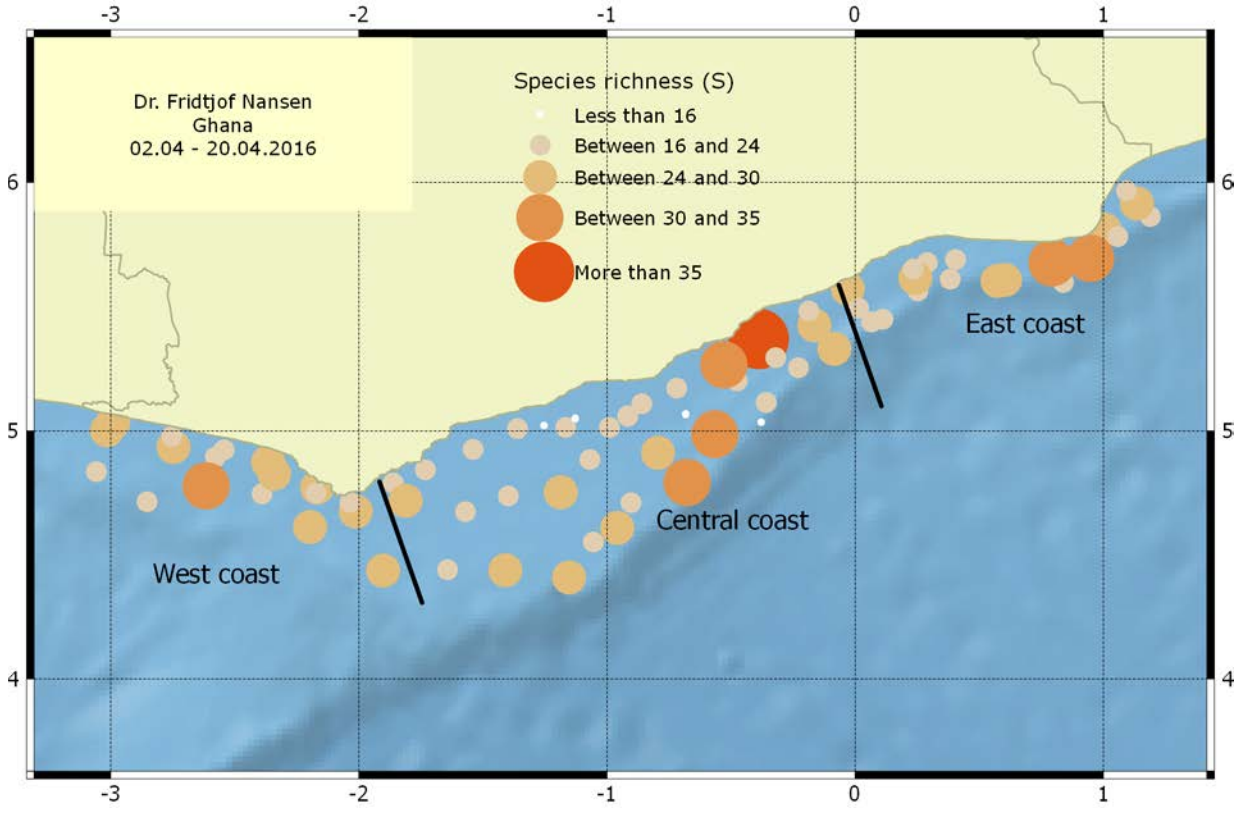


Figure 9. Species richness (S) by station.

Table 10. Top 10 stations ranked by number of species.

Station no.	Species richness	Coast
24	36	Central
30	33	Central
34	32	Central
6	32	East
63	31	West
33	31	Central
8	31	East
89	30	Central
67	30	West
59	30	West

Eight species were captured at more than 97% of trawl stations (bottom and pelagic trawls combined) and included *Decapterus punctatus* (71%), *Sepia hieredda* (63%), *Pseudupeneus prayensis* (56%), *Pagellus bellottii* (55%), *Lagocephalus laevigatus* (46%), *Pagrus caeruleostictus* (45%), *Brachydeuterus auritus* (44%) *and Fistularia petimba* (41%).

The species diversity index (H') computed for each station ranged from 0.168 to 2.829 with a mean of 1.68. When computed by aggregating all stations within each subarea (e.g. East, Central and West coast) the H' indices values were 3.38, 3.01 and 2.79, respectively (Figure 10). The H' index for the entire surveyed area is 3.34.

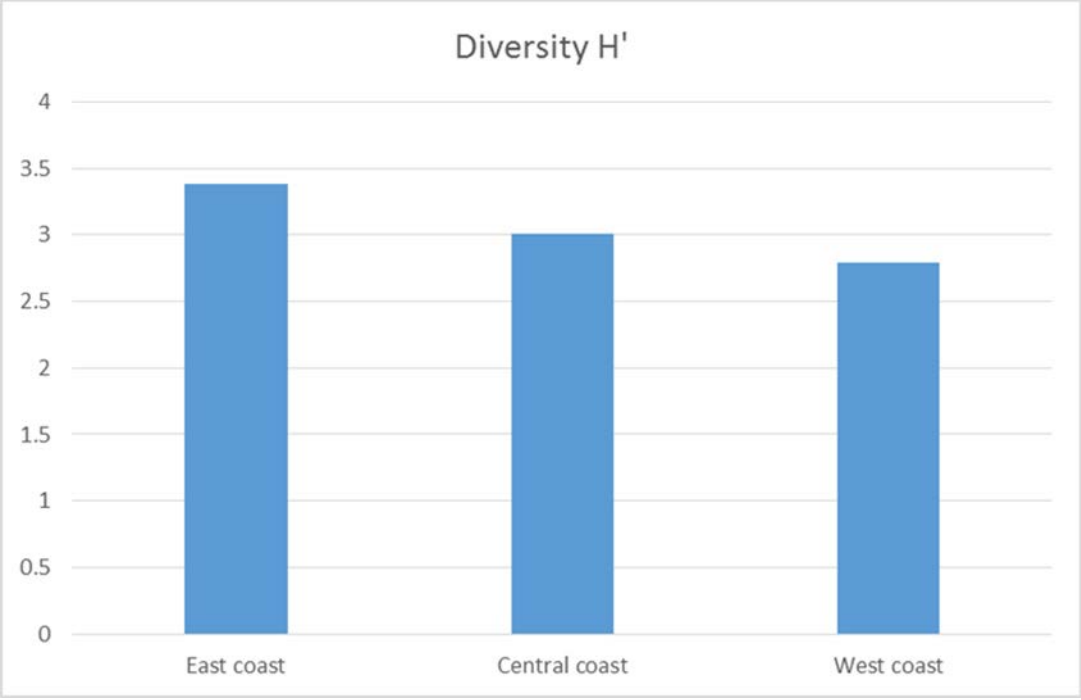


Figure 10. Species diversity index (H') for the East, Central and West coast.

Computation of cumulative number of species against number of stations for the East, Central and West coast shows that, despite dis-homogeneity in the number of stations, sampling was perfectly descriptive as the curves for all three subareas approach an asymptote around the 20th station.

7.2 Exclusive species by subarea and fishing method

It is interesting to note that an elevated number of exclusive species were found on the East, Central and West coast (see Table 11).

Table 11. Exclusive species/taxa by subarea.

East coast	Central coast	West coast
Abudefduf hoefleri	*Aequipecten flabellum*	*Aplysia* sp.
Apogon cf. *imberbis*	*Aequorea forskalea*	*Batrachoides liberiensis*
Ariomma melanum	*Auxis thazard*	*Branchiostegus semifasciatus*
Caranx fischeri	*Bothus podas*	*Calappa pelii*
Cubiceps pauciradiatus	*Caranx rhonchus*	*Callinectes pallidus*
Cymbium glans	*Cephalopholis taeniops*	*Caranx senegallus*
Dasyatis cf. *hastata*	*Chromis cadenati*	*Chaetodipterus lippei*
Dicologoglossa cuneata	*Dagetichthys cadenati*	*Chaetodon hoefleri*
Echiophis punctifer	*Dasyatis marmorata*	*Echeneis naucrates*
Epinephelus caninus	*Eucidaris tribuloides*	*Fusinus meyeri*
Gempylus serpens	*Hippocampus algiricus*	*Grammonus lunghursti*
Gymnothorax afer	*Holacanthus africanus*	*Halobatrachus* cf. *didactylus*
Gymnothorax vicinus	*Lutjanus agennes*	*Hemiramphus brasiliensis*
Hyporthodus haifensis	*Plectorhinchus mediterraneus*	*Muraena melanotis*
Macropipus rugosus	*Pomadasys incisus*	*Parapenaeus longirostris*
Nealotus tripes	*Rachycentron canadum*	*Pisodonophis semicinctus*
Nicholsina collettei	*Rhinobatos albomaculatus*	*Pomadasys perotaei*
Onychoteuthis banksi	*Sarda sarda*	*Scyllarus* sp.
Paralepis sp.	*Scorpaena* cf. *angolensis*	*Squilla acuelata calmani*
Pontinus accraensis	*Sepia bertheloti*	*Squilla* sp.
Promethichthys prometheus	*Synodus synodus*	*Stromateus fiatola*
Pseudomyra cf. *mbizi*	*Trachinus armatus*	*Uranoscopus albesca*
Pseudotolithus senegallus	*Xyrichtys novacula*	*Uroconger syringinus*
Pyrosoma atlanticum		*Vanstraelenia chirophthalma*
Pythonichthys microphthalmus		
Scarus hoefleri		
Scyllarides herklotsii		
Sicyonia galeata		
Zanobatus sp. n.		

Most species were caught exclusively by bottom trawl (145 species), followed by a relatively high number of species caught by both fishing methods (46 species). Only 22 species were caught exclusively by pelagic trawl (Figure 11 and Annex IV).

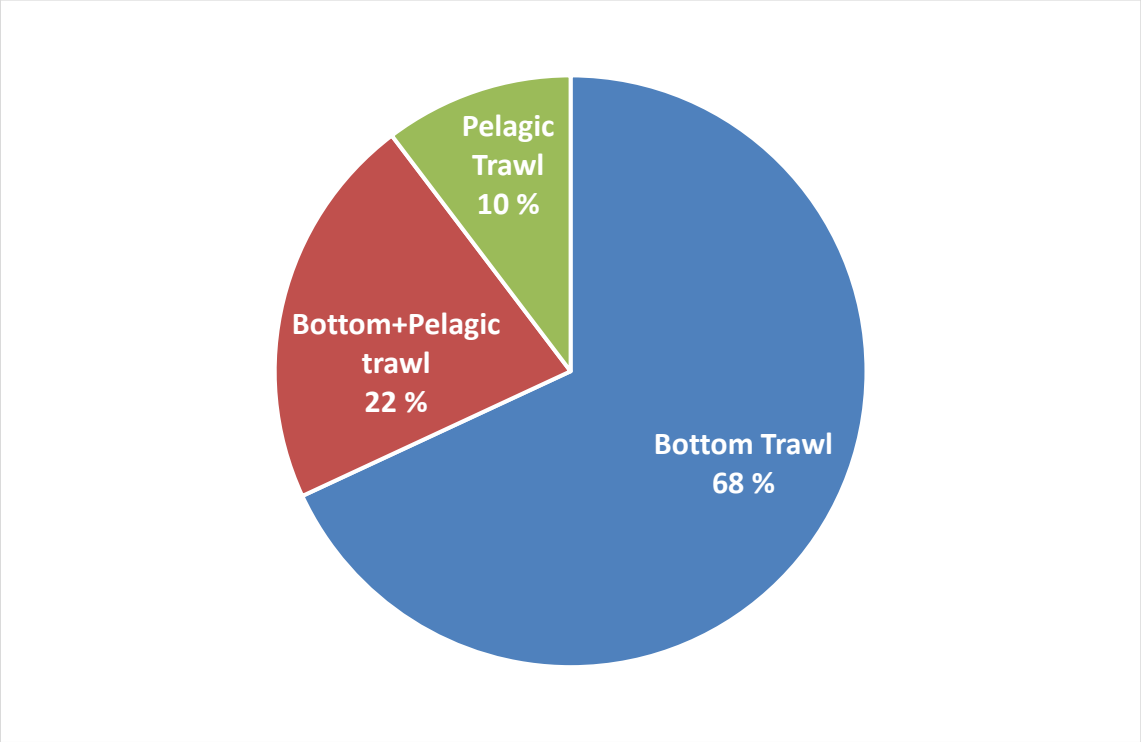


Figure 11. Percentage over total number of species caught by bottom trawl, pelagic trawl and bottom+pelagic trawl.

7.3 Sampling effectiveness

The present survey was limited in time and bathymetric extension. The inclusion of deeper depth-strata (>100 m) would have likely increased the number of species recorded for this area. It should also be noted that a number of typical rocky reef-associated species are unlikely to be sampled by trawling. This can be seen in a plot of cumulative number of species against number of stations (bottom and pelagic trawls combined) surveyed (**Error! Reference source not found.**2). While approaching an asymptote, additional species are being added, even after 103 stations, indicating additional surveys would likely yield additional species.

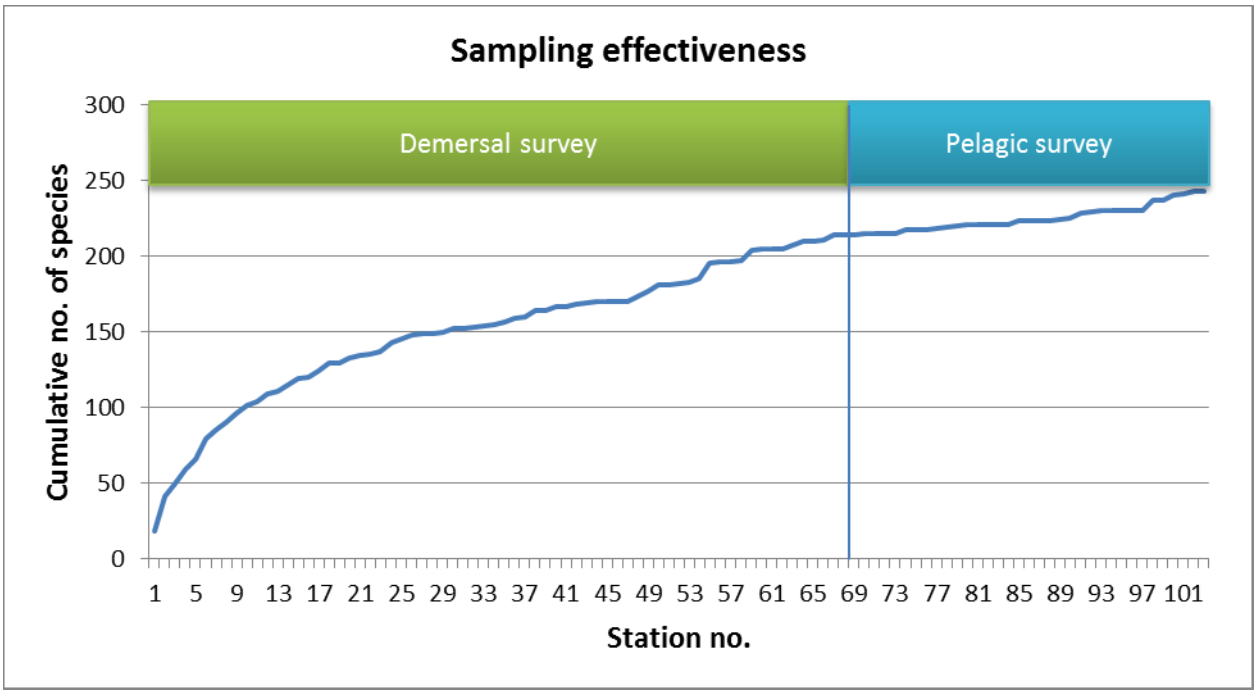


Figure 12. Cumulative number of species against number of stations.

7.4 Relevant faunistic records

Nine fish species from 8 families recorded during the survey represent first records for Ghanaian's waters. Two of them, *Zanobatus* sp. n. and *Torpedo* sp. n. (Figure 13) are new batoid species presently under description by Séret and by Séret & Carvalho, respectively. The third one, *Dasyatis* cf. *hastata*, is relatively common but unnamed stingray found over coastal soft bottoms of the inner continental shelf. Pending on a revision of its status, it is herein provisionally included with the qualifier "cf" preceding the specific name. The fourth and fifth newly recorded species are the anguilliforms *Gymnothorax vicinus* and *Echiophis punctifer*, both with a patchy distribution in the Tropical Eastern Atlantic; whereas *Grammonus longhursti* is a rare ophiidiform fish mostly found in sea caves but sometimes occurring on soft bottoms. The taxonomic status of the labroid fishes *Nicholsina collettei*, *Sparisoma choati* and *Coris atlantica* has only recently been clarified. Their findings represent the first documented records for Ghana.

In addition, specimens identifiable as *Scorpaena angolensis*, *Halobatrachus didactylus*, *Sphoeroides marmoratus* and *Apogon imberbis* were not perfectly conforming to descriptions found in the literature and thus collected for post-survey studies. The latter have been photographed, tissue sampled, packed and sent to relevant taxonomists for expert identification. The feedback received from the experts will serve to clarify their taxonomic status. One Gobiidae and one Paralepididae (tentatively identified as a *Paralepis* species) were also collected and sent out for expert identification.

A number of small non-commercial invertebrate species were identified only to family/genus level due to limited taxonomic information available for these groups. For the same reason some jellyfish and sea urchin species were identified only to the level of class.

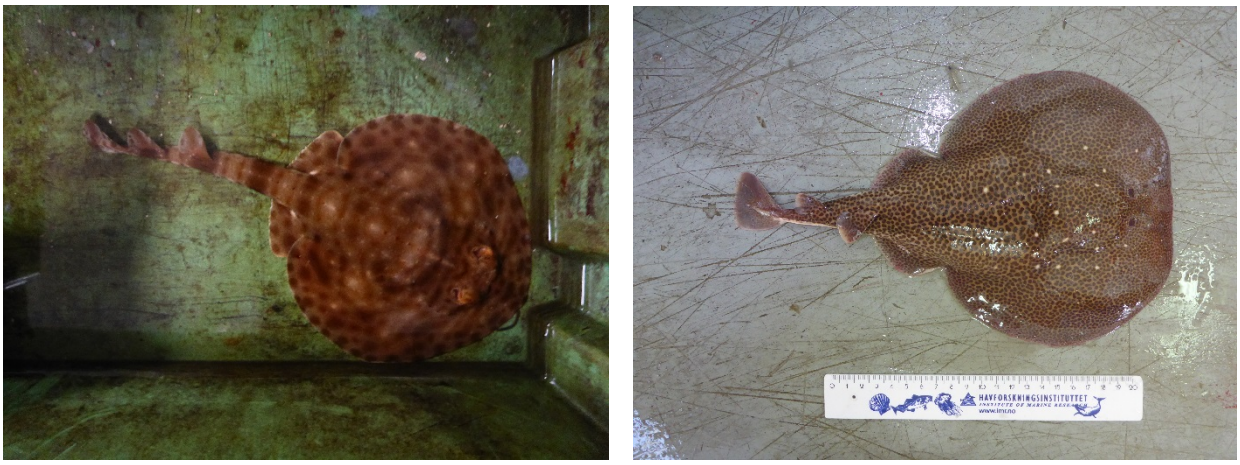


Figure 13. The two undescribed species: *Zanobatos* sp. n. (left) and *Torpedo* sp. n. (right).

7.5 Species importance by subarea and depth

The Index of Relative Importance (IRI%) analysis by areas showed that the most important species on the East coast were *Engraulis encrasicolus, Brachydeuterus auritus, Decapterus punctatus, Chloroscombrus chrysurus, Dentex congoensis, Sphyraena guachancho, Pagellus bellottii, Pagrus caeruleostictus, Sepia hieredda* and *Selene dorsalis.*

In the central coast the most important species were *Decapterus punctatus, Engraulis encrasicolus, Brachydeuterus auritus, Saurida parri, Pagellus bellottii, Pseudupeneus prayensis, Pagrus caeruleostictus, Dentex congoensis, Dentex canariensis* and *Trachurus trecae.*

On the West coast the most important species were *Brachydeuterus auritus, Engraulis encrasicolus, Decapterus punctatus, Trachurus trecae, Selene dorsalis, Chloroscombrus chrysurus, Pagellus bellottii, Saurida parri, Trichiurus lepturus* and *Sphyraena guachancho.*

The 10 most important species according to %IRI for the depth strata 0-30 m, 30-50 m, 50-100 m in the East coast (**Error! Reference source not found.**14), the Central coast (15) and the West coast (**Error! Reference source not found.**16) are shown below.

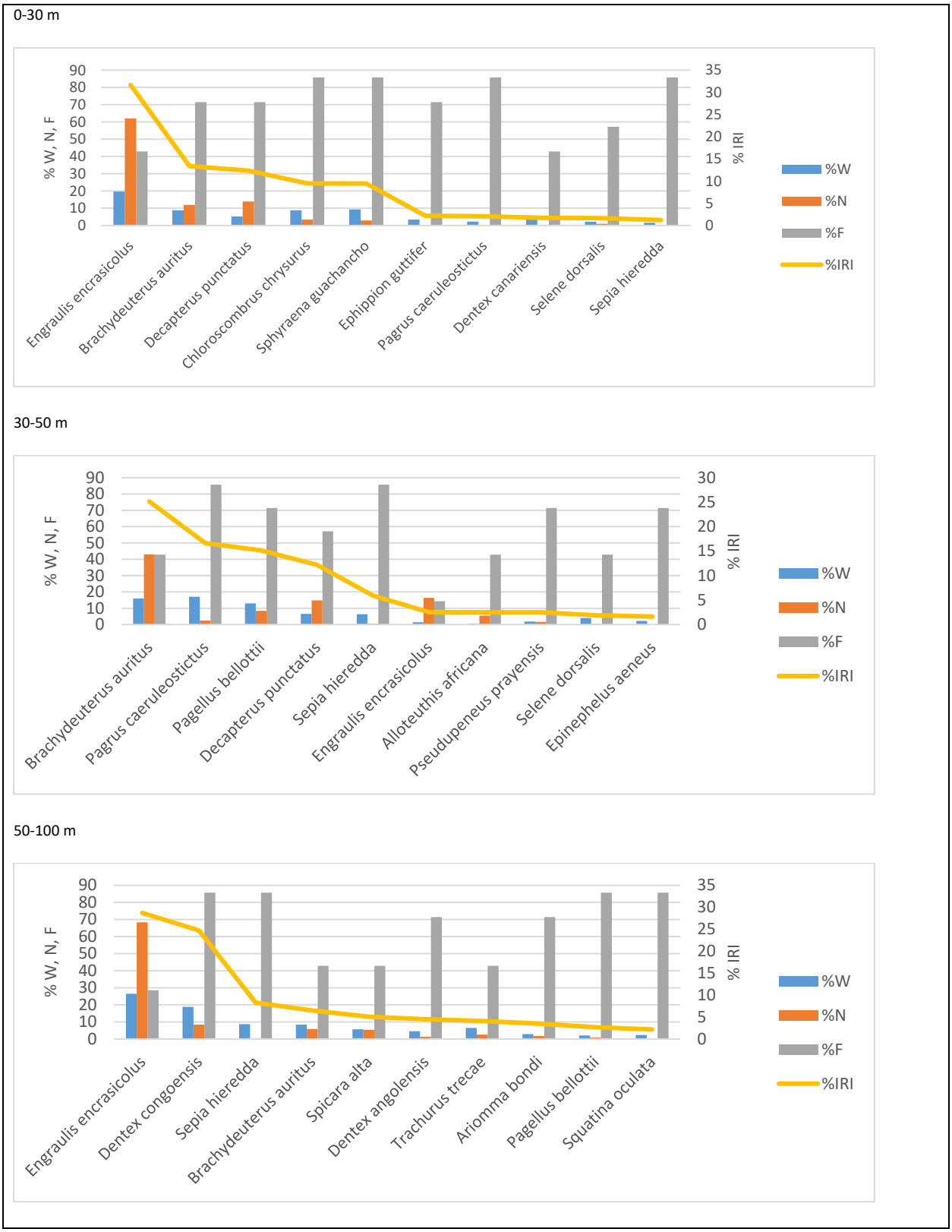


Figure 14. Percent by weight (%W), percent by number (%N), percent occurrence (%F) and percent index of relative importance (%IRI) for the 10 most important species per stratum on the East coast.

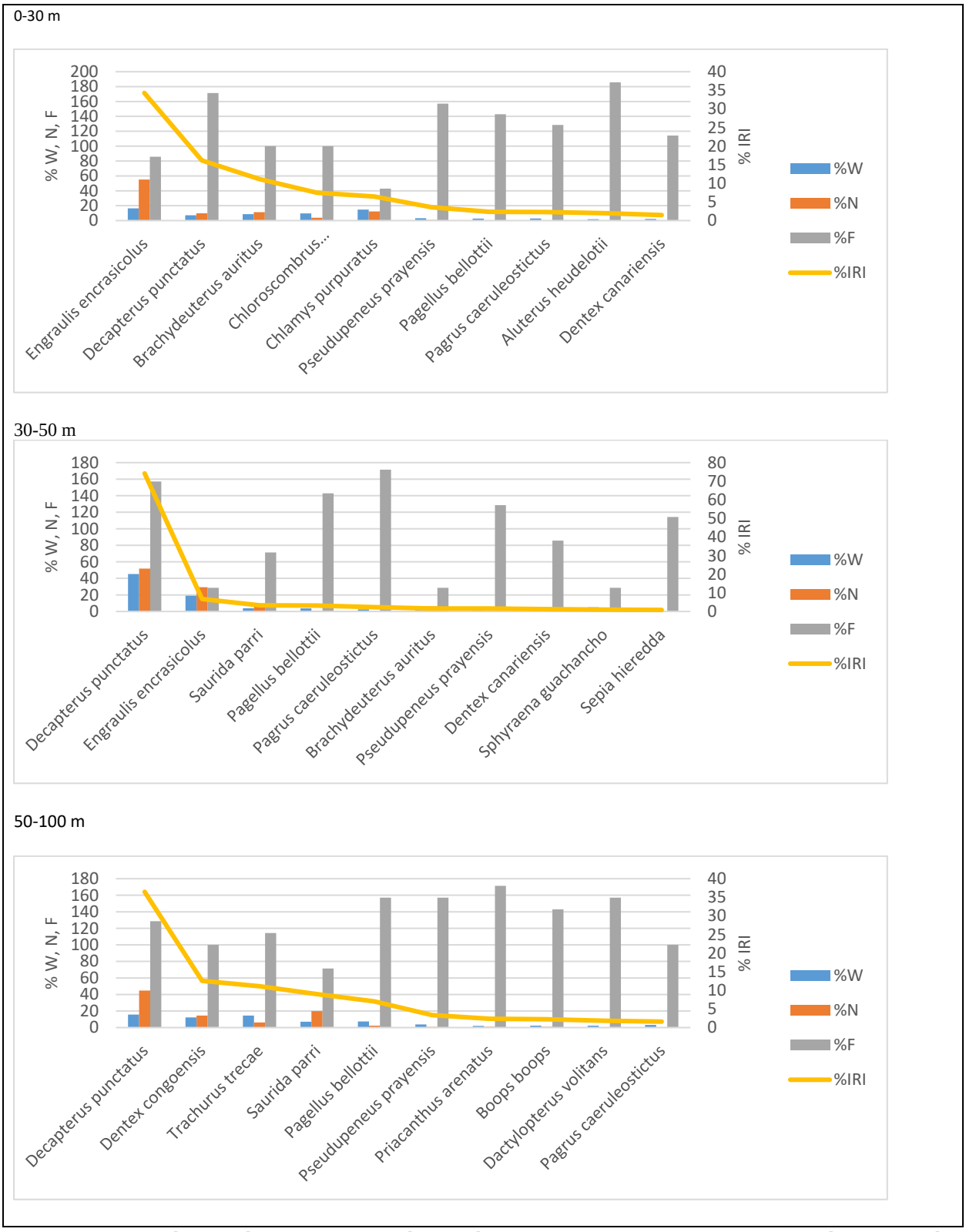


Figure 15. Percent by weight (%W), percent by number (%N), percent occurrence (%F) and percent index of relative importance (%IRI) for the 10 most important species per stratum in the Central coast.

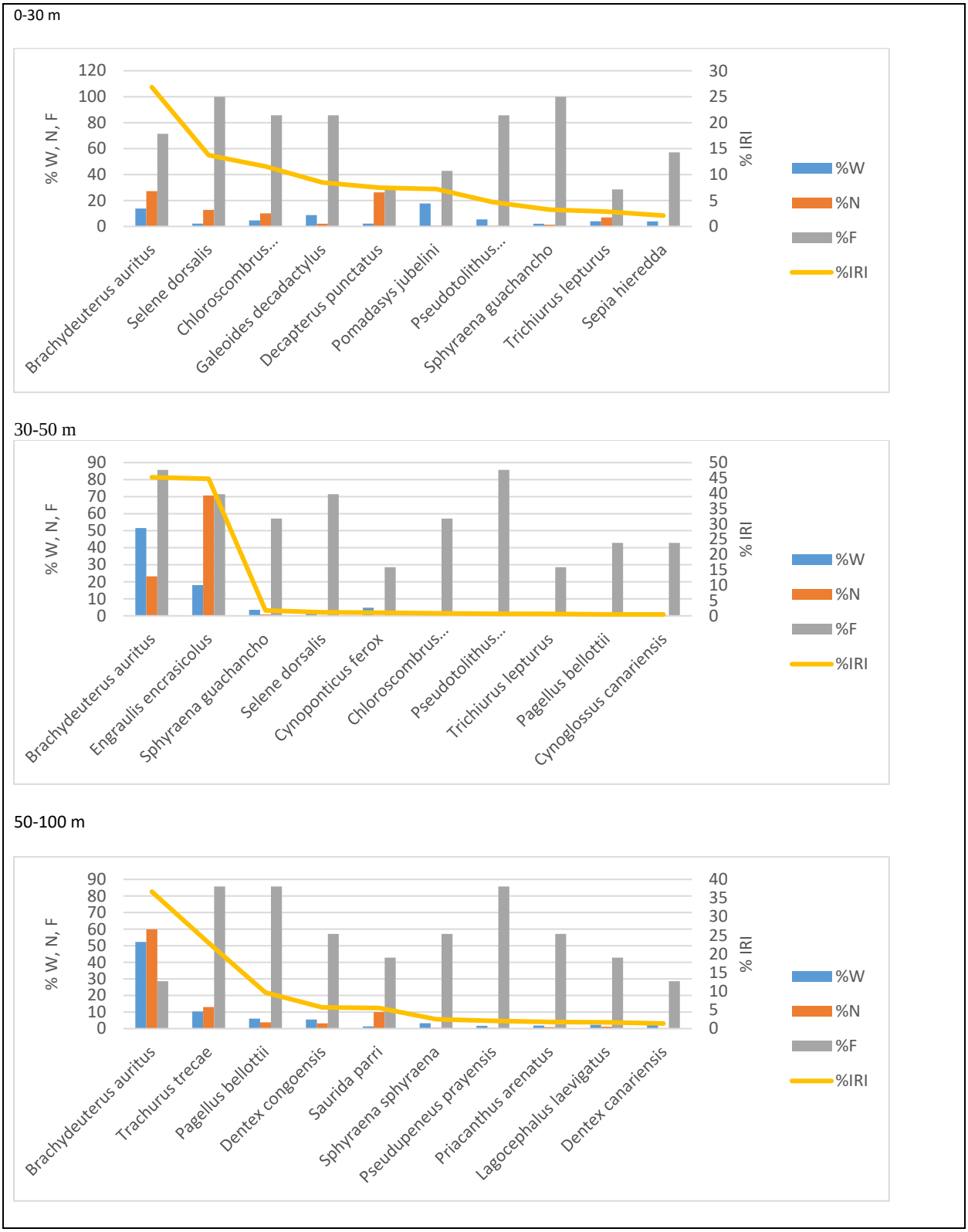


Figure 16. Percent by weight (%W), percent by number (%N), percent occurrence (%F) and percent index of relative importance (%IRI) for the 10 most important species per stratum on the West coast.

SUMMARY OF RESULTS

Oceanography

The survey, which covered the entire coast of the country, recorded a surface temperature range between 28^{o} and 29^{o}C, while salinity ranged between 35.0 psu and 35.2 psu. The thermocline was found between 25 and 30 m depth. Dissolved oxygen values ranged between 2 ml/l at the bottom and 4 ml/l at the surface in all areas. No sign of low bottom oxygen content on the shelf was observed. Very small differences were observed between the profiles of the two hydrographic transects.

Zooplankton

Eleven (11) zooplankton groups were identified of which Copepoda (Calanoida, Cyclopoida and Harpacticoida in order of numbers) emerged to be most abundant as usual. Calanoida were found to be most abundant as usual with thirty-one (31) species and four hundred and twenty-three (423) individuals and the least being Harpacticoida. The least among the groups were Gastropoda with two (2) individuals. Among the sampled groups are Chaetgnatha that are fish eggs and larvae predators. A large number of copepodites (1754) was also enumerated.

Sixty-seven (67) species and one thousand, one hundred and fourty-eight (1148) individuals were identified and enumerated with *Temora stylifera* as most abundant in terms of numbers with one-hundred (100) individuals and the least *Thalia democratica* (Thaliacea) with one (1) individual. The large numbers of *Microsetella rosea* and *Macrosetella gracilis* seems baffling in the history of zooplankton species identifications in Ghana waters and even in the Gulf of Guinea and needs further investigation. This concides with the first time that the WP2 net had been used in Ghana waters to sample zooplankton.

Macrofauna

A total of 213 species (fish and invertebrates) belonging to 109 families in both the pelagic and bottom trawls was recorded. Bony fishes (Osteichthyes) were the most represented taxonomic group with 162 species (76%) followed by Crustacea (22 species, 10.3%), cartilaginous fishes (Chondrichthyes) (10 species, 4.7%) and Cephalopoda (8 species, 3.8%). Species from other taxonomic groups made up 5.2%.

The part of the survey aiming at mapping of pelagic fish, plankton and environmental parameters, registered a total of 132 500 tonnes of pelagic fish. The most abundant species found were the carangids, with an estimated biomass of 107 000 tonnes. Eleven species out of the total of twelve species of carangids were found on the

Central coast, while 10 and 7 were found on the East and West coasts, respectively. Anchovies contributed a biomass of 25 000 tonnes, followed by sardinellas (500 tonnes).

A total of 53 588 tonnes was estimated in the part of the survey aiming for demersal fish. Biomass estimated for valuable demersal species was 16 048 tonnes, of which seabreams made up 81 % (12 959 t), with the highest biomass in the 51 to 100m depth strata. This is slightly lower than that of the 2007 survey. Snappers followed with 9%, - double that of the 2007 survey. Grunts and croakers represented 4% each and groupers, 3%. The most important commercial demersal species identified were the seabreams, mainly *Pagellus bellottii, Dentex canariensis, Pagrus caeruleostictus, D. congoensis, D.angolensis and D. gibbosus*. These had the highest catch rate of 34 kg/h and 100 kg/h on the inner and outer shelves respectively.

Of the 66 demersal hauls during the coverage of demersal fish, the pelagic group had the highest catch average on the inner shelf with a relative contribution of 49%, followed by the demersals group of 30%. Cephalopods had a relative contribution of 2%, with shrimps and sharks accounting for less than 1%. On the inner shelf, the carangids, mainly *Decapterus punctatus, Chloroscombrus chrysurus, Alectis alexandrinus, Selene dorsalis, Selar crumenophthalmus,* and *Caranx crysos,* were found to be the most abundant group. Clupeids were represented by a very low number in both the inner and outer shelves. For the outer shelf, the demersal group dominated, contributing 47% to the total. Here, the pelagic group contributed 28% while cephalopods and sharks 6% and 1%, respectively. Species richness (S) on the whole was highest on the Central coast for both pelagic and demersal species, whereas species diversity index (H') was highest on the East coast.

Nine species were recorded for the first time in Ghana. Two of these, *Zanobatus* sp. n. and *Torpedo* sp. n. are presently under description, while *Dasyatis* cf. *hastata* is relatively common but unnamed, and pending a revision of its status. The rest are *Gymnothorax vicinus, Echiophis punctifer, Grammonus longhursti, Nicholsina collettei, Sparisoma choati* and *Coris atlantica.*

Debris

In areas close to Accra and Tema, large amounts of plastic debris were observed in the surface. In a few trawl hauls close to Accra plastic debris dominated the catches.

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ANNEX I Records of fishing stations

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 1
DATE :02/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 5°51.75
start stop duration Lon E 1°11.30
TIME :07:22:17 07:35:25 13.2 (min) Purpose : 3
LOG : 6519.31 6519.94 0.6 Region : 2600
FDEPTH: 87 86 Gear cond.: 0
BDEPTH: 87 86 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 2.9 kn
Sorted : 0 Total catch: 169.36 Catch/hour: 772.75

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sepia hieredda	322.31	748	41.71	
Dentex congoensis	222.66	3710	28.81	
Squatina oculata	68.62	23	8.88	
Trachurus trecae	33.13	967	4.29	
Zeus faber	28.02	37	3.63	
Lepidotrigla cadmani	23.27	420	3.01	
Priacanthus arenatus	17.34	164	2.24	
Fistularia petimba	16.33	37	2.11	
Lepidotrigla carolae	11.86	402	1.54	
Sphoeroides marmoratus	9.67	365	1.25	
Boops boops	6.75	183	0.87	
Sepia hierreda	6.30	164	0.81	
Pythonichthys microphthalmus	2.10	73	0.27	
Sardinella aurita	1.83	37	0.24	
SALPS	1.00	18	0.13	
Microchirus frechkopi	0.64	18	0.08	
Serranus heterurus	0.55	55	0.07	
Ommastrephes bartrami	0.37	18	0.05	
Total	772.75		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 2
DATE :02/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°54.92
start stop duration Lon E 1°8.05
TIME :08:42:43 09:13:14 30.5 (min) Purpose : 3
LOG : 6526.01 6527.52 1.5 Region : 2600
FDEPTH: 47 46 Gear cond.: 0
BDEPTH: 47 46 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.0 kn
Sorted : 0 Total catch: 162.25 Catch/hour: 318.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	113.04	9495	35.44	5
Pagrus caeruleostictus	38.49	132	12.07	1
Sepia hieredda	37.06	88	11.62	
Decapterus punctatus	28.85	3767	9.04	4
Pagellus bellottii	15.77	157	4.94	8
Alectis alexandrinus	14.63	20	4.59	
Balistes capriscus	12.90	22	4.04	
Fistularia petimba	10.03	29	3.14	
Lagocephalus laevigatus	9.25	14	2.90	
Pseudupeneus prayensis	8.21	285	2.57	3
Selene dorsalis	7.30	18	2.29	2
Epinephelus aeneus	6.92	6	2.17	
Raja miraletus	3.18	6	1.00	
Panulirus regius	3.09	4	0.97	
Dentex gibbosus	3.07	14	0.96	6
Alloteuthis africana	1.77	609	0.55	
Sphyraena sphyraena	1.65	4	0.52	
Chloroscombrus chrysurus	0.89	4	0.28	7
Syaciumguineensis	0.69	10	0.22	
Trachurus trecae	0.59	39	0.18	
Solitas gruveli	0.49	20	0.15	
Serranus accraensis	0.25	10	0.08	
Saurida parri	0.25	10	0.08	
Sphoeroides marmoratus	0.20	10	0.06	
Farfantepenaeus notialis	0.18	8	0.06	
Arnoglossus imperialis	0.15	39	0.05	
C R A B S	0.10	10	0.03	
Total	318.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 3
DATE :02/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°57.98
start stop duration Lon E 1°5.53
TIME :10:10:32 10:40:44 30.2 (min) Purpose : 3
LOG : 6533.74 6535.36 1.6 Region : 2600
FDEPTH: 28 28 Gear cond.: 0
BDEPTH: 28 28 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.2 kn
Sorted : 0 Total catch: 238.37 Catch/hour: 473.43

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	210.92	57009	44.55	
Decapterus punctatus	109.63	34260	23.16	
Sardinella aurita	36.94	4886	7.80	
Balistes capriscus	24.07	34	5.08	
Alectis alexandrinus	15.73	14	3.32	12
Pagrus caeruleostictus	11.82	99	2.50	10
Dentex canariensis	11.33	34	2.39	11
Brachydeuterus auritus	10.72	2979	2.27	
Pseudupeneus prayensis	7.98	465	1.69	13
Ephippion guttifer	7.31	8	1.54	
Lagocephalus laevigatus	6.24	6	1.32	
Chloroscombrus chrysurus	3.57	83	0.76	14
Epinephelus aeneus	3.50	2	0.74	9
Sepia hieredda	2.72	6	0.57	
Aluterus heudelotii	2.65	10	0.56	
Drepane africana	2.15	2	0.46	
Diodon holocanthus	2.11	4	0.44	
Acanthostrascion guineensis	1.79	12	0.38	
Raja miraletus	1.09	2	0.23	
Rypticus saponaceus	0.71	12	0.15	
Stephanolepis hispidus	0.43	2	0.09	
Total	473.43		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 4
DATE :02/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°48.62
start stop duration Lon E 1°0.14
TIME :12:18:47 12:49:28 30.7 (min) Purpose : 3
LOG : 6549.99 6551.52 1.5 Region : 2600
FDEPTH: 29 28 Gear cond.: 0
BDEPTH: 29 28 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 3.0 kn
Sorted : 0 Total catch: 82.05 Catch/hour: 160.40

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	29.72	3222	18.53	20
Diodon holocanthus	18.77	109	11.70	
Ephippion guttifer	18.18	6	11.34	
Acanthostrascion guineensis	17.91	149	11.16	
Sepia hieredda	9.19	23	5.73	
Sphyraena guachancho	8.95	10	5.58	17
Chloroscombrus chrysurus	6.80	203	4.24	15
Engraulis encrasicolus	6.65	493	4.14	
Epinephelus aeneus	6.33	12	3.95	18
Pomadasys jubelini	5.63	4	3.51	36
Lethrinus atlanticus	4.03	336	2.51	21
Pseudupeneus prayensis	3.87	172	2.41	19
Lutjanus fulgens	3.21	125	2.00	
Sphyraena guachancho	2.58	563	1.61	22
Balistes capriscus	2.51	6	1.57	
Pagrus caeruleostictus	2.42	31	1.51	
Nicholsina collettei	2.39	117	1.49	
Cynoglossus canariensis	2.15	8	1.34	
Brachydeuterus auritus	1.72	430	1.07	16
Sphoeroides marmoratus	1.49	86	0.93	
Dentex canariensis	1.21	8	0.76	
Rypticus saponaceus	1.17	8	0.73	
Eucinostomus melanopterus	1.06	16	0.66	
Gymnothorax afer	0.82	8	0.51	
Pagellus bellottii	0.78	16	0.49	
Fistularia tabacaria	0.55	8	0.34	
Farfantepenaeus notialis	0.31	8	0.20	
Total	160.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 5
DATE :02/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°46.89
start stop duration Lon E 1°3.44
TIME :14:04:15 14:34:35 30.3 (min) Purpose : 3
LOG : 6558.34 6559.73 1.4 Region : 2600
FDEPTH: 49 49 Gear cond.: 0
BDEPTH: 49 49 Validity : 0
Towing dir: 0° Wire out : 175 m Speed : 2.8 kn
Sorted : 0 Total catch: 80.40 Catch/hour: 159.10

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	34.83	0	21.89	29
Brachydeuterus auritus	27.23	0	17.11	28
Selene dorsalis	22.96	61	14.43	23
Pagrus caeruleostictus	21.13	196	13.28	27
Fistularia petimba	8.79	20	5.52	
Epinephelus aeneus	6.61	6	4.15	26
Raja miraletus	5.62	12	3.53	
Pagellus bellottii	4.94	47	3.10	24
Sepia hieredda	3.32	12	2.09	
Dentex gibbosus	3.25	12	2.04	25
Dactylopterus volitans	2.97	4	1.87	
Brotula multibarbata	2.32	4	1.46	
Solitas gruveli	2.12	55	1.33	
Chilomycterus spinosus mauretanicus	1.98	4	1.24	
Torpedo torpedo	1.74	2	1.09	
Pseudupeneus prayensis	1.72	24	1.08	
Serranus accraensis	1.29	12	0.81	
Sphyraena sphyraena	1.28	2	0.80	
Octopus sp.	1.15	2	0.72	
Trichiurus lepturus	1.03	8	0.65	
Citharus linguatula	0.99	4	0.62	
Arnoglossus imperialis	0.97	12	0.61	
Lepidotrigla carolae	0.89	4	0.56	
Total	159.10		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 6
DATE :02/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°41.62
start stop duration Lon E 0°56.88
TIME :17:00:46 17:20:47 20.0 (min) Purpose : 3
LOG : 6578.48 6579.43 1.0 Region : 2600
FDEPTH: 18 17 Gear cond.: 0
BDEPTH: 18 17 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 2.8 kn
Sorted : 0 Total catch: 40.58 Catch/hour: 121.62

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pseudotolithus senegalensis	28.68	87	23.58	34
Dasyatis margarita	24.76	42	20.35	
Brachydeuterus auritus	18.64	216	15.33	32
Diodon holocanthus	13.07	84	10.74	
Lutjanus goreensis	6.76	6	5.56	31
Sphyraena guachancho	6.10	15	5.01	30
Galeoides decadactylus	3.90	12	3.20	33
Elops lacerta	3.06	6	2.51	
Acanthostrascion guineensis	3.06	24	2.51	
Lethrinus atlanticus	2.31	33	1.90	35
Fistularia petimba	1.47	3	1.21	
Raja miraletus	1.35	3	1.11	
Chloroscombrus chrysurus	1.17	15	0.96	
Calappa rubroguttata	1.15	9	0.95	0
Torpedo sp.n.	1.05	3	0.86	
Rypticus saponaceus	0.72	6	0.59	
Sepia hieredda	0.63	6	0.52	
Scomberomorus tritor	0.54	9	0.44	
Drepane africana	0.52	3	0.43	
Alectis alexandrinus	0.51	6	0.42	
Ilisha africana	0.31	18	0.26	
Cynoglossus canariensis	0.30	6	0.25	
Pseudupeneus prayensis	0.30	9	0.25	
Caranx crysos	0.25	3	0.21	
Calappa rubroguttata	0.24	9	0.20	
Chaetodipterus goreensis	0.12	3	0.10	
Selene dorsalis	0.12	9	0.10	
Trachinocephalus myops	0.12	6	0.10	
Decapterus punctatus	0.10	9	0.09	
Trichiurus lepturus	0.09	3	0.07	
Lutjanus fulgens	0.06	6	0.05	
Sanguerus validus	0.06	3	0.05	
Farfantepenaeus notialis	0.03	3	0.02	
Total	121.54		99.94	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 7
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°35.78
start stop duration Lon E 0°50.29
TIME :06:44:02 07:14:24 30.4 (min) Purpose : 3
LOG : 6618.55 6620.11 1.6 Region : 2600
FDEPTH: 36 35 Gear cond.: 0
BDEPTH: 36 35 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.1 kn
Sorted : 0 Total catch: 64.68 Catch/hour: 127.86

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagrus caeruleostictus	64.17	113	50.19	38
Fistularia tabacaria	10.83	16	8.47	
Acanthostrascion guineensis	5.69	42	4.45	
Chilomycterus spinosus mauretanicus	5.18	10	4.05	
Diodon holocanthus	5.17	20	4.04	
Balistes capriscus	4.88	8	3.82	
Sepia hieredda	3.29	6	2.57	
Balistes punctatus	3.06	8	2.40	
Lethrinus atlanticus	3.00	42	2.34	37
Dentex canariensis	2.92	12	2.28	39
Ephippion guttifer	2.76	2	2.16	
Starfish	2.61	12	2.04	
Aluterus heudelotii	2.17	4	1.70	
Epinephelus aeneus	2.14	4	1.67	
Torpedo torpedo	2.02	6	1.58	
Rypticus saponaceus	1.42	24	1.11	
Pseudupeneus prayensis	1.36	36	1.07	
Alectis ciliaris	1.35	4	1.06	
Lagocephalus laevigatus	1.29	2	1.01	
Aluterus monoceros	1.27	4	0.99	
Scorpaena laevis	0.50	2	0.39	
Trachinocephalus myops	0.47	6	0.37	
Sphoeroides marmoratus	0.21	12	0.16	
Sphoeroides sp.	0.09	6	0.07	
Total	127.86		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 8
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°40.55
start stop duration Lon E 0°47.54
TIME :08:26:47 08:57:41 30.9 (min) Purpose : 3
LOG : 6627.35 6628.98 1.6 Region : 2600
FDEPTH: 22 21 Gear cond.: 0
BDEPTH: 22 21 Validity : 0
Towing dir: 0° Wire out : 70 m Speed : 3.2 kn
Sorted : 0 Total catch: 187.84 Catch/hour: 364.73

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Ilisha africana	59.67	3893	16.36	46
Pseudotolithus senegalensis	43.11	78	11.82	43
Brachydeuterus auritus	34.74	1214	9.52	45
Dasyatis cf. hastata	33.79	4	9.26	
Elops lacerta	30.52	0	8.37	
Chloroscombrus chrysurus	28.78	1501	7.89	49
Galeoides decadactylus	19.15	72	5.25	41
Farfantepenaeus notialis	16.21	21	4.45	
Alectis alexandrinus	10.37	6	2.84	
Sphyraena afra	8.82	2	2.42	
Sphyraena guachancho	8.39	27	2.30	40
Cymbium glans	7.77	2	2.13	
Diodon holocanthus	7.46	35	2.04	
Sepia hieredda	5.77	43	1.58	
Sphyraena guachancho	5.34	342	1.46	48
Echiophis punctifer	4.78	2	1.31	
Chilomycterus spinosus mauretanicus	4.78	10	1.31	
Panulirus regius	4.62	10	1.27	
Epinephelus aeneus	4.60	8	1.26	
Drepane africana	4.30	14	1.18	
Ephippion guttifer	3.80	4	1.04	
Lethrinus atlanticus	3.43	35	0.94	
Selene dorsalis	2.33	10	0.64	42
Starfish	2.25	14	0.62	
Pseudupeneus prayensis	1.88	134	0.52	44
Chilomycterus spinosus mauretanicus	1.61	8	0.44	0
Selene dorsalis	1.24	179	0.34	47
Chloroscombrus chrysurus	1.19	8	0.33	
Dentex gibbosus	1.18	12	0.32	
Pagrus caeruleostictus	1.13	8	0.31	
Scomberomorus tritor	0.82	6	0.22	
Aluterus heudelotii	0.39	2	0.11	
Calappa rubroguttata	0.26	2	0.07	
Sardinella maderensis	0.15	4	0.04	
Lutjanus fulgens	0.13	2	0.03	
Total	364.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 9
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°36.42
start stop duration Lon E 0°36.18
TIME :10:32:58 11:03:34 30.6 (min) Purpose : 3
LOG : 6640.56 6642.14 1.6 Region : 2600
FDEPTH: 46 47 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.1 kn
Sorted : 0 Total catch: 35.97 Catch/hour: 70.56

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	15.69	1695	22.24	56
Engraulis encrasicolus	14.03	4252	19.89	55
Selene dorsalis	9.10	20	12.90	52
Jellyfish	5.83	4	8.26	
Pagrus caeruleostictus	4.78	22	6.77	51
Octopus sp.	3.79	4	5.36	
Trichiurus lepturus	3.69	84	5.23	50
Alloteuthis africana	2.64	659	3.74	
Balistes capriscus	2.41	4	3.42	
Sepia hieredda	1.57	12	2.22	
Arnoglossus imperialis	1.41	463	2.00	
Epinephelus aeneus	1.37	2	1.95	
Serranus accraensis	0.86	33	1.22	53
Dentex gibbosus	0.81	2	1.15	
Decapterus punctatus	0.53	49	0.75	54
Torpedo torpedo	0.49	2	0.69	
Pagellus bellottii	0.47	16	0.67	
Solitas gruveli	0.39	25	0.56	
Syacium guineensis	0.32	6	0.46	
Scyllarides herklotsii	0.14	37	0.19	
Microchirus frechkopi	0.10	4	0.14	
Penaeus notialis	0.10	2	0.14	
Macropipus rugosus	0.03	6	0.04	
Pseudomyra cf. mbizi	0.00	2	0.00	
Sicyonia galeata	0.00	2	0.00	
Total	70.56		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 10
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°36.15
start stop duration Lon E 0°34.36
TIME :12:03:46 12:31:32 27.8 (min) Purpose : 3
LOG : 6648.05 6649.38 1.3 Region : 2600
FDEPTH: 57 59 Gear cond.: 0
BDEPTH: 57 59 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 2.9 kn
Sorted : 0 Total catch: 486.85 Catch/hour: 1051.89

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	657.10	79791	62.47	57
Brachydeuterus auritus	203.12	8232	19.31	58
Sepia hieredda	56.01	110	5.33	
Raja miraletus	26.36	73	2.51	
Squatina oculata	16.33	2	1.55	
Dactylopterus volitans	11.30	19	1.07	
Dicologoglossa cuneata	11.02	56	1.05	
Pagellus bellottii	8.17	313	0.78	
Cynoglossus senegalensis	7.16	19	0.68	
Solitas gruveli	6.70	277	0.64	
Arnoglossus imperialis	6.24	220	0.59	
Citharus linguatula	5.79	56	0.55	
Trichiurus lepturus	5.69	37	0.54	
Decapterus punctatus	5.51	73	0.52	
Microchirus frechkopi	5.41	37	0.51	
Lepidotrigla carolae	4.68	367	0.45	
Selene dorsalis	3.71	9	0.35	
Lagocephalus laevigatus	2.44	2	0.23	
Dentex canariensis	2.01	4	0.19	
Epinephelus aeneus	1.91	2	0.18	
Pagrus caeruleostictus	1.17	2	0.11	
Brotula barbata	1.10	4	0.10	
Pseudupeneus prayensis	0.83	19	0.08	
Dentex angolensis	0.83	37	0.08	
Blennius normani	0.46	19	0.04	
Lepidotrigla cadmani	0.46	19	0.04	
Alloteuthis africana	0.37	73	0.03	
Total	1051.89		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 11
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°36.59
start stop duration Lon E 0°22.93
TIME :14:12:49 14:43:09 30.3 (min) Purpose : 3
LOG : 6661.06 6662.72 1.7 Region : 2600
FDEPTH: 87 86 Gear cond.: 0
BDEPTH: 87 86 Validity : 0
Towing dir: 0° Wire out : 250 m Speed : 3.3 kn
Sorted : 0 Total catch: 177.31 Catch/hour: 350.76

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	186.71	3773	53.23	59
Dentex angolensis	50.09	669	14.28	60
Sepia hieredda	27.38	55	7.81	
Ariomma bondi	16.32	226	4.65	
Lepidotrigla cadmani	16.11	237	4.59	
Pagellus bellottii	14.93	374	4.26	62
Dicologoglossa cuneata	6.82	12	1.95	
Decapterus punctatus	6.65	166	1.89	61
Zeus faber	6.25	10	1.78	
Pagrus caeruleostictus	5.10	18	1.46	
Pagrus caeruleostictus	4.99	12	1.42	
Boops boops	4.51	113	1.29	
Squatina oculata	2.33	2	0.67	
Fistularia petimba	1.19	6	0.34	
Epinephelus caninus	0.56	2	0.16	
Brotula barbata	0.46	2	0.13	
Citharus linguatula	0.18	12	0.05	
Lepidotrigla carolae	0.15	12	0.04	
Arnoglossus imperialis	0.03	6	0.01	
Total	350.76		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 12
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°40.61
start stop duration Lon E 0°17.39
TIME :15:57:54 16:28:04 30.2 (min) Purpose : 3
LOG : 6672.27 6673.73 1.5 Region : 2600
FDEPTH: 26 29 Gear cond.: 0
BDEPTH: 26 29 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 2.9 kn
Sorted : 0 Total catch: 114.21 Catch/hour: 227.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Fistularia tabacaria	43.43	135	19.12	
Pagrus caeruleostictus	28.56	36	12.57	
65				
Fistularia petimba	23.23	95	10.23	
Sepia hieredda	17.74	24	7.81	
Dentex gibbosus	15.55	95	6.85	66
Aluterus monoceros	15.11	16	6.65	
Pseudupeneus prayensis	14.64	207	6.44	63
Lethrinus atlanticus	9.63	88	4.24	68
Acanthostrascion guineensis	9.43	56	4.15	
Pagrus caeruleostictus	8.91	74	3.92	64
Ephippion guttifer	7.95	6	3.50	
Aluterus heudelotii	7.36	16	3.24	
Acanthurus monroviae	6.96	8	3.06	
Diodon holocanthus	6.36	16	2.80	
Balistes punctatus	4.49	16	1.98	
Panulirus regius	3.82	4	1.68	
Ariomma bondi	1.87	32	0.82	
Scorpaena laevis	0.59	2	0.26	
Scarus hoefleri	0.47	2	0.21	
Sparisoma choati	0.47	2	0.21	
Sargocentron hastatum	0.33	2	0.14	
Coris atlantica	0.24	2	0.10	
Total	227.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 13
DATE :03/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°41.35
start stop duration Lon E 0°24.21
TIME :17:35:02 18:04:21 29.3 (min) Purpose : 3
LOG : 6683.66 6685.11 1.5 Region : 2600
FDEPTH: 29 25 Gear cond.: 0
BDEPTH: 29 25 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.0 kn
Sorted : 0 Total catch: 184.39 Catch/hour: 377.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Acanthurus monroviae	142.52	250	37.76	
Dentex canariensis	128.80	186	34.12	71
Fistularia tabacaria	14.45	33	3.83	
Sepia hieredda	12.86	8	3.41	
Lutjanus fulgens	12.14	16	3.22	69
Bodianus speciosus	11.53	10	3.05	
Lagocephalus laevigatus	9.33	10	2.47	
Decapterus punctatus	9.12	2399	2.42	
Lutjanus goreensis	6.39	2	1.69	
Fistularia petimba	5.04	18	1.33	
Aluterus monoceros	4.60	6	1.22	
Lethrinus atlanticus	3.72	31	0.98	70
Scarus hoefleri	3.22	2	0.85	
Drepane africana	2.95	6	0.78	
Acanthostrascion guineensis	2.82	18	0.75	
Diodon holocanthus	2.55	6	0.68	
Scorpaena laevis	2.43	12	0.64	
Balistes punctatus	1.67	6	0.44	
Aluterus heudelotii	0.73	2	0.19	
Dentex gibbosus	0.39	2	0.10	
Abudefduf hoefleri	0.21	2	0.06	
Total	377.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 14
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°33.74
start stop duration Lon E 0°15.11
TIME :06:32:13 07:03:41 31.5 (min) Purpose : 3
LOG : 6723.23 6724.88 1.7 Region : 2600
FDEPTH: 104 103 Gear cond.: 0
BDEPTH: 104 103 Validity : 0
Towing dir: 0° Wire out : 295 m Speed : 3.1 kn
Sorted : 0 Total catch: 83.73 Catch/hour: 159.64

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dentex congoensis	49.76	1289	31.17	74
Ariomma bondi	27.41	812	17.17	72
Pagellus bellottii	22.07	273	13.82	75
Dentex angolensis	15.47	153	9.69	76
Spicara alta	11.73	458	7.34	73
Brotula barbata	9.34	11	5.85	
Squatina oculata	7.13	6	4.47	
Lepidotrigla cadmani	4.22	57	2.64	
Raja miraletus	3.82	8	2.39	
Octopus sp.	3.81	4	2.39	
Zeus faber	1.53	6	0.96	
Dentex gibbosus	1.41	6	0.88	
Priacanthus arenatus	0.88	6	0.55	
Pontinus accraensis	0.35	2	0.22	
Todaropsis eblanae	0.27	10	0.17	
Citharus linguatula	0.24	10	0.15	
Boops boops	0.10	6	0.06	
Arnoglossus imperialis	0.07	10	0.05	
Illex coindetii	0.04	2	0.02	
Total	159.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 15
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°36.89
start stop duration Lon E 0°14.51
TIME :08:02:38 08:32:54 30.3 (min) Purpose : 3
LOG : 6728.82 6730.39 1.6 Region : 2600
FDEPTH: 57 56 Gear cond.: 0
BDEPTH: 57 56 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.1 kn
Sorted : 0 Total catch: 86.08 Catch/hour: 170.67

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	95.18	19358	55.77	78
Pagrus caeruleostictus	12.02	83	7.04	77
Dentex gibbosus	7.52	87	4.41	
Alloteuthis africana	6.98	2377	4.09	
Pagellus bellottii	6.08	87	3.56	80
Torpedo torpedo	5.67	12	3.32	
Octopus sp.	5.16	4	3.02	
Priacanthus arenatus	4.12	214	2.42	
Dentex congoensis	3.44	101	2.02	79
Pseudupeneus prayensis	3.33	63	1.95	
Sepia hieredda	3.24	10	1.90	
Dactylopterus volitans	2.82	8	1.65	
Raja miraletus	2.74	6	1.60	
Ariomma bondi	2.70	333	1.58	
Todaropsis eblanae	1.82	16	1.07	
Aluterus monoceros	1.76	2	1.03	
Lagocephalus laevigatus	1.53	4	0.89	
Illex coindetii	1.19	8	0.70	
Sphyraena guachancho	1.16	2	0.68	
Citharus linguatula	0.95	24	0.56	
Fistularia petimba	0.44	2	0.26	
Lepidotrigla cadmani	0.28	8	0.16	
Solitas gruveli	0.24	16	0.14	
Chaetodon robustus	0.20	2	0.12	
Arnoglossus imperialis	0.12	56	0.07	
Plastic	0.00	2	0.00	
Metal waste	0.00	2	0.00	
Total	170.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 16
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°39.04
start stop duration Lon E 0°14.00
TIME :09:37:08 10:07:23 30.3 (min) Purpose : 3
LOG : 6737.87 6739.36 1.5 Region : 2600
FDEPTH: 41 42 Gear cond.: 0
BDEPTH: 41 42 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.0 kn
Sorted : 0 Total catch: 71.57 Catch/hour: 141.90

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Pagellus bellottii	95.65	1721	67.41	82
Dactylopterus volitans	14.37	42	10.12	
Sepia hieredda	12.93	18	9.11	
Alectis alexandrinus	2.77	4	1.95	
Stephanolepis hispidus	2.75	14	1.94	
Pagrus caeruleostictus	2.08	8	1.47	81
Raja miraletus	1.74	4	1.23	
Sphyraena sphyraena	1.60	6	1.12	
Balistes capriscus	1.45	2	1.02	
Balistes punctatus	1.29	2	0.91	
Pseudupeneus prayensis	1.10	42	0.78	
Fistularia petimba	0.92	12	0.65	
Lagocephalus laevigatus	0.85	2	0.60	
Syacium guineensis	0.74	18	0.52	
Solitas gruveli	0.54	12	0.38	
Alloteuthis africana	0.51	137	0.36	
Decapterus punctatus	0.39	54	0.27	
Farfantepenaeus notialis	0.12	6	0.08	
Epinephelus haifensis	0.12	6	0.08	

Total	141.90	100.00

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 17
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°34.25
start stop duration Lon W 0°1.81
TIME :11:55:02 12:22:48 27.8 (min) Purpose : 3
LOG : 6755.66 6757.19 1.5 Region : 2600
FDEPTH: 29 29 Gear cond.: 0
BDEPTH: 29 29 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.3 kn
Sorted : 0 Total catch: 730.66 Catch/hour: 1579.23

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	432.71	157519	27.40	
Sphyraena guachancho	284.91	9147	18.04	
Chloroscombrus chrysurus	255.69	9979	16.19	
Brachydeuterus auritus	233.78	36968	14.80	83
Ephippion guttifer	74.46	56	4.71	
Selene dorsalis	71.09	3309	4.50	
Galeoides decadactylus	60.69	1293	3.84	
Pseudotolithus senegallus	47.55	11	3.01	
Drepane africana	24.25	76	1.54	
Pagrus caeruleostictus	20.23	1068	1.28	84
Decapterus punctatus	16.16	5844	1.02	
Acanthostrascion guineensis	11.66	84	0.74	
Eucinostomus melanopterus	8.43	56	0.53	
Pseudupeneus prayensis	7.31	225	0.46	
Caranx fischeri	6.46	56	0.41	
Sardinella maderensis	6.32	56	0.40	
Alectis alexandrinus	6.04	112	0.38	
Pagellus bellottii	2.95	84	0.19	
Rypticus saponaceus	2.11	28	0.13	
Dasyatis margarita	1.76	28	0.11	
Farfantepenaeus notialis	1.15	32	0.07	
Lagocephalus laevigatus	0.98	28	0.06	
Lutjanus fulgens	0.98	112	0.06	
Pseudotolithus senegalensis	0.78	2	0.05	
Lethrinus atlanticus	0.42	28	0.03	
Apogon affinis	0.28	56	0.02	
Squilla mantis	0.09	2	0.01	
Plastic	0.00	648	0.00	
Metal waste	0.00	108	0.00	
Total	1579.23		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 18
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°29.57
start stop duration Lon E 0°0.79
TIME :13:47:31 14:18:03 30.5 (min) Purpose : 3
LOG : 6767.53 6769.24 1.7 Region : 2600
FDEPTH: 48 49 Gear cond.: 0
BDEPTH: 48 49 Validity : 0
Towing dir: 0° Wire out : 160 m Speed : 3.4 kn
Sorted : 0 Total catch: 82.58 Catch/hour: 162.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex canariensis	45.67	104	28.14	88
Pagrus caeruleostictus	36.71	163	22.62	86
Dactylopterus volitans	16.31	51	10.05	
Pagellus bellottii	10.42	255	6.42	87
Balistes punctatus	10.38	35	6.39	
Aluterus monoceros	6.03	8	3.72	
Pseudupeneus prayensis	5.81	49	3.58	85
Epinephelus aeneus	4.76	2	2.93	
Stephanolepis hispidus	3.99	14	2.46	
Sepia hieredda	3.81	20	2.35	
Seriola rivoliana	3.31	2	2.04	
Lagocephalus laevigatus	2.95	8	1.82	
Caranx crysos	2.30	2	1.42	
Fistularia petimba	2.28	33	1.40	
Priacanthus arenatus	2.24	22	1.38	
Diodon holocanthus	1.71	8	1.05	
Rypticus saponaceus	1.10	16	0.68	
Scorpaena sp.	0.60	6	0.37	
Chaetodon robustus	0.57	10	0.35	
Lethrinus atlanticus	0.49	2	0.30	
Syaciumguineensis	0.32	4	0.20	
Trigloporus lastoviza	0.28	4	0.18	
Chelidonichthys gabonensis	0.16	6	0.10	
Prognathodes marcellae	0.09	2	0.05	
Plastic	0.00	2	0.00	
Metal waste	0.00	20	0.00	
Total	162.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 19
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°26.24
start stop duration Lon E 0°3.94
TIME :15:38:33 16:08:58 30.4 (min) Purpose : 3
LOG : 6778.15 6779.92 1.8 Region : 2600
FDEPTH: 89 84 Gear cond.: 0
BDEPTH: 89 84 Validity : 0
Towing dir: 0° Wire out : 245 m Speed : 3.5 kn
Sorted : 0 Total catch: 208.49 Catch/hour: 411.22

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	154.36	3030	37.54	89
Dentex congoensis	96.65	2858	23.50	93
Dentex angolensis	42.73	773	10.39	91
Brachydeuterus auritus	33.90	400	8.24	95
Ariomma bondi	26.51	966	6.45	90
Boops boops	11.39	179	2.77	94
Zeus faber	8.52	14	2.07	
Spicara alta	8.21	538	2.00	
Lepidotrigla cadmani	7.80	166	1.90	
Aluterus monoceros	4.85	4	1.18	
Sepia hieredda	3.94	10	0.96	
Squatina oculata	3.73	4	0.91	
Citharus linguatula	3.66	55	0.89	
Fistularia petimba	1.89	2	0.46	
Octopus sp.	1.35	2	0.33	
Pagellus bellottii	0.62	55	0.15	92
Priacanthus arenatus	0.48	14	0.12	
Solitas gruveli	0.41	14	0.10	
Arnoglossus imperialis	0.21	55	0.05	
Plastic	0.00	39	0.00	
Total	411.22		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 20
DATE :04/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°26.89
start stop duration Lon E 0°6.64
TIME :17:21:01 17:41:00 20.0 (min) Purpose : 3
LOG : 6788.76 6789.66 0.9 Region : 2600
FDEPTH: 113 108 Gear cond.: 0
BDEPTH: 113 108 Validity : 0
Towing dir: 0° Wire out : 280 m Speed : 2.7 kn
Sorted : 0 Total catch: 115.65 Catch/hour: 347.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Spicara alta	198.02	9583	57.02	96
Dentex congoensis	88.50	2625	25.48	97
Dentex angolensis	15.56	327	4.48	98
Raja miraletus	8.35	18	2.40	
Squatina oculata	6.25	3	1.80	
Chelidonichthys gabonensis	4.83	54	1.39	
Pagellus bellottii	3.84	180	1.11	
Boops boops	3.47	54	1.00	
Zeus faber	3.18	3	0.92	
Todaropsis eblanae	2.73	21	0.79	
Sphoeroides pachgaster	2.52	12	0.73	
Umbrina canariensis	2.42	12	0.70	
Trachurus trecae	2.21	42	0.64	
Brachydeuterus auritus	1.00	12	0.29	
Ariomma bondi	1.00	42	0.29	
Microchirus hexophthalmus	0.84	21	0.24	
Sphoeroides pachygaster	0.74	3	0.21	
Arnoglossus imperialis	0.53	84	0.15	
Sargocentron hastatum	0.53	3	0.15	
Citharus linguatula	0.42	42	0.12	
Lepidotrigla carolae	0.37	21	0.11	
Plastic	0.00	30	0.00	
Total	347.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 21
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°19.72
start stop duration Lon W 0°5.05
TIME :06:25:03 06:55:26 30.4 (min) Purpose : 3
LOG : 6827.82 6829.29 1.5 Region : 2600
FDEPTH: 76 76 Gear cond.: 0
BDEPTH: 76 76 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 2.9 kn
Sorted : 0 Total catch: 179.56 Catch/hour: 354.51

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Dentex congoensis	66.19	3633	18.67	101
Pagellus bellottii	61.30	1311	17.29	102
Dentex canariensis	43.08	115	12.15	100
Decapterus punctatus	42.40	1275	11.96	103
Pagrus caeruleostictus	33.25	109	9.38	99
Trachurus trecae	27.85	809	7.86	104
Citharus linguatula	15.75	77	4.44	
Pseudupeneus prayensis	12.76	164	3.60	
Lepidotrigla cadmani	12.70	142	3.58	
Dactylopterus volitans	10.26	34	2.89	
Scorpaena stephanica	5.08	2	1.43	
Bodianus speciosus	3.05	2	0.86	
Chelidonichthys gabonensis	2.93	43	0.83	
Syacium guineensis	2.77	43	0.78	
Torpedo torpedo	2.24	4	0.63	
Lutjanus fulgens	1.93	2	0.55	
Squatina oculata	1.91	2	0.54	
Priacanthus arenatus	1.79	12	0.51	
Lepidotrigla carolae	1.74	109	0.49	
Prognathodes marcellae	1.09	22	0.31	
Sepia hieredda	1.02	65	0.29	
Chaetodon robustus	0.87	12	0.25	
Todaropsis eblanae	0.76	12	0.21	
Squilla mantis	0.49	12	0.14	
Solitas gruveli	0.49	34	0.14	
Dentex angolensis	0.43	34	0.12	
Microchirus frechkopi	0.38	12	0.11	
Total	354.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 22
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°25.41
start stop duration Lon W 0°9.91
TIME :08:24:20 08:54:30 30.2 (min) Purpose : 3
LOG : 6840.38 6841.88 1.5 Region : 2600
FDEPTH: 44 43 Gear cond.: 0
BDEPTH: 44 43 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.0 kn
Sorted : 0 Total catch: 267.88 Catch/hour: 532.91

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Decapterus punctatus	332.31	47228	62.36	105
Pagellus bellottii	60.16	430	11.29	106
Pagrus caeruleostictus	30.08	131	5.64	109
Pseudupeneus prayensis	18.38	1146	3.45	107
Apogon affinis	16.71	5570	3.14	
Dentex canariensis	11.94	36	2.24	108
Lagocephalus laevigatus	10.90	18	2.05	
Syacium guineensis	7.64	143	1.43	
Priacanthus arenatus	6.56	24	1.23	
Sepia hieredda	6.49	24	1.22	
Fistularia petimba	6.33	42	1.19	
Sphyraena guachancho	5.91	8	1.11	
Dactylopterus volitans	4.30	14	0.81	
Balistes punctatus	3.30	14	0.62	
Raja miraletus	2.47	4	0.46	
Epinephelus aeneus	1.67	2	0.31	
Sphyraena sphyraena	1.51	6	0.28	
Lethrinus atlanticus	1.42	10	0.27	
Lutjanus fulgens	1.36	4	0.26	
Balistes capriscus	0.98	2	0.18	
Alloteuthis africana	0.48	143	0.09	
Chromis cadenati	0.48	95	0.09	
Arnoglossus imperialis	0.48	167	0.09	
Stephanolepis hispidus	0.46	4	0.09	
Boops boops	0.24	48	0.04	
Saurida parri	0.24	24	0.04	
Solitas gruveli	0.12	24	0.02	
Total	532.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 23
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°28.90
start stop duration Lon W 0°11.26
TIME :10:00:03 10:15:31 15.5 (min) Purpose : 3
LOG : 6849.73 6850.56 0.8 Region : 2600
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 74 m Speed : 3.2 kn
Sorted : 0 Total catch: 32.13 Catch/hour: 124.62

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Pagrus caeruleostictus	52.36	136	42.02	110
Drepane africana	33.43	97	26.83	
Epinephelus aeneus	11.00	27	8.82	112
Alectis alexandrinus	9.37	31	7.52	
Decapterus punctatus	4.69	322	3.77	111
Sepia hieredda	3.28	4	2.63	
Selene dorsalis	2.33	8	1.87	
Sphyraena guachancho	1.61	4	1.29	
Lutjanus fulgens	1.05	144	0.84	
Apogon affinis	0.89	229	0.72	
Dentex canariensis	0.85	4	0.68	
Panulirus regius	0.80	4	0.64	
Cynoglossus sp.	0.74	4	0.59	
Torpedo torpedo	0.58	8	0.47	
Syacium guineensis	0.52	27	0.42	
Pagellus bellottii	0.35	4	0.28	
Pseudupeneus prayensis	0.27	23	0.22	
Octopus sp.	0.16	4	0.12	
Balistes capriscus	0.14	4	0.11	
Solitas gruveli	0.10	4	0.08	
Hippocampus algiricus	0.10	4	0.08	
Farfantepenaeus notialis	0.02	4	0.02	
Plastic	0.00	1164	0.00	
Total	124.62		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 24
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°22.13
start stop duration Lon W 0°23.36
TIME :11:50:19 12:20:38 30.3 (min) Purpose : 3
LOG : 6863.60 6865.17 1.6 Region : 2600
FDEPTH: 27 27 Gear cond.: 0
BDEPTH: 27 27 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.1 kn
Sorted : 0 Total catch: 142.34 Catch/hour: 281.68

SPECIES	CATCH/HOUR weight	CATCH/HOUR numbers	% OF TOT. C	SAMP
Pseudupeneus prayensis	61.84	1219	21.95	113
Lethrinus atlanticus	32.21	321	11.43	114
Bodianus speciosus	21.85	16	7.76	
Pagrus caeruleostictus	19.99	416	7.10	116
Dentex canariensis	17.49	26	6.21	
Scomberomorus tritor	15.99	8	5.68	
Dentex canariensis	13.65	109	4.85	115
Lagocephalus laevigatus	12.59	12	4.47	
Alectis alexandrinus	7.80	2	2.77	
Acanthurus monroviae	7.13	20	2.53	
Fistularia tabacaria	6.85	4	2.43	
Decapterus punctatus	6.68	950	2.37	117
Balistes punctatus	6.04	36	2.14	
Aluterus heudelotii	5.95	12	2.11	
Chaetodon robustus	5.22	119	1.85	
Stephanolepis hispidus	4.85	46	1.72	
Fistularia petimba	4.79	28	1.70	
Diodon holocanthus	3.84	16	1.36	
Lutjanus fulgens, juvenile	3.44	297	1.22	
Sparisoma choati, female	3.24	4	1.15	
Sparisomachoati, male	2.26	2	0.80	
E C H I N O D E R M A T A	1.78	6	0.63	
Pagellus bellottii	1.68	36	0.60	
Raja miraletus	1.64	2	0.58	
Pagrus caeruleostictus	1.55	4	0.55	
Scorpaena laevis	1.48	6	0.53	
Cephalopholis taeniops	1.42	2	0.51	
Priacanthus arenatus	1.26	6	0.45	
Acanthostrascion guineensis	1.19	10	0.42	
Holacanthus africanus	1.06	4	0.38	
Scorpaena angolensis	0.82	10	0.29	
Syacium guineensis	0.77	10	0.27	
Chromis cadenati	0.74	188	0.26	
Sphoeroides marmoratus	0.74	6	0.26	
Alectis ciliaris	0.55	2	0.20	
Boops boops	0.45	49	0.16	
Rypticus saponaceus	0.35	6	0.13	
Octopus sp.	0.20	6	0.07	
Chloroscombrus chrysurus	0.17	6	0.06	
Eucidaris tribuloides	0.15	2	0.05	
Total	281.68		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 25
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°17.61
start stop duration Lon W 0°19.24
TIME :13:42:20 14:05:58 23.6 (min) Purpose : 3
LOG : 6875.42 6876.57 1.1 Region : 2600
FDEPTH: 47 48 Gear cond.: 0
BDEPTH: 47 48 Validity : 0
Towing dir: 0° Wire out : 155 m Speed : 2.9 kn
Sorted : 0 Total catch: 1395.02 Catch/hour: 3542.16

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	1787.56	155622	50.47	118
Engraulis encrasicolus	1497.08	242384	42.26	120
Sardinella aurita	78.21	7262	2.21	119
Pagellus bellottii	53.91	1899	1.52	
Pagrus caeruleostictus	36.87	223	1.04	
Priacanthus arenatus	19.27	559	0.54	
Euthynnus alletteratus, juvenile	13.97	1117	0.39	
Saurida parri, juvenile	13.97	559	0.39	
Pseudupeneus prayensis	13.69	950	0.39	
Serranus accraensis	11.17	56	0.32	
Lagocephalus laevigatus	5.73	10	0.16	
Raja miraletus	2.02	5	0.06	
Ilisha africana	1.68	335	0.05	
Arnoglossus imperialis	1.40	56	0.04	
Fistularia petimba	1.22	8	0.03	
Syacium guineensis	1.12	223	0.03	
Saurida parri	0.84	56	0.02	
Microchirus frechkopi	0.84	56	0.02	
Solitas gruveli	0.84	56	0.02	
Dactylopterus volitans	0.53	3	0.02	
Lepidotrigla carolae	0.28	56	0.01	
Plastic	0.00	13	0.00	
Total	3542.16		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 26
DATE :05/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°15.18
start stop duration Lon W 0°13.76
TIME :15:24:55 15:55:57 31.0 (min) Purpose : 3
LOG : 6885.59 6887.16 1.6 Region : 2600
FDEPTH: 81 80 Gear cond.: 0
BDEPTH: 81 80 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.0 kn
Sorted : 0 Total catch: 103.92 Catch/hour: 200.94

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex angolensis	40.84	661	20.32	124
Dentex congoensis	35.62	862	17.73	123
Trachurus trecae	26.82	824	13.35	122
Sphyraena sphyraena	19.57	58	9.74	
Ariomma bondi	19.34	673	9.62	
Lepidotrigla cadmani	12.10	217	6.02	
Boops boops	8.66	278	4.31	121
Zeus faber	5.20	17	2.59	
Mustelus mustelus	5.01	4	2.49	
Citharus linguatula	4.37	12	2.17	
Brachydeuterus auritus	4.22	46	2.10	
Cynoglossus senegalensis	4.00	27	1.99	
Squatina oculata	3.12	2	1.55	
Priacanthus arenatus	2.67	54	1.33	
Pseudupeneus prayensis	1.93	31	0.96	
Serranus accraensis	1.93	39	0.96	
Raja miraletus	1.66	4	0.83	
Microchirus frechkopi	1.01	23	0.50	
Solitas gruveli	0.97	46	0.48	
Octopus sp.	0.62	2	0.31	
Lophiodes kempi	0.52	2	0.26	
Fistularia petimba	0.45	2	0.23	
Sepia hierreda	0.31	15	0.15	
Total	200.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 27
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°2.15
start stop duration Lon W 0°22.76
TIME :06:34:52 07:05:05 30.2 (min) Purpose : 3
LOG : 6919.85 6921.58 1.7 Region : 2600
FDEPTH: 115 116 Gear cond.: 0
BDEPTH: 115 116 Validity : 0
Towing dir: 0° Wire out : 330 m Speed : 3.4 kn
Sorted : 0 Total catch: 32.53 Catch/hour: 64.59

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Boops boops	15.37	87	23.79	
Dentex congoensis	9.45	250	14.63	127
Dentex angolensis	7.91	79	12.25	126
Trachurus trecae	7.90	155	12.23	125
Chelidonichthys gabonensis	5.72	79	8.85	
Ariomma bondi	4.52	85	6.99	
Raja miraletus	4.47	10	6.92	
Spicara alta	3.57	121	5.53	
Illex coindetii	1.92	18	2.97	
Lepidotrigla carolae	1.08	52	1.68	
Fistularia petimba	1.07	2	1.65	
Sphoeroides pachygaster	0.66	6	1.01	
Pagellus bellottii	0.41	18	0.63	
Umbrina canariensis	0.40	2	0.61	
Citharus linguatula	0.08	2	0.12	
Anthias anthias	0.08	4	0.12	
Total	64.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 28
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°6.75
start stop duration Lon W 0°21.54
TIME :08:01:43 08:32:02 30.3 (min) Purpose : 3
LOG : 6926.60 6928.13 1.5 Region : 2600
FDEPTH: 68 66 Gear cond.: 0
BDEPTH: 68 66 Validity : 0
Towing dir: 0° Wire out : 180 m Speed : 3.0 kn
Sorted : 0 Total catch: 34.56 Catch/hour: 68.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	33.64	1326	49.19	129
Raja miraletus	6.62	16	9.68	
Pagellus bellottii	6.38	291	9.33	130
Pseudupeneus prayensis	3.55	49	5.19	128
Octopus sp.	2.92	2	4.27	
Torpedo torpedo	1.77	2	2.59	
Priacanthus arenatus	1.69	20	2.47	
Zeus faber	1.67	2	2.45	
Citharus linguatula	1.39	46	2.03	
Sepia hieredda	1.32	79	1.92	
Chelidonichthys gabonensis	1.30	24	1.90	
Solitas gruveli	1.10	42	1.61	
Boops boops	0.85	28	1.24	
Lepidotrigla carolae	0.81	61	1.19	
Syacium guineensis	0.79	10	1.16	
Arnoglossus imperialis	0.63	111	0.93	
Dactylopterus volitans	0.52	2	0.77	
Scorpaena angolensis	0.50	6	0.74	
Sardinella aurita	0.47	22	0.68	
Illex coindetii	0.24	4	0.35	
Chromis cadenati	0.19	8	0.27	
Sphoeroides marmoratus	0.02	2	0.03	
Saurida parri	0.02	4	0.03	
Total	68.39		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 29
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°12.00
start stop duration Lon W 0°28.57
TIME :10:03:52 10:34:11 30.3 (min) Purpose : 3
LOG : 6940.78 6942.32 1.6 Region : 2600
FDEPTH: 39 39 Gear cond.: 0
BDEPTH: 39 39 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.1 kn
Sorted : 0 Total catch: 19.56 Catch/hour: 38.71

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	7.27	105	18.79	133
Lagocephalus laevigatus	6.49	10	16.77	
Pagrus caeruleostictus	5.83	228	15.06	134
Pseudupeneus prayensis	5.63	148	14.54	132
Caranx crysos	2.99	4	7.72	
Priacanthus arenatus	2.13	44	5.50	
Syacium guineensis	1.20	30	3.09	
Decapterus punctatus	1.12	105	2.89	131
Solitas gruveli	0.95	71	2.45	
Balistes punctatus	0.86	2	2.22	
Dactylopterus volitans	0.79	4	2.04	
Arnoglossus imperialis	0.71	148	1.84	
Fistularia petimba	0.61	2	1.58	
Fistularia tabacaria	0.55	10	1.43	
Alloteuthis africana	0.47	148	1.23	
Dentex canariensis	0.35	2	0.89	
Scorpaena stephanica	0.16	2	0.41	
Sepia hieredda	0.15	12	0.39	
Scorpaena angolensis	0.14	2	0.36	
Lepidotrigla carolae	0.10	4	0.26	
Saurida parri	0.08	24	0.20	
Citharus linguatula	0.07	2	0.18	
Lophiodes kempi	0.05	2	0.13	
Serranus heterurus	0.01	2	0.03	
Total	38.71		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 30
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°15.87
start stop duration Lon W 0°31.78
TIME :11:43:23 12:13:23 30.0 (min) Purpose : 3
LOG : 6951.69 6953.17 1.5 Region : 2600
FDEPTH: 28 28 Gear cond.: 0
BDEPTH: 28 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.0 kn
Sorted : 0 Total catch: 141.07 Catch/hour: 282.14

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex canariensis	34.72	0	12.31	140
Acanthurus monroviae	31.84	128	11.29	
Decapterus punctatus	23.56	2908	8.35	139
Pagrus caeruleostictus	23.52	352	8.34	135
Balistes punctatus	19.84	88	7.03	
Pseudupeneus prayensis	17.44	384	6.18	137
Fistularia petimba	15.00	72	5.32	
Aluterus monoceros	14.88	26	5.27	
Aluterus heudelotii	13.60	32	4.82	
Lethrinus atlanticus	11.84	64	4.20	138
Chaetodon robustus	11.80	216	4.18	
Pagellus bellottii	11.36	192	4.03	136
Chloroscombrus chrysurus	10.40	24	3.69	
Diodon holocanthus	7.92	24	2.81	
Stephanolepis hispidus	6.52	72	2.31	
Acanthostrascion guineensis	6.03	42	2.14	
Bodianus speciosus	5.04	24	1.79	
Scorpaena laevis	3.15	10	1.12	
Lagocephalus laevigatus	2.63	4	0.93	
Lutjanus fulgens	2.00	176	0.71	
Rhinobatos albomaculatus	1.84	6	0.65	
Dactylopterus volitans	1.60	8	0.57	
Syacium guineensis	0.92	8	0.33	
Priacanthus arenatus	0.80	8	0.28	
Stephanolepis hispidus	0.72	8	0.26	0
Apogon affinis	0.68	50	0.24	
Holacanthus africanus	0.58	2	0.21	
Sparisoma choati, female	0.58	2	0.21	
Rypticus saponaceus	0.36	8	0.13	
Chromis limbata	0.36	24	0.13	
Cephalopholis taeniops	0.25	2	0.09	
Coris atlantica	0.16	2	0.06	
Sepia hierreda	0.12	8	0.04	
Sardinella aurita	0.04	8	0.01	
Chromis cadenati	0.04	8	0.01	
Plastic	0.00	40	0.00	
Total	282.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 31
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°10.22
start stop duration Lon W 0°43.19
TIME :13:54:55 14:25:11 30.3 (min) Purpose : 3
LOG : 6965.69 6967.35 1.7 Region : 2600
FDEPTH: 27 28 Gear cond.: 0
BDEPTH: 27 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.3 kn
Sorted : 0 Total catch: 28.66 Catch/hour: 56.81

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Balistes punctatus	10.19	18	17.93	
Alectis ciliaris	8.10	12	14.25	
Scomberomorus tritor	7.65	2	13.47	
Ephippion guttifer	7.65	4	13.47	
Decapterus punctatus	5.43	1526	9.56	141
Pseudupeneus prayensis	4.66	632	8.20	142
Epinephelus aeneus	3.45	2	6.07	
Sepia hieredda	2.47	4	4.34	
Fistularia petimba	1.67	6	2.95	
Dentex canariensis	1.59	178	2.79	0
Lethrinus atlanticus	0.86	2	1.52	
Pagrus caeruleostictus	0.68	10	1.20	
Pagellus bellottii	0.62	6	1.10	
Dentex canariensis	0.59	2	1.05	
E C H I N O D E R M A T A	0.42	2	0.73	
Acanthurus monroviae	0.37	2	0.65	
Stephanolepis hispidus	0.19	2	0.33	
Balistes capriscus	0.10	4	0.17	
Solitas gruveli	0.06	4	0.10	
Sardinella aurita	0.04	4	0.07	
Hippocampus algiricus	0.02	2	0.03	
Plastic	0.00	8	0.00	
Total	56.81		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 32
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°4.00
start stop duration Lon W 0°41.02
TIME :15:41:37 16:11:48 30.2 (min) Purpose : 3
LOG : 6977.80 6979.68 1.9 Region : 2600
FDEPTH: 38 38 Gear cond.: 0
BDEPTH: 38 38 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 0 Total catch: 35.60 Catch/hour: 70.73

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	21.46	8694	30.34	143
Lagocephalus laevigatus	13.59	20	19.21	
Dactylopterus volitans	10.17	26	14.38	
Pagrus caeruleostictus	5.09	0	7.19	
Pagellus bellottii	3.93	87	5.56	145
Pagrus caeruleostictus	3.58	342	5.06	144
Balistes capriscus	3.14	6	4.44	
Lethrinus atlanticus	2.23	6	3.15	
Lutjanus fulgens	1.96	6	2.77	
Priacanthus arenatus, juvenile	1.51	40	2.13	
Fistularia petimba	1.35	4	1.91	
Aluterus monoceros	1.02	2	1.45	
Aluterus heudelotii	0.60	2	0.84	
Syacium guineensis	0.56	8	0.79	
Aluterus heudelotii, juvenile	0.36	103	0.51	
Solitas gruveli	0.16	24	0.22	
Arnoglossus imperialis, juvenile	0.04	16	0.06	
Aequipecten flabellum	0.00	1987	0.00	
Plastic	0.00	8	0.00	
Total	70.73		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 33
DATE :06/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°59.17
start stop duration Lon W 0°33.94
TIME :17:32:35 18:02:43 30.1 (min) Purpose : 3
LOG : 6991.56 6993.03 1.5 Region : 2600
FDEPTH: 55 54 Gear cond.: 0
BDEPTH: 55 54 Validity : 0
Towing dir: 0° Wire out : 165 m Speed : 2.9 kn
Sorted : 0 Total catch: 68.17 Catch/hour: 135.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	43.05	6235	31.72	147
Pseudupeneus prayensis	21.71	327	15.99	149
Pagellus bellottii	12.63	149	9.30	150
Dactylopterus volitans	12.07	56	8.89	
Pagrus caeruleostictus	8.07	96	5.94	148
Epinephelus aeneus	7.34	4	5.41	
Boops boops	5.52	364	4.06	146
Sepia hieredda	5.36	38	3.95	
Fistularia petimba	3.74	34	2.76	
Priacanthus arenatus	2.84	20	2.09	
Eucidaris tribuloides	2.76	94	2.03	
Chromis cadenati	1.76	52	1.30	
Chaetodon robustus	1.63	28	1.20	
Sargocentron hastatum	1.49	14	1.10	
Balistes capriscus	1.25	2	0.92	
Alloteuthis africana	0.97	376	0.71	
Zeus faber	0.90	4	0.66	
Raja miraletus	0.75	2	0.55	
Sphyraena sphyraena	0.51	2	0.37	
Chelidonichthys gabonensis	0.38	6	0.28	
Arnoglossus imperialis	0.37	70	0.27	
Syacium guineensis	0.17	4	0.12	
Trigloporus lastoviza	0.13	2	0.10	
Priacanthus arenatus, juvenile	0.10	38	0.07	
Scorpaena angolensis	0.08	2	0.06	
Anthias anthias	0.07	4	0.05	
Prognathodes marcellae	0.04	2	0.03	
Saurida parri	0.03	6	0.02	
E C H I N O D E R M A T A	0.02	2	0.01	
Solitas gruveli	0.01	2	0.01	
Engraulis encrasicolus	0.01	2	0.01	
Apogon affinis	0.01	2	0.01	
Total	135.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 34
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°47.55
start stop duration Lon W 0°40.68
TIME :06:34:42 07:05:02 30.3 (min) Purpose : 3
LOG : 7025.27 7026.77 1.5 Region : 2600
FDEPTH: 78 76 Gear cond.: 0
BDEPTH: 78 76 Validity : 0
Towing dir: 0° Wire out : 330 m Speed : 3.0 kn
Sorted : 0 Total catch: 489.12 Catch/hour: 967.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	372.50	9869	38.50	151
Decapterus punctatus	190.82	73602	19.72	152
Dentex congoensis	71.04	4417	7.34	156
Priacanthus arenatus	53.31	2164	5.51	
Ariomma bondi	51.65	3420	5.34	
Pseudupeneus prayensis	47.71	568	4.93	153
Boops boops	34.62	1009	3.58	154
Sepia hieredda	21.26	208	2.20	
Lepidotrigla cadmani	19.04	471	1.97	
Dentex angolensis	14.96	277	1.55	155
Pagellus bellottii	12.60	582	1.30	157
Sargocentron hastatum	12.46	111	1.29	
Raja miraletus	10.19	24	1.05	
Lepidotrigla carolae	9.21	595	0.95	
Eucidaris tribuloides	6.92	28	0.72	
Squatina oculata	6.41	2	0.66	
Chromis cadenati	4.92	111	0.51	
Citharus linguatula	4.85	152	0.50	
Cynoglossus senegalensis	3.60	28	0.37	
Dentex canariensis	3.12	6	0.32	
Chelidonichthys gabonensis	2.98	42	0.31	
Sardinella aurita	2.35	138	0.24	
Pagrus caeruleostictus	2.26	10	0.23	
Sphoeroides pachygaster	2.05	2	0.21	
Dactylopterus volitans	1.68	4	0.17	
Solitas gruveli	1.59	55	0.16	
Syacium guineensis	1.59	28	0.16	
Sphyraena sphyraena	1.04	4	0.11	
Zeus faber	0.40	2	0.04	
Arnoglossus imperialis	0.28	55	0.03	
Microchirus boscanion	0.14	14	0.01	
Engraulis encrasicolus	0.14	14	0.01	
Total	967.67		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 35
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°54.74
start stop duration Lon W 0°47.70
TIME :08:52:28 09:22:53 30.4 (min) Purpose : 3
LOG : 7042.30 7043.86 1.6 Region : 2600
FDEPTH: 41 41 Gear cond.: 0
BDEPTH: 41 41 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn
Sorted : 0 Total catch: 57.04 Catch/hour: 112.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pseudupeneus prayensis	16.26	381	14.45	158
Acanthurus monroviae	15.63	24	13.88	
Decapterus punctatus, juvenile	13.06	4706	11.61	
Pagrus caeruleostictus	11.81	51	10.49	159
Fistularia petimba	8.17	45	7.26	
Balistes capriscus	7.39	8	6.57	
Lagocephalus laevigatus	6.97	8	6.20	
Lutjanus fulgens	6.63	16	5.89	
Aluterus heudelotii	6.41	4	5.70	
Dentex canariensis	6.00	24	5.33	162
Sepia hieredda	2.30	2	2.04	
Balistes punctatus	2.27	4	2.02	
Acanthostracion guineensis	1.68	10	1.49	
Epinephelus aeneus	1.66	2	1.47	
Pagellus bellottii	1.38	24	1.23	
Boops boops	0.84	126	0.75	
Dactylopterus volitans	0.69	2	0.61	
Pagrus caeruleostictus	0.60	63	0.53	160
Alloteuthis africana	0.58	233	0.52	
E C H I N O D E R M A T A	0.55	34	0.49	
Bodianus speciosus	0.50	2	0.45	
Chromis cadenati	0.44	49	0.39	
Chaetodon robustus	0.34	4	0.30	
Syaciumguineensis	0.26	2	0.23	
Apogon affinis	0.07	30	0.06	
Solitas gruveli	0.04	2	0.04	
Arnoglossus imperialis	0.02	4	0.02	
Total	112.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 36
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°3.57
start stop duration Lon W 0°55.01
TIME :11:10:44 11:40:52 30.2 (min) Purpose : 3
LOG : 7060.06 7061.60 1.5 Region : 2600
FDEPTH: 27 28 Gear cond.: 0
BDEPTH: 27 28 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
Sorted : 0 Total catch: 244.40 Catch/hour: 486.36

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chlamys purpuratus	416.72	46991	85.68	
Balistes capriscus	15.72	22	3.23	
Pagellus bellottii	14.37	90	2.95	163
Ephippion guttifer	8.24	2	1.69	
Xyrichtys novacula	6.26	6	1.29	
Sepia hieredda	4.43	14	0.91	
Lethrinus atlanticus	2.95	6	0.61	
Aluterus heudelotii	2.71	8	0.56	
Lagocephalus laevigatus	2.67	2	0.55	
Dentex canariensis	2.24	4	0.46	
Aluterus monoceros	1.91	2	0.39	
Epinephelus aeneus	1.69	2	0.35	
Seriola rivoliana	1.67	2	0.34	
Dactylopterus volitans	1.02	6	0.21	
Chilomycterus spinosus mauretanicus	0.92	2	0.19	
Balistes punctatus	0.89	2	0.18	
Stephanolepis hispidus	0.80	2	0.16	
Syacium guineensis	0.31	2	0.06	
Trachinocephalus myops	0.27	2	0.06	
Bothus podas	0.18	4	0.04	
Pagrus caeruleostictus	0.13	2	0.03	
Pseudupeneus prayensis	0.12	2	0.02	
Decapterus punctatus	0.09	2	0.02	
Solitas gruveli	0.08	4	0.02	
Total	486.36		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 37
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°0.91
start stop duration Lon W 1°10.00
TIME :13:25:38 13:55:39 30.0 (min) Purpose : 3
LOG : 7077.19 7078.78 1.6 Region : 2600
FDEPTH: 29 29 Gear cond.: 0
BDEPTH: 29 29 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 0 Total catch: 75.35 Catch/hour: 150.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	69.15	7591	45.92	167
Balistes capriscus	22.62	32	15.02	
Sepia hieredda	14.65	30	9.73	
Scomberomorus tritor	9.09	2	6.04	
Aequipecten flabellum	8.64	254	5.74	
Aluterus monoceros	7.36	4	4.88	
Pagellus bellottii	5.24	54	3.48	166
Fistularia petimba	3.57	6	2.37	
Aluterus heudelotii	2.65	6	1.76	
Aequorea forskalea	2.46	2	1.63	
Plastic	2.00	6	1.33	
Pseudupeneus prayensis	1.05	38	0.70	164
Dactylopterus volitans	0.74	2	0.49	
Stephanolepis hispidus	0.49	2	0.33	
Sardinella aurita	0.45	30	0.30	165
Solitas gruveli	0.18	2	0.12	
Bothus podas	0.10	2	0.07	
Syacium guineensis	0.09	2	0.06	
Sphoeroides marmoratus	0.04	2	0.03	
Trachinocephalus myops	0.03	2	0.02	
Total	150.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 38
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°53.12
start stop duration Lon W 1°4.16
TIME :15:21:37 15:51:47 30.2 (min) Purpose : 3
LOG : 7091.57 7093.45 1.9 Region : 2600
FDEPTH: 39 39 Gear cond.: 0
BDEPTH: 39 39 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.7 kn
Sorted : 0 Total catch: 14.88 Catch/hour: 29.59

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	25.93	1207	87.63	168
Sardinella aurita	0.93	28	3.16	169
Aluterus monoceros	0.81	2	2.72	
Pagellus bellottii	0.64	10	2.15	
Pagrus caeruleostictus	0.49	12	1.65	
Solitas gruveli	0.18	16	0.60	
Balistes punctatus	0.15	2	0.50	
Pseudupeneus prayensis	0.12	12	0.40	
Aluterus heudelotii	0.10	2	0.34	
Priacanthus arenatus	0.09	2	0.30	
Fistularia petimba	0.04	2	0.13	
Bothus podas	0.04	4	0.13	
Antennarius striatus	0.02	2	0.07	
Syacium guineensis	0.02	8	0.05	
PORTUNIDAE	0.01	2	0.03	
PARTHENOPIDAE	0.01	2	0.03	
DORIPPIDAE	0.01	2	0.03	
Calappa rubroguttata	0.01	2	0.03	
Sepia hieredda	0.01	4	0.02	
Total	29.59		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 39
DATE :07/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°42.69
start stop duration Lon W 0°54.23
TIME :17:16:34 17:46:41 30.1 (min) Purpose : 3
LOG : 7108.13 7109.65 1.5 Region : 2600
FDEPTH: 56 56 Gear cond.: 0
BDEPTH: 56 56 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.0 kn
Sorted : 0 Total catch: 138.01 Catch/hour: 274.93

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	93.07	8251	33.85	172
Pagellus bellottii	88.96	1127	32.36	171
Pseudupeneus prayensis	16.77	38	6.10	
Epinephelus aeneus	13.59	2	4.94	
Sepia hieredda	11.07	16	4.02	
Pagrus caeruleostictus	9.76	40	3.55	170
Syacium guineensis	7.05	183	2.56	
Raja miraletus	6.97	2	2.54	
Boops boops	4.90	215	1.78	
Dactylopterus volitans	3.70	8	1.34	
Mustelus mustelus	3.39	2	1.23	
Alloteuthis africana	2.99	2689	1.09	
Eucidaris tribuloides	2.67	72	0.97	
Solitas gruveli	1.95	183	0.71	
Sardinella aurita	1.39	96	0.51	
Citharus linguatula	1.27	40	0.46	
Anthias anthias	1.24	56	0.45	
Arnoglossus imperialis	1.20	327	0.43	
Chromis cadenati	0.76	72	0.28	
Saurida parri	0.60	175	0.22	
Lepidotrigla cadmani	0.52	16	0.19	
Lepidotrigla carolae	0.49	24	0.18	
Fistularia petimba	0.40	24	0.14	
Priacanthus arenatus	0.24	8	0.09	
Total	274.93		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 40
DATE :08/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°33.16
start stop duration Lon W 1°3.33
TIME :06:36:49 07:06:54 30.1 (min) Purpose : 3
LOG : 7140.40 7141.88 1.5 Region : 2600
FDEPTH: 59 60 Gear cond.: 0
BDEPTH: 59 60 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.0 kn
Sorted : 0 Total catch: 264.94 Catch/hour: 528.46

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Apsilus fuscus	267.61	882	50.64	174
Dentex canariensis	71.81	104	13.59	176
Pagrus caeruleostictus	61.76	160	11.69	175
Dactylopterus volitans	41.09	16	7.78	
Lutjanus agennes	17.23	2	3.26	
Pagellus bellottii	11.85	112	2.24	177
Pseudupeneus prayensis	11.57	88	2.19	
Acanthurus monroviae	9.89	8	1.87	
Alloteuthis africana	7.18	3590	1.36	
Sepia hieredda	6.86	16	1.30	
Scomber colias	6.26	14	1.19	173
Lutjanus fulgens	4.51	8	0.85	
Decapterus punctatus	3.59	16	0.68	
Bodianus speciosus	2.54	2	0.48	
Priacanthus arenatus	2.23	16	0.42	
Rypticus saponaceus	0.68	8	0.13	
Chaetodon robustus	0.68	8	0.13	
Chelidonichthys gabonensis	0.64	8	0.12	
Chromis cadenati	0.32	32	0.06	
Boops boops	0.16	16	0.03	
Total	528.46		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 41
DATE :08/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°45.18
start stop duration Lon W 1°11.20
TIME :09:02:50 09:33:44 30.9 (min) Purpose : 3
LOG : 7158.09 7159.98 1.9 Region : 2600
FDEPTH: 44 43 Gear cond.: 0
BDEPTH: 44 43 Validity : 0
Towing dir: 0° Wire out : 140 m Speed : 3.7 kn
Sorted : 0 Total catch: 37.34 Catch/hour: 72.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus, juvenile	13.40	9825	18.48	
Pagellus bellottii	9.21	91	12.71	179
Fistularia petimba	7.11	35	9.80	
Pseudupeneus prayensis	6.07	64	8.37	178
Pagrus caeruleostictus	5.16	23	7.11	
Dentex canariensis	4.52	14	6.24	
Apsilus fuscus	3.79	10	5.22	
Lutjanus fulgens	3.68	10	5.08	
Aluterus monoceros	2.38	2	3.28	
Alloteuthis africana	2.23	917	3.08	
Sepia hieredda	2.21	10	3.05	
Syacium guineensis	2.01	17	2.77	
Dactylopterus volitans	1.87	4	2.58	
Lagocephalus laevigatus	1.83	4	2.52	
Bodianus speciosus	1.33	2	1.83	
Decapterus punctatus	1.32	19	1.82	
Balistes punctatus	1.17	4	1.61	
Chaetodon robustus	0.85	12	1.18	
Acanthostrascion guineensis	0.76	4	1.04	
Priacanthus arenatus	0.50	2	0.70	
Scorpaena sp.	0.34	4	0.47	
E C H I N O D E R M A T A	0.18	6	0.25	
Chromis cadenati	0.16	29	0.21	
Solitas gruveli	0.16	12	0.21	
Coris atlantica	0.10	2	0.13	
Apogon affinis	0.06	21	0.08	
Trachinocephalus myops	0.05	2	0.07	
Arnoglossus imperialis	0.03	10	0.04	
Sphoeroides marmoratus	0.02	2	0.03	
Stephanolepis hispidus	0.01	2	0.01	
Total	72.50		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 42
DATE :08/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°0.61
start stop duration Lon W 1°21.67
TIME :11:48:20 12:17:20 29.0 (min) Purpose : 3
LOG : 7181.47 7183.06 1.6 Region : 2600
FDEPTH: 23 24 Gear cond.: 0
BDEPTH: 23 24 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.3 kn
Sorted : 0 Total catch: 178.34 Catch/hour: 368.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Chloroscombrus chrysurus	184.66	7010	50.05	181
Brachydeuterus auritus	86.24	8626	23.37	183
Pagellus bellottii	28.89	420	7.83	185
Decapterus punctatus	15.93	1922	4.32	180
Scomberomorus tritor	14.57	4	3.95	
Pagrus caeruleostictus	12.02	507	3.26	184
Pseudupeneus prayensis	10.86	941	2.94	182
Aluterus heudelotii	3.06	4	0.83	
Dactylopterus volitans	2.88	4	0.78	
Balistes capriscus	1.62	2	0.44	
Sardinella aurita, juvenile	1.30	87	0.35	
Caranx rhonchus	1.23	14	0.33	
Syaciumguineensis	1.23	14	0.33	
Sepia hieredda	0.93	4	0.25	
Lutjanus fulgens	0.92	2	0.25	
Selene dorsalis	0.65	304	0.18	
Stephanolepis hispidus	0.65	2	0.18	
Fistularia petimba	0.59	2	0.16	
Dentex canariensis	0.43	14	0.12	
Solitas gruveli, juvenile	0.29	14	0.08	
Plastic	0.00	8	0.00	
Total	368.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 43
DATE :08/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°55.57
start stop duration Lon W 1°32.41
TIME :13:57:33 14:23:01 25.5 (min) Purpose : 3
LOG : 7195.78 7197.09 1.3 Region : 2600
FDEPTH: 29 29 Gear cond.: 0
BDEPTH: 29 29 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.1 kn
Sorted : 0 Total catch: 168.14 Catch/hour: 396.25

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	171.66	39445	43.32	191
Chloroscombrus chrysurus	128.74	8470	32.49	186
Engraulis encrasicolus	38.60	13381	9.74	193
Scomberomorus tritor	16.66	2	4.20	
Pseudotolithus senegalensis	12.66	14	3.19	
Pagellus bellottii	7.42	127	1.87	187
Pagrus caeruleostictus	4.74	255	1.20	190
Decapterus punctatus	4.17	1668	1.05	189
Pseudupeneus prayensis	2.62	184	0.66	192
Lagocephalus laevigatus	2.05	28	0.52	
Sardinella maderensis	1.70	184	0.43	188
Farfantepenaeus notialis	0.92	28	0.23	
Sphyraena sphyraena, juvenile	0.85	1357	0.21	
Sardinella aurita, juvenile	0.78	57	0.20	
Chilomycterus spinosus mauretanicus	0.75	2	0.19	
Epinephelus aeneus	0.60	2	0.15	
Xyrichtys novacula	0.49	14	0.12	
Alloteuthis africana	0.35	99	0.09	
DORIPPIDAE	0.14	42	0.04	
Torpedo torpedo	0.14	14	0.04	
INACHIDAE	0.07	14	0.02	
Sepia hieredda	0.07	28	0.02	
Antennarius striatus	0.06	2	0.01	
Plastic	0.00	12	0.00	
Total	396.25		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 44
DATE :08/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°44.30
start stop duration Lon W 1°23.88
TIME :16:12:47 16:43:16 30.5 (min) Purpose : 3
LOG : 7213.40 7215.01 1.6 Region : 2600
FDEPTH: 46 47 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 125 m Speed : 3.2 kn
Sorted : 0 Total catch: 23.15 Catch/hour: 45.57

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Lagocephalus laevigatus	11.05	12	24.25	
Fistularia petimba	8.78	45	19.27	
Sepia hieredda	7.05	12	15.46	
Octopus sp.	6.02	2	13.22	
Pseudupeneus prayensis	2.66	20	5.83	194
Dactylopterus volitans	2.07	8	4.54	
Pagellus bellottii	1.61	16	3.54	195
Syacium guineensis	1.56	20	3.43	
Arnoglossus imperialis	1.18	16	2.59	
Lepidotrigla carolae	0.79	6	1.73	
Stephanolepis hispidus	0.53	2	1.17	
Solitas gruveli	0.48	16	1.06	
Acanthostrascion guineensis	0.43	2	0.95	
Pagrus caeruleostictus	0.39	2	0.86	
Pegusa lascaris	0.30	2	0.65	
Chloroscombrus chrysurus	0.17	8	0.37	
Xyrichtys novacula	0.14	2	0.30	
Brachydeuterus auritus	0.11	2	0.24	
Bothus podas	0.09	4	0.19	
Decapterus punctatus	0.06	4	0.13	
Alloteuthis africana	0.06	16	0.13	
Sardinella aurita	0.04	2	0.09	
Plastic	0.00	10	0.00	
Total	45.57		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 45
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°24.59
start stop duration Lon W 1°9.20
TIME :06:27:40 06:58:37 31.0 (min) Purpose : 3
LOG : 7261.32 7262.90 1.6 Region : 2600
FDEPTH: 86 86 Gear cond.: 0
BDEPTH: 86 86 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.1 kn
Sorted : 0 Total catch: 207.73 Catch/hour: 402.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	202.34	4731	50.28	198
Trachurus trecae	68.49	1718	17.02	
Lepidotrigla cadmani	29.06	645	7.22	
Pagellus bellottii	21.12	389	5.25	196
Boops boops	16.75	244	4.16	
Dentex canariensis	10.73	23	2.67	197
Dactylopterus volitans	9.29	27	2.31	
Chelidonichthys gabonensis	7.32	81	1.82	
Raja miraletus	5.68	12	1.41	
Lepidotrigla carolae	4.54	211	1.13	
Priacanthus arenatus	4.34	27	1.08	
Sepia hieredda	4.15	21	1.03	
Citharus linguatula	3.53	130	0.88	
Pseudupeneus prayensis	3.19	35	0.79	
Fistularia petimba	2.99	10	0.74	
Dentex gibbosus	2.76	6	0.69	
Pagrus caeruleostictus	2.46	10	0.61	
Solitas gruveli	0.88	21	0.22	
Todaropsis eblanae	0.65	14	0.16	
Brotula barbata	0.65	8	0.16	
Anthias anthias	0.51	21	0.13	
Zeus faber	0.44	2	0.11	
Microchirus hexophthalmus	0.37	8	0.09	
Saurida parri	0.14	14	0.03	
Antennarius striatus	0.10	8	0.03	
Total	402.46		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 46
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°26.33
start stop duration Lon W 1°24.59
TIME :08:52:22 09:22:34 30.2 (min) Purpose : 3
LOG : 7277.48 7278.88 1.4 Region : 2600
FDEPTH: 64 63 Gear cond.: 0
BDEPTH: 64 63 Validity : 0
Towing dir: 0° Wire out : 190 m Speed : 2.8 kn
Sorted : 0 Total catch: 45.33 Catch/hour: 90.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	22.33	475	24.79	199
Trachurus trecae	19.83	813	22.01	
Pagellus bellottii	18.71	648	20.78	201
Sardinella aurita	16.21	439	18.00	202
Pseudupeneus prayensis	3.31	167	3.67	200
Trachinocephalus myops	1.67	12	1.85	
Bothus podas	1.22	32	1.36	
Arnoglossus imperialis	1.12	205	1.25	
Boops boops	0.73	14	0.81	
Raja miraletus	0.72	2	0.79	
Sepia hieredda	0.66	26	0.73	
Solitas gruveli	0.61	16	0.67	
Priacanthus arenatus	0.48	6	0.53	
Dactylopterus volitans	0.47	6	0.52	
Todaropsis eblanae	0.43	6	0.47	
Chelidonichthys gabonensis	0.39	6	0.43	
Citharus linguatula	0.29	6	0.32	
Lepidotrigla carolae	0.27	14	0.30	
Lagocephalus laevigatus	0.18	4	0.20	
E C H I N O D E R M A T A	0.14	6	0.15	
Blennius normani	0.09	4	0.10	
Eucidaris tribuloides	0.08	6	0.09	
Microchirus hexophthalmus	0.08	2	0.09	
Antennarius striatus	0.05	2	0.06	
Fistularia petimba	0.03	2	0.03	
Total	90.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 47
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°40.51
start stop duration Lon W 1°34.25
TIME :11:20:32 11:51:14 30.7 (min) Purpose : 3
LOG : 7296.21 7297.78 1.6 Region : 2600
FDEPTH: 48 49 Gear cond.: 0
BDEPTH: 48 49 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.1 kn
Sorted : 0 Total catch: 724.24 Catch/hour: 1415.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	970.01	139253	68.53	203
Dentex canariensis	150.72	375	10.65	204
Sepia hieredda	60.82	188	4.30	
Pagellus bellottii	53.47	2533	3.78	206
Pagrus caeruleostictus	51.28	125	3.62	205
Pseudupeneus prayensis	50.35	1438	3.56	
Epinephelus aeneus	25.64	6	1.81	
Caranx crysos	11.88	125	0.84	
Fistularia petimba	9.97	47	0.70	
Balistes capriscus	5.22	6	0.37	
Raja miraletus	4.53	31	0.32	
Syacium guineensis	4.22	63	0.30	
Trachinocephalus myops	4.07	31	0.29	
Illex coindetii	4.07	31	0.29	
Aluterus heudelotii	2.35	4	0.17	
Chaetodon robustus	2.19	31	0.15	
Dactylopterus volitans	1.64	6	0.12	
Arnoglossus imperialis	1.25	281	0.09	
Lagocephalus laevigatus	0.84	4	0.06	
Acanthostrascion guineensis	0.42	2	0.03	
Solitas gruveli	0.31	31	0.02	
Bodianus speciosus	0.14	2	0.01	
Priacanthus arenatus, juvenile	0.06	31	0.00	
Total	1415.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 48
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°50.61
start stop duration Lon W 1°43.92
TIME :13:24:42 13:55:25 30.7 (min) Purpose : 3
LOG : 7311.33 7312.88 1.6 Region : 2600
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 115 m Speed : 3.0 kn
Sorted : 0 Total catch: 71.24 Catch/hour: 139.15

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena sphyraena	37.46	1070	26.92	
Selene dorsalis	26.32	412	18.91	214
Galeoides decadactylus	21.98	295	15.80	
Brachydeuterus auritus	13.13	90	9.43	211
Ilisha africana	9.54	855	6.85	
Brachydeuterus auritus	6.26	576	4.50	210
Chloroscombrus chrysurus	6.15	1203	4.42	
Trichiurus lepturus	3.08	21	2.21	
Engraulis encrasicolus	3.04	1508	2.19	212
Farfantepenaeus notialis	3.01	102	2.16	
Pseudotolithus senegalensis	1.61	8	1.16	
Sardinella maderensis	1.37	281	0.98	215
Dasyatis margarita	1.33	8	0.96	
Todaropsis eblanae	1.23	14	0.88	
Drepane africana	1.16	8	0.84	
Sardinella aurita	0.79	287	0.57	213
Alectis alexandrinus	0.48	35	0.34	
Sanquerus validus	0.45	8	0.32	
Psettodes belcheri	0.45	8	0.32	
Pteroscion peli	0.34	21	0.25	
Total	139.15		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 49
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°47.46
start stop duration Lon W 1°51.71
TIME :14:59:44 15:29:59 30.3 (min) Purpose : 3
LOG : 7321.04 7322.75 1.7 Region : 2600
FDEPTH: 28 28 Gear cond.: 0
BDEPTH: 28 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.4 kn
Sorted : 0 Total catch: 108.66 Catch/hour: 215.52

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	65.34	591	30.31	
Sphyraena guachancho, juvenile	38.60	1075	17.91	
Ilisha africana	36.97	5899	17.15	
Selene dorsalis	33.48	1898	15.53	217
Brachydeuterus auritus	23.84	2144	11.06	216
Pseudotolithus senegalensis	8.53	24	3.96	
Farfantepenaeus notialis	2.34	71	1.09	
Sepia hieredda	2.18	8	1.01	
Pomadasys rogeri	1.39	8	0.64	
Sepiella ornata	0.48	32	0.22	
Trichiurus lepturus	0.40	16	0.18	
Pomadasys incisus	0.40	8	0.18	
Sardinella maderensis, juvenile	0.36	40	0.17	
Antennarius striatus	0.32	8	0.15	
Maja brachydactyla	0.32	8	0.15	
Torpedo sp.n.	0.32	8	0.15	
Epinephelus aeneus	0.16	8	0.07	
Torpedo torpedo	0.12	8	0.06	
Total	215.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 50
DATE :09/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°43.13
start stop duration Lon W 1°48.70
TIME :16:23:20 16:53:30 30.2 (min) Purpose : 3
LOG : 7329.10 7330.68 1.6 Region : 2600
FDEPTH: 46 47 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn
Sorted : 0 Total catch: 534.50 Catch/hour: 1062.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus, juvenile	331.88	39826	31.22	
Sphyraena guachancho, juvenile	310.56	12422	29.22	
Saurida parri	224.65	36980	21.13	
Pagellus bellottii	52.10	587	4.90	218
Dasyatis marmorata	20.48	8	1.93	
Pagrus caeruleostictus	15.95	30	1.50	219
Fistularia petimba	11.14	26	1.05	
Lutjanus fulgens	10.66	14	1.00	
Sepia hieredda	10.39	12	0.98	
Dentex canariensis	8.59	34	0.81	220
Citharus linguatula	7.72	159	0.73	
Selene dorsalis	7.40	80	0.70	
Solitas gruveli	5.81	111	0.55	
Pseudupeneus prayensis	5.81	191	0.55	
Chaetodon robustus	5.57	32	0.52	
Alloteuthis africana	4.53	207	0.43	
Decapterus punctatus	4.30	95	0.40	
Epinephelus aeneus	4.25	6	0.40	
Engraulis encrasicolus	4.22	64	0.40	
Bodianus speciosus	2.63	2	0.25	
Balistes punctatus	2.55	2	0.24	
Cynoponticus ferox	2.38	2	0.22	
Caranx rhonchus	1.74	4	0.16	
Sphyraena sphyraena	1.60	4	0.15	
Plectorhinchus mediterraneus	1.43	2	0.13	
Lagocephalus laevigatus	1.34	6	0.13	
Cynoglossus senegalensis	1.17	4	0.11	
Balistes capriscus	1.17	2	0.11	
Priacanthus arenatus	0.96	2	0.09	
Total	1062.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 51
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°26.46
start stop duration Lon W 1°38.59
TIME :06:28:45 06:59:03 30.3 (min) Purpose : 3
LOG : 7374.40 7375.89 1.5 Region : 2600
FDEPTH: 71 68 Gear cond.: 0
BDEPTH: 71 68 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.0 kn
Sorted : 0 Total catch: 172.20 Catch/hour: 340.87

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Saurida parri	264.15	47996	77.49	
Trachurus trecae	22.13	915	6.49	223
Pseudupeneus prayensis	11.13	396	3.26	222
Pagellus bellottii	9.90	222	2.90	
Lepidotrigla carolae	6.73	546	1.97	
Decapterus punctatus	5.50	261	1.61	221
Ariomma bondi	4.28	79	1.25	
Dactylopterus volitans, juvenile	3.92	396	1.15	
Sepia hieredda	2.61	143	0.77	
Dentex congoensis	2.53	222	0.74	
Dactylopterus volitans	1.62	8	0.48	
Boops boops	1.54	32	0.45	
Raja miraletus	1.10	2	0.32	
Lepidotrigla cadmani	0.87	95	0.26	
Blennius normani	0.75	40	0.22	
Microchirus boscanion	0.44	40	0.13	
Priacanthus arenatus	0.40	8	0.12	
Trachinocephalus myops	0.40	8	0.12	
Illex coindetii	0.32	8	0.09	
Citharus linguatula	0.24	16	0.07	
Lagocephalus laevigatus	0.20	8	0.06	
Solitas gruveli	0.12	8	0.03	
Total	340.87		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 52
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°26.25
start stop duration Lon W 1°54.15
TIME :08:46:37 09:18:35 32.0 (min) Purpose : 3
LOG : 7390.21 7391.90 1.7 Region : 2600
FDEPTH: 87 89 Gear cond.: 0
BDEPTH: 87 89 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.2 kn
Sorted : 0 Total catch: 79.03 Catch/hour: 148.36

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pagellus bellottii	36.80	593	24.80	226
Dentex congoensis	33.39	804	22.51	225
Trachurus trecae	18.89	488	12.73	227
Dentex angolensis	17.60	220	11.86	224
Squatina oculata	8.64	2	5.82	
Dentex canariensis	7.51	15	5.06	
Sepia hieredda	6.06	19	4.09	
Raja miraletus	4.70	8	3.17	
Pseudupeneus prayensis	2.51	19	1.69	
Brotula barbata	2.25	6	1.52	
Lepidotrigla cadmani	2.21	43	1.49	
Pagrus caeruleostictus	1.67	6	1.13	
Chelidonichthys gabonensis	1.10	9	0.74	
Citharus linguatula	1.06	56	0.71	
Arnoglossus imperialis	0.80	122	0.54	
Dentex gibbosus	0.61	2	0.41	
Lepidotrigla carolae	0.56	28	0.38	
Umbrina canariensis	0.46	2	0.31	
Dactylopterus volitans	0.42	6	0.28	
Illex coindetii	0.33	19	0.22	
Ariomma bondi	0.26	6	0.17	
Sargocentron hastatum	0.19	2	0.13	
Anthias anthias	0.12	9	0.08	
Prognathodes marcellae	0.12	6	0.08	
Fusinus meyeri	0.10	2	0.07	
Total	148.36		100.01	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 53
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°40.55
start stop duration Lon W 2°0.76
TIME :11:09:00 11:39:18 30.3 (min) Purpose : 3
LOG : 7407.72 7409.40 1.7 Region : 2600
FDEPTH: 46 47 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 130 m Speed : 3.3 kn
Sorted : 0 Total catch: 13.89 Catch/hour: 27.50

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena sphyraena	4.97	18	18.08	
Octopus sp.	4.16	2	15.12	
Raja miraletus	2.74	6	9.97	
Pagellus bellottii	2.73	22	9.94	
Engraulis encrasicolus	2.60	111	9.47	228
Pseudotolithus senegalensis	2.29	2	8.32	
Epinephelus aeneus	2.27	2	8.25	
Lagocephalus laevigatus	0.89	2	3.24	
Selene dorsalis	0.77	4	2.81	
Trachurus trecae, juvenile	0.67	18	2.45	
Brachydeuterus auritus	0.53	50	1.94	229
Solitas gruveli	0.46	22	1.66	
Syacium guineensis	0.44	16	1.58	
Pseudupeneus prayensis, juvenile	0.44	4	1.58	
Illex coindetii	0.43	4	1.55	
Pagrus caeruleostictus	0.39	2	1.40	
Saurida parri	0.29	55	1.04	
Aluterus heudelotii	0.17	162	0.61	
Microchirus frechkopi	0.06	2	0.22	
Sepiella ornata	0.06	6	0.22	
GOBIIDAE	0.05	12	0.18	
Sepia hierreda, juvenile	0.05	2	0.18	
Sphoeroides marmoratus	0.03	2	0.11	
Serranus accraensis	0.01	2	0.04	
Arnoglossus imperialis	0.01	2	0.04	
Total	27.50		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 54
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°42.75
start stop duration Lon W 2°2.18
TIME :12:35:07 13:08:55 33.8 (min) Purpose : 3
LOG : 7415.45 7417.01 1.6 Region : 2600
FDEPTH: 29 28 Gear cond.: 0
BDEPTH: 29 28 Validity : 0
Towing dir: 0° Wire out : 110 m Speed : 2.8 kn
Sorted : 0 Total catch: 109.30 Catch/hour: 194.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	70.10	252	36.12	230
Pseudotolithus senegalensis	37.68	67	19.41	232
Brachydeuterus auritus	27.88	3642	14.36	231
Selene dorsalis	11.01	3896	5.67	
Chloroscombrus chrysurus	8.31	634	4.28	
Syacium guineensis	8.06	21	4.15	
Sepia hieredda	6.39	7	3.29	
Eucinostomus melanopterus	5.40	64	2.78	
Engraulis encrasicolus	4.51	902	2.32	233
Raja miraletus	2.42	5	1.25	
Farfantepenaeus notialis	2.26	112	1.16	
Aluterus monoceros	2.09	2	1.08	
Pomadasys perotaei	2.09	2	1.08	
Sphyraena guachancho	1.49	121	0.77	
Sargocentron hastatum	0.89	7	0.46	
Calappa rubroguttata	0.85	7	0.44	
Solitas gruveli	0.71	36	0.37	
Trachinocephalus myops	0.60	7	0.31	
Illex coindetii	0.60	7	0.31	
Alectis alexandrinus	0.52	2	0.27	
Cynoglossus senegalensis	0.14	7	0.07	
Arnoglossus imperialis	0.07	7	0.04	
Total	194.08		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 55
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°46.35
start stop duration Lon W 2°10.11
TIME :14:53:39 15:23:49 30.2 (min) Purpose : 3
LOG : 7428.12 7429.79 1.7 Region : 2600
FDEPTH: 30 28 Gear cond.: 0
BDEPTH: 30 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.3 kn
Sorted : 0 Total catch: 136.81 Catch/hour: 272.08

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Cynoponticus ferox	69.11	103	25.40	
Trichiurs lepturus	61.09	2971	22.45	
Galeoides decadactylus	26.70	173	9.81	238
Pseudotolithus senegalensis	22.55	119	8.29	237
Pteroscion peli	15.00	630	5.51	
Illex coindetii	9.55	66	3.51	
Selene dorsalis	7.52	48	2.77	0
Sanquerus validus	7.49	18	2.75	
Brachydeuterus auritus	6.65	493	2.44	234
Callinectes pallidus	6.62	227	2.43	
Dasyatis margarita	5.34	30	1.96	
Pomadasys perotaei	5.22	42	1.92	
Torpedo sp.n.	4.09	12	1.50	
Farfantepenaeus notialis	3.94	84	1.45	
Chloroscombrus chrysurus	3.46	147	1.27	235
Ilisha africana	3.19	251	1.17	
Torpedo sp.n.	2.45	6	0.90	
Sphyraena guachancho	2.42	95	0.89	
Selene dorsalis	2.36	268	0.87	236
Stromateus fiatola	1.67	6	0.61	
Parapenaeus longirostris	1.52	549	0.56	
Lagocephalus laevigatus	0.84	42	0.31	
Calappa rubroguttata	0.81	6	0.30	
Aplysia sp.	0.60	12	0.22	
Cynoglossus senegalensis	0.51	12	0.19	
PAGURIDAE	0.51	6	0.19	
Batrachoides liberiensis	0.42	12	0.15	
Squilla acuelata calmani	0.30	6	0.11	
Rypticus saponaceus	0.18	6	0.07	
Grammonus lunghursti	0.06	6	0.02	
Total	272.15		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 56
DATE :10/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°45.04
start stop duration Lon W 2°10.42
TIME :16:19:12 16:49:41 30.5 (min) Purpose : 3
LOG : 7433.20 7434.94 1.7 Region : 2600
FDEPTH: 37 37 Gear cond.: 0
BDEPTH: 37 37 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.4 kn
Sorted : 0 Total catch: 113.99 Catch/hour: 224.39

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	97.91	14033	43.64	242
Galeoides decadactylus	30.71	266	13.69	239
Sphyraena guachancho	28.97	1152	12.91	241
Selene dorsalis	20.70	59	9.22	0
Engraulis encrasicolus	11.31	2980	5.04	240
Cynoponticus ferox	11.02	14	4.91	
Selene dorsalis	5.43	299	2.42	
Farfantepenaeus notialis	2.63	83	1.17	
Raja miraletus	2.57	4	1.14	
Torpedo torpedo	2.44	8	1.09	
Pseudotolithus senegalensis	1.87	2	0.83	
Chloroscombrus chrysurus	1.74	83	0.78	
Torpedo sp.n.	1.67	2	0.75	
Sepiella ornata	1.62	112	0.72	
Cynoglossus sp.	1.08	2	0.48	
Ephippion guttifer	0.61	2	0.27	
Solitas gruveli	0.56	18	0.25	
Antennarius striatus	0.54	6	0.24	
Maja brachydactyla	0.41	6	0.18	
Decapterus punctatus	0.24	59	0.11	
Pegusa lascaris	0.18	2	0.08	
Sardinella aurita	0.12	6	0.05	
Pteroscion peli	0.03	2	0.01	
Lagocephalus laevigatus, juvenile	0.03	4	0.01	
Total	224.40		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 57
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°36.79
start stop duration Lon W 2°11.82
TIME :06:29:41 07:00:10 30.5 (min) Purpose : 3
LOG : 7482.18 7483.77 1.6 Region : 2600
FDEPTH: 77 76 Gear cond.: 0
BDEPTH: 77 76 Validity : 0
Towing dir: 0° Wire out : 200 m Speed : 3.1 kn
Sorted : 0 Total catch: 56.54 Catch/hour: 111.29

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	23.64	1453	21.24	245
Ariomma bondi	16.83	272	15.12	
Brotula barbata	13.29	18	11.94	
Priacanthus arenatus	7.94	83	7.14	
Sphyraena guachancho	6.91	6	6.21	
Decapterus punctatus	5.52	272	4.96	246
Saurida parri	5.10	1059	4.58	
Fistularia petimba	4.87	30	4.38	
Illex coindetii	4.61	47	4.14	
Trichiurus lepturus	3.69	24	3.32	
Pagellus bellottii	3.60	118	3.24	247
Sepia hieredda	2.37	6	2.13	
Raja miraletus	1.77	6	1.59	
Engraulis encrasicolus	1.71	142	1.54	243
Lagocephalus laevigatus	1.59	18	1.43	
Sardinella aurita	1.54	71	1.38	244
Dentex angolensis	1.42	12	1.27	
Scomber colias	1.27	6	1.14	
Pseudupeneus prayensis	1.09	24	0.98	
Dactylopterus volitans	1.03	6	0.93	
Syacium guineensis	0.71	12	0.64	
Scorpaena stephanica	0.32	6	0.29	
Sphoeroides marmoratus	0.24	18	0.21	
Sepia hieredda, juvenile	0.15	6	0.13	
Parapenaeus longirostris	0.06	12	0.05	
Alloteuthis africana	0.01	6	0.01	
Arnoglossus imperialis	0.01	6	0.01	
Total	111.29		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 58
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°44.81
start stop duration Lon W 2°23.43
TIME :08:35:23 09:14:01 38.6 (min) Purpose : 3
LOG : 7497.15 7499.21 2.1 Region : 2600
FDEPTH: 63 63 Gear cond.: 0
BDEPTH: 63 63 Validity : 0
Towing dir: 0° Wire out : 170 m Speed : 3.2 kn
Sorted : 0 Total catch: 806.70 Catch/hour: 1252.63

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	950.22	27744	75.86	252
Trachurus trecae	80.51	3882	6.43	250
Sphyraena sphyraena	64.86	266	5.18	251
Lagocephalus laevigatus	48.38	651	3.86	
Priacanthus arenatus	27.44	121	2.19	
Pseudupeneus prayensis	26.72	144	2.13	
Raja miraletus	9.87	25	0.79	
Brotula barbata	7.74	17	0.62	
Illex coindetii	6.86	73	0.55	
Sardinella aurita	5.78	266	0.46	248
Saurida parri	5.66	1132	0.45	
Decapterus punctatus	4.21	337	0.34	249
Trichiurus lepturus	3.01	73	0.24	
Pagellus bellottii, juvenile	2.89	96	0.23	
Syacium guineensis	1.68	25	0.13	
Solitas gruveli	1.57	25	0.12	
Fistularia petimba	1.28	6	0.10	
Parapenaeus longirostris	0.96	193	0.08	
Arnoglossus imperialis	0.84	121	0.07	
Sepia hieredda	0.72	25	0.06	
Alloteuthis africana	0.72	96	0.06	
Sphoeroides marmoratus	0.60	48	0.05	
GOBIIDAE	0.12	25	0.01	
Total	1252.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 59
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°49.68
start stop duration Lon W 2°20.49
TIME :10:23:11 10:54:20 31.2 (min) Purpose : 3
LOG : 7507.90 7509.60 1.7 Region : 2600
FDEPTH: 39 40 Gear cond.: 0
BDEPTH: 39 40 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.3 kn
Sorted : 0 Total catch: 158.83 Catch/hour: 305.92

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Cynoponticus ferox	98.70	395	32.26	
Trichiurus lepturus	45.77	1562	14.96	
Cynoglossus canariensis	29.51	85	9.65	
Stromateus fiatola	23.50	46	7.68	
Brachydeuterus auritus	21.96	418	7.18	254
Ephippion guttifer	13.87	15	4.53	
Chloroscombrus chrysurus	10.40	23	3.40	
Pteroscion peli	7.40	524	2.42	
Torpedo sp.n.	6.93	8	2.27	
Pseudotolithus senegalensis	6.90	54	2.25	
Sepia hieredda	6.43	170	2.10	
Todaropsis eblanae	4.24	46	1.39	
Cynoglossus senegalensis	3.93	100	1.28	
Halobatrachus didactylus	3.85	100	1.26	
Selene dorsalis	3.74	154	1.22	253
Caranx crysos	3.62	8	1.18	
Pomadasys perotaei	3.31	8	1.08	
Lagocephalus laevigatus	3.08	39	1.01	
Vanstraelenia chirophthalmus	2.31	31	0.76	
Scyllarus sp.	1.70	92	0.55	
Torpedo sp.n.	1.16	2	0.38	
DORIPPIDAE	0.77	69	0.25	
PAGURIDAE	0.77	8	0.25	
Solitas gruveli	0.62	15	0.20	
Sepiella ornata	0.50	31	0.16	
Pisodonophis semicinctus	0.39	4	0.13	
Machaerus oxyacanthus	0.23	31	0.08	
Calappa pelii	0.21	2	0.07	
Uroconger syringinus	0.08	2	0.03	
Antennarius striatus	0.05	8	0.02	
Batrachoides liberiensis	0.02	2	0.01	
Plastic	0.00	39	0.00	
Total	305.92		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 60
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°52.53
start stop duration Lon W 2°21.94
TIME :11:56:04 12:26:44 30.7 (min) Purpose : 3
LOG : 7513.47 7515.06 1.6 Region : 2600
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.1 kn
Sorted : 0 Total catch: 43.25 Catch/hour: 84.64

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Galeoides decadactylus	12.20	133	14.42	
Pseudotolithus senegalensis	11.39	22	13.46	
Brachydeuterus auritus	9.88	1838	11.68	
Chloroscombrus chrysurus	9.59	2057	11.33	
Sphyraena guachancho	6.50	119	7.68	255
Ilisha africana	4.77	196	5.64	
Selene dorsalis	4.57	773	5.40	
Farfantepenaeus notialis	3.97	129	4.69	
Torpedo sp.n.	3.55	6	4.20	
Epinephelus aeneus	3.39	4	4.00	
Sepiella ornata	1.91	143	2.25	
Lagocephalus laevigatus	1.88	49	2.22	
Cynoglossus canariensis	1.70	12	2.01	
Panulirus regius	1.34	14	1.58	
Trichiurus lepturus	1.31	72	1.55	
Sanquerus validus	1.10	2	1.29	
Pteroscion peli	0.90	37	1.06	
Caranx crysos	0.87	4	1.03	
Calappa rubroguttata	0.81	6	0.96	
Cynoglossus senegalensis	0.79	2	0.94	
Raja miraletus	0.59	2	0.69	
Squilla sp.	0.49	23	0.58	
Ephippion guttifer	0.44	4	0.52	
Torpedo torpedo	0.30	18	0.36	
Maja brachydactyla	0.20	4	0.23	
Scomberomorus tritor	0.16	2	0.18	
DORIPPIDAE	0.03	4	0.03	
PAGURIDAE	0.01	2	0.01	
Total	84.64		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 61
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°55.47
start stop duration Lon W 2°32.59
TIME :14:05:56 14:36:14 30.3 (min) Purpose : 3
LOG : 7528.74 7530.56 1.8 Region : 2600
FDEPTH: 27 28 Gear cond.: 0
BDEPTH: 27 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.6 kn
Sorted : 0 Total catch: 242.12 Catch/hour: 479.45

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Pomadasys jubelini	236.91	246	49.41	257
Drepane africana	58.06	123	12.11	
Sepia hieredda	49.74	42	10.38	
Decapterus punctatus, juvenile	29.31	9073	6.11	
Pagrus caeruleostictus	25.96	63	5.41	256
Pomadasys perotaei	24.24	48	5.06	258
Pomadasys rogeri	21.39	24	4.46	
Pseudotolithus senegalensis	6.06	8	1.26	
Alectis alexandrinus	5.07	16	1.06	
Selene dorsalis	3.90	20	0.81	
Brachydeuterus auritus	3.84	412	0.80	
Sphyraena guachancho	2.17	2	0.45	
Caranx crysos	2.12	4	0.44	
Psettodes belcheri	2.08	2	0.43	
Pagellus bellottii	1.82	12	0.38	
Raja miraletus	1.76	4	0.37	
Lethrinus atlanticus	1.70	4	0.36	
Sphyraena sphyraena	0.74	2	0.15	
Eucinostomus melanopterus	0.61	4	0.13	
Balistes capriscus	0.55	4	0.12	
Panulirus regius	0.51	4	0.11	
Galeoides decadactylus	0.44	4	0.09	
Chloroscombrus chrysurus	0.30	8	0.06	
Sphyraena sphyraena, juvenile	0.16	51	0.03	
Total	479.45		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 62
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°53.74
start stop duration Lon W 2°34.68
TIME :15:28:27 15:58:50 30.4 (min) Purpose : 3
LOG : 7536.28 7537.98 1.7 Region : 2600
FDEPTH: 40 41 Gear cond.: 0
BDEPTH: 40 41 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.3 kn
Sorted : 0 Total catch: 229.90 Catch/hour: 454.05

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	399.82	108695	88.06	
Selene dorsalis	15.13	41	3.33	
Pagrus caeruleostictus	8.91	18	1.96	
Pseudotolithus senegalensis	5.87	8	1.29	
Sphyraena guachancho	4.74	14	1.04	
Brachydeuterus auritus	3.53	207	0.78	
Aluterus monoceros	3.24	2	0.71	
Lagocephalus laevigatus	3.03	4	0.67	
Torpedo torpedo	2.05	2	0.45	
Balistes capriscus	1.80	4	0.40	
Scomberomorus tritor	1.27	2	0.28	
Trachinocephalus myops	0.76	14	0.17	
Pagellus bellottii	0.71	4	0.16	
Farfantepenaeus notialis	0.69	41	0.15	
Alloteuthis africana	0.55	207	0.12	
Raja miraletus	0.53	2	0.12	
Alectis alexandrinus	0.52	2	0.12	
Decapterus punctatus, juvenile	0.48	55	0.11	
Sardinella aurita	0.41	97	0.09	
Pseudupeneus prayensis	0.07	14	0.02	
Total	454.12		100.02	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 63
DATE :11/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°46.74
start stop duration Lon W 2°36.91
TIME :17:05:25 17:35:43 30.3 (min) Purpose : 3
LOG : 7546.34 7548.03 1.7 Region : 2600
FDEPTH: 66 68 Gear cond.: 0
BDEPTH: 66 68 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.4 kn
Sorted : 0 Total catch: 182.52 Catch/hour: 361.42

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	260.67	9820	72.13	263
Saurida parri	25.31	5002	7.00	
Trachurus trecae	14.38	0	3.98	262
Decapterus punctatus	7.84	416	2.17	261
Sphyraena sphyraena	6.72	40	1.86	
Pagellus bellottii	6.59	250	1.82	259
Octopus sp.	6.54	10	1.81	
Illex coindetii	5.58	48	1.55	
Sardinella aurita	5.35	273	1.48	260
Priacanthus arenatus	4.22	321	1.17	
Dentex congoensis	2.85	71	0.79	
Cynoglossus canariensis	2.55	12	0.71	
Fistularia petimba	2.38	18	0.66	
Lagocephalus laevigatus	1.43	36	0.39	
Branchiostegus semifasciatus	1.28	2	0.35	
Arnoglossus imperialis	1.25	238	0.35	
Sepia hieredda	1.08	2	0.30	
Sepia hieredda, juvenile	1.07	59	0.30	
Lepidotrigla cadmani	0.95	59	0.26	
Sphoeroides marmoratus	0.71	24	0.20	
Solitas gruveli	0.59	24	0.16	
Microchirus frechkopi	0.48	12	0.13	
Serranus accraensis	0.42	12	0.12	
Blennius normani	0.30	12	0.08	
Dactylopterus volitans	0.18	12	0.05	
Pseudupeneus prayensis	0.18	12	0.05	
Halobatrachus didactylus	0.13	2	0.04	
Uranoscopus albesca	0.10	2	0.03	
Lophiodes kempi	0.10	2	0.03	
Brotula barbata	0.08	2	0.02	
Scorpaena stephanica	0.06	2	0.02	
Antennarius striatus	0.06	2	0.02	
Total	361.42		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 64
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°42.92
start stop duration Lon W 2°51.21
TIME :06:33:08 07:03:17 30.2 (min) Purpose : 3
LOG : 7586.08 7587.75 1.7 Region : 2600
FDEPTH: 87 87 Gear cond.: 0
BDEPTH: 87 87 Validity : 0
Towing dir: 0° Wire out : 260 m Speed : 3.3 kn
Sorted : 0 Total catch: 214.95 Catch/hour: 427.76

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Dentex congoensis	115.45	1487	26.99	266
Pagellus bellottii	113.57	1642	26.55	265
Dentex canariensis	104.20	181	24.36	267
Dentex gibbosus	32.04	70	7.49	
Pagrus caeruleostictus	19.25	28	4.50	
Pseudupeneus prayensis	7.80	49	1.82	264
Dactylopterus volitans	6.03	22	1.41	
Fistularia petimba	4.91	14	1.15	
Chromis chromis	4.84	64	1.13	
Raja miraletus	3.94	8	0.92	
Sepia hieredda	3.13	8	0.73	
Uranoscopus polli	2.51	8	0.59	
Sphyraena sphyraena	2.09	8	0.49	
Sargocentron hastatum	1.85	8	0.43	
Citharus linguatula	1.78	22	0.42	
Chaetodon hoefleri	1.39	8	0.33	
Chelidonichthys gabonensis	0.98	14	0.23	
Sepia hieredda, juvenile	0.87	22	0.20	
Boops boops	0.59	8	0.14	
Trachurus trecae	0.31	8	0.07	
Arnoglossus imperialis	0.14	56	0.03	
Anthias anthias	0.11	8	0.02	
Total	427.77		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 65
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°56.11
start stop duration Lon W 2°44.82
TIME :08:48:37 09:19:42 31.1 (min) Purpose : 3
LOG : 7603.61 7605.31 1.7 Region : 2600
FDEPTH: 41 41 Gear cond.: 0
BDEPTH: 41 41 Validity : 0
Towing dir: 0° Wire out : 120 m Speed : 3.3 kn
Sorted : 0 Total catch: 142.99 Catch/hour: 276.04

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	141.72	9232	51.34	271
Sphyraena guachancho	41.70	116	15.11	268
Dentex congoensis	23.22	162	8.41	270
Chloroscombrus chrysurus	21.60	336	7.83	269
Mustelus mustelus	7.72	4	2.80	
Lagocephalus laevigatus	7.23	19	2.62	
Balistes capriscus	5.26	15	1.91	
Trichiurus lepturus	4.92	12	1.78	
Pseudotolithus senegalensis	4.18	4	1.51	
Engraulis encrasicolus	3.59	664	1.30	272
Fistularia petimba	3.24	12	1.17	
Epinephelus aeneus	2.64	2	0.95	
Raja miraletus	1.80	4	0.65	
Alloteuthis africana	1.33	764	0.48	
Cynoglossus canariensis	1.20	6	0.43	
Pseudupeneus prayensis	0.95	4	0.34	
Stephanolepis hispidus	0.84	2	0.30	
Sardinella maderensis	0.66	2	0.24	
Todaropsis eblanae	0.58	12	0.21	
Squilla mantis	0.46	2	0.17	
Pomadasys jubelini	0.42	4	0.15	
Arnoglossus imperialis	0.29	58	0.10	
Pegusa lascaris	0.20	2	0.07	
Solitas gruveli	0.17	12	0.06	
Saurida parri	0.12	23	0.04	
Total	276.04		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 66
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°58.78
start stop duration Lon W 2°45.23
TIME :10:05:52 10:36:43 30.9 (min) Purpose : 3
LOG : 7609.22 7610.89 1.7 Region : 2600
FDEPTH: 28 27 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 0 Total catch: 31.73 Catch/hour: 61.69

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena guachancho	14.04	29	22.75	276
Chloroscombrus chrysurus	7.50	163	12.15	274
Aluterus monoceros	5.95	6	9.64	
Epinephelus aeneus	4.74	4	7.69	
Alectis alexandrinus	4.44	17	7.20	
Acanthostrascion guineensis	3.71	8	6.02	
Sepia hieredda	3.20	2	5.18	
Pomadasys jubelini	2.99	4	4.85	
Galeoides decadactylus	2.94	29	4.76	273
Muraena melanotis	2.84	2	4.60	
Ephippion guttifer	1.70	2	2.76	
Dentex canariensis	1.65	16	2.68	275
Caranx crysos	1.46	4	2.36	
Raja miraletus	1.32	4	2.14	
Pagrus caeruleostictus	1.09	2	1.76	
Selene dorsalis	0.64	12	1.04	
Drepane africana	0.47	2	0.76	
Pseudotolithus senegalensis	0.45	2	0.72	
Pseudupeneus prayensis	0.23	2	0.38	
Pagellus bellottii	0.18	2	0.30	
Sepiella ornata	0.15	12	0.24	
Total	61.69		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 67
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 5°2.09
start stop duration Lon W 2°59.37
TIME :12:05:52 12:37:01 31.2 (min) Purpose : 3
LOG : 7623.77 7625.45 1.7 Region : 2600
FDEPTH: 25 23 Gear cond.: 0
BDEPTH: 25 23 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.2 kn
Sorted : 0 Total catch: 229.71 Catch/hour: 442.32

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	160.05	4916	36.18	
JELLYFISH	132.48	347	29.95	
Chloroscombrus chrysurus	41.36	1257	9.35	
Pomadasys jubelini	36.85	39	8.33	
Galeoides decadactylus	15.94	270	3.60	
Chaetodipterus goreensis	7.17	4	1.62	
Lethrinus atlanticus	6.74	13	1.52	277
Dentex canariensis	6.37	23	1.44	
Decapterus punctatus	5.31	2341	1.20	
Sphyraena guachancho	4.88	13	1.10	
Pagrus caeruleostictus	3.63	8	0.82	
Alectis alexandrinus	3.45	8	0.78	
Pseudotolithus senegalensis	2.88	6	0.65	
Selene dorsalis	2.85	108	0.64	
Lagocephalus laevigatus	1.73	4	0.39	
Chaetodipterus lippei	1.70	6	0.39	
Sphyraena guachancho, juvenile	1.46	200	0.33	
Caranx crysos	1.05	2	0.24	
Drepane africana	0.93	2	0.21	
Sardinella aurita	0.92	54	0.21	
Scomberomorus tritor	0.92	85	0.21	
Sepia hieredda	0.77	2	0.17	
Balistes punctatus	0.76	2	0.17	
Caranx senegallus	0.52	2	0.12	
Pomadasys perotaei	0.40	2	0.09	
Acanthostrascion guineensis	0.40	2	0.09	
Torpedo sp.n.	0.24	2	0.05	
Penaeus notialis	0.21	4	0.05	
Pseudupeneus prayensis	0.15	15	0.03	
Trachinocephalus myops	0.12	8	0.03	
Uranoscopus polli	0.04	8	0.01	
Total	442.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 68
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 5°0.17
start stop duration Lon W 3°0.92
TIME :13:26:02 13:56:21 30.3 (min) Purpose : 3
LOG : 7629.27 7630.97 1.7 Region : 2600
FDEPTH: 40 40 Gear cond.: 0
BDEPTH: 40 40 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.4 kn
Sorted : 0 Total catch: 533.21 Catch/hour: 1055.51

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	946.97	13172	89.72	278
Pagellus bellottii	29.00	249	2.75	
Sphyraena sphyraena	18.61	73	1.76	
Scomberomorus tritor	7.64	2	0.72	
Engraulis encrasicolus	6.86	1352	0.65	
Sphyraena guachancho	6.16	18	0.58	
Chloroscombrus chrysurus	5.72	83	0.54	
Pomadasys jubelini	5.36	8	0.51	
Decapterus punctatus	3.74	416	0.35	
Pseudotolithus senegalensis	3.59	4	0.34	
Calappa rubroguttata	2.70	22	0.26	
Trachinocephalus myops	2.29	22	0.22	
Alectis alexandrinus	2.12	6	0.20	
Pseudupeneus prayensis	2.08	42	0.20	
Squilla mantis	2.08	42	0.20	
Cynoglossus canariensis	2.01	8	0.19	
Scomber colias	1.87	249	0.18	
Mustelus mustelus	1.85	2	0.18	
Pomadasys perotaei	1.35	4	0.13	
Caranx crysos	1.03	2	0.10	
Balistes capriscus	0.77	2	0.07	
Raja miraletus	0.49	2	0.05	
Acanthostrascion guineensis	0.38	2	0.04	
Microchirus boscanion	0.31	22	0.03	
Saurida parri	0.31	42	0.03	
Syacium guineensis	0.21	22	0.02	
Fistularia petimba	0.02	2	0.00	
Total	1055.52		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 69
DATE :12/04/16 GEAR TYPE: BT NO: 27 POSITION:Lat N 4°50.19
start stop duration Lon W 3°3.47
TIME :15:42:19 16:12:31 30.2 (min) Purpose : 3
LOG : 7644.55 7646.27 1.7 Region : 2600
FDEPTH: 82 83 Gear cond.: 0
BDEPTH: 82 83 Validity : 0
Towing dir: 0° Wire out : 230 m Speed : 3.4 kn
Sorted : 0 Total catch: 82.58 Catch/hour: 164.07

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trachurus trecae	131.21	2907	79.97	279
Ariomma bondi	5.08	83	3.09	
Fistularia petimba	4.72	22	2.88	
Priacanthus arenatus	4.61	101	2.81	
Pagellus bellottii	4.55	113	2.77	280
Dentex angolensis	3.04	26	1.85	
Pseudupeneus prayensis	2.24	20	1.36	
Lepidotrigla carolae	1.97	62	1.20	
Brotula barbata	1.65	2	1.01	
Sphyraena sphyraena	1.47	6	0.90	
Dentex congoensis	1.15	28	0.70	
Zeus faber	0.75	4	0.45	
Citharus linguatula	0.52	18	0.31	
Chelidonichthys gabonensis	0.34	4	0.21	
Illex coindetii	0.24	2	0.15	
Todaropsis eblanae	0.22	24	0.13	
Sepia hieredda	0.20	8	0.12	
Microchirus frechkopi	0.10	2	0.06	
Arnoglossus imperialis	0.04	12	0.02	
Total	164.07		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 70
DATE :12/04/16 GEAR TYPE: PT NO: 7 POSITION:Lat N 5°2.55
start stop duration Lon W 3°0.56
TIME :18:50:25 19:21:11 31.7 (min) Purpose : 1
LOG : 7665.77 7667.48 1.7 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 24 23 Validity : 0
Towing dir: 0° Wire out : 60 m Speed : 3.1 kn
Sorted : 0 Total catch: 69.03 Catch/hour: 130.65

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	62.69	8652	47.98	283
Chloroscombrus chrysurus	18.17	865	13.91	282
Scomberomorus tritor	10.26	2	7.85	
Sardinella maderensis	9.62	447	7.36	284
Lutjanus fulgens	8.07	45	6.18	281
Galeoides decadactylus	5.00	121	3.82	
Sphyraena guachancho	4.90	21	3.75	
Lutjanus goreensis	4.15	4	3.18	
Chaetodipterus lippei	2.08	6	1.59	
Sepia hieredda	1.70	2	1.30	
Caranx crysos	1.59	15	1.22	
Dentex canariensis	1.14	4	0.87	
Trichiurus lepturus	0.45	23	0.35	
Decapterus punctatus, juvenile	0.34	30	0.26	
Lethrinus atlanticus	0.26	2	0.20	
Hemiramphus brasiliensis	0.12	2	0.09	
Farfantepenaeus notialis	0.06	2	0.04	
Scomberomorus tritor, juvenile	0.04	2	0.03	
Total	130.65		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 71
DATE :13/04/16 GEAR TYPE: PT NO: 7 POSITION:Lat N 4°57.91
start stop duration Lon W 2°42.48
TIME :01:32:56 02:06:38 33.7 (min) Purpose : 1
LOG : 7726.78 7728.69 1.9 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 28 32 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.4 kn
Sorted : 0 Total catch: 154.54 Catch/hour: 275.06

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
JELLYFISH	107.51	392	39.08	
Brachydeuterus auritus	58.38	1783	21.22	286
Chloroscombrus chrysurus	50.26	1828	18.27	
Decapterus punctatus, juvenile	19.01	8818	6.91	
Sphyraena guachancho	16.59	982	6.03	285
Sardinella maderensis	5.05	278	1.84	
Lagocephalus laevigatus	4.71	9	1.71	
Selene dorsalis	3.20	71	1.16	
Galeoides decadactylus	3.13	28	1.14	
Ilisha africana	3.10	121	1.13	
Trichiurus lepturus	1.81	14	0.66	
Alectis alexandrinus	1.53	7	0.56	
Apogon affinis	0.43	221	0.16	
Apsilus fuscus	0.21	7	0.08	
Pseudupeneus prayensis	0.14	14	0.05	
Total	275.06		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 72
DATE :13/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°53.41
start stop duration Lon W 2°26.76
TIME :08:38:42 09:08:52 30.2 (min) Purpose : 1
LOG : 7790.44 7792.06 1.6 Region : 2600
FDEPTH: 20 20 Gear cond.: 0
BDEPTH: 32 32 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.2 kn
Sorted : 0 Total catch: 40.37 Catch/hour: 80.26

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	71.25	26501	88.78	288
Sardinella maderensis	4.00	1217	4.98	289
Sepiella ornata, juvenile	2.09	390	2.60	
Sphyraena guachancho	1.81	4	2.25	
Decapterus punctatus	1.07	294	1.34	287
Lagocephalus laevigatus, juvenile	0.04	12	0.05	
Total	80.26		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 73
DATE :13/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°42.15
start stop duration Lon W 2°17.45
TIME :18:02:31 18:32:22 29.9 (min) Purpose : 1
LOG : 7862.06 7863.80 1.7 Region : 2600
FDEPTH: 35 40 Gear cond.: 0
BDEPTH: 64 57 Validity : 0
Towing dir: 0° Wire out : 145 m Speed : 3.5 kn
Sorted : 0 Total catch: 80.55 Catch/hour: 161.90

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	46.23	866	28.55	290
Sphyraena guachancho	42.91	66	26.51	
Brachydeuterus auritus	37.74	7268	23.31	291
JELLYFISH	19.80	277	12.23	
Sepia hieredda	6.61	6	4.08	
Trichiurus lepturus	5.38	86	3.32	
Selene dorsalis	1.73	36	1.07	
Sepiella ornata	0.88	60	0.54	
Sphyraena guachancho, juvenile	0.42	20	0.26	
Alloteuthis africana	0.20	66	0.12	
Total	161.91		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 74
DATE :14/04/16 GEAR TYPE: PT NO: 0 POSITION:Lat N 4°42.76
start stop duration Lon W 2°8.91
TIME :00:02:30 00:21:24 18.9 (min) Purpose : 1
LOG : 7905.79 7906.85 1.1 Region : 2600
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 39 36 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.4 kn
Sorted : 0 Total catch: 77.41 Catch/hour: 245.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena guachancho	74.26	969	30.20	295
Sphyraena afra	62.76	6	25.53	
Brachydeuterus auritus	20.47	473	8.33	294
Elops lacerta	19.04	35	7.74	
Selene dorsalis	17.76	499	7.22	292
Chloroscombrus chrysurus	16.23	619	6.60	293
Decapterus punctatus	11.51	1677	4.68	
Engraulis encrasicolus	11.18	7137	4.55	
JELLYFISH	9.45	48	3.84	
Trichiurus lepturus	0.91	32	0.37	
Sardinella maderensis	0.84	6	0.34	
Ilisha africana	0.51	25	0.21	
Sepiella ornata	0.40	44	0.16	
Scomberomorus tritor	0.21	44	0.08	
Echeneis naucrates	0.13	13	0.05	
Sardinella rouxi	0.11	10	0.05	
Alectis alexandrinus	0.06	3	0.03	
Sardinella aurita	0.05	13	0.02	
Total	245.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 75
DATE :14/04/16 GEAR TYPE: PT NO: 7 POSITION:Lat N 4°42.41
start stop duration Lon W 2°5.18
TIME :01:35:43 02:05:28 29.8 (min) Purpose : 1
LOG : 7913.62 7915.49 1.9 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 31 32 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.8 kn
Sorted : 0 Total catch: 70.97 Catch/hour: 143.13

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
JELLYFISH	101.08	383	70.62	
Sphyraena guachancho	16.86	692	11.78	296
Chloroscombrus chrysurus	10.43	411	7.28	
Brachydeuterus auritus	4.32	238	3.02	
Ilisha africana	3.65	145	2.55	
Engraulis encrasicolus	2.22	2285	1.55	
Selene dorsalis	1.45	48	1.01	
Trichiurus lepturus	1.37	16	0.96	
Sardinella rouxi	0.75	85	0.52	
Galeoides decadactylus	0.46	4	0.32	
Decapterus punctatus	0.34	141	0.24	
Scomberomorus tritor	0.10	12	0.07	
Sepia hieredda	0.06	8	0.04	
Alectis alexandrinus	0.04	20	0.03	
Total	143.13		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 76
DATE :14/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°45.79
start stop duration Lon W 1°55.46
TIME :10:23:21 10:45:31 22.2 (min) Purpose : 1
LOG : 7987.02 7988.46 1.4 Region : 2600
FDEPTH: 20 20 Gear cond.: 0
BDEPTH: 31 32 Validity : 0
Towing dir: 0° Wire out : 75 m Speed : 3.9 kn
Sorted : 0 Total catch: 46.86 Catch/hour: 126.82

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	91.15	37978	71.87	299
Chloroscombrus chrysurus	14.34	189	11.31	297
Sardinella aurita	10.31	295	8.13	298
JELLYFISH	4.01	11	3.16	
Sphyraena guachancho	3.68	5	2.90	
Decapterus punctatus, juvenile	1.08	536	0.85	
Sepiella ornata	0.78	60	0.62	
Trichiurus lepturus	0.60	38	0.47	
Sardinella maderensis	0.41	27	0.32	
Scomberomorus tritor, juvenile	0.27	11	0.21	
Selene dorsalis, juvenile	0.19	5	0.15	
Total	126.82		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 77
DATE :14/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°45.73
start stop duration Lon W 1°47.93
TIME :20:51:25 21:21:35 30.2 (min) Purpose : 1
LOG : 8073.04 8074.75 1.7 Region : 2600
FDEPTH: 5 5 Gear cond.: 0
BDEPTH: 40 32 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.4 kn
Sorted : 0 Total catch: 87.36 Catch/hour: 173.74

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena guachancho	67.42	2979	38.80	306
Sphyraena guachancho	44.15	113	25.41	300
Chloroscombrus chrysurus	20.49	1042	11.80	303
Selene dorsalis	8.62	209	4.96	304
Brachydeuterus auritus	5.28	203	3.04	305
Engraulis encrasicolus	4.95	1734	2.85	301
Alloteuthis africana	3.94	66	2.27	
Scomberomorus tritor	3.43	12	1.97	
Elops lacerta	2.48	6	1.43	
Alectis alexandrinus	2.21	6	1.27	
Selar crumenophthalmus	2.09	6	1.20	
Sardinella rouxi	2.09	78	1.20	
Galeoides decadactylus	1.97	42	1.13	
Ilisha africana	1.28	54	0.74	
Sardinella aurita	0.98	251	0.57	302
Sepiella ornata	0.89	72	0.52	
Eucinostomus melanopterus	0.75	6	0.43	
Trachurus trecae	0.63	185	0.36	307
Sardinella maderensis	0.09	6	0.05	
Total	173.74		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 78
DATE :14/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°49.62
start stop duration Lon W 1°46.64
TIME :22:07:02 22:37:16 30.2 (min) Purpose : 1
LOG : 8078.69 8080.23 1.5 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 26 28 Validity : 0
Towing dir: 0° Wire out : 80 m Speed : 3.1 kn
Sorted : 0 Total catch: 55.70 Catch/hour: 110.55

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Elops lacerta	25.58	75	23.14	
Chloroscombrus chrysurus	21.63	1175	19.57	
Sphyraena guachancho, juvenile	16.08	127	14.54	
Engraulis encrasicolus	13.48	4718	12.19	
Sardinella maderensis	12.50	959	11.31	
Selene dorsalis	5.70	147	5.15	
Ilisha africana	3.81	222	3.45	
Brachydeuterus auritus	2.32	60	2.10	
Sepia hieredda	1.55	8	1.40	
Trichiurus lepturus	1.43	48	1.29	
Sepiella ornata	1.35	159	1.22	
Scomberomorus tritor	1.29	24	1.17	
Caranx crysos	1.29	12	1.17	
Sardinella rouxi	0.91	83	0.83	
Trachinotus ovatus	0.79	8	0.72	
Lethrinus atlanticus	0.75	8	0.68	
Trachurus trecae, juvenile	0.04	16	0.04	
Sardinella aurita	0.04	12	0.04	
Total	110.55		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 79
DATE :15/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 4°39.60
start stop duration Lon W 1°38.72
TIME :00:36:57 01:10:44 33.8 (min) Purpose : 1
LOG : 8096.60 8098.43 1.8 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 52 49 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.2 kn
Sorted : 0 Total catch: 56.04 Catch/hour: 99.54

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Brachydeuterus auritus	71.33	5526	71.66	
Saurida parri	8.40	1995	8.44	
Decapterus punctatus	6.47	1119	6.50	
Engraulis encrasicolus	6.00	805	6.03	
Trachurus trecae	2.72	178	2.73	
Scomber colias	2.13	7	2.14	
Sepiella ornata	0.48	50	0.48	
Lagocephalus laevigatus	0.48	25	0.48	
Alloteuthis africana	0.43	202	0.43	
Sphyraena guachancho	0.43	18	0.43	
Trachinotus ovatus	0.25	4	0.25	
Caranx crysos	0.14	7	0.14	
Dactylopterus volitans	0.11	18	0.11	
Sardinella maderensis	0.07	4	0.07	
Sardinella aurita	0.05	7	0.05	
Pseudupeneus prayensis	0.04	11	0.04	
Fistularia tabacaria	0.02	4	0.02	
Total	99.54		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 80
DATE :15/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°19.29
start stop duration Lon W 1°32.14
TIME :04:43:56 05:13:43 29.8 (min) Purpose : 1
LOG : 8128.68 8130.56 1.9 Region : 2600
FDEPTH: 20 30 Gear cond.: 0
BDEPTH: 89 82 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.8 kn
Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
N O C A T C H	0.00	0 0.00	
Total	0.00	0 0.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 81
DATE :15/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°52.01
start stop duration Lon W 1°36.47
TIME :14:29:45 15:06:41 36.9 (min) Purpose : 1
LOG : 8198.88 8201.15 2.3 Region : 2600
FDEPTH: 20 25 Gear cond.: 0
BDEPTH: 34 37 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.7 kn
Sorted : 0 Total catch: 0.88 Catch/hour: 1.43

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
JELLYFISH	0.85	6 59.66	
Sepiella ornata	0.45	47 31.25	
Engraulis encrasicolus	0.06	58 3.98	
Decapterus punctatus	0.05	60 3.41	
Stephanolepis hispidus	0.02	49 1.14	
Saurida parri	0.01	2 0.57	
Total	1.43	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 82
DATE :15/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°56.19
start stop duration Lon W 1°25.99
TIME :17:26:07 17:56:16 30.2 (min) Purpose : 1
LOG : 8221.57 8223.32 1.8 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 30 30 Validity : 0
Towing dir: 0° Wire out : 70 m Speed : 3.5 kn
Sorted : 0 Total catch: 117.36 Catch/hour: 233.48

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Engraulis encrasicolus	222.91	111539 95.47	308
Decapterus punctatus, juvenile	3.94	1420 1.69	
Sepia hieredda	3.70	6 1.58	
Sepiella ornata	1.85	388 0.79	
Sardinella aurita	0.93	185 0.40	309
Scomberomorus tritor, juvenile	0.15	12 0.06	
Alloteuthis africana	0.01	6 0.00	
Total	233.48	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 83
DATE :15/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°50.40
start stop duration Lon W 1°24.47
TIME :19:43:10 19:58:27 15.3 (min) Purpose : 1
LOG : 8237.24 8238.23 1.0 Region : 2600
FDEPTH: 20 20 Gear cond.: 0
BDEPTH: 39 38 Validity : 0
Towing dir: 0° Wire out : 65 m Speed : 3.9 kn
Sorted : 0 Total catch: 84.71 Catch/hour: 332.41

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Engraulis encrasicolus	236.08	92464 71.02	312
Sphyraena guachancho	43.17	110 12.99	
Brachydeuterus auritus	25.27	11623 7.60	310
Decapterus punctatus	18.84	5965 5.67	311
Lagocephalus laevigatus	5.22	8 1.57	
Sardinella aurita	2.04	377 0.61	313
Saurida parri	1.81	298 0.54	
Total	332.41	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 84
DATE :15/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 4°42.60
start stop duration Lon W 1°20.93
TIME :21:44:38 21:59:24 14.8 (min) Purpose : 1
LOG : 8251.49 8252.44 1.0 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 47 45 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.9 kn
Sorted : 0 Total catch: 19.92 Catch/hour: 80.85

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Brachydeuterus auritus	39.86	853 49.31	314
Decapterus punctatus	30.77	637 38.06	315
Sardinella aurita, juvenile	4.53	12 5.60	
Decapterus punctatus, juvenile	3.86	459 4.77	
Alloteuthis africana	1.06	142 1.31	
Sepiella ornata	0.53	37 0.65	
Selar crumenophthalmus	0.18	4 0.23	
Scomberomorus tritor, juvenile	0.06	16 0.08	
Total	80.85	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 85
DATE :15/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°43.26
start stop duration Lon W 1°21.20
TIME :22:33:53 22:49:06 15.2 (min) Purpose : 1
LOG : 8254.28 8255.16 0.9 Region : 2600
FDEPTH: 20 20 Gear cond.: 0
BDEPTH: 46 47 Validity : 0
Towing dir: 0° Wire out : 105 m Speed : 3.5 kn
Sorted : 0 Total catch: 13.68 Catch/hour: 53.91

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Sarda sarda	17.40	16 32.28	
Brachydeuterus auritus	14.90	359 27.64	317
Saurida parri	7.73	1210 14.33	
Decapterus punctatus	4.71	197 8.74	316
Lagocephalus laevigatus	4.32	8 8.01	
Sphyraena sphyraena	2.01	8 3.73	
Fistularia petimba	1.46	4 2.71	
Pagellus bellottii	0.51	4 0.95	
Alloteuthis africana	0.28	83 0.51	
Sepiella ornata	0.26	12 0.48	
Sardinella aurita	0.22	8 0.40	
Apogon affinis	0.04	12 0.07	
Caranx crysos	0.04	4 0.07	
Serranus heterurus	0.02	4 0.04	
Serranus accraensis	0.02	4 0.04	
Selene dorsalis	0.00	4 0.01	
Total	53.91	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 86
DATE :16/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 4°39.32
start stop duration Lon W 1°8.69
TIME :04:29:21 04:59:51 30.5 (min) Purpose : 1
LOG : 8310.48 8312.23 1.8 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 49 49 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 3.5 kn
Sorted : 0 Total catch: 64.04 Catch/hour: 125.98

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Decapterus punctatus	116.70	7985 92.63	318
Sepia hieredda	3.80	16 3.01	
Saurida parri	2.77	618 2.20	
Alloteuthis africana	2.09	783 1.66	
Sardinella aurita	0.63	35 0.50	
Total	125.98	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 87
DATE :16/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°1.36
start stop duration Lon W 1°15.27
TIME :08:19:53 08:36:27 16.6 (min) Purpose : 1
LOG : 8341.91 8342.82 0.9 Region : 2600
FDEPTH: 25 25 Gear cond.: 0
BDEPTH: 25 25 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.3 kn
Sorted : 0 Total catch: 4.06 Catch/hour: 14.71

SPECIES	CATCH/HOUR weight	% OF TOT. C numbers	SAMP
Engraulis encrasicolus	5.32	1695 36.19	319
Aluterus heudelotii	4.65	14 31.63	
Balistes capriscus	2.25	4 15.26	
Decapterus punctatus	0.98	47 6.65	
Pseudupeneus prayensis	0.58	4 3.94	
Chloroscombrus chrysurus	0.53	18 3.57	
JELLYFISH	0.31	7 2.09	
Brachydeuterus auritus	0.07	4 0.49	
Sepiella ornata	0.02	4 0.12	
Selene dorsalis	0.00	36 0.02	
Alloteuthis africana	0.00	7 0.02	
Total	14.71	100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 88
DATE :16/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°2.99
start stop duration Lon W 1°7.72
TIME :09:36:11 10:01:02 24.9 (min) Purpose : 1
LOG : 8349.85 8351.30 1.4 Region : 2600
FDEPTH: 26 25 Gear cond.: 0
BDEPTH: 26 25 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.5 kn
Sorted : 0 Total catch: 273.01 Catch/hour: 659.17

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	456.34	175509	69.23	
Decapterus punctatus	119.52	26555	18.13	
Sardinella aurita	42.01	6229	6.37	
Scomberomorus tritor	25.26	5	3.83	
Sphyraena sphyraena	10.67	22	1.62	
Sphyraena guachancho	1.64	2	0.25	
Aluterus heudelotii	1.41	2	0.21	
Balistes capriscus	1.13	2	0.17	
Sepia hieredda	0.92	2	0.14	
Alectis alexandrinus	0.27	2	0.04	
Total	659.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 89
DATE :16/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 4°36.58
start stop duration Lon W 0°57.55
TIME :14:48:18 15:18:24 30.1 (min) Purpose : 1
LOG : 8389.03 8390.72 1.7 Region : 2600
FDEPTH: 60 65 Gear cond.: 0
BDEPTH: 60 65 Validity : 0
Towing dir: 0° Wire out : 210 m Speed : 3.4 kn
Sorted : 0 Total catch: 175.67 Catch/hour: 350.17

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	164.25	17392	46.91	321
Dentex congoensis	71.01	21305	20.28	
Pagellus bellottii	32.64	638	9.32	322
Dentex canariensis	30.54	56	8.72	320
Pseudupeneus prayensis	8.92	100	2.55	
Pagrus caeruleostictus	5.47	20	1.56	
Chelidonichthys gabonensis	5.33	50	1.52	
Priacanthus arenatus	3.79	60	1.08	
Dentex gibbosus	3.53	6	1.01	
Octopus sp.	2.92	2	0.83	
Syacium guineensis	2.34	50	0.67	
Alloteuthis africana	1.89	429	0.54	
Dactylopterus volitans	1.87	8	0.54	
Fistularia petimba	1.77	8	0.51	
Lepidotrigla carolae	1.74	80	0.50	
Torpedo torpedo	1.57	2	0.45	
Raja miraletus	1.41	4	0.40	
Sepia bertheloti	1.10	6	0.31	
Lutjanus fulgens	0.91	2	0.26	
Apsilus fuscus	0.91	2	0.26	
Ariomma bondi	0.80	30	0.23	
Trachurus trecae	0.80	20	0.23	
Sphyraena sphyraena	0.79	2	0.22	
Sepia hieredda	0.71	2	0.20	
Sardinella aurita	0.70	10	0.20	
Citharus linguatula	0.65	10	0.19	
Sphoeroides marmoratus	0.50	10	0.14	
Arnoglossus imperialis	0.45	70	0.13	
Zeus faber	0.40	2	0.11	
Lagocephalus laevigatus	0.40	10	0.11	
Sepia hierreda	0.07	4	0.02	
Total	350.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 90
DATE :16/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 4°55.93
start stop duration Lon W 0°57.03
TIME :19:47:29 20:02:39 15.2 (min) Purpose : 1
LOG : 8431.06 8431.93 0.9 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 36 36 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.5 kn
Sorted : 0 Total catch: 10.76 Catch/hour: 42.56

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Selar crumenophthalmus	15.74	146	36.99	
Scomberomorus tritor	12.20	4	28.67	
Engraulis encrasicolus	4.23	1214	9.94	323
Decapterus punctatus	3.14	36	7.39	324
Euthynnus alletteratus	1.98	4	4.65	
Auxis thazard	1.66	4	3.90	
Sepia hieredda	1.60	4	3.76	
Sphyraena sphyraena	1.07	4	2.51	
Scomberomorus tritor, juvenile	0.42	154	0.98	
Decapterus punctatus, juvenile	0.26	127	0.60	
Sepiella ornata	0.18	83	0.42	
Alloteuthis africana	0.04	40	0.09	
Sardinella aurita	0.02	4	0.05	
Caranx rhonchus	0.02	16	0.05	
Total	42.56		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 91
DATE :16/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°0.88
start stop duration Lon W 0°59.46
TIME :21:29:33 21:49:38 20.1 (min) Purpose : 1
LOG : 8443.01 8444.17 1.1 Region : 2600
FDEPTH: 30 29 Gear cond.: 0
BDEPTH: 30 29 Validity : 0
Towing dir: 0° Wire out : 90 m Speed : 3.4 kn
Sorted : 0 Total catch: 49.54 Catch/hour: 147.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	91.16	54699	61.65	326
Lagocephalus laevigatus	32.18	72	21.76	
Sphyraena guachancho	5.84	9	3.95	
Sphyraena sphyraena	3.70	9	2.50	
Aluterus monoceros	2.66	3	1.80	
Decapterus punctatus	2.10	179	1.42	325
Lethrinus atlanticus	1.76	3	1.19	
Pagellus bellottii	1.61	140	1.09	
Pseudupeneus prayensis	1.46	36	0.99	
Trachinocephalus myops	1.43	96	0.97	
Fistularia petimba	1.24	3	0.84	
Alectis ciliaris	1.15	3	0.78	
Trachinus armatus	0.70	12	0.47	
Syacium guineensis	0.60	6	0.40	
Bothus podas	0.15	3	0.10	
Aluterus monoceros, juvenile	0.07	9	0.05	
Pagrus caeruleostictus	0.04	3	0.03	
Synodus synodus	0.01	3	0.01	
Total	147.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 92
DATE :16/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°6.45
start stop duration Lon W 0°51.60
TIME :23:42:29 00:12:30 30.0 (min) Purpose : 1
LOG : 8460.43 8461.97 1.5 Region : 2600
FDEPTH: 27 29 Gear cond.: 0
BDEPTH: 27 29 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.1 kn
Sorted : 0 Total catch: 76.49 Catch/hour: 152.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	46.85	22487	30.64	
Aequipecten flabellum	41.49	929	27.14	
Pagellus bellottii	17.07	96	11.16	327
Lagocephalus laevigatus	13.20	16	8.64	
Sphyraena guachancho	6.37	8	4.16	
Uranoscopus polli	4.50	10	2.94	
Sphyraena sphyraena	4.12	12	2.69	
Brachydeuterus auritus	3.08	72	2.01	328
Sepia hieredda	3.05	8	1.99	
Aluterus heudelotii	2.32	8	1.52	
Pseudupeneus prayensis	2.24	28	1.46	
Balistes capriscus	1.88	4	1.23	
Trachinocephalus myops	1.76	32	1.15	
Dagetichthys cadenati	1.20	2	0.78	
Dactylopterus volitans	0.84	2	0.55	
Pomadasys incisus	0.79	2	0.52	
Syacium guineensis	0.78	4	0.51	
Trachinus armatus	0.68	12	0.44	
Bothus podas	0.36	12	0.24	
Farfantepenaeus notialis	0.18	84	0.12	
Chloroscombrus chrysurus	0.10	4	0.07	
Decapterus punctatus	0.04	8	0.03	
Total	152.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 93
DATE :17/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 4°55.39
start stop duration Lon W 0°46.88
TIME :01:48:28 02:18:38 30.2 (min) Purpose : 1
LOG : 8473.43 8474.92 1.5 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 43 44 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.0 kn
Sorted : 0 Total catch: 32.96 Catch/hour: 65.53

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	58.89	5549	89.87	
Sepiella ornata	1.93	398	2.94	
Lagocephalus laevigatus	1.47	2	2.25	
Saurida parri	0.92	243	1.41	
Alloteuthis africana	0.84	239	1.29	
Selar crumenophthalmus	0.64	6	0.97	
Sphyraena sphyraena	0.58	2	0.88	
Rachycentron canadum	0.26	6	0.39	
Total	65.53		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 94
DATE :17/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 4°46.16
start stop duration Lon W 0°43.21
TIME :04:49:26 05:06:42 17.3 (min) Purpose : 1
LOG : 8491.36 8492.27 0.9 Region : 2600
FDEPTH: 20 28 Gear cond.: 0
BDEPTH: 70 65 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.2 kn
Sorted : 0 Total catch: 10.04 Catch/hour: 34.88

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	27.86	1279	79.88	
Euthynnus alletteratus	3.84	69	11.01	
Ariomma bondi	2.10	76	6.03	
Saurida parri	0.66	146	1.89	
Sardinella aurita	0.17	7	0.50	
Sepiella ornata	0.14	21	0.40	
Alloteuthis africana	0.10	45	0.30	
Total	34.88		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 95
DATE :17/04/16 GEAR TYPE: PT NO: 0 POSITION:Lat N 5°12.93
start stop duration Lon W 0°41.12
TIME :11:59:49 12:31:49 32.0 (min) Purpose : 1
LOG : 8545.60 8547.58 2.0 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 24 26 Validity : 0
Towing dir: 0° Wire out : 75 m Speed : 3.7 kn
Sorted : 0 Total catch: 2.94 Catch/hour: 5.51

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sepiella ornata, juvenile	2.64	431	47.96	
Engraulis encrasicolus	1.10	186	19.90	331
JELLYFISH	0.99	4	18.03	
Decapterus punctatus, juvenile	0.58	534	10.54	
Lagocephalus laevigatus, juvenile	0.08	36	1.53	
Alloteuthis africana	0.08	21	1.53	
Stephanolepis hispidus, juvenile	0.02	66	0.34	
Selene dorsalis, juvenile	0.01	6	0.17	
Total	5.51		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 96
DATE :17/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 5°10.39
start stop duration Lon W 0°34.26
TIME :19:16:11 19:40:24 24.2 (min) Purpose : 1
LOG : 8604.19 8605.42 1.2 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 35 34 Validity : 0
Towing dir: 0° Wire out : 65 m Speed : 3.0 kn
Sorted : 0 Total catch: 136.32 Catch/hour: 337.70

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	328.49	103095	97.27	329
Decapterus punctatus, juvenile	2.48	10	0.73	
Selar crumenophthalmus	2.20	7	0.65	
Sardinella aurita, juvenile	1.98	99	0.59	
Scomberomorus tritor	1.14	2	0.34	
Sphyraena guachancho	0.76	2	0.22	
Decapterus punctatus	0.46	7	0.14	
Lagocephalus laevigatus, juvenile	0.20	10	0.06	
Total	337.70		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 97
DATE :17/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 5°17.34
start stop duration Lon W 0°30.16
TIME :21:41:56 22:01:21 19.4 (min) Purpose : 1
LOG : 8621.38 8622.42 1.1 Region : 2600
FDEPTH: 15 15 Gear cond.: 0
BDEPTH: 28 27 Validity : 0
Towing dir: 0° Wire out : 65 m Speed : 3.2 kn
Sorted : 0 Total catch: 133.67 Catch/hour: 412.78

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	310.84	82891	75.30	330
Sphyraena guachancho	58.15	454	14.09	
Scomberomorus tritor	22.48	43	5.45	
Elops lacerta	10.50	19	2.54	
Chloroscombrus chrysurus	6.92	216	1.68	
Trachinotus ovatus	1.76	6	0.43	
Decapterus punctatus	1.60	173	0.39	
Sepiella ornata	0.54	108	0.13	
Total	412.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 98
DATE :18/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 5°3.59
start stop duration Lon W 0°21.11
TIME :00:24:26 00:53:11 28.8 (min) Purpose : 1
LOG : 8641.37 8642.96 1.6 Region : 2600
FDEPTH: 20 24 Gear cond.: 0
BDEPTH: 110 85 Validity : 0
Towing dir: 0° Wire out : 70 m Speed : 3.3 kn
Sorted : 0 Total catch: 62.10 Catch/hour: 129.60

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Cubiceps pauciradiatus	59.02	1402	45.54	
Ariomma bondi	59.02	1768	45.54	
Ariomma melanum	9.83	482	7.58	
Gempylus serpens	0.83	21	0.64	
Nealotus tripes	0.42	25	0.32	
Scomberomorus tritor	0.33	88	0.26	
Promethichthys prometheus	0.06	4	0.05	
Lestrolepis intermedia	0.02	4	0.02	
Euthynnus alletteratus	0.02	4	0.02	
Caranx crysos	0.02	4	0.02	
Onychoteuthis banksi	0.02	13	0.02	
Total	129.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 99
DATE :18/04/16 GEAR TYPE: PT NO: 7 POSITION:Lat N 5°23.02
start stop duration Lon W 0°22.08
TIME :04:33:26 05:04:51 31.4 (min) Purpose : 1
LOG : 8673.48 8674.95 1.5 Region : 2600
FDEPTH: 10 10 Gear cond.: 0
BDEPTH: 27 28 Validity : 0
Towing dir: 0° Wire out : 100 m Speed : 2.8 kn
Sorted : 0 Total catch: 10.96 Catch/hour: 20.94

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Decapterus punctatus	17.00	940	81.20	
Chloroscombrus chrysurus	3.15	59	15.05	
Lagocephalus laevigatus	0.54	2	2.60	
Pagellus bellottii	0.20	4	0.96	
Sepiella ornata	0.04	13	0.18	
Total	20.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 100
DATE :18/04/16 GEAR TYPE: BT NO: 21 POSITION:Lat N 5°41.08
start stop duration Lon E 0°22.96
TIME :20:14:59 20:44:41 29.7 (min) Purpose : 1
LOG : 8789.11 8790.77 1.7 Region : 2600
FDEPTH: 32 31 Gear cond.: 0
BDEPTH: 32 31 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.4 kn
Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
N O C A T C H	0.00	0	0.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 101
DATE :18/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 5°42.30
start stop duration Lon E 0°24.28
TIME :22:06:22 22:34:07 27.7 (min) Purpose : 1
LOG : 8798.76 8800.52 1.8 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 28 25 Validity : 0
Towing dir: 0° Wire out : 85 m Speed : 3.8 kn
Sorted : 0 Total catch: 11.54 Catch/hour: 24.97

SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Sphyraena sphyraena	11.19	240	44.80	
Engraulis encrasicolus	8.05	3756	32.24	332
Scomberomorus tritor	1.88	11	7.54	
Decapterus punctatus	1.79	281	7.15	333
Selar crumenophthalmus	1.23	19	4.94	
Alloteuthis africana	0.25	58	1.00	
Sepiella ornata	0.21	24	0.82	
Scomberomorus tritor, juvenile	0.16	91	0.65	
Saurida brasiliensis	0.13	43	0.52	
Sardinella aurita, juvenile	0.08	6	0.30	
ACANTHURIDAE,post larvae	0.01	9	0.04	
Total	24.97		100.00	

R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 102
DATE :19/04/16 GEAR TYPE: PT NO: 1 POSITION:Lat N 5°33.80
start stop duration Lon E 0°36.57
TIME :00:52:30 01:29:23 36.9 (min) Purpose : 1
LOG : 8819.03 8821.02 2.0 Region : 2600
FDEPTH: 25 32 Gear cond.: 0
BDEPTH: 542 53 Validity : 0
Towing dir: 0° Wire out : 0 m Speed : 3.2 kn
Sorted : 0 Total catch: 27.75 Catch/hour: 45.14

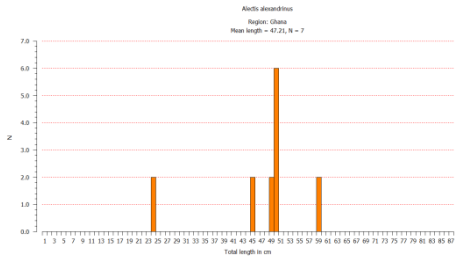
SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Trichiurus lepturus	41.97	405	92.99	
JELLYFISH	1.33	2	2.94	
Synagrops japonicus	0.63	179	1.41	
Gempylus serpens	0.37	3	0.81	
Todaropsis eblanae	0.22	3	0.49	
Selar crumenophthalmus	0.22	3	0.49	
Ariomma melanum	0.11	3	0.23	
Euthynnus alletteratus	0.07	13	0.16	
Nealotus tripes	0.07	5	0.16	
Sardinella maderensis	0.05	2	0.11	
Decapterus punctatus	0.04	5	0.09	
Alloteuthis africana	0.02	3	0.04	
PARALEPIDIDAE	0.02	2	0.04	
Onychoteuthis banksi	0.01	2	0.02	
Saurida parri	0.01	2	0.02	
Hygophum taaningi	0.01	5	0.02	
Total	45.14		100.00	

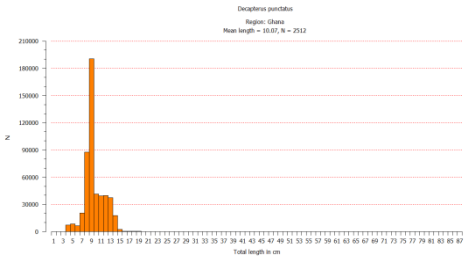
R/V Dr. Fridtjof Nansen SURVEY:2016405 STATION: 103
DATE :19/04/16 GEAR TYPE: PT NO: 4 POSITION:Lat N 5°34.86
start stop duration Lon E 0°49.20
TIME :04:37:06 05:08:14 31.1 (min) Purpose : 1
LOG : 8848.24 8849.98 1.7 Region : 2600
FDEPTH: 0 0 Gear cond.: 0
BDEPTH: 282 28 Validity : 0
Towing dir: 0° Wire out : 95 m Speed : 3.4 kn
Sorted : 0 Total catch: 63.16 Catch/hour: 121.73

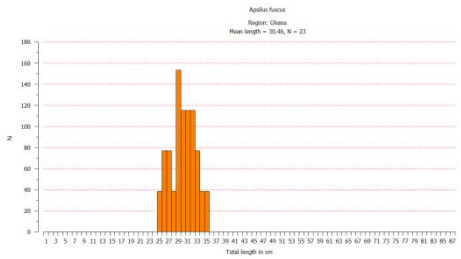
SPECIES	CATCH/HOUR weight	numbers	% OF TOT. C	SAMP
Engraulis encrasicolus	88.04	24696	72.32	335
Trichiurus lepturus	11.26	143	9.25	
Sphyraena guachancho	4.84	15	3.97	
Sardinella aurita	3.32	193	2.72	334
Selene dorsalis	2.68	4	2.20	
Decapterus punctatus	2.64	173	2.17	
Euthynnus alletteratus, juvenile	2.12	351	1.74	
Brachydeuterus auritus	2.06	23	1.69	
Synagrops japonicus	1.87	393	1.54	
Scomberomorus tritor	1.02	4	0.84	
Cubiceps pauciradiatus	0.73	416	0.60	
Sepiella ornata	0.56	89	0.46	
Alloteuthis africana	0.40	108	0.33	
Nealotus tripes	0.12	8	0.09	
Onychoteuthis banksi	0.08	89	0.06	
Total	121.73		100.00	

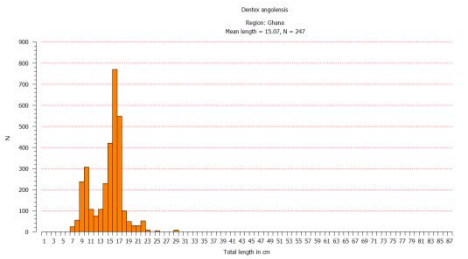
ANNEX I Length distribution of main species

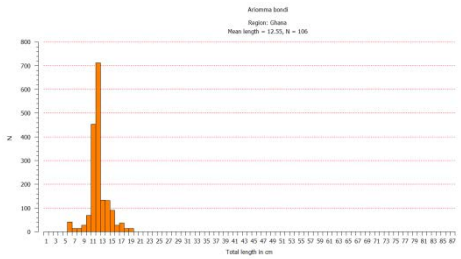
Ghana: Pooled length frequency distribution of the main species weighted by the catch

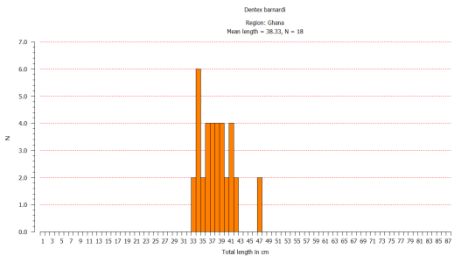


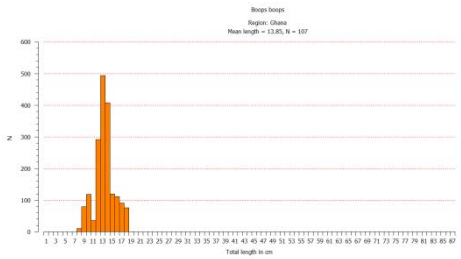


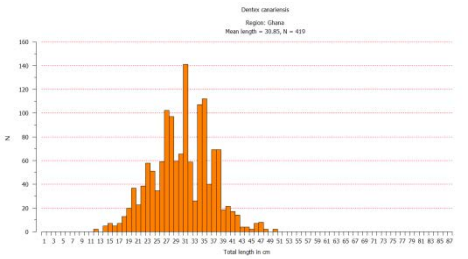


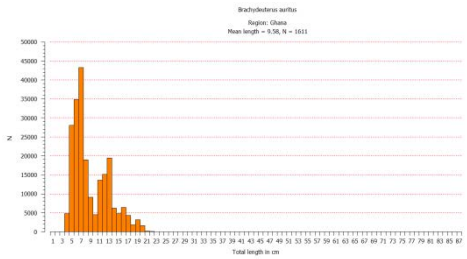


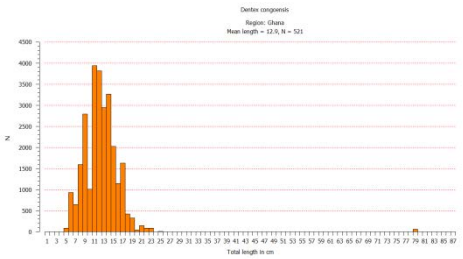


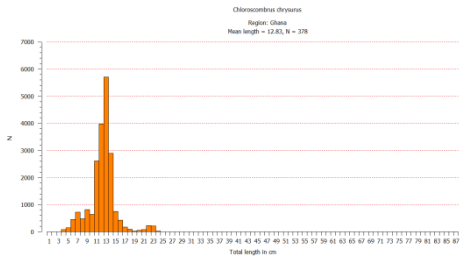


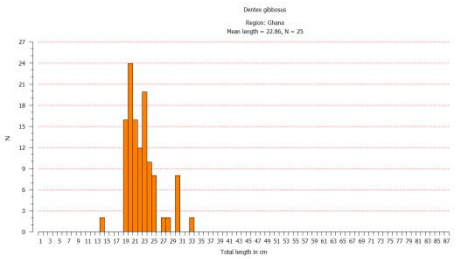


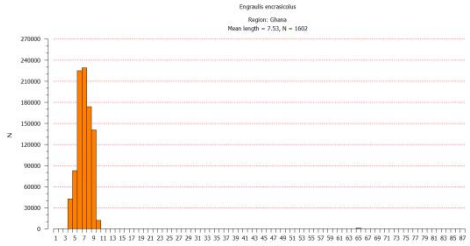


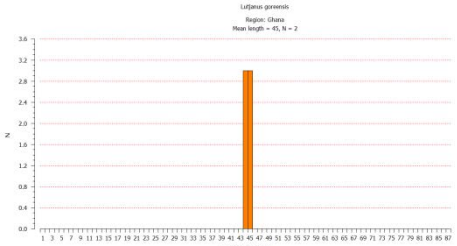


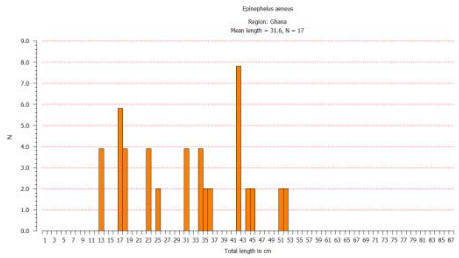


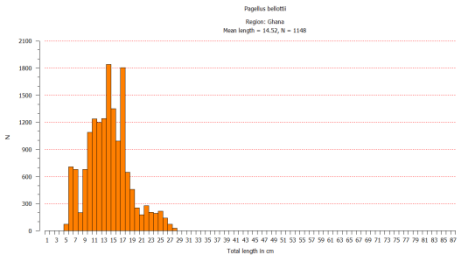


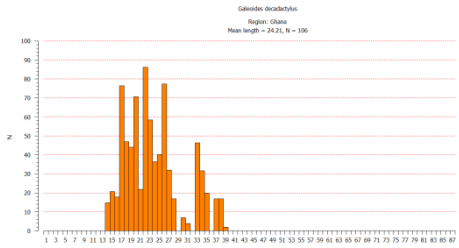


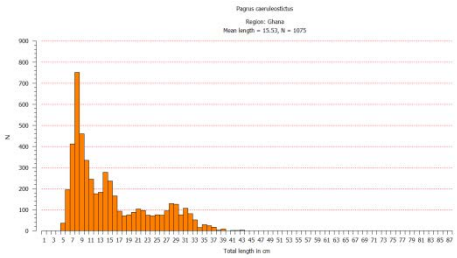

Engraulis encrasicolus
Region: Ghana
Mean length = 7.53, N = 1602
N
Total length in cm

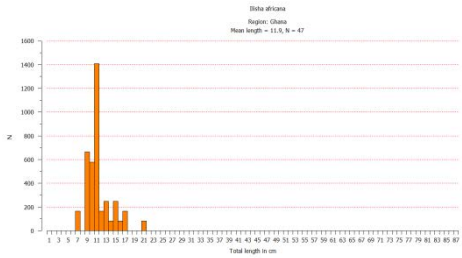

Lutjanus goreensis
Region: Ghana
Mean length = 45, N = 2
N
Total length in cm

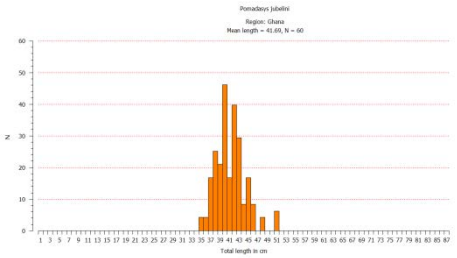

Epinephelus aeneus
Region: Ghana
Mean length = 31.6, N = 17
N
Total length in cm

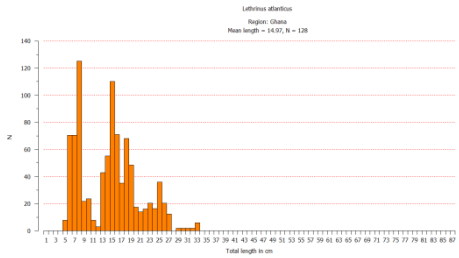

Pagellus bellottii
Region: Ghana
Mean length = 14.52, N = 1148
N
Total length in cm

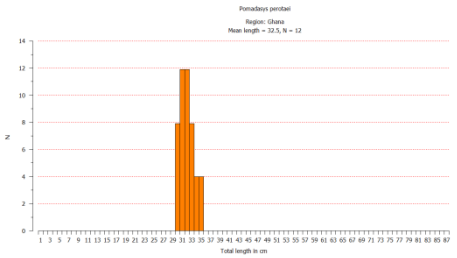

Galeoides decadactylus
Region: Ghana
Mean length = 24.21, N = 106
N
Total length in cm

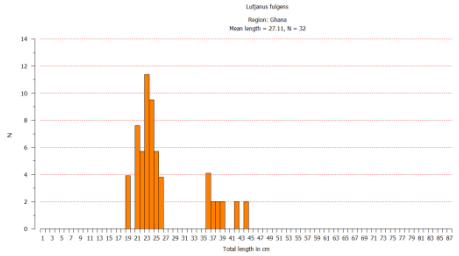

Pagrus caeruleostictus
Region: Ghana
Mean length = 15.53, N = 1075
N
Total length in cm

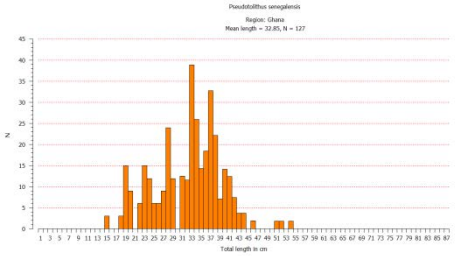

Ilisha africana
Region: Ghana
Mean length = 11.9, N = 47
N
Total length in cm

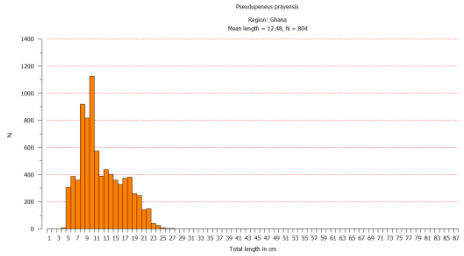

Pomadasys jubelini
Region: Ghana
Mean length = 41.69, N = 60
N
Total length in cm

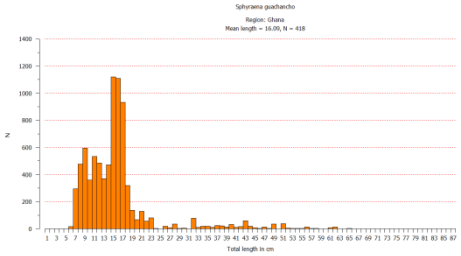

Lethrinus atlanticus
Region: Ghana
Mean length = 14.97, N = 128
N
Total length in cm

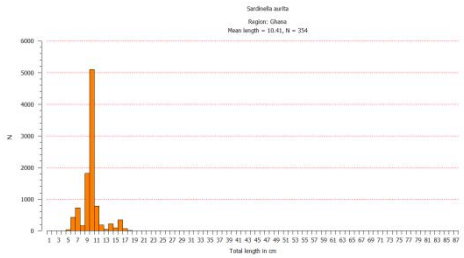

Pomadasys perotaei
Region: Ghana
Mean length = 32.5, N = 12
N
Total length in cm

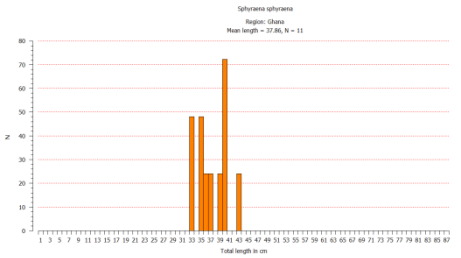

Lutjanus fulgens
Region: Ghana
Mean length = 27.11, N = 32
N
Total length in cm

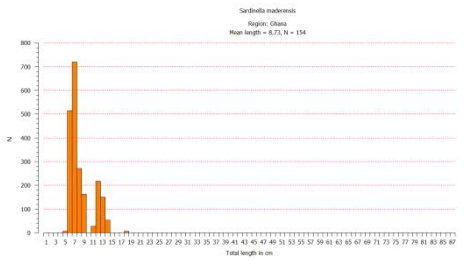

Pseudotolithus senegalensis
Region: Ghana
Mean length = 32.85, N = 127
N
Total length in cm

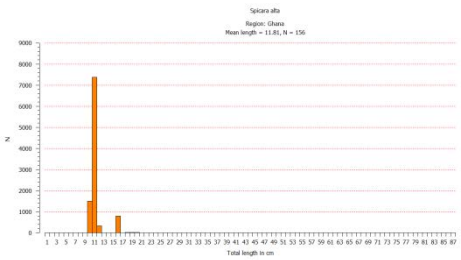

Pseudupeneus prayensis
Region: Ghana
Mean length = 12.46, N = 804
N
Total length in cm

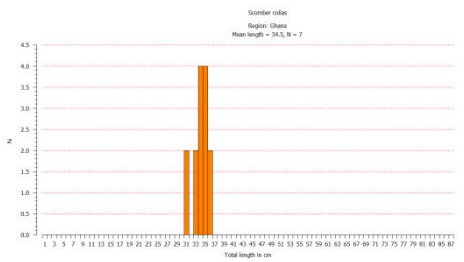

Sphyraena guachancho
Region: Ghana
Mean length = 16.09, N = 418
N
Total length in cm

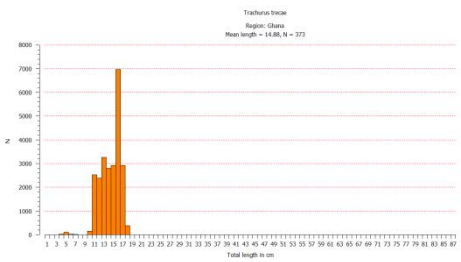

Sardinella aurita
Region: Ghana
Mean length = 10.41, N = 354
N
Total length in cm

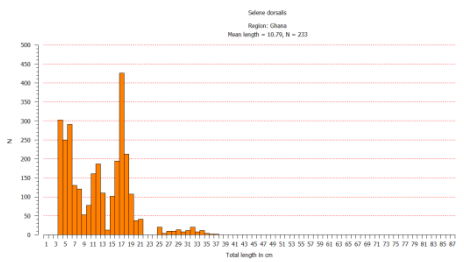

Sphyraena sphyraena
Region: Ghana
Mean length = 37.86, N = 11
N
Total length in cm

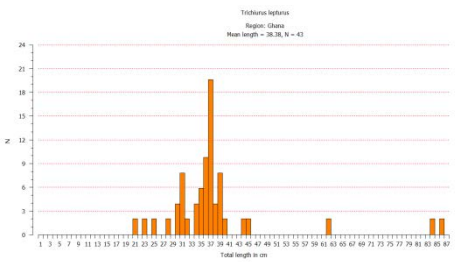

Sardinella maderensis
Region: Ghana
Mean length = 8.73, N = 154
N
Total length in cm

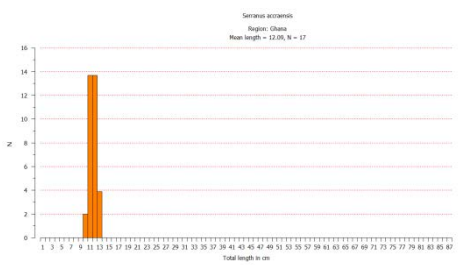

Spicara alta
Region: Ghana
Mean length = 11.81, N = 156
N
Total length in cm


Scomber colias
Region: Ghana
Mean length = 34.5, N = 7
N
Total length in cm


Trachurus trecae
Region: Ghana
Mean length = 14.88, N = 373
N
Total length in cm


Selene dorsalis
Region: Ghana
Mean length = 10.79, N = 233
N
Total length in cm


Trichiurus lepturus
Region: Ghana
Mean length = 38.38, N = 43
N
Total length in cm


Serranus accraensis
Region: Ghana
Mean length = 12.09, N = 17
N
Total length in cm

ANNEX III 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 IV SPECIES BY FISHING STATION

List of species/taxa and stations occurrences (BT:bottom trawl; PT:pelagic trawl)

Class	Family	Species/Taxa	Station List
SHYPHOZOA	**unidentified**	unidentified sp.1	BT 067, BT 087, PT 071, PT 073, PT 074, PT 075, PT 076, PT 081, PT 095, PT 102
		unidentified sp.2	BT 009
	Aequoreidae	*Aequorea forskalea*	BT 037
CRUSTACEA	**Squillidae**	*Squilla acuelata calmani*	BT 055
		Squilla mantis	BT 017, BT 021, BT 065, BT 068
		Squilla sp.	BT 060
	Penaeidae	*Farfantepenaeus notialis*	BT 002, BT 004, BT 006, BT 008, BT 009, BT 016, BT 017, BT 023, BT 043, BT 048, BT 049, BT 054, BT 055, BT 056, BT 060, BT 062, BT 067, BT 092, PT 070
		Parapenaeus longirostris	BT 055, BT 057, BT 058
	Sycyoniidae	*Sicyonia galeata*	BT 009
	Palinuridae	*Panulirus regius*	BT 002, BT 008, BT 012, BT 023, BT 060, BT 061
	Scyllaridae	*Scyllarides herklotsii*	BT 009
		Scyllarus sp.	BT 059
	Paguridae	unidentified sp.3	BT 055, BT 059, BT 060
	Calappidae	*Calappa pelii*	BT 059
		Calappa rubroguttata	BT 006, BT 008, BT 038, BT 054, BT 055, BT 060, BT 068
	Dorippidae	unidentified sp.4	BT 038, BT 043, BT 059, BT 060
	Euryplacidae	*Machaerus oxyacanthus*	BT 002, BT 059
	Leucosiidae	*Pseudomyra cf. mbizi*	BT 009
	Inachidae	unidentified sp.5	BT 043
	Majidae	*Maja brachydactyla*	BT 049, BT 056, BT 060
	Parthenopidae	unidentified sp.6	BT 038
	Portunidae	*Callinectes pallidus*	BT 055
		Macropipus rugosus	BT 009
		Sanquerus validus	BT 006, BT 048, BT 055, BT 060
		unidentified sp.7	BT 038
BIVALVIA			
	Pectinidae	*Aequipecten flabellum*	BT 032, BT 036, BT 037, BT 092
GASTROPODA	**Fasciolariidae**	*Fusinus meyeri*	BT 052
	Volutidae	*Cymbium glans*	BT 008
	Aplysiidae	*Aplysia* sp.	BT 055
CEPHALOPODA	**Sepiidae**	*Sepia bertheloti*	BT 089
		Sepia hieredda	BT 001, BT 002, BT 003, BT 004, BT 005, BT 006, BT 007, BT 008, BT 009, BT 010, BT 011, BT 012, BT 013, BT 015, BT 016, BT 018, BT 019, BT 021, BT 022, BT 023, BT 026, BT 028, BT 029, BT 030, BT 031, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 040, BT 041, BT 042, BT 043, BT 044, BT 045, BT 046, BT 047, BT 049, BT 050, BT 051, BT 052, BT 053, BT 054, BT 057, BT 058, BT 059, BT 061, BT 063, BT 064, BT 066, BT 067, BT 069, BT 088, BT 089, BT 092, PT 070, PT 073, PT 075, PT 078, PT 082, PT 086, PT 090
		Sepiella ornata	BT 049, BT 053, BT 056, BT 059, BT 060, BT 066, BT 087, PT 072, PT 073, PT 074, PT 076, PT 077, 078, PT 079, PT 081, PT 082, PT 084, PT 085, PT 090, PT 093, PT 094, PT 095, PT 097, PT 099, PT 101, PT 103
	Loliginidae	*Alloteuthis africana*	BT 002, BT 009, BT 010, BT 015, BT 016, BT 022, BT 029, BT 033, BT 035, BT 039, BT 040, BT 041, BT 043, BT 044, BT 050, BT 057, BT 058, BT 062, BT 065, BT 087, BT 089, PT 073, PT 077, PT 079, PT 082, PT 084, PT 085, PT 086, PT 090, PT 093, PT 094, PT 095, PT 101, PT 102, PT 103
	Ommastrephidae	*Illex coindetii*	BT 014, BT 015, BT 027, BT 028, BT 047, BT 051, BT 052, BT 053, BT 054, BT 055, BT 057, BT 058, BT 063, BT 069
		Todaropsis eblanae	BT 001, BT 014, BT 015, BT 020, BT 021, BT 045, BT 046, BT 048, BT 059, BT 065, BT 069, PT 102

Class	Family	Species/Taxa	Station List
	Onychoteuthidae	*Onychoteuthis banksi*	PT 098, PT 102, PT 103
	Octopodidae	*Octopus* sp.	BT 005, BT 009, BT 014, BT 015, BT 019, BT 023, BT 024, BT 026, BT 028, BT 044, BT 053, BT 063, BT 089
ECHINOIDEA	**unidentified**	unidentified sp.9	BT 024, BT 031, BT 033, BT 035, BT 041, BT 046
	Cidaridae	*Eucidaris tribuloides*	BT 024, 033, BT 034, BT 039, BT 046
ASTEROIDEA	**Goniasteridae**	unidentified sp.10	BT 007, BT 008
THALIACEA	**Pyrosomidae**	*Pyrosoma atlanticum*	BT 001
CHONDRICHTHYES	**Squatinidae**	*Squatina oculata*	BT 001, BT 010, BT 011, BT 014, BT 019, BT 020, BT 021, BT 026, BT 034, BT 052
	Triakidae	*Mustelus mustelus*	BT 026, BT 039, BT 065, BT 068
	Rhinobatidae	*Rhinobatos albomaculatus*	BT 030
	Zanobatidae	*Zanobatus* sp. n.	BT 100
	Torpedinidae	*Torpedo* sp. n.	BT 006, BT 049, BT 055, BT 056, BT 059, BT 060, BT 067
		Torpedo torpedo	BT 005, BT 007, BT 009, BT 015, BT 021, BT 023, BT 028, BT 043, BT 049, BT 056, BT 060, BT 062, BT 089
	Rajidae	*Raja miraletus*	BT 002, BT 003, BT 005, BT 006, BT 010, BT 014, BT 015, BT 016, BT 020, BT 022, BT 024, BT 025, BT 026, BT 027, BT 028, BT 033, BT 034, BT 039, BT 045, BT 046, BT 047, BT 051, BT 052, BT 053, BT 054, BT 056, BT 057, BT 058, BT 060, BT 061, BT 062, BT 064, BT 065, BT 066, BT 068, BT 089
	Dasyatidae	*Dasyatis* cf. *hastata*	BT 008
		Dasyatis margarita	BT 006, BT 017, BT 048, BT 055
		Dasyatis marmorata	BT 050
OSTEICHTHYES	**Elopidae**	*Elops lacerta*	BT 006, BT 008, PT 074, PT 077, PT 078, PT 097
	Heterenchelyidae	*Pythonichthys microphthalmus*	BT 001
	Muraenidae	*Gymnothorax afer*	
		Muraena melanotis	BT 066
		Muraena vicinus	BT 100
	Ophichthidae	*Echiophis punctifer*	BT 008
		Pisodonophis semicinctus	BT 059
	Muraenesocidae	*Cynoponticus ferox*	BT 050, BT 055, BT 056, BT 059
	Congridae	*Uroconger syringinus*	BT 059
	Engraulidae	*Engraulis encrasicolus*	BT 003, BT 004, BT 009, BT 010, BT 015, BT 017, BT 025, BT 033, BT 034, BT 043, BT 048, BT 050, BT 053, BT 054, BT 056, BT 057, BT 062, BT 065, BT 068, BT 087, BT 088, BT 091, BT 092, PT 072, PT 074, PT 075, PT 076, PT 077, PT 078, PT 079, PT 081, PT 082, PT 083, PT 090, PT 095, PT 096, PT 097, PT 101, PT 103
	Pristigasteridae	*Ilisha africana*	BT 006, BT 008, BT 025, BT 048, BT 049, BT 055, BT 060, PT 071, PT 074, PT 075, PT 077, PT 078
	Clupeidae	*Sardinella aurita*	BT 001, BT 003, BT 025, BT 028, BT 030, BT 031, BT 034, BT 037, BT 038, BT 039, BT 042, BT 043, BT 044, BT 046, BT 048, BT 056, BT 057, BT 058, BT 062, BT 063, BT 067, BT 088, BT 089, PT 074, PT 076, PT 077, PT 078, PT 079, PT 082, PT 083, PT 084, PT 085, PT 086, PT 090, PT 094, PT 096, PT 101, PT 103
		Sardinella maderensis	BT 008, BT 017, BT 043, BT 048, BT 049, BT 065, PT 070, PT 071, PT 072, PT 074, PT 076, PT 077, PT 078, PT 079, PT 102
		Sardinella rouxi	PT 074, PT 075, PT 077, PT 078
	Synodontidae	*Saurida parri*	BT 002, BT 022, BT 025, BT 028, BT 029, BT 033, BT 039, BT 045, BT 050, BT 051, BT 053, BT 057, BT 058, BT 063, BT 065, BT 068, PT 079, PT 081, PT 083, PT 085, PT 086, PT 093, PT 094, PT 101, PT 102
		Synodus synodus	BT 091
		Trachinocephalus myops	BT 006, BT 007, BT 036, BT 037, BT 041, BT 046, BT 047, BT 051, BT 054, BT 062, BT 067, BT 068, BT 091, BT 092
	Paralepididae	*Paralepis* sp.	PT 098, PT 102
	Myctophidae	*Hygophum taaningi*	PT 102
	Ophidiidae	*Brotula barbata*	BT 005, BT 010, BT 011, BT 014, BT 045, BT 052, BT 057, BT 058, BT 063, BT 069
	Bythitidae	*Grammonus lunghursti*	BT 055
	Batrachoididae	*Batrachoides liberiensis*	BT 055, BT 059
		Halobatrachus cf. *didactylus*	BT 059, BT 063
	Lophiidae	*Lophiodes kempi*	BT 026, BT 029, BT 063

Class	Family	Species/Taxa	Station List
	Antennariidae	*Antennarius striatus*	BT 038, BT 043, BT 045, BT 046, BT 049, BT 056, BT 059, BT 063
	Exocoetidae	*Parexocoetus hillianus*	Manta Trawl
	Hemiramphidae	*Hemiramphus brasiliensis*	PT 070
	Holocentridae	*Sargocentron hastatum*	BT 012, BT 020, BT 033, BT 034, BT 052, BT 054, BT 064
	Zeidae	*Zeus faber*	BT 001, BT 011, BT 014, BT 019, BT 020, BT 026, BT 028, BT 033, BT 034, BT 045, BT 069, BT 089
	Syngnathidae	*Hippocampus algiricus*	BT 023, BT 031
	Fistulariidae	*Fistularia petimba*	BT 001, BT 002, BT 005, BT 006, BT 011, BT 012, BT 013, BT 015, BT 016, BT 018, BT 019, BT 022, BT 024, BT 025, BT 026, BT 027, BT 029, BT 030, BT 031, BT 032, BT 033, BT 035, BT 037, BT 038, BT 039, BT 041, BT 042, BT 044, BT 045, BT 046, BT 047, BT 050, BT 057, BT 058, BT 063, BT 064, BT 065, BT 068, BT 069, BT 089, BT 091, PT 085
		Fistularia tabacaria	BT 004, BT 007, BT 012, BT 013, BT 024, BT 029, PT 079
	Dactylopteridae	*Dactylopterus volitans*	BT 005, BT 010, BT 015, BT 016, BT 018, BT 021, BT 022, BT 025, BT 028, BT 029, BT 030, BT 032, BT 033, BT 034, BT 035, BT 036, BT 037, BT 039, BT 040, BT 041, BT 042, BT 044, BT 045, BT 046, BT 047, BT 051, BT 052, BT 057, BT 063, BT 064, BT 089, BT 092, PT 079
	Scorpaenidae	*Pontinus accraensis*	BT 014
		Scorpaena cf. angolensis	BT 024, BT 028, BT 029, BT 033
		Scorpaena laevis	BT 007, BT 012, BT 013, BT 024, BT 030
		Scorpaena sp.	BT 018, BT 041
		Scorpaena stephanica	BT 021, BT 029, BT 057, BT 063
	Platycephalidae	*Solitas gruveli*	BT 002, BT 005, BT 009, BT 010, BT 015, BT 016, BT 019, BT 021, BT 022, BT 023, BT 025, BT 026, BT 028, BT 029, BT 031, BT 032, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 041, BT 042, BT 044, BT 045, BT 046, BT 047, BT 050, BT 051, BT 053, BT 054, BT 056, BT 058, BT 059, BT 063, BT 065
	Triglidae	*Chelidonichthys gabonensis*	BT 018, BT 020, BT 021, BT 027, BT 028, BT 033, BT 034, BT 040, BT 045, BT 046, BT 052, BT 064, BT 069, BT 089
		Lepidotrigla cadmani	BT 001, BT 010, BT 011, BT 014, BT 015, BT 019, BT 021, BT 026, BT 034, BT 039, BT 045, BT 051, BT 052, BT 063
		Lepidotrigla carolae	BT 001, BT 005, BT 010, BT 011, BT 020, BT 021, BT 025, BT 027, BT 028, BT 029, BT 034, BT 039, BT 044, BT 045, BT 046, BT 051, BT 052, BT 069, BT 089
		Trigloporus lastoviza	BT 018, BT 033
	Acropomatidae	*Synagrops japonicus*	PT 102, PT 103
	Serranidae	*Anthias anthias*	BT 027, BT 033, BT 039, BT 045, BT 052, BT 064
		Cephalopholis taeniops	BT 024, BT 030
		Epinephelus aeneus	BT 002, BT 003, BT 004, BT 005, BT 007, BT 008, BT 009, BT 010, BT 018, BT 022, BT 023, BT 031, BT 033, BT 035, BT 036, BT 039, BT 043, BT 047, BT 049, BT 050, BT 053, BT 060, BT 065, BT 066
		Epinephelus caninus	BT 011
		Hyporthodus haifensis	BT 016
		Rypticus saponaceus	BT 003, BT 004, BT 006, BT 007, BT 017, BT 018, BT 024, BT 030, BT 040, BT 055
		Serranus accraensis	BT 002, BT 005, BT 009, BT 025, BT 026, BT 053, BT 063, PT 085
		Serranus heterurus	BT 001, BT 029, PT 085
	Priacanthidae	*Priacanthus arenatus*	BT 001, BT 014, BT 015, BT 018, BT 019, BT 021, BT 022, BT 024, BT 025, BT 026, BT 028, BT 029, BT 030, BT 032, BT 033, BT 034, BT 038, BT 039, BT 040, BT 041, BT 045, BT 046, BT 047, BT 050, BT 051, BT 057, BT 058, BT 063, BT 069, BT 089
	Apogonidae	*Apogon affinis*	BT 017, BT 022, BT 023, BT 030, BT 033, BT 035, BT 041, PT 071, PT 085
		Apogon imberbis	BT 100
	Branchiostegidae	*Branchiostegus semifasciatus*	BT 063
	Echeneidae	*Echeneis naucrates*	PT 074
	Rachycentridae	*Rachycentron canadum*	PT 093
	Carangidae	*Alectis alexandrinus*	BT 002, BT 003, BT 006, BT 008, BT 016, BT 017, BT 023, BT 024, BT 048, BT 054, BT 061, BT 062, BT 066, BT 067, BT 068, BT 088, PT 071, PT 074, PT 075, PT 077
		Alectis ciliaris	BT 007, BT 024, BT 031, BT 091
		Caranx crysos	BT 006, BT 018, BT 029, BT 047, BT 059, BT 060, BT 061, BT 066, BT 067, BT 068, PT 070, PT 078, PT 079, PT 085, PT 098
		Caranx fischeri	BT 017
		Caranx rhonchus	BT 042, BT 050, PT 090
		Caranx senegallus	BT 067

Class	Family	Species/Taxa	Station List
		Chloroscombrus chrysurus	BT 002, BT 003, BT 004, BT 006, BT 008, BT 017, BT 024, BT 030, BT 042, BT 043, BT 044, BT 048, BT 054, BT 055, BT 056, BT 059, BT 060, BT 061, BT 065, BT 066, BT 067, BT 068, BT 087, BT 092, PT 070, PT 071, PT 074, PT 075, PT 076, PT 077, PT 078, PT 097, PT 099
		Decapterus punctatus	BT 002, BT 003, BT 004, BT 005, BT 006, BT 009, BT 010, BT 011, BT 013, BT 016, BT 017, BT 021, BT 022, BT 023, BT 024, BT 025, BT 028, BT 029, BT 030, BT 031, BT 032, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 040, BT 041, BT 042, BT 043, BT 044, BT 046, BT 047, BT 050, BT 051, BT 056, BT 057, BT 058, BT 061, BT 062, BT 063, BT 067, BT 068, BT 087, BT 088, BT 089, BT 091, BT 092, PT 070, PT 071, PT 072, PT 074, PT 075, PT 076, PT 079, PT 081, PT 082, PT 083, PT 084, PT 085, PT 086, PT 090, PT 093, PT 094, PT 095, PT 096, PT 097, PT 099, PT 101, PT 102, PT 103
		Selar crumenophthalmus	PT 077, PT 084, PT 090, PT 093, PT 096, PT 101, PT 102
		Selene dorsalis	BT 002, BT 005, BT 006, BT 008, BT 009, BT 010, BT 017, BT 023, BT 042, BT 048, BT 049, BT 050, BT 053, BT 054, BT 055, BT 056, BT 059, BT 060, BT 061, BT 062, BT 066, BT 067, BT 087, PT 071, PT 073, PT 074, PT 075, PT 076, PT 077, PT 078, PT 085, PT 095, PT 103
		Seriola rivoliana	BT 018, BT 036
		Trachinotus ovatus	PT 078, PT 079, PT 097
		Trachurus trecae	BT 001, BT 002, BT 019, BT 020, BT 021, BT 026, BT 027, BT 034, BT 045, BT 046, BT 051, BT 052, BT 053, BT 057, BT 058, BT 063, BT 064, BT 069, BT 089, PT 077, PT 078, PT 079
	Lutjanidae	*Apsilus fuscus*	BT 040, BT 041, BT 089, PT 071
		Lutjanus agennes	BT 040
		Lutjanus fulgens	BT 004, BT 006, BT 008, BT 013, BT 017, BT 021, BT 022, BT 023, BT 024, BT 030, BT 032, BT 035, BT 040, BT 041, BT 042, BT 050, BT 089, PT 070
		Lutjanus goreensis	BT 006, BT 013, PT 070
	Gerreidae	*Eucinostomus melanopterus*	BT 004, BT 017, BT 054, BT 061, PT 077
	Haemulidae	*Brachydeuterus auritus*	BT 002, BT 003, BT 004, BT 005, BT 006, BT 008, BT 009, BT 010, BT 017, BT 019, BT 020, BT 026, BT 042, BT 043, BT 044, BT 048, BT 049, BT 050, BT 053, BT 054, BT 055, BT 056, BT 058, BT 059, BT 060, BT 061, BT 062, BT 063, BT 065, BT 067, BT 068, BT 087, BT 092, PT 070, PT 071, PT 073, PT 074, PT 075, PT 077, PT 078, PT 079, PT 083, PT 084, PT 085, PT 103
		Plectorhinchus mediterraneus	BT 050
		Pomadasys incisus	BT 049, BT 092
		Pomadasys jubelini	BT 004, BT 061, BT 065, BT 066, BT 067, BT 068
		Pomadasys perotaei	BT 054, BT 055, BT 059, BT 061, BT 067, BT 068
		Pomadasys rogeri	BT 049, BT 061
	Lethrinidae	*Lethrinus atlanticus*	BT 004, BT 006, BT 007, BT 008, BT 012, BT 013, BT 017, BT 018, BT 022, BT 024, BT 030, BT 031, BT 032, BT 036, BT 061, BT 067, BT 091, PT 070, PT 078
	Sparidae	*Boops boops*	BT 001, BT 011, BT 014, BT 019, BT 020, BT 022, BT 024, BT 026, BT 027, BT 028, BT 033, BT 034, BT 035, BT 039, BT 040, BT 045, BT 046, BT 051, BT 064
		Dentex angolensis	BT 010, BT 011, BT 014, BT 019, BT 020, BT 021, BT 026, BT 027, BT 034, BT 052, BT 057, BT 069
		Dentex canariensis	BT 003, BT 004, BT 007, BT 010, BT 013, BT 018, BT 021, BT 022, BT 023, BT 024, BT 029, BT 030, BT 031, BT 034, BT 035, BT 036, BT 040, BT 041, BT 042, BT 045, BT 047, BT 050, BT 052, BT 064, BT 066, BT 067, BT 089, PT 070
		Dentex congoensis	BT 001, BT 011, BT 014, BT 015, BT 019, BT 020, BT 021, BT 026, BT 027, BT 034, BT 045, BT 051, BT 052, BT 063, BT 064, BT 065, BT 069, BT 089
		Dentex gibbosus	BT 002, BT 005, BT 008, BT 009, BT 012, BT 013, BT 014, BT 015, BT 045, BT 052, BT 064, BT 089
		Pagellus bellottii	BT 002, BT 004, BT 005, BT 009, BT 010, BT 011, BT 014, BT 015, BT 016, BT 017, BT 018, BT 019, BT 020, BT 021, BT 022, BT 023, BT 024, BT 025, BT 027, BT 028, BT 029, BT 030, BT 031, BT 032, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 040, BT 041, BT 042, BT 043, BT 044, BT 045, BT 046, BT 047, BT 050, BT 051, BT 052, BT 053, BT 057, BT 058, BT 061, BT 062, BT 063, BT 064, BT 066, BT 068, BT 069, BT 089, BT 091, BT 092, PT 085, PT 099
		Pagrus caeruleostictus	BT 002, BT 003, BT 004, BT 005, BT 007, BT 008, BT 009, BT 010, BT 011, BT 012, BT 015, BT 016, BT 017, BT 018, BT 021, BT 022, BT 023, BT 024, BT 025, BT 029, BT 030, BT 031, BT 032, BT 033, BT 034, BT 035, BT 036, BT 038, BT 039, BT 040, BT 041, BT 042, BT 043, BT 044, BT 045, BT 047, BT 050, BT 052, BT 053, BT 061, BT 062, BT 064, BT 066, BT 067, BT 089, BT 091
		Spicara alta	BT 014, BT 019, BT 020, BT 027
	Polynemidae	*Galeoides decadactylus*	BT 006, BT 008, BT 017, BT 048, BT 049, BT 054, BT 055, BT 056, BT 060, BT 061, BT 066, BT 067, PT 070, PT 071, PT 075, PT 077
	Sciaenidae	*Pseudotolithus senegalensis*	BT 006, BT 008, BT 017, BT 043, BT 048, BT 049, BT 053, BT 054, BT 055, BT 056, BT 059, BT 060, BT 061, BT 062, BT 065, BT 066, BT 067, BT 068
		Pseudotolithus senegallus	BT 017
		Pteroscion peli	BT 048, BT 055, BT 056, BT 059, BT 060
		Umbrina canariensis	BT 020, BT 027, BT 052
	Mullidae	*Pseudupeneus prayensis*	BT 002, BT 003, BT 004, BT 005, BT 006, BT 007, BT 008, BT 010, BT 012, BT 015, BT 016, BT 017, BT 018, BT 021, BT 022, BT 023, BT 024, BT 025, BT 026, BT 028, BT 029, BT 030, BT 031, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 040, BT 041, BT 042, BT 043, BT 044, BT 045, BT 046, BT 047, BT 050, BT 051, BT 052, BT 053, BT 057, BT 058, BT 062, BT 063, BT 064, BT 065, BT 066, BT 067, BT 068, BT 069, BT 087, BT 089, BT 091, BT 092, PT 071, PT 079

Class	Family	Species/Taxa	Station List
	Drepaneidae	*Drepane africana*	BT 003, BT 006, BT 008, BT 013, BT 017, BT 023, BT 048, BT 061, BT 066, BT 067
	Chaetodontidae	*Chaetodon hoefleri*	BT 064
		Chaetodon robustus	BT 015, BT 018, BT 021, BT 024, BT 030, BT 033, BT 035, BT 040, BT 041, BT 047, BT 050
		Prognathodes marcellae	BT 018, BT 021, BT 033, BT 052
	Pomacanthidae	*Holacanthus africanus*	BT 024, BT 030
	Pomacentridae	*Abudefduf hoefleri*	BT 013
		Chromis cadenati	BT 022, BT 024, BT 028, BT 030, BT 033, BT 034, BT 035, BT 039, BT 040, BT 041
		Chromis limbata	BT 030, BT 064
	Scaridae	*Nicholsina collettei*	BT 004
		Scarus hoefleri	BT 012, BT 013
		Sparisoma choati	BT 012, BT 024, BT 030
	Labridae	*Bodianus speciosus*	BT 013, BT 021, BT 024, BT 030, BT 035, BT 040, BT 041, BT 047, BT 050
		Coris atlantica	BT 012, BT 030, BT 041
		Xyrichtys novacula	BT 036, BT 043, BT 044
	Trachinidae	*Trachinus armatus*	BT 091, BT 092
	Uranoscopidae	*Uranoscopus albesca*	BT 063
		Uranoscopus polli	BT 064, BT 067, BT 092
	Blenniidae	*Blennius normani*	BT 010, BT 046, BT 051, BT 063
	Gobiidae	unidentified sp.11	BT 053, BT 058
	Ephippidae	*Chaetodipterus goreensis*	BT 006, BT 067
		Chaetodipterus lippei	BT 067, PT 070
	Acanthuridae	*Acanthurus monroviae*	BT 012, BT 013, BT 024, BT 030, BT 031, BT 035, BT 040
		unidentified (post larvae)	PT 101
	Sphyraenidae	*Sphyraena afra*	BT 008, PT 074
		Sphyraena guachancho	BT 004, BT 006, BT 008, BT 015, BT 017, BT 022, BT 023, BT 049, BT 050, BT 054, BT 055, BT 056, BT 057, BT 060, BT 061, BT 062, BT 065, BT 066, BT 067, BT 068, BT 088, BT 091, BT 092, PT 070, PT 071, PT 072, PT 073, PT 074, PT 075, PT 076, PT 077, PT 078, PT 079, PT 083, PT 096, PT 097, PT 103
		Sphyraena sphyraena	BT 002, BT 005, BT 016, BT 022, BT 026, BT 033, BT 034, BT 043, BT 048, BT 050, BT 053, BT 058, BT 061, BT 063, BT 064, BT 068, BT 069, BT 088, BT 089, BT 091, BT 092, PT 085, PT 090, PT 093, PT 101
	Gempylidae	*Gempylus serpens*	PT 098, PT 102
		Nealotus tripes	PT 098, PT 102, PT 103
		Promethichthys prometheus	PT 098
	Trichiuridae	*Trichiurus lepturus*	BT 005, BT 006, BT 009, BT 010, BT 048, BT 049, BT 055, BT 057, BT 058, BT 059, BT 060, BT 065, PT 070, PT 071, PT 073, PT 074, PT 075, PT 076, PT 078, PT 102, PT 103
	Scombridae	*Auxis thazard*	PT 090
		Euthynnus alletteratus	BT 025, PT 090, PT 094, PT 098, PT 102, PT 103
		Sarda sarda	PT 085
		Scomber colias	BT 040, BT 057, BT 068, PT 079
		Scomberomorus tritor	BT 006, BT 008, BT 024, BT 031, BT 037, BT 042, BT 043, BT 060, BT 062, BT 067, BT 068, BT 088, PT 070, PT 074, PT 075, PT 076, PT 077, PT 078, PT 082, PT 084, PT 090, PT 096, PT 097, PT 098, PT 101, PT 103
	Nomeidae	*Cubiceps pauciradiatus*	PT 098, PT 103
	Ariommatidae	*Ariomma bondi*	BT 011, BT 012, BT 014, BT 015, BT 019, BT 020, BT 026, BT 027, BT 034, BT 051, BT 052, BT 057, BT 069, BT 089, PT 094, PT 098
		Ariomma melanum	PT 098, PT 102
	Stromateidae	*Stromateus fiatola*	BT 055, BT 059
	Psettodidae	*Psettodes belcheri*	BT 048, BT 061
	Citharidae	*Citharus linguatula*	BT 005, BT 010, BT 011, BT 014, BT 015, BT 019, BT 020, BT 021, BT 026, BT 027, BT 028, BT 029, BT 034, BT 039, BT 045, BT 046, BT 050, BT 051, BT 052, BT 064, BT 069, BT 089
	Bothidae	*Arnoglossus imperialis*	BT 002, BT 005, BT 009, BT 010, BT 011, BT 014, BT 015, BT 019, BT 020, BT 022, BT 025, BT 028, BT 029, BT 032, BT 033, BT 034, BT 035, BT 039, BT 041, BT 044, BT 046, BT 047, BT 052, BT 053,

Class	Family	Species/Taxa	Station List
			BT 054, BT 057, BT 058, BT 063, BT 064, BT 065, BT 069, BT 089
		Bothus podas	BT 036, BT 037, BT 038, BT 044, BT 046, BT 091, BT 092
	Paralichthyidae	*Syacium guineensis*	BT 002, BT 009, BT 016, BT 018, BT 021, BT 022, BT 023, BT 024, BT 025, BT 028, BT 029, BT 030, BT 032, BT 033, BT 034, BT 035, BT 036, BT 037, BT 038, BT 039, BT 041, BT 042, BT 044, BT 047, BT 053, BT 054, BT 057, BT 058, BT 068, BT 089, BT 091, BT 092
	Soleidae	*Dagetichthys cadenati*	BT 092
		Dicologoglossa cuneata	BT 010, BT 011
		Microchirus boscanion	BT 034, BT 051, BT 068
		Microchirus frechkopi	BT 001, BT 009, BT 010, BT 021, BT 025, BT 026, BT 053, BT 063, BT 069
		Microchirus hexophthalmus	BT 020, BT 045, BT 046
		Pegusa lascaris	BT 044, BT 056, BT 065
		Vanstraelenia chirophthalma	BT 059
	Cynoglossidae	*Cynoglossus canariensis*	BT 004, BT 006, BT 023, BT 056, BT 059, BT 060, BT 063, BT 065, BT 068
		Cynoglossus senegalensis	BT 010, BT 026, BT 034, BT 050, BT 054, BT 055, BT 059, BT 060
	Balistidae	*Balistes capriscus*	BT 002, BT 003, BT 004, BT 007, BT 009, BT 016, BT 022, BT 023, BT 031, BT 032, BT 033, BT 035, BT 036, BT 037, BT 042, BT 047, BT 050, BT 061, BT 062, BT 065, BT 068, BT 087, BT 088, BT 092
		Balistes punctatus	BT 007, BT 012, BT 013, BT 016, BT 018, BT 022, BT 024, BT 029, BT 030, BT 031, BT 035, BT 036, BT 038, BT 041, BT 050, BT 067
	Monacanthidae	*Aluterus heudelotii*	BT 003, BT 007, BT 008, BT 012, BT 013, BT 024, BT 030, BT 032, BT 035, BT 036, BT 037, BT 038, BT 041, BT 042, BT 047, BT 053, BT 087, BT 088, BT 092
		Aluterus monoceros	BT 007, BT 012, BT 013, BT 015, BT 018, BT 019, BT 032, BT 036, BT 037, BT 038, BT 054, BT 062, BT 066, BT 091
		Stephanolepis hispidus	BT 003, BT 016, BT 018, BT 022, BT 024, BT 030, BT 031, BT 036, BT 037, BT 041, BT 042, BT 044, BT 065, PT 081, PT 095
	Ostraciidae	*Acanthostrascion guineensis*	BT 003, BT 004, BT 006, BT 007, BT 012, BT 013, BT 017, BT 024, BT 030, BT 035, BT 041, BT 044, BT 047, BT 066, BT 067, BT 068
	Tetraodontidae	*Ephippion guttifer*	BT 003, BT 004, BT 007, BT 008, BT 012, BT 017, BT 031, BT 036, BT 056, BT 059, BT 060, BT 066
		Lagocephalus laevigatus	BT 002, BT 003, BT 007, BT 010, BT 013, BT 015, BT 016, BT 017, BT 018, BT 022, BT 024, BT 025, BT 029, BT 030, BT 032, BT 035, BT 036, BT 041, BT 043, BT 044, BT 046, BT 047, BT 050, BT 051, BT 053, BT 055, BT 056, BT 057, BT 058, BT 059, BT 060, BT 062, BT 063, BT 065, BT 067, BT 089, BT 091, BT 092, PT 071, PT 072, PT 079, PT 083, PT 085, PT 093, PT 095, PT 096, PT 099
		Sphoeroides marmoratus	BT 001, BT 002, BT 004, BT 007, BT 024, BT 028, BT 037, BT 041, BT 053, BT 057, BT 058, BT 063, BT 089
		Sphoeroides pachygaster	BT 007, BT 020, BT 027, BT 034
	Diodontidae	*Chilomycterus spinosus mauretanicus*	BT 005, BT 007, BT 008, BT 036, BT 043
		Diodon holocanthus	BT 003, BT 004, BT 006, BT 007, BT 008, BT 012, BT 013, BT 018, BT 024, BT 030

Annex V. Reults of Chorophyll and zooplankton biomass

Chlorophyll *a* and phaeopigment concentrations

Year	Month	Day	Time	Station	Lat	Lon	Bottom (m)	Sampling-depth (m)	Chlorophyll_*a* (mg/m3)	Phaeopigment (mg/m3)
2016	4	12	1749	310	5.010	-3.029	39	30.0	0.98	0.88
2016	4	12	1749	310	5.010	-3.029	39	20.5	0.29	0.15
2016	4	12	1749	310	5.010	-3.029	39	10.3	0.20	0.12
2016	4	12	1749	310	5.010	-3.029	39	5.5	0.25	0.11
2016	4	12	1749	310	5.010	-3.029	39	0.0	0.26	0.12
2016	4	13	1532	311	4.768	-2.276	46	30.2	2.44	1.12
2016	4	13	1532	311	4.768	-2.276	46	20.7	0.68	0.35
2016	4	13	1532	311	4.768	-2.276	46	10.2	0.30	0.12
2016	4	13	1532	311	4.768	-2.276	46	5.9	0.28	0.10
2016	4	13	1532	311	4.768	-2.276	46	0.0	0.35	0.11
2016	4	13	1713	312	4.662	-2.299	73	50.8	0.51	0.77
2016	4	13	1713	312	4.662	-2.299	73	30.3	1.47	1.48
2016	4	13	1713	312	4.662	-2.299	73	19.7	1.86	0.53
2016	4	13	1713	312	4.662	-2.299	73	9.9	0.25	0.10
2016	4	13	1713	312	4.662	-2.299	73	5.9	0.19	0.07
2016	4	13	1713	312	4.662	-2.299	73	0.0	0.74	0.11
2016	4	14	718	318	4.498	-1.963	77	50.9	0.32	0.56
2016	4	14	718	318	4.498	-1.963	77	30.5	4.28	1.83
2016	4	14	718	318	4.498	-1.963	77	20.1	0.40	0.18
2016	4	14	718	318	4.498	-1.963	77	9.5	0.91	0.39
2016	4	14	718	318	4.498	-1.963	77	5.5	0.16	0.08
2016	4	14	718	318	4.498	-1.963	77	0.0	0.31	0.13
2016	4	14	852	319	4.677	-2.010	46	29.9	7.50	3.15
2016	4	14	852	319	4.677	-2.010	46	20.9	3.71	1.19
2016	4	14	852	319	4.677	-2.010	46	11.7	1.15	0.52
2016	4	14	852	319	4.677	-2.010	46	5.0	0.32	0.09
2016	4	14	852	319	4.677	-2.010	46	0.0	0.33	0.10
2016	4	14	1633	320	4.326	-1.665	106	100.6	0.12	0.29
2016	4	14	1633	320	4.326	-1.665	106	76.2	0.20	0.46
2016	4	14	1633	320	4.326	-1.665	106	49.9	0.49	0.75
2016	4	14	1633	320	4.326	-1.665	106	29.8	1.33	0.38
2016	4	14	1633	320	4.326	-1.665	106	19.9	0.49	0.13
2016	4	14	1633	320	4.326	-1.665	106	5.7	0.33	0.08
2016	4	14	1633	320	4.326	-1.665	106	0.0	0.32	0.13
2016	4	14	1748	321	4.464	-1.712	67	50.6	0.49	0.60
2016	4	14	1748	321	4.464	-1.712	67	30.1	5.55	2.10
2016	4	14	1748	321	4.464	-1.712	67	20.3	1.70	0.34
2016	4	14	1748	321	4.464	-1.712	67	9.3	0.25	0.07
2016	4	14	1748	321	4.464	-1.712	67	6.4	0.23	0.10
2016	4	14	1748	321	4.464	-1.712	67	0.0	0.28	0.09
2016	4	15	900	322	4.356	-1.422	79	77.5	0.32	0.44
2016	4	15	900	322	4.356	-1.422	79	48.6	0.44	0.76
2016	4	15	900	322	4.356	-1.422	79	30.0	0.53	0.34
2016	4	15	900	322	4.356	-1.422	79	17.7	0.41	0.13
2016	4	15	900	322	4.356	-1.422	79	11.0	0.41	0.10
2016	4	15	900	322	4.356	-1.422	79	4.7	0.43	0.11
2016	4	15	900	322	4.356	-1.422	79	0.0	0.32	0.11
2016	4	15	1313	323	4.760	-1.567	42	30.3	7.52	2.21
2016	4	15	1313	323	4.760	-1.567	42	20.3	1.69	0.41
2016	4	15	1313	323	4.760	-1.567	42	11.3	0.84	0.21
2016	4	15	1313	323	4.760	-1.567	42	5.4	0.31	0.09
2016	4	15	1313	323	4.760	-1.567	42	0.0	0.28	0.07
2016	4	16	1143	324	4.858	-1.054	41	29.5	1.23	0.75
2016	4	16	1143	324	4.858	-1.054	41	20.4	0.86	0.30
2016	4	16	1143	324	4.858	-1.054	41	9.6	0.35	0.11
2016	4	16	1143	324	4.858	-1.054	41	4.7	0.33	0.11
2016	4	16	1143	324	4.858	-1.054	41	0.0	0.44	0.14
2016	4	16	1353	325	4.566	-0.939	80	77.6	0.14	0.32
2016	4	16	1353	325	4.566	-0.939	80	51.5	0.29	0.57
2016	4	16	1353	325	4.566	-0.939	80	30.4	0.65	0.32
2016	4	16	1353	325	4.566	-0.939	80	19.6	0.60	0.19
2016	4	16	1353	325	4.566	-0.939	80	10.1	0.43	0.08
2016	4	16	1353	325	4.566	-0.939	80	5.5	0.28	0.07
2016	4	16	1353	325	4.566	-0.939	80	0.0	0.33	0.09
2016	4	17	754	326	4.910	-0.651	55	52.2	0.49	0.60
2016	4	17	754	326	4.910	-0.651	55	30.1	0.45	0.26

2016	4	17	754	326	4.910	-0.651	55	20.1	0.31	0.17

Chlorophyll *a* and phaeopigment concentrations

Year	Month	Day	Time	Station	Lat	Lon	Bottom (m)	Sampling-depth (m)	Chlorophyll_*a* (mg/m3)	Phaeopigment (mg/m3)
2016	4	17	754	326	4.910	-0.651	55	10.0	0.29	0.10
2016	4	17	754	326	4.910	-0.651	55	5.1	0.32	0.10
2016	4	17	754	326	4.910	-0.651	55	0.0	0.34	0.12
2016	4	17	954	327	5.086	-0.740	33	29.9	0.99	0.64
2016	4	17	954	327	5.086	-0.740	33	20.3	0.33	0.19
2016	4	17	954	327	5.086	-0.740	33	8.9	0.21	0.09
2016	4	17	954	327	5.086	-0.740	33	5.5	0.28	0.09
2016	4	17	954	327	5.086	-0.740	33	0.0	0.27	0.09
2016	4	17	1656	328	5.052	-0.490	56	49.5	0.39	0.62
2016	4	17	1656	328	5.052	-0.490	56	30.3	0.53	0.35
2016	4	17	1656	328	5.052	-0.490	56	19.5	0.34	0.13
2016	4	17	1656	328	5.052	-0.490	56	11.0	0.23	0.07
2016	4	17	1656	328	5.052	-0.490	56	6.2	0.21	0.06
2016	4	17	1656	328	5.052	-0.490	56	0.0	0.24	0.07
2016	4	17	1755	329	5.160	-0.547	34	29.2	0.56	0.40
2016	4	17	1755	329	5.160	-0.547	34	21.1	0.44	0.24
2016	4	17	1755	329	5.160	-0.547	34	10.2	0.30	0.13
2016	4	17	1755	329	5.160	-0.547	34	5.1	0.19	0.06
2016	4	17	1755	329	5.160	-0.547	34	0.0	0.19	0.06
2016	4	18	849	333	5.307	-0.099	101	99.5	0.04	0.12
2016	4	18	849	333	5.307	-0.099	101	75.1	0.12	0.25
2016	4	18	849	333	5.307	-0.099	101	50.3	0.29	0.41
2016	4	18	849	333	5.307	-0.099	101	30.2	0.37	0.33
2016	4	18	849	333	5.307	-0.099	101	19.8	0.35	0.18
2016	4	18	849	333	5.307	-0.099	101	10.3	0.35	0.08
2016	4	18	849	333	5.307	-0.099	101	5.4	0.46	0.10
2016	4	18	849	333	5.307	-0.099	101	0.0	0.21	0.08
2016	4	18	947	334	5.401	-0.144	51	49.0	0.41	0.60
2016	4	18	947	334	5.401	-0.144	51	30.2	0.55	0.40
2016	4	18	947	334	5.401	-0.144	51	20.0	0.48	0.25
2016	4	18	947	334	5.401	-0.144	51	9.4	0.26	0.08
2016	4	18	947	334	5.401	-0.144	51	5.5	0.20	0.07
2016	4	18	947	334	5.401	-0.144	51	0.0	0.25	0.07
2016	4	18	1546	337	5.641	0.216	43	30.3	0.53	0.29
2016	4	18	1546	337	5.641	0.216	43	20.0	0.29	0.13
2016	4	18	1546	337	5.641	0.216	43	10.1	0.21	0.06
2016	4	18	1546	337	5.641	0.216	43	5.6	0.22	0.08
2016	4	18	1546	337	5.641	0.216	43	0.0	0.19	0.07
2016	4	18	1630	338	5.581	0.253	77	74.9	0.11	0.31
2016	4	18	1630	338	5.581	0.253	77	50.7	0.41	0.57
2016	4	18	1630	338	5.581	0.253	77	30.4	0.66	0.45
2016	4	18	1630	338	5.581	0.253	77	20.2	0.32	0.24
2016	4	18	1630	338	5.581	0.253	77	10.1	0.30	0.11
2016	4	18	1630	338	5.581	0.253	77	5.0	0.30	0.20
2016	4	18	1630	338	5.581	0.253	77	0.0	0.27	0.07
2016	4	19	828	339	5.745	1.005	44	29.4	0.57	0.29
2016	4	19	828	339	5.745	1.005	44	20.1	0.42	0.27
2016	4	19	828	339	5.745	1.005	44	10.6	0.29	0.10
2016	4	19	828	339	5.745	1.005	44	5.5	0.22	0.10
2016	4	19	828	339	5.745	1.005	44	0.0	0.23	0.08
2016	4	19	920	340	5.703	1.023	465	98.5	0.09	0.24
2016	4	19	920	340	5.703	1.023	465	75.7	0.30	0.48
2016	4	19	920	340	5.703	1.023	465	50.4	0.73	0.61
2016	4	19	920	340	5.703	1.023	465	29.8	0.36	0.30
2016	4	19	920	340	5.703	1.023	465	19.9	0.31	0.18
2016	4	19	920	340	5.703	1.023	465	9.9	0.20	0.14
2016	4	19	920	340	5.703	1.023	465	3.8	0.18	0.08
2016	4	19	920	340	5.703	1.023	465	0.0	0.23	0.21
2016	4	19	1404	341	5.866	1.129	52	48.1	0.79	0.60
2016	4	19	1404	341	5.866	1.129	52	30.3	0.51	0.32
2016	4	19	1404	341	5.866	1.129	52	20.3	0.36	0.20
2016	4	19	1404	341	5.866	1.129	52	10.1	0.20	0.10
2016	4	19	1404	341	5.866	1.129	52	5.7	0.17	0.08
2016	4	19	1404	341	5.866	1.129	52	0.0	0.20	0.07

2016	4	19	1500	342	5.932	1.072	31	20.4	0.59	0.19
2016	4	19	1500	342	5.932	1.072	31	10.2	0.31	0.11
2016	4	19	1500	342	5.932	1.072	31	5.9	0.28	0.12
2016	4	19	1500	342	5.932	1.072	31	0.0	0.18	0.06

Zooplankton biomasses (standardized to grams of dry-weight per square meter surface area) for size-fractions >2mm, 1-2mm, 0.18-1mm as well as the total (sum of all size-fractions). Zooplankton were sampled with a vertically hauled WPII-net (mouth-opening area ca. 0.25 m^2, mesh-size 0.18mm). Lower and upper refer to lower and upper sampling depths. The biomasses presented represent the entire depth-stratum sampled.

Station	Year	Month	Day	Time	Lat	Lon	Bottom (m)	Lower (m)	Upper (m)	>2 mm	1-2 mm	0.18-1 mm	Total
309	2016	4	12	1519	4.845	-3.074	82	72	0	0.00	0.48	0.56	1.04
310	2016	4	12	1800	5.010	-3.029	39	30	0	0.00	0.21	0.21	0.42
311	2016	4	13	1542	4.769	-2.276	46	35	0	0.00	0.39	0.01	0.39
312	2016	4	13	1723	4.662	-2.299	73	63	0	0.00	1.50	2.68	4.18
318	2016	4	14	728	4.498	-1.963	77	70	0	0.00	0.41	0.60	1.01
319	2016	4	14	902	4.677	-2.010	50	40	0	0.00	0.39	0.84	1.22
320	2016	4	14	1643	4.326	-1.665	106	103	0	0.75	1.37	2.90	5.01
321	2016	4	14	1758	4.464	-1.712	67	57	0	1.32	0.72	3.55	5.60
322	2016	4	15	910	4.356	-1.422	79	68	0	0.79	0.36	2.68	3.82
323	2016	4	15	1323	4.760	-1.567	42	32	0	0.30	0.55	2.43	3.27
324	2016	4	16	1253	4.858	-1.054	41	31	0	0.20	0.25	1.41	1.86
325	2016	4	16	1403	4.566	-0.939	80	73	0	0.38	0.92	2.59	3.88
326	2016	4	17	804	4.910	-0.651	55	45	0	0.13	0.74	0.91	1.78
327	2016	4	17	1004	5.086	-0.740	33	23	0	0.33	0.38	1.75	2.45
328	2016	4	17	1706	5.052	-0.490	56	46	0	0.12	0.18	1.07	1.38
329	2016	4	17	1805	5.160	-0.547	34	24	0	0.49	0.22	1.24	1.95
333	2016	4	18	859	5.307	-0.099	101	93	0	0.36	1.04	0.95	2.35
334	2016	4	18	957	5.401	-0.144	51	40	0	0.22	0.42	0.45	1.10
337	2016	4	18	1556	5.641	0.217	43	33	0	0.08	0.07	0.58	0.73
338	2016	4	18	1640	5.581	0.253	77	67	0	0.73	0.57	1.06	2.37
339	2016	4	19	828	5.745	1.005	43	35	0	0.06	0.30	0.81	1.17
340	2016	4	19	930	5.703	1.024	465	100	0	0.21	0.71	0.92	1.84
341	2016	4	19	1414	5.866	1.129	52	43	0	0.07	0.43	0.51	1.02
342	2016	4	19	1510	5.932	1.072	31	23	0	0.06	0.71	0.43	1.20