

**NORAD-FAO PROGRAMME  
GCP/GLO/690/NOR**

**CRUISE REPORTS *DR FRIDTJOF NANSEN*  
EAF-Nansen/CR/2019/8**



**TRANSBOUNDARY DEMERSAL AND PELAGIC RESOURCES AND  
ECOSYSTEMS IN THE WESTERN GULF OF GUINEA**

**Ghana and Côte d'Ivoire**

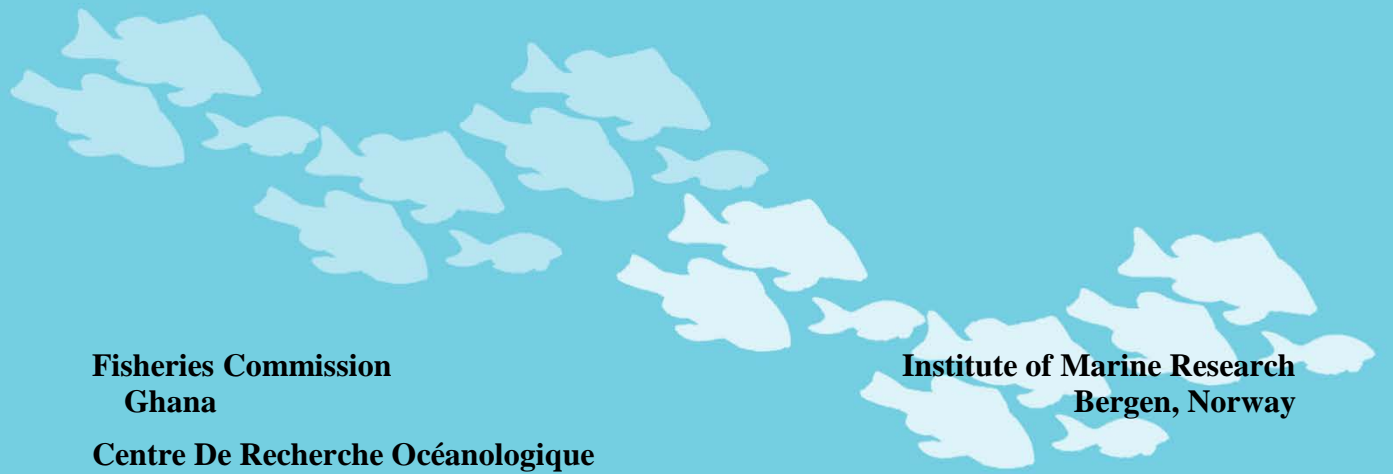
**20 July–17 August 2019**

**Fisheries Commission  
Ghana**

**Centre De Recherche Océanologique  
Côte d'Ivoire**

**Food Research Institute  
Ghana**

**Institute of Marine Research  
Bergen, Norway**





## THE EAF-NANSEN PROGRAMME (2017–2021)

The EAF-Nansen Programme “Supporting the Application of the Ecosystem Approach to Fisheries Management considering Climate and Pollution Impacts” supports partner countries and regional organizations in Africa and the Bay of Bengal improving their capacity for the sustainable management of their fisheries and other uses of marine and coastal resources through the implementation of the Ecosystem Approach to Fisheries (EAF), taking into consideration the impacts of the climate and pollution.

The Programme is executed by the Food and Agriculture Organization of the United Nations (FAO) in close collaboration with the Institute of Marine Research (IMR) of Bergen, Norway, and funded by the Norwegian Agency for Development Cooperation (Norad). This Programme is the current phase (2017–2021) of the Nansen Programme which started in 1975.

The aim of the Programme is that sustainable fisheries improve food and nutrition security for people in partner countries. It builds on three pillars, Science, Fisheries Management, and Capacity Development, and supports partner countries to produce relevant and timely evidence-based advice for management, to manage fisheries according to the EAF principles and to further develop their human and organizational capacity to manage fisheries sustainably. In line with the EAF principles, the Programme adopts a broad scope, taking into consideration a wide range of impacts of human activities and natural processes on marine resources and ecosystems including fisheries, pollution, climate variability and change.

A new state of the art research vessel, the *Dr Fridtjof Nansen*, is an integral part of the Programme. A comprehensive science plan, covering a broad selection of research areas, and directed at producing knowledge for informing policy and management decisions, guides the Programme’s scientific work.

The Programme works in partnership with countries, regional organizations, other UN agencies as well as other partner projects and institutions.

## LE PROGRAMME EAF-NANSEN (2017-2021)

Le programme EAF-Nansen « Soutenir l'application de l'approche écosystémique pour la gestion des pêches compte tenu des impacts du climat et de la pollution » appui les pays partenaires et les organisations régionales en Afrique et dans le golfe du Bengale pour améliorer leur capacité de gestion durable de leurs pêcheries et d'autres usages de la mer ainsi que les ressources côtières, grâce à la mise en œuvre de l'Approche écosystémique des pêches (AEP), en tenant compte des impacts du climat et de la pollution.

Le programme est exécuté par l'Organisation des Nations Unies pour l'alimentation et l'agriculture (FAO) en étroite collaboration avec l'Institut de recherche marine (IMR) de Bergen, en Norvège, et financé par l'Agence norvégienne de coopération au développement (Norad). Ce programme est la phase actuelle (2017-2021) du programme Nansen qui a débuté en 1975.

L'objectif du programme est que la pêche durable améliore la sécurité alimentaire et nutritionnelle des populations des pays partenaires. Il s'appuie sur trois piliers, la science, la gestion des pêches et le développement des capacités, et aide les pays partenaires à produire des avis pertinents et opportuns fondés sur des données factuelles pour la gestion, à gérer les pêcheries conformément aux principes de l'AEP et à développer davantage leur capacité humaine et organisationnelle à gérer durablement les pêches. Conformément aux principes de l'AEP, le programme adopte une large vision, prenant en considération un large éventail d'impacts des activités humaines et des processus naturels sur les ressources et les écosystèmes marins, y compris la pêche, la pollution, la variabilité et le changement climatique.

Un nouveau navire de recherche de pointe, le *Dr Fridtjof Nansen*, fait partie intégrante du programme. Un plan scientifique complet, couvrant un large éventail de domaines de recherche et visant à produire des connaissances pour éclairer les décisions de politique et de gestion, guide les travaux scientifiques du programme.

Le programme travaille en partenariat avec des pays, des organisations régionales, d'autres agences des Nations Unies ainsi que d'autres projets et institutions partenaires.



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ECOSYSTEMS IN THE WESTERN GULF OF GUINEA**

**Ghana and Côte d'Ivoire**

**20 July –17 August 2019**

**by**

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**Institute of Marine Research  
Bergen, 2021**



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## **EXECUTIVE SUMMARY**

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The survey off Ghana and Côte d'Ivoire covered the continental shelf (30–100m depth) and the slope (100–500m depth) with the main goal to examine the status of both pelagic and demersal resources. In parallel, the oceanographic conditions in the area were recorded, in terms of physical, chemical and biological oceanography (plankton). The survey consisted of a pelagic coverage (east to west) and a demersal coverage (west to east). The area surveyed as part of the demersal coverage off Ghana was 14% smaller compared with what initially planned and results have to take this aspect into consideration.

The major pelagic fish species like the sardinellas and anchovy were absent over most parts of the shelf of Côte d'Ivoire but increased in densities on the Ghanaian shelf. Horse mackerel was present in appreciable numbers on the middle and lower shelf of both countries. The overall estimate for sardinellas and anchovy off Côte d'Ivoire is quite similar to that obtained in 2017 in the area (~63 thousand tonnes), but still low compared to the early 2000s (~168 thousand tonnes). The biomass of anchovies on Côte d'Ivoire's EEZ was found to substantially contribute to the biomass of small pelagics.

Despite the reduced area coverage during this survey, all demersal groups on the Ghanaian shelf showed similar biomass levels to those of previous years,. The total estimated biomass of economically valuable demersal resources in the Ivorian coast were low compared to the long-term average (~5 thousand tonnes).

## CHAPTER 1. INTRODUCTION

The research activities under the EAF-Nansen program are guided by the EAF-Nansen Science Plan. The science plan is intended to ensure good scientific use of the wealth of data generated by the R/V *Dr Fridtjof Nansen* and other related data, addressing key research questions in support of tactical and strategic fisheries management.

The science plan covers 11 research themes, presented in Figure 1.

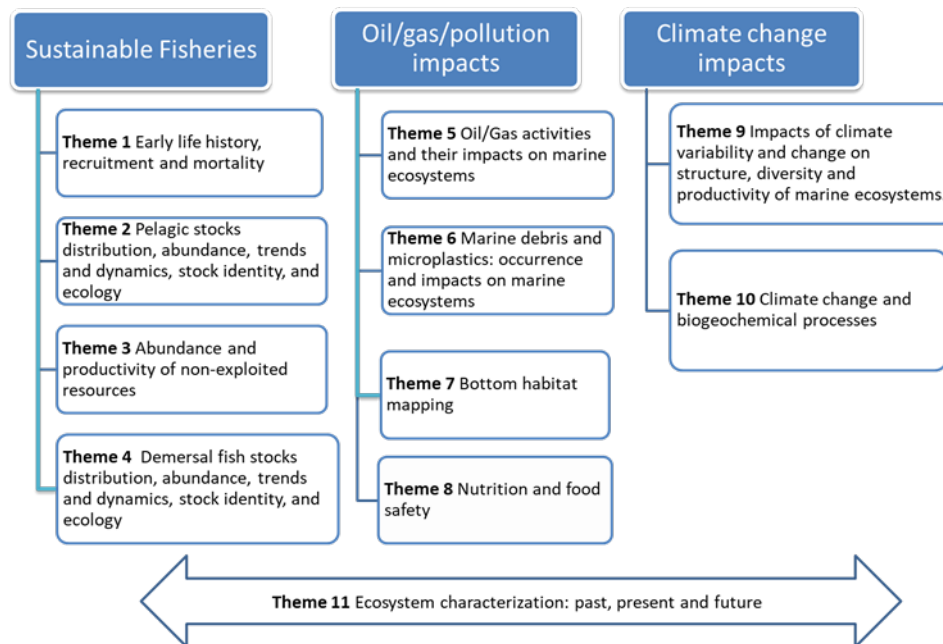


Figure 1. Research themes of the EAF-Nansen science plan

### 1.1 Survey objectives

The objectives of Leg 3.1 are listed below.

#### 1.1.1 Hydrography

- To map the hydrographic and environmental conditions in the survey area (temperature, salinity, dissolved oxygen, chlorophyll-*a*, nutrients, total alkalinity, pH and ocean currents).
- To obtain information on the dissolved oxygen concentrations, ocean acidification state, and calcium carbonate saturation horizon relevant for calcifying organisms.

#### 1.1.2 Primary productivity, zooplankton, and ichthyoplankton

- To describe the primary productivity and the abundance and biomass patterns of phytoplankton of the region.
- To describe the abundance and biomass patterns of zooplankton in the region.

- To provide information on the abundance patterns of ichthyoplakton community (fish eggs and larvae), at the lowest possible taxonomic level.
- 1.1.3 Demersal resources
- To collect information about distribution and abundance of demersal resources using the swept-area method.
  - To obtain biological parameters for priority species (length, weight, maturity).
  - Identification of spawning/nursery areas.
- 1.1.4 Pelagic resources
- To collect information about distribution and abundance of pelagic resources using the acoustic method and trawling for target identification.
  - To collect samples for genetic analysis (stock identification) of *Sardinella aurita* and *S. maderensis*, *Scomber colias*, *Trachurus trecae*
- 1.1.5 Marine debris and pollution
- To map the occurrence of microplastics.
  - To record the occurrence of marine debris in surface waters.
- 1.1.6 Top predators
- To register the occurrence of marine mammals and seabirds.
- 1.1.7 Seaweed (*Sargassum* spp.) observations and sampling
- To record the occurrence of floating seaweed aggregations (*Sargassum* sp.) and collect opportunistic samples for genetic studies.
- 1.1.8 Food safety and nutrition
- To collect samples for levels of environmental contaminants, nutrients, parasites and microorganisms with regards to food safety and pollution of selected species, with special regard to *S. aurita* and *S. maderensis*.
- 1.1.9 Jellyfish
- To collect samples of jellyfish for a) morphological identification and taxonomic studies, b) genetic studies for the purposes of confirming identity, determining population structure and establishing regional and global connectivity, c) histological examination of reproductive maturity to determine reproductive synchronicity and semelparity within populations and individuals; and d) stable isotope analysis to determine trophic position and role.

## 1.2 The survey area

The area surveyed in 2019 by the R/V *Dr Fridtjof Nansen* included the continental shelf and upper slope of West Africa from South Africa to Morocco. Furthermore, a dedicated survey to the Discovery sea mounts was carried out in collaboration with SEAFO and mesopelagic transects were repeated off Walvis Bay (Namibia) and Cap Bojador (Morocco) following the sampling strategy used in 2017. The overall survey programme foreseen for 2019 in the Western Gulf of Guinea and covering the areas of Ghana and Côte d'Ivoire (Leg 3.1) and of Liberia, Sierra Leone, Guinea and Guinea-Bissau (Leg 3.2) is shown in Figure 2.



Figure 2. R/V *Dr Fridtjof Nansen* survey programme 2019, Leg 3

## 1.3 Participation

A total of 29 researchers and technicians from Ghana, Côte d'Ivoire, South Africa, Namibia and Norway participated in the survey. The full list of the participants and their affiliations is provided in Table 1.

Table 1. List of participants and assigned roles on the vessel

PARTICIPANT	ROLE	AFFILIATION	PERIOD
NIKOLAOS NIKOLIOUDAKIS	Cruise leader	IMR	20.07–18.08
STAMATINA ISARI	Plankton Team Leader	IMR	20.07–18.08
LENE BUHL-MORTENSEN	Fish Team Leader	IMR	20.07–18.08
SARAH ANN BRUCK	Fish Team Leader	IMR	20.07–18.08
TOR MAGNE ENSRUD	Chemical oceanography	IMR	20.07–18.08
OLAF JOHAN SØRÅS	Chief Instruments Engineer	IMR	20.07–18.08
FREDRIK EUGEN OTTERLEI MADSEN	Instruments Engineer	IMR	20.07–18.08
HAWA BINT YAQUB	Co-cruise leader (Ghana)/Plankton	FC	20.07–18.08
EUNICE NUERKIE OFOLI ANUM	CTD/Chemical oceanography	FC	20.07–18.08
EBENEZER ADINORTE ADDI	Plankton lab	FC	20.07–18.08
EMMANUEL KWAME DOVLO	Fish lab	FC	20.07–18.08
EDWARD KPAKPO NELSON-COFIE	Fish lab	FC	20.07–18.08
ERNEST ANSONG	Fish lab	FC	20.07–18.08
EUGENIA AMADOR	Fish lab	UCC	20.07–18.08
JONES BORTIER TETTEH	CTD/Physical oceanography	FC	20.07–18.08
RICHARD STEPHEN ANSONG	Fish/Nutrition/Parasites	UG	20.07–18.08
THEOPHILUS NII ADO ANNAN	Fish/Nutrition/Parasites	FRI (CSIR)	20.07–18.08
TAPE JOANNY GNAHORE TOUSSAINT	Co-cruise leader (Côte d'Ivoire)/Fish	CRO	20.07–18.08

<b>PARTICIPANT</b>	<b>ROLE</b>	<b>AFFILIATION</b>	<b>PERIOD</b>
YAYA SORO	Fish lab	UNA	20.07–18.08
BONI JUSTE-GERAUD	CTD/Chemical oceanography	CIAPOL	20.07–18.08
BI SERI RAMSESS GOTTA	Fish lab	CRO	20.07–18.08
N'GUESSAN CONSTANCE DIAHA	Fish lab	CRO	20.07–18.08
ESTELLE SÉVÉRINE KONAN	Plankton lab	CRO	20.07–18.08
KONAN N'DA	Marine mammals/Seabirds	UNA	20.07–18.08
KOUAKOU URBAIN KOFFI	CTD/Physical oceanography	UFHB	20.07–18.08
AKE THEOPHILE BEDIA	Fish lab	UFHB	20.07–18.08
KOUAME MATHIAS KOFFI	Fish/Nutrition/Parasites	LCHAI	20.07–18.08
VERONICA KALEINASHO KAPULA	Plankton lab	UoN	20.07–18.08
PHANGOXOLO SISHUBA	Fish/Jellyfish	UWC	20.07–18.08

*List of institution abbreviations:* IMR - Institute of Marine Research, Norway, FC - Fisheries Commission, Ghana, UG - University of Ghana, Ghana, UCC - University of Cape Coast, Ghana, FRI - Food Research Institute (CSIR – Council for Scientific and Industrial Research), Ghana, UNA - University of Namibia, Namibia, UWC - University of Western Cape, South Africa, UNA - Université Nagui Abrougoua d'Abidjan, Côte d'Ivoire, CIAPOL - Centre Ivoirien d'Antipollution, Côte d'Ivoire, CRO - Centre De Recherche Océanologique, Côte d'Ivoire, LCHAI - Laboratoire Central pour l'Hygiène Alimentaire et l'Agro-Industrie, Côte d'Ivoire, UFHB - Université Félix Houphouët-Boigny, Côte d'Ivoire

## 1.4 Narrative

The vessel departed from Tema, Ghana, at 15h00 on the 20th of July 2019, and sampling commenced at the first extended hydrographic transect east of Tema on the same day at 19h00. After the end of this transect, the vessel proceeded to the border of Ghana and Togo, where the acoustic coverage for Leg 3.1 initiated. The coverage consisted of an acoustic sampling grid that had a transect spacing of approximately 15 NM, covering the shelf and slope until the 500 m bottom depth contour. In parallel with the pelagic coverage of Ghana and Côte d'Ivoire, the environmental transects and a second extended hydrographic transect at Cape Three Points, scheduled for the survey, were also covered. The vessel crossed the border of Ghana and Côte d'Ivoire on the 29th of July at 17h00 and finished the sampling for small pelagic resources on the 2nd of August at 19h00.

Following the reverse route, the vessel moved east, towards the border of Ghana with Togo, to carry out the coverage for demersal resources. After 6 days in Ivorian waters, the vessel returned to Ghanaian waters where the demersal resources were sampled until the 13th of August at 19h00. Having received a message regarding a vessel hijacking incident near the borders of Togo and Ghana just before the conclusion of that day's sampling effort, the vessel did not proceed further east for security reasons. Hence, on the remaining days of the survey, the sampling effort was focused on (a) obtaining some missing trawl hauls lost due to small gear problems during the demersal coverage of the central area of Ghanaian waters, (b) the collection of deep CTD stations to better capture the upwelling event, and (c) the depth stratified collection of ichthyoplankton samples around Cape Three Points. Sampling was concluded on 16th of August, and the vessel steamed to Abidjan arriving at 09h00 on 17th of August. Days spent in the territorial waters of each country surveyed and during each type of coverage are shown in Table 2. The weather was favourable, and no days were lost due to bad weather. In total, 3680 NM were sailed, with only 8h lost during the survey due to a problem in one of the vessel's electroengines.

Table 2. Survey dates for Ghana and Côte d’Ivoire covered by *Dr Fridtjof Nansen* in 2019

Survey area	Coverage	Days	Date Start	Date Completion
Ghana	Pelagic	10	20/07/2019	29/07/2019
Côte d’Ivoire	Pelagic	5	29/07/2019	02/08/2019
Côte d’Ivoire	Demersal	7	02/08/2019	08/08/2019
Ghana	Demersal	9	08/08/2019	16/08/2019
Total survey duration		28	20/07/2019	17/08/2019

## 1.5 Survey design and effort

The design of the standard survey and the sampling followed the agreed sailing order for Leg 3.1 and was based on past demersal and pelagic surveys of the R/V *Dr Fridtjof Nansen* in the area. Demersal trawling was carried out predominantly during the day on predetermined positions within predetermined depth strata along a systematic survey track consisting of pseudo-parallel transect lines perpendicular to the coastline, from 20 m to 800 m depth, equally spaced approximately 15 NM apart. Due to increased oil and gas activity and high density of coastal fishing boats and associated gear (nets), transects on which demersal trawling had been described in the sailing order for Côte d’Ivoire had to be adjusted. This resulted in sampling at trawl stations approximately 20 NM apart in Côte d’Ivoire, ensuring to the degree possible the trawl stations were the same as those used in previous surveys in the area. Due to the aforementioned activities (oil/gas platforms, fishing gear) and the disruption of the survey when moving towards the eastern part of Ghanaian waters some of the planned trawl stations had to be dropped, resulting to a reduced coverage of the Ghanaian EEZ by approximately 16% compared to previous surveys. Demersal trawling for biomass estimations was conducted only during daytime (approximately from 06h00 to 18h30, depending on longitude). Acoustic trawls for target identification were conducted using pelagic and bottom trawling with floats in areas of increased echo backscattering as determined from the echosounders.

Hydrographic variables were measured at every bottom trawl station and at transects perpendicular to the coastline at about every 60 NM where environmental stations were sampled. At these “environmental transects”, more elaborate sampling was carried out, including CTD with water samples at standard depths for chemical, nutrient analyses and phytoplankton, and for zooplankton, ichthyoplankton and microplastics sampling. Additionally, during every trawl a sediment sample was collected by means of steel pipes attached to the trawl. Depth stratified sampling of ichthyoplankton using the Multinet Mammoth sampling gear was also carried out at selected stations of special hydrographic interest around Cape Three Points. Table 3 summarises the survey effort in each region, and Table 4 by depth strata. The cruise tracks with bottom trawls, CTD stations and zooplankton/ichthyoplankton and microplastics stations can be found in Figures 3 to 6.

Table 3. Survey effort in number of sampling stations (total and by region). Number of BT-bottom trawl hauls, PT-pelagic trawl hauls, CTD casts, WP2-zooplankton nets, Bongo-nets for eggs and larvae, Manta-Trawl for plastic particles in the surface. The distance sailed in each country is also provided

Region	Distance sailed (NM)	CTD	WP2	Bongo	Manta	Multinet	BT	PT
Côte d'Ivoire	1 327	68	12	12	12		53	15
Ghana	2 353	152	34	34	34	7	58	17
Total	3 680	220	46	46	46	7	111	32

Table 4. Survey effort (trawl hauls by country and depth strata). BT=Bottom Trawl, PT=Pelagic Trawl

Region	Type	20-30 m	31-50 m	51-100 m	101-150 m	>150 m	Total
Côte d'Ivoire	BT	15	14	20	4		53
Côte d'Ivoire	PT		7	27		1	15
Ghana	BT	17	18	23			58
Ghana	PT	3	6	5	2	1	17
Total		35	45	55	6	2	143

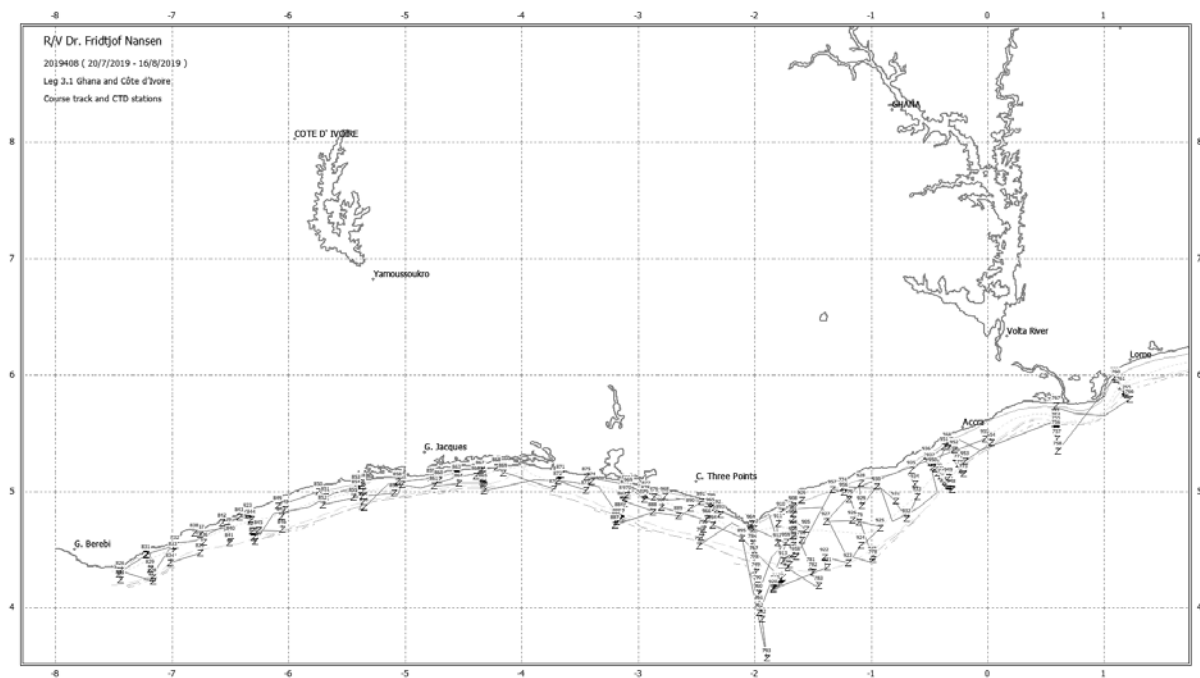


Figure 3. Cruise track with hydrographic stations. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m are indicated

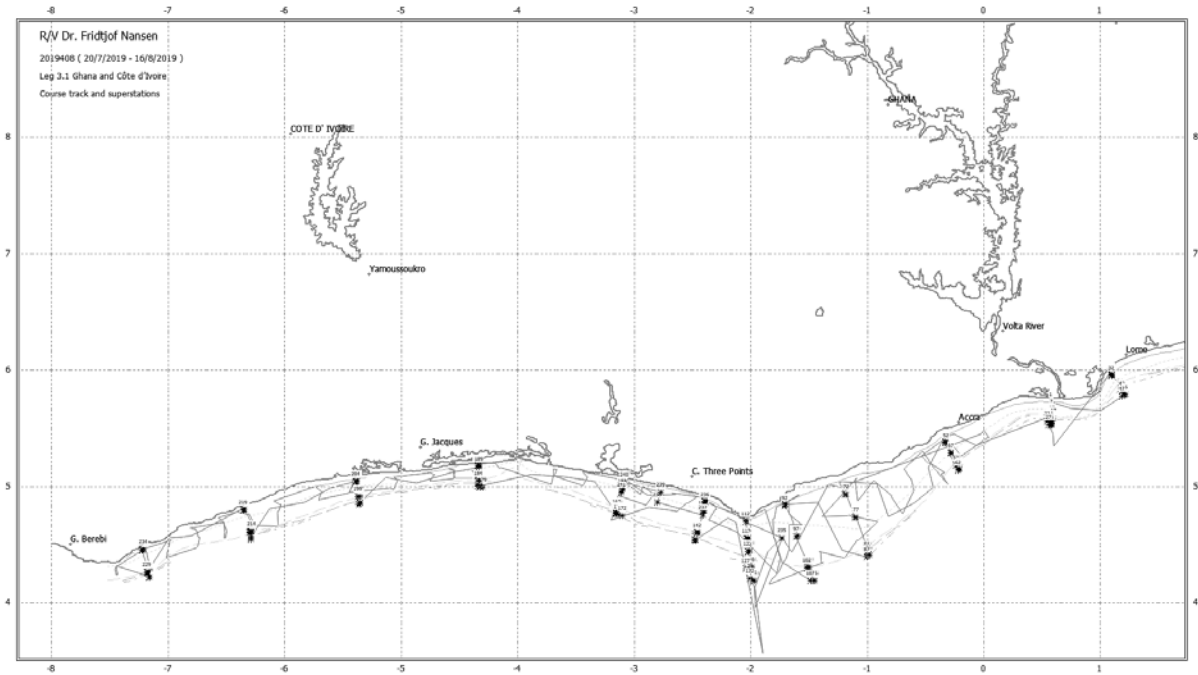


Figure 4. Cruise track with superstations on environmental transects and extra superstations collected. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m are indicated

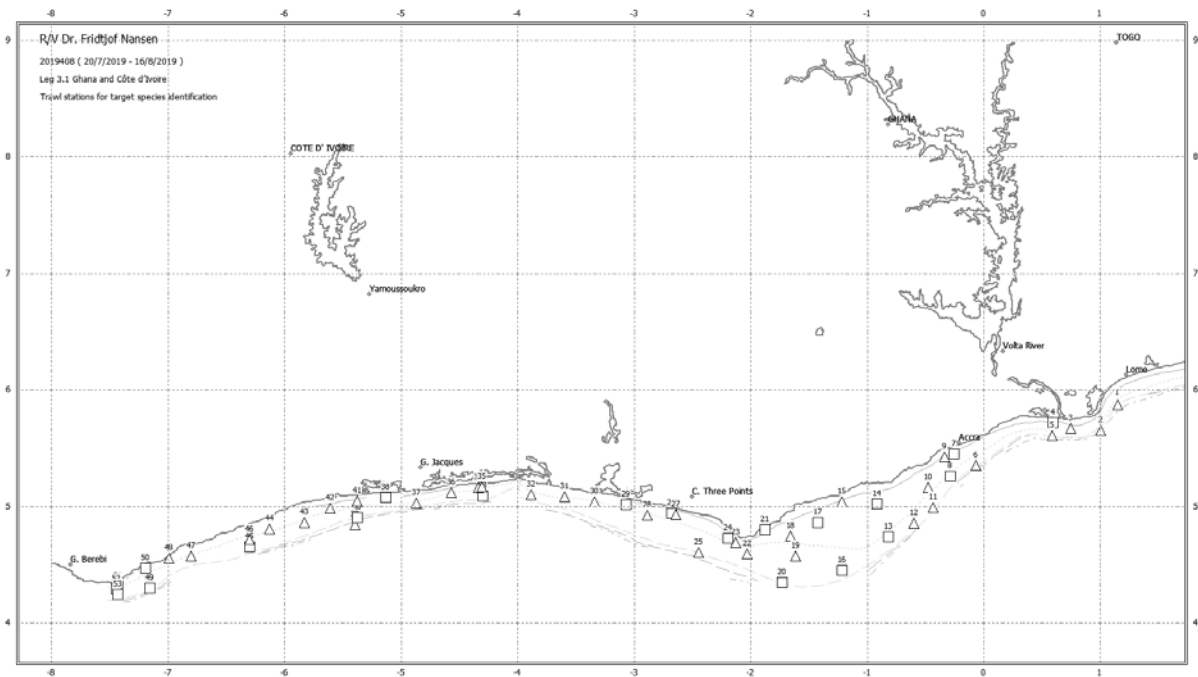


Figure 5. Course track with bottom - and pelagic trawl stations, during the pelagic coverage. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m are indicated



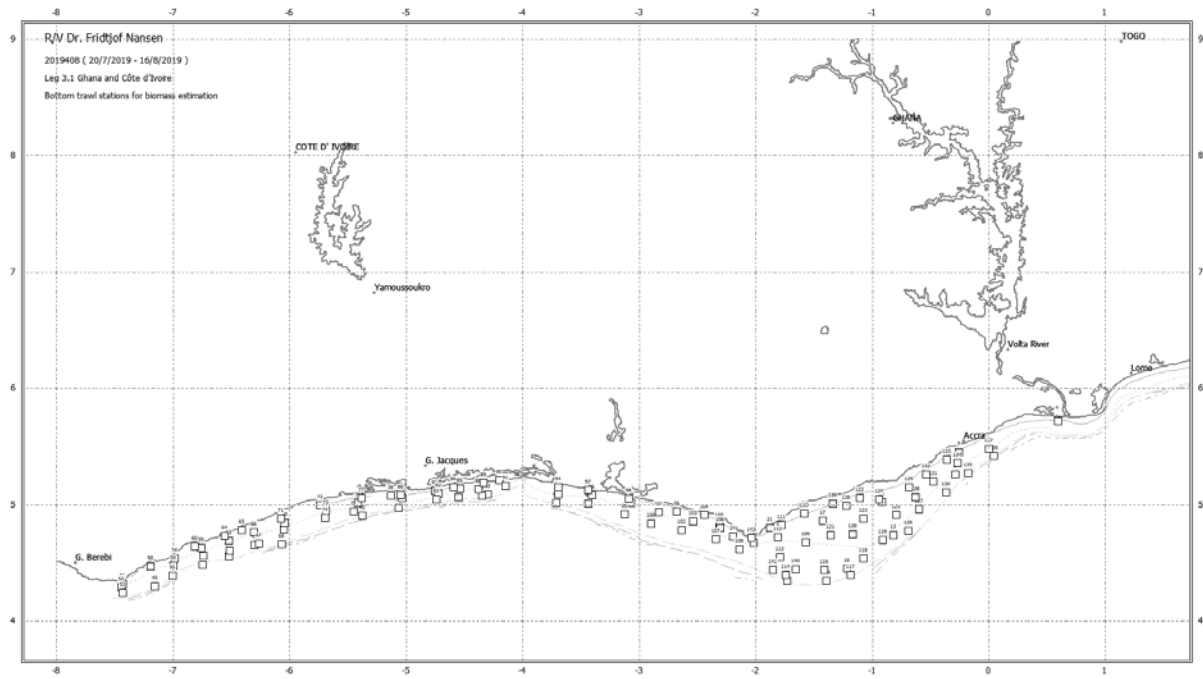


Figure 6. Course track with bottom trawl stations, during the demersal coverage. Depth contours at 20 m, 50 m, 100 m, 200 m, 500 m and 1 000 m are indicated

## **CHAPTER 2. METHODS**

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### **2.1 Underway sampling**

#### 2.1.1 Meteorological data recording

Meteorological data were logged continuously from the AANDERAA Smartguard meteorological station and included wind direction and speed, air pressure, relative humidity, air temperature and solar radiation. All data were logged to the Nansis tracklog system averaged every 60 seconds.

#### 2.1.2 Thermosalinograph

A Sea-Bird Electronics 21 SeaCAT Thermosalinograph ran continuously during the survey, obtaining samples at 4 meters depth to measure salinity and temperature every 10 seconds. A Sea-Bird WETStar Fluorometer was also attached in-line to measure sub-surface fluorescence levels.

#### 2.1.3 Current speed and direction measurements (ADCP)

The ship is equipped with two vessel-mounted Acoustic Doppler Current Profilers (VMADCP) from Teledyne RD Instruments mounted in the drop-keel with frequencies at 75 and 150 kHz.

#### 2.1.4 Bottom mapping echo sounder

The EM 710 multibeam echo sounder is a high-resolution seabed mapping system. The EM710 is mounted on the drop keel and the operational depths of the EM 710 are 3 m to 2 000 m. Across track coverage (swath width) is up to 5.5 times water depth and may be limited by the operator either in angle or in swath width without reducing the number of beams. The operating frequencies are between 70 to 100 kHz. There are 128 beams with dynamic focusing employed in the near field. The transmitting fan is divided into three sectors to maximize range capability and to suppress interference from multiples of strong bottom echoes. The sectors are transmitted sequentially within each ping and use distinct frequencies or waveforms. The along-track beam width is 1 degree. Ping rate is set according to depth. The receiving beam width is 2 degrees. Sound profiles were set manually in the system according to the area of operation. The EM710 was not operational for most of the survey. Data from the EM710 was logged to the on-board Olex plotting system and to raw data files.

### **2.2 Fixed stations**

A series of biological and oceanographic transects were sampled along every 4th acoustic transect (about 60 NM apart). These stations were referred to as “super-stations”. The standard Nansen sampling protocol requires super-stations to be sampled at the 30 m, 100 m and 500 m depths, where CTD casts (including water samples collection) and plankton sampling is carried out. A Sea-Bird 911plus CTD profiler [equipped with 2 x SBE 3Plus

Oceanographic Temperature sensors, 2 x SBE 4C Conductivity sensors, a Digiquartz Pressure ('P') sensor, a SBE 43 dissolved oxygen ('DO') sensor, a WET Labs ECO-AFL Fluorometer and a Satlantic Photosynthetically Active Radiation ('PAR') LOG ICSW sensor] was mounted to a 12-Niskin bottle rosette and used for every CTD deployment. All sensor logging and vertical profiling is performed using Sea-Bird Seasave software.

Depending on the width of the continental shelf additional CTD casts were taken at 20 m, 50 m, 75 m and 200 m bottom depths, or an extra super-station at 1 000 m depth was added. Apart from the standard environmental transects, a denser grid of stations was sampled around Cape Three Points, due to the increased hydrographic interest in this area during the upwelling period. Environmental transects around Cape Three Points were spaced 30 NM apart. In total, 12 environmental transects were sampled, with 46 "super-stations". A schematic overview of the sampling carried out is shown in Figure 7.

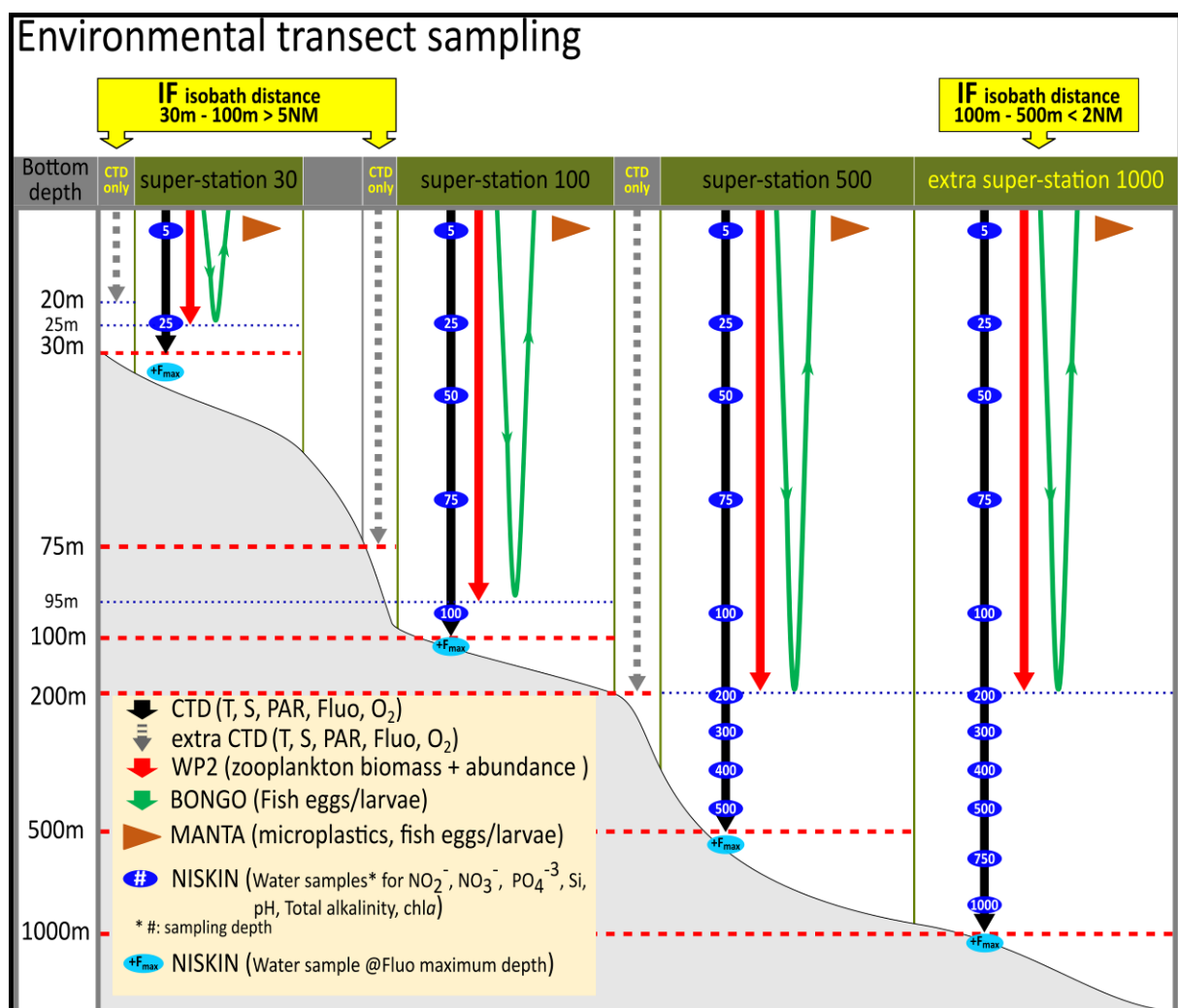


Figure 7. Sampling along environmental transects

In addition to the super-stations where water samples were taken, additional CTD stations without water samples were sampled between the "super-stations". Most of these were at trawl stations, but some were added to obtain reasonable horizontal resolution of the hydrographic parameters measured by the CTD.

At each super-station CTD deployment, Niskin bottles mounted on the rosette were fired and water was collected at predefined depths during the upcast to obtain vertical profiles of pH, total alkalinity, nutrients, as well as chlorophyll- $\alpha$  and dissolved O<sub>2</sub> for validation of the CTD sensors. The CTD stopped at each predefined depth for at least 20 seconds to allow the bottles to rinse with the surrounding water as it reached equilibrium to best represent the water composition at that depth. Standard depths are shown in Figure 7. Additionally, CTD stations without water samples were collected at all bottom trawl stations.

### 2.2.1 Ocean acidification parameters (pH and total alkalinity)

Water samples for pH and total alkalinity analysis were collected in the same 250 ml borosilicate glass bottle using silicone tubing. Since no preservative was used, it was necessary to keep the samples in the dark while waiting to stabilise at 25°C (with a water bath) for analysis. pH was determined using an Agilent Cary 8454 UV-Vis Diode Array spectrophotometer and a 2-mM m-cresol purple indicator dye solution. The indicator dye was measured every 24 hours during analysis to determine the correction factor appropriate for sample measurements (Clayton and Byrne, 1993; Chierici *et al.*, 1999). All pH spectrophotometric measurements were performed in duplicates on board. Total alkalinity was measured via an open-cell potentiometric titration using a 0.05M HCl solution with a sodium chloride background as the titrant (Dickson *et al.*, 2007). A Metrohm 888 Titrand equipped with an Aquatrode plus pH electrode with Pt1000 temperature sensor was used in combination with the Metrohm tiamo™ software to measure the change in pH and perform the total alkalinity titrations. Certified Reference Material of known total alkalinity from Scripps Institution of Oceanography was measured every 24 hours during analysis to determine the correction factor appropriate for sample measurements. All total alkalinity titrations were performed in triplicates on board.

### 2.2.2 Nutrient samples

Nutrient samples for nitrite, nitrate, phosphate and silicate determination were collected at standard depths at all environmental stations (Figure 7). The samples were preserved with 0.2 ml chloroform and kept refrigerated and dark (Hagebø and Rey, 1984) until sent to the Institute of Marine Research for analysis. Analyses will be performed using a Skalar San++ Continuous Flow Analyser while following standard procedures (Grasshoff *et al.*, 1999) and once complete, phosphate and silicate concentrations combined with the onboard measurements of pH and total alkalinity can be used to calculate the area's inorganic carbon components along with the aragonite saturation state to update the ocean acidification status of the region.

### 2.2.3 Primary productivity

Water samples for chlorophyll-a were collected in 1 000 ml polyethylene bottles and subsequently divided into two 260 ml bottles for duplicate analysis. These water samples were collected at super-stations at standard depths (Figure 7) from 200 m to the surface and filtered using a 0.7  $\mu$ m filtration system (Munktell glass-fibre filters Grade: MGF, vacuum 200 mm Hg). The filters were stored in a freezer until they were ready for extraction and

analysis with a Turner Designs 10AU Fluorometer, according to Welshmeyer (1994) and Jeffrey and Humphrey (1975). First measured without acid for chlorophyll-a determination and then a second time with two drops of 5% HCl for phaeopigment determination. The 10AU is calibrated approximately every three months with standards created from a chlorophyll-a solid (from spinach).

## 2.3 Plankton Sampling

Plankton sampling was conducted over a grid of 46 super-stations positioned in 12 transects running perpendicular to the coast (Figure 8). Eight transects comprising 34 stations (i.e. stations 751–805) covered the Ghanaian waters and four transects of a total of 12 stations (i.e. stations 808–830) covered Côte d'Ivoire. Stations were normally located over the isobaths of 30 m, 100 m and 500 m. In the eastern part of the surveyed area an extra station was usually sampled between the 30 m and 100 m isobaths to achieve better coverage over the extended continental shelf.



Figure 8. Superstation sampling grid in the surveyed area

Water samples for the analysis of phytoplankton community were collected at predefined depths at the super-stations from the Niskin bottles, with maximum depth of sample collection at 100 m. Samples were stored in 100 ml dark glass bottles and fixed in 2% neutral Lugol's solution. No qualitative phytoplankton samples (algae net) were collected during the survey.

Mesozooplankton samples were collected with vertical tows of a WP2 net (180  $\mu\text{m}$ ). Sample collection and processing followed the sailing orders of the survey. Specifically, the net was towed within 5 m from the bottom to the surface, or from 200 m depth to the surface at deep stations. Each sample was halved into parts with a Motoda splitter. One half was size fractionated through 2 000  $\mu\text{m}$ , 1 000  $\mu\text{m}$  and 180  $\mu\text{m}$  mesh sizes, and dried in the oven (60  $^{\circ}\text{C}$ ) in pre-weighed aluminum trays for biomass estimation. The second half was

preserved in 4% borax buffered formaldehyde solution for species identification and enumeration. Both phytoplankton and zooplankton samples were shipped to Fisheries Commission in Ghana for further laboratory analysis.

Ichthyoplankton was collected with double oblique tows of a Bongo (405  $\mu\text{m}$ ) within 5 m from the bottom or a maximum depth of 200 m to the surface at deep stations. In all cases, once the Bongo was on board the sample was treated as follows:

- a) The sample of the left net (V) was preserved directly in 4% borax buffered formaldehyde solution (especially made for ichthyoplankton). Samples were shipped to IMR (Bergen) for ichthyoplankton sorting and further identification.
- b) The other replicate net (Bongo H) preserved in 95% ethanol and was used for sorting larval fish onboard. Larval fish were sorted out from all Bongo H samples and for most of the samples, identification to family or lower taxonomic level was done onboard. Larval fish per family or taxonomic level were stored in small vials in ethanol to be used in future genetic analysis. Both sorted larvae and bulk samples were shipped to IMR, Bergen.

Depth stratified ichthyoplankton sampling was conducted at seven selected stations in Ghanaian waters (around Cape Three Points, Figure 9). A Mammoth Multinet equipped with two or three 405  $\mu\text{m}$  nets was towed within the surface 50 m depth at approximate strata 0–13 m, 13–25 m, 25–50 m). All larval fish were sorted from the multinet collections and were identified to the lowest possible taxonomic level. Larvae were preserved in 96% ethanol and kept in Eppendorf tubes that was shipped to IMR (Bergen) along with the sorted bulk samples.

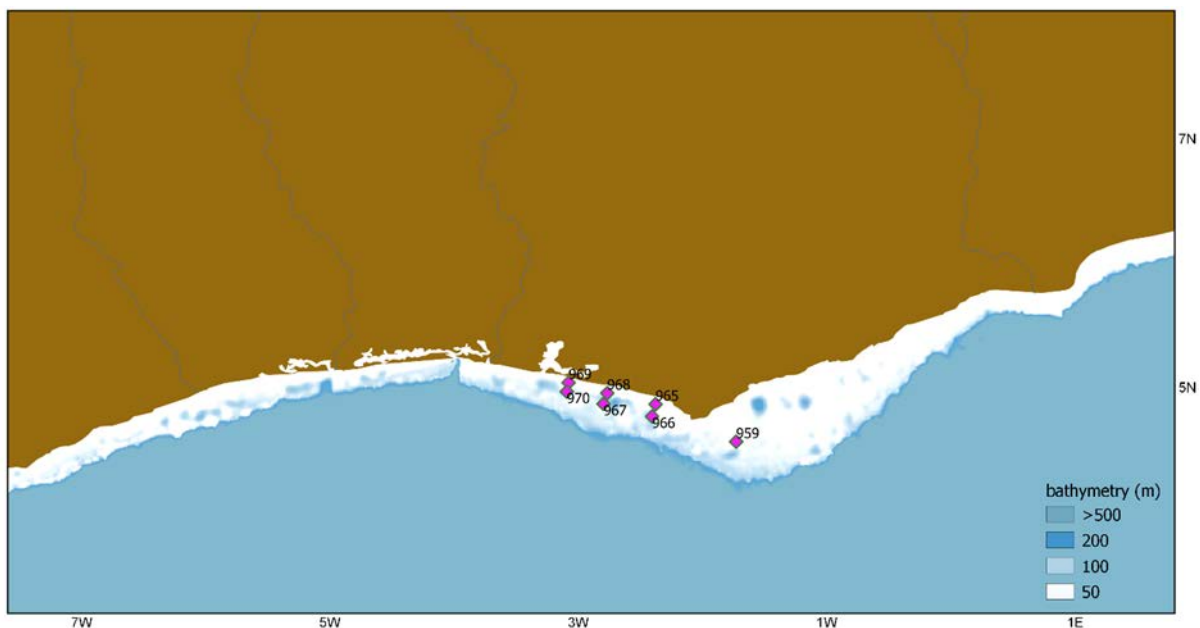


Figure 9. Stations where Mammoth multinet tows were conducted

Larval fish and eggs were also sorted from the samples collected by the Manta trawl. Sorting of ichthyoplankton and microplastics was done onboard for all Manta samples. Larval fish and eggs were sorted and kept in 95% ethanol. Larvae were identified at family or lower taxonomic level onboard. Microplastics were sorted by the Manta collections and were photographed, washed in fresh water, dried in aluminum trays, and individually packed in aluminum foil and stored frozen. Manta samples as well as aluminum trays with microplastics were shipped to IMR for further analysis.

## **2.4 Top Predator Observations**

Observations were carried out on all days during both the pelagic and demersal coverage of the surveyed area. Recordings were conducted from the observation platform of the vessel, situated 21.5 m above sea level, during daylight hours between 06h30 to 18h30 (with breaks). Marine mammal observations were the main objective with seabirds' observations of secondary importance.

Primary observations were carried out in "passing mode", meaning that the ship did not deviate from its track while sailing between oceanographic and fisheries sampling stations. The search effort changed from primary to secondary during such stations. Both marine mammal and seabird observations covered a forward angle of 180° from port to starboard.

The findings from this cruise will contribute to and improve the understanding of distribution patterns of these species in the region.

## **2.5 Seaweed (*Sargassum* spp.) observations and sampling**

During the survey, the marine mammals and seabirds observed kept records of floating *Sargassum* spp. aggregations on the same transects utilised for top predator recordings. Additionally, samples recovered from deployed gear (fish trawl or Manta trawl) were preserved for genetic and morphometric studies to study the species connectivity patterns.

## **2.6 Food safety and nutrition**

### **2.6.1 Background**

Consumption of fish is acknowledged as an important component of a balanced diet by providing several essential nutrients. Further, fish plays a central role in nutrition and food security as a significant source of high-quality proteins, long chain n3 fatty acids, several vitamins and minerals. The concentration of these nutrients varies in different fish species. Presently there is little data on the content of nutrients in most fish species captured around the world. In addition to knowledge of the contents of nutrients, there is a lack of data on the contents of contaminants such as heavy metals and persistent organic pollutants that can be present in different types of fish. Knowledge on the concentration of contaminants is of significance both to assess seafood safety and possible effects of environmental pollution.

The priority species in this part of the EAF-Nansen project are *Sardinella maderensis* (Maderian sardinella), *Sardinella aurita* (Round sardinella) and *Engraulis encrasicolus* (Anchovy).

## 2.6.2 Sampling methods and sample preparation

The composite sample of small fish (<25 cm) should contain at least 25 fish or 120 g wet sample material. Because of the small size of mesopelagic fish, some samples contain more than 25 fish in order to get 120 g. The weight and length of each fish was registered.

The composite sample of large fish (>25 cm) should contain five fish. The weight and length of each fish were registered before head, internal organs and tail were removed. Then the skin was removed, and the weight of the fillets was registered.

One to three parallel composite samples were collected of the same fish in one trawl. Then the fish was homogenised using a food processor and the wet sample of approximately 120 g was transferred into a salad tray and the weight was registered. All samples were then stored in the freezer (-20°C and -80°C) pending freeze drying.

Technical problems were experienced with the freeze-dryer machine that was out of order for several days.

After freeze drying all samples in 24 hours, the samples were weighed again for calculation of dry matter percentage, grinded and transferred to 50 ml tubes. The next step was vacuumation of 10–12 tubes in a bag and storage in the large freezer pending transportation to Norway and analysis of nutrients and contaminants at IMR.

Analysis of nutrients: Energy, water content, total fat, protein, ash, fatty acids, cholesterol, vitamins (D, A, B<sub>12</sub>), iodine, selenium and other minerals. Samples will be stored pending budget for analysis of amino acids and other vitamins.

Analysis of contaminants: Analyses of heavy metals will be carried out. Samples will be stored pending budget for analysis of inorganic arsenic, methyl mercury, PCB, dioxins, furans, PBDE, pesticides, and PAH.

## 2.7 Bottom Trawl sampling

### 2.7.1 Trawling strategy

Trawl stations were located along a systematic survey track with approximately parallel transects perpendicular to the coastline, from 20 m to 800 m depth, equally spaced approximately 15 NM apart. Along the transects, a stratified semi-random design was used with depth as the stratification factor. Trawls were carried out during daylight hours (06h30 to 18h30 UTC). In Ivorian waters the transects were placed 20NM apart as in past surveys.

Trawl duration was standardized to 30 minutes, and trawls with durations of more than 15 minutes were included in the estimates. The trawling start time is controlled by using a "SCANMAR" sensor to detect the landing of the trawl on the bottom, and the stop-time is defined as the time when the wires start to haul the net in. In some cases, the towing was interrupted before 30 minutes either due to poor bottom conditions or too high catches of fish indicated by the installed catch sensors. If the stations were not trusted to reflect the density of



fish on the bottom they were coded as invalid (code 9) in the Nansis database. During the demersal passage, one station was flagged as invalid (Station 105) due to no catch, while another (Station 88) was flagged for species identification only and as such excluded from the demersal biomass estimations.

A detailed description of instruments and fishing gear is given Annex I. The complete records of fishing stations and catches are shown in Annex II.

### 2.7.2 Biological sampling

All catches were sampled for composition by weight and numbers of each species caught in each trawl. Species identification followed FAO Species Identification Sheets for Fisheries Purposes, and Smith's Sea Fishes (Smith *et al.*, 1999) in addition to several online databases especially the Eschmeyer database (Fricke *et al.*, 2019), WoRMS database (WoRMS Ed. Board, 2018) and FishBase (Froese and Pauly, 2018). Invertebrates were identified using the Field Guide to Offshore Marine Invertebrates of South Africa (Atkinson and Sink, 2018). Individual length, weight, sex, maturity and stomach fullness was also registered for a list of priority taxa (Table 5). Due to limited time between trawls, *Penaeus notalis*, *Sepia hierredda*, *Cynoglossus* spp. and *Pentanemus quinquarius* were not treated as priority species and only total numbers and total catch were registered.

All biological data records were entered in the Nansis database and were quality controlled during the survey.

Table 5. Priority taxa for which biological sampling was carried out during the survey and additional type of sampling for selected species related with specific projects of the EAF-NANSEN Science Plan and/or partner needs (\*)

Priority taxa	Standard biological sampling	Genetics	Gonads
<i>Pagellus bellottii</i>	X		
<i>Dentex canariensis</i>	X		
<i>Dentex angolensis</i>	X	X	
<i>Epinephelus aenus</i>	X		
<i>Pseudolithus</i> spp.	X	X	
<i>Galeoides decadactylus</i>	X		
<i>Lutjanus</i> spp.	X		X
<i>Pomadasys</i> spp.	X		
<i>Trachurus trecae</i>	X	X	
<i>Sardinella aurita</i>	X	X	
<i>Sardinella madarensis</i>	X	X	
<i>Engraulis encrasicolus</i>	X		
<i>Scomber colias</i>	X	X	
<i>Brachydeuterus auritus</i>	X		
<i>Trichiurus lepturus</i> *			X

A flow diagram of the sampling procedures used in the fish lab is shown in Annex III, whereas the biological scales are indicated in Annex IV.

### 2.7.3 Sediment sampling

The two stainless steel cylinders (approx. 2 litres in volume) were mounted on the footrope of the trawl during this survey and the obtained sediment will be analysed for chemical composition and microplastics.

### 2.7.4 Benthic Epifauna

Benthic epifauna in the bottom trawls was identified to the lowest possible taxonomic level and information was stored in Nansis database.

### 2.7.5 Swept-area biomass calculations

An index of stock abundance was estimated by using the swept-area method multiplying the density of fish per haul with the area of a given depth stratum (Gunderson, 1993; Jakobsen *et al.*, 1997 and Pennington and Strømme, 1998).

The general formula to estimate biomass B, using this method is:

$$B = \frac{A}{a} \times \frac{\bar{X}}{q}$$

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

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

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

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

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

For conversion of catch rates (kg/h) to fish densities (t/NM<sup>2</sup>), the effective fishing area was considered as the product of the wing spread and the haul length, or distance trawled 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 m (traditionally applied wing spread for the “Nansen”

bottom trawl) times the distance trawled, raised to NM<sup>2</sup>/hour. In most hauls the trawling time (with the gear at the bottom) was around 30 min, which with a towing speed of 3.0 knots and an average horizontal trawl opening of 18.5 m efficient net width gives an area swept by the trawl net of typically around 0.015 NM<sup>2</sup>. Diagrams of the bottom trawl used are shown in Annex I.

The catchability coefficient (q), i.e. the fraction of the fish encountered by the 18.5 m horizontal opening of the trawl that was actually caught, was assumed equal to 1, which leads to an estimation of the biomass which allows for comparison with previous surveys. Catchability may vary depending on the type of gear used and the type of species (e.g. gears with bobbins are less efficient for species such as flat fishes and octopus, as compared to gears without bobbins and with footrope touching the bottom). For this reason, biomass estimates are to be considered indices of abundance and not absolute values.

Mean fish densities by species and strata were calculated by the traditional method used in previous surveys (Excel spreadsheets).

## **2.8 Jellyfish collection**

Jellyfish were sampled from the trawl hauls. When the total catch was considered too big, the catch (fish, jellyfish, etc.) was sub-sampled. Thereafter, all jellyfish specimens caught, or representative random samples thereof, were identified to the lowest possible taxon.

For every degree longitude, when available, at least five jellyfish samples were preserved for further analysis. A small section of the oral arm tissue was removed and preserved in 96% ethanol (EtOH) and stored at -20°C. The rest of the specimen was stored in formalin if in good condition.

## **2.9 Acoustic sampling**

### **2.9.1 Sonar data**

Sonars were only available after the end of the pelagic coverage, due to displaying malfunction. For this reason, sonars could not be used to facilitate school detection during the pelagic coverage of the survey.

### **2.9.2 Echosounder**

Acoustic data were recorded using a Simrad EK80 Scientific Split Beam Echo Sounder equipped with keel-mounted transducers at nominal operating frequencies of 18, 38, 70, 120, 200 and 333 kHz. A successful calibration of the echo sounders was conducted in Walvis Bay on 11–12 May 2019 and hence the echo sounder gains were adjusted at the start of this survey accordingly. In Annex I the details of the acoustic settings used during the survey are provided. Acoustic data were processed on board and backscatter was assigned for biomass estimation purposes to the groups listed in Table 6.

Acoustic data were logged and post-processed on board using the latest acoustic data post-processing software, the Large-Scale Survey System (LSSS) Version 2.7.

In cases where the integrated echo contained more than one category of fish (see Table 6), the mean  $s_A$ -value allocated to each category was in the same ratio as their contribution to the abundance in trawls in that area.

The following target strength (TS) function was applied to convert  $s_A$ -values (mean integrator value for a given species or group of species in a specified area) to number of fish:

$$TS = 20 \log L - 72 \text{ dB}$$

which can be converted (see Toresen *et al.*, 1998 for details) to the area form (scattering cross sections of acoustic targets):

$$C_{Fi} = 1.26 \cdot 10^6 L^{-2}$$

where  $L$  is total length in 1 cm length group  $i$  and  $C_{Fi}$  ( $m^{-2}$ ) is the reciprocal back scattering strength, or so-called fish conversion function. In order to split and convert the allocated  $s_A$ -values ( $m^2/NM^2$ ) to fish densities (numbers per length group per  $NM^2$ ), the following formula was used:

$$\rho_i = s_A \cdot \frac{p_i}{\sum_{i=1}^n \frac{p_i}{C_{Fi}}}$$

where,

$\rho_i$  = density of fish in length group  $i$

$s_A$  = mean integrator value

$p_i$  = proportion of fish in length group  $i$

$\sum_{i=1}^n \frac{p_i}{C_{Fi}}$  = the relative back scattering cross section ( $m^2$ ) of the length frequency sample of the target species, and

$C_{fi}$  = reciprocal back scattering cross section ( $\sigma_{bs}^{-1}$ ) of a fish in length group  $i$ .

The integrator outputs were split into the fish groups listed below using a combination of behaviour pattern as deduced from echo diagrams, the LSSS analysis and catch composition.

The acoustic backscatter was scrutinized daily and allocated to the various target groups. The  $sV$  threshold used when sardinellas occurred to filter out other species and plankton was -45 dB, or in regions where the plankton layer was extremely dense and even lower threshold had to be used. For Pelagic I, Pelagic II and “other pelagic species” -50 dB was used. To identify mesopelagic layers a threshold of -60 dB was used.

The above equations show that the conversion from  $s_A$ -values to number of fish is dependent on the length composition of the fish. It was therefore important to get representative length

distributions from the key species groups in the whole distribution area. When the size classes (of e.g. young fish and older fish) were well mixed, the various length distributions were pooled together with equal importance. Otherwise, when the size classes were segregated, the total distribution area was post-stratified, according to length distributions, and separate estimates were made for the strata containing fish with equal size.

Table 6. Allocation of acoustic densities to species groups considering the species caught in the trawls in the study area

Group	Family	Taxon
Sardinellas	Clupeidae	<i>Sardinella aurita</i>
		<i>Sardinella maderensis</i>
Anchovy	Engraulidae	<i>Engraulis encrasicolus</i>
Pelagic species I	Pristigasteridae	<i>Ilisha africana</i>
Pelagic species II	Scombridae	<i>Auxis</i> sp.
		<i>Scomber colias</i>
		<i>Sarda sarda</i>
		<i>Scomberomorus tritor</i>
	Carangidae	<i>Trachurus trecae</i>
		<i>Chloroscombrus chrysurus</i>
		<i>Caranx</i> sp.
		<i>Selene dorsalis</i>
	Trichiuridae	<i>Trichiurus lepturus</i>
	Other pelagic species, incl:	Haemulidae
Scombridae		<i>Sphyraena</i> sp.
Carangidae		<i>Selar crumenophthalmus</i>
Demersal species, incl:	Ariommatidae	<i>Ariomma bondi</i>
	Serranidae	<i>Epinephelus</i> sp.
	Polynemidae	<i>Galeoides decadactylus</i>
	Sparidae	<i>Pagellus</i> sp.
		<i>Pagrus</i> sp.
		<i>Dentex</i> sp.
	Priacanthidae	<i>Priacanthus arenatus</i>
Mullidae	<i>Pseudupeneus</i> sp.	
Mesopelagic		Myctophidae and other mesopelagic fish
Plankton		Calanoida, Euphausiidae and other plankton

During the survey, allocation of acoustic backscatter was done using the groups shown in Table 6. However, results are presented only for the groups of Sardinellas, anchovy and Pelagic species II, where there is higher confidence in the allocation of acoustic backscatter.

For a stratum representing the distribution of a target group, the following basic data are needed for the estimation of abundance:

- 1) The average  $s_A$ -value for the stratum,
- 2) The surface area (usually square nautical miles,  $NM^2$ ), and
- 3) A representative length distribution of the fish in the stratum.

If the targeted fish was a mixture of more than one species, for example sardinellas, representative distributions of all the species, within the stratum, as shown in the trawl catches, was used. Length distributions representing the various species for each catch was

calculated and normalized to a unit number (usually 100). These were then averaged without weighting. Very small catches (normally less than about 20 fish) were not included. The total catch of each species from all the trawls in a stratum was used as a proxy for estimating the proportion of the total biomass of each species present. While it is recognised that catch is a poor indicator of relative abundance, especially for pelagic fish, no other method is easily available from the data available.

The process followed was therefore to

- a) allocate the  $s_A$ -value to groups of fish and/or species,
- b) produce pooled length distributions of a target species/category for use in the above equation, and
- c) estimate the fish biomass for the given stratum,

using the following procedure:

- The length-frequency samples of the species in the category were respectively pooled together with equal importance (normalized).
- The mean back scattering strength ( $\rho/s_A$ ) of each length frequency distribution of the target group/ species was calculated and summed. This was automatically done in the Excel spreadsheet made available for acoustic abundance estimation on board R/V *Dr Fridtjof Nansen*.
- The pooled length distribution was used, together with the mean  $s_A$ -value, to calculate the density (numbers per square NM) by length groups and species, using the above formula. The total number by length group in the area was obtained by multiplying each number by the area. The numbers were then converted to biomass using the estimated weight at length.

## CHAPTER 3. RESULTS

### 3.1 Underway sampling

#### 3.1.1 Meteorological data

The wind channels (wind speed and wind direction) experienced 668 invalid data sections, approximately 26% of them being longer than 10 minutes. The maximum gap, 2 hours and 14 minutes, occurred on July 28, initiating approximately at 02:30 UCT. A map of the prevailing wind conditions during the survey is shown in Figure 10, with wind vectors averaged over 3h intervals. Overall, the survey was carried out in quite calm weather conditions.

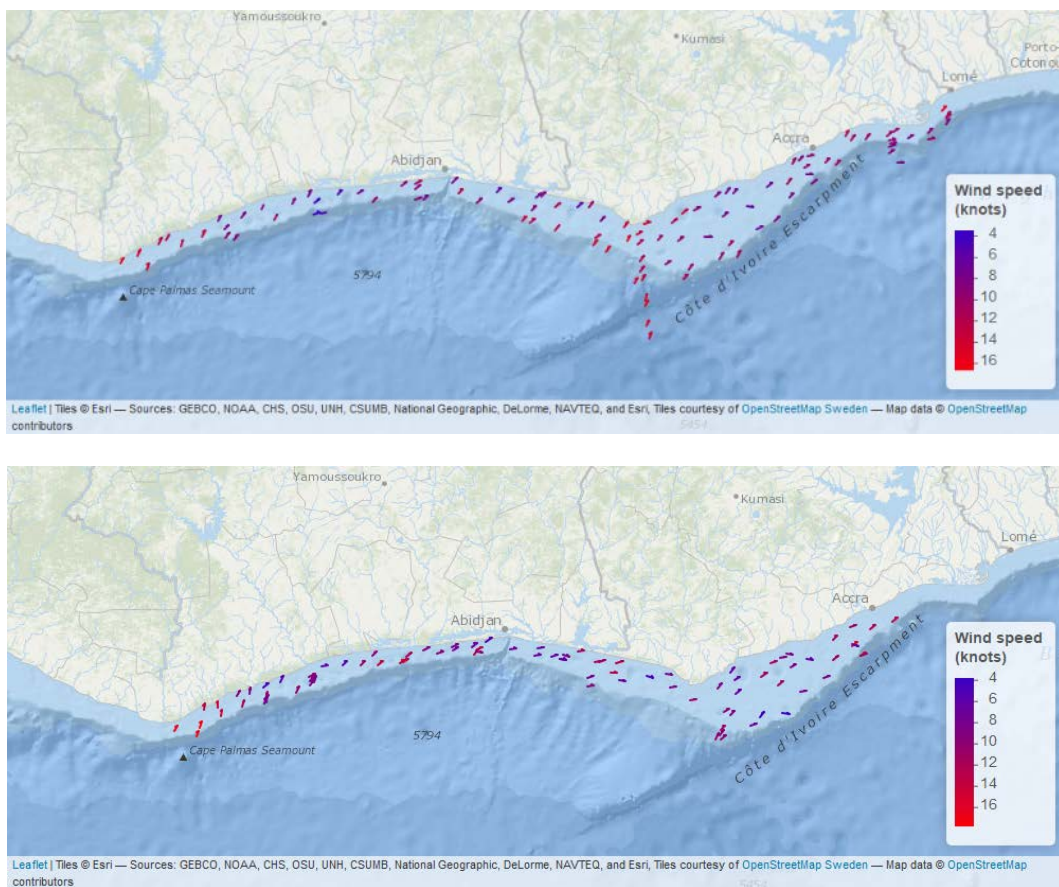


Figure 10. Wind speed and direction during the survey. Pelagic coverage (20/7-2/8) (A) and (B) demersal coverage (2-15/8)

#### 3.1.2 Thermosalinograph

Due to lack of a dedicated physical oceanographer onboard, thermosalinograph data have been collected but not properly scrutinized for incorrect values. A brief examination of the data revealed that there were extended periods of time during the survey where the fluorescence sensor provided unreliable data. These data will need to be excluded from any future analysis. Thermosalinograph temperature and salinity data, excluding some obvious

spikes, did not exhibit any striking abnormal patterns. Sea surface temperature, as measured from the drop keel intake thermosalinograph ranged from approximately 21°C to 27°C during the survey period, while salinity ranged from approximately 31 PSU to 36 PSU, the lower values of which were associated with the westernmost area of the survey.

### 3.1.3 Current speed and direction measurements

Due to complete failure of the 75 kHz ADCP in a previous survey, the 150 kHz ADCP was run in narrowband mode with 8 m vertical bins to a maximum 500 m depth. The heading data to convert the current recorded in the ship-referenced coordinates to the absolute zonal and meridional components were obtained from the vessel's differential GPS system, Seapath.

Most of the cruise was conducted in waters shallower than the maximum depth observable with the 150 kHz ADCP. Thus, the failure of the 75 kHz ADCP did not impact the ADCP data seriously. It was only at the deepest offshore end of the transects that we did not have coverage down to the bottom and the vertical resolution close to the surface was somewhat reduced. Due to lack of a dedicated physical oceanographer onboard, current data were not analysed during the survey but are available for future examination and processing.

### 3.1.4 Bottom mapping echo sounder

The recorded bottom depth information was logged in the onboard navigation planning system and is available upon request.

## 3.2 Fixed stations

Locations of all the CTD deployments carried out during the survey are shown in Figure 11, with transects where water samples and additional sampling for plankton and microplastics occurred highlighted. Results of sensor calibrations of the hydrography sensors for water chemistry quality assurance are provided in Annex V. Figure 12 shows the CTD stations during the pelagic coverage of the survey, while Figure 14 shows the CTD stations during the demersal coverage.



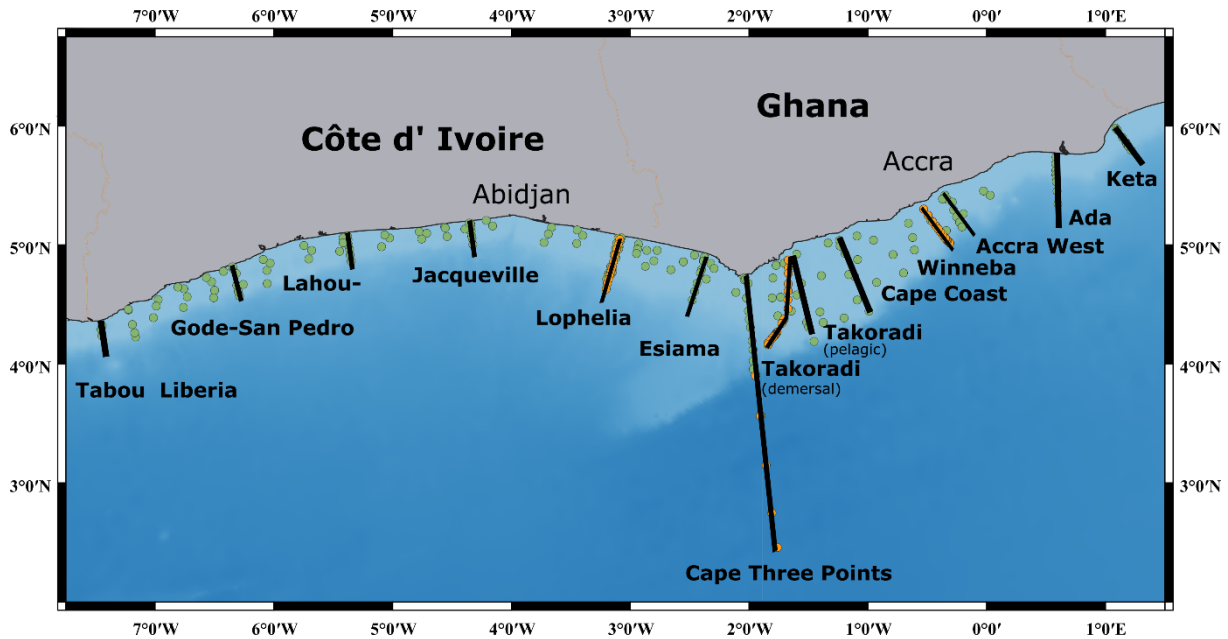


Figure 11. Overview of the CTD stations sampled in Ghana and Côte d'Ivoire during Leg 3.1. In addition, the environmental transects with superstations every 60 NM are shown, as well as the two extra environmental transects east and west of the Cape Three Points transect

### 3.2.1 Temperature, Salinity, Fluorescence and Dissolved Oxygen

#### 3.2.1.1 Horizontal distribution

The distribution of sea surface temperature, salinity, fluorescence and oxygen in the area during the pelagic coverage of the survey (20/7/2019–2/8/2019) is shown in Figure 12, whereas the same variables at the last bottom depth sampled at each CTD station are plotted for the same period in Figure 13.

During the pelagic coverage temperatures at 5 m ranged from 26.7°C (station 0793 - the outermost station on the Cape Three Points transect) to 19.2°C (station 0819 - nearshore western part of Côte d'Ivoire). Oxygen at 5 m ranged between 6.07 ml/l (station 0779 outside Takoradi) and 3.46 ml/l (station 0822 nearshore in the western part of Côte d'Ivoire). Both stations were sampled late in the afternoon. Oxygen minimum was found to be 1.083 ml/l at station 0783 at 300 m depth.

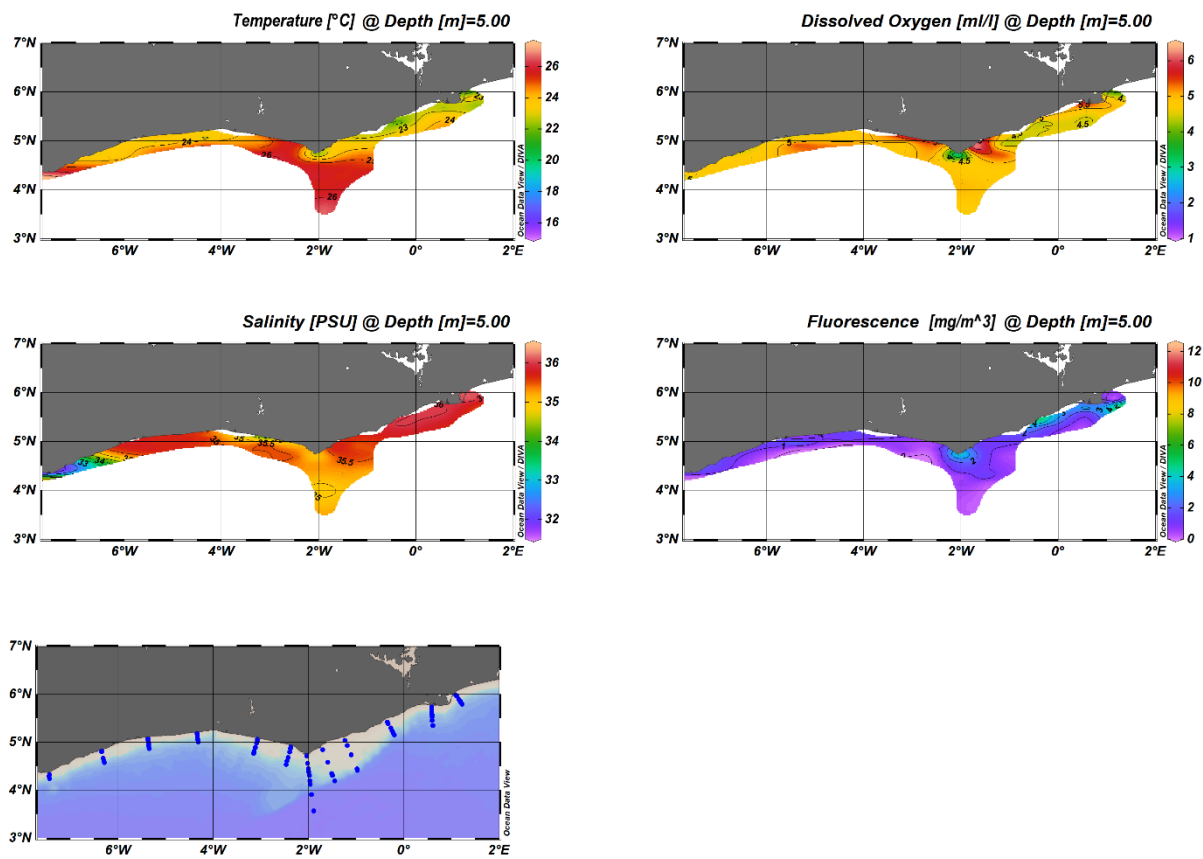


Figure 12. Horizontal distribution maps of the oceanographic parameters measured at 5 m depth at each CTD deployment during the pelagic coverage of the survey (20/7/2019–2/8/2019). CTD stations are shown as blue dots in the bottom left map of the survey area

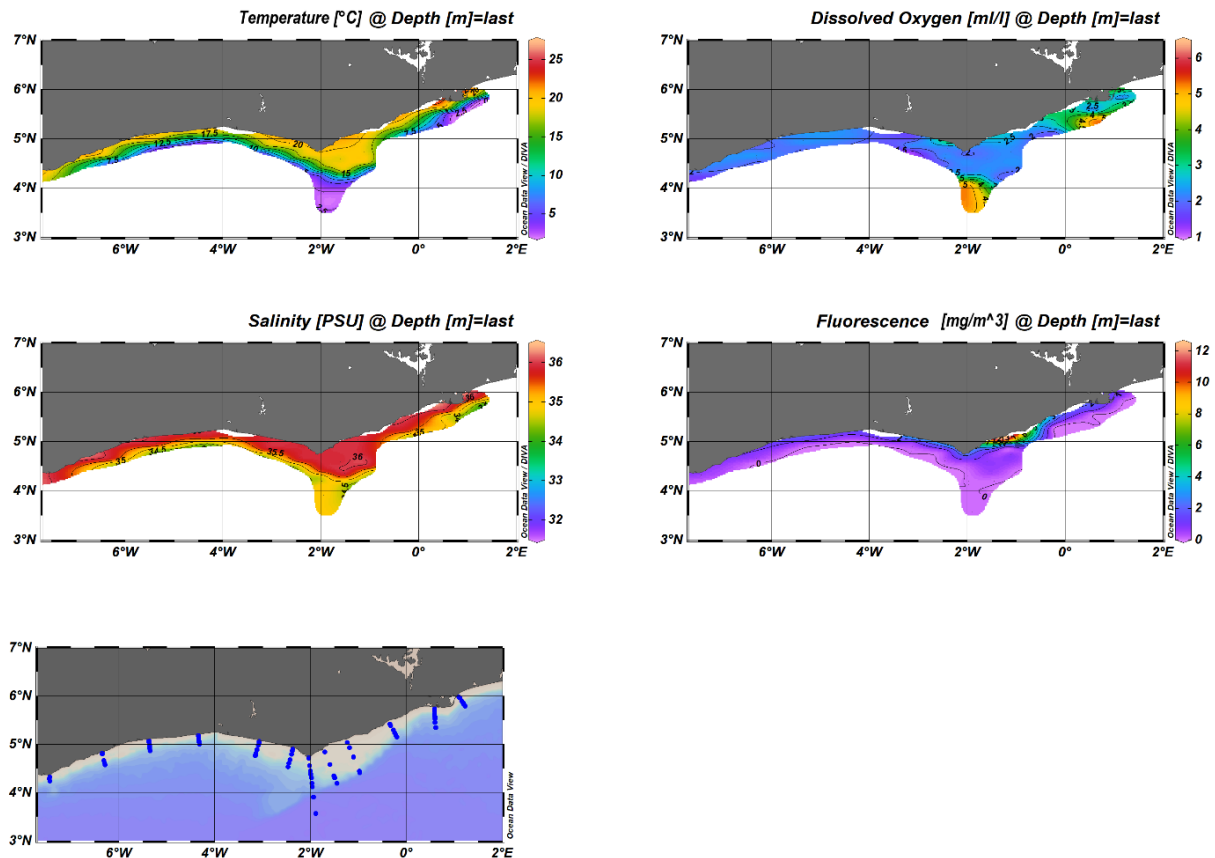


Figure 13. Horizontal distribution maps of the oceanographic parameters measured at the deepest sampled point at each CTD deployment during the pelagic coverage of the survey (20/7/2019–2/8/2019). CTD stations are shown as blue dots in the bottom left map of the survey area

Respectively, the distribution of sea surface temperature, salinity, fluorescence and oxygen in the area during the demersal coverage of the survey (2/8/2019–15/8/2019) is shown in Figure 14, whereas the same variables at the last bottom depth sampled at each CTD station are plotted for the same period in Figure 13.

During the demersal coverage temperatures at 5 m ranged from 26.1°C (station 0827 - nearshore in the western part of Côte d'Ivoire) to 20.9°C (station 0909 - nearshore in the Takoradi area). Oxygen at 5 m ranged between 5.51 ml/l (station 0937 - outside Winneba) and 2.13 ml/l (station 0848 - nearshore in the western part of Côte d'Ivoire). Oxygen minimum was found to be 1.06 ml/l at station 0947 at 300 m depth.

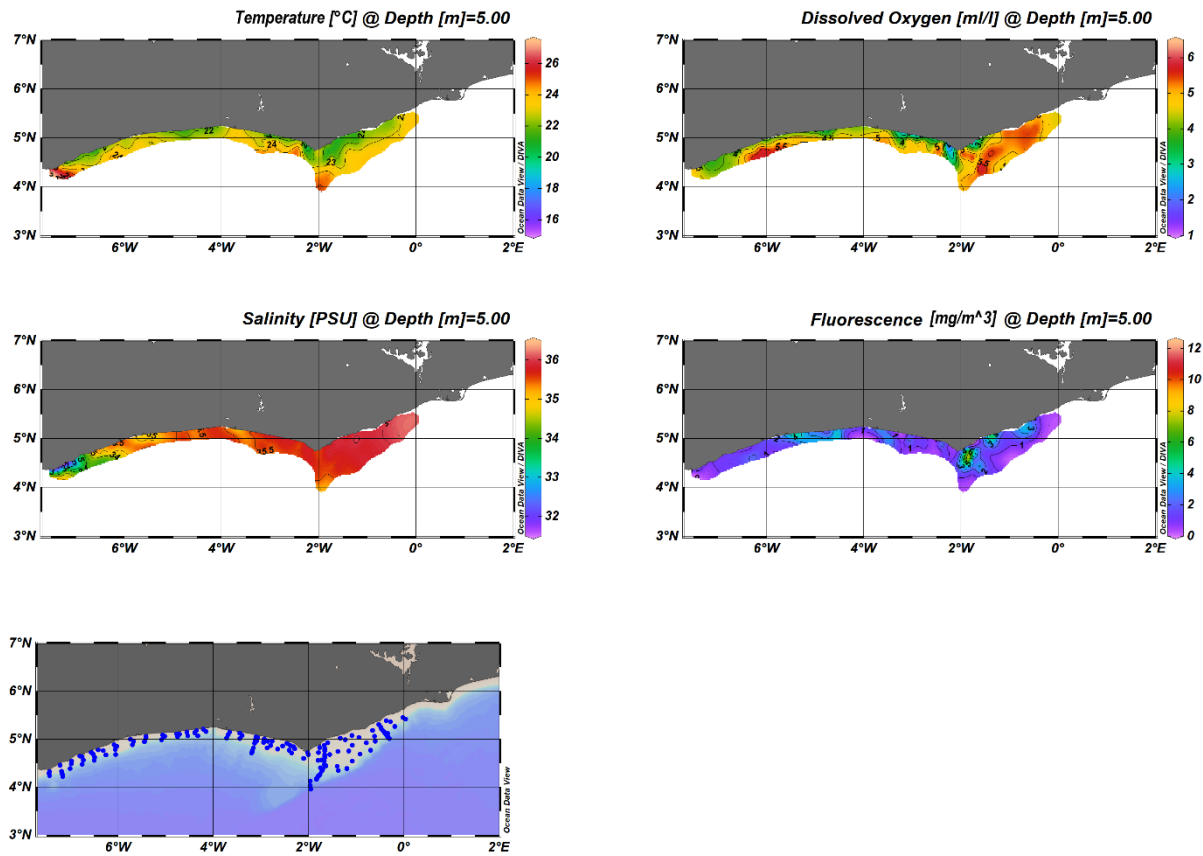


Figure 14. Horizontal distribution maps of the oceanographic parameters measured at 5 m depth at each CTD deployment during the demersal coverage of the survey (2/8/2019–15/8/2019). CTD stations are shown as blue dots in the bottom left map of the survey area

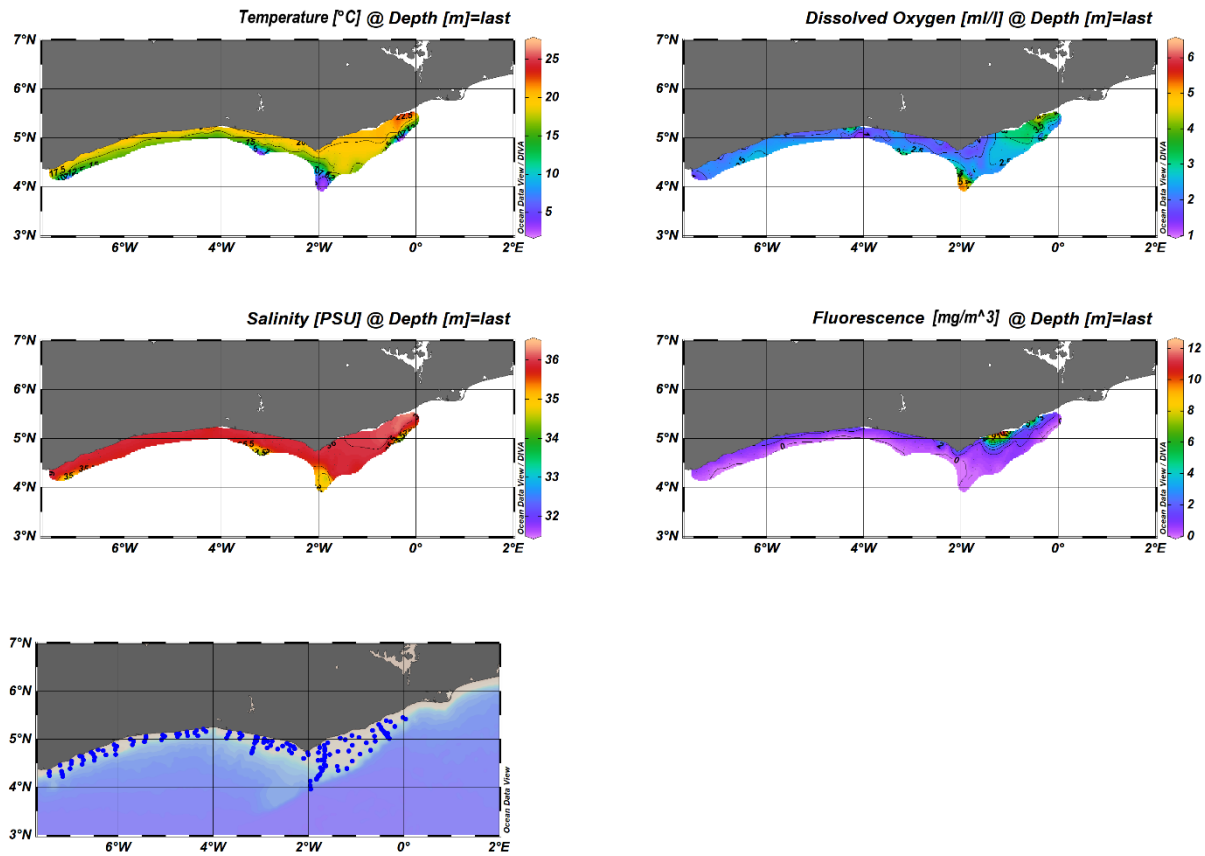


Figure 15. Horizontal distribution maps of the oceanographic parameters measured at the deepest sampled point at each CTD deployment during the demersal coverage of the survey (2/8/2019-15/8/2019). CTD stations are shown as blue dots in the bottom left map of the survey area

### 3.2.1.2 Vertical distribution at oceanographic transects

The vertical distribution of sea temperature, salinity, fluorescence and oxygen in the five oceanographic transects sampled with a denser network of CTD stations during the survey are shown in Figures 16 to 20.

#### Winneba

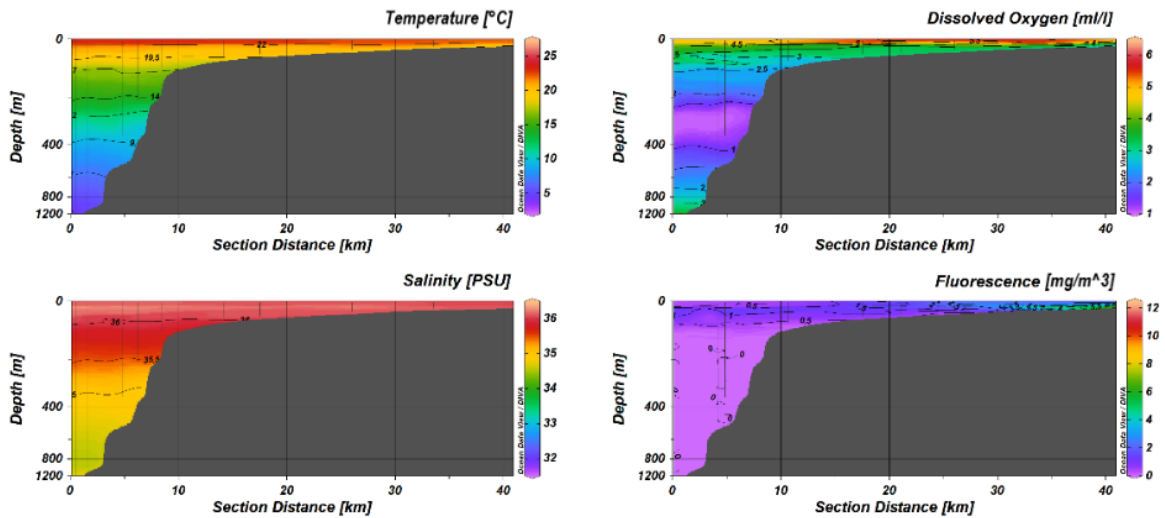


Figure 16. Vertical distribution of the oceanographic parameters measured at the Winneba section

#### Tema

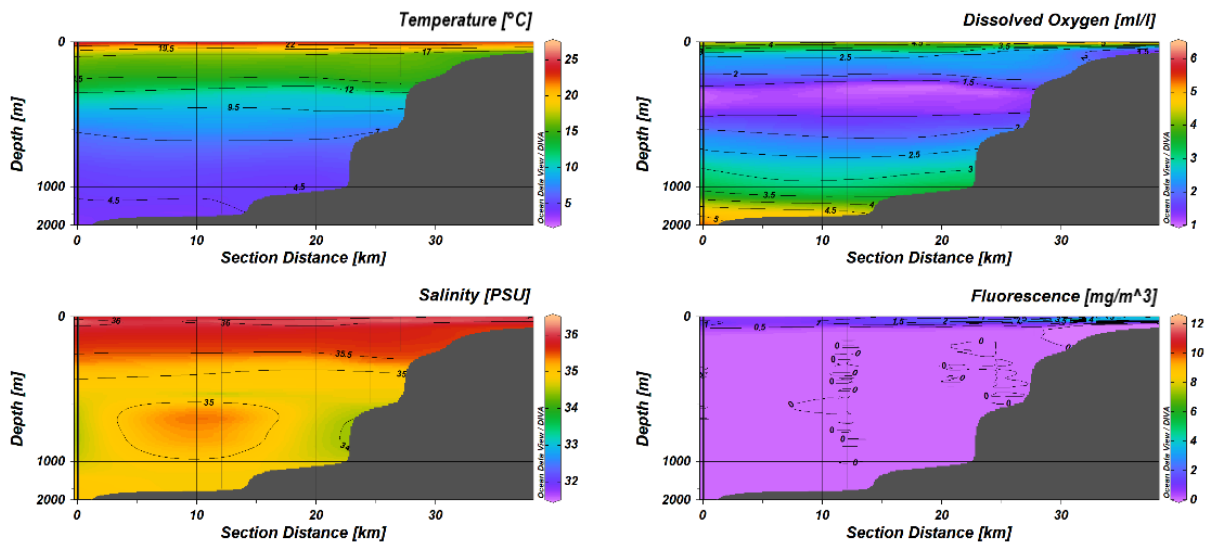


Figure 17. Vertical distribution of the oceanographic parameters measured at the Tema section

Takoradi

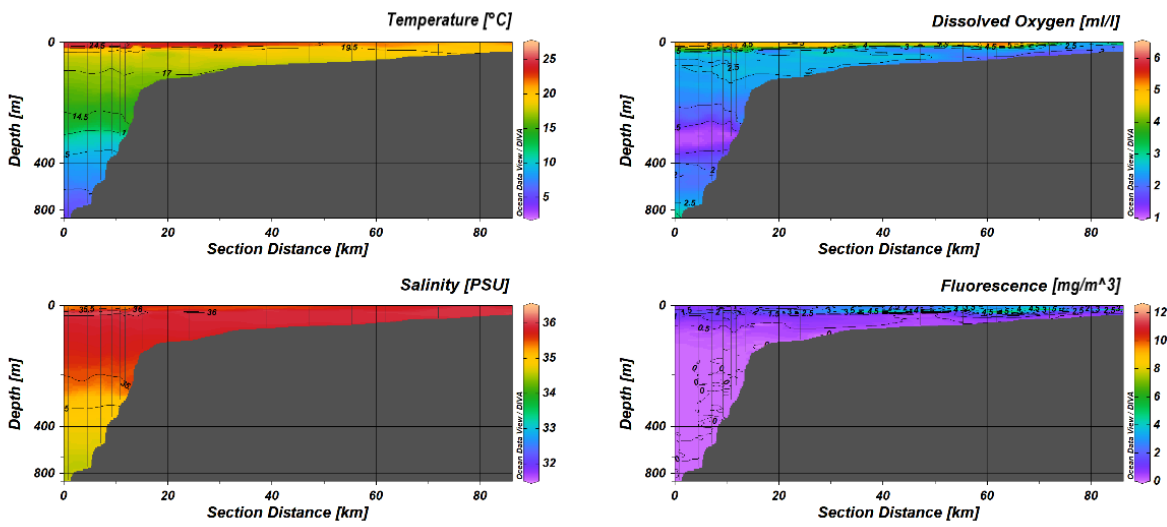


Figure 18. Vertical distribution of the oceanographic parameters measured at the Takoradi section

Cape Three Points

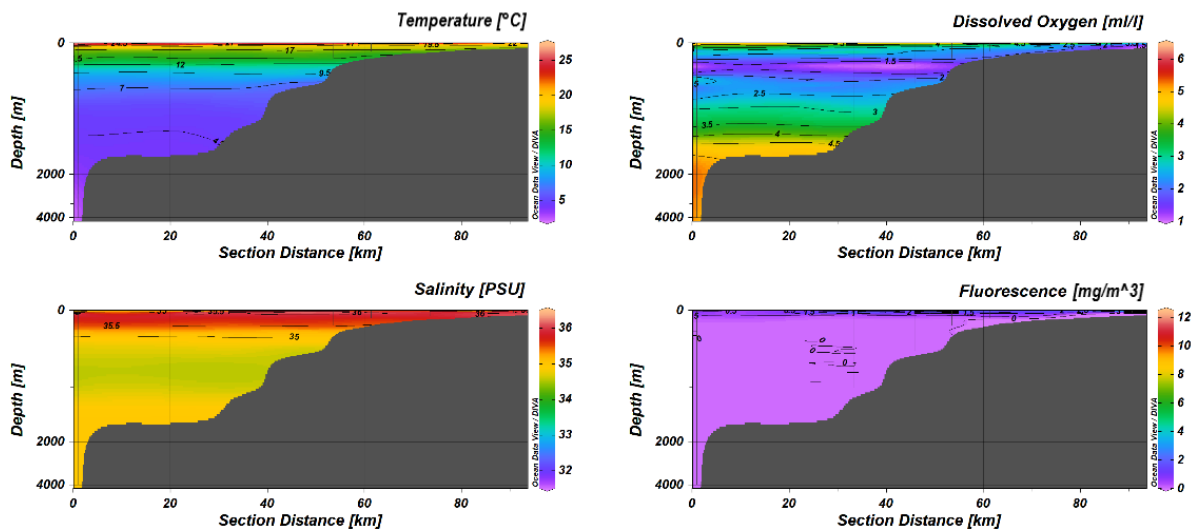


Figure 19. Vertical distribution of the oceanographic parameters measured at the Cape Three Points section

## Lophelia

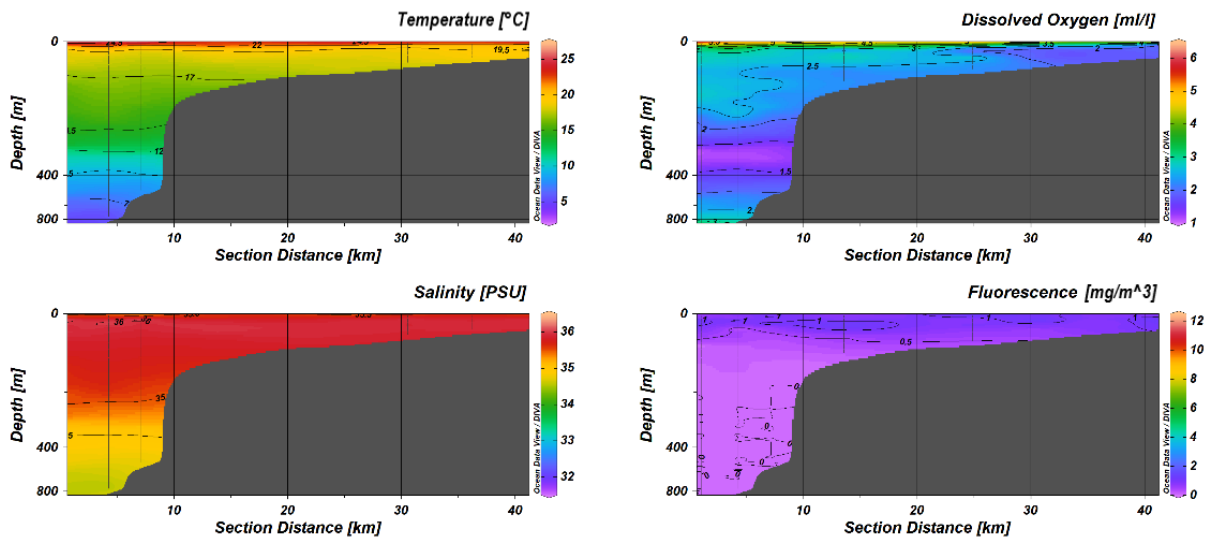


Figure 20. Vertical distribution of the oceanographic parameters measured at the Lophelia section

### 3.2.2 Ocean acidification parameters (pH and total alkalinity)

#### 3.2.2.1 Horizontal distribution

The distribution of pH and alkalinity in the area during the pelagic coverage of the survey (20/7/2019–2/8/2019) is shown in Figure 21, whereas the same variables at the last bottom depth sampled at each CTD station are plotted for the same period in Figure 22.

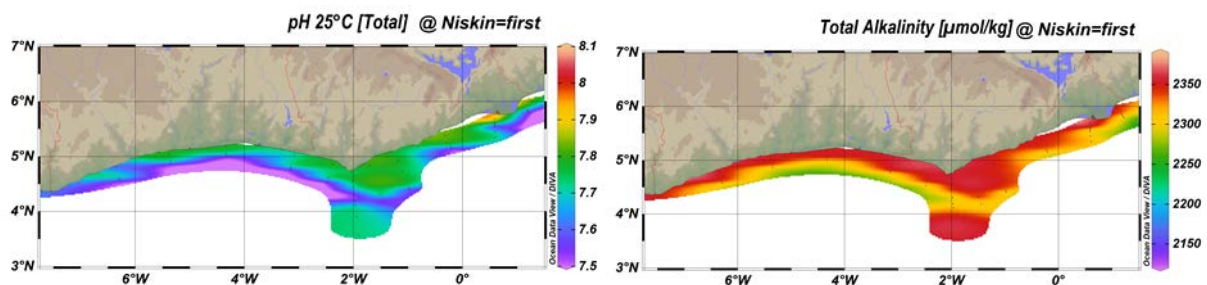


Figure 21. Horizontal distribution maps of the pH (left) and alkalinity (right) measured at 5 m depth at each CTD deployment during the pelagic coverage of the survey (20/7/2019–2/8/2019). CTD stations are shown as blue dots



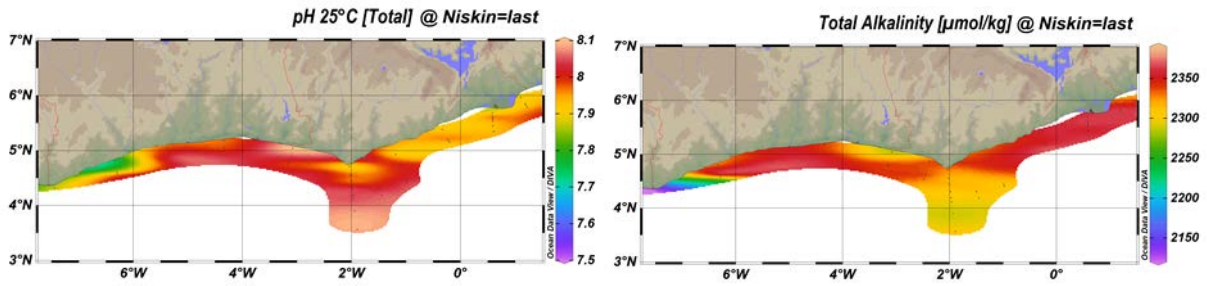


Figure 22. Horizontal distribution maps of the pH (left) and alkalinity (right) measured at the deepest sampled point at each CTD deployment during the demersal coverage of the survey (20/7/2019-2/8/2019). CTD stations are shown as blue dots

The distribution of pH and alkalinity in the area during the demersal coverage of the survey (2/8/2019–15/8/2019) is shown in Figure 23, whereas the same variables at the last bottom depth sampled at each CTD station are plotted for the same period in Figure 24.

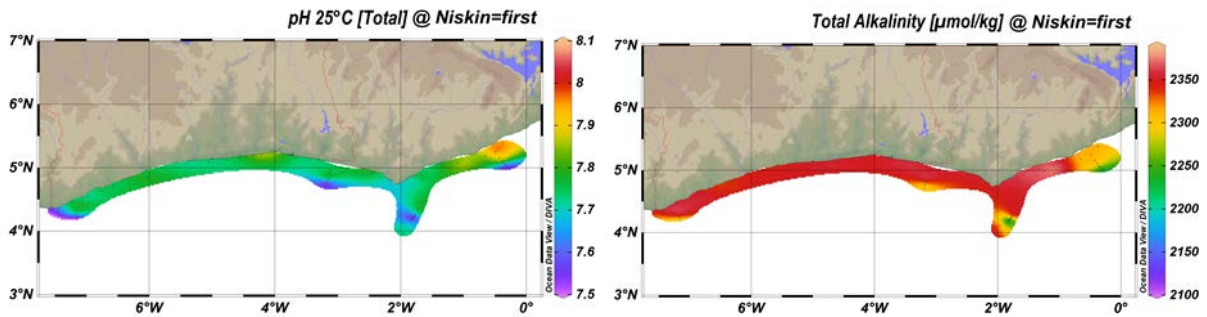


Figure 23. Horizontal distribution maps of pH and alkalinity measured measured at 5 m depth at each CTD station during the demersal coverage of the survey (2/8/2019–15/8/2019). CTD stations are shown as blue dots

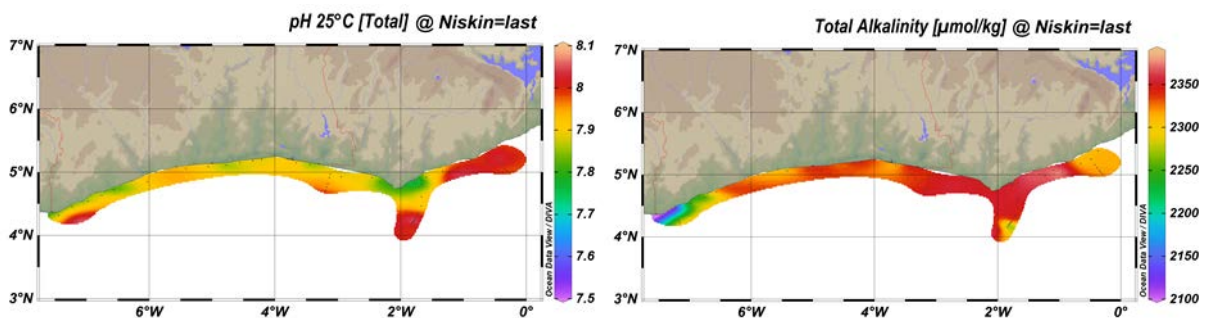


Figure 24. Horizontal distribution maps of the pH (left) and alkalinity (right) measured at the deepest sampled point at each CTD deployment during the demersal coverage of the survey (2/8/2019-15/8/2019). CTD stations are shown as blue dots

### 3.2.2.2 Vertical distribution at transects

The vertical distribution of pH and alkalinity in the five oceanographic transects sampled with a denser network of CTD stations during the survey are shown in Figures 25 to 29.

#### Tema

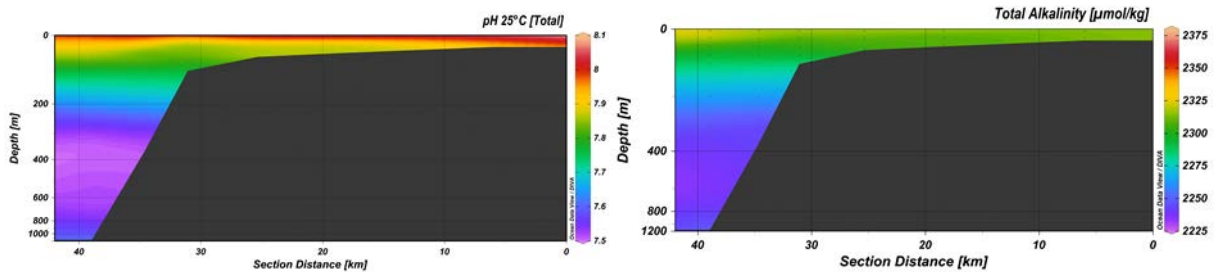


Figure 25. Vertical distribution of pH and alkalinity at the Tema transect (CTD stations 0751, 0752, 0755, 0756, 0757 and 0758)

#### Winneba

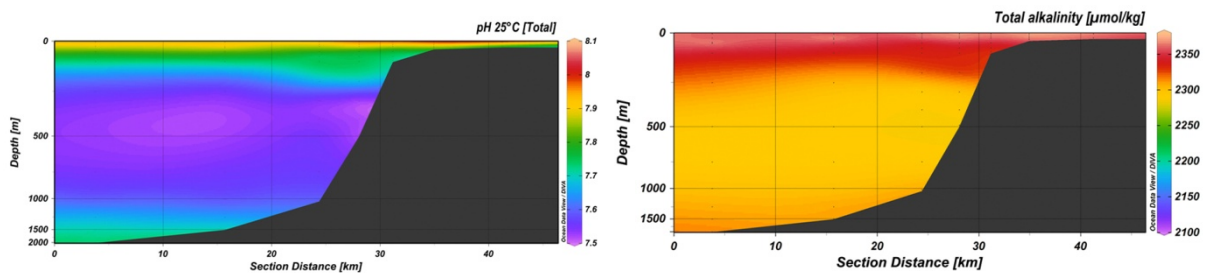


Figure 26. Vertical distribution of pH and alkalinity at the Winneba transect (CTD stations 0937, 0939, 0941, 0943, 0945 and 0947)

#### Takoradi

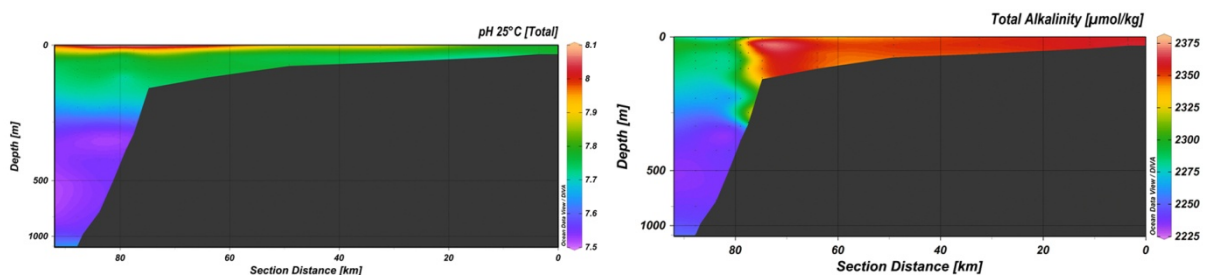


Figure 27. Vertical distribution of pH and alkalinity at the Takoradi transect (CTD stations 0897, 0899, 0901, 0903, 0907, 0908, 0915, 0916, 0917, 0918 and 0920)

## Cape Three Points

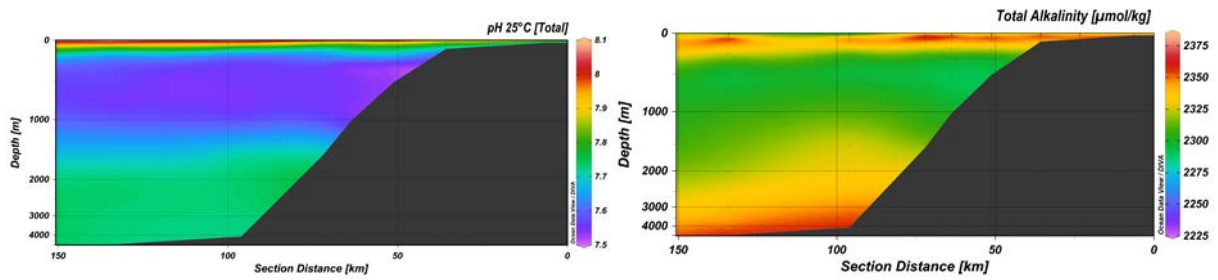


Figure 28. Vertical distribution of pH and alkalinity at the Cape Three Points transect (CTD stations 0785, 0786, 0787, 0789, 0790, 0791, 0792 and 0793)

## Lophelia

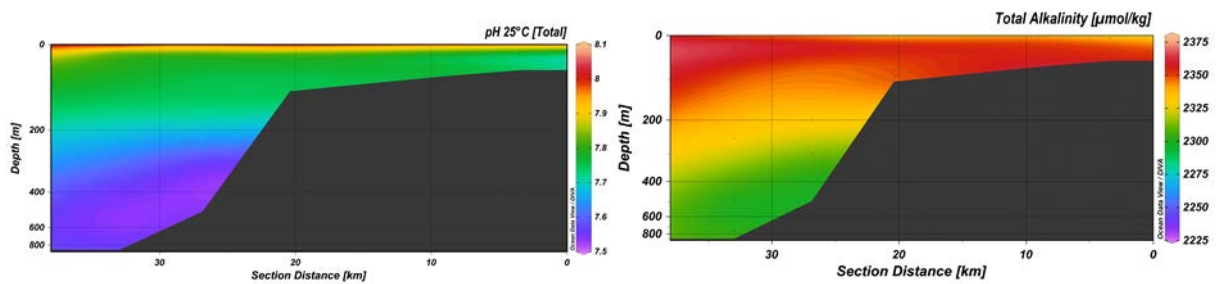


Figure 29. Vertical distribution of pH and alkalinity at the Lophelia transect (CTD stations 0882, 0883, 0884, 0885 and 0887)

The pH vertical profiles in relation to dissolved oxygen during the pelagic and the demersal coverage is shown in Figure 30.

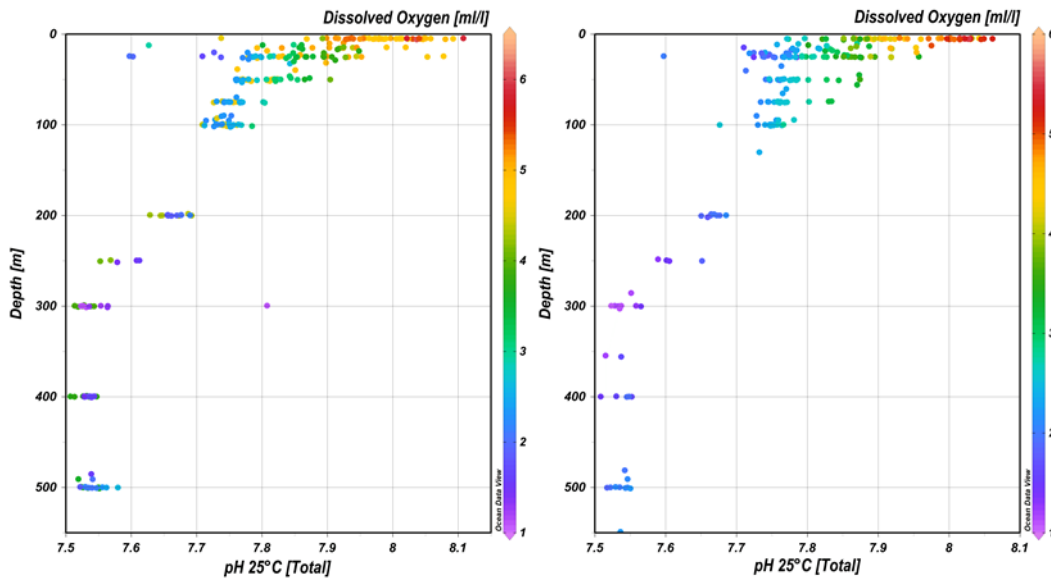


Figure 30. Vertical distribution of pH in relation to dissolved oxygen during the pelagic and demersal coverage of the survey

### 3.2.3 Nutrient samples

#### 3.2.3.1 Horizontal distribution

The horizontal distribution of dissolved inorganic nutrients during the pelagic and demersal coverage are shown in Figures 31 to 34.

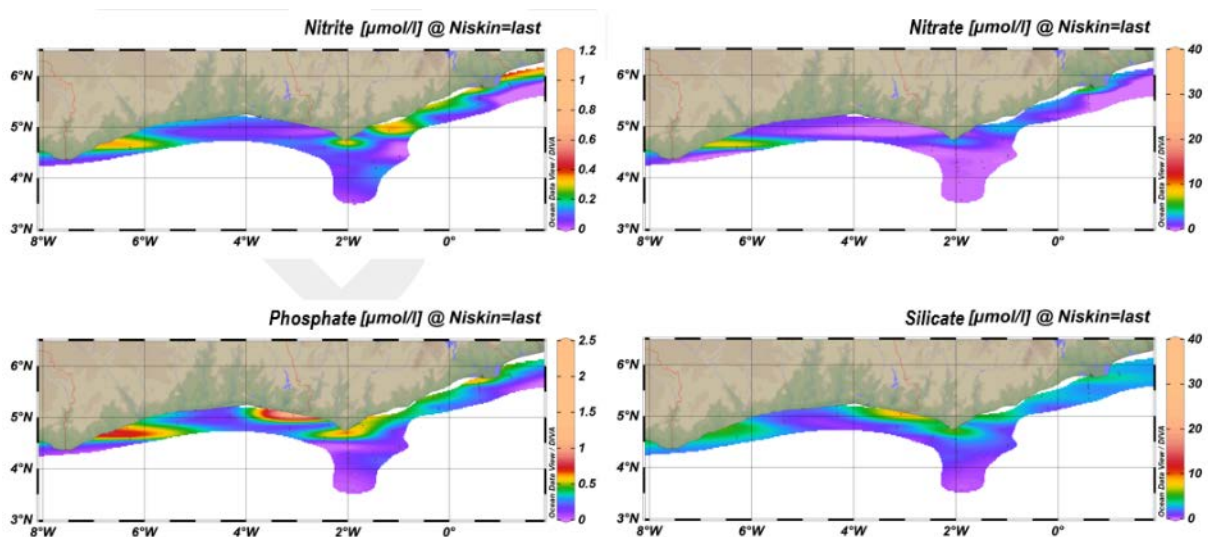


Figure 31. Horizontal distribution maps of dissolved inorganic nutrients measured at 5 m depth at each CTD station during the pelagic coverage of the survey (20/7/2019–2/8/2019). CTD stations are shown as blue dots

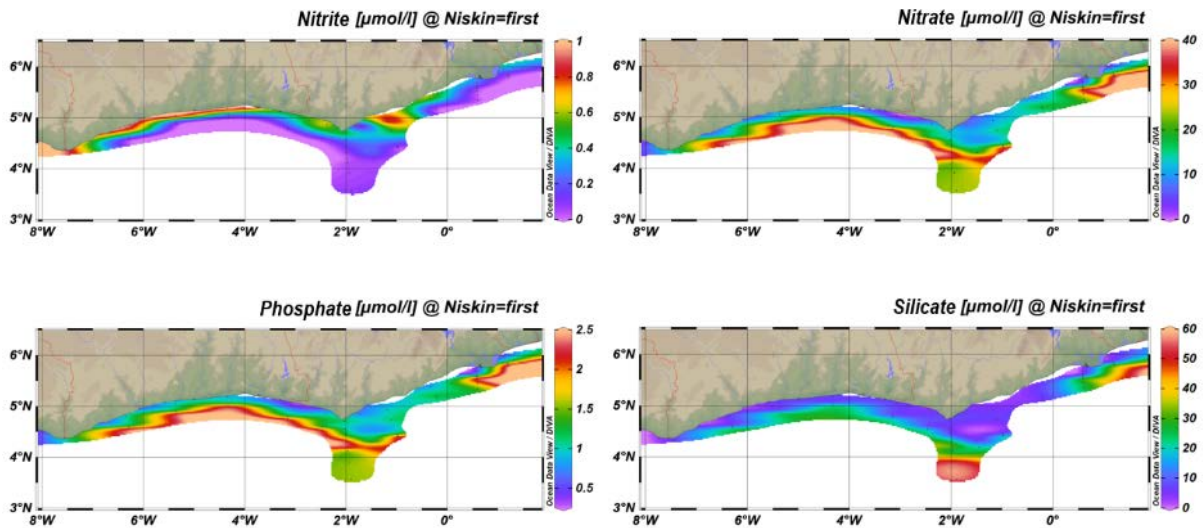


Figure 32. Horizontal distribution maps of dissolved inorganic nutrients measured at the deepest sampled point at each CTD deployment during the pelagic coverage of the survey (20/7/2019–2/8/2019). CTD stations are shown as blue dots

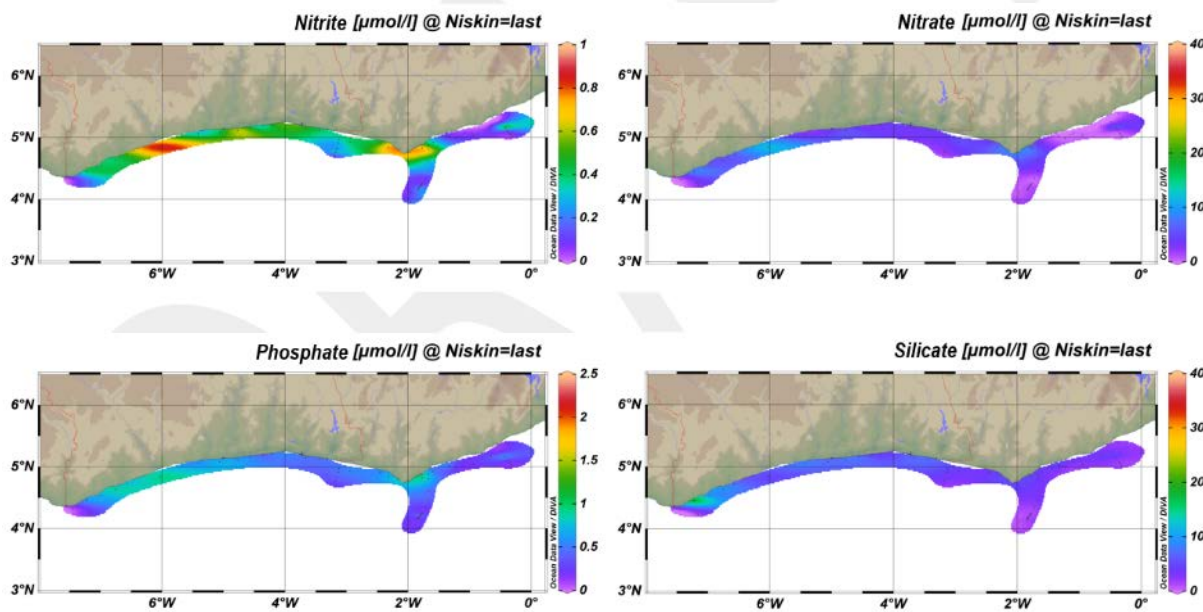


Figure 33. Horizontal distribution maps of dissolved inorganic nutrients measured at 5 m depth at each CTD station during the demersal coverage of the survey (2/8/2019–15/8/2019). CTD stations are shown as blue dots



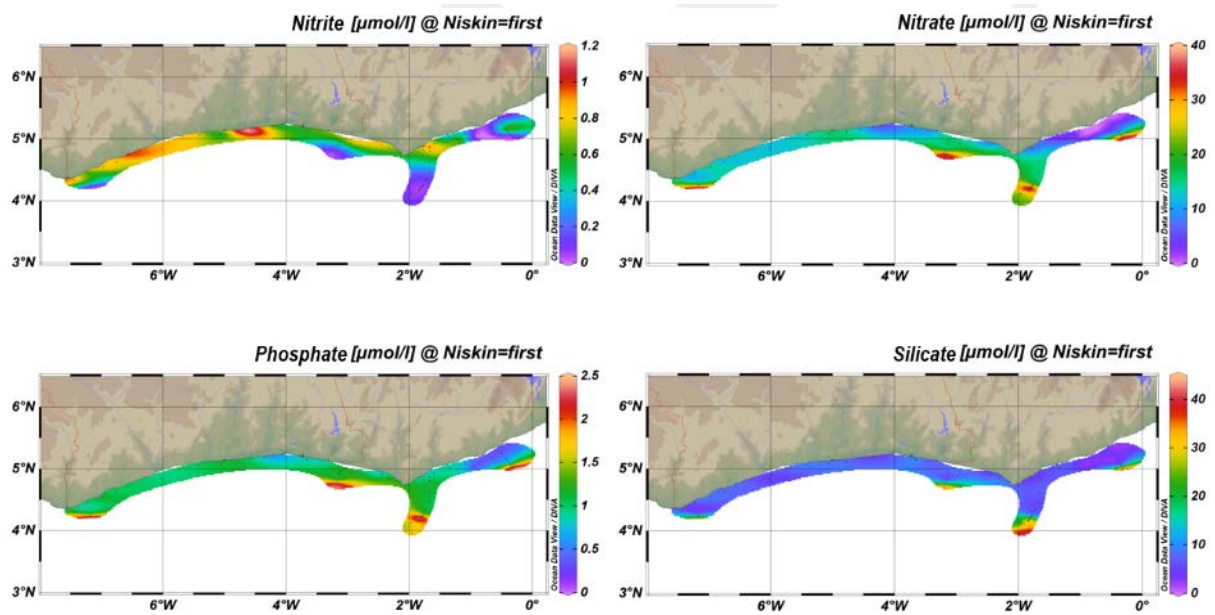


Figure 34. Horizontal distribution maps of dissolved inorganic nutrients measured at the deepest sampled point at each CTD deployment during the demersal coverage of the survey (2/8/2019-15/8/2019). CTD stations are shown as blue dots

### 3.2.3.2 Vertical distribution at oceanographic transects

The vertical distribution of dissolved inorganic nutrients during the pelagic and demersal coverage at the oceanographic transects is shown in Figures 35 to 39.

Tema

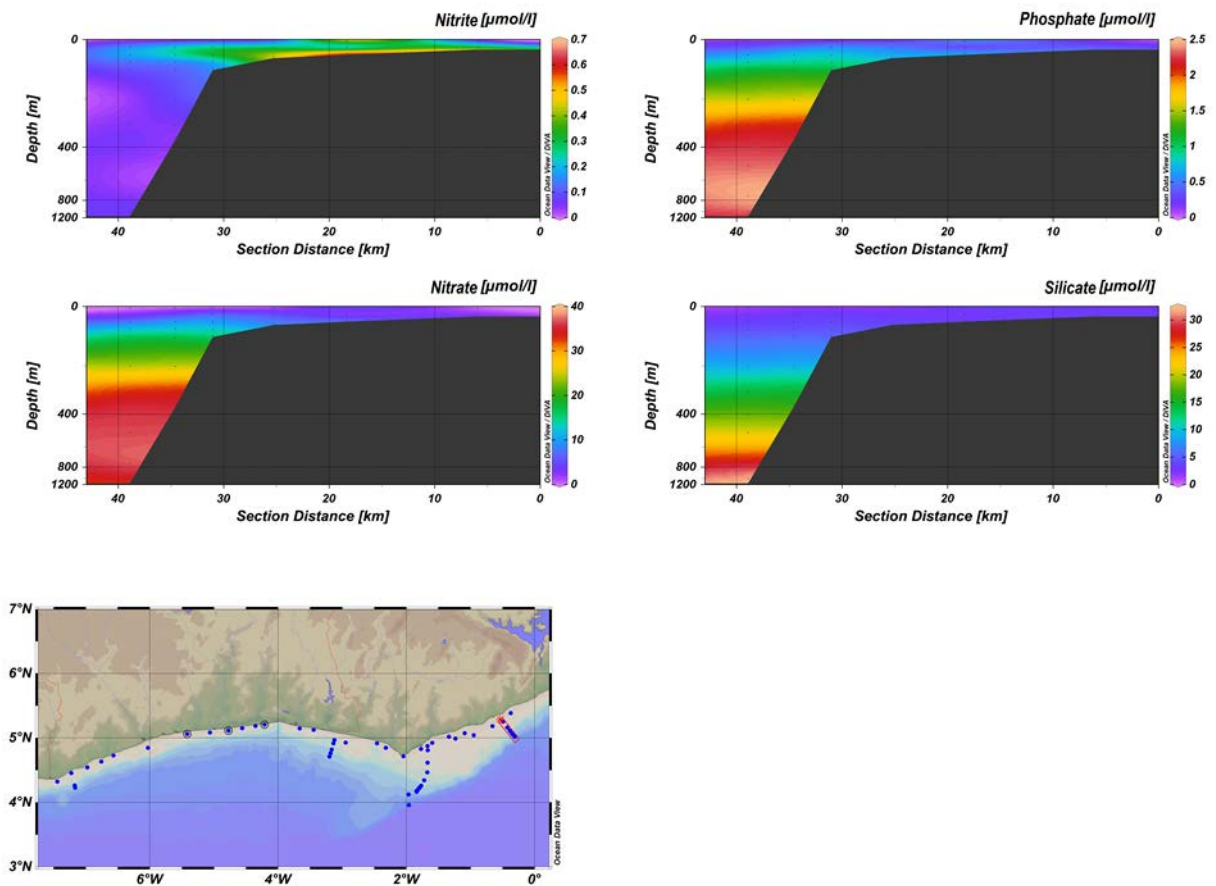


Figure 35. Vertical distribution of dissolved inorganic nutrients at the Tema transect (CTD stations 0751, 0752, 0755, 0756, 0757 and 0758)

Winneba

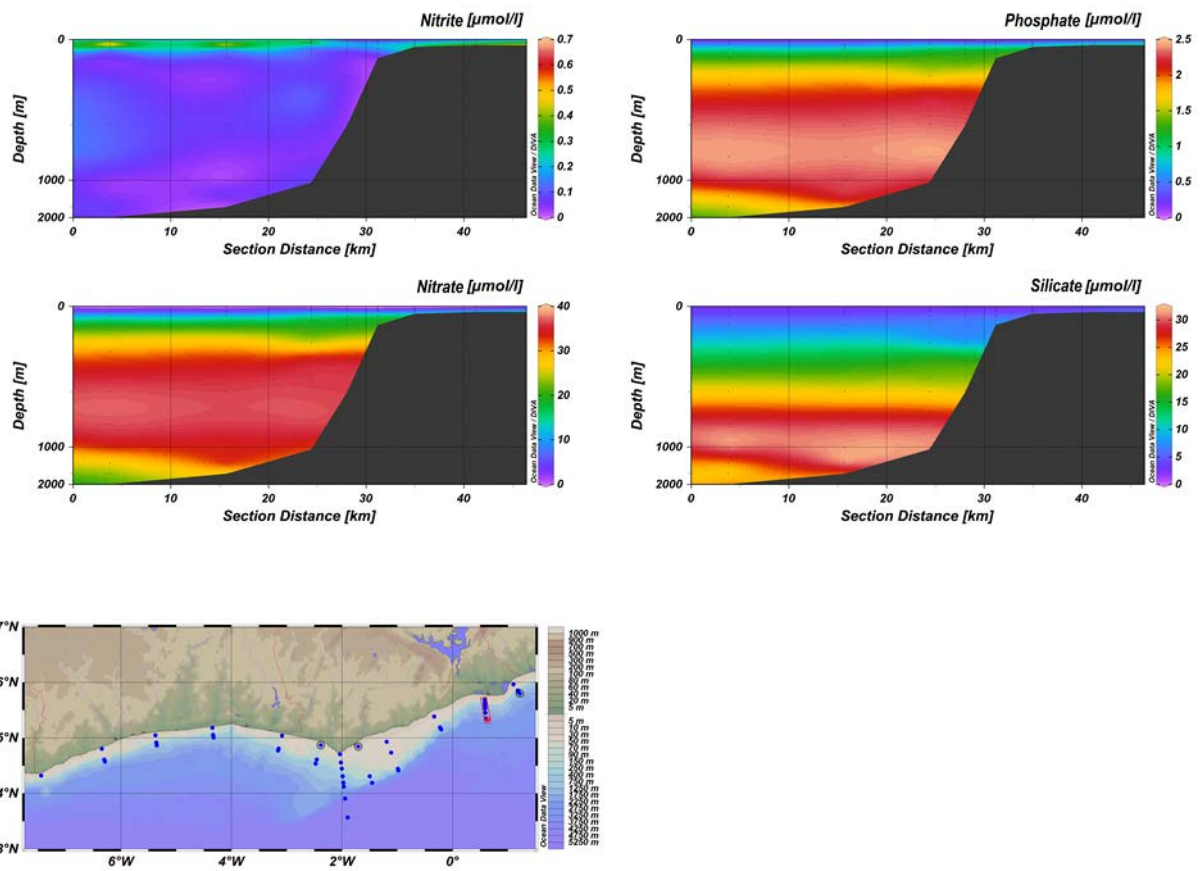


Figure 36. Vertical distribution of dissolved inorganic nutrients at the Winneba transect (CTD stations 0937, 0939, 0941, 0943, 0945 and 0947)



Takoradi

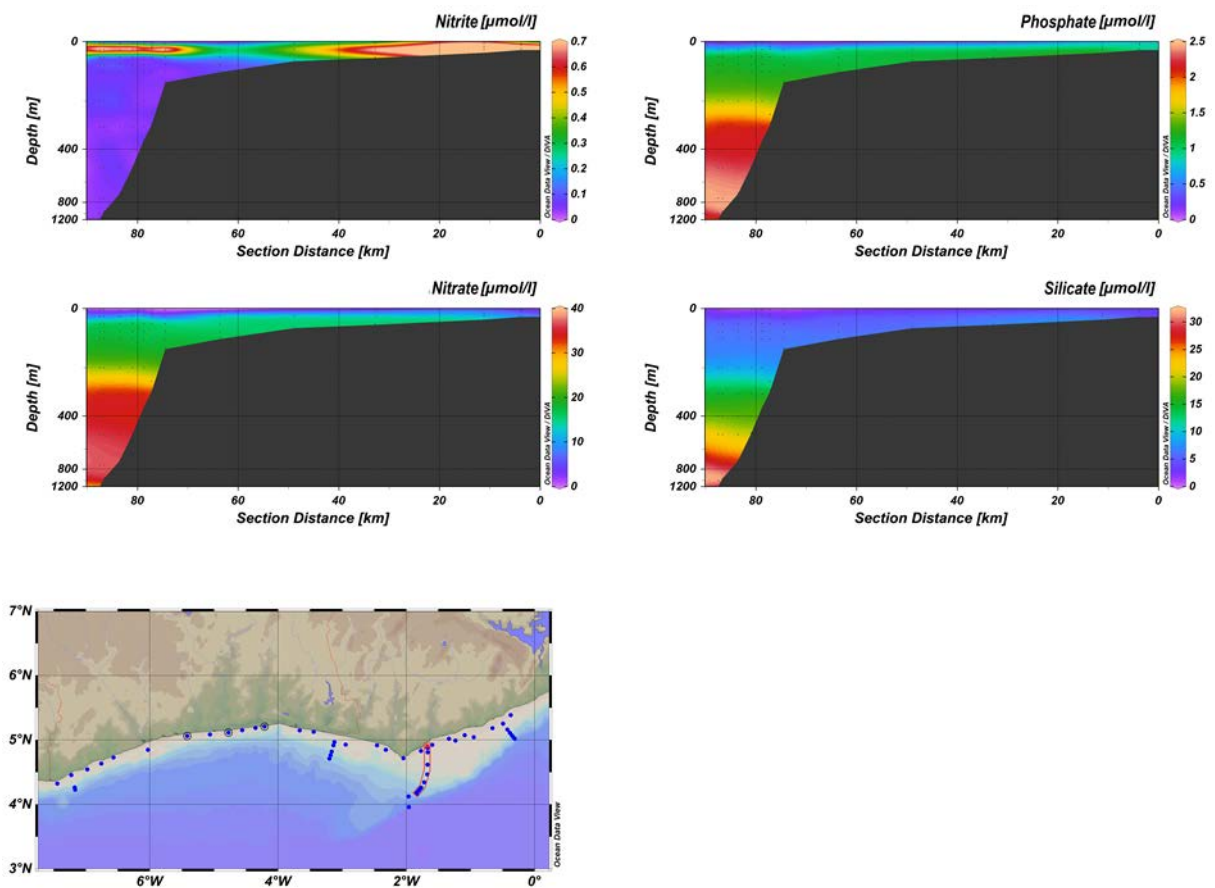


Figure 37. Vertical distribution of dissolved inorganic nutrients at the Takoradi transect (CTD stations 0897, 0899, 0901, 0903, 0907, 0908, 0915, 0916, 0917, 0918 and 0920)

Cape Three Points

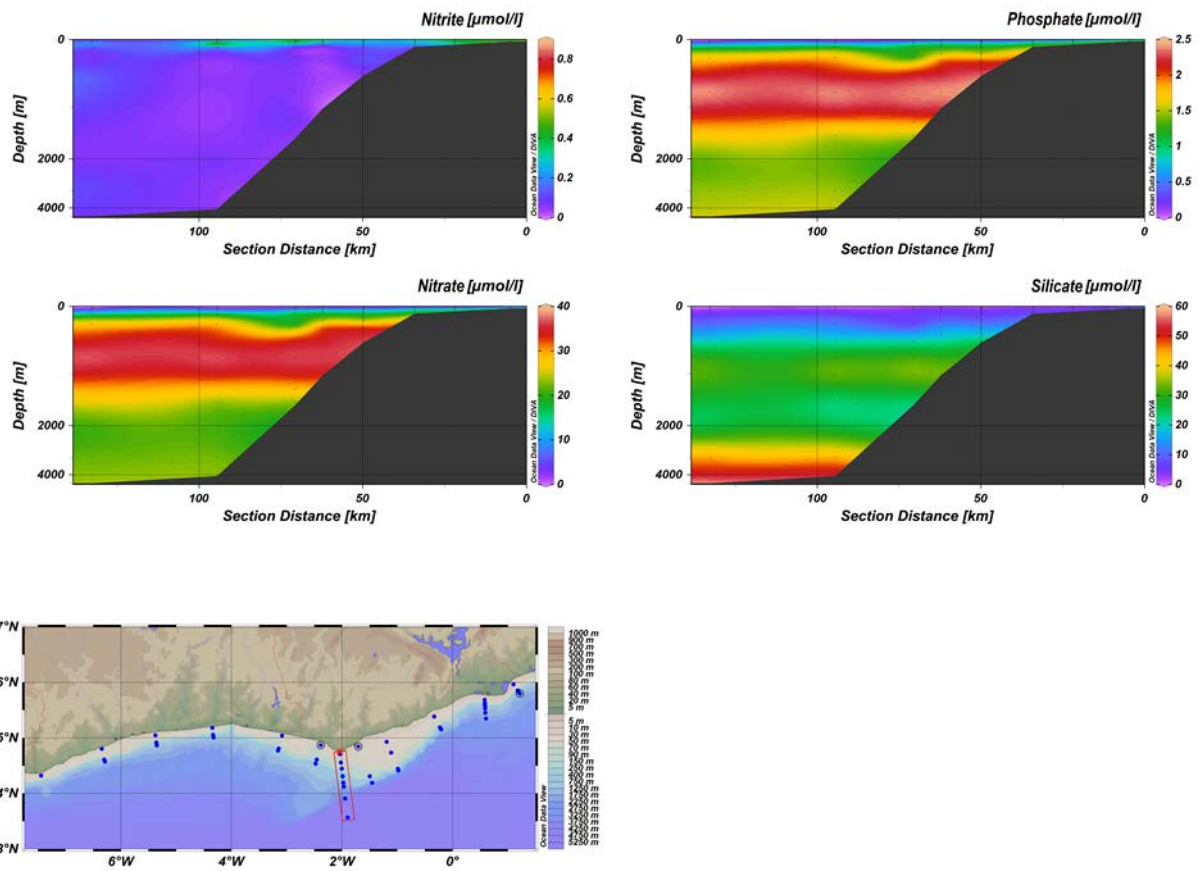


Figure 38. Vertical distribution of dissolved inorganic nutrients at the Cape Three Points transect (CTD stations 0785, 0786, 0787, 0789, 0790, 0791, 0792 and 0793)

*Lophelia*

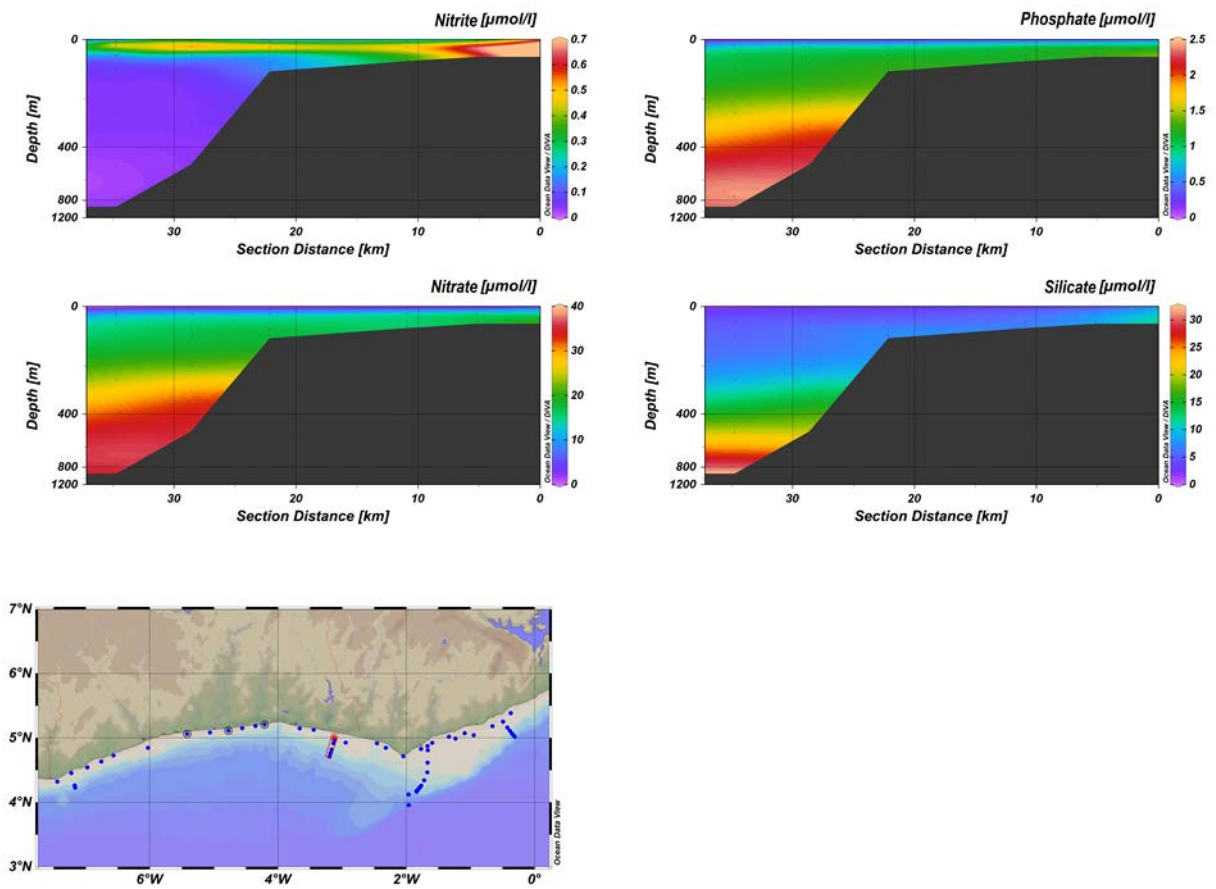


Figure 39. Vertical distribution of dissolved inorganic nutrients at the Lophelia transect (CTD stations 0882, 0883, 0884, 0885 and 0887)

### 3.2.4 Primary productivity

During the pelagic coverage, *chl a* concentrations were 5-fold lower than during the demersal coverage (Figure 40). Higher *chl a* concentrations during the survey were mainly observed between the Tema – Takoradi stretch of the coast, with values ranging from 5 to 14.3  $\mu\text{g/l}$ . The increase was obvious throughout the water column in the area. The stations contributing to the elevated *chl a* are shown in Figure 41. Interestingly, this area exhibited quite low mesozooplanktonic biomass values (see next section). Measurements from the demersal part of the survey showed an average of 1.48  $\mu\text{g/l}$  while from the pelagic coverage the mean *chl a* concentration was 0.57  $\mu\text{g/l}$ . As shown in the horizontal plots of the chlorophyll from the surface and the maximum values from each station, the maximum primary production is concentrated around the Tema-Takoradi stretch of the coast. The vertical distribution of *chl a* at the surveyed transects is presented in Figure 42.

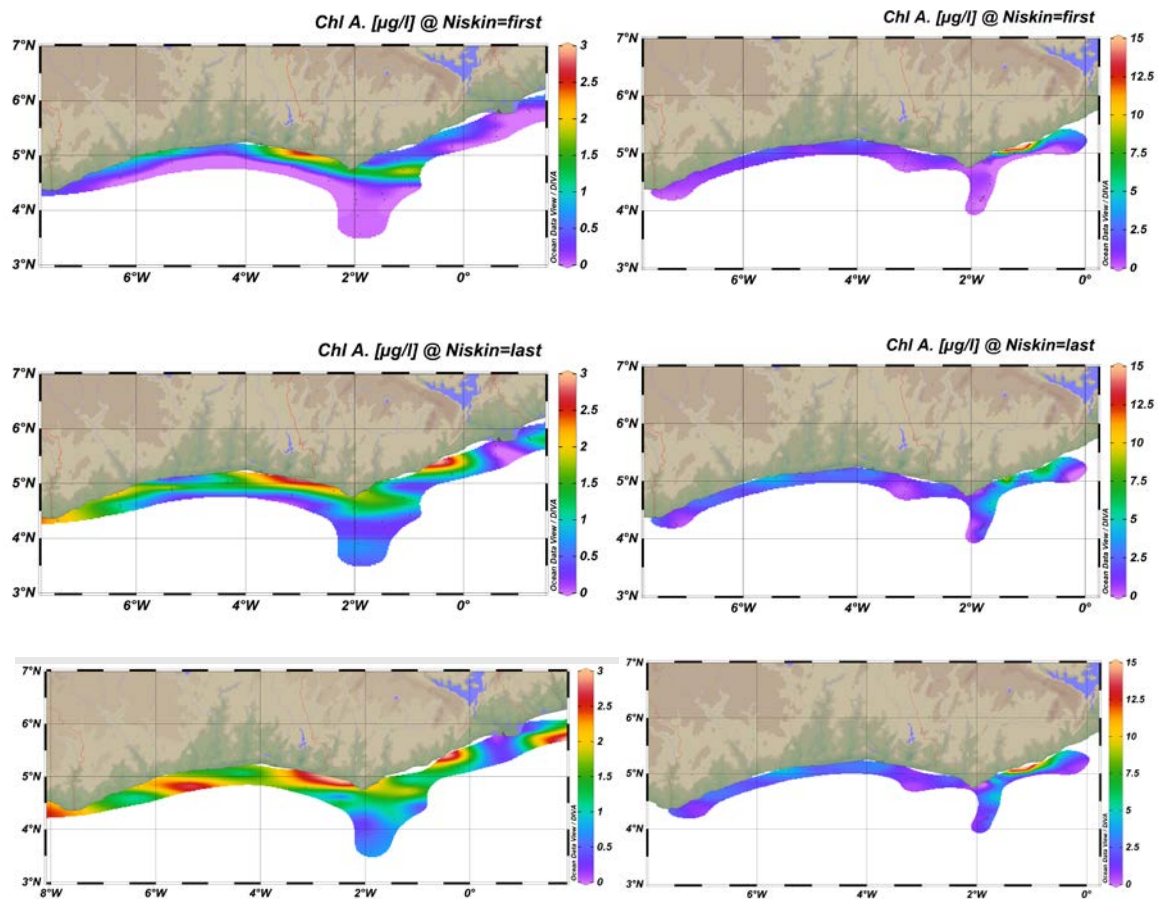


Figure 40. Horizontal distribution maps of *chl a* as measured at 5 m (upper left), the deepest sampled point (upper right) at each CTD deployment and integrated over the water column but only down to 200 m depth for stations where depth exceeded that depth (lower center) during the pelagic coverage (20/7/2019–2/8/2019) (left panel) and during the demersal coverage (2/8/2019–15/8/2019). CTD stations are shown as blue dots

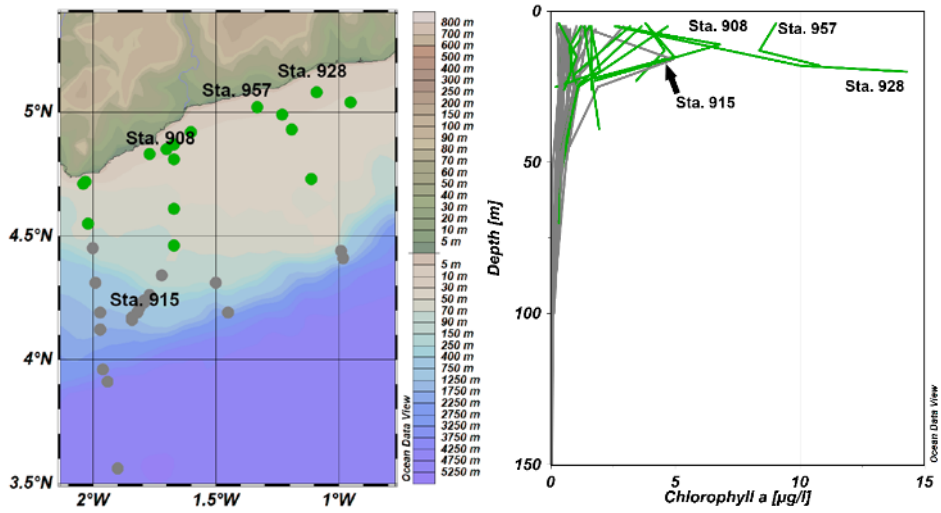


Figure 41. Locations of CTD stations with elevated chla values (left) and chla concentration vertical profiles at these stations

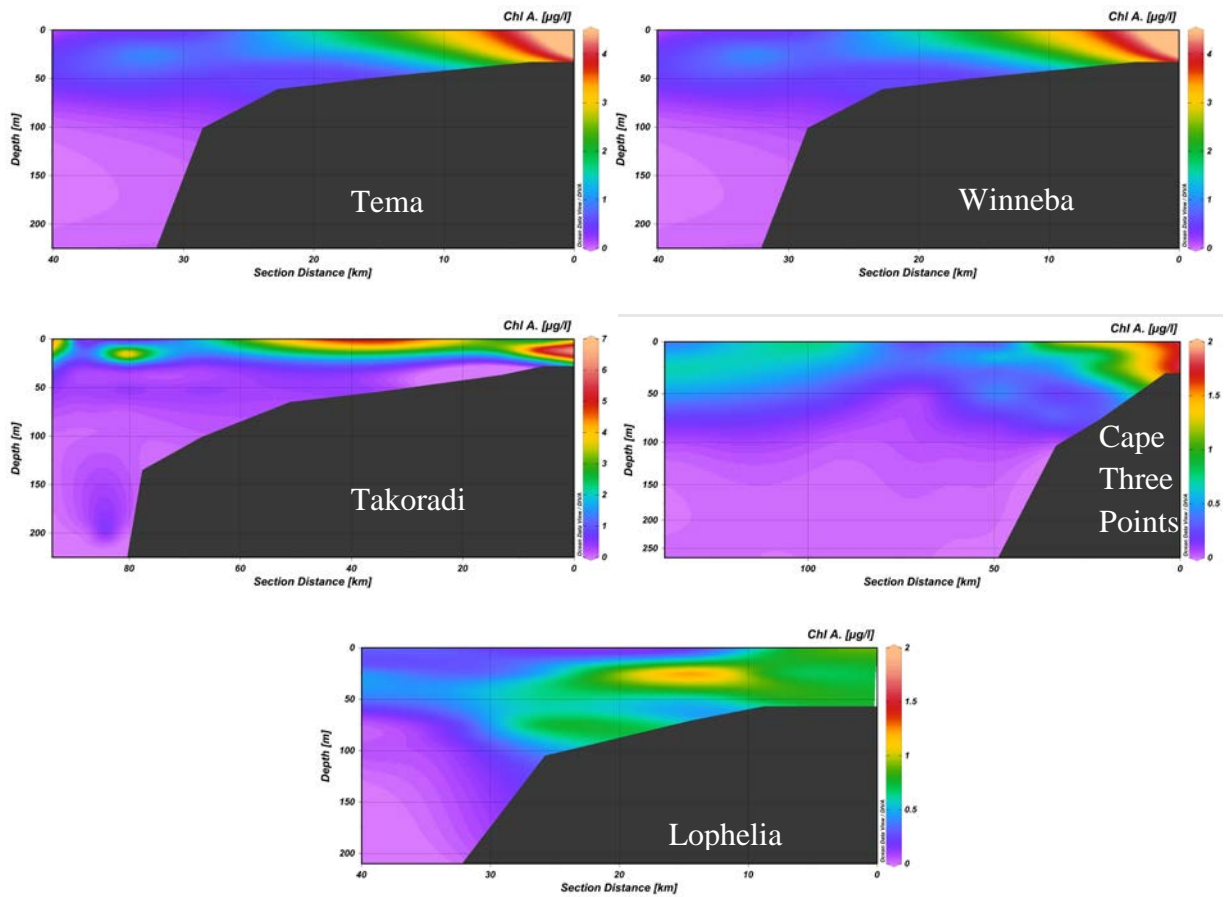


Figure 42. Locations of CTD stations with elevated chla values (left) and chla concentration vertical profiles at these stations

### 3.3 Plankton

A summary of the number of plankton stations and type of samples collected is presented in Table 7.

Table 7. Overview of the plankton superstations sampled

Country	Sampling gear	Number of stations	Number of samples
Ghana	Niskin bottle	29	141
	WP2 (180 $\mu\text{m}$ )	34	24
	Bongo (405 $\mu\text{m}$ )	34	34
	Manta (335 $\mu\text{m}$ )	34	34
	Multinet Mammoth (405 $\mu\text{m}$ )	7	20
Côte d'Ivoire	Niskin bottle	14	58
	WP2 (180 $\mu\text{m}$ )	12	12
	Bongo (405 $\mu\text{m}$ )	12	12
	Manta (335 $\mu\text{m}$ )	12	12

The analysis of the collected plankton samples was prioritized within the framework of EAF-Nansen Science Plan. Specifically, the analysis of phytoplankton and zooplankton samples was carried out at the laboratory of the Department of Marine and Fisheries Sciences at the University of Ghana (Accra) during 09.03.2020 to 18.05.2020 by the plankton experts Estelle Konan and Hawa Bint. Ichthyoplankton samples processing has been carried out in Bergen.

Available preliminary results are presented for all plankton communities below.

#### 3.3.1 Phytoplankton

Twenty two out of the 199 collected phytoplankton samples were analysed using the Utermöhl method, however no phytoplankton cells were recorded. Lugol's solution is traditionally used for preservation of phytoplankton samples and taxonomical analysis, thus absence of phytoplankton cells after sedimentation of the samples is difficult to be explained. A delay in shipment of the samples and likely not suitable conditions at the Customs warehouse at the Accra airport where the samples stayed for a long time, could have resulted in deterioration of the sample preservation.



### 1.1.1 Zooplankton

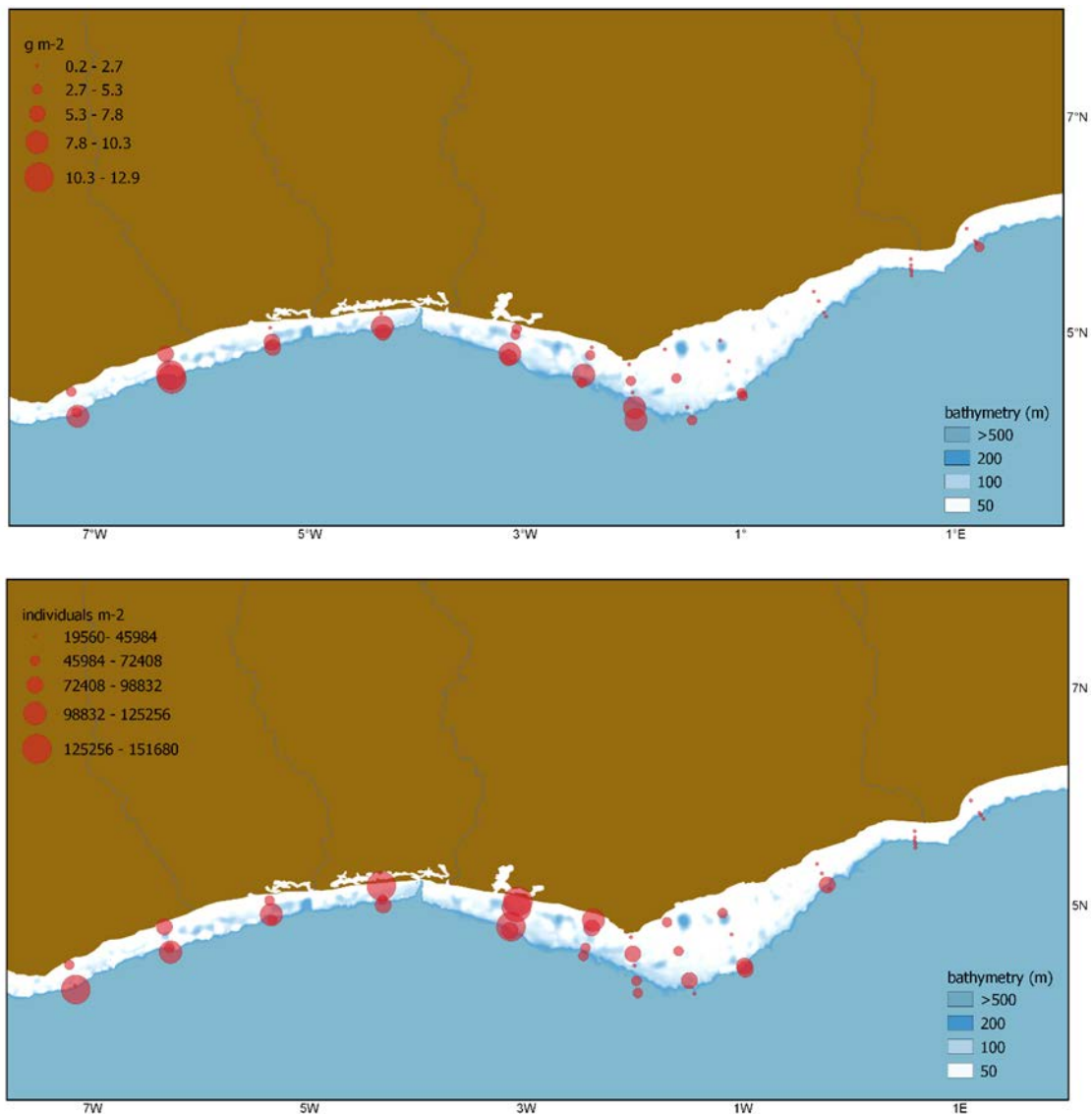


Figure 43. Horizontal distribution of total zooplankton biomass ( $\text{g m}^{-2}$ ) and abundance ( $\text{ind. m}^{-2}$ ) in the superstation grid

A total of 126 aluminium trays for zooplankton dry weight estimation were produced during the survey and transferred to IMR for zooplankton biomass estimation. Based on these measurements the horizontal distribution pattern of mesozooplankton biomass ( $\text{g m}^{-2}$ ) is presented in Figure 43 (upper panel). Total zooplankton biomass ranged between  $0.22\text{--}12.9 \text{ g m}^{-2}$ , with lower values in Ghanaian waters east of the Cape Three Points.

Zooplankton abundance values ( $\text{individuals m}^{-2}$ ) showed a similar distribution pattern to biomass (Figure 43, lower panel). Total mesozooplankton abundance ranged between  $19560\text{--}151680 \text{ individuals m}^{-2}$ , showing lower concentrations at the eastern part of the study area. Size fractionation of samples revealed that organisms smaller than 1 mm in size comprised most of the biomass, although for certain stations contribution of organisms larger than 2 mm was also important (Figure 44). Copepods, and particularly calanoids, dominated

the zooplankton community at all sites. Interestingly, the contribution of cyclopoid copepods was more important in the eastern part of the study area where the lower abundances were recorded (Figure 45). The calanoid species *Calanoides carinatus*, associated with the upwelling conditions in the area, was found mainly present in the western part of the region.

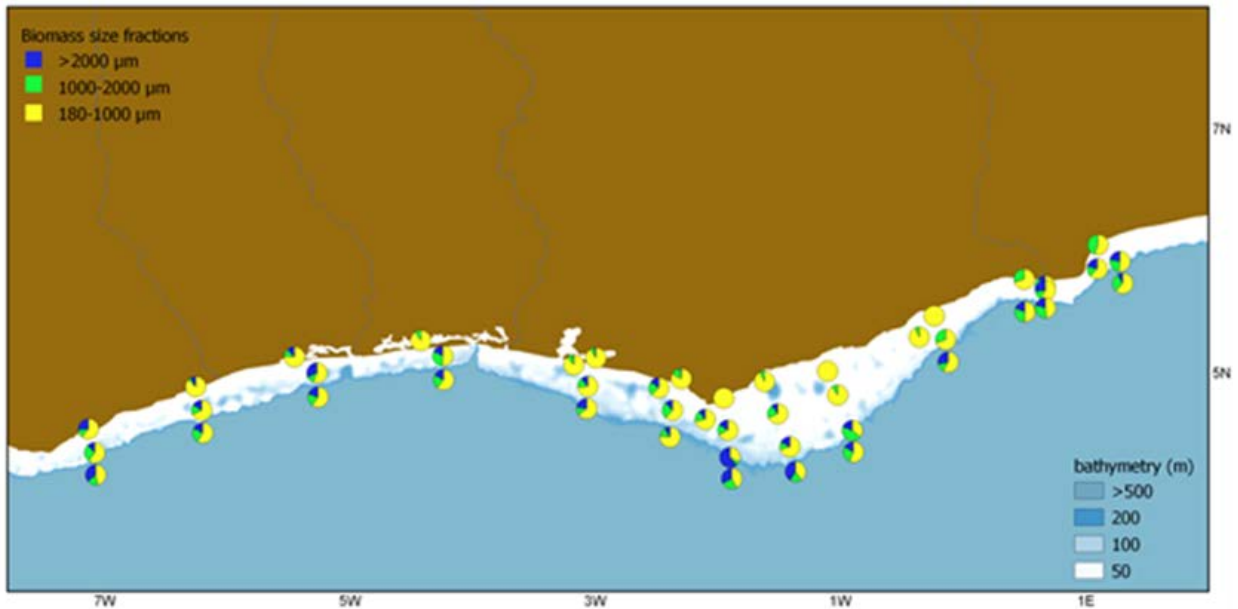


Figure 44. Contribution of three different size fractions to the total mesozooplankton biomass recorded along the station grid

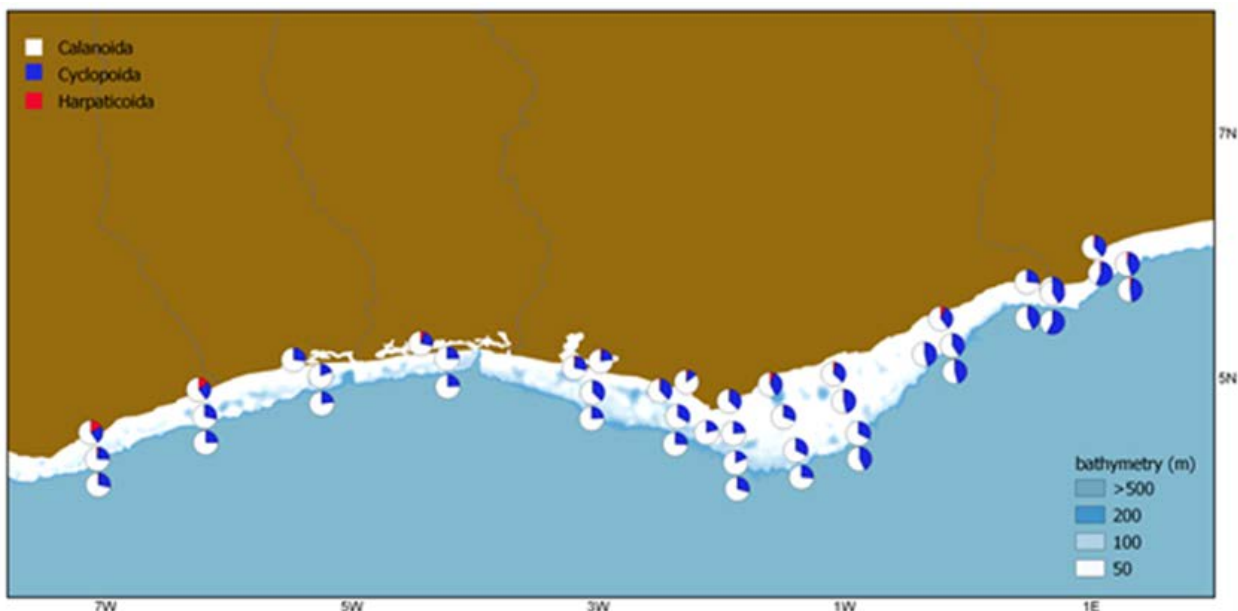


Figure 45. Contribution of copepod orders to the total copepod community along the station grid



### 3.3.2 Ichthyoplankton

#### *Bongo-net*

A total of 5 138 larvae were sorted onboard from the 46 Bongo-H plankton collections. Sorting of Bongo-V samples has been conducted at the IMR laboratory and a major part of the taxonomical analysis has been already completed. Comparison between the yields of the two bongo nets (H vs. V) showed an ca. 3-fold increase in number of larvae sampled by the V net, despite the high similarity of filtration volumes between both nets (Figure 46).

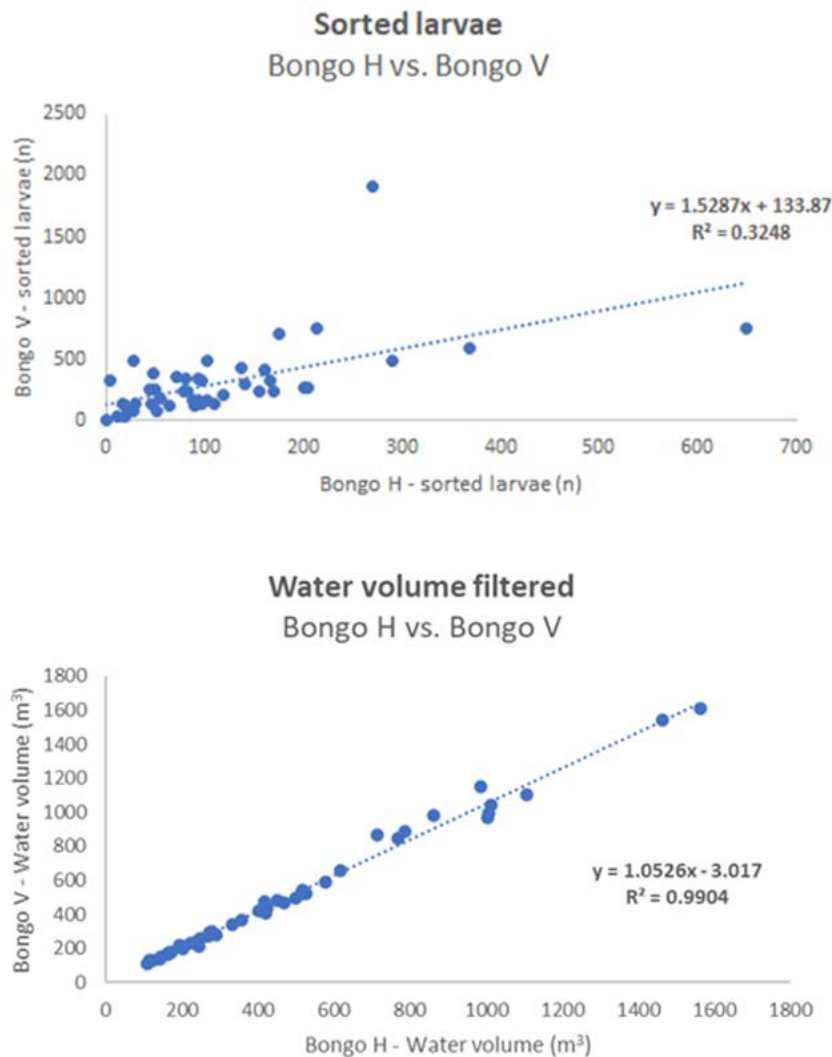


Figure 46. Comparison between number of larval fish sorted and water volume filtered between Bongo-H and Bongo-V net

Re-examination of Bongo-H collections at IMR laboratory verified the accuracy of sorting process onboard but revealed that plankton biovolumes in H collections were unexpectedly lower compared to V collections. Our findings deserve further evaluation since similar difference in the number of larvae collected between the two bongo nets was observed in the next Nansen survey 2019409 (however, with not considerable differences in the plankton

biovolume). Based on the laboratory analysis carried out so far, we report preliminary results on ichthyoplankton community distribution based on taxonomical identification on Bongo-V collections. Total larval fish abundance ranged from 0.8 to 365 larvae  $m^{-2}$  and higher values were found mainly at offshore stations and in the eastern sites of the surveyed area (Figure 47).

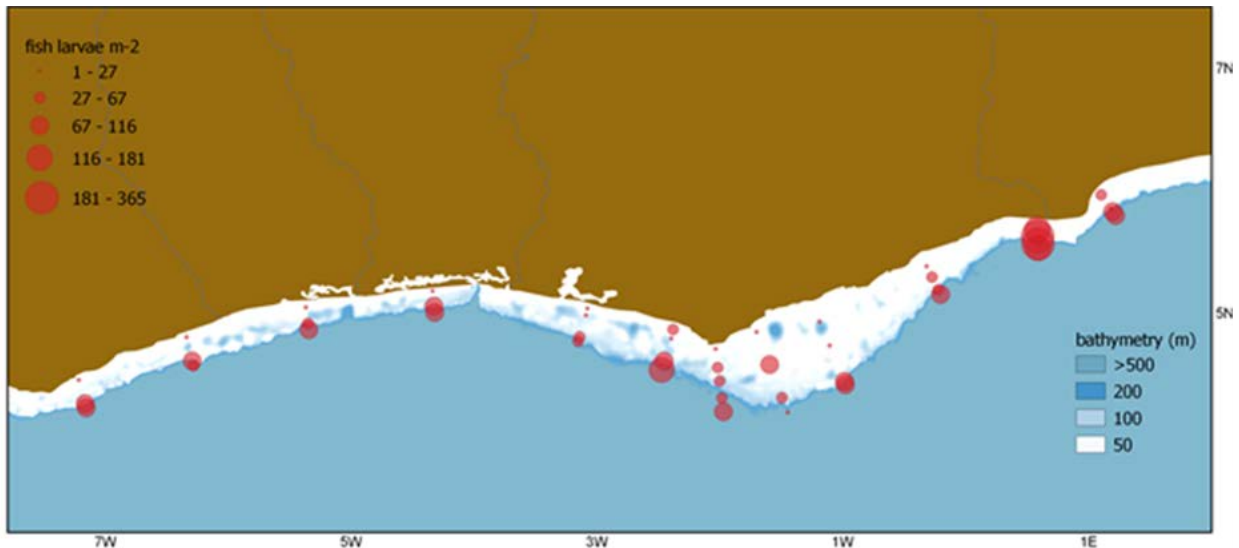


Figure 47. Horizontal distribution of total fish larvae (larvae  $m^{-2}$ ) along the superstation grid

The larval fish assemblage was highly dominated by larvae of meso-bathypelagic fish species, particularly at offshore sites (Figure 48). An important contribution of epipelagic and benthopelagic species

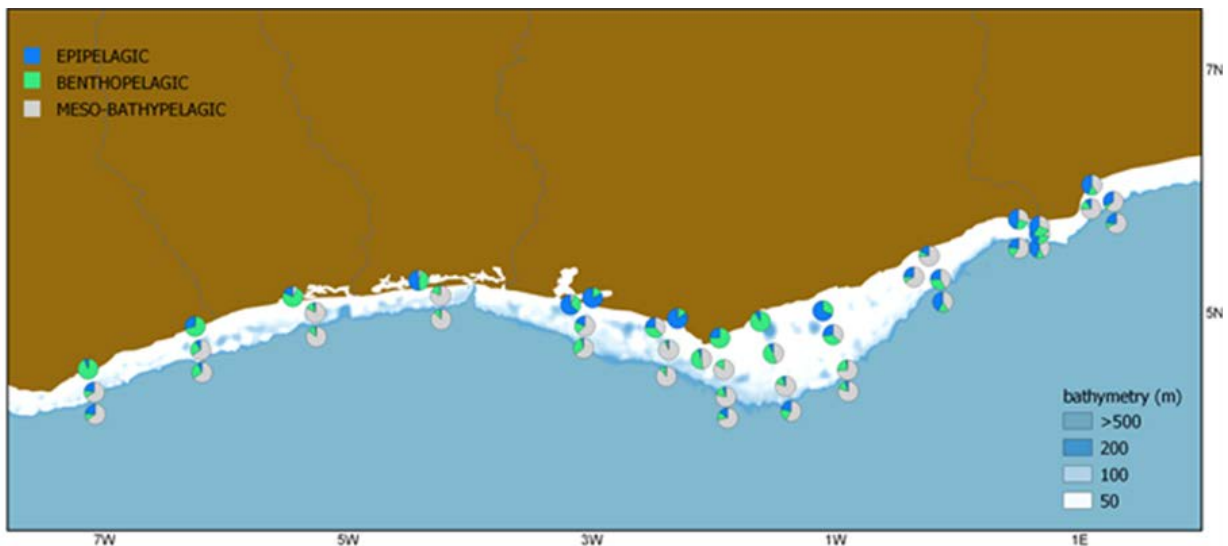


Figure 48. Contribution of epipelagic, benthopelagic and meso-bathypelagic fish taxa in the larval fish community

Epipelagic fish taxa: The abundance and composition of the epipelagic larval fish assemblage is shown in Figure 49. Epipelagic larval abundance ranged from 0.2 to 171 larvae  $m^{-2}$  with higher abundances in the eastern part (close to the transects Keta-Denu and Ada) due to the dominance of anchovy larvae. Anchovy abundance ranged 0.2 to 158 larvae  $m^{-2}$  (Figure 50). Larvae of the families Carangidae and Scombridae were also important (Figure 50). Carangids were more abundant in the waters of Ghana, while higher abundances were recorded in offshore waters around Cape Three Points. Larvae of Scombridae (mostly *Auxis* spp.) were particularly found at offshore stations western of Takoradi transect. Larvae of *Sardinella* were found only at only low abundances (0.2–5.3 larvae  $m^{-2}$ ) at some of the stations where anchovy was also present (Figure 50).

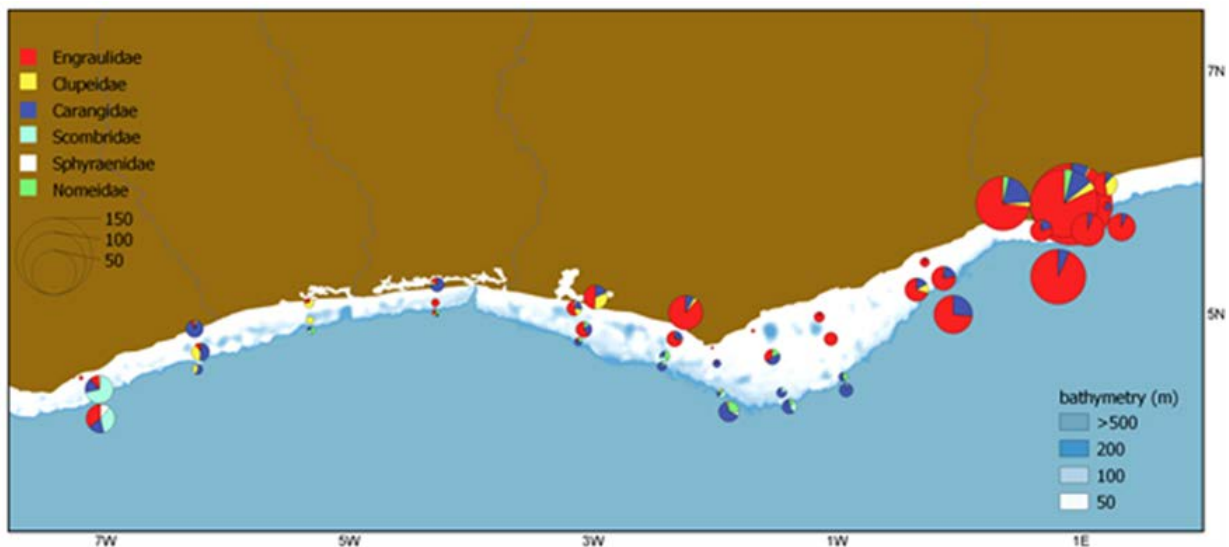


Figure 49. Contribution of families in the epipelagic larval assemblage. Circle diameter is proportional to the abundance of the larval epipelagic assemblage at each site

Figure 51 presents the horizontal distribution of fish eggs in the surveyed area based on Bongo-V collections. Anchovy eggs were found only in 11 stations in concentrations ranging from 0.2-224 eggs  $m^{-2}$ . Higher values (i.e.79 and 224 anchovy eggs  $m^{-2}$ ) were only found at stations along the Accra West transect. In all other cases the abundance of anchovy eggs was very low ranging from 0.2 to 26 eggs  $m^{-2}$ .

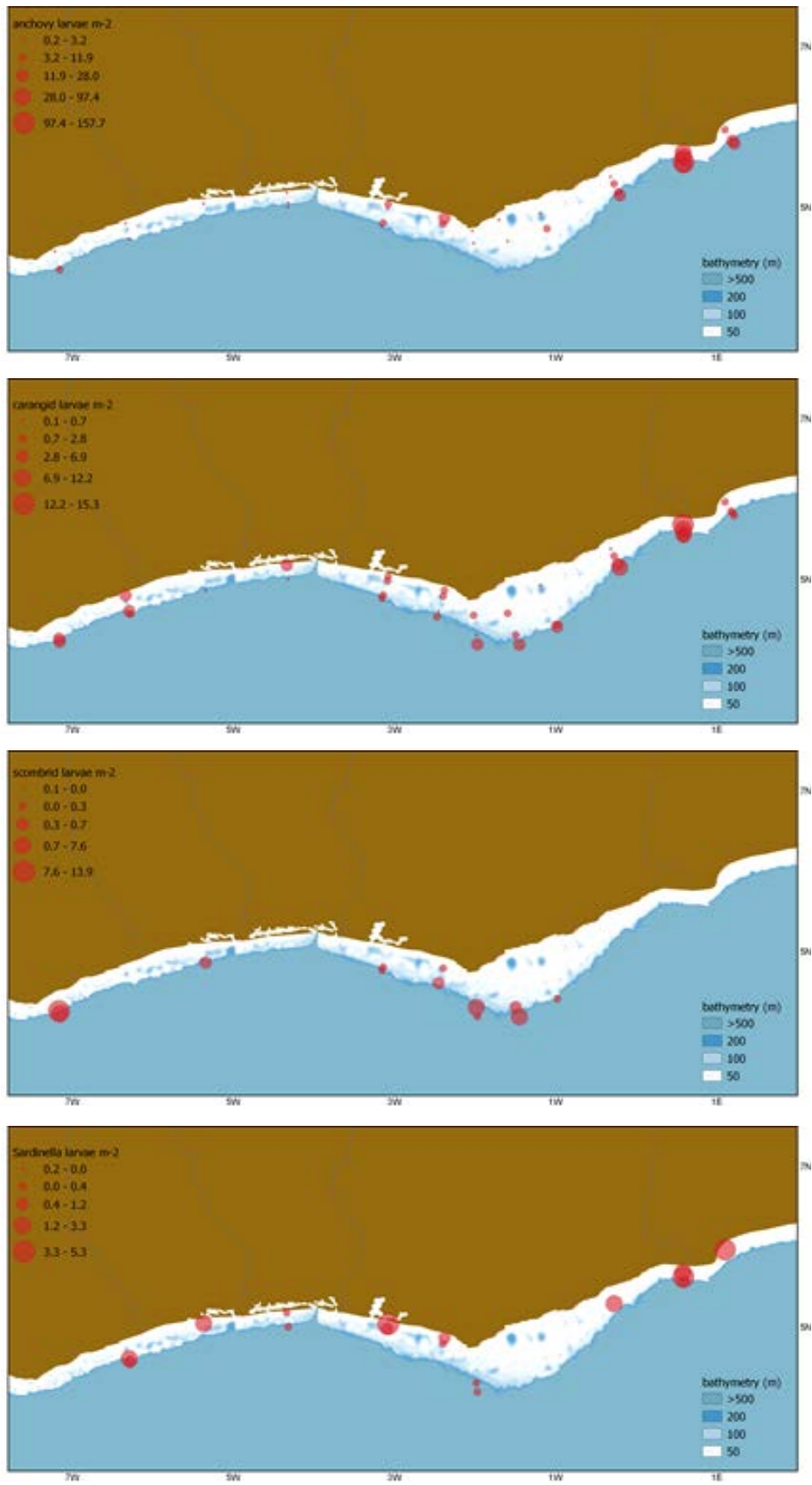


Figure 50. Abundance (larvae m<sup>-2</sup>) distribution patterns of main epipelagic families

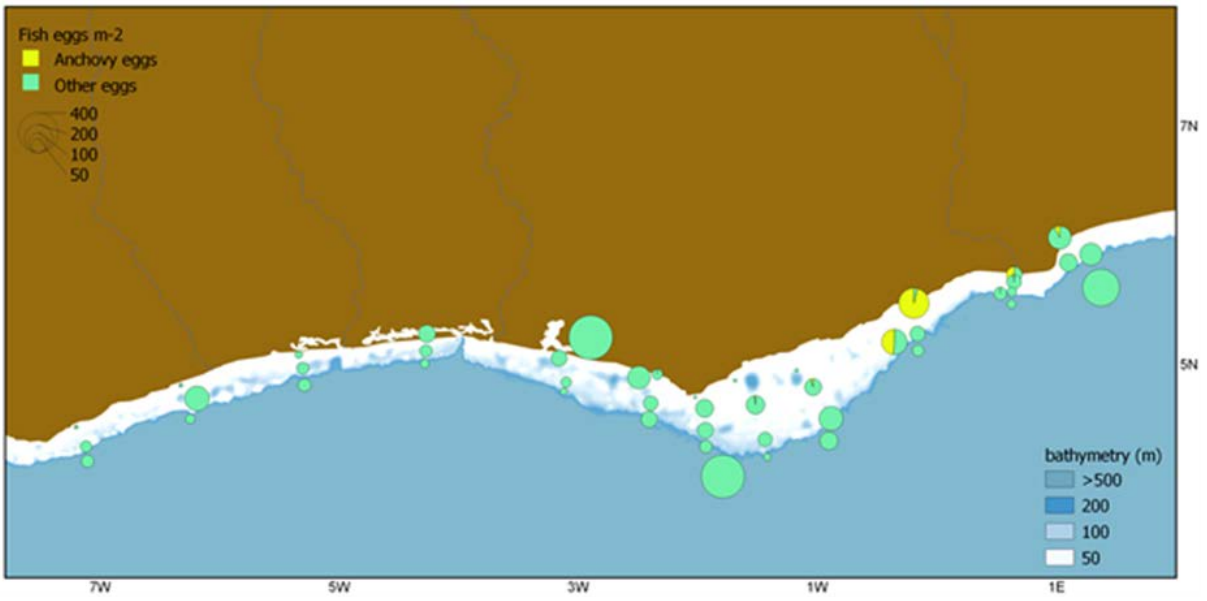


Figure 51. Horizontal distribution of total fish egg abundance (eggs m<sup>-2</sup>) in the superstation grid. The diameter of the circle corresponds to the abundance values, while anchovy eggs are shown in yellow

**Meso-bathypelagic fish taxa:** The abundance of larvae of meso-bathypelagic fish taxa ranged from 0.1 to 118 larvae  $m^{-2}$ . Offshore stations showed the highest concentrations (Figure 52, upper panel). Around 20 distinct meso-bathypelagic families were recorded in the collections (Figure 52, lower panel). Larvae of the myctophids *Hygophum macrochir* and *Myctophum affine* dominated the assemblage and the phosichthyid *Vinciguerria nimbaria* followed in rank order. Representatives of the families Sternoptychidae and Paralepididae were also important at certain sites, as well species of the family Bathylagidae.

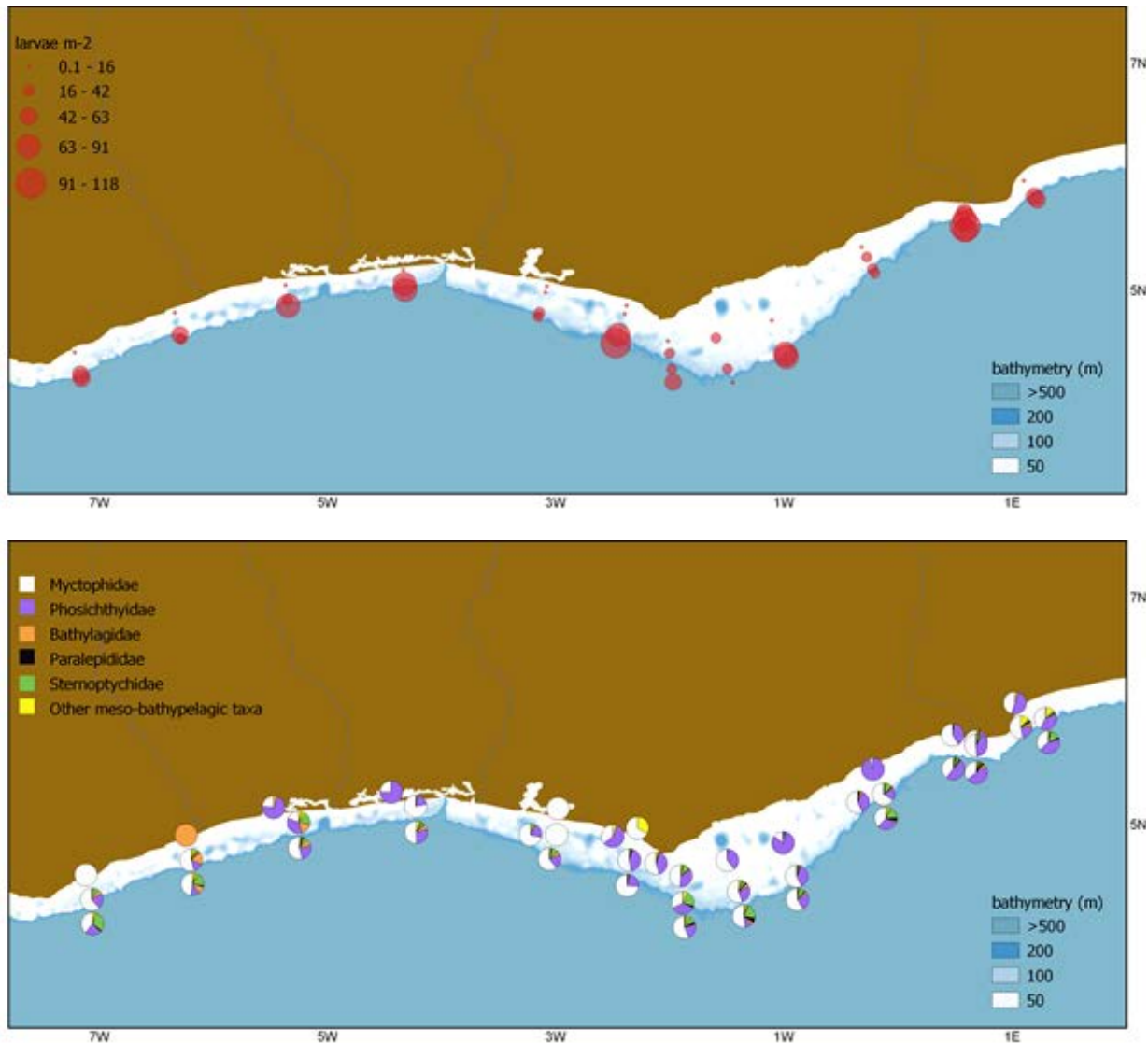


Figure 52. Upper panel: Horizontal distribution of total abundance of larvae of mesopelagic taxa (larvae  $m^{-2}$ ) and contribution of different families to the meso-bathypelagic assemblage (lower panel)

**Benthopelagic fish taxa:** The abundance of larvae of benthopelagic fish taxa ranged from 0.6 to 83.1 larvae  $m^{-2}$  (Figure 53, upper panel). The identified larvae belonged to nine Orders, among which the most important were Perciformes, Gadiformes and Pleuronectiformes. Anguilliform larvae were quite abundant in certain offshore sites. Most important representatives of Perciform larvae were sparids, gobiids and sciaenids. Bregmacerotidae was the dominant gadiform family in the study area with only few records of larvae of the family Gadidae.

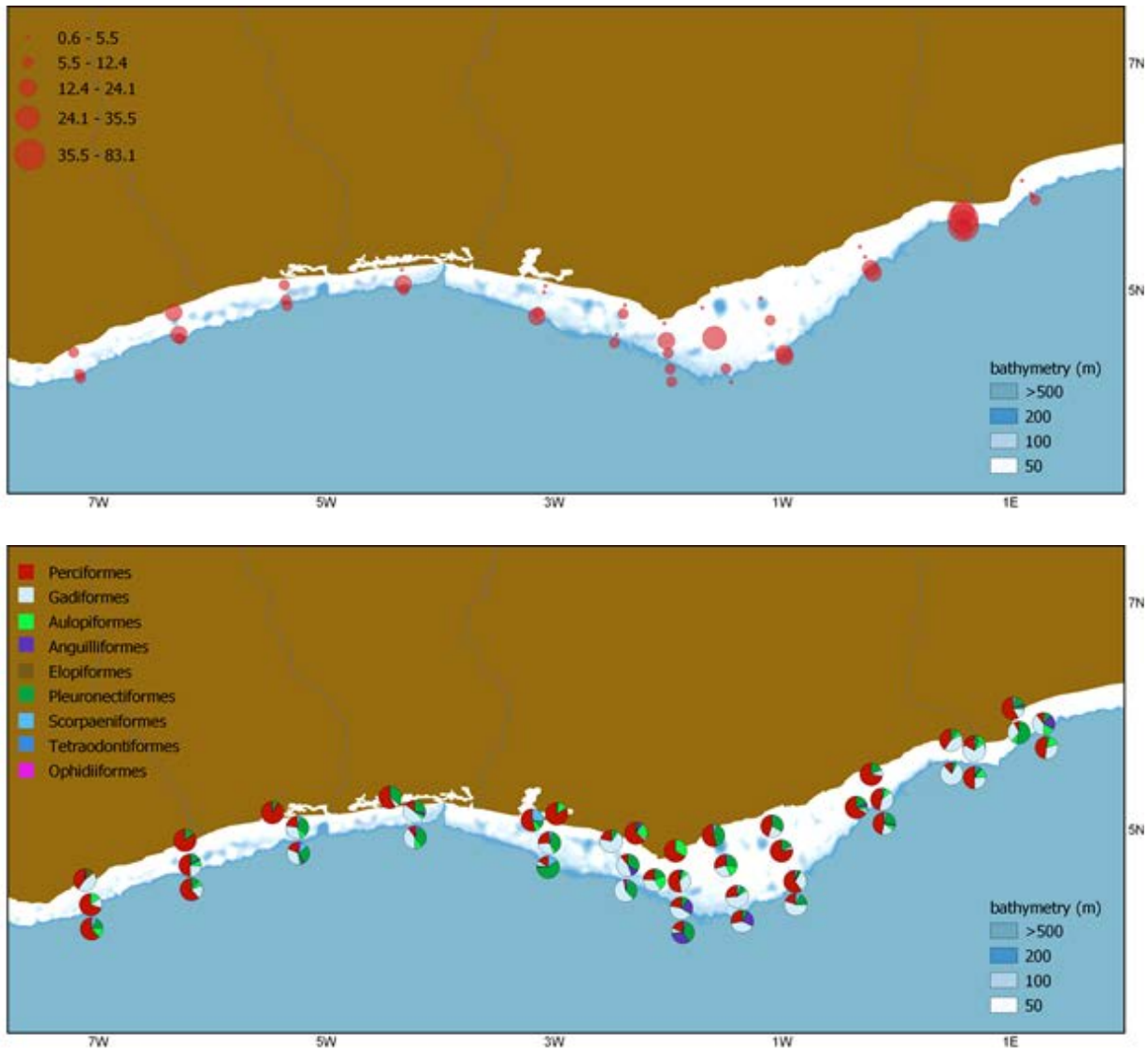


Figure 53. Upper panel: Horizontal distribution of total abundance of larvae of mesopelagic taxa (larvae  $m^{-2}$ ) and contribution of different families (lower panel)



*Manta-net*

A total of 330 larvae and 7 780 eggs were sorted onboard from the manta collections. Larvae from the order Beloniformes (i.e., Hemiraphidae, Exocoetidae) dominated the manta ichthyoplakton collections along with the families Mugilidae and Mullidae. Post larval - juvenile stages were quite abundant in the collections (Figure 54). Samples will be subjected to further analysis and data process.

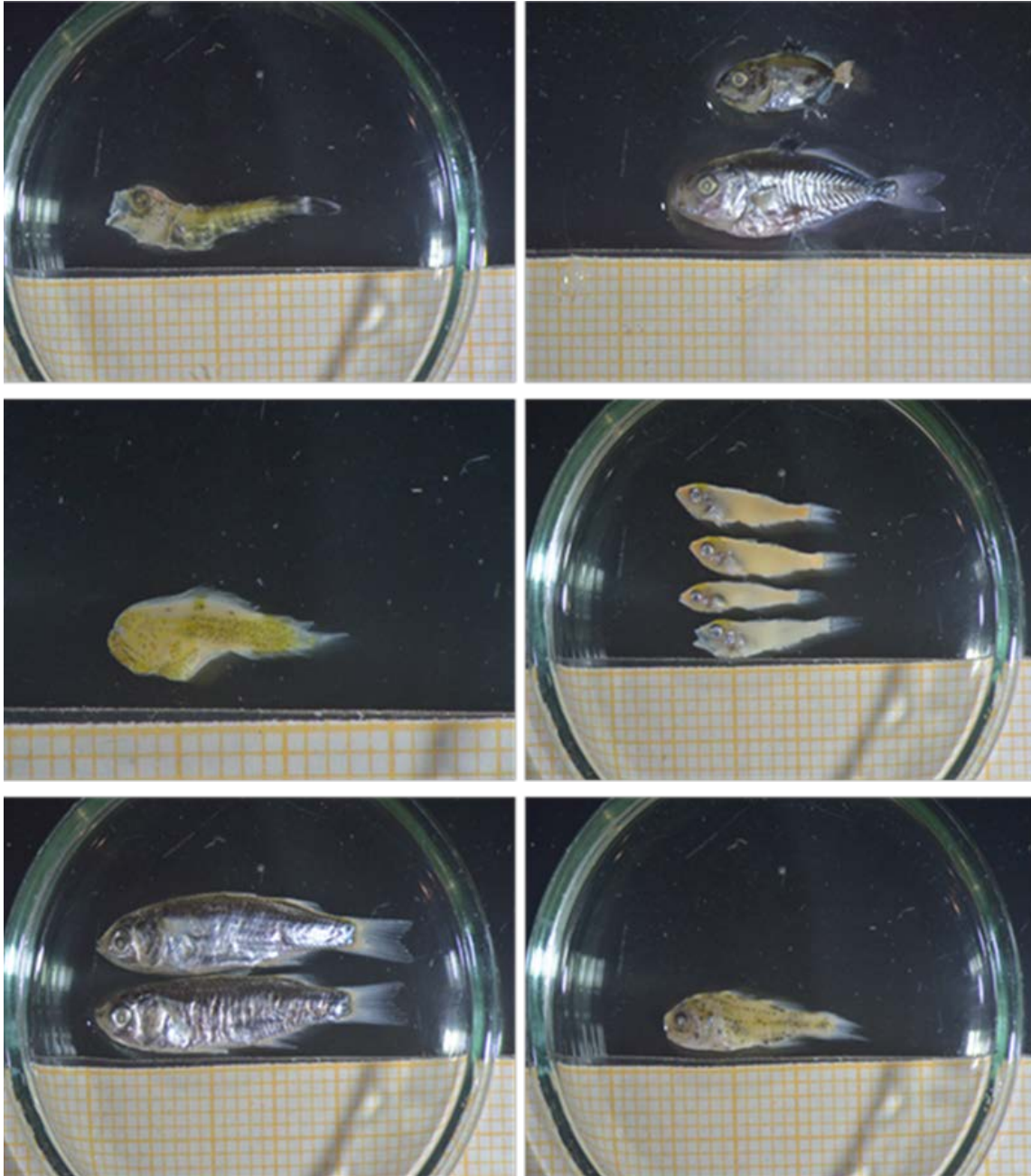


Figure 54. Larval and juvenile stages caught by the Manta trawl





Table 8. Stations at which each species was collected for nutritional purposes

Species	Station number
<i>Engraulis encrasicolus</i>	3, 10, 23, 27, 30, 32, 34, 35, 104
<i>Sardinella aurita</i>	10, 15, 18, 23, 31, 119
<i>Sphyraena guachancho</i>	17
<i>Sardinella maderensis</i>	31, 34, 53, 82
<i>Brachydeuterus auritus</i>	53, 58, 65, 112
<i>Trachurus trecae</i>	125, 134, 141

Table 9. Stations at which each species was collected for microplastics

Species	Station number
<i>Selene dorsalis</i>	7
<i>Peneaus notialis</i>	7
<i>Brachydeuterus auritus</i>	7, 112
<i>Engraulis encrasicolus</i>	9, 23, 27, 30, 104
<i>Trachurus trecae</i>	127

Table 10. Stations at which each species was collected for parasite analysis

Species	Station	Number of samples	Type of parasite analysis
<i>Dentex angolensis</i>	20	15	<i>Anisakis</i> sp. Total=89
	33	32	
	40	15	
	45	27	
<i>Galeoides decadactylus</i>	54	37	<i>Kodua</i> sp. Total=119
	63	20	
	97	17	
	104	5	
<i>Sardinella aurita</i>	31	11	
<i>Sardinella maderensis</i>	42	12	
	46	5	

The collected samples will be analyzed for their composition within the framework of the EAF-Nansen Science Plan. Results were not available until the writing of the current report due to delayed arrival of the samples in IMR.

### 3.7 Pelagic resources

The maps of the main acoustic groups of pelagic fish (Figures 57, 59, 61), i.e. anchovy, sardinellas, and PEL 2 (mainly carangids and scombrids), 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 the *Dr Fridtjof Nansen*. The estimated numbers and biomass of *Engraulis encrasicolus* and *Sardinella* spp. by length-group and country are provided in Annex VI.

### 3.7.1 Distribution, size and biomass estimates of pelagic fish

#### Anchovy

Many schools of *Engraulis encrasicolus* were recorded on the inner shelf in Ghanaian waters. In shallow waters, mostly at depths between 20 m and 30 m schools of various density appeared both at day and nighttime (Figure 55). Catches of anchovy (5–13 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 20 000 tonnes, applying the estimated factors,  $a = 0.0074$  and  $b = 2.976$  for Ghana and  $a = 0.0062$  and  $b = 3.054$  for Côte d'Ivoire, in the relationship  $\text{Weight} = a \cdot \text{Length}^b$ , for the conversion of individuals to biomass. As seen in Figure 55, the distribution of biomass was more pronounced in the proximity of Cape Three Points. As such, the estimated biomass of anchovy in Ghanaian waters was 18 372 t, whereas for Côte d'Ivoire 1 744 t. The length frequency distribution is presented in Figure 58. Information on sex and maturity stages is provided in Annex VII.

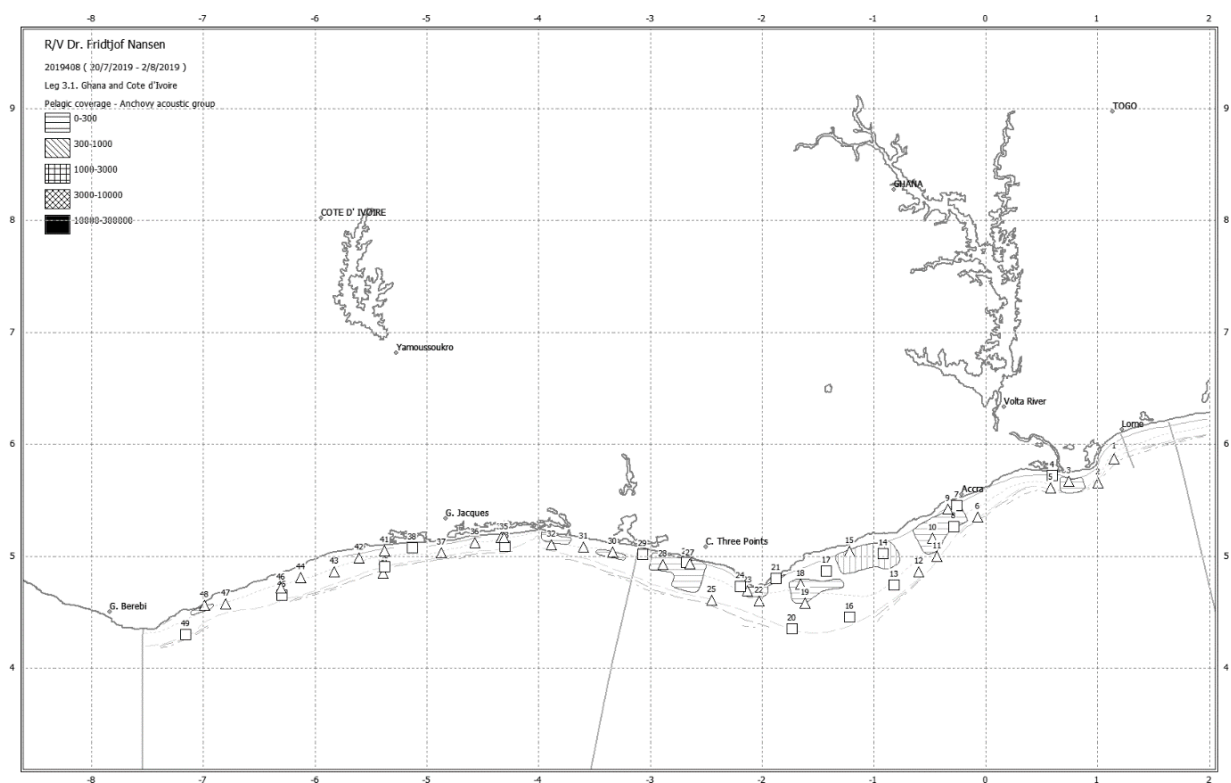


Figure 57. Anchovy acoustic group distribution and trawls carried out during the pelagic coverage

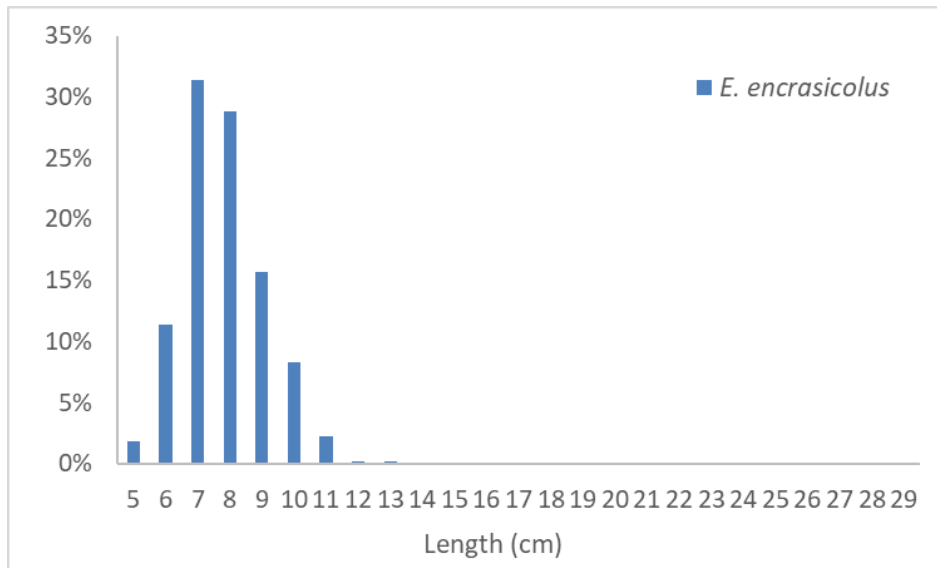


Figure 58. Length frequency distribution (LF) (right) for *Engraulis encrasicolus* in the area. The LF distribution is based on equal weight pooled sums of individual lengths in the trawl catches

*Sardinella* spp.

Sardinellas occurred in trawl hauls only a few places on the inner shelf west of Cape Three Points (Figure 59). A few schools of low density were allocated to sardinellas in this area. On the contrary, higher registrations were allocated to sardinellas on the inner shelf east of Cape Three Points. The total biomass of sardinellas was estimated to be about 10 000 tonnes, applying pooled and non-weighted length distributions from trawl hauls. In contrast to anchovy, the bulk of the biomass seemed concentrated on the inner shelf east of Cape Three Points. *Sardinella aurita* in Ghanain waters was estimated at 7 181 t whereas *S. maderensis* at 217 t. For Côte d’Ivoire, *Sardinella aurita* was estimated at 679 t whereas *S. maderensis* at 1 934 t. The length frequency distributions for the two species are depicted in Figure 60. Information on sex and maturity stages is provided in Annex VII.

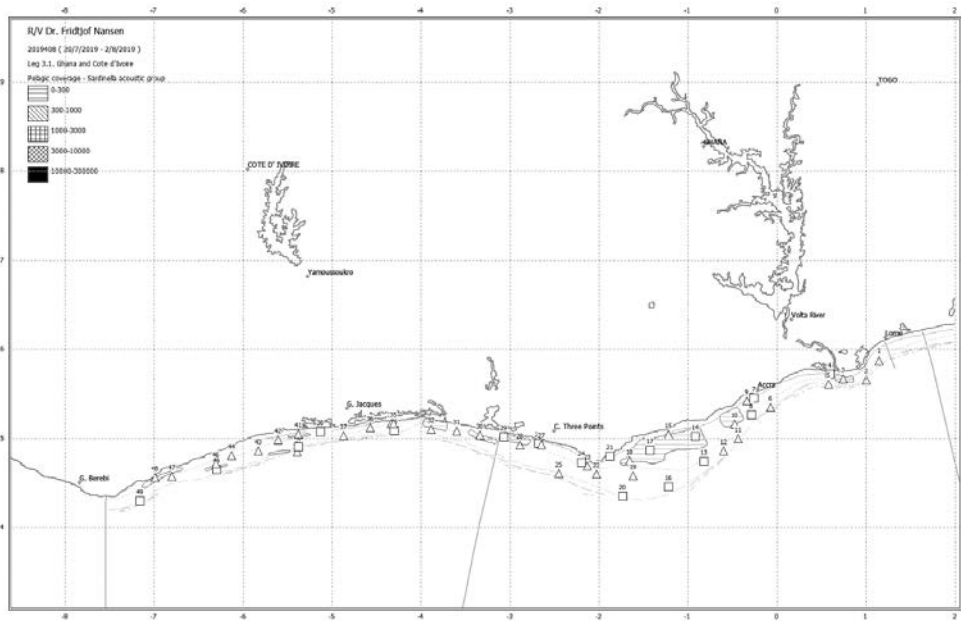


Figure 59. *Sardinella* acoustic group distribution and trawls carried out during the pelagic coverage

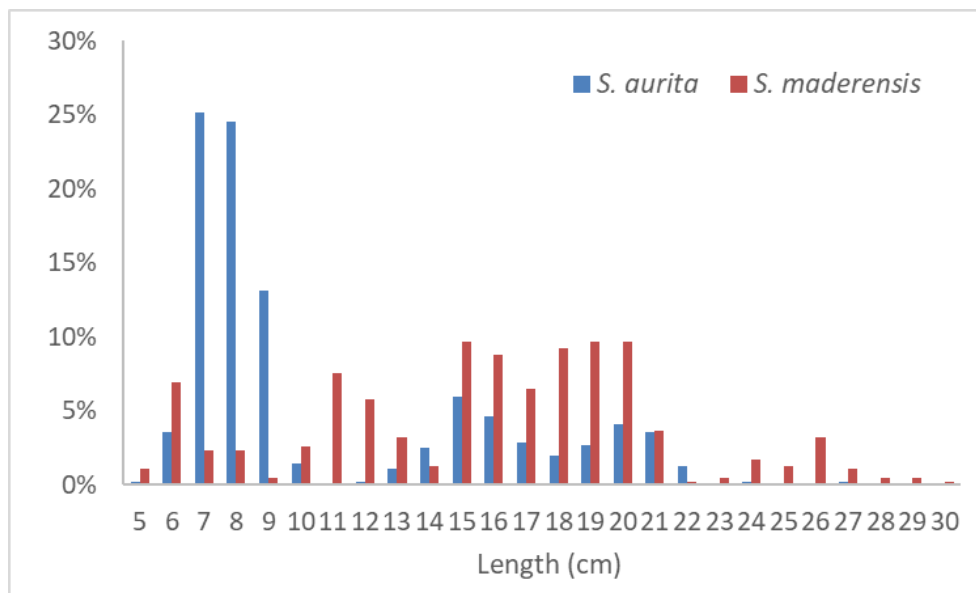


Figure 60. Length frequency distribution (LF) (right) for the two *Sardinella* spp. in the area. The LF distribution is based on equal weight pooled sums of individual lengths in the trawl catches

*PEL 2 (carangids, scombrids, barracudas and hairtail)*

This group consisted mainly of carangids and scombrids and was found throughout the surveyed area (Figure 61). *Trachurus trecae*, *Chloroscombrus chrysurus* and *Selene dorsalis* were the most abundant species in the trawl catches, caught on the whole shelf area. *Scomber colias* and *Scomberomorus tritor* were the most abundant scombrids in the trawl hauls and *Trichiurus lepturus* the most abundant hairtail species. The biomass of PEL 2 was estimated to be 110 500 tonnes, applying a decided length (median) of 10 cm and a condition factor of 0.009. Of these, about 69 000 tonnes were in the EEZ of Côte d'Ivoire, where about

42 000 tonnes in the Ghanaian EEZ<sup>1</sup>. Information on sex and maturity stages for some key PEL2 species is provided in Annex VII.

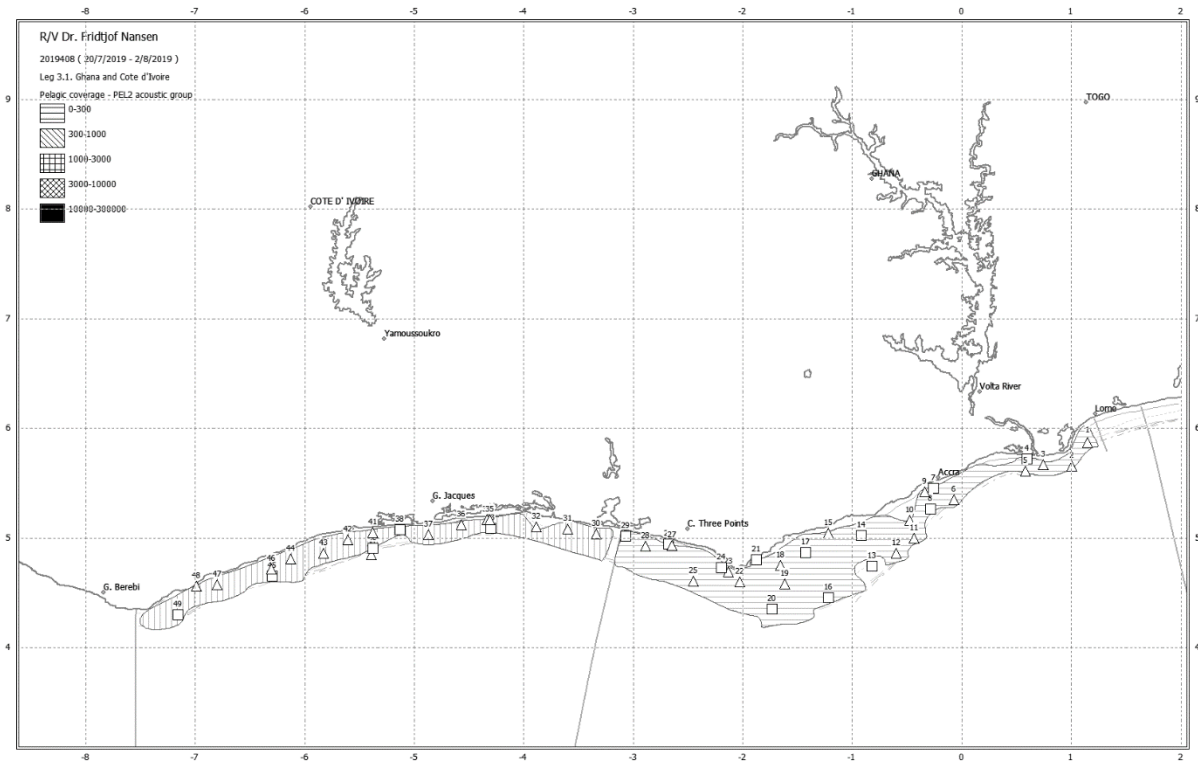


Figure 61. PEL2 acoustic group distribution and trawls carried out during the pelagic coverage

### PEL 1

No sound backscatter was allocated to PEL1 group, due to negligible contribution of PEL1 group species in the catches.

### Other pelagic species

In the trawl hauls, other pelagic species such as barracudas (mainly *Sphyraena guachancho*), were also quite abundant, mainly at the inner shelf. Separate biomass estimations were not carried out for this acoustic group. In this acoustic category, the benthopelagic *Brachydeuterus auratus* was also considered (see map of catches in the demersal resources section of the report).

<sup>1</sup> In the acoustic files for log 671 to 675 acoustic values are mistakenly assigned to PEL2 instead of the Other pelagic species (large catches of *Brachydeuterus auratus*). This has been corrected in the pelagic biomass estimation excel files provided with this report.

### 3.8 Demersal resources

The composition of the fish fauna on the continental shelf and slope of the western Gulf of Guinea changes with depth (Williams, 1968). The provided catch-rates in the tables listed under section 3.8.2 were calculated for two depth strata on the shelf, 0–50 m (inner shelf) and 51–100 m (outer shelf). In the calculations 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 mainly benthopelagic). For the different catch-rates tables, the “other” group includes all species not accounted for in the groups listed. Therefore, the content of “other” will change from table to table in the tables listed under section 3.8.2.

Position of trawl stations is shown in Figure 6. Records of fishing stations and catch densities per priority species are presented in section 3.8.1.1 Distribution of catch of demersal resources. Pooled length distributions of main species by area are shown in Annex VIII, whereas information on sex and maturity stages is provided in Annex VII.

In the swept-area biomass estimates, only the shelf area down to depths of 100 m was included, divided into 0–30 m, 31–50 m and 51–100 m. Moreover, due to the disruption of the demersal part of the survey close to the east border of Ghana (see Section 1.4 Narrative) the area used in the biomass estimates for Ghana extends from the border of Ghana and Côte d’Ivoire up to 0° longitude. The table with the areas per depth stratum for the two countries is provided in Annex IX.

#### 3.8.1 Results of the swept area survey

A total of 46 swept-area trawl hauls were carried out on the shelf of Ghana, whereas 49 swept-area trawl hauls were carried out in Ivorian waters (four deeper than 100 m are not included in the biomass estimations). The densities of the catches are shown in Figures 62 to 65. In Tables 11 to 18, catch rates by main groups for the inner (0–50 m) and outer (51–100 m) shelf, respectively, are presented for each country.

##### 3.8.1.1 Distribution of catch of demersal resources

*Pagellus bellottii* was captured in the majority of bottom trawl stations. Regarding the priority snappers (*Dentex angolensis*, *D. canariensis* and *Lutjanus fulgens*), catch rates of *D. angolensis* were higher than *D. canariensis* and mainly distributed in the Ivorian Exclusive Economic Zone. The lower catch rates of *D. canariensis* were distributed more evenly in both the Ivorian and the Ghanaian EEZs.



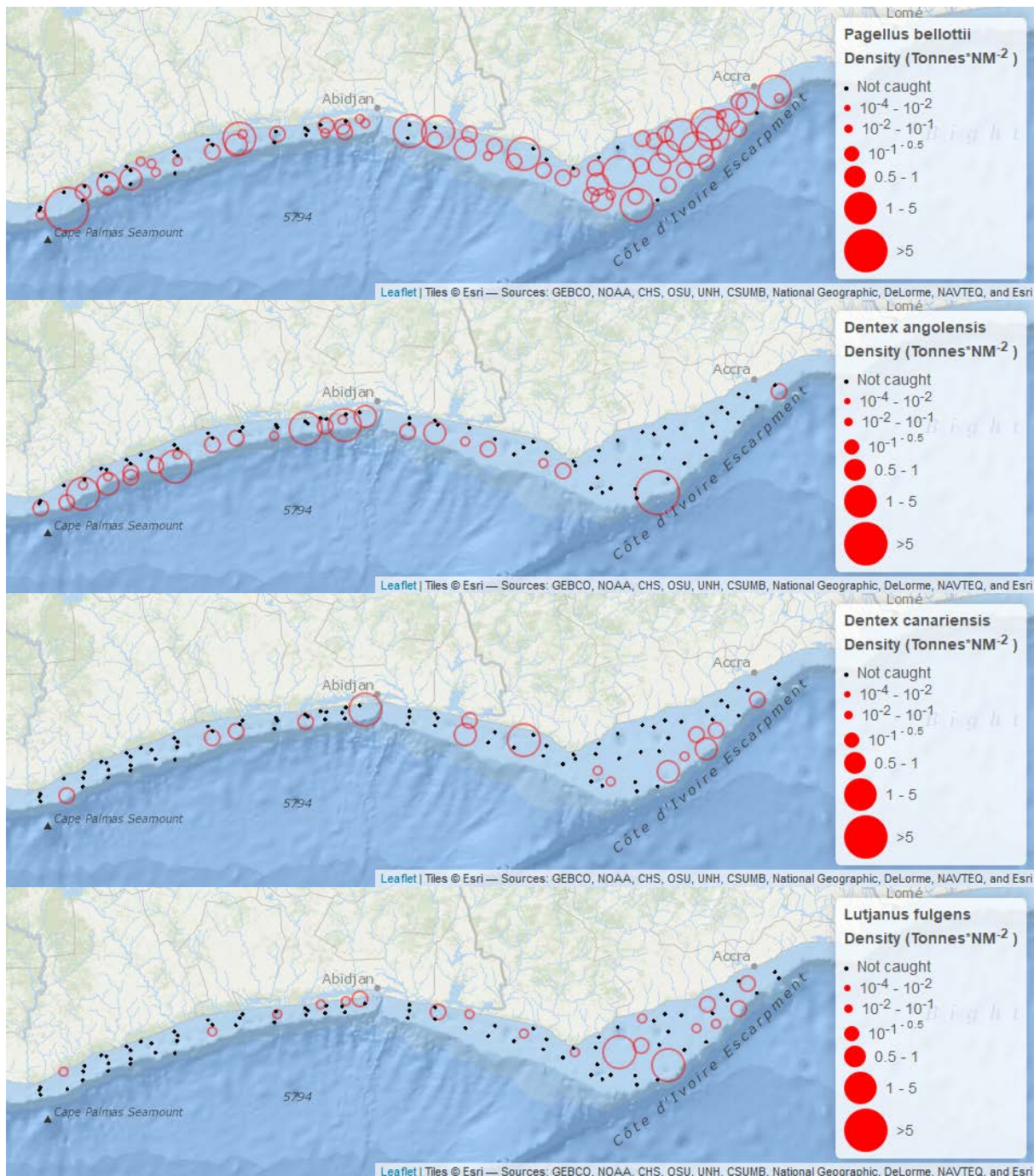


Figure 62. Catch rates (Tonnes\*NM<sup>-2</sup>) for *Pagellus bellottii* and the three priority snapper species (*Dentex angolensis*, *D. canariensis* and *Lutjanus fulgens*)

From the two croaker priority species, *Pseudotolithus senegalensis* was the one almost exclusively captured, with *P. typus* captured at only two stations. *P. Senegalensis* distribution started near Cape Three Points and extended until the western border of the Ivorian EEZ (Figure 63).



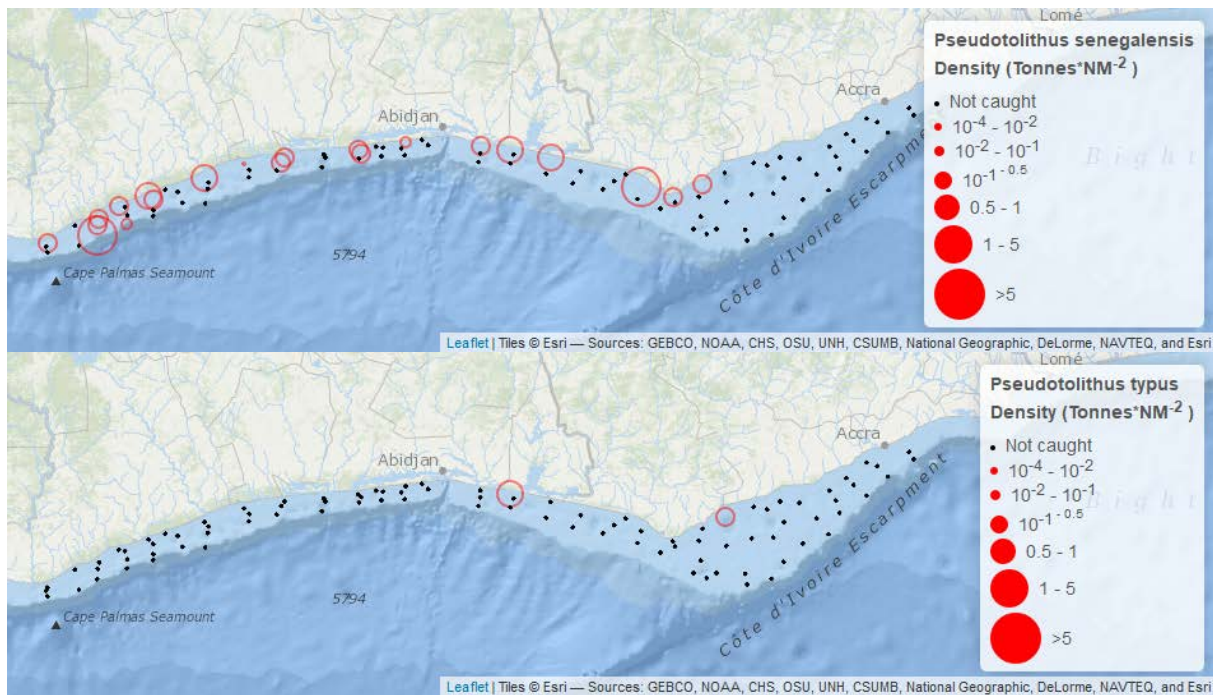
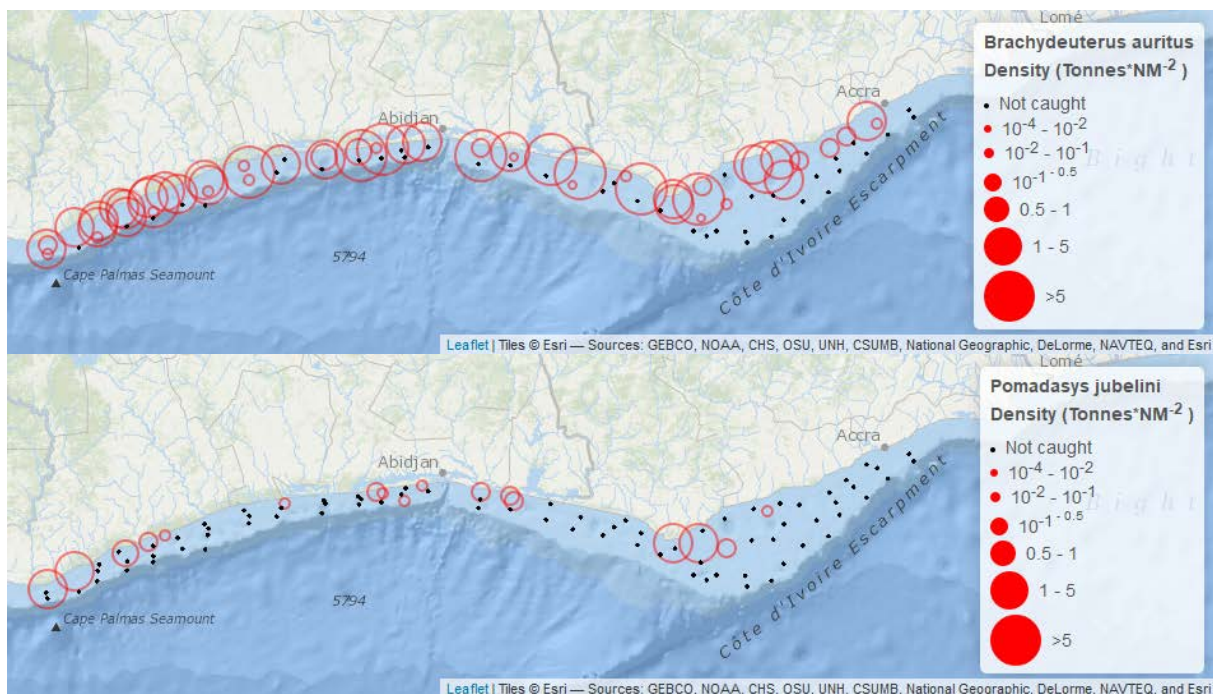


Figure 63. Catch rates (Tonnes\*NM<sup>2</sup>) for *Pseudotolithus senegalensis* and *P. typus*

Regarding grunts, *Brachydeuterus auritus* had a widespread distribution and dominated the catches in both EEZs (Figure 64). Species of the Pomadasys genus were caught rarely, without any specific pattern, apart from the fact that *P. perotaei* was only caught in the Ivorian EEZ (Figure 64).



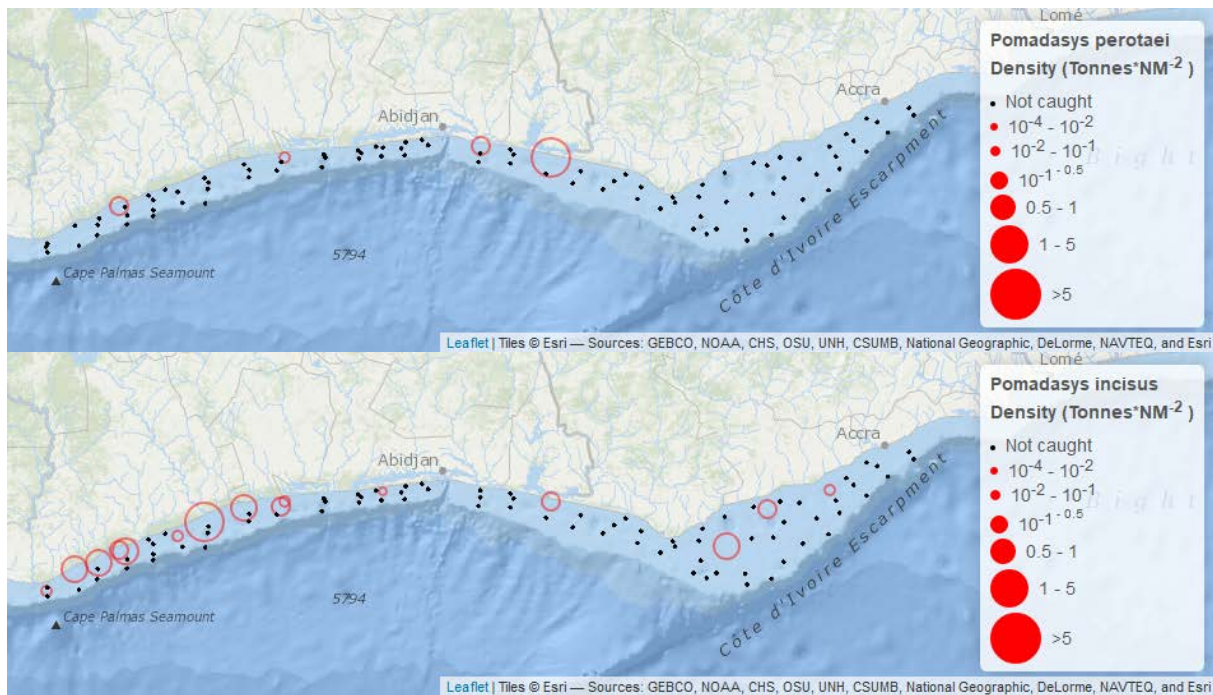


Figure 64. Catch rates (Tonnes\*NM<sup>-2</sup>) for grunts *Brachydeuterus auritus* *Pomadasys jubelini*, *P. perotaei* and *P. incisus*

Finally, both for the grouper *Epinephelus aeneus* and the lesser african threadfin (*Galeoides decadactylus*) catches were evenly distributed between the two EEZs, with slightly increased catch rates in the Ivorian EEZ for *G. decadactylus* (Figure 65).

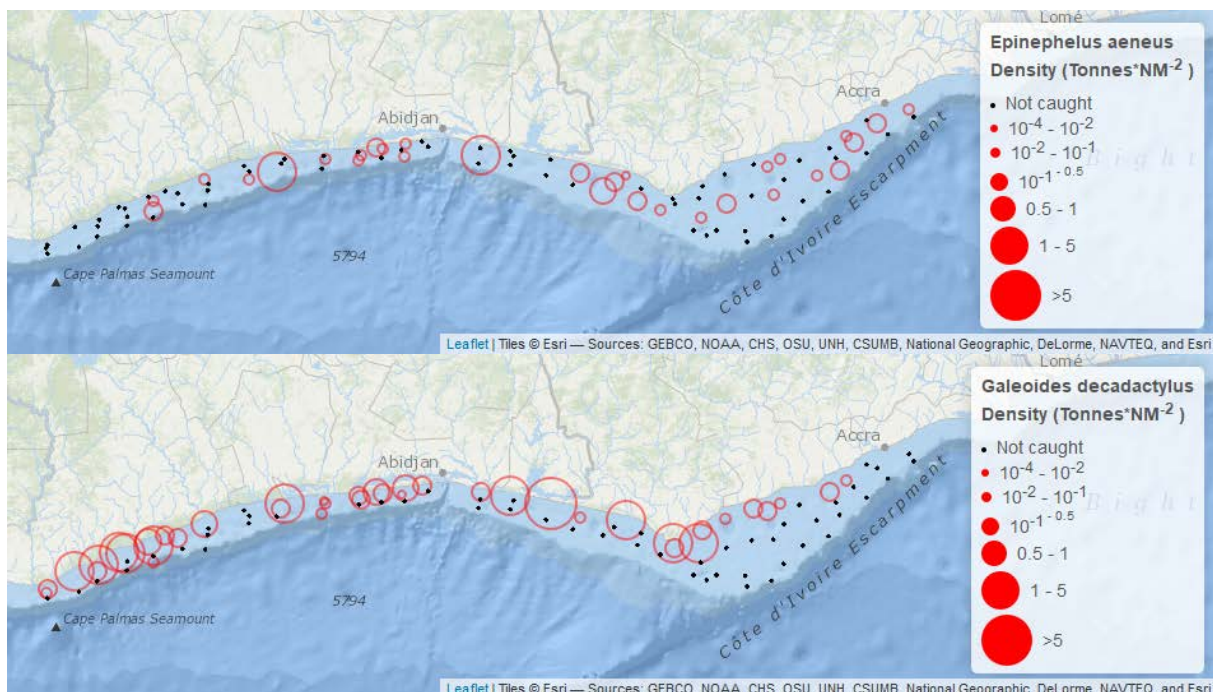


Figure 65. Catch rates (Tonnes\*NM<sup>-2</sup>) for the grouper *Epinephelus aeneus* and the lesser African threadfin *Galeoides decadactylus*



## 3.8.2 Catch rates

### 3.8.2.1 Ghana

The pelagic species group had the highest average catch rate on both the inner and outer shelf, with relative contributions of 37% and 52%, respectively. The group ‘Other’ followed with relative contributions of 31% and 32%, on the inner and outer shelf, respectively. The demersal group followed with 30% and 14%, on the inner and outer shelf, respectively. The remaining groups contributed with less than 2% in the catch on both the inner and outer shelf. All results are shown in Table 11.

Table 11. 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	Gear depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Rays	Other	Total
98	25.5	1 171.14	164.72	6.59	3.88	0.00	3.84	448.17	1 798.33
101	44.0	564.13	194.87	0.00	25.58	0.46	5.03	409.93	1 200.00
103	46.5	169.73	107.82	0.00	18.54	10.13	2.68	286.56	595.46
104	24.5	23.22	199.58	7.65	14.95	0.00	0.32	615.23	860.95
106	42.0	354.48	2 709.36	9.70	0.77	0.00	0.00	118.20	3 192.52
109	48.0	338.84	8.97	0.00	6.47	0.00	8.12	122.39	484.79
110	25.5	10.20	147.83	6.28	42.68	0.00	0.00	118.37	325.35
111	26.0	35.75	589.89	9.58	39.58	0.00	0.00	1 360.22	2 035.02
112	44.5	2 433.21	189.77	0.00	1.96	0.00	53.88	285.07	2 963.89
120	44.0	43.26	31.23	0.01	20.67	0.00	0.00	46.49	141.66
121	43.0	176.33	402.58	0.00	6.10	0.00	6.64	536.45	1 128.10
122	26.0	111.81	16.18	3.18	6.88	0.00	0.00	96.10	234.16
123	38.0	100.97	96.61	0.00	8.43	0.00	0.00	35.53	241.54
124	27.5	127.52	144.74	0.00	4.95	0.00	0.00	120.11	397.32
125	42.0	79.86	57.65	0.00	11.30	0.00	0.00	166.13	314.95
128	39.0	76.91	73.70	0.00	6.47	0.00	0.00	31.26	188.33
129	29.0	123.26	12.18	1.61	12.31	0.00	3.03	155.18	307.57
131	38.5	84.51	423.05	0.00	25.62	0.00	0.96	224.47	758.60
132	27.0	129.95	146.57	0.00	3.97	0.00	0.00	230.51	511.00
133	26.0	321.05	1 082.06	0.50	0.00	0.00	0.00	357.56	1 761.17
134	44.0	73.07	337.10	0.00	8.73	0.00	0.52	105.23	524.65
137	47.0	71.25	121.28	0.00	26.25	0.00	0.76	72.87	292.41
138	29.5	204.80	136.83	0.00	5.07	0.00	0.00	81.55	428.25
139	24.0	96.16	267.25	0.00	18.22	0.00	1.71	187.10	570.45
142	46.0	147.33	164.78	5.75	5.68	0.00	13.40	191.13	528.07
143	26.5	112.02	1 095.81	14.12	11.05	0.00	11.66	1 025.93	2 270.58
Mean		265.95	330.46	2.41	12.45	0.39	4.17	275.10	890.93
SE		94.69	106.32	0.77	2.19	0.37	2.04	59.75	168.08
% Catch		29.85	37.09	0.27	1.40	0.04	0.47	30.88	100.00

#### b) Outer shelf, 51–100m

Station	Gear depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Rays	Other	Total
99	71.0	62.30	30.92	0.02	11.01	1.80	0.00	419.40	525.45
100	73.5	33.10	5.77	0.09	14.32	0.00	0.00	85.44	138.72
102	65.5	28.81	630.33	0.00	26.08	0.00	0.00	73.06	758.28
107	66.0	47.25	521.56	0.32	5.25	10.12	0.00	122.85	707.34
108	69.0	40.72	20.84	6.28	12.89	0.00	0.00	164.33	245.06
113	60.5	22.41	36.39	0.00	13.00	0.00	0.90	30.22	102.92
114	75.0	24.57	402.63	0.00	29.43	0.00	0.00	521.50	978.14
115	85.0	48.52	1 165.07	0.00	23.38	4.22	10.69	168.27	1 420.14
116	62.0	48.12	105.11	0.00	7.00	0.00	0.47	198.63	359.34
117	94.5	906.41	33.96	0.00	17.20	21.75	3.48	302.53	1 285.32
118	57.5	133.19	9.99	0.00	14.98	0.00	0.00	279.40	437.56
119	55.0	173.74	137.30	0.00	20.26	0.00	0.00	186.08	517.38
126	76.5	75.27	5.70	0.00	4.01	0.00	1.31	37.50	123.79
127	53.5	28.79	1 236.34	0.00	15.25	0.00	0.00	125.15	1 405.53
130	67.5	361.21	2 041.81	0.00	3.70	0.00	0.00	698.93	3 105.65
135	92.0	157.60	1 777.10	0.00	2.34	0.00	0.00	1 665.37	3 602.40
136	89.0	15.51	0.92	0.00	4.17	0.00	0.00	9.04	29.64
140	67.0	38.80	104.88	0.04	3.24	0.00	3.17	49.09	199.21
141	79.0	27.73	182.66	0.00	15.19	0.00	4.96	75.80	306.34
Mean		119.69	444.70	0.36	12.77	1.99	1.31	274.35	855.17
SE		47.67	146.75	0.33	1.86	1.23	0.62	87.74	226.26
% Catch		14.00	52.00	0.04	1.49	0.23	0.15	32.08	100.00

Table 12 a-b shows catch rates of the most important pelagic families caught in the bottom-trawl hauls. From the families not belonging to the ‘Other’ group, Hairtails dominated the inner shelf with a mean catch rate of 174.3 kg/h, followed by Carangids with 105.6 kg/h. Carangids dominated the catches on the outer shelf (355 kg/h). Clupeids had a relatively low catch rate of 47 and 37 kg/h, on the inner and outer shelf respectively.

Table 12. 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	Gear depth	Barracuda	Carangidae	Clupeids	Hairtails	Scomberids	Other	Total
98	25.5	28.8	67.7	48.5	19.8	0.0	1 633.6	1 798.3
101	44.0	55.3	119.5	20.1	0.0	0.0	1 005.1	1 200.0
103	46.5	1.2	103.9	2.5	0.0	0.2	487.6	595.5
104	24.5	3.3	41.3	141.8	12.7	0.5	661.4	861.0
106	42.0	0.0	0.8	0.0	2 708.6	0.0	483.2	3 192.5
109	48.0	0.9	6.1	1.0	1.0	0.0	475.8	484.8
110	25.5	1.7	113.3	0.2	31.9	0.6	177.5	325.4
111	26.0	7.7	157.1	8.3	416.9	0.0	1 445.1	2 035.0
112	44.5	18.0	38.0	84.5	42.1	7.2	2 774.1	2 963.9
120	44.0	3.5	27.5	0.2	0.0	0.0	110.4	141.7
121	43.0	6.3	396.3	0.0	0.0	0.0	725.5	1 128.1
122	26.0	3.5	4.1	3.4	5.2	0.0	218.0	234.2
123	38.0	3.0	93.5	0.1	0.0	0.0	144.9	241.5
124	27.5	24.7	87.2	32.9	0.0	0.0	252.6	397.3
125	42.0	2.2	42.6	12.9	0.0	0.0	257.3	315.0
128	39.0	1.9	71.9	0.0	0.0	0.0	114.6	188.3
129	29.0	7.4	3.4	1.0	0.5	0.0	295.4	307.6
131	38.5	0.0	379.8	41.2	0.0	2.0	335.6	758.6
132	27.0	8.8	118.3	0.0	0.6	18.9	364.4	511.0
133	26.0	63.0	238.8	774.2	0.0	6.1	679.1	1 761.2
134	44.0	24.4	310.3	1.3	1.1	0.0	187.6	524.7
137	47.0	28.4	60.7	21.4	1.5	9.3	171.1	292.4
138	29.5	22.1	67.3	16.7	30.7	0.0	291.4	428.3
139	24.0	63.5	178.5	1.4	23.9	0.0	303.2	570.5
142	46.0	0.0	4.1	0.0	154.7	6.0	363.3	528.1
143	26.5	0.0	14.1	0.0	1 081.1	0.0	1 175.4	2 270.6
Mean		14.6	105.6	46.7	174.3	2.0	582.1	925.2
SE		3.8	22.0	29.8	110.4	0.9	118.5	171.0
% Catch		1.58	11.42	5.04	18.84	0.21	62.91	100.00

b) Outer shelf, 51–100m

Station	Gear depth	Barracuda	Carangidae	Clupeids	Hairtails	Scomberids	Other	Total
99	71.0	0.00	22.09	0.00	1.36	7.47	494.53	525.45
100	73.5	3.90	1.87	0.00	0.00	0.00	132.95	138.72
102	65.5	0.64	493.99	18.95	1.36	115.39	127.95	758.28
107	66.0	0.00	519.16	0.00	2.40	0.00	185.78	707.34
108	69.0	0.00	11.25	3.43	5.09	1.07	224.22	245.06
113	60.5	0.00	35.88	0.16	0.00	0.35	66.53	102.92
114	75.0	0.00	0.00	0.00	0.17	402.46	575.51	978.14
115	85.0	0.00	1 165.07	0.00	0.00	0.00	255.07	1 420.14
116	62.0	0.00	90.23	5.33	0.00	9.56	254.23	359.34
117	94.5	0.00	23.92	0.00	0.00	10.03	1 251.36	1 285.32
118	57.5	0.00	9.99	0.00	0.00	0.00	427.57	437.56
119	55.0	0.00	70.94	66.36	0.00	0.00	380.08	517.38
126	76.5	0.00	5.46	0.00	0.00	0.24	118.09	123.79
127	53.5	0.00	1 230.68	5.66	0.00	0.00	169.19	1 405.53
130	67.5	0.00	1 442.97	523.37	0.00	75.47	1 063.84	3 105.65
135	92.0	0.00	1 346.22	74.22	0.00	356.66	1 825.31	3 602.40
136	89.0	0.00	0.92	0.00	0.00	0.00	28.72	29.64
140	67.0	0.49	102.61	0.00	0.00	1.79	94.34	199.21
141	79.0	0.00	167.04	0.00	0.00	15.62	123.68	306.34
Mean		0.26	354.75	36.71	0.55	52.43	410.47	855.17
SE		0.21	120.22	27.50	0.29	27.38	108.85	226.26
% Catch		0.03	41.48	4.29	0.06	6.13	48.00	100.00

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 13 a-b. Seabreams had the highest catch rates both on the inner and outer shelf with average catch rates of 53.2 kg/h and 87.2 kg/h, respectively. The most common species of seabreams were *Pagellus bellottii*, *Pagrus caeruleostictus* and *Dentex gibbosus*, followed by *D. canariensis*, *D. congoensis* and *D. angolensis*. The second most important group on the inner shelf was that of croakers, with average catch rate of 14 kg/h, followed by grunts and (7.5 kg/h) and snappers (6.1 kg/h). On the outer shelf, seabreams were followed by snappers (4.9 kg/h) with the rest of the groups contributing with less than 0.5% to the catch.

Table 13. 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 (51-100 m)

a) Inner shelf, 0–50m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
98	25.5	43.59	0.00	61.09	28.15	0.60	1 664.89	1 798.33
101	44.0	0.00	8.79	0.00	12.17	0.00	1 179.04	1 200.00
103	46.5	26.23	6.50	0.00	134.73	2.06	425.94	595.46
104	24.5	10.97	0.28	0.00	8.92	0.00	840.79	860.95
106	42.0	166.68	0.00	0.00	0.00	0.00	3 025.84	3 192.52
109	48.0	0.00	12.81	27.97	195.68	101.50	146.83	484.79
110	25.5	10.20	0.00	0.00	0.00	0.00	315.15	325.35
111	26.0	18.51	0.00	0.00	0.00	0.00	2 016.51	2 035.02
112	44.5	0.00	0.00	55.95	14.75	0.00	2 893.19	2 963.89
120	44.0	0.00	3.03	0.00	40.23	0.00	98.40	141.66
121	43.0	0.00	0.00	5.10	135.37	22.59	965.04	1 128.10
122	26.0	36.02	1.95	0.00	17.46	0.00	178.73	234.16
123	38.0	0.00	0.00	0.00	38.77	0.00	202.77	241.54
124	27.5	0.00	0.00	0.00	120.06	0.00	277.26	397.32
125	42.0	0.00	3.68	0.00	68.49	7.04	235.74	314.95
128	39.0	0.00	0.00	0.00	76.91	0.00	111.43	188.33
129	29.0	0.00	0.36	0.47	66.93	12.43	227.39	307.57
131	38.5	0.00	10.34	0.92	72.21	0.00	675.13	758.60
132	27.0	0.00	5.59	0.00	71.77	0.00	433.64	511.00
133	26.0	0.00	0.00	0.00	109.41	0.00	1 651.76	1 761.17
134	44.0	0.00	9.13	0.00	57.64	5.20	452.68	524.65
137	47.0	0.00	1.44	0.00	69.81	0.00	221.16	292.41
138	29.5	0.00	0.74	6.51	22.14	0.00	398.85	428.25
139	24.0	6.68	0.00	0.00	18.65	3.11	542.00	570.45
142	46.0	15.54	0.00	0.00	2.51	1.60	508.41	528.07
143	26.5	30.00	0.00	36.03	0.00	2.42	2 202.13	2 270.58
Mean		14.02	2.49	7.46	53.18	6.10	841.95	925.20
SE		6.60	0.76	3.41	10.14	3.94	169.75	171.01
% Catch		1.51	0.27	0.81	5.75	0.66	91.00	100.00

b) Outer shelf, 51–100m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
99	71.0	0.00	2.92	0.00	50.03	0.00	472.50	525.45
100	73.5	5.76	0.00	0.00	16.50	0.00	116.46	138.72
102	65.5	0.00	23.20	0.00	5.61	0.00	729.47	758.28
107	66.0	16.39	11.95	0.00	13.88	0.00	665.12	707.34
108	69.0	0.00	0.93	0.00	17.40	0.00	226.73	245.06
113	60.5	0.00	1.29	0.00	20.96	0.00	80.67	102.92
114	75.0	0.00	0.00	0.00	24.57	0.00	953.57	978.14
115	85.0	2.67	0.00	0.00	44.69	0.00	1 372.78	1 420.14
116	62.0	0.00	0.00	0.00	15.78	0.00	343.56	359.34
117	94.5	0.00	0.00	0.00	906.41	0.00	378.91	1 285.32
118	57.5	0.00	0.00	0.00	55.00	78.19	304.37	437.56
119	55.0	0.00	0.00	0.00	170.69	0.00	346.69	517.38
126	76.5	0.00	0.00	0.00	75.27	0.00	48.52	123.79
127	53.5	0.00	3.51	0.00	12.39	10.46	1 379.17	1 405.53
130	67.5	0.00	0.00	0.00	123.56	4.50	2 977.60	3 105.65
135	92.0	0.00	0.00	0.00	58.64	0.00	3 543.76	3 602.40
136	89.0	0.03	0.00	0.00	15.48	0.00	14.13	29.64
140	67.0	0.16	0.00	0.00	4.54	0.00	194.51	199.21
141	79.0	0.86	0.07	0.00	25.41	0.00	280.00	306.34
Mean		1.36	2.31	0.00	87.20	4.90	759.40	855.17
SE		0.90	1.33	0.00	46.56	4.11	223.12	226.26
% Catch		0.16	0.27	0.00	10.20	0.57	88.80	100.00

### 3.8.2.2 Côte d'Ivoire

The group 'Other' had the highest average catch rate on the inner and the second highest on the outer shelf, with relative contributions of 43% and 32%, respectively. On the inner shelf, demersal and pelagics followed with relative contributions of 29% and 21% respectively. On the outer shelf, pelagic was the group with the highest contribution to the catch (32%) with demersal following closely with 28%. Except for a 6% contribution of cephalopods on the outer shelf, the rest of the groups contributed with <3% throughout the shelf. All results are shown in Table 14.

Table 14. 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	Gear depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Rays	Other	Total
50	41.0	238.02	60.82	13.50	0.12	0.00	2.05	202.51	517.02
51	29.5	63.41	39.82	7.88	0.90	0.00	23.63	45.60	181.24
52	42.5	160.08	11.14	22.91	0.13	0.00	42.91	47.41	284.56
54	45.5	170.98	15.12	22.07	11.31	0.00	40.34	253.53	513.35
59	31.5	292.65	125.10	9.54	2.57	0.00	0.27	744.44	1 174.58
60	28.0	154.31	248.35	40.81	13.44	0.00	0.61	266.99	724.50
63	45.5	262.44	24.05	6.72	9.28	7.32	31.92	230.57	572.30
64	26.5	172.72	260.38	4.92	2.53	0.00	15.64	362.28	818.48
65	29.0	72.10	55.38	3.17	6.53	0.00	34.59	466.74	638.51
66	44.0	61.00	48.60	8.87	3.18	9.99	5.98	82.24	219.85
70	41.0	158.82	471.22	0.07	27.41	0.00	0.88	51.43	709.82
71	26.0	155.35	66.59	29.51	4.14	0.00	8.86	107.63	372.08
72	22.5	19.01	199.21	20.56	121.29	0.00	0.00	2 419.48	2 779.55
73	46.5	378.03	292.96	0.05	31.85	0.00	0.00	14.22	717.11
76	39.0	182.99	22.90	6.43	0.00	8.00	0.00	85.70	306.01
77	25.0	31.51	37.51	29.24	21.09	0.00	4.94	121.45	245.74
79	35.5	98.72	118.32	14.26	0.42	0.00	4.03	44.59	280.34
80	28.5	52.32	54.48	9.22	4.69	0.00	0.54	92.07	213.33
81	22.0	31.16	159.56	2.88	5.07	0.00	1.22	506.69	706.58
82	39.0	1 196.07	415.03	0.00	11.15	9.40	5.24	83.11	1 720.00
85	35.0	251.52	247.04	2.71	18.43	0.00	2.44	74.48	596.61
86	25.0	32.17	34.28	51.08	11.59	0.00	8.64	417.33	555.09
89	24.5	125.45	211.55	2.84	12.61	0.00	3.78	76.56	432.79
90	21.0	257.91	243.14	0.00	19.91	0.00	1.08	72.79	594.84
93	47.0	271.80	123.69	0.00	41.88	0.36	3.56	88.90	530.18
94	25.0	58.18	27.74	34.19	14.29	0.00	6.69	100.01	241.11
96	41.0	92.89	62.51	0.01	54.26	0.00	6.60	289.90	506.17
97	24.5	151.00	92.90	68.12	14.37	0.00	8.49	231.12	566.01
Mean		185.45	134.62	14.70	16.59	1.25	9.46	270.71	632.78
SE		41.40	23.36	3.26	4.60	0.59	2.42	86.09	99.80
% Catch		29.31	21.27	2.32	2.62	0.20	1.50	42.78	100.00

#### b) Outer shelf, 51–100m

Station	Gear depth	Demersal	Pelagic	Shrimps	Cephalopods	Sharks	Rays	Other	Total
49	80.0	170.35	5.30	0.00	28.93	0.00	1.86	5.49	211.93
53	75.5	446.35	32.89	3.90	22.55	14.59	0.17	104.34	624.78
55	62.0	247.94	12.19	25.84	23.63	0.00	4.31	126.14	440.05
58	64.0	201.10	264.32	4.08	7.78	0.00	0.00	58.61	535.89
62	75.5	70.86	133.88	0.00	60.04	1.61	4.84	216.60	487.83
67	75.0	15.97	246.76	0.00	16.67	0.00	0.92	79.56	359.88
69	59.0	12.74	43.30	0.00	30.75	0.00	0.00	44.32	131.11
74	63.0	36.38	134.15	0.00	24.33	8.87	0.00	19.52	223.25
75	67.5	172.93	774.17	0.00	16.05	0.00	2.13	98.99	1 064.26
78	87.0	183.24	114.11	3.01	1.99	0.00	0.29	50.13	352.78
83	71.0	71.89	279.77	1.74	82.26	3.47	1.32	37.96	478.41
84	83.5	26.11	50.97	6.56	14.59	0.00	0.00	25.04	123.26
87	85.5	117.59	18.13	0.00	9.31	0.00	0.00	115.74	260.78
91	74.0	159.81	33.58	0.00	33.60	0.00	1.84	48.41	277.25
92	87.5	12.80	19.94	0.00	12.40	0.00	0.00	1 008.49	1 053.63
95	72.5	51.50	139.76	4.99	19.91	0.00	0.00	235.89	452.05
Mean		124.85	143.95	3.13	25.30	1.78	1.11	142.20	442.32
SE		28.80	48.00	1.61	5.06	1.03	0.39	60.04	70.14
% Catch		28.23	32.54	0.71	5.72	0.40	0.25	32.15	100.00

Table 15 shows catch rates of the most important pelagic families caught in the bottom-trawl hauls. Throughout the shelf, the group ‘Other’ dominated the catch with mean catch rates of 498.3 kg/h and 298 kg/h, on the inner and outer shelf, respectively. Carangids followed throughout the shelf with 60.3 kg/h (inner) and 74.95 kg/h (outer). Clupeids had a low catch rate of 25 kg/h on the inner shelf whereas they were almost absent from the outer shelf (0.19 kg/h).

Table 15. 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	Gear depth	Barracuda	Carangidae	Clupeids	Hairtails	Scomberids	Other	Total
50	41.0	0.00	0.00	0.06	60.76	0.00	456.21	517.02
51	29.5	1.67	2.91	0.07	35.17	0.00	141.42	181.24
52	42.5	0.88	1.01	2.46	6.80	0.00	273.42	284.56
54	45.5	1.07	0.25	0.00	13.80	0.00	498.24	513.35
59	31.5	0.00	8.40	0.60	116.11	0.00	1 049.47	1 174.58
60	28.0	1.87	9.82	0.30	236.36	0.00	476.15	724.50
63	45.5	0.00	3.80	0.08	20.16	0.00	548.25	572.30
64	26.5	0.00	120.59	50.70	89.09	0.00	558.10	818.48
65	29.0	0.00	4.90	2.51	47.79	0.00	583.31	638.51
66	44.0	2.99	15.34	0.00	30.27	0.00	171.25	219.85
70	41.0	9.43	132.81	313.89	13.09	2.00	238.61	709.82
71	26.0	2.35	17.78	5.29	41.09	0.00	305.58	372.08
72	22.5	28.78	66.30	0.00	51.40	51.40	2 581.68	2 779.55
73	46.5	10.24	230.29	0.00	50.75	0.00	425.83	717.11
76	39.0	4.97	4.33	1.39	12.21	0.00	283.12	306.01
77	25.0	0.00	3.22	0.00	34.29	0.00	208.23	245.74
79	35.5	0.76	94.41	0.15	21.56	0.00	163.46	280.34
80	28.5	8.61	26.05	0.68	19.14	0.00	158.85	213.33
81	22.0	2.07	90.73	0.00	66.76	0.00	547.01	706.58
82	39.0	96.05	131.79	166.45	20.74	0.00	1 304.97	1 720.00
85	35.0	3.59	215.22	8.21	19.50	0.51	349.57	596.61
86	25.0	0.75	24.19	4.03	5.30	0.00	520.81	555.09
89	24.5	0.26	138.00	19.86	51.07	2.33	221.28	432.79
90	21.0	6.94	104.12	124.82	7.27	0.00	351.70	594.84
93	47.0	11.42	105.75	0.00	6.52	0.00	406.50	530.18
94	25.0	1.08	17.77	2.02	6.87	0.00	213.37	241.11
96	41.0	1.13	61.38	0.00	0.00	0.00	443.66	506.17
97	24.5	1.92	57.25	4.27	29.46	0.00	473.11	566.01
Mean		7.10	60.30	25.28	39.76	2.01	498.33	632.78
SE		3.48	12.55	12.96	8.90	1.83	91.14	99.80
% Catch		1.12	9.53	4.00	6.28	0.32	78.75	100.00

b) Outer shelf, 51–100m

Station	Gear depth	Barracuda	Carangidae	Clupeids	Hairtails	Scomberids	Other	Total
49	80.0	2.17	0.00	0.00	0.00	3.13	206.63	211.93
53	75.5	0.00	0.00	1.19	31.70	0.00	591.90	624.78
55	62.0	1.61	2.58	0.00	8.00	0.00	427.85	440.05
58	64.0	0.00	1.77	0.00	262.54	0.00	271.57	535.89
62	75.5	0.00	4.52	0.04	129.32	0.00	353.95	487.83
67	75.0	1.08	70.75	0.20	174.48	0.25	113.12	359.88
69	59.0	0.00	28.09	0.06	15.10	0.04	87.81	131.11
74	63.0	0.55	129.98	1.10	2.10	0.43	89.10	223.25
75	67.5	6.07	768.09	0.00	0.00	0.00	290.09	1 064.26
78	87.0	0.00	1.22	0.00	112.89	0.00	238.67	352.78
83	71.0	10.16	20.03	0.52	249.05	0.00	198.64	478.41
84	83.5	0.00	0.00	0.00	50.97	0.00	72.29	123.26
87	85.5	0.00	12.67	0.00	5.46	0.00	242.64	260.78
91	74.0	0.00	22.94	0.00	10.64	0.00	243.67	277.25
92	87.5	0.00	11.18	0.00	8.76	0.00	1 033.69	1 053.63
95	72.5	3.19	125.43	0.00	11.13	0.00	312.29	452.05
Mean		1.55	74.95	0.19	67.01	0.24	298.37	442.32
SE		0.71	47.42	0.10	22.66	0.19	59.49	70.14
% Catch		0.35	16.95	0.04	15.15	0.05	67.46	100.00

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 16. Croakers had the highest catch rate on the inner shelf (34.5 kg/h) followed by grunts (12.14 kg/h) and seabreams (7.16 kg/h). On the outer shelf, however, seabreams were the most important contributors to the catch (39.76 kg/h), followed by croakers (16.9 kg/h) and groupers (6.9 kg/h). The second most important group on the inner shelf was that of croakers, with average catch rate of 14 kg/h, followed by grunts and (7.5 kg/h) and snappers (6.1 kg/h). The most common species of seabreams were *Pagellus bellottii* and *Dentex angolensis*, whereas of croakers, *Pseudotolithus senegalensis* and *P. senegallus*. On the outer shelf, seabreams were followed by snappers (4.9 kg/h, most important species: *Lutjanus fulgens*) with the rest of the groups contributing with less than 0.5% to the catch.

Table 16. 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 (51–100 m)

a) Inner shelf, 0–50m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
50	41.0	31.84	0.00	56.39	0.00	0.52	428.27	517.02
51	29.5	11.29	0.00	45.32	0.00	0.00	124.63	181.24
52	42.5	12.09	0.00	0.63	0.00	0.00	271.84	284.56
54	45.5	42.39	0.00	17.93	0.00	0.14	452.89	513.35
59	31.5	133.42	0.00	51.42	0.00	0.00	989.74	1 174.58
60	28.0	35.95	0.00	14.30	0.00	0.00	674.25	724.50
63	45.5	19.49	3.36	0.00	0.00	0.00	549.45	572.30
64	26.5	99.87	0.00	9.85	0.00	0.00	708.76	818.48
65	29.0	22.89	0.00	1.00	0.42	0.00	614.20	638.51
66	44.0	8.52	0.00	1.87	1.66	0.00	207.81	219.85
70	41.0	0.00	2.00	0.00	0.72	0.00	707.11	709.82
71	26.0	45.74	0.66	69.89	0.00	0.00	255.78	372.08
72	22.5	0.00	0.00	16.45	0.00	0.00	2 763.10	2 779.55
73	46.5	196.63	0.00	0.00	21.44	0.10	498.93	717.11
76	39.0	14.57	0.24	14.72	46.75	0.00	229.73	306.01
77	25.0	26.59	0.00	3.94	0.97	0.00	214.23	245.74
79	35.5	14.74	0.35	0.00	3.80	0.62	260.84	280.34
80	28.5	27.91	0.00	0.25	0.00	0.00	185.17	213.33
81	22.0	10.37	0.29	0.00	0.00	0.00	695.91	706.58
82	39.0	8.12	0.44	0.00	0.00	0.00	1 711.44	1 720.00
85	35.0	5.74	0.64	0.68	8.17	0.00	581.39	596.61
86	25.0	13.86	3.20	7.95	0.00	0.55	529.54	555.09
89	24.5	15.06	0.71	0.00	0.88	0.47	415.67	432.79
90	21.0	0.00	0.00	0.76	5.42	6.06	582.60	594.84
93	47.0	1.64	30.92	0.00	34.18	0.00	463.44	530.18
94	25.0	30.89	0.00	10.78	4.38	0.00	195.05	241.11
96	41.0	0.00	0.08	7.03	71.60	13.91	413.56	506.17
97	24.5	79.98	0.00	8.69	0.00	0.00	477.34	566.01
Mean		32.49	1.53	12.14	7.16	0.80	578.67	632.78
SE		8.47	1.10	3.65	3.18	0.53	100.31	99.80
% Catch		5.13	0.24	1.92	1.13	0.13	91.45	100.00

b) Outer shelf, 51–100m

Station	Gear depth	Croakers	Groupers	Grunts	Seabreams	Snappers	Other	Total
49	80.0	0.00	0.00	0.00	170.35	0.00	41.58	211.93
53	75.5	73.74	0.00	0.00	15.09	0.00	535.95	624.78
55	62.0	46.45	0.00	0.00	14.46	0.00	379.14	440.05
58	64.0	6.00	0.00	0.00	30.48	0.00	499.41	535.89
62	75.5	6.99	22.20	0.00	29.04	0.00	429.60	487.83
67	75.0	2.88	0.00	0.00	6.40	0.00	350.60	359.88
69	59.0	2.80	0.12	0.00	3.29	0.00	124.90	131.11
74	63.0	0.00	2.03	0.00	31.80	0.55	188.88	223.25
75	67.5	0.35	79.88	0.00	38.72	0.00	945.32	1 064.26
78	87.0	121.60	0.00	0.00	0.88	0.00	230.30	352.78
83	71.0	0.00	3.08	0.00	60.38	0.00	414.95	478.41
84	83.5	1.17	0.00	0.00	4.20	0.00	117.90	123.26
87	85.5	5.83	3.44	1.12	54.57	0.00	195.82	260.78
91	74.0	1.43	0.20	0.00	135.46	0.00	140.15	277.25
92	87.5	0.67	0.00	0.00	12.12	0.00	1 040.83	1 053.63
95	72.5	0.00	0.00	0.00	28.86	0.00	423.19	452.05
Mean		16.87	6.93	0.07	39.76	0.03	378.66	442.32
SE		8.65	5.05	0.07	11.98	0.03	70.71	70.14
% Catch		3.81	1.57	0.02	8.99	0.01	85.61	100.00



### 3.8.3 Swept-area biomass estimates

Table 17 and 18 present swept-area biomass estimates for the valuable demersal groups and some other groups that occurred in sizeable quantities in the catches for Ghanaian and Ivorian waters, respectively.

The estimated total biomass of valuable demersal groups was 14 959 tonnes in Ghana, of which seabreams made up 77% (11 598 tonnes). The highest biomass of seabreams was found between depths of 51 m and 100 m. Croakers had the second highest biomass with 1 280 tonnes. Of the pelagic and semi-pelagic groups, carangids had an estimated biomass of 36 420 tonnes, bigeye grunt (*B. auritus*) 16 829 tonnes, cephalopods 2 089 tonnes and barracudas 1 171 tonnes.

Table 17. Biomass estimates (tonnes) of important species/groups on the shelf of Ghana, by depth stratum (0–30m, 30–50m, 50–100m). Sum dem.val: Estimates for the valuable demersal species grouped

Ghana Group/species	Biomass					95% Confidence limits	
	0-30	30-50	50-100	Sum			
Croakers	391	784	105	1 280	27	2 532	
Groupers	21	227	182	431	181	682	
Grunts	262	362	0	624	50	1198	
Seabreams	1 093	3 688	6 817	11 598	4 222	18 974	
Snappers	47	571	407	1 026	0	2 088	
<b>Sum dem.val</b>	<b>1 814</b>	<b>5 633</b>	<b>7 512</b>	<b>14 959</b>	<b>7 388</b>	<b>22 529</b>	
Bigeye grunt	3 621	13 209	0	16 829	0	35 869	
Carangids	2 543	6 623	27 254	36 420	18 030	54 810	
Barracudas	549	601	21	1171	546	1 795	
Cephalopods	390	693	1 006	2 089	1 635	2 544	

The estimated total biomass of valuable demersal groups was 5 546 tonnes in Côte d'Ivoire, of which croakers and seabreams made up 42% (2 341 t) and 39% (2 179 t), respectively. The highest biomass of croakers was found between depths of 31 and 50 m, whereas seabreams were almost equally distributed below 30 m and between 31 and 50 m. Of the pelagic and semi-pelagic groups, carangids had an estimated biomass of 6 503 tonnes, bigeye grunt (*B. auritus*) 6 457 tonnes, cephalopods 2 035 tonnes and barracudas 393 tonnes.

Table 18. Biomass estimates (tonnes) of important species/groups on the shelf of Côte d'Ivoire, by depth stratum (0–30m, 30–50m, 50–100m). Sum dem.val: Estimates for the valuable demersal species grouped

Côte d'Ivoire Group/species	Biomass					95% Confidence limits	
	0-30	30-50	50-100	Sum			
Croakers	564	762	1 015	2 341	1 159	3 524	
Groupers	7	70	429	506	0	1 091	
Grunts	251	231	5	487	207	767	
Seabreams	16	299	1 864	2 179	864	3 494	
Snappers	9	23	2	33	0	74	
<b>Sum dem.val</b>	<b>846</b>	<b>1 385</b>	<b>3 315</b>	<b>5 546</b>	<b>3 956</b>	<b>7 136</b>	
Bigeye grunt	869	4 666	921	6 457	2 898	10 016	
Carangids	903	1 650	3 949	6 503	1 027	11 979	
Barracudas	76	233	84	393	85	701	
Cephalopods	347	342	1 347	2 035	1 328	2 743	

### 3.9 Jellyfish

Jellyfish were collected as part of the trawl samples and were present in 99 of the 143 trawls conducted. Jellyfish were present in both pelagic and demersal trawls. The majority of the identified samples represented the two *Chrysaora* species known to occur in the region. However, there were also samples of *Pelagia noctiluca*, *Aurelia* sp. and a Rhizostomeae. A total of 76 whole samples and their corresponding genetic samples were kept and transported back to the University of the Western Cape for further analysis. An overview of collected taxa is provided in Table 19.

Table 19. Number of stations where jellyfish were captured in the trawl during Leg 3.1 per taxon and country.

Taxon	Cote d'Ivoire	Ghana	Total
<i>Aequorea forskalea</i>	2		2
<i>Aequorea</i> sp.	3	3	6
<i>Atolla</i> sp.	1		1
<i>Chrysaora africana</i>	1	3	4
<i>Chrysaora fulgida</i>		3	3
<i>Chrysaora</i> sp.	4	3	7
Cubozoa sp.	2		2
JELLYFISH unidentified	51	39	90
<b>Total</b>	<b>64</b>	<b>51</b>	<b>115</b>

## CHAPTER 4. CONCLUDING REMARKS

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The survey covered the continental shelf (30–100 m depth) and the slope (100–500 m depth) off Ghana and Côte d'Ivoire with evenly spaced transects running perpendicular to the coastline. Acoustic registrations were integrated every 1NM and allocated to defined acoustic groups based on pelagic and bottom trawl catches, vertical distribution, and depth distribution.

### Meteorological and hydrographic conditions

The survey area recorded wind speeds ranging from 4 to 12 knots in a northwest direction along the Côte d'Ivoire and Ghana coasts during the pelagic coverage of the survey, with speeds approaching 16 knots near the western end of the survey and off the coast at the Cape Three Points transect. The demersal coverage had a similar pattern however the shelf exhibited wind speeds mostly under 10 knots except for that western region.

Subsurface temperatures ranged from 21°C to 27°C throughout the survey with the cooler values along the coast. The central Côte d'Ivoire region averaged 24°C, whereas the Ghana region east of Cape Three Points averaged 21°C. Salinity typically ranged from 35 to 36 PSU except for the area west of 6°W where salinity values approached 31 PSU. This is the same western end where wind speeds and temperature began to increase.

As depicted in Figures 16 to 20, an oxygen minimum zone with values approaching 1 ml/l was observed consistently between 200 m and 500 m depths along the coast throughout the survey. With the greater depths occupied from the Tema and Cape Three Points transects, dissolved oxygen levels exhibited a strong presence beyond 1 500 m with values reaching 5 ml/l. As depicted in Figure 30, pH followed this same pattern portraying a minimum beyond 300 m and a visible increase once greater depths were reached on the Tema and Cape Three Points transects.

During the pelagic coverage, subsurface nutrient measurements showed elevated levels along the coast with spikes near the Gode-San Pedro, Lophelia, Cape Three Points and Keta-Denu transects. During the demersal coverage, nutrient levels were elevated along the shallow coast (which fits with the slight drop in subsurface temperature here), except for silicate which showed a strong presence at the deeper end of the Cape Three Points transect.

During the pelagic coverage, chlorophyll a concentrations were 5-fold lower than during the demersal coverage (Figure 40 and 41). Higher chlorophyll a concentrations during the survey were mainly observed between the Tema–Takoradi stretch of the coast, with values ranging from 5 to 14.3 µg/l. Interestingly, this area exhibited quite low mesozooplanktonic biomass values. As shown in the horizontal plots of the chlorophyll from the surface and the maximum values from each station, the maximum primary production is concentrated around the Tema-Takoradi stretch of the coast.

### Pelagic fish abundance and distribution

The major pelagic fish species like the sardinellas and anchovy were absent over most parts of the shelf of Côte d’Ivoire but increased in densities on the Ghanaian shelf. Horse mackerel was present in appreciable numbers on the middle and lower shelf of both countries.

Table 20 summarises the estimated biomasses of the main pelagic groups from previous surveys in the two countries since 1981 and compares these estimates to the current one. The overall estimate for sardinellas and anchovy off Côte d’Ivoire is quite similar to that obtained in 2017 in the area, but still low compared to the early 2000s. Interestingly, the biomass of anchovies on Côte d’Ivoire’s EEZ was found to have a substantial contribution to the biomass of small pelagics, largely due to anchovy presence.

The biomass of the other species of pelagic fish that were assessed (carangids, scombrids, barracudas and hairtails) was the highest in the time series for Côte d’Ivoire, while for Ghana it was on the average of the time series. However, the time series of biomass estimates shows large interannual variation, also masked by the timing of the vessel’s presence (upwelling vs non-upwelling periods). As such, the results should be treated with caution.

The distribution of the different pelagic fish species between the two countries and adjacent countries to the west reflects the high variability and dynamics of pelagic fish resources. To what extent these variations in biomass can be related to environmental parameters, shelf characteristics, areas with high productivity, fishing mortality, or behavioural patterns (spawning migrations) needs to be further investigated.

Table 20. 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 the *Dr Fridtjof Nansen* off Côte d’Ivoire, Ghana

#### a) Sardinellas and anchovies

Survey Year	Survey period	Côte d’Ivoire	Ghana	Total
1981	June	39 000	40 000	79 000
1989	12.10–20.10	6 000	41 000	47 000
1999	19.4–8.5	42 000	40 000	82 000
2000 <sup>(1)</sup>	29.8–15. 9	111 000	56 500	167 700
2002 <sup>(1)</sup>	16.7–9.8	34 000	73 000	107 500
2004	16.5–9.6	68 000	68 000	136 000
2005	4.5–27.5	37 000	54 000	91 000
2006	19.5–5.6	62 000	57 000	119 000
2007	6.6–11.6	1 000	20 000	21 000
2016	01.04–20.04	Not covered	25 000	----
2017	24.08–13.09	<1 000	63 000	~ 64 000
2019 <sup>(1)</sup>	20.07–18.08	25 357	37 770	~ 63 000

1) Upwelling season 3) 1999 values are split proportional to the shelf area (in parenthesis NM2). 2) The survey in Côte d’Ivoire and Ghana covered only the area between Abidjan and Tema and data are not directly comparable to previous surveys.

b) Carangids, scombrids, barracudas and hairtail (PEL 2)

Survey Year	Survey period	Côte d'Ivoire	Ghana	Total
1981	June	2 000	10 000	12 000
1989	12.10–20.10	33 000	57 000	90 000
1999	19.4–8.5	30 000	50 000	80 000
2000 <sup>(1)</sup>	29.8–15.9	18 000	61 000	79 000
2002 <sup>(1)</sup>	16.7–12.8	10 500	52 000	62 500
2004	16.5–9.6	19 000	37 000	56 000
2005	4.5–27.5	30 000	46 000	76 000
2006	19.5–5.6	19 000	37 000	56 000
2007 <sup>(2)</sup>	6.6–11.6	2 000	20 000	22 000
2016	1.04–20.04	Not covered	107 000	----
2017	24.08–13.09	16 000	28 000	44 000
2019 <sup>(1)</sup>	20.07–18.08	68 748	41 783	~ 110 000

1) Upwelling season 3) 1999 values are split proportional to the shelf area (in parenthesis NM2). 2) The survey in Côte d'Ivoire and Ghana covered only the area between Abidjan and Tema and data are not directly comparable to previous surveys.

Demersal fish abundance and distribution

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.

The time series of biomass estimates of the valuable demersal groups through the years 1999, 2000, 2002, 2004, 2005, 2006, 2007, 2016 and 2019 is shown for the Ghanaian EEZ in Figure 66. The current estimate is similar to that of 2016.

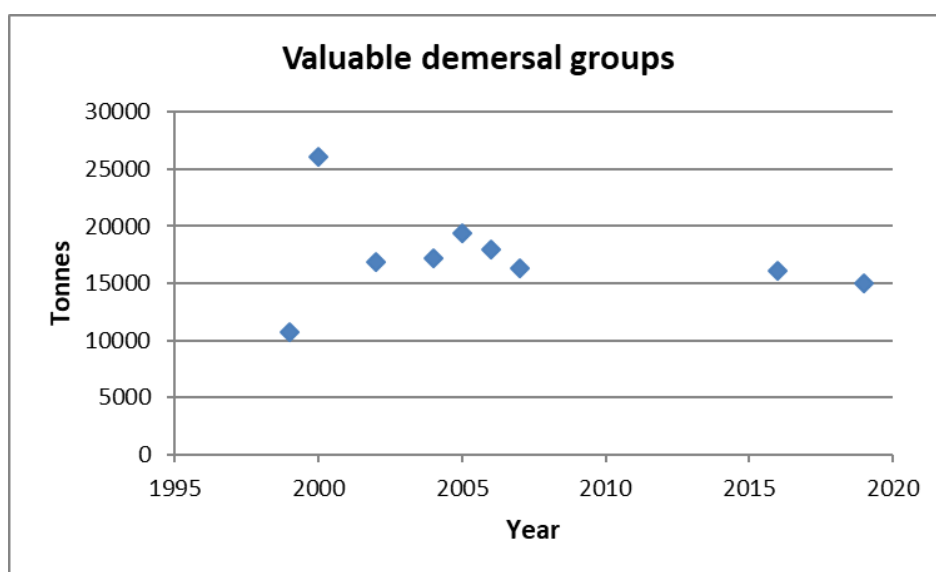


Figure 66. Time series of biomass estimates of demersal valuable fish in Ghana, 1999–2019

Table 21 shows the swept area biomass estimates of valuable demersal groups and a few other common groups during the *Dr Fridtjof Nansen* surveys in the Ghanaian EEZ.

Considering the reduced area surveyed in 2019 (by approximately 14% of the surface between 0 m and 100 m of the Ghanaian EEZ), all of the all groups presented similar biomass levels to those of previous years, close to those of the last survey in the area in 2016. Carangids and croakers appear to have increased their biomass compared to the last survey. The time series of biomass estimates shows 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, but their biomass seems to be rebounding in 2019.

Table 21. Biomass estimates (tonnes) of valuable demersal species and some other groups from swept-area bottom trawl hauls on the Ghanaian shelf (0–100 m) from the 1999–2016 surveys and 2019 survey. 2000 and 2002 surveys are in the upwelling season. Sum dem.val: Estimates for the valuable demersal species grouped

<b>Ghana</b>	<b>Biomass (tonnes)</b>								
<b>Group/species</b>	<b>1999</b>	<b>2000<sup>1</sup></b>	<b>2002</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2016</b>	<b>2019</b>
Seabreams	8 478	13 346	14 181	16 187	15 690	15 166	13 604	12 959	11 598
Grunts	1 431	4 397	1 168	326	2 261	140	806	620	624
Croakers	125	1 046	850	286	821	664	1 011	567	1 280
Groupers	557	1 921	254	220	235	674	169	452	431
Snappers	151	5 422	422	200	413	1 366	771	1 450	1 026
<b>Sum dem.val</b>	<b>10 743</b>	<b>26 032</b>	<b>16 876</b>	<b>17 219</b>	<b>19 420</b>	<b>18 010</b>	<b>16 361</b>	<b>16 048</b>	<b>14 959</b>
Bigeye grunt	70 314	9 120	21 182	13 866	27 896	7 296	5 121	12 301	16 829
Carangids	6 860	47 054	54 332	7 405	19 226	11 831	8 702	19 403	36 420
Barracudas	1 084	915	1 999	1 589	2 201	2 554	1 333	2 522	1 171
Cephalopods	4 400	4 900	2 000	2 600	2 181	3 208	1 067	3 314	2 089

<sup>1)</sup> 2000 estimates corrected

<sup>2)</sup> 2019 area covered is smaller by 14% than the total area from 0 to 100 m depth of the Ghanaian EEZ.

The time series of biomass estimates of the valuable demersal groups through the years 1999, 2000, 2004, 2005, 2006, 2007 and 2019 is shown for the EEZ of Côte d’Ivoire in Figure 67. The current estimate is lower than the long-term average.

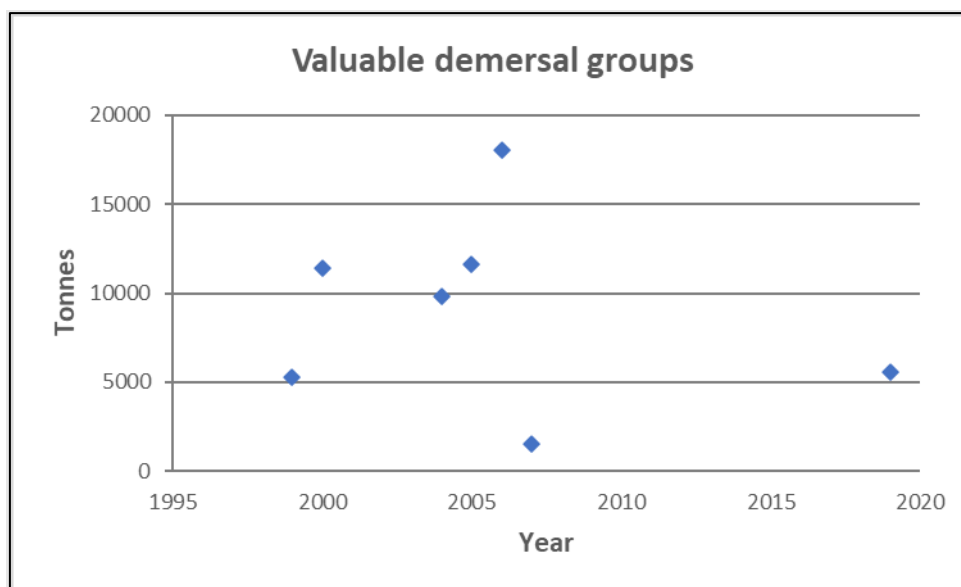


Figure 67. Time series of biomass estimates of demersal valuable fish in Côte d'Ivoire, 1999–2019

Table 22 shows the swept area biomass estimates of valuable demersal groups and a few other common groups during the *Dr Fridtjof Nansen* surveys in the the EEZ of Côte d'Ivoire.

The most prominent change observed is that of the croakers that showed an important increase compared to the long-term average. The other major groups did not show a prominent increase or decrease compared to the long-term average. Since 2007 all groups were found to have an increased biomass, although the 2007 results should be viewed with caution given the very low values compared to the previous years.

Table 22. Biomass estimates (tonnes) of valuable demersal species and some other groups from swept-area bottom trawl hauls on shelf of Côte d'Ivoire (0–100 m) from the 1999–2016 surveys and 2019 survey. 2000 and 2002 surveys are in the upwelling season. Sum dem.val: Estimates for the valuable demersal species grouped

Côte d'Ivoire Group/species	Biomass (tonnes)						
	1999 <sup>1</sup>	2000 <sup>1</sup>	2004	2005	2006	2007	2019
Seabreams	3 457	6 666	6 841	8 868	15 166	1 448	2 341
Grunts	417	1 667	1 216	851	140	39	506
Croakers	941	2 731	1 485	1 586	664	71	487
Groupers	305	283	268	312	674	0	2 179
Snappers	145	38	13	30	1 366	0	33
<b>Sum dem.val</b>	<b>5 265</b>	<b>11 385</b>	<b>9 823</b>	<b>11 646</b>	<b>18 010</b>	<b>1 559</b>	<b>5 546</b>
Bigeye grunt	631	14 245	11 959	15 583	7 296	5 645	6 457
Carangids	1 165	26 369	10 668	15 344	11 831	1 460	6 503
Barracudas	248	259	1 176	5 973	2 554	143	393
Cephalopods				1 045	3 208	8	2 035

<sup>1)</sup> 1999 and 2000 estimates corrected

The standard data handing-over process can be found in Annex X and a summary of all the samples collected, including the purpose of collection and the receiving laboratories is shown in Annex XI.

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## ANNEX I. DESCRIPTION OF INSTRUMENTS AND FISHING GEAR

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### Acoustic instruments

The Simrad EK80/18, 38, 70,120, 200 and 333 kHz scientific sounder was run during the survey. Scrutinizing was done in LSSS using the data from the 38-kHz transducer. Last standard sphere calibrations were checked on the 23.01.2017 in Sandviksflaket, Bergen, Norway using Cu64 for the 18 kHz, Cu60 for the 38 kHz, WC38.1 for the 70, 120 and 200 kHz, and the WC22 for the 333 kHz. The details of the settings for the 38-kHz echo sounder were as follows:

Transceiver2 menu (38 kHz)			
Transducer depth	5.8 m	SA correction	0.03 dB
Absorption coeff.	8.3 dB/km	Angle sensitivity	21.9
Pulse duration	medium (1.024ms)	3 dB beamwidth	6.22° along ship
Bandwidth	2.43 kHz		6.28 athwart ship
Max power	2000 Watt	Alongship offset	0.10°
2way beam angle	20.6dB	Athwardship offset	0.06°
gain	26.95 dB	Bottom detection menu	Minimum level 50 Db

### Fishing gear

The vessel has one small four-panel Åkrahamn pelagic trawl, one MultPelt 624 trawl (Figure I.1, new in 2017) and one 'Gisund super bottom trawl'. All trawls were used during the survey. The smallest pelagic trawl has 8 m to 12 m vertical opening under normal operation, whereas the MultPelt 624 trawl has 25 to 35 m opening.

The bottom trawl has a 31-m headline and a 47-m footrope fitted with a 12" rubber bobbins gear. The codend has 20 mm meshes and has an inner net with 10 mm mesh size. The vertical opening is about 5.5 m. The distance between the wing tips is about 18 m during towing. The sweeps are 40 m long. The trawl doors are 'Thyborøen' combi, 8 m<sup>2</sup> and weigh 2 000 kg. The door spreading is about 45 m when using restraining rope. Trawling was conducted for species identification only and no restraining rope was therefore used during the survey.

The SCANMAR system was used during 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 interdistance and angle, while a height sensor is fitted on the bottom trawl to measure the trawl opening and provide information on clearance and bottom contact.

The all trawls are equipped with a trawl eye that provides information about the trawl opening and the distance of the footrope to the bottom. A pressure sensor is used to show the depth on the headline.

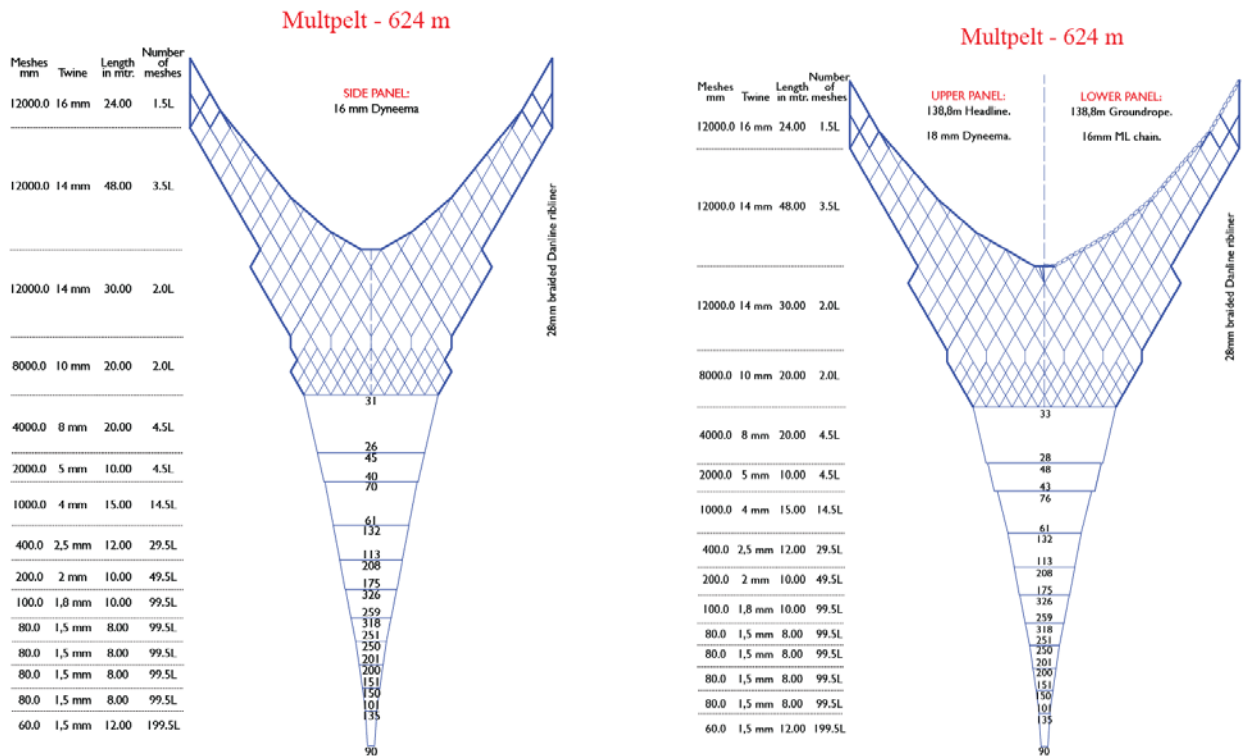


Figure I.1. Schematic drawing of the MultPelt 624

LITEN PELAGISK ÅKRATRAL

HEL MASKER M/M TR&D NR. LENGDE I METER MASKER I EVING

400	64	38,5	4
400	48	14	4
200	32	10,0	4
100	24	20,0	4
38	12	11,4	4
38	18	3,76	4

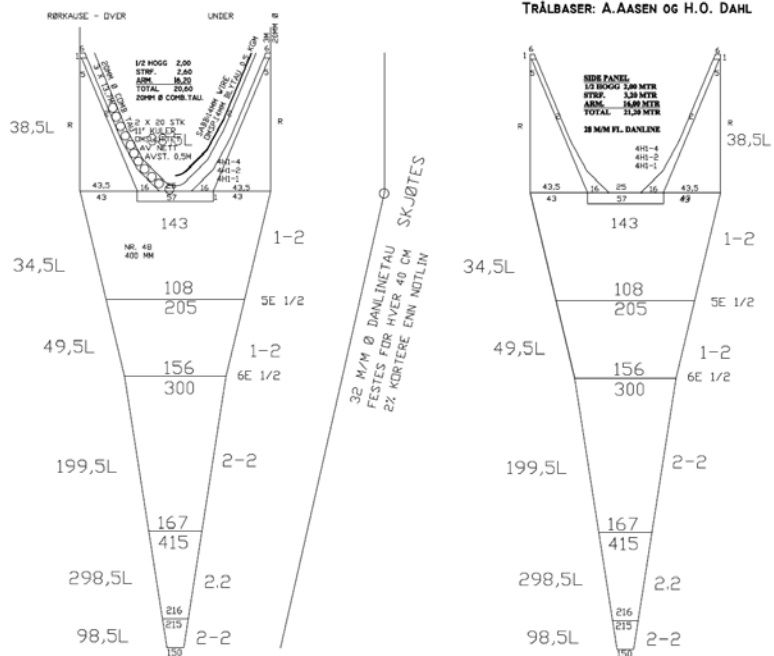


Figure I.2. Schematic drawing of the small pelagic Åkratrawl

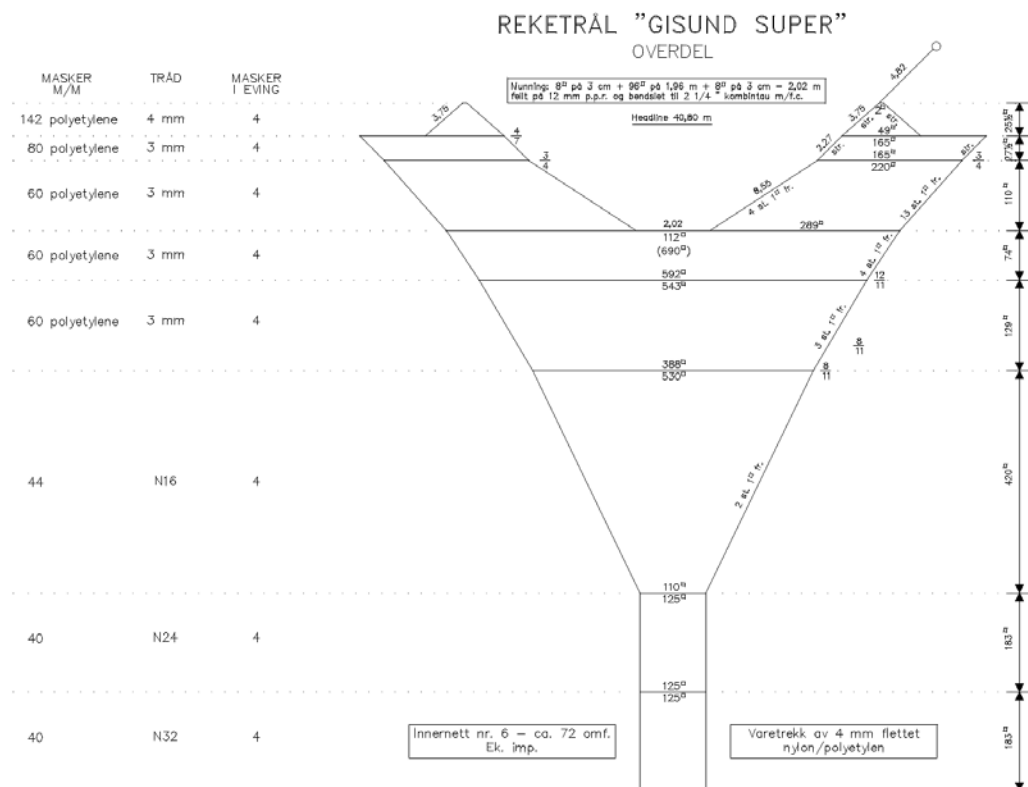
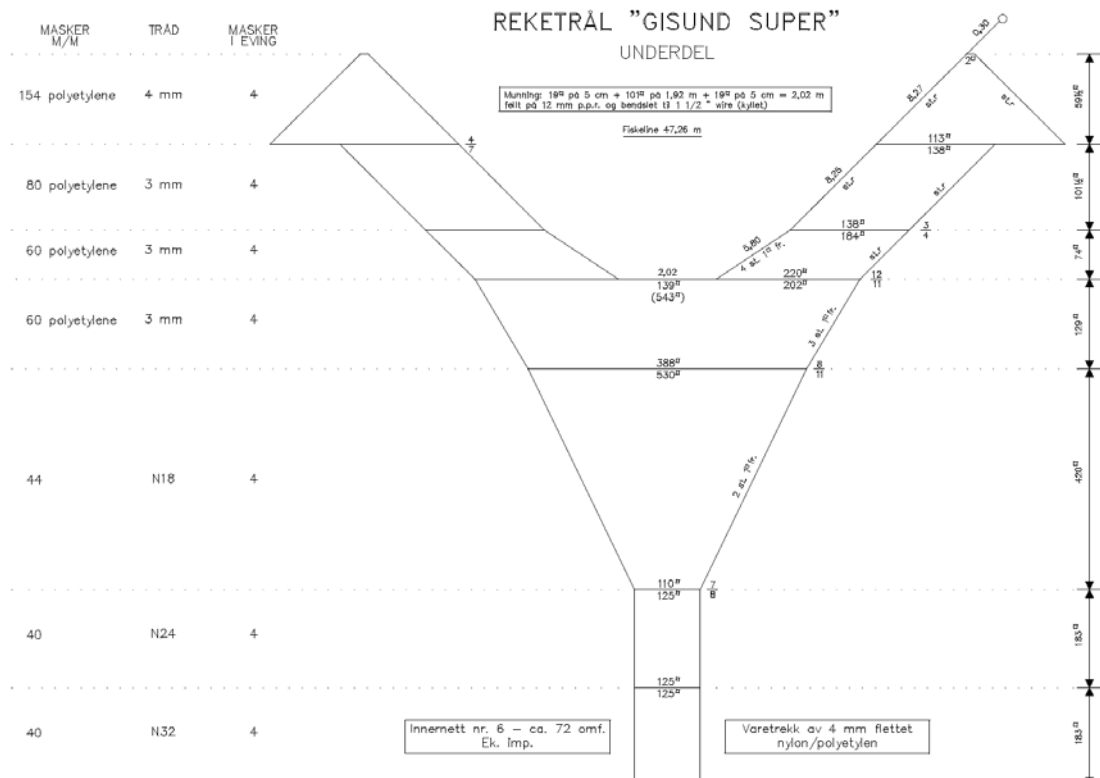


Figure I.3. Schematic drawing of the Super Gisund bottom trawl

# ANNEX II. RECORDS OF FISHING STATIONS

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 1  
 DATE : 21/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°52.20 start stop duration Lon E  
 1°8.98  
 TIME : 19:38:01 20:08:41 30.7 (min) Purpose : 1  
 LOG : 9007.60 9009.28 1.7 Region : 2600  
 FDEPTH: 5 5 Gear cond.: 0  
 BDEPTH: 56 58 Validity : 3  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 34 Total catch: 34.40 Catch/hour: 67.32

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Brachydeuterus auritus	20.74	4	30.81
3 Trachurus trecae	15.85	1074	23.55
1 Sardinella aurita	10.37	182	15.41
2 Illex coindetii	7.95	472	11.80
Sepia bertheloti	3.21	8	4.77
Selene dorsalis	3.17	125	4.71
Sepiella sp.	2.43	344	3.60
Ariomma bondi	2.27	61	3.37
Sphyræna guachancho	1.14	2	1.69
SALPIDAE	0.08	2	0.12
Saurida parri	0.08	49	0.12
Diaphus sp.	0.02	8	0.03
Lagocephalus laevigatus	0.01	4	0.01
Naso sp.	0.01	4	0.01
FISH LARVAE	0.00	14	0.01
Hippocampus sp.	0.00	2	0.00
Total	67.32		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 2  
 DATE : 22/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°39.20 start stop duration Lon E  
 1°0.28  
 TIME : 01:40:34 02:10:53 30.3 (min) Purpose : 1  
 LOG : 9038.62 9040.30 1.7 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 724 228 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 20 Total catch: 25.95 Catch/hour: 51.34

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
J E L L Y F I S H	39.54	22	77.01
Ariomma bondi	5.66	194	11.02
Trichurus lepturus	5.42	346	10.56
Squid unidentified	0.20	16	0.40
Diaphus sp.	0.20	87	0.39
PARALEPIDAE	0.11	14	0.22
Chloroscombrus chrysurus	0.08	55	0.15
Selene dorsalis	0.06	24	0.11
Gempylus serpens	0.04	2	0.08
Saurida parri	0.03	10	0.05
Hemicaranx bicolor	0.01	2	0.01
Trachurus trecae	0.00	2	0.00
Total	51.34		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 3  
 DATE : 22/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°40.29 start stop duration Lon E  
 0°44.63  
 TIME : 05:00:03 05:30:08 30.1 (min) Purpose : 1  
 LOG : 9063.72 9065.47 1.8 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 22 24 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.5 kn  
 Sorted : 6 Total catch: 171.31 Catch/hour: 341.71

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Sphyræna guachancho	106.14	315	31.06
5 Engraulis encrasiolus	99.46	39782	29.11
Selene dorsalis	42.09	209	12.32
Sepia hierredda	24.86	28	7.28
Ilisha africana	22.10	110	6.47
Brachydeuterus auritus	19.55	341	5.72
4 Scomberomorus tritor	15.12	14	4.42
Chloroscombrus chrysurus	4.42	221	1.29
Elops lacerta	2.71	8	0.79
Trachinotus ovatus	2.03	6	0.60
Illex coindetii	1.11	56	0.32
Trichurus lepturus	1.11	84	0.32
Sepia sp.	0.44	56	0.13
Caranx rhonchus	0.25	56	0.07
Hemiramphus balao	0.16	2	0.05
Scomber colias	0.14	28	0.04
Sardinella aurita	0.03	84	0.01
Total	341.71		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 4  
 DATE : 22/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°42.47 start stop duration Lon E  
 0°36.66  
 TIME : 07:38:18 08:09:48 29.6 (min) Purpose : 1  
 LOG : 9080.13 9082.00 1.9 Region : 2600  
 FDEPTH: 26 27 Gear cond.: 0  
 BDEPTH: 26 27 Validity : 0  
 Towing dir: 0° Wire out : 125 m Speed : 3.4 kn  
 Sorted : 85 Total catch: 84.58 Catch/hour: 171.39

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Selene dorsalis	27.92	6282	16.29
Chirocentrus dorab	19.09	705	11.14
Galoides decadactylus	17.99	233	10.50
Pseudolithus senegalus	15.08	10	8.80
Dentex canariensis	12.73	79	7.43
7 Sardinella maderensis	11.47	0	6.69
6 Brachydeuterus auritus	11.43	896	6.67
Sphyræna guachancho	10.82	162	6.31
Pagrus caeruleostictus	6.61	101	3.85
Stromateus fiatola	5.71	6	3.33
Aluterus schoepfii	3.89	4	2.27
Trichurus lepturus	3.77	128	2.20
Rhinobatos irvinei	3.69	2	2.15
Balistes punctatus	3.16	4	1.84
Pseudupeneus prayensis	3.12	73	1.82
Sepia sp.	3.00	132	1.75
0 Penaeus notialis	2.19	69	1.28
Drepane africana	1.95	10	1.14
Pteroscion pelli	1.34	22	0.78
Acanthostracion guineensis	1.34	6	0.78
Chiomycerus spinosus mauretanicus	0.97	2	0.57
Ephippus goreensis	0.97	8	0.57
Ilisha africana	0.57	22	0.33
Lethrinus atlanticus	0.45	6	0.26
Uranoscopus polli	0.36	4	0.21
Dead shells	0.36	344	0.21
Lagocephalus laevigatus	0.28	8	0.17
Scomberomorus tritor	0.28	2	0.17
Echeneis naucrates	0.20	2	0.12
Fishing gears	0.16	59	0.09
Gerres sp.	0.16	2	0.09
Alectis alexandrinus	0.11	2	0.06
Monochirus hispidus	0.08	2	0.05
Parapenaeopsis atlantica	0.08	8	0.05
Plastic	0.08	4	0.05
Penaeus kerathurus	0.04	2	0.02
C R A B S	0.02	8	0.01
Fistularia petimba	0.01	4	0.00
SQUILLIDAE	0.01	4	0.00
Illex coindetii	0.00	8	0.00
Total	171.49		100.06

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 5  
 DATE : 22/07/19 GEAR TYPE: PT NO: 1 POSITION: Lat N  
 5°36.65 start stop duration Lon E  
 0°35.07  
 TIME : 10:32:56 11:04:17 31.3 (min) Purpose : 1  
 LOG : 9100.22 9101.91 1.7 Region : 2600  
 FDEPTH: 10 10 Gear cond.: 0  
 BDEPTH: 46 43 Validity : 5  
 Towing dir: 0° Wire out : 125 m Speed : 3.2 kn  
 Sorted : 0 Total catch: 0.00 Catch/hour: 0.00

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trachurus trecae	0.00	0	0.00
Engraulis encrasiolus	0.00	0	0.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 6  
 DATE : 22/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°21.00 start stop duration Lon W  
 0°4.21  
 TIME : 21:28:48 22:00:00 31.2 (min) Purpose : 1  
 LOG : 9176.68 9178.76 2.1 Region : 2600  
 FDEPTH: 0 67 Gear cond.: 0  
 BDEPTH: 67 69 Validity : 0  
 Towing dir: 0° Wire out : 125 m Speed : 4.0 kn  
 Sorted : 11 Total catch: 10.88 Catch/hour: 20.92

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Ariomma bondi	9.42	187	45.05
Galoides decadactylus	6.17	15	29.51
25 Caranx rhonchus	2.04	42	9.75
Sphyræna guachancho	0.88	2	4.23
Lagocephalus laevigatus	0.62	104	2.94
Allotautis sp.	0.38	135	1.82
Sepia sp.	0.35	23	1.66
Saurida sp.	0.27	112	1.29
SALPS	0.17	0	0.82
Illex coindetii	0.12	15	0.55
Selene dorsalis	0.11	44	0.51
Plastic	0.09	8	0.45
Fistularia sp.	0.07	37	0.34
Naso sp.	0.07	38	0.31
Unid. juvenile fishes	0.05	17	0.22
UNIDENTIFIED FISH	0.03	4	0.17
0 SCOMBRIIDAE	0.03	2	0.17

Priacanthus arenatus	0.01	4	0.06
DIODONTIDAE	0.01	2	0.05
Dactylopterus volitans	0.01	2	0.04
Bregmaceros sp.	0.01	12	0.03
Trichurus lepturus	0.01	2	0.03
TRACHIPTERIDAE	0.00	2	0.02
Total	20.92		100.00

Bembrops sp.	0.89	48	0.79
Caranx rhonchus	0.66	31	0.58
Hyporthodus haifensis	0.66	4	0.58
Dactylopterus volitans	0.54	10	0.48
Boops boops	0.52	8	0.46
Spherooides marmoratus	0.27	10	0.24
Micropogonias undulatus	0.27	10	0.24
Epinephelus itajara	0.27	10	0.24
Saurida sp.	0.17	87	0.15
Total	112.25		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 7  
 DATE : 23/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°27.11

start stop duration Lon W  
 TIME : 01:23:46 01:53:33 29.8 (min) Purpose : 1  
 LOG : 9203.20 9204.78 1.6 Region : 2600  
 FDEPTH: 26 25 Gear cond.: 0  
 BDEPTH: 26 25 Validity : 0  
 Towing dir: 0° Wire out : 125 m Speed : 3.2 kn  
 Sorted : 24 Total catch: 134.40 Catch/hour: 270.69

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Waste General	71.38	0	26.37
Cynoglossus senegalensis	22.92	135	8.47
Brachydeuterus auritus	15.42	1668	5.70
16 Pagrus caeruleostictus	13.46	282	4.97
Torpedo torpedo	12.01	11	4.44
OPHIURIDAE	11.16	26	4.12
Syacium sp.	10.93	328	4.04
Pomadourus jubelini	10.72	6	3.96
15 Galeoides decadactylus	10.65	189	3.94
Pteroscion peli	10.12	179	3.74
Lethrinus atlanticus	9.21	244	3.40
Pseudupeneus prayensis	8.93	169	3.30
Dasyatis margarita	8.55	22	3.16
Epinephelus aeneus	6.04	20	2.23
Sepia hierredda	5.59	83	2.07
Selene dorsalis	5.52	2123	2.04
Chloroscombrus chrysurus	5.41	195	2.00
Ephippion guttifer	3.42	4	1.26
Drepane africana	3.22	20	1.19
Diodon holocanthus	3.11	12	1.15
Lagocephalus laevigatus	2.88	449	1.06
Rajam raietatus	2.30	6	0.85
Penaeus notialis	2.05	68	0.76
Pisodonophis semicinctus	2.03	8	0.75
Gymnathorax afer	1.85	2	0.68
Trichurus lepturus	1.38	46	0.51
Grammolites scaber	1.38	62	0.51
Sphyraena guachancho	1.09	6	0.40
Rypticus saponaceus	1.04	6	0.38
Ephippus gorensis	0.92	12	0.34
Stephanolepis sp.	0.81	30	0.30
Gerres nigri	0.69	12	0.26
Scorpaena sp.	0.68	8	0.25
Alectis alexandrinus	0.58	6	0.21
C R A B S	0.58	173	0.21
Saurida parri	0.46	127	0.17
Fistularia tabacaria	0.41	6	0.15
Caranx rhonchus	0.34	75	0.13
Scyllarus sp.	0.29	12	0.11
Squilla mantis	0.22	8	0.08
Squilla acuelata calmani	0.13	6	0.05
Parapenaeus longirostris	0.12	24	0.04
Stenorhynchus lanceolatus	0.12	32	0.04
Engraulis encrasiolus	0.11	28	0.04
Sphyraena sp.	0.11	46	0.04
Umbra canariensis	0.11	6	0.04
Dicologlossa cuneata	0.06	6	0.02
Antennarius pardalis	0.06	6	0.02
Hippocampus algiricus	0.04	2	0.01
Brotula barbata	0.03	6	0.01
Alloteuthis sp.	0.01	34	0.00
Dactylopterus volitans	0.01	6	0.00
Uranoscopus polli	0.01	6	0.00
Total	270.70		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 8  
 DATE : 23/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°15.77

start stop duration Lon W  
 TIME : 09:59:04 10:30:10 31.1 (min) Purpose : 1  
 LOG : 9245.03 9246.56 1.5 Region : 2600  
 FDEPTH: 58 56 Gear cond.: 0  
 BDEPTH: 58 56 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 3.0 kn  
 Sorted : 7 Total catch: 58.20 Catch/hour: 112.25

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Pseudupeneus prayensis	35.76	638	31.86
Priacanthus arenatus	12.48	7364	11.12
0 Pagellus bellottii	10.92	501	9.73
9 Syacium sp.	7.12	299	6.34
Lagocephalus laevigatus	6.36	8	5.67
Octopus vulgaris	4.98	2	4.43
ARCHITEUTIDAE	3.39	1367	3.02
Chelidoniichthys sp.	3.39	212	3.02
Dentex angolensis	3.36	29	2.99
8 Plastic	3.20	270	2.85
Decapterus punctatus	2.68	154	2.39
Dentex gibbosus	2.58	10	2.30
Branchiostegus semifasciatus	2.43	4	2.16
Serranus accraensis	2.33	87	2.08
Sepia sp.	2.14	58	1.91
Torpedo torpedo	1.50	2	1.34
Trachurus trecae	1.25	39	1.12
Chromis lineata	1.08	29	0.96
Zeus faber	1.04	2	0.93

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 9  
 DATE : 23/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°25.43

start stop duration Lon W  
 TIME : 12:59:51 13:25:32 25.7 (min) Purpose : 1  
 LOG : 9263.62 9265.04 1.4 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 22 22 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 8 Total catch: 34.64 Catch/hour: 80.93

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Engraulis encrasiolus	67.05	25143	82.84
10 Aluterus monoceros	7.29	5	9.01
Stromateus fiatola	2.66	5	3.29
Sardinella aurita	2.25	561	2.78
11 Sepia sp	0.84	56	1.04
Selene dorsalis	0.37	112	0.46
Lagocephalus sp.	0.28	56	0.35
Echeneis naucrates	0.07	2	0.09
Scomber colias	0.05	37	0.06
Total	80.86		99.91

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 10  
 DATE : 23/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5°9.69

start stop duration Lon W  
 TIME : 18:50:51 19:23:14 32.4 (min) Purpose : 1  
 LOG : 9289.50 9291.25 1.8 Region : 2600  
 FDEPTH: 5 5 Gear cond.: 0  
 BDEPTH: 46 44 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 13 Total catch: 120.15 Catch/hour: 222.64

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Caranx rhonchus	155.41	1666	69.80
Sardinella aurita	20.24	506	9.09
12 Engraulis encrasiolus	16.65	1355	7.48
14 Saurida parri	8.16	1388	3.67
J E L Y F I S H	6.82	9	3.06
0 Scomber colias	6.53	587	2.93
13 Lagocephalus laevigatus	4.17	15	1.87
Sepia sp	2.91	441	1.31
Dactylopterus volitans	1.70	293	0.77
0 Trachurus trecae	0.98	17	0.44
Trichurus lepturus	0.48	2	0.22
Alloteuthis africana	0.18	65	0.08
Fistularia sp.	0.16	33	0.07
Total	224.40		100.79

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 11  
 DATE : 23/07/19 GEAR TYPE: PT NO: 1 POSITION: Lat N  
 4°59.65

start stop duration Lon W  
 TIME : 21:50:03 22:18:32 28.5 (min) Purpose : 1  
 LOG : 9310.37 9312.43 2.1 Region : 2600  
 FDEPTH: 70 35 Gear cond.: 0  
 BDEPTH: 89 109 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 4.3 kn  
 Sorted : 1 Total catch: 0.61 Catch/hour: 1.28

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
S H R I M P S	0.38	181	29.56
Diaphus sp.	0.25	227	19.70
Sepia sp.	0.21	13	16.42
Trichurus lepturus	0.13	2	9.85
Auxis sp.	0.10	4	7.72
Lagocephalus laevigatus	0.08	8	6.57
Synagrops japonicus	0.05	8	3.61
Ephippion guttifer	0.03	4	2.46
Ariomma bondi	0.02	2	1.81
SALPS	0.01	32	0.99
Priacanthus arenatus	0.01	2	0.82
Selene dorsalis	0.01	2	0.49
Total	1.28		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 12  
 DATE : 24/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4° 51.43 start stop duration Lon W  
 0° 35.92  
 TIME : 03:44:46 04:15:03 30.3 (min) Purpose : 1  
 LOG : 9359.76 9361.48 1.7 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 69 81 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.4 kn  
 Sorted : 8 Total catch: 7.87 Catch/hour: 15.60

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Sepiella sp.	13.08	949
Auxis sp.	0.91	52
Trachurus trecae	0.52	16
26		
Alloteuthis africana	0.46	145
Ephippion guttifer	0.32	38
J E L L Y F I S H	0.12	8
Ariomma bondi	0.06	4
Illex coindetii	0.06	10
Saurida parri	0.06	0
Plastic	0.02	2
Hippocampus sp.	0.01	2
Total	15.60	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 13  
 DATE : 24/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 44.42 start stop duration Lon W  
 0° 49.04  
 TIME : 08:06:54 08:36:20 29.4 (min) Purpose : 1  
 LOG : 9391.44 9393.00 1.6 Region : 2600  
 FDEPTH: 60 61 Gear cond.: 0  
 BDEPTH: 60 61 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 3.2 kn  
 Sorted : 16 Total catch: 74.44 Catch/hour: 151.76

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Pagellus bellottii	82.65	7344
Uroteuthis (Photololigo) duvau	14.59	8027
Saurida parri	12.24	1501
Chelidoni chthys sp.	9.06	646
Ariomma bondi	4.86	444
Sepia bertheloti	4.81	45
Apogon affinis	4.19	1199
Raja miraletus	2.16	4
Plastic	1.96	110
Sepia sp.	1.85	67
Pseudupeneus prayensis	1.55	14
Lepidotrigla sp.	1.35	14
Grammolites gruvelli	1.34	16
Micrurus boscanion	1.34	108
Syacium guineensis	1.03	269
Zeus faber	1.02	2
Fistularia tabacaria	1.02	139
Hyporthodus haiensis	0.82	2
Sargocentron hastatum	0.73	4
Dactylopterus volitans	0.55	12
0		
Prognathodes marcellae	0.49	4
Algaes	0.49	0
Citharus linguatula	0.25	16
Albunea sp.	0.25	8
Synodus saurus	0.20	8
Boops boops	0.17	8
Trachinocephalus myops	0.17	8
Anthias anthias	0.14	8
Dentex congoensis	0.12	2
ASTEROIDEA	0.08	14
Serranus accraensis	0.08	8
Priacanthus arenatus	0.06	8
Gorgonians	0.04	6
PECTINIDAE	0.04	2
Fistularia petimba	0.03	8
Brisingiidae	0.01	8
Caryophyllidae indetCV1	0.00	126
Polynoidae sp.	0.00	16
ECHINOMETRIDAE	0.00	84
Total	151.76	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 14  
 DATE : 24/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 1.34 start stop duration Lon W  
 0° 55.08  
 TIME : 11:03:05 11:32:29 29.4 (min) Purpose : 1  
 LOG : 9413.77 9415.50 1.7 Region : 2600  
 FDEPTH: 30 29 Gear cond.: 0  
 BDEPTH: 30 29 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3.5 kn  
 Sorted : 35 Total catch: 200.00 Catch/hour: 408.16

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Brachydeuterus auritus	137.71	14706
488		
J E L L Y F I S H	67.41	80
Engraulis encrasicolus	48.35	24178
24		
Sphyræna sp.	30.69	5939
Caranx rhonchus	28.90	13673
Chloroscombrus chrysurus	27.69	1463
Sphyræna sphyraena	26.12	149
Pagellus bellottii	8.53	65
19		
Aluterus monoceros	4.37	10
Lethrinus atlanticus	2.82	6
Fistularia petimba	2.55	29
0		

Sardinella aurita 2.41 822 0.59  
 23 Uranoscopus polli 2.02 12 0.49  
 Galeoides decadactylus 1.71 10 0.42  
 22 Trichurus lepturus 1.43 14 0.35  
 Eucinostomus melanopterus 1.41 10 0.34  
 Dentex canariensis 1.35 4 0.33  
 20 Dactylopterus volitans 1.27 2 0.31  
 Waste General 1.18 0 0.29  
 Plastic 1.18 0 0.29  
 Pagellus acarne 1.00 31 0.24  
 Acanthostracion guineensis 0.98 4 0.24  
 Pagrus caeruleostictus 0.82 4 0.20  
 Trachinocephalus myops 0.80 33 0.20  
 0 Alecthis alexandrinus 0.73 2 0.18  
 Sepia herreda 0.69 4 0.17  
 ASTEROIDEA 0.69 20 0.17  
 Pseudupeneus prayensis 0.69 8 0.17  
 Seriola rivoliana 0.59 300 0.14  
 Schedophilus pamarco 0.51 41 0.13  
 B I V A L V E S 0.41 10 0.10  
 Sargocentron hastatum 0.41 2 0.10  
 CALAPPIDAE 0.41 10 0.10  
 Xyrichtys novacula 0.16 2 0.04  
 Balistes capriscus 0.16 2 0.04  
 Total 408.16 100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 15  
 DATE : 24/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5° 2.53 start stop duration Lon W  
 1° 13.05  
 TIME : 19:02:11 19:21:57 19.8 (min) Purpose : 1  
 LOG : 9446.30 9447.40 1.1 Region : 2600  
 FDEPTH: 5 15 Gear cond.: 0  
 BDEPTH: 23 24 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 17 Total catch: 114.20 Catch/hour: 346.59

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Brachydeuterus auritus	131.83	6134
38.04		
17 Engraulis encrasicolus	81.52	55982
23.52		
Scomber colias	55.08	9639
15.89		
18		
Sepia herreda	21.83	194
6.30		
Chloroscombrus chrysurus	21.67	1305
6.25		
Sphyræna guachancho	10.50	33
3.03		
Scomberomorus tritor	8.08	571
2.33		
Sardinella aurita	5.69	1451
1.64		
Caranx rhonchus	4.04	203
1.17		
Sardinella maderensis	2.02	1011
0.58		
Echeneis naucrates	1.15	3
0.33		
Ilisha africana	1.10	36
0.32		
Trichurus lepturus	0.63	64
0.18		
Pagellus bellottii	0.61	6
0.18		
Galeoides decadactylus	0.37	18
0.11		
Dentex gibbosus	0.30	3
0.09		
Selene dorsalis	0.17	73
0.05		
Total	346.59	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 16  
 DATE : 25/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 27.36 start stop duration Lon W  
 1° 12.92  
 TIME : 08:29:49 09:00:13 30.4 (min) Purpose : 1  
 LOG : 9530.42 9531.98 1.6 Region : 2600  
 FDEPTH: 63 65 Gear cond.: 0  
 BDEPTH: 63 65 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 3.1 kn  
 Sorted : 18 Total catch: 160.00 Catch/hour: 315.79

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Ariomma bondi	152.70	13119
48.35		
Pagellus bellottii	46.47	3189
14.72		
28		
Lutjanus fulgens	19.03	38
6.03		
27		
Caranx rhonchus	16.74	418
5.30		
Dentex sp.	14.21	38
4.50		
Sepia herreda	8.64	71
2.74		
Dentex congoensis	8.08	318
2.56		
Chromis sp.	7.79	116
2.47		
TRIGLIDAE	5.77	405
1.83		
Boops boops	5.47	118
1.73		
Sepia bertheloti	4.52	67
1.43		
Pagrus caeruleostictus	3.08	22
0.97		
MURAENIDAE	2.41	2
0.76		
Apogon affinis	2.31	389
0.73		
Pseudupeneus prayensis	2.05	16
0.65		
Octopus vulgaris	1.70	2
0.54		
Acanthurus monroviae	1.62	2
0.51		
Raja miraletus	1.58	4
0.50		
Arnoglossus imperialis	1.44	304
0.46		
Seriola sp.	1.30	2
0.41		
Fistularia petimba	1.15	158
0.37		
0		
UNI DENTI FIED FISH	1.15	87
0.37		
Syacium guineensis	1.15	462
0.37		
Chromis lineata	0.83	8
0.26		
Zeus faber	0.63	2
0.20		
Alloteuthis subulata	0.58	261
0.18		
Dactylopterus volitans	0.55	2
0.18		
Micrurus boscanion	0.38	43
0.12		
Anthias anthias	0.38	14
0.12		
Citharus linguatula	0.30	43
0.10		
Prognathodes marcellae	0.27	14
0.09		
Grammolites gruvelli	0.22	14
0.07		
Fistularia sp.	0.22	26
0.07		

Ephippion guttifer	0.20	14	0.06
Waste General	0.19	30	0.06
Priacanthus arenatus	0.16	14	0.05
Saurida parri	0.16	30	0.05
Pseudarchaster sp.	0.12	2	0.04
CIDARIDAE	0.09	4	0.03
Plastic	0.06	4	0.02
Brisingiidae	0.05	2	0.02
Selene dorsalis	0.03	14	0.01
Total	315.79		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 17  
DATE : 25/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
4°51.91 start stop duration Lon W  
1°25.46  
TIME : 14:08:10 14:24:58 16.8 (min) Purpose : 1  
LOG : 9577.71 9578.60 0.9 Region : 2600  
FDEPTH: 36 37 Gear cond.: 0  
BDEPTH: 36 37 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.2 kn  
Sorted : 29 Total catch: 290.00 Catch/hour: 1036.33

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Brachydeuterus auritus	323.09	24565	31.18	
Caranx rhonchus	219.17	12736	21.15	
Sphyræna guanchancho	207.91	3906	20.06	
Chloroscombrus chrysurus	142.58	23546	13.76	
Sardinella maderensis	57.61	3413	5.56	
Trichurus lepturus	23.87	247	2.30	
J E L L Y F I S H	12.33	818	1.19	
Pagellus bellottii	11.94	211	1.15	
Octopus vulgaris	10.15	4	0.98	
Pseudupeneus prayensis	6.33	107	0.61	
Ariomma bondi	4.93	318	0.48	
Caranx crysos	4.93	36	0.48	
Engraulis encrasi colus	2.82	597	0.27	
34 Dentex gibbosus	2.82	36	0.27	
Sardinella aurita	2.11	422	0.20	
35 Selene dorsalis	1.39	175	0.13	
Waste General	1.39	71	0.13	
Sepia sp.	0.71	36	0.07	
Scomber colias	0.29	71	0.03	
Total	1036.37		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 18  
DATE : 25/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
4°44.76 start stop duration Lon W  
1°39.30  
TIME : 19:21:28 19:33:50 12.4 (min) Purpose : 1  
LOG : 9610.25 9610.88 0.6 Region : 2600  
FDEPTH: 10 25 Gear cond.: 0  
BDEPTH: 41 42 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.1 kn  
Sorted : 27 Total catch: 245.00 Catch/hour: 1189.32

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Brachydeuterus auritus	559.36	0	47.03	
29 Engraulis encrasi colus	335.75	106209	28.23	
32 Scomberomorus tritor	155.34	68	13.06	
Sardinella aurita	68.34	22078	5.75	
33 Caranx rhonchus	25.26	3243	2.12	
Scomber colias	20.06	2908	1.69	
31 Sphyræna guanchancho	13.61	92	1.14	
Lagocephalus laevigatus	5.44	10	0.46	
Sepia bertheloti	5.15	5	0.43	
Trachurus trachurus	0.75	39	0.06	
Alloteuthis africana	0.26	73	0.02	
Total	1189.31		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 19  
DATE : 25/07/19 GEAR TYPE: PT NO: 1 POSITION: Lat N  
4°34.71 start stop duration Lon W  
1°36.89  
TIME : 22:05:02 22:22:22 17.3 (min) Purpose : 1  
LOG : 9626.69 9627.62 0.9 Region : 2600  
FDEPTH: 0 35 Gear cond.: 0  
BDEPTH: 57 56 Validity : 0  
Towing dir: 0° Wire out : 110 m Speed : 3.2 kn  
Sorted : 6 Total catch: 6.02 Catch/hour: 20.83

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
J E L L Y F I S H	13.98	1979	67.11	
Lagocephalus laevigatus	2.28	90	10.96	
Sepia sp	2.21	62	10.63	
Sphyræna guanchancho	0.76	3	3.65	
Saurida parri	0.76	121	3.65	
Ariomma bondi	0.62	17	2.99	
Dactylopterus volitans	0.21	3	1.00	
Total	20.83		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 20  
DATE : 26/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
4°21.06 start stop duration Lon W  
1°43.98  
TIME : 08:04:19 08:38:21 34.0 (min) Purpose : 1  
LOG : 9690.71 9692.36 1.7 Region : 2600  
FDEPTH: 95 99 Gear cond.: 0  
BDEPTH: 95 99 Validity : 0  
Towing dir: 0° Wire out : 290 m Speed : 2.9 kn  
Sorted : 83 Total catch: 83.18 Catch/hour: 146.66

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Dentex angolensis	49.10	340	33.48	
36 Lepidotrigla cadmani	25.28	340	17.24	
Umbrina canariensis	19.11	79	13.03	
Antennarius oligospilos	10.30	2	7.02	
Dentex congoensis	6.21	35	4.23	
Dentex sp.	4.58	48	3.13	
Zeus faber	4.51	5	3.08	
Branchiostegus semifasciatus	4.02	5	2.74	
Octopus vulgaris	3.98	2	2.72	
Squatina oculata	3.84	2	2.62	
Alloteuthis subulata	3.33	1128	2.27	
Alloteuthis africana	2.87	790	1.96	
Raja marulatus	2.47	5	1.68	
Pagellus bellottii	1.41	30	0.96	
Pseudupeneus prayensis	1.34	12	0.91	
Sargocentron hastatum	0.78	7	0.53	
Gorgonocephalus	0.49	4	0.34	
Sphoeroides pachygaster	0.49	2	0.34	
Sepia hierredda	0.37	11	0.25	
Moroteuthis rosoni	0.35	21	0.24	
Citharus linguatula	0.32	19	0.22	
Dentex gibbosus	0.30	2	0.20	
Prognathodes marcellae	0.30	7	0.20	
Arnoglossus imperialis	0.14	35	0.10	
Saurida grandisquamis	0.12	115	0.08	
Plastic	0.11	14	0.07	
Brisingiidae	0.09	2	0.06	
PARAPAGURIDAE	0.07	4	0.05	
Sepia bertheloti	0.05	2	0.04	
Henricia abyssalis	0.05	4	0.04	
Scleractinia	0.04	4	0.03	
Pseudarchaster sp.	0.04	2	0.02	
UNIDENTIFIED FISH	0.04	2	0.02	
Anthias anthias	0.04	5	0.02	
Fishing gears	0.04	2	0.02	
Selene dorsalis	0.02	14	0.01	
P O L Y C H A E T A	0.02	0	0.01	
Gorgonians	0.02	4	0.01	
0 G A S T R O P O D S	0.01	2	0.01	
Alcyonacea	0.01	0	0.01	
Starfish	0.00	2	0.00	
PARTHENOPIAE	0.00	2	0.00	
Total	146.67		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 21  
DATE : 26/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
4°48.02 start stop duration Lon W  
1°52.61  
TIME : 12:25:02 12:55:31 30.5 (min) Purpose : 1  
LOG : 9723.15 9724.89 1.7 Region : 2600  
FDEPTH: 25 27 Gear cond.: 0  
BDEPTH: 25 27 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn  
Sorted : 830 Total catch: 829.80 Catch/hour: 1632.93

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
J E L L Y F I S H	1047.79	3080	64.17	
Trichurus lepturus	174.21	2478	10.67	
Ephippion guttifer	61.58	26	3.77	
Cynoponticus ferox	45.06	26	2.76	
Ilisha africana	43.05	2552	2.64	
Selene dorsalis	28.54	6482	1.75	
Sphyræna guanchancho	27.75	100	1.70	
Sepia sp	25.03	2003	1.53	
Sargocentron hastatum	25.03	26	1.53	
Chloroscombrus chrysurus	24.57	22678	1.50	
COLOCONGRIAE	22.53	26	1.38	
Pteroscion peli	22.53	1427	1.38	
Galathea decadactylus	18.40	61	1.13	
37 Brachydeuterus auritus	13.05	266	0.80	
38 Pseudotolithus senegalensis	11.21	435	0.69	
Plastic	9.71	0	0.59	
0 Parapenaeus longirostris	6.51	1037	0.40	
Scomberomorus tritor	6.30	2	0.39	
Cynoglossus senegalensis	5.51	49	0.34	
Sphoeroides marmoratus	4.88	2	0.30	
Cronius ruber	2.00	26	0.12	
Maja brachydactyla	1.50	51	0.09	
Pisodonophis semicinctus	1.28	4	0.08	
Cymbium glans	1.00	26	0.06	
Callinectes pallidus	1.00	75	0.06	
Umbrina canariensis	0.67	2	0.04	
C E P H A L O P O D A	0.50	250	0.03	
Priacanthus arenatus	0.43	2	0.03	
BYTHIDAE	0.43	26	0.03	
Sphoeroides maculatus	0.31	2	0.02	
Drepane africana	0.25	26	0.02	
Epinephelus aeneus	0.20	26	0.01	
G A S T R O P O D S	0.07	26	0.00	
Stromateus fiatola	0.05	26	0.00	
Total	1632.94		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 22  
 DATE : 26/07/19 GEAR TYPE: PT NO: 8 POSITION: Lat N  
 4° 35. 83 start stop duration Lon W  
 2° 1. 72  
 TIME : 16: 27: 07 17: 24: 28 57. 4 (min) Purpose : 1  
 LOG : 9746. 92 9751. 27 4. 3 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 67 53 Validity : 0  
 Towing dir: 0° Wire out : 350 m Speed : 4. 5 kn  
 Sorted : 13 Total catch: 73. 06 Catch/hour: 76. 44

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Sepiella ornata	27. 14	1463
Sepia elobyana	21. 59	1299
Alectis alexandrinus	9. 05	4
Scomberomorus tritor	6. 64	4
Fishing gears	3. 10	0
Illex coindetii	3. 00	524
Trachinotus ovatus	2. 25	6
Lagocephalus laevigatus	1. 59	277
Aequorea sp.	0. 97	40
Selene dorsalis	0. 71	313
Chrysaora sp.	0. 21	1
Fistularia petimba	0. 12	26
ACANTHURI DAE	0. 05	30
Trachurus trecae	0. 02	14
Engraulis encrasi colus	0. 01	8
POMACANTHI DAE	0. 01	14
Total	76. 44	100. 00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 23  
 DATE : 27/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4° 41. 40 start stop duration Lon W  
 2° 7. 76  
 TIME : 23: 34: 03 23: 51: 47 17. 7 (min) Purpose : 1  
 LOG : 9912. 72 9913. 61 0. 9 Region : 2600  
 FDEPTH: 10 23 Gear cond.: 0  
 BDEPTH: 42 45 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3. 0 kn  
 Sorted : 34 Total catch: 146. 75 Catch/hour: 496. 90

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Engraulis encrasi colus	165. 73	63284
42 Brachydeuterus auritus	148. 46	3467
39 J E L L Y F I S H	65. 74	403
Trichurus lepturus	32. 87	5015
Scomberomorus tritor	27. 83	17
45 Sardinella aurita	15. 60	3538
40 Scomber colias	12. 53	2103
41 Selene dorsalis	10. 03	626
Chloroscombrus chrysurus	7. 52	264
Sphyræna guachancho	6. 68	41
Parapenaeopsis atlantica	1. 81	41
Sepia sp.	1. 71	278
Plastic	0. 13	0
Saurida parri	0. 10	210
Caranx rhonchus	0. 05	14
Pteroscion peli	0. 04	27
Alectis alexandrinus	0. 04	27
Sardinella maderensis	0. 01	14
Total	496. 89	100. 00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 24  
 DATE : 28/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 43. 81 start stop duration Lon W  
 2° 11. 60  
 TIME : 01: 28: 45 01: 58: 59 30. 2 (min) Purpose : 1  
 LOG : 9924. 46 9925. 90 1. 4 Region : 2600  
 FDEPTH: 42 41 Gear cond.: 0  
 BDEPTH: 42 41 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 2. 8 kn  
 Sorted : 0 Total catch: 310. 00 Catch/hour: 615. 28

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
JELLYFISH	287. 83	937
Scyllarus sp.	96. 60	21045
Pseudotolithus senegalensis	59. 83	99
0 Pteroscion peli	30. 56	748
Trichurus lepturus	23. 86	641
Cynoponticus ferox	17. 15	30
Parapenaeopsis atlantica	14. 39	4849
Cynoglossus canariensis	13. 21	60
Brachydeuterus auritus	11. 63	226
44 Perulibatrachus elminensis	11. 43	365
Pisodonophis semicinctus	11. 04	157
Engraulis encrasi colus	10. 65	3549
43 Sphyræna guachancho	7. 49	10
Galeoides decadactylus	3. 75	30
Torpedo mackayana	2. 90	2
Raja miraletus	2. 30	4
Solitas gruvelli	1. 58	50
Dasyatis margarita	1. 43	10
Antennarius pardalis	1. 38	60
Plastic	1. 27	0
Hoplunnis sp.	0. 99	30
Pegusa lascaris	0. 87	10
Torpedo torpedo few spots	0. 71	6
Brofuta barbata	0. 70	109
Sepiella ornata	0. 59	30
G A S T R O P O D S	0. 44	69

Drepane africana 0. 13 10 0. 02  
 Callinectes pallidus 0. 12 30 0. 02  
 Lagocephalus laevigatus 0. 12 20 0. 02  
 Dorippidae 0. 08 50 0. 01  
 Selene dorsalis 0. 08 40 0. 01  
 Stenorhynchus lanceolatus 0. 07 10 0. 01  
 Octopus vulgaris 0. 05 20 0. 01  
 Stromateus fiatola 0. 05 20 0. 01  
 Geryon trispinosus 0. 04 20 0. 01  
 Chloroscombrus chrysurus 0. 03 50 0. 00  
 Unidentifed 0. 03 40 0. 00  
 Sardinella maderensis 0. 02 10 0. 00  
 Aegaeon sp. 0. 01 10 0. 00

Total 615. 41 100. 02

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 25  
 DATE : 28/07/19 GEAR TYPE: PT NO: 8 POSITION: Lat N  
 4° 36. 24 start stop duration Lon W  
 2° 26. 95  
 TIME : 10: 29: 17 11: 06: 38 37. 4 (min) Purpose : 1  
 LOG : 9978. 54 9981. 15 2. 6 Region : 2600  
 FDEPTH: 30 60 Gear cond.: 0  
 BDEPTH: 104 106 Validity : 0  
 Towing dir: 0° Wire out : 300 m Speed : 4. 2 kn  
 Sorted : 0 Total catch: 0. 00 Catch/hour: 0. 00

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
NOCATCH	0. 00	0
Total	0. 00	0

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 26  
 DATE : 28/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 56. 57 start stop duration Lon W  
 2° 40. 57  
 TIME : 17: 48: 52 18: 18: 46 29. 9 (min) Purpose : 1  
 LOG : 27. 71 29. 41 1. 7 Region : 2600  
 FDEPTH: 33 35 Gear cond.: 0  
 BDEPTH: 33 35 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3. 4 kn  
 Sorted : 0 Total catch: 132. 30 Catch/hour: 265. 39

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Sphyræna guachancho	38. 68	590
0 Triichurus lepturus	36. 67	1316
Pseudotolithus senegalensis	26. 56	0
Polydactylus quadrifilis	22. 35	0
Chrysaora sp.	21. 34	0
48 Galeoides decadactylus	20. 60	315
Brachydeuterus auritus	14. 34	451
49 Aluterus monoceros	12. 80	12
Pagrus caeruleostictus	9. 31	44
Pseudotolithus senegalensis	6. 46	8
Chloroscombrus chrysurus	6. 38	317
Penaeus notialis	6. 27	255
Selene dorsalis	4. 25	1182
0 Pteroscion peli	4. 22	134
0 Pagellus bellottii	4. 12	6
0 Raja miraletus	3. 01	6
Sepia hierredda	2. 73	4
Squilla mantis	2. 40	195
0 Pomadasys jubelini	2. 33	18
Torpedo nobiliana	2. 25	2
Clarybdis sp.	1. 64	2
Torpedo torpedo	1. 60	2
Pseudupeneus prayensis	1. 52	20
Ilisha africana	1. 42	42
DIODONTIDAE	1. 40	2
Cynoponticus ferox	1. 20	6
0 Trachinocephalus myops	1. 10	14
0 Calappa rubroguttata	0. 96	12
Plastic	0. 72	44
Cynoglossus canariensis	0. 60	2
Myrlichthys pardalis	0. 57	14
0 Dentex barnardi	0. 56	6
Aequorea sp.	0. 48	2
Ephippion guttifer	0. 44	2
Pandirus regius	0. 44	2
Alectis alexandrinus	0. 36	2
Solitas gruvelli	0. 34	12
Chaetodipterus lippei	0. 32	2
Dasyatis margarita	0. 28	2
Sargocentron hastatum	0. 28	2
Sepiella ornata	0. 28	14
Penaeus kerathurus	0. 24	4
Chelidoniichthys capensis	0. 20	2
Sepia elobyana	0. 20	8
C E P H A L O P O D A	0. 19	102
Trachurus trecae	0. 15	126
Trachinocephalus sp.	0. 12	2
G A S T R O P O D S	0. 12	6
Small crabs	0. 08	2
0 Calappa pelii	0. 08	6
LEUCOSIIDAE	0. 08	6
DORIPPIDAE	0. 08	2
0 Sphyræna sp.	0. 07	22
UNIIDENTIFIED FISH	0. 06	12
Zeus faber	0. 05	12
Geryon maritae	0. 05	22
Pegusa lascaris	0. 03	12
Sea urchin	0. 02	2



Geryon trispinosus	0.00	12	0.00
J E L L Y F I S H	0.00	0	0.00
Total	265.40		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 27  
 DATE : 28/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4° 55.74 start stop duration Lon W  
 2° 38.58  
 TIME : 19:04:34 19:17:59 13.4 (min) Purpose : 1  
 LOG : 32.88 33.68 0.8 Region : 2600  
 FDEPTH: 10 12 Gear cond.: 0  
 BDEPTH: 35 34 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.6 kn  
 Sorted : 12 Total catch: 86.76 Catch/hour: 388.19

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Engraulis encrasi colus	184.60 98635	47.55
46 Sphyræna guachancho	92.30 676	23.78
Brachydeuterus auritus	57.23 2461	14.74
47 Trichurus lepturus	28.92 1168	7.45
Stromateus fiatola	6.09 13	1.57
Chloroscombrus chrysurus	4.31 183	1.11
Aequorea sp.	3.08 183	0.79
Selene dorsalis	2.46 183	0.63
Sepia elobyana	2.45 67	0.63
J E L L Y F I S H	2.15 4	0.55
Sardinella aurita	1.54 94	0.40
Ilisha africana	1.23 31	0.32
Penaeus notialis	0.89 18	0.23
Scomber colias	0.59 152	0.15
Monochirus hispidus	0.37 31	0.10
Total	388.20	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 28  
 DATE : 29/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4° 55.63 start stop duration Lon W  
 2° 53.11  
 TIME : 01:05:20 01:35:27 30.1 (min) Purpose : 1  
 LOG : 84.05 85.78 1.7 Region : 2600  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 51 49 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.4 kn  
 Sorted : 32 Total catch: 230.00 Catch/hour: 458.32

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Caranx rhonchus	237.63 18494	51.85
Engraulis encrasi colus	97.96 29847	21.37
53 Chloroscombrus chrysurus	35.13 456	7.67
Saurida parri	30.85 343	6.73
Sepia hierredda	14.28 72	3.12
Brachydeuterus auritus	8.28 1156	1.81
51 Sepia bertheloti	8.00 586	1.74
Sphyræna guachancho	4.28 58	0.93
Trichurus lepturus	3.43 229	0.75
Sardinella aurita	3.14 658	0.69
52 Selene dorsalis	2.86 86	0.62
Sphyræna sphyraena	2.57 0	0.56
Scomberomorus tritor	2.55 6	0.56
Lagocephalus laevigatus	2.43 102	0.53
0 Alloteuthis sp.	2.14 556	0.47
Ariomma bondi	1.71 42	0.37
Scomber colias	0.57 357	0.12
50 Thysanoteuthis sp.	0.43 14	0.09
SCOMBRIDAE	0.07 14	0.02
Total	458.32	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 29  
 DATE : 29/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 1.03 start stop duration Lon W  
 3° 4.07  
 TIME : 07:58:24 08:28:28 30.1 (min) Purpose : 1  
 LOG : 121.92 123.63 1.7 Region : 2600  
 FDEPTH: 38 39 Gear cond.: 0  
 BDEPTH: 38 39 Validity : 0  
 Towing dir: 0° Wire out : 150 m Speed : 3.4 kn  
 Sorted : 93 Total catch: 427.96 Catch/hour: 853.64

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Brachydeuterus auritus	272.59 13769	31.93
59 Chloroscombrus chrysurus	203.91 3229	23.89
Galeodes decadactylus	96.32 1797	11.28
60 CORALLINALES	40.69 0	4.77
Pagellus bellottii	38.63 680	4.53
54 Trichurus lepturus	29.67 908	3.48
Octopus vulgaris	24.93 20	2.92
Dentex gibbosus	14.95 50	1.75
Caranx rhonchus	12.89 1077	1.51
58 Raja marulatus	11.77 30	1.38
Ephippion guttifer	9.68 14	1.13
Trachurus trecae	9.67 746	1.13
Sphyræna guachancho	9.63 44	1.13
Pomadourus jubelini	7.26 10	0.85
Sepia officinalis	5.94 6	0.70
Syacium guineensis	5.89 195	0.69
CIDARIDAE	4.99 201	0.58

Pseudupeneus prayensis	4.27	54	0.50
0 Balistes capriscus	4.23	16	0.50
Chrysaora sp.	3.87	2	0.45
Solitas gruvelli	3.51	405	0.41

0 C E P H A L O P O D A  
 Selene dorsalis 3.48 255 0.41  
 Dentex canariensis 3.05 720 0.36  
 55 Sardinella maderensis 2.88 136 0.34  
 56 Gerres nigri 2.71 34 0.32  
 Epinephelus aeneus 2.55 8 0.30  
 Pseudotolithus senegalensis 2.19 4 0.26  
 Clarybdis sp. 1.87 52 0.22  
 DORIPPIIDAE 1.85 26 0.22  
 Briisingidae 1.63 42 0.19  
 UNIDENTIFIED FISH 1.60 2 0.19  
 Cynoglossus canariensis 1.56 8 0.18  
 Citharus linguatula 1.27 72 0.15

0 Cymbium cymbium	1.20	4	0.14
Scomber colias	1.02	102	0.12

57 Allectis alexandrinus 0.96 4 0.11  
 Sepia sp. 0.89 34 0.10  
 Serranus accraensis 0.88 221 0.08  
 B I V A L V E S 0.65 34 0.08  
 Plastic 0.59 80 0.07

0 P O L Y C H A E T A  
 Psettodes belcheri 0.47 52 0.05  
 0.40 2 0.05  
 Briisingidae 0.31 26 0.04  
 Si cyonia galaeata 0.20 120 0.02  
 Zeus faber 0.17 18 0.02  
 Echiniidae sp. 0.16 26 0.02  
 Perulibatrachus elmi nensis 0.16 2 0.02  
 Cynoponticus ferox 0.16 2 0.02  
 Di cologlossa hexophthalma 0.16 2 0.02  
 Saurida parri 0.09 18 0.01  
 Alloteuthis sp. 0.09 8 0.01  
 Metapenaeopsis miersi 0.07 52 0.01  
 Sea anemone sp. 0.06 8 0.01  
 DROMIDAE 0.04 8 0.00  
 Penaeus notialis 0.04 2 0.00  
 Fishing gears 0.03 0 0.00  
 Gorgonians 0.03 8 0.00  
 Monochirus hispidus 0.02 2 0.00  
 ACANTHURIDAE 0.01 8 0.00  
 Shrimps unidentified 0.01 8 0.00  
 Aegaeon lacazei 0.01 8 0.00  
 SCYLLARIDAE 0.01 8 0.00  
 C R A B S 0.01 8 0.00

0 RANINIDAE	0.01	8	0.00
PARTHENOPIIDAE	0.01	8	0.00
Total	853.64		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 30  
 DATE : 29/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5° 2.30 start stop duration Lon W  
 3° 20.40  
 TIME : 19:44:06 20:15:36 31.5 (min) Purpose : 1  
 LOG : 183.88 185.47 1.6 Region : 2500  
 FDEPTH: 5 20 Gear cond.: 0  
 BDEPTH: 52 58 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.0 kn  
 Sorted : 10 Total catch: 122.45 Catch/hour: 233.31

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
62 Engraulis encrasi colus	93.00 22500	39.86
61 Brachydeuterus auritus	57.64 1574	24.71
Chloroscombrus chrysurus	33.91 412	14.53
Scomberomorus tritor	12.27 2	5.26
Saurida parri	9.69 1743	4.15
Trachurus trecae	6.06 133	2.60
Sepia officinalis	4.50 4	1.93
Alloteuthis subulata	4.00 206	1.71
Sardinella aurita	3.39 461	1.45

63 Lagocephalus laevigatus 1.64 2 0.70  
 Sepiella ornata 1.45 72 0.62  
 Sepia elobyana 1.45 36 0.62  
 Selene dorsalis 1.32 13 0.57  
 Scomber colias 1.21 109 0.52

64 JELLYFISH 0.91 48 0.39  
 Illex coindetii 0.25 25 0.11  
 Trichurus lepturus 0.24 11 0.10  
 Alloteuthis africana 0.21 48 0.09  
 Caranx rhonchus 0.16 11 0.07  
 CHAETODONTIDAE 0.01 11 0.00

Total	233.31		100.00
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R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 31  
 DATE : 29/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5° 4.94 start stop duration Lon W  
 3° 35.83  
 TIME : 23:58:52 00:28:47 29.9 (min) Purpose : 1  
 LOG : 214.16 215.86 1.7 Region : 2500  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 49 57 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.4 kn  
 Sorted : 32 Total catch: 290.00 Catch/hour: 581.55

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Chloroscombrus chrysurus	364.42 4883	62.66

	Sardinella aurita	104.95	1221	18.05
70	Caranx rhonchus	43.73	1530	7.52
	Sardinella maderensis	41.54	656	7.14
69	Saurida parri	12.39	2824	2.13
	Alectis alexandrinus	3.81	2	0.66
	Sepia hierredda	3.13	42	0.54
0	C E P H A L O P O D A	2.19	1185	0.38
	Hemiramphus brasiliensis	1.46	18	0.25
	Sphyraena guachancho	1.46	36	0.25
	Dactylopterus volitans	1.09	18	0.19
	Scomber colias	0.73	18	0.13
	Trichiurus lepturus	0.44	2	0.08
	Engraulis encrasi colus	0.15	18	0.03
	Aequorea sp.	0.05	36	0.01
	Total	581.55		100.00

R/V Dr. Fridtjof Nansen		SURVEY: 2019408		STATION: 32	
DATE : 30/07/19		GEAR TYPE: PT NO: 4		POSITION: Lat N	
5° 6.08		start	stop	duration	Lon W
3° 53.11					
TIME : 04:28:48	04:59:02	30.2	(min)	Purpose : 1	
LOG : 250.10	251.80	1.7		Region : 2500	
FDEPTH: 0	0			Gear cond.: 0	
BDEPTH: 56	54			Validity : 0	
Towing dir: 0°	Wire out : 120 m			Speed : 3.4 kn	
Sorted : 5	Total catch: 468.00			Catch/hour: 928.57	
SPECIES		CATCH/HOUR		% OF TOT.	
C SAMP		weight	numbers		
65	Engraulis encrasi colus	874.37	121109	94.16	
	Trichiurus lepturus	20.40	349	2.20	
	Scomber colias	17.71	933	1.91	
66	Caranx rhonchus	7.87	375	0.85	
	Sarda sarda	3.97	4	0.43	
	Sardinella aurita	2.42	373	0.26	
67	Brachydeuterus auritus	1.15	8	0.12	
	SCOMBRI DAE	0.36	4	0.04	
	Illex coindetii	0.20	2	0.02	
	Chloroscombrus chrysurus	0.17	2	0.02	
	Total	928.61		100.00	

R/V Dr. Fridtjof Nansen		SURVEY: 2019408		STATION: 33	
DATE : 30/07/19		GEAR TYPE: BT NO: 27		POSITION: Lat N	
5° 5.44		start	stop	duration	Lon W
4° 18.07					
TIME : 16:05:47	16:35:20	29.6	(min)	Purpose : 1	
LOG : 324.00	325.51	1.5		Region : 2500	
FDEPTH: 83	82			Gear cond.: 0	
BDEPTH: 83	82			Validity : 0	
Towing dir: 0°	Wire out : 240 m			Speed : 3.1 kn	
Sorted : 58	Total catch: 57.69			Catch/hour: 117.13	
SPECIES		CATCH/HOUR		% OF TOT.	
C SAMP		weight	numbers		
71	Trachurus trecae	17.95	579	15.32	
72	Dentex angolensis	15.76	152	13.45	
73	Pagellus bellottii	13.08	4	11.16	
	Alloteuthis africana	12.51	3852	10.68	
	Ariomma bondi	7.51	213	6.41	
	Illex coindetii	6.09	144	5.20	
	Pseudupeneus prayensis	5.93	47	5.06	
	Umbri na canariensis	4.47	20	3.81	
	Boops boops	4.02	138	3.43	
	Branchiostegus semi fasciatus	3.41	12	2.91	
	Dentex canariensis	3.27	2	2.79	
74	CORALLINALES	3.01	0	2.57	
	Zeus faber	2.64	8	2.25	
	Sepia officinalis	2.40	2	2.05	
	Raja miraletus	2.36	8	2.01	
	Brotula barbata	1.99	6	1.70	
	Trichiurus lepturus	1.54	4	1.32	
	Fistularia petimba	1.46	10	1.25	
	Scorpaena stephanica	1.14	2	0.97	
	Chrysaora sp.	1.06	6	0.91	
	Priacanthus arenatus	0.97	6	0.83	
	Saurida parri	0.71	262	0.61	
	Pagrus caeruleostictus	0.61	2	0.52	
	Citharus linguatula	0.53	28	0.45	
	Lepidotrigla cadmani	0.49	6	0.42	
	Serranus cabrilla	0.45	2	0.38	
	Solitas gruvelli	0.45	8	0.38	
	Arnoglossus imperialis	0.41	69	0.35	
	Plastic	0.32	32	0.28	
	Calappa pelii	0.16	2	0.14	
	Serranus africanus	0.12	6	0.10	
	Ephippion guttifer	0.12	8	0.10	
	Brisingiidae	0.06	14	0.05	
	Shrimps, small, non comm.	0.06	87	0.05	
	C R A B S	0.03	14	0.03	
	Anthias anthias	0.02	2	0.02	
	P O L Y C H A E T A	0.02	6	0.02	
	Selene dorsalis	0.02	4	0.01	
	Gorgonians	0.02	20	0.01	
	Total	117.15		100.02	

R/V Dr. Fridtjof Nansen		SURVEY: 2019408		STATION: 34	
DATE : 30/07/19		GEAR TYPE: PT NO: 4		POSITION: Lat N	
5° 9.88		start	stop	duration	Lon W
4° 20.08					
TIME : 19:07:39	19:43:16	35.6	(min)	Purpose : 1	
LOG : 335.66	337.17	1.5		Region : 2500	
FDEPTH: 10	22			Gear cond.: 0	
BDEPTH: 42	42			Validity : 0	
Towing dir: 0°	Wire out : 120 m			Speed : 2.5 kn	
Sorted : 140	Total catch: 140.00			Catch/hour: 235.82	
SPECIES		CATCH/HOUR		% OF TOT.	
C SAMP		weight	numbers		
76	Sardinella aurita	61.16	32426	25.93	
75	Engraulis encrasi colus	54.55	13031	23.13	
	Trichiurus lepturus	31.08	66	13.18	
	Brachydeuterus auritus	23.14	505	9.81	
78	Sardinella maderensis	19.28	1075	8.18	
77	Trachurus trecae	18.18	827	7.71	
86	Alloteuthis subulata	13.22	6777	5.61	
	Caranx rhonchus	7.71	910	3.27	
	Scomber colias	2.75	330	1.17	
85	Sepia officinalis	2.32	5	0.99	
	Sphyraena guachancho	1.89	10	0.80	
	J E L L Y F I S H	0.34	3	0.14	
	Selene dorsalis	0.19	109	0.08	
	Total	235.82		100.00	

R/V Dr. Fridtjof Nansen		SURVEY: 2019408		STATION: 35	
DATE : 30/07/19		GEAR TYPE: PT NO: 1		POSITION: Lat N	
5° 10.14		start	stop	duration	Lon W
4° 18.53					
TIME : 20:23:16	20:53:00	29.7	(min)	Purpose : 1	
LOG : 338.50	340.30	1.8		Region : 2500	
FDEPTH: 25	42			Gear cond.: 0	
BDEPTH: 41	42			Validity : 0	
Towing dir: 0°	Wire out : 90 m			Speed : 3.6 kn	
Sorted : 14	Total catch: 130.00			Catch/hour: 262.36	
SPECIES		CATCH/HOUR		% OF TOT.	
C SAMP		weight	numbers		
81	Engraulis encrasi colus	94.96	14710	36.20	
80	Brachydeuterus auritus	62.45	15162	23.80	
	Trichiurus lepturus	27.89	57	10.63	
	Sardinella aurita	24.14	5697	9.20	
79	Dactylopterus volitans	13.84	97	5.28	
	Alloteuthis subulata	11.91	6069	4.54	
	Trachurus trecae	11.27	595	4.29	
88	Caranx rhonchus	6.44	1013	2.45	
	Saurida parri	3.86	450	1.47	
	Sepia hierredda	2.18	4	0.83	
	Selene dorsalis	1.29	466	0.49	
	Chloroscombrus chrysurus	0.97	16	0.37	
	Scomber colias	0.64	81	0.25	
	Sardinella maderensis	0.32	16	0.12	
	Illex coindetii	0.08	821	0.03	
	Alloteuthis africana	0.08	16	0.03	
	Acanthurus monroviae	0.03	16	0.01	
	Total	262.36		100.00	

R/V Dr. Fridtjof Nansen		SURVEY: 2019408		STATION: 36	
DATE : 30/07/19		GEAR TYPE: PT NO: 4		POSITION: Lat N	
5° 7.29		start	stop	duration	Lon W
4° 34.25					
TIME : 23:09:11	23:21:20	12.2	(min)	Purpose : 1	
LOG : 357.19	357.78	0.6		Region : 2500	
FDEPTH: 5	20			Gear cond.: 0	
BDEPTH: 47	50			Validity : 0	
Towing dir: 0°	Wire out : 120 m			Speed : 2.9 kn	
Sorted : 0	Total catch: 65.51			Catch/hour: 323.51	
SPECIES		CATCH/HOUR		% OF TOT.	
C SAMP		weight	numbers		
	Chloroscombrus chrysurus	202.72	3042	62.66	
	Trichiurus lepturus	56.40	316	17.43	
	Trachurus trecae	33.88	716	10.47	
	Sphyraena guachancho	12.05	311	3.72	
	Squid unidentified	5.95	5012	1.84	
	Stromateus fiatola	4.05	10	1.25	
	Brachydeuterus auritus	3.65	444	1.13	
82	Sardinella maderensis	1.78	40	0.55	
84	Sardinella aurita	1.23	30	0.38	
83	Sepia hierredda	0.94	5	0.29	
	Bregmaceros sp.	0.85	3694	0.26	
	Hippocampus sp.	0.01	5	0.00	
	Total	323.50		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 37  
 DATE : 31/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5° 1.63 start stop duration Lon W  
 4° 52.24  
 TIME : 02:59:09 03:29:35 30.4 (min) Purpose : 1  
 LOG : 389.37 391.03 1.7 Region : 2500  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 58 61 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.3 kn  
 Sorted : 44 Total catch: 44.23 Catch/hour: 87.19

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Trichurus lepturus	43.17	217
Engraulis encrasicolus	15.10	3193
87		
Hemiramphus brasiliensis	8.20	77
Saurida parri	7.96	2113
Alloteuthis africana	3.55	1267
Trachurus trecae	3.51	142
92		
Chloroscombrus chrysurus	1.58	20
Cheltopogon cyanopterus	0.95	2
Scomber colias	0.91	132
91		
Ariomma bondi	0.59	223
Trachinotus ovatus	0.47	2
J E L L Y F I S H	0.43	22
Sardinella aurita	0.39	73
90		
Brachydeuterus auritus	0.20	37
89		
Sepiella ornata	0.12	4
Lagocephalus laevigatus	0.04	8
Sepia bertheloti	0.02	2
Selene dorsalis	0.01	4
Total	87.19	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 38  
 DATE : 31/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 4.53 start stop duration Lon W  
 5° 7.81  
 TIME : 06:41:53 07:11:57 30.1 (min) Purpose : 1  
 LOG : 417.42 419.10 1.7 Region : 2500  
 FDEPTH: 30 30 Gear cond.: 0  
 BDEPTH: 30 30 Validity : 0  
 Towing dir: 0° Wire out : 170 m Speed : 3.4 kn  
 Sorted : 26 Total catch: 140.00 Catch/hour: 279.35

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Chloroscombrus chrysurus	72.25	968
Pteroscion peli	41.73	1022
Trichurus lepturus	25.97	535
Ilisha africana	24.24	539
Brachydeuterus auritus	17.79	2510
93		
Waste General	14.36	0
Pseudotolithus senegalensis	10.50	10
Cymbium glans	8.82	2
Sphyræna guachancho	8.07	64
Galeodes decadactylus	6.83	148
Sepia hieronisi	6.78	8
Penaeus notialis	5.78	152
Parapenaeopsis atlantica	4.21	946
Selene dorsalis	3.60	994
Cynoglossus senegalensis	2.95	12
J E L L Y F I S H	2.82	281
Cynoponticus ferus	2.63	6
Sardinella maderensis	1.96	136
94		
Scyllarus pygmaeus	1.62	375
Epinephelus aeneus	1.48	4
Torpedo torpedo	1.40	6
Trachurus trecae	1.25	32
DORIPPIDAE	1.16	487
Perulibatrachus elminensis	1.12	4
0		
Portunus validus	0.92	2
Pisodonophis semicinctus	0.84	4
Panulirus regius	0.84	2
Rajami crocellata	0.80	2
Sepiella ornata	0.63	24
Ariomma bondi	0.63	16
G A S T R O P O D S	0.62	104
Mustelus mustelus	0.60	4
Scomberomorus tritor	0.52	2
Sicyonia galeata	0.47	313
BALISTIDAE	0.47	8
Batrachoides liberiensis	0.36	20
Callinectes sp.	0.33	48
Pomadasy incisus	0.32	2
Sardinella aurita	0.31	8
95		
Ephippion guttifer	0.28	8
Sepia sp.	0.24	172
Calappa rubroguttata	0.16	2
Alloteuthis subulata	0.16	78
Solitas gruvelli	0.13	48
Plastic	0.13	16
Coral	0.08	4
C R A B S	0.08	24
Alloteuthis africana	0.08	24
Brotula sp.	0.05	8
Penaeus kerathurus	0.04	8
Total	279.34	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 39  
 DATE : 31/07/19 GEAR TYPE: PT NO: 8 POSITION: Lat N  
 4° 50.67 start stop duration Lon W  
 5° 23.58  
 TIME : 12:31:33 13:09:17 37.7 (min) Purpose : 1  
 LOG : 451.90 454.75 2.9 Region : 2500  
 FDEPTH: 0 0 Gear cond.: 0  
 BDEPTH: 725 705 Validity : 0  
 Towing dir: 0° Wire out : 280 m Speed : 4.5 kn  
 Sorted : 2 Total catch: 9.24 Catch/hour: 14.70

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
J E L L Y F I S H	7.90	0
Krill	2.15	26911
Unid. juvenile fishes	1.95	1716
Ariomma bondi	0.96	698
Leptocephalus	0.50	600
CRANCHIIDAE	0.28	14
OMMASTREPHIDAE	0.14	70
Pterycombus brama	0.13	14
BATRACHOIDIDAE	0.13	84
CHAETODONTIDAE	0.10	56
Brotula barbata	0.10	41
Trichurus lepturus	0.10	97
CHIROTETHIDAE	0.08	29
SERRANIDAE	0.08	126
FISH LARVAE	0.03	56
Unidentified crustacean larvae	0.01	29
SCORPAENIDAE	0.01	41
PARALEPIDIDAE	0.01	41
Aequorea sp.	0.01	14
SYNDONTIDAE	0.01	29
Total	14.70	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 40  
 DATE : 31/07/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 54.51 start stop duration Lon W  
 5° 22.65  
 TIME : 15:26:49 15:53:34 26.8 (min) Purpose : 1  
 LOG : 466.94 468.30 1.4 Region : 2500  
 FDEPTH: 99 99 Gear cond.: 0  
 BDEPTH: 99 99 Validity : 0  
 Towing dir: 0° Wire out : 270 m Speed : 3.1 kn  
 Sorted : 44 Total catch: 44.13 Catch/hour: 98.95

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Dentex angolensis	73.43	336
97		
Brotula barbata	9.24	13
Dentex congoensis	4.48	20
Chloroscombrus chrysurus	3.05	47
Octopus vulgaris	1.43	2
Scorpaena stephanica	1.35	2
Dentex canariensis	1.01	2
96		
Stromateus fiatola	0.90	2
Rajami raleus	0.85	2
Trichurus lepturus	0.58	2
Illex coindetii	0.54	18
Chaetodon hoefleri	0.49	2
Zeus faber	0.49	2
Chelidoniichthys gabonensis	0.31	2
Syacium micrurum	0.25	4
PORTUNIDAE	0.16	58
PAGUROIDEA	0.10	7
Brachydeuterus auritus	0.09	2
Cronius ruber	0.07	2
Callinectes amnicola	0.03	4
GONEPLACIDAE	0.02	0
Alloteuthis africana	0.02	7
Microrhynchus boscanion	0.02	2
Scyllarus batei	0.01	4
Saurida parri	0.01	36
Plastic	0.01	13
Bristle worms	0.01	4
Selene dorsalis	0.00	13
Aegaeon lacazei	0.00	2
Spirobranchus notialis	0.00	2
Brisingiidae	0.00	2
Parapandalus narval	0.00	4
Metapenaeopsis miersi	0.00	2
Sicyonia galeata	0.00	4
Total	98.95	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 41  
 DATE : 31/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 5° 2.98 start stop duration Lon W  
 5° 22.62  
 TIME : 19:03:35 19:34:25 30.8 (min) Purpose : 1  
 LOG : 482.04 483.98 1.9 Region : 2500  
 FDEPTH: 5 18 Gear cond.: 0  
 BDEPTH: 28 33 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.8 kn  
 Sorted : 48 Total catch: 260.00 Catch/hour: 505.84

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight	numbers
Chloroscombrus chrysurus	203.13	2117
Sphyræna guachancho	150.66	593
Sardinella maderensis	93.95	899
98		
Sardinella aurita	27.93	730
99		
Stromateus fiatola	8.68	10
Ilisha africana	6.56	126
Caranx senegalensis	6.14	10
Scomberomorus tritor	3.11	6
Trachinotus maxillosus	2.54	10
Sepia sp.	1.48	1249

Trichiurus lepturus	1.27	53	0.25
Scomber colias	0.13	10	0.03
Engraulis encrasicolus	0.07	21	0.01
Selene dorsalis	0.07	10	0.01
Metapneustes miersi	0.06	21	0.01
JELLYFISH	0.05	10	0.01
<b>Total</b>	<b>505.84</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 42  
 DATE : 31/07/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4°59.19

start	stop	duration	Lon	W
5°36.57				
TIME : 21:39:27	21:59:04	19.6 (min)		
LOG : 500.76	501.69	0.9		
FDEPTH: 5	15			
BDEPTH: 36	40			
Towing dir: 0°	Wire out : 120 m			
Sorted : 12	Total catch: 24.14			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Sardinella maderensis	19.08	180	25.85
100	Engraulis encrasicolus	14.78	4771	20.02
	Sphyræna guachancho	13.09	80	17.73
	Chloroscombrus chrysurus	7.22	70	9.78
	Sepia sp.	5.04	4483	6.83
	Sardinella aurita	4.02	3994	5.45
101	J E L L Y F I S H	3.02	205	4.10
	Stromateus fiatola	2.08	3	2.82
	Aequorea sp.	1.75	135	2.37
	Trichiurus lepturus	1.59	3	2.15
	Ilisha africana	1.04	28	1.41
	Selene dorsalis	0.43	3	0.58
	Scomber colias	0.34	67	0.46
	Saurida parri	0.12	15	0.16
	Acanthurus monroviae	0.08	49	0.11
	Trachurus trecae	0.07	49	0.09
	Shrimps, larvae	0.03	101	0.05
	Pseudupeneus prayensis	0.03	15	0.05
	TRIGLIDAE	0.02	15	0.02
<b>Total</b>		<b>73.82</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 43  
 DATE : 01/08/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4°51.66

start	stop	duration	Lon	W
5°49.86				
TIME : 02:33:15	03:03:12	29.9 (min)		
LOG : 542.79	544.27	1.5		
FDEPTH: 0	0			
BDEPTH: 63	69			
Towing dir: 0°	Wire out : 120 m			
Sorted : 21	Total catch: 20.70			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Algae	32.06	0	77.31
	Trichiurus lepturus	4.57	14	11.02
	J E L L Y F I S H	1.16	92	2.80
	Sepiella ornata	0.84	82	2.03
	Saurida parri	0.64	329	1.55
	Sepia sp.	0.60	653	1.45
	Sphyræna sphyraena	0.52	2	1.26
	Trachurus trecae	0.20	24	0.48
	Plankton	0.16	0	0.39
	Sardinella maderensis	0.16	2	0.39
	Alloteuthis africana	0.16	40	0.39
	Sardinella aurita	0.12	2	0.29
	Plastic	0.08	14	0.20
	Waste General	0.08	30	0.18
	Lagocephalus laevigatus	0.03	6	0.08
	Selene dorsalis	0.03	18	0.08
	Scomber colias	0.02	2	0.04
	Acanthurus - juvenile	0.01	8	0.03
	Engraulis encrasicolus	0.01	2	0.03
	Fistularia petimba	0.01	2	0.02
<b>Total</b>		<b>41.48</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 44  
 DATE : 01/08/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4°48.38

start	stop	duration	Lon	W
6°7.78				
TIME : 06:45:12	07:15:17	30.1 (min)		
LOG : 576.98	578.64	1.7		
FDEPTH: 5	22			
BDEPTH: 45	37			
Towing dir: 0°	Wire out : 120 m			
Sorted : 1	Total catch: 11.19			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Sphyræna guachancho	14.64	30	65.57
	Algae	4.34	0	19.46
	J E L L Y F I S H	1.21	72	5.44
	Scomberomorus tritor	0.76	2	3.39
	Trichiurus lepturus	0.64	2	2.86
	Sepiella ornata	0.18	46	0.80
	Priacanthus arenatus	0.16	2	0.71
	Saurida parri	0.13	86	0.60
	Sepia sp.	0.09	156	0.42
	Plastic	0.05	0	0.22
	Trachurus trecae	0.04	2	0.18
	Alloteuthis subulata	0.04	12	0.16
	Alloteuthis africana	0.03	10	0.15
	Acanthurus - juvenile	0.00	2	0.02
	Lagocephalus sp.	0.00	2	0.01
	Selene dorsalis	0.00	2	0.01

Total 22.33 100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 45  
 DATE : 01/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°39.22

start	stop	duration	Lon	W
6°17.99				
TIME : 14:53:14	15:23:07	29.9 (min)		
LOG : 622.90	624.53	1.6		
FDEPTH: 80	80			
BDEPTH: 80	80			
Towing dir: 0°	Wire out : 270 m			
Sorted : 94	Total catch: 219.99			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Trichiurus lepturus	153.19	213	34.68
	Dentex angolensis	109.51	357	24.79
105	Umbrina canariensis	27.59	64	6.25
	Scorpaena stephanica	25.34	38	5.74
	Pagellus bellottii	17.27	86	3.91
104	Brotula barbata	15.20	16	3.44
	Branchiostegus semi-fasciatus	11.82	22	2.68
	EXOCOETHIDAE	9.48	22	2.15
	Chelidoniichthys gabonensis	9.38	66	2.12
	Uranoscopus albesca	7.98	34	1.81
	Sepia sp.	7.60	22	1.72
	Dentex canariensis	6.29	2	1.42
102	Pegusa lascaris	5.72	14	1.30
	Uranoscopus polli	4.69	34	1.06
	Brachydeuterus auritus	4.50	259	1.02
106	Citharus linguatula	4.32	56	0.98
	Trachurus trecae	3.94	141	0.89
103	Alloteuthis africana	3.85	492	0.87
	Pseudupeneus prayensis	3.47	16	0.79
	Raja miraletus	2.63	4	0.59
	JELLYFISH	1.97	14	0.45
	Microchirus frechkopi	1.78	20	0.40
	Dentex gibbosus	1.13	2	0.26
	Priacanthus arenatus	0.94	6	0.21
	Boops boops	0.47	4	0.11
	Prognathodes marcellae	0.38	4	0.09
	Octopus vulgaris	0.38	2	0.09
	Solitas gruvelli	0.28	2	0.06
	Arnoglossus imperialis	0.19	6	0.04
	Fistularia petimba	0.19	2	0.04
	Serranus accraensis	0.09	4	0.02
	Selene dorsalis	0.09	18	0.02
	Parapneustes atlantica	0.06	4	0.01
	Gorgonians	0.01	0	0.00
	Squilla mantis	0.01	2	0.00
	Cepala macrophthalma	0.01	2	0.00
	Saurida grandisquamis	0.01	6	0.00
	Plastic	0.00	8	0.00
	GOBIIDAE	0.00	4	0.00
	LEUCOSIIDAE	0.00	4	0.00
<b>Total</b>		<b>441.75</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 46  
 DATE : 01/08/19 GEAR TYPE: PT NO: 8 POSITION: Lat N  
 4°42.93

start	stop	duration	Lon	W
6°18.09				
TIME : 16:44:52	17:16:46	31.9 (min)		
LOG : 633.83	636.54	2.7		
FDEPTH: 10	30			
BDEPTH: 60	62			
Towing dir: 0°	Wire out : 250 m			
Sorted : 24	Total catch: 57.74			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Sphyræna guachancho	40.44	77	37.24
	Sepiella ornata	36.46	9713	33.57
	Sarda sarda	9.22	8	8.49
	Chloroscombrus chrysurus	5.38	45	4.95
	Illex coindettii	3.59	2391	3.30
	Lagocephalus laevigatus	2.99	239	2.75
0	Stromateus fiatola	2.78	6	2.56
	Sardinella maderensis	1.62	8	1.49
107	Selene dorsalis	1.47	9	1.35
	Caranx crysos	1.20	2	1.11
	Bregmaceros sp.	1.11	7471	1.02
	FISH LARVAE	1.05	7770	0.96
	Ephippion guttifer	0.64	2	0.59
	J E L L Y F I S H	0.60	149	0.55
	Echeneis naucrates	0.08	2	0.07
<b>Total</b>		<b>108.60</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 47  
 DATE : 02/08/19 GEAR TYPE: PT NO: 4 POSITION: Lat N  
 4°34.54

start	stop	duration	Lon	W
6°48.07				
TIME : 02:04:58	02:34:42	29.7 (min)		
LOG : 702.33	704.00	1.7		
FDEPTH: 0	0			
BDEPTH: 53	54			
Towing dir: 0°	Wire out : 120 m			
Sorted : 48	Total catch: 48.42			

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Brachydeuterus auritus	45.72	999	46.79
	Trichiurus lepturus	10.61	545	10.86
	Sphyræna guachancho	10.37	28	10.61

Aequorea forskalea	9.85	0	10.08		
Alectis alexandrinus	5.37	2	5.49		
Selene dorsalis	3.31	42	3.39		
Elops lacerta	2.58	4	2.64		
Chrysaora sp.	1.86	2	1.90		
Alloteuthis africana	1.61	918	1.65		
Caranx crysos	1.33	2	1.36		
Sardinella maderensis	1.13	77	1.16		
110					
Sepia sp.	0.81	115	0.83		
Scomberomorus tritor	0.56	2	0.58		
Chloroscombrus chrysurus	0.48	4	0.50		
Cubozoa sp.	0.48	10	0.50		
Sargassum	0.44	0	0.45		
Trachurus trecae	0.39	40	0.40		
109					
UNIDENTIFIED FISH	0.27	83	0.27		
Echeneis naucrates	0.20	4	0.21		
Ilisha africana	0.16	2	0.17		
Pelagia noctiluca	0.08	4	0.08		
Atolla sp.	0.08	0	0.08		
P O L Y C H A E T A	0.01	4	0.01		
Apsilus fuscus	0.01	2	0.01		
Uranoscopus sp.	0.00	2	0.00		
Bregmaceros sp.	0.00	2	0.00		
Total	97.72		100.02		

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 48			
DATE : 02/08/19	GEAR TYPE: PT NO: 8	POSITION: Lat N			
4° 33.47	start	stop	duration	Lon	W
6° 59.51					
TIME : 06:30:00	07:04:00	34.0 (min)	Purpose : 1		
LOG : 730.24	732.00	1.8	Region : 2500		
FDEPTH: 10	20		Gear cond.: 0		
BDEPTH: 40	42		Validity : 0		
Towing dir: 0°	Wire out : 120 m		Speed : 3.1 kn		
Sorted : 20	Total catch: 206.37		Catch/hour: 364.18		
SPECIES			CATCH/HOUR		% OF TOT.
C SAMP			weight	numbers	
Engraulis encrasi colus	153.74	45690	42.22		
112					
Sphyraena guachancho	49.20	397	13.51		
Elops lacerta	49.06	85	13.47		
J E L L Y F I S H	39.50	1318	10.85		
Scomberomorus tritor	33.00	35	9.06		
Illlex coindetii	14.90	9810	4.09		
Chloroscombrus chrysurus	5.74	72	1.57		
Caranx hippos	3.44	9	0.94		
Stromateus fiatola	3.44	9	0.94		
Selene dorsalis	2.47	11	0.68		
Scomber colias	2.32	392	0.64		
113					
Sardinella maderensis	2.28	604	0.63		
Sardinella aurita	2.12	12	0.58		
Sepia sp.	0.92	595	0.25		
Algaes	0.91	0	0.25		
Brachydeuterus auritus	0.75	30	0.21		
FISH LARVAE	0.40	1779	0.11		
Total	364.18		100.00		

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 49			
DATE : 02/08/19	GEAR TYPE: BT NO: 27	POSITION: Lat N			
4° 18.13	start	stop	duration	Lon	W
7° 9.46					
TIME : 11:25:01	11:54:45	29.7 (min)	Purpose : 3		
LOG : 770.02	771.45	1.4	Region : 2500		
FDEPTH: 81	79		Gear cond.: 0		
BDEPTH: 81	79		Validity : 2		
Towing dir: 0°	Wire out : 210 m		Speed : 2.9 kn		
Sorted : 23	Total catch: 105.01		Catch/hour: 211.93		
SPECIES			CATCH/HOUR		% OF TOT.
C SAMP			weight	numbers	
Pagellus bellottii	160.58	1845	75.77		
114					
Sepia sp.	17.91	48	8.45		
Octopus vulgaris	10.09	6	4.76		
Dentex angolensis	5.12	54	2.41		
115					
Scomber colias	3.13	20	1.48		
116					
Dentex canariensis	3.10	8	1.46		
117					
Sphyraena guachancho	2.17	8	1.02		
Raja miraletus	1.86	8	0.88		
Lepidotrigla cadmani	1.55	54	0.73		
Dentex gibbosus	1.55	8	0.73		
Fistularia petimba	1.55	16	0.73		
Dactylopterus volitans	1.09	8	0.51		
Alloteuthis africana	0.93	458	0.44		
Pseudupeneus prayensis	0.62	8	0.29		
Micropod	0.16	8	0.07		
Syacium micrurum	0.16	77	0.07		
Citharus linguatula	0.16	24	0.07		
Arnoglossus imperialis	0.08	38	0.04		
Saurida parri	0.05	123	0.03		
Plastic	0.04	2	0.02		
Aequorea forskalea	0.04	8	0.02		
C R A B S	0.01	8	0.00		
Isopod	0.00	8	0.00		
Total	211.93		100.00		

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 50			
DATE : 02/08/19	GEAR TYPE: BT NO: 27	POSITION: Lat N			
4° 28.41	start	stop	duration	Lon	W
7° 11.50					
TIME : 14:14:20	14:44:23	30.0 (min)	Purpose : 3		
LOG : 786.78	788.37	1.6	Region : 2500		
FDEPTH: 38	44		Gear cond.: 0		
BDEPTH: 38	44		Validity : 2		
Towing dir: 0°	Wire out : 120 m		Speed : 3.2 kn		
Sorted : 1	Total catch: 258.86		Catch/hour: 517.03		
SPECIES			CATCH/HOUR		% OF TOT.
C SAMP			weight	numbers	
Brachydeuterus auritus	148.69	2469	28.76		
120					
Galoides decadactylus	110.13	481	21.30		
121					
Tri ch i u r u s l e p t u r u s	60.76	1300	11.75		
Pomadasy jubelini	32.73	148	6.33		
118					
Cynoponticus ferox	29.50	58	5.71		
Pomadasy incisus	23.66	118	4.58		
119					
Pteroscion peli	19.86	803	3.84		
Perulibatrachus rossignoli	18.99	1666	3.67		
Parapenaeopsis atlantica	13.14	2964	2.54		
Pseudotolithus senegallus	11.98	88	2.32		
Pisodonophis semicinctus	11.39	102	2.20		
Ilisha africana	9.06	1314	1.75		
Scyllarus pygmaeus	7.39	1314	1.43		
J E L L Y F I S H	7.01	0	1.36		
Hoplunnis punctata	3.51	146	0.68		
Raja miraletus	1.33	16	0.26		
0					
APOGONIDAE	0.88	234	0.17		
GOBIIDAE	0.73	102	0.14		
Torpedo torpedo	0.72	4	0.14		
BYTHIIDAE	0.66	8	0.13		
Brotula barbata	0.59	14	0.11		
Calappa rubroguttata	0.59	14	0.11		
Panulirus regius	0.56	2	0.11		
Lutjanus fulgens	0.52	2	0.10		
122					
Chilomycterus spinosus mauretanicus	0.48	2	0.09		
Lagocephalus laevigatus	0.44	30	0.08		
C R A B S	0.42	58	0.08		
G A S T R O P O D S	0.29	30	0.06		
Sargocentron hastatum	0.28	2	0.05		
Penaeus notialis	0.20	4	0.04		
Penaeus kerathurus	0.16	2	0.03		
Squilla mantis	0.13	30	0.03		
Sepiella ornata	0.12	14	0.02		
OPHICHTHIDAE	0.09	14	0.02		
Sardinella maderensis	0.06	14	0.01		
Total	517.02		100.00		

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 51			
DATE : 02/08/19	GEAR TYPE: BT NO: 27	POSITION: Lat N			
4° 19.18	start	stop	duration	Lon	W
7° 25.83					
TIME : 16:33:29	16:55:03	21.6 (min)	Purpose : 3		
LOG : 804.10	805.37	1.3	Region : 2500		
FDEPTH: 31	28		Gear cond.: 0		
BDEPTH: 31	28		Validity : 2		
Towing dir: 0°	Wire out : 120 m		Speed : 3.5 kn		
Sorted : 65	Total catch: 65.19		Catch/hour: 181.24		
SPECIES			CATCH/HOUR		% OF TOT.
C SAMP			weight	numbers	
Pomadasy jubelini	45.32	47	25.00		
Tri ch i u r u s l e p t u r u s	35.17	1123	19.40		
J E L L Y F I S H	22.30	386	12.30		
Dasyatis margarita	20.57	22	11.35		
Galoides decadactylus	8.12	36	4.48		
124					
Pseudotolithus senegallus	5.84	8	3.22		
0					
Ilisha africana	5.05	275	2.79		
Brachydeuterus auritus	4.78	356	2.64		
123					
Pseudotolithus senegalensis	4.50	28	2.49		
125					
Ephippion guttifer	4.34	3	2.39		
Nematopalaeon hastatus	4.20	8341	2.32		
Parapenaeopsis atlantica	3.67	656	2.02		
Raja miraletus	3.06	6	1.69		
Selene dorsalis	2.78	58	1.53		
Pisodonophis semicinctus	2.50	14	1.38		
Arius sp.	1.89	11	1.04		
Sphyraena guachancho	1.67	11	0.92		
Pteroscion peli	0.95	22	0.52		
Waste General	0.77	0	0.43		
Sargocentron hastatum	0.67	6	0.37		
Sepia sp.	0.59	542	0.33		
Drepane africana	0.50	3	0.28		
CONGRIDAE	0.38	3	0.21		
C R A B S	0.26	175	0.14		
Sepiella ornata	0.20	14	0.11		
SEAWEED	0.17	0	0.09		
Brotula sp.	0.13	25	0.07		
Octopus vulgaris	0.11	3	0.06		
Chloroscombrus chrysurus	0.11	3	0.06		
Cynoglossus senegalensis	0.10	6	0.06		
Scyllarus sp.	0.09	19	0.05		
Maja sp.	0.08	11	0.05		
Sardinella maderensis	0.07	3	0.04		
CORALLIALES	0.05	147	0.03		
FISH LARVAE	0.05	122	0.03		
Ophi ch t h u s s p.	0.05	6	0.03		
P O L Y C H A E T A	0.03	14	0.02		
Trachurus trecae	0.03	25	0.01		
B I V A L V E S	0.03	25	0.01		
Bothus podas	0.02	3	0.01		
OPISTHOBRANCHIA	0.02	8	0.01		
APOGONIDAE	0.01	8	0.01		

Acanthurus monroviae	0.01	8	0.01
Perulibatrachus sp.	0.01	3	0.01
Aristaeomorpha sp.	0.01	6	0.00
CHAETODONTIDAE	0.00	3	0.00
Total	181.24		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 52  
 DATE : 02/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 17.64 start stop duration Lon W  
 7° 26.50  
 TIME : 17:23:10 17:44:38 21.5 (min) Purpose : 3  
 LOG : 807.90 809.09 1.2 Region : 2500  
 FDEPTH: 43 42 Gear cond.: 0  
 BDEPTH: 43 42 Validity : 2  
 Towing dir: 0° Wire out : 150 m Speed : 3.3 kn  
 Sorted : 13 Total catch: 101.88 Catch/hour: 284.58

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Brachydeuterus auritus	139.20	4405	48.91	
128				
Raja miraletus	30.20	296	10.61	
Penaeus notialis	15.61	190	5.48	
Pisodonophis semicinctus	11.70	95	4.11	
Cynoponticus ferox	8.81	20	3.10	
Cynoglossus canariensis	8.18	56	2.87	
Brotula barbata	8.16	70	2.87	
Torpedo torpedo	7.80	64	2.74	
Parapanaeopsis atlantica	7.17	98	2.52	
Trichurus lepturus	6.80	170	2.39	
Pseudotolithus senegalensis	5.54	25	1.95	
Lagocephalus laevigatus	5.41	6	1.90	
Dasyatis marmorata	4.91	6	1.72	
Pentheroscion mbi zi	3.66	95	1.29	
Pteroscion peli	2.89	176	1.02	
Sardinella maderensis	2.46	170	0.86	
127				
Muraena robusta	2.39	6	0.84	
Galeoides decadactylus	1.89	64	0.66	
126				
Pythion chthys micropthal mus	1.51	31	0.53	
DROMIDAE	1.39	25	0.49	
J E L L Y F I S H	1.01	6	0.35	
Dicologoglossa hexophtalma	0.88	70	0.31	
Sphyraena guachancho	0.88	20	0.31	
OPHI CHTH DAE	0.85	64	0.30	
Solitas gruveli	0.75	39	0.27	
Selene dorsalis	0.63	6	0.22	
Pomadasy incisis	0.63	6	0.22	
Hoplunnis sp.	0.50	14	0.18	
Callinectes sp.	0.38	89	0.13	
Syaciun guineensis	0.38	39	0.13	
Squilla mantis	0.38	14	0.13	
TRIGLIDAE	0.25	6	0.09	
Trachurus trecae	0.25	14	0.09	
GOBIIDAE	0.18	50	0.06	
Scorpaena sp.	0.18	14	0.06	
Sepiella ornata	0.13	14	0.04	
Chloroscombrus chrysurus	0.13	6	0.04	
Calappa rubroguttata	0.13	6	0.04	
Scyllarus pygmaeus	0.13	75	0.04	
S H R I M P S	0.13	6	0.04	
Sargassum	0.06	0	0.02	
0				
Perulibatrachus sp.	0.04	14	0.02	
GERYONIDAE	0.03	6	0.01	
0				
Zeus faber	0.02	6	0.01	
Total	284.56		99.99	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 53  
 DATE : 02/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 14.70 start stop duration Lon W  
 7° 25.75  
 TIME : 18:28:25 18:46:12 17.8 (min) Purpose : 3  
 LOG : 813.61 814.55 0.9 Region : 2500  
 FDEPTH: 75 76 Gear cond.: 0  
 BDEPTH: 75 76 Validity : 2  
 Towing dir: 0° Wire out : 250 m Speed : 3.2 kn  
 Sorted : 72 Total catch: 185.04 Catch/hour: 624.78

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Brotula barbata	357.18	594	57.17	
Pentheroscion mbi zi	73.74	1273	11.80	
Pegusa lascaris	33.90	304	5.43	
Trichurus lepturus	31.70	338	5.07	
Uranoscopus albesca	21.19	135	3.39	
Sepia sp.	15.26	17	2.44	
TRIAKIDAE	14.59	7	2.33	
Dentex angolensis	13.73	84	2.20	
130				
Branchiostegus semifasciatus	10.51	17	1.68	
J E L L Y F I S H	7.46	44	1.19	
Octopus vulgaris	7.29	10	1.17	
TRIGLIDAE	6.44	78	1.03	
B I V A L V E S	6.44	246	1.03	
Citharus linguatula	6.27	111	1.00	
Pythion chthys micropthal mus	5.25	34	0.84	
Parapanaeopsis atlantica	3.90	669	0.62	
Scorpaena sp.	3.56	44	0.57	
Perulibatrachus elmi nensis	2.20	27	0.35	
Pagellus bellottii	1.36	17	0.22	
132				
Sardinella aurita	1.19	17	0.19	
129				
Cynoglossus canariensis	0.68	10	0.11	
GOBIIDAE	0.43	84	0.07	
Brachydeuterus auritus	0.34	51	0.05	
131				
Raja miraletus	0.17	10	0.03	
Total	624.78		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 54  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 32.19 start stop duration Lon W  
 6° 58.94  
 TIME : 07:09:41 07:38:54 29.2 (min) Purpose : 3  
 LOG : 887.35 889.02 1.7 Region : 2500  
 FDEPTH: 45 46 Gear cond.: 0  
 BDEPTH: 45 46 Validity : 0  
 Towing dir: 0° Wire out : 200 m Speed : 3.4 kn  
 Sorted : 33 Total catch: 250.00 Catch/hour: 513.35

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Galeoides decadactylus	133.73	474	26.05	
133				
Brachydeuterus auritus	109.26	3064	21.28	
134				
Raja miraletus	25.44	162	4.96	
Pteroscion peli	25.15	1380	4.90	
Scyllarus pygmaeus	22.90	5725	4.46	
CORALLIDAE	22.76	0	4.43	
Cynoponticus ferox	21.77	25	4.24	
Pomadasy incisis	17.93	207	3.49	
135				
Penaeus notialis	16.55	634	3.22	
Pseudotolithus senegalensis	16.41	70	3.20	
J E L L Y F I S H	15.73	400	3.06	
Torpedo torpedo	14.90	82	2.90	
Trichurus lepturus	13.80	359	2.69	
Solitas gruveli	13.52	828	2.63	
Octopus vulgaris	10.88	6	2.12	
Parapanaeopsis atlantica	4.69	1324	0.91	
Ilisha africana	3.59	415	0.70	
BATRACHIDAE	3.03	620	0.59	
Calappa peli	2.21	14	0.43	
Perulibatrachus elmi nensis	2.21	207	0.43	
CYPRAEIDAE (Bulia)	2.21	138	0.43	
Apogon affinis	1.75	524	0.34	
Ophi chthus sp.	1.66	14	0.32	
C R A B S	1.66	125	0.32	
Brotula barbata	1.25	275	0.24	
Cynoglossus canariensis	1.10	27	0.21	
Sphyraena guachancho	1.07	2	0.21	
Sicyonia galatea	0.83	248	0.16	
Umbri na canariensis	0.83	27	0.16	
Pythion chthys micropthal mus	0.83	14	0.16	
Pisodonophis semicinctus	0.83	14	0.16	
GOBIIDAE	0.63	179	0.12	
OPISTHOBRANCHIA	0.44	70	0.09	
Sepiella ornata	0.43	14	0.08	
Scorpaena sp.	0.26	41	0.05	
Selene dorsalis	0.22	55	0.04	
Sargassum	0.21	14	0.04	
OPHI CHTH DAE	0.18	70	0.03	
Apsilus fuscus	0.14	27	0.03	
Stenorhynchus lanceolatus	0.10	55	0.02	
Acanthurus monroviae	0.08	41	0.02	
Lagocephalus laevigatus	0.07	14	0.01	
Nudi branch sp	0.07	14	0.01	
Trachurus trecae	0.03	27	0.01	
Zeus faber	0.01	14	0.00	
Stromateus fiatola	0.01	2	0.00	
Total	513.35		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 55  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 28.80 start stop duration Lon W  
 6° 59.73  
 TIME : 08:34:01 09:05:39 31.6 (min) Purpose : 3  
 LOG : 893.09 894.82 1.7 Region : 2500  
 FDEPTH: 63 61 Gear cond.: 0  
 BDEPTH: 63 61 Validity : 0  
 Towing dir: 0° Wire out : 200 m Speed : 3.3 kn  
 Sorted : 28 Total catch: 232.05 Catch/hour: 440.05

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Brachydeuterus auritus	108.59	5522	24.68	
136				
Brotula barbata	78.44	154	17.83	
Umbri na canariensis	33.22	277	7.55	
Solitas gruveli	24.92	599	5.66	
Citharus linguatula	24.30	476	5.52	
Parapanaeopsis atlantica	17.53	3814	3.98	
Uranoscopus albesca	17.53	707	3.98	
Octopus vulgaris	14.22	9	3.23	
Pagellus bellottii	12.61	93	2.87	
138				
Galeoides decadactylus	11.69	169	2.66	
137				
Scorpaena stephanica	11.07	322	2.52	
Pegusa lascaris	9.84	108	2.24	
Pentheroscion mbi zi	9.54	231	2.17	
Sepia hierredda	9.10	11	2.07	
Penaeus notialis	8.31	307	1.89	
Trichurus lepturus	8.00	108	1.82	
Perulibatrachus elmi nensis	7.69	123	1.75	
Scyllarus pygmaeus	6.15	707	1.40	
Torpedo torpedo	4.31	15	0.98	
GOBIIDAE	4.00	569	0.91	
CONGRIDAE	3.85	15	0.87	
Pseudotolithus senegalensis	3.69	15	0.84	
Dicologoglossa hexophtalma	2.46	93	0.56	
Dentex angolensis	1.85	46	0.42	
139				
Trachurus sp.	1.85	770	0.42	
Sphyraena sphyraena	1.61	2	0.37	
Ephippion guttifer	0.92	262	0.21	
Arnoglossus capensis	0.69	138	0.21	
Apogon affinis	0.69	169	0.16	
Trachurus trecae	0.61	46	0.14	
Sepiella ornata	0.31	30	0.07	
Selene dorsalis	0.12	30	0.03	
Sargassum	0.08	15	0.02	

Acanthurus monroviae	0.02	15	0.00
Total	440.05		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 56  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°23.60 start stop duration Lon W  
 7°0.11  
 TIME : 10:16:47 10:46:53 30.1 (min) Purpose : 3  
 LOG : 901.65 903.17 1.5 Region : 2500  
 FDEPTH: 101 103 Gear cond.: 0  
 BDEPTH: 101 103 Validity : 0  
 Towing dir: 0° Wire out : 280 m Speed : 3.0 kn  
 Sorted : 1 Total catch: 380.00 Catch/hour: 757.22

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trichiurus lepturus	214.88	897	28.38
Trachurus trecae	157.24	6409	20.77
140 Dentex angolensis	90.25	454	11.92
142			
Brotula barbata	71.80	139	9.48
Umbri na canariensis	60.42	317	7.98
Pseudotolithus senegalensis	60.17	783	7.95
Uranoscopus albesca	32.36	291	4.27
Branchiostegus semifasciatus	27.30	26	3.61
Raja miraletus	7.33	12	0.97
Octopus vulgaris	7.01	6	0.93
Citharus linguatula	6.82	102	0.90
Ariomma bondi	4.05	707	0.53
Saurida parri	3.29	745	0.43
Lepidotrigla cadmani	3.29	38	0.43
Lophodes kemp	2.78	12	0.37
Spicar alta	1.77	12	0.23
Priacanthus arenatus	1.52	12	0.20
Boops boops	1.52	12	0.20
Syacium micrurum	1.26	50	0.17
Brachydeuterus auritus	0.76	12	0.10
Sepia sp	0.51	12	0.07
J E L L Y F I S H	0.51	38	0.07
CEPOLIDAE	0.25	12	0.03
Penaeus notialis	0.10	26	0.01
C R A B S	0.04	26	0.00
Total	757.22		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 57  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°29.11 start stop duration Lon W  
 6°44.67  
 TIME : 12:44:41 13:14:41 30.0 (min) Purpose : 3  
 LOG : 918.46 920.04 1.6 Region : 2500  
 FDEPTH: 106 101 Gear cond.: 0  
 BDEPTH: 106 101 Validity : 0  
 Towing dir: 0° Wire out : 320 m Speed : 3.2 kn  
 Sorted : 61 Total catch: 205.00 Catch/hour: 409.86

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trichiurus lepturus	268.54	1050	65.52
Dentex angolensis	30.59	204	7.46
143			
J E L L Y F I S H	26.81	54	6.54
Umbri na canariensis	22.66	172	5.53
Illex coindetii	12.29	1146	3.00
Brotula barbata	7.93	22	1.93
Branchiostegus semifasciatus	7.00	8	1.71
Trachurus trecae	6.02	282	1.47
146			
OMMASTREPHIDAE	5.89	372	1.44
Octopus vulgaris	4.40	12	1.07
Uranoscopus albesca	3.33	20	0.81
Pseudotolithus senegalensis	1.74	32	0.42
Raja miraletus	1.48	6	0.36
Priacanthus arenatus	1.44	6	0.35
Saurida parri	1.28	250	0.31
Lophodes kemp	1.18	2	0.29
Halobatrachus didactylus	1.15	6	0.28
Ariomma bondi	1.15	236	0.28
Pagellus bellottii	1.15	6	0.28
144			
Citharus linguatula	1.02	26	0.25
Syacium micrurum	0.77	26	0.19
Boops boops	0.77	32	0.19
CEPOLIDAE	0.38	12	0.09
Sepia bertheloti	0.26	20	0.06
Sollitas gruvelli	0.26	12	0.06
Unidentifed	0.26	250	0.06
Lepidotrigla cadmani	0.13	6	0.03
C R A B S	0.01	6	0.00
Total	409.87		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 58  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°33.69 start stop duration Lon W  
 6°44.41  
 TIME : 14:17:16 14:47:30 30.2 (min) Purpose : 3  
 LOG : 925.05 926.57 1.5 Region : 2500  
 FDEPTH: 65 63 Gear cond.: 0  
 BDEPTH: 65 63 Validity : 0  
 Towing dir: 0° Wire out : 190 m Speed : 3.0 kn  
 Sorted : 0 Total catch: 270.00 Catch/hour: 535.89

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trichiurus lepturus	262.54	2723	48.99
Brachydeuterus auritus	119.51	2604	22.30
147			
Brotula barbata	45.12	95	8.42
J E L L Y F I S H	40.56	0	7.57

Pagellus bellottii	27.84	228	5.19
148			
Sepia sp.	6.87	12	1.28
GOBIIDAE	5.04	875	0.94
Uranoscopus albesca	4.56	119	0.85
Umbri na canariensis	4.08	24	0.76
Citharus linguatula	3.36	95	0.63
Dentex angolensis	2.64	12	0.49
149			
Penaeus notialis	2.16	48	0.40
Parapenaeopsis atlantica	1.92	540	0.36
Pseudotolithus elongatus	1.92	36	0.36
Trachurus trecae	1.68	371	0.31
145			
Lepidotrigla cadmani	1.20	12	0.22
Pegusa lascaris	0.96	12	0.18
Octopus vulgaris	0.91	2	0.17
Dactylopterus volitans	0.83	4	0.16
Pseudupeneus prayensis	0.72	24	0.13
Microchirus frechkopi	0.72	12	0.13
Saurida parri	0.48	60	0.09
Zeus faber	0.12	24	0.02
Selene dorsalis	0.10	24	0.02
Lagocephalus laevigatus	0.06	24	0.01
Total	535.89		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 59  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°37.99 start stop duration Lon W  
 6°45.70  
 TIME : 15:41:31 16:12:18 30.8 (min) Purpose : 3  
 LOG : 931.82 933.62 1.8 Region : 2500  
 FDEPTH: 31 32 Gear cond.: 0  
 BDEPTH: 31 32 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.5 kn  
 Sorted : 72 Total catch: 602.56 Catch/hour: 1174.58

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Cynoponticus ferox	319.38	195	27.19
J E L L Y F I S H	211.08	0	17.97
Trichiurus lepturus	116.11	940	9.89
Brachydeuterus auritus	107.45	2567	9.15
153			
Ilisha africana	82.68	7857	7.04
Pseudotolithus senegalensis	77.90	400	6.63
Pteroscion peli	55.52	1493	4.73
Galeoides decadactylus	51.04	567	4.35
152			
Drepane africana	37.33	31	3.18
Pomadasy incisus	30.74	135	2.62
151			
Pisodonophis semicinctus	21.49	179	1.83
Pomadasy jubelini	20.67	64	1.76
150			
Parapenaeopsis atlantica	9.25	2433	0.79
UNIDENTIFIED FISH	6.31	74	0.54
Ephippion guttifer	5.83	33	0.50
0			
Selene dorsalis	5.57	121	0.47
Lagocephalus laevigatus	4.12	16	0.35
Gymnothorax afer	3.39	2	0.29
Caranx hippos	2.83	2	0.24
Sepia sp.	1.85	4	0.16
Balistes capricus	1.05	2	0.09
Sardinella aurita	0.60	74	0.05
Sepiella ornata	0.57	74	0.05
OPHIIDAE	0.36	45	0.03
Pentacnemus quinarius	0.30	16	0.03
Nematopalaeon hastatus	0.28	298	0.02
Torpedo torpedo	0.27	2	0.02
Aponog affinis	0.22	60	0.02
C R A B S	0.16	16	0.01
Illex coindetii	0.15	16	0.01
Perulibatrachus elminensis	0.04	16	0.00
Total	1174.58		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 60  
 DATE : 03/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°38.66 start stop duration Lon W  
 6°48.90  
 TIME : 17:01:49 17:33:17 31.5 (min) Purpose : 3  
 LOG : 936.36 938.26 1.9 Region : 2500  
 FDEPTH: 27 29 Gear cond.: 0  
 BDEPTH: 27 29 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.6 kn  
 Sorted : 0 Total catch: 380.00 Catch/hour: 724.50

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trichiurus lepturus	236.36	9226	32.62
Brachydeuterus auritus	104.06	2362	14.36
156			
J E L L Y F I S H	74.72	1617	10.31
Ilisha africana	59.82	13737	8.26
Galeoides decadactylus	50.81	301	7.01
155			
Parapenaeopsis atlantica	27.70	5335	3.82
Pteroscion peli	26.95	1216	3.72
Cynoponticus ferox	25.36	27	3.50
Ephippion guttifer	21.44	475	2.96
0			
Drepane africana	18.88	513	2.61
0			
Sepiella ornata	13.44	3321	1.85
Nematopalaeon hastatus	12.61	13512	1.74
Pomadasy incisus	10.55	44	1.46
154			
Chloroscombrus chrysurus	9.36	244	1.29
Pisodonophis semicinctus	5.19	13	0.72
Pseudotolithus senegalensis	4.88	10	0.67
Pseudotolithus senegalensis	4.12	38	0.57

Pomadasy perotaei	3.74	19	0.52
Waste General	3.42	0	0.47
Perulibatrachus elminensis	1.87	38	0.26
Sphyræna guachancho	1.87	19	0.26
Lagocephalus laevigatus	1.87	55	0.26
Panulirus regius	1.83	2	0.25
UNIDENTIFIED FISH	1.03	1329	0.14
Torpedo marmorata	0.61	2	0.08
Penaeus monodon	0.50	2	0.07
Muraena robusta	0.46	2	0.06
Selene dorsalis	0.46	2	0.06
Engraulis sp.	0.30	749	0.04
CHAETODONTIDAE	0.15	151	0.02
Plastic	0.15	151	0.02
Total	724.50		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 61  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°33.34 start stop duration Lon W  
 6°31.09  
 TIME : 06:30:23 07:01:00 30.6 (min) Purpose : 3  
 LOG : 987.41 988.93 1.5 Region : 2500  
 FDEPTH: 107 109 Gear cond.: 0  
 BDEPTH: 107 109 Validity : 0  
 Towing dir: 0° Wire out : 310 m Speed : 3.0 kn  
 Sorted : 5 Total catch: 59.46 Catch/hour: 116.52

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Ariomma bondi	33.91	1879	29.10
	Trichurus lepturus	26.65	82	22.87
	Illex coindetii	12.49	923	10.72
	Brotula barbata	11.28	29	9.68
	Dentex angolensis	5.79	51	4.97
157	Saurida parri	4.94	1236	4.24
	Branchiostegus semifasciatus	4.31	12	3.70
	Octopus vulgaris	2.41	8	2.07
	Trachurus trecae	2.15	758	1.84
159	Umbri na canariensis	1.76	10	1.51
	Uranoscopus albesca	1.30	14	1.12
	Arnoglossus sp.	1.30	53	1.12
	Citharus linguatula	1.30	39	1.12
	Sepia bertheloti	1.28	27	1.09
	Raja miraletus	0.82	2	0.71
	Lepidotrigla cadmani	0.78	14	0.67
	Serranus africanus	0.65	14	0.56
	Galeoides decadactylus	0.59	6	0.50
158	Lophodes kempii	0.55	2	0.47
	Dicologlossa hexophthalma	0.52	14	0.45
	Parapenaeopsis atlantica	0.52	300	0.45
	Brotula sp.	0.38	14	0.32
	Scorpaena sp.	0.25	65	0.21
	Boops boops	0.16	2	0.13
	Pisodonophis semicinctus	0.07	2	0.06
	Sepia sp.	0.06	53	0.06
	Gorgonians	0.05	14	0.05
	PAGUROIDEA	0.05	25	0.05
	Pentheroscion mbi zi	0.05	39	0.05
	GOBIIDAE	0.04	14	0.03
	UNIDENTIFIED FISH	0.03	4	0.03
	Ethusa sp.	0.03	14	0.02
	GASTROPODS	0.03	14	0.02
	Scleractinia	0.01	14	0.01
Total		116.52		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 62  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°36.40 start stop duration Lon W  
 6°30.96  
 TIME : 07:52:21 08:22:56 30.6 (min) Purpose : 3  
 LOG : 993.67 995.15 1.5 Region : 2500  
 FDEPTH: 76 75 Gear cond.: 0  
 BDEPTH: 76 75 Validity : 0  
 Towing dir: 0° Wire out : 240 m Speed : 2.9 kn  
 Sorted : 32 Total catch: 248.63 Catch/hour: 487.83

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Trichurus lepturus	129.32	551	26.51
	J E L L Y F I S H	78.51	779	16.09
	Octopus vulgaris	45.95	43	9.42
	Pseudupeneus prayensis	36.83	806	7.55
	Scorpaena sp.	24.47	241	5.02
	Saurida parri	17.48	3549	3.58
	Pagellus bellottii	15.06	322	3.09
160	Dentex angolensis	13.98	216	2.87
161	Citharus linguatula	11.56	618	2.37
	Illex coindetii	9.14	793	1.87
	Branchiostegus semifasciatus	8.33	108	1.71
	Serranus accraensis	8.06	336	1.65
	Umbri na canariensis	6.99	53	1.43
	Boops boops	6.72	471	1.38
	Uranoscopus polli	6.45	94	1.32
	Lophodes kempii	5.82	18	1.19
	Raja miraletus	4.84	14	0.99
	Syaci ungui neensis	4.57	834	0.94
	Serranus africanus	4.57	269	0.94
	Trachurus trecae	4.30	698	0.88
162	Brotula barbata	4.30	27	0.88
	Serranus cabrilla	4.03	53	0.83
	Epinephelus aeneus	3.77	2	0.77
	Solitas gruvelli	2.96	80	0.61
	GOBIIDAE	2.96	443	0.61
	CEPOLIIDAE	2.69	108	0.55
	Ariomma bondi	2.69	404	0.55
	Sepia officinalis	1.96	2	0.40
	Chaetodon hoefleri	1.87	53	0.38

Spherooides marmoratus	1.83	135	0.37
Epinephelus goreensis	1.77	2	0.36
Dicologlossa hexophthalma	1.61	41	0.33
Alloteuthis africana	1.61	551	0.33
Brachydeuterus auritus	1.61	41	0.33
Mustelus mustelus	1.61	2	0.33
Priacanthus arenatus	1.35	27	0.28
Echelus myrus	1.26	2	0.26
Sepia hierredda	0.90	2	0.19
Gymnothorax afer	0.71	2	0.14
Chelidoni chthys gabonensis	0.54	14	0.11
Sepia sp.	0.47	27	0.10
Apogon affinis	0.35	53	0.07
Squilla mantis	0.35	14	0.07
Pennatulacea	0.24	67	0.05
BYTHIIDAE	0.24	14	0.05
Macropodus rugosus	0.23	27	0.05
Selene dorsalis	0.22	67	0.04
MDRIDAE	0.19	14	0.04
Brisingiidae	0.16	14	0.03
Fistularia petimba	0.16	14	0.03
Macropodus sp.	0.08	14	0.02
P O L Y C H A E T A	0.07	14	0.01
ANTHOZOA (Sea anemones)	0.05	14	0.01
Sardinella aurita	0.04	14	0.01
Gorgonians	0.01	14	0.00
Total	487.83		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 63  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°41.63 start stop duration Lon W  
 6°31.10  
 TIME : 09:14:43 09:45:22 30.7 (min) Purpose : 3  
 LOG : 1000.95 1002.80 1.9 Region : 2500  
 FDEPTH: 46 45 Gear cond.: 0  
 BDEPTH: 46 45 Validity : 0  
 Towing dir: 0° Wire out : 160 m Speed : 3.6 kn  
 Sorted : 32 Total catch: 292.44 Catch/hour: 572.30

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Brachydeuterus auritus	239.59	5562	41.86
164	Galeoides decadactylus	78.63	421	13.74
163	Scyllarus pygmaeus	34.95	10685	6.11
	Cynoponticus ferox	28.61	25	4.65
	Uranoscopus sp.	25.20	470	4.40
	Solitas gruvelli	20.83	1311	3.64
	J E L L Y F I S H	18.48	0	3.23
	Raja miraletus	17.14	102	2.99
	Trichurus lepturus	16.13	51	2.82
	Torpedo torpedo	14.78	67	2.58
	Pteroscion peli	12.10	487	2.11
	Cynoglossus canariensis	9.07	18	1.59
	Mustelus mustelus	7.32	4	1.28
	Pseudotolithus senegalensis	5.71	18	1.00
	Octopus vulgaris	5.44	4	0.95
	Penaeus notialis	5.38	102	0.94
	Trichurus lepturus, juvenile	4.03	1865	0.70
	Ilisha africana	3.70	51	0.65
	Trachurus trecae	3.70	84	0.65
	Epinephelus aeneus	3.36	18	0.59
	Cymbium glans	3.09	2	0.54
	Sepia hierredda	2.58	4	0.45
	Pseudupeneus prayensis	2.35	18	0.41
	Umbri na canariensis	1.68	33	0.29
	Ephippion guttifer	1.57	2	0.27
	S H R I M P S	1.34	605	0.23
	Lagocephalus laevigatus	1.01	18	0.18
	Microrhynchus frechkopi	1.01	18	0.18
	Sepiella ornata	1.01	33	0.18
	Scorpaena sp.	0.67	67	0.12
	Squilla mantis	0.67	51	0.12
	DROMIDAE	0.67	18	0.12
	Citharus linguatula	0.67	33	0.12
	Apogon affinis	0.34	84	0.06
	CONGRIDAE	0.34	18	0.06
	BYTHIIDAE	0.34	33	0.06
	Arnoglossus imperialis	0.34	18	0.06
	Alloteuthis africana	0.25	168	0.04
	Selene dorsalis	0.10	33	0.02
	Engraulis encrasi colus	0.08	18	0.01
	OPHI CHTHIDAE	0.03	18	0.01
Total		572.30		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 64  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°43.95 start stop duration Lon W  
 6°33.47  
 TIME : 10:34:21 11:04:19 30.0 (min) Purpose : 3  
 LOG : 1006.62 1008.39 1.8 Region : 2500  
 FDEPTH: 26 27 Gear cond.: 0  
 BDEPTH: 26 27 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.5 kn  
 Sorted : 30 Total catch: 408.69 Catch/hour: 818.48

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	J E L L Y F I S H	191.96	118	23.45
	Chloroscombrus chrysurus	100.90	2559	12.33
	Trichurus lepturus	89.09	1796	10.88
	Brachydeuterus auritus	63.00	1945	7.70
165	Sardinella maderensis	50.70	2165	6.19
167	Pteroscion peli	46.76	1428	5.71
	Ilisha africana	40.85	2535	4.99
	Ephippion guttifer	34.40	108	4.20
	Cynoponticus ferox	30.58	20	3.75
	Pseudotolithus senegalensis	29.04	122	3.55
	Pseudotolithus senegalensis	24.07	0	2.94



Galaeoides decadactylus	22.15	74	2.71
168 Selene dorsalis	19.69	344	2.41
Drepane africana	17.65	100	2.16
0 Panulirus regius	14.27	74	1.74
DASYATI DA E	10.49	10	1.28
Pomadasy jubelini	9.85	50	1.20
166 Parapenaeopsis atlantica	4.92	861	0.60
Lagocephalus laevigatus	3.44	74	0.42
Torpedo mackayana	2.87	26	0.35
OPIH CTHI DA E	2.32	16	0.28
Raja miraletus	2.28	4	0.28
Sepiella ornata	1.97	122	0.24
Plastic	1.48	0	0.18
Pentaneus quinquarius	0.99	24	0.12
Sepia hierredda	0.56	2	0.07
Macropus sp.	0.54	24	0.07
Schedophilus pamarco	0.49	24	0.06
Uranoscopus sp.	0.40	2	0.05
C R A B S	0.29	24	0.04
Stephanolepis hispidus	0.24	2	0.03
Squilla mantis	0.12	24	0.01
Total	818.48		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 65  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 46.93 start stop duration Lon W  
 6° 24.75  
 TIME : 12:10:06 12:40:10 30.1 (min) Purpose : 3  
 LOG : 1015.83 1017.43 1.6 Region : 2500  
 FDEPTH: 30 28 Gear cond.: 0  
 BDEPTH: 30 28 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.2 kn  
 Sorted : 0 Total catch: 320.00 Catch/hour: 638.51

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
J E L L Y F I S H	370.92	0	58.09
Cynoponticus ferox	48.12	26	7.54
Brachydeuterus auritus	47.79	2656	7.48
171 Trichiurus lepturus	47.79	1287	7.48
Torpedo mackayana	26.07	26	4.08
Ilisha africana	24.56	2388	3.85
Pteroscion peli	18.88	1219	2.96
Pisodonophis semicinctus	8.86	84	1.39
Torpedo torpedo	8.52	34	1.33
Galaeoides decadactylus	6.68	26	1.05
170 Sepia hierredda	4.19	6	0.66
Pseudotolithus senegallus	4.01	16	0.63
Drepane africana	3.07	4	0.48
Selene dorsalis	2.84	275	0.45
Parapenaeopsis atlantica	2.84	275	0.45
Sardinella maderensis	2.51	16	0.39
173 Sepiella ornata	1.84	118	0.29
Schedophilus pamarco	1.55	42	0.24
Chloroscombrus chrysurus	1.17	76	0.18
Lagocephalus laevigatus	1.00	34	0.16
Pomadasy jubelini	1.00	8	0.16
172 Trachurus trecae	0.84	50	0.13
174 Gymnothorax afer	0.58	2	0.09
C R A B S	0.56	42	0.09
Alloteuthis africana	0.50	317	0.08
Pagellus bellottii	0.42	8	0.07
169 Batrachoides sp.	0.33	42	0.05
Nematopalaemon hastatus	0.33	343	0.05
BYTHI DA E	0.23	26	0.04
Stromateus fiatola	0.18	16	0.03
Scorpaena sp.	0.11	8	0.02
Apogon affinis	0.08	34	0.01
Alectis alexandrinus	0.06	26	0.01
Saurida parri	0.05	8	0.01
CHAETODONTI DA E	0.02	16	0.00
Zeus faber	0.02	8	0.00
Total	638.51		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 66  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 45.87 start stop duration Lon W  
 6° 18.34  
 TIME : 13:40:07 14:10:08 30.0 (min) Purpose : 3  
 LOG : 1023.08 1024.68 1.6 Region : 2500  
 FDEPTH: 44 44 Gear cond.: 0  
 BDEPTH: 44 44 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 3.2 kn  
 Sorted : 57 Total catch: 110.00 Catch/hour: 219.85

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Brachydeuterus auritus	47.74	1125	21.71
176 Trichiurus lepturus	28.03	172	12.75
Scyllarus pygmaeus	25.77	5376	11.72
Perulibatrachus elminensis	19.71	164	8.97
Cymbium glans	13.27	12	6.04
Selene dorsalis	11.98	164	5.45
Mustelus mustelus	9.99	14	4.55
Penaeus notialis	7.58	570	3.45
Solitas gruvelli	7.57	444	3.44
Pseudotolithus senegallus	5.98	18	2.72
Raja miraletus	5.98	24	2.72
J E L L Y F I S H	5.60	112	2.55
Galaeoides decadactylus	4.20	60	1.91
175 Chloroscombrus chrysurus	3.36	32	1.53
Sepia sp.	3.18	4	1.44

Sphyraena guachancho	2.99	10	1.36
Pteroscion peli	2.35	108	1.07
Trichiurus lepturus, juvenile	2.24	3558	1.02
Pomadasy incisus	1.87	18	0.85
178 Sicyonia galeata	1.29	532	0.59
Brotula barbata	1.22	10	0.55
Pagellus bellottii	1.17	10	0.53
177 Pythionichthys micropthalmus	1.03	4	0.47
Cynoglossus canariensis	0.75	10	0.34
Perulibatrachus elminensis, juvenile	0.62	140	0.28
Syacium micrurum	0.56	18	0.25
C R A B S	0.51	60	0.23
Dentex congoensis	0.49	4	0.22
Microrhynchus frechkopi	0.47	32	0.21
P O L Y C H A E T A	0.31	140	0.14
DORIPPI DA E	0.31	28	0.14
SCORPAENI DA E	0.29	4	0.13
Ilisha africana	0.28	4	0.13
DROMI DA E	0.20	4	0.09
Plastic	0.19	4	0.08
Pegusa lascaris	0.19	4	0.08
Umbria canariensis	0.19	10	0.08
CONGRI DA E	0.19	4	0.08
Antennarius sp.	0.09	4	0.04
Uranoscopus sp.	0.06	28	0.03
Ilisha spinosa	0.06	28	0.03
Uranoscopus albesca	0.05	4	0.02
Total	219.85		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 67  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 40.18 start stop duration Lon W  
 6° 15.91  
 TIME : 15:20:05 15:50:06 30.0 (min) Purpose : 3  
 LOG : 1032.24 1033.78 1.5 Region : 2500  
 FDEPTH: 76 74 Gear cond.: 0  
 BDEPTH: 76 74 Validity : 0  
 Towing dir: 0° Wire out : 240 m Speed : 3.1 kn  
 Sorted : 22 Total catch: 180.00 Catch/hour: 359.88

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Trichiurus lepturus	174.48	264	48.48
Trachurus trecae	70.75	816	19.66
181 J E L L Y F I S H	51.51	0	14.31
Branchiostegus semifasciatus	8.84	16	2.46
Octopus vulgaris	7.84	14	2.18
Brotula barbata	5.80	12	1.61
Saurida parri	5.59	1314	1.55
Dentex angolensis	4.52	56	1.26
180 Sepia hierredda	4.41	20	1.23
0 Ariomma bondi	4.22	1026	1.17
Alloteuthis africana	4.22	1206	1.17
Pseudupeneus prayensis	3.16	18	0.88
Umbria canariensis	2.88	12	0.80
Fistularia petimba	1.88	10	0.52
Pagellus bellottii	1.88	8	0.52
179 Priacanthus arenatus	1.52	10	0.42
Scorpaena stephanica	1.32	14	0.37
Sphyraena sphyraena	1.08	4	0.30
Raja miraletus	0.92	2	0.26
Boops boops	0.89	34	0.25
0 Citharus linguatula	0.66	22	0.18
0 Zeus faber	0.32	2	0.09
Scomber colias	0.25	24	0.07
Sardinella aurita	0.20	8	0.06
0 Sepia bertheloti	0.20	2	0.06
Spherooides marmoratus	0.12	6	0.03
Plastic	0.12	0	0.03
Syacium micrurum	0.12	12	0.03
Lepidotrigla cadmani	0.12	2	0.03
Perulibatrachus elminensis	0.06	6	0.02
Total	359.88		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 68  
 DATE : 04/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 39.84 start stop duration Lon W  
 6° 4.06  
 TIME : 17:27:33 17:47:19 19.8 (min) Purpose : 3  
 LOG : 1047.96 1048.91 0.9 Region : 2500  
 FDEPTH: 103 103 Gear cond.: 0  
 BDEPTH: 103 103 Validity : 0  
 Towing dir: 0° Wire out : 280 m Speed : 2.9 kn  
 Sorted : 12 Total catch: 73.58 Catch/hour: 223.53

SPECIES C SAMP	CATCH/HOUR		% OF TOT.
	weight	numbers	
Dentex angolensis	93.05	556	41.63
182 Brotula barbata	34.04	55	15.23
Illlex coindetii	17.26	1191	7.72
Ariomma bondi	16.61	1978	7.43
Umbria canariensis	14.10	58	6.31
Trachurus trecae	10.11	316	4.52
183 Branchiostegus semifasciatus	8.93	12	4.00
Dentex congoensis	4.81	43	2.15
Trichiurus lepturus	4.37	12	1.96
Scorpaena stephanica	3.06	12	1.37
Citharus linguatula	2.84	55	1.27
TRI GLI DA E	1.97	21	0.88
Priacanthus arenatus	1.53	12	0.88
Arnoglossus sp.	1.09	33	0.49
Octopus vulgaris	1.03	3	0.46

Saurida parri	0.87	656	0.39
Sepia officinalis	0.87	12	0.39
OMMASTREPHIDAE	0.87	43	0.39
Raja m. crocellata	0.85	3	0.38
Zeus faber	0.73	3	0.33
Chaetodon hoefleri	0.67	3	0.30
Syacium guineensis	0.66	21	0.29
Serranus cabrilla	0.61	3	0.27
Spicara alta	0.55	3	0.24
Boops boops	0.43	3	0.19
Alloteuthis subulata	0.37	122	0.17
Uranoscopus albesca	0.36	3	0.16
J E L L Y F I S H	0.36	12	0.16
Parapenaeopsis atlantica	0.33	261	0.15
Syacium micrurum	0.11	21	0.05
Scyllarus sp.	0.07	12	0.03
Algaes	0.01	12	0.01
Total	223.54		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 69  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 47.35

start	stop	duration	Lon	W
6° 2.82				
TIME : 06:27:10	06:57:58	30.8 (min)		
LOG : 1080.03	1081.70	1.7		
FDEPTH: 59	59			
BDEPTH: 59	59			
Towing dir: 0°	Wire out : 230 m			
Sorted : 38	Total catch: 67.30			

SPECIES	CATCH/HOUR	% OF TOT.	
C SAMP	weight	numbers	
Trachurus trecae	27.72	717	21.14
185 Sepia officinalis	20.96	31	15.99
0 J E L L Y F I S H	19.33	58	14.74
Tri ch i u r u s l e p t u r u s	15.10	43	11.52
Pri ac an th u s a r e n a t u s	7.55	95	5.76
Octopus vulgaris	7.52	10	5.74
Saurida parri	3.79	949	2.89
Boops boops	3.73	156	2.84
Brachydeuterus auritus	2.80	187	2.13
186 Umbrina canariensis	2.80	10	2.13
Zeus faber	2.49	10	1.90
Branchiostegus semi fasciatus	2.45	6	1.87
Dentex angolensis	2.05	10	1.56
188 Pseudupeneus prayensis	1.74	37	1.33
Perulibatrachus elminensis	1.37	12	1.04
Pagellus bellottii	1.24	16	0.95
187 DORIPPIDAE	1.06	31	0.81
Alloteuthis africana	0.93	0	0.71
Alloteuthis subulata	0.90	1482	0.69
Citharus linguatula	0.87	41	0.66
Solitas gruvelli	0.81	41	0.62
Fistularia petimba	0.66	4	0.51
Lagocephalus sp.	0.62	4	0.47
Caranx rhonchus	0.31	4	0.24
Dicologlossa hexophthalma	0.31	16	0.24
Illex coindetii	0.25	4	0.19
Sepiella ornata	0.19	12	0.14
Arnoglossus imperialis	0.19	37	0.14
Algaes	0.19	0	0.14
Uranoscopus polli	0.19	4	0.14
Lesueurigobius sanzii	0.17	19	0.13
Macropodus rugosus	0.12	12	0.10
Serranus accraensis	0.12	6	0.10
Spherooides marmoratus	0.10	6	0.08
E C H I N O D E R M A T A	0.09	94	0.07
BLENNIIDAE	0.08	6	0.06
Sardinella aurita	0.06	4	0.05
189 Selene dorsalis	0.06	10	0.05
Scomber colias	0.04	4	0.03
Brisingiidae	0.04	4	0.03
Molluscs	0.04	6	0.03
P O L Y C H A E T A	0.04	41	0.03
PAGUROIDEA	0.01	19	0.01
Inachus sp.	0.01	10	0.01
Calappa sp.	0.01	4	0.00
Small crabs	0.00	6	0.00
Psilaster sp.	0.00	6	0.00
G A S T R O P O D S	0.00	10	0.00
Total	131.11		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 70  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 50.63

start	stop	duration	Lon	W
6° 2.43				
TIME : 07:52:25	08:22:35	30.2 (min)		
LOG : 1085.48	1087.20	1.7		
FDEPTH: 41	41			
BDEPTH: 41	41			
Towing dir: 0°	Wire out : 150 m			
Sorted : 7	Total catch: 356.80			

SPECIES	CATCH/HOUR	% OF TOT.	
C SAMP	weight	numbers	
Engraulis encrasi colus	239.91	49981	33.80
191 Brachydeuterus auritus	156.10	51983	21.99
192 Trachurus trecae	131.95	65976	18.59
193 Sardinella aurita	73.97	14795	10.42
190 Octopus vulgaris	16.23	8	2.29
Fishing gears	11.02	0	1.55
GOBIIDAE	10.00	1798	1.41
Sphyræna guachancho	9.43	26	1.33

J E L L Y F I S H	8.63	302	1.22
Solitas gruvelli	8.03	302	1.13
Tri ch i u r u s l e p t u r u s , j u v e n i l e	8.00	1999	1.13
Alloteuthis subulata	8.00	5899	1.13
Syacium guineensis	6.00	99	0.85
Tri ch i u r u s l e p t u r u s	5.09	20	0.72
Sepia hierredda	3.18	4	0.45
Balistes caprisicus	2.11	6	0.30
Scomber colias	2.00	199	0.28
Serranus accraensis	2.00	199	0.28
Arnoglossus imperialis	1.40	199	0.20
Pri ac an th u s a r e n a t u s	1.11	4	0.16
Scyllarus pygmaeus	1.00	400	0.14
Sargassum	0.98	0	0.14
Raja miralatus	0.88	6	0.12
Selene dorsalis	0.86	203	0.12
Macropodus rugosus	0.80	99	0.11
Dentex gibbosus	0.72	2	0.10
Stephanolepis hispidus	0.28	2	0.04
Penaeus notialis	0.07	2	0.01
Luidia sp	0.07	2	0.01

Total 709.82 100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 71  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 52.90

start	stop	duration	Lon	W
6° 4.41				
TIME : 09:08:29	09:39:14	30.7 (min)		
LOG : 1091.22	1093.01	1.8		
FDEPTH: 27	25			
BDEPTH: 27	25			
Towing dir: 0°	Wire out : 130 m			
Sorted : 23	Total catch: 190.63			

SPECIES	CATCH/HOUR	% OF TOT.	
C SAMP	weight	numbers	
Pomadasyus incisus	69.89	353	18.78
0 Tri ch i u r u s l e p t u r u s	41.09	1001	11.04
0 Brachydeuterus auritus	39.06	1967	10.50
197 Parapenaeopsis atlantica	29.37	7723	7.89
Galathea decadactylus	27.31	293	7.34
194 Pseudotolithus senegalensis	26.43	74	7.10
Pteroscion peli	14.98	367	4.03
Chloroscombrus chrysurus	14.39	191	3.87
Uranoscopus polli	13.82	148	3.71
Ilisha africana	10.87	1571	2.92
Scyllarus pygmaeus	7.64	1159	2.05
Cynoglossus senegalensis	5.55	25	1.49
Sardinella maderensis	5.29	176	1.42
196 Perulibatrachus elminensis	5.03	33	1.35
Trachinocephalus myops	4.99	74	1.34
Torpedo torpedo	4.65	10	1.25
Pisodonophis semicinctus	4.37	10	1.18
Pseudotolithus senegalensis	4.33	4	1.16
Raja miralatus	4.22	8	1.13
Sepia officinalis	4.14	6	1.11
Cynoponticus ferox	3.83	8	1.03
Callinectes pallidus	3.82	572	1.03
Solitas gruvelli	3.23	88	0.87
Bothus podas	2.35	146	0.63
Synaptura cadenati	2.35	29	0.63
Sphyræna guachancho	2.35	29	0.63
Selene dorsalis	2.06	10	0.55
Pseudupeneus prayensis	2.06	16	0.55
Ephippion guttifer	1.54	18	0.41
Fishing gears	1.48	0	0.40
Trachurus trecae	1.23	39	0.33
198 Batrachoides liberiensis	1.18	29	0.32
PAGUROIDEA	1.18	16	0.32
Perulibatrachus sp.	1.18	205	0.32
CORAL	0.88	0	0.24
Schedophilus pamarco	0.88	29	0.24
Sargassum	0.88	0	0.24
Epinephelus aeneus	0.66	2	0.18
Dromia sp.	0.59	16	0.16
Portunus validus	0.47	2	0.13
Sicyonia galeata	0.15	45	0.04
Zeus faber	0.15	16	0.04
Trachurus trecae, juvenile	0.10	74	0.03
Stromateus fiatola	0.09	35	0.02
Plastic	0.04	2	0.01
Total	372.08		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 72  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4° 59.92

start	stop	duration	Lon	W
5° 44.06				
TIME : 11:54:13	12:24:26	30.2 (min)		
LOG : 1112.89	1114.51	1.6		
FDEPTH: 23	22			
BDEPTH: 23	22			
Towing dir: 0°	Wire out : 130 m			
Sorted : 28	Total catch: 1400.00			

SPECIES	CATCH/HOUR	% OF TOT.	
C SAMP	weight	numbers	
Chrysaora sp.	2232.57	0	80.32
Sepia hierredda	121.29	206	4.36
Chloroscombrus chrysurus	57.56	74522	2.07
Tri ch i u r u s l e p t u r u s	51.40	1028	1.85
Scomber colias	51.40	103	1.85
Cynoponticus ferox	45.23	103	1.63
Pisodonophis semicinctus	38.99	103	1.40
Sphyræna sphyraena	28.78	103	1.04
Schedophilus pamarco	22.61	411	0.81
Cubozoa sp	22.61	206	0.81

	Pomadasys incisus	16.45	103	0.59
200	Uranoscopus polli	12.34	103	0.44
	SOLEIAE	12.34	103	0.44
	Ilisha africana	10.28	308	0.37
	Parapenaeopsis atlantica	10.28	1233	0.37
	Penaeus kerathurus	6.17	103	0.22
	Callinectes sp.	5.24	212	0.19
	Trachurus trecae	4.63	3187	0.17
319	Trachinocephalus myops	4.11	103	0.15
	Squilla mantis	4.11	103	0.15
	Calappa rubroguttata	4.11	103	0.15
	Selene dorsalis	4.11	103	0.15
	Nematopalaemon hastatus	4.11	4934	0.15
	Antennarius striatus	4.11	103	0.15
	Brachydeuterus auritus	2.57	103	0.09
199	Stromateus fiatola	1.34	206	0.05
	Syacium micrurum	0.51	103	0.02
	C R A B S	0.31	103	0.01
	Pseudotolithus senegalensis	0.00	0	0.00
	Lagocephalus laevigatus	0.00	0	0.00
	Rajamalietus	0.00	0	0.00
	<b>Total</b>	<b>2779.55</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 73  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°57.08 start stop duration Lon W  
 5°41.33  
 TIME : 13:19:52 13:49:55 30.1 (min) Purpose : 3  
 LOG : 1119.02 1120.61 1.6 Region : 2500  
 FDEPTH: 47 46 Gear cond.: 0  
 BDEPTH: 47 46 Validity : 0  
 Towing dir: 0° Wire out : 180 m Speed : 3.2 kn  
 Sorted : 32 Total catch: 359.15 Catch/hour: 717.11

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Umbrina canariensis	195.56	986	27.27
Brachydeuterus auritus	159.85	15682	22.29
Selene dorsalis	148.01	627	20.64
Chloroscombrus chrysurus	74.67	629	10.41
Trichurus lepturus	50.75	759	7.08
Octopus vulgaris	27.05	22	3.77
Pagellus acarne	21.44	128	2.99
Trachurus trecae	7.61	2995	1.06
184			
Syacium micrurum	5.70	48	0.80
Sphyræna guachancho	5.21	20	0.73
Sphyræna sphyraena	5.03	20	0.70
Sepia hierredda	3.19	2	0.45
Ephippion guttifer	1.96	2	0.27
Stromateus fiatola	1.68	4	0.23
J E L L Y F I S H	1.52	0	0.21
Cynoglossus canariensis	1.28	2	0.18
Pteroscion peli	1.07	22	0.15
Perulibrachius elmienis	1.00	4	0.14
Balistes caprisus	0.92	2	0.13
Pseudupeneus prayensis	0.86	22	0.12
Alloteuthis africana	0.84	329	0.12
Alloteuthis sp.	0.41	128	0.06
Lesueurigobius sanzi	0.36	76	0.05
Sepiella ornata	0.36	26	0.05
Saurida parri	0.36	50	0.05
Scyllarus pygmaeus	0.20	26	0.03
LUTJANIDAE	0.10	26	0.01
Plastic	0.08	0	0.01
Sicyonia galeata	0.05	26	0.01
<b>Total</b>	<b>717.11</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 74  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°53.27 start stop duration Lon W  
 5°41.50  
 TIME : 14:46:49 15:15:22 28.6 (min) Purpose : 3  
 LOG : 1125.58 1127.13 1.6 Region : 2500  
 FDEPTH: 64 62 Gear cond.: 0  
 BDEPTH: 64 62 Validity : 0  
 Towing dir: 0° Wire out : 230 m Speed : 3.3 kn  
 Sorted : 0 Total catch: 106.23 Catch/hour: 223.25

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Trachurus trecae	129.98	4644	58.22
253			
Alloteuthis africana	17.61	7221	7.89
Dentex canariensis	13.49	23	6.04
202			
Mustelus mustelus	8.87	2	3.97
Pagellus bellottii	7.86	88	3.52
208			
Pseudupeneus prayensis	7.33	137	3.28
0			
Pagrus caeruleostictus	6.30	13	2.82
Octopus vulgaris	4.67	11	2.09
Saurida parri	4.58	887	2.05
Dentex angolensis	4.14	40	1.86
207			
Balistes caprisus	2.98	4	1.34
Trichurus lepturus	2.10	4	0.94
Sepia hierredda	2.06	2	0.92
Fistularia petimba	2.02	6	0.90
Priacanthus arenatus	1.26	15	0.56
Epinephelus aeneus	1.18	2	0.53
Brachydeuterus auritus	1.15	50	0.51
205			
Boops boops	0.86	29	0.39
Sardinella aurita	0.76	38	0.34
204			
Lutjanus fulgens	0.55	2	0.24
Sphyræna sphyraena	0.55	2	0.24

	Scomber colias	0.43	29	0.19
254	Serranus accraensis	0.43	6	0.19
	Zeus faber	0.42	2	0.19
	Rypticus saponaceus	0.42	2	0.19
	Sardinella maderensis	0.34	2	0.15
201	Arnoglossus imperialis	0.29	65	0.13
	Solitas gruvelli	0.29	15	0.13
	Citharus linguatula	0.14	6	0.06
	Lepidotrigla cadmani	0.14	6	0.06
	J E L L Y F I S H	0.04	15	0.02
	PAGUROIDEA	0.02	6	0.01
	Ophiuroidea indetCV1	0.01	6	0.00
	<b>Total</b>	<b>223.25</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 75  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 4°56.71 start stop duration Lon W  
 5°27.15  
 TIME : 16:41:55 17:02:46 20.9 (min) Purpose : 3  
 LOG : 1140.38 1141.51 1.1 Region : 2500  
 FDEPTH: 67 68 Gear cond.: 0  
 BDEPTH: 67 68 Validity : 0  
 Towing dir: 0° Wire out : 260 m Speed : 3.3 kn  
 Sorted : 0 Total catch: 370.00 Catch/hour: 1064.24

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Trachurus trecae	768.09	39196	72.17
212			
Epinephelus aeneus	79.73	9	7.49
Pseudupeneus prayensis	57.76	380	5.43
0			
Boops boops	53.99	1151	5.07
Zeus faber	21.45	43	2.02
0			
Pagellus bellottii	18.72	181	1.76
211			
Sepia hierredda	12.19	37	1.15
Dentex angolensis	11.09	221	1.04
210			
Dentex canariensis	8.92	17	0.84
209			
Fishing gears	8.74	0	0.82
Sphyræna guachancho	5.04	37	0.47
Octopus vulgaris	3.62	9	0.34
Saurida parri	2.16	431	0.20
Rajamalietus	2.13	9	0.20
Dicologlossa hexophthalma	1.44	37	0.14
Lepidotrigla carolae	1.44	37	0.14
Dactylopterus volitans	1.38	9	0.13
Sargassum	1.07	37	0.10
Sphyræna sphyraena	1.04	6	0.10
Fistularia petimba	0.81	6	0.08
Scorpaena stephanica	0.66	40	0.06
0			
Ariomma bondi	0.58	144	0.05
Citharus linguatula	0.45	40	0.04
0			
Syacium micrurum	0.40	72	0.04
Scorpaena sp.	0.35	6	0.03
Umbrina canariensis	0.35	3	0.03
Illex coindetii	0.23	3	0.02
Prognathodes marcellae	0.17	3	0.02
Anthias anthias	0.14	37	0.01
Scleractinia	0.07	72	0.01
CHAETODONTIDAE	0.04	37	0.00
Arnoglossus imperialis	0.03	3	0.00
Alloteuthis subulata	0.00	828	0.00
<b>Total</b>	<b>1064.26</b>		<b>100.00</b>

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 76  
 DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°1.18 start stop duration Lon W  
 5°24.70  
 TIME : 17:47:43 18:17:08 29.4 (min) Purpose : 3  
 LOG : 1146.65 1148.32 1.7 Region : 2500  
 FDEPTH: 39 39 Gear cond.: 0  
 BDEPTH: 39 39 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3.4 kn  
 Sorted : 0 Total catch: 150.00 Catch/hour: 306.02

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Brachydeuterus auritus	105.84	13775	34.59
216			
Pagellus bellottii	46.75	406	15.28
213			
Algaes	33.96	0	11.10
Pomadasys incisus	14.72	120	4.81
Trichurus lepturus	12.21	1016	3.99
0			
Galeodes decadactylus	11.26	269	3.68
215			
Pseudupeneus sp.	11.26	112	3.68
Mustelus mustelus	8.00	8	2.61
Umbrina canariensis	6.93	35	2.26
Penaeus notialis	6.35	555	2.07
0			
J E L L Y F I S H	5.39	51	1.76
Pseudotolithus senegalensis	5.22	6	1.71
Sphyræna guachancho	4.97	10	1.62
0			
Pseudupeneus prayensis	3.88	29	1.27
Trachurus trecae	3.72	143	1.21
0			
Lagocephalus laevigatus	2.77	8	0.91
Pteroscion peli	2.42	51	0.79
TRI GLIDAE	1.73	16	0.57
Balistes sp.	1.71	4	0.56
Scorpaena stephanica	1.51	29	0.49
0			

Stephanolepis hispidus	1.41	14	0.46
0 Sardinella maderensis	1.39	78	0.45
214 Solitas gruvelli	1.39	27	0.45
GOBIIDAE	1.06	78	0.35
0 Gerres nigri	1.04	27	0.34
Uranoscopus polli	0.98	4	0.32
C R A B S	0.95	208	0.31
Boops boops	0.87	8	0.28
Ilisha africana	0.87	16	0.28
Dicologlossa hexophthalma	0.87	27	0.28
Dactylopterus volitans	0.86	2	0.28
Paraconger notialis	0.78	6	0.25
0 Selene dorsalis	0.61	251	0.20
Perulibatrachus elminensis	0.45	2	0.15
Syacium micrum	0.38	8	0.12
Squilla mantis	0.35	8	0.11
Zeus faber	0.27	69	0.09
Trachinus vipera	0.26	8	0.08
Epinephelus adscensionis	0.24	2	0.08
Sphoeroides marmoratus	0.17	8	0.06
Scyllarus pygmaeus	0.12	16	0.04
Parapenaeopsis atlantica	0.05	16	0.02
C A S T R O P O D S	0.04	8	0.01
Sicyonia galeata	0.03	8	0.01
Acanthurus monroviae	0.02	8	0.01
Total	306.01		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 77  
DATE : 05/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
5°3.50 start stop duration Lon W  
5°23.11  
TIME : 18:50:01 19:19:19 29.3 (min) Purpose : 3  
LOG : 1151.13 1152.80 1.7 Region : 2500  
FDEPTH: 25 25 Gear cond.: 0  
BDEPTH: 25 25 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.4 kn  
Sorted : 24 Total catch: 120.00 Catch/hour: 245.73

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Galeoides decadactylus	51.42 774	20.93
217 Trichurus lepturus juvenile	33.63 8678	13.69
Parapenaeopsis atlantica	26.81 7413	10.91
J E L L Y F I S H	23.33 117	9.50
Pteroscion peli	20.82 702	8.47
Sepia hierredda	20.44 23	8.32
Uranoscopus polli	9.40 149	3.82
Callinectes sp.	7.69 1349	3.13
Lagocephalus laevigatus	7.41 16	3.02
Pseudolithus senegalensis	5.77 10	2.35
Pisodonophis semicinctus	4.55 12	1.85
Ilisha africana	3.22 620	1.31
Penaeus kerathurus	2.43 98	0.99
Pomadasy jubelini	1.78 8	0.73
Gerres nigri	1.78 16	0.73
RAJIDAE	1.72 4	0.70
Perulibatrachus elminensis	1.72 4	0.70
Cynoglossus senegalensis	1.64 4	0.67
Dactylopterus volitans	1.39 6	0.57
Pomadasy perotai	1.35 2	0.55
Trachurus trecae	1.33 381	0.54
Rajamiralatus	1.30 8	0.53
Chloroscombrus chrysurus	1.29 256	0.52
Pentanezum quinarius	1.13 25	0.46
Trachinocephalus myops	1.13 16	0.46
Bothus podas	1.05 109	0.43
Dasyatis margarita	0.98 2	0.40
0 PAGUROIDEA	0.98 18	0.40
Pseudupeneus prayensis	0.97 8	0.40
Pagellus bellottii	0.97 8	0.40
Torpedo torpedo	0.94 2	0.38
Trachinus lineolatus	0.84 248	0.34
Pomadasy incisus	0.81 8	0.33
Balistes punctatus	0.78 2	0.32
Trichurus lepturus	0.66 2	0.27
Ephippion guttifer	0.66 2	0.27
Sepiella ornata	0.65 8	0.26
Selene dorsalis	0.60 125	0.24
Scyllarus pygmaeus	0.36 125	0.14
Total	245.74	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 78  
DATE : 06/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
4°58.51 start stop duration Lon W  
5°3.72  
TIME : 06:10:06 06:30:36 20.5 (min) Purpose : 3  
LOG : 1189.26 1190.40 1.1 Region : 2500  
FDEPTH: 86 88 Gear cond.: 0  
BDEPTH: 86 88 Validity : 0  
Towing dir: 0° Wire out : 260 m Speed : 3.3 kn  
Sorted : 8 Total catch: 120.49 Catch/hour: 352.65

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Pentheroscion mbi zi	121.19 66858	34.37
Trichurus lepturus	112.89 509	32.01
Brotula barbata	60.59 100	17.18
Branchiostegus semifasciatus	19.20 29	5.44
Pegusa lascaris	10.71 102	3.04
Cynoponticus ferrox	10.30 6	2.92
Parapenaeopsis atlantica	3.01 1124	0.85
GOBIIDAE	1.67 217	0.47
Octopus vulgaris	1.64 3	0.46
Priacanthus arenatus	1.46 9	0.41
Waste General	1.23 0	0.35
Physiculus sp.	1.20 76	0.34
Trachurus trecae	1.17 44	0.33

Galeoides decadactylus	0.94	9	0.27
219 Dentex angolensis	0.88	6	0.25
218 Saurida parri	0.67	217	0.19
Fistularia petimba	0.53	3	0.15
Sphoeroides marmoratus	0.51	44	0.14
Perulibatrachus elminensis	0.41	3	0.12
Umbri na canariensis	0.41	3	0.12
Sepia hierredda	0.35	6	0.10
Zanobatus shoeneini	0.29	35	0.08
Uranoscopus albesca	0.29	9	0.08
Boops boops	0.18	3	0.05
Scorpaena stephanica	0.18	6	0.05
Dicologlossa hexophthalma	0.18	3	0.05
Gorgonians	0.14	53	0.04
Squilla mantis	0.13	18	0.04
Saurenchelys sp.	0.10	3	0.03
Macropus sp.	0.10	32	0.03
P O L Y C H A E T A	0.07	18	0.02
Uranoscopus sp.	0.05	32	0.01
Antennarius striatus	0.04	3	0.01
Selene dorsalis	0.03	18	0.01
Inachus sp	0.02	3	0.01
Chloroscombrus chrysurus	0.02	18	0.00
Total	352.78		100.04

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 79  
DATE : 06/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
5°3.48 start stop duration Lon W  
5°1.98  
TIME : 07:34:47 08:05:42 30.9 (min) Purpose : 3  
LOG : 1196.41 1198.00 1.6 Region : 2500  
FDEPTH: 35 36 Gear cond.: 0  
BDEPTH: 35 36 Validity : 0  
Towing dir: 0° Wire out : 140 m Speed : 3.1 kn  
Sorted : 34 Total catch: 144.37 Catch/hour: 280.34

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Brachydeuterus auritus	78.12 1878	27.87
220 Chloroscombrus chrysurus	70.68 1163	25.21
Trachurus trecae	23.28 464	8.30
221 Trichurus lepturus	21.56 1569	7.69
Scyllarus pygmaeus	18.85 5237	6.72
Penaeus notialis	10.61 450	3.79
Pseudolithus senegalus	8.76 27	3.12
Pteroscion peli	5.47 167	1.95
Perulibatrachus elminensis	4.53 74	1.62
Cynoglossus canariensis	4.26 19	1.52
Pagellus bellottii	3.80 16	1.36
222 J E L L Y F I S H	3.65 31	1.30
Torpedo torpedo	3.10 14	1.11
Cymbium glans	2.99 4	1.07
Parapenaeopsis atlantica	2.58 608	0.92
Dromia sp.	2.13 39	0.76
Stromateus fiatola	1.44 4	0.51
CORALLINALES	1.34 0	0.48
Ilisha africana	1.22 23	0.43
Solitas gruvelli	1.06 91	0.38
Galeoides decadactylus	1.06 31	0.38
Sicyonia galeata	1.06 676	0.38
Rajamiralatus	0.93 8	0.33
Boops boops	0.76 8	0.27
Sphyræna guachancho	0.76 16	0.27
Pseudupeneus prayensis	0.76 8	0.27
Cynoponticus ferrox	0.66 2	0.24
Lutjanus fulgens	0.62 2	0.22
Selene dorsalis	0.46 183	0.16
Dicologlossa hexophthalma	0.46 39	0.16
Pentheroscion mbi zi	0.46 243	0.16
Epinephelus aeneus	0.35 2	0.12
Brotula barbata	0.33 52	0.12
Lagocephalus laevigatus	0.30 8	0.11
C E P H A L O P O D A	0.30 388	0.11
Ethusa sp.	0.29 136	0.10
Priacanthus arenatus	0.27 2	0.10
Calappa pelii	0.27 8	0.09
Sardinella maderensis	0.15 8	0.05
Callinectes sp.	0.12 23	0.04
Octopus vulgaris	0.12 2	0.04
Chaceon sp.	0.11 68	0.04
Fishing gears	0.08 0	0.03
Umbri na canariensis	0.05 8	0.02
Zeus faber	0.03 8	0.01
Ilisha spinosa	0.02 8	0.01
C R A B S	0.02 23	0.01
UNIDENTIFIED FISH	0.02 8	0.01
SOLEIDAE	0.02 8	0.01
Acanthurus monroviae	0.02 8	0.01
Uranoscopus polli	0.02 8	0.01
Plastic	0.02 2	0.01
G A S T R O P O D S	0.01 8	0.00
Gorgonians	0.01 8	0.00
Stenorrhynchus lanceolatus	0.01 8	0.00
Total	280.34	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 80  
DATE : 06/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
5°5.09 start stop duration Lon W  
5°2.82  
TIME : 08:50:25 09:21:30 31.1 (min) Purpose : 3  
LOG : 1201.13 1203.02 1.9 Region : 2500  
FDEPTH: 29 28 Gear cond.: 0  
BDEPTH: 29 28 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.6 kn  
Sorted : 31 Total catch: 110.54 Catch/hour: 213.33

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	



Inachus sp	0.02	14	0.02
Pentheroscion mbi zi	0.01	8	0.00
Luidia sp	0.00	2	0.00
Selene dorsalis	0.00	2	0.00
Total	123.26		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 85  
 DATE : 06/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 8.52' start stop duration Lon W  
 4° 32.16'  
 TIME : 17:04:48 17:34:50 30.0 (min) Purpose : 3  
 LOG : 1247.01 1248.53 1.5 Region : 2500  
 FDEPTH: 36 34 Gear cond.: 0  
 BDEPTH: 36 34 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.0 kn  
 Sorted : 22 Total catch: 298.60 Catch/hour: 596.60

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Brachydeuterus auritus	218.25	17962	36.58
243	Trachurus trecae	212.01	5029	35.54
248	CORALLINALES	29.25	0	4.90
	J E L L Y F I S H	26.17	256	4.39
	Trichurus lepturus	19.50	1590	3.27
	Boops boops	18.05	208	3.03
	Alloteuthis subulata	8.21	5131	1.38
	Sardinella aurita	7.70	256	1.29
244	Pagellus bellottii	7.33	72	1.23
	Octopus vulgaris	6.55	2	1.10
	Pseudupeneus prayensis	4.48	56	0.75
	Syacium micrum	4.40	40	0.74
	Galeodes decadactylus	4.31	80	0.72
241	Sphyræna guachancho	3.59	78	0.60
	Pseudotolithus elongatus	2.57	52	0.43
	Sepia hierredda	2.56	2	0.43
	Penaeus notialis	2.32	86	0.39
	Pseudotolithus senegallus	2.08	4	0.35
	Chloroscombrus chrysurus	1.67	128	0.28
	Selene dorsalis	1.54	641	0.26
	Gerres nigri	1.54	26	0.26
	Uranoscopus polli	1.36	8	0.23
	Raja miraletus	1.32	4	0.22
	Torpedo torpedo	1.12	6	0.19
	Umbri na canariensis	1.10	28	0.18
	Pagrus caeruleostictus	0.84	8	0.14
	Sepia officinalis	0.72	26	0.12
	Epinephelus aeneus	0.64	2	0.11
	Stephanolepis hispidus	0.64	6	0.11
	Scomber colias	0.51	26	0.09
247	Sardinella maderensis	0.51	26	0.09
246	Pomadasys jubelini	0.48	2	0.08
245	Cynoglossus canariensis	0.40	2	0.07
	Alloteuthis africana	0.39	78	0.06
	Aluterus sp.	0.36	2	0.06
	Sicyonia galeata	0.31	180	0.05
	Balistes caprisicus	0.28	2	0.05
	Ethusa sp	0.26	128	0.04
	Priacanthus arenatus	0.24	2	0.04
	Pomadasys incisus	0.20	2	0.03
242	Saurida parri	0.18	128	0.03
	Sargassum	0.18	52	0.03
	Solitas gruveli	0.16	4	0.03
	Pythionchthys micropthal mus	0.12	2	0.02
	Scyllarus pygmaeus	0.10	52	0.02
	Parapenaeopsis atlantica	0.08	26	0.01
	Spherooides marmoratus	0.04	2	0.01
	Acanthurus monroviae	0.03	26	0.00
Total		596.61		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 86  
 DATE : 06/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 9.08' start stop duration Lon W  
 4° 35.62'  
 TIME : 18:28:04 18:58:28 30.4 (min) Purpose : 3  
 LOG : 1252.07 1253.66 1.6 Region : 2500  
 FDEPTH: 24 26 Gear cond.: 0  
 BDEPTH: 24 26 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.1 kn  
 Sorted : 37 Total catch: 281.25 Catch/hour: 555.09

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	J E L L Y F I S H	367.20	791	66.15
	Parapenaeopsis atlantica	45.39	8645	8.18
	Galeodes decadactylus	18.28	1269	3.29
250	Selene dorsalis	13.25	4737	2.39
	Alloteuthis subulata	11.09	7920	2.00
	Pteroscion peli	10.86	10	1.96
	Pomadasys jubelini	7.95	41	1.43
249	Chloroscombrus chrysurus	6.91	3412	1.25
	Zanobatus schoenleinii	5.88	12	1.06
	LETHRINIDAE	5.72	12	1.03
	Penaeus kerathurus	5.45	191	0.98
	Trichurus lepturus	5.30	566	0.96
0	Trachinocephalus myops	5.29	120	0.95
0	Uranoscopus polli	5.02	93	0.91
	Sargassum	4.03	0	0.73
	Trachurus trecae	4.03	215	0.73
	Sardinella maderensis	4.03	114	0.73
	Cymbium glans	4.03	2	0.73
	Epinephelus aeneus	3.20	4	0.58

Ephippion guttifer	3.00	2	0.54	
Pseudotolithus senegallus	3.00	4	0.54	
CALAPPIIDAE	1.73	562	0.31	
Torpedo marmorata	1.70	2	0.31	
Pseudupeneus prayensis	1.43	20	0.26	
Scorpaena scrofa	1.26	4	0.23	
Lagocephalus laevigatus	0.99	2	0.18	
Bothus podas	0.94	30	0.17	
Brachydeuterus auritus	0.86	57	0.16	
252	Pi sodonophis semicinctus	0.75	2	0.14
	Sphyræna guachancho	0.75	4	0.14
	Ephippus goreensis	0.71	4	0.13
	Raja miraletus	0.71	2	0.13
	Lutjanus fulgens	0.55	2	0.10
	CORAL	0.52	30	0.09
	Sepiella ornata	0.50	43	0.09
	Plastic	0.36	14	0.06
	Torpedo torpedo	0.36	2	0.06
	Drepane africana	0.32	2	0.06
	Ilisha africana	0.26	43	0.05
	Calappa rubroguttata	0.24	4	0.04
	Apogon frenatus	0.20	101	0.04
	Penaeus notialis	0.20	4	0.04
	Mugil cephalus	0.20	2	0.04
	Spherooides marmoratus	0.16	30	0.03
	Cynoglossus canariensis	0.14	14	0.03
	Chaetodon sp.	0.10	14	0.02
	Acanthurus monroviae	0.07	43	0.01
	Sicyonia galeata	0.04	14	0.01
	Starfish	0.04	14	0.01
	TRI GLIDAE	0.03	0	0.01
	Scyllarus pygmaeus	0.03	30	0.01
	Brotula barbata	0.03	14	0.01
Total		555.09		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 87  
 DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 4.57' start stop duration Lon W  
 4° 20.88'  
 TIME : 06:00:41 06:23:06 22.4 (min) Purpose : 3  
 LOG : 1292.78 1293.93 1.1 Region : 2500  
 FDEPTH: 85 86 Gear cond.: 0  
 BDEPTH: 85 86 Validity : 0  
 Towing dir: 0° Wire out : 250 m Speed : 3.1 kn  
 Sorted : 30 Total catch: 97.44 Catch/hour: 260.78

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	
	Dentex angolensis	41.79	388	16.02
257	Ariomma bondi	39.62	781	15.19
	Brotula barbata	36.88	62	14.14
	Branchiostegus semifasciatus	26.76	56	10.26
	Boops boops	15.75	474	6.04
	Trachurus trecae	12.67	543	4.86
258	Pagellus bellottii	11.87	211	4.55
256	Pseudupeneus prayensis	11.19	56	4.29
	Octopus vulgaris	8.24	8	3.16
	Saurida parri	7.54	1793	2.89
	Citharus linguatula	6.74	177	2.58
	Fistularia petimba	6.21	40	2.38
	Umbri na canariensis	5.82	21	2.23
	Trichurus lepturus	5.46	13	2.09
	Priacanthus arenatus	5.25	0	2.01
	Lepidotrigla cadmani	3.08	96	1.18
	Zeus faber	2.46	5	0.94
	Epinephelus aeneus	2.41	3	0.92
	Dactylopterus volitans	1.34	5	0.51
	Pomadasys jubelini	1.12	3	0.43
255	Scorpaena stephanica	1.07	3	0.41
	Serranus cabrilla	1.03	5	0.39
	Dentex congoensis	0.91	11	0.35
	Solitas gruveli	0.80	35	0.31
	Sargocentron hastatum	0.70	3	0.27
	Pythionchthys micropthal mus	0.64	3	0.25
	Illex coindetii	0.57	11	0.22
	CORALLINALES	0.46	0	0.18
	Bri ssopsis sp	0.37	5	0.14
	Dicologlossa hexopthal ma	0.34	5	0.13
	Sepia sp.	0.34	11	0.13
	Spherooides pachygaster	0.34	24	0.13
	Arnoglossus imperialis	0.23	35	0.09
	PAGUROIDEA	0.13	8	0.05
	CORAL	0.13	11	0.05
	E C H I N O D E R M A T A	0.12	5	0.04
	Alloteuthis africana	0.10	24	0.04
	Bri ssidae	0.08	5	0.03
	Alloteuthis subulata	0.06	16	0.02
	CALAPPIIDAE	0.05	29	0.02
	Plastic	0.04	8	0.02
	GOBIIDAE	0.04	5	0.02
	Spi nolambrus notialis	0.02	11	0.01
	Astropecten irregularis	0.01	5	0.00
	Pentheroscion mbi zi	0.01	5	0.00
Total		260.78		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 88  
 DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 8.11' start stop duration Lon W  
 4° 22.63'  
 TIME : 07:26:36 07:57:18 30.7 (min) Purpose : 3  
 LOG : 1298.91 1300.63 1.7 Region : 2500  
 FDEPTH: 59 60 Gear cond.: 0  
 BDEPTH: 59 60 Validity : 3  
 Towing dir: 0° Wire out : 220 m Speed : 3.4 kn  
 Sorted : 41 Total catch: 168.59 Catch/hour: 329.50

SPECIES		CATCH/HOUR		% OF TOT.
C	SAMP	weight	numbers	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 89				R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 91					
DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N				DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N					
5° 11. 26 start stop duration Lon W				5° 9. 79 start stop duration Lon W					
4° 20. 33 TIME : 08: 45: 45 09: 16: 12 30. 4 (min) Purpose : 3				4° 8. 76 TIME : 11: 51: 57 12: 21: 58 30. 0 (min) Purpose : 3					
LOG : 1304. 77 1306. 47 1. 7 Region : 2500				LOG : 1320. 61 1322. 27 1. 6 Region : 2500					
FDEPTH: 25 24 Gear cond.: 0				FDEPTH: 74 74 Gear cond.: 0					
BDEPTH: 25 24 Validity : 0				BDEPTH: 74 74 Validity : 0					
Towing dir: 0° Wire out : 120 m Speed : 3.3 kn				Towing dir: 0° Wire out : 210 m Speed : 3.3 kn					
Sorted : 0 Total catch: 219.64 Catch/hour: 432.79				Sorted : 14 Total catch: 138.67 Catch/hour: 277.25					
SPECIES CATCH/HOUR % OF TOT.				SPECIES CATCH/HOUR % OF TOT.					
C SAMP weight numbers				C SAMP weight numbers					
0	Chloroscombrus chrysurus	117.36	3606	27.12	0	Dentex canariensis	109.68	158	39.56
0	Brachydeuterus auritus	108.33	7647	25.03	261	Octopus vulgaris	29.51	16	10.64
0	Trichiurus lepturus	51.07	3005	11.80	0	Trachurus trachurus	22.92	762	8.27
0	Galeoides decadactylus	32.76	386	7.57	0	Dentex angolensis	19.95	194	7.20
262	Sardinella maderensis	19.35	774	4.47	259	Brotula barbata	12.28	16	4.43
264	J E L L Y F I S H	14.70	0	3.40	0	Trichiurus lepturus	10.64	30	3.84
0	Pteroscion peli	11.87	193	2.74	0	Boops boops	10.44	128	3.76
0	Trachurus trecae	9.54	244	2.20	0	Lepidotrigla cadmani	10.03	128	3.62
0	Sargassum	7.22	0	1.67	0	Saurida parri	9.21	4616	3.32
0	Pseudupeneus prayensis	7.22	65	1.67	0	Citharus linguatula	5.52	168	1.99
0	Selene dorsalis	7.22	3612	1.67	0	Solitas gruvelli	4.71	108	1.70
0	Octopus vulgaris	5.40	2	1.25	0	Pagrus pagrus	4.19	10	1.51
0	Sepia officinalis	4.89	6	1.13	0	Zeus faber	3.80	12	1.37
0	Caranx rhonchus	3.87	26	0.89	0	Alloteuthis africana	3.78	1090	1.37
0	Ephippion guttifer	3.59	4	0.83	0	Fistularia petimba	3.40	16	1.23
0	Pseudotolithus senegalensis	3.19	6	0.74	0	J E L L Y F I S H	3.27	0	1.18
265	Parapenaeopsis atlantica	2.84	516	0.66	260	Cynoponticus ferox	2.48	2	0.89
0	Trachinocephalus myops	2.84	77	0.66	0	Torpedo torpedo	1.84	6	0.66
0	Chrysaora sp.	2.58	77	0.60	0	Pagellus bellottii	1.64	20	0.59
0	Scomberomorus tritor	2.33	6	0.54	0	Umbriina canariensis	1.43	6	0.52
0	Torpedo mackayana	1.81	4	0.42	0	Pegusa lascaris	1.13	10	0.41
0	Alloteuthis africana	1.55	786	0.36	0	Dactylopterus volitans	1.13	6	0.41
0	Antipatharia	1.29	39	0.30	0	Priacanthus arenatus	1.02	6	0.37
0	Perulibatrachus elmiensis	1.22	2	0.28	0	Sargassum	0.51	0	0.18
0	Torpedo torpedo	1.10	2	0.25	0	Micrurus frechkopi	0.41	10	0.15
0	Chrysaora africana	1.03	39	0.24	0	Lagocephalus laevis	0.41	26	0.15
0	Dentex gibbosus	0.88	14	0.20	0	B I V A L V E S	0.31	6	0.11
0	Raja miraletus	0.87	2	0.20	0	Perulibatrachus elmiensis	0.31	6	0.11
0	Sepiella ornata	0.77	26	0.18	0	Illex coindetii	0.31	6	0.11
0	Uranoscopus polli	0.71	4	0.16	0	Serranus accraensis	0.20	6	0.07
0	Epinephelus aeneus	0.71	2	0.16	0	Arnoglossus imperialis	0.20	40	0.07
0	Solitas gruvelli	0.52	14	0.12	0	Plastic	0.16	0	0.06
0	Sardinella aurata	0.52	14	0.12	0	Luidia sp	0.15	6	0.06
263	Lutjanus fulgens	0.47	2	0.11	0	G A S T R O P O D S	0.08	12	0.03
0	Dactylopterus volitans	0.35	2	0.08	0	0	0.06	6	0.02
0	ANTENNARIIDAE	0.35	2	0.08	0	Calappa pelii	0.03	6	0.01
0	Sphyræna sphyraena	0.26	26	0.06	0	CORAL	0.03	6	0.01
					0	E C H I N O D E R M A T A	0.02	6	0.01
					0	Selene dorsalis	0.02	6	0.01
					0	Uranoscopus polli	0.02	10	0.01
					0	Scyllarus pygmaeus	0.02	6	0.01

CIDARIDAE	0.01	6	0.00
C R A B S	0.01	10	0.00
Rochinia sp.	0.01	6	0.00
RANINIDAE	0.01	6	0.00
Total	277.25		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 92  
 DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 1.15 start stop duration Lon W  
 3° 42.66  
 TIME : 16:09:27 16:30:50 21.4 (min) Purpose : 3  
 LOG : 1349.13 1350.19 1.1 Region : 2500  
 FDEPTH: 88 87 Gear cond.: 0  
 BDEPTH: 88 87 Validity : 0  
 Towing dir: 0° Wire out : 300 m Speed : 3.0 kn  
 Sorted : 0 Total catch: 375.10 Catch/hour: 1052.67

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
J E L L Y F I S H				
0	1000.63	0	95.06	
Dentex angolensis	12.12	115	1.15	
Trachurus trecae	11.17	429	1.06	
Trichiurus lepturus	8.76	306	0.83	
Octopus vulgaris	8.42	11	0.80	
Zeus faber	2.69	3	0.26	
Illex coindetii	2.25	81	0.21	
Ariomma bondi	1.80	34	0.17	
Sepia hierredda	1.74	3	0.17	
Fistularia petimba	1.35	6	0.13	
Saurida parri	1.07	11	0.10	
Umrina canariensis	0.67	6	0.06	
Citharus linguatula	0.34	6	0.03	
Priacanthus arenatus	0.28	3	0.03	
Bolinus brandaris	0.17	3	0.02	
Uranoscopus albesca	0.11	3	0.01	
LOVENIIDAE	0.05	3	0.01	
Selene dorsalis	0.01	6	0.00	
Total	1053.63		100.09	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 93  
 DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 5.56 start stop duration Lon W  
 3° 41.77  
 TIME : 17:22:27 17:52:26 30.0 (min) Purpose : 3  
 LOG : 1355.76 1357.10 1.3 Region : 2500  
 FDEPTH: 48 46 Gear cond.: 0  
 BDEPTH: 48 46 Validity : 0  
 Towing dir: 0° Wire out : 150 m Speed : 2.7 kn  
 Sorted : 45 Total catch: 265.00 Catch/hour: 530.18

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
273	204.00	22670	38.48	
275	105.75	3135	19.95	
CORALLINALES				
Sepia officinalis	37.68	0	7.11	
Pagellus bellottii	33.51	84	6.32	
274	33.33	568	6.29	
Epinephelus aeneus	28.17	4	5.31	
J E L L Y F I S H	22.50	300	4.24	
Sphyraena guachancho	11.42	670	2.15	
Pseudupeneus prayensis	9.01	142	1.70	
Trichiurus lepturus	6.52	152	1.23	
Octopus vulgaris	3.72	2	0.70	
Raja miraletus	3.56	8	0.67	
Solitas gruvelli	3.50	244	0.66	
Lagocephalus laevis	3.00	6	0.57	
Serranus sp.	2.75	148	0.52	
Alloteuthis subulata	2.54	952	0.48	
Waste General	2.14	22	0.40	
Zeus faber	2.13	24	0.40	
Plastic	1.92	12	0.36	
Arnoglossus imperialis	1.91	402	0.36	
Fistularia petimba	1.68	18	0.32	
Illex coindetii	1.68	60	0.32	
Umrina canariensis	1.64	4	0.31	
Balistes capriscus	1.52	4	0.29	
Boops boops	1.06	32	0.20	
Dactylopterus volitans	0.88	2	0.17	
Pagrus caeruleostictus	0.85	32	0.16	
Citharus linguatula	0.42	74	0.08	
Alloteuthis africana	0.42	74	0.08	
Mustelus mustelus	0.36	2	0.07	
Priacanthus arenatus	0.32	2	0.06	
Stephanolepis hispidus	0.16	2	0.03	
Uranoscopus sp.	0.12	2	0.02	
Gorgonians	0.01	6	0.00	
Total	530.18		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 94  
 DATE : 07/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 9.14 start stop duration Lon W  
 3° 41.78  
 TIME : 18:41:28 19:11:33 30.1 (min) Purpose : 3  
 LOG : 1361.82 1363.44 1.6 Region : 2500  
 FDEPTH: 25 25 Gear cond.: 0  
 BDEPTH: 25 25 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.2 kn  
 Sorted : 1 Total catch: 121.00 Catch/hour: 241.28

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
J E L L Y F I S H	40.64	197	16.85	
Parapenaeus sp.	34.03	5003	14.10	
Pteroscion peli	20.35	841	8.43	

Galoeides decadactylus	13.48	371	5.59	
317	Brachydeuterus auritus	12.13	439	5.03
316	Sepia officinalis	10.77	18	4.46
	Pseudotolithus senegalensis	10.21	42	4.23
	Sargassum	8.05	0	3.34
	Selene dorsalis	7.75	1178	3.21
	Perulibatrachus elminensis	7.50	20	3.11
	Trachurus trecae	7.07	253	2.93
	Pomadasys perotaei	7.07	68	2.93
318	Trichiurus lepturus	6.87	469	2.85
	C R A B S	6.38	1980	2.64
	Pisodonophis semicinctus	4.83	22	2.00
	Pagrus caeruleostictus	4.38	16	1.81
	Torpedo marmorata	4.19	4	1.74
	Pomadasys jubelini	3.71	6	1.54
314	Sepiella ornata	2.52	134	1.04
	Raja miraletus	2.51	20	1.04
	Solitas gruvelli	2.36	50	0.98
	Chloroscombrus chrysurus	2.36	1178	0.98
	Cynoglossus senegalensis	2.36	16	0.98
	Sardinella maderensis	2.02	50	0.84
315	Gerres nigri	1.34	16	0.56
	Cynoglossus canariensis	1.09	18	0.45
	Sphyraena guachancho	1.08	4	0.45
	G A S T R O P O D S	1.06	235	0.44
	Trachinocephalus myops	1.01	16	0.42
	Sepia sp	1.01	688	0.42
	Lagocephalus laevis	0.96	14	0.40
	Sea urchins (strong spines)	0.94	50	0.39
	ANTENNARIIDAE	0.84	34	0.35
	Philine sp.	0.84	16	0.35
	Perulibatrachus sp.	0.84	50	0.35
	Panulirus sp.	0.84	4	0.35
	Cynoponticus ferox	0.80	6	0.33
	PAGUROIDEA	0.68	2	0.28
	Ilisha africana	0.67	185	0.28
	Calappa sp.	0.64	6	0.26
	Alectis alexandrinus	0.59	34	0.24
	Uranoscopus sp.	0.50	16	0.21
	Uranoscopus polli	0.44	2	0.18
	Diodon sp.	0.40	2	0.17
	Umrina canariensis	0.33	16	0.14
	Acantostichus guineensis	0.30	16	0.13
	Penaeus monodon	0.16	2	0.07
	Bolinus brandaris	0.12	2	0.05
	Plastic	0.08	10	0.03
	Callinectes sp.	0.04	2	0.02
Total		241.11		99.93

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 95  
 DATE : 08/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 0.47 start stop duration Lon W  
 3° 26.24  
 TIME : 06:06:17 06:36:43 30.4 (min) Purpose : 3  
 LOG : 1386.08 1387.79 1.7 Region : 2500  
 FDEPTH: 72 73 Gear cond.: 0  
 BDEPTH: 72 73 Validity : 0  
 Towing dir: 0° Wire out : 240 m Speed : 3.4 kn  
 Sorted : 0 Total catch: 229.26 Catch/hour: 452.04

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Selene dorsalis	108.82	659	24.07	
Saurida parri	84.92	10614	18.79	
J E L L Y F I S H	78.11	6116	17.28	
Brotula barbata	22.64	41	5.01	
Uranoscopus albesca	21.11	757	4.67	
Dentex angolensis	21.08	150	4.66	
290	Trachurus trecae	16.61	379	3.68
291	Octopus vulgaris	12.82	8	2.84
	Trichiurus lepturus	11.13	162	2.46
	Sargassum	8.96	0	1.98
	Priacanthus arenatus	8.27	0	1.83
	Pagellus bellottii	7.78	105	1.72
292	Citharus linguatula	6.31	116	1.40
	Ariomma bondi	5.89	63	1.30
	Fistularia petimba	5.17	6	1.14
	Parapenaeopsis atlantica	4.95	907	1.09
	Illex coindetii	4.42	63	0.98
	Sphyraena guachancho	3.19	4	0.71
	Pegusa lascaris	3.15	32	0.70
	Alloteuthis subulata	2.47	824	0.55
	Cymbium glans	2.33	2	0.51
	Scorpaena stephanica	2.17	8	0.48
	Branchiostegus semifasciatus	1.46	2	0.32
	Cynoponticus ferox	1.34	2	0.30
	Dactylopterus volitans	1.26	10	0.28
	Plastic	1.12	0	0.25
	Lepidotrigla cadmani	1.05	22	0.23
	Scorpaena sp.	0.63	10	0.14
	Callinectes sp.	0.58	83	0.13
	Lagocephalus laevis	0.55	2	0.12
	Ethusa sp.	0.41	124	0.09
	Geryon sp.	0.21	41	0.05
	GOBIIDAE	0.21	41	0.05
	Alloteuthis africana	0.21	41	0.05
	Spirolambus notialis	0.21	124	0.05
	PAGUROIDEA	0.17	41	0.04
	Lesueurigobius sanzi	0.17	41	0.04
	Starfish	0.17	41	0.04
	Crangon sp	0.04	41	0.01
Total		452.05		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 96  
 DATE : 08/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5° 5.05



start stop duration Lon W  
 3°24.46  
 TIME : 07:47:12 08:17:55 30.7 (min)  
 LOG : 1393.91 1395.70 1.8  
 FDEPTH: 41 41  
 BDEPTH: 41 41  
 Towing dir: 0° Wire out : 150 m  
 Sorted : 1 Total catch: 259.16

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
CORALLINALES	164.91 0	32.58
Epigonus telescopus	63.87 14	12.62
Pagellus bellottii	40.43 0	7.99
306		
Pagrus caeruleostictus	31.17 113	6.16
Selene dorsalis	29.84 55	5.90
Alectis alexandrinus	24.77 18	4.89
Saurida parri	21.60 8744	4.27
Alloteuthis subulata	20.42 0	4.03
Alloteuthis africana	18.26 4770	3.61
Lutjanus fulgens	13.91 51	2.75
305		
J E L L Y F I S H	12.77 1400	2.52
Octopus vulgaris	7.77 4	1.54
Sepia sp.	7.34 12	1.45
Pomadasy jubelini	7.03 4	1.39
307		
Raja miraletus	6.52 18	1.29
Acanthostracion quadricornis	5.74 25	1.13
Lagocephalus sp.	4.30 6	0.85
Dactylopterus volitans	3.59 8	0.71
Trachurus trecae	2.75 994	0.54
Solitas grueli	2.73 0	0.54
Trachinotus goreensis	2.27 4	0.45
Fistularia petimba	1.84 6	0.36
Caranx rhonchus	1.76 10	0.35
Pseudupeneus prayensis	1.60 20	0.32
Balistes capricus	1.17 4	0.23
Syacium micrurum	1.13 27	0.22
Sphyræna guachancho	1.13 4	0.22
Briassopsis sp	0.82 12	0.16
BALISTIÐAE	0.78 2	0.15
Citharus linguatula	0.47 18	0.09
Illex coindetii	0.43 6	0.08
Gorgonians	0.39 12	0.08
0		
Gerrus nigri	0.35 10	0.07
Arnoglossus imperialis	0.31 45	0.06
Luidia sp	0.28 16	0.06
Brachydeuterus auritus	0.27 23	0.05
Ariomma bondi	0.20 2	0.04
Plastic	0.18 12	0.03
Uranoscopus polli	0.16 2	0.03
Scorpaena stephanica	0.16 2	0.03
CIDARIDAE	0.16 10	0.03
P O L Y C H A E T A	0.10 6	0.02
CORAL	0.08 8	0.02
Torpedo torpedo	0.08 2	0.02
Serranus accraensis	0.08 10	0.02
Sepiella ornata	0.04 2	0.01
SOLEIDAE	0.04 4	0.01
Sphoeroides marmoratus	0.04 4	0.01
Coral	0.04 6	0.01
Zeus faber	0.04 4	0.01
PORIFERA (Sponges)	0.03 2	0.01
Scyllarus pygmaeus	0.01 2	0.00
Sicyonia galeata	0.01 4	0.00
Ilia spinosa	0.01 4	0.00
Spirolambus notialis	0.01 2	0.00
Stenorhynchus lanceolatus	0.00 2	0.00
Dromia sp.	0.00 2	0.00
Macropodia indetCV1	0.00 2	0.00
Total	506.17	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 97  
 DATE : 08/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°7.58 start stop duration Lon W  
 3°26.19  
 TIME : 08:59:49 09:29:30 29.7 (min)  
 LOG : 1398.95 1400.52 1.6  
 FDEPTH: 25 24  
 BDEPTH: 25 24  
 Towing dir: 0° Wire out : 120 m  
 Sorted : 38 Total catch: 280.00

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
J E L L Y F I S H	73.49 0	12.98
0		
Galeoides decadactylus	66.89 724	11.82
293		
Parapenaeopsis atlantica	60.65 8646	10.72
0		
Brachydeuterus auritus	59.35 3681	10.48
295		
CORALLINALES	36.79 0	6.50
Chloroscombrus chrysurus	35.22 4041	6.22
Trichiurus lepturus	29.46 1221	5.20
Pteroscion peli	29.25 805	5.17
Drepane africana	28.42 184	5.02
Pseudotolithus senegalensis	28.30 135	5.00
294		
Selene dorsalis	21.99 6641	3.88
Pseudotolithus typus	18.80 4	3.32
297		
Pomadasy jubelini	8.69 16	1.54
298		
Sepia hierredda	7.12 8	1.26
Nematopalaeon hastatus	5.55 7057	0.98
Cynoponticus ferus	4.65 2	0.82
Sardinella maderensis	4.27 131	0.75
296		
Sepiella ornata	4.27 164	0.75
Uranoscopus polli	4.06 61	0.72
Torpedo mackayana	3.96 10	0.70

Pseudupeneus prayensis	3.84	51	0.68
Pseudotolithus epipercus	3.63	40	0.64
0			
Lethrinus atlanticus	2.99	10	0.53
Alloteuthis africana	2.99	936	0.53
Callinectes pallidus	2.35	235	0.41
Panulirus regius	2.26	12	0.40
Sphyræna guachancho	1.92	10	0.34
Penaeus kerathurus	1.92	51	0.34
E C H I N O D E R M A T A	1.92	439	0.34
Dasyatis margarita	1.71	10	0.30
Torpedo torpedo	1.70	2	0.30
Raja miraletus	1.13	2	0.20
Cynoglossus canariensis	1.09	2	0.19
Saurida parri	0.85	265	0.15
Trachinocephalus myops	0.85	10	0.15
Scorpaena scrofa	0.81	2	0.14
Syacium micrurum	0.64	10	0.11
Portunus validus	0.48	10	0.08
Schedophilus pamarco	0.43	30	0.08
Pisodonophis cancrivorus	0.28	2	0.05
Trachinus lineolatus	0.15	10	0.03
Gorgonians	0.15	30	0.03
Luidia sp	0.12	2	0.02
G A S T R O P O D S	0.10	10	0.02
Synaptura cadenati	0.10	10	0.02
Microchirus frechkopi	0.08	10	0.02
Citharus linguatula	0.07	10	0.01
Nudi branch sp	0.06	10	0.01
BYTHIDAE	0.05	10	0.01
Alectis alexandrinus	0.04	20	0.01
Solitas grueli	0.04	10	0.01
Plastic	0.04	4	0.01
Scorpaena stephanica	0.03	10	0.01
Total	566.01	100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 98  
 DATE : 08/08/19 GEAR TYPE: BT NO: 27 POSITION: Lat N  
 5°3.19 start stop duration Lon W  
 3°5.41  
 TIME : 11:38:38 12:08:39 30.0 (min)  
 LOG : 1420.18 1421.96 1.8  
 FDEPTH: 26 25  
 BDEPTH: 26 25  
 Towing dir: 0° Wire out : 120 m  
 Sorted : 59 Total catch: 899.40

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Brachydeuterus auritus	1037.70 53690	57.71
282		
Galeoides decadactylus	314.45 54	17.49
279		
J E L L Y F I S H	103.02 0	5.73
Pomadasy perotaei	57.50 120	3.20
Selene dorsalis	29.35 8071	1.63
Sphyræna guachancho	28.75 240	1.60
Sardinella maderensis	26.36 1018	1.47
281		
Chloroscombrus chrysurus	26.36 11036	1.47
Pteroscion peli	22.16 390	1.23
Pseudotolithus senegalensis	21.43 42	1.19
278		
Trichiurus lepturus	19.77 3211	1.10
Engraulis encrasiolus	17.97 0	1.00
276		
Pagellus bellottii	13.18 90	0.73
284		
Dentex canariensis	9.58 60	0.53
286		
Alectis alexandrinus	9.58 240	0.53
Parapenaeopsis atlantica	6.59 330	0.37
Drepane africana	6.32 14	0.35
Sardinella aurita	4.19 90	0.23
280		
Ephippion guttifer	4.00 2	0.22
Raja miraletus	3.84 8	0.21
Pomadasy incisus	3.59 30	0.20
283		
Dentex gibbosus	3.59 60	0.20
Balistes punctatus	2.88 4	0.16
Ilisha africana	2.70 60	0.15
Sepia hierredda	2.68 4	0.15
Cynoglossus canariensis	2.64 4	0.15
Pseudupeneus prayensis	2.40 30	0.13
Trachurus trecae	2.40 630	0.13
277		
Trachinocephalus myops	2.10 30	0.12
Pagrus caeruleostictus	1.80 30	0.10
C R A B S	1.80 90	0.10
Balistes capricus	1.60 2	0.09
Gorgonians	1.50 30	0.08
Trachinus lineolatus	1.38 30	0.08
Alloteuthis africana	1.20 330	0.07
E C H I N O D E R M A T A	1.20 30	0.07
Lutjanus fulgens	0.60 30	0.03
285		
Plastic	0.20 0	0.01
Total	1798.33	100.01

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 99  
 DATE : 08/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°55.09 start stop duration Lon W  
 3°7.67  
 TIME : 14:26:10 14:56:11 30.0 (min)  
 LOG : 1433.53 1435.17 1.6  
 FDEPTH: 71 71  
 BDEPTH: 71 71  
 Towing dir: 0° Wire out : 230 m  
 Sorted : 32 Total catch: 262.73

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	

		327.77	12880	62.38
Arionma bondi		327.77	12880	62.38
Pagellus bellottii		26.96	406	5.13
301				
Dentex canariensis		22.09	32	4.20
Selene dorsalis		12.99	64	2.47
Priacanthus arenatus		12.67	64	2.41
J E L L Y F I S H		11.37	0	2.16
Lepidotrigla cadmani		11.37	358	2.16
Balistes punctatus		11.04	16	2.10
Pseudupeneus prayensis		9.42	162	1.79
Boops boops		7.47	82	1.42
Scomber colias		7.47	292	1.42
303				
Sepia hierredda		5.85	212	1.11
Brissidae		5.85	98	1.11
Trachurus trecae		5.52	162	1.05
304				
Solitas gruveli		5.52	228	1.05
Zeus faber		5.52	16	1.05
Caranx rhonchus		3.57	16	0.68
Saurida parri		3.25	520	0.62
Pegusa lascaris		3.25	178	0.62
Serranus accraensis		2.92	82	0.56
Alloteuthis subulata		2.27	520	0.43
Citharus linguatula		2.27	114	0.43
Sargassum		2.27	0	0.43
Lagocephalus laevigatus		2.27	32	0.43
Octopus vulgaris		2.24	4	0.43
Brotula barbata		1.88	6	0.36
Mustelus mustelus		1.80	2	0.34
Trichurus lepturus		1.36	2	0.26
Arnoglossus imperialis		1.30	212	0.25
Dentex angolensis		0.97	32	0.19
302				
Fistularia petimba		0.97	32	0.19
CORALLINALES		0.97	0	0.19
Illex coindetii		0.65	32	0.12
Microrhynchus frechkopi		0.65	0	0.12
Caryophyllia sp.		0.49	16	0.09
PAGUROIDEA		0.32	64	0.06
Medorippe lanata		0.31	16	0.06
Echinidae sp.		0.19	64	0.04
Macropus rugosus		0.18	16	0.03
Philine sp.		0.08	32	0.02
Plastic		0.04	0	0.01
Astropecten irregularis		0.03	16	0.01
Aegaeon lacazei		0.02	16	0.00
Total		525.45		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 100  
DATE : 08/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 50.19 start stop duration Lon W  
2° 53.88  
TIME : 16:25:55 16:56:07 30.2 (min) Purpose : 3  
LOG : 1448.16 1449.85 1.7 Region : 2600  
FDEPTH: 74 73 Gear cond.: 0  
BDEPTH: 74 73 Validity : 0  
Towing dir: 0° Wire out : 230 m Speed : 3.4 kn  
Sorted : 1 Total catch: 69.76 Catch/hour: 138.64

SPECIES	CATCH/HOUR	% OF TOT.
J E L L Y F I S H	65.44	4034
Dentex angolensis	13.75	12
288		
Brotula barbata	10.81	16
Octopus vulgaris	10.26	6
Umbriina canariensis	5.76	38
Sphyraena guachancho	3.90	12
Arionma bondi	3.82	66
Priacanthus arenatus	3.14	38
Pagellus bellottii	2.74	48
287		
Zeus faber	2.35	10
Fistularia petimba	2.23	16
Citharus linguatula	2.03	46
Alloteuthis subulata	1.87	541
Trachurus trecae	1.87	44
289		
Lepidotrigla cadmani	1.31	48
Branchiostegus semifasciatus	1.27	2
Sepia hierredda	1.23	26
Illex coindetii	0.95	14
Scorpaena stephanica	0.91	6
Dead shells	0.75	0
HIMANTOLOPHIDAE	0.68	2
Pegusa lascaris	0.32	4
Uranoscopus albesca	0.24	2
Brisingiidae	0.23	22
Solitas gruveli	0.20	4
PAGURIDAE	0.11	22
Fishing gears	0.09	44
Prognathodes marcellae	0.08	2
S H R I M P S	0.07	22
Saurida parri	0.05	22
Calappa pelii	0.04	2
Sphoeroides pachygaster	0.04	4
Brachydeuterus auritus	0.03	2
Physiculus cf huloti	0.02	2
Arnoglossus imperialis	0.02	2
G A S T R O P O D S	0.02	2
Spionolambus notialis	0.02	44
Aegaeon lacazei	0.02	22
Pseudomyrmbizi	0.02	22
CORAL	0.01	2
Plastic	0.01	2
C R A B S	0.01	2
Selene dorsalis	0.00	4
Total	138.72	100.06

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 101  
DATE : 08/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 56.34 start stop duration Lon W  
2° 49.76

TIME	17:59:02	18:30:32	31.5 (min)	Purpose	: 3
LOG	: 1457.60	1459.19	1.6	Region	: 2600
FDEPTH:	45	43		Gear cond.:	0
BDEPTH:	45	43		Validity:	0
Towing dir:	0°	Wire out	: 150 m	Speed	: 3.0 kn
Sorted	: 51	Total catch:	630.00	Catch/hour:	1200.00
SPECIES		CATCH/HOUR	% OF TOT.		
C SAMP		weight	numbers		
Brachydeuterus auritus		534.44	39288	44.54	
308					
CORALLINALES		343.79	0	28.65	
Trachurus trecae		86.82	0	7.23	
312					
Sphyraena guachancho		55.27	265	4.61	
0					
Chloroscombrus chrysurus		29.23	5	2.44	
Sardinella aurita		19.20	392	1.60	
310					
Sepia officinalis		17.14	116	1.43	
Saurida parri		11.34	2465	0.95	
Pagellus bellottii		10.84	190	0.90	
309					
Boops boops		8.73	196	0.73	
Solitas gruveli		8.73	392	0.73	
Serranus accraensis		5.24	175	0.44	
Raja macleoti		5.03	13	0.42	
Cymbium glans		4.69	11	0.39	
Actinoptilum		4.37	78	0.36	
Pseudupeneus prayensis		4.36	109	0.36	
Sepia hierredda		4.08	11	0.34	
Lagocephalus laevigatus		3.93	23	0.33	
0					
J E L L Y F I S H		3.77	4	0.31	
Caranx rhonchus		3.49	261	0.29	
Epinephelus aeneus		3.47	8	0.29	
Syacium micrum		3.36	90	0.28	
0					
Unidentifed urchin		3.16	42	0.26	
Fistularia petimba		3.02	29	0.25	
CIDARIDAE		2.67	38	0.22	
Priacanthus arenatus		2.59	15	0.22	
PAGUROIDEA		2.59	15	0.22	
Dactylopterus volitans		2.02	6	0.17	
Alloteuthis subulata		1.74	436	0.15	
Pagrus caeruleostictus		1.33	2	0.11	
Illex coindetii		1.31	21	0.11	
Galeodes decadactylus		1.31	21	0.11	
313					
Alloteuthis africana		1.31	328	0.11	
Arnoglossus imperialis		1.14	415	0.09	
Sardinella maderensis		0.87	44	0.07	
311					
Citharus linguatula		0.87	44	0.07	
Brissopsis sp		0.68	21	0.06	
Mustelus mustelus		0.46	2	0.04	
Medorippe lanata		0.39	44	0.03	
SOLEIDAE		0.37	21	0.03	
Spionolambus notialis		0.28	109	0.02	
Sargassum		0.26	0	0.02	
Lepidotrigla cadmani		0.24	44	0.02	
Anthias anthias		0.09	21	0.01	
UNIDENTIFIED FISH		0.01	21	0.00	
Total		1200.00		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 102  
DATE : 09/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 47.14 start stop duration Lon W  
2° 38.32  
TIME : 08:58:48 09:28:50 30.0 (min) Purpose : 3  
LOG : 1546.73 1548.37 1.6 Region : 2600  
FDEPTH: 66 65 Gear cond.: 0  
BDEPTH: 66 65 Validity : 0  
Towing dir: 0° Wire out : 200 m Speed : 3.3 kn  
Sorted : 0 Total catch: 379.64 Catch/hour: 758.27

SPECIES	CATCH/HOUR	% OF TOT.
Caranx rhonchus	459.46	30489
Scomber colias	115.39	2822
324		
Trachurus trecae	34.53	1095
327		
Epinephelus aeneus	21.93	8
Sardinella aurita	18.95	969
326		
CORALLINALES	14.32	0
J E L L Y F I S H	10.11	1011
Saurida parri	9.27	1558
Alloteuthis subulata	8.84	7013
Priacanthus arenatus	8.27	60
Pagellus bellottii	5.61	86
325		
Arionma bondi	5.47	232
Solitas gruveli	5.47	232
Octopus vulgaris	4.95	2
Sepia officinalis	4.75	10
Illex coindetii	4.37	66
0		
Lepidotrigla cadmani	3.79	126
Pseudupeneus prayensis	2.53	42
Zeus faber	2.00	8
Alloteuthis africana	1.90	210
Fistularia petimba	1.72	30
0		
Brisingiidae	1.47	106
Trichurus lepturus	1.36	2
Citharus linguatula	1.26	126
Arnoglossus imperialis	1.26	168
Syacium micrum	1.26	358
Serranus accraensis	1.26	42
Dicologlossa hexophthalma	1.26	22
Sepia hierredda	1.26	126
Lagocephalus laevigatus	1.00	4
PAGUROIDEA	0.88	126
Sphyraena guachancho	0.64	2

Actinoptilum	0.25	126	0.03
Scorpaena stephani ca	0.21	22	0.03
E C H I N O D E R M A T A	0.19	84	0.03
Sphoeroides pachygaster	0.17	22	0.02
Sargassum	0.17	22	0.02
P O L Y C H A E T A	0.15	64	0.02
Holothuria sp.	0.15	64	0.02
Macropodia indetCV1	0.11	22	0.01
Fishing gears	0.08	68	0.01
Gorgonians	0.06	296	0.01
Crinoida	0.04	106	0.01
Philine sp.	0.04	22	0.01
Plastic	0.04	0	0.01
G A S T R O P O D S	0.02	22	0.00
Scyllarus pygmaeus	0.02	22	0.00
Total	758.28		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 103  
DATE : 09/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 51.34

start	stop	duration	Lon	W
2° 32.41				
TIME : 10:32:22	11:02:21	30.0 (min)		
LOG : 1555.30	1556.99	1.7	Purpose : 3	Region : 2600
FDEPTH: 47	46		Gear cond.: 0	
BDEPTH: 47	46		Validity : 0	
Towing dir: 0°	Wire out : 160 m		Speed : 3.4 kn	
Sorted : 34	Total catch: 297.52		Catch/hour: 595.44	

SPECIES CATCH/HOUR % OF TOT.

C SAMP	weight	numbers	
CORALLINALES	203.54	0	34.18
Trachurus trecae	103.25	11382	17.34
328 Dentex canariensis	37.06	106	6.22
331 Pagellus bellottii	34.69	416	5.83
494 Dentex gibbosus	32.96	126	5.54
Pagrus caeruleostictus	30.02	252	5.04
Umbri na canariensis	26.23	100	4.40
J E L L Y F I S H	13.47	0	2.26
Apogon affinis	12.03	2686	2.02
Octopus vulgaris	11.73	8	1.97
Lagocephalus laevigatus	10.88	20	1.83
Pseudupeneus prayensis	10.42	138	1.75
Mustelus mustelus	10.13	4	1.70
Epinephelus aeneus	6.14	10	1.03
335 Sepia hierredda	5.20	88	0.87
Aluterus heudelotii	5.12	10	0.86
Fistularia petimba	4.70	62	0.79
Panulirus regius	3.44	12	0.58
Raja miraletus	2.68	4	0.45
Balistes punctatus	2.56	10	0.43
Priacanthus arenatus	2.20	8	0.37
Lutjanus fulgens	2.06	12	0.35
333 Acanthostracion quadricornis	2.06	12	0.35
Luidia sp	1.99	124	0.33
Solitas gruvelli	1.98	108	0.33
Sardinella aurita	1.80	116	0.30
329 Alloteuthis africana	1.62	44	0.27
Saurida parri	1.44	278	0.24
MURICIDAE	1.27	8	0.21
Syacium sp.	1.26	0	0.21
Sphyræna guachancho	1.20	4	0.20
Chaetodon robustus	1.20	2	0.17
Gorgonians	1.02	1747	0.17
Citharus linguatula	0.90	62	0.15
Engraulis encrasi colus	0.72	108	0.12
330 Arnoglossus imperialis	0.72	108	0.12
Actinoptilum	0.72	36	0.12
Alectis alexandrinus	0.64	2	0.11
STICHOPODIDAE	0.59	8	0.10
G A S T R O P O D S	0.57	8	0.10
LABRIDAE	0.39	8	0.07
Serranus accraensis	0.36	18	0.06
C R A B S	0.32	322	0.05
Astropecten sp.	0.22	18	0.04
Boops boops	0.22	26	0.04
Scomber colias	0.21	8	0.04
332 Chromis limbata	0.20	8	0.03
Brisingiidae	0.19	18	0.03
GOBIIDAE	0.18	54	0.03
Scleractinia	0.17	0	0.03
Scyllarides delfosii	0.16	2	0.03
Fishing gears	0.16	2	0.03
P O L Y C H A E T A	0.14	18	0.02
Hippocampus sp.	0.12	8	0.02
Spionambus notialis	0.06	18	0.01
Zeus faber	0.05	8	0.01
Lophodes kempii	0.04	8	0.01
Sargassum	0.03	0	0.00
Henricia sp	0.03	8	0.00
Medorippe lanata	0.02	8	0.00
E C H I N O D E R M A T A	0.01	8	0.00
Total	595.46		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 104  
DATE : 09/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 54.71

start	stop	duration	Lon	W
2° 26.55				
TIME : 12:07:39	12:37:36	29.9 (min)	Purpose : 3	Region : 2600
LOG : 1563.13	1564.81	1.7	Gear cond.: 0	
FDEPTH: 25	24		Validity : 0	
BDEPTH: 25	24		Speed : 3.4 kn	
Towing dir: 0°	Wire out : 120 m		Catch/hour: 860.96	
Sorted : 67	Total catch: 429.62			

SPECIES CATCH/HOUR % OF TOT.

C SAMP

	weight	numbers	
J E L L Y F I S H	231.24	0	26.86
Drepane africana	133.25	495	15.48
Engraulis encrasi colus	133.11	29311	15.46
336 Ilisha africana	97.41	14611	11.31
Galeoides decadactylus	81.78	920	9.50
337 Balistes punctatus	20.31	24	2.36
Polydactylus quadrifilis	18.68	2	2.17
Trachurus trecae	16.32	1377	1.90
338 Selene dorsalis	15.30	5992	1.78
Trichurus lepturus	12.68	1657	1.47
Ephippion guttifer	12.67	6	1.47
Sepia hierredda	11.89	12	1.38
Aluterus monoceros	10.34	8	1.20
Pagrus caeruleostictus	8.92	12	1.04
Chloroscombrus chrysurus	8.16	3836	0.95
Sardinella maderensis	7.65	357	0.89

	weight	numbers	
339 Pteroscion peli	5.61	204	0.65
Umbri na canariensis	5.36	52	0.62
Parapenaeus longirostris	4.59	459	0.53
Cynoglossus canariensis	3.47	12	0.40
Sphyræna guachancho	3.30	148	0.38
Brachydeuterus auritus	3.06	102	0.36
340 Penaeus notialis	3.06	255	0.36
Sepiella ornata	2.55	128	0.30
Eucinostomus melanopterus	2.55	26	0.30
Alectis alexandrinus	1.53	26	0.18
Sargassum	1.05	0	0.12
Sardinella aurita	1.02	152	0.12
341 Plastic	0.84	24	0.10
Maja brachydactyla	0.66	102	0.08
Scomber colias	0.51	50	0.06
342 Alloteuthis africana	0.51	281	0.06
Uranoscopus polli	0.51	26	0.06
Callinectes pallidus	0.41	152	0.05
Raja miraletus	0.32	2	0.04
Epinephelus aeneus	0.28	26	0.03
343 Fishing gears	0.04	2	0.00
Sea urchin	0.03	26	0.00
Total	860.95		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 105  
DATE : 09/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 50.45

start	stop	duration	Lon	W
2° 18.66				
TIME : 13:43:33	13:54:04	10.5 (min)	Purpose : 3	Region : 2600
LOG : 1572.13	1572.72	0.6	Gear cond.: 0	
FDEPTH: 28	28		Validity : 5	
BDEPTH: 28	28		Speed : 3.4 kn	
Towing dir: 0°	Wire out : 120 m		Catch/hour: 0.00	
Sorted : 0	Total catch: 0.00			

SPECIES CATCH/HOUR % OF TOT.

C SAMP	weight	numbers	
NOCATCH	0.00	0	0.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 106  
DATE : 09/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
4° 48.23

start	stop	duration	Lon	W
2° 18.51				
TIME : 14:58:26	15:29:26	31.0 (min)	Purpose : 3	Region : 2600
LOG : 1576.56	1578.43	1.9	Gear cond.: 0	
FDEPTH: 41	43		Validity : 0	
BDEPTH: 41	43		Speed : 3.6 kn	
Towing dir: 0°	Wire out : 150 m		Catch/hour: 3192.52	
Sorted : 111	Total catch: 1650.00			

SPECIES CATCH/HOUR % OF TOT.

C SAMP	weight	numbers	
Trichurus lepturus	2708.56	50604	84.84
Brachydeuterus auritus	187.80	2854	5.88
345 Pseudotolithus senegalensis	123.30	342	3.86
344 J E L L Y F I S H	46.24	342	1.45
Pteroscion peli	41.10	1113	1.29
Cynoponticus ferox	40.84	31	1.28
Schedophilus pemarko	8.56	29	0.27
Parapenaeus longirostris	7.42	1797	0.23
Nephtidae sp	5.99	1484	0.19
Cynoglossus canariensis	5.71	58	0.18
Ilisha africana	2.85	58	0.09
Cardium sp.	2.43	29	0.08
Penaeus notialis	2.28	199	0.07
G A S T R O P O D S	2.28	313	0.07
Umbri na canariensis	2.28	58	0.07
Lagocephalus laevigatus	1.14	29	0.04
Selene dorsalis	0.80	313	0.03
Alloteuthis africana	0.77	228	0.02
Plastic	0.62	39	0.02
Perulibatrachus elminensis	0.54	58	0.02
Syacium micrurum	0.29	29	0.01
Uranoscopus polli	0.23	58	0.01
Nudibranch sp	0.20	58	0.01
Saurida parri	0.17	29	0.01
RANINIDAE	0.11	29	0.00
Total	3192.52		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 107  
DATE : 09/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
4° 42.14

start	stop	duration	Lon	W
2° 20.41				

TIME : 16:37:47 17:07:05 29.3 (min)  
 LOG : 1585.73 1587.38 1.6  
 FDEPTH: 65 67  
 BDEPTH: 65 67  
 Towing dir: 0° Wire out : 150 m  
 Sorted : 0 Total catch: 345.42

Purpose : 3  
 Region : 2600  
 Gear cond.: 0  
 Validity : 0  
 Speed : 3.4 kn  
 Catch/hour: 707.34

C R A B S  
 Spinelambrus notialis 0.01 6 0.00  
 0.01 6 0.00  
 Total 245.06 100.00

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Chloroscombrus chrysurus	465.40 831	65.79
Eretmochelys imbricata	81.91 0	11.58
Selene dorsalis	43.71 154	6.18
Umbri na canariensis	16.39 55	2.32
Epinephelus aeneus	11.71 4	1.66
Pagellus bellottii	11.37 252	1.61
347		
Mustelus mustelus	10.12 2	1.43
Caranx rhonchus	10.05 842	1.42
Ariomma bondi	7.87 121	1.11
Fistularia petimba	6.56 10	0.93
J E L L Y F I S H	6.34 524	0.90
Pseudupeneus prayensis	4.78 55	0.68
Alloteuthis subulata	4.15 1376	0.59
Zeus faber	4.15 23	0.59
Lepidotrigla cadmani	3.06 109	0.43
Boops boops	2.84 33	0.40
Priacanthus arenatus	2.62 23	0.37
Dentex angolensis	2.51 76	0.36
346		
Trichurus lepturus	2.40 88	0.34
Saurida parri	2.40 502	0.34
Brotula barbata	2.18 10	0.31
Illex coindetii	0.87 10	0.12
Brisingiidae	0.77 23	0.11
Nephtyidae	0.49 285	0.07
Apogon affinis	0.32 131	0.04
Parapenaeopsis atlantica	0.32 43	0.04
Squilla mantis	0.25 10	0.04
Serranus accraensis	0.24 10	0.03
Solitas gruvelli	0.22 10	0.03
Alloteuthis africana	0.22 88	0.03
Gobiidae	0.21 33	0.03
Syacium micrurum	0.17 33	0.02
Plastic	0.16 23	0.02
Citharus linguatula	0.14 10	0.02
Pennatulacea	0.11 23	0.02
PAGUROIDEA	0.08 20	0.01
0		
Sargassum	0.08 0	0.01
Caryophyllia sp.	0.08 20	0.01
0		
Scyllarus pygmaeus	0.04 10	0.01
Calappa sp.	0.04 10	0.01
Spinelambrus notialis	0.01 10	0.00
Total	707.34	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 108  
 DATE : 09/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 4°37.22 start stop duration Lon W  
 2°8.46  
 TIME : 18:26:12 18:55:48 29.6 (min) Purpose : 3  
 LOG : 1598.69 1600.39 1.7 Region : 2600  
 FDEPTH: 68 70 Gear cond.: 0  
 BDEPTH: 68 70 Validity : 0  
 Towing dir: 0° Wire out : 230 m Speed : 3.4 kn  
 Sorted : 1 Total catch: 120.94 Catch/hour: 245.07

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Ariomma bondi	49.04 705	20.01
Saurida sp.	44.42 6940	18.12
Priacanthus arenatus	22.27 296	9.09
Brotula barbata	22.03 47	8.99
Pegusa lascaris	16.46 172	6.72
Pagellus bellottii	12.91 231	5.27
Gobiidae	10.78 1611	4.40
Parapenaeopsis atlantica	6.28 1256	2.56
Citharus linguatula	5.93 184	2.42
Trichurus lepturus	5.09 101	2.08
Sepia hierredda	5.09 142	2.08
Dentex angolensis	4.49 24	1.83
321		
Trachurus trecae	4.03 142	1.64
322		
Caranx rhonchus	3.91 213	1.60
Benthesedon sp.	3.89 6	1.59
Engraulis encrasiolus	3.43 338	1.40
320		
Chloroscombrus chrysurus	3.32 24	1.35
Alloteuthis sp.	3.08 853	1.26
Lepidotrigla cadmani	2.61 71	1.06
J E L L Y F I S H	2.13 201	0.87
Solitas gruvelli	1.89 36	0.77
Perulibatrachus sp.	1.78 18	0.73
Fistularia petimba	1.74 4	0.71
Lagocephalus laevigatus	1.66 2	0.68
Scomber colias	1.07 24	0.43
323		
Uranoscopus albesca	1.07 24	0.43
Dactylopterus volitans	0.95 6	0.39
Illex coindetii	0.83 12	0.34
Epinephelus aeneus	0.69 2	0.28
G A S T R O P O D S	0.50 521	0.20
Boops boops	0.35 6	0.14
Spherooides pachygaster	0.35 30	0.14
Serranus accraensis	0.24 6	0.10
PAGUROIDEA	0.17 107	0.07
Ilia spinosa	0.15 12	0.06
Medorippe lanata	0.10 6	0.04
NEPHROPTERIDAE	0.09 12	0.04
UNIDENTIFIED FISH	0.06 18	0.03
Unidentified	0.06 12	0.02
Zeus faber	0.05 6	0.02
P O L Y C H A E T A	0.02 6	0.01
Sargassum	0.02 6	0.01
Waste General	0.02 6	0.01

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 109  
 DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°40.68 start stop duration Lon W  
 1°34.42  
 TIME : 05:44:51 06:14:42 29.8 (min) Purpose : 3  
 LOG : 1667.23 1668.86 1.6 Region : 2600  
 FDEPTH: 48 48 Gear cond.: 0  
 BDEPTH: 48 48 Validity : 0  
 Towing dir: 0° Wire out : 170 m Speed : 3.3 kn  
 Sorted : 1 Total catch: 246.50 Catch/hour: 495.64

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Dentex gibbosus	110.37 205	22.27
Lutjanus fulgens	75.32 127	15.20
367		
Pagrus caeruleostictus	44.27 157	8.93
Pagellus bellottii	41.04 354	8.28
366		
Acanthurus monroviae	34.18 32	6.90
Pseudupeneus prayensis	33.00 394	6.66
Apsilus fuscus	24.49 56	4.94
Pomadasys incisus	23.71 209	4.78
368		
Epinephelus aeneus	11.38 4	2.30
Acanthostracion quadricornis	10.25 36	2.07
Fistularia petimba	6.80 44	1.37
Trachurus trecae	4.95 384	1.00
371		
Alloteuthis subulata	4.84 368	0.98
Torpedo torpedo	4.42 8	0.89
Pomadasys jubelini	4.26 2	0.86
369		
Raja miraletus	3.70 6	0.75
Trachinocephalus myops	3.39 36	0.68
J E L L Y F I S H	3.15 38	0.64
Lepidotrigla cadmani	3.14 28	0.63
Bodianus speciosus	2.90 2	0.58
Uranoscopus polli	2.63 16	0.53
ECHINOMETRIDAE	2.49 92	0.50
GORGONOCEPHALIDAE	2.34 46	0.47
Armoglossus imperialis	2.20 241	0.44
Syacium micrurum	1.97 22	0.40
Lutjanus sp.	1.69 4	0.34
Sepia hierredda	1.49 2	0.30
Citharus linguatula	1.48 24	0.30
Serranus accraensis	1.43 10	0.29
Balistes punctatus	1.33 2	0.27
Astropecten irregularis	1.23 18	0.25
Balistes capricus	1.17 4	0.24
Caranx rhonchus	1.14 32	0.23
Bothus podas	1.03 40	0.21
Paraconger notialis	1.03 4	0.21
Trichurus lepturus	1.01 2	0.20
Engraulis encrasiolus	0.99 10	0.20
Solitas gruvelli	0.90 34	0.18
Sphyrna guachancho	0.88 4	0.18
Brachydeuterus auritus	0.88 28	0.18
370		
Prognathodes marcellae	0.80 12	0.16
Lutjanus sp.	0.77 12	0.16
Syacium guineensis	0.77 66	0.16
Spicularia nigricauda	0.64 2	0.13
Saurida parri	0.55 99	0.11
OSTREIDAE	0.40 4	0.08
Stephanolepis hispidus	0.36 2	0.07
Apogon affinis	0.33 88	0.07
PAGUROIDEA	0.24 14	0.05
Schedophilus pamarco	0.17 2	0.03
Gorgonius	0.14 60	0.03
Starfish	0.12 2	0.02
Cardium sp.	0.11 6	0.02
Euaxocephalus sp.	0.10 2	0.02
Waste General	0.09 28	0.02
Fishing gears	0.09 6	0.02
Brisopsis sp.	0.08 2	0.02
Sepiella ornata	0.05 2	0.01
Scyllarus pygmaeus	0.05 22	0.01
Squilla mantis	0.04 2	0.01
Calappa rubroguttata	0.02 2	0.00
Spinelambrus notialis	0.01 2	0.00
Stenorhynchus lanceolatus	0.01 2	0.00
Total	484.79	97.81

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 110  
 DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°55.59 start stop duration Lon W  
 1°35.24  
 TIME : 09:08:25 09:30:33 22.1 (min) Purpose : 3  
 LOG : 1688.21 1689.49 1.3 Region : 2600  
 FDEPTH: 26 25 Gear cond.: 0  
 BDEPTH: 26 25 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.5 kn  
 Sorted : 0 Total catch: 120.00 Catch/hour: 325.35

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
	weight numbers	
Chloroscombrus chrysurus	95.01 10262	29.20
Ilisha africana	35.64 3351	10.96
Sepiella ornata	33.83 2920	10.40
0		
Trichurus lepturus	31.94 1497	9.82
0		
Turritella	19.62 16349	6.03
Selene dorsalis	18.31 5165	5.63
CANIDAE	13.08 10921	4.02
B I V A L V E S	11.77 8437	3.62
Pentacnemus quinquarius	11.14 588	3.42
Pisodonophis semicinctus	9.87 62	3.03

SEPIIDAE	6.24	19	1.92			Zeus faber	6.22	32	0.21
Pseudolithus typus	6.00	106	1.84			Stephanolepis hispidus	5.13	32	0.17
J E L L Y F I S H	4.93	160	1.51			Sardinella maderensis	4.77	2220	0.16
Pteroscion peli	4.20	325	1.29						
S H R I M P S	3.92	1635	1.21			358 Saurida parri	4.43	443	0.15
Alloteuthis africana	2.62	981	0.80			Citharus linguatula	3.85	193	0.13
Plastic	2.36	65	0.72			Pagellus bellottii	3.85	64	0.13
Parapenaeus longirostris	2.36	1982	0.72			354 Pseudopenaeus prayensis	3.21	32	0.11
Drepane africana	1.93	54	0.59			Actinoptilum	2.60	32	0.09
Sphyræna guachancho	1.71	22	0.53			Syacium micrum	1.93	32	0.07
Galeoides decadactylus	1.50	54	0.46			Alloteuthis africana	1.22	221	0.04
Calappa rubroguttata	1.07	11	0.33			Sepiella ornata	0.74	32	0.02
Batrachoides sp.	1.07	22	0.33			NATCIDAE	0.48	32	0.02
Maja brachydactyla	0.72	54	0.22			Scyllarus pygmaeus	0.44	110	0.01
Modiolus sp.	0.65	130	0.20						
Scomber colias	0.64	22	0.20			Total	2963.89		100.16
Pythionichthys microphthalmus	0.64	11	0.20						
Scorpaena sp.	0.59	65	0.18						
Gorgonians	0.43	43	0.13						
G A S T R O P O D S	0.39	718	0.12						
Cidaroides indetCVI	0.32	11	0.10						
Gobioides sp.	0.26	5	0.08						
Sardinella maderensis	0.21	11	0.07						
Apogon affinis	0.20	130	0.06						
Soft corals	0.13	130	0.04						
Lagocephalus laevigatus	0.07	65	0.02						
Total	325.35		100.00						

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 111  
DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 49.49 start stop duration Lon W  
1° 46.72  
TIME : 11:25:59 11:56:11 30.2 (min) Purpose : 3  
LOG : 1704.88 1706.80 1.9 Region : 2600  
FDEPTH: 26 26 Gear cond.: 0  
BDEPTH: 26 26 Validity : 0  
Towing dir: 0° Wire out : 120 m Speed : 3.8 kn  
Sorted : 65 Total catch: 1024.29 Catch/hour: 2035.02

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
Chrysaora fulgida	1050.18	51.61
Trichurus lepturus	416.88	20.49
Chrysaora africana	145.56	7.15
Ilisa africana	102.78	5.05
Chloroscombrus chrysurus	90.02	4.42
Selene dorsalis	65.76	3.23
Brachydeuterus auritus	17.24	0.85
348 Sepia hierredda	15.32	0.75
Sepiella ornata	15.32	0.75
Pseudolithus senegalensis	12.77	0.63
351 UNIDENTIFIED FISH	12.77	0.63
C R A B S	12.77	0.63
Parapenaeopsis atlantica	9.58	0.47
Sepia sp	8.94	0.44
Plastic	8.70	0.43
Sardinella maderensis	8.30	0.41
350 G A S T R O P O D S	7.85	0.39
Sphyræna guachancho	7.66	0.38
Galeoides decadactylus	6.38	0.31
349 Pteroscion peli	5.75	0.28
Unidentified	3.83	0.19
Pisodonophis cancrivorus	2.26	0.11
Soft corals	1.92	0.09
B I V A L V E S	1.92	0.09
Squilla mantis	1.28	0.06
Trachurus trecae	1.28	0.06
PAGUROIDEA	1.07	0.05
Scorpaena stephanica	0.64	0.03
Cynoglossus canariensis	0.32	0.02
Total	2035.02	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 112  
DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 43.28 start stop duration Lon W  
1° 48.66  
TIME : 13:03:08 13:33:03 29.9 (min) Purpose : 3  
LOG : 1713.57 1715.26 1.7 Region : 2600  
FDEPTH: 44 45 Gear cond.: 0  
BDEPTH: 44 45 Validity : 0  
Towing dir: 0° Wire out : 160 m Speed : 3.4 kn  
Sorted : 91 Total catch: 1475.58 Catch/hour: 2959.06

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
Brachydeuterus auritus	2362.51	79.84
355 Engraulis encrasiolus	79.71	2.69
357 Galeoides decadactylus	69.27	2.34
353 Drepane africana	64.14	2.17
Pomadasyx jubelini	55.95	1.89
352 Plastic	54.20	1.83
Raja miraletus	46.18	1.56
Trichurus lepturus	42.07	1.42
Trachurus trecae	31.00	1.05
356 J E L L Y F I S H	27.52	0.93
CORALLINALES	19.93	0.67
Sphyræna guachancho	17.96	0.61
Pagrus caeruleostictus	10.90	0.37
Solitas gruvelli	7.81	0.26
Torpedo torpedo	7.70	0.26
Ephippion guttifer	7.28	0.25
Scomber colias	7.22	0.24
Selene dorsalis	7.04	0.24
C R A B S	6.64	0.22

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 113  
DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 33.05 start stop duration Lon W  
1° 47.68  
TIME : 15:02:50 15:33:35 30.7 (min) Purpose : 3  
LOG : 1726.34 1728.15 1.8 Region : 2600  
FDEPTH: 61 60 Gear cond.: 0  
BDEPTH: 61 60 Validity : 0  
Towing dir: 0° Wire out : 200 m Speed : 3.5 kn  
Sorted : 0 Total catch: 52.73 Catch/hour: 102.92

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
Trachurus trecae	35.88	34.86
359 Pagellus bellottii	20.03	19.46
361 Octopus vulgaris	4.18	4.06
Sepia hierredda	4.13	4.02
Pseudopenaeus prayensis	3.94	3.83
Fistularia petimba	3.83	3.72
Saurida parri	3.67	3.56
Dactylopterus volitans	3.24	3.15
Arnoglossus imperialis	2.72	2.65
Solitas gruvelli	2.34	2.28
Alloteuthis sp.	2.11	2.05
Brisingiidae	1.99	1.93
STRONGYLOCENTRIDAE	1.76	1.71
Sepiella ornata	1.52	1.48
Epi nophelus aeneus	1.09	1.06
360 Zeus faber	1.05	1.02
J E L L Y F I S H	0.96	0.93
Raja miraletus	0.90	0.87
Plastic	0.86	0.83
Lepidotrigla cadmani	0.70	0.68
Alloteuthis africana	0.66	0.64
Dentex canariensis	0.51	0.49
362 Pagrus caeruleostictus	0.43	0.42
DI OGENIDAE	0.42	0.41
Citharus linguatula	0.41	0.40
Illex coindetii	0.39	0.38
Psettodes erumei	0.37	0.36
Sarda sarda	0.35	0.34
PAGUROIDEA	0.25	0.24
Lagocephalus laevigatus	0.23	0.23
Scleractinia	0.21	0.20
UNIDENTIFIED FISH	0.19	0.19
Trachinocephalus myops	0.16	0.15
Anthias anthias	0.16	0.15
Sardinella aurita	0.14	0.14
363 Boops boops	0.12	0.11
Ariomma bondi	0.11	0.10
Priacanthus arenatus	0.11	0.10
Syacium micrum	0.08	0.08
Apogon affinis	0.08	0.08
Actinoptilum	0.08	0.08
Microrhynchus frechkopi	0.08	0.08
Brachydeuterus auritus	0.04	0.04
Prognathodes marcellae	0.04	0.04
Sargassum	0.04	0.04
Serranus accraensis	0.04	0.04
Scorpaena stephanica	0.04	0.04
Microrhynchus boscani	0.03	0.03
Aphroditidae spCVI	0.03	0.03
Syngnathus acus	0.03	0.03
Hexaplex saharicus	0.02	0.02
Maja brachydactyla	0.02	0.02
Chromis cadenati	0.02	0.02
Caryophyllidae indetCVI	0.02	0.02
Engraulis encrasiolus	0.02	0.02
Boleus cornutus	0.02	0.02
Sabellidae sp	0.01	0.01
Spirolambus notialis	0.01	0.01
P O L Y C H A E T A	0.01	0.01
Luidia sp	0.01	0.01
Small crabs	0.01	0.01
Stenorhynchus lanceolatus	0.01	0.01
Gorgonians	0.01	0.01
OPHIIDIAE	0.01	0.01
Ethusa sp.	0.00	0.00
Medorippe lanata	0.00	0.00
Crinoidea	0.00	0.00
Ilia spinosa	0.00	0.00
Macropis rugosus	0.00	0.00
Ebalia sp.	0.00	0.00
Ophiuroidea	0.00	0.00
Total	102.92	100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 114  
DATE : 10/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
4° 24.09 start stop duration Lon W  
1° 44.62  
TIME : 16:56:17 17:26:31 30.2 (min) Purpose : 3  
LOG : 1737.56 1739.27 1.7 Region : 2600

FDEPTH: 75 75		Gear cond.: 0			
BDEPTH: 75 75		Validity : 0			
Towing dir: 0°		Wire out : 220 m		Speed : 3.4 kn	
Sorted : 9		Total catch: 492.82		Catch/hour: 978.14	
SPECIES		CATCH/HOUR		% OF TOT.	
C	SAMP	weight	numbers		
	Ariomma bondi	471.25	19804	48.18	
	Scomber colias	402.46	15233	41.15	
365	Alloteuthis subulata	18.18	3979	1.86	
	Pagellus bellottii	18.18	663	1.86	
364	Chromis cadenati	14.74	220	1.51	
	Pseudupeneus prayensis	7.37	99	0.75	
	Octopus vulgaris	6.83	4	0.70	
	Dentex gibbosus	5.40	14	0.55	
	Uranoscopus polli	3.44	24	0.35	
	Sargassum	3.44	0	0.35	
	Dactylopterus volitans	3.10	12	0.32	
	Syacium micrurum	2.95	836	0.30	
	Sepia hierredda	2.95	123	0.30	
	Sargocentron hastatum	2.95	24	0.30	
	Arnoglossus imperialis	2.46	343	0.25	
	ASTEROIDEA	2.11	24	0.22	
	CIDARIDAE	1.96	50	0.20	
	Zeus faber	1.79	4	0.18	
	Alloteuthis africana	1.47	196	0.15	
	Citharus linguatula	1.47	99	0.15	
	Pagrus pagrus	0.99	2	0.10	
	Saurida parri	0.98	147	0.10	
	Gorgonians	0.64	320	0.07	
0	Solitas gruvelli	0.49	24	0.05	
	Fistularia petimba	0.32	2	0.03	
	Trichurus lepturus	0.17	50	0.02	
	Ophiuroidea	0.02	24	0.00	
	Plastic	0.01	4	0.00	
Total		978.14		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 115  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°20.84 start stop duration Lon W  
 1°23.61  
 TIME : 05:30:27 05:50:39 20.2 (min) Purpose : 3  
 LOG : 1789.69 1790.81 1.1 Region : 2600  
 FDEPTH: 85 85 Gear cond.: 0  
 BDEPTH: 85 85 Validity : 0  
 Towing dir: 0° Wire out : 260 m Speed : 3.3 kn  
 Sorted : 40 Total catch: 478.59 Catch/hour: 1420.84

SPECIES		CATCH/HOUR		% OF TOT.	
C	SAMP	weight	numbers		
	Trachurus trecae	1165.07	21972	82.00	
372	J E L L Y F I S H	79.77	7241	5.61	
	Pagellus bellottii	43.38	1645	3.05	
373	Lepidotrigla cadmani	36.39	419	2.56	
	Sepia bertheloti	13.29	419	0.94	
	Raja miraletus	10.69	24	0.75	
	Trachinus pellegrini	7.70	36	0.54	
	Citharus linguatula	7.00	315	0.49	
	Illex coindetii	6.30	386	0.44	
	Sargassum	5.60	0	0.39	
	Squatina oculata	4.22	3	0.30	
	Syacium micrurum	4.20	561	0.30	
	Diocologlossa hexophthalma	3.50	104	0.25	
	Octopus vulgaris	3.09	0	0.22	
	Macropodus rugosus	2.80	36	0.20	
	Saurida parri	2.80	629	0.20	
	Uranoscopus scaber	2.80	36	0.20	
	Dactylopterus volitans	2.79	12	0.20	
	Umbriina canariensis	2.67	6	0.19	
	Cynoponticus ferox	2.66	45	0.19	
	Lagocephalus laevigatus	2.38	6	0.17	
	Pseudarchaster sp.	1.75	71	0.12	
	Microrhynchus boscani	1.40	140	0.10	
	Pagrus caeruleostictus	1.31	6	0.09	
	OPHIURIDAE	1.16	104	0.08	
	Priacanthus arenatus	1.01	6	0.07	
	Brisingiidae	0.70	36	0.05	
	Cidaridae indetCV1	0.70	71	0.05	
	Solitas gruvelli	0.70	36	0.05	
	Alloteuthis subulata	0.70	243	0.05	
	Zeus faber	0.59	3	0.04	
	Fistularia petimba	0.42	3	0.03	
	Echiniidae sp.	0.35	71	0.02	
	Gorgonians	0.10	733	0.01	
	Caryophyllia sp.	0.10	36	0.01	
	Plastic	0.07	104	0.01	
Total		1420.14		99.95	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 116  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°26.35 start stop duration Lon W  
 1°24.68  
 TIME : 07:01:53 07:32:14 30.3 (min) Purpose : 3  
 LOG : 1797.59 1799.24 1.6 Region : 2600  
 FDEPTH: 62 62 Gear cond.: 0  
 BDEPTH: 62 62 Validity : 0  
 Towing dir: 0° Wire out : 220 m Speed : 3.3 kn  
 Sorted : 38 Total catch: 181.70 Catch/hour: 359.33

SPECIES		CATCH/HOUR		% OF TOT.	
C	SAMP	weight	numbers		
	Ariomma bondi	123.12	2108	34.26	
	Caranx rhonchus	82.32	4036	22.91	
	Boops boops	32.34	688	9.00	
	Priacanthus arenatus	21.68	295	6.03	
	J E L L Y F I S H	19.30	3216	5.37	

	Pagellus bellottii	15.07	386	4.19	
375	Pseudupeneus prayensis	9.92	138	2.76	
	Scomber colias	9.56	350	2.66	
374	Trachurus trecae	7.90	156	2.20	
377	Chromis sp.	6.06	138	1.69	
	Sardinella aurita	5.33	275	1.48	
376	Dactylopterus volitans	5.17	18	1.44	
	Sepia bertheloti	3.69	79	1.03	
	Alloteuthis subulata	2.76	827	0.77	
	Trachinocephalus myops	2.21	28	0.61	
	Lepidotrigla cadmani	1.84	73	0.51	
	Brisingiidae	1.75	73	0.49	
	STRONGYLOCENTRIDAE	1.47	83	0.41	
	Solitas gruvelli	1.10	45	0.31	
	Syacium micrurum	0.98	10	0.27	
	Zeus faber	0.79	2	0.22	
	Fistularia petimba	0.74	55	0.20	
	Pagrus caeruleostictus	0.71	2	0.20	
	Astropecten irregularis	0.68	38	0.19	
	Sepia officinalis	0.55	6	0.15	
	Raja miraletus	0.47	2	0.13	
	Arnoglossus imperialis	0.40	91	0.11	
	Sargassum	0.37	0	0.10	
	Saurida parri	0.28	55	0.08	
	Luidia sp.	0.15	10	0.04	
	Brisingsis sp.	0.14	10	0.04	
	Echiniidae sp.	0.10	55	0.03	
	Citharus linguatula	0.10	10	0.03	
	Fishing gears	0.08	10	0.02	
	Pseudarchaster sp.	0.07	10	0.02	
	Microrhynchus boscani	0.04	10	0.01	
	Aphrodite pol	0.03	18	0.01	
	Pennatulacea	0.03	10	0.01	
	Plastic	0.03	10	0.01	
	Spinolambrus notialis	0.01	10	0.00	
	PAGUROIDEA	0.01	10	0.00	
Total		359.34		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 117  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°23.77 start stop duration Lon W  
 1°11.11  
 TIME : 09:39:22 10:09:43 30.3 (min) Purpose : 3  
 LOG : 1816.17 1817.85 1.7 Region : 2600  
 FDEPTH: 95 94 Gear cond.: 0  
 BDEPTH: 95 94 Validity : 0  
 Towing dir: 0° Wire out : 280 m Speed : 3.3 kn  
 Sorted : 37 Total catch: 649.94 Catch/hour: 1285.32

SPECIES		CATCH/HOUR		% OF TOT.	
C	SAMP	weight	numbers		
	Dentex angolensis	892.56	29753	69.44	
379	Ariomma bondi	150.37	5610	11.70	
	Lepidotrigla cadmani	71.46	1823	5.56	
	J E L L Y F I S H	40.94	4548	3.19	
	Mustelus mustelus	21.75	8	1.69	
	Trachurus trecae	21.59	447	1.68	
380	Metal waste	19.78	0	1.54	
	Dentex gibbosus	13.25	24	1.03	
	Scomber colias	9.68	261	0.75	
378	Sepia bertheloti	8.93	186	0.69	
	Spherooides cf. pachygaster	5.54	16	0.43	
	Illex coindetii	5.21	223	0.41	
	Waste General	3.72	38	0.29	
	Citharus linguatula	2.90	148	0.23	
	Torpedo torpedo	2.61	4	0.20	
	Seriola carpenteri	2.33	2	0.18	
	Zeus faber	2.21	8	0.17	
	Branchiostegus semifasciatus	1.74	2	0.14	
	Alloteuthis subulata	1.60	522	0.12	
	Octopus vulgaris	1.27	4	0.10	
	CIDARIDAE	1.23	38	0.10	
	Lophodes kempii	0.87	2	0.07	
	Raja miraletus	0.87	2	0.07	
	Fistularia petimba	0.71	4	0.06	
	Pagrus caeruleostictus	0.59	2	0.05	
	Plastic	0.48	38	0.04	
	Syacium micrurum	0.37	75	0.03	
	SCOMBRIDAE	0.36	2	0.03	
	Alloteuthis africana	0.19	38	0.01	
	Gorgonians	0.08	447	0.01	
	PAGUROIDEA	0.08	38	0.01	
	Sargassum	0.04	0	0.00	
Total		1285.32		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 118  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°32.41 start stop duration Lon W  
 1°4.77  
 TIME : 11:30:06 12:00:08 30.0 (min) Purpose : 3  
 LOG : 1827.81 1829.36 1.6 Region : 2600  
 FDEPTH: 58 57 Gear cond.: 0  
 BDEPTH: 58 57 Validity : 0  
 Towing dir: 0° Wire out : 170 m Speed : 3.1 kn  
 Sorted : 90 Total catch: 219.00 Catch/hour: 437.56

SPECIES		CATCH/HOUR		% OF TOT.	
C	SAMP	weight	numbers		
	Chromis cadenati	195.09	2559	44.59	
	Lutjanus fulgens	57.45	112	13.13	
383	Pseudupeneus prayensis	44.85	316	10.25	
	Pagrus caeruleostictus	29.05	98	6.84	
	Acanthurus monroviae	21.15	24	4.83	
	Dentex canariensis	18.80	42	4.30	
382					

Apsilus fuscus	12.32	42	2.81
Alloteuthis africana	11.09	3536	2.54
Seriola carpanteri	9.97	14	2.28
Lutjanus agemnes	8.43	2	1.93
Pagellus bellottii	7.14	76	1.63
381			
Bodianus speciosus	5.08	4	1.16
Sepia hierredda	3.60	18	0.82
Zeus faber	2.32	4	0.53
Chaetodon robustus	2.07	28	0.47
Dactylopterus volitans	1.65	4	0.38
Chilomycterus spinosus mauretanicus	1.03	4	0.24
Lepidotrigla cadmani	1.03	10	0.24
ECHINOMETRIDAE	0.94	4	0.22
LABRIDAE	0.86	6	0.20
Pelagia noctiluca	0.80	358	0.18
Aurelia sp	0.56	4	0.13
Starfish	0.50	32	0.12
Illex coindetii	0.28	4	0.06
Algaes	0.28	0	0.06
Scorpaena sp.	0.28	4	0.06
Sphoeroides marmoratus	0.20	4	0.05
Briissidae	0.19	0	0.04
Prognathodes marcellae	0.19	4	0.04
ASTEROIDEA	0.13	4	0.03
Xyrichtys novacula	0.12	4	0.03
Ceramaster sp.	0.06	24	0.01
Trachurus trecae	0.03	4	0.01
P O L Y C H A E T A	0.01	4	0.00
Plastic	0.00	0	0.00
Total	437.56		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 119  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°41.91 start stop duration Lon W  
 0°54.80  
 TIME : 13:40:23 14:10:30 30.1 (min) Purpose : 3  
 LOG : 1841.74 1843.32 1.6 Region : 2600  
 FDEPTH: 55 55 Gear cond.: 0  
 BDEPTH: 55 55 Validity : 0  
 Towing dir: 0° Wire out : 220 m Speed : 3.1 kn  
 Sorted : 13 Total catch: 259.64 Catch/hour: 517.38

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
Dentex congoensis		144.93	18719	28.01
ECHINOMETRIDAE		72.47	76390	14.01
Trachurus trecae		70.94	7463	13.71
385				
Sardinella aurita		66.36	4348	12.83
384				
Priacanthus arenatus		39.66	3356	7.67
Pseudupeneus prayensis		34.33	496	6.63
Pagellus bellottii		11.80	345	2.28
387				
Sepia hierredda		11.10	126	2.15
Ariomma bondi		9.92	458	1.92
Pagrus caeruleostictus		9.89	86	1.91
Alloteuthis africana		9.15	2708	1.77
ASTEROIDEA		8.39	648	1.62
Fistularia petimba		6.10	953	1.18
Dentex canariensis		3.07	8	0.59
386				
Boops boops		3.05	229	0.59
Sea urchins (strong spines)		3.05	76	0.59
Solitas gruvelli		2.29	114	0.44
Briissidae		2.29	76	0.44
Dactylopterus volitans		1.36	4	0.26
Zeus faber		1.28	2	0.25
PAGUROIDEA		1.14	191	0.22
Dentex gibbosus		1.00	2	0.19
Syacium micrum		0.76	267	0.15
Lagocephalus laevis		0.76	38	0.15
Lepidotrigla cadmani		0.76	6	0.15
Soft corals		0.38	114	0.07
Arnoglossus imperialis		0.34	76	0.07
Saurida parri		0.30	153	0.06
Plastic		0.20	0	0.04
Spicularia		0.15	38	0.03
Actinoptilum		0.15	38	0.03
Total		517.38		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 120  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°44.98 start stop duration Lon W  
 1°10.11  
 TIME : 16:15:41 16:45:46 30.1 (min) Purpose : 3  
 LOG : 1860.40 1862.19 1.8 Region : 2600  
 FDEPTH: 44 44 Gear cond.: 0  
 BDEPTH: 44 44 Validity : 0  
 Towing dir: 0° Wire out : 150 m Speed : 3.6 kn  
 Sorted : 0 Total catch: 70.99 Catch/hour: 141.66

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
Caranx rhonchus		27.54	3719	19.44
Pagellus bellottii		22.67	331	16.00
391				
Sepia sp		19.99	110	14.11
Pagrus caeruleostictus		16.24	64	11.47
Pseudupeneus prayensis		14.21	130	10.03
Lagocephalus laevis		6.62	12	4.68
Balistes caprisus		5.87	14	4.14
Fistularia petimba		4.11	100	2.90
Sphyraena guachancho		3.51	4	2.48
Epinephelus aeneus		3.03	2	2.14
Dactylopterus volitans		2.59	8	1.83
Priacanthus arenatus		2.12	14	1.49
Astropecten irregularis		1.56	130	1.10
Syacium sp.		1.48	120	1.04
Dentex gibbosus		1.32	6	0.93
Acanthostracion quadricornis		1.24	6	0.87
Trachinocephalus myops		1.16	20	0.82

Gymnothorax afer	1.04	2	0.73
Persististrombus latus	1.00	14	0.70
Lepidotrigla cadmani	0.80	12	0.56
Alloteuthis subulata	0.64	337	0.45
Saurida parri	0.52	78	0.37
Lutjanus sp	0.44	10	0.31
Solitas gruvelli	0.40	30	0.28
Ceramaster sp.	0.28	22	0.20
Fishing gears	0.24	4	0.17
Arnoglossus imperialis	0.24	32	0.17
Plastic	0.20	14	0.14
Sardinella aurita	0.18	12	0.13
392			
Citharus linguatula	0.16	10	0.11
CIDARIDAE	0.10	8	0.07
Holothuroidea	0.08	8	0.05
Alloteuthis africana	0.04	12	0.03
PAGURIDAE	0.02	4	0.02
Echiniidae sp.	0.01	10	0.01
Sicyonia galeata	0.01	4	0.01
Aphroditidae spCVI	0.01	4	0.01
Scyllarus pygmaeus	0.01	2	0.00
Illa spinosa	0.00	2	0.00
Spirolambus notialis	0.00	2	0.00
0			
Hexaplex saharicus	0.00	2	0.00
Gorgonians	0.00	2	0.00
Henricia abyssalis	0.00	2	0.00
Total	141.66		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 121  
 DATE : 11/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4°44.51 start stop duration Lon W  
 1°21.30  
 TIME : 17:54:00 18:22:43 28.7 (min) Purpose : 3  
 LOG : 1871.59 1873.22 1.6 Region : 2600  
 FDEPTH: 43 43 Gear cond.: 0  
 BDEPTH: 43 43 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3.4 kn  
 Sorted : 0 Total catch: 540.00 Catch/hour: 1128.13

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
Acanthurus monroviae		439.91	577	38.99
Caranx rhonchus		394.31	11593	34.95
Pagrus caeruleostictus		64.49	320	5.72
Dentex gibbosus		61.65	213	5.46
Aluterus monoceros		23.98	21	2.13
Priacanthus arenatus		18.47	58	1.64
Lutjanus fulgens		13.28	29	1.18
390				
LETHRINIDAE		12.69	29	1.13
Pseudupeneus prayensis		10.97	115	0.97
Soft corals		9.24	0	0.82
Pagellus bellottii		9.24	115	0.82
389				
Prognathodes marcellae		7.50	86	0.67
Sphyraena guachancho		6.27	6	0.56
Acanthostracion guineensis		6.18	27	0.55
Lutjanus goreensis		5.85	2	0.52
388				
Plectorhynchus sp.		5.10	4	0.45
Chromis cadenati		4.04	173	0.36
Rhinobatos blochii		3.72	2	0.33
Fistularia petimba		3.72	17	0.33
Balistes punctatus		3.68	10	0.33
Octopus vulgaris		3.47	2	0.31
Apsilus fuscus		3.46	58	0.31
Sphyraena marmorata		2.92	2	0.26
Aluterus heudelotii		2.92	4	0.26
Sepia hierredda		2.63	4	0.23
Uraspis secunda		2.01	2	0.18
Apogon affinis		1.73	1444	0.15
Psettodes belcheri		1.71	2	0.15
Gorgonians		0.87	40	0.08
Diodes sp.		0.63	2	0.06
Boops boops		0.58	58	0.05
Scyllarides defossi		0.46	2	0.04
Plastic		0.42	6	0.04
Total		1128.10		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 122  
 DATE : 12/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 5°3.44 start stop duration Lon W  
 1°6.55  
 TIME : 05:37:32 06:07:43 30.2 (min) Purpose : 3  
 LOG : 1905.08 1906.64 1.6 Region : 2600  
 FDEPTH: 25 27 Gear cond.: 0  
 BDEPTH: 25 27 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.1 kn  
 Sorted : 0 Total catch: 118.52 Catch/hour: 235.63

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
Brachydeuterus auritus		55.83	33089	23.69
402				
Pseudotolithus senegalensis		36.02	4	15.29
J E L L Y F I S H		29.96	320	12.72
Fishing gears		20.64	0	8.76
LIMDAE		13.48	0	5.72
Pagellus bellottii		13.00	2332	5.52
401				
Pseudupeneus prayensis		6.96	531	2.95
Trachinocephalus myops		6.82	135	2.89
Trichurus lepturus		5.23	370	2.22
Lagocephalus laevis		4.73	10	2.01
Sepia officinalis		3.98	12	1.69
Sphyraena guachancho		3.46	358	1.47
Engraulis encrasicolus		3.42	1024	1.45
400				
Dentex gibbosus		3.10	52	1.32
Galeoides decadactylus		2.94	16	1.25
404				

Decapterus rhonchus**	2.64	80	1.12
Sepia hierredda	2.31	48	0.98
0			
Metapenaeopsis miersi	2.31	1537	0.98
Aluterus monoceros	2.19	4	0.93
Epinephelus aeneus	1.95	8	0.83
Trachinus armatus	1.51	44	0.64
Pagrus caeruleostictus	1.35	40	0.57
Uranoscopus polli	1.35	16	0.57
Syacium micrurum	1.19	32	0.51
Chloroscombrus chrysurus	1.19	644	0.51
Stephanolepis hispidus	0.87	36	0.37
Gorgonians	0.64	48	0.27
Penaeus kerathurus	0.56	8	0.24
Lethrinus atlanticus	0.56	4	0.24
Chaetodipterus lippei	0.48	8	0.20
Scorpaena stephanica	0.48	16	0.20
Fistularia tabacaria	0.40	2	0.17
Plastic	0.40	16	0.17
Alloteuthis sp.	0.38	85	0.16
Penaeus notialis	0.32	8	0.13
Bothus podas	0.32	24	0.13
Trachurus trecae	0.24	4	0.10
403			
Astropecten irregularis	0.22	42	0.09
Sepia sp.	0.22	42	0.09
Solitas gruvelli	0.16	4	0.07
Calappa nitida	0.08	4	0.03
Sphaeroides cf. pachygaster	0.08	4	0.03
Cynoponticus ferax	0.08	4	0.03
Scyllarus pygmaeus	0.08	4	0.03
Alcyonacea	0.04	4	0.02
Stenorhynchus lanceolatus	0.02	4	0.01
Total	234.16		99.38

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 123  
 DATE : 12/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 4° 52. 85 start stop duration Lon W  
 1° 4. 57  
 TIME : 07: 40: 55 08: 11: 41 30. 8 (min) Purpose : 3  
 LOG : 1918. 23 1920. 08 1. 9 Region : 2600  
 FDEPTH: 38 38 Gear cond.: 0  
 BDEPTH: 38 38 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3. 6 kn  
 Sorted : 25 Total catch: 123. 87 Catch/hour: 241. 54

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
452	Brachydeuterus auritus	62.20	2991	25.75
453	Trachurus trecae	46.65	1535	19.31
454	Caranx rhonchus	41.54	16616	17.20
	Pagellus bellottii	31.74	458	13.14
	Lagocephalus laevigatus	11.50	29	4.76
	Fistularia petimba	7.72	97	3.20
	Chloroscombrus chrysurus	5.33	107	2.20
	Pseudupeneus prayensis	5.33	86	2.20
	Sepia officinalis	4.17	12	1.73
	Dentex gibbosus	4.05	74	1.68
	J E L L Y F I S H	3.97	41	1.64
	Pagrus caeruleostictus	2.98	107	1.23
	Sphyræna guachancho	2.98	148	1.23
	Dead shells	2.34	0	0.97
	Trachinocephalus myops	1.92	21	0.79
	Sepia sp	1.28	10	0.53
	Balistes capricus	1.17	6	0.48
	Alloteuthis subulata	1.06	544	0.44
	Illex coindetii	1.06	21	0.44
	Alloteuthis africana	0.85	160	0.35
	BALISTIDAE	0.43	21	0.18
	Ariomma bondi	0.43	31	0.18
	Syacium gunteri	0.32	53	0.13
	Arnoglossus imperialis	0.21	43	0.09
	Saurida parri	0.14	21	0.06
	Engraulis encrasi colus	0.11	21	0.04
399	Plastic	0.03	0	0.01
	Stenorhynchus lanceolatus	0.01	10	0.00
	Fishing gears	0.01	0	0.00
Total		241.54		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 124  
 DATE : 12/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 5° 2. 75 start stop duration Lon W  
 0° 56. 58  
 TIME : 09: 36: 26 10: 06: 34 30. 1 (min) Purpose : 3  
 LOG : 1931. 32 1933. 19 1. 9 Region : 2600  
 FDEPTH: 28 27 Gear cond.: 0  
 BDEPTH: 28 27 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3. 7 kn  
 Sorted : 35 Total catch: 199. 52 Catch/hour: 397. 32

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
405	Pagellus bellottii	63.66	498	16.02
	Chloroscombrus chrysurus	45.88	1398	11.55
	Dentex gibbosus	41.29	818	10.39
	J E L L Y F I S H	38.81	60	9.77
	Caranx rhonchus	35.18	7328	8.85
	Sardinella maderensis	27.34	6213	6.88
394	Sphyræna guachancho	24.66	1541	6.21
	Balistes capricus	17.59	76	4.43
	Pseudupeneus prayensis	16.25	171	4.09
	Pagrus caeruleostictus	15.10	106	3.80
	Dead shells	12.81	0	3.22
	Aluterus monoceros	10.50	38	2.64
	Lagocephalus laevigatus	8.64	22	2.18
406	Brachydeuterus auritus	6.31	277	1.59

Fistularia petimba	6.13	44	1.54
Alectis alexandrinus	5.16	68	1.30
Engraulis encrasi colus	5.16	1613	1.30
393			
Alloteuthis sp.	4.18	6	1.05
Balistes punctatus	3.07	4	0.77
Acanthostracion quadricornis	2.11	10	0.53
Trachinocephalus myops	1.72	20	0.43
Aluterus heudelotii	1.63	4	0.41
Lethrinus atlanticus	1.15	2	0.29
Trachurus trecae	0.96	38	0.24
408			
Alloteuthis africana	0.76	153	0.19
Sardinella aurita	0.38	10	0.10
407			
Stephanolepis hispidus	0.38	20	0.10
Solitas gruvelli	0.12	10	0.03
PAGURIDAE	0.12	58	0.03
Plastic	0.09	0	0.02
Bothus podas	0.06	10	0.01
Selene dorsalis	0.03	10	0.01
Turritella	0.03	0	0.01
Gorgonians	0.02	10	0.01
Spirolambus notialis	0.02	10	0.01
RANINIDAE	0.02	10	0.01
Total	397.32		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 125  
 DATE : 12/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 54. 77 start stop duration Lon W  
 0° 47. 73  
 TIME : 11: 42: 13 12: 12: 27 30. 2 (min) Purpose : 3  
 LOG : 1945. 86 1947. 52 1. 7 Region : 2600  
 FDEPTH: 42 42 Gear cond.: 0  
 BDEPTH: 42 42 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3. 3 kn  
 Sorted : 79 Total catch: 158. 68 Catch/hour: 314. 95

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
409	Acanthurus monroviae	56.20	89	17.84
	Pagellus bellottii	44.22	510	14.04
409	Pseudupeneus prayensis	42.82	435	13.60
	Trachurus trecae	33.08	6673	10.50
396	Lagocephalus laevigatus	20.64	24	6.55
	Pagrus caeruleostictus	16.93	413	5.37
	Alloteuthis africana	10.92	6276	3.47
	Balistes punctatus	9.58	28	3.04
	Seriola carpenteri	9.51	16	3.02
	Engraulis encrasi colus	8.93	1919	2.84
398	Dentex canariensis	7.34	62	2.33
397	Chromis cadenati	6.95	1356	2.21
	Aluterus monoceros	6.19	4	1.97
	Apsilus fuscus	6.11	1195	1.94
	Ceramaster sp.	3.97	50	1.26
	Sardinella aurita	3.97	480	1.26
395	Bodianus speciosus	3.79	8	1.20
	Luidia sp	3.64	16	1.16
	Epinephelus aeneus	3.14	4	1.00
410	Dactylopterus volitans	2.32	4	0.74
	Syacium micrurum	2.27	95	0.72
	Sphyræna sphyræna	2.16	8	0.69
	Soft corals	1.65	0	0.52
	Apogon affinis	1.32	530	0.42
	Chaetodon robustus	1.08	16	0.34
	Lutjanus fulgens	0.93	4	0.29
411	Priacanthus arenatus	0.85	4	0.27
	Plastic	0.79	0	0.25
	Stephanolepis hispidus	0.75	4	0.24
	Boops boops	0.66	248	0.21
	Rypticus saponaceus	0.54	4	0.17
	Gorgonians	0.50	50	0.16
	Sepia hierredda	0.39	16	0.12
	Acanthostracion sp.	0.36	2	0.11
	Fistularia petimba	0.31	8	0.10
	ASTEROIDEA	0.13	16	0.04
	P O L Y C H A E T A	0.02	16	0.01
Total		314.95		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 126  
 DATE : 12/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 46. 60 start stop duration Lon W  
 0° 41. 54  
 TIME : 13: 52: 39 14: 22: 52 30. 2 (min) Purpose : 3  
 LOG : 1959. 67 1961. 35 1. 7 Region : 2600  
 FDEPTH: 78 75 Gear cond.: 0  
 BDEPTH: 78 75 Validity : 0  
 Towing dir: 0° Wire out : 240 m Speed : 3. 3 kn  
 Sorted : 0 Total catch: 62. 35 Catch/hour: 123. 79

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP		weight	numbers	
412	Dentex canariensis	24.72	56	19.97
	Dentex congoensis	20.30	802	16.40
	Pseudupeneus prayensis	15.09	117	12.19
	Pagrus caeruleostictus	11.72	44	9.46
	Chromis cadenati	9.63	197	7.78
	Dentex gibbosus	9.55	24	7.71
	Pagellus bellottii	8.99	294	7.26
412	Trachurus trecae	5.46	177	4.41
415	Zeus faber	2.66	2	2.15
	Sepia hierredda	2.01	79	1.62
	Alloteuthis africana	2.01	502	1.62
	Brisingiidae	1.85	185	1.49



Citharus linguatula	1.60	56	1.30
Raja miraletus	1.31	2	1.06
Dactylopterus volitans	1.20	4	0.97
Branchiostegus semifasciatus	1.04	4	0.84
Lepidotrigla cadmani	0.88	16	0.71
Sargocentron hastatum	0.75	4	0.61
Saurida parri	0.72	393	0.58
Syacium micrurum	0.64	87	0.52
Arnoglossus imperialis	0.32	44	0.26
Prognathodes marcellae	0.32	8	0.26
Scomber colias	0.24	8	0.19
414			
Sphoeroides "marmor"	0.16	8	0.13
Solitas gruvelli	0.16	8	0.13
Gorgonians	0.14	16	0.12
Fistularia petimba	0.08	4	0.06
Nudi branch sp	0.08	4	0.06
Plastic	0.07	0	0.05
Ariomma bondi	0.06	4	0.05
P O L Y C H A E T A	0.02	40	0.02
Total	123.79		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 127  
 DATE : 12/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 57.61 start stop duration Lon W  
 0° 35.82  
 TIME : 15:49:57 16:19:43 29.8 (min) Purpose : 3  
 LOG : 1972.46 1974.04 1.6 Region : 2600  
 FDEPTH: 54 53 Gear cond.: 0  
 BDEPTH: 54 53 Validity : 0  
 Towing dir: 0° Wire out : 160 m Speed : 3.2 kn  
 Sorted : 1 Total catch: 697.38 Catch/hour: 1405.53

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Trachurus trecae	1226.57	0	87.27	
416				
Pseudupeneus prayensis	50.92	161	3.62	
Chromis cadenati	43.65	969	3.11	
Apsilus fuscus	8.89	1294	0.63	
Bodianus speciosus	7.13	10	0.51	
Dactylopterus volitans	6.41	28	0.46	
Pagrus caeruleostictus	4.85	161	0.35	
Engraulis encrasiolus	4.85	647	0.35	
455				
Alloteuthis africana	4.85	1637	0.35	
Octopus vulgaris	4.51	4	0.32	
Sepia hierredda	4.27	75	0.30	
Seriola carpenteri	4.11	6	0.29	
Dentex canariensis	3.83	10	0.27	
419				
Epinephelus aeneus	3.27	4	0.23	
418				
Prognathodes marcellae	3.23	81	0.23	
Acanthurus monroviae	2.62	4	0.19	
Pagellus bellottii	2.42	121	0.17	
417				
Boops boops	2.42	121	0.17	
UNIDENTIFIED FISH	2.36	4	0.17	
0				
ASTEROIDEA	1.94	282	0.14	
Illex coindetii	1.62	40	0.12	
Lutjanus fulgens	1.57	2	0.11	
Balistes punctatus	1.49	2	0.11	
Pagrus africanus	1.29	6	0.09	
Fistularia petimba	1.13	163	0.08	
Priacanthus arenatus	1.09	4	0.08	
Trachinocephalus myops	0.85	2	0.06	
Sardinella aurita	0.81	81	0.06	
456				
Arnoglossus imperialis	0.77	121	0.05	
Stephanolepis hispidus	0.44	4	0.03	
Ariomma bondi	0.36	4	0.03	
Syacium micrurum	0.28	81	0.02	
Rypticus saponaceus	0.24	2	0.02	
Pegusa lascaris	0.16	2	0.01	
Chaetodon robustus	0.12	2	0.01	
Gorgonians	0.10	2	0.01	
Plastic	0.05	0	0.00	
Algaes	0.04	0	0.00	
Total	1405.53		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 128  
 DATE : 12/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 5° 3.94 start stop duration Lon W  
 0° 37.72  
 TIME : 17:19:50 17:45:08 25.3 (min) Purpose : 3  
 LOG : 1980.82 1982.18 1.4 Region : 2600  
 FDEPTH: 40 38 Gear cond.: 0  
 BDEPTH: 40 38 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3.2 kn  
 Sorted : 20 Total catch: 79.38 Catch/hour: 188.33

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Pagellus bellottii	58.52	0	31.07	
420				
Caranx rhonchus	47.41	0	25.17	
Chloroscombrus chrysurus	13.85	342	7.35	
Trachurus trecae	9.45	221	5.02	
421				
Pagrus caeruleostictus	9.26	102	4.91	
Dentex gibbosus	9.13	36	4.85	
Pseudupeneus prayensis	7.49	130	3.98	
Syacium micrurum	6.68	81	3.55	
Lagocephalus laevigatus	4.60	5	2.44	
Sepia officinalis	3.37	7	1.79	
Fistularia petimba	2.94	21	1.56	
Acanthurus monroviae	2.70	2	1.44	
Alloteuthis subulata	2.61	0	1.38	
Plastic	2.09	12	1.11	
Sphyraena guachancho	1.85	7	0.98	
Dead shells	1.79	0	0.95	

Chromis sp.	1.30	244	0.69
Caranx crysos	1.14	17	0.61
Lepidotrigla cadmani	0.81	7	0.43
Apogon affinis	0.65	187	0.35
Sepia hierredda	0.33	24	0.17
Arnoglossus imperialis	0.19	33	0.10
Alloteuthis africana	0.17	50	0.09
Total	188.33		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 129  
 DATE : 12/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 5° 9.07 start stop duration Lon W  
 0° 40.95  
 TIME : 18:28:09 18:58:37 30.5 (min) Purpose : 3  
 LOG : 1987.66 1989.32 1.7 Region : 2600  
 FDEPTH: 30 28 Gear cond.: 0  
 BDEPTH: 30 28 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.3 kn  
 Sorted : 36 Total catch: 156.20 Catch/hour: 307.58

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Pagellus bellottii	37.09	13260	12.06	
422				
Pseudupeneus prayensis	28.97	701	9.42	
Lethrinus atlanticus	28.13	108	9.15	
Dead shells	23.23	0	7.55	
Pagrus caeruleostictus	19.43	327	6.32	
Apogon affinis	18.81	5210	6.11	
Acanthostracion quadricornis	14.98	183	4.87	
Brachydeuterus auritus	14.94	805	4.86	
423				
Lutjanus fulgens	12.43	232	4.04	
425				
Dentex gibbosus	10.41	148	3.39	
Galeoides decadactylus	10.26	93	3.33	
424				
Fistularia tabacaria	8.94	16	2.91	
Sepia officinalis	7.85	35	2.55	
Sphyraena guachancho	7.36	160	2.39	
Syacium micrurum	7.34	130	2.39	
Cynoglossus senegalensis	6.27	10	2.04	
Prognathodes marcellae	4.66	100	1.52	
Stephanolepis hispidus	4.04	47	1.31	
Lagocephalus laevigatus	3.51	6	1.14	
Scorpaena stephania	3.00	43	0.98	
Sepia hierredda	2.49	39	0.81	
Uranoscopus polli	2.33	16	0.76	
Trachinocephalus myops	2.18	32	0.71	
Diodon sp.	2.01	6	0.65	
Dactylopterus volitans	2.01	4	0.65	
Octopus vulgaris	1.97	4	0.64	
Chloroscombrus chrysurus	1.90	77	0.62	
Torpedo torpedo	1.81	4	0.59	
Aluterus monoceros	1.65	2	0.54	
Caranx rhonchus	1.48	278	0.48	
Gerres nigri	1.40	8	0.45	
Plastic	1.32	0	0.43	
Calappa rubroguttata	1.29	14	0.42	
Sargocentron hastatum	1.24	16	0.40	
Holacanthus africanus	1.24	8	0.40	
Dasyatis margarita	1.22	2	0.40	
Gorgonians	1.14	24	0.37	
Engraulis encrasiolus	0.97	449	0.32	
Small shrimps	0.67	374	0.22	
Fistularia petimba	0.51	4	0.17	
Scyllaridae	0.47	2	0.15	
Penaeus kerathurus	0.47	8	0.15	
Trichurus lepturus	0.47	32	0.15	
Penaeus notialis	0.47	16	0.15	
Aluterus heudelotii	0.47	8	0.15	
Pomadasyss incisus	0.47	8	0.15	
426				
Synodus synodus	0.47	16	0.15	
Nudi branch sp	0.45	37	0.15	
Luidia sp	0.39	2	0.13	
Rypticus saponaceus	0.36	8	0.12	
Chromis sp.	0.19	37	0.06	
Squilla mantis	0.11	37	0.04	
Cynoponticus ferox	0.09	8	0.03	
Solitas gruvelli	0.09	8	0.03	
CIDARIDAE	0.06	8	0.02	
Callinectes sp.	0.06	8	0.02	
Total	307.57		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 130  
 DATE : 13/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 5° 6.47 start stop duration Lon W  
 0° 21.86  
 TIME : 05:45:01 06:05:50 20.8 (min) Purpose : 3  
 LOG : 2031.76 2033.02 1.3 Region : 2600  
 FDEPTH: 67 68 Gear cond.: 0  
 BDEPTH: 67 68 Validity : 0  
 Towing dir: 0° Wire out : 230 m Speed : 3.6 kn  
 Sorted : 0 Total catch: 1076.63 Catch/hour: 3102.69

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Caranx rhonchus	1350.94	51545	43.54	
Chromis sp.	570.61	9571	18.39	
Sardinella aurita	523.37	24911	16.87	
490				
Boops boops	233.16	4602	7.51	
Trachurus trecae	92.03	2239	2.97	
491				
Pseudupeneus prayensis	88.97	951	2.87	
Dentex gibbosus	83.55	182	2.69	
Scomber colias	75.47	2207	2.43	
492				
Pagrus caeruleostictus	27.73	115	0.89	
Pagellus bellottii	12.27	245	0.40	
493				
Dactylopterus volitans	10.55	46	0.34	

Sargocentron hastatum	6.14	61	0.20
Lutjanus fulgens	4.50	9	0.14
489 Zeus faber	3.69	6	0.12
Sepia hierredda	3.68	153	0.12
Lepidotrigla cadmani	2.97	35	0.10
Plastic	2.92	118	0.09
Scorpaena stephanica	2.46	32	0.08
Bodianus speciosus	2.02	6	0.07
Citharus linguatula	1.84	61	0.06
Fistularia petimba	1.84	32	0.06
UNIDENTIFIED FISH	1.50	3	0.05
Ariomma bondi	1.23	61	0.04
Aluterus monoceros	1.04	6	0.03
UNIDENTIFIED FISH	0.61	32	0.02
0 Gorgonians	0.32	55	0.01
Fishing gears	0.20	12	0.01
Syacium micrurum	0.03	6	0.00
Alloteuthis africana	0.02	12	0.00
Total	3105.65		100.10

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 131  
 DATE : 13/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 5° 11.98 start stop duration Lon W  
 0° 28.55  
 TIME : 07:53:42 08:23:45 30.1 (min) Purpose : 3  
 LOG : 2043.93 2045.63 1.7 Region : 2600  
 FDEPTH: 39 38 Gear cond.: 0  
 BDEPTH: 39 38 Validity : 0  
 Towing dir: 0° Wire out : 150 m Speed : 3.4 kn  
 Sorted : 32 Total catch: 379.93 Catch/hour: 758.59

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Caranx rhonchus	191.01	18753	25.18	
Chloroscombrus chrysurus	179.67	3790	23.69	
CORALLINALES	88.47	0	11.66	
Dead shells	43.07	0	5.68	
Sardinella aurita	41.24	2727	5.44	
435 Pagellus bellottii	32.41	337	4.27	
433 Pseudupeneus prayensis	27.84	435	3.67	
Pagrus caeruleostictus	26.10	0	3.44	
Syacium micrurum	14.79	457	1.95	
Dentex gibbosus	13.69	176	1.81	
Lagocephalus laevis	10.46	14	1.38	
Epinephelus aeneus	9.26	14	1.22	
Trachurus trecae	9.14	218	1.20	
434 Sepia hierredda	8.94	152	1.18	
Sepia officinalis	8.27	38	1.09	
Gymnothorax afer	6.35	2	0.84	
PAGURIDAE	6.09	174	0.80	
Balistes punctatus	5.83	4	0.77	
Alloteuthis subulata	5.16	1474	0.68	
Arnoglossus imperialis	3.04	501	0.40	
Solitas gruvelli	3.04	130	0.40	
Dactylopterus volitans	2.39	26	0.32	
Strombus latus	2.17	44	0.29	
Chromis sp.	2.17	22	0.29	
Octopus vulgaris	2.08	2	0.27	
Fishing gears	2.04	2	0.27	
Scomberomorus tritor	2.00	0	0.26	
Fistularia petimba	1.92	52	0.25	
Plastic	1.32	30	0.17	
Alloteuthis africana	1.18	296	0.16	
Epinephelus itajara	1.08	2	0.14	
Lethrinus atlanticus	1.04	2	0.14	
Raja miraletus	0.96	2	0.13	
Plectorhinchus mediterraneus	0.92	2	0.12	
Synodus synodus	0.87	22	0.11	
Prognathodes marcellae	0.65	22	0.09	
PAGUROIDEA	0.59	148	0.08	
Iliia spinosa	0.44	296	0.06	
PORIFERA (Sponges)	0.44	22	0.06	
P O L Y C H A E T A	0.30	148	0.04	
Gorgonians	0.17	928	0.02	
Total	758.60		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 132  
 DATE : 13/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 5° 15.54 start stop duration Lon W  
 0° 32.32  
 TIME : 09:13:51 09:44:15 30.4 (min) Purpose : 3  
 LOG : 2051.43 2053.26 1.8 Region : 2600  
 FDEPTH: 26 28 Gear cond.: 0  
 BDEPTH: 26 28 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.6 kn  
 Sorted : 34 Total catch: 258.81 Catch/hour: 510.98

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Chloroscombrus chrysurus	83.63	2219	16.37	
Pseudupeneus prayensis	51.21	598	10.02	
Dentex gibbosus	47.34	332	9.26	
CORALLINALES	46.52	0	9.10	
Lethrinus atlanticus	36.39	154	7.12	
Aluterus monoceros	29.52	53	5.78	
Pagrus caeruleostictus	23.02	330	4.51	
Scomberomorus tritor	18.91	4	3.70	
Selene dorsalis	17.38	330	3.40	
Brachydeuterus auritus	16.21	764	3.17	
436 Prognathodes marcellae	14.56	259	2.85	
Balistes punctatus	14.09	71	2.76	
Bodianus speciosus	12.36	10	2.42	
Acanthostracion quadricornis	12.22	83	2.39	
Sphyræna guachancho	8.80	53	1.72	
Bryozoa spp.	8.72	95	1.71	

0

Alectis alexandrinus	8.37	28	1.64
0 Fistularia tabacaria	8.25	16	1.62
Lagocephalus laevis	7.82	8	1.53
Fistularia petimba	5.77	34	1.13
Caranx rhonchus	5.64	740	1.10
Epinephelus itajara	3.47	4	0.68
Stephanolepis hispidus	3.29	47	0.64
Uraspis secunda	3.28	4	0.64
Sepia officinalis	2.92	4	0.57
PORIFERA (Sponges)	2.58	12	0.51
0 Syacium micrurum	2.35	36	0.46
Epinephelus aeneus	2.11	24	0.41
Demospongiae indet CV2	1.82	12	0.36
Psettodes belcheri	1.58	2	0.31
J E L L Y F I S H	1.41	12	0.28
Galoides decadactylus	1.41	12	0.28
437 Pagellus bellottii	1.41	36	0.28
438 Octopus vulgaris	0.87	8	0.17
Demospongiae indet CV1	0.75	140	0.15
ASTEROIDEA	0.70	12	0.14
Demospongiae indet CV3	0.70	116	0.14
Starfish	0.59	2	0.12
Trichurus lepturus	0.55	2	0.11
Gorgonians	0.47	71	0.09
Apogon affinis	0.34	306	0.07
Plastic	0.33	36	0.07
Spherooides pachygaster	0.25	12	0.05
Fishing gears	0.24	2	0.05
Chromis sp.	0.23	36	0.05
Alloteuthis africana	0.18	83	0.03
Diodon sp.	0.12	2	0.02
Muraena melanotis	0.08	2	0.02
UNIDENTIFIED FISH	0.07	12	0.01
Arca sp.	0.05	12	0.01
CIDARIDAE	0.04	24	0.01
B I V A L V E S	0.04	24	0.01
Iliia spinosa	0.01	12	0.00
Macropus sp.	0.01	12	0.00
Total	511.00		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 133  
 DATE : 13/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 5° 23.46 start stop duration Lon W  
 0° 21.80  
 TIME : 11:12:14 11:42:14 30.0 (min) Purpose : 3  
 LOG : 2064.57 2066.32 1.8 Region : 2600  
 FDEPTH: 26 26 Gear cond.: 0  
 BDEPTH: 26 26 Validity : 0  
 Towing dir: 0° Wire out : 130 m Speed : 3.5 kn  
 Sorted : 64 Total catch: 880.88 Catch/hour: 1761.17

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Engraulis encrasiolus	760.37	108020	43.17	
458 Chloroscombrus chrysurus	165.78	8113	9.41	
Chrysaora fulgida	126.54	28	7.19	
Lethrinus atlanticus	116.60	442	6.62	
Aluterus monoceros	105.54	138	5.99	
Brachydeuterus auritus	95.05	1933	5.40	
439 Pagrus caeruleostictus	90.07	580	5.11	
Sphyræna sphyraena	50.84	138	2.89	
Selene dorsalis	43.10	442	2.45	
Chrysaora africana	29.84	166	1.89	
Drepane africana	26.53	138	1.51	
Pseudupeneus prayensis	17.13	166	0.97	
Sardinella aurita	13.82	994	0.78	
457 Stephanolepis hispidus	13.26	82	0.75	
Sphyræna guachancho	12.16	28	0.69	
Alectis alexandrinus	11.05	110	0.63	
Trachurus trecae	11.05	1629	0.63	
459 Dentex gibbosus	10.50	82	0.60	
Ephippion guttifer	9.20	4	0.52	
Fistularia petimba	8.84	28	0.50	
Pagellus bellottii	8.84	1464	0.50	
Caranx hippos	7.18	28	0.41	
Balistes capricus	6.08	28	0.35	
Scomber colias	6.08	248	0.35	
460 Acanthostracion quadricornis	4.97	28	0.28	
Eucinostomus melanopterus	3.87	28	0.22	
Syacium micrurum	2.76	28	0.16	
Plastic	1.96	0	0.11	
Starfish	0.84	2	0.05	
Caranx rhonchus	0.64	56	0.04	
Penaeus notialis	0.50	28	0.03	
Gorgonians	0.19	28	0.01	
Total	1761.17		100.00	

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 134  
 DATE : 13/08/19 GEAR TYPE: BT NO: 2 POSITION: Lat N  
 5° 21.60 start stop duration Lon W  
 0° 16.29  
 TIME : 12:45:26 13:15:42 30.3 (min) Purpose : 3  
 LOG : 2072.15 2073.87 1.7 Region : 2600  
 FDEPTH: 42 46 Gear cond.: 0  
 BDEPTH: 42 46 Validity : 0  
 Towing dir: 0° Wire out : 160 m Speed : 3.4 kn  
 Sorted : 64 Total catch: 264.60 Catch/hour: 524.65

SPECIES		CATCH/HOUR		% OF TOT.
C SAMP	weight	numbers		
Chloroscombrus chrysurus	226.38	4451	43.15	
Trachurus trecae	51.65	4685	9.85	
427 Pagrus caeruleostictus	31.97	1023	6.09	

Lagocephalus laevis	26.46	56	5.04	Pentheroscion mbi zi	0.03	37	0.09
Pagellus bellottii	24.10	480	4.59	Natica adansonii	0.02	3	0.08
443 Pseudupeneus prayensis	23.94	424	4.56	P O L Y C H A E T A	0.02	26	0.08
Sphyaena guachancho	17.48	71	3.33	Alloteuthis africana	0.02	11	0.07
J E L L Y F I S H	16.26	2	3.10	Natica multipunctata	0.02	3	0.07
Caranx crysos	15.12	63	2.88	Alloteuthis subulata	0.02	6	0.06
Decapterus punctatus	10.87	527	2.07	Total	29.64		100.00
Fistularia petimba	9.92	95	1.89				
Epinephelus aeneus	9.13	24	1.74				

440 Sphyaena sphyaena	6.93	24	1.32	R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 137
Balistes caprisus	6.61	16	1.26	DATE : 13/08/19	GEAR TYPE: BT NO: 1	POSITION: Lat N
Plastic	5.99	0	1.14	5°28.92	start stop duration	Lon E
Caranx rhonchus	5.35	135	1.02	0°10.17		
Lutjanus fulgens	5.20	16	0.99	TIME : 18:11:05 18:40:59	29.9 (min)	Purpose : 3
442 CORALLINALES	4.88	0	0.93	LOG : 2107.11 2108.81	1.7	Region : 2600
Balistes punctatus	4.25	8	0.81	FDEPTH: 47 47		Gear cond.: 0
Alloteuthis africana	4.25	1275	0.81	BDEPTH: 47 47		Validity : 0
Octopus vulgaris	2.74	2	0.52	Towing dir: 0°	Wire out : 200 m	Speed : 3.4 kn
Syacium micrurum	1.89	87	0.36	Sorted : 0	Total catch: 145.76	Catch/hour: 292.41
Sepia hierredda	1.74	6	0.33			
Dentex gibbosus	1.57	8	0.30			
Sardinella aurita	1.26	40	0.24			
444 Trichurus lepturus	1.11	2	0.21			
Brachydeuterus auritus	1.10	16	0.21			
441 Stephanolepis hispidus	1.10	8	0.21			
Lepidotrigla cadmani	1.10	63	0.21			
Alectis alexandrinus	0.95	8	0.18			
Gorgonians	0.86	63	0.16			
Solitas gruvelli	0.79	40	0.15			
Priacanthus arenatus	0.71	6	0.14			
Rajamiraletus	0.52	2	0.10			
Arnoglossus imperialis	0.32	40	0.06			
Monochirus sp.	0.16	16	0.03			
Total	524.65		100.00			

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 135
DATE : 13/08/19	GEAR TYPE: BT NO: 2	POSITION: Lat N
5°16.27	start stop duration	Lon W
0°10.82		
TIME : 14:28:23 14:48:52	20.5 (min)	Purpose : 3
LOG : 2081.64 2082.83	1.2	Region : 2600
FDEPTH: 91 93		Gear cond.: 0
BDEPTH: 91 93		Validity : 0
Towing dir: 0°	Wire out : 260 m	Speed : 3.5 kn
Sorted : 35	Total catch: 1229.62	Catch/hour: 3602.40

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Ariomma bondi	1628.66 54480	45.21
Caranx rhonchus	1148.31 32678	31.88
Scomber colias	356.66 7834	9.90
464 Trachurus trecae	197.91 8039	5.49
463 Boops boops	98.96 1649	2.75
Sardinella maderensis	74.22 1339	2.06
465 Dentex congoensis	53.60 3094	1.49
Lepidotrigla cadmani	20.62 413	0.57
Zeus faber	9.32 12	0.26
Pseudupeneus prayensis	6.18 103	0.17
Dentex canariensis	5.04 15	0.14
445 Octopus vulgaris	2.34 3	0.07
Dactylopterus volitans	0.35 3	0.01
Plastic	0.23 0	0.01
Total	3602.40	100.00

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 136
DATE : 13/08/19	GEAR TYPE: BT NO: 1	POSITION: Lat N
5°25.20	start stop duration	Lon E
0°2.54		
TIME : 16:39:05 16:59:58	20.9 (min)	Purpose : 3
LOG : 2097.76 2099.05	1.3	Region : 2600
FDEPTH: 89 89		Gear cond.: 0
BDEPTH: 89 89		Validity : 0
Towing dir: 0°	Wire out : 260 m	Speed : 3.7 kn
Sorted : 10	Total catch: 10.32	Catch/hour: 29.64

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Dentex angolensis	11.49 144	38.76
446 Lepidotrigla cadmani	2.18 63	7.36
Octopus vulgaris	1.78 3	6.01
Dentex maroccanus	1.78 43	6.01
Dentex gibbosus	1.55 6	5.23
Dead shells	1.38 0	4.65
Sepia hierredda	1.21 46	4.07
Illex coindetii	1.15 124	3.88
Priacanthus arenatus	1.15 11	3.88
Citharus linguatula	1.09 37	3.68
Lophiodes kemp	0.86 3	2.91
Caranx rhonchus	0.80 20	2.71
Pagellus bellottii	0.66 20	2.24
448 Ariomma bondi	0.57 9	1.94
Solitas gruvelli	0.40 20	1.36
CIDARIDAE	0.40 14	1.36
Plastic	0.34 34	1.16
Arnoglossus imperialis	0.23 55	0.78
CONIDAE	0.11 6	0.39
Trachurus trecae	0.11 3	0.39
447 Gorgonians	0.10 95	0.33
Saurida parri	0.07 20	0.24
PAGUROIDEA	0.04 49	0.14
Medorippe lanata	0.03 6	0.12

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 137
DATE : 13/08/19	GEAR TYPE: BT NO: 1	POSITION: Lat N
5°28.92	start stop duration	Lon E
0°10.17		
TIME : 18:11:05 18:40:59	29.9 (min)	Purpose : 3
LOG : 2107.11 2108.81	1.7	Region : 2600
FDEPTH: 47 47		Gear cond.: 0
BDEPTH: 47 47		Validity : 0
Towing dir: 0°	Wire out : 200 m	Speed : 3.4 kn
Sorted : 0	Total catch: 145.76	Catch/hour: 292.41

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Caranx rhonchus	60.70 0	20.76
Pagellus bellottii	34.74 457	11.88
449 Sphyaena guachancho	28.37 44	9.70
Lagocephalus laevis	22.51 26	7.70
Sardinella aurita	21.32 0	7.29
451 Dentex gibbosus	21.07 68	7.21
Algaes	16.18 502	5.53
Octopus vulgaris	15.09 4	5.16
Pagrus caeruleostictus	13.99 96	4.79
Pseudupeneus prayensis	11.41 68	3.90
Scomberomorus tritor	8.95 12	3.06
Alloteuthis subulata	6.40 0	2.19
Priacanthus arenatus	4.64 32	1.59
Aluterus monoceros	4.13 4	1.41
Balistes punctatus	3.17 6	1.08
Diodon sp.	3.01 8	1.03
Alloteuthis africana	2.51 0	0.86
Sepia hierredda	1.76 44	0.60
Fistularia petimba	1.58 60	0.54

SPECIES	CATCH/HOUR	% OF TOT.
0		
Trichurus lepturus	1.52 2	0.52
Prognathodes marcellae	0.88 12	0.30
Stephanolepis sp.	0.88 6	0.30
Lepidotrigla cadmani	0.88 6	0.30
Epinephelus aeneus	0.80 2	0.27
Rajamiraletus	0.76 2	0.26
Plastic	0.68 26	0.23
Rypticus saponaceus	0.64 0	0.22
Sargocentron hastatum	0.63 6	0.21
Pegusa lascaris	0.63 6	0.21
Illex coindetii	0.50 56	0.17
Scomber colias	0.38 12	0.13
450 Brisingidae	0.35 6	0.12
ASTEROIDEA	0.33 162	0.11
Apogon affinis	0.16 44	0.05
Arnoglossus imperialis	0.13 50	0.05
Chromis sp.	0.11 6	0.04
Aphroditidae spCVI	0.10 62	0.03
Spherooides pachygaster	0.09 6	0.03
Citharus sp.	0.08 6	0.03
Luidia sp	0.08 6	0.03
Gorgonians	0.06 100	0.02
Pseudarchaster sp.	0.06 6	0.02
PORTIFERA (Sponges)	0.06 12	0.02
Fishing gears	0.04 68	0.02
Engraulis encrasicolus	0.04 6	0.02
462 Astropecten irregularis	0.00 12	0.00
Astropecten sp.	0.00 6	0.00
Metapenaeopsis miersi	0.00 6	0.00
Total	292.41	100.00

R/V Dr. Fridtjof Nansen	SURVEY: 2019408	STATION: 138
DATE : 14/08/19	GEAR TYPE: BT NO: 1	POSITION: Lat N
4°59.38	start stop duration	Lon W
1°13.39		
TIME : 07:22:56 07:53:32	30.6 (min)	Purpose : 3
LOG : 2192.17 2193.94	1.8	Region : 2600
FDEPTH: 29 30		Gear cond.: 0
BDEPTH: 29 30		Validity : 0
Towing dir: 0°	Wire out : 120 m	Speed : 3.5 kn
Sorted : 0	Total catch: 218.48	Catch/hour: 428.25

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP	weight numbers	
Brachydeuterus auritus	175.40 5518	40.96
461 Chloroscombrus chrysurus	56.33 2680	13.15
Trichurus lepturus	30.68 1031	7.16
Dead shells	27.25 0	6.36
Sphyaena guachancho	22.11 370	5.16
J E L L Y F I S H	18.09 253	4.22
Sardinella maderensis	16.72 698	3.90
467 Pagellus bellottii	13.97 137	3.26
466 Galeoides decadactylus	9.85 69	2.30
468 Pseudupeneus prayensis	5.27 80	1.23
Pagrus caeruleostictus	5.25 10	1.23
Pomadasys incisus	4.12 24	0.96
470 Stephanolepis hispidus	3.89 45	0.91
Dactylopterus volitans	3.57 14	0.83
Caranx rhonchus	3.43 1133	0.90
Selene dorsalis	2.98 149	0.70
Dentex gibbosus	2.92 47	0.68
Aluterus monoceros	2.82 4	0.66
Waste General	2.51 0	0.59

	Pomadasys jubelini	2.39	2	0.56
471	Sepia hierredda	2.29	69	0.53
	Sepia officinalis	2.23	2	0.52
	Psettodes belcheri	2.06	12	0.48
	Alectis alexandrinus	2.06	35	0.48
	Selar crumenophthalmus	2.06	45	0.48
	Trachinocephalus myops	1.37	24	0.32
	Solitas gruvelli	0.92	24	0.21
	Epinephelus aeneus	0.74	2	0.17
	Fishing gears	0.63	12	0.15
	Plastic	0.58	27	0.14
0	Uranoscopus polli	0.55	2	0.13
	Syacium micrurum	0.46	24	0.11
	Trachurus trecae	0.46	24	0.11
469	Ariomma bondi	0.46	12	0.11
	Alloteuthis subulata	0.34	114	0.08
	Gorgonians	0.29	24	0.07
	Luidia sp	0.29	24	0.07
	Schedophilus pamarco	0.27	12	0.06
	ASTEROIDEA	0.24	114	0.06
	Octopus vulgaris	0.21	12	0.05
	PAGURIDAE	0.10	24	0.02
	Portunus hastatus	0.09	24	0.02
	Total	428.25		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 139  
 DATE : 14/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 5° 0.68 start stop duration Lon W  
 1° 20.25  
 TIME : 09:23:15 09:52:42 29.4 (min) Purpose : 3  
 LOG : 2203.92 2205.67 1.8 Region : 2600  
 FDEPTH: 23 25 Gear cond.: 0  
 BDEPTH: 23 25 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 3.6 kn  
 Sorted : 1 Total catch: 280.00 Catch/hour: 570.46

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Chloroscombrus chrysurus	163.29	8196	28.62
Brachydeuterus auritus	67.71	12149	11.87
472			
Sphyræna guachancho	63.52	990	11.14
Dead shells	58.22	0	10.21
Ilisha africana	36.46	1440	6.39
J E L L Y F I S H	30.72	29	5.39
Trichiurus lepturus	23.89	1302	4.19
0			
Fishing gears	23.06	0	4.04
Turritella	16.33	7880	2.86
Trachurus trecae	12.78	4331	2.24
Pagrus caeruleostictus	10.46	226	1.83
Pseudupeneus prayensis	8.55	183	1.50
Sepia officinalis	8.39	6	1.47
Pagellus bellottii	8.20	126	1.44
473			
Pseudotolithus senegallus	6.68	16	1.17
0			
Sepia off. h. eggs	4.69	5	0.82
Galeodes decadactylus	4.52	71	0.79
474			
Lutjanus fulgens	3.11	29	0.55
475			
Trachinocephalus myops	2.83	157	0.50
0			
Octopus vulgaris	2.73	6	0.48
Selene dorsalis	1.77	255	0.31
Torpedo torpedo	1.71	4	0.30
Sepia hierredda	1.42	283	0.25
Engraulis encrasicolus	1.35	354	0.24
Plastic	1.23	92	0.22
Illex sp.	0.99	497	0.17
PAGURIDAE	0.92	0	0.16
Schedophilus pamarco	0.85	14	0.15
Holothuroidea	0.59	14	0.10
Caranx rhonchus	0.40	126	0.07
Cavernularia sp.	0.35	71	0.06
Calappa rubroguttata	0.28	14	0.05
Dactylopterus volitans	0.28	71	0.05
Apogon affinis	0.28	14	0.05
Saurida parri	0.28	14	0.05
Synodus synodus	0.28	14	0.05
Stephanolepis hispidus	0.28	14	0.05
Alectis alexandrinus	0.25	43	0.04
Trachinus armatus	0.25	14	0.04
Portunus hastatus	0.21	29	0.04
Scyllarus pygmaeus	0.14	71	0.03
ASTEROIDEA	0.14	71	0.03
Total	570.45		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 140  
 DATE : 14/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 26.74 start stop duration Lon W  
 1° 39.45  
 TIME : 14:24:53 14:54:46 29.9 (min) Purpose : 3  
 LOG : 2243.87 2245.58 1.7 Region : 2600  
 FDEPTH: 67 67 Gear cond.: 0  
 BDEPTH: 67 67 Validity : 0  
 Towing dir: 0° Wire out : 220 m Speed : 3.4 kn  
 Sorted : 1 Total catch: 98.82 Catch/hour: 198.43

SPECIES	CATCH/HOUR		% OF TOT.
	weight	numbers	
C SAMP			
Trachurus trecae	70.62	3267	35.59
479			
Boops boops	34.09	394	17.18
Caranx rhonchus	31.66	0	15.95
Pseudupeneus prayensis	18.75	279	9.45
Chromis cadenati	7.22	147	3.64
Trachinocephalus myops	6.98	32	3.52
Dead shells	4.30	0	2.17

	Raja miraletus	3.17	8	1.60
	Pagellus bellottii	2.76	88	1.39
476				
	Scomber colias	1.79	56	0.90
478				
	Brisingiidae	1.70	135	0.86
	Citharus linguatula	1.63	8	0.82
	Dactylopterus volitans	1.46	12	0.74
	Alloteuthis africana	1.46	426	0.74
	Dentex canariensis	1.22	4	0.61
477				
	Priacanthus arenatus	1.06	12	0.53
	Sepia heronis	1.04	2	0.53
	Fishing gears	0.92	0	0.47
	Solitas gruvelli	0.89	32	0.45
	Sepia hierredda	0.73	24	0.37
	Bothus podas	0.57	16	0.29
	Pagrus caeruleostictus	0.57	4	0.29
	Sphyræna guachancho	0.49	4	0.25
	Lepidotrigla carolae	0.41	12	0.20
	Syacium micrurum	0.41	114	0.20
	Arnoglossus imperialis	0.41	56	0.20
	Gorgonians	0.33	24	0.16
	Chloroscombrus chrysurus	0.33	16	0.16
	Ariomma bondi	0.33	20	0.16
	Saurida parri	0.33	68	0.16
	Lagocephalus laevisgatus	0.33	8	0.16
	Cidaroidae indetCV1	0.20	8	0.10
	Pteroscion peli	0.16	106	0.08
	Cavernularia sp.	0.16	12	0.08
	J E L L Y F I S H	0.16	16	0.08
	Luidia sp	0.12	8	0.06
	Caryophyllidae indetCV1	0.09	40	0.04
	Fistularia petimba	0.08	4	0.04
	Aphroditae indetCV1	0.06	32	0.03
	PORIFERA (Sponges)	0.04	4	0.02
	Aegaeon lacazei	0.04	4	0.02
	Blenniuss normani	0.04	4	0.02
	P O L Y C H A E T A	0.03	48	0.02
	ECHINOMETRIDAE	0.02	4	0.01
	Hippocampus algiricus	0.01	4	0.01
	Scleractinia	0.01	24	0.01
	Astropecten irregularis	0.01	4	0.00
	Astropecten sp.	0.00	8	0.00
	Scyllarus pygmaeus	0.00	4	0.00
	Garthambrus sp	0.00	4	0.00
	Ophiuroidea	0.00	4	0.00
	Bolinus cornutus	0.00	4	0.00
Total		199.21		100.40

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 141  
 DATE : 14/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 26.66 start stop duration Lon W  
 1° 51.31  
 TIME : 18:08:40 18:37:56 29.3 (min) Purpose : 3  
 LOG : 2263.84 2265.39 1.6 Region : 2600  
 FDEPTH: 76 82 Gear cond.: 0  
 BDEPTH: 76 82 Validity : 0  
 Towing dir: 0° Wire out : 250 m Speed : 3.2 kn  
 Sorted : 37 Total catch: 149.44 Catch/hour: 306.34

SPECIES	CATCH/HOUR		% OF TOT.	
	weight	numbers		
C SAMP				
Trachurus trecae	167.04	3317	54.53	
Ariomma bondi	35.73	728	11.66	
Scomber colias	15.62	332	5.10	
Illex coindetii	12.06	1060	3.94	
Pagellus bellottii	11.91	0	3.89	
Saurida parri	8.20	1578	2.88	
Pseudupeneus prayensis	8.04	109	2.83	
Dentex congolensis	5.57	3	1.82	
J E L L Y F I S H	5.26	527	1.72	
Raja miraletus	4.96	8	1.62	
Dentex barnardi	4.51	10	1.47	
Brisingiidae	3.87	244	1.26	
Pagrus caeruleostictus	2.34	8	0.76	
Sargocentron hastatum	2.23	16	0.73	
Priacanthus arenatus	1.86	16	0.61	
Scorpaena stephanica	1.84	2	0.60	
Citharus linguatula	1.70	262	0.56	
Arnoglossus imperialis	1.70	279	0.56	
Sepia hierredda	1.55	84	0.51	
Boops boops	1.39	23	0.45	
Dentex gibbosus	1.08	8	0.35	
Alloteuthis sp.	1.08	332	0.35	
Lepidotrigla carolae	0.93	23	0.30	
Umbria canariensis	0.86	2	0.28	
Fistularia petimba	0.70	2	0.23	
Solitas gruvelli	0.62	16	0.20	
Octopus vulgaris	0.49	2	0.16	
Chromis sp.	0.46	8	0.15	
Calappa rubroguttata	0.46	8	0.15	
Prognathodes marcellae	0.46	16	0.15	
Dicologlossa hexophthalma	0.46	16	0.15	
Philine sp.	0.16	53	0.05	
Aphroditae indetCV1	0.15	109	0.05	
Macropodus rugosus	0.14	47	0.05	
Cidaroidae indetCV1	0.13	8	0.04	
G A S T R O P O D S	0.12	39	0.04	
Luidia sp	0.08	16	0.03	
Plastic	0.08	8	0.03	
Gorgonians	0.08	16	0.03	
Astropectenidae	0.08	2	0.02	
Serranus accraensis	0.07	8	0.02	
P O L Y C H A E T A	0.05	53	0.02	
Ophiuroidea	0.04	70	0.01	
Uranoscopus polli	0.04	16	0.01	
ECHINOMETRIDAE	0.03	23	0.01	
Monoplex	0.02	8	0.01	
Spirolambus notialis	0.02	16	0.01	
Astropecten irregularis	0.02	16	0.01	
PAGURIDAE	0.02	8	0.01	
Ethusa sp	0.01	8	0.00	
Macropoda indetCV1	0.01	8	0.00	
Astropecten sp.	0.00	8	0.00	
Total		306.34		100.00

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 142  
 DATE : 15/08/19 GEAR TYPE: BT NO: 7 POSITION: Lat N  
 4° 40.44 start stop duration Lon W  
 2° 0.97  
 TIME : 09:21:44 09:51:47 30.1 (min) Purpose : 3  
 LOG : 2353.83 2355.65 1.8 Region : 2600  
 FDEPTH: 46 46 Gear cond.: 0  
 BDEPTH: 45 46 Validity : 0  
 Towing dir: 0° Wire out : 140 m Speed : 3.6 kn  
 Sorted : 0 Total catch: 264.73 Catch/hour: 528.59

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
Triichurus lepturus	154.74	29.27
Brachydeuterus auritus	127.54	24.13
480		
J E L L Y F I S H	126.24	23.88
Cynoponticus ferox	26.48	5.01
Pteroscion peli	15.54	2.94
Galeoides decadactylus	11.89	2.25
481		
Raja miraletus	6.93	1.31
Torpedo torpedo	6.47	1.22
Scomberomorus tritor	5.99	1.13
Perulibatrachus elminensis	4.80	0.91
Sepia hierredda	4.39	0.83
Sollitas gruvelli	3.89	0.74
Scyllarus pygmaeus	2.97	0.56
Penaeus notialis	2.97	0.56
Chloroscombrus chrysurus	2.74	0.52
Pagellus bellottii	2.51	0.48
483		
Medorippe lanata	2.17	0.41
Ephippion guttifer	1.92	0.36
Calappa pelii	1.83	0.35
Pegusa lascaris	1.83	0.35
Lutjanus fulgens	1.60	0.30
482		
Sicyonia galeata	1.25	0.24
Acanthurus monroviae	1.16	0.22
Schedophilus pamarco	1.14	0.22
Selene dorsalis	1.14	0.22
Sepiella ornata	1.14	0.22
Stenorhynchus lanceolatus	0.90	0.17
Parapenaeus longirostris	0.85	0.16
Lagocephalus laevigatus	0.72	0.14
Penaeus monodon	0.56	0.11
Dromia sp.	0.55	0.10
Ilia spinosa	0.52	0.10
Hydatina physis	0.39	0.07
Scorpaena stephani ca	0.23	0.04
Stephanolepis hispidus	0.23	0.04
Zeus faber	0.23	0.04
Portunus hastatus	0.18	0.03
G A S T R O P O D S	0.16	0.03
Brotula barbata	0.14	0.03
Decapterus rhonchus**	0.14	0.03
PAGURIDAE	0.11	0.02
Aphroditidae spCV1	0.11	0.02
Illex coindetii	0.10	0.02
Goneplax sp.	0.08	0.02
Philine sp.	0.07	0.01
Metapenaeopsis miersi	0.07	0.01
Syacium micrurum	0.07	0.01
Dicologlossa hexophthalma	0.06	0.01

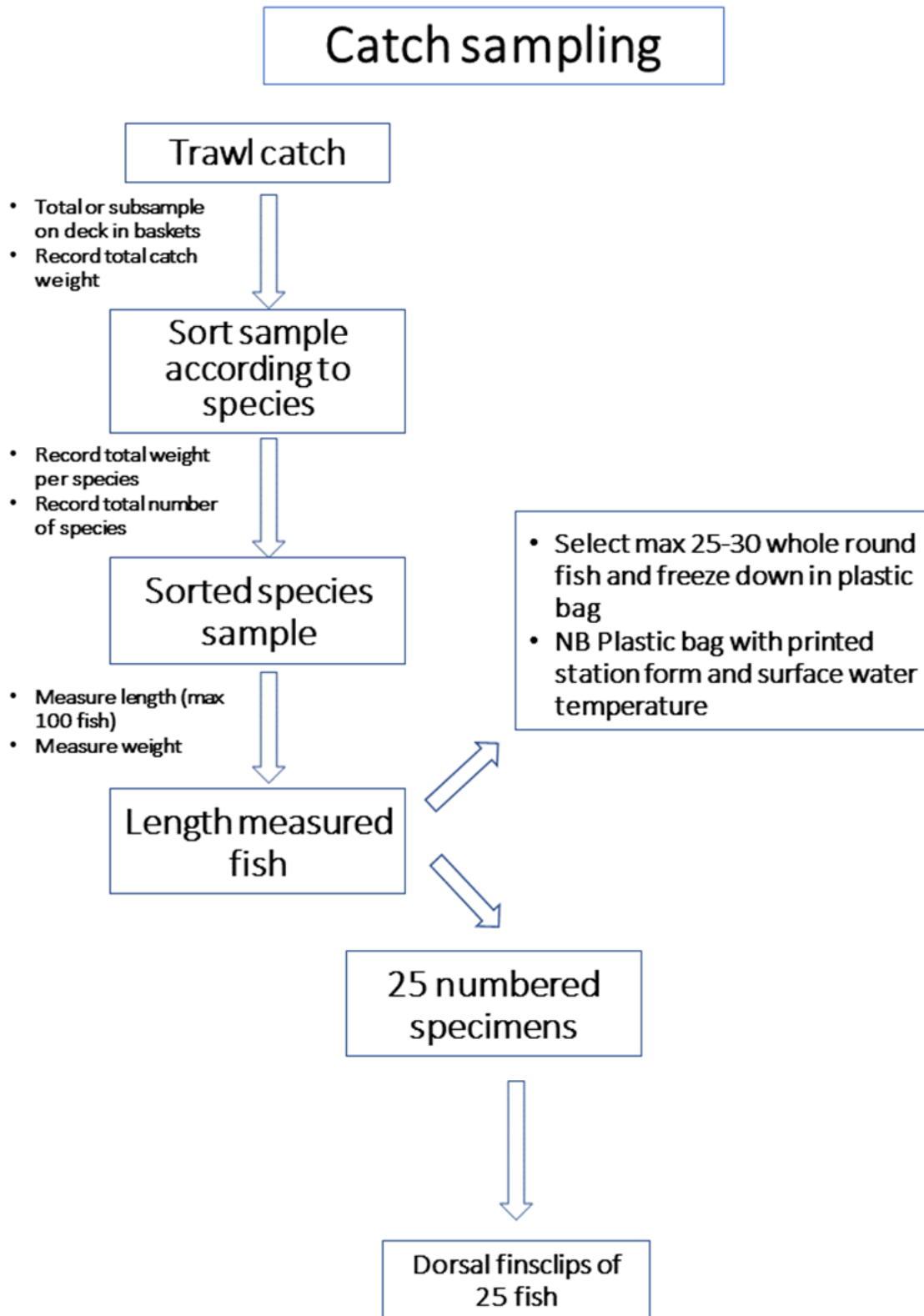
Aegaeon lacazei 0.06 46 0.01  
 Unid. juvenile fishes 0.06 46 0.01  
 Alloteuthis subulata 0.05 12 0.01  
 RANIIDAE 0.05 0 0.01  
 Fishing gears 0.04 2 0.01  
 Macropus rugosus 0.03 12 0.01  
 Allectis alexandrinus 0.02 12 0.00  
 Macropus sp. 0.01 12 0.00  
 Astropecten irregularis 0.01 12 0.00  
 Macropetasma africana 0.01 12 0.00  
 Plastic 0.01 2 0.00  
 Total 528.07 99.90

R/V Dr. Fridtjof Nansen SURVEY: 2019408 STATION: 143  
 DATE : 15/08/19 GEAR TYPE: BT NO: 1 POSITION: Lat N  
 4° 43.01 start stop duration Lon W  
 2° 2.15  
 TIME : 10:49:45 11:21:27 31.7 (min) Purpose : 3  
 LOG : 2359.93 2361.46 1.5 Region : 2600  
 FDEPTH: 26 27 Gear cond.: 0  
 BDEPTH: 26 27 Validity : 0  
 Towing dir: 0° Wire out : 120 m Speed : 2.9 kn  
 Sorted : 72 Total catch: 1200.00 Catch/hour: 2270.58

SPECIES	CATCH/HOUR	% OF TOT.
C SAMP		
Triichurus lepturus	1081.05	47.61
Chrysaora fulgida	633.96	27.92
Cynoponticus ferox	166.32	7.32
Chrysaora africana	77.33	3.41
Drepane africana	57.75	2.54
Galeoides decadactylus	52.78	2.32
485		
Brachydeuterus auritus	43.57	1.92
484		
Pomadasyd jubelini	36.03	1.59
486		
Pteroscion peli	25.16	1.11
Perulibatrachus elminensis	19.03	0.84
Parapenaeus longirostris	14.12	0.62
Dasyatis margarita	11.66	0.51
Sepiella ornata	11.05	0.49
Chloroscombrus chrysurus	7.98	0.35
Selene dorsalis	6.14	0.27
Pisodonophis semicinctus	4.60	0.20
Pseudotolithus senegalensis	3.82	0.17
487		
Schedophilus pamarco	3.68	0.16
Ilisha africana	3.68	0.16
BYTIIDAE	2.45	0.11
Lutjanus goreensis	2.42	0.11
Lagocephalus laevigatus	1.84	0.08
C R A B S	1.23	0.05
Pseudotolithus senegalensis	1.01	0.04
Ephippion guttifer	0.91	0.04
Stromateus fiatola	0.65	0.03
Plastic	0.30	0.01
Uranoscopus polli	0.06	0.00
Total	2270.58	100.00

## ANNEX III. OVERVIEW OF SAMPLING PROCEDURES IN THE FISH LAB

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## ANNEX IV. BIOLOGICAL SCALES AND STAGES

### Sexual maturity

Stage	State	Description
I	Immature	Ovary and testis about 1/3rd length of body cavity. Ovaries pinkish, translucent, testis whitish. Ova not visible to naked eye.
II	Maturing virgin and recovering spent	Ovary and testis about ½ length of body cavity. Ovary pinkish, translucent, testis whitish, symmetrical. Ova not visible to naked eye.
III	Ripening	Ovary and testis is about 2/3rds length of body cavity. Ovary pinkish yellow colour with granular appearance, testis whitish to creamy. No transparent or translucent ova visible.
IV	Ripe	Ovary and testis from 2/3rds to full length of body cavity. Ovary orange-pink in colour with conspicuous superficial blood vessels. Large transparent, ripe ova visible. Testis whitish-creamy, soft.
V	Spent	Ovary and testis shrunken to about ½ length of body cavity. Walls loose. Ovary may contain remnants of disintegrating opaque and ripe Ova, darkened or translucent. Testis bloodshot and flabby

### Stomach content

Scale	Designation	Description
0	Empty	Stomach empty except for water.
1	Very little content	Stomach is almost empty. Only traces of small organisms can be found.
2	Some content	Stomach not completely full and not dilated.
3	Stomach full	Stomach full, but not bloated/dilated.
4	Bloated/dilated	The stomach is visibly expanded and tight. Content can be observed from the outside.

## ANNEX V. OCEANOGRAPHIC SENSORS AND WATER CHEMISTRY QUALITY ASSURANCE

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### CTD Sensors

Type	Serial Number	Model	Calibration Date
Deck unit	11-1082	SBE 11plus	
Pressure sensor	127957	DigiQuartz	22.07.2013
Underwater unit	09P75372-1160	SBE 9plus 6800m	20.10.2018
Water sampler	32-0972	SBE 32 6800m	
Conductivity sensor	42037	SBE 4C 6800m	04.12.2018
Conductivity sensor	43080	SBE 4C 6800m	04.12.2018
Oxygen sensor	43-3525	SBE 43 7000m	02.02.2019
Submersible pump	52147	SBE 5T	2014
Submersible pump	054196	SBE 5T	
Temperature sensor	31602	SBE 3plus 6800m	18.12.2018
Temperature sensor	03P4537	SBE 3plus 6800m	18.12.2018
Fluorometer	4892	WET Labs ECO-AFL fluorometer	08.11.2017
Sonar Altimeter	1186	Benthos PSA-916	2005
Par sensor	1123	PAR-LOG ICSW	12.10.2017

### Thermosalinograph Sensors – 6 m water drop keel

Type	Serial Number	Model	Calibration Date	Usage Start Date
Thermosalinograph	21-3419	SBE21	06.04.2016	04.04.2019
Conductivity sensor	3419	SBE21	06.04.2016	04.04.2019
Temperature sensor (Int)	3419	SBE21	06.04.2016	04.04.2019
Temperature sensor (Ext)	0878	SBE38	31.03.2016	04.04.2019
Fluorometer	257S	9702011 WETStar	20.04.2015	02.01.2019

### Thermosalinograph Sensors – 4 m water intake

Type	Serial Number	Model	Calibration Date	Usage Start Date
Thermosalinograph	21-3418	SBE21	06.04.2016	15.04.2017
Conductivity sensor	3418	SBE21	06.04.2016	15.04.2017
Temperature sensor (Int)	3418	SBE21	06.04.2016	15.04.2017
Temperature sensor (Ext)	0880	SBE38	23.03.2016	15.04.2017



## Water Chemistry Quality Assurance

pH and total alkalinity samples were measured in triplicate. Chlorophyll *a* and phaeopigment samples were measured in duplicate. No duplicate measurements were performed for nutrients.

Parameter	Sample count	Average Standard Deviation*
pH	537	0.003
Total alkalinity	537	1.73
Chlorophyll <i>a</i>	401	0.37
Phaeopigment	401	0.39
Nutrients	543	N/A

\*Outliers removed

Fluorometric standard measurements were performed to quality control chlorophyll *a* and phaeopigment measurements:

Parameter	Low Standard	High Standard*
Standard Average	462	N/A
Standard Standard Deviation	10	N/A
Standard Average Drift	-1	N/A

\*The high standard was not measured on this survey due to an oversight by the operator

## CTD dissolved oxygen and salinity value validity statistics

Parameter	Sample Count	Offset from factory calibration
Dissolved Oxygen	68	-0.7%*
Salinity	0	N/A

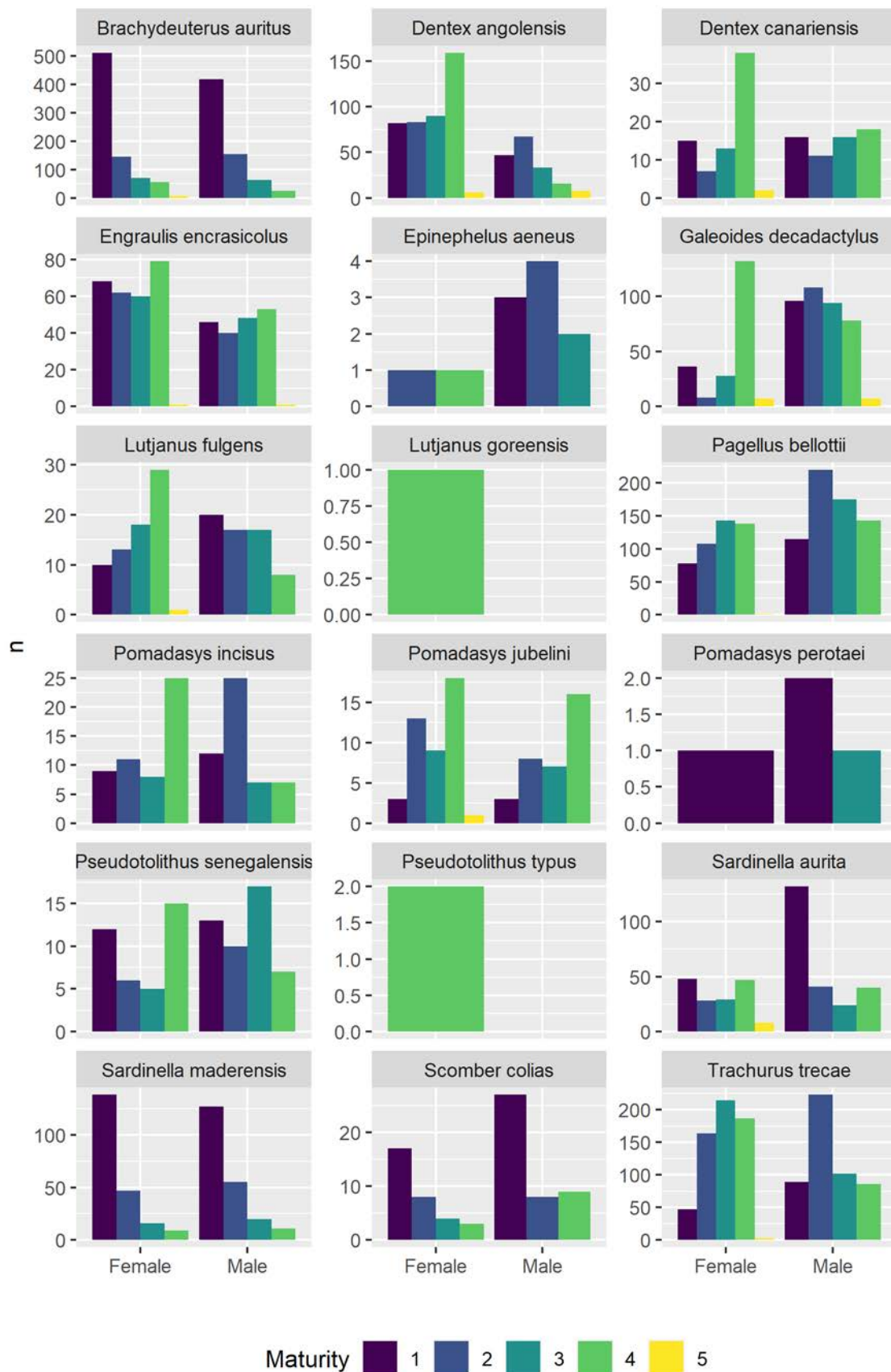
\*Outliers removed

The Portasal salinometer was being repaired during Leg 3.1. Therefore, CTD derived salinity values were not validated for this survey.

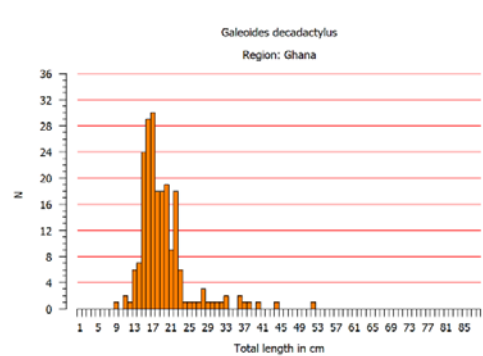
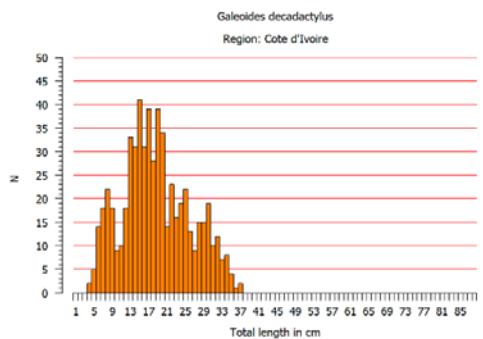
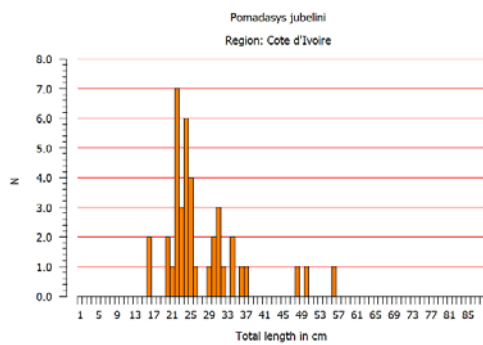
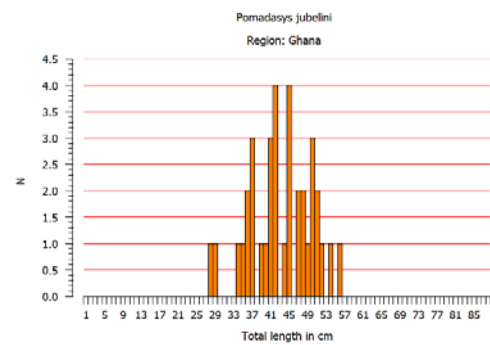
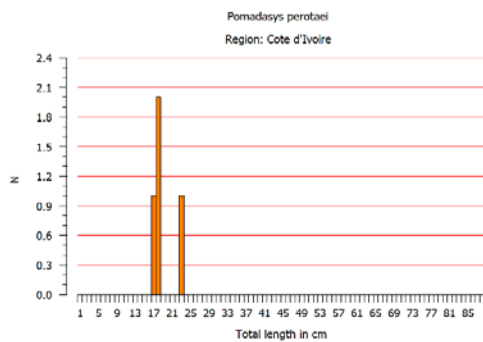
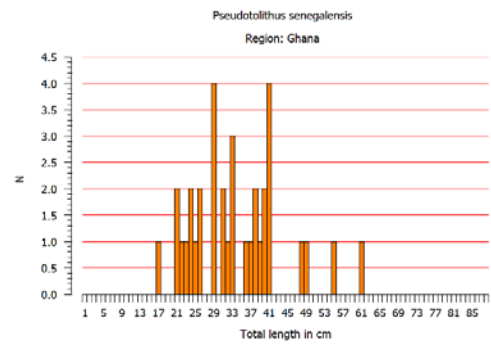
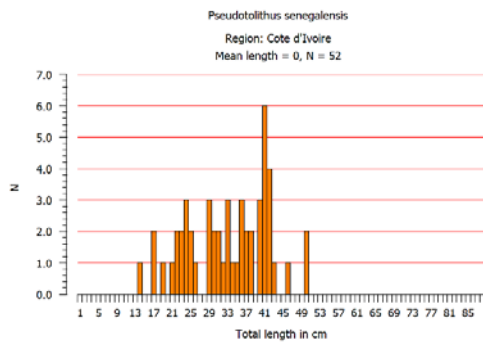
**ANNEX VI. ESTIMATED NUMBERS AND BIOMASS OF *ENGRAULIS ENCRASICOLUS* AND *SARDINELLA* SPP. BY LENGTH-GROUP AND COUNTRY**

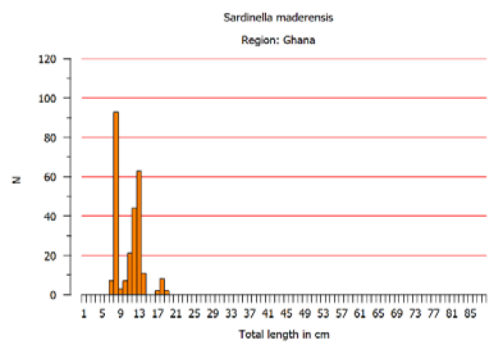
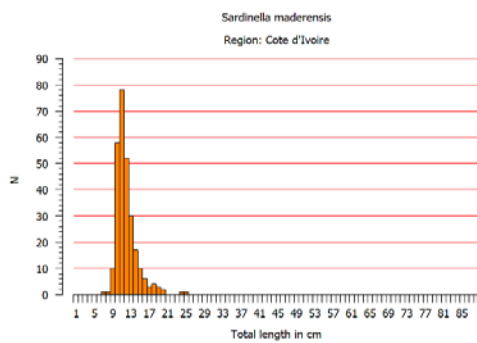
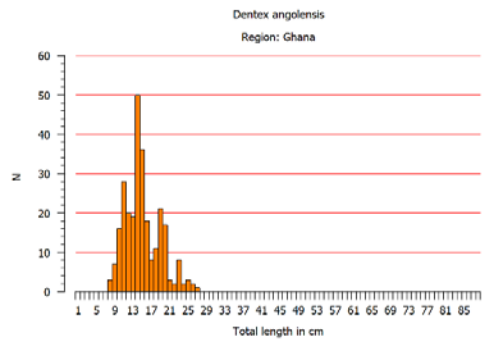
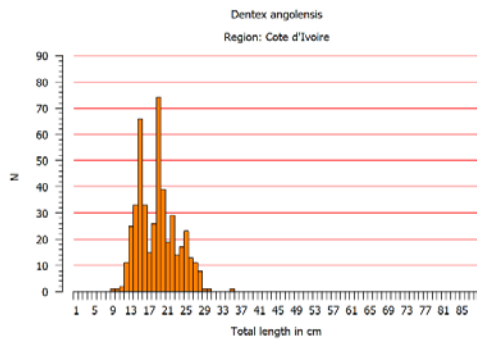
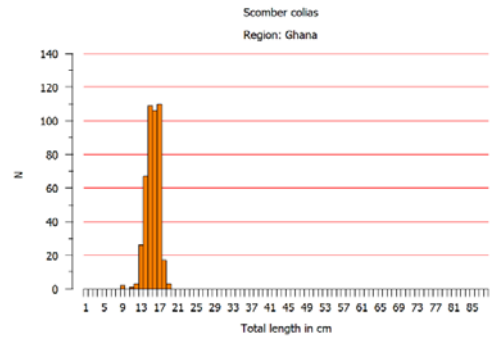
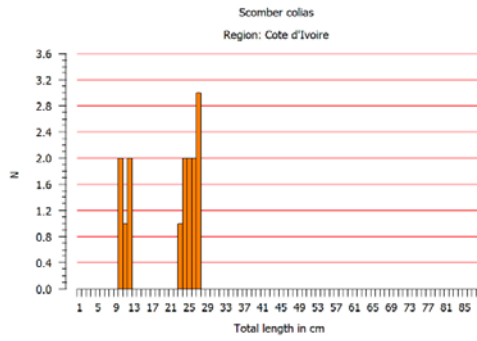
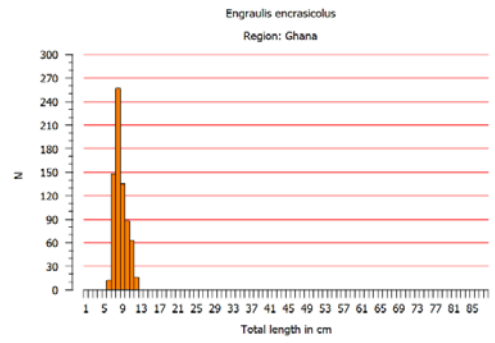
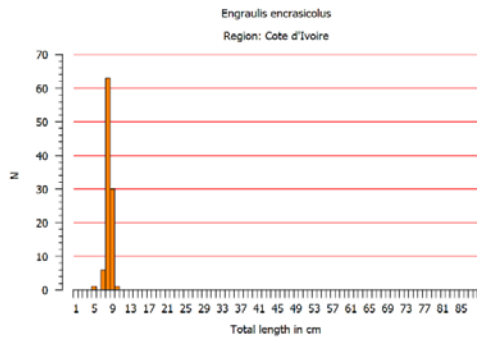
Length (cm)	Numbers in millions				Biomass in 1000 tonnes			
	Côte d'Ivoire		Ghana		Côte d'Ivoire		Ghana	
	<i>S. aurita</i>	<i>S. maderensis</i>	<i>S. aurita</i>	<i>S. maderensis</i>	<i>S. aurita</i>	<i>S. maderensis</i>	<i>S. aurita</i>	<i>S. maderensis</i>
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0.1	0.27	0	0	0	0	0	0
6	1	1.7	11.1	0	0	0	0	0
7	1.9	0.58	61.5	0	0	0	0.2	0
8	4.5	0.58	324.6	0	0	0	1.6	0
9	2	0.14	578.2	0	0	0	4.1	0
10	0.2	1.7	91.2	0	0	0	0.9	0
11	0	4.41	0	2.37	0	0.1	0	0
12	0.1	3.29	0	3.56	0	0.1	0	0.1
13	0.2	1.14	0.1	3.57	0	0	0	0.1
14	0.1	0	0.3	0.05	0	0	0	0
15	0.5	0.17	2	0.37	0	0	0.1	0
16	0.2	0.3	1.6	0.32	0	0	0.1	0
17	0.2	1.26	1.9	0.11	0	0.1	0.1	0
18	0.6	2.87	0.2	0	0	0.2	0	0
19	1.3	3.23	0.2	0	0.1	0.2	0	0
20	2.1	3.11	0	0	0.2	0.3	0	0
21	1.6	1.06	1.2	0.02	0.1	0.1	0.1	0
22	0.6	0.07	0	0	0.1	0	0	0
23	0.1	0.15	0	0	0	0	0	0
24	0.1	0.58	0	0	0	0.1	0	0
25	0.1	0.44	0	0	0	0.1	0	0
26	0.1	1.32	0	0	0	0.2	0	0
27	0.1	0.36	0	0	0	0.1	0	0
28	0	0.38	0	0	0	0.1	0	0
29	0	0.38	0	0	0	0.1	0	0
30	0.3	8.56	0	0	0	0.2	0	0
Total	17.9	38.04	1074.2	10.37	0.7	1.9	7.2	0.2

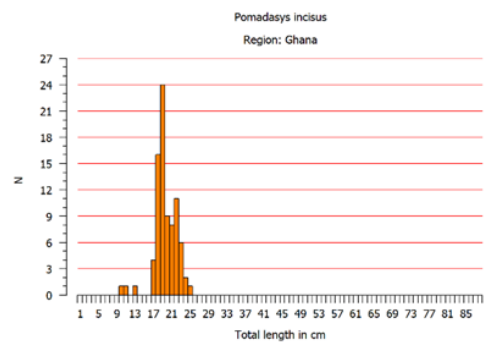
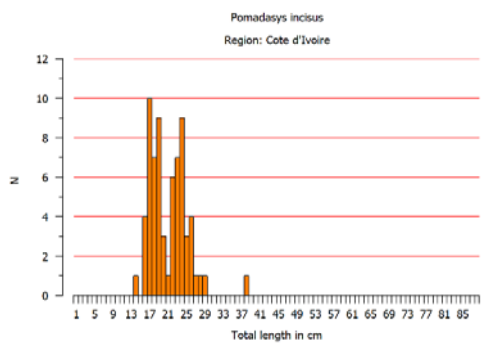
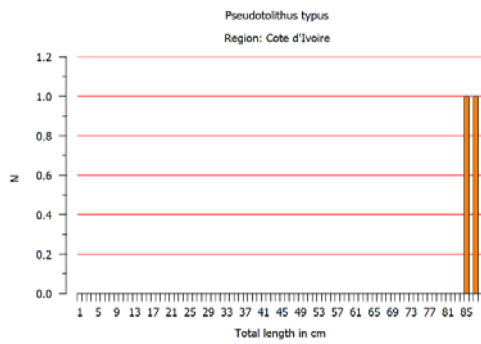
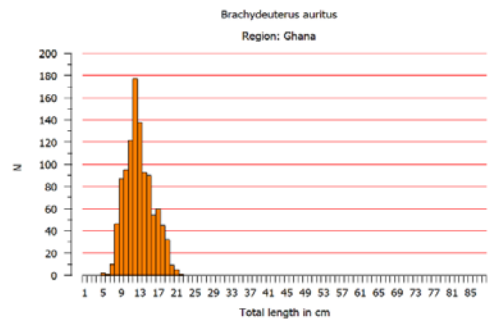
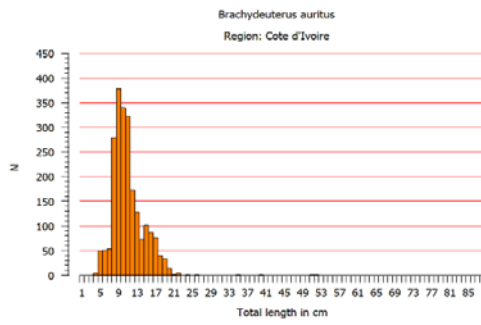
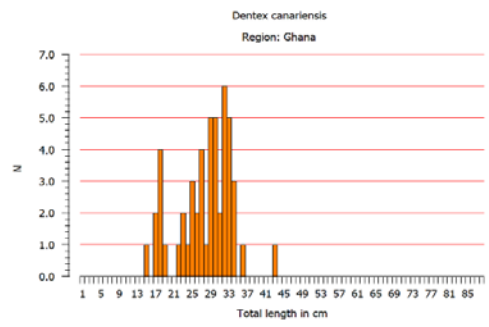
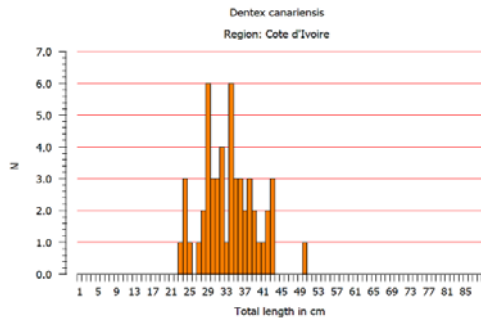
## ANNEX VII. SEX AND MATURITY INFORMATION FOR PRIORITY TAXA

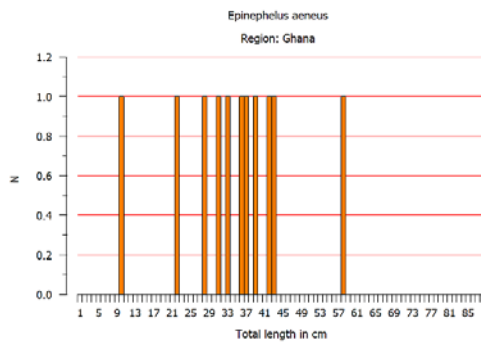
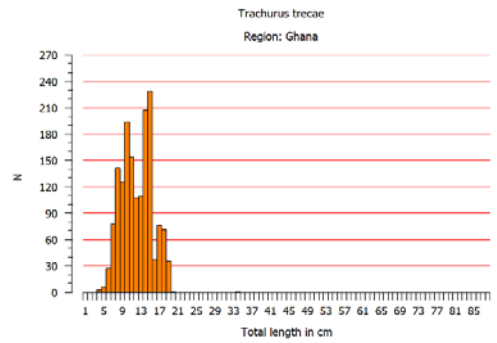
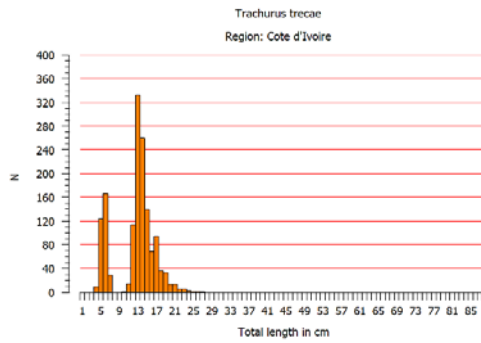
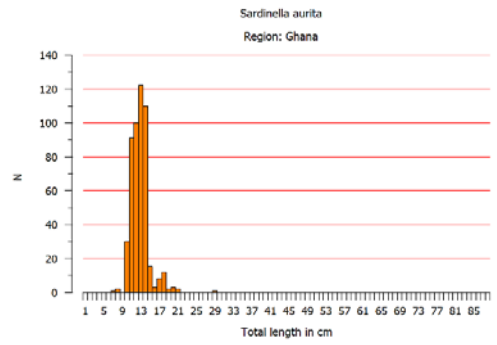
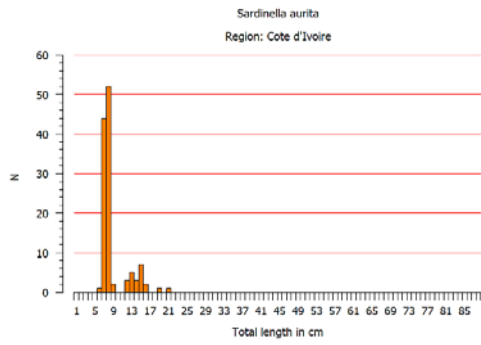


# ANNEX VIII. LENGTH FREQUENCY DISTRIBUTIONS FOR PRIORITY TAXA









## ANNEX IX. DEPTH STRATA INFORMATION

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		<b>0-30</b>	<b>31-50</b>	<b>51-100</b>
<b>GHANA</b>	Côte d'Ivoire-3°W	36	61	218
	3°-2°W	155	270	745
	2°-1°W	390	868	1088
	1°-0°E	416	691	549
	0°-1°E	358	150	151
	0°E-Togo	67	83	41
	<b>Total</b>	<b>1 422</b>	<b>2 123</b>	<b>2 792</b>
<hr/>				
<b>CÔTE D'IVOIRE</b>	Liberia-7°W	50	72	252
	7°-6°W	167	220	439
	6°-5°W	247	191	380
	5°-4°W	103	110	263
	4°W-Ghana	72	126	272
	<b>Total</b>	<b>639</b>	<b>719</b>	<b>1 606</b>



## ANNEX X. STANDARD PROCESS FOR HANDING OVER DATA TO THE PARTNERS

Survey no 2019408		after the survey	at the post survey meeting	upon request	not collected/stored	analyzed by partner country	analyzed through the Science Plan
<b>Data types</b>	<b>Data</b>						
Acoustic data	EK60 compatible		x				
Acoustic data	EK80			x			
Acoustic data	MS70				x		
Acoustic data	ME70				x		
Acoustic data	SU90				x		
Acoustic data	SH90				x		
Acoustic data	SBP300	-	-		x		
Acoustic data	EM302			x			
Acoustic data	EM710			x	-		
Physics	CTD probe	x					
Physics	CTD Underway				x		
Physics	ADCP 75kHz	-					
Physics	ADCP 150kHz	x					
Physics	LADCP				x		
Physics	Thermosalinograp	x					
Physics	Nutrients		x				
Physics	pH			x			
Physics	Total alkalinity			x			
Physics	PCO2			x			
Physics	Chlorophyll	x	x				
Biology	Trawl catch data	x	x				
Biology	Zooplankton		x				
Biology	Phytoplankton		x				
Pollution	Microplastics						x
Geology	Sediment (trawl)						x
Geology	Grab					x	
Observation	VAMS				x		
Observation	WBAT				x		
Observation	Deep vision				x		

## ANNEX XI. COLLECTED SAMPLES, PRESERVATION AND FOLLOW-UP

Gear/equipment	Analysis	Samples	Preservation	Port of offloading	Type of transportation	Institution address	Contact person Leg 3.1 (e-mail, phone no)
Niskin bottles on CTD Rosette		Nutrients	0.2 ml chloroform (keep cool)	Las Palmas		IMR	David Cervantes
Niskin bottles on CTD Rosette		Chlorophyll a	Frozen (-18 to -20 C, best -80)	On board		IMR	
Niskin bottles on CTD Rosette	Phytoplankton	Phytoplankton community composition	Lugol solution (keep cool)	Las Palmas		FSSD Ghana	Hawa Bint Yaquab
WP2 (180 µm) from max 200 m 1/2 Split	Zooplankton biomass estimation	Aluminium trays	Dried and then frozen	Las Palmas		IMR	Stamatina Isari
WP2 (180 µm) from max 200 m 1/2 Split	Zooplankton community identification	Bottles with ½ of bulk WP2 sample	4% formaldehyde	Las Palmas		FSSD Ghana	Hawa Bint Yaquab
Multinet N1-N3 (405 µm)	Ichthyoplankton community identification	Bottles with bulk sample	4% formaldehyde	Las Palmas		IMR	Stamatina Isari
Multinet N1-N3 (405 µm)	Species identification, Genetics	Scintillation vials with sorted larval fish from the bulk multinet sample	96% ethanol	Las Palmas		IMR	Stamatina Isari

Bongo V (405 µm)	Ichthyoplankton community identification	Bottles with bulk sample	4% formaldehyde	Las Palmas		IMR	Stamatina Isari
Bongo H (405 µm)	Ichthyoplankton community identification	Bottles with bulk sample	96% ethanol	Las Palmas		IMR	Stamatina Isari
Bongo H (405 µm)	Species identification, Genetics	Scintillation vials with sorted larval fish from the bulk bongo sample	96% ethanol	Las Palmas		IMR	Stamatina Isari
Manta trawl (335 µm): surface tow for 15 mins	Neuston community identification	Bottles with bulk sample	96% ethanol	Las Palmas		IMR	Stamatina Isari
	Species identification, Genetics	Scintillation vials with sorted larval fish and eggs from the bulk manta sample	96% ethanol	Las Palmas		IMR	Stamatina Isari
	Abundance and chemical composition of microplastics	Aluminium trays with sorted microplastics from the bulk manta sample	Photographed, dried and frozen	Las Palmas		IMR	Bjørn Einar Grøsvik
Trawl samples	Genetics	Jellyfish arm	96% Ethanol + frozen	Las Palmas	mail	UWC	Mark Gibbons
Trawl samples	Taxonomic identification	Jellyfish the rest	4% formaldehyde	Las Palmas	mail	UWC	Mark Gibbons
Trawl samples	Genetics (stock identity)	Fingclips of priority species (list of species)	96% Ethanol	Las Palmas	mail	IMR	Geir/Maria

Trawl samples	Food safety	Parasites	Frozen	Las Palmas		IMR	Marian Kjellevoid
Trawl samples	Food safety	Nutrients	Frozen	Las Palmas		IMR	Marian Kjellevoid
Trawl samples	Food safety	Microplastics	Frozen	Las Palmas		IMR	Marian Kjellevoid
Trawl samples	Food safety	Heavy metals	Frozen	Abidjan		Un. Felix Houphouet Boigny	Koffi Mathias
Trawl samples	Fecundity	Gonads	Gilson's fluid	Abidjan		FSSD Ghana	Eugenia Amador
Trawl samples	Maturity	Whole fish	Frozen	Abidjan		CRO Abidjan	Constance Diaha, Yaya Soro, Bedia Ake Theophile
Trawl sediment pipe samples	chemical composition /microplastics	Trawl cylinder sediment	Frozen	Dakar/Las Palmas		FSSD Ghana	Hawa Bint Yaqub
Sargassum samples	Genetics/Morphometrics	Plastic bags with piece of the seaweed	Frozen	Dakar/Las Palmas		FSSD Ghana	Hawa Bint Yaqub



